BARBER - PRESALE R 0138418

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138418 R2539406

NBAR

NBAR Critical Path Schedule

Firecontrol

First Design	June	1	89	2	mos.
Prototype (3)	July	1	89	1	mo.
Engineering Evaluation	Sept	1	89	2	mos.
Redesign	Oct.	1	89	1	mo.
Quotation & Economics	Jan.	1	90	3	mos.
Prototype (10)					
- Vendor Parts	July	1	90	6	mos.
Test & Redesign	Aug.	15	90	6	wks.
Build 30 Design Accept.	May	15	91	9	mos.
and Trial and Pilot	-				
T & P Testing	July	15	91	2	mos.
Redesign and Reprocess	Jan.	15	91	6	mos.
Produce to Warehouse	4 (2 91			
Introduce to Trade	Janua	ary	1992		

This is a list of the NBAR features, (that represent our design goals), in order of priority.

o Detachable Magazine Box

o Improved Firecontrol

- No Connector
 - Two Trigger Pull Springs (low spring rate)
 "Sealed Firecontrol"

. . . .

- Balanced Trigger
- Trigger and Sear Block
- Not Retrofittable to M/700

o Bolt Lock w/override

o Integral Scope Mounts

o New Extractor

o New "Custom Shop" Barrel Contour -Mountain Rifle Crown

o Improved Bedding System

o M/700 receiver, cosmetically altered

o New Wood Stock

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NBAR Critical Path Schedule

Firecontrol

First Design	Mar.	1	89	2	mos.
Prototype (3)	Apr.	1	89	1	mo.
Engineering Evaluation	June	1	89	2	mos.
Redesign	July	1	89	1	mo.
Quotation & Economics	Oct.	1	89	3	mos.
Prototype (10)					
- Vendor Parts	Apr.	1	90	6	mos.
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 - Trigger and Sear Block
 - Not Retrofittable to M/700
- o Bolt Lock w/override

o Integral Scope Mounts

- o New Extractor
- o New "Custom Shop" Barrel Contour -Mountain Rifle Crown
- o Improved Bedding System
- o M/700 receiver, cosmetically altered
- o New Wood Stock

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BARBER - PRESALE R 0138421

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

Revised 3/13/89 TCD . .

Product Redesign Criteria Clip Detachable Rifle (CDL)

Revised 3/29/89

Metalwork

- o Detachable Magazine Box
- o Two Position Safety
- o Bolt Lock w/override
- o New Extractor
- o BDL Barrel Contour
- o M/700 receiver
- o BDL Open Sights

Woodwork

- o 30 Gloss Finish
- o New Butt Pad
- o No White Line Spacers

RSM/TGB 3-29-89

SSS

1997 (P. 1997) - 1997 (P. 1997)

Product Redesign Criteria

New Bolt Action Rifle (NBAR)

Revised 3/14/89

Metalwork

...

o Detachable Magazine Box

o Improved Firecontrol

- No Connector

- Two Trigger Pull Springs (low spring rate)
- "Sealed Firecontrol"
- Balanced Trigger
- Trigger and Sear Block - Not Retrofittable to M/700
- o Bolt Lock w/override
- o Integral Scope Mounts
- o New Extractor
- o New "Custom Shop" Barrel Contour -Mountain Rifle Crown
- o M/700 receiver, cosmetically altered

Woodwork

o Improved Bedding System

o New Wood Stock

RSM/TGB 3-14-89 17-50X-012 - 535-

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This is a list of the NBAR features, (that represent our design goals), in order of priority.

o Detachable Magazine Box

o Improved Firecontrol

- No Connector

- Two Trigger Pull Springs (low spring rate) - "Sealed Firecontrol"

. -

- Balanced Trigger
- Trigger and Sear Block
- Not Retrofittable to M/700
- o Bolt Lock w/override
- o Integral Scope Mounts
- o New Extractor

o New "Custom Shop" Barrel Contour -Mountain Rifle Crown

- o Improved Bedding System
- o M/700 receiver, cosmetically altered

o New Wood Stock

3-14-89 RSM/TGB

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER **KINZER V. REMINGTON**

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== LIST == 12- 9-88 13:35:19 FUTIL 10.27

	FILENAME	DATE	TIME			
	RES.NBAR.TRIGGER-GUARD.TJF.&PD	10-27-88	14:03:59			
	RES.NBAR.BBL-NEW-CONTOUR.RAW.&PD	8-22-88	13:18:20			
	RES.NEAR.BEL-NEW-CONTOUR-MAG.RAW.&PD	8-22-88	13:35:57			
	RES.NBAR.BOLT-ASSY.TJP.&PD	10- 1-87	10:30:11			
	RES.NBAR.BOLT-HEAD.&PD	6-11-86	17:52:09			
	RES.NBAR.BOLT-LOCK.RAW.&PD	3-28-88	21:32:45			
	RES.NBAR.FIRCTRL-PLATE-LFT.%FD	2-25-87	20:09:57			
	RES.NBAR.FIRCTRL-PLATE-RT.&PD	1- 5-88	18:56:10			
	RES.NBAR.FIRING-PIN-ASSY-LA.&PD	3-14-86	7:10:34			
	RES.NBAR.FRONT-SPACER.&PD	2-25-87	16:35:03			
	RES.NBAR.GUARD-SCREW.&PD	7-16-86	9:37:22			
	RES.NBAR.REAR-GUARD-SCREW.&PD	7-22-86	15:02:13			
	RES.NBAR.REAR-SPACER.%PD	11-29-87	9:44:54			
	RES.NBAR.FIRING-PINHEAD.%PD	1-29-88	8:03:43			
	RES.NEAR.RECEIVER.&PD	11-29-87	9:53:59			
	RES.NBAR.SAFETY-ASSY.&PD	2-26-87	20:27:52			
	RES.NEAR.SAFETY-PIVOT-PIN.&PD	12-21-87	16:47:41			
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	RES NEAR OR -NEW-CONTOIR RAW &PD	8-27-88	13.18.20			
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	RES. NEAR. BOLT-ASSY, TJE. MPD	10- 1-87	10:30:11			
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	RES.NBAR.SAFETY-PIVOT-PIN.&PD	12-21-87	16:47:41			
	RES.NBAR.SEAR-SAFETY-CAM. &PD	1- 4-88	17:26:42			
	RES.NBAR.STOCK.&PD	3-10-87	16:10:49			
	RES.NBAR.STOCK-INSERT.&PD	10- 8-86	16:09:23			
	KES.NBAK.TRIGGER-ASSY.&PD	5- 6-88	22:04:45			
	RES.NEAR.IRIGGER-BLK-PLUNGER.&PD	2-25-87	16:08:33			
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CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138426

RES.NBAR.TRIGGER-GUARD.TJP.&PD	10-27-88	14:03:59
RES.NBAR.BBL-NEW-CONTOUR.RAW.&PD	8-22-89	13:18:20
RES.NEAR.BBL-NEW-CONTOUR-MAG.RAW.&PD	8-22-88	13:35:57
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RES.NBAR.TRIGGER-HOUSING-ASSY. &PD	11-29-87	10:10:07
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RE3.700. E33225.35. RECOVER-LA-RH. DSF. & PD

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Views 1, 2,4, 21, 3,5,6, 32, 51, 52

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BARBER - PRESALE R 0138426 R2539414

		RECORDS CONTROL SCHEDUL
	· · ·	RECORDS CATEGORY OR TITLE:
	G-88 DON'T SAY ITWRITE IT	R+D Periodic Reports
		COPY "O" (OFFICIAL)
	From	TOTAL RETENTION:
	 Research Quarterly Report (Due the last Frid 	GS-11050 Rev. 8/76
	- March - June - September (30th) - December (30th)	
×.	 Research Highlight Report (Due the last Friday 	of month in Bridgeport)
	- January - July - February - August - April - October (28th) - May - November (25th)	
	Note: The New Products Report should be in Jim Martin's Of	fice the preceding
	Friday.	
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BARBER - PRESALE R 0138427

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INTER-DEPARTMENTAL CORRESPONDENCE

Reminster MAD

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DETERS

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY"_____ December 17, 1984

TO: J.W. Bower

PROM: R.S. Murphy 254

Quarterly Report - December, 1984

HIGHLIGHTS

- Due to delays in receiving prototype parts from the Model Shop, NBAR design evaluation will not begin until early January.
- The Custom Shop is building .350 Rem. Mag. rifles for test; evaluation and transmittal will follow.
- Research support to Process Engineering regarding the Mountain Rifle is continuing.

Quarterly Report - December, 1984

New Bolt Action Rifle

A new bolt action rifle is being developed as a potential replacement for the Model 700, possibly in 1988. Technical improvements over the Model 700 include enhanced safety, a detachable magazine, a claw-type extractor, an independent bolt lock, and integral scope mounts.

The design evaluation scheduled for December has been delayed until January due to difficulties in scheduling prototype parts through the Model Shop. Components yet to be delivered include long action bolts, short action stocks, trigger guards, magazine boxes, followers, and triggers. The delay of the bolts is critical to the start of testing since after receipt from the Model Shop they must be processed through production before final heading of the barreled actions can be started. Of the remaining components, all but the magazine assemblies should be completed before final heading of the barrels. The trigger guard and follower are being processed through the N/C Shop and I cannot estimate a realistic completion date.

Five rifles have been readied for Focus Panel reviews of several cosmetic features including receiver, bolt handle, bolt plug, and stock styling. Marketing is scheduling the reviews that may start as early as January, 85.

Model 700 Chassic - .350 Rem. Mag.

Remington is continuing the limited run, special caliber offering in the Classic line by reintroducing the .350 Rem. Mag. in 1985.

Research involvement is limited to strength, accuracy, and feeding testing as well as the transmittal of model drawings. The Custom Shop is assembling the rifles and a test outline has been written in anticipation of their receipt.

Mountain Rifle

Scheduled for a 1986 introduction, the Mountain Rifle will address the higher end of the bolt action rifle line and replace the Model 700 Classic.

N/C Shop fabrication of the stock former is continuing at an unacceptable pace and will probably interfere with the trial and pilot schedule.

RSM:sps

ILY"____

November 13, 1984

ONTHLY REPORT

R.S. Murphy/F.E. Martin

arding prototype components is and I expect to have test rifles problem areas have been identified tock. Preliminary testing can if it is not complete. Concernbe started in the Model Shop, butside contractor.

.ce for testing extractors is ; be written.

safety and fire control is r 13, at 1:00 p.m.

e reviewed with J.R. Snedeker er 16.

ined in anticipation of the

F.H. Smith

luction is continuing. The completion date for the stock will be transmitted by the last of the loose ends. inletting have come up and ___F.H._Smith

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nbled and will be processed ing. Strength, accuracy, buld be complete approxiies barrels. The test lovember 23.

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REMINGTON ARMS COMPANY. INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington TIMD PETERS

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY"_____

October 22, 1984

TO: J.W. Bower

FROM: 'R.S. Murphy

RE: October Monthly Report

700 Mountain Rifle

Research assistance to Production is continuing and a transmittal involving changes to the stock, grip cap, fore-end tip and receiver plug drawings is complete. N/C work is underway on the stock former. (The importance of this work must be stressed with Bob Sanzo.)

Research has yet to develop a final grip checkering pattern. This will be scheduled.

NBAR F.E. Martin - R.S. Murphy

A total part drawing package is five (5) drawings short of being complete and these will be done by Wednesday, October 24. All components will be in the Model Shop also by Wednesday. Prototype samples for test are expected by December 1.

Investigation of tolerance stack-ups as well as outlining future testing will begin this week.

RSM: sps

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON 1111 A

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Reminster MPRD "CONFINE YOUR LETTER TO ONE SUBJECT ONLY"_____

September 11, 1984

TO: J.W. Bower

FROM: R.S. Murphy () ()

RE: Quarterly Report - September, 1984

HIGHLIGHTS

- o The 700 Mountain Rifle economics have been approved and Process Engineering work is underway.
- Transmittal of the Sportsman 78 short action calibers is complete.
- The Ducks Unlimited Model 700 Dinner Rifle transmittal is complete.
- New Bolt Action drawing, C.V., and prototype fabrication work is continuing.

Model 700 Mountain Rifle

Scheduled for a 1986 introduction, the Mountain Rifle will address the higher end of the bolt action rifle line and replace the Model 700 Classic. Project economics have finally been approved and a Process Engineering master schedule has been developed.

The N/C Shop fabrication of the stock former is continuing in an effort to meet the Process Engineering schedule.

Sportsman 78 - R.S. Murphy

With the addition of the 308 and 243 short action calibers planned for 1985, the Sportsman 78 will offer a more complete line to the cost conscious shooter. Since these calibers already exist in the present 700 line, our total Research commitment will be limited to the transmittal and a limited trial and pilot evaluation. The drawings and

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

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<u>Quarterly Report - September, 1984</u>

Sportsman 78 - cont'd.

parts list transmittal is complete and the remaining evaluation will be scheduled.

- 2 -

Model 700 Ducks Unlimited - R.S. Murphy

For the first time in 1985, Remington will produce a special, limited production Ducks Unlimited Dinner Rifle. Since the variation from a standard Model 700 entails only cosmetic changes, the total Research commitment will be limited to the transmittal and the trial and pilot evaluation. The transmittal is complete and the evaluation will be scheduled.

New Bolt Action Rifle - R.S. Murphy, F.E. Martin

A new bolt action rifle is being developed as a potential replacement for the Model 700, possibly in 1988. A "preferred" design has been selected by Marketing and Research, and work on the drawing package is continuing. A limited number of engineering test prototypes are also being built for evaluation in December. Computervision modeling of individual components is being done on a "safety critical" priority basis.

RSM: sps

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138433 R2539421

REMINGTON	ARMS	COMPANY.	INC.
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INTER-DEPARTMENTAL CORRESPONDENCE

Remington.

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"CONFINE YOUR LETTER TO ONE SUBJECT ONLY".

PETERS

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August 14, 1984

To: J. W. Bower

From: <u>R. S. Murphy</u>R3M

Subject: Monthly Report - August

New Product Development - Rifles

Model 700 Mountain Rifle

(F. E. Martin)

(R. S. Murphy)

The N/C Shop has received the tool drawing from PE&C and work on the stock former is being scheduled.

New Bolt Action Rifle

(F. E. Martin, K. L. Calkins, R. A. Jones)

886

Design efforts on the NBA are continuing in several areas of product development.

An alternate side tang bolt lock design is nearing completion and only requires detailed drawings. Feedback regarding the legal implications of this design is expected from Marketing.

Three-dimensional modeling of critical components on the C.V. System has been started. The complete rifle is expected to be on the system before transmittal.

Final Research cost estimating of the preferred design is continuing and should be complete the week of August 27.

Several components are in the Model Shop for the fabrication of engineering test prototypes.

Marketing has forwarded initial caliber volume and pricing estimates, however, magazine box and bolt handle styling questions still remain.

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CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER

KINZER V. REMINGTON

BARBER - PRESALE R 0138435 R2539423

MONTHLY

REPORTS

985. -

11-18-87 STATUS NBAR ACCURACY TESTING UNDERWAY ON 22 1/78 30-06 its exception of control guns, these will be sent -11 mail Vendor 87 50 -1-87 ______to Waitin 041: 0 <u>1-1-88</u> · 10 - BARREL Action Assemale Polist & Color READY FOR Assy Fire Controcs Less Safety Harry & Bout LOCK READY · SHACTY Assy I Bour Cocks Not Completed ALT. MANU. Metron - STAmping VenDon -Quoting Expect Reply 11-20-87

July 1, 1993

TO:	Кеп	Soucy
FROM:	Jim	Ronkainer

SUBJECT: June Monthly Report

M/700 DM

Design acceptance (DA) testing of the M/700 DM started and stopped on June 7 due to feeding difficulties with the magazine. Based on the early test results, the magazine box was moved higher inside the receiver to increase the "interference" of the bolt with the head of the round feeding from the magazine. The increased "interference" cut the malfunction rate from approximately 60% to 0% on the guns that were tested. The design for the boxes and receiver have been modified to reflect the higher position of the shell inside the receiver. The early DA testing also revealed that loading a full magazine of magnum cartridges into a rifle with a closed action was extremely difficult. Modification of the magazine follower relieved this difficulty.

Tooling and components for Trial and Pilot (T&P) are underway. The diecasting mold for the long action trigger guards has been successfully run at the vendor. Trigger guards will be available for T&P and catalog samples. The first investment cast samples of the latches and the long action followers have been received and inspected. Investment cast parts are on schedule for T&P. Trial molding runs from the MIM tooling have been run and downstream process development has begun. The first 100 long action BDL stocks from S&K have been run and are now in Ilion. Magnum BDL stocks will be available in mid to late July. Modifications to the long action magazine spring tooling have delayed delivery of parts from mid-June until mid-July. Samples of magazine boxes made to the new design will be available in mid-August for initial T&P testing. Final production tooling for the boxes will be available in mid-September. Changes to the receiver will be done on the Fadal machining center until new cams are available for the Tri-ordinate machines.

Design acceptance testing will begin on a small scale during plant shutdown and resume in earnest after shutdown. As many pre-production and production parts as possible will be included in the DA testing.

M/700 Synthetic Stock

The new synthetic long stock mold was run off from 6/22-24. The first samples look very good and are currently in test in the R&D Test Lab. A softer material for the recoil pad was also run at the same time as the stock mold with promising results.

M/700 Classic for 1994 - 6.5 x 55 Swedish

The drawing package and parts list for the 6.5 x 55 Swedish were transmitted in early June. The chamber for the cartridge meets the new SAAMI specifications for this cartridge (translation of the CIP drawing to English units).

June 4, 1993

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TO: Ken Soucy FROM: Jim Ronkainen

SUBJECT: May Monthly Report

M/700 DM

The first long action trigger guards were received from the R&D NC shop this week. These guards are powder coated and will begin design acceptance testing today. The final drawings for the machined trigger guards are being transmitted today. Tooling for the trigger guard castings is on schedule for a July Trial & Pilot (T&P). Fixturing for the secondary machining is a critical path item for July T&P. Alternate methods for the secondary machining are being investigated to keep the T&P on schedule.

The long action boxes for the design acceptance test have passed inspection. The short action sample is in process at the vendor and is expected in one week. The design of the latch retaining tab has been resolved and was transmitted to the vendor on May 27. Work on tooling for the boxes will commence immediately. Product Team decided all trigger guards and magazine boxes would be powder coated to guarantee a good color match between the magazine box and the trigger guard. It should be noted that powder coating the floorplate will make the future addition of artwork difficult due to the tendency of the powdercoat to fill and cover any surface imperfections, including intentional marking or engraving.

The first stocks inlet for the M/700 DM at S&K were received last week. A cursory check of the stocks here showed a mismatch in the depths of the latch relief cuts, but Maurice Monteau felt this would be an easy item to correct. All other inletting appeared to be good. Maurice will visit S&K next week and run corrected samples for finishing if time permits.

Sample waxes and parts for the magazine latches have been received from the investment casting vendor. Three separate samples of waxes for the long action magazine follower have been received from the vendor. The first two samples contained errors that were corrected in the third and final version of the wax. Approximately 50 investment cast samples of each component are expected here early next week for our evaluation. Design and build of tooling for the secondary machining of the investment cast parts is underway. I visited the mold vendor for the MIM latches to approve the checkering electrodes for the die. The molds for the latches and the short magazine followers are expected the second week in June. Latches for design acceptance testing are being made in the tool room.

Design acceptance testing starts today.

M/700 SS for 1993

Trial and pilot testing was successfully completed.

M/700 Synthetic Stock

The drawing package for the Remington made synthetic stock was transmitted in May. Mold run off is still scheduled for 6/14.

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BARBER - PRESALE R 0138439

TO: Ken Soucy FROM: Jim Ronkainen

SUBJECT: June Monthly Report

M/700 DM

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M/700 Classic for 1994 - 6.5 x 55 Swedish Mauser Work on this project has been delayed by my work on the M/700 DM project. Transmittal of the drawing package will take place next week.

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138440 R2539428

June 4, 1993

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LALLE W. W. WARLES

TO: Ken Soucy FROM: Jim Ronkainen

SUBJECT: May Monthly Report

M/700 DM

The first long action trigger guards were received from the R&D NC shop this week. These guards are powder coated and will begin design acceptance testing today. The final drawings for the machined trigger guards are being transmitted today. Tooling for the trigger guard castings is on schedule for a July Trial & Pilot (T&P). Fixturing for the secondary machining is a critical path item for July T&P. Alternate methods for the secondary machining are being investigated to keep the T&P on schedule.

The long action boxes for the design acceptance test have passed inspection. The short action sample is in process at the vendor and is expected in one week. The design of the latch retaining tab has been resolved and was transmitted to the vendor on May 27. Work on tooling for the boxes will commence immediately. Product Team decided all trigger guards and magazine boxes would be powder coated to guarantee a good color match between the magazine box and the trigger guard. It should be noted that powder coating the floorplate will make the future addition of artwork difficult due to the tendency of the powdercoat to fill and cover any surface imperfections, including intentional marking or engraving.

The first stocks inlet for the M/700 DM at S&K were received last week. A cursory check of the stocks here showed a mismatch in the depths of the latch relief cuts, but Maurice Monteau felt this would be an easy item to correct. All other inletting appeared to be good. Maurice will visit S&K next week and run corrected samples for finishing if time permits.

Sample waxes and parts for the magazine latches have been received from the investment casting vendor. Three separate samples of waxes for the long action magazine follower have been received from the vendor. The first two samples contained errors that were corrected in the third and final version of the wax. Approximately 50 investment cast samples of each component are expected here early next week for our evaluation. Design and build of tooling for the secondary machining of the investment cast parts is underway. I visited the mold vendor for the MIM latches to approve the checkering electrodes for the die. The molds for the latches and the short magazine followers are expected the second week in June. Latches for design acceptance testing are being made in the tool room.

Design acceptance testing starts today.

$\frac{M/700}{Trial}$ so for 1993. Trial and pilot testing was successfully completed.

M/700 Synthetic Stock

The drawing package for the Remington made synthetic stock was transmitted in May. Mold run off is still scheduled for 6/14.

M/700 Classic for 1994 - 6.5 x 55 Swedish Mauser Work on this project has been delayed by my work on the M/700 DM project. Transmittal of the drawing package will take place next week.

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138442 R2539430



BARBER - PRESALE R 0138443 R2539431



BARBER - PRESALE R 0138444 R2539432



Patented July 11, 1950

2,514,981

STATES PATENT UNITED OFFICE

2,514,981

FIRING MECHANISM FOR FIREARMS

Merle H. Walker and Philip R. Haskell, Ilion, N. Y., assignors to Remington Arms Company, Inc., Bridgeport, Conn., a corporation of Delaware

Application February 12, 1948, Serial No. 7,778

5 Claims. (Cl. 42-,98) 70

1 This invention relates to firearms and has particular reference to means for controlling the firing thereof.

Many well-known firearms employ a breech closing boit which has a reciprocating movement in opening and closing the breech and which may be locked in the closed position by any suitable means. Most of these firearms are provided with spring-urged bolt mounted strikers or firing pins mounted in the receiver to engage the firing pin or an extension thereof to restrain it against forward movement and to insure trisser controlled release when such release is desired. It is to this type of firearm that our invention is particularly 15 applicable.

A suitable fire control for a firearm of this type provides readily operable means for locking the firing pin positively in a "Safe" position as well as a trigger controlled sear to permit the instant 20 release of the firing pin when it is desired to fire. The value of any safety is proportional to the positiveness of its action. To this end we have found it to be essential that the safety means be so arranged that an inadvertent operation of the trigger while the safety is in "Safe position will not condition the arm to fire upon release of the safety. The value of any type of sear mechanism is proportional to the degree in which it provides for facile, clean, release free 30 from the disturbing effects of drag, creep, slap.

It is an object of our invention to provide fire control having a safety which operates by positively moving the firing pin rearwardly out 35 of contact with the sear and there releasably retaining it. In this way, should the trigger be operated while the safety is engaged, the trigger and sear springs will immediately reposition the mechanism to catch the firing pin upon release 40 of the safety.

It is a further object of this invention to provide a sear and control therefor which operate on barely perceptible movement of the trigger, yet releases the firing pin instantly and completely

It is contemplated that these objects may be best attained by mounting on the receiver a housing containing two similarly shaped members engageable with the firing pin in such a way that the firing pin energy urges the mem- 50 bers to move out of opposition thereto. One of these members may be conveniently identified as a safety cam and the other as a sear. A safety piece arranged to move into contact with the safety cam and a trigger assembly arranged to 55 releasably oppose disengaging movement of the sear, provide for controlling the movement of these members, and through them the firing pin is controlled.

other objects and advantages thereof will become more clearly apparent from consideration of the specification referring to the accompanying drawings in which:

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Figure 1 is a vertical, longitudinal sectional view of a portion of the assembled rifle action. Figure 2 is a rear elevational view of the receiver and trigger housing assembly.

Figure 3 is a vertical, transverse sectional view and depend upon means relatively fixedly 10 on the line 3-3 of Fig. 1, the stock and trigger guard having been removed to correspond with Fig. 2.

Figure 4 is a partial left side elevational view of the receiver and trigger housing assembly.

Fig. 5 is a right side elevational view of the fire control assembly, the right-hand side plate and elements supported directly thereon having been removed for clarity in illustrating the interior construction.

Fig. 6 is a vertical sectional view taken on the line 6-6 of Fig. 5.

Referring to the drawings by characters of reference, it may be seen that the portion of a rifle action which is illustrated comprises a receiver I which serves as a housing for a conventional type of upturn and pull back bolt 3 and as a mounting for a trigger housing 4. In the usual fashion the rear end of the bolt is closed with a bolt plug 5 which serves as an abutment for the main spring 6 and as a guide for the firing/pin 7. Secured on the rear end of the firing pin by a cross pin 8 is a firing pin head or eecking plece 9. The cocking piece is formed with a rib 10 which is slidably received in a groove 11 in the receiver and with an angularly disposed sear engaging face 12.

A longitudinally extending mortise 13 is milled through the bottom wall of the receiver to accommodate the trigger housing 4 which is secured therein by cross pins 14 and 15 mounted in the receiver and passing through the trigger housing assembly to serve as pivots and stops for elements therein

Between the side plates of the trigger housing which may be conveniently blanked and formed from a single piece of sheet metal, the front cross pin 14 pivotally supports the sear 16 and the safety cam IT. Each of these members occupies substantially half of the width between the side plates and in their top contour they are substantially identical. They are provided with similar striker engaging faces 18 and 19, the angular relationship between these striker engaging surfaces and the sear engaging face 12 being such that there is a tendency for sear and safety cam to swing counter-clockwise about the pivot pin 14 under the urging of the main spring 6 which acts through the firing pin 1. Such an angular relationship between the engaging faces and the











CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER **KINZER V. REMINGTON**

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monly known as a "negative angle" as distinsuished from a "positive angle" where the force domponents act to retain the two surfaces in engagement. This tendency is slightly resisted by the sear spring 20 which engages both sear 5 and safety cam with sufficient pressure to urge them to turn clockwise when they are free from the bring pin load until they are stopped by engagement with pin 15. Positive means to be next described are provided for absolutely preventing movement of scar and safety cam under main spring urging except when such movement is desirable.

A safety 21 is pivotally mounted on a pivot pin 22 which has an enlarged head 23 on the 15 left outside wan or the trigger housing and passes therethrough to support the inner arm 24 of the safety between the side plates and the outer arm 25 outside the right hand wall. A leaf spring 26 is also received on the safety 20 pivot pin and the assembly is held together by a wishbone key 27 engaged with an annular groove 28 in the pin. The rear end of the leaf spring is provided with inturned legs 29 which straddle the outer arm 25 and constrain the spring to turn 25 with the safety. The forward or free end of the leaf spring overlaps a hole 30 in the bolt lock arm 32 of the safety. Loosely seated in the hole 30 is a ball detent 31 which is pressed into alternative engagement with detent holes 33 or 30 34 formed in the side wall of the trigger housing to releasably retain the safety in the desired position. It will be seen that the bolt lock arm 32 is in position to pass upwardly through the bottom wall of the receiver into engagement with 35 a notch 35 in the bolt and lock same against rotation when the safety has been turned to its counterclockwise limit of rotation or "Safe" position. In the clockwise or "Firing" position, arm 32 does not extend through the receiver wall and the bolt may be readily turned to unlock the action.

Inner arm 24 of the safety is provided with/an eccentric 36 which is disposed beneath the heel 31 of the safety cam. With the safety in "Firing" position, the eccentric does not engage the safety cam and release of the cocking piece by the sear will permit the safety to be cammed out of the way. However, when the safety has been rotated into "Safe" position the eccentric 50 has engaged the heel of the safety cam and lifted it slightly. Since the safety cam engages the cocking piece on an angle, the effect of this upward movement will be to cam the cocking piece slightly to the rear. This rearward move- 55 ment insures that the sear will be returned by the sear spring to position for full engagement with the cocking piece if the trigger should be inadvertently operated while the safety is effective.

As has been previously noted, the sear 16 is of the so-called "negative angle" type and under pressure of the main spring tends to rotate itself out of engagement with the cocking piece. The sear is supported against this disengaging do force by engagement of the step 38 with the connector 39. Connector 39 is bent to substantially a right angle and lies against the front face and over the top of the trigger 40 which is pivotally mounted on a pin 41 passing through 70 the side plates of the trigger housing 4. Trigger spring 42 seats against an adjustable screw 43 and bears on the forward face of the connector resiliently urging the connector into engagement with the trigger and through the connector. 75

resiliently urging the upper end of the trigger rearwardly. Movement of the trigger is limited in extent by an adjustable rear stop screw 44 which obviously limits the amount of engagement which the connector has with the sear step 38. Ordinarily, this latter adjustment will be made to a minimum safe value and the screw staked in place at the factory. Since the forces upon either screws 43 or 44 are not great, they may conveniently be of slightly greater diameter than the distance between the inside faces of the trigger housing 4 and have threaded engagement with an incomplete thread cut in those inside faces. Forward stop screw 45 serves as a convenient support for the sear spring 20 and passes freely through a hole 45 in the connector to oppose the trigger proper. To facilitate the support of the spring and to provide a rigid mounting, this screw may conveniently be mounted in threaded holes in brackets 45a and 45b turned inwardly from the side walls of the trigger housing 4. This stop screw provides an adjustment to positively stop trigger movement just as the sear is released and makes possible the complete elimination of undesirable trigger slap or overtravel. This complete elimination of trigger slap could not, however, be accomplished without endangering the crispness of the letoff if it were not for the flexible mounting of the connector, for it is not practicably possible to produce and maintain absolutely sharp square corners on the engaging surfaces of a sear and conventional trigger. Invariably after normal wear these corners will be rounded on a small radius which will permit the movement of the sear to start before the trigger has fully disengaged therefrom. If the sear is to completely release the striker a conventional trigger must have an overtravel or slap and the release will not be clean and crisp. If we examine the functioning of the unit, we will observe that the trigger and connector move as a unit until the instant the connector starts to clear the edge of the sear step. At this point the trigger stops but the connector is restrained only by the relatively light trigger spring 42 and, as the sear is campied down, the radii existing on the points of the connector and sear cause the connector be cammed forwardly and completely clear the sear step. This allows a clean crisp let-off closely approaching the target shooter's ideal without requiring any additional trigger movement after release is first instigated. These advantages of freedom from creep or slap with the short light trigger pull, crisp let-off, and short lock time characteristic of negative angle sears, have been achieved in a construction which is absolutely safe in the hands of the hunter or target shooter and rugged enough to remain so in spite of the abuse and neglect which are often heaped

upon sporting arms It will be noted that clearance is provided in the lower face of the safety cam so that it cannot engage the connector and that the heel of the sear does not extend to a point where it can engage the safety eccentric. Thus, the operation of safety and sear is entirely independent in spite of their common mounting, common spring, and similar engagement with the cocking piece.

the side plates of the trigger housing 4. Trigger spring 42 seats against an adjustable screw 43 and bears on the forward face of the connector resiliently urging the connector into engagement with the trigger and through the connector, 75 the left end of the trigger pivot pin 41. A finger













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piece #57 extends into the trigger guard in position/tq be engaged by the finger for generally vertical movement and a lateral extension 49 at the upper end engages a notch 50 in the tail of the bolt stop 51. Preferably the slots 47a and 410/are disposed at an angle to each other so that the release has a combined translational and swinging movement, causing the extension 49 to follow closely the arcuate path of the notch 50 Support for the bolt stop is provided by 10 the bolt stop pin 15 which, as previously noted. assists in retaining the trigger housing in assembled relation to the receiver. The bolt stop is resiliently urged to swing about the pin 15 in a clockwise-direction, as viewed in Fig. 4, by a 15spring 52 seated in a blind hole in the receiver. Extending into the receiver under spring urging and withdrawable by the action of the shooter's finger on the fingerpiece 48 is the bolt stop shoulder 53 This shoulder normally extends a 20 substantial distance into the usual type of guide track 54 for the left hand bolt locking lug and places a definite rearward limit upon movement of the bolt. Since the bolt stop release 41 is protected by the trigger guard from accidental con- 25 ing a lug on said sear: a trigger pivotally mounttact with brush, a saddle scabbard or any other object which might dislodge an externally mounted bolt stop, it will be a practical impossibility to inadvertently pull the bolt free of the receiver.

Although a single specific embodiment has been illustrated and described in detail, it should be understood that the invention is not to be considered as limited to the exact embodiment disclosed. It is intended that all modifications and 35equivalents falling within the terms of the appended claims shall be considered as a part of the invention.

We claim:

1. Fire control means for a firearm having a spring urged striker comprising means defining a negative angle sear engaging face on said striker; a pivotally mounted sear having formed thereon a negative angle face arranged for en-45 gagement with the face of said striker; trigger means to releasably support said sear against disengagement from said striker as a result of striker spring force acting through said negative angle faces; sear spring means tending to restore said sear to striker engaging position; a pivotally 50 mounted safety cam constructed and arranged to have negative angle engagement with said striker substantially similar to that of said sear: and manually actuable safety operating means 55 comprising an eccentric member manually rotatable about a fixed axis between a "Firing" position and a circumferentially displaced "Safe" position, said fixed axis being so disposed relative to said safety cam that said eccentric will not engage the safety cam in "Firing" position and in "Safe" position will have engaged said safety cam and shifted same into said further engagement with the striker.

2. Fire control means for a firearm having a receiver and a main spring-urged striker therein comprising an abutment on said striker having a sear engaging surface; a sear pivotally mounted in said receiver and engageable with said abutment surface, said sear being so arranged relative to said abutment that a line projected between the point of contact with said surface and the point of pivotal mounting of the sear makes an angle of greater than 90 degrees with said surface and a component of main spring force 75

acts to disengage the sear from said abutment; a lug on said sear; a trigger; means to pivotally support said trigger with a portion thereof beneath said lug; a connector overlying the portion of said trigger beneath said lug and carried thereby, said connector having an aperture therethrough and providing a surface releasably engageable with said lug; a trigger spring engaged with said connector arranged to act through said connector in opposing movement of said trigger; and trigger stop means passing through said aperture in position to limit movement of the trigger without retarding movement of said connector, said trigger and connector being so constructed and arranged that movement of the trigger into contact with said stop means will substantially complete the disengagement of said connector from said lug and further movement of the connector relative to the trigger will allow the sear to move without material impairment by said connector.

3. Fire control means for a firearm having a trigger housing and a sear which is acted upon by a force tending to release the sear comprised in said housing having a surface movable into and out of a position opposed to said lug; a connector carried by the trigger and movable relative thereto, a portion of said connector overlying said surface and arranged to be engaged between said surface and said lug, said connector being arranged on said trigger to be moved thereby in the direction of disengagement from said lug and being also arranged to be capable of movement relative to said trigger in the direction of disengagement from said lug; spring means opposing movement of said connector relative to the trigger; and positive stop means on-said housing arranged to block further movement of the trigger after the trigger has been moved to a position in which disengagement of said connector from said lug is substantially complete 4

Fire control means as described in claim 3, said pivotally mounted trigger comprising an elongated member of which an end face forms said Jug opposing surface; and said connector comprising an L-shaped member, one leg of which overlies said end face to be engaged with said lug while the other leg of said L-shaped member lies against said elongated member; said spring means being engaged between said other leg and said-housing and tending to yieldingly hold said other leg in engagement with said elongated member.

5. Fire control means as described in claim 4. said L-shaped member being formed to provide an aperture through said other leg; said positive stop means comprising a screw adjustably mounted in said housing and passing loosely through said aperture in position to engage said elongated member when said trigger has been moved to said position in which disengagement is substantially complete.

> MERLE H. WALKER. PHILIP R. HASKELL.

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BARBER - PRESALE R 0138450 R2539438



BARBER - PRESALE R 0138451 R2539439



2.869.269

Fatented Jan. 20, 1959

2

2,869,269 SAFETY MECHANISM FOR FIREARMS

1

Wilfrid J. Couture, deceased, late of New Haven, Conn., by Clara M. Couture, administratrix, New Haven, Conn., assignor to Olin Mathieson Chemical Corparation, a corporation

Application June 2, 1955, Serial No. 512,606

1 Claim: (Cl. 42-70)

This invention relates to a firearm and more particu- 15 larly to a novel safety mechanism for a firearm of the bolt action type.

In bolt action rifles of the upturn and pullback type, it is desirable to incorporate into the gun a safety mechanism which not only can lock the trigger but also can 20 lock the bolt. The former is desirable to prevent accidental firing while the latter is desirable to prevent accidental release of the bolt.

An object of this invention is a safety mechanism for a bolt action rifle which is simple and economical in con- 25 struction and adapted for use upon a gun of the upturn and pullback type. A further object of this invention is a novel safety mechanism which operates both upon the trigger and upon the bolt so as to completely lock the gun. A still further object of this invention is to provide a novel satiety mechanism which permits movement of the bolt while the trigger is locked thereby enabling safe unloading of the gun. Another object of this in-vention is to provide a novel safety mechanism which cams the cocking shoulder of the trigger against the engaging sear surface of the sear. Other objects will be come apparent to those skilled in the art upon reading the following detailed description and accompanying drawings in which.

Figure 1 is a partial right side view of a bolt action 40rifle showing an embodiment of the safety mechanism of this invention as it appears in a "fully on" position, that is, when both the bolt and the trigger are locked,

Figure 2 is a broken right side perspective view de the rifle showing the safety mechanism and its spring 45detent,

Figure 3 shows a partial left side view of the bolt action rifle shown in Figure 1 but in which the safety mechanism is in a "partially on" position, that is, locks only the trigger,

Figure 4 is a partial left side view of the rifle shown in Figure 3 showing the safety mechanism in an "off" position, and

Figure 5 is a perspective view of the disassembled safety of this invention.

The illustration in the accompanying drawings show the use of the safety mechanism of this invention in a bolt action rifle of the so-called upturn and pullback type. This name is applied because the bolt is withdle, turning it up and pulling it back. This type of gun generally consists of a receiver 11 of tubular shape having sliding channels on its inner surface to form a bolt receiving passage. It also has an upward facing load and ejection opening 13. A barrel 14 is threaded to 65 the front or muzzle end of the receiver, said barrel having a chamber section at its breech end.

A sliding cylindrical bolt 15 having sliding and locking lugs thereon is contained within the bolt receiving passage of the receiver. Operating handle 16 extends 70 sidewise from said bolt. The bolt consists of a tubular

casing 17 in which is contained a firing pin 18, spring loaded by a firing pin spring 19. Threaded into the rear end of the tubular casing 17 is a bolt sleeve 20 through which the firing pin extends rearwardly. Extending downwardly from the rear end portion of the firing pin is a sear engaging lug 21 which acts as a cocking shoulder for engagement by a sear 22. Scar 22 pivots about sear pin 23 to enable release of the firing pin if it is cocked (as shown). The sear is normally 10 held against the sear engaging lug of the firing pin by sear spring 24.

Extending downwardly from the receiver is a support member 25 which acts to support a trigger 26, a bolt release 27 and a safety 28. The trigger and the bolt release lock are pivoted for rotation about trigger pin 29 while the safety is pivoted for rotation about safety pin 30.

The trigger 26 consists of sheet metal stock having a rearwardly extending lug 31 upon which a trigger pin spring 32 rests in a normally compressed state. A downwardly extending adjustable guide rod 33, adjusted to avoid contact with the rear lug 31 of the trigger pin guides the spring 32 in its operation. Extending forwardly in the trigger and engaging the sear is a cocking shoulder 34. This shoulder contacts the sear 22 at its shoulder 35 and blocks counterclockwise (Fig. 1) movement of the sear until the trigger is pulled rearwardly. When the trigger 26 is pulled rearwardly (to the left as viewed in Fig. 1) the shoulders 34 and 35 slip past one another and become unblocked thus freeing the sear to rotate counterclockwise (Fig. 1) about sear pin 23. The sear spring 24 comprises a flat leaf having a laterally projecting lug (not shown) which engages the sear as at 24a. The sear spring 24 is suitably mounted in the body of the rifle so that it normally tends to cause the sear 22 to rotate in a clockwise direction as viewed in Fig. 1. In spite of the urging of the sear 22 in a clockwise direction by the sear spring, the force of the firing pin spring 19 is dominant and is sufficient to cause the bolt 15 to move to the right when the sear is in the unblocked condition. During the course of the motion/of the bolt 15 to the right the lug 21 of the bolt ristes over the sear 22 and cams it downwardly in a counterclockwise direction about the sear pin.

The bolt release 27 is also of sheet metal stock having an upwardly extending member 36 which extends through a slot in the receiver 11 and into the slide passage of the front lug of the bolt to prevent complete removal of the holt This bolt release is normally kept 50 in a bolt engaging position by spring plunger 37 which spring loads against an upward extending arm of the bolt release 27.

Directly beneath the load and ejection opening 13 of receiver 11 is magazine-38 of the box type. Within 55 said magazine is contained magazine spring 39, spring loading a magazine follower 40 upwardly. Resting upon said follower is cartridge 41. Additional cartridges may be stored within said magazine, if desired.

The safety 28 of this invention is affixed to the lower drawn from the chamber by grasping the operating han- 60 end of support member 25. As shown in unassembled relationship in Figure 5, it consists of sheet metal stock folded over at its lower end 51 to form an uneven armed U-shaped member. A hole 52 is drilled through said members to receive safety pin 30, thereby producing a journal bearing for said safety. The short arm 53 of the inverted U-shaped member has a forwardly extending stop member 54 which engages the trigger when assembled upon the gun. The long arm 62 of theshaped member has a much larger forwardly extending locking lug 55 extending from the lower portion of said arm up through a slot in the receiver. Its tip 56 en-



CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER **KINZER V. REMINGTON**

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gages a notch 57 in the bolt when said bolt is in battery position. In an unlocked position it extends to a point befow the potch 57. The long arm of the U-shaped njentber also contains a vertical slot 58 through which leaf spling 59/extends. The lower end of the leaf spring s shaped to encircle the safety pin 30 while the upper end contains a lug 60 which engages a flat on the re-ceiver in which three depressions are formed. Engagement of the lug 60 and the left depression (Fig. 2) represents the position in which the bolt and the trigger are 10 blocked while engagement of the lug 60 with the middle depression represents the position of the safety in which the bolt is free to be opened and the trigger alone is latched or blocked. When the safety is in the righthand position shown in Fig. 2 (with the lug 60 in engagement with a depression which is not visible) both the trigger and the bolt are unlocked. A ratchet mechanism for controlling the position of the safety thereby results. Topping the long arm 62 of the U-shaped member is a finger piece 61 having ridges therein for fric- -0 tional engagement with the thumb of the shooter.

The receiver assembly is affixed to a gun stock 70 by means of trigger guard plate 71 through which bolts 72, 73 and 74 extend and are threaded into the receiver.

To operate the gun, the shooter first loads the gun by opening the action. This is performed by lifting up on the operating handle 16 and pulling back the bolt 15 until its forward locking lug is stopped by the bolt en-gaging arm 36 of the bolt release 27. Cartridges are then inserted through the load opening 13 of the re-ceiver into the magazine 33. The bolt is then rammed home and in so doing, the top cartridge in the magazine is driven into the chamber section of the barrel 14. The rear of the cartridge contained in the chamber, designated C in Figure 1, is supported by the cartridge seat face 80 of the bolt and its rim is engaged by a spring biased extractor 81 which protrudes partly across the cartridge seat face. The operating handle is then turned downwardly to cock the firing pin through engagement of the downward extending lug 21 of the firing pin 18 with the sear 22. This sear is normally held in an up ward position by the sear spring 24.

At this time, it is generally the practice to operate the safety. It is placed in a fully "on" position by pulling the finger piece 61 of the safety completely toward the rear. Lug 60 "snaps" into the several depressions oh the flat of the side wall of the receiver. In its rearmost position both the bolt 20 and the trigger 26 are locked by the safety-the bolt by reason of safety tip m 56 engaging notch 57, and the trigger by reason of stop member 54 wedging the cocking shoulder 34 of the trigger against the sear shoulder 35 of the sear. A completely safe transportable gun is thereby enabled. Any jar against the trigger or against the operating handle will not cause firing or accidental opening of the bolt because both the pin and the bolt are locked.

Should one desire to unlock the bolt while retaining the trigger in its safety position as generally required when unloading the gun, the finger piece 51 of the cosafety is moved forwardly until the safety lug "snaps" into a center notch. In this condition the bolt can be operated in the normal fashion but the trigger cannot be pulled because it engages nose 54 of the safety 28. The bolt has been unlocked because the safety tip 56 65 has been disengaged from notch 57 of the bolt.

Complete forward movement of the finger piece 61 completely releases the bolt and trigger. The gun may then be fired by pulling the trigger. In such instance, the safety tip 56 is out of engagement with the notch 57 of the bolt and the stop member 54 is opposite a groove 82 in the trigger (see Figure 4).

Pulling the trigger releases the sear 22 which pivots about its sear pin 23 by the force of the firing pin spring 19 acting through the firing pin lug 21. The firing pin 18 is driven into the igniter of the cartridge C by the firing pin spring 19 and bullet is ejected from the muzzle of the gun.

After firing, the cartridge case C is extracted from the chamber by lifting the operating handle 16 and pulling it rearwardly. By so doing, the extractor 81 grips the rim of the cartridge case pulling it rearwardly. An ejector within the bolt housing pushes forward through an orifice in the cartridge scat face thereby causing the cartridge to pivot around the extractor as it clears the forward portion of the load and ejection opening 13 of the receiver 11. The fired cartridge case is thereby ejected. The gun is reloaded by forward movement of the bolt to drive another cartridge contained in the magazine into the chamber section of the barrel. The action of the gun may then be repeated as described above.

Obviously, certain modifications are possible, for example the ratchet mechanism of the safety may be of different design. A projection instead of the leaf spring from the long arm of the U-shaped member may be used to engage the staggered depressions in the flat on the receiver wall. One might also employ a ratchet mechanism at the bearing section of the safety. Another obvious variation could be in the bearing section of the safety. It could be a solid journal having appropriate arms extending therefrom to act as a stop member and a bolt engaging tip. In the gun itself many modifications can obviously be made without changing the opration of the safety. Here again, these should not deter om the scope of the described safety and its use.

intentions having thus been described what is The desired to be secured by Letters Patent is as follows:

In a bolt action firearm including a bolt, a slidable firing nin, a trigger and a receiver, a safety device pivotally mounted upon the receiver, said device comprising a pietallic, U-shaped member formed with a lockng hg and a stop, said lug and said stop being directly encageable with the bolt and with the trigger respectively for locking the bolt and for blocking the operation of the trigger, said safety device being rotatable to a first position wherein the bolt and the trigger are both locked, said safety device being rotatable to a second position wherein the trigger only is locked and leaf spring means mounted upon the safety device and cooperating with the receiver for locking the safety device selectively in either of said two positions.

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CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER **KINZER V. REMINGTON**

BARBER - PRESALE R 0138453 R2539441


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FRANK A. WILLIAMS, OF DETROIT, MICHIGAN.

COMBINED SAFETY AND BOLT LOCK FOR GUNS.

Specification of Letters Patent.

Patented Oct. 14, 1919.

Application filed February 14, 1919. Serial No. 276,944.

To all whom it may concern:

1\\$1⁄8,423.

Be it known that I, FRANK A. WILLIAMS, a citizen of the United States of America, residing at Detroit, in the county of Wayne 5 and State of Michigan, have invented certain new and useful improvements in Combined Safety and Bolt Locks for Guns, of which the following is a specification, reference being had there in to the accompanying

10 drawings. The invention relates to guns of the bolt action type and has particular reference to constructions in which the rear sight is mounted above the bolt. It is the primary

15 object of the invention to obtain a construction of safety which does not interfere with the sight mounting. And further to obtain a construction which performs auxiliary functions as hereinafter set forth.

In the drawings: 20

30

Figure 1 is a side elevation of a bolt ac-tion gun, showing the rear sight mounted above the bolt and provided with my improved safety;

- Fig. 2 is a rear elevation of the bolt and $\mathbf{25}$ sight;
 - Fig. 3 is a similar view of the sight de tached:
 - Fig. 4 is a plan view of the sight;
 - Fig. 5 is a longitudinal section thereof;
 - Fig. 6 is a cross-section; Fig. 7 is a longitudinal section through the sight, sleeve, firing pin and safety sembly detached;
- Fig. 8 is a cross-section thereof in the cen-35 tral plane of the safety;

Fig. 9 is a horizontal section;

Fig. 10 is a plan view showing the relation of the safety and bolt lock;

Fig. 11 is an end elevation of the bolt 40 lock :

Fig. 12 is a cross-section through the bolt in the plane of the lock.

- A is the gun stock, B the frame, C the 45 bolt, D the actuating bolt handle, E the sleeve, and F the firing pin of a standard bolt action assembly. G is a rear sight assembly which is mounted upon the sleeve E, but which is also provided with a bearing
- 50 portion H for slidably engaging the frame so as to accurately position the sight. The construction of the sight assembly forms no part of the present invention, but as shown comprises a leaf frame I which is

on the shaft J in the bifurcated bracket member K, while a vertically adjustable spring frame L engages the leaf and carries the peep sight M. The mounting of this sight above the 60

sleeve interferes with the use of a rockable safety such as are provided on standard bolt actions, and I have therefore devised a safety of the following construction: N is a bar which slidably engages a transverse 65 aperture in the sleeve between the mounting for the sight and the firing pin. Upon the lower face of this bar are the projecting ribs or teeth O adapted to engage corresponding ribs or teeth P on the firing pin. 70 The bar N is of greater length than the bearing in the sleeve so that it can be adjusted in position by pressure on the projecting end into any one of three different positions. The lower surface of the safety 75 is also cut away at Q so as to permit, in one position of its adjustment, the free movement of the firing pin, while in the other positions of adjustment the engagement of the teeth O and P will lock said firing pin. 80 The entering ends of the teeth O are slightly bevoled at O' so that in engaging with the teeth P the pin F is slightly retracted. This has the effect of withdrawing the cocking nose R, so that in case the sear is withdrawn 85 it can return again into position for en-gagement with the firing pin. The safety N is held in its several posi-

tions of adjustment by a spring pressed detent S which is arranged in a longitudinal 90 bore in the upper portion of the sleeve E. This detent S also performs the function of a bolt lock and to this end comprises a hollow member S' and a pointed nose member S² at one end thereof. S⁵ is a cross pin en- 95 gaging an elongated slot S⁴ in the member S', and S⁵ is a spring within the hollow member interposed between the pin S³ and the nose piece S². The safety N is formed with a notch T for engaging the nose piece S² 100 when in one position of adjustment, in which position the opposite end of the member S' is projected beyond the bore and into engagement with a recess U in the bolt so as to lock the bolt from turning. The safety 105 N is further provided with a groove T² into which the nose piece S^2 is forced by the tension of the spring S⁵ when said safety is in the second or third position of adjust 110 55 pivotally and laterally adjustably rounted ment. In either of these latter two posi-



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tions the member S' is retracted into the bore and is thereby withdrawn from engagement with the recess U, permitting the turning of the bolt.

With the construction just described, to place the mechanism on safety and also to lock the bolt from operation, the member N is in the position shown in Figs. 7 to 10. It will be noted that in this position the nose
piece S² being in engagement with the notch T will hold the member N with the teeth O in full engagement with the teeth P, and therefore the firing pin is locked from movement with the notch U prevents the rotation of the bolt. If it is desired to release the bolt and at the same time to continue the locking of the firing pin, the member N is

- adjusted to its intermediate position, where
 adjusted to its intermediate position, where
 the nose piece S² is in lengagement with the
 slot T². The teeth O and P are still in engagement with each other so that the firing
 pin is locked, but the movement of the nose
 piece S² into the slot T² permits the spring
- S⁵ to withdraw the projecting end of the member S', disengaging the same from the notch U and freeing the bolt for rotation.
 Thus, the operator is permitted to remove
 30 the bolt while the firing pin remains locked.
 In the third position of adjustment the cut
- away portion Q of the member N registers with the firing pin, so that the latter is free to move whenever released by the sear and 35 the gun is consequently in condition for
- firing.

A safety constructed as above described/in/ no way interferes with the sight assembly, for the member N is below the bifurcated

40 member K in which is mounted the transverse pin J carrying the sight leaf. Fur thermore, the safety may be manipulated more easily and conveniently than the rockable construction which has heretofore been 45 used.

What I claim as my invention is:

1. In a gun of the bolt action type, the combination with a sleeve for the bolt having an upward extension forming a mount-

50 ing for the sight, of a safety transversely adjustably mounted in said upward extension and engageable with the firing pin.

2. In a gun of the bolt action type, the combination with a sleeve for the bolt hav-

- 55 ing an upward extension forming a mounting for the sight, of a safety in the form of a transversely slidable bar engaging an aperture in said upward extension between the sight mounting and the firing pin and en-60 gageable with the latter to lock the same.
- 3. In a gun of the bolt action type, the combination with a sleeve for the bolt having an upward extension forming a mounting for a sight, of a safety in the form of a 65 transversely slidable bar having a tooth on

the lower face thereof for engagement with the firing pin and being cut away at one point to clear said pin.

4. In a gun of the bolt action type, the combination with a sleeve for the bolt hav- 70 ing an upward extension forming a mounting for a sight, of a safety in the form of a transversely adjustable bar engaging an aperture in said sight mounting and projecting beyond the same, said safety being 75 adjustable into a plurality of positions and having a tooth for engagement with the firing pin in one of said positions and cut away to clear said firing pin in another position.

5. In a gun of the bolt action type, the 80 combination with a sleeve and the firing pin therein, of a safety in the form of a transversely movable bar mounted in said sleeve, said safety bar having a tooth thereon for engaging said firing pin when in one position of adjustment and being cut away to clear said firing pin in another position of adjustment.

6. In a gun of the bolt action type, the combination with the bolt, the sleeve and the ⁹⁰ firing pin slidable therein, of a safety in the form of a transversely extending bar mounted in a bearing in said sleeve and projecting beyond the same, said safety bar having a tooth on one portion thereof for engaging a ⁹⁵ coöperating tooth on the firing pin and being cut away at another point for clearing the firing pin.

7. In a gun of the bolt action type, the combination with the bolt, the sleeve and the 100 firing out, of a safety in the form of a transversely movable bar mounted in said sleeve, having a toothed engagement with the firing pin in one position of adjustment and cut away to clear said pin in another position of 105 adjustment, a spring pressed detent for holding said safety in its alternative positions of adjustment, and coöperating means on said safety for adjusting said detent into locking engagement with said bolt in one of 110 its positions of adjustment.

8. In a gun of the holt action type, the combination with the holt, the sleeve and the firing pin, of a safety in the form of a transversely adjustable bar mounted in said sleeve 115 and having a plurality of positions of adjustment, a spring pressed detent having one end engageable with said safety to hold the same in the different positions of adjustment and the opposite cnd being engageable with 120 the bolt, and coöperating means on said safety for actuating said detent into locking engagement with said bolt in one of its positions of adjustment.

9. In a gun of the bolt action type, the 125 combination with the bolt, the sleeve and the firing pin, of a safety in the form of a transversely movable bar mounted in said sleeve, the under side of said safety having a tooth portion and a cut away portion, the former 130











1,318,423

for locking the firing pin and the latter to provide clearance for said firing pin, a detent coöperating with said safety for yieldably holding the same in a plurality of positions of adjustment, said safety being fashioned to/react upon said detent to adjust the saniointo different positions, one of said positions of the detent being in locking engagement with said bolt.

- 10 10. In a gun of the bolt action type, the combination with the bolt, the sleeve and firing pin, of a safety in the form of a transversely extending pin engaging an aperture in said sleeve, a detent engaging a longitudi-
- 15 nal aperture in said sleeve having one end operatively engaging said safety and the opposite end engagenble with the breech bolt to lock the same, and a bearing on said safety for said detent cammed to actuate the detent
- 20 into locking engagement with the bolt in one position of adjustment of the safety and to release the locking of the bolt in another position of the safety.

11. In a gun of the bolt action type, the combination with the bolt, the sleeve and fir- 25 ing pin, of a safety in the form of a transversely extending bar engaging a transverse aperture in the sleeve and having three positions of adjustment, a tooth on said safety for engaging the firing pin in two of said 30 positions of adjustment, the safety being cut away to release said pin in the third position of adjustment, a detent for yieldably holding said safety in its different positions of adjustment and having its opposite end oper- 35 able into locking engagement with the bolt, and a cammed surface on said safety for engaging said detent to hold the same in locking engagement with the bolt in one position of the safety where the firing pin is also 40 locked, to release said bolt in another position where the firing pin is also released, and to release the bolt in an intermediate position where the firing pin is locked.

In testimony whereof I affix my signature. 45 FRANK A. WILLIAMS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."





"C" Series Photos

Bolt lock is mounted, as in "B" Series, independently of safety.

Gun cocked - ready to fire Safe in "Fire" posotion Bolt unlocked

C-2 Gun cocked Safe in "ON SAFE" position Bolt-locked

C-3 <u>Gun cocked</u> Safe in "ON SAFE" position but is pulled rearward to unlock bolt



F.E. Martin:T 4-11-78

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

1998年1月1日 1月1日 1月1日



cc: C. B. Workman (no attachments)

REMINGTON ARMS COMPANY. INC.

INTER-DEPARTMENTAL CORRESPONDENCE

$\Lambda / \Lambda / /$	Remington, IPMD
	J. W. B

RD-69 REV. 6-58

BRIDGEPORT, CONN. SEPTEMBER 14, 1978

BROOKS

FROM: W. L. ERICSON

SUBJECT: THREE-POSITION SAFETY: RELEASABLE BOLT LOCK

An extensive search has been made for patents relevant to the protetype three-position safety shown in the "C" series photos you supplied us (stamped April 3, 1978 by your Photo Lab). No patents which could raise any infringement risks were found. The following are of interest with respect to the patentability of this design:

> 7,318,423 - Williams -2,824,402 - Fischer -2,869,269 - Couture -3,138,888 - Brewer -

The Williams, Fischer, Couture and Brewer patents show various forms of three-position safeties having alternate "safe" positions in which the bolt is locked and released, However, it appears to me that none of these is so closely related to your prototype as to foreclose us from obtaining patent protection for it, in the event it is selected for use.

Williams uses a safety bar (N which is slidable transversely of the bolt C, and has ribs O that internere with ribs P on the firing pin F in two "safe" positions, but are cut away at Q to define a "fire" position. In one of the safe positions, the bolt C and its handle D are locked by the projection into a recess U of a springloaded detent S (see Fig. 9); but this detent retracts into a notch T₂ in the safety bar in its remaining two positions,

Fischer has a bolt lock button 12, 13 engageable with a notch 14 in the bolt 2 of a Mauser action (Fig. 4); this button carries an interlock pin 26 which is engaged by a safety lever 23 in its "fire" position 23A, to unlock the bolt, <u>In an</u> intermediate "safe" position 23B, the firing pin 4 is locked by a safety pin 19 (see Fig. 5), and the button 13 can be manually operated to either lock or unlock the bolt. In a second "safe" position, shown in solid line at 23 in Fig. 4, the button 13 is held in the locking position by a notch 28.

Page 2 Sept. 14, 1978

dout/ure bears some resemblance to our Walker Patent 2,514,981 in that a bell crank lever 28 serves both as a safety and a bolt lock. Nowever, Couture provides for three safety positions rather than two; these positions are determined by a spring-loaded lug 60 engageable in any of three recesses, shown unnumbered in Fig. 2. The safety has a stop member 54 which locks the trigger in either a rear or an intermediate position, and a longer arm 55 which engages a notch 57 in the bolt only in the rear position. (This mode of operation is the reverse of your prototype).

Brewer employs a sliding safety 190 that has a screw 228 which locks the trigger, and a lug 230 which engages a locking notch 234 in the bolt, in the rearmost safety position shown in Fig. 12. Forward movement to an intermediate position keeps the trigger locked, but disengages the lug 230 from the bolt notch. Incidentally, there are only two detent notches 229 and 231, which correspond to the rear "double-safe", and "fire" positions: so feeling the intermediate position would appear to be somewhat uncertain.

To summarize, the prior art most nearly related to your design is the Couture patent, but this is a one-piece trigger safety and bolt lock that is readily distinguishable both in construction and mode of operation. Patent protection should be obtainable on your prototype.

There is a mention in earlier correspondence of a three-position safety in the Model 725. If you have a sample, we might compare it.



WLE/dt Attach.(5) W, L, ERICSON <u>SENIOR</u> PATENT COUNSEL

Bill Ericson

48.50

United States Patent Office

2,824,402

Patented Feb. 25, 1958

2,824,402

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BREECH BOLT AND FIRING PIN SAFETY MECHANISM FOR FIREARMS

Joseph F. Fischer, Grand Rapids, Mich.

Application June 21, 1956, Serial No. 592,846



This invention relates to improvements in safety mech-15 anism for fire arms. The principal objects of this invention are:

First, to provide a novel safety mechanism for rifles of the Mauser type which safety does not interfere with the mounting of a telescopic sight on the rifle and which 20 is mounted for easy operation on the bolt handle side of the rifle.

Second, to provide a safety mechanism for Mauser type gun actions which will lock the firing pin in safe position without interfering with or preventing the re-²⁵ moval of the bolt from the receiver of the gun.

Third, to provide a safety that locks the firing pin in safe position regardless of the position of the bolt so that the bolt may be opened and closed to inspect the chamber of the gun without removing the safety lock of the mechanism.

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Fourth, to provide a firing pin safety lock with an operating member that interlocks with the bolt lock of a Mauser type rifle to hold the bolt in closed, locked position and the firing pin in cocked, locked position as ³⁵ when the gun is double locked for rough handling or transportation through brush or in a saddle scabbard

Fifth, to provide a bolt and firing pin lock mechanism in which movement of the firing pin lock to firing position automatically moves the bolt lock to unlocked position. Sixth, to provide a firing pin lock for a Mauser type gun action which is extremely simple and silent in operation and which is relatively inexpensive to incorporate in the bolt assembly either as initial construction or as an attachment to existing guns.

Other objects and advantages of the invention will be apparent from a consideration of the following description and claims. The drawings, of which there is one sheet, illustrate a highly practical form of the safety mechanism.

Fig. 1 is a fragmentary side elevational view of the rear end of the receiver of a Mauser type rifle action with the bolt having the safety mechanism of the invention assembled in the receiver in cocked firing position.

Fig. 2 is an enlarged fragmentary rear elevational 55 view of the receiver and bolt with the safety in first intermediate locked position.

Fig. 3 is a fragmentary transverse cross sectional view through the bolt and safety taken along the plane of the line 3-3 in Fig. 4 with the safety in a first or intermediate locked position corresponding to the position shown in Fig. 2.

Fig. 4 is a fragmentary top plan view of the receiver area which when registered with the outer end of the safety pin permits the complete retraction of the safety the plane of the broken line 4-4 in Fig. 2 and showing ⁶⁵ pin from the firing pin 4 and permits firing of the rifle.

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the safety in double safe locked position with the bolt locked in the receiver.

Fig. 5 is a fragmentary transverse cross sectional view taken along the plane of the line 5-5 in Fig. 2.

The gun action to which the safety mechanism of the invention is applied is the familiar type of Mauser rifle which is well known so no attempt will be made to disclose or describe in detail the construction of the gun action except as it cooperates with the safety mechanism 10 of the invention. The action includes generally a receiver 1 in which the bolt 2 is rotatably and reciprocably mounted for loading and cocking the gun action. The bolt includes the familiar bolt handle 3 that projects rigidly from the right side of the action for rotating the bolt in the receiver to unlock the bolt and cam it rearwardly. Reciprocably mounted within the bolt 2 is a firing pin 4 that is spring pressed forwardly to fire the gun in the well known manner. The rear end of the firing pin 4 carries a depending rib 5 with a notch therein that is engaged by the sear 6 of the trigger mechanism to control the firing of the gun. The rear end of the firing pin 4 is slidably and non-rotatably received in the bolt sleeve 7 which embraces the rear end of the tubular bolt and within which the bolt rotates to effect cocking of the firing pin. The bolt sleeve 7 has a flatted undersurface 8 that non-rotatably engages the rear end of the receiver in the well known manner.

As is standard in Mauser type gun actions the rear end of the firing pin 4 is annularly grooved as at 9 within the bolt sleeve 7 to provide a safety lock shoulder 10. The upper portion of the bolt sleeve 7 is axially bored as at \mathbf{H} to receive the bolt lock pin. The standard Mauser bolt lock pin is rotated by a lever on its rear end but in this lock assembly a new bolt lock pin 12 is substituted. The pin 12 is reciprocable in the sleeve and projects to the bolt lock button 13 on the rear end of the secve. The rear end of the bolt 2 as currently and previously manufactured already has a peripheral notch 14 cut therein. In the standard Mauser this notch coacts with the rotary bolt lock pin but in this assembly it registers with the bolt lock pin 12 when the bolt is in closed locked position in the receiver. By pressing forwardly on the bolt lock hutton 13 the pin 12 enters the notch 14 and prevents rotation of the bolt in the receiver and therefore preventy removal of the bolt or cocking of the firing pin. A lock screw 15 prevents rotation of the bolt lock pin 12.

The bolt lock pin 12 cannet control the trigger action or the firing pin and it is possible to fire the gun with the 50 belt locked unless there is other safety mechanism provided. For this purpose the present invention provides a small solid block of metal 16 that is secured as by the silver solder indicated at 17 along the right side of the bolt sleeve 7. The block 16 and the adjacent portion of the bolt sleeve are transversely bered as at 18 to receive the short safety pin 19 having a rounded inner end projected into the path of the locking shoulder 10 on the firing pin 4 when the firing pin is cocked. In order to selectively control the position of the safety pin 19 the block 16 is vertically bored as at 20 to receive the operating shaft 21 in intersecting relation to the bore 18. The shaft 21 has a cutaway portion 22 forming a broad flat area which when registered with the outer end of the safety pin permits the complete retraction of the safety



2,824,402

This position of the shaft 21 is the unlocked position of the shaft and the gun action and corresponds to the dotted position 23A of the safety shaft shown in Fig. 4. In order to conveniently rotate the shaft (22) it is provided on its upper end with the arm 23 extending laterally to a depend-5 ing finger piece/24 that swings along the side of the block 16. The shaft 21 is further provided with a shallow flatted surface 25 which when registered with the safety pin 19 presses the safety pin into the intermediate safe position shown in Fig. 5 in which the firing pin can not be released 10 by the trigger and in which the gun action is in safe condition. The intermediate safe position of the safety and the actuating arm 23 corresponds to the dotted position 23B appearing in Fig. 4. The shallow flat 25 not only locks the safety pin 19 but forms a detent surface that is 15 readily felt in the finger pass 24 as the safety mechanism is rotated to intermediate safe position. The marksman is thus advised that the finger piece has been moved fully from firing position 23A to safe position 23B or vice versa.

In order to interlock the firing pin safety lock with the 20 bolt lock of the action the bolt lock button 13 is provided with a laterally and downwardly inclined interlock pin 26 that projects into the plane of the operating arm 23 of the safety mechanism. The inner end of the operating arm 23 is provided with a concentric arcuate portion 27 25 that intercepts and prevents forward locking motion of the bolt locking pin 12 and the interlocking pin 26 when the safety mechanism is in off or firing position. The actuating arm 23 is provided with a laterally opening notch 28 that opens to receive the interlock pin 26 when 30 the safety is in intermediate safe position dorresponding to position 23B in Fig. 4. Thus in the bolt closed cocked position of the gun action the safety can be moved to intermediate safe position and the bolt lock member advanced to lock the bolt. In order to further lock the gun 35 action for rough handling or transporting through brush or in a scabbard, the actuating arm 23 and the finger piece 24 can be rotated to a full rearwardly directed position as shown in full lines in Fig. 4 in which case the rear end of the notch 28 will engage and prevent accidental retrac-tion of the bolt lock pin 12. This is the full or double locked position of the safety mechanism. In this full locked position of the safety the rounded portion 29 o the shaft 21 appearing in Fig. 5 engages the outer end of the safety pin 19.

It is pointed out that the action of the actuating arm 23 in moving from either of the locked positions to firing position automatically disengages the bolt lock pin 12 because the forward end of the notch 28 cams the interlock pin 26 rearwardly to unlock the bolt as the safety 50 is moved to unlocked firing position. The finger piece 24 of the safety actuating member is conveniently located along side of the bolt sleeve near the bolt operating handle 23 and the trigger mechanism where it can be operated by the thumb of either right or left handed marksmen. The 55camming action of the flatted surfaces on the shaft 21 provides positive locking movement of the safety pin 19 with a minimum of effort on the part of the marksman. The position of the safety mechanism in all of its adjusted positions is below the top of the bolt sleeve so as not to interfere with any auxiliary sights mounted on the gun action. The position of the safety mechanism also balances the appearance of the bolt sleeve by occupying the area opposite the housing for the spring 30 that presses the locking pin 31 of the bolt sleeve forwardly into en- 65 gagement with the rear end of the bolt to non-rotatably lock the sleeve to the bolt as is familiar in the Mauser type of bolt. The safety operating shaft 21 is retained in the block 16 by a lock screw 32 threaded through the 70 rear of the block into the groove 33 in the lower end of the shaft.

Having thus described the invention, what is claimed as new and is desired to be secured by Letters Patent is:

1. A safety mechanism for a fire arm of the Mauser 75 type having a bolt slidably and rotatably mounted in a

receiver and a firing pin reciprocably mounted within the bolt with a bolt sleeve positioned around the rear of the bolt and non-rotatably engaged with the receiver, said safety mechanism comprising a block fixedly secured as an attachment to the side of said bolt sleeve, a safety locking pin extending through the side of said sleeve and having its outer end received in a transverse bore in said block, an upright bore in said block intersecting said transverse bore, a shaft journaled in said upright bore and engageable with the outer end of said pin, a retaining screw threaded in said block and engaged in a groove in said shaft, said shaft having a cutaway portion permitting retraction of said safety pin from the inside of said sleeve and a flatted portion engageable with the end of said pin in the intermediate safe position of said shaft to project said safety pin into said sleeve, said firing pin having a safety groove the end of which is engaged with said safety pin in the safe position of the pins, an arm secured to the top of said shaft and projecting laterally to a downturned finger piece at the side of said block, said bolt having a notch in the periphery of its rear end located within said sleeve, a bolt lock pin reciprocally and non-rotatably mounted in said sleeve and projecting from the rear end of the sleeve, said bolt lock pin being receivable in said notch in the locked position of said bolt, and an interlock pin projecting from the rear end of said bolt lock pin into the path of the arm on said shaft, said arm having a rounded inner end cammingly engageable with said interlock pin to retract said bolt lock pin when said arm and said finger piece are moved forwardly to register the cutaway portion on said shaft with said safety pin to condition the mechanism for firing, said arm having a notch adjacent said rounded end receiving said interlock pin when said arm and finger piece are rotated rearwardly to prevent retraction of said bolt locking pin from bolt locking position when said shaft is in a double safe position rotated rearwardly from said intermediate safe position with a rounded portion of its surface engaged with the outer end of said safety pin and holding it in locking engage-

ment with said firing pin. 2. A safety mechanism for a fire arm of the Mauser type having a bolt slidably and rotatably mounted in a receiver and a firing pin reciprocably mounted within the bolt with a bolt sleeve positioned around the rear of the bolt and mon-rotatably engaged with the receiver, said safety mechanism comprising a block fixedly secured to the side of said bolt sleeve, a safety locking pin extending through the side of said sleeve and having its outer end received in a transverse bore in said block, an upright bore in said block intersecting said transverse bore, a shaft journaled in said upright bore and engageable with the outer end of said pin, said shaft having a cutaway portion permitting retraction of said safety pin from the inside of said sleeve and a flatted portion engageable with the end of said pin in the intermediate safe position of said shaft to project said safety pin into said sleeve, said firing pin having a safety groove the end of which is engaged with said safety pin in the safe position of the pins, an arm secured to the top of said shaft and projecting laterally to a finger piece at the side of said block, said bolt having a notch in the periphery of its rear end located within said sleeve, a bolt lock pin reciprocally and non-rotatably mounted in said sleeve and projecting from the rear end of the sleeve, said bolt, lock pin being receivable in said notch in the locked position of said bolt, and an interlock pin projecting from the rear end of said bolt lock pin into the path of the arm on said shaft, said arm having an inner end cammingly engageable with said interlock pin to retract said bolt lock pin when said arm and said finger piece are moved forwardly to register the cutaway portion on said shaft with said safety pin to condition the mechanism for firing, said arm having a notch adjacent said end receiving said interlock pin when said arm and finger piece



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are rotated rearwardly to prevent retraction of said bolt looking pin from bolt locking position when said shaft is in a double safe position rotated rearwardly from said intermediate/safe position with a portion of its surface encaged with the outer end of said safety pin and holding it in looking engagement with said firing pin.

3) A safety mechanism for a fire arm of the Mauser type having a bolt slidably and rotatably mounted in a receiver and a firing pin reciprocably mounted within the bolt with a bolt sleeve positioned around the rear of the 10 bolt and non-rotatably engaged with the receiver, said safety mechanism comprising a block on the side of said bolt sleeve, a safety locking pin extending through the side of said sleeve and having its outer end received in a transverse bore in said block, an upright bore in said 15 block intersecting said transverse bore, a shaft journaled in said upright hore and engageable with the outer end of said safety pin, said shaft having a cutaway portion permitting retraction of said pin from the inside of said sleeve and a flatted portion engageable with the end of 20 said safety pin in the safe position of said shaft to project said pin into said sleeve, said firing pin having a safety groove the end of which is engaged with said safety pin in the safe position of the pins, an arm secured to the top of said shaft and projecting laterally to a finger piece 25 at the side of said block, said bolt having a notch in the periphery of its rear end located within said sleeve, a bolt lock pin reciprocally and non-rotatably mounted in said sleeve and projecting from the rear end of the sleeve, said bolt lock pin being receivable in said notch in the 30 locked position of said bolt, and an interlock pin projecting from the rear end of said bolt lock pin into the path of the arm on said shaft, said arm having a notch therein receiving said interlock pin when said arm and finger piece are rotated rearwardly to prevent retraction of said 35 bolt locking pin from bolt locking position when said shaft is in double safe position with a portion of its surface engaged with the outer end of said safety pin and holding said safety pin in firing pin locking position.

4. A safety mechanism for a fire arm of the Mauser type having a bolt slidably and rotatably mounted in A receiver and a firing pin reciprocably mounted within the bolt with a bolt sleeve positioned around the rear of the bolt and non-rotatably engaged with the receiver, (said safety mechanism comprising a block on the side of said 4.5 bolt sleeve, a safety locking pin extending through the side of said sleeve and having its outer end received in a transverse bore in said block, an upright bore in said block intersecting said transverse bore, a shaft journaled in said upright bore and engageable with the outer end 50 of said safety pin, said shaft having a cutaway portion permitting retraction of said safety pin from the inside of said sleeve and a portion engageable with the end of said pin in the safe position of said shaft to project said pin into said sleeve, said firing pin having a safety groove 55 the end of which is engaged with said safety pin in the safe position of the pins, an arm secured to the end of said shaft and projecting laterally to a finger piece at the side of said block, said bolt having a notch in the periphery of its rear end located within said sleeve, a bolt 60 lock pin reciprocally and non-rotatably mounted in said sleeve and projecting from the rear end of the sleeve, said bolt lock pin being receivable in said notch in the locked position of said bolt, and an interlock pin projecting from the rear end of said bolt lock pin into the path 65 of the arm on said shaft, said arm having a notch therein receiving said interlock pin when said arm and finger piece are rotated rearwardly to prevent retraction of said bolt locking pin from bolt locking position when said shaft is in double safe position with a portion of its sur- 70 face engaged with the outer end of said safety pin and holding said safety pin in firing pin locking position.

5. A safety mechanism for a fire arm of the Mauser type having a bolt slidably and rotatably mounted within the bolt with a bolt sleeve positioned around the rear of 75 engageable in an intermediate rotated safe position with

6

the bolt and firing pin and non-rotatably engaged with the receiver, said safety mechanism comprising a safety locking pin extending through the side of said sleeve and having its outer end received in a transverse bore in said sleeve, an upright bore intersecting said transverse bore, a shaft journaled in said upright bore and engageable with the outer end of said safety pin, said shaft having a cutaway portion permitting retraction of said safety pin from the inside of said sleeve and a flatted portion engageable with the end of said pin in the safe position of said shaft to project said pin into said sleeve, said firing pin having a safety groove the end of which is engaged with said safety pin in the safe position of the pins, an arm secured to said shaft and projecting laterally to a finger piece at the side of said sleeve, a bolt lock in said sleeve and engageable with said bolt in the locked position of said bolt, and an interlock member on said bolt lock extending into the path of the arm on said shaft, said arm having a first portion cammingly engageable with said interlock member to retract said bolt lock when said arm and said finger piece are moved forwardly to register the cutaway portion on said shaft with said safety pin to condition the mechanism for firing, said arm having a second portion locking said interlock in bolt locking position when said arm and finger piece are rotated rearwardly to double safe position with another portion of its surface engaged with the outer end of said safety pin to hold said safety pin in firing pin locking position.

6. A safety mechanism for a fire arm of the Mauser type having a bolt slidably and rotatably mounted within the bolt with a bolt sleeve positioned around the rear of the bolt and firing pin and non-rotatably engaged with the receiver, said safety mechanism comprising a safety locking pin extending through the side of said sleeve and having its outer end received in a transverse bore in said sleeve, an upright bore intersecting said transverse bore, a shaft journaled in said upright bore and engageable with the outer end of said safety pin, said shaft having a cutaway portion permitting retraction of said safety pin from the inside of said sleeve and a portion engageable with the end of said pin in the safe position of said shaft to project said pin into said sleeve, said firing pin having a safety groove the end of which is engaged with said safety pin in the safe position of the pins, an arm secured to said shaft and projecting laterally to a finger piece at the side of said sleeve, a bolt lock in said sleeve and engageable with said bolt in the locked position of said bolt, and an interlock member on said bolt lock extending into the path of the arm on said shaft, said arm having a first portion cammingly engageable with said interlock member to retract said bolt lock when said arm and said finger piece are moved to register the cutaway portion on said shaft with said safety pin to condition the mechanism for firing, said arm having a second portion locking said interlock in boit locking position when said arm and finger piece are rotated to safe position with another portion of its surface engaged with the outer end of said safety pin to hold said safety pin in firing pin locking position.

7. In a fire arm having a bolt rotatable between locked firing position and unlocked retractable position and a firing pin reciprocable in said bolt and spring pressed forwardly to firing position, safety mechanism comprising a sleeve non-rotatably mounted on said fire arm around the rear of said bolt and said firing pin, a safety pin mounted in said sleeve in transversely extending relation to said firing pin and projectable into engagement with a shoulder on said firing pin in the safe positions of the pins, an actuating shaft rotatably mounted in said sleeve in transversely extending intersecting relation to the path of said safety pin and in transversely extending off-set relation to the axis of said bolt, said shaft having a first portion cut away to permit retraction of said safety pinted firing position and a second intermediate flatted portion

2,824,402

pin to advance the safety pin into safe position, and a finger piece on said shaft to rotate the same.

the outer end of said safety pin to advance the safety pin into safe position, said shaft having a third rounded portion engageable with said safety pin in a further rotated double safe position of the shaft to hold said safety pin in safe position, and a finger piece on said shaft to rotate 5 the same, said finger piece on said shaft in the locked position of said bolt lock and the double safe position of the shaft and said finger piece, said finger piece having a portion cammingly engageable with said bolt lock to move the bolt lock to unlocked position upon rotation of the finger piece to safe position.

8. In a fire arm having a bolt rotatable between locked firing position and unlocked retractable position and a firing pin reciprocable in said bolt and spring pressed forwardly to firing position, safety mechanism comprising a sleeve non-rotatably mounted on said fire arm around the rear of said bolt and said firing pin, a safety pin mounted in said sleeve and projectable into engagement with a shoulder on said firing pin in the safe positions 20 of the pins, an actuating shaft rotatably mounted in said sleeve in intersecting relation to the path of said safety pin and in transversely extending off-set relation to the axis of said bolt, caid shaft having a first portion cut away to permit retraction of said safety pin to firing position 25and a second intermediate flatted portion enggaeable in an intermediate rotated safe position with the outer end of said safety pin to advance the safety pin into safe position, said shaft having a third portion engageable with said safety pin in a further rotated double safe position of the shaft to hold said safety pin in safe position, and a finger piece on said shaft to rotate the same, said fire arm having a bolt lock member interlocked with said shaft in the locked position of said bolt lock and the double safe position of the shaft and said finger piece.

9. In a fire arm having a bolt rotatable between locked firing position and unlocked retractable position and a firing pin reciprocable in said bolt and spring pressed forwardly to firing position, safety mechanism comprising a sleeve non-rotatably mounted on said fire arm around the rear of said bolt and said firing pin, a safety pin mounted in said sleeve in transversely extending relation to said firing pin and projectable into engagement with a shoulder on said firing pin in the safe positions of the pins, an actuating shaft rotatably mounted in said sleeve in transversely extending intersecting relation to the path of said safety pin and in off-set relation to the axis of said bolt, said shaft having a first portion cut away to permit retraction of said safety pin to firing position and a second portion engageable in a rotated safe position with 50 the outer end of said safety pin to advance the safety pin into safe position, and a finger piece on said shaft to rotate the same, said fire arm having a bolt lock member, said bolt lock member being blocked from engagement with said bolt by said finger piece on said shaft in the firing 55position of the shaft and said finger piece, said finger piece having a portion cammingly engageable with said bolt lock to move the bolt lock to unlocked position upon rotation of the finger piece to firing position.

10. In a fire arm having a bolt rotatable between 60 locked firing position and unlocked retractable position and a firing pin reciprocable in said bolt and spring pressed forwardly to firing position, safety mechanism comprising a sleeve non-rotatably mounted on said fire arm around the rear of said bolt and said firing pin, a 65 safety pin mounted in said sleeve in transversely extending relation to said firing pin and projectable into engagement with a shoulder on said firing pin in the safe positions of the pins, an actuating shaft rotatably mounted in said sleeve in transversely extending intersecting 70 relation to the path of said safety pin and in off-set relation to the axis of said bolt, said shaft having a first portion cut away to permit retraction of said safety pin to firing position and a second portion engageable in a rotated safe position with the outer end of said safety 75

 In a fire arm having a bolt rotatable between locked firing position and unlocked retractable position and a firing pin reciprocable in said bolt and spring pressed forwardly to firing position, safety mechanism comprising a sleeve non-rotatably mounted on said fire arm around the rear of said bolt and said firing pin, a safety pin mounted in said sleeve in transversely extending relation to said firing pin and projectable into engagement with a shoulder on said firing pin in the safe positions of the pins, an actuating shaft rotatably mounted in said sleeve in transversely extending intersecting relation to the path of said safety pin and in off-set relation to the axis of said bolt, said shaft having a first portion cut away to permit retraction of said safety pin to firing position and a second portion engageable in a rotated safe position with the outer end of said safety pin to advance the safety pin into safe position, and a finger piece on said shaft to rotate the same, said fire arm having a bolt lock member, said bolt lock member being blocked from engagement with said bolt by said shaft in the firing position of the shaft and said finger piece.

12. In a fire arm having a bolt rotatable between locked firing position and unlocked retractable position and a firing pin reciprocable in said bolt and spring pressed forwardly to firing position, safety mechanism comprising a sleeve non-rotatably mounted on said fire arm around the rear of said bolt and said firing pin, a safety pin mounted in said sleeve and projectable into engagement with a shoulder on said firing pin in the safe positions of the pins, an actuating shaft rotatably mounted in said sleeve in transversely extending intersecting relation to the path of said safety pin and in off-set relation to the axis of said bolt, said shaft having a first radially recessed portion to permit retraction of said safety pin to firing position and a second intermediate flatted portion engageable in an intermediate rotated safe position with the outer end of said safety pin to advance the safety with into safe position, said shaft having a third portion engageable with said safety pin in a further rotated double safe position of the shaft to hold said safety pin in safe position, and a finger piece on said shaft to rotate the same.

13. A safety attachment for a fire arm of the Mauser type having a bolt slidably and rotatably mounted in a receiver and a firing pin reciprocably mounted within the bolt with a bolt sleeve positioned along the rear of the bolt and non-rotatably engaged with the receiver, said safety attachment comprising a block adapted to be fixedly secured to the side of said bolt sleeve, a safety locking pin adapted to extend through the side of said sleeve and having its outer end received in a transverse bore in said block, an upright bore in said block intersecting said transverse bore, a shaft journaled in said upright bore and engageable with the outer end of said safety pin, a retaining screw-threaded in said block and engaged in a groove in said shaft, said shaft having a radially recessed portion permitting retraction of said safety pin from the inside of said sleeve and a flatted portion and further rotated double lock portion engageable with the end of said safety pin in the safe position of said shaft to project said safety pin into said sleeve, said firing pin having a safety groove the end of which is engaged with said safety pin in the safe position of the pins, and an arm secured to the top of said shaft and projecting laterally to a downturned finger piece at the side of said block.

ed in said sleeve in transversely extending intersecting 70 relation to the path of said safety pin and in off-set relation to the axis of said bolt, said shaft having a first portion cut away to permit retraction of said safety pin to firing position and a second portion engageable in a rotated safe position with the outer end of said safety 75 1.4



CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138465

fixedly secured to the side of said bolt sleeve, a safety locking pin adapted to extend through the side of said sleeve and having its outer end received in a transverse

bore in said block, an upright bore in said block inter-secting said transverse bore, a shaft journaled in said 5 upright bore and engageable with the outer end of said

2,824,402

having a safety groove the end of which is engaged with said safety pin in the safe position of the pins, and an arm secured to said shaft and projecting laterally to a finger piece at the side of said block.

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BARBER - PRESALE R 0138468 R2539456





BARBER - PRESALE R 0138469 R2539457

United States Patent Office

3,138,888

Patented June 30, 1964

1 3,138,888

FRIGGER SAFETY FOR BOLT ACTION RIFLE Nicholas L. Brewer, deceased, late of Tarpon Springs, Fla., by Margaret W. Brewer, executrix, Tarpon Springs, Fla., assignor, by mesne assignments, to The 5 American Hardware Corporation, a corporation of Connecticut

Original application Nov. 20, 1958, Ser. No. 775,143, now Patent No. 3,005,279, dated Oct. 24, 1961. Divided and this application May 12, 1961, Ser. No. 120,822 9 Claims. (Cl. 42-70)

The present invention relates to improvements in small arms, such as rilles or the like, and in certain aspects finds particular utility in bolt action rifles.

This is a divisional application of applicant's copending 15 application Serial No. 775,14B, filed November 20, 1958, now Patent No. 5,005,279, and assigned to Savage Arms Corporation.

The principal object of this invention is to provide improved safety mechanism for firearms, such as bolt action rifles and the like

These and related objects of the invention including the novel features by which such ends are obtained will be apparent from the following description of the disclosure found in the accompanying drawings and the particular 25 novelty thereof pointed out in the appended claims.

In the drawings:

FIG. 1 is a side elevation of a receiver and associated parts embodying the present invention with certain por-tions thereof broken away and with the action closed;

30

FIG. 2 is a plan view of the elements seen in FIG. 1 with the action open;

FIG. 3 is a fragmentary section taken on line III-III of FIG. 1, with the bolt removed from the receiver and with the shells removed from the magazine;

FIG. 4 is an exploded perspective view, on an enlarged scale, of the magazine and ejector assembly seen in FIG. J

FIG. 5 is a partially exploded perspective view on, enlarged scale and with portions in section, of the bold seen in FIG. 1; 40

FIG. 6 is a section taken on line VI-VI in FIG. 5

FIG. 7 is a perspective view on a different angle show ing the front end of the bolt seen in FIG. 5 and illustration ing its relation to the receiver which is shown partially in section and with its extractor in exploded relation;

FIG. 8 is a perspective view, with certain parts removed, showing a different angle of the rear end of the bolt seen in FIG. 5;

FIG. 9 is a longitudinal section showing the front end of the bolt as it would be locked up in the breech prepara- 50 tory to firing the illustrated cartridge;

FIG. 10 is a plan view of certain component parts seen in FIG. 5;

FIG. 11 is a section taken on line XI-XI in FIG. 5;

FIG. 12 is an elevation on an enlarged scale and with 55certain portions being shown in longitudinal section, of the firing mechanism indicated in FIG. 1;

FIG. 13 is a section taken on line XIII-XIII in FIG. 12;

FIG. 14 is a perspective view of the mechanism seen in $_{60}$ FIG. 12 detached from the receiver;

FIG. 15 is a perspective view on a different angle of the mechanism shown in FIG. 12 showing an operative relationship with the bolt; and

FIG. 16 is a section taken on line XVI-XVI in FIG. 65 12 showing only the receiver and its tang.

The present invention includes certain aspects which are related to bolt action rifles as well as other novel features having broader utility in the field of small arms as will be apparent to those skilled in the art. FIGS. 1 and 2 70 illustrate the relationship of the various components of a bolt action rifle embodying these inventive features.

2

Thus a rifle stock 20 is grooved to receive the lower portion of a receiver 22 and secured thereto by screws 24. 26 threaded into the receiver. The rifle barrel briefly indicated at 28 is threaded onto the forward end of the receiver with a lock nut 30 clamping a recoil plate 32 against the front face of the receiver 22. The recoil plate 32 may be received in a transverse slot formed in the rifle stock 20 so that, if desired, the barrel 28 may be otherwise dissociated from the rifle stock to give a free floating barrel mounting yielding greater accuracy.

A bolt 34 is slidably and rotatably mounted in the receiver 22 and may be operated by a handle 36 to carry out the functions normally associated with bolt action rifles. Thus the handle 36 may be raised from the position seen in FIG. 1 to rotate the bolt 34, and cock the firing pin. It may then be retracted (FIG. 2) to withdraw an expended cartridge shell from the firing chamber to automatically eject the shell and then moved forwardly to feed a fresh cartridge from a magazine 38 into the chamber. When the handle 36 is again moved to its 20 lower position, the bolt is locked in the breech of the rifle with the firing pin cocked in position to be released by the trigger 40. The above brief description is provided primarily to give an over-all picture of the rifle in which the present invention is embodied and the various components thereof, as well as its detailed mode of operation, will now be described in detail.

The bolt 34 best seen in FIGS. 5 through 10, and particularly in FIG. 5, comprises an elongated tubular body 42. The bolt handle 36 is provided with a hub 44 (FIGS. 5 and 8) having an inturned flange 45 which seats on the rear end of the tubular bedy 42. The hub 44 is slotted at 45 to receive diametrically opposed projections 48 extending from the rear end of the tubular body 42, thereby 35 angularly positioning the handle 36 with respect to the tubular body 42. A screw 50 is threaded into the rear end of the tubular body 42 to secure the handle 36 in place. Upill detents 51 (FIG. 10) engage grooves 53 in the hub 44 (FIG. 8) to prevent loosening of the screw 50 when the rifle is in use and yet permit easy manual disstands of the screw 50 without the need for special hand tools.

A bolt head 52 is disposed at the front end of the tubutar body 42 and has a reduced diameter 54 (FIGS. 5 and 6) telescopically received within the front end of the tubular body 42. The bolt head 52 is angularly positioned by a projection 56 struck from the upper surface of the body 42 (FIG. 6) and received by a notch formed on the inner end of the reduced diameter 54. A locking pin or cross pin 58 secures the bolt head in place on the front end of the body 42. It will be seen that oppositely extending lock lugs 60 project from the fore portion of the bolt head 52. A front baffle 62 is rotatably mounted on the reduced diameter 54 between the front end of the body 42 and the lock lugs 60 and further has oppositely extending baffle lugs 64 projecting therefrom, the baffle lugs 64 having the same general cross section as the lock lugs 60. It will also be noted that a spring friction washer 66 (FIG. 9) is disposed between the front baffle 62 and the bolt head 52 to urge the latter forwardly and thereby maintain the pin 58 in place and also to prevent the free relative rotation between the lugs 64 and the lugs 60, that is, the lugs 64 will be held from turning out of line with lugs 60 by themselves when outside the rcceiver.

The bolt 34, as thus far described, is slidingly received within a bore 65 (FIG. 3) extending lengthwise of the receiver 22, while horizontally disposed channels 70, opening outwardly of the bore 68, slidingly receive the lugs 64 and 66. The channels 70 terminate (FIG. 7) at the forwardmost position of the lock lugs 60 and the front end of the receiver is counterbored to form locking shoul-



CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138470 R2539458

ders 72 (FIG_7) which are angularly disposed to the channels 70. With this arrangement the bolt 34 is locked in the breech by moving the bolt to its forwardmost position and then rotating the handle 36 from upper position to its lower position and thus bringing the lock lugs 60 5 into engagement with the shoulders 72, thereby locking the bolt. It will also be noted that when the bolt is so rotated the baffle lugs 64 are captured in the channels 70 and their position relative to the receiver remains unchanged. This relationship of lugs 60 and 64 also involves the baffling of gases as in the event of a ruptured cartridge, all as will be later dealt with in greater detail.

After firing a shell, the bolt handle is raised to return the locking lugs 60 into alignment with channels 70 preparatory to retracting the bolt and extracting the ex- 15 pended cartridge casing from the firing chamber. The relationship of the bolt nead to the cartridge casing is best appreciated from FIG. 9 wherein it will be seen that the forward end face of the bolt head is counterbored at 73 to receive the grooved end of the cartridge case c. An 20 extractor 74 is mounted on the forward end of the bolt head 52 and includes a lip or hook 76 (see also FIG. 7) which engages the conventional groove formed in the grooved end of the casing c. More particularly, the extractor comprises a split spring band or clip having a rela- 25 tively thin annular section 78 (FIG. 7) with grooved retaining lugs 80 at either extremity, the hook 76 extending from one of the retaining lugs 80. The forward end of the bolt head is relieved at 81 (FIG. 7) to receive the annular extractor section 78 with grooves 82 (FIGS. 7 30 and 9) being provided to receive the rear portions of the retaining lugs 80, thereby positively positioning the extractor 74 relative to the bolt head 52 in an axial sense. This mounting arrangement further permits the spring band to be expanded as the retaining lugs 80 are snapped into notches 83 in the front face of the bolt head 52 with the lip or hook 76 projecting into the counterbore 73. The extractor 74 thus yieldingly hooks the rear end of a cartridge casing and is free to be deflected when the end of a cartridge case is inserted or ejected from the counter- 40 bore 73. It will be appreciated that the extractor is simple to manufacture, requires a very minimum of space and may be easily removed simply by springing one of the other of the retaining lugs 80 out of the notch dr recess 83 formed in the end of the bolt head.

The extractor 74 thus releasably grips the cartridge by the hook 76 and after firing, the bolt handle is rotated to its upper position preparatory to withdrawing and ejecting the casing. On firing the cartridge the casing will expand in the chamber and cam means are provided for 50 positively camming the bolt rearwardly to initially free the casing from the chamber. These means comprise a member 84 rotatably and slidably mounted on the bolt body 42 between the bolt handle hub 44 and the rear end of the receiver 22 (FIGS. 1 and 8). Member 84 also 55 serves as a rear gas baffle, as is later explained, and further includes a cam face 86 which is engaged by a projection 88 extending from the handle hub 44. In the last part of the upward movement of the bolt handle 36 the projection 88 engages the cam surface 86 and positively displaces the bolt 34 rearwardly thereby drawing with it the expended cartridge casing which is gripped by the lip or hook 76. It will be noted the extractor 74 is in the counterbore end of the barrel at this point and is thereby prevented from expanding as the casing is forcibly re-moved by this camming action. The bolt may then be fully retracted and the shell casing carried rearwardly to the ejector mechanism for automatically kicking the expended shell casing from the receiver.

Reverting back to member 84, it will be seen that it is 70 somewhat greater than semi-circular in cross section with its lower ends resting upon shoulders 90 (FIG. 1) formed adjacent the rear end of the receiver 22. The member 84 is normally maintained in a given angular relationship with the bolt body 42 by means of a spring pressed ball 75

3,138,888

detent 92 (FIG. 5) riding in a longitudinal groove 94 formed in the tubular body 42. This detent arrangement permits the bolt body to be rotated relative to the member 84 when the bolt handle 36 is moved to its lower position to lock the bolt in the breech of the rifle.

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Referring next to FIG. 6, it will be seen that a tapered slot 96 is cut in the lower front end of the bolt head 52 and enters the bottom of the counterbore 73. Upon retraction of the bolt 34, the slot 96 is in aligned relation with a stamped sheet metal ejector 98 (FIGS. 1 and 3) which is spring urged upwardly. As the bolt nears full retraction, the ejector 98 enters slot or groove 96 and the rear end of the casing will forcibly strike the forward face of the ejector 98, thereby kicking the casing out through an ejection port or cut-a-way 100 intermediate the ends of the receiver. It will be noted that the lip 76 (FIG. 7) is generally aligned with the port 100 so that as the rear end of the casing strikes the ejector 98 it will be thrown laterally through the port 100 in a low arc.

The ejector 98 is disposed towards the rear of a bottom or lower opening 102 formed in the receiver 22 and is provided with an integral depending tail 104 which is guidingly received by a slot 106 formed in an ejector housing 168 (see also FIG. 4). The upper end of the ejector 98 slidingly engages the rear wall of a magazine box 110 and the rear wall of the receiver opening 102. A spring 112 is captured between the bottom wall of housing 108 and a projection 114 extending rearwardly of the extractor 98. This arrangement provides for vertical reciprocating movement of the ejector 98 allowing it to move upwardly into the slot 96 of the bolt head 52 upon retraction of the bolt and to thereby eject the expended casing. The extractor is thereafter cammed downwardly as the bolt is again moved forwardly to feed another shell from magazine 38 into the firing chamber.

Referring now to the magazine 38 it will be seen that it comprises the magazine box 110 which is a sheet metal stamping bent into a rectangular configuration with the ends of the stamping meeting in abutting relation along vertical line intermediate the width of the rear wall of the magazine box as is best seen in FIG. 4. A pair of tabs or lips 116 project outwardly from the rear wall of the magazine box and receive a downbent tab 118 extend-ing from the ejector housing 108. The rear wall of the magazine box is also slotted at 120 to receive projections 122 extending from the walls of housing 108 to prevent the rear wall of the magazine 110 from spreading. It will also be noted that a lip 124 projects forwardly from the front wall of box 110 and lips 126 project rearwardly from the rear wall of the box. The lips 126 are spaced apart to permit passage of the ejector 98 therebetween and further guide said ejector. The lips 124, 126 are both spaced below the upper side edges 128 of said box, so that box 110 may preferably be mounted on receiver 22 by forming ledges 130 (FIGS. 1 and 3) longitudinally of the bottom opening 102 and opposed horizontal slots 132, 134 spaced downwardly from the ledges 130 at the forward and rear ends of the opening 102. With this arrangement, the magazine box 110 may be assembled on the receiver 22 by inserting the lips 126 fully into the slot 134 engaging the upper box edges 128 with the ledges 130 and then shifting the box forwardly a distance sufficient to introduce the lip 124 into the slot 132 and against the forward end of the receiver opening 102. The housing 65 108 with the ejector 98 and spring 112 assembled therebn is then inserted between the rear end of the box 110 and the forward end of the bottom opening 102 with the pro-jections 122 entering the slots 120. Thus lips 124 and 126 are caught in the slots 132 and 134 respectively and cannot be removed without dismantling the housing 108. It will be appreciated that while the combination mounting of the ejector 98, its housing 108 and the magazine box

adjacent the rear end of the receiver 22. The member 84 is normally maintained in a given angular relationship with the bolt body 42 by means of a spring pressed ball 75 one or the other in the manner described, utilizing the









necessary functions attributable to each and yet by either using some other form of ejector mechanism or using some other means for mounting the magazine box.

As can be seen from FIG. 1 the magazine box 110 is disposed within a central opening through the rifle stock 5 20. / A base plate 131 covers over the bottom of this opening/and is held in place by the screws 24, 26. A follower plate 133 is urged upwardly from the base plate 131 by a spring 135. This arrangement, as illustrated, permits carridges to be loaded through the upper and lower ports 10 100 and 102 into the magazine 38 in staggered relationship. The follower plate 133 is provided with an off-set projection 137 (FIG. 2) which insures that the cartridges will be caught on one side or the other of the bottom opening 102 (see FIG. 3) and not be fed loosely from 15 the magazine 38. The cartridges project upwardly a suffi-cient distance so that upon full retraction of the bolt 34 the rear end of the uppermost cartridge is picked up for projection by the holt 34 centrally from the magazine and then carried into the firing chamber as the bolt is moved forward. It will be seen that the inbent ridges 139 are formed on the side walls of the magazine box 110 to engage the forward shoulders of the cartridge casings to prevent shucking of the cartridges and consequent damage to the tips of the bullets.

The firing mechanism for the present invention is uniquely simple and comprises a firing pin 136 (FIG. 5) centrally disposed within the tubular bolt body 32 and projecting through a central bone of the bolt head 52. A firing pin stop nut or stop piece 138 is threaded on the forward end of the firing pin 136 and is engageable with the rear end of the reduced bolt head diameter 54 to limit the protrusion of the forward end or point 141 of the firing pin 136 beyond the counterbore 73. The point 141 of the firing pin 136 is best seen in its cocked position in FIG. 9, wherein it can also be seen that the bore in the outermost end of the bolt head closely approximates the diameter of the point of the firing pin to minimize the amount of gas which may be blown rearwardly through the bolt body 42. As has been noted, the ston piece 138 controls the extent of firing pin protrysion, this being established by threading the stop piece 138 to the appropriate axial position on the firing pin 136

A lock washer 140 (FIG. 5) maintains the stop piece 138 in adjusted position. More particularly, the lock 45 washer 140 is formed with a central opening having a straight edge which non-rotatably engages a lat 142 formed lengthwise of the firing pin 136 and has spurs projecting outwardly and received in notches formed in the rear end of the stop piece 138.

A main spring 144 is coiled about an intermediate length of the firing pin 136 and is seated at its forward end on the lock washer 140 and at its other end on a washer 146 which is axially positioned on the firing pin 136 by a cocking piece 148 threaded on the rear end thereof to preload the spring 144. The washer 146 is also non-rotatably mounted on the firing pin 136 by reason of a central hole having a straight edge (FIG. 11) cngaging the flat 142. A sleeve 150 slidably surrounds the cocking piece 143 (FIG. 5) and is provided with pro-jections 152 (FIG. 11) at its forward end which interdigitate with spurs extending outwardly of the washer 146. The sleeve 150 (FIG. 10) at its rear end butts against a shoulder formed on the assembly screw 50 and is rotatably mounted thereon by means of indentations as at 154 which engage a peripheral groove 156 formed in the forward end of the screw 50. The sleeve 150 is provided with a lengthwise slot 158 having a width somewhat less than the diameter of a transverse hole 150 formed adjacent the rear end of the cocking piece 148. A cocking pin 162 (FIG. 8) is disposed within the hole 169 (FIG. 5) and retained therein by the marginal edges of the sleeve slot 158 embracing a necked portion ad-jacent the head of the pin 162. The head of cocking

3,138,888

body 42 passing through a cam opening 164 formed therein.

With this arrangement of parts, the firing pin may be cocked and fired in the following fashion. From FIG. 12 it will be seen that the head of the cocking pin 162, in the forward position of the bolt is disposed within the rear of receiver 22, entering into the near channel 70. A sear lever 156 projects upwardly into the near channel 70 (see also FIG. 13) in obstructive relation to further forward movement of the cocking pin 162, and is integrally formed on a sear 169 to be later described in detail.

Normally the firing pin 141 is held in a retracted or cocked position by reason of spring 144 being compressed and held by the cocking pin resting in a notch 168 (FIG. 5) formed adjacent the rear end of the cam opening 164. In this position of the cocking pin 162 the cocking piece 148 and striker 136 are of course retracted while the spring 146 is compressed since the washer 146 is held 20 relatively stationary by the sleeve 150. The above describes the relative disposition of the cocking pin 162 and related parts as the bolt 34 is moved forwardly to close the action of the rifle. After the action is closed, the boit handle 36 is lowered to locked position as above 25 described. In so lowering the handle 36, the bolt body 42 is rotated relative to the receiver 22 while the cocking pin remains relatively stationary being captured in the channel 70. The cocking pin 162 is thus held in cocked position at the rear of the greatest lengthwise extent of the 30 opening 164 and the rifle is in readiness to be fired. Finger pressure on the trigger 49 will release the sear 169, in a manner later described, allowing the sear lever to swing downwardly out of the path of forward movement of the cocking pin 162 thereby permitting the firing pin to percussively strike the cartridge in the firing chamber under the influence of main spring 144. It will be noted that the cocking piece 148 is axially adjusted on the firing pin 136 to prevent the cocking pin 162 from striking the forward end of the opening 165.

After the rifle has thus been fired the bolt handle 36 raised to its upper position thereby rotating the tubular bolt body 42 relative to the cocking pin 162. During this rotation the angularly confined pin 162 is displaced rearrardly by cam surface 171 (FIG. 5) of the opening 164 thereby camming the cocking pin 152 and with it the firing pin 136 rearwardly and reseating the cocking pin 162 in the notch 168. Spring means, later described, return the sear lever 166 to the position illustrated in FIG. 12 and the firing cycle just described may be repeated after retraction of the bolt 34 to eject an expended cartridge 50 casing and return movement of the bolt to feed a fresh cartridge into the chamber.

The bolt and firing pin assembly above described com-prise parts which may be readily fabricated primarily by screw machine operations and by sheet metal stampings. Their assembly in the original manufacture of the rifle 55 as well as their disassembly for repair or adjustment is ex-tremely simple and convenient. Disassembly involves merely the removal of screw 50 together with sleeve 150, removal of cocking pin 162, withdrawal of the firing pin 136 and removal of the pin 58 to take down the component parts of bolt 34. The main spring 144 may be removed by threading the cocking piece 143 off the rear end of firing pin 136. Adjustment of the extent of protrusion of the point 141 of the firing pin, may be made by telescoping the bolt head 52 over the point 141 in abutting relation with the stop piece 138. With lockwasher 140 removed, stop piece 138 may be varied axially of firing pin 136 to obtain the desired extension of point 141 beyond the inner face of counterbore 73. The ex-70tent of protrusion may be gauged by the sleeve 150 (FIG. 10). With the extractor 74 removed the sleeve projections 152 may be brought against the counterbore 73 on either side of the firing pin 141 and the amount of propin 162 is disposed adjacent the outer surface of the bolt 75 trusion set to match the height of the projections 152

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3,138,888

which height is in fact the preferred distance for protrusion of the firing pin.

Normally when a cartridge is discharged its casing is expanded into sealing contact with the walls of the firing chamber preventing rearward escape of gases so that at least substantially all of the gases are propelled outwardly through the barrel of the rifle. However, in the case of an ineffective seal or rupturing of the cartridge casing, gases may blow back rearwardly of the firing chamber past the boit head 52 which is locked in the breech of 10 the firing chamber. In order that gases may not injure the user of the rifle, various ports and baffles are provided to deflect such gases laterally of the receiver. In FIG. 7, the tapered slot 96, when the bolt head is locked, is disposed to provide communication, for the forward end of 15 the bolt head 52 with a lateral hole 151 formed in the receiver 22 forward of the channel 70 (FIG. 2). The slot 96 thus provides conduit means for conducting gases from the rifle chamber to a predetermined location in the receiver. It will be noted that the baffle lug 64 is aligned 20 with the slot 96 and the port 151 for deflecting gases outwardly through the port 151. This will effectively minimize the passage of gases rearwardly of the front baffle. What little gas may pass between the bolt and receiver is throttled as it enters the opening 100 thereby safely dis- 25 sipating its effect.

There may also be a possibility of gases passing through the firing pin hole opening of the counterfore 73 (FIG. 9). Such gases would pass interiorly of the bolt head 9). and then be vented for the most part through a port 153 (FIG. 7) communicating with the interior of said bolt and aligned with a port 155 (FIG. 2) formed in the receiver 22. The firing pin hole and port 153 provide conduit means for conducting gases from the rifle chamber to a predetermined location in the receiver. The bafile 35 lug 64 is aligned with the ports 153 and 155 for deflecting gases outwardly of the receiver through the port 155. This effectively minimizes the passage of gases rearwardly of the baffle. There is also a possibility that some gases will pass rearwardly through the bolt body 42 and escape through the cam opening 164 which in the firing position, of the bolt is enclosed within the rear end of the received 22. In order to prevent gases from escaping from the rear of the receiver 22 adjacent the eye of the shooter, member 84 is arranged to serve as a baffle member and is positioned at the rear end of the receiver to insure lateral deflection of such gases. This position of the member 84 is automatically provided for by the manner in which it is mounted on the bolt body 42. As has been noted, the member 84 is rotatable on the body 42 and as can be seen, is also axially slidable thereon. Thus, in the primary ejection of an expended cartridge the member 84 will be firmly seated against the rear face of receiver 22 when projection 88 (FIG. 8) engages cam surface 86 as previously described. This position of member 84 is also assumed when the action is locked, as indicated in FIG. 1.

The rear baffle is free to slide forwardly and rearwardly slightly so that pressure of escaping gas will move it backward if necessary to escape.

The sear 169 and trigger 40 also embody certain novel 60 features which will be apparent from the following detailed description of their construction and operation with particular reference being had to FIGS. 12-16.

A U-shaped trigger mounting bracket 172 is secured beneath a tang 174 extending rearwardly of the receiver 22. More particularly the bracket 172 comprises a sheet metal stamping having its bridge vertically disposed towards the rear of tang 174. A tab 180 is bent rearwardly from the upper edge of the bridge of bracket 172 and is received in an appropriate recess 177 (FIGS. 12 and 16) formed 70 adjacent the rear end of a slot 176 extending through the rear portion of tang 174. Recesses 181, 183 (FIG. 13) are formed on opposite sides of the lower surface of the receiver 22 and provide vertical faces which are embraced by ears 182 extending upwardly from the front 75 of an upward projection from the safety member 190 and

ends of the arms of bracket 172. A pin 184 extends through the ears 182 and the embraced portion of receiver 22 to secure the front end of bracket 172 thereto with its upper edges engaging the lower surface of tang 174 and its rear end retained in place by tab 180. The pin 184 is thus the single fastening element for the trigger mounting -bracket 172.

The trigger 40 is pivotally mounted on a pin 186 extending between depending ears 187 (FIGS, 12 and 15) of the bracket 172. The trigger 40 comprises, as can be seen, a rearwardly extending leg 188 which is cooperatively disposed relative to a safety member 190, later described in detail, and a forwardly extending leg 192 which is disposed in cooperative relationship with the sear 169.

The scar 169 is bent from a single piece of sheet metal and comprises two U-shaped portions one of which includes a bridge 196 (FIGS. 14 and 15) and arms 194, 195 embracing the bracket cars 182 (FIG. 13) and pivotally mounted on the pin 184. The second U-shaped portion comprises a second bridge 197 interconnecting the arm 195 with a third outwardly spaced arm 199.

The sear lever 166 is formed as an integral extension of the sear arm 195 and projects through slot 201 into channel 70 (FIGS. 13 and 16) to cooperate with the cocking pin 162 as above described. The sear arm 199 extends upwardly receiving the unheaded end of pin 184, and extending above the stock 20 (FIG. 13) adjacent a relieved portion 203 of the receiver 22. The upper end of arm 199 is outbent to provide a visual indicator 205 which may readily be checked when the action is closed to determine whether or nor the firing pin is cocked. That is, when the firing pin is cocked the indicator 205 is in its upper position seen in FIG. 12, and after the gun has been fired, forward movement of the cocking pin 162 depresses the sear lever 166 into slot 201 and rotates the sear 169 bringing the indicator 205 to a lower horizontal position.

A torsion spring 206 (FIGS, 12 and 13) is disposed between the sear arms 195, 199, being concentrically positioned on the pin 184 by a bushing 208. The free ends of the torsion spring 206 respectively bear against the rear surface of receiver recess 183 and the upper end of the bridge 197 to urge the sear 169 in a counterclockwise direction (FIG. 12) and thus return the cocking lever 166 to its upright position when the firing pin is cocked by manipulation of the bolt handle 36 as above described. The scar 169 is latched in what may be termed its cocked position by the lower knife edge of the bridge 196 bearing against the forward face of the trigger leg 192. It will be seen that a spring loaded plunger 210 (FIG. 12) bears against the trigger leg 138 to urge the trigger leg 192 into obstructive relation with the sear bridge 196. When the action is closed and the bolt locked in the receiver, the head of $\operatorname{cocking pin 162}$ will engage the sear lever 166 and under the influence of main spring 144 tend to rotate the sear in a clockwise direction (FIG. 12) bringing the knife edge of bridge-196 into firm engagement with the forward face of trigger leg 192. The extent of this engagement is adjustably controlled by a screw 212 threaded into the outer end of leg 192. It will be apparent that if the screw 212 were threaded further inwardly of the leg 192 the bridge 196 would be disposed nearer the upper edge of the leg 192 and conversely if the screw 212 were threaded outwardly the spring loaded plunger 210 would rotate the trigger to space the knife edge of bridge 196 further from the upper edge of the leg 192. In this manner the extent of trigger travel necessary to release the cocking pin 162 may be controlled to suit the needs of the user of the gun.

The spring loaded plunger 210 is mounted on the safety member 190 which is longitudinally slidable between the arms of the trigger bracket 172.

The safety member 190 is provided with a thumb piece 220 which is integrally formed as a rearward extension







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BARBER - PRESALE R 0138473 R2539461

projecting upwardly through the tank slot 176. The thumb piece 220 (FIG. 12) slidably engages the upper surface of tang 174 to provide the rear bearing point for the safety member 190. A pin 222 extends between the arms of bracket 172 and slidingly supports a forward horizontal undersurface of the safety member 190. An adjustable intermediate bearing point for the safety member is provided by an upwardly projecting screw 224 which is threaded into the safety member 190 and bears against the lower surface of tank 174.

Various surfaces formed on the trigger leg 188 cooperate with the safety member 190 as will now be described. A raised land 226 is formed at the rear of leg 188 beneath a screw 228 projecting from the safety member 190. When the safety member is in the "safe" position illustrated in FIG. 12, the screw 228 is in obstructive relation with land 226 thereby preventing any rotation of the trigger 40 sufficient to bring the leg 192 out of obstructive relation with the sear bridge 196, which in turn prevents release of the cocking pin 162 and discharge of the piece. 20 The safety member is also arranged to lock the bolt 34 so that the action cannot be inadvertently opened when the gun is in <u>"safe" condition</u>. This is attained by an upstanding lug 230 projecting from the forward end of the safety member 190 through a second tank slot 232 (FIGS. 12 and 16) spaced forwardly of the slot 176. The bolt handle hub 44 is notched at 234 (FIG. 15) to receive the lug 230 when the bolt 34 with the action closed.

The trigger leg 188 is transversely notched at 229 to 30 receive the spring loaded plunger 210 to provide detent means for releasingly maintaining the safety member 190 in its "safe" position.

The safety member 190 is displaced forwardly of the notch 229 to a further "safe" position in which the screw 35 228 will still be disposed above the land 226 preventing releasing movement of the trigger 40 and wherein the lug 230 will be disposed forwardly of the bolt handle hub 44. In this position of the safety member 193 the action may be opened and closed by manipulation of the bolt <u>40</u> handle 36, as, for example, to discharge an expended cartridge casing, or to empty the magazine 38 by reciprocation of bolt 34 without danger of firing the rifle.

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In the forwardmost or firing position of the safety member the screw 228 is spaced forwardly of the raised land 226 allowing sufficient movement of the trigger 40 to release the sear 169, thereby releasing the Gring pin. A second transverse notch 231 is formed in the trigger leg 188 to receive the spring loaded plunger 210 and releasably maintain the safety member 190 in its fir-50ing or inoperative position. Travel of the trigger beyond that necessary to bring the leg 192 out of obstructive relationship with the sear bridge 196 may be limited by a screw 236 threaded into the same hole as the screw 224 and projecting from the lower surface of safety mem- 55 ber 190. Thus, immediately upon release of the sear 169 the trigger leg 188 may be arranged to engage the screw 236 thereby minimizing the extent of trigger travel after firing the rifle. The force of trigger pull is primarily controlled by a spring 216, confined by a screw 218, and 60 (FIG. 12) urging the plunger 210 into engagement with the trigger leg 188. The force of spring 216 may be varied by the extent to which screw 218 is threaded into the safety 190. With the safety member 190 in the il-65 lustrated safe position, it will be seen that the upper end of screw 218 is accessible through slot 176 to receive a screw driver whereby the force of spring 216 may be readily adjusted without disassembly of the rifle components.

A further point to be noted is that the scar lever 166 also serves as a bolt stop. That is, when the bolt is retracted, the right hand (FIGS. 5 and 13) baffle lug 64 will engage the sear lever 166 thereby limiting rearward travel of the bolt 34. When it is desired to remove the bolt, 75

3,138,888

trigger 40 is pulled to drop the trigger leg 192 below sear bridge 196 and then cocking indicator 205 is depressed (see also FIG. 12) to lower cocking lever 166 below the level of channel 70 thereby permitting the bolt 34 to be withdrawn from the receiver 22.

Operation

The rifle is loaded by inserting cartridges downwardly into the magazine while the bolt 34 is disposed in its re-10 tracted position. A cartridge is rammed into the firing chamber of the rifle by forward movement of the bolt. lip 76 of the extractor 74 engaging the groove of the cartridge case. As the bolt 34 is moved forwardly in the receiver the cocking pin 162 engages the sear lever 166 (FIG. 12). When the bolt is rotated to its breech closing position, the cocking pin is prevented from rotating by channel 70 of the receiver and is held in its cocked position at the rear of the bolt cam opening 164 (FIGS. 5 and 8) by the sear lever 166. The cocking indicator 205 (FIG. 12) is disposed in its upwardly extending position indicating the cocked condition of the rifle. When the bolt is rotated to its locked position, the lock lugs 60 are carried into engagement with the shoulders 72 in the breech end of the receiver thus locking the bolt in its closed position. The baffle lugs 64 are prevented from rotating by channel 70 and are held thereby in axial alignment rearwardly of the receiver gas escape ports 151 and 155 (FIG. 2) and the slot 96 and port 153 (FIG. 7) on opposite sides of the bolt 34.

The cocking pin 162 is held in its cocked position against the force of the compressed main spring 144 by the sear 169 which is prevented from rotating by the trigger leg 192. As shown in FIG. 12, the plunger 210 urges the trigger leg into its sear engaging position. When the trigger is pulled, the plunger 210 is forced upwardly against spring 216 and the trigger leg 192 is pivoted downwardly releasing the cocking pin 162. The firing pin is thrust forwardly by the main spring 144 firing the round in the chamber and the cocking pin 162 moves the scar lever 166 downwardly out of the channel 70.

In the event of rupture of a cartridge case, escaping gases are deflected outwardly through the gas escape ports by means of the baffle lugs 64. Furthermore, any gas which might escape rearwardly of the baffle lugs will be deflected outwardly by the rear baffle 84.

To discharge the cartridge case after a round is fired, the bolt handle 36 is rotated counterclockwise. Pro-Jection 88 (FIG. 8) of the bolt handle engages the cam face 86 of the rear baffle and the bolt is cammed rearwardly to break the seal of the cartridge case in the chamber.

As the bolt handle <u>36 is raised</u>, the cocking pin <u>162</u> is prevented from rotating by channel **70** (FIG. 12) and is displaced rearwardly by the cam surface **171** (FIG. 5) of the opening <u>164</u>. The cocking pin <u>162</u> is thus reseated in the notch <u>168</u> is position prior to loading the round into the chamber. The sear spring <u>206</u> returns the sear <u>169</u> to the position illustrated in FIG. 12.

As the bolt is pulled rearwardly to eject the cartridge case, the ejector 98 is received in the slot 96 (FIG. 6) of the bolt and the <u>ejector strikes the</u> lower edge of the cartridge case which is then ejected from the receiver. Another round may then be loaded into the chamber and the firing cycle repeated.

It will be noted from the disclosure as seen in the drawings that the rifle is for a right handed shooter. Very few parts of the assembly would require changes in order to convert the same for left handed shooting. The bolt body, handle, and head, the extractor, the receiver port, the rear baffle, and the stock are the only parts requiring conversion to manufacture guns for the left <u>hand</u> shooter. The remaining mechanism need not be <u>altered</u> and accordingly most of the component parts can be interchangeably used for right hand or left hand rifles.



Having thus described the invention what is novel and desired to be secured by Letters Patent of the United States is:

1. In a rifle/or the like, a receiver having a lengthwise bore, a boilt slidable therein, a sear for holding the firing mechanism of said bolt in cocked position in the normal position of said sear, said receiver having opposed recesses formed in its lower portion generally beneath the reat end thereof, said recesses including opposed vertical faces, said receiver further comprising a rear- 10 wardly extending tang having a slot adjacent its rear end, a U-shaped sheet metal trigger mounting bracket having its bridge generally vertically disposed and aligned with the rear end of said tang slot and with its arms extending forwardly thereof, the bridge of said bracket having 15 a tab extending upwardly through said tang slot and rearwardly to engage an upper surface of said tang, said bracket further Having ears extending upwardly from the forward ends of its arms and embracing the vertical faces of said receiver recesses; a retaining pin extending 20 through said bracket ears and said receiver as the single fastening element for mounting said bracket on said receiver, a trigger being pivotally mounted on a pin extending between the arms of said mounting bracket beneath and to the rear of said retaining pin, said sear be- 25 ing mounted on said retaining pin said trigger having a first leg for engaging said sear and releasably holding said sear in its normal position, said trigger further having a second leg extending rearwardly of its pivotal pin and being generally horizontally disposed, a safety mem- 30 ber slidably mounted between the arms of said bracket and means for guiding said safety for longitudinal movement between a safe position in which the safety member is in obstructive relation with said second trigger leg preventing disengagement of said first leg from said sear 35 and a firing position wherein the trigger may be moved to disengage said first leg from said sear and the rifle fired, the means for guiding said safety member comprising a thumb piece slidably engaging the upper surface of said tang and joined to said safety member by an integral upright portion extending through said tang slot a pin extending between the arms of said mounting bracket and engaging a horizontal undersurface of said safety member and a bearing projection extending upwardly from said safety member and engaging the undersurface of said tang intermediate said thumb piech and said bearing member.

2. In a rifle or the like as in claim 1 wherein a raised land is formed on the rear end of said second trigger leg and a safety screw is threaded into the undersurface $_{50}$ of said safety member and is disposed above said raised land and in obstructive relation to releasing movement of said trigger in the safe position of said safety member, said safe position being the rearward position of said safety member and said safety member being slideable 55 forwardly to dispose said safety screw in advance of said raised land in the firing position of said safety member.

3. In a rifle or the like as in claim 2 wherein the tang has a second slot spaced forwardly of the first-mentioned 60 tang slot, the bolt has a hub having a notch in its lower surface opening forwardly of said hub and disposed above said second tang slot and wherein the safety member has an upwardly extending projection passing through said 65 second tang slot and entering said notch in the safe position of said safety member to prevent rotative movement of said bolt.

4. In a rifle or the like as in claim 3 wherein longitudinally spaced front and rear notches are formed in the 70 upper surface of said second trigger leg with the rear notch being disposed immediately in advance of said raised land and a spring loaded plunger projects from the lower surface of said safety member and enters said rear

ters the front notch in the firing position of said safety member.

5. In a rifle or the like as in claim 4 wherein the spring loaded plunger is mounted in a vertical hole in said safety member and a compression spring is urged thereagainst by a screw threaded into the upper end of said hole and wherein said screw is accessible through said rear tang slot for adjustment to vary the pressure exerted by said spring on said plunger and thereby vary the force required for pulling the trigger.

6. In a rifle or the like, as in claim 4 wherein the relative spacing between the notches on the rear trigger leg, the raised land thereon, the safety screw, the safety member projection for entering the hub notch are such that in the rear safe position of the safety member the safety screw is in obstructive relation with said raised land and the upwardly extending safety member projection is engaged with the hub notch with the spring loaded plunger entering the rear notch on the trigger leg and when the plunger is disposed intermediate said front and rear notches, the safety screw is in obstructive relation with said raised land preventing releasing movement of said trigger and said upwardly extending safety projection is disposed in advance of said hub notch thereby permitting rotation of said hub and when the plunger enters said front notch the safety member is moved in advance of said raised land and out of obstructive relation therewith.

7. In a rifle or the like comprising a receiver having a lengthwise bore, a bolt slidable therein, said receiver having a tang extending rearwardly thereof with a slot formed adjacent its rear end, a U-shaped trigger mounting bracket having its bridge vertically disposed and aligned with the rear end of said tang slot with its arms extending forwardly thereof, the bridge of said bracket having a tab extending upwardly through said tang slot and rearwardly to engage an upper surface of said tang, said bracket being secured to said receiver by a single retaining pin extending through the forward ends of the bracket arms and a portion of said receiver, a trigger pivotally mounted on a pin stending between the arms of said mounted bracket, said trigger having a sear engaging portion and a horizontal rearwardly extending leg, a safety member slidably mounted between the arms of said bracket and guided for horizontal movement between a rearward safe position and a forward firing position, a spring loaded plunger slidably mounted in a vertical hole formed in said safety member, a compression spring bearing against said plunger and unging it downwardly into engagement with said trigger leg, said spring being confined at its upper end by a screw threaded into said vertical hole, front and rear notches formed in said trigger leg and spaced apart a distance approximating the movement of said safety member between said safe, and firing positions and in combination with the plunger serve as detent means for said safety member as well as providing the means for urging said trigger into latching engagement with said sear.

8. In a rifle or the like as in claim 7 wherein a screw is threaded into said safety-member forwardly of said plunger and depending therefrom and obstructively engaging said second trigger leg upon a predetermined travel of the leg past that necessary to release the sear.

9. In a rifle or the like comprising a receiver having a lengthwise bore, a bolt slidable therein, said receiver having a tang extending rearwardly thereof with a slot formed adjacent its rear end, a U-shaped trigger mount ing bracket having its bridge vertically disposed and aligned with the rear end of said tang slot with its arms extending forwardly thereof, the bridge of said bracket having a tab extending upwardly through said tang slot and rearwardly to engage an upper surface of said tang said bracket being secured to said receiver by a single retaining pin extending through the forward ends of the bracket arms and a portion of said receiver, a trigger pivotally mounted on a pin extending between the arms notch in the safe position of said safety member and en- 75 of said mounted bracket, said trigger having a sear engag-





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sear.

ing portion and a horizontal rearwardly extending leg, a safety member slidably mounted between the arms of said bracket and guided for horizontal movement between a tearward safe position and a forward firing position, a spring loaded plunger slidably mounted in a vertical hole 5 tormed in said safety member, a compression spring bearing against said plunger and urging it downwardly into engagement with said trigger leg, said spring being confined at its upper end by a screw threaded into said vertical hole, front and rear notches formed in said trigger 10 leg and spaced apart a distance approximating the movement of said safety member between said safe and firing positions to serve as detent means for said safety member





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March 21, 1975

J. H.

Model 700-4000-4002 Three-Position Safety

in economic evaluation has been completed on the proposal to re-design the present Two-Fosition Safety to a Three-Position Safety on the Models 700-40MC-40XR rifles. Presently, the bolt on these rifles can be unlocked and opened only when the safe is in the 'Fire' position. The Three-Fosition safe would enable the bolt to be opened in either the 'Fire' position or the new 'U' position. On the 'U' position the rifle could not fire.

The economics indicate an annual cost increase of \$4400 and an expenditure of \$25,600 for new tooling and fixturing. The full book unit cost indicates a cost increase of \$.056 for each rifle.



JP/mc

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G. E. Puckett A. D. Kerr C. B. Workman W. E. Leek J. J. Marley J. Kowalski Est. File #3401

March 21, 1975



An economic evaluation has been completed on the proposal to re-design the present Two-Position Safety to a Three-Position Safety on the Models 700-40XG-40XR rifles. Presently, the bolt on these rifles can be unlocked and opened only when the safe is in the 'Fire' position. The Three-Position safe would enable the bolt to be opened in either the 'Fire' position or the new 'U' position. On the 'U' position the rifle could not fire.

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METHODS & STANDARDS SECTION Carlson, Superintendent Polinka John Pelivka Ъv

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MODELS 700 - 40XC - 40XR 3- POSITION SAFETY

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BARBER - PRESALE R 0138481

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BARBER - PRESALE R 01384812539469

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

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CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138484 R2539472

BARBER - PRESALE R-013048505171	DA. $DAFE - F.($	o. CARLSC	
PROCESS ENGINEERING ES	TIMATE - TRIAL /.ND	PILOT SHE	ET .
• SEQUENCE	E OF OPERATIONS *		
HODEL 40XE COMPONENT FIND	L ASSEMBLY	PARTNO	
DATE 1-SETS COMPLETER KOULA	15-1	SHEET I	
		DEPT HOUSE	
NO. OPERATION NAME	MACHINE	NO. DESIGN	BOILD
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BARBER - PRESALE R 0138485 R2539473

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PROCESS ENGINE ERING ESTIMATE - TRIA LAND PILOT SHEET * SEQUENCE OF OPERATIONS *

MODEL 700- COMPONENT FULL	ASSENBLY RH. LH	_ PA	RT NO	
PATE 8.75 COMPUTER KOW!	ALSKI		SHEET	OF
PER / OPERATION NAME	MACHINE	DEPT.	HOURS	HOURS
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BARBER - PRESALE R 0138487 - POSTINIS SAFE -

PROCESS ENGINE ERING ESTIMATE - TRIA _ AND PILOT SHEET

• SEQUENCE OF OPERATIONS •

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PATE 10-75 COMPUTER KOWL	<u>LSKI</u>	<u>؛</u>	SHEET	OF
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BARBER - PRESALE R 0138488	FIGN SAFE -			
PROCESS ENGINEERING ES	TIMATE - TRIAL AND	FIL	OT SHE	EET
SEQUENCE	OF OPERATIONS .			5810
MODEL HO XC COMPONENT RECE	INER	Φ.Δ	RT NO 3	3575
DATE 1-10-75 COMPUTER KOWA	ALSKI	- ' -	SHEET _1	OF 1
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•	• SEQUENC	LOF OPERATIONS •		
MOC	COMPONENT KEC	EIVER -1974- LEFT	_ PA	RT NO - 222 C
DATE	AFR-AD COMPUTER DOWA	LSKI (TAND)		SHEET OF
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RD-6568 1-18-63

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON
3 POSITION SAFE

PROCESS ENGIN IERING ES	TIMATE - TRIAL AND	PIL	OT SHEET	
MODEL TOO . HOKE COMPONENT SAFE DATE 1477 7 FL COMPUTER KOW	M ASSENS, - RIGHT	- PA	RT NOB-26	53
OPER OPERATION NAME	MACHINE	DEPT. NO.	HOURS HOU DESIGN BUIL	RS LD
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NO OPERATION NAME	MACHINE	NO.	DESIGN	BUILD
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- 3 POSITION SAFE-

PROCESS ENGINEERING ES	TIMATE - TRIAL AND	PIL	OT SHE	ET
• SEQUENCE	OF OPERATIONS .		uls	
NODEL 30-401-4-R-COMPONENT_SAF	ETY - (RIGHT HAND)	. PA	RT NO.	2.15370
DATE V-ATTAL COMPUTER KOWAL	541	9	SHEET _1	OF
OPER / OPERATION NAME	MACHINE	DEPT.	HOURS	HOURS
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- 3 Posit	TION JAFE -			
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• SEQUENC	E OF OPERATIONS .		ME	T MIZ
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CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON - 3 POSITION SAFE-

PROCESS ENGINEL'RING ESTIMATE - TRIAL AND PILOT SHEET

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OPERATION NAME	MACHINE	DEPT. NO.	HOURS DESIGN	HOURS
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CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON BARBER - PRESALE R 0138494 R2539482

- 3 Posit	ION SAFE -			•
PROCESS ENGINEERING ES	THATE - TRUL AND	PIL	OT SHE	
• SEQUENCE	E OF OPERATIONS . LEP	T	μ	·LP
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Chite IA M-75 COMPUTER KOU	i Al-Six i	- 1 -		05 } .
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CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON BARBER - PRESALE R 0138495 R2539483

BARBER - PRESALE R 0138496	a and a second and a
- 3 POSITION	J SAFE -
PROCESS ENGINE ERING E	STIMATE - TRIAL AND PILOT SHEET
• SEOLEN	CE OF OPERATIONS " R
	KIGH & LOFT
MODEL OF COMPONENT	HALE HERE AND ART NO. ALC
$\frac{DA}{12} \frac{1}{1} $	VACSK-I OF I
NOL / \ OFERATION NAME	MACHINE DEPT. HOURS HOURS NO. DESIGN BUILD
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SAME AS PRESENT	STOCK ASSEMBLY
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	FORMER-L.AUT. D.84453 ALTER 2 10
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BARBER - PRESALE R 0138497 - 3 POSITION SAFE -PROCESS ENGINEERING ESTIMATE - TRI/ L AND PILOT SHEET • SEQUENCE OF OPERATIONS • 3.33510 PART NO. 33501 ttovere: AnXCHE COMPONENT. 40 D E L った фате V KOULLEKA SHEET 1 **k**a COMPUTER . . OF 🔟 DEPT. HOURS HOURS F OPERATION NAME MACHINE NO. DESIGN BUILD NOTE ; STOCK SJ ٦F AS PRESE 00 EY.CENS THE Fou 477 . 60 5/0 RTR INIET MACHINE SAME EXCEPT SAFETY CLEATZ Haes TAPE 3 SLOT 15 LARGE • TOTAL

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

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BARBER - PRESALE R 0138497 R2539485

BARBER - PRESALE R 0138498				
PROCESS ENGIN LERING ES	TIMATE - TRIAL AND	FIL	OT SHE	
• SEQUENCE	OF OPERATIONS .		D.	22530
MODEL 40X COMPONENT	<u> </u>	PA	RTNOD	1:0701
PATE 1-10-75/ COMPUTER KOWL	<u>Leit</u>	S	SHEET _\	OF
OPERI / OPERATION NAME	MACHINE	DEPT. NO.	HOURS DESIGN	HOURS BUILD
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BARBER - PRESALE R 0138498 R2539486

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PROCESS ENGIN LERING ES	TIMATE - TRIAL AND	PILOT SHE	ET
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MODEL DO. 4975 COMPONENT TELS	GER SIDE PLATE . RICH	T PART NO.	- 30780
PATE A -TA COMPUTER KOWA	LSIGI HANS	> SHEET	OF 2
OPERATION NAME	MACHINE	DEPT. HOURS NO. DESIGN	HOURE BUILD
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CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON BARBER - PRESALE R 0138499 R2539487

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PROCESS ENGINIERING E	STIMATE - TR	IL AND	PIL	OT SHE	ET
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	cc:	R.E. W.H.	. Fielitz . Coleman	 F&FP F&FP	-	B11218 Ilion
E. I. DU PONT DE NEMOURS & COMPANY						
LEGAL DEPARTMENT						
	June	28,	1985	•		

F. E. Martin F & FP Department Ilion

Patent Proposal FP-0045 A Fire Control for Bolt Action Rifles Having a Trigger and Sear Block

Your Request to File a Patent Application dated December 10, 1982 has been given the above case number. The class code is 8FAO. Don Huntley will be handling your Request. Any questions or additional information should be directed to his attention.

JTC:jcb

Attachment

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BARBER - PRESALE R 0138507 REMINGTON ANIAS COMPANY. INC. INTER-DEPARTMENTAL CORRESPONDENCE mington DETERS MANT OUR LETTER TO ONE SUBJECT ONLY". Ilion, New York December 7, 1982 SENINGTON ARAIS SO. 14 RECEIVED DEC1 0 1982 Barry Estri PATENT DIVISIO Patent Department Bridgeport FP-00 **INVENTION REPORT NO. IT-300** A FIRE CONTROL FOR BOLT ACTION RIFLES HAVING A TRIGGER AND SEAR BLOCK FRED E. MARTIN BOX 599, RD #2, DUTCH HILL ROAD FRANKFORT, NEW YORK 13340 REASON FOR DEVELOPMENT A fire control featuring a sear block along with a trigger block was developed to eliminate unwanted trigger movement when the safety is in the on safe position. THE PROBLEM A major problem with present fire controls used in bolt action rifles has been unwanted and unnecessary trigger movement when the safety is in the on safe position. The trend has been to allow this movement to exist unless specifically addressed by the use of a trigger block safety. A trigger block safety was used on the early Remington M/788.

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BARBER - PRESALE R 0138508

Invention Report No. IT-300 A Fire Control For Bolt Action Rifles Having a Trigger and Sear Block

Other safeties in use are the firing pin block used by U.S. Repeating Arms (Winchester) and Weatherby.

SUMMARY OF INVENTION

The trigger block plunger has an enlarged tip that is depressed by the safety into a recess in the trigger when in the on safe position. The plunger releases the trigger by seating in a conical recess in the safety lever in the fire position. The plunger is mounted thru the trigger and housing and is spring loaded to the unblocked position.

INVENTION DISCLOSURE

Completely assembled this unit consists of the present trigger housing assembly modified to accept the plunger, the trigger altered to have a thru clearance-hole and blocking recess, a compression spring to actuate the plunger, a newly designed safety lever, and the trigger block plunger.

PRIOR ART

To the writer's knowledge there are no fire controls that have a trigger block passing thru the trigger

This system was designed for Bolt Action Rifles to eliminate unnecessary trigger movement, and may be adapted to Remington's present line.

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Fred E. Martin	Date
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December 7, 1982



INVENTION REPORT NO. IT-300 A FIRE CONTROL FOR BOLT ACTION RIFLES HAVING A TRIGGER AND SEAR BLOCK

FRED E. MARTIN BOX 599, RD #2, DUTCH HILL ROAD FRANKFORT, NEW YORK 13340

REASON FOR DEVELOPMENT

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The trend has been to allow this movement to exist unless specifically addressed by the use of a trigger block safety. A trigger block safety was used on the early Remington M/788.

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CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138510 R2539498

BARBER - PRESALE R 0138511 80-49-8 hooks good. I have no prestores with this REMINGTON ARMS COMPANY, INC. INTER-DEPARTMENTAL CORRESPONDENCE <u>Remington</u> DETERS QUIPOND DIDONC write yr. YOUR LETTER TO ONE SUBJECT ONLY" Ilion, New York December 7, 1982 Barry Estrir Patent Department Bridgeport INVENTION REPORT NO. IT-300 A FIRE CONTROL FOR BOLT ACTION RIFLES HAVING A TRIGGER AND SEAR BLOCK FRED E. MARTIN BOX 599, RD #2, DUTCH HILL ROAD FRANKFORT, NEW YORK 13340

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BARBER - PRESALE R 0138512

Invention Report No. IT-300 A Fire Control For Bolt Action Rifles Having a Trigger and Sear Bleck

Other safeties in use are the firing pin block used by U.S. Repeating Arms (Winchester) and Weatherby.

SUMMARY OF INVENTION

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INVENTION DISCLOSURE

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PRIOR ART

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Fred E. Martin	Date
Ilion Research Division	
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Invention Report No. IT-300 A Fire Control For Bolt Action Rifles Having a Trigger and Sear Block

Other safeties in use are the firing pin block used by U.S. Repeating Arms (Winchester) and Weatherby.

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SUMMARY OF INVENTION

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INVENTION DISCLOSURE

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CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138515 R2539503

BOLT

У Б С BARBER - PRESALE R 0138516

CC: C. B. WORKMAN J. S. MARTIN

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington

BRIDGEPORT, CONN.

NOV. 5, 1980

FRED MARTIN

SUBJECT: BULT LOCK FOR BOLT-ACTION RIFLES

A patent search has been made on the bolt lock shown in your Assembly Drawing SK-D-3596, and the corresponding detail drawings. The following are the most closely related prior patents that were located. In my opinion, they should not prevent us from securing a patent on your design.

> 1,669,496 - Stahl 1,322,514 - Bader

Stahl has a locking bolt 14 rotatably mounted in a transverse bore and passing across a flat 15 milled in the firing pin. When the firing pin is cocked as in Fig. 4, the forward end of the firing pin flat engages a mating flat on the locking bolt to prevent it from rotating. A detent pin 19 on the locking bolt (see Figs. 1 and 2) then restrains the bolt handle from being raised. However, the detent pin can be manually released by pressing a spring-loaded finger piece 21 (Figs. 1, 2 and 7). On firing, the locking bolt 14 is released by the firing pin, and is rotated out of locking engagement with the bolt handle simply by applying an upward pressure of the bolt handle on the detent pin 19.

Bader slidably mounts a detent 9 on a bolt plug or sleeve 5 to engage (Fig. 4) or disengage (Fig. 5) the bolt handle. A J-shaped pivoting lever 13 is spring-biased in a direction to normally engage the detent with the bolt <u>handle</u>. The detent 9 may be withdrawn to unlock the bolt either by manual rotation of the lever 13 when the firing pin is cocked, or by engagement with a shoulder 24 on the firing pin when the rifle is fired.

Rill Ericson

WILLIAM L. ERICSON SENIOR PATENT COUNSEL

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BARBER - PRESALE R 0138517 R2539505





UNITED STATES PATENT OFFICE.

GUSTAV A. BADER, OF ROCHESTER, NEW YORK.

GUN.

Specification of Letters Patent. Patented Nov. 25, 1919.

Application filed May 23, 1919. Serial No. 299,103.

To all whom it may concern:

514.

Be it known that I, GUSTAV A. BADER, a citizen of the United States, and resident of Rochester, in the county of Monroe and 5 State of New York, have invented certain new and useful Improvements in Guns, of

which the following is a specification. The present invention relates more par-

ticularly to the type of guns in which a re-

- 10 ciprocatory <u>bolt mechanism</u> carries a spring pressed fi<u>ring pin and</u> is provided with a portion which rotates to lock the bolt mechanism in firing position, an object of this invention being to lock the rotary part of the 15 bolt mechanism against movement while in
- 15 bolt mechanism against movement while in firing position and preferably to control such locking means automatically through the firing of the gun.
- To this and other ends, the invention con-20 sists of certain parts and combinations of parts all of which will be hereinafter described, the novel features being pointed out in the appended claims.
 - In the drawings:
- 25 Figure 1 is a fragmentary side view of a gun equipped with the present invention, Fig. 2 is a fragmentary top view of said gun;
 - Fig. 3 is a rear view of the breech bolt; Fig. 4 is a horizontal sectional view
- 30 Fig. 4 is a horizontal sectional view through a portion of the gun in the plane of the axis of the firing pin showing the locking device locking the breech bolt in closed position;
- 35 Fig. 5 is a detail sectional view of the firing pin engaging the locking device and holding said locking device out of connection with the breech bolt:
- Fig. 6 is a detail view of the sleeve which 40 connects with the rear end of the breech bolt:

Fig. 7 is a vertical transverse section through said sleeve showing the manner in which the locking device is mounted on the 45 sleeve; and

Fig. 8 is a detail view of one member of the locking device.

The invention herein is illustrated in the U.S. magazine rifle, model of 1903, which is 50 described in publication #1923 of the Ordnance Department U.S. A., revised February 14, 1908, entitled "Description and Rules for the Management of the U.S. Magazine Rifle, Model of 1903, Caliber 30," and refs55 erence may be had to this publication for

any parts of the rifle which are not herein shown as it is unnecessary to illustrate in detail such a rifle in view of the fact that the invention is confined to an addition to the same. It will be understood however, that 60 the invention is not limited to a rifle such as shown in the above mentioned publication but may be embodied in any construction where similar results are desired.

In rifles of the type mentioned, unless the 65 bolt handle is turned fully down, the cam on the cocking piece will strike the cocking cam on the bolt and the energy of the main spring will be expended in closing the bolt, instead of on the primer; this prevents the 70 possibility of a cartridge being fired until the bolt is fully closed, (see page 30 of the publication above referred to). In most instances, the bolt handle is turned fully down but is afterward unintentionally and un- 75 knowingly shifted slightly in an upward direction so that when the trigger is pulled the firing does not take place. It will be readily understood that this is not only a disauvantage to an army in battle but it is 80 also a disudvantage to a hunter who, after roaming many hours, and may be days, meets game only to lose it through misfire due to the upward shifting of the bolt handle of which he had no knowledge. According to 85 this invention the turning of the rotary part of the balt mechanism is prevented by a locking device which automatically enters into locking position to lock the rotary portion of the bolt mechanism, this locking de- 90 vice being automatically shifted out of lock-

ing position when the gun is fired. Referring to the <u>calculation</u> of the invention herein shown, 1 indicates the stock of the gun and 2 the <u>receiver</u> on which the 95 bolt mechanism is reciprocable.] This mechanism comprises in this instance a breech block 3 reciprocable and rotatable in the well of the receiver and interlocking with the receiver by a rotary movement under the 100 action of the handle 4, a sleeve 5 being guided on the receiver to be held against turning with the bolt and having a screw threaded connection 6 with the bolt. Carried by the sleeve and the breech bolt is a firing pin 7 which is acted upon by a main spring 8 of helical formation surrounding the firing pin. The foregoing parts are the known parts of the U. S. magazine rifle above mentioned.



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As before pointed out, the handle 4 on the breech bolt 3 is shifted accidentally at times away from its lowered position where it looks the breech bolt to the receiver, thus catsing the energy of the main spring of the firing pin to be used up in closing the bolt instead of acting on the primer with full force. According to the illustrated embodiment of this invention, means is provided 10 for looking the breech bolt in its innermost position interlocked with the receiver. This means in this instance comprises a detent 9 preferably slidably mounted on the sleeve 5 at one side of the latter by form-15 ing groupes 9 in the upper and lower surfaces of the detent and projecting ribs 9⁵ on the sleeve to fit into said grooves 9⁵. This detent may have a nose 10 adapted to enter a recess or notch 1 formed in the rear face 20 of the bolt arm 4, the uppermost face of the nose 10 being beyeled at 12 so that when the bolt wind the side upper surface 12.

- and move the latter rearwardly, after which 25 the detent 9 will move under the action of a spring to be described, so that the nose 10 enters into the notch 11 and locks the bolt arm 4 in its lowermost position so that the
- bolt is held interlocked with the receiver.
 30 The detent 9 may be controlled either manually or automatically, the latter being accomplished preferably through the firing pin 7. To these ends, a lever 13 may be pivotally mounted at 14 in the sleeve
 35 5 and extend through an opening 15 in the detent 9, the lever having on opposite sides curved faces 16 acting as curved bearing.
- for engaging opposite walls of the opening 15. On the outer side of the detent, the
 40 lever 13 may have a curved arm 17 and between this arm 17 and the detent, a helical spring 18 may be arranged, said spring be-
- ing received within a pocket 19 in the detent 9 and a rocking projection 20 on the 45 inner face of the arm 17. It will be apparent that this spring 18 acts on the operating lever 13 to shift the latter in a direction
- to move the detent 9 toward the arm 4 of the breech bolt 3. The pivot pin 14 may 50 act as a stop for limiting the movement of the detent 9 and to this end the inner face of the detent is provided above and below the lever 13 with notches 21 in which the pivot pin 14 is received, the ends of these 55 notches serving to limit the movement of the
- detent 9 on the guides of the sleeve 5. It will thus be apparent that the pin 14 not only holds the lever 13 to the sleeve 5 but also retains the detent on the sleeve 5 and 60 therefore the removal of this pin 14 permits the removal of the two parts as well as the
 - spring arranged between such parts. The control of the detent 9 through the

firing pin is preferably effected by provid-65 ing an extension 22 on the lever 13 which

projects through an opening 23 in the sleeve into the path of the usual shoulder 24 on the firing pin. When the firing pin is in its innermost position in the sleeve 5, this shoulder 24 engages the extension 22 of 70 the lever 13 and moves the lever 13 in a direction to carry the detent out of interlocking connection with the arm 4 of the breech bolt, as will be seen more clearly by referring to Fig. 5 of the drawings, thus 75 permitting the breech bolt to be rotated to become unlocked from the receiver in order that the bolt, the sleeve and the firing pin may be moved rearwardly after the firing pin is cocked. The shoulder 24 moves away 80 from the extension 22 permitting the end 22 to shift rearwardly under the action of the spring 18 and in this way to project the detent 9 forwardly so that when the arm 4 of the breech bolt is moved downwardly, 85 it will coöperate with the beveled end 12 of the detent shifting the latter to the rear so that the nose 10 may enter into the notch 11, thus locking the arm 4 of the breech bolt in the lower position. <u>In this position 90</u> of the detent it may be moved rearwardly manually by pressing on the extension 17 of the lever 13 or it may be moved rear-wardly automatically by shifting the firing pin to its innermost position in the sleeve5, 95 when the shoulder 24 will engage the lever extension 22 and through the lever shift the detent 9 to the rear.

From the forcgoing it will be seen that there has been provided a locking device 100 which locks the rotary part of the bolt mechanism in interlocking connection with the receiver, thus preventing the accidental shifting of the bolt mechanism to an inoperative position. This locking device is controllable either manually or automatically so as to release the bolt mechanism. The automatic control is preferably effected through the firing of the gun due preferably to the shifting of the firing pin in firing, 110 the firing pin engaging with a lever which shifts the detent out of locking position.

What I claim as my invention and desire to secure by Letters Patent is:

1. A firearm of the type in which the 115 breech mechanism has a sliding movement in the receiver and a portion which rotates to lock the mechanism in firing position, distinguished by a locking device which locks the rotary part against rotary movement, 120 and is operated automatically to release the rotating part on the firing of the gun.

2. A firearm of the type having a reciprocatory bolt mechanism provided with a firing pin movable with said holt mechanism 125 and also relatively thereto and also with a portion rotatable to lock the bolt mechanism in firing position, distinguished by a locking device for locking the rotary portion against rotary movement, said locking 130











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device being controlled by the firing pin to release the rotary portion on the firing of the gun.

3. A firearm of the type having a reciprototory bolt, a sleeve reciprocating with said breech bolt but held against rotation with the bolt, distinguished by a locking device which is carried by the sleeve, cooperates with the breech bolt to hold the latter 10 against rotation and is operated automatically on the firing of the gain to release the

breech bolt. 4. A firearm of the type having a rotary and reciprocatory breech bolt, a sleeve re-15 ciprocating with the bolt but held against rotation therewith, and a firing pin moving with the sleeve and the breech bolt and also relatively to said parts, distinguished by a

locking device for holding the breech bolt against rotation, said locking device being 20 mounted upon the sleeve and controlled by the firing pin.

5. A firearm comprising a rotary and reciprocatory breech bolt, a sleeve reciprocating with the bolt but held against rotation 25 with said bolt, a firing pin reciprocating with the sleeve and the bolt and also movable relatively to said parts, a detent slidably mounted upon the sleeve and adapted to coöperate with the breech bolt to hold the 30 latter against turning, and a lever mounted on the sleeve and having a manually operable portion and also a portion arranged to be operated by the firing pin.

GUSTAV A. BADER.







BARBER - PRESALE R 0138522 R2539510



BARBER - PRESALE R 0138523 R2539511



BARBER - PRESALE R 0138524 R2539512 Patented May 15, 1928.

UNITED STATES PATENT OFFICE.

ELMER R. STAHL, OF DOWAGIAC, MICHIGAN,

BOLT-ACTION GUN.

Application filed August 12, 1927. Serial No. 212,492.

The main objects of this invention are: First, to provide a bolt locking means for bolt action guns in which the flight of the firing put is away from and unimpeded by 5 the toeking means.

Second, to provide a breech bolt locking means which is automatic in its operation.

Third, is provide an automatic breech bolt locking means which is capable of manual 10 release.

Fourth, to provide a breech bolt locking means in which the parts are comparatively simple and are sp formed and supported that they are not likely to be injured or ren-

 16 dered inoperative in use by severe or careless manipulation of the gun.
 Objects relating to details and economics of construction and operation of my invention will definitely appear from the detailed 20 description to follow.

The invention is defined and pointed out in the claims.

A structure which is a preferret embodi-ment of my invention is illustrated in the

25 accompanying drawing, for hipg a part of this application, in which:

Fig. 1 is a side elevation of a gun action embodying the features of my invention, the stock and barrel and magazine being 30 omitted.

Fig. 2 is a fragmentary plan view.

Fig. 3 is a longitudinal section on a line corresponding to line 3-3 of Figs. 2.5 and 7. certain parts being shown in full lines 35 for convenience in illustration, the firing pin being in firing position.

Fig. 4 is a fragmentary longitudinal section corresponding to Fig. 3 with the firing pin in retracted position.

-10 Fig. 5 is a transverse section on line 5-5 of Figs. 1. 2. 4. and 7.

Fig. 6 is an enlarged detail partially in longitudinal section showing the firing pia in retracted or set position, with the breech

15 bolt locking bolt in locking relation thereto. Fig. 7 is a detail view partially in longitudinal section on line 7-7 of Figs. 1, 5 and 6.

Fig. 8 is a side elevation of the firing pin 50 with its plunger removed.

Fig. 9 is a side elevation of the non-rotating portion of the breech bolt.

Fig. 10 is a plan view of the locking bolt. Fig. 11-is a plan view of the locking bolt tion. 55 detent and its spring.

In the drawing similar reference characters refer to similar parts throughout the several views, and the sectional views are taken looking in the direction of the little arrows at the ends of the section lines. 60

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Referring to the drawings, 1 represents the body or receiver portion of the breech holt action. This is a standard commercial type and its structural details need not, therefore, he described.

The breech bolt 2 is mounted in the receiver for reciprocating and rotary movement as is common with gun actions of this type, the bolt being provided with a laterally projecting arm 3 having a hand piece 4 at 70 its outer end.

The breech bolt sleeve 5 is non-rotatably supported for reciprocating movement with the barrel portion of the breech bolt, having threaded engagement therewith at 6.

The firing pin 7 is supported in the breech bolt and its sleeve for movement independently thereof. The trigger 8 is hung from the sear 9 which engages the keeper 10 of the firing pin when the firing pin is retracted 80 or set, as shown in Fig. 4.

The firing pin is provided with an actuating spring 11 and a tappet or plunger 12.

The sleeve 5 is provided with a transverse hore 13 to receive and rotatably sup- 85 port the locking bolt 14. the firing pin having an elongated recess 15 to receive this bolt, the bore 13 in part intersecting the firing pin bore 15 in the sleeve 5.

The locking bolt has a segmental recess 16 99 which permits limited movement thereof and provides a flat face 17 coacting with the forwardly inclined shoulder 18 at the forward end of the recess 15 when the parts are in locking position, the firing pin in this posi-tion, as shown in Fig. 4, serving as a detent to support the locking bolt against rotation in releasing direction.

The locking bolt is provided with a detent 19 reciprocatingly mounted in a transverse 100 bore 20 in the locking bolt, shown in Fig. 7, to coact with the arm 3 on the breech bolt. This detent is provided with a finger piece 21 which permits manual releasing of the detent should occasion require. 105

The locking bolt has a transverse kerflike recess 22 engaged by the retaining scre 23 for holding the parts in assembled pos

With the parts thus arranged, when the 110
1,660,496

2

breech bolt is actuated to set the trigger, it is in its initial position, said detent being the shoulder 18 of the firing pin is brought. into engagement with the locking bolt, serving as a detent to support it against rotation, Figs. 4. 6 and 7, the arm 3 being engaged by the detent 19 and thereby locked in its initial position so that the breech bolt cannot be accidentally removed in position to 10 impede the flight of the firing pin.

it will be observed that while the firing pre-constitutes an element of the locking means, its flight is away from the locking means so that its movement is not impeded

by the locking means, its movement in fact 15 being entirely free or independent from such locking means.

T have illustrated and described my improvements in an embodiment which is high-

10 ly practical. I have not attempted to illustrate or describe other embodiments or adaptations as I believe this disclosure will enable those skilled in the art to embody or

adapt my improvements as may be desired. Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a firearm, the combination of a receiver, a breech bolt he unted for reciprocat-30 ing and rotary movement in said receiver and provided with a laterally projecting firing pin is in set position, said locking arm, a non-rotatable sleeve mounted to reciprocate with said bolt, a firing operation tively associated with said breech bolt and

85 sleeve, a locking bolt rotatably mounted in manually releasable. said sleeve transversely of said firing pin, 5. In a firearm, the said firing pin having a transverse recess to) receive said locking bolt, the front end of ching and rotary movement in said receiver, said recess being forwardly inclined pro-40

having a transverse recess to receive said firing pin, the face of said recess being engaged by the said locking shoulder of the firing pin when the firing pin is in set position, and a 45 spring actuated reciprocating detent dis-

posed transversely of said locking bolt to engage said breech holt arm when it is in its initial position, said detent being provided with a finger piece permitting the re-50 leasing of said breech bolt.

2. In a firearm, the combination of a receiver, a breech bolt mounted for reciprocating and rotary movement in said receiver and provided with a laterally projecting 55 arm, a non-rotatable sleeve mounted to reciprocate with said bolt, a firing pin operatively associated with said breech bolt and sleeve, a locking holt rotatably mounted in said sleeve transversely of said firing pin, 60 said firing pin having a transverse recess to receive said locking bolt, said locking bolt having a transverse recess to receive said firing pin, and a spring actuated reciprocating detent disposed transversely of said lock-65 ing bok to engage said breech bolt arm when associated with said breech bolt and sleeve, 120

provided with a finger piece permitting the releasing of said breech bolt.

3. In a firearm, the combination of a rethe parts being then in position shown in ceiver, a breech bolt mounted for recipro 70 cating and rotary movement in said receiver, a non-rotatable sleeve mounted to reciprocate with said bolt, a firing pin operatively associated with said breech bolt and sleeve, and means for locking said breech bolt com- 75 prising a locking bolt rotatably mounted in said sleeve transversely of said firing pin, said firing pin having a transverse recess to receive said locking bolt, the front end of said recess providing a locking shoulder, said 80 locking bolt having a transverse recess to receive said firing pin, the face of said recess being engaged by the locking bolt of the firing pin when the firing pin is in set position.

4. In a firearm, the combination of a receiver, a breech bolt mounted for reciprocating and rotacy movement in said receiver and provided with a lateraily projecting arm, a non-rotatable sleeve mounted to re- po ciprocate with said boll, a firing pin operatively associated with said breech bolt and sleeve, and a locking bolt rotatably mounted in said sleeve transversely of said firing pin to be engaged by the firing pin when the 95 bolt having a spring actuated detent dis-posed to engage said breech bolt arm when it is in its initial position, said detent being 100

5. In a firearm, the combination of a recleiver, a breech bolt mounted for reciproa non-rotatable sleeve mounted to reciproviding a locking shoulder, said locking bott ente with said bolt, a firing pin operatively 105 associated with said breech bolt and sleeve, and a locking member for said breech bolt rotatably mounted in said sleeve transversely of said firing pin to be engaged by the firing 110 pin when the firing pin is in set position.

6. A firearin comprising a rotary and reciprocatory breech bolt. a non-rotating sleeve reciprocating with the bolt, a firing pin reciprocating with the sleeve and bolt and movable relative to said parts, and means 115 for locking said bolt in firing position comprising a locking member mounted on said sleeve to cooperate with said bolt, said firing pin cooperating with said locking member to hold the same in bolt locking position 120 when the firing pin is in set position, the flight of the pin being away from shid locking means whereby its movement is unimpeded by the locking means.

7. In a firearm, the combination of a re- 125 ceiver, a breech bolt mounted for reciprocating and rotary movement in said receiver, a non-rotatable sleeve mounted to recipie cate with said bolt, a firing pin operatively

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BARBER - PRESALE R 0138526 R2539514

and a locking member for said breech bolt tively associated with said breech bolt, and mounted in said sleeve to be engaged by the firing pin when the firing pin is in set position. the firing pin acting when set to hold said

8. A firearm comprising a rotary and reciprocatory breech bolt, a non-rotating sleeve reciprocating with the bolt, a firing pin operatively associated with said bolt and sleeve and movable relative thereto, and means for locking said breech bolt in firing position comprising a locking member mounted on said sleeve to cooperate with said breech bolt, said firing pin cooperating, when in set position, with said locking member to hold the same in breech bolt locking position, the flight of the firing pin being away from said locking member whereby its movement is unimpeded by the locking means.

9. A firearm comprising a rotary and reciprocatory breech bolt, a non-rotating sleeve reciprocating with the bolt, a firing pin operatively associated with said bolt and sleeve and movable relative thereto, and
²⁵ means for locking sail breech bolt in firing position comprising a locking member mounted on said sleeve to cooperate with said breech bolt, said liring pin cooperating, when in set position, with said locking mem³⁰ ber to hold the same in breech bolt locking position.

10. A firearm comprising a rotary and verticely associated with said breech bolt, and ciprocatory breech bolt, a firing pin opera- a breech bolt locking means operatively associated therewith, and a breech sociated with said breech bolt and firing 35 bolt locking means cooperating with said fir- pin, the firing pin constituting a detent for

ing pin when the firing pin is in set position to lock the breech bolt, the firing stroke of said firing pin being away from said locking means.

 11. A firearm comprising a rotary and reciprocatory breech bolt, a firing pin operatively associated therewifh, and a breech bolt bolt locking means, said firing pin when in set position constituting a detent for the breech bolt locking means, the firing stroke of said firing pin being away from said locking means.

12. A firearm breech bolt action comprising a breech bolt mounted for reciprocatory and rotary movement, a firing pin opera-

a breech bolt locking means operatively associated with said breech bolt and firing pin, the firing pin acting when set to hold said locking means in locked position, the flight 55 of the firing pin being away from and unimpeded by said locking means.

13. A firearm breech bolt action comprising a breech bolt mounted for reciprocatory and rotary movement, a firing pin operatively associated with said breech bolt, and a breech bolt locking means operatively associated with said breech bolt and firing pin, the firing pin acting when set to hold said locking means in locked position. 65

14. A breech bolt firearm action consisting of a breech bolt, automatic means for locking said breech bolt in initial position after actuation to set the firing pin, and a firing pin constituting a detent for said locking means, the flight of the firing pin being free and unimpeded by said locking means.

15. A breech bolt firearm action consisting of a breech bolt, automatic means for locking said breech bolt in initial position ⁷⁵ after actuation to set the firing pin, and a firing pin constituting a detent for said locking means.

16. A firearm breech bolt action comprising a breech bolt mounted for reciprocatory ⁸⁰ and rotary movement, a firing pin operatively associated with said breech bolt, and a breech bolt locking means operatively associated with said breech bolt and firing pin, the firing pin constituting a detent for said locking means, the flight of the firing pin being free and unimpeded by said locking means.

17. A firearm breech bolt action comprising a breech bolt mounted for reciprocatory ⁹⁰ and rotary movement, a firing pin operatively associated with said breech bolt, and a breech bolt locking means operatively associated with said breech bolt and firing pin, the firing pin constituting a detent for said ⁹⁵ locking means.

In withes where of I have hereunto set ny hand.

ELMER R. STAHL.

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BARBER - PRESALE R 0138527 R2539515





Dealer Discount Sheet

JANTZ SIDE SWING SAFETIES:

Mauser	Less	25%
Rem. 700	Less	25%
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CLASSIC BOLT HANDLES:

)
Plain Handle welded to your boltNET	
Hand Checkering NET	
JANTZ BOLT WELDING JIGLess 25%)
CONETROL RINGS NET	
JANTZ CONTOURED CONETROL BASES:	
Polished and bluedLess 20%	b
Machined only Less 33%	D
RARRELINC Less 2004	'n
ACTION RESTYLING	
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Jin Carmichael writes in "OUTDOOR LIFE" magazine - "Jantz's safeties are gracefully contoured and feature a checkered thumb pad, they are as good or better than any I've seen---" Nick Harvey writes in Austrailias "Sporting Shooter" magazine -"The Jantz sideswing safety adds a touch of class---"

We now have a sideswing safety for the SPRINGFIELD which utilizes the original sleeve, as we have done with the Mauser. These Standard model SPRINGFIELD safeties sell for \$59.95. Our Classic safety for the Springfield is completely machined (from the sleeve to the safety handle). This is a 3-position safety which adds classic lines to your fine custom rifle. These are now available for \$124.95.

The REM 700 side safety, which also fits the 721,722, 600, Mohawk, 40X and XP-100, is completely machined, designed to add elegance to the finest custom rifle. With this 3-position safety you can lock the bolt or open the action while on safe. We offer a right or left hand model, each with complete fitting instructions. The current price of these safeties $\frac{16}{10} \leq 67.95$.

Our RUGER sideswing safety a must for every owner of a Ruger 77 action is a completely custom classic design 3-position safety. With complete fitting instructions, these sell for only \$87.95.

We also have a SAKO 3-position safety available on a custom order basis. We must have your complete action to <u>complete</u> this safety.

Thank you for your interest, we look forward to pleasing you with our quality products soon.

Sincerely, Ken Jantz

Enclosure

P.S. We are not taking orders for any trigger guards at present EXCEPT for the Win M 70 of which there is a limited supply. We are out of stock at present on all others and it will be several months before we are able to fill the orders we now have. Thank you

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Fit Canjar triggers to your action
Fit trigger and safety at same time
Drill and tap receiver for scope
Check headspace
Rockwell hardness test action
Rockwell hardness test action and bolt9
Remove barrel from action
Lap locking lugs on Mauser type action
Fit custom bases to receiver

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Our RUGER sideswing safety, a must for every owner of a Ruger 77 action is a completely custom classic design 3-position safety. With complete fitting instructions, these sell for only \$87.95.

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Inlet receiver for bolt handle	5
Fit Canjar triggers to your action	0
Fit trigger and safety at same time	5
Drill and tap receiver for scope	5
Check headspace	5
Rockwell hardness test action	6
Rockwell hardness test action and bolt	9
Remove barrel from action	5
Lap locking lugs on Mauser type action10	0
Fit custom bases to receiver10	0

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BARBER - PRESALE R 0138535 0141-62 REMINGTON ARMS COMPANY, INC. xc: C. B. Workman INTER-DEPARTMENTAL CORRESPONDENCE I. S. Martin F. E. Martin <u>Remington</u> DETERS E. R. Owens **OUPOND** IFINE YOUR LETTER TO ONE SUBJECT ONLY" April 8, 1981

To:	T. L. Capeletti
Fror	n: W. Bower AVE
Re:	M/700 Bolt Lock - Manufacturing Costs

In October, 1980, Industrial Engineering issued a report on the cost of the M/700 Bolt Lock based on a PE & C estimate. Because of the seemingly high cost to manufacture this feature, the Research Process Development Group was asked to review. Exhibit 1 shows a comparison of costs based on estimates prepared by PE & C, Research, and a hypothetical best case.

The major difference between the Research and PE & C estimate is the labor cost to make the extra cuts in the Bolt Plug. PE & C estimated two special machines, the Research estimate provides for 1 machine, and, therefore, less labor input. This \$.21 difference is multiplied when labor variance, industrial relations, and overhead are added to it.

The "best case" condition assumes that the pin hole in the Bolt Latch can be moved so that the powder metal blank can be made to include the hole. This \$.11 savings in the direct cost to drill the hole is again multiplied by the various overhead accounts.

Two other approaches are possible. If a high strength plastic could be substituted for powder metal in the Bolt Latch, it may be possible to reduce the total cost of the feature by an additional \$.20 below the "best case". Finally, the possibility of an investment cast It would be necessary to eliminate all of the added cuts in the investment cast blank, however, to show any significant savings.

JWB:ws Firearms Research Division Attach.



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BARBER - PRESALE R 0138535 R2539523

Exhibit 1

M/700 BOLT LOCK

MANUFACTURING COSTS

V/	PF&C	RAD	BEST
Standard Material	1100	<u>NGD</u>	CADE
Bolt Latch	.17	. 15	.15
Detent Plunger	.02	.02	.02
Detent Plunger Spr.	.01	.01	.01
Detent Retaining Pin	.01	.01	.01
Total	.21	.19	.19
Material Variance (12.2%)	.03	.02	.02
Standa rd Labor			
Bolt Latch	.12	.12	.01
Bolt Plug	.38	.17	.17
Bolt Assembly	.05	.03	.03
Firing Pin Assembly	.09	.07	.07
Final Assembly	.01		01
Total	.65	.40	.29
Labor Variance (38.6%)	.25	.15	.11
Industrial Relations (47.9%)	43	.26	.19
Misc. Direct Exp (3.8%)	.06	.04	.03
Depreciation (7.5% Capital)	33	.07	.07
Manufacturing Overhead (10%	() . <u>18</u>	.12	.09
Plant Overhead (17.5%)	34		_ <u>.17</u>
Price/Gun	\$ 2.28	\$1.47	\$1.16

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BARBER - PRESALE R 0138537

C. B. Workman J. P. Linde F. E. Martin S. A. Fanelli

REMINGTON ARMS COMPANY, INC.

RD-54-6

NTER-DEPARTMENTAL CORRESPONDENCE

Remington PETERS

Ilion, New York January 9, 1981

TO: T. L. Capeletti FROM: J. S. Martin (1971) SUBJECT: M/700 Bolt Lock - M/788 Safety

A meeting was held on January 8, 1981 with John Linde and Process Personnel to resolve the problems on the M/700 bolt lock and the M/788 safety designs.

The bolt lock design was covered first and a complete review of each component was discussed as to the design/cost, etc. The plunger will be looked at again (.0234) and the bolt handle. New quotes will be made. The rest of the parts were inspected for design/cost, etc. and found to be in line. Other designs were shown including the latest and the cost savings <u>vs</u>. the appearance and acceptability was not that much greater.

It was agreed upon that we will stay with the design we now have. Five models are complete and ready for test.

It is my opinion that we should finalize the bolt lock design as is, finish the testing and if proven satisfactory with the new fire control design, make a proposal to the committee that this be approved.

If there are objections, the other proposal would be to just remove the bolt lock completely and go with our present M/700 design fire control.

The M/788 Safety

The design was reviewed and explained to the Process Engineering Personnel.

It was suggested that a large sample of springs and plungers be purchased and our present safety lever be altered to the new angle 100° included and

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BARBER - PRESALE R 0138537

M/700 Bolt Lock - M/788 Safety

try the design of the new safety force (on and off) to better prove the design. The only other thing left would then be to add the new head design the way we have it.

If is the opinion of the writer that this is a good way to go and we have full cooperation from Process Engineering. We should propose the design this way to the committee, show the new design lever and ask for approval to proceed in this manner.







JSM:ws Firearms Research Division

Copies to: R. L. Hal'. R. A. Mor is H. K. Boyle G. E. Fletcher J. H. Sweeney

J. P. Linde L. B. Bosquet Z. J. Kowalski Est. No. 4197

October 24, 1980

G. D. CAMPBELL



M/700 Bolt Latch Mechanism

Evaluation of the proposed Bolt Latch mechanism for M/700 rifles indicates it will result in a \$3.00 increase in unit factory cost (full allocation basis) in its first year (1982). For comparison purposes, a 1982 M/700 "Line Before" and three alternative "Line After" results were developed based on M/700 cost performance during the first six months of 1979. These alternatives were:

1. Adding of the Bolt Latch mechanism without adjusting prices.

- 2. Adding the Bolt Latch mechanism and adjusting prices to maintain the percent pretax margin.
- 3. Adding the Bolt Latch mechanism without adjusting prices, but deleting the sling and swivels from the BDL grade to compensate for the increased cost.

The results of these evaluations are summarized in the attached table which shows weighted average unit prices, costs, and pretax earnings and the project results. This data has been adjusted to anticipated 1982 price and cost levels.

As shown in this table, Alternative IRI is the most attractive in % margin, earnings, and net return on investment because it results in a net reduction in costs and working capital requirements. One disadvantage of this alternative is that ADL and Classic grade earnings are adversely affected, and the results shown depend on maintaining current product mix.

Alternative II also results in increased earnings, however, its net return on investment is substantially lower because of <u>additional</u> working capital requirements resulting from increased costs and <u>sales</u>.

All alternatives require project expenditures of \$249M construction and \$83M in operations charges. Detailed data for the line before and each alternative are attached.

J. C. Hutton, Superintendent INDUSTRIAL ENGINEERING SECTION

by T. R. Andrews TRA/mc Att.

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		1982 Line After												
	1982 Line <u>Before</u>	Alternative I Without Price Adjustment	Alternative II <u>With Price Adjustment</u>	Alternative III With Sling Deleted From BDL										
Retail Selling Price	\$ 411. 28	\$ 411.28	\$ 419.09	\$ 411.28										
Net Selling Price	220.55	220.55	224.74	220.55										
Factory Cost	158.05	161.05	161.05	155.89										
Total Cost	183.75	186.62	187.23	181.68										
Pretax Earnings - Unit Line	36.80 \$ 5,123 м	33.93 \$ 4,723 м	37.51 \$ 5,221 м]38.87 \$_5,410 м										
% of Net Selling	16.7%	15.4%	16.7%	17.6%										
<u>Project Results</u> <u>Pretax Earnings</u>			$\left(\int \right)$											
Full Allocation Incremental		(\$400M) (\$310M)	\$ 98M \$223M	\$ 287 м \$ 275 м										
Net Earnings Full Allocation Incremental		(\$204m) (\$158m)	\$ 52M \$117M	\$ 150 м \$ 144 м										
Net Return on Investment Full Allocation Incremental		Negative Negative	8.6% 19.7%	202.7% 187.0%										

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M/700 LINE BEFORE - 1982

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STANDARD MATERIAL	\$ 31	. 46	∦	# 39	. 49		\$ 32	.99		5	,09	6	5	,090	6			
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District	3	.65		4	49		ų	. 10			58	3		260		4	.19	
COST BEFORE ADMIN. EXP	163	.67		192	. 15		174	. 82					18	. 59		¹		
TOTAL COST	\$164	. 89	-	194	.03		۳ \ ח6	.59		25	.57	9	19	.11	•	183	.15	
											_				_	_		
EARNING BEFORE ADMIN. EXP	28	.36		43	.65		41	.05					12	, 10	3			
less: ADMIN EXP	۱	.22		1	.88		1	. 77			23	0		52	0	1	.66	
PRETAX EARNINGS	ボュコ	. 14		\$41	רי.		\$ 39	.28		5	.12	З	11	. 58	3	36	.80	
Less: TAX																		
PLUS: A MORTIZED ITC																		
NET EARNINGS							ļ						 					
													<u> </u>					
PRETAX MARGIN	14	1.1 7	6	11	. 7 7	7.	18	<u>, م</u> °	7。			i	1			16	.7%	<u>ار</u>
(% OF NET SELLING)	1	i I		•	1						[1	

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138541 R2539529

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BARDER PRESALE RO138542 1982

PRICE ADJUSTMENT WITHOUT

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\ <u>\</u> /\						LLAS	510		130	oo k		Tucus	men	Tal			
19244+1++/	46.63	<u> </u>	88	<u>, 20</u>	8	<u>+</u>	170		139	<u>, 7 1</u>	<u>د</u>	139	.210	>	139	210	 7
RETAIL BELLING PRICE	358.14	*	439	. 72		لدهلا	.55		57	,25	4				841 I	. 29	.
NET SELLING PRICE	51921.05	\$	235	.90		215	. 97		30	. 70	2	20	. 70	Þ.	\$220	. 5 5	
STANDARD MATERIAL	\$ 31.89		\$ 39	.92		# <u>33</u>	.42		5	, 15	6	5	,15	6			
MATERIAL VARIANCE	3.08		4	.93		4	.13			63	4		63	ч			ļ
STANDARD LABOR	23.00		25	.82	_	24	.20		3	.45	6	3	. 45	6			
LABOR VARIANCE	13.52		15	.37		13	.46		ב	,04	6	2	,04	6			
DIRECT EXPENSE	27.74		25	.90		25	. 54										
GAS & POWER	7.30		2	. 58		2	.42										
INDUSTRIAL RELATIONS	17.49		19	73		18	.04										
GRATUS REPAIRS	.87			.93			. 87										
TOTAL DIRECT CHGS.	43.40		49	. 14		46	. 87		6	, 56	4	6	56	4			
SUPERVISION	2.22		2	. 48		2	. 36				_						
INDUSTRIAL RELATIONS	1.06		· 1	. 18			.12										
FACTORY CLERKS	.28			.31			.30		· ·					Ц			
INDUSTRIAL ENGINEERING	.31			. 34			.33										
DEPRECIATION	3.29		3	<u></u>		3	.48						1	8			
PEtC DIRECT	21			.23			.22										
FLOOR SPACE	2.41		<u>· 2</u>	. 69		2	.55					<u> </u>					
PROJECT COST	. 93			.04	\mathbf{x}	ļ	.99										
OTHER DIRECT	. 29		\square	<u>. 32</u>	$\overline{)}$. 30										
TOTAL MEG O/H	11.00		/ / 2	.30		11	.64			<u>,64</u>	9			8			
SUB - TOTAL	126.69		147	.48		133	.72		19	,50	5	17	. 67	4			
PLANT OVERHEND	22.32		125	. 80	4	24	.05		3	.42	2			\square			
UNADTUSTED FACTORY COST	149.01		173	29		4157	. ۲ ۲		22	.92	<u>n</u>	רו	. 87	4			
FACTORY COST (COST PED)	145.73		169	.45		154	.29		22	,42	<u>o</u>	17	<u>, 47</u>	9	161	,05]
SELLING & ADMINISTRATIVE	14.60		17	<u>192</u>		16	.41		2	,33	4		92	<u>h</u>	16	. 76	
LECHNICAL	2.69		3	.30		3	. 02			<u>43</u>	0		15	4	3	. 09	
DISTRIBUTION	3.65		4	.48		4	. 0			58	З		36	8	4	. 19	
COST BEFORE ADMIN. EXP	166.67		195	.15		וחי	. 624		<u> </u>			18	,92		<u> </u>		
TOTAL COST S	167.76		196	.90		5179	. 46		25	.97	9	19	.42	2	P196	.62	
				_						1							
EARNING BEFORE ADMIN. EXP	25.38		40	65	_	30	. 65						,78	Þ	 		
Less ADMIN EXP	1.09			, 75		1	.64			21	2		50	7	<u> </u>	.53	
PRETAX EARNINGS	\$ 24.29		\$ 38	. 90		\$ 3 6	. 41		4	ר,	3	11	<u>, 27</u>	3	\$ 33	.93	
Less: TAX																	
plus: AMORTIZED ITC													Ц_				
NET EARNINGS	· ·															1	
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PRETAX MARGIN	12.67	6	16	. 5 7		16	.9	7.		}		1			15	<u>, 4</u> 9	70
(% OF NET SELLING)			•						L								

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PRICES ADJUSTED TO MAINTAIN TO MARGIN

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Hy xu Aitr	46	. 43	S	86.398		4,176		139.210		2	139.210			139	<u>, 210</u>	2		
RETAIL GELKING PRICE	5365	.95		[₩] 44.7	. 53		\$410	. 36		59	. 34	1				419	.09	
Net SELLING PRICE	\$196	.24		239	.99		220	.06		31	.20	5	31	,28	5	P224	, 74	
STANDARD MATERIAL									_									
MATERIAL VARIANCE		\																
STANDARD LABOR		<u>\</u>																
LABOR VARIANCE		1					:											
DIRECT EXPENSE		ļ			:	_				ļ			<u> </u>					\parallel
GAS & POWER		ļ																
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TOTAL DIRECT CHOS.																		
SUPERVISION	 	-	<u> </u>							 								
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FACTORY CLERKS		<u> </u>	S	AME	<u>-</u> A	<u>_</u>		NE		AF	TE.	R						
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DEPRECIATION	<u> </u>																	
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FLOOR SPACE			<u> </u>															_#
PROJECT COST		1	ļ			$ \rightarrow $												
OTHER DIRECT						7	<u> </u>			 								#
TOTAL MEG O/H			<u> </u>	44						 								
SUB - TOTAL		/	<u> </u>	$\left\ \left\{ \cdot \right\} \right\ $		\Rightarrow				l								
PLANT OVERHEAD	L					Д												
UNADTUSTED FACTORY COST						4						_						
- FACTORY COST (COST RED)	3145	.73	-	P169	.45		#154	.29		22	, 42	٥	17	<u>,47</u>	9	4161	.05	_∦
SELLING FADMINISTRATIVE	14	.91	┨━━─	18	.24		16	בר,		<u> २</u>	,37	8		93	9	17	<u>, 08</u>	
TECHNISAL	<u> </u>	.74		3	.36	-	1	•08-		#	<u>_43</u>	8		15	6	3	.14	
	3	. 73		<u> </u>	.56		4	.18		 	59	4		37	5	4	.27	
LOST BEFORE ADMIN, EXP	167	. 11		195 5.	.61		178	<u>, 21</u>			<u>}</u>		18	,94	2	H I		
LOTAL COST	*168	• 36	1	197	.52	_	180	<u>. o p</u>	-	26	06	4	19	<u>47</u>	2_	<u>187</u>	<u>-73</u>	
- EARNING BEFORE ADMIN. Exp	29	.13		44	.38		41	.79		<u> </u>	-		17	, 33	6	 		
less: ADMIN EXP	4	. 25	+	#	.91		₩ <u></u>	, BO	Ļ	<u> </u>	23	4		53	0		.69	
PRETAX EARNINGS	- <u></u>	.83	-	r 42	47		- 39	. 99	_	5	,22			80	6	27	.51	=
less. TAX	<u> </u>		-															
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BEFALL EFILING PRICE	5-25-Q	14	# 429	. 12		ادميآ	55	57	354			Fu	أعدا	
Not Selling Porce S	192	05	\$235	.80	-	215	. 87	30		30	297	P 720	.55	
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STANDARD MATERIAL	\$31	.89	\$ 33	. 65		\$ 33	. 42	4	601	4	.601	1		
MATERIAL VARIANCE	3	88	Ц Ц	.16		ц	. 13		566		566			
STANDARD LABOR	23	.00	25	.91	_	24	.20	3	456	3	456			
LABOR VARIANCE	13	.52	15	1.37		13	.46	2	,046	2	046	<u> </u>		
DIRECT EXPENSE	22	.74	25	. 89		25	. 54			∥				
GAS & POWER	<u></u>	.30	<u> </u>	. 58	_	2	. 42							\parallel
- INDUSTRIAL RELATIONS	17	. 49	19	1.72		18	.04			<u> </u>	<u>↓ </u>	<u> </u>	 	\parallel
GRATUS REPAIRS		-87		.93			. 87							
TOTAL DIRECT CHGS.	43	. 40	49	1:12		46	. 87	6	.562	6	,562			
SUPERVISION	2	.22	<u> </u>	. 48		2	.36			1	 		-	
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FACTORY CLERKS		28		.31			. 30					1	├ ── <u></u>	4
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DEPRECIATION	<u> </u>	29	3	1.71	-	3	.48				18		┝━╌┼╸	
PE + C DIRFET	╟╌╶┠┨	21	-∦	. 23			. 22		<u> </u>				╞──┼╸	-
FLOOR SPACE	2	41	1 3	. 69		2	.55	·						-
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TOTAL MEG O/H	11	.00	<u> ∦ </u>	.30		11	.64	<u> </u>	.649		18			┉╢
<u>SUB-TOTAL</u>	126	. 69	1140	<u>. 41</u>	-	133	.72	18	. 280		,249			\parallel
PLANT OVERHEND	22	<u>.32</u>	1 24	.56	4	24	,05	_ 3	312	<u> </u>				
UNADINATED FACTORY COST	1 49	.01	184		\triangleleft	157	. 77	133	192	17	249			4
- HACTORY COST (COST RED)	45	.73	161	.33		154	.29	131	,702	16	. 868	155	.89	
SELLING FADMINISTRATIVE	14	.60		1.97		16	. 41	<u> </u>	334		921	16	.76	
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	<u> 3</u>	. 65	<u> </u>	1.48	_	4	· la		583		368	<u> </u>	.19	
LOST BEFORE ADMIN. EXP	166	.67	1187	.03		ררו	.22		├──	18	,311			-#
LOTAL LOST	167	.76	189	1.13	=	179	- 46	- 23	292	18	. 844	<u>FIBI</u>	. 68	=
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LARNING BEFORE HOMIN, EXP	25	.38	48	<u> 77</u>	-	38	.05			╟╌╵┵	391	<u>∦ ,</u> -		-#
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			- 46	1. 67	_	<u> </u>	. 41	= 		<u> </u>	. 858	- 38	. 27	=
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(7 OF NET SELLING)			- 		10	-16	<u>, ~ 10</u>		. 1	u .	: ۱ <u>۰</u>			<u></u>
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BARBER - PRESALE R 0138544 R2539532

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BARBER - PRESALE R 0138545 R2539533

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CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

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CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

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CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

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D138559 1 BOLT LATCH FOR BOLT-ACTION FIREARMS

This invention relates to firearms of the bolt-action type, which have a bolt reciprocable in a receiver between open and closed positions, and rotatable by means of a handle between locked and unlocked relationship to the firearm barrel. The invention is particularly concerned with an improved bolt latch mechanism which is normally operated automatically

- 10 by the firing and re-cocking of the firearm, but which may be selectively disabled, according to the user's wishes.
- In a bolt-action firearm intended for hunting use, it is desirable to provide both a safety, and a bolt latch for securing the bolt locked in a closed position. These two fleatures allow the firearm to be carried in the field loaded and cocked, without risk either of accidental firing, or of the bolt being unlocked by
- 20 some accidental jar or collision. At the same time, the user should be enabled to open the bolt readily and safely for unloading. Controls for the safety and bolt latch should be simple enough to avoid confusion in poor lighting conditions; should be readily
- 25 manipulable even by a hunter wearing gloves; and yet should not protrude in a manner either to interfere with manual operation of the firearm, or to be susceptible to inadvertent displacement.
- 30 One approach to this question is shown in U. S. Patent 2,514,981 to Walker et al, in which a two-position safety lever also serves as a bolt latch. The safety lever has two arms: a safety arm bearing an eccentric which blocks the sear of the trigger mechanism in a
- 35 "safe" position of the lever; and another latch arm which engages a notch in the bolt to latch it against rotation. Movement of the safety lever to the "fire" position releases the sear, and also removes

RA-0247

the latch arm from engagement with the bolt. This is a satisfactory system; but it does require the safety to be released when the bolt is opened, and therefore calls for proper caution to be exercised when the user wishes to unload the firearm.

Another prior art solution involves a safety lever movable to three positions: one in which the safety and the bolt latch are both engaged; a second, inter-10 mediate position which either disengages the bolt latch, or enables it to be manually disengaged, but leaves the safety on; and a third, firing position in which both the safety and the bolt latch are inoperative. Examples of this approach appear in

- 15 U.S. Patents 2,824,402 to Fischer; 1,318,423 to Williams; 2,869,269 to Couture; and 3,138,838 to Brewer. If a hunter is working in good lighting conditions, without gloves, and with leisure to see that the safety is correctly positioned, these systems
- 20 are satisfactory. But in the press of urgency and excitement that often arises in the field, and under adverse conditions, error in selecting among three safety positions is not unlikely to occur.
- 25 Another solution that has been suggested is to provide a bolt latch that is completely diverced from the safety mechanism. This enables the hunter to unload without concern about changing the condition of a safety he has previously activated. Two examples of
- 30 such a bolt latch are found in U. S. Patents 1,332,514 to Bader, and 1,669,496 to Stahl. In Bader, a sliding latch, mounted on the side of the behind the bolt handle, is movable to or from latching engagement with the bolt handle by means of a pivoted
- 35 lever, which is spring-biased toward the latch-engaging position. The latch may be withdrawn either by lever engagement with a shoulder on the firing pin when the

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RA-0247

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138560 R2539548

rifle is fired, or by manual rotation of the pivoted lever. After manual opening with the rifle cocked, the pivoted lever must be held manually retracted in order to re-close the bolt.

In the Stahl Patent, a rotatable shaft, formed with a flat and carrying a spring-biased latch plunger, extends tranversely across a mating flat in the firing pin. The cocking of the firing pin mates the two 10 flats so as to turn the shaft and latch plunger into locking engagement with the bolt handle. Upon firing, the bolt handle may be raised, with the shaft and latch plunger now being free of the firing pin and able to rotate to permit this opening movement. After re-cocking, the latch may be retracted manually for unloading the rifle, although like Bader, it must also be held retracted to permit the bolt to be re-closed.

- 20 So far as applicant is aware, neither of the Bader nor Stahl latch mechanisms has ever been widely used or accepted. This may be at least in some part due to the awkwardness involved in holding the latches, which are in close proximity to the bolt handles,
- 25 open with the thumb of a left hand which supports the rifle, while the right hand concurrently opens or closes the bolt handle. This problem might be considerably exacerbated by the wearing of gloves.
- 30 The present invention has as its general object the improvement of bolt latch mechanisms for bolt-action rifles which have independently-operable safety devices. The improved mechanism features a simplified construction, involving a single pivoted, spring-
- 35 loaded lever to fulfill both the functions of an automatically-operated latching element, and a manual latch release. The device provides automatic detenting to releasably secure the latch in a disabled

RA-0247

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138561 R2539549
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position when it is manually released. The latch may be readily released or reactivated by the press of a gloved finger, after which the hands are freed to carry out loading, cocking, firing, or unloading operations without further attention to the latch.

According to a preferred embodiment of the invention, the bolt plug of a bolt-action firearm is recessed to receive a latch lever, which is pivotally mounted in the recess for rocking motion to any of three <u>positions</u>: latched by cocking the weapon and closing

- the bolt handle; unlatched by firing the weapon; and <u>manually</u> disabled and detented in an unlatched condition. A spring and plunger bias the lever toward 15 <u>the lat</u>ched position, in which a tooth formed at one end of the lever engages in a mating notch in the closed bolt mandle. The latch lever has a cam surface so arranged, in the latched position, as to project into the path of motion of the head of the firing pin,
- 20 which therefore pivots the lever to the unlatched position when the weapon is fired. Subsequent re-cocking and withdrawal of the firing pin head enables the spring-loaded plunger to return the lever automatically to the latched position. The latch
- 25 lever may be manually rocked beyond the latched position to the disabled position, in which a detent notch formed in the lever engages and interferes with movement of the spring-loaded plunger; the plunger cannot then move the lever toward the latched position
- 30 until the lever is manually pressed in a direction to release the detent.

FIG. 1 is a fragmentary view in side elevation of a preferred embodiment of the improved bolt latch

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35 mechanism, shown in latched relation to the bolt assembly of an illustrative bolt-action firearm, which is shown cocked and ready to fire;

RA-0247

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

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FIG. 2 is a fragmentary view in rear elevation of the assembly of FIG. 1;

FIG. 3 is a fragmentary view showing the latch in unlatched position, with the bolt handle raised to unlock the bolt, and the parts of the firearm in fired and uncocked condition;

FIG. 4 is a fragmentary cross-sectional view in side 10 elevation, with the parts in the same latched and

cocked condition as in FIG. 1;

FIG. 5 is a view similar to FIG. 4, but showing the firing pin in a fired position, and the latch mechanism

FIG. 6 is a view similar to FIGS. 4 and 5, but showing the firing pin in a cocked position, and the latch mechanism detented in a disabled position.

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The improved bolt latch mechanism is broadly applicable to bolt-action firearms of various designs, but is shown for purposes of illustration in a boltaction rifle of substantially the same type as is

- 25 shown in more detail in ILS. Patents 2,585,195 to Walker and 2,514,981 to Walker et al, which were assigned to the owner of the present application. The rifle includes a hollow cylindrical bolt 10 which is mounted for rotation and longitudinal reciprocation
- 30 in a receiver (not shown), by means of a Handle 12 brazed or otherwise secured to the bolt. The bolt, when closed against the breech of the rifle barrel, may be locked by means of conventional lugs formed on its forward end (not shown), which are engaged by
- 35 rotating the handle down into the position shown in FIGS. 1 and 2, or unlocked by raising the handle to the position of FIG. 3. The bolt is shown in its

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RA-0247

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138563 R2539551

closed longitudinal position with respect to elements of a fire control mechanism which includes a sear 3⁴ and a trigger 35. With the bolt turned to its unlocked position of FIG. 3, it may be pulled longitudinally to the left to open the action for loading and unloading cartridges, and for cocking a firing pin 2⁴.

A bolt plug 16 has a threaded extension 18 which extends forwardly into threaded engagement with 10 internal threads 14 formed in the bolt, thus drivingly connecting the bolt and bolt plug for joint longitudinal reciprocation, but permitting the bolt to rotate independently. The bolt plug is formed with recessed flats 19 for sliding engagement with mating surfaces 15 formed on the receiver (not shown), to restrain the bolt plug from rotating with the bolt. The bolt plug also has a cylindrical recess 20 slidably receiving an enlarged head 26 of the firing pin 24, and a slot 22 through which a sear-engaging lug 28 and a cocking 20 arm 30 of the firing pin extend in freely-slidable but non-rotatable relation.

In the relative positions of these elements shown in FIGS. 1 and 4, the firing pin 24 is cocked, with an 25 oblique face 42 of the fug 28 bearing against a mating face 40 of the sear 4. The firing pin is continuously urged toward a firing position, that is, toward the right in the drawings, by a conventional firing pin spring contained within the <u>bolt</u>. The sear,

- 30 pivoted on a pin 36, is held in its illustrated angular position by the engagement between a step 39 in the sear and a connector 37 attached to the trigger 35, thereby restraining the firing vin in its cocked position. To fire the weapon, the trigger is pulled
- 35 to move the connector 37 to the position shown in FIG. 3. The angle of the faces 40 and 42 with respect to the longitudinal axis of the bolt and firing pin is

6

RA-0247

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138564

such that the firing pin spring exerts a downward component of force on the sear that overcomes the upward force exerted by a sear spring 33, and pivots the sear counterclockwise to the position shown in FIG. 3, permitting the firing pin to be driven forwardly to its fired position shown in FIG. 5.

In the fired condition, the cocking arm 30 of the firing pin extends forwardly into the deepest part of a cocking cam 32 cut into the bolt 10, which is circummerentially aligned with the cocking arm when the bolt is closed (compare FIGS. 1 and 3). After firing, raising the bolt handle to the position of FIG. 3 causes the cocking arm to ride along the curved surface of the cam 32, and retracts the firing pin back toward the cocked position. Then as the bolt is opened and re-closed by a reciprocating movement along its major axis, the lug face 42 engages against the re-elevated sear face 40 and retains the firing pin in the cocked 20 condition of FIGS. 1 and 4 once more.

The firearm action thus far described is conventional in design, and is further illustrated and described in the aforementioned Patents 2,585,195 and 2,514,981.

- 25 Therefore, no further detailed description of its operation and design is believed necessary. A safety mechanism of any type suitable to such an action may be utilized as desired, and the bolt latch of the present invention is intended to operate entirely independently
- 30 of the safety mechanism. As illustrated, the sear 34 is provided with a cam lobe 38 for cooperation with a safety lever having an eccentric, of the kind disclosed in Patent 2,514,981, which is selectively operable to block the sear against movement from the cocked
- 35 position of FIG. 1. This is intended merely as an illustrative example of various safety mechanisms that might be used in conjunction with the improved bolt

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CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138565 R2539553

latch, which will now be described.

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The bolt plug 16 is formed with a radially-extending recess 50, in which a latch lever 51 is pivotally supported on a pin 60 received in a tranverse hole 58. The lever 51 has a tooth 52 at its forward end, which, in a latched position of FIGS. 1 and 4, engages in a locking notch 62 at the rear of the bolt 10 and handle 12 to prevent the bolt from being moved from 10 its closed and locked position. A plunger 68 is slidably received in a blind hole 64 in the bolt plug, and is urged against a rear face 53 of the lever 51 by a spring 66 to bias the lever in a clockwise direction toward the latched position.

The latch lever 51 is formed with a planar cam surface 55 which projects into the recess 20 in the latched position of FIG. 4, into the path of movement of the outer cylindrical surface of the firing pin head 26

- 20 from its cocked position of FIG. 4 to its fired position of FIG. 5. In the latched position, the cam surface 55 extends in a direction inclined downwardly in a forward direction with respect to the longitudinal axis A of the firing pin motion. When the trigger 35
- 25 is pulled to release the firing pin, the forwardlymoving cylindrical head 26 engages the cam surface 55 and pivots the lever 51 to the unlatched position shown in FIG. 5, against the bias of the spring-loaded plunger 68. The bolt 10 is now free to turn, and may 30 be unlocked and opened. The surface 55 continues to be inclined downwardly in a forward direction, for a
- reason which will appear, but at a greatly reduced angle to the bolt axis A.
- 35 Re-cocking of the firing pin 24 frees the cam surface 55 from the head 26. This allows the plunger 68 to automatically re-latch the lever 51 in the position

8

RA-0247

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON of FIG. 4, as the bolt handle is closed and the locking notch 62 becomes aligned with the tooth 52.

The rear face 53 of the latch lever is formed with a
detent notch 70, which is not reached by the plunger
68 sliding along the face 53 during the pivotal
movements of the lever between the latched position
of FIG. 4 and the unlatched position of FIG. 5.
However, the lever may be rocked, by applying finger
pressure to a projecting V-shaped upper surface 54,
counterclockwise into a further disabled position
shown in FIG. 6, in which the plunger 68 seats in the
notch 70. The engagement between the plunger and the
notch 70. The spring 66, and thus detents the lever
in this disabled position.

To provide for an ample arcuate displacement between the unlatched and disabled positions of the lever 51, 20 the surface 55 must have some clearance from the head 26. Thus this surface is inclined downwardly at a small angle to the axis A in both the unlatched and the disabled positions, but in opposite axial directions.

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When placed in the disabled, detented position of FIG. 6, the latch lever 51 will remain inoperative and unaffected by movement of the firing pin, until such time as finger pressure is applied to it in a 30 clockwise direction to release the plunger 68 from the notch 70, and thus restore the parts to the normal automatically-operating positions of FIGS. 4

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RA-0247

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In a hunting situation in the field, where a series of shots may be fired, the bolt is cyclically opened to reload the rifle, and reclosed to cock the firing pin for the next shot; and the latch lever automatically cycles between the latched and unlatched positions of FIGS. 4 and 5. Assuming, however, that the hunter wishes to unload the cocked and latched rifle without firing previously-loaded live rounds, he need not release the safety to do so. He merely presses the latch lever 51 into the disabled position of FIG. 6,

and opens the bolt with the safety engaged. When he next wishes to reload the rifle, the latch lever should be pressed to release it from the detented <u>disabled</u> condition, so that its normal automatic 15 operation is restored.

The latch lever is preferably positioned near the top of the bolt plug as shown, so that it is readily visible and easily pressed even with a gloved hand,

20 but does not protrude in such a location as to be readily subject to accidental operation by the user's hand carrying the rifter or by jarring against other objects.

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CLAIM 1. In a bolt-action firearm of the type having a bolt rotatably mounted for movement between open and closed positions; a bolt plug non-rotatably mounted and having threaded connection with said bolt; a firing pin mounted reciprocably in said bolt plug for movement between fired and cocked positions with respect to said bolt; the improved latch mechanism which comprises:

- 10 A latch lever having a tooth; said bolt being formed with a notch arranged for receiving said tooth when said bolt is rotated to its closed position; said latch lever being pivotally mounted on said bolt plug for pivotal movement between a latched position in which 15 said tooth is engaged in said notch to lock said bolt against rotation, and an unlatched position in which said tooth is disengaged from said notch to release said bolt; means for biasing said latch lever toward said latched position; said latch lever having cam
- 20 means constructed and arranged to cooperate with said firing pin to pivot said latch lever from said latched to said unlatched position thereof in response to movement of said firing pin from said cocked to said fired position thereof; releasable detent means for
- 25 said latch lever; said latch lever being further pivotally movable to a detented disabled position in which said detent means is operable to releasably secure said latch lever against movement by said biasing means.
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CLAIM 2. A bolt latch mechanism as recited in CLAIM 1, said latch lever being selectively manually pivotable between said detented disabled position and said latched and unlatched positions by applying pressure 35 in alternate angular directions to said latch lever.

11

RA-0247

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138569 R2539557

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CLAIM 3. In a bolt-action firearm of the type having a .bolt rotatably mounted for movement between open and closed positions; a bolt plug non-rotatably mounted and having threaded connection with said bolt; a firing pin mounted reciprocably in said bolt plug for movement between fired and cocked positions with respect to said bolt; the improved bolt latch mechanism which comprises:

- 10 a latch lever having a tooth; said bolt plug being formed with a recess receiving said latch lever; said bolt being formed with a notch arranged for receiving said tooth when said bolt is rotated to said closed position; means mounting said latch lever in said 15 recess for pivotal movement between a latched position in which said tooth is engaged in said notch to latch said bolt against rotation with respect to said bolt plug, and an unlatched position in which said tooth is disengaged from said notch to release said bolt; 20 spring-biased plunger means mounted in said bolt plug for biasing said latch lever toward said latched position;
- said latch lever having cam means arranged to project when said latch lever is in said latched position thereof, into the path of reciprocation of said firing pin, whereby movement of said firing pin to said fired position normally pivots said latch lever to said unlatched position, and movement <u>of said firing</u> pin to
- 30 said cocked position normally permits said springbiased plunger means to pivot said latch lever to said latched position;

said latch lever having a detent notch, and being

35 manually pivotable in said recess to a disabled position in which said tooth is released from said locking notch and said detent notch engages said

12

RA-0247

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138570 R2539558

plunger means to interfere with rotation of said latch lever and thereby render said plunger means inoperative to pivot said latch lever toward said latched position thereof.

CLAIM 4. A bolt latch mechanism as recited in CLAIM 3, said latch lever being manually pivotable from said disabled position toward said latched and unlatched positions thereof, by applying pressure sufficient to displace said plunger means from said detent notch.

CLAIM 5. A bolt latch mechanism as recited in CLAIM 3, said latch lever having a face area normally bearing against said plunger means for relative sliding

15 movement as said latch lever is pivoted between said latched and'unlatched positions, said detent notch being formed in said face in a location spaced from said bearing area to engage said plunger means in said disabled position of said latch lever.

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CLAIM 6. A bolt latch mechanism as recited in CLAIM 3, said latch lever being pivotable: in a first angular direction into said unlatched position; in an opposite angular direction into said latched 25 position; and beyond said unlatched position in said

first angular direction into said disabled position.

CLAIM 7. A bolt latch mechanism as recited in CLAIM 6, said firing pin being formed with a head having a

- 30 peripheral surface cylindrical about the axis of movement of said firing pin; said cam means comprising a cam surface formed on said latch lever; said latch lever being constructed and pivotally mounted so that in said latched position thereof, said cam surface is
- 35 inclined toward the axis of reciprocation of said firing pin in the direction of movement of said head from said cocked to said fired positions thereof, for sliding engagement by said head surface.

RA-0247

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138571 R2539559

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CLAIM 8. A bolt latch mechanism as recited in CLAIM 7, said latch lever being constructed and pivotally mounted so that in said unlatched position thereof, said cam surface slidably engages said head surface and remains inclined to the axis of reciprocation of said firing pin in the direction of movement of said head from said cocked to said fired positions thereof, but at a smaller angle than in said latched position of said latch lever, thereby permitting further

- 10 pivotal movement of said latch lever in said first angular direction into said disabled position without producing binding interference between said cam surface and said head surface.
- 15 CLAIM 9. A bolt latch mechanism as recited in CLAIM 3, said latch lever projecting from said bolt plug recess outwardly of said bolt plug, and having a Vshaped upper surface for manual rocking between said disabled position and said latched and unlatched
- 20 positions.



14

RA-0247

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ABSTRACT OF THE DISCLOSURE

A bolt-action firearm, of the type having a bolt rotatably movable between closed and open positions, has an improved bolt latch mechanism which is operable independently of a safety mechanism. The latch normally locks the bolt in closed position automatically when the firing pin is cocked and releases the bolt upon firing; but it may be

10 manually moved to a disabled position, in which it is detented. The latch mechanism is recessed in the bolt plug in such fashion that it is readily visible and accessible, yet does not interfere with normal manual operation of the firearm, and does not protrude 15 so that it might be accidentally displaced.



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RA-0247





BARBER - PRESALPRICE STOMay 1, 1984 Sheet 1 of 2

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CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER **KINZER V. REMINGTON**

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[54] BOLT LATCH FOR BOLT-ACTION FIREARM

- [75] Inventor: Fred E. Martin, Frankfort, N.Y.
- [73] Assignce: Remington Arms Company, Inc., Bridgeport, Conn.
- [21] Appl. No.: 511,449
- [22] Filed: Jul. 7, 1983

Related U.S. Application Data

- [63] Continuation of Ser. No. 290,693, Aug. 6, 1981.
- [51] Int. Cl.³ F41C 11/06
- [58] Field of Search 42/16, 69 A, 70 R, 70 F

[56] References Cited

U.S. PATENT DOCUMENTS

1,318,423	10/1919	Williams 42/16
1,322,514	11/1919	Bader 42/16
3.138.888	6/1964	Brewer

[11]	4,445,292		
[45]	May 1, 1984		

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Primary Examiner-Charles T. Jordan

Assistant Examiner-Ted L. Parr Attorney, Agent. or Firm-Nicholas Skovran; William L. Ericson; Barry Estrin

[57] ABSTRACT

A bolt-action firearm, of the type having a bolt rotatably movable between closed and open positions, has an improved bolt latch mechanism which is operable independently of a safety mechanism. The latch locks the bolt in closed position automatically when the firing pin is cocked, and releases the bolt upon firing. The latch mechanism is recessed in the bolt plug in such fashion that it is readily visible and accessible, yet does not interfere with normal manual operation of the firearm, and does not protrude so that it might readily be displaced accidentally. In one embodiment, the latch may be manually displaced to or from a disabled position, in which it is releasably detented.

7 Claims, 6 Drawing Figures



BARBER - PRESSLERATCIES 78 May 1, 1984 Sheet 2 of 2

4,445,292



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BOLT LATCH FOR BOLT-ACTION FIREARM

This application is a continuation of application Ser. No. 290,693 filed Aug. 6, 1981.

This invention relates to firearms of the bolt-action type, which have a bolt reciprocable in a receiver between open and closed portions, and rotatable by means of a handle between locked and unlocked relationship cerned with an improved bolt latch mechanism which is normally operated automatically by the firing and recocking of the firearm, but which may be selectively disabled, according to the user's wishes.

In a bolt-action firearm intended for hunting use, it is 15 desirable to provide both a safety, and a bolt latch for securing the bolt locked in a closed position. These two features allow the firearm to be carried in the field loaded and cocked, without risk either of accidental firing, or of the bolt being unlocked by some accidental 20 jar or collision. At the same time, the user should be enabled to open the bolt readily and safely for unloading. Controls for the safety and bolt latch should be simple enough to avoid confusion in poor lighting conditions; should be readily manipulable even by a hunter 25 wearing gloves; and yet should not protrude in a manner either to interfere with manual operation of the firearm, or to be susceptible to inadvertent displacement

One approach to this question is shown in U.S. Pat. 30 No. 2,514,981 to Walker et al, in which a two-position safety lever also serves as a bolt latch. The safety lever has two arms: a safety arm bearing an eccentric which blocks the sear of the trigger mechanism in a "safe" gages a notch in the bolt to latch it against rotation. Movement of the safety lever to the "fire" position releases the sear, and also removes the latch arm from engagement with the bolt. This is a satisfactory system; but it does require the safety to be released when the 40 bolt is opened, and therefore calls for proper caution to be exercised when the user wishes to unload the firearm.

Another prior art solution involves a safety lever movable to three positions: one in which the safety and 45 the bolt latch are both engaged; a second, intermediate position which either disengages the bolt latch, or enables it to be manually disengaged, but leaves the safety on; and a third, firing position in which both the safety and the bolt latch are inoperative. Examples of this 50 approach appear in U.S. Pat. Nos. 2,824,402 to Fischer; 1,318,423 to Williams; 2,869,269 to Couture; and 3,138,888 to Brewer. If a hunter is working in good lighting conditions, without gloves, and with leisure to see that the safety is correctly positioned, these systems 55 are satisfactory. But in the press of urgency and excitement that often arises in the field, and under adverse conditions, error in selecting among three safety positions is not unlikely to occur.

Another solution that has been suggested is to pro- 60 vide a bolt latch that is completely divorced from the safety mechanism. This enables the hunter to unload without concern about changing the condition of a safety he has previously activated. Two examples of such a bolt latch are found in U.S. Pat. Nos. 1,322,514 to 65 Bader, and 1,669,496 to Stahl. In Bader, a sliding latch, mounted on the side of the bolt plug just behind the bolt handle, is movable to or from latching engagement with

the bolt handle by means of a pivoted lever, which is spring-biased toward the latch-engaging position. The latch may be withdrawn either by lever engagement with a shoulder on the firing pin when the rifle is fired, 5 or by manual rotation of the pivoted lever. After manual opening with the rifle cocked, the pivoted lever must be held manually retracted in order to re-close the bolt.

In the Stahl Patent, a rotatable shaft, formed with a to the firearm barrel. The invention is particularly con- 10 flat and carrying a spring-biased latch plunger, extends tranversely across a mating flat in the firing pin. The cocking of the firing pin mates the two flats so as to turn the shaft and latch plunger into locking engagement with the bolt handle. Upon firing, the flats disengage so that the bolt handle may be raised, with the shaft and latch plunger now being free of the firing pin and able to rotate to permit this opening movement. If it is desired to unload the rifle with the firing pin cocked, the latch plunger may be retracted manually to permit the bolt to be opened. The latch plunger must once again be held retracted to permit the bolt to be re-closed; this disadvantage is shared by Bader and Stahl.

The present invention has as its general object the improvement of bolt latch mechanisms for bolt-action rifles which have independently-operable safety devices. The improved mechanism features a simplified construction, involving a single pivoted, spring-loaded latch lever, which is automatically operated by the displacements of a firing pin during cocking and firing. In one embodiment, a detent is provided so that the latch is selectively operable manually to releasably secure it in a disabled position. The latch may readily be disabled or reactivated by the press of even a gloved finger, after which the hands are free to carry out loadposition of the lever; and another latch arm which en- 35 ing, cocking, firing, or unloading operations without further attention to the latch.

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According to the invention, the bolt plug of a boltaction firearm is recessed to receive a latch lever, which is pivotally mounted in the recess for rocking motion to either of two positions: latched by cocking the weapon and closing the bolt handle; or unlatched by firing the weapon. A spring and plunger bias the lever toward the latched position, in which a tooth formed at one end of the lever engages in a mating notch in the closed bolt handle. The latch lever has a cam surface so arranged, in the latched position, as to project into the path of motion of the head of the firing pin, which therefore pivots the lever to the unlatched position when the weapon is fired. Subsequent re-cocking and withdrawal of the firing pin head enables the spring-loaded plunger to return the lever automatically to the latched position.

In one embodiment, the latch lever may be manually rocked beyond the latched position to a disabled position, in which a detent notch formed in the lever engages and interferes with movement of the springloaded plunger. The plunger cannot then move the lever toward the latched position until the lever is manually pressed in a direction to release the detent and thus restore automatic operation.

FIG. 1 is a fragmentary view in side elevation of one embodiment of the improved bolt latch mechanism, shown in latched relation to the bolt assembly of an illustrative bolt-action firearm, which is shown cocked and ready to fire;

FIG. 2 is a fragmentary view in rear elevation of the assembly of FIG. 1;

FIG. 3 is a fragmentary view showing the latch in unlatched position, with the bolt handle raised to un-

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138579

FIG. 4 is a fragmentary cross-sectional view in side elevation, with the parts in the same latched and cocked condition as in FIG. 1; 5

FIG. 5 is a view similar to FIG. 4, but showing the firing pin in a fired position, and the latch mechanism is an unlatched position; and

FIG. 6 is a view similar to FIGS. 4 and 5, but showing the firing pin in a cocked position, and the latch 10 mechanism detented in a disabled position.

The improved bolt latch mechanism is broadly applicable to bolt-action firearms of various designs, but is shown for purposes of illustration in a bolt-action rifle of substantially the same type as is shown in more detail 15 in U.S. Pat. Nos. 2,585,195 to Walker and 2,514,981 to Walker et al, which were assigned to the owner of the present application. The rifle includes a hollow cylindrical bolt 10 which is mounted for rotation and longitudinal reciprocation in a receiver (not shown), by 20 means of a handle 12 brazed or otherwise secured to the bolt. The holt, when closed against the breech of the rifle barrel, may be locked by means of conventional lugs formed on its forward end (not shown), which are engaged by rotating the handle down into the position 25 hown in FIGS. 1 and 2, or unlocked by raising the handle to the position of FIG. 3. The bolt is shown in its closed longitudinal position wih respect to elements of a fire control mechanism which includes a sear 34 and a trigger 35. With the bolt turned to its unlocked position 30 recess 50, in which a latch lever 51 is pivotally supof FIG. 3, it may be pulled longitudinally to the left to open the action for loading and unloading cartridges, and for cocking a firing pin 24.

A bolt plug 16 has a threaded extension 18 which extends forwardly into threaded engagement with inter- 35 nal threads 14 formed in the bolt, thus drivingly connecting the bolt and bolt plug for joint longitudinal reciprocation, but permitting the bolt to rotate independently. The bolt plug is formed with recessed flats 19 for sliding engagement with mating surfaces formed on 40 the receiver (not shown), to restrain the bolt plug from rotating with the bolt. The bolt plug also hes a cylindrical recess 20 slidably receiving an enlarged head 20 of the firing pin 24, and a slot 22 through which a searengaging lug 28 and a cocking arm 30 of the firing-pin 45 extend in freely-slidable but non-rotatable relation

In the relative positions of these elements shown in FIGS. 1 and 4, the firing pin 24 is cocked, with an oblique face 42 of the lug 28 bearing against a mating face 40 of the sear 34. The firing pin is continuously 50 urged toward a firing position, that is, toward the right in the drawings, by a conventional firing pin spring contained within the bolt. The sear, pivoted on a pin 36, is held in its illustrated angular position by the engagement between a step 39 in the sear and a connector 37 55 attached to the trigger 35, thereby restraining the firing pin in its cocked position. To fire the weapon, the trigger is pulled to move the connector 37 to the position shown in FIG. 3. The angle of the faces 40 and 42 with respect to the longitudinal axis of the bolt and firing pin 60 is such that the firing pin spring exerts a downward component of force on the sear that overcomes the upward force exerted by a sear spring 33, and pivots the sear counterclockwise to the position shown in FIG. 3, permitting the firing pin to be driven forwardly to its 65 fired position shown in FIG. 5.

In the fired condition, the cocking arm 30 of the firing pin extends forwardly into the deepest part of a cocking

cam 32 cut into the bolt 10, which is circumferentially aligned with the cocking arm when the bolt is closed (compare FIGS. 1 and 3). After firing, raising the bolt handle to the position of FIG. 3 causes the cocking arm to ride along the curved surface of the cam 32, and retracts the firing pin back toward the cocked position. Then as the bolt is opened and re-closed by a reciprocating movement along its major axis, the lug face 42 engages against the re-elevated sear face 40 and retains the firing pin in the cocked condition of FIGS. 1 and 4 once more.

The firearm action thus far described is conventional in design, and is further illustrated and described in the aforementioned U.S. Pat. Nos. 2,585,195 and 2,514,981. Therefore, no further detailed description of its operation and design is believed necessary. A safety mechanism of any type suitable to such an action may be utilized as desired, and the bolt latch of the present invention is intended to operate entirely independently of the safety mechanism. As illustrated, the sear 34 is provided with a cam lobe 38 for cooperation with a safety lever having an eccentric, of the kind disclosed in U.S. Pat. No. 2,514,981, which is selectively operable to block the sear against movement from the cocked position of FIG. 1. This is intended merely as an illustrative example of various safety mechanisms that might by used in conjunction with the improved bolt latch, which will now be described.

The bolt plug 16 is formed with a radially-extending ported on a pin 60 received in a tranverse hole 58. The lever 51 has a tooth 52 at its forward end, which, in a latched position of FIGS. 1 and 4, engages in a locking notch 62 at the rear of the bolt 10 and handle 12 to prevent the bolt from being moved from its closed and locked position. A plunger 68 is slidably received in a blind hole 64 in the bolt plug, and is urged against a rear face 53 of the lever 51 by a spring 66 to bias the lever in a clockwise direction toward the latched position.

The latch lever 51 is formed with a planar cam surface 55 which projects into the recess 20 in the latched position of FIG. 4, into the path of movement of the outer cylindrical surface of the firing pin head 26 from its cocked position of FIG. 4 to its fired position of FIG. 5. In the latched position, the cam surface 55 extends in a direction inclined downwardly in a forward direction with respect to the longitudinal axis A of the firing pin motion. When the trigger 35 is pulled to release the firing pin, the forwardly-moving cylindrical head 26 engages the cam surface 55 and pivots the lever 51 to the unlatched position shown in FIG. 5, against the bias of the spring-loaded plunger 68. The bolt 10 is now free to turn, and may be unlocked and opened. The surface 55 continues to be inclined downwardly in a forward direction. for a reason which will appear, but at a greatly reduced angle to the bolt axis A.

Re-cocking of the firing pin 24 frees the cam surface 55 from the head 26. This allows the plunger 68 to automatically re-latch the lever 51 in the position of FIG. 4, as the bolt handle is closed and the locking notch 62 becomes aligned with the tooth 52.

In the illustrated embodiment, the rear face 53 of the latch lever is formed with a detent notch 70, which is not reached by the plunger 68 sliding along the face 53 during the pivotal movements of the lever between the latched position of FIG. 4 and the unlatched position of FIG. 5. However, the lever may be rocked, by applying finger pressure to a projecting V-shaped upper surface

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER **KINZER V. REMINGTON**

BARBER - PRESALE R 0138580 R2539568

54, counterclockwise into a further disabled position shown in FIG. 6, in which the plunger 68 seats in the notch 70. The engagement between the plunger and the notch restrains the lever against being rotated by the bias of the spring 66, and thus detents the lever in this 5 disabled position.

To provide for an ample arcuate displacement between the unlatched and disabled positions of the lever 51, the surface 55 must have some clearance from the head 26. Thus this surface is inclined downwardly at a 10 small angle to the axis A in both the unlatched and the disabled positions, but in opposite axial directions.

When placed in the disabled, detented position of FIG. 6, the latch lever 51 will remain inoperative and unaffected by movement of the firing pin, until such 15 time as finger pressure is applied to it in a clockwise direction to release the plunger 68 from the notch 70, and thus restore the parts to the normal automaticallyoperating positions of FIGS. 4 and 5.

In a hunting situation in the field, where a series of 20 shots may be fired, the bolt is cyclically opened to reload the rifle, and reclosed to cock the firing pin for the next shot; and the latch lever automatically cycles between the latched and unlatched positions of FIGS. 4 and 5. Assuming, however, that the hunter wishes to 25 unload the cocked and latched rifle without firing previously-loaded live rounds, he need not release the safety to do so. He merely presses the latch lever 51 into the disabled position of FIG. 6, and opens the bolt with the safety engaged. When he next wishes to reload the 30 face in a location spaced from said bearing area to enrifle, the latch lever should be pressed to release it from the detented disabled condition, so that its normal automatic operation is restored.

The latch lever 51 is preferably positioned near the top of the bolt plug as shown, so that it is readily visible 35 into said unlatched position; in an opposite angular and easily pressed even with a gloved hand, but does not protrude in such a location as to be readily subject to accidental operation by the user's hand carrying the rifle, or by jarring against other objects.

I claim:

1. In a bolt-action firearm of the type having a substantially cylindrical bolt rotatably mounted for movement between open and closed positions; a bolt plug non-rotatably mounted and having threaded connection with said bolt; a firing pin mounted reciprocably in said 45 bolt plug for movement between fired and cocked positions with respect to said bolt; the improved bolt latch mechanism which comprises;

a latch lever having a tooth; said bolt plug being formed with a recess receiving said latch lever; said 50 bolt being formed with a locking notch opening onto an outer peripheral surface thereof at a location radially aligned with said tooth upon rotation of said bolt to said closed position; means mounting said latch lever in said recess for pivotal movement 55 about an axis substantially perpendicular to the longitudinal axis of said cylindrical bolt between a first, latched position in which said tooth is engaged in said locking notch to latch said bolt against rotation with respect to said bolt plug, and 60 a second, unlatched position in which said tooth is disengaged from said locking notch to release said bolt for rotation; spring-biased plunger means mounted in said bolt plug for biasing said latch lever toward said first position;

said latch lever having cam means arranged to project, upon pivotal movement of said latch lever

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into said first position, into the path of reciprocation of said firing pin, whereby movement of said firing pin to said fired position normally pivots said latch lever from said first to said second position to unlatch said bolt, and movement of said firing pin to said cocked position normally permits said spring-biased plunger means to pivot said latch lever from said second to said first position to latch said bolt;

said latch lever having a detent notch, and being manually pivotable in said recess to a third, disabled position in which said cam means is withdrawn from the path of reciprocation of said firing pin, said tooth is released from said locking notch and said detent notch engages said plunger means to interfere with rotation of said latch lever from said third position, and thereby render said plunger means inoperative to pivot said latch lever toward said first position thereof.

2. A bolt latch mechanism as recited in claim 1, said latch lever being manually pivotable from said disabled position toward said latched and unlatched positions thereof, by applying pressure sufficient to displace said plunger means from said detent notch.

3. A bolt latch mechanism as recited in claim 1, said latch lever having a face area normally bearing against said plunger means for relative sliding movement as said latch lever is pivoted between said latched and unlatched positions, said detent notch being formed in said gage said plunger means in said disabled position of said latch lever.

4. A bolt latch mechanism as recited in claim 1, said latch lever being pivotable: in a first angular direction direction into said latched position; and beyond said unlatched position in said first angular direction into said disabled position.

5. A bolt latch mechanism as recited in claim 4, said 40 firing pin being formed with a head having a peripheral surface cylindrical about the axis of movement of said firing pin; said cam means comprising a cam surface formed on said latch lever; said latch lever being constructed and pivotally mounted so that in said latched position thereof, said cam surface is inclined toward the axis of reciprocation of said firing pin in the direction of movement of said head from said cocked to said fired positions thereof, for sliding engagement by said head surface.

6. A bolt latch mechanism as recited in claim 5, said latch lever being constructed and pivotally mounted so that in said unlatched position thereof, said cam surface slidably engages said head surface and remains inclined to the axis of reciprocation of said firing pin in the direction of movement of said head from said cocked to said fired positions thereof, but at a smaller angle than in said latched position of said latch lever, thereby permitting further pivotal movement of said latch lever in said first angular direction into said disabled position without producing binding interference between said cam surface and said head surface.

7. A bolt latch mechanism as recited in claim 1, said latch lever projecting from said bolt plug recess outwardly of said bolt plug, and having a V-shaped upper 65 surface for manual rocking between said disabled position and said latched and unlatched positions.

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER **KINZER V. REMINGTON**

BARBER - PRESALE R 0138584

BOLT LATCH FOR BOLT-ACTION FIREARMS

This invention relates to firearms of the bolt-action type, which have a bolt reciprocable in a receiver between open and closed positions, and rotatable by means of a handle between locked and unlocked relationship to the firearm barrel. The invention is particularly concerned with an improved bolt latch mechanism which is normally operated automatically

- 10 by the firing and re-cocking of the firearm, but which may be selectively disabled, according to the user's wishes.
- In a bolt-action firearm intended for hunting use, it is desirable to provide both a safety, and a bolt latch for securing the bolt locked in a closed position. These two features allow the firearm to be carried in the field loaded and cocked, without risk either of accidental firing, or of the bolt being unlocked by 20 some accidental jar or collision. At the same time,
- the user should be enabled to open the bolt readily and safely for unloading. Controls for the safety and bolt latch should be simple enough to avoid confusion in poor lighting conditions; should be readily 25 manipulable even by a hunter wearing gloves; and yet should not protrude in a manner either to interfere with manual operation of the firearm, or to be

susceptible to inadvertent displacement.

- 30 One approach to this question is shown in U. S. Patent 2,514,981 to Walker et al, in which a two-position safety lever also serves as a bolt latch. The safety lever has two arms: a safety arm bearing an eccentric which blocks the sear of the trigger mechanism in a
- 35 "safe" position of the lever; and another latch arm which engages a notch in the bolt to latch it against rotation. Movement of the safety lever to the "fire" position releases the sear, and also removes

RA-0247

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138582 R2539570

the latch arm from engagement with the bolt. This is a satisfactory system; but it does require the safety to be released when the bolt is opened, and therefore calls for proper caution to be exercised when the user wishes to unload the firearm.

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Another prior art solution involves a safety lever movable to three positions: one in which the safety and the bolt latch are both engaged; a second, internediate position which either disengages the bolt latch, or enables it to be manually disengaged, but leaves the safety on; and a third, firing position in which both the safety and the bolt latch are inoperative. Examples of this approach appear in

- 15 U. S. Patents 2,824,402 to Fischer; 1,318,423 to Williams; 2,869,269 to Couture; and 3,138,888 to Brewer. If a hunter is working in good lighting conditions, without gloves, and with leisure to see that the safety is correctly positioned, these systems
- 20 are satisfadtory. But in the press of urgency and excitement that often arises in the field, and under adverse conditions, error in selecting among three safety positions is not untakely to occur.
- 25 Another solution that has been suggested is to provide a bolt latch that is completely divorced from the safety mechanism. This enables the hunter to unload without concern about changing the condition of a safety he has previously activated. Two examples of
- 30 such a bolt latch are found in U. S. Fatents 1,332,514 to Bader, and 1,669,496 to Stahl. In Bager, a sliding latch, mounted on the side of the bolt blug just behind the bolt handle, is movable to or from latching engagement with the bolt handle by means of a pivoted
- 35 lever, which is spring-biased toward the latch-engaging position. The latch may be withdrawn either by lever engagement with a shoulder on the firing pin when the

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RA-0247

rifle is fired, or by manual rotation of the pivoted lever. After manual opening with the rifle cocked, the pivoted lever must be held manually retracted in order to re-close the bolt.

In the Stahl Patent, a rotatable shaft, formed with a flat and carrying a spring-biased latch plunger, extends tranversely across a mating flat in the firing pin. The cocking of the firing pin mates the two 10 flats so as to turn the shaft and latch plunger into locking engagement with the bolt handle. Upon firing, the flats disengage so that the bolt handle may be raised, with the shaft and latch plunger now being free of the firing pin and able to rotate to permit this opening movement. If it is desired to unload 15 the rifle with the firing pin cocked, the latch plunger may be retracted manually to permit the bolt to be opened. The latch plunger must once again be held retracted to permit the bolt to be 20 re-closed; this disadvantage is shared by Bader and Stahl.

The present invention has as its general object the improvement of bolt latch mechanisms for bolt-action 25 rifles which have independently-operable safety devices. The improved mechanism features a simplified construction, involving a single pivoted, spring-loaded latch lever, which is automatically operated by the displacements of <u>a firing</u> pin during

- 30 cocking and firing. In one embodiment, a detent is provided so that the latch is selectively operable manually to releasably secure it in a disabled position. The latch may readily be disabled or reactivated by the press of even a gloved finger,
- 35 after which the hands are free to carry out loading, cocking, firing, or unloading operations without further attention to the latch.

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RA-0247

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According to the invention, the bolt plug of a bolt-

action firearm is recessed to receive a latch lever, which is pivotally mounted in the recess for rocking motion to either of two positions: latched by cocking the weapon and closing the bolt handle; or unlatched by firing the weapon. A spring and plunger bias the lever toward the latched position, in which a tooth formed at one end of the lever engages in a mating notch in the closed bolt handle. The latch lever has a cam surface so arranged, in the latched 10 position, as to project into the path of motion of the head of the firing pin, which therefore pivots the lever to the unlatched position when the weapon is fired. Subsequent re-cocking and withdrawal of the firing pin head enables the spring-loaded plunger 15 to return the lever automatically to the latched position.

In one embodiment, the latch lever may be manually 20 rocked beyond the latched position to a disabled position, in which a detent notch formed in the lever engages and interferes with movement of the springloaded plunger. The plunger cannot then move the lever toward the latched position until the lever is 25 manually pressed in a direction to release the detent and thus restore automatic operation.

FIG. 1 is a fragmentary view in side elevation of 30 one embodiment of the improved bolt latch mechanism, shown in latched relation to the bolt assembly of an illustrative bolt-action firearm, which is shown cocked and ready to fire;

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FIG. 2 is a fragmentary view in rear elevation of the assembly of FIG. 1;

FIG. 3 is a fragmentary view showing the latch in unlatched position, with the bolt handle raised to unlock the bolt, and the parts of the firearm in fired and uncocked condition;

FIG. 4 is a fragmentary cross-sectional view in side 10 elevation, with the parts in the same latched and recorded condition as in FIG. 1:

FIG. 5 is a view similar to FIG. 4, but showing the firing pin in a fired position, and the latch mechanism 15 in an unlatched position; and

FIG. 6 is a view similar to FIGS. 4 and 5, but showing the firing pin in a cocked position, and the laten mechanism detented in a disabled position.

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The improved bolt latch mechanism is broadly applicable to bolt-action firearms of various designs, but is shown for purposes of illustration in a boltaction rifle of substantially the same type as is

- 25 shown in more detail in U.S. Patents 2,585,195 to Walker and 2,514,981 to Walker et al, which were assigned to the owner of the present application. The rifle includes a hollow cylindrical bolt 10 which is mounted for rotation and longitudinal reciprocation
- 30 in a receiver (not shown), by means of a handle 12 brazed or otherwise secured to the bolt. The bolt, when closed against the breech of the rifle barrel, may be locked by means of conventional lugs formed on its forward end (not shown), which are engaged by
- 35 rotating the handle down into the position shown in FIGS. 1 and 2, or unlocked by raising the handle to the position of FIG. 3. The bolt is shown in its

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RA-0247

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138586 R2539574

closed longitudinal position with respect to elements of a fire control mechanism which includes a sear 34 and a trigger 35. With the bolt turned to its unlocked position of FIG. 3, it may be pulled longitudinally to the left to open the action for loading and unloading cartridges, and for cocking a firing pin 24.

A bolt plug 16 has a threaded extension 18 which extends forwardly into threaded engagement with 10 internal threads 14 formed in the bolt, thus drivingly connecting the bolt and bolt plug for joint longitudinal reciprocation, but permitting the bolt to rotate independently. The bolt plug is formed with recessed flats 19 for sliding engagement with mating surfaces 15 formed on the receiver (not shown), to restrain the

- bolt plug from rotating with the bolt. The bolt plug also has a cylindrical recess 20 slidably receiving an enlarged head 26 of the firing pin 24, and a slot 22 through which a sear-engaging lug 28 and a cocking 20 arm 30 of the firing pin extend in freely-slidable
- 20 arm 30 of the firing pin extend in freely-slidable but non-rotatable relation.

In the relative positions of these elements shown in FIGS. 1 and 4, the firing pin 24 is cocked, with an ' oblique face 42 of the Tug 28 bearing against a mating face 40 of the sear 34. The firing pin is continuously urged toward a firing position, that is, toward the right in the drawings, by a conventional firing pin spring contained within the <u>bolt</u>. The sear,

- 30 pivoted on a pin 36, is held in his illustrated angular position by the engagement between a step 39 in the sear and a connector 37 attached to the trigger 35, thereby restraining the firing pin in its cocked position. To fire the weapon, the trigger is pulled
- 35 to move the connector 37 to the position shown in FIG. 3. The angle of the faces 40 and 42 with respect to the longitudinal axis of the bolt and firing pin is

RA-0247

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138587

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such that the firing pin spring exerts a downward component of force on the sear that overcomes the upward force exerted by a sear spring 33, and pivots the sear counterclockwise to the position shown in FIG. 3, permitting the firing pin to be driven forwardly to its fired position shown in FIG. 5.

In the fired condition, the cocking arm 30 of the firing pin extends forwardly into the deepest part of 10 a cocking cam 32 cut into the bolt 10, which is circumferentially aligned with the cocking arm when the bolt is closed (compare FIGS. 1 and 3). After firing, raising the bolt handle to the position of FIG. 3 causes the cocking arm to ride along the curved surface 15 of the cam 32, and retracts the firing pin back toward the cocked position. Then as the bolt is opened and re-closed by a reciprocating movement along its major axis, the lug face 42 engages against the re-elevated sear face 40 and retains the firing pin in the cocked 20 condition of FIGS. 1 and 4 once more.

The firearm action thes far described is conventional in design, and is further illustrated and described in the aforementioned Patents 2,585,195 and 2,514,981.

- 25 Therefore, no further detailed description of its operation and design is bedieved necessary. A safety mechanism of any type suitable to such an action may be utilized as desired, and the bolt latch of the present invention is intended to operate entirely independently
- 30 of the safety mechanism. As illustrated, the sear 34 is provided with a cam lobe 38 for <u>cooperation</u> with a safety lever having an eccentric. of the kind disclosed in Patent 2,514,981, which is selectively operable to block the sear against movement from the cocked
- 35 position of FIG. 1. This is intended merely as an illustrative example of various safety mechanisms that might be used in conjunction with the improved bolt

EA-0247

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latch, which will now be described.

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The bolt plug 16 is formed with a radially-extending recess 50, in which a latch lever 51 is pivotally supported on a pin 60 received in a tranverse hole 58. The lever 51 has a tooth 52 at its forward end, which, in a latched position of FIGS. 1 and 4, engages in a locking notch 62 at the rear of the bolt 10 and handle 12 to prevent the bolt from being moved from its closed and locked position. A plunger 68 is slidably received in a blind hole 64 in the bolt plug, and is urged against a rear face 53 of the lever 51 by a spring 66 to bias the lever in a clockwise direction toward the latched position.

The latch lever 51 is formed with a planar cam surface 55 which projects into the recess 20 in the latched position of FIG. 4, into the path of movement of the outer cylindrical surface of the firing pin head 26

- 20 from its colled position of FIG. 4 to its fired position of FIG. 5. In the latched position, the cam surface 55 extends in a direction inclined downwardly in a forward direction with respect to the longitudinal axis A of the firing pin motion. When the trigger 35
- 25 is pulled to release the firing pin, the forwardlymoving cylindrical head-26 engages the cam surface 55 and pivots the lever 51 to the unlatched position shown in FIG. 5, against the bias of the spring-loaded plunger 68. The bolt 10 is now free to turn, and may
- 30 be unlocked and opened. The surface 55 continues to be inclined downwardly in a forward <u>direction</u>, for a reason which will appear, but at a greatly reduced angle to the bolt axis A.
- 35 Re-cocking of the firing pin 24 frees the cam surface 55 from the head 26. This allows the plunger 68 to automatically re-latch the lever 51 in the position

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EA-0247

of FIG. 4, as the bolt handle is closed and the locking notch 62 becomes aligned with the tooth 52.

In the illustrated embodiment, the rear face 53 of the
latch lever is formed with a detent notch 70, which is not reached by the plunger 68 sliding along the face
53 during the pivotal movements of the lever between the latched position of FIG. 4 and the unlatched position of FIG. 5. However, the lever may be rocked,
by applying finger pressure to a projecting V-shaped upper surface 54, counterclockwise into a further
disabled position shown in FIG. 6, in which the plunger 68 seats in the notch 70. The engagement between the plunger and the notch restrains the lever

To provide for an ample arcuate displacement between the unlatched and disabled positions of the lever 51, 20 the surface 55 must have some clearance from the head 26. Thus this surface is inclined downwardly at a small angle to the aris A in both the unlatched and the disabled positions, but in opposite axial directions.

and thus detents the lever in this disabled position.

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When placed in the isabled, detented position of FIG. 6, the latch lever 51 will remain inoperative and unaffected by movement of the firing pin, until such time as finger pressure is applied to it in a

30 clockwise direction to release the plunger 68 from the notch 70, and thus restore the parts to the normal automatically-operating positions of FIGS. 4 and 5.

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BARBER - PRESALE R 0138590 R2539578

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In a hunting situation in the field, where a series of shots may be fired, the bolt is cyclically opened to reload the rifle, and reclosed to cock the firing pin for the next shot; and the latch lever automatically cycles between the latched and unlatched positions of FIGS. 4 and 5. Assuming, however, that the hunter wishes to unload the cocked and latched rifle without firing previously-loaded live rounds, he need not release the safety to do so. He merely presses the latch lever 51 into the disabled position of FIG. 6, and opens the bolt with the safety engaged. When he next wishes to reload the rifle, the latch lever should be pressed to release it from the detented disabled condition, so that its normal automatic lo operation is restored.

The latch lever 51 is preferably positioned near the top of the bolt plug as shown, so that it is readily visible and easily pressed even with a gloved hand, 20 but does not protrude in such a location as to be

- readily subject to accidental operation by the user's hand carrying the rifle, or by jarring against other objects.
- 25 In an alternative embodiment which is not illustrated, the detent notch 70 is not formed in the latch lever 51, and the rear face 53 is left uninterrupted. The cycle of operation would then include only movements between the latched and unlatched <u>positions</u> of FIGS.
- 30 4 and 5. If the hunter wishes to unload live rounds from the rifle when it is in a codked condition, without releasing the safety, he presses the latch lever into the unlatched position of PTC 5, and opens the bolt. The disadvantage of omitting the
- 35 detent notch 70 is that he must use a finger of one hand, which also supports the rifle, to retain the lever 51 in the FIG. 5 position during his action of

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RA-0247

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138591 R2539579

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initially opening the bolt by grasping and turning the bolt handle with the other hand. An offsetting advantage of omitting the detent notch is that he need not later reactivate the lever 51 by releasing it from a disabled condition as shown in FIG. 6. When the bolt has been initially turned from the closed toward the open position, the user's finger may be released from the lever 51, and the tooth 52 will slide against the outer periphery of the 10 rotating bolt. Reclosing of the bolt can then be earried out without having to press the lever 51 again, since the tooth 52 will slide back along the

outer bolt surface until it falls into the locking notch 62, and assumes the latched position of FIG. 4.

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CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

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CLAIM 1. In a bolt-action firearm of the type having a substantially cylindrical bolt rotatably mounted for movement between open and closed positions; a bolt plug non-rotatably mounted and having threaded connection with said bolt; a firing pin mounted reciprocably in said bolt plug for movement between fired and cocked positions with respect to said bolt; the improved bolt latch mechanism which comprises:

- 10 a latch lever having a tooth; said bolt plug being formed with a recess receiving said latch lever; said bolt being formed with a locking notch opening onto an outer peripheral surface thereof at a location radially aligned with said tooth upon rotation of said
- 15 bolt to said closed position; means mounting said latch lever in said recess for pivotal movement substantially radially of said cylindrical bolt between a latched position in which said tooth is engaged in said locking notch to latch said bolt
- 20 against rotation with respect to said bolt plug, and an unlatched position in which said tooth is disengaged from said locking notch to release said bolt for rotation; spring-blased plunger means mounted in said bolt plug for blasing said latch lever toward 25 said latched position;

said latch lever having cam means arranged to project, upon pivotal movement of said latch lever into said latched position thereof, into the path of recipro-

30 cation of said firing pin, whereby movement of said firing pin to said fired position pivots said latch lever to said unlatched position, and movement of said firing pin to said cocked position permits said spring-biased plunger means to pivot said latch lever 35 toward said latched position.

CLAIM 2. A bolt latch mechanism as recited in CLAIM 1, said latch lever having a detent notch, and being

EA-0247

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON BARBER - PRESALE R 0138593 R2539581

13

manually pivotable in said recess to a disabled position in which said tooth is released from said locking notch and said detent notch engages said plunger means to interfere with rotation of said latch lever and thereby render said plunger means inoperative to pivot said latch lever toward said latched position thereof.

CLAIM 3. A bolt latch mechanism as recited in CLAIM 10 2. said latch lever being manually pivotable from said disabled position toward said latched and unlatched positions thereof, by applying pressure sufficient to displace said plunger means from said detent notch.

- 15 CLAIM 4. A bolt latch mechanism as recited in CLAIM 2, said latch lever having a face area normally bearing against said plunger means for relative sliding movement as said latch lever is pivoted between said latched and unlatched positions, said
- 20 detent notch being formed in said face in a location spaced from said bearing area to engage said plunger means in said disabled position of said latch lever.

CLAIM 5. A bolt latch mechanism as recited in CLAIM

- 25 2, said latch lever being pivotable: in a first angular direction into said unlatched position; in an opposite angular direction into said latched position; and beyond said unlatched position in said first angular direction into said disabled position.
- 30

CLAIM 6. A bolt latch mechanism as resited in CLAIM 5, said firing pin being formed with a head having a peripheral surface cylindrical about the axis of movement of said firing pin; said cam means comprising

35 a cam surface formed on said latch lever; said latch lever being constructed and pivotally mounted so that in said latched position thereof, said cam surface is

13

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138594

14

inclined toward the axis of reciprocation of said firing pin in the direction of movement of said head from said cocked to said fired positions thereof, for sliding engagement by said head surface.

CLAIM 7. A bolt latch mechanism as recited in CLAIM 6, said latch lever being constructed and pivotally mounted so that in said unlatched position thereof, said cam surface slidably engages said head surface 10 and remains inclined to the axis of reciprocation of said firing pin in the direction of movement of said head from said cocked to said fired positions thereof, but at a smaller angle than in said latched position of said latch lever, thereby permitting further 1 pivotal movement of said latch lever in said first angular direction into said disabled position without producing binding interference between said cam surface and said head surface.

- 20 CLAIM 8. A bolt latch mechanism as recited in CLAIM 2, said latch lever projecting from said bolt plug recess outwardly of said bolt plug, and having a Vshaped upper surface for manual rocking between said disabled position and said latched and unlatched
- 25 positions.

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RA-0247

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CLAIM 9. In a bolt-action firearm of the type having a bolt rotatably mounted for movement between open and closed positions; a bolt plug non-rotatably mounted and having threaded connection with said bolt; a firing pin mounted reciprocably in said bolt plug for movement between fired and cocked positions with respect to said bolt; the improved latch mechanism which comprises:

- 10 A latch lever having a tooth; said bolt being formed with a notch arranged for receiving said tooth when said bolt is rotated to its closed position; said latch lever being pivotally mounted on said bolt plug for pivotal movement between a latched position in which 15 said tooth is engaged in said notch to lock said bolt against rotation, and an unlatched position in which said tooth is disengaged from said notch to release said bolt; means for biasing said latch lever toward said latched position; said latch lever having cam
- 20 means constructed and arranged to cooperate with said firing pin to pivot said latch lever from said latched to said unlatched position thereof in response to movement of said firing pin from said cocked to said fired position thereof; releasable detent means for
- 25 said latch lever; said latch lever being further pivotally movable to a detented disabled position in which said detent means is operable to releasably secure said latch lever against movement by said biasing means.
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CLAIM 10. A bolt latch mechanism as recited in CLAIM 9, said latch lever being selectively manually pivotable between said detented disabled position and said latched and unlatched positions by applying pressure 35 in alternate angular directions to said latch lever.

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RA-0247

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

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ABSTRACT OF THE DISCLOSURE

A bolt-action firearm, of the type having a bolt rotatably movable between closed and open positions, has an improved bolt latch mechanism which is operable independently of a safety mechanism. The latch locks the bolt in closed position automatically when the firing pin is cocked, and releases the bolt upon firing. The latch mechanism is recessed in the holt plug in such fashion that it is readily visible and accessible, yet does not interfere with normal manual operation of the firearm, and does not protrude so that it might readily be displaced accidentally. In one embodiment, the latch may be manually displaced 15 to or from a disabled position, in which it is

releasably detented.

16

RA-0247

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

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RD-69 REV. 6-58

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington MID

BRIDGEPORT, CONNECTICUT

APRIL 9, 1981

FRED MARTIN

SUBJECT: BOLT DATCH FOR BOLT-ACTION FIREARMS RA-0247

I am enclosing a draft patent application for your consideration, Your file copy has copies of the Stahl and Bader patents attached, which are discussed at pages 2 and 3 of the application.

There are several other patents mentioned at pages 1, 2, or 5, including two Walker patents owned by Remington, which relate to the Models 721, 700, etc., and four other patents to Fischer, Williams, Couture, and Brewer that relate to three-position safeties. These are not as pertinent to your invention as Stahl and Bader, and are mentioned only as general background; so I haven't attached copies, but will be glad to supply if you want to see them.

If you find that the application describes your bolt latch accurately and fully, please sign the Declaration attached to the "PTO Copy", sign the Assignment and have it notarized, and return these signed papers for filling in the Patent and Trademark Office.

However, if you want to make corrections or additions, please either give me a call, or correct your file copy in pencil and send all the papers back to me for revision.

Bill Ericson

WILLIAM L. ERICSON SENIOR PATENT COUNSEL

WLE/dt Encls.

RA-0247







BARBER - PRESALE R 0138602 R2539590



Patented May 15, 1928.

BARBER - PRESALE R 9438604

UNITED STATES PATENT OFFICE.

ELMER R. STAHL, OF DOWAGIAC, MICHIGAN.

BOLT-ACTION GUN.

Application filed August 12, 1927. Serial No. 212,493.

The main objects of this invention are: First, to provide a bolt locking means for bolt action guns in which the flight of the firing pin is away from and unimpeded by the locking means.

5 the locking means. Second, to provide a breech bolt locking means which is automatic in its operation.

Third, to provide an automatic breech bolt locking means which is capable of manual 10 release.

Fourth, to provide a breech bolt locking means in which the parts are comparatively simple and are so formed and supported that they are not likely to be mured or ren-16 dered inoperative in use by severe or care-

e dered inoperative in use by severe or careless manipulation of the gun.

Objects relating to details and economies of construction and operation of my invention will definitely appear from the detailed 20 description to follow.

The invention is defined and pointed out in the claims.

A structure which is a preferred embodiment of my invention is illustrated in the 25 accompanying drawing, forming a part of

this application, in which:

Fig. 1 is a side elevation of a gun action embodying the features of my invention, the stock and barrel and magazine being so omitted.

Fig. 2 is a fragmentary plan view. Fig. 3 is a longitudinal section on a line corresponding to line 3-3 of Figs. 2.5 and 7, certain parts being shown in full lines 25 for convenience in illustration, the firing pin

being in firing position. Fig. 4 is a fragmentary longitudinal section corresponding to Fig. 3 with the firing pin in retracted position.

10 Fig. 5 is a transverse section on line 5-5 of Figs. 1, 2, 4, and 7.

Fig. 6 is an enlarged detail partially in longitudinal section showing the firing pin in retracted or set position, with the breech

⁴⁵ bolt locking bolt in locking relation thereto. Fig. 7 is a detail view partially in longitudinal section on line 7-7 of Figs. 1, 5 and 6.

Fig. 8 is a side elevation of the firing pin 30 with its plunger removed.

Fig. 9 is a side elevation of the non-rotating portion of the breech bolt.

Fig. 10 is a plan view of the locking bolt. Fig. 11 is a plan view of the locking bolt to detent and its spring.

In the drawing similar reference characters refer to similar parts throughout the several views, and the sectional views are taken looking in the direction of the little arrows at the ends of the section lines.

1,669,496

Referring to the drawings, 1 represents the body or receiver portion of the breech bolt action. This is a standard commercial type and its structural details need not, therefore, be described.

The breech bolt 2 is mounted in the receiver for reciprocating and rotary movement as is common with gun actions of this type, the bolt being provided with a laterally projecting arm 3 having a hand piece 4 at 70 its outer end.

The breech bolt sleeve 5 is non-rotatably supported for reciprocating movement with the barrel portion of the breech bolt, having threaded engagement therewith at 6.

The firing pin 7 is supported in the breech holt and its sleeve for movement independently thereof. The trigger 8 is hung from the sear 9 which engages the keeper 10 of the firing pin when the firing pin is retracted 80 or set, is shown in Fig. 4.

The firing pin is provided with an actuating spring 11 and a tappet or plunger 12.

The sleeve 5 is provided with a transverse here 13 to receive and rotatably support the locking bolt 14, the firing pin having an elongated recess 15 to receive this bolt, the hore 13 in part intersecting the firing pin hore 15 in the sleeve 5.

The locking bolt has a segmental recess 16 **90** which permits limited movement thereof and provides a flat face 17 coacting with the forwardly inclined shopher 18 at the forward end of the recess 15 when the parts are in locking position, the firing pin in this posi- 95 tion, as shown in Fig. 4, corving as a detent to support the locking holt against rotation in releasing direction.

The locking bold is provided with a detent 19 reciprocatingly mounted in a transverse 100 bore 20 in the locking bolt, shown in Fig. 7, to coact with the arm 3 on the breech holt. This detent is provided with a finger piece 21, which permits manual releasing of the detent should occasion require.

The locking bolt has a transverse kerflike recess 22 engaged by the retaining screw 23 for holding the parts in assembled position.

With the parts thus arranged, when the he

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

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It will be observed that while the firing pin constitutes an element of the locking means, its flight is away from the locking means so that its movement is not impeded

15 by the locking means, its movement in fact being entirely free or independent from such locking means.

I have illustrated and described my improvements in an embodiment which is high-

- so ly practical. I have not attempted to illustrate or describe other embodiments or adaptations as I believe this disclosure will enable those skilled in the art to embody or adapt my improvements as may be desired. Having thus described my invention, what 0K
- I claim as new and desire to sequre by Letters Patent, is:

1. In a firearm, the combination of a receiver, a breech bolt mounted for reciprocat-

- 30 ing and rotary movement in said receiver and provided with a laterally projecting arm, a non-rotatable sleeve mounted to re-
- said sleeve transversely of said firing pind said firing pin having a transverse recess to receive said locking bolt, the front end of said recess being forwardly inclined pro-
- 40 viding a locking shoulder, said locking bolt, having a transverse recess to receive said firing pin. the face of said recess being engaged by the said locking shoulder of the firing pin when the firing pin is in set position, and a
- 45 spring actuated reciprocating detent disposed transversely of said locking bolt to engage said breech bolt arm when it is in its initial position, said detent being provided with a finger piece permitting the re-50 leasing of said breech bolt.

2. In a firearm, the combination of a receiver, a breech bolt mounted for reciprocating and rotary movement in said receiver

- and provided with a laterally projecting 55 arm, a non-rotatable sleave mounted to reciprocate with said bolt, a firing pin operatively associated with said breech bolt and sleeve, a locking bolt rotatably mounted in said sleeve transversely of said firing pin,
- 60 said firing pin having a transverse recess to receive said locking bolt, said locking bolt having a transverse recess to receive said firing pin, and a spring actuated reciprocating detend disposed transversely of said lock-

releasing of said breech bolt.

Figs. 4, 6 and 7, the arm 3 being engaged cating and rotary movement in said receiver, by the detent 19 and thereby locked in its a non-rotatable sleeve mounted to reciprocate with said bolt, a firing pin operatively not be accidentally removed in position to associated with said breech bolt and sleeve, and means for locking said breech bolt com- 75 prising a locking bolt rotatably mounted in said sleeve transversely of said firing pin, said firing pin having a transverse recess to receive said locking bolt, the front end of said recess providing a locking shoulder, said 80 locking bolt having a transverse recess to receive said firing pin, the face of said re-cess being engaged by the locking bolt of the firing pin when the firing pin is in set 85 position.

4. In a firearm, the combination of a receiver, a breech bolt mounted for reciprocating and rotary movement in said receiver and provided with a laterally projecting arm, a non-rotatable sleeve mounted to re- 90 ciprocate with said bolt, a firing pin operatively associated with said breech bolt and sleeve, and a locking bolt rotatably mounted in said sleeve transversely of said firing pin to be engaged by the firing pin when the 95 firing pin is in set position, said locking arm, a non-rotatable sleeve mounted to re- bolt having a spring actuated detent dis-ciprocate with said bolt, a firing pin opera-tively associated with said breech bolt and this in its initial position, said detent being sleeve, a locking bolt rotatably mounted in manually releasable. 100

5. In a firearm, the combination of n receiver, a breach bolt mounted for reciprocating and rotary movement in said receiver, a non-rotatable sleeve mounted to reciprocate with shid bolt, a firing pin operatively 105 as existed with said breech bolt and sleeve, and a locking member for said breech bolt rotatably mounted in said sleeve transversely of said firing pin to be engaged by the firing 110

pin when the firing pin is in set position. 6. A firearm comprising a rotary and re-ciprocatory breech bolt, a non-rotating sleeve reciprocating with the bolt a firing pin re-ciprocating with the sleeve and bolt and movable relative to said parts, and means 115 for locking said holt in firing position com-prising a locking member mounted on said sleeve to cooperate with said bolt, said firing pin cooperating with said locking member to hold the same in bolt locking position 120 when the firing pin is in set position, the flight of the pin being away from said locking means whereby its movement is unimpeded by the locking means.

7. In a firearm, the combination of a re- 125 ceiver, a breech bolt mounted for reciprocating and rotary movement in said receiver. a non-rotatable sleeve mounted to reciprocate with said bolt, a firing pin operatively as ing bolt to engage said breech bolt arm when associated with said breech bolt and sleeve, 130

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER **KINZER V. REMINGTON**

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and a vocking member for said breech bolt tively associated with said breech bolt, and mounted in said sleeve to be engaged by the a breech bolt locking means operatively asfiring pin when the firing pin is in set position.

8 A firearm comprising a rotary and reciprecatory breech bolt, a non-rotating sleeve reciprecating with the bolt, a firing pin operatively associated with said bolt and sleeve and movable relative thereto, and is means for locking said breech bolt in firing a position comprising a locking member mounted on said sleeve to cooperate with said breech bolt, said firing pin cooperating,

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- said breech bolt, said firing pin cooperating, when in set position, with said locking member to hold the same in breech bolt locking position, the flight of the firing pin being away from said locking member whereby its movement is unimpeded by the locking means.
- ²⁰ 9. A frearm comprising a rotary and reciprocatory breech bolt, a non-rotating sleeve reciprocating with the bolt, a firing pin operatively associated with said bolt and cleared a manufacture and
- sleeve and movable relative thereto, and means for locking said breech holt in firing position comprising a locking member mounted on said sleeve to cooperate with said breech bolt, said firing pin cooperating, when in set position, with said locking mem-
- ⁰ ber to hold the same in breech bolt locking position.

10. A firearm comprising a rotary and reciprocatory breech bolt, a firing pin operatively associated therewith, and a breech

- ³⁵ bolt locking means cooperating with said fiving pin when the firing pin is in set position to lock the breech bolt, the firing stroke of said firing pin being away from said locking means.
- ⁴⁰ 11. A firearm comprising a rotary and velciprocatory breech bolt, a firing pin operatively associated therewith, and a breech bolt locking means, said firing pin when in set position constituting a detent for the
 ⁴⁵ breech bolt locking means, the firing stroke
- of said firing pin being away from said locking means. 12. A firearm breech bolt action compris-

ing a breech bolt mounted for reciprocatory ⁵⁰ and rotary movement, a firing pin opera-

a breech bolt locking means operatively associated with said breech bolt and firing pin, the firing pin acting when set to hold said locking means in locked position, the flight 55 of the firing pin being away from and unimpeded by said locking means.

13.' A firearm breech bolt action comprising a breech bolt mounted for reciprocatory and rotary movement, a firing pin operatively associated with said breech bolt, and a breech bolt locking means operatively associated with said breech bolt and firing pin, the firing pin acting when set to hold said locking means in locked position. 65

14. A breech bolt firearm action consisting of a breech bolt, automatic means for locking said breech bolt in initial position after actuation to set the firing pin, and a firing pin constituting a detent for said locking means, the flight of the firing pin being free and unimpeded by said locking means.

15. A breech bolt firearm action consisting of a breech bolt, automatic means for locking said breech bolt in initial position ⁷⁵ after actuation to set the firing pin, and a firing pin constituting a detent for said locking means.

16. A firearm breech bolt action comprising a breech bolt mounted for reciprocatory ⁸⁰ and rotary movement, a firing pin operatively associated with said breech bolt, and a breech bolt locking means operatively associated with said breech bolt and firing pin, the firing pin constituting a detent for ⁸⁵ said locking means, the flight of the firing pin being free and unimpeded by said locking means.

17. A firearm breech bolt action comprising a breech bolt mounted for reciprocatory ⁹⁰ and potary movement, a firing pin operalively associated with said breech bolt, and a breech bolt locking means operatively associated with said breech bolt and firing pin, the firing pin constituting a detent for said ⁹⁵ locking means.

In witness whereof I have hereunto set my hand.





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CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138608 R2539596

JNITED STATES PATENT OFFICE.

GUSTAV A. BADER, OF ROCHESTER, NEW YORK.

GUN.

Specification of Letters Patent. Patented Nov. 25, 1919.

Application filed May 23, 1919. Serial No. 299,103.

To all whom it may concern:

22,514,

Be it known that I, GUSTAV A. BADER, a citizen of the United States, and resident of Rochester, in the county of Monroe and 5 State of New York, have invented certain new and useful Improvements in Guns, of which the following is a specification.

The present invention relates more particularly to the type of guns in which a re-10 ciprocatory <u>holt mechanism</u> carries a spring

- 10 ciprocatory <u>bolt mechanism</u> carries a spring pressed firing pin and is provided with a portion which rotates to lock the bolt mechanism in firing position, an object of this invention being to lock the rotary part of the
- 15 bolt mechanism against movement while in firing position and preferably to control such locking means automatically through the firing of the gun.
- To this and other ends, the invention con-20 sists of certain parts and combinations of parts all of which will be hereinafter described, the novel features being pointed out in the appended claims.

In the drawings:

- 25 Figure 1 is a fragmentary side view of a gun equipped with the present invention; Fig. 2 is a fragmentary top view of said gun;
- Fig. 3 is a rear view of the breech bolt;
 30 Fig. 4 is a horizontal sectional view through a portion of the gun in the plane of the axis of the firing pin showing the locking device locking the breech bolt in closed position;
- 35 Fig. 5 is a detail sectional view of the firing pin engaging the locking device and holding said locking device out of connection with the breech bolt;
- Fig. 6 is a detail view of the sleeve which 40 connects with the rear end of the breech bolt:

Fig. 7 is a vertical transverse section through said sleeve showing the manner in which the locking device is mounted on the 45 sleeve; and

Fig. 8 is a detail view of one member of the locking device.

The invention herein is illustrated in the U. S. magazine rifle, model of 1903, which is

50 described in publication #1923 of the Ordnance Department U. S. A., revised February 14, 1908, entitled "Description and Rules for the Management of the U. S. Magazine Rifle, Model of 1903, Culiber .30," and ref-

55 erence may be had to this publication for above mentioned.

any parts of the rifle which are not herein shown as it is unnecessary to illustrate in detail such a rifle in view of the fact that the invention is confined to an addition to the same. It will be understood however, that 60 the invention is not limited to a rifle such as shown in the above mentioned publication but may be embodied in any construction where similar results are desired.

In rifles of the type mentioned, unless the 65 bolt handle is turned fully down, the cam on the cocking piece will strike the cocking cam on the bolt and the energy of the main spring will be expended in closing the bolt, instead of on the primer; this prevents the 70 possibility of a cartridge being fired until . the bolt is fully closed, (see page 30 of the publication above referred to). In most instances, the bolt handle is turned fully down but is afterward unintentionally and un- 75 knowingly shifted slightly in an upward direction so that when the trigger is pulled the firing does not take place. It will be readily understood that this is not only a disadvantage to an army in battle but it is 80 also a diadvantage to a hunter who, after roaming many hours, and may be days, neets game only to lose it through misfire due to the upward shifting of the bolt handle of which he had no knowledge. According to \$5 this invention the turning of the rotary part of the bolt mechanism is prevented by a locking device which automatically enters into locking position to lock the rotary portion of the bolt mechanism, this locking de- 90 vice being automatically shifted out of lock-

ing position when the gan is fired. Referring to the embodiment of the invention herein shown, 1 indicates the stock of the gan and 2 the receiver on which the 95 bolt mechanism is reciprocable. This mechanism comprises in this instance a breech block 3 reciprocable and rotatable in the well of the receiver and interlocking with the receiver by a rotary movement under the 100 action of the handle 4, a sleeve 5 being guided on the receiver to be held against turning with the bolt and having a screw threaded connection 6 with the bolt. Carried by the sleeve and the breech bolt is a firing pin 7 which is acted upon by a main spring 8 of helical formation surrounding the tiring pin. The foregoing parts are the known parts of the U. S. magazine rifle

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As before pointed out, the handle 4 on the/breech bolt 3 is shifted accidentally at times away from its lowered position where it locks the breech bolt to the receiver, thus causing the energy of the main spring of the firing pin to be used up in closing the bolt instead of acting on the primer with full force. According to the illustrated embodiment of this invention, means is provided 10 for locking the breech bolt in its innermost position interlocked with the receiver. This means in this instance comprises a detent <u>0 preferably</u> slidably mounted on the sleeve <u>i at one cill</u>e of the latter by form-15 ing grooves 0^a in the upper and lower surfaces of the detent and projecting ribs 9^b on the sleeve to fit into said grooves 9. This detent may have a nose 10 adapted to enter a recess or notch 11 formed in the rear face

- 20 of the belt arm 1, the uppermost face of the nose 10 being beveled at 12 so that when the bolt arm 4 is swung to its lowermost position, it will coöperate with the cam face 12 and move the latter rearwardly, after which 25 the detent 9 will move under the action of
- a spring to be described, so that the nose 10 enters into the notch 11 and locks the bolt arm 4 in its lowermost position so that the bolt is held interlocked with the receiver.
- The detent 9 may be controlled either manually or automatically, the latter be-ing accomplished preferably through the 30 firing pin 7. To these ends, a lever 13 may be pivotally mounted at 14 in the sleeve
- 35 5 and extend through an opening 15 in the detent 9, the lever having on opposite sides curved faces 16 acting as curved beavings for engaging opposite walls of the $\phi p ening$ 15. On the outer side of the detent, the 40 lever 13 may have a curved arm 17 and be-
- tween this arm 17 and the detent, a helical spring 18 may be arranged, said spring be ing received within a pocket 19 in the detent 9 and a rocking projection 20 on the 45 inner face of the arm 17. It will be appar-
- ent that this spring 18 acts on the operating lever 13 to shift the latter in a direction to move the detent 9 toward the arm 4 of the breech bolt 3. The pivot pin 14 may
- 50 act as a stop for limiting the movement of the detent 9 and to this end the inner face of the detent is provided above and below the lever 13 with notches 21 in which the pivot pin 14 is received, the ends of these
- 55 notches serving to limit the movement of the detent 9 on the guides of the sleeve 5. It will thus be apparent that the pin 14 not only holds the lever 13 to the sleeve 5 but also retains the detent on the sleeve 5 and 60 therefore the removal of this pin 14 permits
- the removal of the two parts as well as the spring arranged between such parts.

The control of the detent 9 through the firing pin is preferably effected by provid-85 ing an extension 22 on the lover 13 which

projects through an opening 23 in the sleeve into the path of the usual shoulder 24 on the firing pin. When the firing pin is in its innermost position in the sleeve 5, this shoulder 24 engages the extension 22 of 70 the lever 13 and moves the lever 13 in a direction to carry the detent out of interlocking connection with the arm 4 of the breech bolt, as will be seen more clearly by referring to Fig. 5 of the drawings, thus 75 permitting the breech bolt to be rotated to become unlocked from the receiver in order that the bolt, the sleeve and the firing pin may be moved rearwardly after the firing pin is cocked. The shoulder 24 moves away 80 from the extension 22 permitting the end 22 to shift rearwardly under the action of the spring 18 and in this way to project the detent 9 forwardly so that when the arm 4 of the breech bolt is moved downwardly, \$5 it will cooperate with the beveled end 12 of the detent shifting the latter to the rear so that the nose 10 may enter into the notch 11, thus locking the arm 4 of the breech bolt in the lower position. In this position 90 of the detent it may be moved rearwardly manually by pressing on the extension 17 of the lever 13 or it may be moved rear-wardly automatically by shifting the firing pin to its innermost position in the sleeve 5, 95 when the shoulder 24 will engage the lever extension 22 and through the lever shift the detent 9 to the rear.

From the foregoing it will be seen that there has been provided a locking device 100 which locks the rotary part of the bolt mechanism in interlocking connection with the receiver, thus preventing the accidental shifting of the bolt mechanism to an inoperative position. This locking device is con- 105 trollable either manually or automatically so as to release the bolt mechanism. The automatic control is preferably effected through the firing of the gun due preferably to the shifting of the firing pin in firing, 110 the firing pin engaging with a lever which shifts the detent out of locking position. What I claim as my invention and desire

to secure by Letters Patent is:

1. A firearm of the type in which the 115 breech mechanism has a sliding movement in the receiver and a portion which rotates to lock the mechanism in firing position, distinguished by a locking device which locks the rotary part against rotary movement, 120 and is operated automatically to release the rotating part on the firing of the gun.

2. A firearm of the type having a recipro catory bolt mechanism provided with a fir ing pin movable with said bolt mechanism 125 and also relatively thereto and also with a portion rotatable to lock the bolt mechanism in firing position, distinguished by a locking device for locking the rotary portion against rotary movement, said locking 130

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER **KINZER V. REMINGTON**

BARBER - PRESALE R 0138610 R2539598

the gun. 3 A firearm of the type having a recipro-5 entry bolt, a sleeve reciprocating with said breech bolt but held against rotation with the bolt, distinguished by a locking device which is carried by the sleeve, coöperates with the breech bolt to hold the latter 10 against rotation and is operated automatically on the firing of the gun to release the breech bolt.

4. A firearm of the type having a rotary and reciprocatory herech bolt, a sloeve re-15 ciprocating with the bolt but held against rotation therewith, and a firing pin moving with the sleeve and the breech bolt and also relatively to said parts, distinguished by a

locking device for holding the breech bolt against rotation, said locking device being 20 mounted upon the sleeve and controlled by the firing pin.

5. A firearm comprising a rotary and reciprocatory breech bolt, a sleeve reciprocating with the bolt but held against rotation 25 with said bolt. a firing pin reciprocating with the sleeve and the bolt and also movable relatively to said parts, a detent slidably mounted upon the sleeve and adapted to coöperate with the breech bolt to hold the 30 latter against turning, and a lever mounted on the sleeve and having a manually operable portion and also a portion arranged to be operated by the firing pin.

GUSTAV A. BADER.



REARBER - PRESALE R 0138612

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington, IIIID

BRIDGEPORT, CONNECTICUT

JULY 16, 1981

FRED MARTIN

SUBJECT: BOLT LATCH - RA-0247

Enclosed is a revised draft patent application on your invention, which covers the alternative of omitting a detent notch from the latch lever. The principal changes are on pages 3 (discussion of Stahl and Bader Patents modified); 4 (detent described as applicable to only one embodiment); 10 and 11 (please consider carefully whether the comparisons drawn between the alternative versions are valid); the Claims on pages 12-15; and the Abstract on page 16. The other pages are unchanged.

If you are satisfied that the description is adequate and accurate, please sign the Declaration attached to the "PTO copy", sign the Assignment and have it notarized, and return these papers for filing in the Patent and Trademark Office. But if changes are needed, please give me a call. Till be in Ilion on July 22nd, and can discuss this more fully then if you wish.



Bill Ericson

WILLIAM L. ERICSON SENIOR PATENT COUNSEL

WLE/dt Encls.

RA-0247

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Sol Г-Чос

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON BARBER - PRESALE R 0138613 R2539601

BARBER - PRESALE R 0138614

'A'' S/eries Photos Bolt lock on bolt plug - independent of safety A-1 Gun cocked - ready to fire Safe in "Fire" position Bolt locked A-2 Gún cockqd \$ate in "ON SAFE" position Bolt locked A-3 Gun cocked Safe in "ON SAFE" position Bolt latch depressed Bolt is unlocked and can be rotated

F.E. Martin:T 4-11-78



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RD-40-0 BARBER - PRESALE R REMINGTON ARMS CON	R 0158621 IPAN I, INC. Espondence	(x	C:	C. B. Workman T. L. Capeletti J. R. Snedeker
Remington	DETERS	June 24, 19	81	S. A. Fanelli J. J. Bechard

To: J. S. Martin From: F. E. Martin Re: M-700 Fire Control

Test results of April 8, 1981 show that the fire control performance is acceptable. I feel more testing is needed to prove conclusively our system is best.

I will order 30 fire controls fabricated and tested. With proper priority this can be completed by October 1, 1981.



FEM:ws

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xc: R.L. Hall H.K. Boyle G.E. Fletcher J.C. Hutton J.H. Sweeney T.A. Capeletti J.P. Linde) In G.D. Campbell) Turn J.S. Martin) In F.E. Martin) In F.E. Martin) Turn L.B. Bosquet) In G.J. Hill) Turn

\Est. #4305



June 18, 1981

M/700 Trigger Assembly Present Trigger Assembly vs. Proposed New Trigger Assembly

A high spot economic evaluation has been completed using the 1981 M/700 forecast comparing the present M/700 Trigger Assembly to a proposed new designed Trigger Assembly. The safety is revised in the proposed new Trigger Assembly, cutting off the locking arm and adding a countersink to actuate the new safety plunger when the "safe" is on. New designed side plates, trigger and a new stop screw and spring completes the proposed new Trigger Assembly.

The attached economic sheet indicates an annual cost increase of \$35,270 in operating cost. A cost increase of \$16,800 after amortization of operation charges of \$16,500 will be realized with total capital required of \$20,060.

> Industrial Engineering Section R.W. Farrington, Jr., Supervisor

By: A.E. Desmond

AED/kc Attached

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RBER - PRESALE R 0138626 - S. Martin G-88 DON'T SAY IT-WRITE T Date 3 Fan St To D CAMPETCE From From IN ARTIN PLEASE PREPARE COST ESTIMATE FOR THE M- Too Fire ConTroc Consisting Or Supposed PHRTS - PHRTS THAT HAVE BEEN ALTERED ARE SARETY LEVER - TRICER - HOUSING -TRIC. Non Seren AND TRIC Suncia -New MARTS ARE TRIG BLOCK Ren ISP And PLANCER SPRINC. Haseminey Province Is Beine Completion AND WILL BE AUHILIANCE IN FEB. 81 "SAFETY RULES ARE PERFECT TOOLS"

BARBER - PRESALE R 0138626 R2539614

M-700 WMM/AL-24/147525 Free Soft Soft Soft Soft Sear Sear Sear Sear Sear Sear Sear Sear	Aug. 3	31, 1982	<u>ьл./.О.////</u>	JULV K	p V//LU			William
Total Oraphic South Rows	M . 1700	(MMAN #/11/7		2		1 Tomas Ene	<u> </u>	
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Verter OF Test Minimans 025 512 512 42 017 020 Leve Free after 1000 rds. Minimans 025 515 512 40 1 020 Dev (rette 613 716 56 813 1 1 020 1000 rds. 1000 rds. 613 716 1 020 1 020 1000 rds. 56 813 1 1 020 020 021 020 1500 rds. 1500 rds. 51 813 021 020 020 020 1500 rds. 11 813 020 020 020 020 020 1500 rds. 11 813 1 020 020 020 020 1000 rds. 11 1000 rds. 1000 rds. 1000 rds. 1000 rds. 020 020 020 020 1000 rds. 11 116 116 1173 020 020 020 1000 rds. 11 116 116 116 116 116	++	A A A A A A A A A A A A A A A A A A A						
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JRY LYCLE 6.6 81 3500 cyc 6.9 81 4000 cyc 6.9 81 41000 cyc 61 7.3 5000 cyc 61 7.3 5000 cyc 61 7.3 5000 cyc 62 6.5 .020 4170 64 7.3 .020 .020 5000 cyc 65 .020 .020 .020 4170 64 65 .020 .020 4170 64 65 .020 .020 1000 cyc 64 8.5 .020 .020 1000 cyc 64 8.0 47 .020 1000 cyc 64 8.0 47 .020 1000 cyc 64 8.5 4.6 .000 1000 cyc 64 8.5 4.6 .000 1000 cyc 64 8.5 .000 .000 1000 cyc 64 8.5 .000 .000 1000 cyc 64 .000 .000 .0000 1000 cyc </td <td></td> <td></td> <td>╫╾┼┼┼╫┼┼╴┥</td> <td>┠┼╆╂┼╂╁╾</td> <td></td> <td>╾╫┼┼┼┼┼</td> <td>╏─┼┽╉┽┼╋╌</td> <td>╢┼┼┼┼┼┼</td>			╫╾┼┼┼╫┼┼╴┥	┠┼╆╂┼╂╁╾		╾╫┼┼┼┼┼	╏─┼┽╉┽┼╋╌	╢┼┼┼┼┼┼
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$ \frac{3500 \text{ cyc}}{41000 \text{ cyc}} $ $ \frac{4000 \text{ cyc}}{4500 \text{ cyc}} $ $ \frac{41000 \text{ cyc}}{5000 \text{ cyc}} $ $ \frac{410000 \text{ cyc}}{5000 \text{ cyc}} $ $ \frac{410000 \text{ cyc}}{5000 \text{ cyc}} $ $\frac{410000 \text{ cyc}}{5000 \text{ cyc}} $ $\frac{4100000 \text{ cyc}}{5000 \text{ cyc}} $ $\frac{4100000 \text{ cyc}}{5000 \text{ cyc}} $ $41000000000000000000000000000000000000$		3,000 eye.	╟╌┼┼┝╤╇╷╷╶┥	┟┽┼╂┼┼┼╌		╶╢┼┼┼┼┼┤┥	┠╍┟┽┟┽┊┼╌	╢╌┼┼┼┼┼
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		<u>3500 сус.</u>	╢╴┼┼┼┼┼╌┤	┝┼┼┟┟┿╪╤╴			╏╼┧┊╌┠╾┤┼┠╌╴	╋╍┊┊┝┝┝┿
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		4300 cyc		│<i>⋠⋎</i>╎├╎┼─		3		
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LIVE FIRE after 2,500 vdc. ttl. Mintoo 3 .025 5.1 448 51 DRY CYCLE 5500 eye. 6.1 80 47 6000 cye 6.1 80 47 6500 cye 6.1 80 47 700 cye 6.1 80 47 1000 cye 1000 c			╏╺┽┽┼┼┼┼╴┤	+ N $+$ $+$ $-$		╼╫┼┼┼┼┼	╏─┼┼┠┼┽╁╴	
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Dry Cycle 5500 eye 6000 cye 6000 cye 610 cye 700 cye 700 cye 7500 cye 7500 cye 63 cy 7500 cye 63 cy 7500 cye 63 cy 7500 cye 63 cy 7500 cye 65 cy 65 cy		atter 2,500 rds. TTL.	Mintoo3	1025	5./ #	8 31	┫╼┼╌┝╴┨╌┽╌╎╌┢╼╸	
DRY CYCLE 6/ 80 47 5500 eye 6/ 80 47 6000 eye 6/ 80 47 6500 eye 70 85 46 7000 eye 6/ 85 46 7000 eye 6/ 85 46 7500 eye 6/3 7/6 4/8			╫┼┼┼┼┼┼		╟┈┼┼┞┼╎┍╋	━╉╾┽╾┽╶┼╷╎╴╎	╏─┼┼╎┾╎╎	╉┽┼┼┽┼
		DRY CYCLE	╟╌┼┽┽┼┼┼╌┤	┠┽┼┼┼┼┈		╒╫╾┼┼┲╴╵┼╌╴	┝┥╎┽┤┝┼╸	╋┽┾┽┽
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		<u>5500 eye.</u>	╟┼┼┼┼┼╌┥	╞┼┼┼┼┼╴	61/ 8		╏┝┝┠╏┤╏┠	╫╌┽┼┼┼┤
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		7000 cyc	╟╌╎┟╂╌╎┨╌╿	┠╶┾┽╂╌┼┾┠╼╸	6.8 8.	1 47	┠╾┾┼╂┾┼┠┯	╢┊╎┥╎┥
		7500 cyc	╟┼┼┼┼┤╌╿	┝╌┝╌┝╴┝╴┝	63 7	6 48	┟┼┾┟┼┼┼	╫╾┽╎┽┽┼
			╟╌┼┼┼┼┼┼╌┥		╟╌┾┼┥┝┝┥	╾╢╌┼┼┼┼┼╷┤	<mark>╢╾┼╍┽╶┨╺╫┑</mark> ╌╴	╫╍┼┼┼┼┼
			╟╾┥┽┽┽┼╴┥	┟╾┽┽┽╎╎┥╍╸	┣╾┼┤┟╷╷╷	╶╫┽┼┼┼┼		╢┥┤┼╎╎
			╟╌╎╌╎┥┥	┠╆┾╄┽┼╂╾	╟╌┾┼┠┽┆┤	╶╫┽┼╎╎╷	╽╾┽┼┠╟╢╢┥╴	╫╍┝┤┟╎╎
──┼─╢─────╫┼╎╎╎╎╢╖╗╗╗╗╗ ──┼─╢──────╢╷╎╎╎╎╎╎╎╎╎╎╎╎╎╎╎╎╎╎╎╎╎╎╎╎╎╎╎			╟╌╎┼╉┼┼╎╼┩	┟╎╎┟╎╷╴	╟┼┼┟╎╷	╼╫╺┊┼┼┼┼╎┤	┠╌╎┤╏╢╢╼╸	╟╎┼┼┼
──┤─╫──────╫╎╿╿╎╎║║╎╿╎╎║║╎╎╿╎╎║║╎╎╎╎║║╎╎╎╎╎║ ──┤─╫──────╫╎╎╎╎╎╢╎╎╎╎ ──┼─╫──────╫╷╎╎╎╎╢╎╎╎╎╎			╟┼┽╏┝╎╉╴┨	┝╺┼┼┼┼┼┼	╟╌┊┼╏╎╢┥		<u>│ │ ╎ │ ╢ │ ५</u> ━━	╫╤╤┿┧╴╎╴┆
╾╾┊╾╢──────╢╎╎╎┟┟┟┟╎╎╻╢╵┝╎╎╎┟╎╎╎╎╎╎╎╎╎			╟┊┊╎╿┊┝	┟╌┼┼┝┝┝┝	╟╌┽┼┠┝┾┞	╾╫┼┼┟╎╎╽	╏┊╎╎╵ ╵╵╹ ┠╌╁┙	π
				┝╌╁╌┟╴┨╶╎╴╢╸╌	╟╌┊┥┠┊┊╎	─╢ ┤╎╎╎╎	<u> </u>	

<u> Aug. 3</u> ,	1,1982						R.Willia
M - HAA	AMMADI #/145CUU	1	2		V TOTALED	5 5	
	St. 1. N. H.	//	PTRING	<u>, V9FE (16</u>	P (II)	JEAK	DEAR
$-/\Lambda$	Jample 110. 7	HEADSPHCE	FIN LNDENT	and are	Full (105)	<u></u>	ENGAGE/
++	<u>₩-//</u>						
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<u>v / </u>	OTAT DE TEST	/1/N +002		d. 3 3.7			
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	aller 1,000 ms	1 IN TOUL		Grad Drat			╢─┼┼┼┼
	DRY AVALE						
	500 14	╟╍┼┾┅┾┽┼┼┈╸		74 170	╤╫╍┼┾╉┾┾╅╼╢		╏╴╴╴╴╴╴╴
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	1500 eye			1.9 71:			╏╌┼╌┼┼┼┼
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	LEVE FEPE						
	after 2 april	Min top3	022	73 44	- 38	0155	23
	47.101 - 1000 iou						
	DRY CYCLE						
	3000 040			67 81	7		
	3500 14			75 71	7		
	4000 440			7.7 6	7		
	4500 cvc			95 7	7		
	5000 CYE.			77 6.	7	.017	.03
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				h			
	LIVE FIRE						
	after 2.500rds. HL	Mint.003	022	88 4:	3 43		
	DRY CYCLE						
	5500 eye.			8.2 90	4.5		
	6000 iye			7.3 94			
	6500 cyc	/		7.5 9.	3 42		
	7000 cyc			8.3 9.	2 43		
	7500 cyc.			87 8.	3 43		
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					╶╫╌┼┽┟┊┥┥╸╢		
			╢┼┽╉╃╵┥	┝╌┼┽┦┽┥┿			

BARBER - PRESALE R 0138629

M-700 TRIGGER /SEAR BLOCK EVALUATION

Aug. 31 1982

Report No. 812441

No.3 R.Williams

7	M-700	6MMeat. #A6744915		FIRING	SAFE	TRIGGER	SEAR	SEAR
, i 	\vdash / \land	Shiple No. 3	HEADSPACE	PEN INDENT	(in Has)	PULL (16)	LIFT	ENGOGEMEN
	$\overline{77}$	$\times//$						
2	$\mathbb{V}/$	START OF TEST	Min. + OOH "	.025″	9.16.4	4.7	_0157	.025"
3	\vdash							
5		after 1000rds	M:1 + 004"	.026"	97 57	4.1		
6								
7		DRY CYCLE						
8		L SOO CYT			8.2 69			
9 10		<u>ΛΟΟΟ CYC.</u>	┠┼┾┠┽┼┼		8 9 4 3			╟╾┼┼╂┼┽┼┾╌
11		2000 VC			92 7.0			
12		2500 LYC.			98 6.0		.012"	.032"
13								
14		LIVE FIEE		07.4	100 6 2		A: 7"	02210
15		atter 2000 rds.	Minstallo		TAK OA			
17		DRY CYCLE						
्रे		.3000 cyc.			85 85			
19		3500 cyc.			92 7.2			
20		4000 v/c.						
22		$\pm 500 \text{ GeV}$			915 12.2		.015"	037"
23		0.000 syc.						
24					hulli.			
25		IVE FIRE	A Set		0050			
26 27		atter 2500rds. HL	Min + 005	-020	48 <u>14</u>			
28		Dev Pycie			╞┼┼┼┼┍╋═			
29		5500 CVC			83 83			
30		6000 cyc.			9.2 8.8 -			
31		6500 cyc.			9793		┝┥┥┥	╟┼┾┾┼┾┼
32		1000 cyc.			95 120	<mark>╞╼┾╍╪╍┿╧</mark> ┦╷┥╾╷╽		
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CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON BARBER - PRESALE R 0138629 R2539617

M-700 TRIGGER/SEAR BLOCK EVALUATION

Aug. 31 1982

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R Williams

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	M-700	6 MM cal. # A6744869		FIRING	SAFE	TRIGGER	SEAR	SEAR
	/ <u></u>	Sample No.2	HEADSPACE	PIN INDENT	(inlbs.)	PULL	LIFT	ENGAGEME
	$\lfloor / / \rangle$				ON OFF	(in 165.)		
V	$ T \setminus$	N//						
	$V7 \square$	TART OF TEST	Min.+.003"	023	6.5 5.3	4.3	.0135"	.026"
V								
		LIVE FIRE						
		after 1000rds.	MIN +. 004"	0247	64 3.2	44		
		DRY GYELE						
		50000			59 78			
		TOODCVL			6.0 6.1			
Ŋ		1500 cvr.			6.0 7.0			
		20000			5.5 6.7			
2		2500 cvr.			5.3 7.7		.015	.025
,		/						
-		LIVE FIRE						
;		after 2000rds.	MIN. +. 004"	.023"	5.7 4.8	42	.014"	.029"
		,						
·		DRY CYCLE						
		3000 c.vc.			65 8.0			
,		3500 CYC.			55 7.8			
b		4000 cvc.			5.8 1.2			
ı		4500cyc.		$ \mathcal{I} $	2 7.7			
2		5000 cvr.			7.8 80		:018	.0285
3								
٩								
5		LIVE FIRE						
5		after 2500rds Ht.	Min +LOOH"	.023″	18 4.5	47		
1								
3		DRY CYELF						
,		5500cm			70 95	4.8		
丬		6000 cvc.			67 87			
		6500cm			6.7 7.8	4.5		
2		7000cm			7.2 7.8	4.8		
		7500 cile			66 85	4.5		
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BARBER - PRESALE R 0138630 R2539618

KINZER V. REMINGTON

BARBER PRESALE R 0138631

Aug. 31, 1982

M-700 TRIGGER/SEAR BLOCK EVALUATION

Report No. 81244

NAI

R. Williams

人民協会の人

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11	M- (CO)	6MMCHL ~ H615,473		FIRING	SAFE (165)	TRIGGER	SEAR	SEAR
	$ -// \rangle$	Sample Na	HEADSPACE	PIN INDENT		TULL (165)	LIFT	ENGAGEMENT
		<u> </u>			ON OFF			
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7		DRY LYCLE	╏╌┾┼┽┼┼┼				-++++++++++++++++++++++++++++++++++++++	
8	ļ	500 dye			5.5 8.6			
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27)						
28		DRY CYCLE						
29		5500 eve			62 INT-	- 4-8		
30		6000cvr			6.2 d.h	4.6		
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CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

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BARBER - PRESALE R 0138632 R2539620

New Design M/700 Trigger/Sear Block Evaluation

TEST PROCEDURE - CONT'D.

\5.

The rifles were then subjected to another Safe On/Off dry cycle test. They were brought to the 5,000 cycle level. (2,500 additional cycles) Safe on/off measurements were taken every 500 cycles and sear lift and engagement wear measured at the 5,000 cycle level.

These same procedures were followed until live fire totaled 2,500 rounds per rifle and safe On/Off dry cycle totaled 7500 cycles per rifle.

C. AMMUNITION

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Remington 80 grain Pointed Soft Point.





10/2262/10/
New Design M/700 Trigger/Sear Block Evaluation

Report No. 812441

- H.

All/four (4) new trigger assemblies were subjected to the following trick test:

- \ Place Safety Switch in the Safe "On" position.
- Close the bolt.

TEXT

REP

- Fut constant pressure on the trigger attempting to fire the rifle.
- Push the Safety Switch from the "On" position to the "Off" position.
- Does the firing pin fall?

All four (4) New Design Trigger Assemblies with the trigger /sear blocked passed this test. In all four (4) guns the firing pin did not fall.

<u>NOTE</u>: The measurements recorded for the Safe On/Off forces are questionable. There is no way to determine if they are within Remington Standards, because there are no standards written for these forces with this fire control assembly. The only Remington Standards written for Safe On/Off forces, pertain to the common fire control. That Standard is:

4 – 8 lbs. – One sharp click Double click not allowed

The Safe On/Off forces measured in this test range from 5.25 lbs to 10.2 lbs. – almost a 5 lb. difference. (Refer to Appendix A, Data Sheats No. 1 – 5 for all Safe On/Off measurements).

TEST PROCEDURE

A. MEASUREMENTS

The following measurements were taken on the five rifles used in this test:

- Headspace
- Firing Pin Indent
- Trigger Pull
- Sear Lift
- Sear Engagement
- Safe On/Off Forces

B. TEST CONDITIONS

- 1. After every 20 rounds fired, the safety was checked. This was done by holding the trigger and pushing the safety switch from safe to fire.
- 2. After 1,000 rds. of live fire all the rifles were cleaned and they were remeasured. (Jack Shooting).
- 3. The rifles were then subjected to Safe On/Off dry cycle. Each rifle was cycled for 2,500 cycles, with Safe On/Off measurements taken every 500 cycles and Sear Lift and Engagement at the 2500 cycle level.
- 4. The rifles were then live-fired to the 2,000 round level. (Jack Shooting) Measurements were taken at this level.

REMINGTON ARMS COMPANY, INC. Firearms Research Division

Septerni	ber 10, 19 82
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FROM:	$\mathbb{V}/$
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J. H. Hennings

R. Williams

REPORT TITLE:

NEW DESIGN M/700 TRIGGER/SEAR BLOCK EVALUATION

ABSTRACT:

A total of (5) M /700 Fire control assemblies with the New Design safety assemblies, were delivered to the Test Lab by Fred Martin for testing. This safety assembly blocks the trigger and the sear so that the firing pin won't fall when the trigger is held back while the safety switch is pushed from the safe to fire position. Both dry cycle and live fire endurance tests were used to test the assemblies. A M/700 fire control assembly (Current Production) was used as a control and (4) out of the (5) New Design assemblies were used in the test.

SCOPE OF TEST

To evaluate the functional performance of the New Design safety assembly, in the M/700 Rifle during lab testing.

TEST RESULTS

No functional problems arose during testing. Both the New Design safety and the control functioned normally. There was no significant change in the safe On Off forces measured before, during and after testing, on all the assemblies, including the control



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TEST & MEASUREMENT LAB REPORT

	REFORT NUMBER:	812441
() // ()	REPORT TITLE:	New Design Trigger/Sear Block Evaluation
$\langle V \rangle$	MODEL(S):	700 ADL
	GAUGE OR CALIBER:	6MM Remington
	DATE:	9/10/82
	WORK ORDER NO .:	C-1803-000
	PART NAME:	Trigger Assembly
	DESIGNER/ENGINEER:	F. Martin
	TEST TYPE:	
	1.	PHOTO LAB
	. 2.	STRENGTH TEST - NO. OF GUNS TESTED
	3.	FUNCTION TEST - NO. OF GUNS TESTED
	4.	ACCURACY TEST - NO. OF GUNS TESTED
	5.	MEASUREMENTS - TYPE: Static
	6.	ENVIRONMENTAL TEST
	7.	AMMUNITION TESTING & EVALUATION - TYPE:
	8.	VISUAL EVALUATIONOUT OFGUN SAMPLE
	9.	ENDURANCE - NO. OF GUNS TESTED: 5
		NO. OF ROUNDS PER GUN2.500
		TOTAL ROUNDS FIRED IN TEST: 12,500
		AMMO TYPE: MAGS; TARGET:
		RIM FIRECENTER FIRE_6mm

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REMINGTON ARMS COMPANY, INC.	Y‴	Distribution:	C. B. Workman J. S. Martin C. E. Ritchie F. S . Martin
RESEARCH TEST and MEASUREMENT REPOR	<u>T</u> – Report No. OCK EVALUATIO	_812441	v
	Prepared by:	Ron Williams	
	Date Prepared:	9/10/82	
Proofread and Cleared By: J.H. Hennings , Foreman-Test Lab Foreman-Measurement Lab	Suprature	denny	D 9-15-82
C.E. Ritchie, Sr. Supervisor - Testing, Meas. & Mech. Analysis Lab	Signature	Fithlue	<u>9-14-92</u> Dare

States and the

REMINGTON ARMS COMPANY, INC. Firearms Research Division ebruary 24, 1982

Xc:	C.B.	Workman
	J.S.	Martin
	C.E.	Ritchie
	J.W.	Bower

BARBER - PRESALE R 0138638 R2539626 ċ



On Friday, February 26, 1982 the Plant will remove from the Production area and the Custom Shop all safety assemblies with the bolt lock arm. They will be delivered to Arms Service. All new trigger assemblies will have the bolt lock removed.

Beginning February 25 all Model 700 rifles (Right and Left Hand) 40XB, 40XC, 40BBR and 40XR rifles that are returned to Production should be tagged to identify them if they have a safety with the bolt lock arm.



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KINZER V. REMINGTON

RD-69 REV. 6-58

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CC: J. S. MARTIN (No Attach.) C. B. WORKMAN (No Attach.)

BRIDGEPORT, CONNECTICUT

JANUARY 4, 1982

FRED MARTIN

RE: BOLT ACTION SAFETY WITH SEAR AND TRIGGER BLOCKS

A preliminary patent search has been made on the trigger assembly shown in your drawing of February 10, 1981 (unnumbered), which shows a Model 700 sear-blocking safety with the addition of a spring-biased trigger block plunger (SKB-3633). This plunger is slidable transversely in a hole through the trigger; it has an enlarged tip which is depressed by the safety lever into locking engagement with the trigger in the "safe" position, but releases the trigger by seating in a conical recess in the safety lever in the "fire" position.

My search did not disclose any competitively-owned patents that would pose any infringement risks in connection with your design. While other types of safetles were found that block both the sear and the trigger, I believe that patent protection may be obtainable in the event your design is used.

Hildebrandt Patent 3,608,224 shows a safety lever 30 which carries a bent rod 36, and in the "safe" position, slides this rod between opposed surfaces of the sear 16 and trigger 8 to block movement of either.

Horsrud Patent 2,310,238 has a safety slide 123 formed with a vertical arm whose extremities 122, 125 are engaged with the sear 66 and the trigger 87 to block movement of either, when the slide is moved to the "safe" position.

These references are representative of the state of the art; no patent has been found that discloses a system equivalent to yours.

WILLIAM L. ERICSON SENIOR PATENT COUNSEL

WLE/dt Attachs. 45.100

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON





BARBER - PRESALE R 0138640 R2539628

United States Patent Office

1 3,608,224 SEAR-TRIGGER SAFETY MECHANISM B. Hildebrandt, Springfield, Mass., assignor to Emhart Corporation, Bloomfield, Conn. Filed Dec. 19, 1969, Ser. No. 886,716 Int. CL F41c 17/00, 17/08 U.S. Cl. 42-70C 6 Claims

ABSTRACT OF THE DISCLOSURE

Safety mechanism for firearms having a trigger and sear combination in which the trigger has a portion engaged in a notch of the sear when the trigger is in its rest position. The trigger and sear are each pivotable for re- 15 1956. lease of the trigger from the notch of the sear and include spaced opposed portions movable toward each other on said release of the trigger. A safety which has a portion movable between the spaced opposed portions of the trig-

BACKGROUND

Safety mechanism for guns are available in a wide variety of types. In general, such safety mechanisms include a block, lever or pin which is moved or swung into blocking engagement with the hammer, sear, trigger or bolt of the gun. All too frequently guns have been fired and people killed or wounded when the safety was "thought to be on." Analysis of many of these accidental firings has shown that in some cases the critical polition of the safety had been broken or distorted as a result of the gun being dropped or sustaining some other sharp impact when the safety was "on." Of course, if the operative portion of the safety is damaged or broken, the safety is generally ren dered inoperable or imperfectly operable. In many in stances the end of a safety lever or pin has been sheared off permitting inadvertent discharge of the gun, since usually such damage is not known to the operator.

It is the principal object of this invention to provide a safety which is simple in construction and operation while being most reliable and effective in its operation. Another object of this invention is to provide a safet

in which the operative portion thereof is not subject to shear or bending forces when in a "safe" position.

The above and other objects of this invention will be more readily apparent from the following description and with reference to the accompanying drawings, in which: 50 FIG. 1 is a side elevational view of a portion of a gun

partially in section showing a safety embodying this invention;

FIG. 2 is a partial elevational view showing the safety in FIG. 1 in greater detail;

FIG. 3 is a view similar to FIG. 2 with the safety in different operative relationship; and

FIG. 4 is a section taken along line 4-4 of FIG. 1.

The gun comprises a trigger 8 pivotable about a pin 10. The trigger includes a latch portion in the form of 60 a tooth or shoulder 12 forward of the pivot 10 for interlocking engagement with a notch 14 in sear 16. The sear 16 is mounted for pivotable movement about a pin 18 which is located above the trigger pivot pin 10. The trigger and sear are each provided with recesses 20 and 22 to 65 receive the outer ends of a compression spring 24 which urges toward counterclockwise rotation both the trigger and sear. The spring serves as the trigger spring and to return the trigger and sear to their rest positions (FIG. 2) after firing.

The outer surface of shoulder 12 of the trigger is configured for surface to surface engagement with the op2

3.608.224

Patented Sept. 28, 1971

posed surface portion of the sear, so that when the trigger is pulled or rotated clockwise, the sear will be rotated counterclockwise through a small angle before the shoulder 12 of the trigger clears the sear notch.

Rearward of their respective pivot pins the trigger and sear each include ledges 26 and 28 respectively, which are in spaced opposed, generally parallel relationship when the action is cocked, as shown in FIG. 2. When the trigger is pulled, the ledges move toward each other until the 10 shoulder 12 clears the sear notch 14. When released, the

sear is rotated clockwise by the movement of striker lug 29 moving forward for firing the gun. The bolt and striker mechanism may be of the same general type as disclosed in U.S. Pat. No. 2,765,562, issued on Oct. 9,

In accordance with this invention the safety comprises a lever 30 pivotable about the pin 18 supported adjacent its outer ends by opposite side wall portions of the housing member 32. The safety lever includes an actuating flange ger and sear and which is in compression therebetween ²⁰ portion 34 by which the lever may be pivoted forward when an attempt is made to pull the trigger. ²⁰ portion 34 by which the lever may be pivoted forward and backward for placing its safety "off" and "on" respectively. Adjacent its lower end, this safety lever is connected to a rod 36.

As best shown in FIGS. 1 and 4, the lever 30 has an 25 aperture adjacent its lower end for receiving the outer end portion of the rod 36. In the embodiment shown, the outer end of the rod is provided with a hook 38 of generally U-shaped configuration by which the lever is drivingly coupled to the rod. From the hook portion 38 the rod 30 extends rearwardly and generally parallel to the path of movement of the safety lever 30 and then transversely or laterally to the direction of movement of the lever 30. The rod 36 is movable from a position in which it is interposed between the opposed ledges 26 and 28 of the sear ³⁵ and trigger to a position in which it is clear of the path of pixotal movement of the sear and trigger (FIG. 3).

The rod may be made of any suitable material of sufficient highlity and strength to serve as a safety without distortion or breaking. It has been found that metal wire or 40 rod stock, such as steel wire on the order of $\frac{1}{16}$ "- $\frac{3}{12}$ " in-diameter is suitable. The rod stock material selected may be somewhat softer than the steel of the sear and trigger so that in effect it cushions or absorbs any impact or shock transmitted from one to the other of these parts, thereby further minimizing the possibility of breakage or damage. It is important that the diameter of the rod or wire stock be sufficient to block any substantial pivotable movement of the sear or trigger, otherwise the trigger will be released from the sear notch. The diameter should also be such that it will be readily accommodated in the space between the two ledges 26 and 28.

When it is desired to place the safety "on," the actuator 34 of lever 30 is simply moved rearward. Since the lower end of the lever is coupled to safety rod 36 by its hook 55 portion 38, the transverse portion of the rod is carried into a blocking position between the rear ledge portions 26 and 28 of the tridger and sear, as shown in FIGS. 2 and 4. In this position, any attempt to fire the gun by pulling the trigger is entirely blocked, as is also movement of the sear. A simultaneous and mutual blocking of the sear and trigger is thereby achieved since as previously mentioned, to release the sear, the trigger must move clockwise while the sear must move counterclockwise. Thus, with the safety "on" when a firing pull is exerted on the trigger, the transverse portion of the rod is "squeezed" or in compression between the ledge portions 26 and 28 of the trigger and sear respectively.

When it is desired to fire the gun, the actuator 34 of 70 the safety lever is moved forward, whereby the lower end of the lever moves the safety rod 36 rearwardly until it is clear of the path of rotation of the trigger and sear.

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BARBER - PRESALE R 0138641 R2539629

Thereafter when the trigger is pulled, its sear engaging portion 12 moves out of the sear notch 14 and the striker lug 29 under influence of the striker spring (not shown) pivots the sear clockwise, as shown in dotted lines in FIG. 3, as the striker moves forwardly to fire the gun. The coil 5 spring 24 then serves to return the trigger and sear to their rest positions and operation of the bolt will again cock the gun as shown in FIG. 2.

Inasmuch as the safety rod is disposed between the opposed surfaces of the sear and trigger, which in the 10 particular embodiment is on the order of $\frac{3}{16}$ " in width, the likelihood of damage or breakage of the safety, or the engaged portions of the firing mechanism from a sharp impact to the gun is for all practical purposes eliminated.

Having thus disclosed the invention, what is claimed is: 15 1. Safety mechanism for a gun having a striker releasably retained by a sear and trigger combination, said trigger and sear being pivotable in opposite directions and each including spaced opposed surface portions pivotable toward each other for release of the sear on firing move-20 ment of said trigger, and a safety including a portion selectively movable into and out of blocking relation between the opposed surface portions of the sear and trigger, said safety when in blocking relation simultaneously preventing firing movement of the trigger and sear. 25

2. Safety mechanism as set forth in claim 1 in which said safety comprises a rod, which when in blocking engagement between the trigger and sear is in compression against firing movement of the combination of the trigger and sear.

3. Safety mechanism for a gun having a striker releasably retained by a sear and trigger combination, said trigger including a shoulder and said sear including a notch for releasably receiving the shoulder of the trigger, said trigger and sear being pivotable in opposite directions and ²⁵ each including spaced opposed surface portions pivotable toward each other for release of the sear and said trigger,

3.608,224

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and a safety including a portion selectively movable into and out of blocking relation of said opposed surfaces of the sear and trigger, said safety when in its blocking relation simultaneously preventing movement of the trigger and sear whereby the shoulder is retained in the notch of said sear.

4. Safety mechanism as set forth in claim 3 in which said safety includes a pivotable lever and a rod drivingly coupled to said lever, and a portion movable into and out of blocking relation between said spaced opposed portions of the trigger and sear.

5. Safety mechanism as set forth in claim 3 in which the trigger and sear are pivotable at points, one generally above the other, said shoulder of the trigger and the notch of the sear being disposed to one side of said pivot points, said opposed surfaces being in the form of ledges disposed to the opposite side of said pivot points, the rod of said safety including a portion movable into and out of blocking relation between said ledges for simultaneously blocking pivotable movement of the sear and trigger, and being in compression when preventing said gun from being fired when said gun is on "safe."

6. Safety mechanism as set forth in claim 5 in which said safety comprises a pivotable lever with a metal rod 25 coupled to said lever and with a transverse portion disposed for blocking movement of said sear and trigger when the gun is on "safe."

References Cited

UNITED STATES PATENTS

2,765,562	10/1956	Rober et al 42-70E
2,976,637	3/1961	Robinson, Jr 4270E
3,130,513	4/1964	Knode, JR., 42-70E

BENJAMIN A. BORCHELT, Primary Examine:

C. T. JORDAN, Assistant Examiner







Patented Feb. 9, 1943

UNITED STATES PATENT OFFICE

2,310,238

FIREARM

Ole Hotsrud, Fox River Grove, Ill., assignor to Sears, Roebuck and Co., Chicago, ill., a corporation of New York

Application August 7, 1039, Serial No. 288,793

3 Claims. (Cl. 42--12)

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This invention relates to fitearms and is concerned more particularly with firing mechanism therefor.

Past filearm constructions have been more or has unsatisfactory because of excessive wear between certain parts of the control mechanism, resulting in impairment of accuracy and elliciency carly in the life of the fireman. To overcome this defect and provide a ficearm construction of enhanced reliability and df practically indefinite life is accordingly the essential object of my invention.

Another object is to provide a fire control mechanism in which substantially all of the wear occurs at places not vital to the accuracy and 15 efficiency of the firing mechanism.

A further object is to provide A fire control incohanism in which wear at places vital to the efficiency of the mechanism is negligible.

It is a further object of the invention to provide an improved positive locking mechanism for a frearm.

It is another object to provide a firing methonism such that a major part of the strain when the mechanism is cocked is taken by a relatively 25 stationary member or members.

Another object is to provide a sear and strikely assembly formed to minimize strain on the sear and sear control mechanism.

It is a further object to provide a firing mecha- 30 tism in which friction between the sear and the striker is practically non-existent.

It is also an object to provide an improved adjustment for the trigger pressure.

A further object is to enable the sear to pass 35 substantially instantaneously from fully obstructing position to fully unobstructing position.

Another object is to provide a striker and bolt construction affording minimum friction therebetween.

It is another object to enable the striker to be in full flight from its rearmost position.

Further objects and advantages of the invention will appear as the description proceeds.

The invention will be better understood upon 45 reference to the foregoing description and the accompanying drawings, in which:

Fig. 1 is a fragmentary longitudinal sectionalview of a firing mechanism embodying features of the invention, with the statker cocked.

Fig. 2 is a fragmentary elevation of a portion of the structure appearing in Fig. 1, but taken from the opposite side.

Fig. 3 is a view similar to Fig. 2 but with a portion removed to disclose certain details.

Fig. 4 is an enlarged sectional view taken substantially as indicated by the line 4-4 in Fig. 1. Fig. 5 is a view similar to Fig. 1 but with the parts in the relations assumed when the striker ites the bullet.

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Fig. 6 is similar to Fig. 1 but shows a modified drearm construction.

Fig. 7 is similar to Fig. 5 but shows the modified form.

Fig. 8 is a sectional view taken as indicated by the line 8-8 in Fig. 0.

Figs. 9 and 10 are fragmentary elevations showing the firearm unlocked and locked.

Referring now more particularly to the drawings, wherein the same reference characters designate the same parts, a receiver 16 is shown adjacent a barrel 11 adapted to receive a oullet 12 in a shell 13. The receiver carries a bolt 15 provided with the usual handle 18 by which the tolt is adapted to be turned and translated in time ore 11 of the receiver.

The polt comprises a forward section 19 having an elongated narrow recess 20 housing a triker or hammer 2i adapted for limited longitudinal movement in said recess, said striker having a firing pin 22 which at all times is dis-posed in a hole 24 which renders the cap or primer 25 of the shell accessible to the pin. The triker 21 is of generally flat cross section conforming to the recess 20 and has a slot 27 for the accommodation of thrust bearings 28 and 29 between and about which a firing spring 21 is disposed, the sides of the recess 29 being enlarged as at 32 in Figs. 4 and 8 to accommodate said bearings and spring. A pin \$2 mounted on the, bolt 19 serves as a reaction member limiting the bearing 29 rearwardly. The rear end of the slot 20 provides shoulders 35 engageable with the bearing 29 and a recess 36 providing clearance for the pin 33 and having a wall engageable with the latter, thereby to limit the firing forward stroke of the striker.

In the form shown in 54gs. 1 to 5, the bolt 16 has a rear peripheral shoulder 40 and an exten-45 sion 41 of reduced diameter, and extension peing diametrically slotted as at 42 in continuation of the recess 26 in the bolt. Rotatably and slidably fitted about the reduced extension fi is a collar 45 to which the handle 16 is secured. The 50 collar 45 may comprise rigidly connected outer and inner sleeves and is preferably slidably ensageable with the shoulder 40. A retainer pug 49 releasebly threaded at 58 within the rear each of the reduced portion 41 of the bolt is limiter 55 by said portion so that the collar 45 mas sliding



2.310.238

engagement with the shoulder 53 on the plug, when the plug is threaded home. A friction spring ring 54 may be provided to take up play. The dollar \$5 may have diametrically opposed iots/56 from which extend helical cam slots 5 37 ds shown in Figs. 1 and 5. The striker 21 has/a/reduced rear extension or neck 59 project= and hisposed in the diametrical slot 42 thereof. abd terminates rearwardly in cam follower lugs 10 in Fig. 1, its contact point 103 is so disposed 61 adapted to project into the slots 57 of the collar 45. When the striker has fired and is thus in its feremost position, as shown in Fig. 5, the lugs 61 are disposed at the forward ends of the associated cam slots $\mathbf{51}$ and are so arranged 15that rotation of the collar 45 in the proper direction will cause the forward walls of the cam slots **51** to force the firing pin **21** rearward against the action of the spring **31**. When the handle is pulled and swung from its down po-20 sition (Fig. 5) to its uppermost position, it rotates the collar 45 to effect a rearward camming of the stuker 2;

The receiver 19 may have a suitable catch (not shown, cooperating with the bolt 15 to prevent 25 rotation of the forward section 19 thereof while permitting the bolt to move axially in the bole 17.

The receiver 10 has a longitudinal channel or keyway 65 adapted to receive a sear 66 piv-oted at its ferward end as shown at 67 to the forward section 19 of the bolt. The sear extends rearwardly from the pivot 61 and has an inclined rearwardly facing abutment or shoulder id engageable with a forwardly facing abutment or shoulder 11 on the striker 21. These shoulders are adapted to be interengaged when the striker 35 is in its rearmost or cocked position. At such time, the shoulder 10 on the sear 66 is adapted to obstruct the forward movement of the striker 21 and thereby prevent firing. The inclination of the surfaces 11 and 11 is such that, at the moment the sear is released, as will appear, the spring 31 will exert a force which, acting through the shoulder 71 on the striker, will cam the sedr downward out of obstructing position and will 45 cause the striker to fire. The inclination of said shouldnes, moreover, is such that, while the sear is supported in obstructing position, substant tially less than the full force of the spring 31 is communicated to the sear pivot pin 67, 50 50 handle (C is limited by an abutment (not shown) that said pin is subjected to minimum stress consistent with correct design of the sear supporting mechanism, as will appear.

For controlling the position of the sear 66, I provide a bell crank lever dog 75 pivoted as at 55 76 on side plates of a bracket 17 or other suitable means mounted preferably on the receiver 10 as at 78 and elsewhere. The dog 75 has an upwardly extending arm 60 engageable with the bottom side \$1 of the sear \$6 when the shoulders 10 and 11 are interengaged, and is adapted to be rigidly held there by a latch 83 engaged in the recess 84 in the other arm 85 of the lever. The latch 33 is formed on a trigger 81 pivotally mounted as at $\delta \mathbf{3}$ on μ depending extension $\mathbf{89}$ 65 on the bracket 11, and is urged upward by spring means 91. With the parts thus arranged, it is evident that firing or the striker pin 21 is positively prevented.

The bracket 17 may be U-shaped, providing a 70 bight 25 disposed reaswardly of the dog 15 and having a bearing opening \$6 through which a pin SE pivotally connected as at 93 to the arm 85 of the dog 15 is slidably extended. A spring 100 dispesed about the pin f

a shoulder 101 on the pin and with the bight 95 mores the dog to swing clockwise as seen in Figs. 1 and 5, so as to urge the dog arm 80 toward the bottom surface 81 of the scar 85. Computed to the spring 31, the pressure of the spring 100 is very light, so that it offers negligible resistance to the action of the spring 31 in thrusting the sour 56 downward when the latch \$3 is released.

When the deg 15 is in locked position, as shown as to turn about the pivot IS in response to the downward thrust resulting from the pressure of the spring 31 when the latch 63 is out of the incress £4.

Fig. 5 shows the relation of the parts when the firearm has been fired. To cock the firearm, the handle (6 is turned through a suitable and e in the receiver 10, say about 90", thereby turning the collar 45 and the forward walls of the cam slots 57 to engage the lugs 61 and cam the striker rearwardly against the resistance of the spring 31. The forward ends of the lugs may be rounded as at 102 to minimize friction. The spring 31 at this time is pressing the latch 83 upward, and the spring 100 is urging the bell crank lover ann 80 toward the sear 65 and thus pressing the scar upward into engagement with the striker adjacent the shoulder if thereof. As the upward rotation of the handle 15 moves the striker rearward, the spring 109 moves the sear 65 upward to effect engagement between the shoulders 70 and 71, the arm 85 of the dog 75 also moving to bring the recess 84 thereof closer to the end of the latch 83. When the striker is fully withdrawn by the cam action, the spring 190 causes the shoulders 19 and 71 to be fully interengaged and the contact end 103 of the dog 15 to engage the bettom 81 of the scar 66, and enables the spring 91 to slip the latch 83 into the recess \$4, all as shown in Fig. 1. At such time. with the handle 15 in its upper position, the forward walls of the cam slots 57 are engaged with the lugs 61 so as to permit the proper posiforming of the sear and control mechanism thereis depressed, the scar 66, being locked by the dog 15 and trigger 87 in the position shown in Fig. 1, upsitively prevents the striker from moving forward. The downward movement of the In the receiver 10, and when the handle is brought to rest in its down position, the lags 61 are aligned with the slots 55 in the collar 45. so that the forward walls of the cam sicts 51 offer no obstruction to the firing stroke of the firing pin. Now the firearm is fully cocked, and, to fire the same it is necessary merely to pull the trigger \$7._____

The rear part of the keyway 55 is formed to 60 accommodate the spar 66 so that the entire bolt may be removed if destred.

It will be observed that the line of action of the force on the dog 15 in response to the pressure of the spring 31 is adjacent the axis of the pivot bin 15, so that the component in that direction of the force of the shoulder 71 on the shoulder 70 is resisted very largely by the pin 76 and the bracket 17 and accordingly by the rucoiver 19. Only a relatively small part of the force is taken by the latch 83 and transmitted thereby to the trigger pivet pin 88. In the move ment of the trigger, there is friction between the latch 83 and the dog 15, and this friction, being relatively light, will not cause appreciable wear ngaged with 75 of the surfaces involved. Also, by virtue of the

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fact that the latch 83 is subjected to a relatively light force, the triager pixor pin 83 likewise is subjected to negligible wear. Horeover, even if excessive wear of the frictionally encaged surfaces of the dog 75 and latch 83 or of the trigger 5 vavof fin 38 could take place, the sear 65 could he depressed to only a negligible extent by the sheir of 31 during the movement of the latch 83 f position clear of the dog 15, so that the re-Justing wear on the surfaces 10 and 11 would be 10 negigible. It is thus apparent that the operation of the trigger results in substantially no wear to the surfaces affecting the proper operation of the striker. When the trigger is pulled clear of the dog 75, the passage of the shoulder 71 over 15 the shoulder 10 is practically instantaneous, the sear 66 offering anistantially no resistance to such morement. Concequently, the friction between the surfaces 10 and 14 is practically nonexistent and, as a result, the surfaces will remain 20 in their prizmal condition indefinitely, tims insuring the same accurate fiding process throughout the life of the firearm.

The trigger has a bearing surface 110 extending rearwardiy and below the bight 95, and has 25 a recess iti recommande lower end of a spring 112. Received in the upper end of the spring is a projection 114 formed on the bracket hight 95. A screw 117 carried by the triagen is adapted to engage the spring 112 and to adjust the pressure 30 thereof. The spring 112 is relatively light, compared to the spring 31 and accordingly, adjustment of the screw 117 will offect slight changes in the spring pressure on the trigge

The bracket 11 may be fasteficit at the rear 25 thereof to the receiver 10 in any suitable manner, as by a serew 123, and preferably has a slot 121 through which a keeper or laten 122, formed on a safety locking member 123, projects. When the firearm is cocked, as shown in Fig. 1, the 40 lock member may be in inoperative position, as shown in Fig. 1, or it may be slid into operative position as shown by the dotted lines in Fig. 1 In this position, the keeper is substantially/er gaged with the bottom side 81 of the sear while 45 the bottom 125 of the locking member is substantially engaged with a shoulder 126 on the triager. Thus, the locking member positively locks both the sear and the trigger against releasing movement so that it is impossible for the 50 striker 21 to fire.

The locking member 123 preferably has a side plate 130 slidebly engaged with a face 131 on the receiver 10 and has a knurled or otherwise roughened thumb-engaging projection or handle 55 132 to facilitate movement of the locking member. The looking member 123 is preferably removably mounted as by screws 135 entending through a plate 136 and through slots 137 formed in the portion 430 of the locking member, wild 60 crews being threaded into the receiver 10. The crows and slots determine the limits of movement of the locking member. In one of the limits, the locking member is in inoperative position as shown in Figs. 1, 2 and 6 in full lines, and, in $_{\rm 35}$ the other limit, the locking member is in operalive position, as shown in dotted lines in Fig. 1. The projection 132 is profecably on the side at which the bundle 16 is located, for greater cenvenience.

in the operation of rotating the handle 16 to cam the striker rearward, the forward walls of the cum slots 57 exert a rotative force on the striker in the direction of turning of the handle.

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upper left corner edge of the striker and the lower right corner edge of the striker. If charp, might score the respective walls (4) and (4) of the recess 20 and would themselves become work. with the result that the proper dring of the fireare might be seriously affected. The fit between the sides of the striker and the walls (40 and 141 of the recess 20 is preferably such as to slicw substantially no more than free sliding movement of the striker. Since such a fit whaten some clearance, it is obvious that if the corner edges referred to were sharp, there may be a biting knife-edge-to-surince friction contact possibly resulting in the deleterious wear above referred to. To obviete such condits, I have rounded said corner edges as shown at 198 and 144, in Fig. 4 thereby providing for engagement between a flat wall and a relatively blunt curved surface as shown, to that friction will be minimized.

The sliding portion 130 of the lock member 122 may be tormed with openings or indeacations 141 and 148, and the cover plate 136 with a pering depression or detent 149 adapted to snap in the recess 148 when the locking member 120 is in inoperative position and in the recess (4) when the locking member is in locked position.

In the form of the invention appearing in Figs. 6 to 10, the striker or hammer 150 has a neck 161 slidably fitted in the not 152 in the reduced rear end 163 of the bolt 15. A sleeve 185 journaled on said end 163 is slidably engaged with the bolt shoulder 40 and a cap 186 is shreaded in said end. The sleeve has a cam slot 57 cooperative with a lug 167 on the striker neck 161 in the manner set forth above in connection with the lugs 51, so that when the ball handle 15 is raised the wall of said cam slot \$7 in Fig. 6, retracts the striker against the resistance of the firing spring 31 to cocked position.

The sear 170 is pivoted to the receiver 18 at 111 sarries a spring 112 forward of the pivot, said saring bearing against the under side of the sinker so as to at all times tend to turn the sear anti-clockwise. The rear and portion (78 of the sear has an inclined surface ind complemental to an inclined surface 145 on the striker. A due 118 pivoted at 117 to a bracket 178 mountaspat 119 on the receiver is constantly urged a spring 180 to turn clockwise, an arm illi of the dog being engageable with the rear and 113 of the sear to press the sear surface 174 ugainst the striker surface 115.

A frigger 183 pivoted at 184 to the bracket 118 is urged clockwise by a spring 185 compressed. between the trigger and arreshchoring member 106 carried by the bracket and adjustable by hand or a suitable tool. Thus, the other and 191 of the trigger automatically snaps into engagemont with the shoulder 188 of the dog 186, as shown in Figs. 5, 9 and 10, upon retraction of the striker as aforesaid.

The safety lock means of Figs. 6 to 10 differs from that previdually unscribed in that the slide 190 abuts the receiver 10 and not the scar 170. The mechanism is locked when the slide 190 casages the surface 191 of the trigger as shown in full lines in Figs. 6 and 19 and is unlocked when the slide is disposed rearwardly of said surface as shown in full lines in Figs. 7 and 9 and in cotted lines in Fig. 6.

It is evident from the foregoing that I have provided with a minimum of parts a construption which enables the firing spring 3/ to exert With the arrangement illustrates a in Fig. 1, the 75 its full force in driving the striker from its ex-

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treme rear position to its firing position without interference from the sear 66 or other means, se that the firing pin has acquired maximum momentum possible upon its striking the shell cap /25/. The parts are easily accessible, the stref of resulting from maintaining the striker n dodged position are taken largely by the gun Arafud so as to substantially relieve the trigger. and wear between the surfaces which might seripully affect the efficiency of operation is negligi- 10 he. A simple yet effective double acting lock is provided, and minute adjustments in the pressure on the trigger are possible. The receiver 10 may be provided with an opening (Figs. 1, 5, 6 and 7) through which a cartridge clip may be 15 fed and used shells released.

The elements of the firing and the control mechanism may be ear steel or other metal or alloy of sufficient hardness to withstand the conditions of use of the firearm, as is understood by 20 those skilled in the art.

Various dhanges coming within the spirit of the invention may be suggested by those skilled in the art, and hence I do not wish to be limited to the specific forms shown or uses mentioned. I claim

1. In a mechanism for maintaining a firing pin in cocked position, a receiver, a bolt therein, a striker in said bolt and having a forwardly facing shoulder, a sear mounted on said bolt and 30 having a rearwardly facing shoulder engageable with the aforesaid shoulder when the striker is in cocked position, a lever pivotally supported from said receiver and engaged with said sear, a trigger supported from said receiver and hold-35 ing said lever in engagement with said sear, and a spring for firing said striker, said spring being inoperative while said trigger holds said lever engageable from said lever to render said firing 40

spring operative, at least one of said shoulders being inclined upwardly and forwardly to enable said striker to cam said shoulders apart when said spring becomes operative.

2. A fircarm comprising a bolt, a striker therein, a sear matable into and out of a position obstructing foring movement of said striker, said sear being movable by said striker out of obstructing position, means pivotally mounting said sear on said bolt, said means being disposed in advance of the place of engagement, releasable means for maintaining said sear in obstructing position, said sear extending longitudinally between the place of engagement and its pivot, so that the forward component of the force of

the spring is withstood by said belt, the releasable means comprising a member engaging said sear opposite the place of interengagement between said striker and sear to preclude bending of said sear by said striker.

3. A firearm, comprising a receiver, a boit therein, a striker in said bolt, a sear pivoted on said bolt and movable into and out of a position obstructing firing movement of said striker, a spring for propelling said striker, said sear being 25 movable by said striker out of obstructing position, means including a lever pivoted on said vectiver for maintaining said sear in obstructing positon, the sear pivot being disposed to transmit the forward component of the force of the spring-pressed striker on said sear to said bolt, said lever engaging said sear at such a point that when the sear is swung out of obstructing position, it will swing the lever, and means releasably retaining said lever in position to meintain the sear in obstructing relation to the striker, the lever pivot being disposed to withstand a major portion of the downward componert of said striker on said sear.

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U.S. Patent

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SAFETY MECHANISM FOR A FIREARM

1

BACKGROUND OF THE INVENTION

The present invention relates to improvements in firearms and particularly to an improved safety mechanism for bolt action firearms.

A long-standing problem in bolt action firearms is that when the bolt is rotated to the unlocked position in opening the breech, the firearm may accidentally discharge a cartridge contained in its chamber. This occurs because many safety mechanisms for bolt action firearms must be placed in an "off-safe," or firing, position to permit the bolt to be raised from its closed and locked position. 15

Particularly when firearms have been designed or modified for hunting use, the trigger mechanism is often adjusted to require only a very small amount of movement to release the striker which propels the firing pin into the primer of the cartridge. While in most military ²⁰ rifles an appreciable amount of slack in the trigger mechanism must be taken up before the striker is released, such firearms when modified for hunting use ordinarily do not have such slack in the trigger mechanism, and are subject to accidental discharge as a result. ²⁵

Some bolt action firearms employ a safety mechanism attached to the rear end of the breech bolt. Typically, a knob or small lever of such a safety mechanism must be moved to engage or disengage the safety, a movement requiring the shooter to release his grip on the stock of 30 the firearm.

Most previously known safety mechanisms for bolt action firearms are either of the bolt mounted type just described, or else operate by blocking a portion of the trigger or sear mechanism, preventing the trigger from 35 being moved sufficiently for the sear to release the striker. Because of the short distance which the trigger must move to discharge a cartridge in a firearm designed for hunting use, however, even a small amount of wear in a safety mechanism of this rype may be sufficient to allow an accidental discharge of the firearm, upon rotation of the bolt to open the breech, or should the trigger snap on an object as the firearm is being carried.

Customarily, in the case of known firearms which are 45 provided with a lock for securing the bolt against rotation, the bolt lock is coupled with the safety mechanism in such a way that when the safety mechanism is set on "safe," the bolt is prevented from opening. In such firearms, then, the bolt and firing mechanism are both 50 locked or else both capable of actuation. As a result, there is a definite uncertainty while handling the firearm, because a shot can be accidentally discharged as the bolt is rotated.

What is needed, therefore, is a safety mechanism for 55 a bolt action firearm which can secure the bolt in its locked position, preventing opening of the bolt and also preventing actuation of the firearm, and which selectively permits rotation of the bolt from its locked position while still preventing discharge of a cartridge. 60 Additionally, such a safety mechanism should be handily operable by the shooter without the need to remove his hand from its normal position on the stock of the firearm.

SUMMARY OF THE INVENTION

. The present invention overcomes the aforementioned shortcomings and disadvantages of previously known

safety mechanisms by providing a three-position safety mechanism mounted on the tang of the receiver of the bolt action firearm, where it is thumb-operable. In one "safe" position the safety mechanism of the present invention prevents discharge of the firearm and also prevents rotation of the bolt, while in another "safe" position it prevents discharge of the firearm, yet allows rotation of the bolt from its closed-and-locked position to a position in which the safety mechanism of the firearm prevents the firearm from discharging the cartridge. In a third, or "off-safe" position the safety mechanism permits discharge of the weapon.

It is therefore a primary objective of the present invention to provide an improved safety mechanism for ¹⁵ use in bolt action firearms.

It is another important objective of the present invention to provide a safety mechanism for bolt action firearms which cannot be overcome by pulling the trigger of such firearm.

It is yet another important objective of the present invention to provide a safety mechanism which prevents discharge of the firearm independently of the trigger and sear mechanism.

It is yet a further objective of the present invention to provide a safety mechanism which prevents inadvertent rotation of the breech bolt of a bolt action firearm.

It is a still further objective of the present invention to provide a safety mechanism which is operable without the need for the shooter to move his hand from its normal position gripping the stock of the firearm.

The present invention provides a thumb-operated three-position safety mechanism which is located conveniently on the tang of the receiver portion of the firearm. It is applicable to nearly any bolt action firearm having a striker located at the rear of the bolt, and having a cocking lug for engaging the sear mechanism on the bottom of the striker.

The safety mechanism of the invention comprises a wear in a safety mechanism of this type-may be suffient to allow an accidental discharge of the fitearm, ison rotation of the bolt to open the breech, or should e trigger snap on an object as the firearm is being rried. Customarily, in the case of known firearms which are customarily, in the case of known firearms which are customarily, in the case of known firearms which are customarily with a lock for securing the bolt against rota-

> In a preferred embodiment, one end of the lock pin fits into an opening in a safety mechanism operating lever which extends upward from the tang of the receiver to a position where a shooter can easily move the lever with his thumb. Movement of the lever forward or, rearward rotates the lock pin, and a helical cam groove included in the lock pin moves it laterally of the firearm as it is rotated. When the firearm is cocked, the lock pin can be moved in this manner into a recess which is provided in the cocking lug. As the lock pin extends into the recess in the cocking lug, it engages a conical inner surface of the recess in the cocking lug, forcing the cocking lug, and thereby also the striker, to move a slight distance rearward within the receiver With the lock pin engaged in the recess in the cocking lug, the sear lever is free to move away from and to return to its position locking the cocking lug, allowing operation of the trigger mechanism while the safety 65 mechanism is in one of the two "safe" positions. The lock pin of the safety mechanism of the present invention thus holds the striker securely in a rearward position independently of the trigger mechanism, prevent-

ing discharge of the firearm despite operation of the trigger mechanism and despite jarring which might otherwise cause an accidental discharge.

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Further movement of the operating lever of the safety mechanism, in the direction required to engage 5 the lock pin in the recess of the cocking lug, moves a cam attached to the operating lever into contact with a follower located on one end of a blade which is pivotably mounted on the receiver of the firearm. The cam pivots the blade about an axis generally perpendicular 10 to the blade, raising an edge of the blade through a slot provided in the receiver of the firearm into a groove provided in the bolt of the firearm, thereby preventing the bolt from rotating away from its closed-and-locked position closing the breech. 15

It is, therefore, a principal feature of the invention that it includes a laterally-extending lock pin which is movable laterally into locking engagement in a recess provided in a part of the striker of a bolt action firearm, to positively engage and retain the striker, preventing 20 discharge of the firearm.

It is another important feature of safety mechanism of the present invention that the lock pin positively moves the striker rearward in the receiver of the firearm as the lock pin moves into the recess provided in the cocking 25 lug.

It is another important feature of the present invention that when the operating lever of the safety mechanism is in an intermediate position, the bolt may be rotated, but the cocking lug is held securely, preventing 30 discharge of the firearm.

It is a primary advantage of the present invention that it provides greater safety then previously known safety mechanisms for bolt action fifearms, since it locks the striker independently of the trigger mechanism of the 35 firearm. with the forward movement of the striker 20 when the firearm is cocked. Referring now also to FIGS. 2-5, the safety mechanism of the present invention may be seen to comprise a backing piece 36 fitted against one side of the tang 38 of

It is another primary advantage of the present invention that it is more convenient to operate than a boltmounted safety mechanism.

It is a further advantage of the present invention that it is less susceptible to wear than safety mechanisms which depend upon lockage of the trigger mechanism, particularly in firearms requiring only a slight movement of the trigger to discharge the firearm.

The foregoing and other objectives, features and 45 advantages of the present invention will be more readily understood upon consideration of the following detailed description of the invention taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary partially cut away side elevational view of a rifle including an exemplary safety mechanism embodying the present invention.

FIG. 2 is a top view of the rear portion of the receiver 55 of the rifle shown in FIG. 1, with the bolt removed.

FIG. 3 is a partially sectional side elevational view of a portion of the bolt of the rifle shown in FIG. 1, showing the lock pin and the blade of the safety mechanism shown in FIG. 1 engaged therein.

FIG. 4 is a bottom view, taken along line 4-4 of FIG. 3, of a portion of the bolt shown in FIG. 3, with the lock pin of the safety mechanism of the invention engaged therein.

FIG. 5 is a pictorial view, at an enlarged scale, of the 65 lock pin of the safety mechanism shown in FIG. 1.

FIG. 6 is a bottom view, at an enlarged scale, of a detail of the bolt of the rifle shown in FIG. 1, showing

the relationship between the lock pin of the safety mechanism and the cocking lug of the bolt.

FIG. 7 is a right side elevational view, at an enlarged scale, of the safety mechanism shown in FIG. 1.

FIG. 8 is a bottom view of the safety mechanism shown in FIG. 1, taken along line 8-8 of FIG. 7.

FIG. 9 is a left side elevational view of the safety mechanism shown in FIG. 1, taken along line 9-9 of FIG. 8.

DETAILED DESCRIPTION OF THE INVENTION

A bolt action rifle 10, equipped with a safety mechanism 12 which is a preferred embodiment of the present 15 invention, is shown in FIG. 1. The rifle 10 comprises a receiver 14 having a barrel 15 attached at its forward end. A breech bolt 16 is operatively mounted in the receiver 14 to block the breech of the barrel 15. A bolt handle 18 of the breech bolt 16 is shown (partially cut 20 away for clarity) in a forward-and-down, closed-andlocked position, and a striker 20 carried by the bolt 16, is in its cocked position, in which it is held rearward with respect to the bolt 16 against the force of a striker spring (not shown).

The trigger mechanism of the rifle comprises a trigger 22, pivotably mounted on a trigger pivot pin 24, and a sear lever 26 mounted on a sear pivot pin 28. A forward end of the trigger 22 is supported by a trigger adjusting screw 30 and a trigger spring 32, while a sear 34 is provided on an upper portion of the trigger 22 to releasably hold the sear lever 26 in a position interfering with the forward movement of the striker 20 when the firearm is cocked.

Referring now also to FIGS. 2-5, the safety mechabacking piece 36 fitted against one side of the tang 38 of the receiver 14 of the rifle 10, and a lock pin 40, having a longitudinal axis 42, which extends laterally through a bore 43 defined in the backing piece 36 and the tang 38 of the receiver 14. An operating lever extends upward above the backing piece 38 and has a head 45 shaped to be conveniently moved by thumb pressure. An elongated opening 46, through which an outer end portion 47 of the lock pin 40 extends, is defined in the operating lever 44. A cover plate 48 is secured to the backing piece to limit movement of the operating lever 44, while a hole 50 defined in the cover plate 48 and located in alignment with the elongated opening 46 permits the lock pin 40 to move laterally and also permits observation of the position of the lock pin 40. The operating 50 lever 44 may be moved forward, rotating about a pivot axis coincident with the central longitudinal axis 42 of the lock pin 40, from the position shown in solid line in FIG. 1, in which the safety mechanism of the invention is in a "safe" position, to the "off-safe" position shown in broken line, which permits the rifle 10 to be discharged.

A cam 52, is located on the lower portion of the operating lever 44, where it engages a follower 54 connected to a blade 56. The blade 56 is pivotably secured to the receiver 14 by, for example, a blade mounting screw 57 extending laterally through the blade into the receiver 14. An edge 58 of the blade 56 extends upward through a slot 60 in the receiver, engaging a groove 62 defined in the bottom of the bolt 16, near the bolt handle 18, preventing the bolt 16 from rotating out of its forward-and-down locked position. A blade spring 64 normally retains the edge 58 in a lowered position.

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United States Patent [19]

Godsey

[56]

[54] SAFETY MECHANISM FOR A FIREARM

- [76] Inventor: Floyd E. Godsey, Box 154, Willow Creek, Calif. 95573
- [21] Appl. No.: 126,682
- [22] Filed: Mar. 3, 1980
- [51]
 Int. Cl.³
 F41C 17/04

 [52]
 U.S. Cl.
 42/70 F; 42/70 R

 [58]
 Field of Search
 42/70 F, 70 R, 69 A
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[11]4,305,218[45]Dec. 15, 1981

Primary Examiner-Charles T. Jordan Attorney, Agent, or Firm-Chernoff & Vilhauer

[57] ABSTRACT

A safety device for a bolt action firearm has a laterally extending lock pin which is movable laterally to engage a recess in the cocking lug of the striker to prevent the striker from moving forward despite sear release by the trigger mechanism. An operating lever is movable rearward from a forward position in which the firearm may be discharged, rotating a helical cam which moves the lock pin laterally into the recess in the cocking lug. When the lever is moved further rearward, a cam on the operating lever pivots a blade upward into a groove in the bolt to prevent rotation of the bolt.

13 Claims, 9 Drawing Figures





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SAFETY MECHANISM FOR A FIREARM

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BACKGROUND OF THE INVENTION

The present invention relates to improvements in firearms and particularly to an improved safety mechanism for bolt action firearms.

A long-standing problem in bolt action firearms is that when the bolt is rotated to the unlocked position in opening the breech, the firearm may accidentally dis- 10 arm prevents the firearm from discharging the carcharge a cartridge contained in its chamber. This occurs because many safety mechanisms for bolt action firearms must be placed in an "off-safe," or firing, position to permit the bolt to be raised from its closed and locked position.

Particularly when firearms have been designed or modified for hunting use, the trigger mechanism is often adjusted to require only a very small amount of movement to release the striker which propels the firing pin into the primer of the cartridge. While in most military 20 rifles an appreciable amount of slack in the trigger echanism must be taken up before the striker is released, such firearms when modified for hunting use ordinarily do not have such slack in the trigger mechahism, and are subject to accidental discharge as a result. 25 Some bolt action firearms employ a safety mechanism attached to the rear end of the breech bolt. Typically, a knob or small lever of such a safety mechanism must be moved to engage or disengage the safety, a movement

the firearm. Most previously known safety mechanisms for bolt action firearms are either of the bolt mounted type just described, or else operate by blocking a portion of the trigger or sear mechanism, preventing the trigger from 35 being moved sufficiently for the sear to release the striker. Because of the thort distance which the trigger must move to discharge a cartridge in a firearm designed for hunting use, however, even a small amount of wear in a safety mechanism of this type may be suffi- 40 cient to allow an accidental discharge of the fiscary, upon rotation of the bolt to open the oreech, or should the trigger snap on an object as the firearm is being carried.

requiring the shooter to release his grip on the stock of 30

Customarily, in the case of known firearms which are 45 provided with a lock for securing the bolt against rotation, the bolt lock is coupled with the safety mechanism in such a way that when the safety mechanism is set on "safe," the bolt is prevented from opening. In such firearms, then, the bolt and firing mechanism are both 50 locked or else both capable of actuation. As a result, there is a definite uncertainty while handling the firearm, because a shot can be accidentally discharged as the bolt is rotated.

What is needed, therefore, is a safety mechanism for 55 a bolt action firearm which can secure the bolt in its locked position, preventing opening of the bolt and also preventing actuation of the firearm, and which selectively permits rotation of the bolt from its locked position while still preventing discharge of a cartridge. 60 Additionally, such a safety mechanism should be handily operable by the shooter without the need to remove his hand from its normal position on the stock of the firearm.

SUMMARY OF THE INVENTION

The present invention overcomes the aforementioned shortcomings and disadvantages of previously known

safety mechanisms by providing a three-position safety mechanism mounted on the tang of the receiver of the bolt action firearm, where it is thumb-operable. In one "safe" position the safety mechanism of the present invention prevents discharge of the firearm and also prevents rotation of the bolt, while in another "safe" position it prevents discharge of the firearm, yet allows rotation of the bolt from its closed-and-locked position to a position in which the safety mechanism of the fire-

tridge. In a third, or "off-safe" position the safety mechanism permits discharge of the weapon.

It is therefore a primary objective of the present invention to provide an improved safety mechanism for 15 use in bolt action firearms.

It is another important objective of the present invention to provide a safety mechanism for bolt action firearms which cannot be overcome by pulling the trigger of such firearm.

It is yet another important objective of the present invention to provide a safety mechanism which prevents discharge of the firearm independently of the trigger and sear mechanism.

It is yet a further objective of the present invention to provide a safety mechanism which prevents inadvertent rotation of the breech bolt of a bolt action firearm.

It is a still further objective of the present invention to provide a safety mechanism which is operable without the need for the shooter to move his hand from its normal position gripping the stock of the firearm.

The present invention provides a thumb-operated three-position safety mechanism which is located conveniently on the tang of the receiver portion of the firearm. It is applicable to nearly any bolt action firearm having a striker located at the rear of the bolt, and having a cocking lug for engaging the sear mechanism on the bottom of the striker.

The safety mechanism of the invention comprises a lock pin which extends laterally toward the striker through a bore provided in the tang of the receiver, and which is laterally movable by action of a cam to engage and hold the striker, preventing discharge of the firearm. Another cam is used to move a blade into a groove in the breech bolt of the firearm to secure the bolt in a closed position.

In a preferred embodiment, one end of the lock pin fits into an opening in a safety mechanism operating lever which extends upward from the tang of the receiver to a position where a shooter can easily move the lever with his thumb. Movement of the lever forward or rearward rotates the lock pin, and a helical cam groove included in the lock pin moves it laterally of the firearm as it is rotated. When the firearm is cocked, the lock pin can be moved in this manner into a recess which is provided in the cocking lug. As the lock pin extends into the recess in the cocking lug, it engages a conical inner surface of the recess in the cocking lug, forcing the cocking lug, and thereby also the striker, to move a slight distance rearward within the receiver With the lock pin engaged in the recess in the cocking lug, the sear lever is free to move away from and to return to its position locking the cocking lug, allowing operation of the trigger mechanism, while the safety mechanism is in one of the two "safe" positions. The lock pin of the safety mechanism of the present inven-65 tion thus holds the striker securely in a rearward position independently of the trigger mechanism, prevent-

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ing discharge of the firearm despite operation of the trigger mechanism and despite jarring which might otherwise cause an accidental discharge.

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Further movement of the operating lever of the safety mechanism, in the direction required to engage 5 the lock pin in the recess of the cocking lug, moves a cam attached to the operating lever into contact with a follower located on one end of a blade which is pivotably mounted on the receiver of the firearm. The cam pivots the blade about an axis generally perpendicular 10 to the blade, raising an edge of the blade through a slot provided in the receiver of the firearm into a groove provided in the bolt of the firearm, thereby preventing the bolt from rotating away from its closed-and-locked position closing the breech.

It is, therefore, a principal feature of the invention that it includes a laterally-extending lock pin which is movable laterally into locking engagement in a recess provided in a part of the striker of a bolt action firearm, to positively engage and retain the striker, preventing 20 discharge of the firearm.

It is another important feature of safety mechanism of the present invention that the lock pin positively moves the striker rearward in the receiver of the firearm as the lock pin moves into the recess provided in the cocking 25 lug.

It is another important feature of the present invention that when the operating lever of the safety mechanism is in an intermediate position, the bolt may be rotated, but the cocking lug is held securely, preventing 30 34 is provided on an upper portion of the trigger 22 to discharge of the firearm.

It is a primary advantage of the present invention that it provides greater safety then previously known safety mechanisms for bolt action firearms, since it locks the striker independently of the trigger mechanism of the 35 firearm.

It is another primary advantage of the present invention that it is more convenient to operate than a boltmounted safety mechanism.

It is a further advantage of the present invention that 40 it is less susceptible to wear than safety mechanisms which depend upon lockage of the trigger mechanism, particularly in firearms requiring only a slight movement of the trigger to discharge the firearm.

The foregoing and other objectives, features and 45 advantages of the present invention will be more readily understood upon consideration of the following detailed description of the invention taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary partially cut away side elevational view of a rifle including an exemplary safety mechanism embodying the present invention.

FIG. 2 is a top view of the rear portion of the receiver 55 of the rifle shown in FIG. 1, with the bolt removed.

FIG. 3 is a partially sectional side elevational view of a portion of the bolt of the rifle shown in FIG. 1, showing the lock pin and the blade of the safety mechanism shown in FIG. 1 engaged therein.

FIG. 4 is a bottom view, taken along line 4-4 of FIG. 3, of a portion of the bolt shown in FIG. 3, with the lock pin of the safety mechanism of the invention engaged therein.

lock pin of the safety mechanism shown in FIG. 1.

FIG. 6 is a bottom view, at an enlarged scale, of a detail of the bolt of the rifle shown in FIG. 1, showing the relationship between the lock pin of the safety mechanism and the cocking lug of the bolt.

FIG. 7 is a right side elevational view, at an enlarged scale, of the safety mechanism shown in FIG. 1.

FIG. 8 is a bottom view of the safety mechanism shown in FIG. 1, taken along line 8-8 of FIG. 7.

FIG. 9 is a left side elevational view of the safety mechanism shown in FIG. 1, taken along line 9-9 of FIG. 8.

DETAILED DESCRIPTION OF THE INVENTION

A bolt action rifle 10, equipped with a safety mechanism 12 which is a preferred embodiment of the present 15 invention, is shown in FIG. 1. The rifle 10 comprises a receiver 14 having a barrel 15 attached at its forward end. A breech bolt 16 is operatively mounted in the receiver 14 to block the breech of the barrel 15. A bolt handle 18 of the breech bolt 16 is shown (partially cut away for clarity) in a forward-and-down, closed-andlocked position, and a striker 20 carried by the bolt 16, is in its cocked position, in which it is held rearward with respect to the bolt 16 against the force of a striker spring (not shown).

The trigger mechanism of the rifle comprises a trigger 22, pivotably mounted on a trigger pivot pin 24, and a sear lever 26 mounted on a sear pivot pin 28. A forward end of the trigger 22 is supported by a trigger adjusting screw 30 and a trigger spring 32, while a sear releasably hold the sear lever 26 in a position interfering with the forward movement of the striker 20 when the firearm is cocked.

Referring now also to FIGS. 2-5, the safety mechanism of the present invention may be seen to comprise a backing piece 36 fitted against one side of the tang 38 of the receiver 14 of the rifle 10, and a lock pin 40, having a longitudinal axis 42, which extends laterally through a bore 43 defined in the backing piece 36 and the tang 38 of the receiver 14. An operating lever extends upward above the backing piece 38 and has a head 45 shaped to be conveniently moved by thumb pressure. An elongated opening 46, through which an outer end portion 47 of the lock pin 40 extends, is defined in the operating lever 44. A cover plate 48 is secured to the backing piece to limit movement of the operating lever 44, while a hole 50 defined in the cover plate 48 and located in alignment with the elongated opening 46 permits the lock pin 40 to move laterally and also permits observation of the position of the lock pin 40. The operating lever 44 may be moved forward, rotating about a pivot axis coincident with the central longitudinal axis 42 of the lock pin 40, from the position shown in solid line in FIG. 1, in which the safety mechanism of the invention is in a "safe" position, to the "off-safe" position shown in broken line, which permits the rifle 10 to be discharged.

A cam 52, is located on the lower portion of the operating lever 44, where it engages a follower 54 con-60 nected to a blade 56. The blade 56 is pivotably secured to the receiver 14 by, for example, a blade mounting screw 57 extending laterally through the blade into the receiver 14. An edge 58 of the blade 56 extends upward through a slot 60 in the receiver, engaging a groove 62 FIG. 5 is a pictorial view, at an enlarged scale, of the 65 defined in the bottom of the bolt 16, near the bolt handle 18, preventing the bolt 16 from rotating out of its forward-and-down locked position. A blade spring 64 normally retains the edge 58 in a lowered position,

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"B" \$ dries Photos Bolt lock is mounted and can work independently of safety lever. Button shown in photo to right of safety lever is bolt latch actuating button.

- B-1 Gun cocked ready to fire Safe in "Fire" position Bolt is unlocked
- B-2 Gun cocked Safe in "ON SAFE" position Bolt is locked
- B-3 Gun cocked Safe in "ON SAFE" position Bolt latch actuating button depressed Bolt unlocked and can be rotated.

F.E. Martin:T 4-11-78



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ENGINEERING COMPUTATION SHEET t bottom needs to be .03• solution 14th with at top of tow · Can go to .050 R. at minde where of my well . Use superit landing it new with squared flat on S. 11 12 13 the of steel by extruin Je (wein file) U Ale oie car ~ the / got 16 17 fitme lith 20 21 **2**2 23 (. 010" for anythe . Need flatmen spece. 25 21 · O.K. . ~ * 28/p-t w/he drilled 21 CX TRASOR . Some-lost can bet de. 33 34 DET FINISHED PRINT TO SURE-CAT 35 36 37 TANDANDS FOR MINIMUM ESSENTIAL INSTALLATION

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COMPUTATION SHEET FEATURES NBAR 8 9 10 11 12 13 14 15 16 17 18 . 19 20 21 27 28 29 30 31 INTERNAL EXTERNAL regated by SWS 0 NTEGAR #4rs . c.16 INDEPENDENT BUT LOUK DETACHABLE MAG. BX. FLAT Sider 0 0 Kouns Bottom ٩ TOTAL WEIGHT 10 */1... SAME AS 0 11 LIGHTER 0 + 12 13 15 WHICH Ry INTEGRAL SCORE MTS. 1 N RINGS ATTACH RECEIVER DIRECTLY 28 21 BARREL NY BEL. CONTOUR CHERENTLY 2 2 USED. Custom SHOP 23 (TRY ADJUSTING MAGNUM CONTROL AS TUM. 24 · DIFFERENT BK. CONTOUR NON - MAGNUM - RECESSED CROWN (July MTN. RIFLE) 25 20 -> Ket Hols. from Tim McC. • Strength • Accord 27 28 29 30 -> IMPRIVES CUREENT BDL SIGHTS 31 (Take at look at Tim's new Coston Shop inglat) 32 33 34 35 36 37 USE STANDARDS FOR MINIMUM ESSENTIAL INSTALLATIONS

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NBAR PROBLEM	ALTERNATIVES
*Mag. box has vertical play at the rear	*Put a stop surface on receiver to bias box downward at rear.
within the magazine well.	*Form geometry in rear of box which will stop on top rear of mag. well.
	*Form geometry at bottom front of box to stop downward rotation.
*Mag. latch is hard to operate.	*Reduce line contact on finger through redesign of finger piece.
	the spring againing and the spring again
	"Lower laten spring position on laten (closer to proof).
<pre>*(Trig. gd. + box) height varies v / respect to receiver in final assembly.</pre>	*Use spacer tube(s) between trig. gd. and receiver through which take down screws pass.
*Mag follower tips sideways: reduced capacity	*Add leg to side of follower at front.
*Cartridge may sometimes be made to stay down	*Hove mag. spring force rearward by shortening length of spring so
at the rear, thereby causing bolt override.	that it just wraps around the front of the boss and is more rearvard
\sim	on the follower bottom.
*Mag. latch will hold box in mag. well even	*Bevel top front edge of box so that latch pushes downward on box.
when latch is not in the full latch position	
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WARNING

READ THESE BASIC SAFETY RULES. Learn how to handle your thream safely. Failure to obey these rules can result in serious personal injuries. Only you can prevent accidents.

KNOW YOUR FIREARM. To use it correctly



follow the instructions in the enclosed firearms safety booklet and this instruction book.

and safely

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TREAT EVERY FIREARM AS IF IT WERE LOADED! Don't-ly on the safety switch. Use it as shown in this book.



NEVER MAKE ADJUSTMENTS. Do not make changes or alterations to any parts of a firearm. Use only REMINGTON parts. Never make an adjustment to the trigger, or change the shape or size of the sear, sear notch, or other parts.

MAKE YOURSELF SAFE. Wear eve protection, such as glasses or sunglasses, when shooting. Wear ear protection, such as ear plugs or mulfs, when target shooting or plinking. Repeated exposure to shooting noise can cause permanent hearing loss. Never drink alcoholic beverages before or during shooting.



TAKE CARE OF YOUR FIREARM. Keep the barrel clean and free of obstructions. Clean and have the firearm checked periodically to make sure it is mechanically correct. Worn, damaged or missing parts maybe dangerous.

WATCH YOUR MUZZLE. Always keep the firearm pointed in a safe direction.



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SAFETY RULES



RANGE ½ TO 5 MILES





NEVER USE THE WHONG AMMUNITION. Only use ammunition that exactly matches the caliber or gauge markings on your firearm. Handloads can be dangerous. Remington Arms Company, Inc. is not responsible for accidents or damage caused by badly-loaded handloads.

LOAD YOUR FIREARM SAFETY. Never load a firearm until you are in a location where it is safe to shoot, and you are ready to shoot.

KNOW YOUR TARGET. Before you guil the tridger, make sure you can see the target clearly, and the dam of the bullet, slug, or shot charge beyond the target. Never short at water, rocks, or any hard surface. Bullets may glance off such turfaces and cause injuries.

KNOW THE RANGE OF YOUR FIREARM. Remember, shotgun pellets can travel 500 yards and shotgun slugs have a range of more than one-half mile. Rimfire bullets can travel up to 5 miles.

IF FIREARM FAILS TO FIRE keep it pointed in safe direction, then unload carefully avoiding exposure to breech. If fireard fire but report or recoil seems weak, unload and then make spre the barrel is not obstructed.

UNLOAD YOUR FIREARM WHENEVER YOU ARE NOT SHOOTING. Never carry or store a loaded firearm in a building or a vehicle. Unload your firearm before climbing up or over a fallen tree, fence or slippery area.

STORE YOUR FIREARM SAFELY. Keep firearms and ammunition away from children. Lock unloaded firearms and ammunition securely in separate locations.

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IMPORTANT PARTS OF THE AIREARM

THE SAFETY SWITCH

- The safety switch provides protection against acdidental o unintentional discharge under normal usage when proper engaged.
- To engage the safety switch, put the switch in the 'S position. See picture 3.

Always put the safety switch in the "S" position before handling, loading or unloading the firearm.

- When you are ready to fire the firearm, put the safety switch in the "F" position. See picture 4.
- Do not touch the trigger while moving the safety switch.

Never pull the trigger when the safety switch is in the "S" position.

WARNING: The firearm will fire when the trigger is pulled and the safety switch is in the "F" position.



Even when the safety switch is in the "S" position, careless handling can cause the firearm to tire.













THE BOLT ASSEMBLY



The bolt assembly locks the cartridge into the chamber.

TO INSTALL THE BOLT ASSEMBLY:

- Point the firearm in a safe direction.
 Put the safety switch in the "S" position.
- 3. Align the lugs on the bolt assembly with the receiver. See picture 5.
- 4. Slide the bolt assembly into the receiver and push all the way in.
- 5. To lock the bolt assembly into position push the bolt handle down.

TO REMOVE THE BOLT ASSEMBLY:

- 1.
- 2.
- Point the firearm in a safe direction. Put the safety switch in the "S" position. Do not touch the trigger while moving the safety 3. switch,
- 4 Raise the bolt handle.

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- 5. Pull the bolt handle all the way back.
- 6. Push the bolt stop release. See picture 5.7. As you push the bolt stop release, slide the bolt from the firearm.



THE TRIGGER ASSEMBLY

Pulling the trigger fires the fifear The trigger is adjusted at the All adjustments to the trigger mas be made by the factory of a REM INGTON RECOMMENDED GUN SMITH.

Never remove the trigger mechanism, or make adjust-ments to the trigger or trigger assembly.



NEVER put your finger on the trigge unless you are going to fire the firear







THE BARREL

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and free of obstructions. The inside of the barrel must be clean

- TO CHECK THE INSIDE OF THE BARREL: ł.
- Point the firearm in a safe direction.
 Put the safety switch in the "S" position.
 Raise the bolt handle.
- 4. Pull the bolt handle all the way back.
- 5. Remove any ammunition from the chamber or magazine. See page 8.
- Remove the bolt. See page 5.
 Look through the inside of the barrel from e chamber end to the muzzle. See picture 1.

11 TO REMOVE OBJECT FROM INSIDE THE

- Use the correct size cleaning rod. 1.

BARRE

Ose the correct size cleaning rod.
 Push the cleaning rod from the chamber end all the way through the barrel, until the rod comes out the muzzle.
 If an object cannot be easily pushed out of the barrel with a cleaning rod, return the firearm to the factory or a REMINGTON RECOMMENDED GUNSMITH.

NEVER try to remove an object from the barrel STOP by loading another cartridge and flring.

TO CLEAN THE BARREL FOLLOW INSTRUCTIONS 111 SHOWN ON PAGE 11.

Before loading the firearm make sure the inside of the barrel is free of dirt, or other objects.



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TO LOAD THE FIREARM

- ſ TO LOAD THE MAGAZINE AND CHAMBER:
- Point the firearm in a safe direction. 1.
- 2. Put the safety switch in the "S" position.
- Raise the bolt handle.
 Pull the bolt handle all the way back.
- 5. Push four cartridges of the correct caliber, one at a time, into the magazine. If the firearm is a magnum, you can only load three cartridges. If the firearm is a 17, 222, or 223 caliber, the maga-zine will hold 5 cartridges. Keep the bullets aligned toward the chamber. See Picture 6.-
- 6. Put one cartridge into the chamber.
- 7. Use your fingers to push the cartridges in the magazine all the way down. Slowly slide the bolt assembly forward, so that the bolt slides over the top of the cartridges in the magazine.
- 8. Push the bolt handle down.

THE FIREARM IS NOW LOADED.

9. To fire the firearm, put the safety switch in the "F" position.

THE FIREARM IS READY TO FIRE.

11 TO LOAD ONE CARTRIDGE ONLY:

- 1. Point the firearm In a safe direction.
- Put the safety switch in the "S" position. 2.
- 3. Raise the bolt handle,

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- Pull the bolt handle all the way back.
- Put one cartridge of the correct caliber on the magazine follower, or in the chamber. See picture 6.
- 6. Slide the bolt handle forward, then push the bolt handle down to lock the cartridge into the chambe
- na na marka n Na marka na m THE FIRE LOADED. To fire 7. le
- e safety switch in the иt "F" posit lon

THE F REALC TO FIRE

WARNING: Always check the cartridge for the correct caliber before loading the firearm.



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There are two types of Model 700 rifles, one with a FLOOR PLATE and one without a FLOOR PLATE. INSTRUCTIONS FOR THE MODELS WITH A FLOOR PLATE

- 1. Point the muzzle in a safe direction.
- 2. Put the safety switch in the "S" position.
- 3. Raise the bolt handle.
- Put one hand over the top of the ejection port.
 Slowly pull the bolt handle back with your other hand to remove the cartridge from the chamber.
- hand to remove the cartridge from the chamber.6. Hold the cartridge and remove it from the firearm.
- 7. Put your hand under the floor plate.
- Push the floor plate latch to release the floor plate. See picture 7. The magazine spring and follower will be released
- from the magazine.
- Remove released cartridges.
 Push in the magazine follower, then close the floor plate.

WARNING: Make sure there are no cartridges in the chamber or magazine.

INSTRUCTIONS FOR THE MODELS WITHOUT A

- 1. Point the muzzle in a safe direction.
- 2. Put the safety switch in the "S" position.
- 3. Raise the bolt handle.
- Put one hand over the top of the ejection port.
 Slowly pull the bolt handle back with your other
- Slowly pull the bolt handle back with your other hand to remove the cartridge from the chamber.
- 6. Hold the cartridge and remove it from the firearm.

- Keep the muzzle pointed up, push the bolt handle slowly forward until the cartridge is released from the magazine. CAUTION: The cartridge may slide into the chamber, if the bolt is pushed too far forward. See note below.
- Pull the bolt handle fully back and remove the cartridge from the ejection port.
- 9. Repeat this action until the magazine is empty.

WARNING: Chack the chamber and the magazine to make sure ther are no carkridges in the firearm.

NOTE: If the bolt is putned all the way forward, and a cartridge slides into the chamber, the gun can be fired. Normally, the bartidges/will slide out of the chamber when the bdit is pulsed back. If the cartridge remains, in the chamber, point the more lin a safe direction, slide the bolt forward all the way and push the bolt handle down to lock the bolt. Then repeat steps 2 through 9 above.





HOW TO LOAD AND UNLOAD





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- See picture 9 for the location of parts: 1. Slide the strap through the band.
- Push the strap up through the first swivel.
- 3. Slide the strap back through the band.
- Push the strap into and through the buckle.
 Push the strap down and through the second
- swivel, 6. Align the slots in the strap and fasten with the brass fastener.
 - TO ATTACH THE SLING STRAP ASSEMBLY TO THE STOCK.

See picture 9 for location of parts:

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- Push plunger on swivel until the small plate lifts and is free of the stud.
- Push the stud into the center of the swivel screw.
 Close the plate on the swivel to lock the swivel to the swivel screw.
- 10. To adjust the length of the strap, pull the strap through the buckle.

TO REMOVE THE SLING FROM THE STOCK. To remove the sling strap assembly from the stock repeat step 7.



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LUBRICATION AND MAINTENANCE

LUBRICATION:



Over-lubrication should be avoided at all times. A thin coat of Remtm Oil is all that is needed to prevent the possibility of rusting. See note below.

When the firearm is to be stored, it should be carefully cleaned and thoroughly oiled. Outside surfaces should be wiped with a light coat of Remtm Oil occasionally.

When firearm is to be reused, all excess lubrication must be removed. The chamber and bore must be thoroughly wiped dry.

NOTE: Remington Remtm Oil with DuPont Teflon Wet Lubricant is available from your local dealer. If your dealer is out of stock, ask him to order Remtm Oil from his Remington distributor.

TO CLEAN THE BARREL

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WARNING: Check the chamber and magazine to make sure there are no cartridges in the firearm.

- 1. Use the equipment provided in a good cleaning kit,
- Remove the bolt assembly. See instructions on Page 5.

3. Select the correct caliber cleaning brush and attach the brush to the cleaning rod.

4. Fut the cleaning brush into the gun cleaning sol-

NOTE: Barrel should lay horizontally with the ejection port facing down during cleaning. Always clean the barrel from the chamber end to the muzzle.

- 5. Push the cleaning prush mough the barrel several times.
- Remove brush from rod attach tip with patch, and push through the toge.
- 7. Repeat several times, using a new cleaning patch each time, until the patch is not dirty.
- 8. Push a clean patch saturated with Rem^{trn} OII through the barrel.
- 9. Push a clean dry patch through the barrel to remove excess lubricant.
- 10. Apply a thin coat of Remtm Oil to the outside of the barrel with a soft clean cloth.
- 11. After cleaning the barrel, clean the receiver the trigger assembly.

WARNING: This firearm should be checked period ically by the Remington Arms Company Inc. or a REMINGTON RECOMMENDED GUNSMITH. This will insure proper inspection and any necessary replacement of worn or damaged parts.

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TO CLEAN THE RECEIVER AND TRIGGER ASSEMBLY

TO CLEAN THE RECEIVER AND TRIGGER ASSEMBLY

- 1. Put safety switch to "S" position.
- 2. Remove the bolt assembly. See Instructions on Page 5.
- Turn the rifle upside down.
- 4. Remove the screws from the trigger guard. See Picture 10.
- Lift the stock away from the receiver and trigger assure by.

MODELS WITHOUT A FLOOR PLATE:

Remove the magazine spring and follower from the receiver.

NOTE: Clean the receiver and trigger assembly as a unit with Rem^{IIII} Oil.

Spray the receiver and the four points of the trigger assembly with Remtm Oil (see Picture 11). Let stand for 15 minutes. Spray again to wash off components. Shake off excess lubricant.

WARNING: Excessive use of a non-recommended lubricant tould cause serious function problems possibly leading to accidental firing,





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TO ASSEMBLE THE MODELS WITHOUT A FLOOR PLATE

- 1. Put the magazine follower and the spring into the magazine.
- 2. Put the stock over the receiver and trigger assembly.
- 3. Replace and tighten the screws on the trigger guard.

WARNING: Before you replace the bolt assembly, make sure the barrel is free of obstructions.

4. Replace the bolt assembly. See Instruction on Page 5.

WARNING: After cleaning the trigger assembly, check the chamber and magazine to make sure there are no cartridges in the firearm. Put the safety switch in the "F" position. Close the bolt smartly. The firing pin must remain cocked. To check, pull the trigger. The firing pin must fall. Repeat the test at least ten times. If the firing pin will not remain cocked when the bolt is closed smartly, return the firearm to the factory, or a REM-INGTON RECOMMENDED GUNSMITH.

- TO ASSEMBLE THE MODELS WITH A FLOOR PLATE 1. Put the magazine all the way into the bottom of the receiver.
- 2. Assemble the trigger guard assembly on the stock.
- 3. Put the stock over the receiver and trigger assembly.
- 4. Replace and tighten the trigger guard screws.

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5. Cose the Floor Plate.

WARNING: Before you replace the bolt assembly, make sure the barrel is free of obstructions.

6. Replace the bolt essembly. /See Instruction on Page 5.

WARNING: After chaning the finder assembly, check the chamber and magazine to make sure there are no cartridges in the firearm. Put the party switch in the "F" position. Close the bolt smartly. The firing pix must remain cocked. To check, pull the trigger. The firing pix must fail. Repeat the test at least ten times. If the firing pix must fail. Repeat the test at least ten times. If the firing pix must fail. Repeat the test at least ten times. If the firing pix must fail. Repeat the test at least ten times. If the firing pix must fail. Repeat the test at least ten times. If the firing pix must fail. Repeat the test at least I is closed smartly, return the firearm to the factory, or a REM-INGTON RECOMMENDED GUNSMITH.

CLEANING FREQUENCY

1. Before and after long term storage.

- If the rifle has been subjected to adverse conditions; such as, shooting in the rain, snow, sleet, or in fall water areas.
- If the rifle is exposed to dirty conditions/such as laying on the ground outdoors, dropped in mud, etc.







TO DISASSEMBLE THE BOLT FOR CLEANING

- 1. Remove the bolt assembly from the firearm. See Instruction on Page 5.
- Put the notch on the firing pin head over a metal edge.
 Pull the bolt assembly away from the firing pin. Put a coin into the slot near the back edge of the firing pin head. See Picture 12.
- Hold the bolt assembly and turn the bolt plue counter clockwise until the firing pin assembly can be removed from the bolt assembly.
- CAUTION: Clean the firing pin assembly as a unit.
 4. Clean all parts with gun cleaning solvent. Dry with a clean cloth.
- 5. Apply a thin coat of Remtm Oil. TO ASSEMBLE
- Put the firing pin assembly into the rear of the bolt assembly.
- 2. Tighten the bolt plug into the bolt assembly with your hand.
- 3. Pull the coin from the slot in the firing pin head.
- Turn the bolt plug until the firing pin head goes into the small notch on the rear rim of the bolt. The bolt is now cocked. See Picture 13. NOTE: The bolt must be cocked to be assembled into
- the rifle.5. Assemble the bolt assembly into the rifle. See Instructions on Page 5.



14







TO ORDER PARTS

- Arms Service Parts (315) 895-7393
- 1. Use the picture on page 16 to find the correct part name and number.
- 2. Write the model and serial number of your firearm, and the part name and number on the parts order.
- 3. Send parts order to: Arms Service Division Remington Arms Company, Inc. Ilion, New York 13357
- 4. We can ship your order on a C.O.D. basis or provide an estimate of your required remittance. NOTE: Bolts, barrels, or receivers for centerfire rifles, pistols, and rimfire rifles are not sold separately. Repairs or replacements for these parts must be done by Remington Arms Company, Inc. Barrels and bolts for shotguns are available as parts.

WARNING: Use only Remington parts in Remington lirearms.

TO ORDER FACTORY SERVICE:

15

Arms Service - Repairs (315) 895-7791

- Write a short description of the problem. 1. Give the model and serial number. Make a copy of
- this note. Attach the original note to the firearm, and put the copy in an envelope attached to the outside of the shipping box.

- 2. Make sure the gun is unloaded. Never include any ammunition in the package with the firearm.
- Send by either United Parcel Service or Parcel Post. NOTE: Make sure the gun is unloaded, and therepis-go ammunitipmin the box.
- 4. Get insurance for the firearm.
- 5. Record serial number, it is required when calling factory of inquire if firearm has been received for repairs
- 6. Send finearns for facton, service to: Arms Service Division Remington Acous Company, Inc. Ilion, New York 13357

INSTRUCTION BOOKS:

To get instruction books for any Remington firearm, write to Remington Arms Co., Inc. Arms Service Division, Ilion, New York 13357 Give the model, serial number, gauge or caliber.

REMINGTON AUTHORIZED GUNSMITHS

A listing is available from Remington Arms Company, write to Remington Arms Co., Inc., Arms Service Division, Illion, New York 13357.



CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

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HOW

TO ORDER PARTS AND

16







View	Part	NAME	View	Part	NAME
No.	No.		No.	No.	
		NOTE: Basic 30-06 Caliber listed below.	13	1 2017	Ejector Spring
			14	91816	Extractor
1		Barrel Assembly	15	22020	Firing Pin
2		Bolt Assembly	16	22043	Firing Pin Assembly, ADL Grade
		Bolt Final Assembly	L	22040	Firing Pin Assembly BDL Grade
3	92510	Bolt Plug ADL	17	17022	Firing Pin Cross Pin
	17012	Bolt Plug BDL	18	15291	Floor Plate Latch, BDL Grade
4	17013	Bolt Stop (Restricted)	19	16451	Floor Plate Latch Fin, BDL Grade
5	24475	Bolt Stop Pin (Restricted)	20	16452	Floor Plate Latch Spring BDL Grade
6	15224	Bolt Stop Spring (Restricted)	21	16453	Floor Plate Pivot Pin_BDL Grade
7	90953	Butt Plate	22	22035	Front Guard Screw
8	90954	Butt Plate Spacer BDL Grade	23	15161	Front Guard cover Bushing, ADL Grad
9	25380	Butt Plate Screw	24	15373	Front Sight
10	15287	Center Guard Screw ADL Grade		15719	Front Sight (Low)
11	17017	Ejector	25	28510	Front Sight Ramp
12	17676	Ejector Pin	-	15635	Front Sight Ramp, BDL Grade
			26	28505	Front Sight Ramp Screw

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View	Part	NAME	View	Part	NAME
No.	No.		No.	No.	
- 27	15363	Front Sight Hood, BDL Grade	37	23505	Rear/Sight Base Screw (2)
29	15358	Front Swivel Screw	38	90905	Plear Sight Slide
	90957	Grip Cap, BDL Grade (not shown)	39	90906	Elevation Screw
-	25380	Grip Cap Screw	40	15398	Rear Swivet Screw
	90958	Grip Cap Spacer, BDL Grade (not shown) .	41	17034	Receiver Plug Screw
. 30	15284	Magazine, ADL Grade	42	24476	Sear Pin (Restricted)
	16430	Magazine, BDL Grade (not shown)	43	30855	Sling Strap Assembly, BDL Grade
31	92492	Magazine Follower, ADL		26990	Sling Strap Assemble & Mountings Comp .
	91017	Magazine Follower, BDL	44	100021	Stock Assembly ADL Grade
	15940	Magazine Tab Screw, ADL Grade		33371	Stock Assembly, BDC Grade
32	17028	Magazine Spring		18186	Stock Reinforcing Screw (not shown)
	15677	Magazine Spring, BDL Grade		16970	Stock Reintorcing Screw Dowel (not
33	17029	Main Spring		1	shown)
34	26365	Rear Guard Screw	45	26555	Swivel Assembly, BDL Grade (Q.D.)
35	32510	Rear Sight Aperture		26990	Sling Strap Assembly & Mountings Corep
	32524	Rear Sight Assembly	46	26345	Trigger Assembly (Restricted)
36	91595	Rear Sight Base	47	15281	Trigger Guard

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138689 R2539677





				\Box	
View No.	Part No.	NAME	View No.		
48	26371	Trigger Guard Assembly, BDL Grade		2204	Firing Pin Assembly, 222 Rem., 17 Rem.
49	90904	Windage Screw	ł		V2/3 Win, 308 Win., 6mm Rem., 22-250
		ADDITIONAL CALIBERS		Щ	Rem., 223 Rem., BDL Grade
		See 30-06 list for parts not listed below		2203	Front Guard Screw, 222 Rem., 223 Rem.
		Barrel Assembly	{	1	243 & 308 Win., 6mm Rem., 22-250
	15850	Extractor 222 Rem., 223 Rem			Bem. 17
	14669	Extractor 308 Win.,7mm-08 Rem., 243	1	1465	59 Eront Sight 7mm Fern Mag. 264 Win
	1	Win.,6mm Rem		1.400	AL Error Siche Romer ADI Conto
	15709	Extractor Magnum Calibers		2651	Pront Signt Hamo, ADL Bride
	27342	Extractor Rivet 222 Rem., 223 Rem		1599	J2 Front Sight Hamp, UDE-Grade
	27340	Extractor Rivet 308 Win.,7mm-08 Rem.,		1528	32 Magazine, ADL Grade, 222 Rum., 223, 1
	}	243 Win.,6mm Rem	1		Rem
	27431	Extractor Rivet Magnum Calibers	{	1671	16 Magazine, BDL Grade, 222 Rem., 223, 1
	22021	Firing Pin, 222 Rem.,243-308 Win.,6mm	ł		Rem
	1	Rem.,22-250 Rem.,223 Rem., 17 Rem.		1528	33 Magazine, ADL Grade, 243 & 308, 6m
		Rem., 17 Rem			Rem., 22-250 Rem
1	22042	Firing Pin Assembly 222 Rem 17	1	1.07.	

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138690 R2539678





View Pa	art	NAME	Τ	View	Part	NAME
925 905 922 905 905 910 905 157 157 157 91	508 951 455 982 951 017 952 286 742 286 133	Magazine Follower, 222 ADL Magazine Follower, 222 Rem., BDI Magazine Follower, 243, 308, 6mm, 22- 250 ADL Magazine Follower, 243 & 308 Win., 6mm Rem., 22-250 Rem., BDL Magazine Follower, 243 & 308 Win., 6mm Rem., 22-250 Rem., BDL Magazine Follower, 243 & 308 Win., 6mm Rem., 22-250 Rem., BDL Magazine Follower, 243 & 308 Win., 6mm Rem., 22-250 Rem., BDL Magazine Follower, 270, 25-06, 30-06 (BDL Grade) Magazine Follower, 8mm Rem. Mag., BDL Grade. Magazine Spacer, 222 Rem., BDL Grade. Magazine Spacer, 222 Rem., ADL Grade. Magazine Spacer, 223 Rem., BDL Grade, 17 Rem. 17 Rem.			17891 5698 7068 90949 25410 100022 100020 33365	Magazine Spring, 243 & 308 Win., 6mm Ren Magazine Spring, 22-250 Rem., 6mm Magazine Spring, 22-250 Rem., 6mm Mrm., 243 Win., BDL Grade. Mrin Spring, 222 Rem., 223 Rem., 308 Win. 17 Rem Recoil Pad, 7mm Rem. Mag., 264 & 300 Win., Mag., 8mm Rem. Mag., 264 & 300 Win., Gmm Rem., 222 Rem., 243 Win., 308 Win., 6mm Rem., 22-250 Rem., ADL Grade. Stock Assembly, 222 Rem., 243 Win., 308 Win., 6mm Rem., 22-250 Rem., ADL Grade. Stock Assembly, 222 Rem., 243 Win., 308 Win., 6mm Rem., 22-250 Rem., ADL Grade. Stock Assembly, 222 Rem., 243 Win., 308

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138691







View No,	Part No.	NAME	View No.	Part No.	NAME
	33385	Stock Assembly, 7mm Rem., Mag., 264- 300 Win., Mag., BDL Grade, 8mm Rem.,		33326	Stock Assembly, 222 Rem., 223 Rem., 243 Wn., 5mm Rem., 22-250 Rem
	33370	Stock Assembly, 222 Rem., 243 Win., 308 Win., 6mm Rem., 22-250 Rem., BDL		34370	NODEL 700 "CLASSIC"
	26370	Grade, 17 Rem			See 30-06 list for parts not listed below
		308 Win., 6mm Rem., 22-250 Rem MODEL 700 VARMINT		91544	Recoil Pad, 22-250 Rem. 243 Win., 6mm Rem., 270 Win., 39 09
		See 30-06 list for parts not listed below		91556	Recoil Pad, 7mm Rem, Mag
				25410	Recoil Pad Screw.
		Barrel Assembly	1	34591	Stock Assembly 270 Win., 30-06
	16204	Front Scope Base		34590	Stock Assembly, 22-250 Hem., 6mm
	18843	Rear Scope Base			Rem., 243 Win
	16205	Scope Base Screw, Front.		34592	Stock Assembly, 7mm Rem. Mag

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138692 R2539680

1997 - N. S. 1997









View	Part	NAME	View	11.	Part		Ι.	NAME
No.	No.		No.	Ш	116.		4	<u> </u>
1		MODEL 700 MOUNTAIN RIFLE				V	MO See	DEL 700 LEFT HAND 30-06 list for parts not listed below.
				Ш	_ \ [∨]	V	Bar,	Assembly
	92510	Bolt Plug	1	Ψ		ł.	Bdi	Assembly
	22043	Firing Pin Assembly	1				Boit	t Final Assembly
	92755	Grip Cap	1		90554	1	Bolt	Stop Spring
1	92762	Recoil Pad	1		90982		Mag	azine Follower 22-250, 243 & 308
	25410	Recoil Pad Screw	•		90952		Mag	azine Follover Magnum
	100565	Stock Assembly			15699	[Mag	azine Spring 32-250
-					17891		Mag	azine Spring/243 308
1		MODEL 700 POLICE			33390	1	Stoc	ck Assembly 22 230, 243, 308
1		See 30-06 list for parts not listed below.			33391	1	Stoc	ck Assen/bi4
					33395		Stor	ck Assembly Mogquin
		Barrel Assembly			32905	1	Trig	ger Housing Assembly (Restricted)
	02705	Bolt Assembly				1		
	16207	Conter Guard Service				(
	22044	Firing Rin Assorbly						
	22044	Front Guard Screw				1		
	93153	Manazine Follower 223				1		
	93120	Magazine Follower 308						
1	91133	Magazine Sorino 223						
	17891	Magazine Spring 308				1		
	102820	Stock Assembly						
	92829	Trigger Guard						
						1		
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CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON (z)

BARBER - PI	RESALE R 0138699
REMINGTON A	RMS COMPANY, INC.
"CONFINE YOU	R LETTER TO ONE SUBJECT ONLY"
	July 16, 1985
Responsib	NBAR Integral Scope Mounts
Objective	To provide a reliable, aestheticly pleasing scope mount design that is unique to Remington.
Goals:	 Mounts must securely hold scope against magnum recoil for at least 100 rounds. Must be easily installed and removed Must be compatable with 1" dia. scope bodies Marketing approved aesthetics
Stake:	o Improved customer price/value relationship
Status:	The design is complete and injectalloy components are being fabricated.
Program Timing:	 Check CV drawings Fabrication complete Recoil endurance/accuracy testing Redesign Design acceptance testing
RSM:spsR.	sm [] V]

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138699 R2539687

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* Plus 0.5 Manyears support from Test Lab and N/C Shop personnel.



ECONOMIC ANALYEIS AND SHARE ANALYEIS - 1003

steet exclusion into

Case 1 - Vo Nothing Case 3 - Add Sportar

Yolume (M) Suggested Relati/Unit	<u>Carce 1</u> 14 359, 95	Direct 2 Direct 2 Direct 1 10 30 30 369, 96 429, 95	Cure 2 24 439, 95	Case 1 Core 2 8 B 390.05 409.0	5 Cm21	Cause 2 30 419, 96	BDL 3 <u>Chuic 1</u> 13 119. Db	<u>Cane 2</u> 13 469, 95		Chese 8	1982 11 <u>A Fest.</u> 80, 5
Net Balling Price/Unit Aroas Balos (M)	223, 17 3 124, 4	229.37 286.07 2 293.7 7 097.1	972,77 6 \$10.5	247.07 254.1 1 983.8 2 033.4		260, 37 7 811, 1	3 707,3	291, 37	10 013.6	22 1/8.6	20 172.0
Excise Tax (4 11% Cosh (4 3, 0% ++ Act Estes The Unit	309, 6 <u>81, 4</u> 3 730, 4 195, 03	227. 3 708. 5 <u>62. 0</u> 316. 1 2 004. 5 200. 44 232. 95	618. 6 <u>176. P</u> 6 720. 6 238, 37	100.0 001.6 <u>03.0</u> <u>06.0</u> 7 737.6 1 776.0 216.70 232.1		774.1 211.1 6 428.9 227,63	367.4 100.3 3 210.5 740.10	375. 3 107. 4 3 510. 1 264. 02	1 008.4 <u>114.4</u> 34 093.0 226.03	2 227,0 <u>607,4</u> 19 638,1 231,01	3 0%), 0 <u>150, 0</u> ** 17 613, 0 318, 80
Crut of Kuloa Variable Ficud Total Jaar Undt	1 643,0 <u>- 903,1</u> 2 546,1 161,85	1 173,4 5 084,6 <u>492,9</u> 1 036,6 1 666,3 5 021,1 1 66,3 1 197,37	3 188, 5/- <u>1 186, 1 -</u> 4 3/3, 8 162, 23	800.9 880.9 <u>Nic.2</u> 595.4 507.1 3276.3 174.64 2164.1		4. (X10, 1 1. <u>1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1</u>	1 430.8 109.5 2 778.5 2 13.79 1	1 039.8 041.3 1 081.1 198.46	8 448, 2 <u>1 105, 1</u> 12 643, 6 104, 63	11 212,7 <u>4 196,6</u> 15 408,2 181,27	9 005, 0 <u>3 068, 0</u> 13 763, 0 170, 17
Other Chesta Variable Fixed fiotal Sir Unit	177.0 - <u>598.9</u> 775.9 55.42	126, 1 440, 9 <u>327, b</u> 1 244, J 46, 36 1 725, 6 45, 36 1 725, 6 17, b2	361, 9 <u>780, 6</u> 1 137, 4 47, 39	101.8 101.4 <u>012.4</u> 201.4 111.2 365.0 66.63 45.	S	125.1 942.0 1 407.7 10.93	208, 8 555, 0 765, 3 68, 87	200, 6 425 1 033, 0 16, 76	028.5 <u>9</u> 782.5 <u>9</u> 711.0 (7.09	1 313.7 . <u>2 782.5</u> 3 108.2 47.01	1 077.0 2 020.0 3 703.0 45.09
1er Unit	237,28	211.99 254.69	220.02	230, 17 204, 0	1	8 918.16 7 230.62	3 544.8 272,68	3 816.0 247.31	16 364.6 261.61	19 404.4 328.29	17 465.0 210.96
Protox Farningo 1 ir Unit 1/110	(691, 6) (42, 26) (21, 7)	(115, 5) (61,8, 2) (1, 16) (21, 94) (6, 8) (0, 4)	200.8 1.8.74 3.7	$\begin{array}{c} -(117,7) \\ -(13,10) \\ (6,2) \end{array} \begin{array}{c} 137.0 \\ 17.1 \\ 7.1 \\ 7.1 \end{array}$	1	(¥2, 7) (3, 00) (1, 4)	(306, 1) (23, 47) (9, 4)	95, 1 7, 32 3, 9	(1 662, 6) (1, 05) (11, 4)	733,7 2,75 1,3	348.0 1, 14 0, 8
! Market Soure - (M Unito Totat Market)	<u> </u>		Estimato <u>1982</u> 200)))(s3 No (3m ng <u>e</u> 200	19 <u>Pror</u> %	83 <u>xxuud</u> 10		· · · · · · · · · · · · · · · · · · ·	
i Neuringten Billere		124 36, 4		/0 /10 /71.0		86 22, 0	1. 1 2	16 19, 0			
* 1782 Eelima Escale Basic Xik Cash @ 4	Ici Coat clud @ ! . Cust. .5% 1982	0.0% per 6. Car Mariled try W	nphell. • J. Thec.	tven "Az.			,				

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BARBER - PRESALE R 0138701

(4) No. 1997 (1997) 111 (1997)



		CASE 1			•	CAST 2	
<u>TY.</u>	NET Sales	VARIABLE	FIXED PTE	QTY.	NET SALES	VARIABLE	FIXED PTE
50	11,301.5	7,212.5	6,977-9 - (2.9)	60	13,862.4	8,771.4	6,977.9 11.91
55	12,431.7	7,933-0	(2.5)	65	15,017.6	9,502-4	(1.5)
60	13,561.9	8,655.0	(2.1)	70	16,172.8	10,233.3	(1.0)
65.	14,692.0	9,376-7	(1.7) ¹	75	17,328.0	20,964.3	(0.6)
70	15,822.1	10,097.5	(1,3)	80	18,403.2	11.695.2	(0.2)
75	16,952.3	10,818.9	(0.9)	. 85	- 19,638.4	12,426.3	0.2
80	18,082.4	11,540.0	(0.5)	90	20,793 6	13,157.1	0.6
85	19,212.6	12,261.3	. 5 (0.1)	95	21,948 -B	13,000.1	1.0
90	20,342.7	12,982.5	0.3	100	23,104-0	14,619.0	1.4
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BARBER - PRESALE R 0138703

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CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

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BARBER - PRESALE R 01387032539691

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RT N	10. & Pa	RT NAME	CAPITAL	5.4. + T.E. STD. COST.	MATL OR Purmase Cost	STD. COST.	EDGTORY 5	
	Barne	Z ASSY COMPLETE		.534	8.311	8.845	50.563	-
	Bor	eer Asty 1	\$2000	468 398 1.367	4.633	6,000	27.24	_
-	BARE	LEZ (LONG BLID)	\$2000	272 1.805	4.120	5.925	10.74	
	Bis			1.976	(4.120)	(6.0%)	19.9:	_
	Re	CEIVER ENS		5.766	ns 2,60	6.363 Ens	20.358	-
- <u></u> .		BLANK EHS	400,000	· · · · · · · · · · · · · · · · · · ·	(Z.60)		(3.3:2.)	_
		·						
		·· · · · ·						_
	Bas	E SCOPE 7		. 007	1.04	1.017		_
<u> </u>	0	BUANIC 1	33,500		(1.04)			-
	<u> </u>	TE SOPE !		- 07	26	267	404	-
	<u> </u>	ANK .	20,000		(26)	רול	470	
	<u></u> 2	ZEW JCOPE	27 000	.007	r(z)	- <i>,</i>	<u>, 4 / 1</u>	-
•••==	- <u>D</u> L	ADE 1	1 35,000		Ng/	107	102-1	
	<u>10</u> 8	$\frac{1}{2} \frac{1}{2} \frac{1}$	26,000				1.0-	<u> </u>
								_
		TOTAL	\$113,000	. 028	2.290	2.318	5.00	-
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CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON A LE CLUBSER M.

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, PREFERED D	ESIGN			-	8-200-	ç2,
RT NO. & PART NAME	CAPITAL	5.2. + T.E. STD. COST.	MATL OR Pursuage	STD.COST.	EDGTORY COST.	5
SKD-3553 BOLT ASSY	\$12,000	1.693	7.737	1. 29.9	••	ŀ
EXP.1114 BOLT BOON ASS'Y	6109,300	2.409	1.451	5.8:0		<u>F</u> .
·20200 Bout Body		059	· 294	.353	.479	Ţ.
18493 BOLT BODY BRAZING SUIC			. 003	. @3	. 004	
28615' CERP-1111 (15851 BOLT HEAD		.856	. 970	1.826	2.2.7	
32820 BLANK		(.167)	(.970)		2.069	ŀ
18758 BOLT PIN	$\square)]$.033	.033	.038	
17011 EJECTOR WASHER			.069	. 062	.080	¦.
EXP-1265 BOLT HANDLE	1 11 L	.239	2.06	2.200	2.94:	Ţ.
BLANK	13,300	: 	(2.06)		<u> </u>	ŀ
20185 BOUT HANDIE BRAZING SHI	1		.034	. 034	.042	1
NON ELECTOR	•	.0026	.166	.169	. 129	1.
13974 BLANK	•		1. 66;		192	Ī
17676 EJECTOR PIN	•	.0006	. 206	.0066	.003	T
· 91802 BLANK	•		(206)		. 007	
17019 EJECTOR SALING	•		1. 920/	.020	1025	T
EXP-1111 EXTRACTOR	16,000	.012	1.200	.220		ŀ
BLANK,			(208)		. 1-,	
		• •				
					1	
TOPAL	145.600	5.271	2.1	13/-		-+-
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EDE7 ERED DESIGN PREF 3-20-5 MATL OR 5.4. + T.E. THIN FACTORY ----JET NO. & PA PURE ET NAME CAPITAL STD.COST STD. COST -057 4.337 67 FIRING PIN ASSY . -8+7 0.851 PLUY =xP-1261 - Bout \$ 21,000 .350 .85 1.8 2% 1.200 BIA 1.85 PURCH. \$2000 =xP-1267 Field P. .276 1.166 41,153 89 BLANK (. 89 PURCH \$2000 EXP-1264 FIRING RN HEAD # 1.271 09 68 77 BLANK .68 PURCH -17058 MAIN SPRING .113 113 PURC .131 BOLT STOP -15 .170 .255 020 5 Prod .15 BLANK 24,000 .24475 BOLT STOP PIN .037 032 032 Bat STOP SPRING 083 .083 093 old 3 300 $O \in \mathbb{R}$ A-3552 BOLT LOCK PETENT See 038 EXP-1266 BOLT LATCH .020 .300 , 30 0 450 PORCH BLANK 28 6 18,000 KB-3549 BOLT LATZH PLUNIER 006 106 .159 BLANK FURCH .035 .053 KB-3554 Pin .030 005 BLANK 1.030 PURCH FIRING PIN DETENT BOLL (WERN) 039 03/2 PURCH 042 67.000 1.587 TOTAL -

BARBER - PRESALE R 01387	07					
PREFERED	DESIGN				40F 1 B-20-H	4
RT NO. & PART NAME	CAPITAL	5.4. + T.E. 5TD. COST.	MATL OR PURMALA	STD.COST.	FACTOR 7 COST.	Ē,
22035 FRONT GUARD SEREW		~~2 ~~3.005	022	.027	035	
28810 BLANK A.			(022)		(024)	
TOTAL		. 005		. 527	· · · ·	
			•			
16716 HAGAZINE		.024.030	.550	.580	732	,
17971 BLANK			(.550)		(.627)	ŀ
90951 HAGAZINE FALCINER		202.241	2.44	2.681	3.627	
90339 BLANK			(2, 1+)		(2.825)	
15677 191133 LESONA MALAZINE SPRING			.333	.333	,382	
26355 REAR GUADO SOLON		002 005	.024	.029	.039	•
1.91908 BLANK			(.024)		(023)	Γ
TOTAL		.276	3,347	2.623	4.730	Γ
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		Ŧ	\Box /			1-
24475 SEAR PIN			032	022.	.037	ŀ
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	· ·					
ROTARY HOLAZINE BOX ACCY		.245		-245	,368	<u> </u>
END PLATE	19,500	,045	. 160	.205	.308	
HAGAZINE	91,000	.064	.640	.764	1.25%	
ROTOR PIVOT	19,500	.053	.160	23	4330	
ROTOR .	58,500	.057_	,320	.377		Γ
MAGAZINE Lock	13,000	.006	.252	.758	AB5.	
Bank			(.252)			1
MAGAGINE LOCK SPAINY		.003	1.108	.111	167	
- HALAZINE Love P.N.		.003	.077	.030	.045	
torn -	201.500	701	1. 1. 1	114.2	2217	

	5708					
PREFERED D	ESIGN			9	50e 1 8.20.84	
RT NO. & PART NAME	CAPITAL	5.4. + T.E. STD. COST.	MATL OR Purmate COST	STD. COST.	EDETORY COST.	
STOCK ASSY		15.114	14.580	29.694	68.632	
STDCK A	8,600					
Br-Rate 3	9,100	.04.6	.139	.185	272	
But RADE Scraws		.002	. 005	. 007	010	
-Bank			(.005)			
FORSEND TIP. 3		.058	.059	. 117	.257	
GRIP CAP		.042	.011	.053	103	
REZOIL PAD.					 	<u> </u>
REZOIL PAD Serving	- Sourt					<u> </u>
-BUANK		:			<u> </u>	_
-92843 STOCE REINFORCING RUE	 	· 013	.130	.143.	.164	<u> </u>
. 92844 STOCK REINFORCING WASHING		. 003	.030	.033	.038	
92854 STOCK REINFORCING Pue 62)	.000	. 050	.053 .	.007	
15358 Swiver Scean, Front	<u> </u>		.125	· · ,	.145	4-
15358 Suiva Screw, REAR			125	<u>Π.</u> Ξ.	145	
26555 Swive Assy.		·	810/	· /· · ·	1.007	
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AT NO. & PART NAME	CAPITAL	5.4. + T.E. 570. cost.	MATL OR Purmare Cost.	STB. COST.	COST.	F, _
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BI SAFETY LEVER S	PURCH	023	.280	↓. E つ [™] ↓	.506	_
SAFETY LEVER BLANK	9,100		(28)		(.468)	_
SOFETY DETENT 5	9,100	.009	<u>52 20</u>	.2:22	.399	_
- CL SAFETY ROTOR	PURCH	.009	,350	<u>. ಬರಲ</u>	.600	
BLANK	13,000	·	(.350)		(585)	
SAFETY LINK (WIRE FOUR)	4,000	.008	.080	.087	.147	┣
Safety RETAINING RING	Purch	.003	.020	.023	. 038	-
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TOTAL	35,200	120	.960	1.012		F
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<u>C? 'SEAR</u>	PURCH	285	.68	.915	1.52 -	
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TRILLEN SPRING	PURCH	003	035	.038	.063	
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RT NO. & PART NAME	CAPITAL	5.L. + T.E. 510. cost.	MATL OR PURUNALE	STD. COST.	FACTOR 7 COST.	
TRILLER QUAND ASSY.		1.743	4.545	6.285	1-129	
Truccon Gump Sub Assy.		1.508	4270	5.778	10.940	
FLOOR PLATE	13,000	.303	1.545	1. 84.R	ニュフママ	
BLANK /			(1.545)		(1.787)	
TRIGGER GUARD	8	.509	2.699	3.208	4.757	
BLANK			(2.699)		(3.125))
5291- FLOOR PLATE LATEH		. 073	. 179	.252	.494	
1759- BLANK			(179)		(207)	
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1943 - BLANK		:	(.009)		(011)	
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BARBER - PRESALE R 0138714	
1987 DEVELOPMENT PROGRAMS FIREARMS	
	BUDGET(\$000)
APPLIED RESEARCH	250
SLUG BARREL DEVELORMENT	100
MODEL 870 FUNCTIONAL IMPROVEMENTS	50
NCS //\\	700
NBAR // \\	200
MODELS 870 AND /1 100 Small GAGE RESTYLE	50
SYNTHETIC STOCKS	150
SINGLE SHOT SHOTGUN \ \	250
LAW ENFORCEMENT/MILITARY	100
10 GAGE MAGNUM	200
LIGHTWEIGHT SHOTGUN RECEIVER	100
MODEL 700 MOUNTAIN RIFLE CALIBER ADDITIONS	100
SHOTGUN PRODUCT IMPROVEMENTS	100
RIFLE PRODUCT IMPROVEMENTS	50
TOTAL NEW PRODUCT DEVELOPMENT	2,400
SHOTGUN BARREL PROCESS DEVELOPMENT	200
TOTAL NEW PROCESS DEVELOPMENT	200



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BARBER - PRESALE R 0138721 ITEMS - FROM STATER MTG.
П П /-3-90
NEW BOLT ACTION RIFLE (N'BAR) - CONT'D. PAGE 2
The purpose of the New Bolt Action Rifle (N'BAR) is to offer a
replacement for the M/700 'BDL' Rifle currently being produced.
METAL MATCH PLACE PBIGETYEWITH M/100
Detachable Magazine Box GRETRE FIT ABLE - NG FLOOR PLATE COVER
PEVES/GNED - NO-Connector
- /Two Trigger Pull Springs (Low Rate Spring)
- Balanced Trigger
- Trigger & Sear Block
Bolt Lock w/Over ride Dook AT FRED'S ROLT LOCK PESIGN)
 New Scope Mounts - Possibly aftermarket bases and rings. To
• New Extractor System LEAF SERVE THE
• New 'Custom Shop' Barriel Contour 7 516HT HOLE DEPTH
• Improved Bedding/Accuracy Features NEEDOIFF. SIGHTS - T. ACCOVINE
Example:
- Relieved thread - rec. fit full hub bearing
M/700 Receiver to start with same round blank size and assumptionable altered behind front ring of steal ever labeling
lugs. Timeconnack extend TANG LOOKS BETTER _
 New Wood Stock - Cosmetically altered for fittings/dress Up/checkering
· COCKING INDICATOR INDEPENDENT OF BOLT LOCK
The "N'Bar" Design features will initially be produced in five
year of introduction. These design/cost estimates are based
strictly on introduction of these five calibers only in long
time other calibers and short actions are added to this program,
they will have additional development and introduction costs added.
LADOW CHAMBER INDICATOR - LOOK AT DOING OFF OF EJECTOR
COTTER CHARGE NEW STINCCOEMAR OR EXTR
· BOLT HYDROG I DOK AT UNICLE MIKES //
· RECOIL PARTS COOP
FULLY ENCLOSED BOLT PLUG
LIGHT WEIGHT FIRING PIN LI
THE PROBLEM PROBLEM APRODE
* PROCESS - CONTACT TO SEE IF ATTOR AND THE SISTS
IN PRODUCING M/ 900 AS CORRECT ENTE

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2. Schedules/Strategy/Priorities and Cost Data

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1990 NEW PRODUCTS STATUS CODE CONVERSION SHEET

- A = Product Specifications.
- B = High Spot volumes, pricing, design costs, production gosts, project timing.
- C = /H/igh Spot economics and machine capacities.
- D = Research design and test phase.
- E = Engineering estimate on advance prints.
- F = Final economics.
- G = Project approval.
- H = Transmittal of final design.
- I = Process records, MRP structures and routings, Trial & Pilot schedule, tentative Production schedule, tool-up for T&P and 3 months of production.
- J = Trial and Pilot.
- $K = R \in D$ verification testing of Trial and Pilot guns.
- L = Process revisions.
- M = Finalize Production Schedule.
- N = Forecast warehouse.
- O = Desired warehouse.

Revised 3/13/89 TCD

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June 20, 1989

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RESEARCH DEVELOPMENT COSTS

FOR

NEW BOLT ACTION RIFLE (NBAR)

RESEARCH DEVELOPMENT COST ESTIMATE: Jan.'89 thru Oct.'91

1.	Initial Design	=	365	M
2.	Build Initial, Design Prototype Guns	(3)=	184	M
•	- Preliminary Prototype			
	Tooling - temporary	-	80	M
3.	Design Review Team Analysis	-	35	M
4.	Test Phase I Prototypes	=	74	M
5.	Redesign After Phase I Test	-	155	M
6.	Build Phase II Design Samples (15)	=	159	Μ
	- Prototype Tooling	-	160	Μ.,
	- Plant Assistance	=	35	M
7.	Test Phase II Samples	-	70	Μ
8.	Redesign After Phase II Testing	-	141	M
9.	Build Design Acceptance Guns (30)	-	242	M
	- Prototype/Permanent Tooling	-	105	Μ
	- Plant Assistance	-	45	Μ
10.	Test Design Acceptance Guns	-	72	М
11.	Minor Redesign & Transmittal To			
	Production	-	13	Μ
12.	Draft Manual	*	25	М
13.	Test Ammunition Cost 55,000 Rounds	┐ =	/114	M
	(5,000 Rds 1990 x .25)	.\		
	(50,000 Rds 1991 x .25)	$\Lambda \Lambda$	A	
		$ \rangle \rangle /$	////	
TOTA	L DEVELOPMENT COST (1989 DOLLARS)	\\\/1	.974	M
		\^/		

RESEARCH MANPOWER ESTIMATE: May'89 thru Oct.'91

4.94 man years 1.03 man years 1.90 man years Research Engineer 1. 2. EDL Engineer 3. CAD Designer 1.74 man/years CAD Detailer 4. 5. Draftsman .25 man<u>ye</u>ads 6. Model Shop Personnel 4.18 man years 2.08 han years 7. N/C Programmer 8. Test Lab Personnel 2.50 man years

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VEW BOLT ACTION RIFLE (N'BAR) - CONT'D.

PAGE 2

The purpose of the New Bolt Action Rifle (N'BAR) is to offer a replacement for the M/700 'BDL' Rifle currently being produced. The new design parameters will include:

- o Detachable Magazine Box
 - Improyed Fire Control
 - Nø\Connector
 - / \[\phi wo\] \[Trigger Pull Springs (Low Rate Spring)
 - -/ Sealed Fire Control
 - -/ /Balanded Trigger
 - L Trigger & Sear Block

Non-Retrofittable to M/700

- o Bolt Lock w/Override
- New Scope Mounts Possibly aftermarket bases and rings. To be offered with rifle package.
- o New Extractor System
- o New 'Custom Shop<u>| Barr</u>el Contour - Mountain Rifle Srown
- o Improved Bedding/Accuracy Features Example:
 - Thicker barrel bracket
 - Relieved thread rec. fit & full hub bearing
- o M/700 Receiver to start with same round blank size and cosmetically altered behind front ring of steel over locking lugs.
- o New Wood Stock Cosmetically altered for fittings/dress up/checkering

The "N'Bar" Design features will initially be produced in five calibers (30-06, 270, 280, 25-06 & 7MM Mag.) during the first year of introduction. These design/cost estimates are based strictly on introduction of these five calibers only in long action standard and mag. calibers only. If at a later point in time other calibers and short actions are added to this program, they will have additional development and introduction costs added.

- Initial Design

This includes preliminary experimental development work, sketches, scenarios, layouts, design, computer modeling, detailing and checking. This design will be a redesign of the existing M/700 Rifle currently in our line, only in those areas so stated above in the design parameters section. Short actions and additional calibers will be considered during initial design to allow them to be compatible for design inclusion at a Tater time. Personnel required to accomplish this will include: one Research Engineer full time, one Cad Designer and one CAD Detailer, and one Research Engineer 50% of time, as well as some part time help from one EDL Engineer, Model Maker, N/C Programmer & Tester.

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Dec.'89 ط

NEW BOLT ACTION RIFLE (N'BAR) - (CONT'D.) PAGE 3

- Send Vendor Parts Out For Manufacturability and Quotation Estimate Jan.'89 - May'90

Early vendor consultation and input is required due to many parts for detachable magazine box, fire control, scope mounts and extractor being vendor supplied parts with long lead times and vendor development input requirements for the design. 'High spot' estimates will be pursued early to determine feasibility of producing at a competitive cost. We will also look at after market products already developed, such as quick klip for a detachable magazine box and numerous scope mount/ring manufactures. A decision will have to be made at this time⁻ for project direction to go with a total Remington design magazine box or after market adaptation.

- Build Initial Design Prototype Guns

Sept.'89 - Jan]'90

At least three prototype guns will be built: one in cal. 30-06 to cover similar calibers of 280, 270, 25-06, one in 7MM Rem. Mag. for Mag. Cal. and one for esthetic evaluation in standard head size caliber. All common parts with M/700 will be procured from the the plant, current inventory. All newly designed parts will be fabricated by Remington where possible or be developed by outside vendors with Engineering/Development assistance from Remington. Personnel required will be: one Research Engineer, one CAD Designer, one CAD Detailer, one N/C Programmer part time and two Model Makers full time, one part time.

- Initiate Design Review Team Analysis

Dec.'89 - Feb.'90

Their purpose will be to review design at this point and look at design objectively. Input is necessary from Process Engineering, Chemical/Materials Engineering, Arms Service feedback, Legal, as well as other Designers. Each group will review design as to potential 'Roadblocks' and feasibility to produce an acceptable design.

- Test Phase I Prototypes

Jan.'90 - Feb.'90

The two test prototypes - one standard caliber and one magnum caliber will be preliminary tested as to fit, form and function. These test guns will show up any major or minor design shortcomings prior to building multiple test guns for evaluation of function, accuracy, endurance. Testing will consist of dry firing/cycle, live firing, function and accuracy. Extended testing of one or both guns may be desired at this time depending on preliminary functioning results.



NEW BOLT ACTION RIFLE (N'BAR) - CONT'D.

PAGE 4

- Test Phase I Prototypes - Cont'd.

A Marketing/Sales Manager Meeting will be held to evaluate styling, aesthetics, features utilizing the third prototype gun built. Their decisions will affect time for redesign and rebuild of models for both testing and aesthetics. Personnel required are: one Research Engineer full time, part time allowances for one EDL Engineer, one Model Maker, one CAD Designer and one Tester.

- Redesign (Decision Point)

Feb.'90 - May'90

Redesign begins as soon as problems arise in Phase I assembly or testing, and continues through Phase I Testing. Depending on the extent and nature of parts requiring redesign as a result of testing, Marketing, Legal or Design Review Team recommendations, will greatly affect straight forward progress or delays for redesign, reevaluation and retesting. Depending on how much and how many components need attention will constitute a need for additional personnel such as: one Research Engineer, one EDL Engineer, one CAD Designer, one CAD Detailer, one Model Maker full or part time. Styling, stock design, weight, balance, safety will need to be addressed at this phase. Also, high spot economics of the whole program will need to be completed at this time, and evaluated to determine project feasibility and path forward or redesign.

- Build Phase II Design Samples

May'90 - Aug.'90

A total of 15 design sample guns will be built (3 of each caliber) for this Phase II. The majority of the design, legal, and styling questions will be resolved during this phase. As many vendor sample prototype parts as are available, will be used. Other non-vendor parts will be made by Production, Model Shop or N/C Shop. Ongoing vendor visits will be required to consult and fabricate test sample parts from vendor temporary tooling. Some in-house finishing of these vendor components will be necessary by the Model Shop or N/C. Personnel required to implement this Phase II are: four Model Makers and two Engineers will be required full time, one N/C Programmer full time.

- Test Phase II Design Samples



These design sample guns will be tested for function, endurance, strength, blow/up, crud and temperature extreme tests, safety performance, dry firing and field function. Two 30-06 and two 7MM Rem. Mag. guns will be subjected to an intentional abuse test. This may constitute some design changes or modification as deemed necessary from test results. Personnel required are: one Engineer and two testers will be required full time and one Model Maker and N/C Designer part time.



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NEW BOLT ACTION RIFLE (N'BAR) - CONT'D.

- Mini Redesign and Drawing Transmittal July'91

By this phase of development, the design is firm and no major setbacks should occur. Only minor changes or updates should take place. Changes will be limited to process updates, improving endurance, cost effectiveness, and improved functionality only on parts found to be problem areas from previous testing. Initial transmittal of Research Model drawings and specifications takes place at this time. Personnel required are: one Engineer and one CAD Draftsman full time.

- Project Approval (Decision Point)

July'91 - Aug.'91

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PAGE 6

During this period, final management approval of the design is given and money is released to begin production tooling. All pertinent economics and production process estimates will be completed for this project approval report.

- Draft Manuals

Aug.'91 - Oct.'91

This involves development of text and illustrations for the owners manuals and instruction booklets and field service manuals. This will be prepared in conjunction with a commerical printer. Personnel required are: one Engineer and one Draftsman part time with input required from Legal Department and Customer Service.

NEW BOLT ACTION RIFLE (N'BAR) - CONT'D.

- Mini Redesign and Drawing Transmittal July'91

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May 5, 1989

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CONFIDENTIAL

RESEARCH DEVELOPMENT COSTS

FOR

NEW BOLT ACTION RIFLE (NBAR)

Jan. '89 thru Oct. '92 RESEARCH DEVELOPMENT COST ESTIMATE: 1. Initial Design 365 M Build Initial Design Prototype Guns(3)= 184 M 2. Preliminary Prototype Tooling - temporary 80 M Design Review Team Analysis Test Phase I Prototypes 3. 35 M -4. . 74 M Redesign After Phase I Test Build Phase II Design Samples (15) 5. 155 M 6. -159 M 160 M .--Prototype Tooling: . - Plant Assistance : Test Phase II Samples -35 A 7. -70 M 141 M

- 8. Redesign After Phase II Testing
 9. Build Design Acceptance Guns (30)
 Prototype/Permanent Topling
 Plant Assistance
 10. Test Design Acceptance Guns
- 11. Minor Redesign & Transmittal To Production = 13 M 12. Draft Manual = 25 M 13. Test Ammunition Cost 55,000 Rounds = /14 M

TOTAL DEVELOPMENT COST (1989 DOLLARS)

(5,000 Rds 1990 x .25) (50,000 Rds 1991 x .25)

RESEARCH MANPOWER ESTIMATE: May '89 thru Oct. '92

1. Research Engineer 4.94 man, years 2. EDL Engineer 1.03 man years 1.90 man years 3. CAD Designer -4. CAD Detailer 1.74 man years -5. Draftsman .25 man vears 6. Model Shop Personnel 4.18 m/a/n yeàr\s -7. 2.08 mán yeaks N/C Programmer -8. Test Lab Personnel 2.50 man years



NEW HOLT ACTION RIFLE (N'BAR) - CONT'D. PAGE 2

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- Improved Fire Control
 - / Mo Connector
 - -/ <u>Two</u> \Trigger Pull Springs (Low Rate Spring)
 - -/ Sealed Fire Control
 - // Balanced Trigger
 - 🖵 Trigger & Sear Block
 - Non-Retrofittable to M/700
- o Bolt Lock w/Override
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 Example:
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NEW BOLT ACTION RIFLE (N'BAR) - (CONT'D.) PAGE 3

- Send Vendor Parts Out For Jan.'89 - Jan.'91 Manufacturability and Quotation Estimate

Early vendor consultation and input is required due to many parts for detachable magazine box, fire control, scope mounts and extractor being vendor supplied parts with long lead times and vendor development input requirements for the design. 'High spot' estimates will be pursued early to determine feasibility of producing at a competitive cost. We will also look at after market products already developed, such as quick klip for a detachable magazine box and numerous scope mount/ring manufactures. A decision will have to be made at this time for project direction to go with a total Remington design magazine box or after market adaptation.

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Aug.'89 - Apr.'90

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- Initiate Design Review Team Analysis Mar.'90 - May'90

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- Test Phase I Prototypes

Apr.'90 - May'90

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NEW BOLT ACTION RIFLE (N'BAR) - CONT'D.

PAGE 4

- Test Phase I Prototypes - Cont'd.

A Marketing/Sales Manager Meeting will be held to evaluate styling, aesthetics, features utilizing the third prototype gun built. Their decisions will affect time for redesign and rebuild of models for both testing and aesthetics. Personnel required are: one Research Engineer full time, part time allowances for one EDL Engineer, one Model Maker, one CAD Designer and one Tester.

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- Build Phase II Design Samples

July'90 - Jan.'91

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- Test Phase II Design Samples

Jan.'91 - Mar.

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PAGE 5

- Redesign

Feb.'91 - May'91

Redesign begins as soon as problems arise during Phase II Testing and continues throughout testing. The test results will determine redesign effort needed to correct any deficiencies of the design. All styling, Marketing, and Legal concerns will be finalized by this time. If a major redesign or management change in criteria is required a substantial amount of time and effort will be required to complete. Personnel required will be one EDL Engineer, one Research Engineer, one CAD Designer, one CAD Detailer will be required full time.

- Build Design Acceptance Guns

Mar.'91 - Mar.'92

Apr. '92 - June'92

The purpose of the design acceptance test is for finalizing design component parts to be fully tested in several guns prior to design transmittal to the plant. A total of 30 guns will be built including all five calibers for a large enough sample to be statistically sound. The majority of parts will be vendor produced parts on permanent tooling and in-house parts produced as much as possible on production machinery that will be used in the process of full production schedules. Some component parts may need finishing operations by the Rit D Model Shop or N/C Shop. Also, N/C will aid FMS Operations for programming and debugging. Other current production parts required as used, or if in need of modifications will be procured from the plant. Personnel required will be: one Engineer, one N/C Programmer and one Model Maker full time. Some plant personnel will be required part time.

- Test Design Acceptance Guns

Design acceptance testing of 30 gun samples is the final test performed on the design prior to transmittal. No alterations or modifications are allowed during this testing phase to the test guns. The Test Lab has complete control of the testing and performs all testing it deems necessary to verify design for release to production. Control Gun Testing will be run concurrently with New Design Acceptance Test Guns to compare current design with new offering, also to include competitive products where appropriate. Testing will include endurance field function, drop, dry fire, strength, intentional abuse, temperature extreme, solvent testing and accuracy. When the Test Lab has passed these guns on all tests, a written report certifying the gun is acceptable for transmittal is filed. Personnel required are: one Engineer and four Test Lab / personnel full time.

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138737

NEW BOLT ACTION RIFLE (N'BAR) - CONT'D. PAGE 6

- Nini Redesign and Drawing Transmittal July'92

By this phase of development, the design is firm and no major setbacks should occur. Only minor changes or updates should take place. Changes will be limited to process updates, improving endurance, cost effectiveness, and improved functionality only on parts found to be problem areas from previous testing. Initial transmittal of Research Model drawings and specifications takes place at this time. Personnel required are: one Engineer and one CAD /Draftsman full time.

- Project Approval (Decision Point)

July'92 - Aug.'92

During this period, final management approval of the design is given and money is released to begin production tooling. All pertinent economics and production process estimates will be completed for this project approval report.

- Draft Manuals

Aug.'92 - Oct.'92

This involves development of text and illustrations for the owners manuals and instruction **pooklets** and field service manuals. This will be prepared in conjunction with a commerical printer. Personnel required are: one Engineer and one Draftsman part time with input required from Legal Department and Customer Service.



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June 20, 1989

CONFIDENTIAL

RESEARCH DEVELOPMENT COSTS

FOR

NEW BOLT ACTION RIFLE (NBAR)

RESEARCH DEVELOPMENT COST ESTIMATE: Jan.'89 thru Oct.'91

1.	Initial Design =	365	M	
2.	Build Initial Design Prototype Guns(3)=	184	M	
	- Hreliminary Prototype			
	Topling - temporary =	80	M	
3.	Design Review / Team Analysis =	35	M	
4.	Test Phase I Prototypes -	74	M	
5.	Redesign After Phase I Test	155	M	
6.	Build Phase II Design Samples (15) =	159	M	
	- Prototype Tooling -	160	M	
	- Plant Assistance =	35	M	
7.	Test Phase II Samples =	70	M	
8.	Redesign After Ph ase II Te sting =	141	M	
9.	Build Design Acceptance Guns (30) =	242	M	
	- Prototype/Permanent Tooling =	105	M	
	- Plant Assistance =	45	M	
10.	Test Design Acceptance Guns =	72	M	
11.	Minor Redesign & Transmittal To			
	Production =	13	M	
12.	Draft Manual =	25	M	
13.	Test Ammunition Cost 55,000 Rounds -	14	M	
	(5,000 Rds 1990 x .25)			
	(50,000 Rds 1991 x .25) \ /			
TOTA	L DEVELOPMENT COST (1989 DOLLARS) // +	1,974	M	
RESEARCH	MANPOWER ESTIMATE: May'89 thru Oct.'91			
1.	Research Engineer =	4.94	man	vears
2.	EDL Engineer =	1.03	man	vears
3.	CAD Designer =	1.90	-man	vears
4.	CAD Detailer =	1.7/4	man	vears
5.	Draftsman -	. 25	man	vears
6.	Model Shop Personnel -	4/1/9	nan	vears
7.	N/C Programmer =	2/. 08	man	years
8.	Test Lab Personnel -	2./50	man	years
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BARBER PRESALE R 0138743
NEW BOLT ACTION RIFLE (N'BAR) - CONT'D. PAGE 2
The purpose of the New Bolt Action Rifle (N'BAR) is to offer a replacement for the M/700 'BDL' Rifle currently being produced. The new design parameters will include:
o Detachable Magazine Box
o Jmproved Fire Control
/ A-\ No Connector
/ - Two Trigger Pull Springs (Low Rate Spring)
- Balanced Trigger
-\ Trigger & Sear Block
- Non-Retrofittable to M/700
o Bolt Lock w/Override
o New Scope Mounts - Possibly aftermarket bases and rings. To
be offered with rille package.
O New 'Custom Shop' Barrel Contour
- Mountain Rifle Crown
o Improved Bedding Accuracy Features
Example:
 Thicker barrel bracket
- Relieved thread - rec. fit & full hub bearing
0 M/JUU Receiver to start with same round blank size and
luge
o New Wood Stock - Cosmetidally altered for fittings/dress
up/checkering
The "N'Bar" Design features will initially be produced in five
calibers (30+06, 270, 280, 25-06 & 7MM Mag.) during the first
year of introduction. These design/cost estimates are based
strictly on introduction of these five calibers only in long

action standard and mag. calibers only. If at a later point in time other calibers and short actions are added to this program, they will have additional development and introduction costs added.

- Initial Design

This includes preliminary experimental development work, sketches, scenarios, layouts, design, computer modeling, detailing and checking. This design will be a redesign of the existing M/700 Rifle currently in our line, only in those areas so stated above in the design parameters section. Short actions and additional calibers will be considered during initial design to allow them to be compatible for design inclusion at a later time. Personnel required to accomplish this will include: one Research Engineer full time, one Cad Designer and one CAD Detailer, and one Research Engineer 50% of time, as well as some part time help from one EDL Engineer, Model Maker, N/C Programmer & Tester.

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON Jan 189 - Dec.'89

-BARBER - PRESALE R 0138744

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NEW BOLT ACTION RIFLE (N'BAR) - (CONT'D.) PAGE 3

- Send Vendor Parts Out For Jan.'89 - May'90 Manufacturability and Quotation Estimate

Early vendor consultation and input is required due to many parts for detachable magazine box, fire control, scope mounts and extractor being vendor supplied parts with long lead times and vendor development input requirements for the design. 'High spot' estimates will be pursued early to determine feasibility of producing at a competitive cost. We will also look at after market products already developed, such as quick klip for a detachable magazine box and numerous scope mount/ring manufactures. A decision will have to be made at this time for project direction to go with a total Remington design magazine box or after market adaptation.

- Build Initial Design Prototype Guns Sept.'89 - Jan.'90

At least three prototype guns will be built: one in cal. 30-06 to cover similar calibers of 280, 270, 25-06, one in 7MM Rem. Mag. for Mag. Cal. and one for esthetic evaluation in standard head size caliber. All common parts with M/700 will be procured from the the plant, current inventory. All newly designed parts will be fabricated by Remington where possible or be developed by outside vendors with Engineering/Development assistance from Remington. Personnel required will be: one Research Engineer, one CAD Designer, one CAD Detailer, one N/C Programmer part time and two Model Makers full time, one part time.

- Initiate Design Review Team Analysis Dec.'89 - reb.'90

Their purpose will be to review design at this point and look at design objectively. Input is necessary from Process Engineering, Chemical/Materials Engineering, Arms Service feedback, Legal, as well as other Designers. Each group will review design as to potential 'Roadblocks' and feasibility to produce an acceptable design.

- Test Phase I Prototypes

The two test prototypes - one standard caliber and one magnum caliber will be preliminary tested as to fit, form and function. These test guns will show up any major or minor design shortcomings prior to building multiple test guns for evaluation of function, accuracy, endurance. Testing will consist of dry firing/cycle, live firing, function and accuracy. Testended testing of one or both guns may be desired at this time depending on preliminary functioning results.

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- Test Phase I Prototypes - Cont'd.

A Marketing/Sales Manager Meeting will be held to evaluate styling, aesthetics, features utilizing the third prototype gun built. Their decisions will affect time for redesign and rebuild of models for both testing and aesthetics. Personnel required are: one Research Engineer full time, part time allowances for one EDL Engineer, one Model Maker, one CAD Designer and one Tester.

-/Redesign (Decision Point)

Feb.'90 - May'90

Redesign begins as soon as problems arise in Phase I assembly or testing, and continues through Phase I Testing. Depending on the extent and nature of parts requiring redesign as a result of testing, Marketing, Legal or Design Review Team recommendations, will greatly affect straight forward progress or delays for redesign, reevaluation and retesting. Depending on how much and how many components need attention will constitute a need for additional personnel such as: one Research Engineer, one EDL Engineer, one CAD Designer, one CAD Detailer, one Model Maker full or part time. Styling, stock design, weight, balance, safety will need to be addressed at this phase. Also, high spot economics of the whole program will need to be completed at this time, and evaluated to determine project feasibility and path forward or redesign.

- Build Phase II Design Samples

May'90 - Aug.'90

A total of 15 design sample guns will be built (3 of each caliber) for this Phase II. The majority of the design, legal, and styling questions will be resolved during this phase. As many vendor sample prototype parts as are available, will be used. Other non-vendor parts will be made by Production, Model Shop or N/C Shop. Ongoing vendor visits will be required to consult and fabricate test sample parts from vendor temporary tooling. Some in-house finishing of these vendor components will be necessary by the Model Shop or N/C. Revisionnel required to implement this Phase II are: four Model Makers and two Engineers will be required full time, one N/C Programmer full time.

- Test Phase II Design Samples

Aug.'90 - - Oct.'90

These design sample guns will be tested for function, endurance, strength, blow/up, crud and temperature extreme tests, safety performance, dry firing and field function. Two 30-05 and two 7MM Rem. Mag. guns will be subjected to an intentional abuse test. This may constitute some design changes or modification as deemed necessary from test results. Personnel required are: one Engineer and two testers will be required full time and one Model Maker and N/C Designer part time.

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON BARBER - PRESALE R 0138745

BARBER - PRESALE R 0138746

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NEW BOLT ACTION RIFLE (N'BAR) - CONT'D. PAGE 5

- Redesign

if in need of modifications will be procured from the plant. Personnel required will be: two Engineers, two N/C Programmers and two Model Makers full time. Some plant personnel will be required part time. - Test Design Acceptance Guns May'91 - July'91

Design acceptance testing of 30 gun samples is the final test performed on the design prior to transmittal. No alterations or modifications are allowed during this testing phase to the test guns. The Test Lab has complete control of the testing and performs all testing it deems necessary to verify design for release to production. Control Gun testing will be run concurrently with New Design Acceptance Test Guns to compare current design with new offering, also to include competitive products where appropriate. Testing will include endurance, field function, drop, dry fire, strength, intentional abuse, temperature extreme, solvent testing and accuracy. When the Test Lab has passed these guns on all tests, a written report certifying the gun is acceptable for transmittal is filed. Personnel required are: one Engineer and four Test Lab personnel full time.

Redesign begins as soon as problems arise during Phase II Testing and continues throughout testing. The test results will determine redesign effort needed to correct any deficiencies of the design. All styling, Marketing, and Legal concerns will be finalized by this time. If a major redesign or management change in $\phi r/i$ devia is required a substantial amount of time and effort will the dequired to complete. Personnel required will be one EDL Engineer, \one Research Engineer, one CAD Designer, one CAD Detailer will be required full time.

built including all five calibers for a large enough sample to be statistically sound. The majority of parts will be vendor produced parts on permanent tooling and in-house parts produced

as much as possible on production machinery that will be used in the process of full production schedules. Some component parts may need finishing operations by the R & D Model Shop or N/C Shop. Also, N/C will aid FMS Operations for programming and debugging. Other current production parts required as used, or

The purpose of the design acceptance test is for finalizing design component parts) to be fully tested in several guns prior to design transmittal to the plant. A total of 30 guns will be

- Build Design Acceptance Guns

Nov.'90 - Apr.'91

Sept.'90 - Dec.'90



CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER

KINZER V. REMINGTON

- Mini Redesign and Drawing Transmittal July'91

By this phase of development, the design is firm and no major setbacks should occur. Only minor changes or updates should take place. Changes will be limited to process updates, improving endurance, cost effectiveness, and improved functionality only on parts found to be problem areas from previous testing. Initial transmittal of Research Model drawings and specifications takes place at this time. Personnel required are: one Engineer and one/CAD Draftsman full time.

- Project Approval (Decision Point)

July'91 - Aug.'91

During this period, final management approval of the design is given and money is released to begin production tooling. All pertinent economics and production process estimates will be completed for this project approval report.

- Draft Manuals

Aug.'91 - Oct.'91

This involves development of text and illustrations for the owners manuals and instruction booklets and field service manuals. This will be prepared in conjunction with a commerical printer. Personnel required are: one Engineer and one Draftsman part time with input required from Legal Department and Customer Service.



CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON BARBER - PRESALE R 0138747





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NEW BOLT ACTION RIFLE (N'BAR) - (CONT'D.) PAGE 3

- Send Vendor Parts Out For Jan.'89 - Jan.'91 Manufacturability and Quotation Estimate

Early vendor consultation and input is required due to many parts for detachable magazine box, fire control, scope mounts and extractor being vendor supplied parts with long lead times and vendor development input requirements for the design. 'High spot' estimates will be pursued early to determine feasibility of producing at a competitive cost. We will also look at after market products already developed, such as quick klip for a detachable magazine box and numerous scope mount/ring manufactures. A decision will have to be made at this time for project direction to go with a total Remington design magazine box or after market adaptation.

- Build Initial Design Prototype Guns

At least three prototype guns will be built: one in cal. 30-06 to cover similar calibers of 280, 270, 25-06, one in 7MM Rem. Mag. for Mag. Cal. and one for esthetic evaluation in standard head size caliber. All common parts with M/700 will be procured from the the plant, current inventory. All newly designed parts will be fabricated by Remington where possible or be developed by outside vendors with Engineering/Development assistance from Remington. Personnel required will be: one Research Engineer, one CAD Designer, one CAD Detailer, one N/C Programmer part time and come Model Maker_full time, one part time.

TWO

- Initiate Design Review Team Analysis

Their purpose will be to review design at this point and look at design objectively. Input is necessary from Process Engineering, Chemical/Materials Engineering, Arms Service feedback, Legal, as well as other Designers. Each group will review design as to potential 'Roadblocks' and feasibility to produce an acceptable design.

- Test Phase I Prototypes

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The two test prototypes - one standard caliber and one magnum caliber will be preliminary tested as to fit, form and function. These test guns will show up any major or minor design shortcomings prior to building multiple test guns for evaluation of function, accuracy, endurance. Testing will consist of dry firing/cycle, live firing, function and accuracy. Extended testing of one or both guns may be desired at this time depending on preliminary functioning results.

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NEW BOLT ACTION RIFLE (N'BAR) - CONT'D. PAGE 4

- Test Phase I Prototypes - Cont'd.

A Marketing/Sales Manager Meeting will be held to evaluate styling, assthetics, features utilizing the third prototype gun built. The Ar decisions will affect time for redesign and rebuild of models/ for both testing and aesthetics. Personnel required are: one <u>Res</u>earch Engineer full time, part time allowances for one EDL /Engineer, one Model Maker, one CAD Designer and one Tester./

- Redesign (Decision Point)

Redesign begins as soon as problems arise in Phase I assembly or testing, and continues through Phase I Testing. Depending on the extent and nature of parts requiring redesign as a result of testing, Marketing, Legal or Design Review Team recommendations will greatly affect straight forward provides or delays for redesign, reevaluation and retesting. Depending on how much and COMPE how many components need attention will constitute a need for additional personnel such as: one Research Engineer, one EDL Engineer, one CAD Designer, one CAD Detailer, one Model Maker full or part time. Styling, stock design, weight, balance, safety will need to be theressed at this phase. Also, high spot economics of the whole program will need to be completed at this time, and evaluated to determine project feasibility and path forward or redesign.

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- Build Phase II Design Samples

A total of 15 design sample guns will be built (3 of each caliber) for this Phase II. The majority of the design, legal, and styling questions will be resolved during this phase. As many vendor sample prototype parts as are available, will be used. Other non-vendor parts will be made by Production, Model Shop or N/C Shop. Ongoing vendor visits will be required to consult and fabricate test sample parts from vendor temporary tooling. Some in-house finishing of these vendor components will be necessary by the Model Shop or N/C. Personnel required to implement this Phase II are: two Model Makers and one Engineers will be required full time, one N/C Programmer for time.

- Test Phase II Design Samples

These design sample guns will be tested for function, endurance, strength, blow/up, crud and temperature extreme tests, safety performance, dry firing. field function, 100 - 06 and two 7MM \leftarrow Rem. Mag. guns will be subjected to an intentional abuse test. This may constitute some design changes or modification as deemed necessary from test results. Personnel required are: one Engineer and two testers will be required full time and one Model Maker and N/C Designer part time.

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PAGE 5

- Redesign

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Redesign begins as soon as problems arise during Phase II Testing and continues throughout testing. The test results will determine dedesign effort needed to correct any deficiencies of the design. All styling, Marketing, and Legal concerns will be finalized by this time. If a major redesign or management change in criteria is required a substantial amount of time and effort will be required to complete. Personnel required will be one EDL Engineer, one Research Engineer, one CAD Designer, one CAD Detailer will be required full time.

- Build Design Acceptance Guns

NON. 90 - APR.91 Har. 91 - Har. 92

MAY 91 - JULY 91

The purpose of the design acceptance test is for finalizing design component parts to be fully tested in several guns prior to design transmittal to the plant. A total of 30 guns will be built including all five calibers for a large enough sample to be statistically sound. The majority of parts will be vendor produced parts on permanent tooling and in-house parts produced as much as possible on production machinery that will be used in the process of full production schedules. Some component parts may need finishing operations by the R 4 D Model Shop or N/C Shop. Also, N/C will aid FMS Operations for programming and debugging. Other current production parts required as used, or if in need of modifications will be procured from the plant. Personnel required will be: _______ Engineer? ______ N/C Programmers and Two eme Model Makers full time. Some plant personnel will be required part time.

- Test Design Acceptance Guns

Design acceptance testing of 30 gun samples is the final test performed on the design prior to transmittal. No alterations or modifications are allowed during this testing phase to the test guns. The Test Lab has complete control of the testing and performs all testing it deems necessary to verify design for release to production. Control Gun Testing will be run concurrently with New Design Acceptance Test Guns to compare current design with new offering, also to include competitive products where appropriate. Testing will include endurance, field function day fire strength intentional abute

field function, grop, dry fire, strength, intentional abuse, temperature extreme, solvent testing and accuracy. When the Test Lab has passed these guns on all tests, a written report certifying the gun is acceptable for transmittal is filed. Personnel required are: one Engineer and four Test Lab personnel full time.

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER **KINZER V. REMINGTON**

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NEW BOLT ACTION RIFLE (N'BAR) - CONT'D.	PAGE 6
	91
- Mini Redesign and Drawing Transmittal	July'-92

By this phase of development, the design is firm and no major setbacks should occur. Only minor changes or updates should take place. Changes will be limited to process updates, improving endurance, coat effectiveness, and improved functionality only on parts found to be problem areas from previous testing. Initial transmittal of Research Model drawings and specifications takes place at this time. Personnel required are: one Engineer and one CAD Draftsman full time.

- Project Approval (Decision Point) During this period, final management approval of the design is given and money is released to begin production tooling. All pertinent economics and production process estimates will be completed for this project approval report.

- Draft Manuals

91 91 Aug.'97 - Oct.'97

This involves development of te<u>xt and i</u>llustrations for the owners manuals and instruction booklets and field service manuals. This will be prepared in conjunction with a commerical printer. Personnel required are: one Engineer and one Draftsman part time with input required from Legal Department and Customer Service.

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May 5, 1989

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CONFIDENTIAL

RESEARCH DEVELOPMENT COSTS

FOR

NEW BOLT ACTION RIFLE (NBAR)

RESEARCH DEVELOPMENT COST ESTIMATE: Jan. '89 thru Oct. '92

· · ·	Initial Design	= 365	M
4.	- Preliminary Prototype	- 104	м
	Tooling - temporary	- 80	М
3.	Design Review Team Analysis	= 35	M
4.	Test Phase I Prototypes	= 74	M
5.	Redesign After Phase I Test	= 155	М
6.	Build Phase II Design Samples (15)	= 159	M
	– Prototype Tooling	= 160	М
	- Plant Assistance	- 35	M
7.	Test Phase II Samples	= 70	M
8.	Redesign After Phase II Testing	= 141	М
9.	Builc Design Acceptance Guns (30)	- 242	M
	- Prototype/Permanent Tooling	= 105	M
	- Plant Assistance	= 45	M
10.	Tes Design Acceptance Guns	= 72	M
11.	Mir, r Redesign & Transmittal To		
	Projuction	- 13	M
12.	Dr ft Manual	=25	M
13.	Te t Ammunition Cost 55,000 Rounds	- / 14	M
	$(0.00 \text{ Bds} 1990 \times .25)$		••
	$(5) 000 \text{ Rds} 1991 \times 25)$	///	
		//	
TO' AT	L EVELOPMENT COST (1989 DOLLARS)		м
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RESEAR H	ANPOWER ESTIMATE: May '89 thru Oct.	192	

1. Research Engineer 4.94 man years 1.03 man years 1.90 man years 1.74 man years EDL Engineer -Ξ. CAD Designer 2. -:. CAD Detailer .25 /man_years 5. Draftsman 4.18 man years 2.08 man years 6. Model Shop Personnel -7. N/C Programmer -8. 2.50 man years Test Lab Personnel -

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CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON BARBER - PRESALE R 0138754

BARBER - PRESALE R 0138755



- Initial Design Jan.'89 -June'90 This includes preliminary experimental development work, sketches, scenarios, layouts, design, computer modeling, detailing and checking. This design will be a redesign of the existing M/700 Rifle currently in our line, only in those areas so stated above in the design parameters section. Short actions and additional calibers will be considered during initial design to allow them to be compatible for design inclusion at a later time. Personnel required to accomplish this will include: one Research Engineer full time, one Cad Designer and one CAD Detailer, 50% of time, as well as some part time help from one

EDL Engineer, Model Maker, N/C Programmer & Tester.

BARBER - PRESALE R 0138756

NEW BOLT ACTION RIFLE (N'BAR) - (CONT'D.) PAGE 3

LSend Vendor Parts Out For Jan.'89 - Jan.'91 Manufacturability and Quotation Estimate

Early vendor consultation and input is required due to many parts for detachable magazine box, fire control, scope mounts and extractor being vendor supplied parts with long lead times and vendor development input requirements for the design. 'High spot' estimates will be pursued early to determine feasibility of producing at a competitive cost. We will also look at after market products already developed, such as quick klip for a detachable magazine box and numerous scope mount/ring manufactures. A decision will have to be made at this time for project direction to go with a total Remington design magazine box or after market adaptation.

- Build Initial Design Prototype Guns Aug.'89 - Apr.'90

At least three prototype guns will be built: one in cal. 30-06 to cover similar calibers of 280, 270, 25-06, one in 7MM Rem. Mag. for Mag. Cal. and one for esthetic evaluation in standard head size caliber. All common parts with M/700 will be procured from the the plant, current inventory. All newly designed parts will be fabricated by Remington where possible or be developed by outside vendors with Engineering/Development assistance from Remington. Personnel required will be: one Research Engineer, one CAD Designer, one CAD Detailer. one N/C Programmer part time and one Model Maker full time, one part time.

- Initiate Design Review Team Analysis

Mar.'90 - May'90

Their purpose will be to review design at this point and look at design objectively. Input is necessary from Process Engineering, Chemical/Materials Engineering, Arms Service feedback, Legal, as well as other Designers. Each group will review/design as to potential 'Roadblocks' and feasibility to produce an acceptable design.

- Test Phase I Prototypes

Apr.'90 - May'90

The two test prototypes - one standard caliber and one magnum caliber will be preliminary tested as to fit, form and function. These test guns will show up any major or minor design shortcomings prior to building multiple test guns for evaluation of function, accuracy, endurance. Testing will consist of dry firing/cycle, live firing, function and accuracy. Extended testing of one or both guns may be desired at this time depending on preliminary functioning results.

- Test Phase I Prototypes - Cont'd.

A Marketing/Sales Manager Meeting will be held to evaluate styling, aesthetics, features utilizing the third prototype gun built. Their decisions will affect time for redesign and rebuild of models for both testing and aesthetics. Personnel required are: one Research Engineer full time, part time allowances for one EDL Engineer, one Model Maker, one CAD Designer and one Tester.

- Redesign (Decision Point)

May'90 - Aug.'90

Redesign begins as <u>soon as</u> problems arise in Phase I assembly or testing, and continues through Phase I Testing. Depending on the extent and nature of parts requiring redesign as a result of testing, Marketing, Legal or Design Review Team recommendations, will greatly affect straight forward progress or delays for redesign, reevaluation and retesting. Depending on how much and how many components need attention will constitute a need for additional personnel such as: one Research Engineer, one EDL Engineer, one CAD Designer, one CAD Detailer, one Model Maker full or part time. Styling, stock design, weight, balance, safety will need to be addressed at this phase. Also, high spot economics of the whole program will need to be completed at this time, and evaluated to determine project feasibility and path forward or redesign.

- Build Phase II Design Samples

July'90 - Jan.'91

A total of 15 design sample guns will be built (3 of each caliber) for this Phase II. The majority of the design, legal, and styling questions will be resolved during this phase. As many vendor sample prototype parts as are available, will be used. Other non-vendor parts will be made by Production, Model Shop or N/C Shop. Ongoing vendor visits will be required to consult and fabricate test sample parts from vendor temporary tooling. Some in-house finishing of these vendor components will be necessary by the Model Shop or N/C. Personnel required to implement this Phase II are: two Model Makers and one Engineer will be required full time, one N/C Programmer part time.

- Test Phase II Design Samples

Jan.'91 - Hay.'91

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These design sample guns will be tested for function, endurance, strength, blow/up, crud and temperature extreme tests, safety performance, dry firing and field function. Two 30-06 and two 7MM Rem. Mag. guns will be subjected to an intentional abuse test. This may constitute some design changes or modification as deemed necessary from test results. Personnel required are: one Engineer and two testers will be required full time and one Model Maker and N/C Designer part time.

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

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-LRedesign

Feb.'91 - May'91

Redesign begins as soon as problems arise during Phase II Testing and continues throughout testing. The test results will determine redesign effort needed to correct any deficiencies of the design. All styling, Marketing, and Legal concerns will be finalized by this time. If a major redesign or management change in criteria is required a substantial amount of time and effort will be required to complete. Personnel required will be one EDL Engineer, one Research Engineer, one CAD Designer, one CAD Detailer will be required full time.

- Build Design Acceptance Guns

Mar.'91 - Mar.'92

Apr. '82 - June'92

The purpose of the design acceptance test is for finalizing design component parts to be fully tested in several guns prior to design transmittal to the plant. A total of 30 guns will be built including all five calibers for a large enough sample to be statistically sound. The majority of parts will be vendor produced parts on permanent tooling and in-house parts produced as much as possible on production machinery that will be used in the process of full production schedules. Some component parts may need finishing operations by the R & D Model Shop or N/C Shop. Also, N/C will aid FMS Operations for programming and debugging. Other current production parts required as used, or if in need of modifications will be procured from the plant. Personnel required will be: one Engineer, one N/C Programmer and one Model Maker full time. Some plant personnel will be required part time.

- Test Design Acceptance Guns

Design acceptance testing of 30 gun samples is the final test performed on the design prior to transmittal. No alterations or modifications are allowed during this testing phase to the test guns. The Test Lab has complete control of the testing and performs all testing it deems necessary to verify design for release to production. Control Gun Testing will be run concurrently with New Design Acceptance Test Guns to compare current design with new offering, also to include competitive products where appropriate. Testing will include endurance, field function, drop, dry fire, strength, intentional abuse temperature extreme, solvent testing and accuracy. When the Lab has passed these guns on all tests, a written report certifying the gun is acceptable for transmittal is filed. Personnel required are: one Engineer and four Test Lab personnel full time.

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- Mini Redesign and Drawing Transmittal July'92

By this phase of development, the design is firm and no major setbacks should occur. Only minor changes or updates should take place. Changes will be limited to process updates, improving endurance, cost effectiveness, and improved functionality only on parts found to be problem areas from previous testing. Initial transmittal of Research Model drawings and specifications takes place at this time. Personnel required are: one Engineer and one CAP Draftsman full time.

- Project Approval (Decision Point)

July'92 - Aug.'92

During this period, final management approval of the design is given and money is released to begin production tooling. All pertinent economics and production process estimates will be completed for this project approval report.

- Draft Manuals

Aug.'92 - Oct.'92

This involves development of text and illustrations for the owners manuals and instruction <u>booklets</u> and field service manuals. This will be prepared in conjunction with a commerical printer. Personnel required are: one Engineer and one Draftsman part time with input required from Legal Department and Customer Service.



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ASSAULT STAND

BARBER PRESALE R 0138761 NEW BOLT ACTION RIFLE (N'BAR) - CONT'D. PAGE 2 The purpose of the New Bolt Action Rifle (N'BAR) is to offer a replacement for the M/700 'BDL' Rifle currently being produced. The new design parameters will include: 0 Detachable Magazine Box Improved Fire Control /No\Connector <u>Tw</u>d Trigger Pull Springs (Low Rate Spring) Sealed Fire Control Balanced Trigger Trigger & Sear Block Non-Retrofittable to M/700 Bolt Lock w/Override 0 New Scope Mounts - Possibly aftermarket bases and rings. To 0 be offered with rifle package. New Extractor System 0 New 'Custom Shop' Barrel Contour 0 - Mountain Rifle Crown 0 Improved Bedding/Acquracy Features Example: Thicker barrel bracket Relieved thread - rec. fit 4 full hub bearing M/700 Receiver to start with same round blank size and ~ cosmetically altered behind from ring of steel s locking lugs. New Wood Stock - Cosmetically altered for fittings/dress up/checkering The "N'Bar" Design features will initially be produced in five calibers (30-06, 270, 280, 25-06 5 7MM Mag.). douring the first year of introduction. Twhese design/cost estimates are based strictly on introduction of these five calibers only in long

action standard and mag. calibers only. If at a later point in time other calibers and short actions are added to this program, they will have additional development and introduction costs added.

- Initial Design

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This includes preliminary experimental development work, sketches, scenarios, layouts, design, computer modeling, detailing and checking. This design will be a redesign of the existing M/700 Rifle currently in our line, only in those areas so stated above in the design parameters section. Short actions and additional calibers will be considered during initial design to allow them to be compatible for design inclusion at a later time. Personnel required to accomplish this will include: one Research Engineer full time Cad Designer fone CAD Detailer, 50% of time, as well as some part time help from one EDL Engineer, Model Maker, N/C Programmer & Tester.

Jag. 189 -June 90

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NEW BOLT ACTION RIPLE (N'BAR) - (CONT'D.) PAGE 3

- Send Vendor Parts Out For Jan.'89 - Jan.'91 Manufacturability and Quotation Estimate

Early vendor consultation and input is required due to many parts for detachable magazine box, fire control, scope mounts and extractor being vendor supplied parts with long lead times and vendor development input requirements for the design. 'High spot' estimates will be pursued early to determine feasibility of producing at a competitive cost. We will also look at after market products already developed, such as quick klip for a detachable magazine box and numerous scope mount/ring manufactures. A decision will have to be made at this time for project direction to go with a total Remington design magazine box or after market adaptation.

- Build Initial Design Prototype Guns Aug.'89 - Apr.'90

At least three prototype guns will be built: one in cal. 30-06 to cover similar calibers of 280, 270, 25-06, one in 7MM Rem. Mag. for Mag. Cal. and one for esthetic evaluation in standard head size caliber. All common parts with M/700 will be procured from the the plant, current inventory. All newly designed parts will be fabricated by Remington where possible or be developed by outside vendors with Engineering/Development assistance from Remington. Personnel required will be: one Research Engineer, one CAD Designer, one CAD Detailer, one N/C Programmer part time and one Model Maker full time, one part time.

- Initiate Design Review Team Analysis

Mar.'90 - May'90

Their purpose will be to review design at this point and look at design objectively. Input is necessary from Process Engineering, Chemical/Materials Engineering, Arms Service Feedback, Legal, as well as other Designers. Each group will review design as to potential 'Roadblocks' and feasibility to produce an acceptable design.

- Test Phase I Prototypes

Apr.'90 - May'90

The two test prototypes - one standard caliber and one magnum caliber will be preliminary tested as to fit, form and function. These test guns will show up any major or minor design shortcomings prior to building multiple test guns for evaluation of function, accuracy, endurance. Testing will consist of dry firing/cycle, live firing, function and accuracy. Extended testing of one or both guns may be desired at this time depending on preliminary functioning results.

- Test Phase I Prototypes - Cont'd.

A Marketing/Sales Manager Meeting will be held to evaluate styling, aesthetics, features utilizing the third prototype gun built. Their decisions will affect time for redesign and rebuild of models for both testing and aesthetics. Personnel required are: one Research Engineer full time, part time allowances for one EDL Engineer, one Model Maker, one CAD Designer and one Tester.

- Redesign (Decision Point)

May'90 - Aug.'90

Redesign begins as soon as problems arise in Phase I assembly or testing, and continues through Phase I Testing. Depending on the extent and nature of parts requiring redesign as a result of testing, Marketing, Legal or Design Review Team recommendations will greatly affect straight forward **Design Review Team** recommendations redesign, reevaluation and retesting. Depending on how much and how many components need attention will constitute a need for additional personnel such as: one Research Engineer, one EDL Engineer, one CAD Designer, one CAD Detailer, one Model Maker full or part time. Styling, stock design, weight, balance, safety will need to De Capressed at this phase. Also, high spot economics of the whole program will need to be completed at this time, and evaluated to determine project feasibility and path forward or redesign.

- Build Phase II Design Samples

A total of 15 design sample guns will be built (3/of each caliber) for this Phase II. The majority of the design, legal, and styling questions will be resolved during this phase. As many vendor sample prototype parts as are available, will be used. Other non-vendor parts will be made by Production, Model Shop or N/C Shop. Ongoing vendor visits will be required to consult and fabricate test sample parts from vendor temporary tooling. Some in-house finishing of these vendor components will be necessary by the Model Shop or N/C. Personnel required to implement this Phase II are: two Model Makers and one Engineer will be required full time, one N/C Programmer part time./

- Test Phase II Design Samples

Jan.'91 - Már.'91

July'90 - Jan.'91

These design sample guns will be tested for function, endurance, strength, blow/up, crud and temperature extreme tests, safety performance, dry firing field function fwo 30-06 and two 7MM \leq Rem. Mag. guns will be subjected to an intentional abuse test. This may constitute some design changes or modification as deemed necessary from test results. Personnel required are: one Engineer and two testers will be required full time and one Model Maker and N/C Designer part time.

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BARBER - PRESALE R 0138764

NEW BOLT ACTION RIFLE (N'BAR) - CONT'D. PAGE 5

- Redesign

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Feb.'91 - May'91

Redesign begins as soon as problems arise during Phase II Testing and continues throughout testing. The test results will determine redesign effort needed to correct any deficiencies of the design. All styling, Marketing, and Legal concerns will be finalized by this time. If a major redesign or management change in criteria is required a substantial amount of time and effort will be required to complete. Personnel required will be one EDL Engineer, one Research Engineer, one CAD Designer, one CAD Detailer will be required full time.

- Build Design Acceptance Guns

Mar.'91 - Mar.'92

The purpose of the design acceptance test is for finalizing design component parts to be fully tested in several guns prior to design transmittal to the plant. A total of 30 guns will be built including all five calibers for a large enough sample to be statistically sound. The majority of parts will be vendor produced parts on permanent tooling and in-house parts produced as much as possible on production machinery that will be used in the process of full production schedules. Some component parts may need finishing operations by the R & D Model Shop or N/C Shop. Also, N/C will aid FMS Operations for programming and debugging. Other current production parts required as used, or if in need of modifications will be procured from the plant. Personnel required will be: one Engineer, one N/C Programmer and one Model Maker full time. Some plant personnel will be required part time.

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certifying the gun is acceptable for transmittal is filed ______ Personnel required are: one Engineer and four Test Lab personnel full time. ÷

NEW BOLT ACTION RIFLE (N'BAR) - CONT'D. PAGE 6

- Mini Redesign and Drawing Transmittal July'92

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BARBER, PRESALE R 0138766 5-5-89 CONFIDENTIAL Ŷ LESEMLLH DEVELOPMENT COSTS New BOLT ACTION RIFLE (N'BAR) RESEARCH DEVROPMENT COST ESTIMATE : JAN B9 THRU OCT. 92 1. IN LTYAL DESIGN 365 m 184 M BUILD INITIAL DESIGN PROTO TUPE GUNS (3) 2. PRELIMINARY PROTOTUPE TOOWNG -TEMPOROTY 80 M 31 DESYGN REVIEW TEAM ANALYSIS 35 M TEST PHASE I PROTOTUPES 74 M 4. 155M 6. BUILD PHASE I DESIGN SAMAPLES (15) 159 11 -PROTE 54PC 160 4 TOOLING, 35 M - PLANT ASSISTANCE 20 m 7, TEST PHOSE IT SAMPLES B. REVESIGN AFTER PHANE I TESTING 101 M 7.42M 105 M - PROTO TYPE / PETINE ENVIRONT TOO UNG. 45m - BLANT ASSISTACE 72 M 10. TEST DESIGN ALLEPTANCE GUNS 11. MINOR RE-DESIGN & TRANSMITTED TO PRODUCTION 13M 25M R. PRAT-T 55,000 RIS 5000 805 100 x.25¢ (50,00 det 191 x.25¢ / COST 14 M 13. Tes T FATA ANNN ITTON TOTAL DEVENDMENT COST (1989 Tochars) 19974 M ord T. 92 MAN POWER ESTIMATE : MAY 89 THRU RESEARCH 4,94 1. RESEARCH ENGINEER M YEARS 2. EDL ENGINER 0/ 1.90 .. 3, CAO DESIGNER 1.74 " 4. CAO DETAILER .25 5. PRAFTSMAN 4,18 6. MODEL SHOP PERSONNEL . . 7. N/C PROGRAMMER 2.08 TG8 5-5-89 TEST 8. LAB PERSONNEL 2.50 1. ۰.

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BARBER - PRESALE R 0138766 R2539754

BARBER - PRESALE R 0138767 RE D DEVELOPMENT COSTS NEW BOLT ALTIN RIFLE (N'BAR) THE PURPOSE OF THE NEW BOLT ACTION RIFLE (N'BAR) IS TO OFFER A REPLACEMENT FUR RIFLE CORENTLY BEING PRODUCED. m/700 BDL DESILN WILL INCLUDE : PREAMATERS DETACHABLE MAGAZINE BOX IMPROVED FIRE CONTROL -NO TRIGGER PULL SPRINGS (LOW SPRING FILTENTROL - BALANCES TEIGGER - TLIGGER & SOME BUCK - NON RETROPTIONELS TO M/200 - - - - - -LOCK W/ AVERRIDE BOLT 0 O NEW SCOPE MOUNTS - POSSIBLY AFTER MARKET EINGS. TO BE OFFERED WITH RIFLE BASES PAULAGE O NEW EXT RACTOR SYSTEM BARR O NEW CUSTOM SHOP - MOUNTAIN RIFLE CROWN O IMPROVED BEPPING / ACCURACY FERTURES EX: THICKER BARRE - RELIGNED THREAD LEL. FI BEARING, O. M/TOG RECEIVER TO START WITH SAME BLANK SIZE & COSMETICALLY ALTERED BEHIND FRONT RING OF STEEL OVER LOCKING LUGS, O NEW WOOD STOCK - COSMETTICALLY ALTERED FOR FITTINGS / DRESS UP / CHECKERING.

BARBER - PRESALE R 0138768

THE N'BAR DESIGN FEATURES WILL INITIALLY IN 5 CAL'S, (30-06, 270, 280, 25-09 BE PRODUCED \$ 7 MM MAG. DURING THE FIRST YEAR 1F INTRODUCTION, DESIGN / COST ESTIMATES THESE ARE BASE 1/4 TRODUCTION OF THOSE 5 CAL'S ON ONLY STO DMAG, CAL'S ONLY. ALTION _1.F. AT A LATER OTHER CAL'S & SHORT ACTIONS ARE POINT TIME APPED TO PRO GRAN THEY WILL HAVE APPITONAL DEVELOPMENTEINTROPULTION COSTS ADDED,

PINITIAL

DESIGN ... JAN. 89 - JUNE 90 THIS INCLUDES PRELIMINARY EXPERIMENTION PEVELUPARENT WORK, SKETCHES, SE MURINES, MAYOUTS, DESIGN, COMPUTER MODELING, DETRILING, & CHECKING, THIS DESIGN WILL BE A RE-DESIGN OF THE EXISTING M/200 RIFLE CURRENTY 14 OUR LINE, ONLY IN THOSE AREAS SO STATED ABONG IN THE DESIGN PARAMETERS SECTION. SHORT ACTIONS & APRITIONAL BE CONSPERE INITAL CAL'S, WILL URING TO BE TBUT FOR DESIGN DESIGN ALLOW THEM INCLUSION ATA LATER TIME. PERSONNER DURED TO PLACE THIS WILL INCLUDE: ONE LES EARCHE ENGINEERL FULL TIME ONE CAP DESIGNER, ONE CAP PETMLER, 50 4 DE TIME AS SOME PART TIME HELP ONC ASWAL EDL ENGINEER, MODE MAKEL N/C PROGRAM NET. vi resper, JAN : 89 - JAN 91 SEND YENDOR PARTS OUT FOR MANUFACT URBBILITY Ł QUOTATION ESTIMATES EARLY NENPOR CONSULTATION & IMPUT IS REQUIRE

PETRIMARIE

PARTS FOR KMAGAZINE Box, FIRE CONTRA,

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Scope MOUNTS & EXTRACTOR BEING YENDOR SUPPLIED PORTS
WITH LONG LEDD TIMES & VENDOR DEVENT
INPUT REQUIREMENTS FOR THE DESIGN, "HIGH SPOT"
ESTIMOTES WILL BEPERSUSS EARLY TO DETERMINE
FERSABLUTY OF PRODUCING AT A CONAPETATIVE COST,
WE WILL ALSO LOOK AT AFTER MARKET PROPULTS
ALRENNY DENERD, SUCH AS QUILLE KLIP FOR, A
DETACHABLE MAGATING BOX & NUMEROUS SCOPE MOUNT/ DECISION
ILING MANUFACTURES A DETERMINETO
Ge WAVE AT THE TIME FOR FOR PROVECT DIRECTION 10
LETER & DELLET DE DETERMINE TON VESTER MACENCE DE X OR
BUILD INITIAL DESIGN PROTO TYPE GONS
AT LEAST 3 PROTOTYPE QUILS WILL BE BULT, ONE IN
CAL 30-06 TO COVER SIMILIAR CAL'S OF 280, 270, 25-06
ONE IN 7 MM REN MAG, FOR MAG. CAL. AND OME FOR
ESTRETIC EVALUATION IN STO HERE STRETC. ALL COMMON
PARTS WITH M/DOW WILL BE PROCUPER THE DUMET,
CUPPENT INNERTERY, ALL NEWLY DESIGNED PARTS WILL
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TE: OUT RESERVE DECOMPETER OUT CON RECTOR
GOD DETAILER AND IN IC PROGRAMES PART TIME AND
ONE MODELER FULL TIME ONE PART TIME

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 (\mathcal{L}) 3 INITIATE DESIGN REVIEW TERM ANDLYSIS MER 90 - MAY8 THETE PURPOSE WILL RE TO REVIEW DESIGN AT THIS PAULT AND LOOK AT DESIGN OBJECTIVELY. INPUT IS NECESSAR FROM PROCESS ENG, CHEMICAL/ METERINE ENGINEER ATH'S SETUNCE FEEDBACK, LEGAL, AS WELL AS OTHER RESIGNERS. EACH GROUP WILL REVIEW DESTON AS TO POTER TIM) TO AD BLOKE & FEAS ABILITY TO PRODUCE AN ALLEPTADIE DESIGN, 4)-TEST BHASE I PRITO TUPES APR 90 - MAY 90 THE TWO TEST PROTO TYPES ONE STO, COL & DNE MADGNOND CAL, WILL BE PRELIMEINARY TESTED AS TO FIT, FORM, & FUNCTION. THESE TEST GONS WILL SHOW UP ANY MONOR OR MILLOR DESIGN SHORT COMINOS PRIOR TO BUILDING MULTIPLE TEST GUNS FOR EVALUATION ---- OF FUNCTION, ACCURACY, ENPARAMILET TES THE LIL _____ CONSIST OF DR-4 FIRING/CYCLES, LIKE FIRING, FUNCTION + ACCIPACY, EXTRUPED TEST VO OF OUE OR BOTTY GUNS MAN BE DESIRED ATTIMS TIME DEPENDING ON PRELIMINARY FUNCTIONING RESULTS A MARKETINE / SPIGS MANAGE MEETING WILL RE HED TO EXAMPLE STYLING, ACTIVETICS / FORTURES UTILIZING THE 3 RD PROTOTYPE GUN BUILT, THEIR PEUSIONS WILL AFFECT TIME FOR RE-DESIGN & REBULD OF MODELS FOR BOTH TESTING & AUSTH PERSONNAL REQUIRED ARE: ONE RESEARCH ENGINE FULLTIME, PART TIME ALLOW SALES FOR ONE EDL ... ONE MORE MORET, ONE CAO DESIGNER & ONCE TESTER

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٩, S RE-RESIGN (RELISION POINT) MAY 90 - AUG 90 REPESION BECINS AS SOON AS PROBLEMS ARISE IN AMAGE I ASSEMBLY OR TESTING, & CONTINUES THRU PINDE I TESTING. PEPENING ON THE EXTENT & NATURE OF PARTS REQUIRING REDESIGN AS & RETOLT OF TESTING MARKETING LEGAL OR DESIGN REVIEW monons will GREATLY AFTERTY FORWARD PROCRESS OR DRAYS FOR RE-DESIGN, REEMINATION E RETESTING DEPENDING ON HOW MUCH & HOW NO ANY COMPONENTS NEED ATTENTION WILL CONSTITUTE HEED FOR ADDITIONEL BERSONNEL SUCH AS! ONE RESEMUE ENGLUBER, OUE EDL ENGINEER, ONE LAD DES MENER ONE COD DETRICER ONE MODEL MAKER FUL OR PART THE. STYLING STOLE DESIGN, GEONT, BRIMUS, SAFETY WILL NERED TO BE APPRESSED AT THIS PHOSE. ARO GRAMA WILL NOD SPOT ECONOMICS OF THE WHOLE TO BE COMPLETED AT THIS SEVALUATED TO DETERMINE PROJECT FEAS ANY /-FORUME OR RE-RESIGN RESIGN SMARTES (15) 104 0F 15 PESCON SAMPLE GUNI TOTAL FOR THIS PHOSE IT THE BESIGN, LEGAR, STYLING RESOLVED DURING THIS PHASE. AS VENDOR PROTOTURE PART AS ARE ANALDBLE, WILL BE OTHER NON VENDOR PARTY WILL BE MME BY PRO MOR SHOP OR N/C SHOP. ON GOING VERBOR VISITS WILL BE REQUIRED TO CONSULT & FABRICATE

BARBER - PRESALE R 0138771

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VELOOR TEST SAMPLE. PARTS FRANKTEDAPORARY TOOLING, FINISHING OF TITS EXCOMPONENT SARE IN HOUSE NECESSAR By THE MODEL SHOP OR N/C. PEPSanan M REPORE INPLEDENT THIS PHASE I ALG : THE MODEL MARTIS ONE ENGINEER میں WILL BE REQUIRE FULL ONE IN/C PLOGRAMME TTNE. PART TIME, TEST BHASE JAN. 91 - MAR 91 DESIGN SAMBLES THESE PESIGA SAMEUS GUNS WILL BE TESTED FOR FUNCTION, STREWTH - BLUE /OP, CRUD & TEMPERATURE GNOURANCE TESTS, SAFETY PERFORMANCE, PRU FIRING, EXTRAC FICO FUNCTION Two 30-00 8 Two gran Roma nonco, GUNS WILL BE SUBJECTES TO AN INTEMPONEL ABUSE TEST. THIS MAY CONSTITUTE SOME DESIGN CHANNES PERSONAR READ ARTS SERV FRA TEST OR MODIFICATIONS RESULTS, GONE ENGINETTE Two TESTERS WILL BE REQUIRED FULL TIME \$ ONE MOREL & M/C PERICUEL PART TIME.

B RE-DESKN -

RE-PESCON BEGINS AS SOCA AS PROBLEMS ARISO DURING & CONTINUES THROUGHT PHASE IL TESTING TESTING, THE TEST RESULTS WILL DETERMINE REDETICA EFFORT MERCE TO CORPERT MAY DETRICIENCIES OF TITS PESSON ALL STULING, MARKETING, & LEGAR CONFETTAS wich Be FINAULO BY THIS TIME. IF A MASSIAL REPORTION OR MANAGEMENT CHANGE IN CRITERIA IS REQUIRE A SUBSTANTIAL AMOUNT OF TIME & EFFORT WILL BE REQUIRE TO COMPLETE , DETSONGE REP'O, WILL BE ONE EDL ENG NEER, ONE RESEARCH ENG MER, and chie PESNENT, ONE LAD DETRICE WILL BE REPURCES FULL THE

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Ż BULLO PESIGN ACCEPTANCE GUNS, - MAR 91 - MAR 92 PURPOSE OF THE DESIGN ALLETTANLE TEST IS FOR FINALIZING RESIGN COMPONENT PARTS TO BE FULLY THE THE IN SEVERIAL GUNS PRIOK TO DEFIGH TRANSMITTEL TO THE PLANT. A TOTAL OF 30 GUN'S WILL BU BUILT ALL 5 CAL'S FOR ALARGE ENOUGH TO BE STOSTICALY SOUND THE MENORITY WHAL BE VELOOR PRODUCED PARTS PERMENDET TOOLING & IN HOUSE PARTS PRODUCED AS MUCH AS POSSIBLE ON PRODUCTION MACHINERY THAT WILL BE USED IN ME PROCESS OF FULL PRODUCTION SCHEDULES, SOME COMPONENT PARTS MAY NEED FINISHING OPERATIONS BY THE REP MORISHOP OR N/C SHOP. ALSO H/C WILL AID FAS OPERATIONS FOR PROGRAMMENTE EPEBUCOING, OTHER CURRENT -s us/52 PRODUTION PARTS REQUIRED MODIFICATIONS WILL BE PROCUR ı/æ PERSONNIA REPID WILL BE PROGRAMM . 5 and MODE MAKEL FULTIME PLANT PETSOUNEL BE REQUERED PARTTINE DESIGN ALLENTIQUE GUNS. 92 - JUNE 92 DESIGN ACCEPTANCE TESTING OF 30 GUM/SAN KLES_ TEST PERFORMED ON THE DESIGN PRIOR TO TRANSMITTAL, NO ALTERATIONS OR MODIFICATIONS DURING THIS TESTING PHOSE TO THE TEST LAB 1+25 COMPLETE CONTROL OF THE TEST PERFORMS ALL TOSTING IT PEERS NECESSARY TO VERIFIEN DESIGN FOR REFISE TO PRODUCTION.

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CONTROL GUN TESTING WILL BE FUN CONCURRENTLY WITH NEW DESIGN ACLEPTIONLE TEST GUNS TO COMPARE KURPERT DESIGN WITH NEW OFFERING, ALSO TO INCLUPE L'ECONDETTUE PRODUCTS WHERE APPROPRIATE, TESTING _ WILL INCLUDE ENDURANCE, FIEL FUNCTION, PROP, DRY FIRE, STRENGTH, IMPERETUNAL ARUSE, TEMPERATURE EXTERNE, ... SOLVENT TESTING) AND ACCURACY. WHEN THE TEST LABUPAS THESE GUNS ON ALL TESTS, A WRITTEN REPORT CERTIALING THE GUN IS ALLEDTABLE FOR TRANSMITTER IS FILED, PERSONNER REDO ARE: ONE ENGINEER & FOUR TEST LAS RERIGNAGE FALTIME, MINI REDESIGN & PRAWING TRANSMITTEL JULY 92 BY THIS PHOSE OF DEVELOPMENT, THE DESIGN IS FIRM IND MADOR SETSACKS SHOULD OCCUR, ONLY MINOR CHARGES OR UNDERES SHOUD TRILE PLACE. CHANGES WILL BE LIMITED TO PROFESS UPPOTES, INPROVING ENDURANCE, COST EXTERINENESS, & INPROVED FUNCTION PLITY DNLY ON PARTS FOUND TO BE PROBLEM AREAS FROM BREVIUS TOSTING, _INITIAL TRANSMITTIGL OF RETEARCH MODE DRAWINGS & SPECIFIC PTIONS TALLES PLACE AT THIS TIME. PERSONNEL REQUIRED ARE: ONE ENGINEER I ONE CAD DRAFTSNAM FULL TIME

PROJECT APPROVAL (DECISION POINT) JULY 9Z - DURING THIS PERIOD FINAL MENAGENENT APPROVA ... OF THE DESIGN IS GIVEN & MONEY IS RELEASED TO BE PROPUTION TOOLING. ALL PETTINENT ELONONIS AND PROCULTION PROLETS ET TIM ATES WILL BE

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COMPLETED FOR THIS PROGET APPROVAL REPORT
DROFT MANUPLS ALC. 92 - GET 92
THIS INVOLVES DEVELOPMENT OF TEXT & ILLUSTRATIONS FOR
THE OWNERS MANUALS & INSTRUCTION BOOKLETS & FIED
CONJUNCTION WITH A CONSMERCISC PRINTER.
PETSONNEL PEPPO ARE: ONE ENGINEER & ONE PRAFTSMA
PART TIME WITH INPUT REQID FROM LEDAL DEPARTMONT
& CUSTOMER SERVICE,

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BARBER - PRESALE R 0138776 R2539764 $[1,1]_{\rm eff}$

BARBER - PRESALE R 0138777 3 CRITSRIP FOR THE ABOVE FIRE CONTROL OBE APHOLOD TO, WILL ALSO AFFECT TH Low WG ents. NEW BAR: OF TH Æ , RECEIVER E-PERIGN OR MOPIFICATIONS DUE ودى TO NO INTERCHANGE ASKITY OF È SEALED F. CONTLIC ENCUDS TO ELIMINATE CRUD MATRY · BOLT, BUT PLOG, EIRING PIN & HERO RE-DETICN DUE TO BOLT LOCK BEING RT OF INDEP SAFETH LEVER

BARBER - PRESALE R 0138777 R2539765
BARBER - PRESALE R 0138778 2-21-89 DEVELOPMENT SCHEDULE (BY TUES 20 FEB) - NEW/ BOLT ACTION RIFLE - FINALIZE DESIGN PATE FILATION SHEET - LIST OF FEATURES REVELOPMENT COSTS TOOLING, COSTS PART INITIAL DESIGN 10012 -000T イドフ PROTO TYPE STRUE MORES FOR THIS T COST EST. DESKON REVIEW _____ TESTING - ' REPETION W PLOTOTYLES RETEST DESIGN ACCEPTANCE TEST TRANSMITTON TO PRODUCTION

This is a list of the NBAR features, (that represent our design goals), in order of priority. o Detachable Magazine Box Improved Firecontrol 0 No Connector Two Trigger Pull Springs (low spring rate) "Sealed Firecontrol" - Balanced Trigger - Trigger and Sear Block - Not <u>Retrofittable</u> to M/700 o Bolt Lock w/byerride o Integral Scope Mounts o New Extractor o New "Custom Shop" Barrel Contour -Mountain Rifle Crown o Improved Bedding System o M/700 receiver, cosmetically altered o New Wood Stock

3-14-89 RSM/TGB



May 5, 1989

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RESEARCH DEVELOPMENT COSTS

	FOR					
	// NEW BOLT ACTION RIFLE (NBAR)					
RESEARCH	DEVELOPMENT COST ESTIMATE: Jan. '89 (n)	u u	CC.	. 92		
1	Initial Design	,	65	м		
2	Build Initial Design Prototype Guns(3)=	1	84	M		
۷.	- Preliminary Prototype	-	0.1			
	Tooling - tendorary =		80	м		
. 3.	Design Review Team Analysis =		35	M		
4.	Test Phase I Prototypes =		74	M		
5.	Redesign After Phase I Test =	1	55	М		
6.	Build Phase II Design Samples (15) =	· 1	59	М		
	- Prototype Tooling =	1	60	Μ		
	- Plant Assistance -		35	М		
7.	Test Phase II Samples -		70	М		
8.	Redesign After Phase II Testing =	1	41	М		
9.	Build Design Acceptance Guns (30) =	2	42	М		
	- Prototype/Permanent Tooling =	1	05	М		
	- Plant Assistance =		45	M		
10.	Test Design Acceptance Guns =		72	M		
11.	Minor Redesign & Transmittal To					
• •	Production =		13	M		
12.	Draft Manual =		25	M		
13.	Test Ammunition Cost 55,000 Rounds =	\square	14	M		·
	$(5,000 \text{ Rds} 1990 \times .25)$	A				
	(50,000 Rds 1991 X .25)	/				
TOTA	DEVELOPMENT COST (1989 DOLLARS)	4 9	74	м		
				••		
	$\Box \lor$					
RESEARCH	MANPOWER ESTIMATE: May '89 thru Oct. '	92				
	•					
1.	Research Engineer =	4.	94	man	years	;
2.	EDL Engineer =	1.	03	, ntan∖	years	;
3.	CAD Designer =	1.	90	/my/anha \	years	;
4.	CAD Detailer -	1.	74/	<u>man</u>	Years	;
5.	Draftsman =	•	25	man	years	;
6.	Model Shop Personnel =	4.	1/8	/man	Years	;
7.	N/C Programmer =	2.	্যন্ত	man	years	;
8.	Test Lab Personnel *	2.	50	man	years	;
						$ \rangle$
mc	•					N
195:Cap 5/05/00						
5/05/03		•				

NEW BOLT ACTION RIFLE (N'BAR) - CONT'D. PAGE 2 The purpose of the New Bolt Action Rifle (N'BAR) is to offer a eplacement for the M/700 'BDL' Rifle currently being produced. The new design parameters will include: Detachable Magazine Box ο 0 Improved Fire Control No Connector Two Trigger Pull Springs (Low Rate Spring) Sealed Fire Control Balanded Trigger Frigger & Sear Block - - Non-Retrofittable to M/700 Bolt Lock w/Override 0 New Scope Mounts - Possibly aftermarket bases and rings. 0 то be offered with rifle package. o New Extractor System o New 'Custom Shop' Barrel Contour Mountain Rif<u>le</u>Crown Improved Bedding Accuracy Features 0 Example: Thicker barrel bracket Relieved thread - rec. fit & full hub bearing o M/700 Receiver to start with same round blank size and

- cosmetically altered behind front ring of steel a locking lugs.
- o New Wood Stock Cosmetically altered for fittings/dress up/checkering

The "N'Bar" Design features will initially be produced in five calibers (30-06, 270, 280, 25-06 & 7MM Mag.). douring the first year of introduction. Typese design/cost estimates are based strictly on introduction of these five calibers only in long action standard and mag. calibers only. If at a later point in time other calibers and short actions are added to this program, they will have additional development and introduction costs added.

- Initial Design

Jan.'89 -June'90

This includes preliminary experimental development work, sketches, scenarios, layouts, design, computer modeling, detailing and checking. This design will be a redesign of the existing M/700 Rifle currently in our line, only in those areas so stated above in the design parameters section. Short actions and additional calibers will be considered during initial design to allow them to be compatible for design inclusion $\frac{d}{dt}$ a later time. Personnel required to accomplish this will include: one Research Engineer full time Cad Designer & one CAD Detailer, -> 50% of time, as well as some part time help from one EDL Engineer, Model Maker, N/C Programmer & Tester.

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER **KINZER V. REMINGTON**

BARBER - PRESALE R 0138781

- Send Vendor Parts Out For Jan.'89 - Jan.'91 Manufacturability and Quotation Estimate

Early vendor consultation and input is required due to many parts for detachable magazine box, fire control, scope mounts and extractor being vendor supplied parts with long lead times and vendor development input requirements for the design. 'High spot' estimates will be pursued early to determine feasibility of producing at a competitive cost. We will also look at after market products already developed, such as quick klip for a detachable magazine box and numerous scope mount/ring manufactures. A decision will have to be made at this time for project direction to go with a total Remington design magazine box or after market adaptation.

- Build Initial Design Prototype Guns

Aug.'89 - Apr.'90

At least three prototype suns will be built: one in cal. 30-06 to cover similar calibers of 280, 270, 25-06, one in 7MM Rem. Mag. for Mag. Cal. and one for esthetic evaluation in standard head size caliber. All common parts with M/700 will be procured from the the plant, current inventory. All newly designed parts will be fabricated by Remington where possible or be developed by outside vendors with Engineering/Development assistance from Remington. Personnel required will be: one Research Engineer, one CAD Designer, one CAD Detailer, one N/C Programmer part time and one Model Maker full time, one part time.

- Initiate Design Review Team Analysis Mar.'90 - May'90

Their purpose will be to review design at this point and look at design objectively. Input is necessary from Progess Engineering, Chemical/Materials Engineering, Arms Service feedback, Legal, as well as other Designers. Each group will review design as to potential 'Roadblocks' and feasibility to provuce an acceptable design.

- Test Phase I Prototypes

Apr.'90 - May'90

The two test prototypes - one standard caliber and one magnum caliber will be preliminary tested as to fit, form and function. These test guns will show up any major or minor design shortcomings prior to building multiple test guns for evaluation of function, accuracy, endurance. Testing will consist of dry firing/cycle, live firing, function and accuracy. Extended testing of one or both guns may be desired at this time depending on preliminary functioning results.

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BARBER - PRESALE R 0138782 R2539770

Test Phase I Prototypes - Cont'd.

A Marketing/Sales Manager Meeting will be held to evaluate styling, aesthetics, features utilizing the third prototype gun built. Their decisions will affect time for redesign and rebuild of models for both testing and aesthetics. Personnel required are: one Research Engineer full time, part time allowances for one EDL Engineer, one Model Maker, one CAD Designer and one Tester. $/\Lambda$

- Redesign (Decision Point)

May'90 - Aug.'90

Redesign begins as soon as problems arise in Phase I assembly or testing, and continues through Phase I Testing. Depending on the extent and nature of parts requiring redesign as a result of testing, Marketing, Legal or Design Review Team recommendations will greatly affect straight forward programs or delays for redesign, reevaluation and retesting. Depending on how much and how many components need attention will constitute a need for additional personnel such as: one Research Engineer, one EDL Engineer, one CAD Designer, one CAD Detailer, one Model Maker full or part time. Styling, stock design, weight, balance, safety will need to be oppressed at this phase. Also, high spot economics of the whole program will need to be completed at this time, and evaluated to determine project feasibility and path forward or redesign.

- Build Phase II Design Samples

July'90 - Jan.'91

A total of 15 design sample guns will be built (3 of each caliber) for this Phase II. The majority of the design, legal, and styling questions will be resolved during this phase. As many vendor sample prototype parts as are available, will be used. Other non-vendor parts will be made by Production, Model Shop or N/C Shop. Ongoing vendor visits will be required to consult and fabricate test sample parts from vendor temporary tooling. Some in-house finishing of these vendor components will be necessary by the Model Shop or N/C. Personnel required to implement this Phase II are: two Model Makers and one Engineer will be required full time, one N/C Programmer part time.

- Test Phase II Design Samples

Jan.'91 - Mah

These design sample guns will be tested for function, endurance, strength, blow/up, crud and temperature extreme tests, safety performance, dry firing, field function, two 30-06 and two 7MM Rem. Mag. guns will be subjected to an intentional abuse test. This may constitute some design changes or modification as deemed necessary from test results. Personnel required are: one Engineer and two testers will be required full time and one Model Maker and N/C Designer part time.

BARBER - PRESALE R 0138784 EW BOLT ACTION RIFLE (N'BAR) - CONT'D.

PAGE 5

- Redesign

Feb.'91 - May'91

Redesign begins as soon as problems arise during Phase II Testing and continues throughout testing. The test results will determine redesign effort needed to correct any deficiencies of the design. All styling, Marketing, and Legal concerns will be finalized by this time. If a major redesign or management change in criteria is required a substantial amount of time and effort will be required to complete. Personnel required will be one EDL Engineer, one Research Engineer, one CAD Designer, one CAD Detailer will be required full time.

- Build Design Acceptance Guns

Mar.'91 - Mar.'92

Apr. '9-2 - June'92

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The purpose of the design acceptance test is for finalizing design component parts to be fully tested in several guns prior to design transmittal to the plant. A total of 30 guns will be built including all five calibers for a large enough sample to be statistically sound. The majority of parts will be vendor produced parts on permanent tooling and in-house parts produced as much as possible on production machinery that will be used in the process of full production schedules. Some component parts may need finishing operations by the R & D Model Shop or N/C Shop. Also, N/C will aid FMS Operations for programming and debugging. Other current production parts required as used, or if in need of modifications will be procured from the plant. Personnel required will be: one Engineer, one N/C Programmer and one Model Maker full time. Some plant personnel will be required part time.

- Test Design Acceptance Guns

Design acceptance testing of 30 gun samples is the final test performed on the design prior to transmittal. We alterations or modifications are allowed during this testing phase to the test guns. The Test Lab has complete control of the testing and performs all testing it deems necessary to verify design for release to production. Control Gun Testing will be run concurrently with New Design Acceptance Test Guns to compare current design with new offering, also to include competitive products where appropriate. Testing will include endurance, field function, frop, dry fire, strength, intentional abuse temperature extreme, solvent testing and accuracy. When the Test Lab has passed these guns on all tests, a written report certifying the gun is acceptable for transmittal is filed. Personnel required are: one Engineer and four Test Lab personnel full time.

BARBER - PRESALE R 0138785 NEW BOLT ACTION RIFLE (N'BAR) - CONT'D.

PAGE 6

Mini Redesign and Drawing Transmittal July'92

by this phase of development, the design is firm and no major setbacks should occur. Only minor changes or updates should take place. Changes will be limited to process updates, improving endurance, cost effectiveness, and improved functionality only on parts found to be problem areas from previous testing. Initial transmittal of Research Model drawings and specifications takes place at this time. Personnel required are: one Engineer and one CAD Draftsman full time.

- Project Approval (Decision Point)

July'92 - Aug.'92

During this period, final management approval of the design is given and money is released to begin production tooling. All pertinent economics and production process estimates will be completed for this project approval report.

- Draft Manuals



Aug.'92 - Oct.'92

This involves development of text and illustrations for the owners manuals and instruction booklets and field service manuals. This will be prepared in <u>conjunction</u> with a commerical printer. Personnel required are: one Engineer and one Draftsman part time with input required from Legal Department and Customer Service.



BARBER - PRESALE R 0138786 PAGE 2 NEW BOLT ACTION RIFLE (N'BAR) - CONT'D. **The purpose of t**he New Bolt Action Rifle (N'BAR) is to offer a replacement for the M/700 'BDL' Rifle currently being produced. the new design parameters will include: METEL MATH PROG PRISENTEWITH M/100 0 Detachable Magazine Box GRETRA FITTABLE - NO FL ALSO SWS USE KIT FOR REPLACEMENT IN FILED o <u>Improved</u> Fire Control -REVESKNED - No Connector Twø /Trigger Pull Springs (Low Rate Spring) Sealed Fire Control Balanced Trigger Trigger & Sear Block Mon-Retrofittable to M/700 Bolt Lock W/Override (Look AT FRED'S BOLT LOCK PESIGN New Scope Mounts - Borilling on N. BAR 0 New Scope Mounts - Possibly aftermarket bases and rings. be offered with rifle package. 2 PC RIMG SETS TO 0 be offered with rifle package. 2 New Extractor System Earrel Contour 7 5/6/ 0 ? SIGHT HOLG DEPTH NEEDDIFF. SIGHTS -T. MCCORMACK Mountain Rifle Crown 0 Improved Bedding/Adcuracy Features Example: Thicker barred bracket LOOK AT MIM Relieved thread - rec. fit & full hub bearing M/700 Receiver to start with same round blank size and cosmetically altered behind front ring of steel over locking lugs. TINCCONNER EXTEND TIME LOOKS BETTER New Wood Stock - Cosmetically altered for fittings/dress 0 COCKING INDICATOR INDEPENDENT OF BOLT LOCK The "N'Bar" Design features will initially be produced in five calibers (30-06, 270, 280, 25-06 & 7MM Mag.) during the first year of introduction. These design/cost estimates are based strictly on introduction of these five calibers only in long action standard and mag. calibers only. If at a later point in time other calibers and short actions are added to this program, they will have additional development and introduction costs added. OF EJELTOR LOADED CHAMBER MORCATOR - LOOK AT GOING OFF OF ED. ٥ NEWET.MCCORMAC BOLT HYANDLE SHAPPE UNICLE MIKES 0

RECOIL PADS LOOK AT

O FULLY EXCLOSED BOLT PLUG LIGHT WENGHT FIRING PIN

¥ PROCESS - CONTRAT TO SEE IF HAND ANY PROBLEM AREA IN PRODUCING M/ 900 AS CURRENTY EXISTS

NEW BOLT ACTION RIFLE (N'BAR) - CONT'D. PAGE 2

The purpose of the New Bolt Action Rifle (N'BAR) is to offer a replacement for the M/700 'BDL' Rifle currently being produced. The new design parameters will include:

- O Detachable Magazine Box REDESIGNED Improved Aite Control
- No/Connector
 - Two Trigger Pull Springs (Low Rate Spring) _
 - Sealed Fire Control
 - Balanced Trigger
 - Trigger & Sear Block
 - Non-Retrofittable to M/700
- o Bolt Lock w/Override
- New Scope Mounts Possibly aftermarket bases and rings. To be offered with rifle package.
- o New Extractor System -
- o New 'Custom Shop' Barrel Contour - Mountain Rifle Crown-
- Improved Bedding/Accuracy Features 0 Example:
 - Thicker barrel bracket
 - Relieved thread rec. fit a full hub bearing
- o M/700 Receiver to start with same round blank size and cosmetically altered behind front ring of steel over locking luqs.
- o New Wood Stock Cosmetically altered for fittings/dress-OLDADED CHAMBER NONEW SIGHTS up/checkering / Record Flip

COCKING INDICATOR 0 The "N'Bar" Design features will initially be produced in five calibers (30-06, 270, 280, 25-06 & 7MM Mag.)_during the first year of introduction. These design/cost estimates are based strictly on introduction of these five calibers only in long action standard and mag. calibers only. If at a later point in time other calibers and short actions are added to this program, they will have additional development and introduction costs added.

DENLLTED BOLT PLUG

June 20, 1989

The States

CONFIDENTIAL

RESEARCH DEVELOPMENT COSTS



FOR

NEW BOLT ACTION RIFLE (NBAR)

RESEARCH DEVELOPMENT COST ESTIMATE: Jan.'89 thru Oct.'91

1.	Initial Desi gn	=	365	м		
2.	Build Initial Design Prototype Guns(3)	=	184	М		
	- Preliminary Brototype					
	Tooling - temporary	=	80	М		
3.	Design Review Team Analysis	=	35	М		
4.	Test Phase 1 Prototypes	=	74	М		
5.	Redesign After Phase I Test		155	М		
6.	Build Phase II Design Samples (15)	=	159	М		
	 Prototype Tooling 	=	160	Μ		
	- Plant Assistance	E	35	М		
7.	Test Phase II Samples		70	M		
8.	Redesign After Phase II Testing	=	141	M		
9.	Build Design Acceptance Guns (30)	=	242	M		
	 Prototype/Permanent poling 	=	105	M		
	- Plant Assistance	=	45	М		
10.	Test Design Acceptance Guns	-	72	М		
11.	Minor Redesign & Transmittal To					
	Production	=	- ¹³	М		
12.	Draft Manual	=/	25	M		
13.	Test Ammunition Cost 55,000 Rounds	71	14	M		
	(5,000 Rds 1990 x .25)	//1				
	(50,000 Rds 1991 x .25)	//	1			
		/	074			
TOTAL	L DEVELOPMENT COST (1989 DOLLARS)		19/4	M		
PESTADOU	MANDOWED ESTIMATE. May/80 thru Oct /	0 1				
ABBEARCH	MARTOWER ESTIMATE. May 09 child occ.					
1.	Research Engineer	=	4.94	66	vears	
2.	EDL Engineer	=	1.03	/man	vears	
3.	CAD Designer	=	1.90	man	vears	
4.	CAD Detailer	=	1.74	man	Vears	
5.	Draftsman	=	24		vears	
6.	Model Shop Personnel	-	4.18	man	vears	
7.	N/C Programmer	=	2.08	man	vears	\neg
8.	Test Lab Personnel	=	2.50	man	vears	
					1	$ \rangle$
					1	1

TGB:cap 6/20/89

The purpose of the New Bolt Action Rifle (N'BAR) is to offer a replacement for the M/700 'BDL' Rifle currently being produced. The new design parameters will include:

- o Detachable Magazine Box
 - Improved Fire Control

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- No/\Connector
- ftwo\trigger Pull Springs (Low Rate Spring)
- /Sealed Fire Control
 - -/ Balanded Trigger
- Trigget & Sear Block
 - Non-Retrofittable to M/700
- o Bolt Lock w/Override
- New Scope Mounts Possibly aftermarket bases and rings. To be offered with fifle gackage.
- o New Extractor System
- New 'Custom Shop Barrel Contour
 Mountain Rifle Crown
- o Improved Bedding Accuracy Features Example:
 - Thicker barrel bracket
 - Relieved thread rec. fit & full hub bearing
- M/700 Receiver to start with same round blank size and cosmetically altered behind front ring of steel over locking lugs.
- o New Wood Stock Cosmetically altered for fittings/dress up/checkering

The "N'Bar" Design features will initially be produced in five calibers (30-06, 270, 280, 25-06 & 7MM Mag.) during the first year of introduction. These design/cost estimates are based strictly on introduction of these five calibers only in long action standard and mag. calibers only. If at a flater point in time other calibers and short actions are added to this program, they will have additional development and introduction costs added.

- Initial Design

Jan.'89 - Dec.'89

This includes preliminary experimental development work, sketches, scenarios, layouts, design, computer modeling, detailing and checking. This design will be a redesign of the existing M/700 Rifle currently in our line, only in those areas so stated above in the design parameters section. Short actions and additional calibers will be considered during initial design to allow them to be compatible for design inclusion at a later time. Personnel required to accomplish this will include: one Research Engineer full time, one Cad Designer and one CAD Detailer, and one Research Engineer 50% of time, as well as some part time help from one EDL Engineer, Model Maker, N/C Programmer & Tester.

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138789

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- Send Vendor Parts Out For Manufacturability and Quotation Estimate

Jan.'89 - May'90

Early vendor consultation and input is required due to many parts for detachable magazine box, fire control, scope mounts and extractor being vendor supplied parts with long lead times and vendor development input requirements for the design. 'High spot' estimates will be pursued early to determine feasibility of producing at a competitive cost. We will also look at after market products already developed, such as quick klip for a detachable magazine box and numerous scope mount/ring manufactures. A decision will have to be made at this time for project direction to go with a total Remington design magazine box or after market adaptation.

- Build Initial Design Prototype Guns

Sept.'89 - Jan.'90

At least three protocype guns will be built: one in cal. 30-06 to cover similar calibers of 280, 270, 25-06, one in 7MM Rem. Mag. for Mag. Cal. and one for esthetic evaluation in standard head size caliber. All common parts with M/700 will be procured from the the plant, current inventory. All newly designed parts will be fabricated by Remington where possible or be developed by outside vendors with Engineering/Development assistance from Remington. Personnel required will be: one Research Engineer, one CAD Designer, one CAD Detailer, one N/C Programmer part time and two Model Makers full time, one part time.

- Initiate Design Review Team Analysis

Their purpose will be to review design at this point and look at design objectively. Input is necessary from Process Engineering, Chemical/Materials Engineering, Arms Service Feedback, Legal, as well as other Designers. Each group will review design as to potential 'Roadblocks' and feasibility to produce an acceptable design.

- Test Phase I Prototypes

Jan.'90 - Feb. 90

Dec.'89 - Feb.'90

The two test prototypes - one standard caliber and one magnum caliber will be preliminary tested as to fit, form and function. These test guns will show up any major or minor design shortcomings prior to building multiple test guns for evaluation of function, accuracy, endurance. Testing will consist of dry firing/cycle, live firing, function and accuracy. Extended testing of one or both guns may be desired at this time depending on preliminary functioning results.

- Test Phase I Prototypes - Cont'd.

A Marketing/Sales Manager Meeting will be held to evaluate styling, aesthetics, features utilizing the third prototype gun built. Their decisions will affect time for redesign and rebuild of models for both testing and aesthetics. Personnel required are: one Research Engineer full time, part time allowances for one EDL Engineer, one Model Maker, one CAD Designer and one Tester.

- Redesign (Decision Point)

Feb.'90 - May'90

Redesign begins as soon as problems arise in Phase I assembly or testing, and continues through Phase I Testing. Depending on the extent and nature of parts requiring redesign as a result of testing, Marketing, Legal or Design Review Team recommendations, will greatly affect straight forward progress or delays for redesign, reevaluation and retesting. Depending on how much and how many components need attention will constitute a need for additional personnel such as: one Research Engineer, one EDL Engineer, one CAD Designer, one CAD Detailer, one Model Maker full or part time. Styling, stock design, weight, balance, safety will need to be addressed at this phase. Also, high spot economics of the whole program will need to be completed at this time, and evaluated to determine project feasibility and path forward or redesign.

- Build Phase II Design Samples

May'90 - Aug.'90

A total of 15 design sample guns will be built (3 of each caliber) for this Phase II. The majority of the design, legal, and styling questions will be resolved during this phase. As many vendor sample prototype parts as are available, will be used. Other non-vendor parts will be made by Production, Model Shop or N/C Shop. Ongoing vendor visits will be required to consult and fabricate test sample parts from vendor temporary tooling. Some in-house finishing of these vendor components will be necessary by the Model Shop or N/C. Personnel required to implement this Phase II are: four Model Makers and two Engineers will be required full time, one N/C Programmer full time.

- Test Phase II Design Samples

Aug.'90 Dct.

These design sample guns will be tested for function, endurance, strength, blow/up, crud and temperature extreme tests, safety performance, dry firing and field function. Two 30-06 and two 7MM Rem. Mag. guns will be subjected to an intentional abuse test. This may constitute some design changes or modification as deemed necessary from test results. Personnel required are: one Engineer and two testers will be required full time and one Model Maker and N/C Designer part time.

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- Redesign

Sept.'90 - Dec.'90

Redesign begins as soon as problems arise during Phase II Testing and continues throughout testing. The test results will determine redesign effort needed to correct any deficiencies of the design. All styling, Marketing, and Legal concerns will be finalized by this time. If a major redesign or management change in criteria is required a substantial amount of time and effort will be required to complete. Personnel required will be one EDL Engineer. One Research Engineer, one CAD Designer, one CAD Detailer will be required full time.

- Build Design Acceptance Guns

Nov.'90 - Apr.'91

– July'91

May/

1211 - 1811 - 1934 B. 194 - 11

The purpose of the design acceptance test is for finalizing design component parts to be fully tested in several guns prior to design transmittal to the plant. A total of 30 guns will be built including all five dalibers for a large enough sample to be statistically sound. The majority of parts will be vendor produced parts on permanent tooling and in-house parts produced as much as possible on production machinery that will be used in the process of full production <u>schedules</u>. Some component parts may need finishing operations by the R & D Model Shop or N/C Shop. Also, N/C will aid FMS Operations for programming and debugging. Other current production parts required as used, or if in need of modifications will be procured from the plant. Personnel required will be: two Engineers, two N/C Programmers and two Model Makers full time. Some plant personnel will be required part time.

- Test Design Acceptance Guns

Design acceptance testing of 30 gun samples is the final test performed on the design prior to transmittal. No alterations or modifications are allowed during this testing phase to the test guns. The Test Lab has complete control of the testing and performs all testing it deems necessary to verify design for release to production. Control Gun Testing will be run concurrently with New Design Acceptance Test Guns to compare current design with new offering, also to include competitive products where appropriate. Testing will include endurance, field function, drop, dry fire, strength, intentional abuse temperature extreme, solvent testing and accuracy. When the Test Lab has passed these guns on all tests, a written report certifying the gun is acceptable for transmittal is filed. Personnel required are: one Engineer and four Test Lab personnet full time.

Mini Redesign and Drawing Transmittal July'91

By this phase of development, the design is firm and no major setbacks should occur. Only minor changes or updates should take place. Changes will be limited to process updates, improving endurance, Cost effectiveness, and improved functionality only on parts found to be problem areas from previous testing. Initial transmittal of Research Model drawings and specifications takes place at this time. Personnel required are: one Engineer and one CAD Draftsman full time.

- Project Approval (Decision Point)

July'91 - Aug.'91

During this period, final management approval of the design is given and money is released to begin production tooling. All pertinent economics and production process estimates will be completed for this project approval report.

- Draft Manuals

Aug.'91 - Oct.'91

This involves development of text-and illustrations for the owners manuals and instruction booklets and field service manuals. This will be prepared in conjunction with a commerical printer. Personnel required are: one Engineer and one Draftsman part time with input required from Legal Department and Customer Service.



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CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138794 R2539782









CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138797

	RES. NBAR. TRIGGER-GUARD. TJP. MPD	10-27-88	14:03:59
	RES.NBAR.BBL-NEW-CONTOUR.RAW.&PD	8-22-88	13:18:20
i	RES. NEAR. BBL-NEW-CONTOUR-MAG. RAW. MPD	8-22-88	13:35:57
	RES. NBAR. BOLT-ASSY. TJP. MPD	10- 1-87	10:30:11
	RES.NBAR.BOLT-HEAD.&PD	6-11-86	17:52:09
	RES.NBAR.BOLT-LOCK.RAW.&PD	3-28-88	21:32:45
	RES.NBAR.FIRCTRL-PLATE-LFT.&PD	2-25-87	20:09:57
	RES.NBAR.FIRCTRL-PLATE-RT.%PD	1- 5-88	18:56:10
	RES.NBAR.FIRING-PIN-ASSY-LA.%PD	3-14-86	7:10:34
	RES.NBAR.FRONT-SPACER.%PD	2-25-87	16:35:03
	RES.NBAR.GUARDASCREW.&PD	7-16-86	9:37:22
	RES.NEAR.REAR-GWARD-SCREW.&PD	7-22-86	15:02:13
	RES. NEAR. REAR-SPACER. & PD	11-29-87	9:44:54
	RES.NBAR. # URING A INHEAD. &FD	1-27-88	8:03:43
	RES.NEAR.RECEIVER. & PD	11-29-87	9:53:59
	RES.NBAR. SAFETY-ASSY. &PD	2-25-87	20:27:52
	RES.NBAR.SAFETY-PIVOT-PIN.&PD	12-21-87	16:47:41
	RES.NBAR.SEAR-SAFETY-CAM.MPD	1- 4-88	17:26:42
	RES.NEAR.STOCK.&PD	3-10-87	16:10:49
	RES.NBAR.STOCK-INSERT &PD	10- 8-86	16:07:23
	RES.NEAR.TRIGGER-ASSY & PD //	5- 6-88	22:04:45
	RES.NBAR.TRIGGER-BLK-PLUNGER	2-25-87	16:08:33
	RES.NEAR.TRIGGER-HOUSING-ASAY &FD	11-29-87	10:10:09

RE3.700. E33225.35. RECOVER - LA - 24. DUF. & PD BECOMES 700. 8 AUS Views 1, 2, 4, 2, 1, 5, 6 32, 51, 52

3. Drawings, Part Blueprints, Sketches

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BARBER - PRESALE R 0138799 R2539787 







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8- 7-89 15:57:37 FUTIL 10.27

DATE TIME

1 99/305 FU1IL 10.27 L 200 CG05200X 4.0 ARCIVE ARCIVE 1 RES. NKAH STUCK .N C2. APD 2 RES. NBAR .STUCK .N C1. APD 3 RES. NBAR .STUCK .& PD 8-13-86 12:03:06 5-15-86 21:59:24 8-28-86 8:20:36

2	1 87/147 99/2 05 FUT IL 10.27	CG() S2 00 X	4.0	ARCIVI	ARCIVE
F	KES. NEAR BARKEL APD // 6-26-B	6 10:00:38			
2	HES. NOAH BARJEI-ASBY BRID 8- 4-8	6 7115121			
3	RES. NHAR . HARREI - ASSY-COMPLETE . APD	0 ///2/21			
-	5-20-8	6 17:00:45			
4	RES. NBAR FOLLOWER-IA SPD 6- 5-8	6 0:28:15			
5	HES. NOAN . HARREL-VAR. APD 6- 5-8				
6	RES. NBAN BARNEL MAG. APD 8- 4-8	6 7128144			
7	RES. NHAR BOLT-BODY & PD	6 17:20:27			
8	RES. NEAR . SCOPE-MOUNT-CLAMP.& PD	0 11 27 27			
-	8-26-8	6 8149106			
9	RES. NBAR, HULT-HUDY-ASSY, APD ID-7-8	6 17126106			
10	RES. NBAR . STUCK-PLUG. SPD d- 5-8	6 10.23124			
11	RES. NB AR. MAGAZINE-RELEASE &PD 3-10-8	6 21 # 44 # 05			
12	KES. NBAR. HOLI-HEAD. & PD 6-11-8	6 17152109			
13	KES.NBAR.BOLT-HEAD-BLANK & PD 4-15-8	6 18:16:23			
14	RES. NEAR . BOLI-LA TCH. &PD 7-22-8	6 9106109			
15	KES. NEAR . BOLT-LA TCH-PT VOT-PTN . 8PD				
	6-26-8	6 8 57:04			
15	RES. NEAR . HOLT-LOCK-PLUNGER .DSE . & PD				
-	8-1-8	6 1 3 4 2 4 7			
17	HES.NBAR.BOLT-PIN. &PD 1- 6-8	6 1 8 4 1 4 4			
18	HES.NOAH.BULT-PLUG.&PD 2-17-8	7 19:54:13			
15	HES.NOAH.BULT-ASSY.TUP.&PD 10- 7-8	6 47:4742			
20	RES. NEAR . BOLT-PLUG-WASHER. SMM. 8PD				
	3-12-8	6 14:22:34			
21	RES. NEAR . BOL I-STOP . & PD 3-14-8	6 12:59:45	_		
22	HES. NEAR . BOLT-STOP-RELEASE . & PD		/	.\	
	3-18-8	6 9:02:30		$\land \land$	
23	HES.NBAR.BOLT-STOP-RELEASE.BLANK. &PD		- / /		
	9-24-8	5 10:20:30	14	<u> </u>	
24	RES. NBAR. EXPI600 .BULT-LATCH. USF. &PD		1		
	8-29-8	6 14:56:00			
25	RES. NBAR. SCOPE-M T-SWS-ASSY. TJP.&PD	· · · • • · · ·			
	8-28-8	6 8:34:59			_
26	RES. NBAR . TSTACK. MAG- BO TTOM-MAX .DSF .&P	D			
	5-29-8	6 13:46:37			$\left[N \right]$
27	HES. NBAR . TSTACK . MAG- BO TTOM-MIN.DSF . 34	D			$ \setminus $
	5-29-8	6 14:07:18			$ \setminus $
28	RES.NBAR.EJECTOR.&PD 1-15-8	6 7:25:08			$ \setminus V$
29	RES. NBAR. EJECTOR-WASHER. & PD 1-15-8	6 7:04:53			$ $ \times
30	RES. NBAR . EXPIGIO .BOLT-LATCH. TJP. & PD				
	9-8-8	6 14:08:48			

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER **KINZER V. REMINGTON**

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ECORD FILENAME UATE TIME 31 HES. NEAR . EXTRACTOR-222 . & PD 10- 3-85 9:12:45 32 RES. NBAR. EXTRACT (R-MAG. &PD 10- 9-85 10:14:43 33 RES. NEAR . FIRCTRL-PLATE-LFT. & PD 4- 4-86 9:37:27 34 RES.NBARAHIRCTRL-PLATE-RI.&PU 35 RIS.NBAH.FURING-PIN-ASSY.&PD 3-26-86 7:50:23 6-26-85 22:00:15 36 R.S. NOAR. A RING-PIN-ASSY-LA. &PD 3-14-86 7:10:34 37 KES. NOAR . NRYNG- PIN-CROSS-PIN. 8PU 3-12-86 13:05:49 38 HES.NBAR.FIRING-PIN-LA.&PD 6-26-86 9:37:28 39 RES.NBAR.FIRING-PIN-SA.&PD 1-8-86 8:04:11 40 RES. NBAR . . IR ING- HINHEAD &PD 9-12-86 19:25:45 41 RES. NBAR. EXP-1627. BOLT-PLUG. SET-SCREN-BOLT-LOCK. EAK. &PL 10- 5-86 14:15:32 42 RES. NUAR . FRONT-SPACER. SPC 3-12-86 12+50+54 43 HES NOAR . EXP-MAG +LATCH . TUP . & PD 10-14-86 21:07:32 44 RES. NBAR. GUA-D-SCRIEN. & PD 7-16-86 9:37:22 45 RES.NBAR.EXP-MAG-LAT-RET.TJP.&PD 10-14-86 20:56:59 46 RES.NBAR.EXP-NAG-LAT-TP.TJP.&PD 714-86 20:51:41 10 47 RES.NBAR.EXP-MAG-LAT-TP.FHS.&PD ۱Ø 6-86 14:34:20 48 RES.NOAR.EXP-MAG-LAT-FP.TJP.&PD .10+14-86 20\$59\$16 49 RES.NBAR.EXP-1629.BOLT-LOCK.SET SCREW.DSF. &PD 12-10-86 11+52+10 50 RES. NU AR . MAG-RELEASE. TJP. & PD 6- 6-86 9:21:48 51 HES.NBAR.EXP-MAG-LAT-KLC.TJP.&PD 12- 3-86 13 20:05 52 RES. NBAR. EXP-1635. MAG-LAICH-LEVER. FHS. 4PD 10- 8-80 112:49:02 53 RES. NBAR. MAGAZINE-BOTTOM. & PD 172 1 45/7 6-26-86 54 H ES. NUAR . MAGAZINE-LA . & PD 6- 6-86 10:22/48 55 RES.NBAR.EXP-1636.MAG-LAICH-PIN.FHS.&PD 10- 8-86 19:41:40 56 RES. NB AR. EXP-1637. MAG-LATCH-PIVOT-PIN. FHS. &PU 10-14-86 6:50:28 57 RES. NUAR. EXP-1638. MAG-BOX. FHS. &PD 10-17-86 L0:24:34 58 HES. NEAR . BOLT-LUCK-REDESIGN. TJP. &PD 10-14-86 22:03:05 59 RHS.NEAR.REAR-GUARD-SCREW. &PD 7-22-86 15:02:13 60 RES.NBAR.REAR-MAG-LATCH.&PD 5-28-86 10:40:05 61 RES.NEAR.REAR-SPACER.&PD 3-12-86 12:55:27 62 RES. NUAR . RECEIVER. &PU 2-11-87 8:30:59 63 RES. NBAR. EXP-BOLT-PLUG.EAK. &PD 10-29-86 8:43:23 64 RES. NBAR .R IVET & PD 6-26-86 8:28:24 65 KES. NHAR. EXP-1643. BOLT-LOCK. SET-SCREW. TJP. &PD 10-14-86 17:30:18 3-12-86 11:53:48 66 RES.NBAR.SAFETY.&PD 67 RES. NBAR. SAFETY-ASSY & PD 7-30-86 7:52:54 08 RES.NBAR.SAFETY-BUTTON .&PD 3-12-86 10:45:37 64 RES. NUAR. SAFETY-PIVO (-PIN. &PD 4-14-86 7129148

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138803 R2539791

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			DATE	IIME
${{\color{black} \square}}$	5	RES. NEAR . BBL-NEW-CON TO UR-MAG. RA	8-22-88 W-4PD	13+18+20
	7	RES.NBAR_BBL-NEW-CON DUR-VAR.RA	8-22-88	13:35:57
	8	HES. NOAH AJUL T- ASSY. TJP. &PD	8-22-88 0- 1-87	13+07+38 10+30+11
	10	RES. NB/AR. HOLT-BODY & PD RES. NB/AR. HOLT-BODY-ASSY. & PD RES. NB/AR. HOLT-BODY-ASSY. & PD	1-29-88 0- 7-86	8*13*37 17*26*06
	12	KES. NBAR. BULL-BODY-MIN. SAN . SPD	2- 1-88	6:44:49
	13	RES.NOAR.BOLT-HEAD.&PD	1-29-88	22:09:06
	14 15	KES.NBAR.BOLI-HEAD-BLANK & PD HES.NBAR.BOLI-LOCKLRAW.APD	4-15-86	18:10:23
	ło	RES. NEAR . BOLI-LOCK MAX . RAW . & PD	3-18-88	19122120
	17	RES. NOAR . BUL I-LOCK-MIN. FAK . & PD	3-17-88	21:26:04
	18 19	RES.NGAR.BOLT-PIN-APJ LA RES.NGAR.BOLT-PLUG.APD I	1- 6-86	13+41+48
	20	HES.NOAR.BOLT-PLUG-WASHER.SMM.8	120 3-12-86	14122134
	21 22	RES.NBAR.BOLT-STOP.WFP.8PD RES.NBAR.DEXP1782.0.MAG-HELEASE	- 4- 88	19:21:04 D
	23	RES. NEAR . DEXP 1782. NO . MAG-RELEAS	1- 6-68 5≣.GDS.&	12:46:25 PD
	24	RES.NBAR.EJECTOR.&PD	2-28-87 1-15-86	8:45:50 7:25:08
	25 26	HES.NBAR.EJECTOR-WASHER.&PD RES.NDAR.EXP-1637.MAG-LATCH-PI	1-15-86 /0T-PIN.	7:04:53 FHS.&PD
	27	RES. NBAR. EXTRACTOR-222.8PD	0-14-86	0150128 0112145
	20 29	RES. NOAR . FIRCTRE -PLAILEI-MIN. E	0 85 AK.&PU	
	30	RES. NBAR . F IRCTRL-PLAT-LT-MAX. RA	3-10-00 N.&PD	
	31	RES.NUAR .FIRCTRL-PLATE-LFT.&PD	2-25-87	20109157
	32	RES.NUAR IRCTRL -PLATE-RT. &PU	1- 5-88	18:56:10
	34	DES NOAS - TROTRE - LA TE-RI-MAX. H	1- 5-88	22:11:45
	27	DES NEAD EIDING DIN ACCULA CON	AK - 6- 68	20+34+23
	30	VES NHAS EIDING DIN COMES DIN	3-14-86	7:10:34
	30	DES NEAD EIDING DIN LA AND	3-12-86	13:05:49
	38	RES.NBAR.FIRING-PIN-LA-MAX.EAK.	1-29-88 & 20 1-20 80	13114110
	39	RES.NUAR.FIRING-PIN-LA-MIN.EAK.	1-29-88 &PD	21120119
	40	RES. NEAR .F IRING-PIN-SA .& PD	1- 8-86	810411
	41	RES.NBAR.FIRING-PINHEAD.SPD RES.NBAR.FIRING-PINHEAD-MAX.RAM	1-29-88 1.4PD	8:03:43

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138805 R2539793

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RECURD FILENAME DATE TIME 2- 1-88 8:01:03 RES_NEAR .FIRING-PINHEAD-MIN. RAW. &PD **4**B 2- 1-88 13:38:44 44 RES.NBAR.FOLLOWER-LA.SPD 5- 3-88 18+26+23 45 RES.NBAR. FRONT-SPACER. &PD 2-25-87 16:35:03 46 RES.NBAR. PRONI-SPACER-WAX. RAW. &PD 3-16-38 20:21:30 RON 1-SPACER-MIN. RAW. &PD 47 KES. NHAR . 3-16-88 20:54:53 48 KES. NBAN . JUAND -S CREW . & PD 7-16-86 9:37:22 44 HES. NB AR /MAG-BOX . RAW . & PD 3- 4-88 11:28:23 50 HES. NEAR MAG-REPEASE . NC. HAJ. & PD 5- 3-88 13+20+03 51 RES. NUAR . MAG-REL EASE . RAJ . & PU 4-27-88 15:42:49 52 RES. NBAR . MAGAZINE-LA. & PD 6- 6-86 10:22:48 53 RES.NBAR.NEW-REC-STYLING.DSK.&PD 4- 5-88 10:14:58 54 RES. NBAR. PLATE-RT-MAX-EAK. &PU 1- 7-88 16:09:31 55 RES. NB AR . PLATE-R T-MIN. EAK &PL 1- 6-88 22:14:56 56 RES. NBAR . REAK-GU ARD SCREW . SPU 7-22-86 15+02+13 57 RES. NUAH . REAR-SP ACER & PD 11 11-29-87 9:44:54 58 RES.NBAR.REAH-SPACER-MAX.EAK.&PD 1- 5-88 17:03:37 59 RES.NBAR.REAR-SPACER-MIN.EAK.&PD 5-88 9:19:16 11-29-87 9:53:59 6-26-86 8:28:24 1-4-88 21:04:02 1-7-88 17:26:00 2-26-87 20:29:52 50 RES.NBAR.RECEIVER.&PD 61 RES. NB AR .R IVET .& PD 62 RES. NUAR . RIVET-MAX . EAK . & PD 63 RES. NB AR . R IVET-M IN . R AW . & PD 64 RES. NBAR. SAFETY-ASSY . & PD 65 RES. NBAR. SAFETY-BUTTON .& PD 3-12-86 10:45:37 66 RES.NBAR.SAFETY-LEVER.TJP.8PD 1- 6-88 15:45:15 67 RES. NB AR. SAFELY-LEVER-MAX. RAW. &PD 1- 8-88 21 14:17 68 RES. NBAR. SAFETY-LEVER-MIN. EAK. &PD 1-11-88 17 39 :\37 69 RES.NBAR.SAFETY-PIN.MIN.EAK.&PD *\3\7 4-88 19 42 1-70 RES. NBAR. SAFETY-PIN-MAX. EAK.&PD 1- 4-88 20:15:37 71 RES.NBAR.SAFETY-PIVOT-PIN.&PU 12-21-87 16:47:41 72 RES.NBAR.SCOPE-MOUNT.&PD 3-17-88 22:23:00 73 RES. NEAR . SCOPE-MOUNT . CRASH 2-14-85 14+21+01 74 RES. NBAR. SCOPE-MOUNT-ASSY. &PD 3-17-88 22:14:07 75 RES. NEAR . SCOPE-MOUNT-CLAMP.&PD 3-17-88 20:16:26 76 RES.NBAR.SCOPE-MOUNT-NUT.&PD 6-26-86 9:00:33 77 RES. NBAR . SCUPE-HOUNT-RING . &PU 6-11-86 12:51:29 78 RES. NO AR . SEAR-MAX. RAW. &PD 1-14-88 6147133 79 RES.NBAR.SEAR-MIN.RAN. &PD 1- 5-88 21:12:12 80 RES. NO AR . SEAR-SAFETY-CAM . & PD 1- 4-88 17:20:42 81 RES.NBAR.STOCK.&PD -3-10-87 16:10:49 82 RES. NBAR.STOCK.NCI.& PD 2-25-87 16:47:50 83 RES. NB AR . STOCK-INSERT. &PL 10- 8-86 16+09+23 84 RES.NBAR.STUCK-PLUG.&PD 6- 5-86 10:23:24 85 RES. NUAR.STOCK-RIVET.& PD .6-2**6-**86 8:34:43 86 RES. NBAR. STOCK-WASHER. &PD 1- 6-86 13:57:45

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RECORD	FILENAME		DATE	TIME	
81	HES. NB AH	.I-P-ASSY-MAX-FM.TJP.8F	PD		
88	RES. NBAR	. TRIG-ASSY-WAX .TJP .84D	2- 8-88	19=36=42	
89	RES. NBAR	.TRIG-PLATE-ASSY-MAX.T.	1- 8-88 JP.&PD	21:57:58	
90	KES. NBAK	. IR IGARLATE-ASSY-MIN.T.	2- 8-88 JP.&PD	15+27+46	
91	RES.NBAR	.TRIG-RLUNGER-MAX.EAK.8	1-28-88 IPD	16+04+35	
92	RES. NEAR	.TRIG-PLUNGER-MIN. EAK. 8	1-13-88 190	17=51=01	
93	RES. NEAR	.TRIG-PULL-AUJ-SCREM.&F	1-13-88 20	17:47:33	
94	RES.NBAR	TRIG-PULL-PLUNGER SPD	2-26-87	16#27#02	
			11-30-87	8+49+38	
95	RES. NHAR	.TRIGGER.SMM. & PD	1- 7-88	8:39:56	
96	RES. NBAR	- TRIGGER -A SSY APL	5- 6-88	22104145	
07	RES. NRAD	TDIGGED-ASSY-MIN-TIL A		22:04:40	
21 28	RES. NH AR	TRIGGER-BIK-BILINGER		15+28+58	
			2-25-97	14.09.22	
99	RES. NB AR	.TRIGGER-GUARD.TJP.&PD	0-12-99	10:00:33	
100	RES. NBAR	.TRIGGER-GUARD.TJP.EEXF	1350		
101		TRIGGER -CUAUD TID I		204544.00	
102	RES. NEAR	.TRIGGER-HOUSING-ASSY.		20+50+22	
		1	1-29-87	10 = 10 = 09	
103	RES. NEAR	TRIGGER -MAX . RAW . & PI)	1- 8-88	12:42:40	
104	PES NHAD	TRIGGED -HIN EAK PDD		12+56+20	
105				12.30.20	
105	KEJ • NO AR	• I KIOOER-PLUNDER-MAX•EP	K.APU		
			1-13-88	17+58+22	
106	RES. NBAH	. TRIGGER-PLUNGER-MIN.E	K.8PD		
			3-16-88	20141137	
5	8 (9/016 99/365 FUTIL 10.	.27	CG4200X/40	ARCIVI
ł	RES. NO AR	. TRIGGER -GUARD.TJP.&PD	()-27-88	14:03:59	
2	RES. NHAR	. BRI-NEW-CONTOUR DAW 20		14-05-57	
E.	11204110741	TODE NEW CONTOURTRANTOR			\square
	FF		8-22-88	13:18:20	$\langle \Lambda \rangle$
ى	KE2.NBAR	.BBL-NEW-CONTOUR-MAG.R/	W.&PD		
			8-22-88	13:35:57	$// \setminus$
4	RES. NEAR	BOLT-ASSY TUP &PD	0- 1-87	10:30:11	
ñ	KES. NHAN	HOLT-HEAD & PD	6-11-94	17152100	
~	RES. NRAD	HOL CALOR DIM PUD	2-28-00	21.22.45	//
07	DEC NDAR		2-20-08	45 <i>11 24</i> 15	
/	RED. NO AK	.FIRCIRC-PLAIE-EFI.&PD			
			2-25-87	20:09:57	
8	RES. NUAR	.FIRCTRL-PLATE-RI.&PU	1- <u>5</u> -88	18456410	
9	RES. NH AR	.FIRING-PIN-ASSY-IA. APT)		
•		The second second second	3-14-94	7.10.34	
10		EDINIT_EDIOED ADS	3-14-00	1 1 1 4 3 4	
10	HED. NOAK	.FRUNITSPACER. &PU	2-25-87	16:35:03	
11	RES. NBAR	.GUARD-SCREW.&PD	7-16-86	9:37:22	
12	RES. No AR	.REAR-GUARD-SCREW.&PD	7-22-86	15:02:13	

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON

BARBER - PRESALE R 0138807 R2539795

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ECORD FILENAME		DATE	TIME
13 RES. NOAR .RI	EAR-SPACER .& PD	11-29-87	9:44:54
14 RES. NBAR .F	IRING-PINHEAD.&PD	1-29-88	8:03:43
15 RES. NBAH .R	CEIVER. &PU	11-29-87	9:53:59
10 HES.NBAR.S.	FETY-ASSY .& PD	2-26-87	20:29:52
17 RES.NBAR.S.	VFETY-FIVOT-PIN. &PU	12-21-87	16147141
18 HES. NOAR . SI	EART SAFE TY -CAM . & PD	1- 4-88	17:26:42
19 RES. NBAR .S	TOOK & PD	3-10-87	16:10:49
20 RES. NBAR .S	TOCK TINSERT. &PE	10- 8-86	16:09:23
21 RES. NHAR . D	RIGGER-ASSY. SPL	5- 6-88	22:04:45
22 RES. NBAR TI	LGGER-BLK-PLUNGER	LED T	
		2-25-87	16108133
23 RES NBAR	RIGGER-HOUSING-ASSY.	APD 01	10-00-55
		11-29-87	10+10+09

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER **KINZER V. REMINGTON**

BARBER - PRESALE R 0138808 R2539796

RECORD

1-18-89 19:00:49 FUTIL 10.27 -LENAME F

DATE TIME

.99/365 FUTIL 10.27 CG()S200X - I 86/266 4.0 ARCIVI ARCIVI 1 7029.14.MAIN-SPRING-LA. APD + RES.7 A LOL 8- 5-85 12:47+00 7058 .2.3.MAIN-SPRING-SA.&PD -2 RE5.700.A 8- 5-85 12:39:43 3 RES. 700. A3632.0. TRIG-BLK-PLUNGER-SPG. &PD 8- 5-85 11:27:31 4 RES. 700. BI 4630. J 1. ERINT-S PACER.& PD 7-31-85 22139143 5 RES. 700. BIA631.15 REAR-SPACER. &PD 7-31-85 22141124 6 RES. 700. B1 5224.13 SPRING-TURSION & PD 8-30-85 8:51:01 7 RES. 700. 817013.25. BULT-STOP. & PD 7-24-85 22+59+53 .8 RES. 700. 817043.32. PIN. &PD 8-29-85 17:39:06 9 RES. 700. 817044.23. SAFETY-CLIP. &PD 1- 7-86 6:10:18 3- 3-86 13:05:10 10 RES. 700. C15368. 17. SPRING. &PD 11 RES. 700. C15478. 15. BOLT-STUP-RELEASE. APD 9- 4-85 13:41=36 12 RE5.700.026330.28.BOLT-HANDLE.&PD 3-14-86 14:11:32 .8PD 13 RES. 700. 026330. 29. BOLT-HANDLE 6-19-86 21:48:40 14 RES. 700. D33580.0. RECEIVER-222 -223-LH.&PD 11- 5-85 21 +57 +21 15 RES. 700.D33580, 12. RECEIVER-222-223-RH. 8PD 11- 5-85 20 25 40 16 RES. 700. D92762. 1. RECUIL-PAD. &PD 4- 3-85 181391 17 RES. 700. E33225.27. RECEIVER-LA-RH. & PD 3- 7-86 18:36+17 18 KES. 700. E33225.28. RECEIVER-LA-RH. & PD 8-21-86 12:54:57 • 19 RES. 700. E33225.28. RECEIVER-LA-RH. DSF. ARD 9-23-86 9116137 20 RES. 700. E33226.0. RECEIVER-SA-RH. &PD 7-31-86 14:33:30 21 RES. 700. E33265. 10. RECEIVER-LA-LH. &PD 7-29-86 22:45:18 22 RES. 700. E33266.10. RECEIVER-SA-LH. &PD 10- 9-85 22:00:14 23 RES. 700. FP-ASSY-LAYOUT. &PD 1-28-86 21:17:56 24 RES. 700. MAG-LATCH- MP 01.8PD 3-24-86 8153132 2 ł 86/266 99/365 FUTIL 10.27 CG05200X 4.0 ARCIVI ARC 1 RES.KLC. 700MR. E100570. &PD .9- 5-86 18:17:13

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER KINZER V. REMINGTON 1. C.

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RECORD	FELENAME	DATE	TIME		
2 3 4 5 6 7 8 9	RES. KLC. BUTTPT. & NF IG RES. KLC. FENDPT. & NF IG RES. KLC. M IDPT. & NF IG REM. RES. KLC. BUTT PT. & NF IG REM. RES. KLC. FEND PT. & NF IG REM. RES. KLC. M IDP T. & NF IG RES. RJS. FOOMR. EI 00570. NCO. & PD RES. RJS. TUOMR. EI 00570. NCO. & PD	10-30-84 10-30-84 10-30-84 10-30-84 10-30-84 10-30-84 9-10-86 9-15-86	9125136 9152150 9136135 9125136 9152150 9136135 14143123 17149151		
3	1 87/221 99/365 FUTIL 1	0.27	CGOS200X	4.0 ARCI	VI ARCIVI
ł	RES. 700. E33225.34. RECEIVER-LA	-RH.DSF.&	D		
2	RES. 700. E33226.1.RECEIVER 54-	RH. FHS. &PE) R105110		
3	RES. 700. E33266.0 . RECEIVER-SA-	LH.FHS.&PE			
	· .	0 /-0/	10-21-14		
4	1 88/166 99/365 FUTIL 1	0.27	COUSZOOX	4.0 ARCI	
. 1	RES. 700. A 1 7044.20. CL IP-MAX.WF	P.8PD			
. 2	RES. 700. A17044.20. CL IP-MIN.WF	10-15-87 P.&PD	16+58+16		
. 3	RES. 700.814630.14.5PACER-FRON	10-15-87 T-MAX-8PD	16112157		Ň
- 4	RES. 700. B1 4630 .1 4. SP ACER-FRON	12- 8-87 T-WIN.RAW.	11:41:43 &PD		-
5	RES. 700. 815368. 16. SPRING-MAX.	12- 8-87 RAM.&PD	11+20+32		
6	RES. 700. 815368. 16. SPRING-NIN.	10-19-87 RAN. 4PD	9 08-07		
7	RES. 700. 817043.32. SA FETY-PIN-	10-19-87 MAX.RAW.&F	9104124		
8	RES. 700. 817043.32. SA FETY-P IN-	10-15-87 MIN.RAM.&F			
· 9	RES. 700. B1 7053.31. TR IG-STUP-S	CREW-MAX.W	FP.8PD		
10	RES. 700. B1 7053 . 3.1. TR IG-STUP-S	CREW-MIN.F	1/19414 RAW.&PD	\square	N N
1.1	RES. 700. 82 3220 .4 6. SA FETY-DETE	NT-BALL . #F	P.&PD	$/ \bigtriangleup$	\backslash
12	RES. 700. CI 5280.30. TR IGGER-MAX	.RAM. &PD	13145150	/	
13	RES. 700.015280.30.TRIGGER-NIN	.WFP.&PD	19122104	<u> </u>	\smile
14	RES. 700. C1 5478 .1 5. BOLT-STOP-R	ELEASE.WFF	22108121		
.15	RES. 700. CI 5666 .2.3. SEAR-MAX.EA	K.&PD	17121123		
16	HES. 700. C15 666.2 3. SEAR-MIN.TJ	P.&PD	16158114		
17	RES. 700. C19461.19.CO NNECTOR-M.	AX.FHS.&PD)		

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RECIT	FILENAME	DATE	TINE
		DATE	IIMC
-	12	- 8-87 1	3+41+15
18	RES. 700. C19461.19.CO NNECTΩR-MIN.	WFP.&PD	4135141
19	RES. 700. 026655.20. TR IG-HUUS-A SSY	-MAX.EAN	. &PD
20	RES. 700/02 055.20.TR IG-HOUS-A 55	-MIN.EAN	.&PD
21	RES. 700, C30780. 13. PLATE-MAX. RAW.	4PD	6117102
22	RES. 700. C30780. 1 3. PLATE-NIN. RAW.	2- 8-87 &PD	0 * 22 * 3 5
23	12 RES. 700. C30780. 13. RH-PLATE-MAX. M	- 8-87 1	0+30+12
24	RES. 700- C30780 . 13. PH-PLATE HIN	-1.9-87	7 = 57 = 1 5
-~		-19-87	7=34=48
	RES. 100. CY2212.2. SAFELT-MAX. HAN.	apu)-23-87	7127136
20	RES. 700. C92212.2.SAF ETY-MAX.TJP.	4PD -14-88	6136107
27	RES. 700. C92212.2 .SAF ETY-MIN. RAW.	&PD	7124142
28	RES. 7 0. E33225.34. REC-SAFETY. FH	. & PD	
29	RES. 700. E3322 5.34. RECEIVER-LA-R	1.09F.8P)
30	RES. 700. E33226.2 .RECEIVER-SA-RH.	-25-87 F#S.&PD	6+52+42
3+	RES. 700. E33245. J.J. RECEIVER-LA-IH	5- 9-88 1. FHS. KPI	9+41+06
32	RES. 700-E33266.0 PECETVED-SA-TH	- 2-87	8 = 50 = 50
		-24-87	3130143
	RES. TOOLF LRECHTRL-ASST.MAX-MIN-L	-13-88	0=35=01
14	RES. 100.FIRECNTRL-ASSY.SAFETY.DS	F.4PD	8 11 13
35	RES. 700. FORMER. COPYING-ROLL. & RD	-15-84	
36	RES. 700. LB553.0. CHANBER-DWG-300	M.FHS.L	20
37	RES. 700. RECEI VER -BLANK-ANGLE.FHS	. 4 PD	1120119
38	RES. 700. RECEIVER-END-VIEW. FHS. &P	1-1-88 10	2+37+06
39	22 RES. 700. SAS. 894340.0. RETA LNING-F	-12-88 1 PIN.TJP.8	3+36+11 LPD
40	9 RES. 700.5W5.C94339.0.PIN.T.IP. APP	-10-87 1	5+20+59
41	RES. 700. SHS (2434) 0 GAGE-DUIG	-10-87 1	5+24+37
17		-10-87	5149133
72	RES. (00.503.CEAP1/50.0./50LB-TES	01-CONE.D 0-10-87 1	15+26+32
43	WES. 700.545.CEXP 1765.0.WOOD-DIRT	-BOX.DSF	*.&PD 8+17:49
44	RES. 700. SAS. D943 38.0 . GAGE-PLUG. T	JP.&PD	5.00.55
45	RES. 700. SAS. EJECTION-CHART.DSF.	PD	9+22+00
	9	-21-87 1	6 1 08 1 56

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RECORD FILENAME DATE TIME 12 RES. 700. LB 554.0. 416-REM-HAG-REM-UNLY. NFP. & PD . 10-25-88 16+57+27 13 RES. 700. LB 554. 0. 416- REM-WAG-INQUIRIE. WFP. & PD 10-25-88 16:59:45 892018 99/365 FUTIL J0.27 8 CG()5200X 4.0 ١ ARCIVI ARCIVI I RES. 700'. MR-STUCK -INLETTING. &PD 1-17-89 10157132 2 RES. 700. EX PI 539. BOL-SYN-STK. & PD 1-18-89 8:21:14

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on Res rch Division Ι MODEL 700 RIFLE - "CLASSIC" FOR 1990 Date: BOLT ACTION REPEATER CENTERFIRE 09/22/89 1722/89 .25-06 REMINGTON (Dotted line (----) 2 Sheet o£ 3 indicates same part number DWG. PART NAME .25-06 REMINGTON NO. PART NUMBERS 22040 B-22040 FIRING PIN ASSEMBLY C-17012 Bolt Plug (Blk. C-19894) 17012 Firing Pin (Blk, C-28805) 22020 C-22020 17022 B-17022 Firing Pin Cross Pin C-23320 Firing Pin Head (Blk. B) 27975) 23320 Main Spring 17029 A-17029 B-17013 Bolt Stop (Blk. B-90492) 17013 C-24475 Bolt Stop Pin 24475 B-15224 Bolt Stop Spring L 15224 C-22035 Front Guard Screw (Blk. C-28810) 22035 16430 C-16430 Magazine (Blk. C-91933) C-92218 Magazine Follower (Blk. 92769) 92218 A-15677 15677 Magazine Spring A-26355 Rear Guard Screw (A-91908) 26355 B-17034 Receiver Plug Screw (4) (Blk. B-91913) 17034 C-24475 Sear Pin 24476 C-34590 STOCK ASSEMBLY 34591 A-91544 Recoil Pad 91544 C-25410 Recoil Pad Screw (2) (Blk. C-91916) 25410 15358 15358 A-15358 Front Swivel Screw A-15358 Rear Swivel Screw B-15651 Stock Reinforcing Screw 15651 E-34355 Stock (Check.Pat.D-91546)(Blk.19752) 34356 26345 D-26345 TRIGGER ASSEMBLY 15478 C-15478 Bolt Stop Release (Blk. C-91917) B-92297 92297 Safety Assembly 92212 C-92212 Safety Safety Button C-14578 14578 B-23220 Safety Detent Ball 23222 B-15368 Safety Detent Spring 15368 B-17043 Safety Pivot Pin (Blk. B-91918) 17043 A-17044 Safety Washer 17044 C-15666 Sear Safety Cam (Blk. C-91919) 15666 A-17047 Sear Spring 17047 C-15280 Trigger (Blk. C-91912) 15280 B-17053 Trigger Screw, Front (Blk. B-91920) 17053

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Date: MODEL 700 RIFLE - "CLASSIC" FOR 1990 09/22/89 BOLT ACTION REPEATER CENTERFIRE 11722/89 .25-06 REMINGTON		
Sheet 3	(Dotted line ()	
of 3	indicates same part number	
DWG.	// \\ PART NAME	.25-06
NO.		REMINGTON
		PART NUMBERS
C-19461	Trigger Connector (Blk. C-91921) (Blk. C-91937)	19461
B-91128	Trigger Engagement Screv(Blk. B-91922)	91128
C-26655	TRIGGER HOUSING ASSEMBLY	26655
B-14632	Trigger Housing Rivet (4)	14632
B-14630	Trigger Housing Spacer, Front (Blk. B-91923)	14630
B-14631	Trigger Housing Spacer, Rear (Blk. B-91924)	14631
C-30780	Trigger Side Plate, Right (Blk. C-32785)	30780
C-30780	Trigger Side Plate, Left	30781
C-24475	Trigger Pin	24477
A-15400	Trigger Spring	15400
A-15481	Trigger Stop Screw (Blk. A-91926)	15481
B-26370	TRIGGER GUARD ASSEMBLY	26371
	THE ABOVE PART NUMBER IS FOR ARMS SERVI	CE ONLY
B-31490	Trigger Guard Sub-Assembly	31491
C-19800	Floor Plate (Blk. 91942)	19βου /
A-16453	Floor Plate Pivot Pin	16453 /
D-26375	Trigger Guard (Blk. 34315)	26B76 //
B-15291	Floor Plate Latch (Blk. 91759)	15291\\ //
A-16451	Floor Plate Latch Pin (Blk. 91943)	16491 \\/
A-16452	Floor Plate Latch Spring	



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