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QUARTERLY REPORT
ARMS SECTION, TECHNICAL DIVISION
FOURTH QUARTER, 1944

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ARMS SECTION, TECHNICAL DIVISION

Fourth Quarter, 1944

Project Name: New Center Fire Rifle, M/760

Project Number: M-1029

Personnel: J. D. Howell, C. C. Orloff, H. W. Young, Gun Design Unit.

Authorized Amount: $89,000.00 **Expenditures to Date:** $62,466.96

Nature of Problem:

Design a high power slide action rifle capable of handling ammunition more powerful than any previously handled in slide action rifles and yet weighing less and costing less to produce than our present medium power slide action center fire rifle.

Summary of Progress from Inception:

A model was constructed in .30-06 caliber and tested for 3000 rounds. Tests indicated certain sliding surfaces break down due to heavy load. Weight is satisfactory. Costs are higher than desired, but lower than present line of slide action center fire rifle.

The Quarter's Work:

Model work on a revised action nearing completion. Alteration of the trigger plate. Set of brass castings for a master pattern of receiver were produced. About fifteen (15) M/760 aluminum receivers were precision cast which were unsatisfactory due to failure of the lining of the mold.

Next Quarter's Work or to Completion:

Assemble a model with revised action and test. If successful die casting dies and sample die castings will be procured.

Project Name: Setting Up Procedure for Review of Products Specifications

Project Number: TP-3006-1

Personnel: R. H. Grace, C. F. Benner, B. C. Andrews

Authorized Amount: Category "A" Expenditures to Date: $5,103.88

Nature of Problem:

To prepare and issue to plant specifications covering material, heat treatment, and heat treatment inspection.

Summary of Progress from Inception:

Five material specifications have been issued.

Sixty-two heat treatment specifications have been issued.

Forty-seven heat treat inspection specifications have been issued.

The Quarter's Work:

All of Above.

Next Quarter's Work or to Completion:

Complete coverage on M/11 heat treat and heat treat specifications. Mate ial specifications to be completed at rate of two per month.

Project Name: Technical Assistance to Plant

Project Number: TP-3006-2

Personnel: R. H. Grace, C. F. Benner, W. T. Lennox, G. H. Hart, L. A. Rix, R. P. Kelly.

Authorized Amount: Category "A" Expenditures to Date: $4,702.84

Nature of Problem:

To render all possible assistance to the Plant, as requested by them.

Summary of Progress from Inception:

Work under the above project number has been done only since November 7, 1944. Prior to that date the same type of work was done under project TP-3406. Since a return to greater activity in the production of Commercial Arms, requests for assistance have increased.

The Quarter's Work:

Copper brazing M/81 magazines has been done with satisfactory results. Custom Repair Department has had help on repairing M/81 barred extension, and a procedure written. Jacket heads on M/81 have had attention as well. Induction brazing M/31 action bar to eliminate riveting is also under tests. Furnished a cost estimate on suggested change in M/121 action bar. Numerous drawings were changed to comply with requests for wider limits, more specific information on dimensions, materials, etc. Certain parts were redesigned (and tested) to facilitate production.

Next Quarter's Work:

Continue the above investigations and many others of similar nature.

Project Name: Rite Flite Trap and Magnetic Release Rite Flite Trap

Project Number: K-3030 and TM-3328

Personnel: F. G. duPont, Gun Design Unit

Authorized Amount: $5,970.00 **Expenditures to date:** $6,200.45

1,500.00 1,642.71

Nature of Problem:

The design of traps that are more economical than those in our present line, and a magnetic release for use with the same.

Summary of Progress from Inception:

Models of the trap and release have been completed and test started.

The Quarter's Work:

Tests indicated rapid wear between the pawl and trigger. Revision of these parts is under way.

Next Quarter's Work or to Completion:

Complete necessary revisions, and if possible, complete all tests.

Project Name: Engineering Training Program

Project Number: TP-3091

Authorized Amount: Category "A" Expenditures to date: $2,168.17

Personnel: All Ilion Technical Section

Nature of Problem: To present up-to-date Engineering information on various processes and product pertinent to our business.

Progress from Inception:

A series of talks by members of the Ilion Technical Division and engineers from outside concerns have been presented. In addition, several movies prepared by various manufacturing concerns have been presented.

The Quarter's Work:

See above.

Next Quarter's Work or to Completion:

These meetings will be continued along the same lines as those which have been held in the past.

Project Name: Process Record Form Revisions

Project Number: TP-3092

Personnel: E. K. Wheat, L. P. Lee

Authorized Amount: Category "A" Expenditures to date: $620.21

Nature of Problem:

To investigate the most desirable form for the presentation of manufacturing information.

Summary of Progress from Inception:

The review has been completed and a single operation per page type of process record selected as most desirable.

The Quarter's Work:

The various forms which the process record could take were reviewed in detail as to cost of preparation and cost of maintenance. These included records with several operations per page and with one operation per page, and included variations with sketches to show what was done in each operation as well as variations without sketches. A detailed proposal showing all the types of pages needed to present the various types of operations was prepared.

Next Quarter's Work or to Completion:

No further work is anticipated.

Project Name: M/721, Bolt Action High Power Rifle

Project Number: L-3121

Personnel: M. H. Smith, P. Henriksen, H. C. Moss, R. W. Angell, Engineering Unit; M. H. Walker, Design Unit.

Authorized Amount: $71,100.00 Expenditures to Date: $29,981.78

Nature of Problem:

Development of a low-cost High Power Rifle to take the place of the present M/720.

Summary of Progress from Inception:

A design in which the objectives of simple parts was met very successfully was conceived and built. Twenty-three of the fifty parts are stamp and form operations or springs which can be furnished by vendors specializing in this field. Basic process records have been written for the remaining 27 parts, which are being reviewed by a committee representing Design, Tool Design, Estimating, and Production Engineering of the Technical Division. In processing the gun, operations little used at Ilion, such as internal broaching, rise and fall milling, induction brazing, swage rifling, and automatic machine finishing of barrels, are planned. Conformity to the recommendations of the Arms Study Processing Report are also considered.

Model Guns, a M/721 in .300 Magnum caliber and a M/722 in .300 Savage caliber, have gone through lengthy and severe tests with very gratifying results. Two additional models in the same calibers went through some of the same tests with equally gratifying results. Testing program involved 4,700 rounds of live fire, 6,000 rounds of dry fire with dummies, and 18,000 rounds of dry fire without dummies.

Next Quarter's Work or to Completion:

Investigating certain design changes, and revisions which the above tests indicated to be desirable, and further testing. Cold testing remains to be done. Testing manual will be completed.

Project Name: M/740, Autoloading High Power Rifle

Project Number: L-3122

Personnel: H. W. Young, Gun Design Unit

Authorized Amount: $48,100.00 Expenditures to Date: $18,012.94

Nature of Problem:

Design autoloading means which could be applied to the M/760 with a maximum number of parts common to both models.

Summary of Progress from Inception:

Autoloading means were developed in conjunction with a preliminary action and used for firing 300 rounds of .300 Magnum ammunition with the M/760 action which had previously undergone the 3000-round test. The weight was satisfactory, but gun was muzzle heavy. Revision of the autoloading means will have to be made. Other problems remain unsolved.

The Quarter's Work:

Work held up pending completion of a revised M/760 action.

Next Quarter's Work or to Completion:

Install the present autoloading means in the revised M/760 action, test its suitability for use, and alter as found necessary to increase rate of fire and reduce muzzle heaviness.

Project Name: M/550, Improvement to Functioning

Project Number: TM-3313

Personnel: K. J. Lowe, R. P. Kelly, H. W. Young, Gun Design Unit.

Authorized Amount: $14,100.00 Expenditures to Date: $13,625.71

Nature of Problem:

To revise the design of the M/550, to return the gun to the trade with assurance of more satisfaction to customer.

Summary of Progress from Inception:

Tested guns with parts made to drawing specifications. These tests indicated minor changes in design. After alterations were completed the tests indicate satisfactory functioning. Simplification of design is desirable to develop a gun which will handle a variety of .22 caliber cartridges without the use of the slip chamber, and make more economical their manufacture. Justification for testing this further revision can not yet be established.

The Quarter's Work:

Secured parts from the plant to assemble 25 guns. Where required, those parts have gone into the Model Shop for revision.

Next Quarter's Work or to Completion:

Assemble and alter, to include revised parts, 25 guns, and complete their testing, and furnish the necessary information to the plant for production of a Post-War M/550.

Project Name: Processing Methods for Arms Components

Project Number: TM-3321

Personnel:

Authorized Amount: $10,000.00 **Expenditures to Date:** $3,179.06

Nature of Problem:

To investigate various processes not currently applied to gun manufacture.

Summary of Progress from Inception:

Exploratory work was carried out on precision casting, induction hearting, choke swaging for shotguns and several other processes.

This Quarter's Work:

None.

Next Quarter's Work or to Completion:

Project dormant.

Project Name: Precision Casting Process

Project Number: TR-3355

Personnel: E. M. Wilson, R. G. Drumm

Authorized Amount: $14,500.00 Expenditures to Date: $9,319.54

Nature of Problem:

To determine correct process and materials for Precision Casting of gun components.

Summary of Progress from Inception:

To date all the major equipment for the process has been obtained and installed except an electric arc steel melting furnace which is on order. Some aluminum and some steel parts have been cast using pressure casting techniques with encouraging results.

The Quarter's Work:

Visited Watervliet Arsenal to observe their semi-works scale Precision Casting unit in operation. Several ideas were noted, including gravity casting. Approximately twenty-five M/11 Operating Slides were cast in steel. Some experience has been gained in steel melting techniques. A set of cast iron bending dies for the Paratrooper Rifle was produced.

Next Quarter's Work or to Completion:

Electric arc melting furnace is scheduled for delivery February 1, 1965. This will permit investigation of gravity casting process used at Watervliet Arsenal.

Produce 250 M/11 Operating Slides by pressure casting.

Produce 100 M/31 Slides by gravity casting.

Project Name: Investigation of .22-Caliber Chambers

Project Number: TP-3764

Personnel: H. W. Young, Gun Design Unit

Authorized Amount: $2,500.00 Expenditures to date: $2,166.49

Nature of Problem:

To determine the feasibility of the use of a tapered chamber to eliminate the use of the Slip Chamber as used in the M/550.

Summary of Progress from Inception:

A range of chambers was designed and various barrels were equipped with different chambers within this range. Testing was done in a converted M/550 rifle. Satisfactory functioning was obtained in a fairly wide range of dimensions, but did not include a chamber now used in the M/37 rifle. Indications are that the chamber which does provide satisfactory autoloading operation can be used in other Remington .22-Caliber models, with the probable exception of the M/513-T.

The Quarter's Work:

Testing indicates that the chambers must be heat treated to eliminate erosion affecting functioning where a large number of rounds are fired.

Actually, a test involving 7000 rounds of gallery shorts eroded the chamber to such an extent that long rifle high speed cartridges malfunctioned in that they mulled under the head and some of them burst at this point.

Next Quarter's Work or to Completion:

Try out the chamber in other Remington .22 rifles (not including M/37 and M/513) to determine its effect on accuracy and function, and supply Bridgeport Technical with a M/241 with this chamber for test work on functioning of higher velocity ammunition.

Project Name: Investigation and Preparation of Cost Estimate, M/11 Garland Conversion.

Project Number: TF-3403-2

Personnel: W. T. Lennox

Authorized Amount: $500.00 **Expenditures to date:** $252.34

Nature of Problem:

Exploratory. To prepare a rough cost estimate for the manufacture of an autoloading shotgun based on the Garland conversion of the Model 11.

Summary of Progress from Inception:

All work has been completed.

This Quarter's Work:

See above.

Next Quarter's Work or to Completion:

Will close out.

Project Name: Preparation of a Project for a Checkering Machine.

Project Number: TR-3403-3

Personnel:

Authorized Amount: $300.00 Expenditures to date: $371.07

Nature of Problem:

Exploratory.

Summary of Progress from Inception:

Work is being done in Bridgeport. (No detailed report.)

The Quarter's Work:

See above.

Next Quarter's Work or to Completion:

See above.

Project Name: Polish M/31 Components Comparable to M/12 Winchester

Project Number: TP-3403-5

Personnel: W. T. Lennox

Authorized Amount: $500.00 Expenditures to Date: $583.62

Nature of Problem: (Exploratory) To estimate the cost of obtaining a finish comparable to that used by Winchester on our Model 31 shotgun.

Summary of Progress from Inception:

A means of polishing the metal parts of the Model 31 and subsequently coloring them by Pentrate has been developed. The finish is believed to be comparable to that used by Winchester.

The Quarter's Work:

See above.

Next Quarter's Work or to Completion:

Submit the sample to the Arms Products Committee to determine acceptability of the finish. If desired, turn over to the plant for further trial and development of actual costs.

Project Name: Investigation of Exploratory Welding

Project Number: TP-3403-8

Personnel: C. F. Banner

Authorized Amount: $500.00 **Expenditures to Date:** $356.47

Nature of Problem:

(Exploratory) To compare Shielded Arc Welding, Copper Brazing and Induction Brazing for cost, strength and application.

Summary of Progress from Inception:

Visit was made to General Electric Company where samples were copper brazed. Test specimens have been prepared for evaluating the 3 methods.

The Quarter's Work:

Same.

Next Quarter's Work or to Completion:

Emphasis will be put on Induction Brazing during next quarter because equipment is available.

Project Name: Technical Assistance to Plant - Current Arms Models

Project Number: TP-3406

Personnel: Various

Authorized Amount: $5,000. Expenditures to Date: $7,181.13

Nature of Problem: This project was designed to provide assistance to manufacturing departments in connection with current arms models.

Summary of Progress from Inception:

Many miscellaneous plant problems in connection with heat treatment, control, drawings, etc. have been handled. This work has since been transferred to Category A. It is no longer chargeable to this project.

The Quarter's Work:

See above.

Next Quarter's Work or to Completion:

Planned to complete final close-out of this project, as of figures of 11/8/44.

Project Name: Compilation of Engineering Data for M/11 & M/31 Stocks

Project Number: TP-3419

Personnel: O. L. Fuller, J. A. Firnie

Authorized Amount: $4,000.00 **Expenditures to Date:** $5,022.11

Nature of Problem:

To make a complete record of all the tooling used in the manufacture of Model 11 and Model 31 stocks and fore-ends.

Summary of Progress from Inception:

No records existed of many of the tools used in the manufacture of the wood for these models. This project was designed to make such a record. The work has been completed.

The Quarter's Work:

All work was completed on September 19, 1944.

Next Quarter's Work or to Completion:

It is expected that the project will be closed out.

Project Name: M/85X Autoloading Shotgun

Project Number: TP-2426

Personnel: J. D. Howell, D. E. Kelly, F. G. duPont, Gun Design Unit

Authorized Amount: $25,000.00 **Expenditures to date:** $1,662.14

Nature of Problem:

Design an autoloading shotgun, to be manufactured in five gauges, to cost and weigh less than the present M/11.

Summary of Progress from Inception:

Examined a model exhibited by V. A. Browning. Have made up certain altered parts for use by V. A. Browning in evaluating the features shown in his model that are of interest.

The Quarter's Work:

Included above.

Next Quarter's Work or to Completion:

Make certain parts which can be used in conjunction with M/11 guns, to evaluate some of the principles which are being considered for inclusion in the M/85A.

Project Name: Plug Reaming .22 Caliber Barrels

Project Number: TP-3408-6

Personnel: E.K. Wheat, K.B. Fontaine

Authorized Amount: $500.00 Expenditures to Date: $352.27

Nature of Problem:

(Exploratory) To investigate the possibility of replacing conventional reaming operation by plug reaming on the draw rifle machine for the 500 series barrels.

Summary of Progress from Inception:

The Commercial experimental converted cut rifling to draw rifling machine was installed in 84-3.

Experimental plugs were designed and fabricated. An experimental drill and ream tool was designed and used.

Barrels were specially processed with various diameters for experimental data.

The Quarter's Work:

Improved barrel drilling was accomplished with the combination tool and cold rolled steel barrels to accompany and to facilitate plug reaming.

Plug reaming was attempted on the Commercial experimental draw rifling machine with subsequent plug rifling. The machine did not satisfactorily perform due to lack of sufficient barrel support combined with push rod strength. Heat treated rods are on order.

Operations were suspended October 27, 1944, due to lack of space to relocate the experimental machine after removal from the Commercial assembly area formerly occupied.

Next Quarter's Work or to Completion:

Adequate measuring instruments to control .22 Cal. testing has been ordered under a separate project.

The receipt of this equipment will facilitate further experimental work on this project.

Adequate space has been provided for in the new Technical Pilot Plant area.

Project Name: Engineering Study of Current Arms Models - M/11 Shotgun

Project Number: TP-3413

Personnel: R. H. Grace, C. F. Benner, B. C. Andrews, W. T. Lennox

Authorized Amount: $25,000.00 **Expenditures to Date:** $4,455.31

Nature of Problem:

Furnish Ilion Plant with Engineering information to assist in the manufacture of the M/11 Shotgun, such as drawings, process records, metallurgical and chemical procedures and standards, adequate inspection standards and adequate perishable tool and gage information.

Summary of Progress from Inception:

Activity under this project never reached major proportions due to the advent of military work. Certain detail revisions to design and process were carried on until such activities were transferred to Category A.

The Quarter's Work:

Work on heat treatment specifications which are now being used by Inspection and Heat Treatment Personnel. Furnished a cost estimate and time schedule of Induction brazing of one-piece and two-piece barrel guide to the barrel. Also started testing program of three M/11 Shotguns with numerous design and process changes to determine advisability of change.

Next Quarter's Work or to Completion:

Project to be closed out. All work on revision of current models has been turned over to the Plant Production Engineering and Control Section. Control activities on Product Drawings and Chem. and Met. Specifications is now carried on as a Category A function.

Project Name: M/552 Tubular and M/540 Box Magazine .22 Cal. Rifles

Project Number: EP-3414

Personnel:

Authorized Amount: $25,000.00 **Expenditures to date:** $236.16

Nature of Problem:

Design a .22 caliber low-cost autoloading rifle to be made in two versions: (1) A tubular magazine model to be known as the M/552. (2) A box magazine rifle to be known as the M/540.

Summary of Progress from Inception:

Little has been done on this project other than to arrive at a very definite ideas.

The Quarter's Work:

Planning and preliminary work in outlining a development program.

Next Quarter's Work or to Completion:

Drawings will be made of definite ideas conceived for purpose of evaluation as to their feasibility.

Project Name: Engineering Study of Current Arms Models - 500 Series

Project Number: TP - 3405

Personnel: H.H. Grace, G.F.Benner, B.G.Andrews, W.T.Lennox

Authorized Amount: $41,400.00 Expenditures to Date: $18,471.31

Nature of Problem:

Furnish Ilion Plant with Engineering information to assist in manufacture of current models, such as drawings, process records, metallurgical and chemical procedures and standards, adequate inspection standards, and adequate perishable tool and gage information.

Summary of Progress from Inception:

An extended review of available information was made in preparation for correction and revision. With the advent of military work, activity on this project ceased, except on certain metallurgical and chemical phases.

The Quarter's Work:

Made up twenty M/510 bolt handles and cocking cams for copper brazing. Brazed by General Electric Company, Schenectady, N.Y., in a dryzalene atmosphere brazing furnace with satisfactory results. Conducted dry and live fire tests on M/510 components in the soft, unhardened state with excellent results. Carried on work on heat treatment specifications for Inspection and Heat Treatment personnel. Completed a cost estimate showing estimated savings to be obtained through the elimination of heat treat operations on numerous components, and Hydogen brazing of bolt handle assembly.

Next Quarter's Work or to Completion:

Project to be closed out. All work on revision of current models has been turned over to the Plant Prod. Engr. & Control Section. Control activities on Product Drawings and Chemical and Metallurgical specifications.

Project Name: Low Cost Finishing Methods

Project Number: TP-3445

Personnel: R. H. Grace

Authorized Amount: $14,550.00 **Expenditures to Date:** $5,141.21

Nature of Problem:

To develop lower cost finishing methods.

Summary of Progress from Inception:

This project was authorized on 12/21/44. The expenditure to date includes money spent under Projects B-151 and MKB-2150 which were absorbed by TP-3445. Under TP-3445, several lower cost methods of preparing metal parts for coloring have been observed.

The Quarter's Work:

A visit was made to the Pangborn Corporation to procure sand, grit and shot blasted components for coloring. A visit was made to the Vapor Blast Manufacturing Company to observe their process and to process samples. This is a wet method of blasting which permits the use of abrasives as fine as face powder.

Next Quarter's Work or to Completion:

Continue work on sand and vapor blasting. Obtain color samples and perform wear tests to evaluate finish.

Project Name: New Type Cement Kiln Gun

Project Number: RI-174

Personnel:

Authorized Amount: $33,585.00 **Expenditures to Date:** $27,463.00

Nature of Problem:

Design New Type Cement Kiln Gun.

Summary of Progress from Inception:

Started about 1938 and one gun was built which did not meet requirements. In 1943 the requirements were revised, the gun altered slightly and satisfactory results obtained.

The Quarter's Work:

Sample gun received from contractor and order placed for 40 guns, after making minor changes.

Next Quarter's Work or to Completion:

Inspect and test guns when they are received.

Project Name: 100 .30 Caliber Browning M/2 Aircraft Machine Gun Barrels

Project Number: TP-3446

Personnel: M. H. Smith, K. Wheat, K. B. Fontaine, P. Henriksen

Authorized Amount: $10,000.00 Expenditures to Date: $528.67

Nature of Problem:

To develop process and manufacture 100 Browning machine gun barrels with a stellite liner.

Summary of Progress from Inception:

Model drawings have been prepared. Tool drawings have been made and orders placed. A preliminary lot of 25 barrels has been processed through Finish Ream. 14 Retainers and 2 Liners are being made by the Plant. Plans for the firing range have been submitted to Central Safety for approval. Preliminary Process Records of all parts have been prepared.

The Quarter's Work:

Model drawings have been prepared. Tool drawings have been made and orders placed. A preliminary lot of 25 barrels has been processed through Finish Ream. 14 Retainers and 2 Liners are being made by the Plant. Plans for the firing range have been submitted to Central Safety for approval. Preliminary Process Records of all parts have been prepared.

Next Quarter's Work or to Completion:

Check Draw Rifling process on 6 steel barrels. Build testing range. Set up machinery to completely make Liners, Retainers, and turn barrels. Manufacture 100 barrels. Prepare Process Records.

Project Name: M/ Modification

Project Number: TP-3437

Personnel: C. C. Loomis, K. J. Lowe, W. B. Kennah

Authorized Amount: $4,000.00 Expenditures to Date: $3,917.61

Nature of Problem:

Rinse two M/1 rifles to demonstrate two different means of rinsing full as well as semi-automatic operation.

Summary of Progress from Inception:

A model operating on a principle under development here was delivered to the Ordnance Department on October 14, 1944, and the second model, based on a principle suggested by the Ordnance Department, was delivered on November 1, 1944. This work was accepted as satisfactory and steps were taken to close the project.

The Quarter's Work:

A model operating on a principle under development here was delivered to the Ordnance Department on October 14, 1944, and a second model, based on a principle suggested by the Ordnance Department, was delivered on November 1, 1944. This work was accepted as satisfactory and steps were taken to close the project.

Next Quarter's Work or to Completion:

Complete final closing.

Project Name: Design and Develop two Rear Sights for U.S. Rifle M/1 .30 Cal.

Project Number: TP-3429

Personnel: W. Walker, L. Rix

Authorized Amount: $2,500.00 Expenditures to Date: $2,055.17

Nature of Problem: To design a simple and rugged sight suitable for mounting on the M/1 Receiver without any alteration in the Receiver. Build two models of same.

Summary of Progress from Inception:
Drawings were made and models completed for Ordnance Department's approval.

The Quarter's Work:
Two models of the design were submitted and returned for a slight alteration.

Next Quarter's work or to Completion:
Rinse models according to change suggested by the Ordnance Department. Re-submit and close project.

Project Name: Test Bench

Project Number: TR-3393

Personnel: L. Snow

Authorized Amount: $1,930.00 **Expenditures to date:** $2,725.65

Nature of Problem:

To design a test bench providing facilities for testing guns without ammunition.

Summary of Progress from Inception:

A bench was equipped with a motor drive for operating guns and mechanisms. Fixtures were made to hold all guns in the line and the bench has already been used in at least six life tests of guns or mechanisms.

The Quarter's Work:

All work was completed on October 27, 1944 and steps taken to close out the project.

Next Quarter's Work or to Completion:

It is expected to complete closing.

Project Name: To Collect Charges on Investigation of Complaints on Firearms.

Project Number: TE-3071

Personnel: G. H. Hart, R. F. Kelly, L. A. Sim, J. D. Howell, F. G. duPont, D. E. McNally, Gun Design Unit.

Authorized Amount: Category "A" **Expenditures to date:** $9,154.03

Nature of Problem:

Investigate causes of customer complaints and where feasible eliminate them by design changes.

Summary of Progress from Inception:

Miscellaneous changes have been made to improve trigger pull, sight equipment, durability, and safety.

This Quarter's Work:

A revised design of M/11 Trigger was made and tested. A new M/11 Trigger Spring was designed to make the trigger pull meet specifications. A new M/81 Firing Pin to eliminate marked primers was designed and tested. A great amount of work was done to track down and eliminate causes of V. A. Browning's complaints.

Next Quarter's Work or to Completion:

Continue work to improve quality of the line based on eliminating causes of complaints.

Project Name: Design and Develop Suitable Modification (Paratroopers Rifle)

Project Number: TP-3430

Personnel: K. J. Lowe, C. C. Loomis, W. B. Kannah

Authorized Amount: $20,200.00 Expenditures to date $19,287.79

Nature of Problem:

Convert an M1 rifle to accommodate a 20-shot magazine and to fire full,as well as semi-automatically. Certain restrictions on weight and degree of similarity with unaltered M1 made this problem a difficult one.

Summary of Progress from Inception:

On the first attempt the modified rifle performed reasonably well. However, certain alterations were deemed necessary.

The Quarter's Work:

Many slight revisions were made, some to correct minor weaknesses and others to meet revised requirements. The major cause of difficulty is the magazine, which is the standard B.A.R. (Browning Automatic Rifle) magazine altered slightly for the subject arm.

Next Quarter's Work or to Completion:

Continue development to perfect functioning, concentrating on revision of the magazine.

Project Name: Preparation of M/81 Service Manual.

Project Number: MSI-1233

Personnel: W. B. Kinnah

Authorized Amount: $1,050.00 Expenditures to date: $250.14

Nature of Problem:

To write and illustrate an instruction manual covering the servicing of the M/81 Rifle.

Summary of Progress from Inception:

See below.

The Quarter's Work:

The work was started during this quarter and is nearing completion.

Next Quarter's Work or to Completion:

Complete the work and close the project.

Project Name: Sabot Projectiles

Project No: TP-3417

Personnel: T. R. Kinraide, R. H. Grace, J. Hammond, E. K. Wheat, G. L. Fuller, M. D. Blanek

Authorized Amount: $150,000 **Expenditures to Date:** $105,000

Nature of Problem:

To develop high velocity armor piercing projectiles for 90, 76, 75 and 105 mm cannon and carry out production engineering preparatory to manufacture.

Summary of Progress from Inception:

Original designs by University of New Mexico tested and found inadequate. New design developed and carried through preliminary tests.

The Quarter's Work:

Remington design of 90 mm projectile has shown velocities approximately 50% higher than standard projectiles. Performance on armor penetration is good. Accuracy is not quite up to the desired level. Further modifications now being built.

Next Quarter's Work or to Completion:

Work being confined to 90 mm and 76 mm sizes. Further design modifications being prepared for test. Detailed process to be laid out on completion of successful design.

Project Name: Caliber .50 Machine Gun Barrel - Draw Rifled

Project Number: TP-3440

Personnel: E. K. Wheat, K. B. Fontaine

Authorized Amount: $5,000.00 **Expenditures to Date:** $4,604.48

Nature of Problem:

To rifle Stellite lined caliber .50 barrels by draw rifling and to convert one caliber .30 machine to perform this operation.

Summary of Progress from Inception:

Machine has been converted. 32 steel barrels and 4 Stellite barrels have been rifled by the draw method. Tests have been made with steel barrels looking toward duplication of cut rifling by the draw rifling method. Indications are not promising. Further work is pending receipt of additional barrels.

The Quarter's Work:

Same as above.

Next Quarter's Work or to Completion:

Due to lack of funds we will only rifle 10 additional barrels when they are received. Additional work is being requested by OSRD.

Project Name: Caliber .30 Machine Gun Barrel

Project Number: TP-3433

Personnel: E. K. Wheat, K. B. Fontaine

Authorized Amount: $10,000 **Expenditures to Date:** $919.60

Nature of Problem:

Produce 100 Stellite lined caliber .30 Browning machine gun barrels for OSRD.

Summary of Progress from Inception:

25 barrels are in process, 12 to check the possibility of producing the standard rifling by the draw rifle method. The balance to gain experience in inserting Stellite liners.

The Quarter's Work:

See above.

Next Quarter's Work or to Completion:

Complete manufacture of 100 barrels. ~~Further funds are proposed by OSRD.~~

ACTIVE PROJECTS
for which no detailed report is made

Number	Name	Amount Authorized	Expend... Date
TP-3006-3	Product & Process Test Program for Arms	$ 6,000.00	...0
TP-3093	Establishment of Tool Design Files		9,...
TM-3318	M/31, Redesign of Fire Control	5,000.00	2,660....
L-3132	Barrel Processing Methods	10,000.00	5,360....
TP-3368	Research Salary and Wages, Burden, Material and Supplies for Application to Fuse Metal		126....
TP-3382	Development of New Products in Present Line of Fire Arms	8,840.00	17,...
TP-3391	Standardization	2,300.00	168....
TP-3403-7	Investigation of Laboratory Heat Treating Equipment	500.00	...
TP-3438-1	Impressed Checkering	2,500.00	8,...

INACTIVE PROJECTS

J-3024	M/850 Die Cast Receiver		6,675....
TP-3072	Tool Metallurgy		25,...
K-3038	Roll Forming of Shot Gun Barrels	200.00	150....
K-3058	Design for Low Cost Single Barrel Shot Gun	18,000.00	11,644....
K-3067	Low Cost .22 Rifle (Model 500)	12,000.00	20,560....
TM-3300	Draw Rifling	7,000.00	7,057....
TM-3316	Design for Low Cost Slide Action .22 Cal. Rifle (Model 570)	12,465.00	1,639....
TM-3334	M/760-M/740 Alternate Design Study	6,000.00	4,880....
TM-3338	M/541 Low Cost Autoloading Rifle	10,000.00	4,550.00
TM-3346	New Finishes for Gun Furniture	5,600.00	5,556....
TM-3348	Adaptation of 500 Series Rifles for .22 Hornet Cartridges	1,900.00	3,071....

INACTIVE PROJECTS - Cont'd

TM-3349	Models 610, 611, 613, Accuracy Study	$ 2,350.00	$ 1,876.00
TM-3350	Adaptation of Model 141 Rifle to .300 Cal. Savage Ammunition	2,100.00	1,304.00
TM-3351	Investigation of Arms Revision	5,000.00	28,347.84
TM-3364	Tests on M/11 Improvement	1,500.00	2,369.95
TP-3379	Improvement to Firearms in Current Line	6,100.00	.00
TP-3388	Firing Pin Blow M/720	750.00	.00
TP-3389	Primer Set-Back Autoloading Means	7,200.00	23.09
TP-3408-9	Investigation of Induction Heating and Austempering	500.00	.00