

REMINGTON ARMS COMPANY, INC.

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May 5, 1989

TO: D. K. Albrecht
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File: Tech. Monthly Reports

FROM: W. H. Coleman, II

ILION R & D AND TECHNICAL
MONTHLY REPORTS
APRIL 1989

Constructive suggestions, ideas and criticism are welcomed by all
report contributors.

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Ilion, New York
May 5, 1989

TO: W. H. COLEMAN, II
FROM: L. B. BOSQUET/T. C. DOUGLAS

NEW PRODUCTS DEVELOPMENT MONTHLY REPORT - APRIL

CURRENT PRODUCTS

EKSTROM-CARLSON CHECKERING MACHINE - Monteau/Hickey

The software needed to enable Remington personnel to modify the Programmable Application Logic routines in the controller has been received and tried. However, it has been determined that additional information is required and Ekstrom has been contacted. A special connector (Elco #7038) for interfacing the punch to the tape module has been ordered from Allen Bradley. As stated previously, full utilization of the machine and the satisfaction of all safety concerns is the goal of this program.

A trip to Cad Cam Alliance is being planned to discuss further optimization of the insert checker routine. Items to be discussed and resolved are the elimination of excessive motions in the routine and cycle time reduction. This may be accomplished through the development of a special routine which will run with "insert checker". A basic premise for handling checkering lines has been established. Additional examples are being tried prior to the submission of a quote.

The data input difficulties encountered with programming the Model 870 Wingmaster stock have been resolved and both the stock and fore-end are running.

The air counterbalance system - designed to eliminate the springs supporting each head - has been tried. It was found that the resistance of the cylinder seals creates too much drag and a redesign to use teflon seals is underway.

Programs have been written for the Model 11-87 Premier stock and fore-end.

In order to address capacity concerns in the checkering area, a program is being investigated to remove all short stocks and fore-ends from the multi-head machines and put them on the Ekstrom-Carlson machine. A complete list is being developed by model and pattern. Tooling and programming requirements are also being looked at.

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Further testing of this barrel is planned using a 10 gun sample of GFM barrels and 10 Mike Rock barrels as controls. A third mandrel has been received which has 5 conventional lands and grooves versus the radiused configuration. This mandrel will be evaluated during this same test. The next step is to get the steel for the GFM barrels(if necessary), get GFM blanks manufactured, and then get GFM time to run them. Supply of M118 ammunition is also being evaluated. The steel has been ordered, with a tentative delivery date of 3Q89.

MULTI-HEAD CHECKERING SOFTWARE - Monteau/Hickey

The Model 700 Mountain Rifle pistol grip program has been revised and line length corrections have been made. Debugging of the "Z" clearance and "tilt" moves is underway. The forearm program errored out on the "GST" routine and the cause is being investigated by American Bay Limited. A new disc was received 4/12 which revised the "PLT" routine. This corrected the plotting problems but not the difficulty with the border numbers. Status of the various routines is as follows:

- o INP - running - no revisions necessary
- o CGN - running - no revisions necessary
- o PLT - running but needs a minor revision
- o FWD - running but needs further clarification
- o DRV - running - no revisions necessary
- o EDT - running under trial
- o MSC - running under trial
- o GST - running on the pistol grip but errors out on the forearm

A new electric drive motor is being ordered for try-out. If successful, a project will be written to convert the machine drives from hydraulic to electric.

The project to store and download checkering programs to the Bostomatic and multi-head machines by means of a "fileserver" has been revised and a new estimate is being prepared.

A preventative maintenance and repair program is being developed and will be implemented in May.

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TOOL DESIGN - Monteau

Delivery of the non-ammonia print machine - scheduled for mid-April - has been delayed. Bruning has been contacted and the week of May 15 has been set as the revised delivery date. Work orders covering the installation of this equipment have been issued. An initial SOP has been written.

M/11-87/1100 FORE-END - Powers

All further efforts will center around contour of the fore end and a "cold process" to install the reinforcement. The 40 prototype fore ends with nylon reinforcing patches (from Sile DeRobertis) have not arrived for testing. S & K personnel were notified of the acceptability of reducing the length of the finger groove. We are awaiting either samples or a dimension for this change before issuing a DCR.

ELVALOY RECOIL PAD - Powers

The prototype pads for design acceptance testing have arrived. After they have been inspected, they will be shipped to S & K for processing.

M/11-87 GAS CYLINDER COLLAR - Powers

Redesign of this part, per vendor suggestions, is still pending.

REVISIONS TO H & P DIE AND STAMPING PARTS - Powers

Ed Owens, Tom Bauman, Hal Munson, I met with H & P during their visit in April. We reviewed the list of parts which we have agreed to resolve problems with.

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NEW PRODUCTS - 1988 CATALOG

PARKER - Murphy

The primary effort in the previous month was directed towards final gunsmithing the six design acceptance test guns. Highlights of last months activity are as follows:

- o A formal report on the barrel assembly x-ray inspection procedure is still expected from Fred Schmidt. I will contact Fred for a date.
- o John Remington has stocked three Parkers and Larry DelGrego has stocked two. Problems with ejection and action looseness shown up in both of Larry's guns and two of Johns. These guns have been returned to Kolar to be repaired. The results of the repairs and the reasons for it will be communicated to Larry and John as soon as possible. Based on this experience, Larry and Tim McCormack are now able to quote on stocking production Parkers and their feedback is expected by mid-May.
- o I have shipped to Kolar the following:
 - Two double spindle buffing machines
 - Two Divine polishing jacks
 - Obsolete 3200 cutters
- o Design acceptance testing that was scheduled to be done by March 31 has started slowly. One gun is in test and now I am waiting for the four repair guns from Kolar.
- o The first draft of the Parker manual has been done and is being revised. Ron Smithson will begin the illustrations soon.
- o A Parker contract has been sent to Kolar and Phil Harper and Bill Ericson are negotiating the liability indemnification language with Kolar.
- o Kolar has invoiced Remington for \$120,000.00 for advance payment and tooling money against the Parker contract. Since we have an agreement in principle, this invoice has been approved for payment.

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NEW PRODUCTS - 1989 CATALOG

SP-10 MAGNUM - Rowlands/Bauman/Lewis/Verdura/Murphy

10,000 copies of the Owners Instruction Book have been received from the printer. Work is continuing on the Field Service Manual but is progressing slowly because of frequent interruptions caused by Trial & Pilot consultations and SPC study evaluations, etc..

Twelve 10 Ga. choke tubes made from Carpenter Maraging Stainless Steel (Custom 455) have been manufactured and are ready for testing as soon as SP-10 Mag. trial and pilot guns are available.

SPC dimensional studies of vendor supplied parts have identified a number of components that have dimensions that appear to be uncontrollable within the specified tolerance spread. In the majority of cases a larger tolerance has been determined to be acceptable and drawing changes and DCR's are being transmitted to reflect this.

Vestshell has begun to submit substantial price increases on some of their investment castings. This has increased the price differential between investment castings and MIM parts to such an extent that we should again consider MIM parts as an alternative. The carrier is a prime example of a part that could function adequately with MIM mechanical properties and now provide an attractive cost saving. Vestshell 5/89 Quote: \$7.52 each. MIM 5/87 Quote \$3.34 each, tooling cost \$15,000.

The problems encountered in the machining of the trigger plate have been resolved and parts are being processed. Work is progressing on the 12 part "A" and "B" load programming and it is expected that it will be running in early May. The 32 piece "C" load program is also nearing completion. The single part routine has been expanded to include one complete face of the tombstone or eight parts and all four faces should be running in early May. The first trigger plates have been processed through the finishing operations and are ready for trigger plate final assembly.

The bi-weekly meeting has been changed to once a week and will continue to meet each Monday. We are currently tracking the last of the trial and pilot parts and have started shifting the emphasis of the meeting to addressing production start-up concerns.

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Assembly of the trial and pilot guns has started and as of April 26, 16 SP10's have been assembled and shot in the gallery. Eight of these guns shot clean and after minor adjustments to the magazine tube and the extractor, the other eight were passed. It is anticipated that guns will be available for the Test Lab by the end of the first week in May.

A "product tree" has been put together by the SPC team and occupies two walls of the room. It is being used to track the progress of both SPC and the first production lots of parts. It is also being used as a means of highlighting problems and potential problems so that resources can be more effectively utilized in fulfilling the plant's commitment to have 2,000 guns in the warehouse by August 1 of this year.

SLUG GUN SYSTEM - D.Findlay/Lewis/Verdura

The first production run of this product has been rescheduled for July and will cover both Model 870 and 11-87 special purpose deer guns. Rescheduling was necessitated by late tool deliveries. At this time, the critical path tooling is the fixturing for the NC machining of the scope mount base. It is being built by CMCI and is due May 5. The NC programs for both the scope mount base and the cantilever have been written and are ready for try-out and debugging. Production orders have been issued for cut-off and grind for these parts.

The scope ring sets, on order with Tasco, are the last of the purchased parts and should be received around the middle of May.

Ron Leacock met with Remington personnel on April 3rd to discuss the issue of providing greater freedom of motion in the location and clamping of the barrels in the new machine. An agreement was reached whereby Leacock will design and build a developmental fixture which will meet the agreed on criteria. This fixture will be retrofitted to the present machine and will be proved out prior to completing the design of the new machine. It is hoped that the current delivery date of October will not be adversely affected.

MODEL 700 CLASSIC .300 WEATHERBY MAGNUM - Lewis/Verdura

Responsibility for this trial and pilot has been assumed by John Balio's ATO group. The trial and pilot run will include 300-350 guns to be shipped to Alaska in time for the opening of the Alaskan bear season. These guns will have to be ready for shipment by March 17 and every effort will be made to accomplish this request from the marketing group.

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MODEL 700 AS BDL (ARYLON STOCK) - SMITH/VERDURA/LEWIS

Both Lee Six, Six Enterprises, and Tony Bruckner, Culpepper Plastics, were on plant the week of April 10th to try and repair Arylon stocks that didn't meet our specifications for fit of the grip cap and/or recoil pad and run-out of the receiver area. Once here and able to see the amount of rework required to make the stocks usable both Tony and Lee decided to have the stocks shipped back to Culpepper to have the alterations done there. Approximately 900 stocks were shipped for alterations that included:

1. Correction to the tang area of the receiver section, to let this run-out into the top of the grip instead of leaving a step behind the receiver that might chip out during shooting, as a result of recoil.

2. Replace recoil pads with a solid rubber pad instead of the two piece pad that was currently being used. This would give us a better fit to the stock than the two piece pad allowed.

3. Tony to use the recommended epoxy to glue the grip cap and recoil pad, instead of the off the shelf adhesive that he was using, and to clean the excess epoxy off the stock.

4. Remove flash from bolt handle cut and rear take down hole.

5. Insure a uniform fit around the grip cap.

Remington supplied both Tony and Lee with least acceptable sample stocks that should be used as guides for fit and appearance.

On Friday April 21st. a stock was received from Culpepper that had all the corrections. This stock was given to John Balio for his approval, he decided that the stock was acceptable as a least acceptable sample do to a slight gap at the top of the recoil pad. This information was given to both Lee and Tony and they were told to return the samples they have to have them replaced with new samples.

Culpepper will be shipping stocks beginning Monday April 24th. which should get stocks here for the beginning of the production run.

Most of this confusion over these stocks would have been eliminated if Purchase Parts Inspection had lived up to their agreement of May 27, 1988, where they agreed to have specifications and gages made to inspect these stocks to. Also Process Engineering agreed to be part of setting up these specifications however this stock assignment was shuffled between three different Engineers during this time. This is the second stock project in a row where there were no incoming inspection procedures when we started receiving production parts, and it wasn't from lack of information and/or help from

Research.

As of this date the vendor has no written inspection procedures or gages to check these stocks to.

The initial production run has been completed. Responsibility for this item has been assumed by John Balio's ATO group and further reporting will be from them.

MODEL 1100 RETROFIT BARREL/STEEL SHOT - Verdura

The responsibility for this introduction has been assumed by Bob Orf's ATO engineers and further reporting will be from that group. Warehousing is scheduled to begin in April but is contingent on the availability of choke tubes.

MARAGING STAINLESS STEEL CHOKE TUBES - Powers

Use of this material for all 12 Gauge applications, except the rifled tube, has been approved and the DCR's have been issued. The 10 Gauge tubes are now in test with the Trial and Pilot guns.

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NEW PRODUCTS AND PROCESSES - 1990 AND BEYOND

NEW .22 AUTOLOADING RIFLE - Smith/Findlay, Sr./Findlay

The one gun has been test fired for bolt velocities using both the steel and aluminum strikers. As expected the aluminum striker gave us the desired velocities but doesn't withstand the lock up with the sear. Another aluminum striker will be made and the front surface will be hard coated, also a synthetic striker will be made to see how well it performs in this system.

We hope to do some endurance shooting this week and next as well as some high speed movies. This work will pivot around the magazine box fine tuning that is currently being done by Dave. We are also concentrating on getting the drawings up to date by mid-May so that current and corrected drawings can be sent to vendors for the 12 gun build and test phase.

Dave has gotten the schedule and program write up finished and we have meet with process to discuss the gun and their end of the scheduling process.

Marketing has seen the rifle and added their comments of the features and styling, most of their wishes are items that we were going to change and/or improve.

Brad has been receiving vendor quotes on most of the components and last week we received our first quotes on the housing, receiver, and synthetic magazine box. Part count stands at 46.

Recommendations for material and part design/dimensioning from DuPont are in, and Bill Marks recommends that we use Rynite PBT instead of Arylon for strength and filling problems in the mold.

NEW AUTOLOADING RIFLE (NAR) - Powers/Findlay Sr.

The design is in the cartridge-feeding layout phase (infancy). Three initial calibers (7mm REM MAG, 300 WIN MAG & .338 WIN MAG) are now proposed. Product specifications and estimated Development Schedule Timing/Costs been developed. Layout designs for the striker system have also been considered.

CONFIDENTIALNEW CONCEPT SHOTGUN - Powers

Ken, Earl, Terry and I discussed the future of this program. We decided that the weight equalized recoil test must be shot before making any decisions for the direction of the program. An estimate of gun weight made by Earl suggests the NCS will be about 8 - 8 1/2 pounds. A serious weight reduction effort might get it down to 7 3/4 pounds. Our modified KFC/NCS weighs about 9 1/2 pounds. This high weight contributed to the favorable recoil rating of the gun in recent testing. Our main concern is that a realistically weighted gun would have unacceptable recoil. If this is the case we will probably change the design of the action system from the current gas-assisted inertia to a pressure regulated gas system, possibly the transverse vent design which we were developing earlier. Additional reasons for this decision would be: perceived difficulty of barrel manufacture, complexity of assembly/disassembly, and high stress levels in the inertia spring. It is hoped to shoot the weight-equalized recoil test the third week in May.

NEW BOLT ACTION RIFLE - Bauman/Murphy

Little has been done on the NBAR in the previous month. Tom Bauman has been working exclusively on the SP-10 Mag. and my time has been spent with the Parker.

MODEL 700 CLASSIC .300 SAVAGE (1990) - Martin

Design Acceptance testing was successfully completed with Transmittal accomplished on March 20th.

MODEL 11-87 POLICE - Powers

Six prototype guns are being readied for test and delivery to the FBI for a June demonstration. This gun is being viewed as a combination of current parts and finishes, but not any that we have ever done before.