

Project XC-13

M/600 PRELIMINARY DESIGN Notes

Calibers 308, 222 Mag., .222, 44 Mag., 30-30-35

by R. L. St. John

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PROJECT - 20-13

6-61

PURPOSE - LIGHT WEIGHT

SHORT GRIP

SHORT RECEIVER

SHORT OVERALL LENGTH

POSSIBLE NYLON STOCK

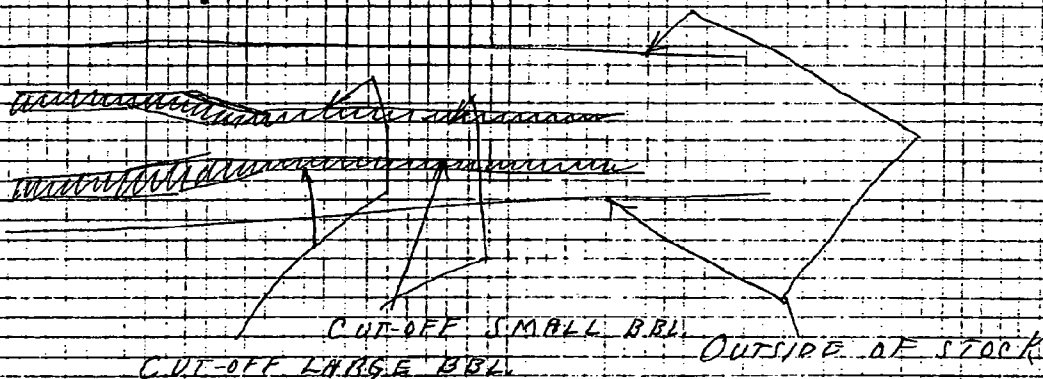
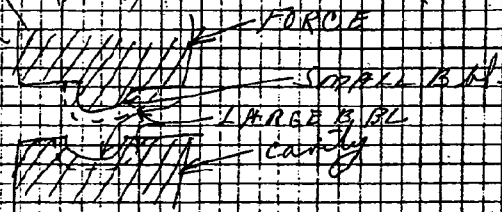
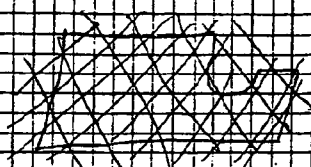
CAL. 308-222 MAG. - 222 - 44 MAG. - 30-30-35

IN PRELIMINARY INVESTIGATION IT HAS BEEN FOUND THAT WOULD BE ~~NECESSARY~~ NECESSARY TO MOVE THE BRIDGE OF THE REC. REARWARD, FROM THE REGULAR 222 MODEL (N. CHAMBER 1.630. This is to provide room for the 308 cal. magazine. This change, means the fire control housing must move, also, each these changes necessitates a further change in the Bolt Stop & old Release.

A very rough model was made of a different type Release of Bolt. It may be found to be possible to make this angle also, at this point, it would seem the above changes will not be costly. In fact, it would seem we could, perhaps, save a savings. This is comparing the new model with present comparable model (i.e. 721 or 722).

The stock of model, would present a problem in that the gauge of calibers contemplated, would necessitate different gunner barrels, and a variation of jaw contour of the Receiver means ingesting of the force, side of the mold and possibly inserts in the cavity. This means that when using a stock mold for a small Bolt (222) there would be a line tracing the outline of the largest (44 mag.) Bolt contour. Perhaps it could be ~~correct~~ covered or hidden in a design since nothing has been done - definitely - along this line, there is nothing to go by - only the thought that the above is a possibility. Elaborate on this point, it would seem, since we have no guard on this stock, the cut-off in the mold would be along a contour of the Bolt, meaning that the top surface of the stock on the outer edge, to the Bolt, would be in the cavity. Therefore when Bolt diameter change, the put-off would change making necessary to alter the cavity. If this is done by an insert the line of the insert would be noticeable whenever it contacted a stock contour. This, perhaps would be objectionable, since it

would be on the outside of the stock.
To illustrate this:



Shaded area is in cavity of mold. It must expand or contract to accommodate the smaller or larger core for the BBL groove dia.

31-11

Since the BBL Dia. at the intersection of the 15° with the 30° taper has been established as .710 on the 222 this allows .263 all at this point.

Proceeding with this in mind, it would ~~be~~ mean that on a 308 this Dia. would be .834 and the 44 mag. would be .55.

Due to cartridge length, it would be necessary to alter the BBL contour at this point. Starting at the 1.180 hub dia. the angle must run into the $0^\circ 30'$ taper farther out along the H. This would give an entirely different ~~appearance~~ appearance to the gun. Due to BBL Dia. the stock fore end must be wider than the 222 model (H. Chamber) thus again will affect the appearance of the gun - versus the present.

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These things are not problems, but it must be pointed out before any approval is given on the basis of the existing model gun (222 H. Chambers)

6-1-61

Design for model gun in Cal. 308 ~~has~~ started.

Trigger	Design complete
Trigger Connector	complete
Trigger Housing	marked Print
Receiver	complete - partially refers to 222 des.
Barrel	Making Design complete
Web	

Design	Estimated	Parts List
Trigger	6-3-61	
Trigger Conn.	6-3-61	
Trigger Housing	6-3-61	

On 6-2-61 a meeting was held with W. C. Lusk, A. P. Kelly, H. Morse, H. P. Chambers and R. H. Holm. It was decided to disassociate the rifle from the pistol. At first it was hoped that the same Receiver could be used on the pistol as well as a rifle. However, due to the 308 cartridge, such radical changes were necessary in the Receiver - changes from the pistol - seems necessary to have two types of Receiver in the rifle. i. Receiver for the 308, 30-30, 35 and one Rec. for the 222 & 44 Mag.

Cont'd. on PAGE 14

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DATE	RELEASED TO	PARTS REC'D
TRIGGER	6-3-61	
TRIGGER COIL	6-3-61	
TRIGGER HOUSING	6-3-61	
RECEIVER	6-6-61	

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5-1-61

Work started on design of safety. It has been suggested by a rotating safety on the firing pin back. This safety would lock the firing pin when on.

5-23-61

One model in 308 Cal. being made. This model is being made for V.C. Lusk. It will help to show the problems we may encounter in the manufacture and in the function of such a short action in this caliber. This job to be completed by 7-14-61.

Until the model is completed, it will not be possible to tell what is happening in the feeding of the 308 Cal. This is probably the one where we will give trouble.

5-30-61

Work on design of 308 Cal. has been completed. Very possibly some operations will have to be made when all parts are received. Working surface on the receiver is very thin. It seems that lowering the cut for the trigger housing and enlarging the mag it will be possible to increase this point.

5-13-61

308 Cal. caliber ready to proof off work out, model will be ready for V.C. Lusk on schedule. The only thing which has not been tried out to any extent is the feeding of the cartridge from the magazine. An alteration to the ramp cut on the Receiver would seem to be indicated.

5-21-61

V.C. Lusk in 308 Cal. finished. Proofed and 3 rds. fired in jack. Some mentioned O.K. However, it was noted that both handle, being directly in trigger, could hit finger upon recoil. This is being redesigned and moved forward to clear finger.

The model gave some trouble on closing. This seems to be due to primary extraction cam digging into Bolt Handle. This must be investigated to see if there is a difference between this model set-up and the regular 721-722.

Also, with the shorter Receiver, some trouble was encountered with a surface which, when the firing pin back, this is being taken care of in the Receiver by going to the same angle.

and tang thicknesses as the old 721-722.

17-61

When the model of the 72-13 was finally assembled it was decided to reduce the overall length of the stock by $1\frac{1}{2}$ " This has been done and the top end shortened down. The resulting effect is to make the rifle appear shorter.

The Bolt Handle is now being altered to clear the finger, place ball as being pulled. W. A. Duke reported, upon returning from inspection that he found some difficulty in seating a tight bolt. The Bolt Handle bent the hand when struck with force enough to seat these shells.

It has also been suggested that the upper part of the grip section be rounded a bit more because a person with a small hand would find it difficult to reach around our present grip. This can be accomplished by removing material just behind the Receiver tang.

After completion of the nylon stock, it will be necessary to perform some experiments to find if Nylon will be a suitable material for gun stock in the heavier calibers.

There has been a sample Receiver made to provide more surface for cocking. This is a radical change in the appearance, and it looks to be rather difficult to style the stock in this section so there will be a pleasing appearance.

Also, a change in the Ejection port has been suggested. It need not be as long as the model, and perhaps can be brought over the top of the bolt to near the head of the ~~Ball~~ Bolt. This would provide more stability to the Bolt upon closing. At present, the Bolt moves up & out of the Receiver due to the pressure of the magazine spring against the ~~Bottom~~ bottom. This causes the Bolt to interfere with the opening of the breach end of the Receiver. This must be overcome, and if the above proposal does not accomplish this a chamfer must be added to the mouth of the Bolt hole to help guide the Bolt in.

28-61

It has been decided that since this gun will be going into production it may be necessary to make ~~the~~ the stock of nylon. If so, some means of reinforcing will be needed. Fiber glass has been suggested and tests will be run on this to ~~ascertain~~ ascertain the possibility and probability of using this as a reinforcing material.

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a visit was made to the Owen-Corning Fibre Glass Laboratory
of Columbus, Ohio. It yet remains to find a way in which
the material can be used in conjunction with Nylon to
sufficiently reinforce these stocks.

7-5-61

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M.C. Leek suggested we make our next model in 30-30 Cal. since this shell has a recessed case, it will be necessary to do something to the magazine to prevent the rounds from catching one on another in feeding.

Also, it was decided that a Nylon stock be made. This stock is to allow sight behind the present wooden stock.

10/17/61

A second model - first one revised - has been made and satisfactory and a receiver has been made with a much shorter section out. The receiver is exactly - in outward appearance - a duplicate of the first receiver. This was the aim in the beginning and seems to have been accomplished.

It has been decided the 44 Mag. calibre be dropped. This would allow using the same outside Dia. B.t. This eliminates the problem of a line showing on top of the molded stock. We will make the mold the same B.t. groove in all stocks for all Cal.

Nylon STOCK SHELVED STOCK TO BE WOOD

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6/7/62

PRELIMINARY MODEL OF 30-30 CAL. HAS BEEN COMPLETED. THE BBL IS IDENTICAL IN SIZE & CONTOUR TO 30X CAL., WHICH MEANS THAT THE STUCKS CAN BE IDENTICAL.

AT THE MOUTH OF THE CHAMBER THERE IS A CODE SHAPED PROTRUSION THIS IS TO THROAT THE CASE TO THE RIM THIS CODE PROJECTIONS INTO THE BOLT AND IS SHORT OF THE BOLT FACE BY THE AMOUNT OF THE THICKNESS OF THE RIM. THIS FORMS THE HEAD SPACE.

THE BOLT HEAD IS IDENTICAL TO OUR OTHER BOLT ACTIONS, EXCEPT THAT A "GWEIR" TYPE EXTRACTOR IS USED ELIMINATING THE NECESSITY OF AN UNDERCUT OR THE RING TYPE EXTRACTOR.

THE ONLY TROUBLE ENCOUNTERED THIS FAR HAS BEEN IN THE FEEDING. A NEW MAGAZINE WAS MADE WITH THE DOUBLE COLUMN SINGLE FEED PRINCIPLE. THIS IS NOT, HOWEVER, TOO SATISFACTORY SINCE THE TWO LIPS AT THE REAR MUST BE ~~VERY~~ ^{NEARLY} SHORT, ~~WHICH IS NECESSARY TO~~ ^{TO} FEED LOAD THE ROUNDS AHEAD OF THESE & THEN MOVE ~~THEM~~ ^{THEM} BACK, ~~AND~~ THERE IS NOTHING UP FORWARD TO RETAIN THE SHELL AND HOLD THE NOSE DOWN. SPACE FOR LOADING IS VERY LIMITED IN THIS RIFLE, THEREFORE IT IS ALMOST IMPOSSIBLE TO LOAD A BOX WHICH IS NOT FULLY OPEN AT THE TOP.

WE NOW ARE USING A REGULAR SHORT ACTION MAG WITH A CURRENT FOLLOWER. THE ONLY ALTERATION TO THE FOLLOWER, A PIECE HAS BEEN SOLDERED ON WHICH RAISES THE NOSE OF THE FIRST ROUND JUST HIGH ENOUGH TO KEEP IT LEVEL. ~~WELL~~

6/8/62

THE FEEDING SEEMS MUCH BETTER WITH ABOVE MENTIONED IMP. HOWEVER, IT IS POSSIBLE THAT THE HUMP IS TOO CLOSE TO THE SHOULDER OF THE SHELL. IT APPEARS THAT THE SHELLS ARE TOO TIGHT, AT THIS POINT, UNDER THE REC. RAILS.

A TENTATIVE PARTS LIST HAS BEEN MADE TO INCLUDE BOTH THE 30X AND 30-30 CAL. THE BBL, BOLT HEAD, EXTRACTOR DW'GS. HAVE BEEN COMPLETED, BUT NO NUMBERS HAVE BEEN ASSIGNED.

THESE 3 PARTS AND POSSIBLY THE FOLLOWER ARE THE ONLY PARTS DIFFERENT THAN ANY CURRENT PARTS SO FAR.

4/11/62

THE 3030CAL HAS BEEN PROOFED & A FEW (120) RDS. HAVE BEEN FIRED IN THE TESTING SECTION.

THE LAST RND FROM THE MAG. SEEMS TO BE A BIT TROUBLE SOME ON OVERIDES PERHAPS MOVING THE RAMP AHEAD WILL HELP THAT.

IN SHOOTING THE 120 RDS. ONE SHOOTER HAD 3 STEM THE FEED RAMP. THIS WAS ON THE LAST 20 RDS. THIS IS ALL THIS PARTICULAR SHOOTER FIRED ON THE FIRST 100 RDS. THIS MALFUNCTION DID NOT APPEAR.

TWENTY MORE ROUNDS WERE FIRED-TOTAL 140-NO MALFUNCTIONS IN FEEDING DUMMIES, THE ONLY FAILURE IN FUNCTION IS AN OCCASIONAL OVERRIDE AS STATED BEFORE, THIS MAY BE REMEDIED BY ALTERATION TO THE NEW HUMP ON THE FOLLOWER.

5/12/62

THE ABOVE MENTIONED MALFUNCTION OF STEM THE FEED RAMP TURNED OUT TO BE NOT A STEM BUT AN INTERLOCKING OF THE TM OF THE FIRST SHELL OUT OF THE MAGAZINE WITH THE TM OF THE SECOND SHELL THIS IS ATTRIBUTABLE TO THE WAY THE SHOOTER LOADS THE MAGAZINE. IT APPEARS AS THOUGH WITH PROPER INSTRUCTIONS THE SHOOTER WOULD BE ABLE TO LOAD AND AVOID THIS. HOWEVER, IF THIS ^{SEEMS} ~~SEEMS~~ TO BE UNSATISFACTORY, MUCH MORE WORK AND INVESTIGATION MUST BE DONE TO MAKE A MAGAZINE WHICH IS ABSOLUTELY FOOL-PROOF.

IT HAS BEEN THE INTENTION TO DO ALL DESIGNING FOR FEEDING WITHIN THE MAGAZINE AND PARTS OF THE MAGAZINE. IT WOULD SEEM TO BE BETTER, AT LEAST ECONOMICALLY, TO AVOID ANY ALTERATION TO THE RECEIVER. IF POSSIBLE, WE COULD THEN HAVE A RECEIVER WHICH IS COMMON TO ALL CAL'S.

ONE THING, WHICH UNDOUBTEDLY WOULD HELP THE OVERRIDE SITUATION, IS ALTERING THE FEED RAILS ON THE RECEIVER TO ALLOW THE FEEDING SHELL TO RISE HIGHER AT THE RIM AND THUS GIVE MORE COVERAGE TO THE BOLT. THIS WOULD HAVE TO BE DONE CAREFULLY SINCE WITH TOO SMALL A FEED RAIL THE SHELLS COULD NOT BE RETAINED UNTIL THE PROPER RELEASE TIME. THE REAR OF THE FOLLOWER SEEMS, AT TIMES, TO HAVE A

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TENDENCY TO SLICK DOWN. THIS, IN ITSELF, MAKES FOR OVER-
RIDES. HOWEVER, THIS IS A TENDENCY WHICH IS INHERENT
IN THE BOX, FOLLOWER & SPRING.

6/13/62

MORE MATERIAL WAS GROUNDED OFF THE REAR OF THE HUMP
IN THE FOLLOWER. THIS, IN EFFECT, IS THE SAME AS MOVING
THE HUMP FORWARD. IN SO DOING, THE RUBBING AND ~~RE-
WORKING~~ WORKING OF THE SHELLS JUST BEFORE THE REDEAR SEEMED
USED. THIS IS IN FEEDING DUMMIES. IT WILL BE TRIED IN
HOOTING, BUT THE BOLT STOP HAS BEEN REMOVED TO BE HARDENED
SOON. AS IT IS RETURNED WE WILL TRY FIRING A FEW MORE
ROUNDS.

Received from D. L. St. John. 6/13/62
D. L. St. John