

- M/700 Design Changes

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE



File 39

xc:

- J.P. Glas
- R.B. Sperling
- F.T. Millener
- P.H. Holmberg
- W.H. Forson, Jr.
- C.B. Workman
- T.L. Capeletti
- J.W. Brooks

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

Ilion, New York
October 27, 1981

MODEL 700

INSTRUCTION BOOKS REVISIONS

Attached is a revised copy of Page 4 for the M/700 Instruction Books as sent to you with cover letter dated October 1, 1981. This revision has been approved by Legal, and replaces the copy of Page 4 you now have.

Your prompt review and/or comments will be appreciated by November 5, 1981, after which time it will be assumed that the instructions meet with your approval and printing will commence.

R.L. Sassone, Supervisor

Project Control & Administrative Services

By: R.L. Smithson

RLS:m
Firearms Research Division
Attach.

CURRENT



IMPORTANT PARTS OF THE FIREARM

THE SAFETY SWITCH

The safety switch provides protection against accidental or unintentional discharge under normal usage when properly 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 when the firearm is loaded and not ready for firing.

X The bolt handle cannot be lifted when the safety switch is in the "S" position. See picture 3.

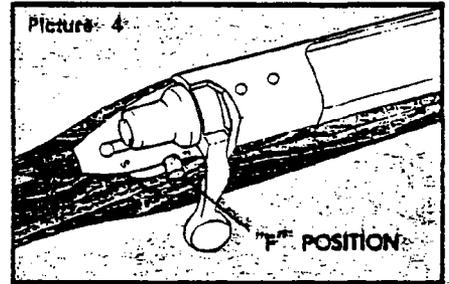
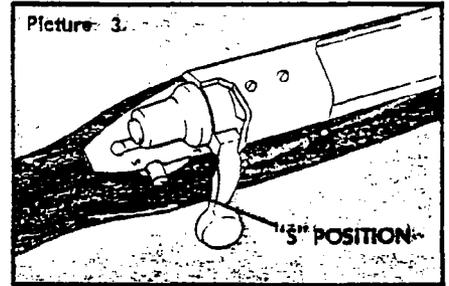
When you are ready to fire the firearm, put the safety switch in the "F" position. See picture 4.

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 fire.



PROPOSED



IMPORTANT PARTS OF THE FIREARM

THE SAFETY SWITCH

The safety switch provides protection against accidental or unintentional discharge under normal usage when properly 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 when the firearm is loaded and not ready for firing.

X Before moving the bolt handle, always put the safety switch in the "S" position.

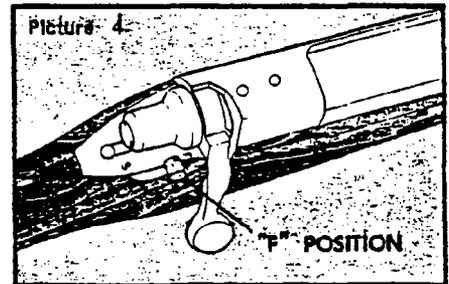
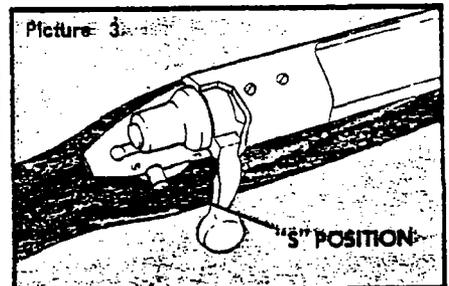
When you are ready to fire the firearm, put the safety switch in the "F" position. See picture 4.

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 fire.



DON'T SAY IT—WRITE ITTo ClarkDate 8/3/81From Tamire: Bolt Action Rifle Strategy

Attached is a description of five (5) models that Marketing has proposed for a Market Research study (as per telephone conversation today with Joe Glas). Joe wants to know how soon we could have a model of each ready for the study. — Need ASAP! I have provided a copy of this info to Fred Martin and Doug Bullis and asked that they get started and be prepared to discuss on your return to work.

“SAFETY RULES ARE PERFECT TOOLS”

①

7/3/81
TE

Bolt Action Rifle Strategy - Marketing Research

Need Five (5) Samples:

1) Low Price M/700

Price \approx M/788

Features - M/700 long action, 22" barrel, M/788 sights, birch stock, press checkering(?), formed magazine follower, no floor plate, straight classic stock, low cost bolt handle (no jewel on knob), no Harper buffing on action (and possibly barrel), no sling swivel studs, no grip cap, low cost lacquer finish

2) M/700 ADL Competitive with Ruger M/97

Features (As per July 14, 1981 letter from Marketing)
- Standard M/700 action, detachable floor plate, no iron sights, scope mount rings (included in package / not installed), redesigned cast magazine follower, no bolt lock, jeweled bolt, M/700 ADL stock, cut checkering (with reduced pattern from BDL or Classic), new lacquer finish - medium gloss, sling swivel studs, M/4 butt plate, BDL grip cap

(2)

9/3/81
TE

Bolt Action Rifles (Cont)

3) Upgraded M/700 BDL

Features - Present BDL + M/4 type grip cap, contrasting wood fore-end tip (eg rosewood), steel trigger guard, floor plate, improved metal finish, scope mount rings (included in package/not installed), new lacquer finish - medium gloss

4) Bolt Action Carbine

Features - Same as recent models

5) Model 7

Features - As currently proposed + straight stock with cheekpiece (If necessary, buy a custom stock such as those currently made for M/700's)

File #39

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE



Xc: T. L. Capeletti
 J. S. Martin
 J. W. Brooks

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

November 21, 1981

TO: C. B. WORKMAN
 FROM: F. E. MARTIN
 SUBJECT: .257 ROBERTS

I recently learned of the planned introduction of this caliber in the M/700 Classic. Also that it is to be in the M/700 long action.

After talking with you on this matter, I am submitting in writing my feelings on this subject.

- The .257 should be in the M/700 short action to keep it the compact easily handled rifle this cartridge was intended for.
- The barrel need not be 24" long; 22" is adequate. Cartridge case capacity does not warrant a 24" barrel. Also again I emphasize compact easily handled.

If we are to base the action length purely on whims of some handloaders, we should also look at changing the length of actions used on the .308, 6mm, .243 and other short action calibers.

Handloading is the tailoring of hand made ammunition to production guns not guns to handloaders.

Being one of several who has lobbied, for the past three years, for the reintroduction of this cartridge and having chosen it for the M/7, I feel close to the subject and aware of the desires of shooters.

fm

FEM:ws

File 67

xc: H.K. Boyle
H.C. Munson
C.B. Workman
T.L. Capeletti
J.P. Linde
R.W. Farrington, Jr.

Est. #4338

April 15, 1982

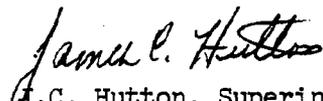
G.D. Campbell

M/700 Sporter

The attached preliminary first and third year economics have been calculated for the proposed M/700 Sporter based on prices and volumes supplied by Marketing. The cost estimates are based on current M/700 cost experience adjusted for inflation, changes in production volume, and the estimated cost effects of the revised product features specified by Marketing. Because details of the product mix within each grade were not available, all ADL, BDL, Classic, and Sporter grade rifles were assumed to be standard caliber (i.e. .30-06). The BDL special grade was assumed to include varmint and left hand grades.

Estimated first year (1983) results show this proposal will increase the average M/700 unit margin from 4.8% to 11.0% as a result of increased prices and improved efficiency due to the higher volume (85M units vs. 65M units). Additional net earnings of \$755M yield a 22.2% net return on investment on a full allocation basis including the effects of reallocating overhead costs due to the increased volume. First year incremental results show net earnings of \$1,201M and a 37.8% net return on investment.

A 46M unit increase in volume is anticipated for the third year of operation (1985) which will generate an estimated \$1,461M net earnings and a 17.2% net return on investment on a full allocation basis. Estimated third year incremental results are \$2,709M net earnings and a 34.4% net return on investment.


J.C. Hutton, Superintendent
Industrial Engineering Section

TRAndrews/kc
Attached

**M/700 SPORTER
ESTIMATED UNIT PRICES, COSTS AND PRE-TAX EARNINGS
1st YEAR OF OPERATION**

PRESENT

	<u>M/700 ADL</u>	<u>M/700 BDL</u>	<u>M/700 Classic</u>	<u>M/700 Specials</u>	<u>Composite Unit</u>
SALES QUANTITY	14,000	30,000	8,000	13,000	65,000
RETAIL PRICE	\$ 359.95	\$ 429.95	\$ 399.95	\$ 459.95	\$ 417.18
NET SELLING PRICE	\$ 194.63	\$ 232.48	\$ 216.26	\$ 248.70	\$ 225.58
TOTAL COST	\$ 189.03	\$ 220.48	\$ 207.53	\$ 234.21	\$ 214.86
PRE-TAX EARNINGS	\$ 5.60	\$ 12.00	\$ 8.73	\$ 14.49	\$ 10.72
% OF NET SELLING PRICE	2.9%	5.2%	4.0%	5.8%	4.8%

PROPOSED OPERATION

	<u>M/700 ADL</u>	<u>M/700 BDL</u>	<u>M/700 Classic</u>	<u>M/700 Sporter</u>	<u>M/700 Specials</u>	<u>Composite Unit</u>
SALES QUANTITY	10,000	24,000	8,000	30,000	13,000	85,000
RETAIL PRICE	\$ 369.95	\$ 439.95	\$ 409.95	\$ 419.95	\$ 469.95	\$ 426.42
NET SELLING PRICE	\$ 200.04	\$ 237.89	\$ 221.66	\$ 227.07	\$ 254.11	\$ 230.57
TOTAL COST	\$ 181.26	\$ 209.29	\$ 198.89	\$ 204.25	\$ 221.95	\$ 205.17
PRE-TAX EARNINGS	\$ 18.78	\$ 28.60	\$ 22.77	\$ 22.82	\$ 32.16	\$ 25.40
% OF NET SELLING PRICE	\$ 9.4%	12.0%	10.3%	10.1%	12.7%	11.0%

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER

KINZER V. REMINGTON

R2530303

**M/700 SPORTER
ESTIMATED EARNINGS AND NET RETURN ON INVESTMENT
FIRST YEAR OF OPERATION (1983)**

	Present Operation (M/700 Line)	Results From This Project		Operation After This Project
		Full Allocation*	Incremental Basis	
<u>SALES QUANTITIES</u>				
M/700 ADL	14,000	(4,000)	(4,000)	10,000
M/700 BDL	30,000	(6,000)	(6,000)	24,000
M/700 CLASSIC	8,000	-	-	8,000
M/700 SPORTER	-	30,000	30,000	30,000
M/700 BDL SPECIALS	<u>13,000</u>	<u>-</u>	<u>-</u>	<u>13,000</u>
TOTAL	65,000	20,000	20,000	85,000
<u>NET SALES</u>				
M/700 Cost	\$ 14,662	\$ 4,937	\$ 4,937	\$ 19,599
Selling & Admn. Exp.	\$ 12,541	\$ 2,939	\$ 2,297	\$ 15,480
Finished Product Dist. Exp.	1,145	442	353	1,587
	<u>279</u>	<u>93</u>	<u>59</u>	<u>372</u>
TOTAL COST	\$ 13,965	\$ 3,474	\$ 2,609	\$ 17,439
<u>PRE-TAX EARNINGS</u>	\$ 697	\$ 1,463	\$ 2,328	\$ 2,160
<u>NET EARNINGS</u>	\$ <u>359</u>	\$ <u>755</u>	\$ <u>1,201</u>	\$ <u>1,114</u>
<u>INVESTMENT</u>				
Project Expenditures	\$ -	\$ 200	\$ 200	\$ 200
Existing Facilities used directly in Operation	\$ 6,069	-	-	\$ 6,069
Allocated General Facilities	200	74	25	294
Working Capital	<u>\$ 10,519</u>	<u>\$ 3,127</u>	<u>\$ 2,956</u>	<u>\$ 13,646</u>
TOTAL INVESTMENT	\$ 16,808	\$ 3,401	\$ 3,181	\$ 20,209
NET RETURN ON INVESTMENT	2.1%	22.2%	37.8%	5.5%

* Includes effects of reallocation of overhead costs due to increased volume

M/700 SPORTER
ESTIMATED UNIT PRICES, COSTS AND PRE-TAX EARNINGS
3rd YEAR OF OPERATION

	PRESENT				
	<u>M/700 ADL</u>	<u>M/700 BDL</u>	<u>M/700 Classic</u>	<u>M/700 Specials</u>	<u>Composite Unit</u>
SALES QUANTITY	10,600	23,900	6,000	12,000	52,500
RETAIL PRICE	\$ 419.95	\$ 489.95	\$ 459.95	\$ 519.95	\$ 479.25
NET SELLING PRICE	\$ 227.07	\$ 264.92	\$ 248.70	\$ 281.14	\$ 259.13
TOTAL COST	\$ 213.73	\$ 248.44	\$ 234.18	\$ 263.45	\$ 243.23
PRE-TAX EARNINGS	\$ 13.34	\$ 16.48	\$ 14.52	\$ 17.69	\$ 15.90
% OF NET SELLING PRICE	5.9%	6.2%	5.8%	6.3%	6.1%

	PROPOSED OPERATION					
	<u>M/700 ADL</u>	<u>M/700 BDL</u>	<u>M/700 Classic</u>	<u>M/700 Sporter</u>	<u>M/700 Specials</u>	<u>Composite Unit</u>
SALES QUANTITY	6,000	20,000	10,000	48,500	14,000	98,500
RETAIL PRICE	\$ 429.95	\$ 499.95	\$ 469.95	\$ 479.95	\$ 529.95	\$ 487.06
NET SELLING PRICE	\$ 232.48	\$ 270.33	\$ 254.11	\$ 259.51	\$ 286.55	\$ 263.36
TOTAL COST	\$ 200.50	\$ 231.72	\$ 220.54	\$ 223.21	\$ 243.19	\$ 226.12
PRE-TAX EARNINGS	\$ 31.98	\$ 38.61	\$ 33.57	\$ 36.30	\$ 43.36	\$ 37.23
% OF NET SELLING PRICE	13.8%	14.3%	13.2%	14.0%	15.1%	14.1%

M/700 SPORTER
ESTIMATED EARNINGS AND NET RETURN ON INVESTMENT
3rd YEAR OF OPERATION

	Present Operallon (M/700 Line)	<u>Results From This Project</u>		Operation After This Project
		<u>Full Allocation</u>	<u>Incremental Basis</u>	
<u>SALES QUANTITIES</u>				
M/700 ADL	10,600	(4,600)	(4,600)	6,000
M/700 BDL	23,900	(3,900)	(3,900)	20,000
M/700 CLASSIC	6,000	4,000	4,000	10,000
M/700 SPORTER	-	48,500	48,000	48,500
M/700 BDL SPECIALS	<u>12,000</u>	<u>2,000</u>	<u>2,000</u>	<u>14,000</u>
TOTAL	52,500	46,000	46,000	98,500
<u>NET SALES</u>				
	\$13,604	\$ 12,337	\$ 12,337	\$ 25,941
<u>NET COST</u>				
Mill Cost	\$11,439	\$ 8,205	\$ 6,326	\$ 19,644
Selling & Admn. Exp.	\$ 1,072	\$ 1,064	\$ 606	\$ 2,136
Finished Product Dist. Exp.	\$ <u>258</u>	\$ <u>235</u>	\$ <u>148</u>	\$ <u>493</u>
TOTAL COST	\$12,769	\$ 9,504	\$ 7,080	\$ 22,273
<u>PRE-TAX EARNINGS</u>				
	\$ 835	\$ 2,833	\$ 5,257	\$ 3,668
<u>NET EARNINGS</u>				
	\$ 430	\$ 1,461	\$ 2,709	\$ 1,891
<u>INVESTMENT</u>				
Project Expenditures	\$ -	\$ 200	\$ 200	\$ 200
Existing Facilities Used directly In Operation	\$ 6,261	-	-	\$ 6,261
Allocated General Facilities	\$ 204	\$ 185	\$ 62	\$ 389
Working Capital	\$ <u>9,706</u>	\$ <u>8,122</u>	\$ <u>7,618</u>	\$ <u>17,828</u>
TOTAL INVESTMENT	\$16,171	\$ 8,507	\$ 7,880	\$ 24,678
<u>NET RETURN ON INVESTMENT</u>				
	2.7%	17.2%	34.4%	7.7%

CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER
KINZER V. REMINGTON

R2530306

File 67

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE



Xc: R. E. Fielitz
C. A. Riley
P. H. Holmberg
W. H. Forson, Jr.
G. D. Campbell
J. W. Brooks
J. S. Martin

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

Ilion, New York
May 10, 1982

CONFIDENTIAL

TO: C. B. WORKMAN
FROM: T. L. CAPELETTI *TC*
SUBJECT: MODEL 700 ADL RESTYLE FOR 1983 — REVISED SPECIFICATIONS

Based on Bill Forson's memorandum dated April 30, 1982, features for the Model 700 ADL for 1983 are as follows:

- Walnut Stock - No fore-end tip
- Cut Checkering - 18 lines/inch
- Grip and fore-end (side panels only)
- Stock slimmer in grip area, but with same shape on grip end as current ADL
- No grip cap
- No white line spacers
- No rubber butt pad
- Sling swivel studs
- Medium gloss wood finish
- Improved metal finish
- Iron sights — same as present Model 700 ADL
- Stamped "no bind" follower
- No floor plate
- Calibers; .222, 22-250, 6mm, .243, 25-06, .270, 30-06, 7mm Mag., .308

TLC:ws
Firearms Research Division

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington
OUPON**PETERS**
OUPON

F-77
Xc: C. B. Workman
T. L. Capeletti
J. W. Brooks
J. A. Stekl

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

September 24, 1982

TO: J. S. Martin
FROM: F. E. Martin
SUBJECT: Ken Jantz Metalsmithing
Route 1
Sulphur, Oklahoma 73086

Installation instructions that accompanied the three position safety, marketed by the above company, require the alteration of three parts critical to the safe operation of the Models 700 - 721 - 722 - 600 and XP-100; the firing pin, firing pin head, and the sear. Legal should be made aware of this recommended alteration and the resultant malfunction when this modification is performed improperly.

Attached, for your review, is a copy of the instructions.

JM
FEM:ws
Attach.

INSTRUCTIONS

JANTZ SIDE SWING SAFETY - REMINGTON 3- Position

For Models 700, 721, 722, 600 and X-P100

1. Disassemble bolt and striker assembly.
2. Remove bolt sleeve from your old bolt and install your new assembly.

FOR SAFETY AND PROPER OPERATION DO THIS!!! :

The following instructions **MUST** be followed carefully! We recommend that you take your safety to a qualified gunsmith for these adjustments.

3. Grind as shown in illustration (we recommend you use a surface grinder to do this, however, if one is not available it can be done with a bench grinder if care is taken.)
4. Install safety and with the safety in fire position pull back the striker (firing pin) and place the safety on safe position. This procedure will allow you to measure the amount the safety is moving the cocking piece off of the sear.

WHEN FINISHED THE SAFETY SHOULD MOVE THE COCKING PIECE REARWARD .015 - .020 FOR BEST OPERATION BE SURE YOU DO NOT OVERGRIND, IF YOU DO IT WILL BE NECESSARY TO REMOVE SOME METAL FROM THE SEAR (Rem 700 part #15666)

NOW TRY SAFETY FOR PROPER OPERATION

5. Pull trigger with safety on. Release safety (try this several times). If gun dry fires, safety is not withdrawing cocking piece far enough to allow sear to retract. Grind Sear, (Rem 700 part #15666) carefully to correct this condition.

INSTRUCTIONS

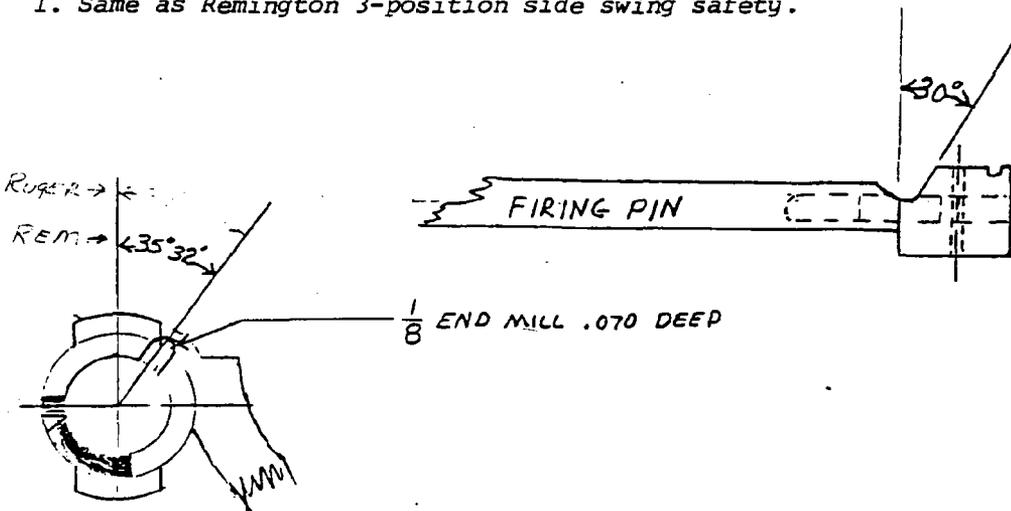
JANTZ SIDE SWING SAFETY - RUGGER 77 3-Position safety

1. Same as Remington 700 (above) except as noted on drawing.

INSTRUCTIONS

JANTZ SIDE SWING SAFETY - Springfield 3-position

1. Same as Remington 3-position side swing safety.



COCKING PIECE
TOP VIEW
30° NOTCH should be
CUT SO SAFETY WILL
MOVE COCKING PIECE
DIS FROM SEAR, WHEN
IN SAFE POSITION

REM. 700 Bolt
REAR VIEW

NOTCH ALSO INDEXES
BOLT SLEEVE WHEN
BOLT IS OPEN IN
SAFE POSITION

F-83

REMINGTON Model 700

TWENTY YEARS AGO, a new center-fire rifle was unveiled, one that would very quickly become the first choice of riflemen everywhere who either recognized its qualities firsthand or believed what gun writers had to say about it (perhaps both). Actually, a close look reveals that this rifle really wasn't all that new; it was more like a refined version of another born in 1948.

Remington introduced their Models 721 and 722 bolt-actions that year, catching postwar America with an insatiable appetite for sporting rifles and their competitors with their breeches down over slow production. And when we consider the limited choice in US-made bolt-actions on the market in those days, it's obvious that Remington's timing was doubly good.

Except for their action lengths, the two new rifles were one and the same; the Model 721 took longer cartridges such as the .30-06 and .300 H&H

Magnum, while the Model 722 was first offered in .257 Roberts and .300 Savage. Even with such a fine plan, there were still a few kinks, because the .257 Roberts was a bit long for the Model 722 action, as was the .300 H&H Magnum for the Model 721. Remington solved that problem by milling-out a slot in the front of the receiver ring and shortening the bolt stop.

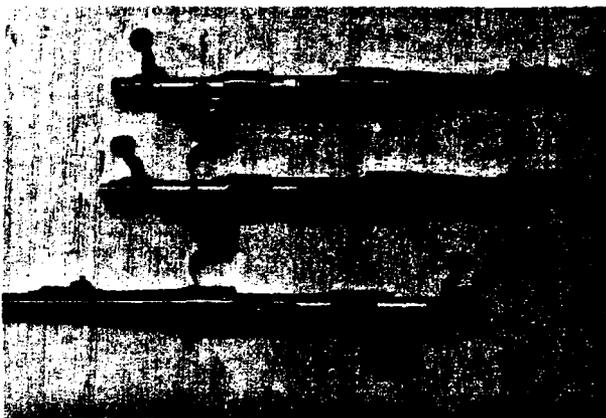
The Models 721 and 722 were probably the strongest and thus safest rifles ever built in the US; their triggers broke like expensive crystal; taken on average, they were the most inherently accurate mass-produced hunting rifles ever seen by American shooters; their price was right — and just as important as any other factor that led to their eventual success, Remington went all-out in making sure that there were plenty to go around.

With tubular receivers machined from bar stock, Remington's Models 721 and 722 were a manufacturing

revelation for 1948. Also unique among their details was a counterbored bolt head that mated with a counterbored breech face, both encircled by the receiver ring. Such an arrangement completely enclosed a chambered cartridge head with "three rings of steel," as Remington's ads would put it years later.

For extraction of fired cases, a groove inside the bolt head counter-bore lip holds captive a C-shaped spring with integral claw on its inner surface. A spring-loaded pin protruding through the bolt face bears on one side of a case, ejecting it when its mouth clears the receiver ring. The Models 721 and 722 took a few on the jaw and below the belt during their heyday but were praised a lot, too. At any rate, Remington sold a passel of them.

When I bump into one of those rifles today, I'm reminded of a funny little adventure that involved a farmer and a



When it was introduced in 1962, the Model 700 action (center) had the same receiver and bolt body as the Models 725 (top), 721, and 722 but with a two-position safety lever like that of the Models 721 and 722. Also, its bolt knob was checked over top and bottom, and its sleeve was shorter. This Model 700LH (bottom) shows changes made in 1969: longer bolt sleeve, round safety-lever thumb piece, and jeweled bolt body.



The rear sight on the Model 725 (top) also appeared on transitional Models 721 and 722 during 1958 and was inherited by the Model 700 in 1962 (center). This sight consisted of a removable base with a stepped elevator and a spring-steel leaf. In 1969, this sight was replaced by a sliding leaf dove-tailed to an inclined base (bottom), which makes finer elevation adjustments possible.

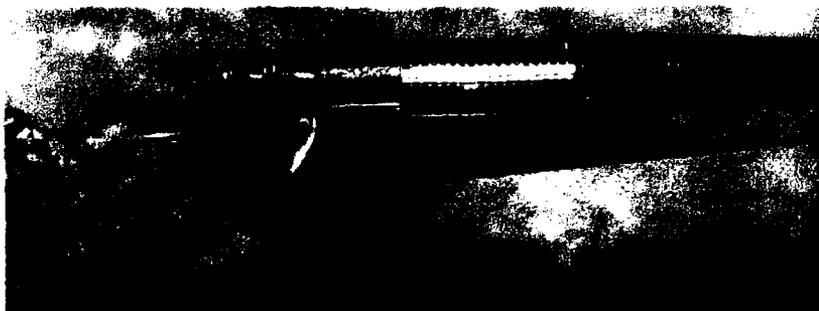
Layne Simpson

brand-new barbed-wire fence. He and I were bouncing around in his pickup that day, shooting crows with a Model 722 in .222 Remington, topped with a Weaver 10x scope. We spied several in his bottomland, busy pulling-up young corn shoots. He stopped the truck beside a four-string fence (which had been installed the weekend before), laid the rifle on the window sill, and started trying to find feathers through the Weaver and the fence. He had never used a scope before, so I warned him about not being able to see the wire so close — all to no avail. The shiny new wire twanged like a snapped banjo string when a fifty-grain Sierra passed through it. As it turned out, I ended-up shooting all the crows that were shot that day.

Remington knew that there were just so many empty slots in gun cabinets that could be filled with rifles such as the Models 721 and 722. They were the kind of rifle that a fellow would buy because he needed something to shoot, not the kind of rifle that would

cause one to head for the store with boot in one hand and a Model 70 in the other. Economical, no-nonsense rifle that it was, the boys as New Haven sold one that looked better, which is probably what caused Remington to later offer fancier grades such as *B*, *ADL*, *BDL*, *Special*, *Peerless*, and *Premier*. But underneath the fancy dressing was still that stamped trigger guard, with no way to unload except by jacking cartridges through the chamber.

In 1958, Remington really got somewhere. For the same price as Winchester's Model 70, one could buy Remington's Model 725, a rifle that did everything the Model 70 did and as a bonus was a bit more appealing to the eye. Just as important, this one had everything the Models 721 and 722 didn't have — and more: hinged floor-plate, three-position safety, removable rear-sight base, hand checkering, and wood that lacked the anemic look so common among Models 721 and 722 rifles.

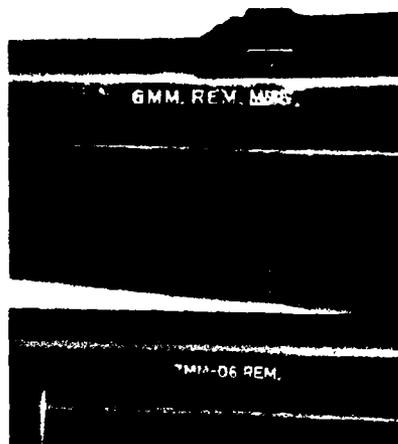


Remington introduced the Premier-grade rifle in Models 721 and 722 in 1949 and continues to offer it in the Model 700. The Premier and the less expensive Peerless grade are made on special orders only, and the waiting period for either grade is about six months.

Although the popularity of varmint shooting increased after World War Two, Remington had no heavy-barrel rifle until 1967, when the Varmint Special was introduced in .222 and .223 Remington, .22-.250, .243 Winchester, and 6mm Remington. Still more chamberings were added in later years.

Where the Models 721 and 722 had a simple blade dovetailed into a ramp, the Model 725 had a hooded front sight with, as Remington's 1958 announcement put it, "a pinned-in blade which can be changed without disturbing windage adjustment on the previously used sight setting." I haven't exactly figured out what they meant by that.

A couple of important details first featured on the Model 725, details that set a precedent for its forthcoming replacement as well as rifles eventually produced by most of Remington's competitors, was a stock that was



These barrel stampings are rare, on early rifles chambered for cartridges first given one designation then given a different one. The first renaming of the .244 Remington was 6mm Remington Magnum, and the rifles stamped with this designation weren't supposed to be shipped (but some slipped through). Years later, the same thing happened when the .280 Remington was first redesignated 7mm-06 Remington, and a few rifles thus marked were shipped before the official renaming of this fine old cartridge to 7mm Express.



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After comparing his Model 700 Classic (top) and Model 725, Layne concluded that after nearly two decades, Remington had come almost full circle in execution and style, with function and practicality establishing form, the result being the finest standard-production bolt-action rifles ever to come out of Remington's Ilion factory.

This Model 700LH (bottom) dates from 1973, the year of its introduction. Its plastic butt plate and white spacer, heavier barrel, and ribbon-type checkering were 1969 changes. Cut checkering on the BDL grade appeared in 1974 and was changed to skip-a-line style (top) in 1978.



This Model 700 BDL (top) and Model ADL (bottom) are first-model 700s, according to the pattern of their checkering and checkered aluminum butt plate on the ADL. The stainless-steel barrel on the BDL was discontinued around 1969. The ADL has the twenty-inch barrel common on Model 700s in standard chamberings during 1962 and 1963.

compatible with either iron sights or scope sights. This idea is credited to Clark S. Campbell, author of *The '03 Springfields*, and at the time an engineer under Wayne Leek in Remington's research-and-development department. With the Model 725 was born the now-familiar concept of high-comb stocks and high iron sights on factory rifles, features that would also appear on Remington's Models 721 and 722 rifles (transition model) and remain until its discontinuance.

Another evolutionary step came in 1961 with the introduction of the Model 725 in .375 H&H Magnum and .458 Winchester Magnum. Commonly known as the Kodiak, this rifle differed from the standard Model 725 by its recoil pad, detachable sling swivels, heavy twenty-six-inch barrel, and muzzle brake. The Kodiak also had a black fore-end tip with white spacer there and under its grip cap as well. Such decoration edged the Model 725 just a little closer in appearance to its successor, which Mike Walker had started putting together several years before.

In January of 1962, Remington's news letter announced that shipment

of new Model 700 rifles would commence on March first of that year. Two standard production grades were offered; ADL with blind magazine at \$114.95, which was \$13.70 more than the Models 721 and 722 that it replaced; and BDL grade, which took the Model 725's place at the same price of \$139.95. Both grades were available in .222 Remington, .222 Remington Magnum, .243 Winchester, .270 Winchester, .280 Remington, .308 Winchester, .30-06, .264 Winchester Magnum, and 7mm Remington Magnum, with the .375 H&H Magnum and .458 Winchester Magnum offered in BDL grade only.

Barrel lengths were twenty inches for standard cartridges, twenty-four inches for the .264 and 7mm magnums, the last two with stainless-steel barrels and chrome-plated bores. After Remington engineers tested random rifles from several production runs, it was determined that chromed bores offered no appreciable increase in barrel life with the magnum cartridges; so that feature was soon dropped.

Rifles in .375 H&H Magnum and .458 Magnum differed from the other

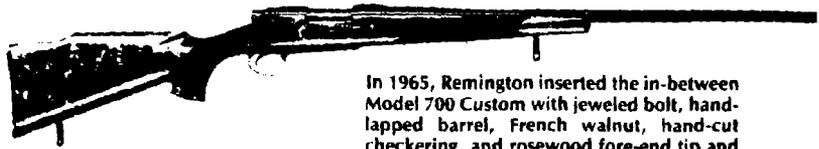
two magnums by their heavy twenty-six-inch barrels (of conventional steel), with muzzle brakes and a through-bolt behind the recoil lug. I am told that later rifles have a second recoil lug soldered to the bottom of the barrel.

Mechanical changes in the Model 700 were few, but cosmetic embellishments were there to make it look like many things other than the old bolt gun. At heart, it was still Model 721-722 through and through. In fact, Models 721, 722, 725, and 700 receivers are identical in contour, and scope mounts are the same for all three. Bolts usually interchange, though the Model 700 handle is longer and swept to the rear, and its knob is checkered top and bottom.

Remington's Model 725 trigger was used in the Model 700 except for a two-position safety lever, much like the Models 721 and 722. Model 725 and Model 700 trigger-guard-floor-plate assemblies look the same from a distance, but the Model 700 has a tapered bow and flat tang, as opposed to a wider and shorter nontapered bow and curved tang on the Model 725. Also used was the same removable rear sight that first appeared on the Model 725. Another significant change that I see in the transition from Model 725 to 700 is a rivet through the bolt-face counterbore lip that further



Until about 1968, the Model 700 BDL for the .375 H&H and .458 Winchester Magnums had a twenty-six-inch barrel, a muzzle brake, and a reinforced stock. In 1969, these two chamberings were offered in the Model 700 Safari grade (above), with two inches less barrel, no muzzle brake, an oil finish on the stock, and hand-cut checkering.



In 1965, Remington inserted the in-between Model 700 Custom with jeweled bolt, hand-lapped barrel, French walnut, hand-cut checkering, and rosewood fore-end tip and grip cap, plus a few other special options.



Although the Models 721 (top) and 722 were pure economy models with plain, uncheckered stocks, efforts to embellish these bolt-action rifles began soon thereafter. The B grade (middle), introduced in 1949, had better wood, checkering, and sling swivels. The Model 725 (bottom) came along in 1958, with Monte Carlo comb, hand-cut checkering, and hinged floorplate. This Kodiak version, available in .375 H&H Magnum and .458 Winchester Magnum with a muzzle brake, was offered in 1961, the last year of the Model 725.

secures the extractor in place. The Model 725 does not have this rivet.

Most research and development on the new rifle went into its stock, and with it a new phrase was born and added to the vocabularies of gun writers: impressed checkering. Not only was the checkering impressed into the wood with a hot die; it was negative as well, meaning that the diamonds pointed in rather than out. Despite the absence of cut checkering, that early stock still feels good to me, with its comb and cheekpiece shaped to shed recoil away from one's jaw. Rifles for standard cartridges inherited the Model 725's checkered aluminum buttplate, while the magnums had ventilated recoil pads.

I distinctly remember buying my first Model 700 in 7mm Remington Magnum from a local gun shop that had it and a Model 70 in .300 Winchester Magnum in stock. After closely examining both for what probably seemed like hours to the clerk, and changing my mind about two dozen times, I picked the Remington, mainly because it came with sling and detachable swivels. I know what you're already thinking — but how the heck was I to know then what would eventually happen with pre-1964 Model 70s?

Even today, I'm not at all certain what made the Model 700 such a hot potato so fast. Surely, everybody didn't pick the one with sling and

detachable swivels, as I did. Perhaps it was a combination of things that happened at the right time in the right places. The Model 700 was new; it had earned an envious accuracy record while wearing Model 721-722 clothing; and when compared to other rifles available in 1962, it was not a bad-looking rifle. Add to this the reams upon reams of praises written about its new chambering, the 7mm Remington Magnum, and I guess that it really isn't so mysterious why that machine did fly.

And Remington has a reputation for getting quite restless after sitting on their laurels for only a short time, even when it might appear that theirs is the best mouse trap in town. In 1964, the twenty-inch barrels were lengthened to twenty-two inches; and by 1965, three more cartridges were added to the list: 6mm Remington, .22-.250, and .300 Winchester Magnum. That same year, another Model 700 variation appeared in eleven chamberings, though it was not catalogued until 1969. Designated the custom rifle or Model 700 C, this one featured hand-checkered French walnut with rosewood grip cap and fore-end tip — with or without white spacers. Optional twenty, twenty-two, or twenty-four-inch barrels were offered, all hand-lapped and hand-bedded, with or without open sights. Its bolt was jeweled, all metal shone with a high-polish blue job, and the Model 700 C could be had with BDL-type hinged floorplate or blind

magazine a la ADL grade. All of this for a hundred forty-five dollars more than the BDL — and for a few dollars more, oil-finished wood and a left-hand stock were available.

In 1967, varmint shooters were talking about a new Model 700 with heavy barrel; and in 1969, those who yearned for a .375 H&H Magnum or .458 Winchester Magnum had yet another choice, the Safari-grade rifle. Along about this time, Remington also decided that the front-sight ramp on all Model 700s should be held in place with two screws, not one.

A few more things happened to the Model 700 in 1969. The bolt shroud was lengthened to duplicate that on the old Model 725, and the safety lever was lowered, with its thumb-piece shape changed from rectangular to round. A jeweled bolt appeared, and the buttplate turned from checkered aluminum to black plastic, with white spacer.

I'm not exactly sure when Remington went from a split to a solid sear in the Model 700, but I believe that it happened during this 1969 overhaul. A new ribbon-type checkering pattern was not one of Remington's better ideas. Its layout appeared to be far too complex for the application process as it then existed, and many that I have seen are a poor second place as compared to the older stocks — which

(Continued on page 63)

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Remington Model 700

(Continued from page 23)

is saying a lot, since the earlier stocks had impressed checkering, too.

Unfortunately, Model 700 barrels for standard cartridges lost a bit of their trimness at this time by picking up a few more ounces, additional weight still carried by rifles of current manufacture. In 1962, muzzle diameters ran about 0.600 inch (as compared to 0.575 inch for the Model 725) and 0.650 inch for the .264 and 7mm magnums. For some reason, probably known only by some fellow back in cost control, muzzle diameters for all rifles of standard caliber were increased to that of the two magnums. One might say that when everything is tallied at this point in the evolution of the Model 700, pre-1969 rifles are to be preferred.

Stainless-steel barrels in .264 and 7mm Magnum rifles disappeared around 1969. I am told that exhaustive barrel-life and accuracy tests at Ilion finally revealed that producing these barrels caused more headaches than any benefit they offered to the average shooter, so they were dropped from production.

1970 saw Remington's new .17 cartridge emerge with a stainless-steel barrel; and a year later, the .25-06 was finally legitimized and given a permanent home. Shortly thereafter, Remington produced their last stainless-steel barrels in .17 Remington; and in 1973, left-hand shooters were smiling all the way to Remington dealers and thanking Mike Walker for realizing that everybody didn't shoot from the same side.

Then came 1974 with the 6.5mm and .500 magnums finally laid to rest and what can be considered nothing less than a milestone in Model 700 history — cut checkering on the BDL grade. Strangely enough, though, considering all the flak thrown at impressed checkering through the years, it seemed that very few people got excited when what they had long moaned about finally disappeared and what they had long asked for finally arrived.

The stock took on a new shape with its grip slimmed down slightly at the tang, and a square-shaped fore-end became fuller and rounder. A glued-on grip cap was replaced with one held in place by two screws, and the buttplate became a facsimile of a skeleton-type with four screws. Remington canned their old ventilated recoil pad on magnum rifles, replacing

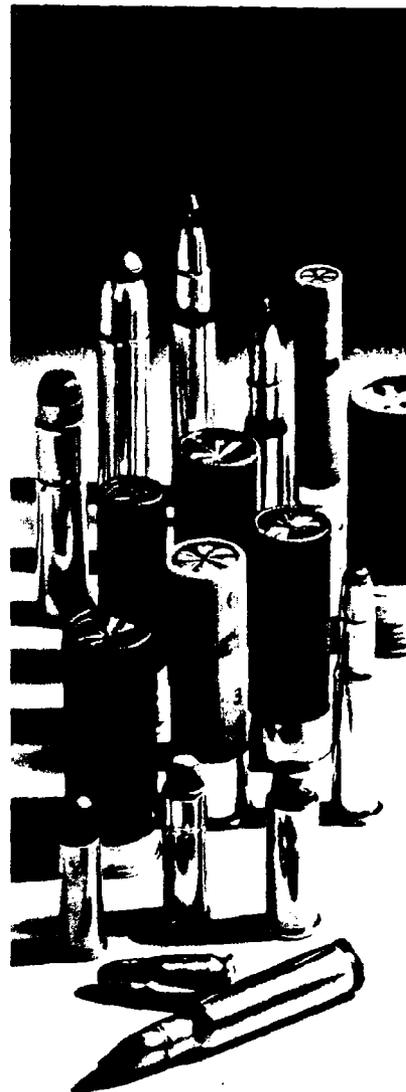
it with a solid pad. The Model 725-type rear sight made way for another with its leaf dovetailed to an inclined base, which allowed for finer adjustments by eliminating the stepped elevator.

No doubt about it, 1974 was the Model 700's big year. Its follower was changed to stainless steel for smoother feeding, and though I have never detected a problem with earlier rifles, the bolt handle was shifted slightly forward as additional insurance against knuckles being bruised during recoil. Nor have I ever experienced any bolt binding with these rifles, or even heard of such, but the Model 700 got an antibind modification just the same. It consists of a guide rib milled into the right receiver rail and receiver bridge that mates with a slot in the right locking lug.

Remington's sleeve still hadn't run out of high cards. In 1977, a new 8mm Magnum cartridge was offered; and during the next year, their fine Classic rifle was unveiled in .22-250, 6mm Remington, .243 Winchester, .270, .30-06, and 7mm Magnum. Not since discontinuing their Model 725 had Remington built such a masterpiece and offered it as a standard production rifle. Now they were really walking in high cotton.

And they weren't through yet. Along with the Classic came a new skip-line checkering pattern on the BDL grade, "highlighted by raised diamonds." Remington went on to offer a limited number of 7x57mm Classic rifles in 1981 and the same in .257 Roberts in 1982. I believe that about ten thousand of each were built, same as the old Model 725 Rifle. Also offered for the first time in 1982, on special order, is the Classic Rifle in .375 H&H Magnum.

All told, I'm aware of twenty-six cartridge designations that have been stamped on Model 700 barrels, from .17 to .458, with two being what I call Remington *uh-ohs*. The first happened to a small batch of rifles in 1963, when Remington decided to rename their .244 cartridge. At first, their intent was to call it *6mm Remington Magnum*, which is what appeared on the first batch of rifles. At the time, it probably made sense, as their big 7mm was called *magnum*, and it took off like a scalded dog. But for some reason, they had a change of heart and decided to drop the *magnum* designation from their six-millimeter. What to do with rifles already made up? Nobody knew for sure, but someone had the bright idea that *Mag* on the barrels should be *Xd* out, which is exactly what took place. Obviously, someone at Remington, or perhaps



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XS 81-1



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their advertising agency, still prefers 6mm Remington Magnum, as that is what it is called on page twenty-four of their 1982 catalog.

Another uh-oh was born in 1979 when it was decided that the .280 Remington under a new guise was ready for reintroduction in the Model 700. Rifles and ammunition were first stamped 7mm-06, but then someone realized that this old wildcat differed slightly (but enough) from the .280 to get folks in trouble, so its name was changed to 7mm Express Remington. One difference here is that the fellow with the X stamp didn't get around to these. Interestingly enough, Remington's code number for this ammunition remains as 7M06.

"Officially," Model 700 rifles stamped 6mm Rem Mag and 7mm-06 Rem were not supposed to leave the factory, but obviously the crew back in shipping failed to get the message. About two hundred of each managed to escape Ilion, or so I am told.

The last change in Model 700s that I'm aware of came about in 1981. The extractor rivet that first appeared in

1962 was deleted, and the extractor itself was slightly redesigned. Among other things, this eases a gunsmith's chore when replacing the extractor, but for what reason one might have for doing so, I really can't say. Though it was cussed and condemned at its birth, I know of no person who has had a problem with this extraction system.

There's no telling what now brews deep within the catacombs of Ilion and Bridgeport, but a safe bet would be that a company full of gun enthusiasts are not sitting around twiddling their thumbs and talking about the good old days. Among other positive things to ponder, I wouldn't be at all surprised to see the Model 600 brought back in some form, and I'll bet that ten thousand Classics in .350 Remington Magnum would be scooped-up fast.

It's a bit disturbing when each new catalog that Remington puts out shows less and less of the Model 700 LH. Their 1982 catalog is a perfect example. I had to look hard to find the small blurb covering this option, and I have long known that Remington makes a left-hand rifle. It is most doubtful that a left-hander unfamiliar with Remington's line would ever know that they produce a rifle just for him. If he found out, it would have to come from another source. I'm saying all of this to say that I would hate to see the Model 700 LH quietly fade away.

Soon after its introduction in 1962, the Model 700 zoomed far ahead of its competition in sales, and it is said that no other rifle has gained on it enough to taste its dust. In 1964, another rifle manufacturer tried about the same routine, impressed checkering and shiny stocks, but despite what must have been a small fortune spent in advertising, their cost-cutting ploy backfired. Their hide was literally nailed to the smoke-house door for traveling backward in one giant leap.

Remington, on the other hand, pulled basically the same production tricks but instead was lauded highly for the revolutionary progress made with their old Models 721 and 722. In fact, we've bought over a million of their bolt-actions since 1948, with the majority being Model 700s. Such is the unpredictably whimsical nature of American shooters.

As it now stands, the Model 700 can be had in nine configurations to fit most any budget, need, or taste; ADL, BDL, Varminter, left-hand, Classic, Custom, Safari, Peerless, and Premier. Some collectors of old rifles may consider such a statement to be sacrilegious, but I suppose that we could honestly say that within two decades, Remington's Model 700 has become the modern rifleman's rifle.

Spotting Scope

(Continued from page 6)

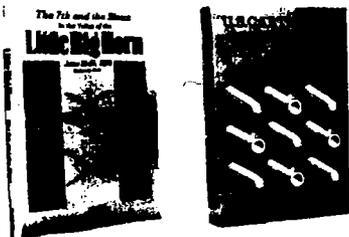
your answer may appear in one of the regular columns or one of our full-length features — if not in the old-fashioned question-and-answer column.

Third, in the same way, especially good letters to the editor will be hoarded for future use in a select column of the familiar type.

Fourth, you now don't need to send a stamped, addressed envelope with any question that you may send in. This means, unfortunately and unavoidably, that if your question is either of a type that isn't at all appropriate for us to answer, or if it is not of obvious interest to a number of readers other than yourself, we won't be able to reply. (Please remember that when I refer to *your letter*, I'm addressing that reference to an impressive number of *thousands* of readers, not just to one individual. Here, *your* is plural and stands for quite a number of gunfolk all over the earth.)

As I've already said, the new columns will occupy the space formerly used for letters, questions, and answers. I hope that the meatier quality of the material in these columns makes them more valuable, to more readers, than the older material that they replace. Like you, all of the fellows who get this magazine out to you are rifle enthusiasts, and we love to shoot the breeze about gun matters as much as you do — but we have to streamline our use of time and page space. — Ken Howell

SPECIAL PRICES FOR OUR READERS!



U.S. Cartridges and Their Handguns

The author, Charles R. Suydam, is a respected technical editor with Wolfe Publishing, and a renowned authority on guns and ammunition. This excellent reference work describes cartridges in the 1795 to 1975 period, with pictures and dimensions of the variations. A picture of a handgun, usually the first model chambered for the cartridge, is included. Its 333 pages make it a useful and comprehensive source of information. We bought the last copies of the second (paperback) edition, which formerly sold at \$9.95; our price is \$6.95, postpaid. For those of you familiar with Suydam's expertise, you will realize this is, indeed, a bargain.

In the Valley of the Little Big Horn

We acquired the limited remaining supply of this historical work by Robert C. Keim. This second edition reproduces numerous margin notations by the late Col. Edward M. Offley. He was a retired Cavalry officer who rode with men who had survived in other units at the Little Big Horn, and heard their discussions of the event around campfires and officer's mess. Offley was 92 when he wrote the notations, and died within days of completing the work. Here is a truly rare account, as nearly eye-witness as can be found, an interesting, intriguing perspective of the Custer battle — by an old Cavalryman. This hardcover edition formerly sold for \$7.95, so you won't want to miss the chance to buy it for only \$4.95, postpaid.

At these prices, both books should go quickly. Send your check or money order now. Arizona residents please include 5% sales tax.

Wolfe Publishing Company
PO Box 3030 138 No. Montezuma St.
Prescott, Arizona 86302

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STATEMENT REQUIRED BY THE ACT OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, JULY 2, 1946, AND JUNE 11, 1950 (74 STAT. 208), SHOWING THE OWNERSHIP, MANAGEMENT, AND CIRCULATION OF THE RIFLE MAGAZINE, PUBLISHED BI-MONTHLY AT PRESCOTT, ARIZONA, FOR SEPTEMBER-OCTOBER 1982.

1. The name of the publisher and editor is Dave Wolfe, Prescott, Arizona.
2. The owner is Wolfe Publishing Co., Inc., 138 N. Montezuma St., Prescott, AZ 86302. David R. Wolfe, 138 N. Montezuma, Prescott, AZ.
3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.
4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also, the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bonafide owner.
5. The average number sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown was: (This information is required by the act of June 11, 1950, to be included in all statements regardless of frequency of issue.) 20,055

DAVID WOLFE, Publisher

RIFLE 85

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE



Xc: T. L. Capeletti

F-83**"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____**

March 1, 1983

TO: J. S. MARTIN
FROM: F. E. MARTIN
SUBJECT: M/700 LWT

Larry Blackhurst of the Custom Shop informs me that several attempts to turn M/700 barrels to the M/7 LWT contour have failed. We will have to wait until the lathe in our N/C area is back on line. This will be approximately March 4, 1983. Prior to the lathe "coming up", would you help me to establish a priority to meeting our completion date of March 15, 1983 for initial accuracy testing. Regarding the stock - for the first model to be completed March 15, 1983, it is planned to have Production run them for us March 2 or March 3. It will be close.

FEM:ws

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington
UPON*PETERS*
UPONxc: C. B. Workman
T. L. Capeletti
E. R. Owens**"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____**

April 24, 1981

To: J. P. Linde
From: J. W. Bower *JWB*
Subject: Stainless Steel M/700 Action

The present cost for 4137 receiver material is \$45.65 per hundredweight. The present cost for 155 spec barrel steel is \$33.52 per hundredweight. If 416 R stainless steel was used, the cost per hundredweight would be \$157.00. This differential would increase material cost for the barrel and receiver on the M/700 by \$13.00 per gun.

A stainless steel barrel bracket would also be required at an estimated cost increase of \$.20 per gun. Allowing for a slight increase in handling, a stainless steel action in the M/700 would probably increase factory costs by about \$15.00 per gun.

JWB:ws
Firearms Research Division

DON'T SAY IT-WRITE ITTo B. H. GilbertDate April 20, 1981From E. R. Owens

We would like to inform Planning that we (R&D) are trying to schedule the making of 12 each M/700 Receivers and 7mm -08 Varmint Bbl's to be made from 416 stainless steel (Rem #1189).

We already have been in contact with P.E. & C. and have Receiver Blanks ready for Rec. Process Op. 5. We also are trying to get Bbl. Blanks to catch up to your scheduled run of 7mm-08 Varmint Bbl's for June 1981.

If you have any questions, please call.

E. R. Owens (ext. 253)

ERO

"SAFETY RULES ARE PERFECT TOOLS"

Per Oleung Andersen 4/22/81

155 barrel steel 33.52 / 100 cwt
(583 # / 100 pcs per procurement sheet)

4137 mod. receiver steel # 45.65 / cwt
(450 lbs / 100)

416 R (rifle barrel quality) Stainless
1/2" OD, hot rolled, annealed
1.57 / lb w/ 24 wk leadlines
40M lb orders.

450[#]/~~1000~~ 4.5 lbs / Receiver

4137 .4565/lb x 4.5 lbs = 2.05 #/blank

416R 1.57/lb x 4.5 lbs = 7.065 #/blank
5.015 # Δ

155 440[#]/100 6.4 lbs / Ball

155 .3352/lb x 6.4 lbs = 2.15 #/blank

416R 1.57/lb x 6.4 lbs = 10.05 #/blank
7.90 # Δ

Total price increase for stainless
= 12.915

say \$13.00

+ \$1 additional for Ball Bracket = 14.00

+ 20% additional handling costs = 16.80

say \$20 premium

Receiver Blank

$$1.469_{\text{max}} \text{ OD} \times \frac{8.715}{\text{max}} \text{ length}$$
$$r = .735_{\text{max}}$$
$$\text{Density} = 485 \text{ lbs/ft}^3$$

$$\text{Vol} = 1.469$$

$$V = \pi r^2 h$$

$$V = \pi (.735 \text{ in})^2 (8.715 \text{ in})$$
$$= \frac{14.78 \text{ in}^3}{1728 \frac{\text{in}^3}{\text{ft}^3}} = .0086 \text{ ft}^3$$

$$\text{weight} = .0086 \text{ ft}^3 \times 485 \frac{\text{lbs}}{\text{ft}^3} = 4.15 \text{ lbs}$$

Sbl bracket weight \approx 2oz = .125 lbs

mat'l
assumed cost differential of 1.50 - .40
= 1.10 per pound
= # .14 per blank

Machinability of Stainless Steels

400 (martensitic) steels

- 1) 416
- 2) 430 F
- 3) {
 - 403
 - 405
 - 416
- 6) 446

300 (austenitic) steels

- 1) 303
- 2) 347 F
- 3) {
 - 301
 - 302
 - 304

Combined

- 1) 416
- 2) 430 F
- 3) 303

416 Stainless 17 cal M1700 Bal
Hot rolled

416 is martensitic. Can be heat treated to a high hardness. Because of their oxidation resistance, martensitic stainless steels are extensively used for cutlery, razor blades, surgical instruments, etc.

Chemical properties:

.15% max Carbon
1.25 max Manganese
1.0 max Silicon
12.0-14.0 Chromium
.15 min Sulphur

4137 Modified
Not rolled

M1700 Receiver

.35/.40% Carbon
.7/.9 Manganese
.04 max Phosphorus
.04 max Sulphur
.20/.35 Silicon
.8/1.10 Chromium
.15/.25 Molybdenum

H/T to Rc 37/44
500°F for 30 min
draw

Mechanical Properties of 4140

Tensile strength = 180 Kpsi

Yield strength = 163 Kpsi

Brunell Hardness = 372

Tensile strength range of Stainless

416 } 400 series H/T'd
414 }

1212

.13 Max Carbon
.7/1.0 Mn
.07/0.12 P
.16/0.23 S

Hot Rolled

Yield Strength = 33 ksi

Tensile Strength = 55 ksi

Machinability = 114-168 (1705 FPM = 100%)

Elongation = 25% in 2 in.

Cold drawn

Yield Strength = 58 ksi

Tensile Strength = 75 ksi

Elongation = 10% in 2 in

Machinability = same as hot rolled

Chromium is added to steels primarily to increase hardenability, with strengthening as a secondary purpose.

Manganese is present in plain carbon steel to the extent of .25 to .4% so as to combine with the sulfur and prevent brittleness. It also a powerful agent to increase hardness.

Silicon increases strength properties, especially the elastic limit, with little loss of ductility.

1360

136

22,000

(continued)

cut should generally never exceed two-thirds of cutter diameter, and to minimize tool impact, be sure that one cutter is in the cut at all times.

6. Select proper insert size for required maximum depth of cut.

7. Consider cutters with inserts positioned on-edge so that cutting forces are directed through the heaviest and strongest section of the carbide.

FORMING

Close Tolerance Forging Study

Researchers at Battelle's Columbus (OH) Laboratories have begun a two-year study to develop computer-aided techniques for close-tolerance forging. Computational techniques will be developed that will allow the manufacturer to predict forging load and stresses in critical die areas, design parameters for shrink-fit dies, and metal flow and die fill during forging. Interested companies may join the study. Contact Dr. Taylan Altan at Battelle Columbus Laboratories, 505 King Ave., Columbus, OH 43201.

FINISHING

Polishing Machine Works on Inside Diameters

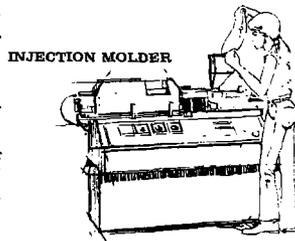
A micropolishing machine designed and built by Acme Manufacturing Co., Detroit, is believed to be one of the first applications of a micropolishing process to surface finishing of the inside diameter of a circular metal surface. The machine is finishing a stamped steel 12-in. dia. by 1-in. wide component used in an automotive transmission. Reports indicate a production rate of 200 per hour going from a surface finish of 80 rms to 30 rms.

PROCESS

Metal Injection Molding System Employs Metal Powders

A metal injection molding system is being introduced by Witec California, Inc. The system, utilizing a series of nickel-steel alloys, makes it feasible to manufacture complex parts out of metal that could not be fabricated economically by traditional machining techniques—some applications include small machine parts and computer hardware. A series of nonmetallic materials is scheduled for release some-time next year.

The process consists of mixing the metal dust with a binding ingredient and



loading the compound in a conventional plastic injection molding machine where it is forced into a mold at temperature of 330-380° F and pressure of 600-800 psi. Next the part is ejected, trimmed if needed, and put in a "debinderizer" which removes the binding agent and sinters the part to provide an initial atomic bond between particles of metal. The final step is a "process reactor," a chamber heated to 2300° F with a controlled argon/hydrogen atmosphere, where the workpiece is annealed and the final bonding occurs.

Raymond R. Weich, the physicist who developed the process, reports: "Part of the technology's super-productivity is that it conserves raw material. Material can be recycled with no degradation of the finished product."

Named Model 80A, the system consists of four elements—an injection molder, debinderizer, process reactor, and process control computer.

U.S. and Canadian sales of the Witec system are handled by Integrated Materials Systems, Nashville.

MATERIALS

Free-Machining Stainless Steel Increases Production 37%

A 37 percent increase in production was achieved on a screw machine operation at Baity Screw Machine



Products, Inc., Chickasha, OK, by changing work-piece materials. Production on a swivel spindle bushing used in gasoline pump assemblies went from 94 to 129 pieces an hour, form tools lasted up to 30 percent longer and thread roll life improved 40 percent through use of a modified Type 416 stainless steel developed by Carpenter Steel Div., Reading, PA, to replace Type 416 stainless steel. The modified "416" was created to optimize machinability without sacrificing the corrosion resistance needed.

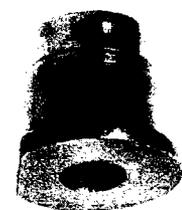
less steel developed by Carpenter Steel Div., Reading, PA, to replace Type 416 stainless steel. The modified "416" was created to optimize machinability without sacrificing the corrosion resistance needed.

Put a Cap on Your Oil Costs

High water base fluids (HWBF) could become the hydraulic fluids of the future. Sperry Vickers' Omaha manufacturing facility has just completed one year of tests using an HWBF on a part-clamping operation. The results, according to Sperry Vickers, were thousands of parts processed without a problem, and considerable savings in oil costs. To efficiently use an HWBF, Sperry Vickers developed a wet armature solenoid valve, and special vane and gear pumps,

(continued)

Cold Forming Saves Material...

Saved 64%	Saved 35%	Saved 57%	Saved 60%	Saved 40%
 Automotive Door Latch	 Electrical Cable Connector	 Hose Connector	 Automatic Horn Core	 Chain Roller



... and these parts made with 0% waste.

Material loss from scrap and waste is a growing concern, but switching to cold forming can significantly curb that loss. The percentage figures above only hint at National's cold forming "before-and-after" success story. In any case, the story's the same: substantial savings.

However, *reducing material loss* isn't the only reason to cold form on a National. Here are some others:

Speed. All the shapes above form at speeds ranging from 50 to 105 parts per minute depending upon the part specs and the size of the former.

Versatility. Note the wide range in shape and complexity.

Close tolerances and excellent finishes reduce the need for secondary operations.

And features like trimming, piercing, burnishing, pointing and threading—all possible on Nationals.

Write or call. We can help you cold form more and waste less.

National Machinery

NATIONAL MACHINERY CO., TIFFIN, OHIO 44883
 TELEPHONE (419) 447-5211, TELEX 28-6450
 DESIGNERS AND BUILDERS OF HOT AND COLD
 FORGING MACHINERY

Box 13

M-720 vs M-7 Lwt strength Test
WR 823061 safety Button
WO C-1866

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE



Distribution: C. B. Workman
J. W. Brooks
C. E. Ritchie
D. E. Bullis

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

RESEARCH TEST and MEASUREMENT REPORT - Report No. 823051

M/700 VS. M/SEVEN LWT. SAFETY BUTTON COMPARISON STRENGTH TEST

Prepared by: J. Baggetta

Date Prepared: 11-19-82

Proofread and Cleared By:

J.H. Hennings, / R.E. Nightingale,
Foreman-Test Lab / Foreman-Measurement Lab

J. Baggetta 1-14-83
Signature Date

C.E. Ritchie,
Sr. Supervisor - Testing,
Meas. & Mech. Analysis Lab

C. E. Ritchie 1/14/83
Signature Date

TEST & MEASUREMENT LAB REPORT

REPORT NUMBER: 823051
REPORT TITLE: M/700 Vs. M/Seven LWT. Safety Button Comparison Strength Test
MODEL(S): M/700, M/Seven LWT.
GAUGE OR CALIBER:
DATE: 11-19-82
WORK ORDER NO.: C-1856
PART NAME:
DESIGNER/ENGINEER: D. Bullis

TEST TYPE:

1. PHOTO LAB
2. STRENGTH TEST - NO. OF ^{Safety's}~~GUNS~~ TESTED 20
3. FUNCTION TEST - NO. OF GUNS TESTED _____
4. ACCURACY TEST - NO. OF GUNS TESTED _____
5. MEASUREMENTS - TYPE: _____
6. ENVIRONMENTAL TEST
7. AMMUNITION TESTING & EVALUATION - TYPE: _____
8. VISUAL EVALUATION - _____ OUT OF _____ GUN SAMPLE
9. ENDURANCE - NO. OF GUNS TESTED: _____

NO. OF ROUNDS PER GUN: _____

TOTAL ROUNDS FIRED IN TEST: _____

AMMO TYPE: MAGS. _____; TARGET: _____

RIM FIRE _____ CENTER FIRE _____

November 19, 1982

TO: J. H. Hennings

FROM: J. Baggetta

REPORT TITLE: M/700 VS. M/SEVEN LWT. SAFETY BUTTON COMPARISON STRENGTH TEST

ABSTRACT

A work request was received from D. E. Bullis, Current Products Design, to strength test 10 M/700 regular safety (old button HD 2020) and 10 M/Seven LWT. (New Material Safety, New Button HD 1000). The test was run to determine whether the new M/Seven LWT. is as strong as the old style button.

SCOPE OF TEST

The purpose of this test is to determine if the new material used in the M/Seven LWT. Safety Button causes any significant changes to the force required to separate the Safety Button from the arm. The current production M/700 Safety was used as a comparison.

TEST RESULTS

All of the M/700 and M/Seven LWT. tested exceeded 50 lbs. of pressure with no separation of the safety button from the arm.

REPORT TEXT

Ten M/700 current production safety assemblies with the old button HD 2020 and 10 M/Seven LWT. with the new material safety button HD 1000 exceeded 50 lbs. of pressure with no separation of the safety button from the safety. Each safety button was tested by pushing with a downward force of up to 50 lbs. (See Data Sheet No. 1, Appendix "A".)

TEST PROCEDURE

- o Test was run in dry cycle room using bolt lift operating machine.
- o A 80 lb. scale was attached to the bolt lift machine. (See Photo Data Sheet No. 2, 3 – Appendix "A").
- o Each safety button was tested one time by pushing with a downward force.

" A P P E N D I X " A "

Data Sheets

M/700 Safety Button

(Old Style HD 2020)

1. 50 lbs.
2. 50 lbs.
3. 50 lbs.
4. 50 lbs.
5. 50 lbs.
6. 50 lbs.
7. 50 lbs.
8. 50 lbs.
9. 50 lbs.
10. 50 lbs.

M/Seven LWT. Safety Button

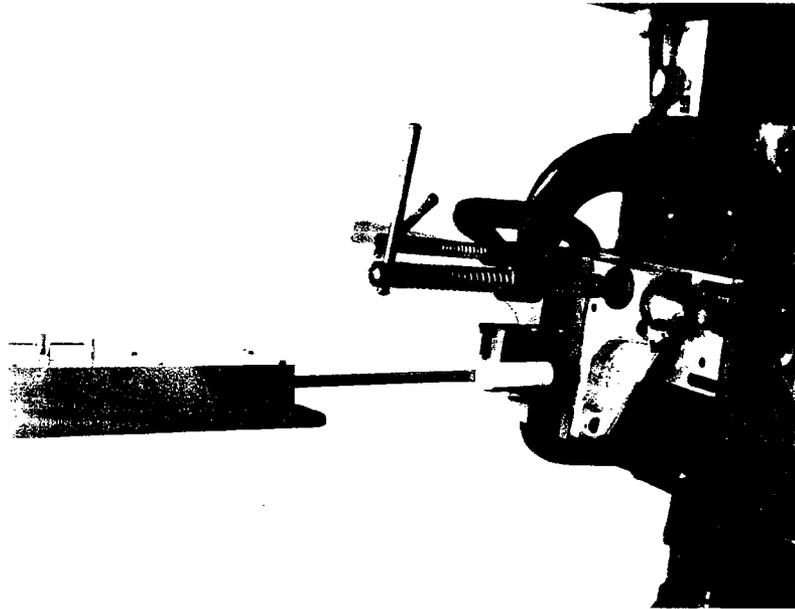
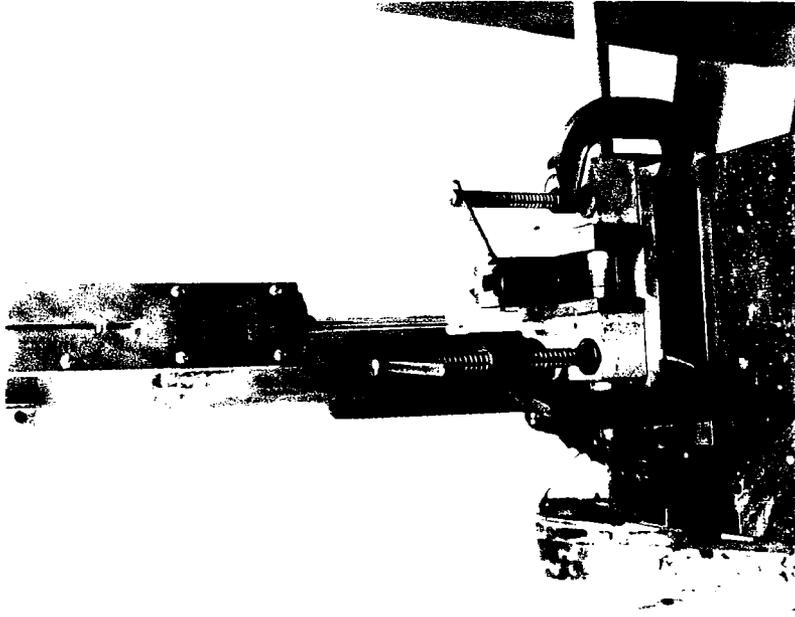
(New Material HD 1000)

1. 50 lbs.
2. 50 lbs.
3. 50 lbs.
4. 50 lbs.
5. 50 lbs.
6. 50 lbs.
7. 50 lbs.
8. 50 lbs.
9. 50 lbs.
10. 50 lbs.

M-700 + M-7 Lowt Safety Button Set-Up

Sheet #2

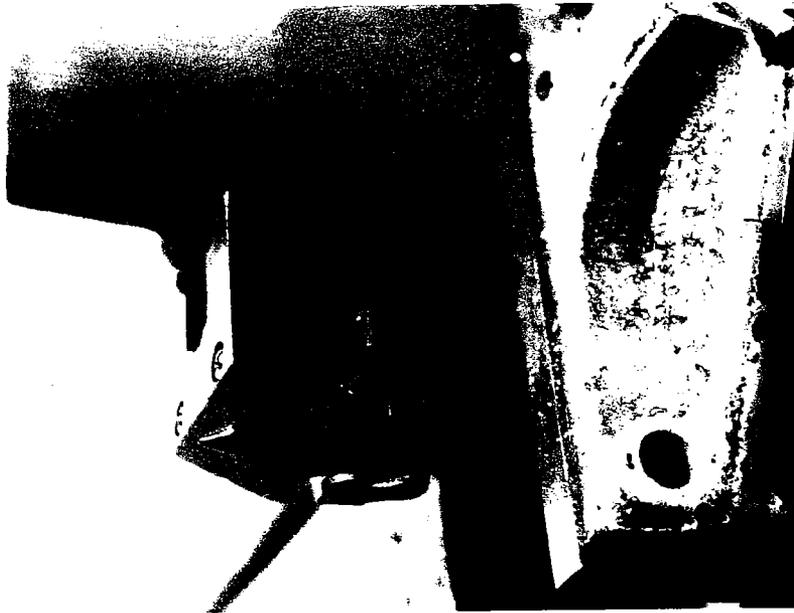
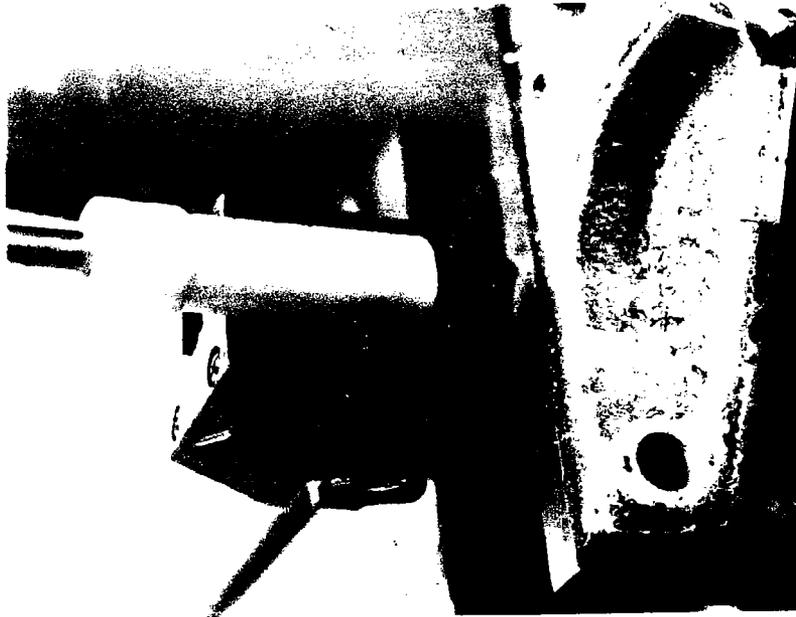
Report No. 823051



M. 730 + M. 740t Safety Button Set - U.S.

Sheet # 3

Report No. 823051



RESEARCH TEST & MEASUREMENT LAB WORK REQUEST

<input type="checkbox"/> Developmental <input type="checkbox"/> Design Acceptance <input type="checkbox"/> Pre-Pilot <input type="checkbox"/> Pilot <input type="checkbox"/> Production Acceptance	<p style="text-align: center;"><u>AREA OF TESTING</u></p> <input type="checkbox"/> Safety Related <input type="checkbox"/> Litigation <input type="checkbox"/> Competitive Evaluation <input type="checkbox"/> Warehouse Audit <input type="checkbox"/> New Design <input type="checkbox"/> Cost Reduction <input type="checkbox"/> Design Change <input type="checkbox"/> Stake _____ <input type="checkbox"/> Plant Assistance <input checked="" type="checkbox"/> Other <u>STRENGTH</u>
--	--

<p style="text-align: center;"><u>FIREARM STAT'S.</u></p> MODEL: <u>7 LWT</u> CAL. or GAGE: _____ BARREL TYPE: _____ PROOFED: YES _____ NO _____	<p style="text-align: center;"><u>REPORT REQ'D.</u></p> FORMAL <input checked="" type="checkbox"/> TEST RESULTS ONLY _____	DATE REQUESTED: <u>11-1-82</u> DATE NEEDED BY: _____ REQUESTED BY: <u>BULLIS</u> WORK ORDER NO: <u>C-1856</u>
---	---	--

<u>TEST TYPE</u>			
<input checked="" type="checkbox"/> Strength Test	<input type="checkbox"/> Ammunition Test	<input type="checkbox"/> Dry Cycle Test	<input type="checkbox"/> Photo/Video
<input type="checkbox"/> Function Test	<input type="checkbox"/> Environmental Test	<input type="checkbox"/> Measurements	<input type="checkbox"/> Other _____
<input type="checkbox"/> Accuracy Test	<input type="checkbox"/> Customer Complaint	<input type="checkbox"/> Endurance Test	_____

EXPLAIN IN DETAIL THE REASON FOR THIS TEST:

SEE HOW MUCH ^{tensile} FORCE IS REQUIRED TO SEPARATE THE SAFETY BUTTON FROM THE SAFETY.
 (IS THE NEW ONE AS GOOD AS THE OLD ONE?)

FURNISHED

- 10 M/700 REG. SAFETYS. (OLD BUTTON HA 2020)
- 10 M/7 LWT (NEW MATL.) SAFETYS (NEW BUTTON HD1000)

New ones made of different material (still powder metal)

-GUNS REQUIRED:

NOTE: NO firearms or parts will be tested in the Labs unless they are accompanied by a Work Request, and both are delivered to the Labs by the designer or engineer. All Work Requests are to be filled out in detail. No Exceptions.

DATE COMPLETED: _____
 TEST COMPLETED BY: _____
 REPORT DATE: _____

Name James J. Martin
Section Manager (Research)
Daily Record (1981)



AMERICAN PAPER CO. HOLYOKE, MASS. 01040

Efficiency. NOTEBOOK

80 SHEETS 11 X 8 1/2 IN. NO. 8004-Y
MEDIUM RULED WITH MARGIN LINE

Monday Jan 5, 1981

temp +5°

8-12 worked on setting up new note book to better organize the work load and maintain control over the various projects.

1:00 meeting in Clark's office

Reports needed for operation Committee

needed are = 1. 7400

2. m/4 Amsted Elections

3. m/700 Bolt stock

4. m/788 Safety redesigns

2:30. meeting m/7400 task force

1. reviewed interviews

2. reviewed 100% gun inspectors

3. reviewed Gallery rejects.

Bus: Jan 6, 1981 temp +10

P-9 work on note book.

9:00 had a meeting with Tomi and Jim Snodcker for report on m/7400 took force to the operations Committee

11:00 interview held with Don Lewis and Jim Bowers
Discussion on m/7400 problems.

2:00 interview with Bob Joy - also Jim Bowers

found out for the second or third time that management is not doing their job for moral. The meeting lasted until 4:30.

Wed. Jan 7, 1981

temp +22

8-9. Inspections made on returns gun from
Semi-graphic Service, with barrel checked.
barrel will be investigated to find out
materials and why.

9:00. Interview with Ziggy Howalski
review m/7400 project. see notes

11:00 Interview with Kala Poore
review m/7400 project - see notes.

2:30 meeting with Jim Smedeker on
took force.

3:30 meeting - interview with Ralph
Bottini

1-8

4

Thurs Jan 8, 1981

Temp -5°

8-12.

Called Frank Ambrose (H&P) and
reviewed magazine box dimensions
for m/7400

wrote note to Lemic about applications
for A.D.P.A.

1:00 meeting in Conference room.

The movie shown was on DePont
code of ethics Good info

1:30 Hot spot meeting.

3:00 meeting with Fred Martin and
Sal Janelle on Balk Hack and
m/788 safety.

Thurs Jan 9, 1981

8:00 Made a report to Lami on the m/700 bolt lock design and m/788 Safety redesign.

10:00 Held interview with Spence Bennett on m/7400 process and design -

12:30 new initiative group -

Set up a group for evaluating Remington
Harris
John Martin Chairman
Tom Plunkett Sec.
Tom Bannan
Ed Owens
Pete Hagen

1-12

6 Mon: 1-12-81 temp - 25°

Note truck would not start for the first time.

8:00 Sp up meeting with Tom Bauman to review the +56 programs. He need for new incentives to make the group more productive.

9:00 Picked up Ed Hanner at reception room.

Ed Hanner is working with Phil Masters for Maxco Inc. He explained he was in the administrative sections and will be involved with Sales, repairs - etc.

A complete review of the seismic gun and electric breech block was given to Ed by Ken Spolans and myself.

mon Continued:

-7

A tour was made of the Research Sections and Ed was shown how we set the model making and testing of the seismic gun (only)

— went to lunch with Ed. Cafeteria
12:30:

Arranged for a plant tour for Ed.

1:00-2:00 Reviewed feed catch designs for XSG with Jack East.

2:00 Back with Ed Hanner and reviewed the cold weather test and designs.

Ken Rowlands and Ed Foster Jr. spent most of the day.

3:00-4:30

Reviewed design of safety for 788 and also m/y LE with Bill Johnson and Paul Homberg.

1-13-81

8

Tues 1-13-81.

temp -11°

NOTE Truck
STARTED

8:00

Ed Honner arrived about 8:15-

picked up Ed in receiving and
brought up to office.

9:00 we set up a test at the Lions

Fish & Game Club to demonstrate the
live firing of the 979 Seismic Gun

Present were Jim Martin
Ed. Honner
Ed Yetter Jr.
Bob Baggetta
Ken Howlands

The gun fired with no problem - the
gun was also left in the snow for about
20 min. and re-fired - no freeze up
occurred.

12:00 Ed Honner left for Bridgeport

1:00 meeting with Tomi

1-14

Wed 1-14-81

temp -5°⁹

Did not come to work - called in
about 8:00

Had a major job because of a
water pipe freeze up - pipe broke
at the shut off valve and drained
the wells - (big problem)

Worked until noon and had repair
fixed

Spent the afternoons and evening
adding new pipe and also adding
heat tapes to prevent further freeze ups.

1-15-81

10 Thurs 1-15-81

Temp -5°

8:00

Review progress on X36 gun
with Tom Bauman.

The locking block design proved
was shut and would not function
with buffers. Tom removed the buffers
and fired approx 200 rds. at high
bolt velocities - 365 m/s

The gun failed in the Breach
Bolt Area. The bolt failed at
the rear section also the locking
block has a crack in the rear
bottom pin area. (right leg.)

10-12:00

went over Seismic barrel package
with Ed Tetter Jr. Looked at designs

1:30-4:30 reviewed Seismic Design barrel problems

1-16

Fri 1-16-81

Temp + 10°

8:00 to 12:00

Had a call from Phil Martin of
Mapco on seismic gun testing.

Phil indicated that the guns that
were in Australia were shooting fine.
He had no problems after he had
the wiring straighten out and 50 ohm
resisters in the lines. Very Happy
with results.

Call from Bill Jowers.

Talked about m/7400 project
would like to see if we could make
a m/4 carbine for 1981 warehouse by
June.

Also discussed maybe changes
in wood - finish etc.

1-16
~~1-16~~

12

Tue. Continued

12:30.

new instituted group met in 324 Conference room for a joint meeting. Clark explained where we stood and the group that were set up on special assignments were released to work on them until 2:00. It was also pointed out we could change our time and work longer like every other week and spend all of Tue afternoons on whatever.

2:00-4:30

Worked on A.I. report (740)

Mon. 1-19-81

temp +18°

8:00

Set up daily XSG meeting starting at 8:00.

The meeting was a kick off type to better motivate the group and make an understanding of what the goals are on this project.

10:00 meeting with Clark - review projects in preparation

of Clark's report to the managers meeting in Bridgeport

11:00 Meeting with Lami and Jim Bowers - ~~what~~ went over the seismic project.

The decision was made to turn over seismic project to Jim and have Ed Yetter Jr stay in my section and work on the B95 Systems and Jim Modeling.

1-19-81

14

Mon Continued.

12:30 to 2:30

meeting continued

2:30 to 4:30

Had a meeting with Jim Bowers to review the seismic gun project and bring him up to date.

Turned over my files on the seismic program also showed gun and explained the design.

Jim now has the A.I. reports

Plus Jan 20, 1981

Temp +28°
(Near wave)

8:00 meeting on X86

reviewed status of components also
set up group to work on Gas Systems

The personal are: Jim Martin
Adam Hageich
Tom Bauman
Ed Fetterly.

10:00 had meeting on m/700

Covered the bolt lock designs and
the m/788 safety designs

Discussions held on how we would
present the new ideas to marketing.

12:30 - 2:30 -

Worked on note book and A.I.
report also prepared for operations
Committee, which is - 1-21-81.

16

Wed. Jan 21, 81

Temp -10°

8:00

meeting on XSB Program

Plans in toh

X-0014 = 7500 - 8000

X-0018 = in test toh

9:00 meeting on Gas Systems

Personal. Jack Kast
Adam Hugick
Norm Baumann
Ed Letter
Jim Murtus

10:00 meeting on Bolt Action m/700's
Prod & Sol.

discussed Bolt lock designs
and reviewed new ideas - follow up
meeting will take place to set up design
specification

11:00 Operation Committee 52-4.

3:00 review with Joe Cloo on Gas Systems XSB
Adam Hugick. office -

Thurs. Jan 27, 81

Temp +11°

8:00 XSB meeting

Guns in test

0010X - 8024 back in test -

0018 = 1. accific - 300 in/sec.

short mag.

x0016 sub-spring 1 $\frac{3}{4}$

Gas System review.

8:30 Ball Actions meeting.

Fred & Sol.

Got research note book out - and started record. and design specifications -

10:00 } review of 7400 Carbine designs

12:30 meeting on Gas systems: Jack Kost.

1:30 Hot sheet meeting.

2:30-4:30 report on highlights for monthly Report.

1-23

18 Fri Jan 23, 81

Temp +28,

5:00 XSE meeting

1 X0016 Gun now has 8470 adn. $2\frac{3}{4}$ " mag. -
the action bar assembly with EB welding
rod separated (broke) at 100 rds - the
second sample was tried and also broke
at 100 rds.

2 X0018. Gun with new locking system
sliding Pin type has been fired 1000 rds.
of shot magnums, one cross pin broke
and there is some upsetting where firing
pin contacts slide block. Bolt velocities
are 300 in/sec

3. new feed latches are complete from model
shop. Action bars will be out of shop
1-23-81.

Assembly should begin on Mon. 1-26-81

4 Gas System:

Adam Hugvick renewed the gas system
work that Bob Boyer from DuPont. has done.
also discussions on design system Jack East
is doing.

9:00 Bolt Action Rifle meeting:

Fred Martin assigned a proposed
Sal Tarelli specifications sheet - see NOTE

Book

Hi Continued:

9:30 meeting Clark's office

Hold quick safety meeting so far this year we have had no loss time injury.

Inform everyone there will be new initiative meeting every other week and spend 4 hrs. starting next week.

11:00. Dave Finlay put on a presentation to the staff on the m/5400 new magazine design.

reviewed with Dave and we will set up a new time for second review.

Haymala vs Rem.

12:30 - 4:50

2:30 Bob Sperling called COURT CASE delayed 2-3 off.

no meeting cleaned up mail box

and worked on note books -

I did have new Research note books issued to me as follows -

- 1. X86 Shotgun designs No 2053
- 2. 7400 Rifle design No 2055
- 3. Bolt Action Rifles No 2054.

1-26-81

20 Mon Jan 26, 1981

Temp⁺ 22°

8:00 XSG meeting

X0016 - Back in test.

X0018 - 2000^{psi} short magazines -
300 w/sec.

List of parts on hand being made.
parts needed will be put in shop.

8:30 Bolt Action Rifles:

Prob. Martin:

6 guns in test lab
one control.
5 prototypes

4 guns (the bolt lock does not work. all
the time.)

9:00 meeting with Tim:

Review XSG - 7400 & Bolt Actions

Continued.

12:00 hour -
Temp +45

10-12:00

Worked on Note Book -

2:30 Task Force MEETING -
Jim Smedley & Jim Bowers -

Review interview gallery performance
and.

3-4:30 worked on AI Report.

1-27-81

22 *Thurs Jan 27, '81*

Temp +40

800 XSB - meeting -

X0016

X0018. 2600 rd. Shutt magnum.

actions are complete. to-day
assembly. mech work -

900. interview 7400 Assembler
John Porcell.

9:45 interview 7400 Assembler
Bob Lynett.

10:30 interview 7400 Assembler
John MacLean

11:15 interview 7400 Assembler
Everett Pabley

1:00 - 4:30

work on report of interviews -

wed Jan 28, 81

temp +20²³

8:00 XSB Meeting:

X0016 Action Spring Breakage -
10,600 2 $\frac{3}{4}$ " mag. 20,772 -
add new spring - and continue

X0018. 2973 rds - action spring, etc.
1,900 - 26,565 TOTAL - rds -
crack locking block, Broken Action bar -
new locking will be started.
(2000 rds on locking systems)

9:00 Bolt Action Rifles.

Five guns in test lab with bolt lock.

1. 6 new latches without detent lock bolt -
2. new screw design pull weight adjustment screws and spring - to prevent customer improper adjustment of trigger pull -

This is now in new fire control for test.

five - 2 with minimum trigger pull -
2 with factory Spec. #5
1 with mod " "

1-28-81

27

→ Continued. wed.

10:00 Discussion with Jim Smedley
on task force.

After reviewing interviews with
Assemblers, something should be done
to our system. We are apparently
outdated or something. The quality of
final assembly parts is very poor.

11:00 - 12:00

12:30 - 2:30

Worked on A.I. reports and reviewing
note book, to date.

2:30 Task Force Meeting on 7400 Design

3:00 to 4:30

Worked on Book.

Jan 29, 81

temp #18

8:00 X56 MEETING.

testing X0016 re. find.

Discussion on Gas System, Locking Bolt
Design etc.

Suggestions made by Dave Kendrick re try
moving the Gas cylinder forward. to better
control bolt velocity functions.

9:15 interview 7600 assembly -

↓

3. assembly - Ron Paul & Bernard.

11:00.

11:00 Discussion with Jim Bowers -

↓

12:00.

12:30 note book work.

3:30 - 4:30

7400 interview with night
employees -

1-30-81

26

Thurs Jan 30.

Temp 22°

"Day. Vacation"

Personal:

Went to Raquette Lake with
Bet and Rosie to the camp.

Saturday was nice and we went
to Long Lake on our snowmobiles.

Sunday. Cut Birch tree down.
and Block up

my snowmobile truck locked up
and I had to drive the truck
across the ice to camp.

snow was heavy on the way home.
"good time"

cmom:

Feb 2

27

temp + 40

XSB meeting

X-0016 total 23,292

new Spring - 2,000 10,000 Locking Steel

X-0018 new sliding Locking Systems -
test - to - days

Receives new model - schedule = March 1,

Gas System - Tom Baumann - "Dump"
two piston and Seal.

Layout for down bore - gas systems -
fire Control - due to model chap.
Tom Powers -

→ Check model. chap. barrel.
orifice cut off.

presentations on barrel heat treat.
Adam #6.

new action bar assembly.
mark Coiter -

9:00. Comparisons Remo evaluation

m/7400 - m/4 vs 742 AOL - 742 BDL

2-2-81

28

Continued!

11:00 Clarks office.

12:30 Telephone ~~conversations~~ ^{conversations} with

Bill Johnson. on m/4 LE wants to change the side art work.

Got to-gether with Tom J. on phone conversation.

And three⁽³⁾ way. Purchase is still holding on collect, Aurum about 1500 guns now marketing wants to change back to original designs. Will take about 8 wks.

2:00 meeting with Clark. and three purchasing personnel. D.A. L.P. & Ray T.

3:30 interview with Cy Brewer,
7400 Night shift assembler.

Tues Feb 3, 81

29

temp +15

8:00 XSG meeting

Spring - #1 10,355
" #2 2,020
" #3 3,000

X0014 = 2,020.

X0018: Hold test until new locking block is made.

9:00 Staff Meeting - Clark's office

1. Product Safety review meeting.
(a) committee to be set up in house
(a) make suggestions as to who?
2. XSG review - personnel who are involved are to put on presentations to staff.
3. Development meeting in March.
4. Claypool will be here with B Emerson with auto-loading rifle designs

7-3-81

30

Continued

5. Review to be made on Bolt Lock and fire Control status
6. 22's PMC ammo. test
7. m/c & Co. Carbine design
8. Pre-Op to be wred. 3:30 - 2-4
9. Find out how much travel, schooling. Shows to be covered. etc. need by March 1, 81
10. Set up a new date for unit review.

11:00 AM

meeting in Clock's office on development schedule

MODEL 700

Testing

Remington-Union Brand

REMINGTON-UNION BRAND
MADE IN U.S.A.

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE



Xc: R. L. Hall
 W. E. Leek
 M. F. deMayo
 M. H. Walker
 J. Brooks
 File

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

Ilion, New York
 December 14, 1973

TO: C. B. WORKMAN
FROM: A. A. HUGICK
DATE: DECEMBER 14, 1973
SUBJECT: M/700 - 243 Cal. BDL - ADL
 DESIGN CONFORMATION TESTING

TEST PERIOD: DECEMBER 10, 1973 thru DECEMBER 14, 1973

WORK ORDER: 88809

INTRODUCTION:

Eight BDL and Four ADL M/700 rifles in 243 Win. Cal. were selected from the pilot production sample for design conformation testing by Research. The 1974 rifle improvements are bolt anti-bind system, cast magazine follower and cut checkering on the BDL. Testing was concentrated on accuracy and function due to recent M/700 - 7mm Rem. Mag., 270 Ca., 25-06, testing.

TEST OBJECTIVE:

Design conformation test the M/700 rifle - 243 Win. Caliber.

TEST OBSERVATIONS:

1. Accuracy and function was considered satisfactory.

RECOMMENDATIONS:

1. The M/700 - 243 BDL and ADL considered acceptable product.

COMMENT:

The ADL rifles were received and tested without the magazine spring retainers.
Deletion of the retainer was required to meet the four shell magazine requirement.

AAH:bd A.
Measurement / Test Lab
Ilion Research Division

TEST FUNCTION	ONE	TWO	THREE	FOUR	FIVE	SIX	SEVEN	EIGHT	SPECS,
BDL SERIAL NUMBER	6696715	6696737	6697234	6697406	6697201	6697518	6697719	6697701	—
RESPONSE - MINT (AS RATIO)	T.002	T.003	T.004	T.004	T.002	T.004	T.003	T.003	.000 TO T.005
RIGGER PULL	4.25	4.50	5.00	3.50	4.00	4.50	3.50	4.50	3.00 TO 5.00
DRIVING PIN INDENT	.0230	.0250	.0230	.0230	.0240	.0240	.0235	.0250	.0180 TO .0200
LENGTH	4 1/8	4 1/16	4 1/16	4 5/8	4 5/8	4 1/16	4 1/8	4 1/8	—
ROUND SIZE - 4x33HOT R-P80 H.P. GROUPS	1.71	—	1.94	—	—	1.91	—	1.83	2.02
DR. SPREAD	1.33	—	1.59	—	—	1.24	—	1.09	—
VERTICAL SPREAD	1.17	—	1.34	—	—	1.68	—	1.67	—
ROUND SIZE - 4x33HOT W/ W 80 P.S.P. GROUP SIZE - 4x33HOT	—	—	—	—	—	—	—	1.66	—
F80.80 S.P.	—	—	—	—	—	—	—	1.28	—
LOAD, P.O.I., AS RATIO	0.0	—	0.5R	—	—	3.0R	—	1.5R	—
VERTICAL P.O.I., AS RATIO	10.0 L	—	1.0 H	—	—	1.5 H	—	1.5 L	—
VERTICAL P.O.I. MAX.	14.0 H	—	22.5 H	—	—	20.5 H	—	22.0 H	—
VERTICAL P.O.I., MIN.	14.0 L	—	3.5 L	—	—	2.5 L	—	5.5 L	—
VERTICAL FUNCTION WORD JACK TEST	0	0	0	0	0	0	0	0	—

DON'T SAY IT—WRITE IT

To L. I. SCOTT

DATE April 8, 1970

FROM S. M. ALVIS

MODEL 700 - Caliber 25-06

In our quest to save money I made a decision this morning. Hope this is right.

There was talk of more extensive testing for the above round using 5 rifles and on outside range in order to get the 100 to 300 yard increments. It is estimated that the testing would cost about \$1200.

I asked this be "passed" on assumption that you fellows have no doubt checked the extended "down range" performance at Bridgeport. Also, before release to warehouse, we did make a quick test of 2 guns up to 300 yards. The conditions were adverse so the test was rather limited.

I am sending along copy of notes of these results. Should there be any question about the above, please let us know.

SMA:T

Sam:

Ok with me to skip this. If Mike or others wish to know more of our test plans

- cc: G.M. Calhoun
- L. Fox
- M.H. Walker
- W.E. Leek - W.R. Googin - File

they can call Marty Leach or Frank Piroli.

Lenny

TO BE SAFE, FIRST THINK YOU MIGHT NOT BE

25.06 CAL.

3-5-70
SHEET #1

POINT OF AIM VS. POINT OF IMPACT INVESTIGATION

RANGE - 100, 200 & 300 yds. BENCH REST

GUNS USED - 1-REM-700-25.06-BDL-SER.# 6311564

1-REM. 40X. 25.06-SER.# 36799B

SCOPES USED - TEST #1-REM 20X-# 157-FINE CROSS HAIR

TEST #2-UNERTAL-20X-# 26883-MEDIUM CROSS HAIR

OBJECTIVE: To determine variation in Point of Impact at 200 and 300 yds with scope sighted ~~at~~ at 100 yds. 1-10 shot group fired at each range

SHOOTERS: W. Googin - M-700
J. HENNING - 40X

GUN	SCOPE	RANGE	GP. SIZE	HOR SPREAD	VERT. SPREAD	POINT OF IMPACT
40X	REM	100yds.	1.35"	1.05"	1.35"	.41" RIGHT - .89" LOW
40X	UNTOUCHED FROM 100yds.	200yds.	2.81"	2.79"	2.04"	3.00" RIGHT - 4.61" LOW
40X	UNTOUCHED FROM 100yds.	300yds.	6.51"	4.01"	6.16"	3.35" RIGHT - 12.70" LOW
700	REM UNTOUCHED	100yds.	1.61"	1.49"	1.09"	1.19" LEFT - .75" HIGH
700	FROM 100yds. UNTOUCHED	200yds.	2.68"	2.48"	2.60"	.10" LEFT - 2.89" LOW
700	FROM 100yds. UNTOUCHED	300yds.	6.51"	5.12"	6.51"	1.60" RIGHT - 9.41" LOW
700	UNERTAL UNTOUCHED	100yds.	1.52"	1.28"	1.18"	.41" LEFT - .07" HIGH
700	FROM 100yds. UNTOUCHED	300yds.	5.75"	5.60"	2.95"	.35" LEFT - 10.75" LOW

① *L. J. Boych* DON'T SAY IT - WRITE IT

TO S. M. ALVIS

DATE October 12, 1972

FROM M. H. WALKER

Subject MODEL 700 SEARS

*Fail
Testing*

The sear problem on the 700, 40XB, etc., discovered on the Left Hand pilot test, is one which is probably more serious than the Plant realizes.

Apparently a material change was made without adequate testing. Present sears develop up to 10# trigger pulls, and although none were reported, failures to fire could develop after only 1000 to 5000 dry cycles. Failures to fire are extremely dangerous as a slight lift of the bolt will generally fire the rifle. Present sears will not produce adequate trigger pulls on M/40XB rifles as assembled.

We have threatened to change the sear to wrought material in an attempt to get quick action. Sears of the old material are being fabricated. It is possible they are working as fast as they can. This should be checked again.

Copy sent to L. J. Boych

L. 704

by

SMW

10/12/72

MHW/nl

TO BE SAFE: FIRST THINK YOU MIGHT NOT BE

DON'T SAY IT—WRITE IT

To S. M. ALVIS

DATE October 12, 1972

FROM M. H. WALKER

Subject MODEL 700 SEARS

(L)

Testing

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*I sent
Copies to
H. Boyer
L. Fox
Clark Workman
L. J. Boyer
SMA*

MHW/nl

TO BE SAFE. FIRST THINK YOU MIGHT NOT BE

DON'T SAY IT—WRITE ITTo S. M. ALVISDATE October 12, 1972FROM M. H. WALKERSubject MODEL 700 SEARS

The sear problem on the 700, 40XB, etc., discovered on the Left Hand pilot test, is one which is probably more serious than the Plant realizes.

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MHW/nl

TO BE SAFE, FIRST THINK YOU MIGHT NOT BE

W. J. ...
W. J. ...
u
John Brooks

...

Ilion, New York
June 13, 1966

MEMORANDUM

To: C. B. Workman

From: A. A. Hugick

DROP TESTING OF MODEL 700 POWDER METAL SEARS

The enclosed drop test procedure was organized and conducted using M/700 powder metal sears. Two samples of M/700 sears were submitted for drop testing at this time.

Sample No. 1 consisted of M/700 chrome plated powder metal sears with approximately .003" radius when received from Production and had been cock-and-fire dry cycled for 30,000 cycles each. No malfunctions of the sear were encountered during drop testing of sample No. 1 sears.

Sample No. 2 consisted of M/700 chrome plated powder metal sear with approximately .0005-.001" radius at the connector edge, increased density, and zero dry cycles. No malfunctions of the sear were experienced during drop test of the M/700. This sample of sears had tight pin holes and had to be polished out for testing.

The fire control adjustment was made by Production prior to the dry cycle and drop testing. Hardness measurements on the RC scale varied from 38.5 RC to 54.5 RC. This variation of measured RC hardness should be clarified.

Recommendations:

Based on test results of submitted test samples, the chrome plated powder metal sears should be considered for use in the M/700.

If the hardness difference is considered significant, some of the latest, softer sears should be dry cycled for wear on the sear connector edge.

Enc.
AAH:c

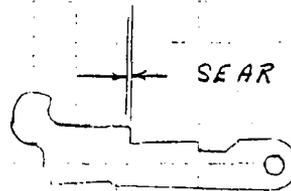
M 700 PM SEAR TEST
 DROP TEST SEAR DATA.
 A.A.H.

SAMPLE NUMBER ONE

SEAR NUMBER	TOTAL NUMBER OF DRY CYCLES	SEAR RADIUS AT CONNECTOR EDGE	SEAR COMPONENT WEIGHT & HARDNESS	AVE. TRIG. PULL @ BEGINNING AND END OF TEST
153959	30,000	.0045	9.3685 GRAMS 38.5 RC SCALE	5.10 - 5.10
139298	30,000	.0035	9.4080 gr 52 RC SCALE	5.20 - 5.15
139413	30,000	.0050	9.4200 gr 51.5 RC SCALE	3.90 - 3.80
139555	30,000	.0068	9.3880 52 RC SCALE	4.90 - 4.55
139312	30,000	.0029	9.4140 gr 51 RC SCALE	NOT TESTED
139457	30,000	.0053	9.4310 gr 54.5 RC SCALE	4.60 - 4.75

SAMPLE NUMBER TWO

139298	00	.0005	9.5332 38.5 RC SCALE	5.55 - 4.95
139412	00	.0011	9.5000 45.0 RC SCALE	4.85 - 4.75



SEAR RADIUS AT CONNECTOR
 MEASURED ON
 OPTICAL COMPARATOR

WEIGHT HEIGHT WAS TAKEN AT 45 INCHES.

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE



"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

DROP TEST PROCEDURE

MEASUREMENT and TEST LAB

- I. Trigger Pull and Firing Pin Indent
 - A. Take five samples.

- II. Safety Mechanism Shock Test
 - A. Drop gun ten inches on solid wood surface with safety "ON".
 1. Butt down
 2. Muzzle down
 3. Topside down
 4. Bottom down
 - B. The Trigger shall be tried after each drop to determine whether the safety has released any mechanism which may allow firing.
 - C. Three drops per position.

- III. Jar-Off Test
 - A. Drop gun ten inches on solid wood surface with safety "OFF".
 1. Butt down
 2. Muzzle down
 3. Topside down
 4. Bottomside down
 - B. The Trigger shall be tried after each drop to determine whether the safety has released any mechanism which may allow firing.
 - C. Three drops per position.

AAH:T
566

DROP TEST PROCEDURE - Measurement & Test Lab

IV. Safety Operations Test

- A. This test is for testing the safety mechanism.
 - 1. Cock gun
 - 2. Put Safety "ON"
 - 3. Try Trigger
 - 4. Release the Safety
 - 5. Pull Trigger
 - 6. Record if Trigger functions with Safety on
 - 7. Record if Firing Pin fell when Trigger was pulled
- B. Make 50 trials.

V. Safety Mechanism Shock Test

- A. Drop gun "waist height" on solid wood surface with safety "ON".
 - 1. Butt down
 - 2. Muzzle down
 - 3. Topside down
 - 4. Bottomside down
- B. The Trigger shall be tried after each drop to determine whether the Safety has released any mechanism which may allow firing.
- C. Three drops per position.

VI. Jar Off Test

- A. Drop gun "waist height" on solid wood surface with safety "OFF".
 - 1. Butt down
 - 2. Muzzle down
 - 3. Topside down
 - 4. Bottomside down
- B. Trigger shall be tried after each drop to determine whether the safety has released any mechanism which may allow firing.
- C. Three drops per position.

VII. Gun Function Check

- A. Trigger pull
- B. Firing pin indent
- C. Take sample of five.

AAH:T

CHRONOLOGICAL RECORD OF TESTING

MODEL & DESCRIPTION ~~770 YOC~~ POWDER METAL SEAR WITH ROSSER ~~(10052)~~

CALIBER or GAUGE .243

DATE 6-1-66 TEST M/YOC sear drop test TESTER PAGE NO.
S. Hennings.

Cartridges #1 2 3 4 5
139298, 139559, 139555, 139457, 139413 - were used
with powder metal
powder metal
sears

Test I - Trigger pulls & Firing pin indents - (separate sheets)

Test II - (top side down) # 139457 on second drop rear sight broke

Test III - (bottom side down) # 139457 on first & second drops bolt jarred open

Test IV - no malfunctions noticed

Test V - (top side down) # 139457 on second drop rear sight came off

(bottom side down) # 139298 on second drop stack started to crack
around trigger plate

Test VI - (mixed side down) sears # 1, 2, 3, had a total of 7 drops
in which safety was jarred to "ON" position.

(top side down) sears # 1, 3, 4, 5 - had a total of 5 drops
in which bolt was jarred open. (# 139298 on third
drop safety jarred to "ON" position.)

(bottom side down) sears - # 1, 2, 3, 4 - had a total of 5 drops
in which bolt jarred open. (# 139555 on first
drop stack broke just behind trigger guard)

CHRONOLOGICAL RECORD OF TESTING

MODEL & DESCRIPTION 700 P.M. sear (LATEST PROD w SHARP RND)

CALIBER or GAUGE .243

DATE 6-1-66 TEST P.M. sear drop test TESTER FACE NO.

J. Harnings

barrels # 139298+ 139413 were used with new P.M. sears.

TEST - I - Trigger pulls & firing pin indents (separate shoots)

TEST - II - (butt down) - # 139298 - on first drop rear sight broke off

TEST III - (MUZZLE DOWN) - # 139298 - on second drop bolt jarred open.

TEST - IV - no malfunctions noticed.

TEST - V - no malfunctions noticed.

TEST - VI - (butt down) both guns - a total of 4 drops in which safety was jarred open. # 139298 on third drop bolt jarred open.

NOTE! ON BOTH ACTIONS PIN HOLE LOOSE TIGHT, CAUSING SEAR TO BIND.

File
Clark
Please see me on
this

W. L. ...
M. ...
Navy ...

Work Order 74287
October 22, 1925

Clerk Workman
Test Lab

RELOADABILITY TEST FOR M-700 AND M-788

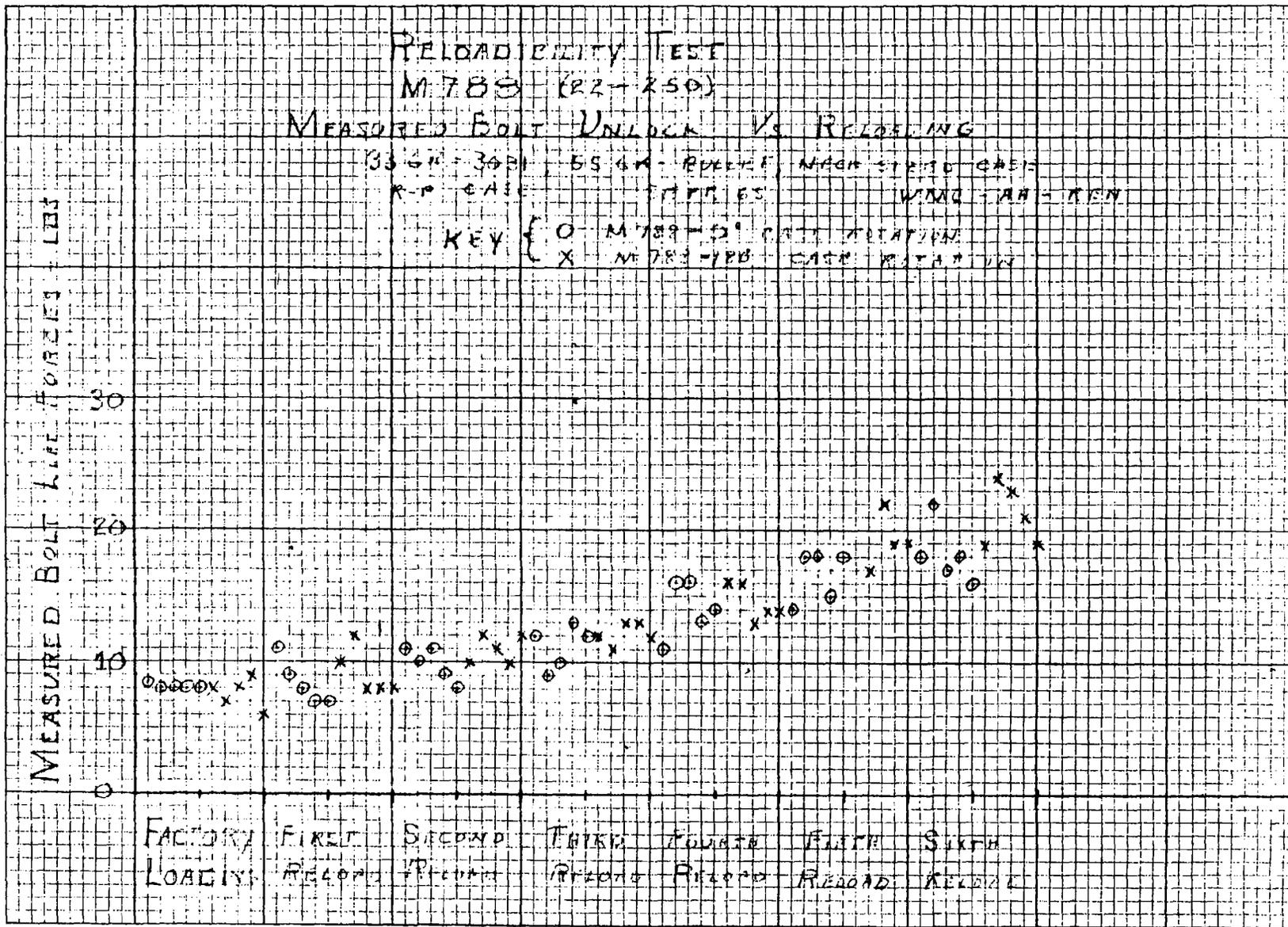
The test was conducted to see how the M-788 compared to the M-700 in case reloadability. The 22-250 cartridge was used for both models. The cartridge cases were neck sized only after each firing.

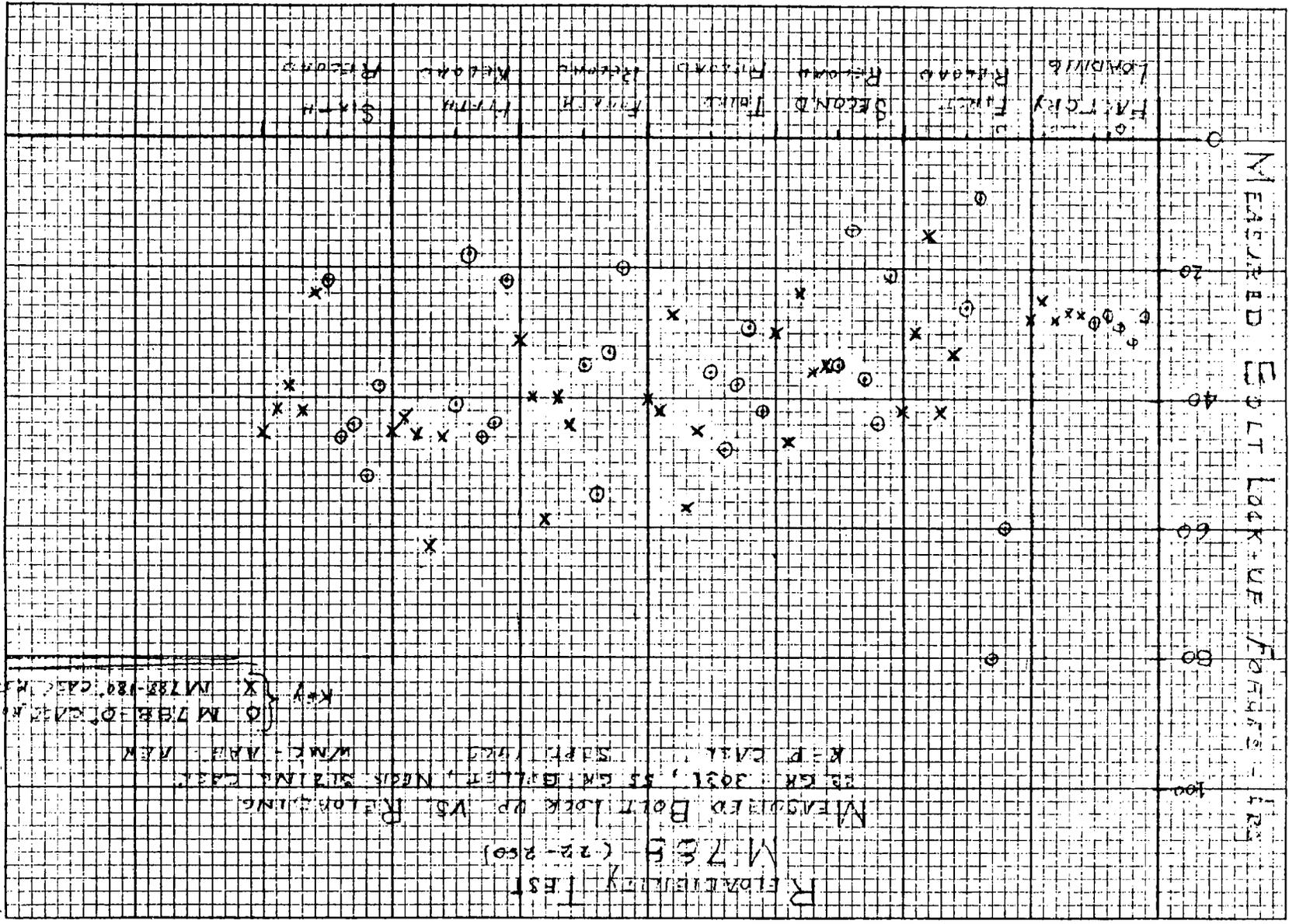
Measurements of the pounds required to open and close the bolt by hand, were taken from a strain gage mounted on the bolt handle. The strain gage on the bolt handle was calibrated with a spring scale. The guns were mounted in a shooting jack and aimed into the chronograph pit. The calibrated strain gage was hooked up to the oscilloscope and bolt closing and opening forces were recorded on film.

The Potter chronograph was used for recording bullet velocities. On the following pages, graphs are plotted with lock and unlock forces versus times reloaded.

Wayne - Here are the pressures you requested. (attached)

John Linde





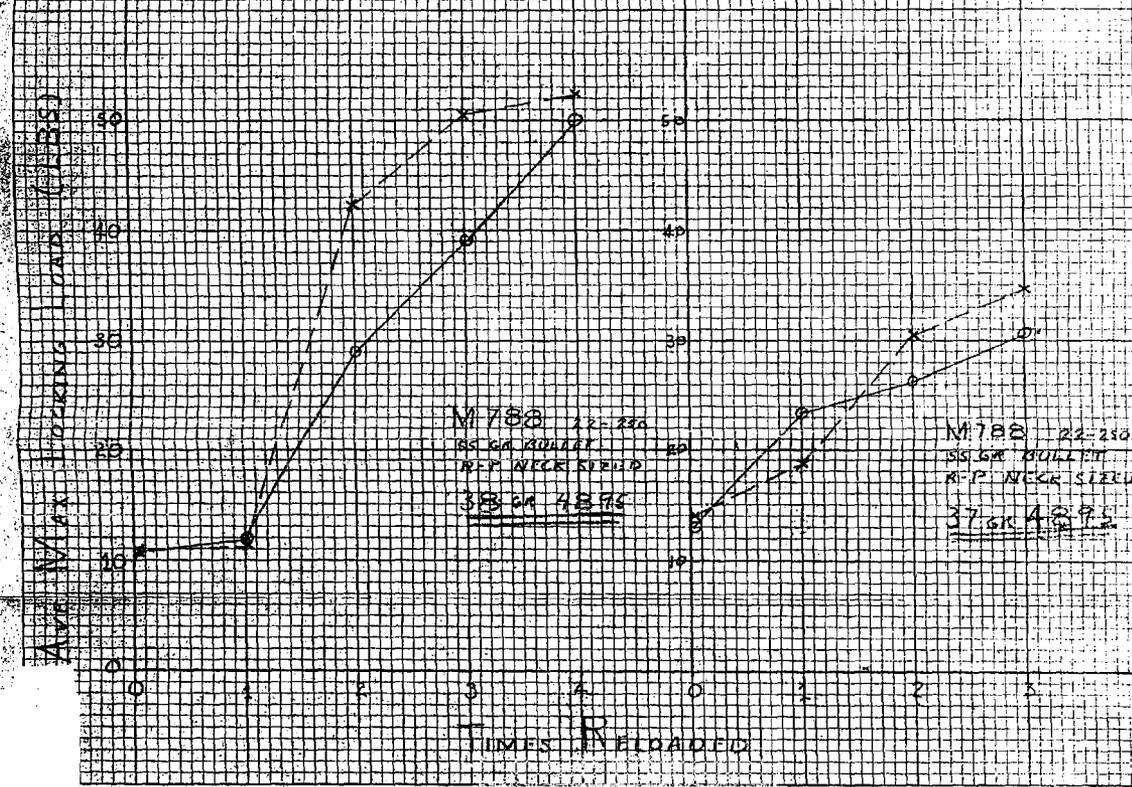
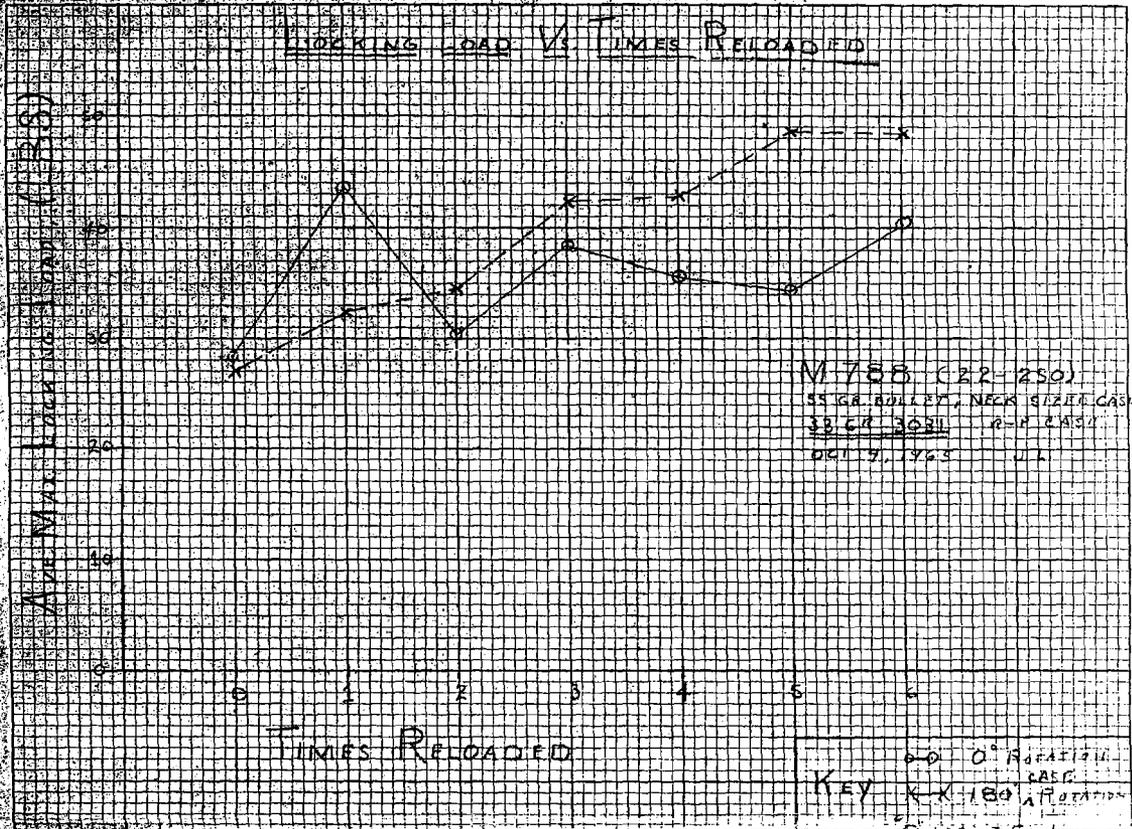
22-250 REMINGTON

"POWER-LOKT" AND CONVENTIONAL BULLETS

BALLISTICS DATA

<u>Bullet Type</u>	<u>Barrel Number</u>	<u>Powder Type</u>	<u>Powder Wt. (Grs)</u>	<u>Instrumental Vel. (FPS)</u>	<u>Pressure (PSI)</u>
PLHP	PV 3	3031	33	3563	43,000
PSP	PV 3	3031	33	3603	44,100
PLHP	PV 3	4895	36	3697	49,000
PSP	PV 3	4895	36	3681	48,600
PLHP	PV 3	4895	37	3786	53,300
PSP	PV 3	4895	37	3789	54,200
PLHP	PV 3	4895	38	3913	60,800
PSP	PV 3	4895	38	3895	60,500
PLHP	Vel 9	3031	33	3618	-
PSP	Vel 9	3031	33	3624	-
PLHP	Vel 9	4895	36	3761	-
PSP	Vel 9	4895	36	3782	-
PLHP	Vel 9	4895	37	3907	-
PSP	Vel 9	4895	37	3901	-
PLHP	Vel 9	4895	38	3981	-
PSP	Vel 9	4895	38	4000	-

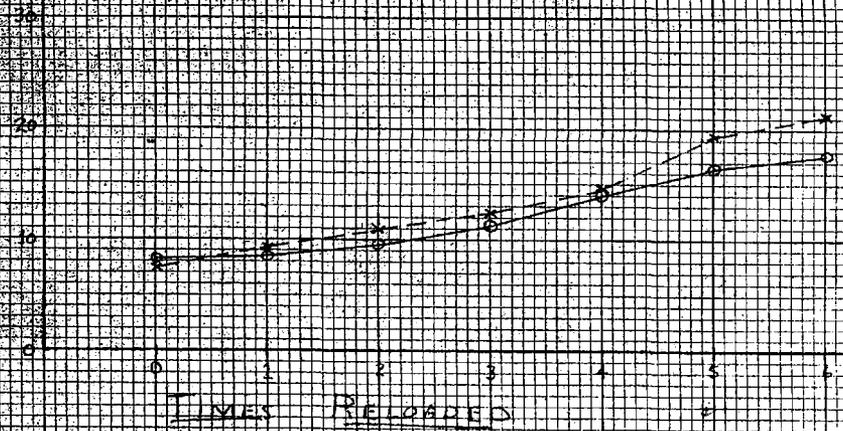
All Readings Ave of 10



UNLOCKING LOAD VS. TIMES RELOADED

M788 (22-250)
 55 GR. BULLET, R-P NEAR FIXED CASE
 QRT. CASE
 33 GR. 4895

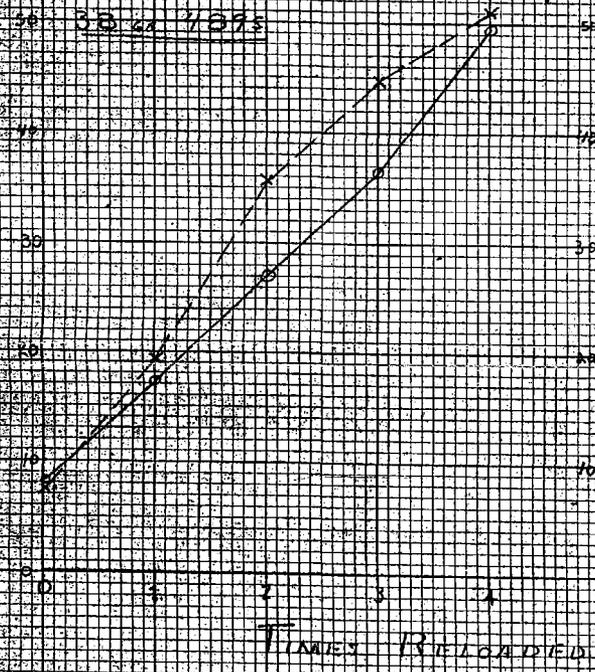
AVERAGE UNLOCKING LOAD (CLIPS)



(O) O CASE ROTATION
 (X) X CASE ROTATION
 (O) LOAD, (X) FACTORY LOAD

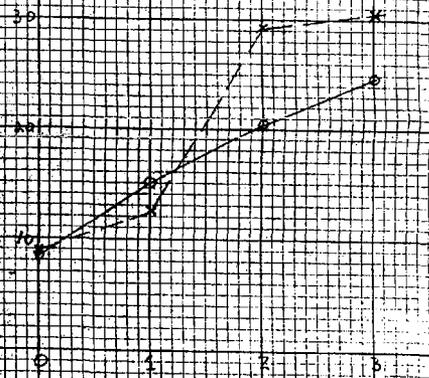
M788 (22-250)
 55 GR. BULLET
 R-P NEAR FIXED CASE
 QRT. CASE
 33 GR. 4895

AVERAGE UNLOCKING LOAD (CLIPS)

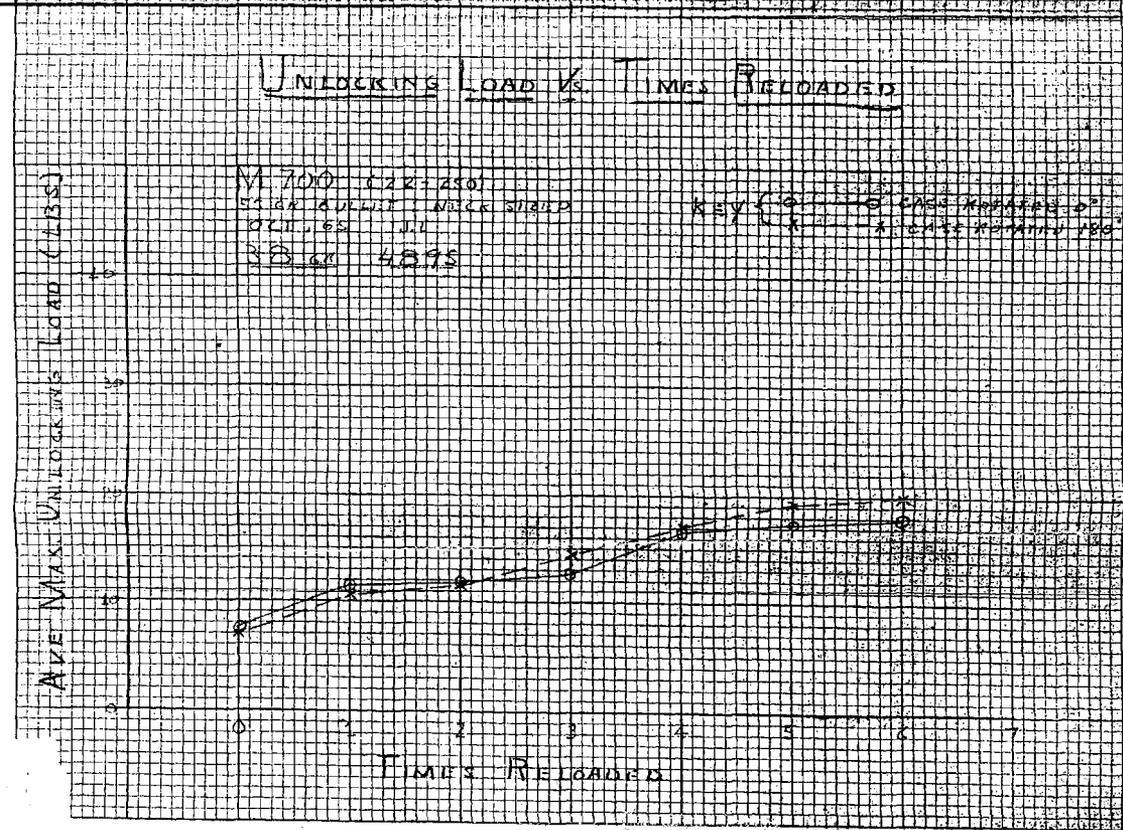
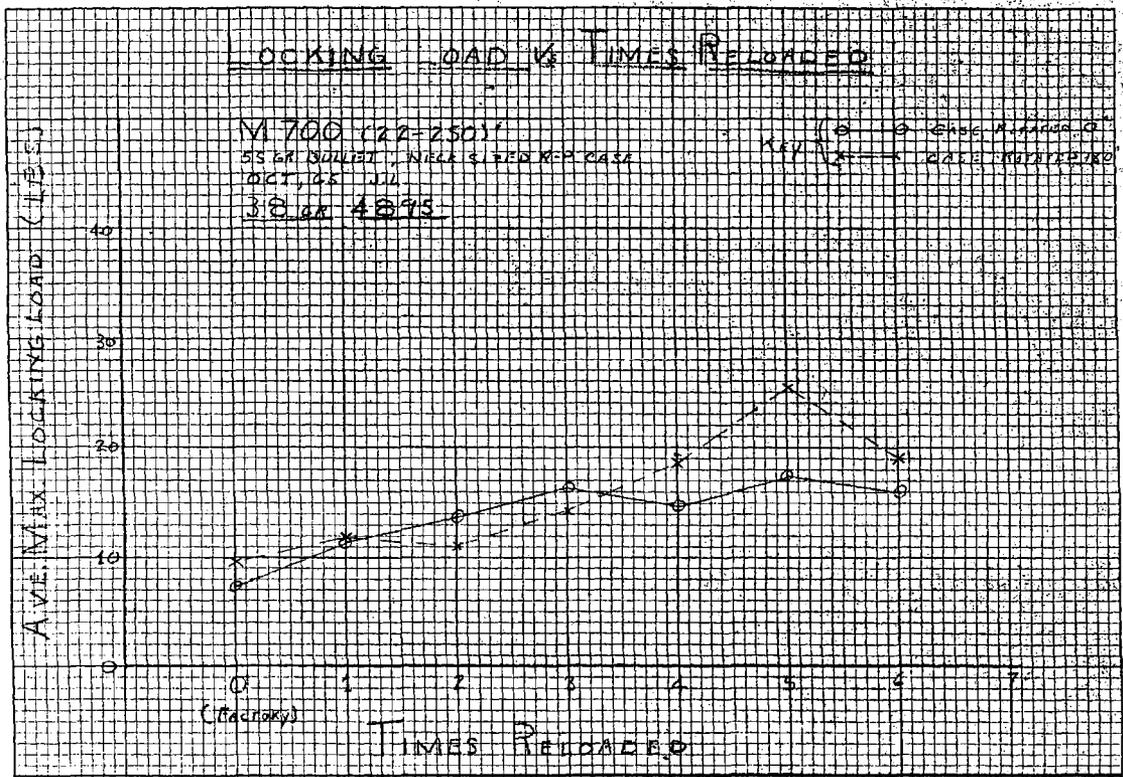


M788 (22-250)
 55 GR. BULLET
 R-P NEAR FIXED CASE
 37 GR. 4895

AVERAGE UNLOCKING LOAD (CLIPS)







cc: G. M. Calnour - Bdpt. ✓
~~S. M. Alvis~~ W. E. Leel

December 9, 1964

M. H. WALKER

22-250 Caliber - M/700

In order to test the 22-250 caliber in the M/700 for accuracy and barrel life, six rifles were made by the Custom Shop.

The barrels were standard button rifled Plant barrels for the 222 caliber. Three of these were leaded at the breech end to remove the tight section ahead of the chamber. Custom Shop .22-250 reamers were used for chambering.

Feeding problems were noted and this was corrected by using magazine spring No. 17028 (same as for the 30-06) instead of No. 17891 which is used for 6mm Rem.

Accuracy results were as follows:-

Targets measured center to center - 35.9 grains 4064 - 53 grain Speer Hollow Point bullets used in all accuracy tests.

Rifle No. 118812
Leaded Barrel - Action bedded in stock

Rifle No. 118884
Not Leaded - Not Bedded

Start of Test - Ave. 1.06"

Start of Test - Ave. 1.14"

<u>after</u>	<u>Ave.</u>
385 rnds.	1.16"
715 rnds.	1.27"
1075 rnds.	.88"
1435 rnds.	.83"
1735 rnds.	.99"

<u>after</u>	<u>Ave.</u>
335 rnds.	1.67"
665 rnds.	.99"
1005 rnds.	1.02"
1335 rnds.	1.37"
1675 rnds.	.96"

The barrels in both rifles show some erosion for approximately 6 inches of the breech end. The lands are eroded away completely approximately 1/4" ahead of the chamber.

M. H. Walker

December 9, 1964

22-250 Caliber - M/700

The four remaining rifles were fired for accuracy with the same loads and results were as follows:

<u>Not Leaded - Not Bedded</u> <u>Rifle Number</u>		<u>Leaded and Bedded</u> <u>Rifle Number</u>	
<u>118904</u>	<u>118840</u>	<u>117269</u>	<u>118975</u>
1.32"	.80"	.76"	.90"
.86"	.70"	.52"	.88"
<u>1.34"</u>	<u>.68"</u>	<u>.98"</u>	<u>.68"</u>
1.17"	.73" Ave.	.75" Ave.	.82" Ave.

The average group size for leaded barrels and actions bedded in stock - .87"
not leaded or bedded - 1.03"

L. P. Gogol
L. P. Gogol

LPG:nl

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE



cc: C. H. Morse
C. D. Hunt
H. J. Waterman

*File
Case File*

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

MEMORANDUM

Ilion, New York
December 31, 1963

To: W. E. Leek *WEL*

From: C. B. Workman *CBW*

MODEL 700 (Serial No. 19024) DROP TEST

At your request one Model 700 was subjected to the same test as the three Model 600's in a previous report.

- (a) All drops from 10-inch height.
- (b) Ten drops each position (muzzle first, butt first, upside down and in normal position).

Trigger Pull (lbs)					
Before 10 drops		4.03	3.40	3.05	2.50
After 10 drops		4.13	3.73	3.55	--
Number of jar off's	Muzzle first	0	0	0	1
	Butt first	0	0	0	0
	Top first	0	0	0	0
	Bottom first	0	0	2	2

CBW:B

Harold W. [unclear]
 REMINGTON ARMS COMPANY, INC.
 INTER-DEPARTMENTAL CORRESPONDENCE
 Remington
 PETERS

cc: L. J. Hagen
 C.B. Workman

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY"

- ① ~~SMA~~
- ② ~~W.E.T. in~~
- ③ ~~M. H. WALKER~~
- ④ ~~[unclear]~~

How about [unclear]
M/W [unclear]
 Iliion, New York
 April 16, 1963
 TEST
 MODEL 700 - 222 Rem.
 NEW DESIGN EXTRACTOR TEST

SMA + Wagon
 The new 222 -
 222 mag looks good,
 as per this report.
 We are turning
 drawings over to
 Hockman

At your request two Model 700 - 222 Rem. were tested for endurance of new design extractor as follows:

1. Each rifle fired 40 rds. factory loads consisting of 20 rds. Peters 50 gr. PSP and 20 rds. Win. 50 gr. PSP.
2. Five rds. of each type ammunition were reloaded with 22.2 gr. No. 4198 powder and 50 gr. Rem. bullets, and fired in each rifle to note pressure on primer and brass. No pressure was noted.
3. The same 5 rds. were again reloaded with 22.4 gr. No. 4198 powder and 50 gr. Rem. bullets. Again no pressure was noted.
4. Five rds. of the Peters ammunition only was reloaded with 17 gr. No. 2400 powder and 50 gr. Rem. bullets. Again no pressure was noted.
5. Two rds. of the Peters ammunition were loaded with 18 gr. No. 2400 powder and 50 gr. Rem. bullets. No pressure noted.
6. Two rds. of the Peters ammunition were loaded with 19 gr. No. 2400 powder and 50 gr. Rem. bullets. No pressure noted.
7. One round of Peters ammunition was loaded with 20 gr. of No. 2400 powder and 50 gr. Rem. bullet. This load was fired in Gun #59134 and resulted in a bulged case at the rim and expanded primer pocket allowing primer to drop out.
8. The bolts from the two test guns (#59134 and 59348) were then checked with a plug gauge to determine if the extractor had taken any set. Gun #59134 measured .354, and Gun #59348 measured .364 (same as original measurements at start of test).

9. The two rifles were then fired a total of 1,000 rds. Rem. 50 gr. PSP ammunition and checked for extractor set at 100 rds., 500 rds., and 1,000 rds..

<u>Gun No.</u>	<u>100 rds.</u>	<u>500 rds.</u>	<u>1,000 rds.</u>
59134	.354	.354	.354
59348	.364	.365	.365

Two ejection failures occurred in Gun #59134, each being the last round fired and by moving the bolt very slowly rearward.

Note: In building up the pressure loads at start of test, the same brass was fired in the gun in which it had originally been fired.


W.R. Googlin
Design Test Lab

WRG:T

*Wayne m
Gals*

CC: S.M. ALVIS
→

*70/700
Testing*

Ilion, New York
June 28, 1963

G. M. CALHOUN
BRIDGEPORT

6mm Accuracy Test - Neck Wall Thickness

A short time ago we reported that a lot of 6mm cases which we had were poor from neck wall thickness standpoint as compared with other lots of 244 cases which we had on hand. You asked that we run a test that would prove or disprove that neck wall thickness affected accuracy.

The first test in a M/40X, using maximum wall thickness of slightly over .017" as compared with maximum wall thickness of .015", gave an average for the selected thick wall cases of .86 at 100 yards against .63 for the thin wall. This used up all the really thick wall cases available to us and the next two tests using .0165" maximum wall thickness gave no significant difference in accuracy between the thick and the thin wall.

Our conclusions are that uniform wall thicknesses are desirable and that the thickness should be maintained so that no interference occurs with the chamber wall.

M.H.W.
M. H. Walker
Ilion Research Division

MHW:nl

W. Boyer
[Signature]

cc: D. E. Miller
L. J. Boyle
M.H. Walker - File

Ilion, New York
June 27, 1963

H. J. HACKMAN

Testing
[Signature]
←

MODELS 700 & 742 - 6MM BARRELS

Because of the apparent continued difficulties with this caliber and also since M. Walker does not seem to be in agreement with some of the processing, I have asked him to relate in detail the specific points for attention.

1. Barrel Pitting - This problem has apparently been with us in varying degrees for considerable time. Mike believes that the first lot of 6MM barrels was hardly acceptable for this reason and the present lot shows about 10% of the barrels with visible pits. We have been advised by the National Rifle Association representative that samples of the Model 700 and the 742 are being returned for replacement because of the barrel pitting.

Walker thinks that this problem can be overcome with some time and effort expended.

2. Distorted Muzzles - Flattening of the lands at the muzzle from a cone shaped tool or plug is visible on some barrels in almost every lot. Mike claims that the most recent testing of the 6MM and the subsequent examination of the barrels indicates that the efforts to eliminate this problem have not been successful.
3. Bell Mouth Muzzles - It seems that we get into this difficulty whenever we attempt to lead barrels from the muzzle end. Apparently it is almost impossible to avoid this. Walker feels that in order to insure that no enlargement or bell mouching results in a finished barrel, at least one inch should be removed after the lapping operation. He also has pointed out it was agreed that the second lot of 6MM barrels would be started in 24" blanks and that no cutting off would be done until after all the lapping operation was completed. However, for some reason unexplained it seems that this second lot of 6MM barrels were cut off before the lapping operation.

SMA:T

S. M. Alvis
Ilion Research Division

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE



"CONFINE YOUR LETTER TO ONE SUBJECT ONLY"

① Leak *not* *corn* *Jafa*
 ② Muzzle *corn*
 S. M. Avis *File*
 ③ *M/700 TEST MV*
6MM BARRELS

Hion, New York
June 25, 1963

We have gone over barrel problems several times with Plant and Process people on this caliber. However, it seems some of the problems recur at odd times indicating additional effort is needed. In the order of their importance the problems are:

1) Barrel Pitting

As is well known this problem exists in varying degrees. The previous lot of 6mm barrels was hardly acceptable for this reason. The present lot shows about 10% of the barrels with visible pits. We feel this problem can be licked with some time and effort expended. Since the NRA has reported that both the M/700 and M/742 6mm are being returned for replacement for this reason, effort at eliminating this problem should not be delayed.

2) Distorted Muzzles

Flattening of the lands at the muzzle from a cone shaped tool or plug has occurred on nearly every lot of barrels we have examined. More recent testing of 6mm and subsequent examination of the barrels indicates that efforts to eliminate this problem have not been successful.

3) Bell Mouth Muzzles

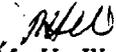
As all experienced engineers, tool makers, and machinists know, it is nearly impossible to lap a hole without bell mousing the edge of the piece. When barrels are lapped or "leaded" along the bore center line to improve finish and uniformity this bell mousing

S. M. Alvis

- 2 -

June 25, 1963

of the ends occurs. In order to be sure no enlargement exists in the finished barrel at least one (1) inch should be removed after the lapping operation. It was agreed that the second lot of 6mm barrels would start as 24" blanks and no cut off would be done until the lapping operation was completed. It is understood now that the barrels were cut off before the lapping operation.


M. H. Walker

MHW:nl

7211

MODEL 700 RIFLE - 6MM REMINGTON

Remington

A review of the 6mm Ammo problem indicates that the Plant is producing ammo which shoots an average accuracy of 1.5" on control in heavy accuracy barrels. Similar results are obtained on firing in heavy barrel rifles. The same ammo fired in the M/700 gives an average accuracy 2.5" or larger.

Winchester .243 100 grain gives the same or worse results in M/700 standard .243 caliber rifles.

We recognize that improvements in accuracy may be made by eliminating the cannellure, improvements in jacket hardness, and wall thickness variation over standard production practice. Whether these improvements would always insure varmit accuracy performance would have to be verified by an investigation requiring a minimum of four months.

As far as the M/700 rifle is concerned, addition of weight to the barrel improves the accuracy to the point that varmit accuracy specs can be met with current ammunition. This is indicated by results obtained with M/40X rifles and test on a standard M/700 with a weighted barrel.

An investigation to determine what changes could be made to the rifle, along with the ammo, would have to be verified by an investigation requiring about the same time as the ammunition program.

As far as current product is concerned the 6mm ammunition and gun perform as well or better than the .243 Win. 100 grain in accuracy and have superior ballistics. We therefore feel that the 6mm program should proceed as planned recognizing that the accuracy of both the cartridge and the gun should be improved at the earliest practical date.

3/12/63

cc: ~~S. M. Kivis~~
D. S. Foote
M. H. Walker
R. M. Malcom

Bridgeport, Connecticut
April 15, 1963

G. M. CALHOUN

TEST

BARREL FOULING AND ACCURACY
ON 6 MM MODEL 700 RIFLE

Barrel fouling and accuracy tests were conducted with hard and soft jacketed bullets. Samples were made up of production jackets and jackets without an anneal after the finish draw.

Results indicated there was no difference in barrel fouling or in accuracy using the hard or the soft jacketed bullets.

There was a marked difference in the fouling of a Model 700 rifle and a Model 722 rifle.

Data sheets are attached listing the fouling and accuracy results.

In the future, new cartridges should be fired in model rifles before the combination is approved for production.

RED
R. E. Dickey, Supervisor
Centerfire and Rimfire Ammunition

RED:MR
Attachment

ACCURACY
(100 Yard Range, Bench Rest with Telescope)

<u>Rifle</u>	<u>Number</u>	<u>Cartridge</u>	<u>Bullet Weight</u>	<u>Extreme Spread</u>			
				<u>1</u>	<u>2</u>	<u>3</u>	<u>Ave.</u>
M700	58534	Factory Load	100 gr.	1.4	2.0	2.1	1.8
M700	58534	Hard jacket, no anneal	100	2.9	1.6	2.0	2.3
M700	58534	Hard jacket, no anneal weight on barrel	100	2.2	-	-	2.2
M700	58534	Hard jacket, 550°F relief anneal	100	2.9	1.2	2.5	2.2
M700	58534	Factory Load	75	4.2	4.3	2.7	3.7
M700	58562	Factory Load	100	2.6	2.8	2.6	2.7
M700	58562	Factory Load, weight on barrel	100	4.3	3.1	2.6	3.3
M700	58562	Factory Load	75	2.9	2.0	2.6	2.6

BARREL FOULING
20 Rounds Fired

<u>Rifle</u>	<u>Number</u>	<u>Cartridge</u>	<u>Bullet Weight</u>	<u>Copper in Barrel</u>
M700	24597	Factory Load, .025 gr. size	100 gr.	88 mg.
M700	24597	Hard jacket, no anneal	100	79 mg.
M700	24597	Speer, Round Nose, .005 gr. size	105	79 mg.
M722	366407	Factory Load, .025 gr. size	100	33 mg.

Barrel fouling results will be forthcoming on the accuracy samples. From the color of the solutions, there will be less fouling than in the M722 rifle.

Due to questions of barrel rigidity in the Model 700 rifle for the 6mm cartridge, barrels of other Remington rifles were measured at two positions from the receiver.

<u>Rifle</u>	<u>Number</u>	<u>Caliber</u>	<u>15" From Receiver</u>	<u>19" From Receiver</u>
M700	24597	6 mm	0.659	0.616
M722	366407	.244	0.755	0.714
M722	414777	.222 mag.	0.714	0.640
M521RF	Rem. 237	22	0.685	0.657
M510RF	Rem. 291	22	0.683	0.653
M514RF	Rem. 450	22	0.621	0.621
M550-1RF	Rem. 127	22	0.657	0.631

REDickey:MR
4-15-63

C. D. ...
Chick ...

REMINGTON ARMS COMPANY, INC.
INTER-DEPARTMENTAL CORRESPONDENCE

cc: G.M. Calhoun - Bdpt.
D. S. Foote - "
R. E. Dickey - "
H. J. Hackman - Ilion



"CONFINE YOUR LETTER TO ONE SUBJECT ONLY"

S. J. ...
Clark

Wayne ...
S. M. ALVIS

Info

File
M/700

Ilion, New York
April 5, 1963

CALIBER 6MM

Test results with three 6mm M/700 rifles fabricated in the Custom Shop indicate that no improvement occurs when the barrel length is changed to 24" or 22" with the factory 100 grain lot A23P. Some minor improvement may occur with handloads using Sierra 100 grain Pointed Soft Point bullets, and other bullets of this type, but this is not conclusive.

The only definite conclusions which can be drawn from all shooting is that factory 100 grain lot A23P does metal foul all barrels produced to date including the best available. One rifle only produces consistent grouping under 2". This rifle is one of the models with barrel cut rifled for the twist test. Only very minor improvements in accuracy are gained by lapping the bore. The best M/700 rifles assembled by the shop using standard plant processes gave averages with A23P from 1.92" to 2.88" extreme spread center to center. The accuracy gets progressively worse in repeated tests. Lumps of gilding metal fouling are visible in the bore after only five rounds.

The .243 Win. M/700 and the M/70 Win. rifles produced essentially the same results with 100 grain Pointed "Core-Lokt" bullets. Winchester 100 grain .243 produced even poorer results than Remington 100 grain with averages 2.63" and up.

Minor improvements in accuracy can be gained by improved finish and uniformity in the bore. To improve the accuracy to the 2" category, some other means will need to be employed.

Future Program

More rifles will be assembled for test using stainless and 4140 steel. This should tell us if the steel is contributing to the fouling problem.

MHW
M. H. WALKER

MHW:nl

cc: G.M. Calhoun
D.E. Miller
A.D. Kerr

~~M. H. Walker - File~~

m
Ilion, New York
March 22, 1963

File
H. J. HACKMAN

MODEL 700 - 6mm

The designers are still test firing for data in effort to see if there is a more optimum barrel length than the original 20" specification. It is reasonably certain that it should be lengthened. Therefore, suggest that a new lot be started for 24" with the idea of cutting if necessary after data analysis.

I would think it wise that such a lot of blanks be not more than 500 -- perhaps 200 -- and that special emphasis be on observing the stress relief operation.

S. M. Alvis,
Ilion Research Division

SMA:T

Mitchell
What is the mod. of the
overall

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE



cc: G.M. Calhoun - Bdpt.
S.C. Toulson - "
F.E. Morgan - "
R.E. Dickey - "

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY"

① DE Miller
② ~~H.D. Hartman~~ *of the*
of the
③ *of the*
of the

S. M. ALVIS

CALIBER 6mm REM.

Model 700
TESTING

Ilion, New York
December 11, 1962

Accuracy tests to determine the best twist for the 6mm Rem. gave the following results:

	<u>8" Twist</u>	<u>9" Twist</u>	<u>10" Twist</u>
M/700	2.22"	1.83"	2.34"
M/40X	1.35"	1.23"	1.22"

This shooting included all bullet weights from 60 grain to 105 grain inclusive.

Under any circumstances no detriment to accuracy would occur if the 9" twist is used. Some deterioration in accuracy would occur if the 8" twist is used. 9" twist has been recommended and the drawings have been altered.

M. H. Walker

MHW:nl

Some may desire to
know comparison
with old m/700

G.M. Calhoun - Bdpt.
S. M. Alvis - Lion
M.H. Walker - "

File
m/700 ~~Testing~~

COMPARISON REPORT
REMINGTON M/700 EXTRACTOR
VS.
COMPETITIVE MODELS
SEPTEMBER 1962

by
J. W. Blair

RESEARCH AND DEVELOPMENT DEPARTMENT
REMINGTON ARMS COMPANY, INC.
MILTON, NEW YORK

INTRODUCTION

Customers have complained that the patented extractor used by Remington Arms in the Model 721, 722 and 725 rifles, were unsatisfactory because they broke or failed to perform.

Most of these failures occurred during the firing of hand loads, loads which were extremely hot, or overloads. When the overload was fired the gas escaped back into the bolt head. This gas expanded the case head and damaged the extractor. Because the case was enclosed in the shrouded head of the bolt, there was no damage to the rest of the rifle.

In previous tests conducted by Remington (see CF-B-61-0037), data shows that at excessive pressure loads and plugged barrel conditions, Remington designed bolt actions withstood tests that all competitive weapons failed. In conditions where competitive weapons were failing on bolts, receivers and stocks, Remington actions and extractors were still functioning properly.

Although Remington extractors are damaged at times due to these excessive conditions, the customer loses sight of the fact that a competitive weapon under similar conditions would fail completely, possibly resulting in shooter injury. Instead of replacing the damaged extractor, the customer continued to fire the weapon and subsequently complained when the extractor failed to function satisfactorily.

A modified extractor was introduced when the M/700 was designed. This modified extractor made a good component even better and stronger. The following test procedure was developed to establish these facts and show why the complaints of the customer are generally not justified.

A device was made to preload the cartridge case in the chamber in order to test the maximum extraction capability of each firearm. (see Experimental Details)

The following table shows that the M/700 in all tests was capable of exerting minimum extraction forces 20% greater than any of the competition rifles tested.

Comparison M/700 and Competitive Extractors

<u>Make</u>	<u>Model</u>	<u>Caliber</u>	<u>Pounds of Load (Pull on Extractor)</u>		
			<u>Min.</u>	<u>Max.</u>	<u>Ave.</u>
Remington	700	7mm	310	385	349
Remington	700	30-06	300	350	323
B S A		30-06	250	275	266
Husqvarna		30-06	235	360	290
Weatherby	Mark V	30-06	250	250	250
Weatherby	Mark V	300 Mag.	250	(extractor broke)	
Winchester	70	308	100	200	150
Winchester	70	264 Mag.	175	190	182
Winchester	70	458 Mag.	200	300	246

Extractor Testing Device

Purpose of Project

This project was to devise a method to test and compare the capability of the M/700 extractor to its predecessor, the M/721, and to competitive models. The test was devised to show the ability of the M/700 extractor to withstand forces in excess of 300 pounds during primary extraction.

Method of Testing

A. Testing Device:- The device consisted of a rod threaded on each end, a spring capable of exerting greater than 500 pounds of force when compressed, a threaded handle to compress the spring against the muzzle, spacers to adjust for variable barrel lengths and a gauge calibrated to measure force exerted by the spring as it was compressed. (see Fig. 1)

B. Application of Device:- Appropriate caliber cartridge cases were selected for uniformity of dimensions. The cases were drilled and tapped through the primer pocket to fit the threaded rod. The case was chambered with the rod protruding through the barrel and the bolt closed to engage the extractor. The spring and appropriate spacers were mounted on the free end of the rod and the handle adjusted to exert force on the spring. The gauge was inserted between the spacers and the force was read on the scale. There was no load on the extractor until the bolt was rotated against the extracting cam to initiate primary extraction. As the extractor cam forced the bolt to the rear additional compression of the spring increased the load on the extractor accordingly. (see Fig. 2)

Test Device

Figure 1

- 4 -

Testing an Extractor

Figure 2

Results of Tests

Comparison of M/700 and M/721:- A preliminary test was conducted to compare the new M/700 extractor against the type supplied in the M/721. One rifle was selected at random from each model. The M/700 was a .30-06 and one maximum pull test recorded 375 pounds before the extractor sheared part of the case rim and released. The M/721 was a .264 Mag. and one maximum pull test recorded 325 pounds before the extractor shaved the rim and released.

Results of Tests - Cont'd.

Comparison of M/700 Calibers:- Five 7mm and three .30-06 rifles were selected at random and subjected to three maximum pull tests each. The cartridge cases were selected for uniformity of dimensions with .002 max. variation in rim diameter allowed.

- a. The fifteen tests of the 7mm caliber averaged 349 pounds pull before release. The maximum reading was 385 pounds and the minimum was 310 pounds. See figure 3 for deformation of case rim by extractor before releasing.
- b. The nine tests of the .30-06 caliber averaged 323 pounds pull before release. The maximum reading was 350 pounds and the minimum was 300 pounds.

Figure 3

- 6 -

Comparison to Competitive Rifles:- Similar tests and selection of cartridge cases were made for comparison of available competitive models. One rifle was tested in each circumstance three or more times with the following results:

B S A .30-06

Three tests averaged 266 pounds pull with maximum of 275 and minimum of 250 pounds. Slight shaving occurred when the extractor released.

Husqvarna .30-06

Three tests averaged 290 pounds pull with maximum of 360 and minimum of 235 pounds. The extractor shaved part of the case rim except the maximum pull which sheared a section of the rim.

Weatherby Mark V .30-06

Three tests were all readings of 250 pounds when extractor slipped over rim of case with slight shaving of the case rim.

Weatherby Mark V .300 Mag.

On the first test the tang on the extractor arm broke off at a reading of 250 pounds.

Winchester M/70 .308

Five tests were conducted because of the low readings. The average was 150 pounds with the maximum 200 and the minimum 100 pounds. The extractor shaved a very small sliver from the rim of the case.

Winchester M/70 .264 Mag.

Four tests were conducted and averaged 182 pounds. The maximum was 190 and the minimum 175 pounds. The extractor shaved the case rim.

Winchester M/70 .458 Mag.

Three tests were conducted and averaged 246 pounds. The maximum was 300 and the minimum 200 pounds. The extractor shaved the case rim.