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A COMPARISON TEST OF UNITED KINGDOM AND UNITED STATES LIGHTWEIGHT RIFLES. TENTH REPORT OF PROJECT NO. TS2-2015

CODE SHEET FOR TENTH REPORT OF PROJECT NO. TS2-2015

A COMPARISON TEST OF UNITED KINGDOM AND UNITED STATES LIGHTWEIGHT RIFLES.

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"X" = Speed Graphic

"Y" = Super XX

"Z" = Mobil aero hydraulic oil, HFA (petroleum-base), manufactured by Socony Vacuum Oil Co.

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A COMPARISON TEST OF UNITED KINGDOM AND UNITED STATES LIGHTWEIGHT RIFLES

TENTH REPORT OF PROJECT NO. TS2-2015

DATES OF TEST: 16 February 1950 to 28 April 1950

OBJECT

To obtain information on the characteristics and performance of 3 models of lightweight rifles, two models of which (EM2 and FN) were furnished by the United Kingdom and one (T25) by the United States.

SUMMARY

Two rifles of each model were subjected to a light rifle test. Of the 3 models tested the EM2 gave the best performance in the dust, mud, cold, dry and automatic accuracy tests but gave the poorest performance in the disassembly, sea water immersion, salt spray, rain, elevation and grenade tests and gave the greatest number of parts breakages in the endurance test. The FN rifle gave the best performance in the disassembly, endurance, salt spray and flash (with flash hider) tests but gave the poorest in the semi-automatic accuracy and cold tests. The T25 rifle gave the best performance in the rain, elevation, semi-automatic accuracy, sea water immersion and grenade tests and was the only rifle to complete the cook-off test but gave the poorest performance in the mud, dust and dry tests.

CONCLUSIONS

It is concluded that, since the T25 rifle was chambered for a cartridge giving 40% more muzzle energy than the one used in the EM2 and FN weapons, a true comparison of many features of the rifles cannot be made. However, an evaluation can be drawn on weapon characteristics not affected by muzzle energy. None of the rifles gave performance indicative of final development (See Section IV, Conclusions).

RECOMMENDATION

It is recommended that features found desirable in this test and in field tests be incorporated on future models.

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I INTRODUCTION

A. DISCUSSION

There is a requirement for a rifle having a lighter weight and incorporating various features not found on present standard arms. It is desired to develop a rifle and cartridge meeting this requirement and then to standardize these items for use in Armies of the allied countries. Three models of rifles and 2 designs of cartridges have been submitted for test. It is desired to obtain a comparison of the features and performance of these models when subjected to a test agreed upon by the representatives of the countries submitting the test items. It appears likely that a rifle meeting the above requirements will replace several present standard shoulder weapons.

B. REFERENCES

1. Authority for conducting this test is contained in directive letter OO 474/2(C), APG (C)474/21, dated 3 February 1950, a copy of which is attached as Appendix A.

2. Technical References

a. Two hundred and ninety-ninth report on Ordnance Program No. 5092. First Report on Standardizing the Dust and Mud Test of Small Arms.

b. First Report of Project No. TS2-2015. A Test of Cartridge, Ball, Caliber .30, T65E1 and Rifle, Lightweight, Caliber .30, T25.

c. Second Report of Project No. TS2-2015. A Test of 4 Rifles, Lightweight Caliber .30, T25.

d. Ninth Report of Project No. TS2-2015. A Test to Compare the Performance of Caliber .30, T65E2 Combat Ammunition with Caliber .280 Combat Ammunition.

e. A Comparative Accuracy Test of Rifle, Tokarev, Caliber 7.62 mm, M40 and Rifle, U.S., Caliber .30, M1.

f. TM9-1990, Small-Arms Ammunition.

g. FM23-5, U.S. Rifle, Caliber .30, M1.

II DESCRIPTION OF MATERIAL

A. Rifle, Lightweight, Caliber .30, T25

1. General Description

The T25 rifle is an air-cooled, gas-operated, magazine fed (20 rounds), shoulder weapon which delivers both semi-automatic and automatic fire through selective control by the operator.

The rifle is equipped with a stabilizer and an in-line stock to reduce recoil and muzzle climb. A hand grip is provided at the rear of the trigger. Both stock and handguard are of laminated wood.

The type of sights provided are a blade front (with protective wings) aperture rear, both of which fold down. The rear sight elevation scale ranges [illegible] to 600 yards; both elevation and windage adjustments are in one-minute-of-angle clicks. The line of sight from the line of bore is approximately 2.3 inches.

2. Accessories

The bipod, grenade launcher, flash hider and bayonet must be mounted regularly since each is adapted to the bayonet lug. The lug is an integral part of the stabilizer.

a. Bipod

The bipod can be locked in 2 open positions permitting an adjustment in height of the weapon for firing. In the closed position the bipod is folded to the rear under the weapon.

b. Grenade Launcher

Of conventional design, the body is indexed with rings for range variation and a spring is added at the top to retain the grenade in the proper position. The launcher is assembled to the rifle over the stabilizer.

c. Flash Hider

Of standard cone type, it is assembled over the stabilizer.

d. Bayonet

The U.S. carbine bayonet was modified for adoption to the T25 rifle. The barrel band was enlarged to fit over the stabilizer and the handle was changed by providing a catch midway of the handle instead of at the rear end. It is assumed that the standard carbine bayonet scabbard would be used.

e. Sling

The M1 web type sling is used with this weapon.

3. General Operation

In loading, the magazine containing 20 rounds is inserted into the magazine well and forced upward until the magazine catch engages in the aperture provided at the upper part of the magazine tube right wall. The magazine may be inserted with the bolt in the open or closed positions.

4. Semi-automatic Fire

A complete cycle initiated with the action open, a loaded magazine in [illegible] the selector in the SEMI position will be described.

With movement of the trigger to the rear the automatic sear is cammed [illegible] to release the bolt (together with the operating slide) under energy of [illegible] compressed operating springs. A round is fed from the magazine into the chamber. The bolt moves forward it clears the hammer allowing it to rotate forward until [illegible] engaged by the sear. As pressure on the trigger is released, the hammer [illegible] from the sear and moves into engagement with the secondary sear (trigger [illegible]. The rifle is ready to fire.

A second pull of the trigger releases the hammer from the secondary [illegible]; the hammer rotates forward under energy of the tensioned hammer spring. Energy is transferred from the hammer, through the rear and front firing pins, to fire the chambered round.

On firing the round, the bullet passes through the bore uncovering the gas port, allowing gas to enter the gas cylinder and hollow piston. The hollow piston moves to the rear, and gas from the bore is cut off.

In its rearward movement the piston drives back the operating slide with which it is in continuous contact. The operating slide cams the bolt lock down for unlocking and the bolt moves to the rear. The fired cartridge case is withdrawn from the chamber and when it clears the barrel, the ejector, which is continually exerting pressure on the base of the cartridge, ejects the empty case upward through action of the compressed ejector spring. The bolt rotates the hammer back and downward for engagement with the sear. The bolt is stopped in its rearward movement on contact with the fiber buffer located in the rear of the receiver.

As the bolt moves forward, actuated by the operating springs which were compressed in recoil, the hammer rotates upward until it is engaged by the sear. If the trigger was released prior to this action, the hammer would be engaged by the secondary sear (trigger lug). In the forward movement of the bolt the top cartridge is stripped from the magazine and chambered. The weapon is now ready to repeat the cycle.

After the last round has been fired, an extension of the magazine follower blocks the bolt in the rearmost position. Withdrawal of the empty magazine permits the bolt to move forward into engagement with the automatic sear which locks the recoiling parts to the rear until the trigger is pulled. The magazine is removed by depressing the magazine catch located on the right side of the weapon.

5. Automatic Fire

A complete cycle initiated with the action open, a loaded magazine in place, and the selector on the AUTO position will be described.

Moving the selector from the REPEAT to the AUTO positions results in the [illegible] being forced back so that engagement with the hammer is not possible.

If sufficient pressure is then applied to the trigger, the automatic sear is disengaged from the bolt, allowing the bolt and the operating slide to go forward [illegible] firing a round as in semi-automatic fire. However, with the sear rendered inoperative the hammer rotates upward until its movement is arrested by the hammer lock. In the final forward movement of the operating slide, after locking of the bolt has been accomplished, the hammer lock is disengaged from the hammer through a [illegible] action by the operating slide.

The cycle in automatic fire is similar to that in semi-automatic fire except that, with the sear rendered inoperative and the trigger being held to the rear, the hammer continues to rotate upward until it contacts the hammer lock. The [illegible] of the operating slide on the hammer lock effects release of the hammer and firing of the chambered round. The rifle will continue to fire until the trigger is released, a stoppage occurs, or all ammunition in the magazine has been fired.

If the trigger is released before the magazine is empty the action may stop on either the open or closed bolt positions depending on the point of the cycle at which the trigger was released. If the trigger is released during the counter-recoil travel of the bolt, after the bolt has passed over the automatic sear and before the hammer lock is tripped by the operating slide, the action will stop on a closed bolt with the hammer engaged by the secondary sear. Release of the trigger at any other point of the cycle will cause the firing to stop with the bolt in the open position.

6. Safety Features

The safety is of the cross-bolt type operating on the rear of the trigger.

In the event that bolt closure is incomplete, release of the hammer cannot be accomplished by a pull on the trigger. The hammer lock prevents the hammer from rotating upward unless the action is locked. Release of the trigger, to grasp the operating slide handle for manual assistance in closing the action, automatically results in the trigger engaging the hammer.

The front and rear firing pins are not aligned until the bolt is closed.

B. Rifle, Lightweight, Caliber .280, FN

1. General Description

The FN rifle is an air-cooled, gas-operated, magazine-fed (20-round), shoulder weapon which delivers either semi-automatic or automatic fire through selective control by the operator.

The rifle is equipped with a stock, handguard, and a grip at the rear of the trigger. No upper handguard is provided. The stock assembles to the action at the conventional angle from the line of recoil.

The trigger and stock groups unlatch from the rear end of the receiver as a unit and pivot on a pin from the receiver. This arrangement affords quick removal of the bolt, bolt slide and bolt cover.

The cocking handle is independent of the recoiling parts and its use is limited to retracting the bolt.

The gas regulator in this weapon is designed on the exhaust principle. Gas escape from the cylinder is varied by selection of one of 3 vents in the regulator which is positioned over a port in the top of the cylinder.

The type of sights provided are a blade front (with protectors) and an aperture rear. The rear sight is graduated from 100 to 600 yards in 100 yard stages. By depressing a spring-loaded lock, the aperture slide may be moved up or down the ramp to the desired range. The line of sight from the line of bore is approximately 1.7 inches.

Fired cartridge cases are ejected from the right side of the weapon.

2. Accessories

a. Bipod

The bipod is mounted on the barrel and retained by locking lugs at the front of the handguard. The bipod legs latch in a closed position but do not fold under the weapon.

b. Stabilizer

Of conventional design, it screws to the threaded section of the barrel.

c. Grenade Launcher

The launcher is of conventional design with the exception that a sight is assembled on the rear end of the body. The body is indexed with rings for range variation and a spring near the top retains the grenade in the proper position. The launcher is clamped to the bayonet lugs.

d. Flash Hider

Of the cone type, it screws to the threaded section of the barrel.

e. Combination Bayonet and Flash Hider

The flash hider projects over the blade of the bayonet preventing use of this part of the blade. No handle is provided for use of the bayonet when off the rifle. The unit is assembled to the bayonet lugs on the barrel. A scabbard is provided.

f. Sling

The sling is of a similar type and material as the U.S. M1 web type sling but is of a more complicated design.

3. General Operation

In loading, the magazine is inserted in the magazine well and forced upward until the magazine catch engages in the notch at the right side of the magazine rear wall. The magazine may be latched in position with the bolt open or closed.

On pulling the cocking handle to the rear the bolt is retracted and the operating spring is compressed. To retain the action in the open position the bolt stop is applied manually. The bolt stop is located on the left side of the receiver at the rear of the magazine well. The cocking handle is then placed in the forward position; it does not move in firing.

4. Semi-automatic Fire

A complete cycle initiated with the action open, a loaded magazine in place, and the selector in the R (repeat) position will be described.

To chamber a round, the bolt stop is pushed downward releasing the bolt (together with the bolt slide). The bolt forces a round from the magazine and into the chamber under energy of the compressed operating spring. The claw-type extractor is cammed over the cartridge base and the bolt comes to rest against the rear face of the barrel. The back end of the bolt is cammed down by the bolt slide so that it is locked against a bolt locking block positioned in the receiver. With a pull on the trigger the rear end of the sear is rotated upward causing the front end to go down and out of engagement with the hammer. The hammer rotates forward under energy of the compressed hammer spring. The energy is transferred from the hammer through the firing pin to fire the chambered round.

As the bullet passes through the bore, past the gas port, gas is allowed to enter the gas cylinder forcing the piston to the rear. The piston, bearing against the top front of the bolt slide, forces it to the rear. The bolt slide cams the bolt up for unlocking and the parts then move to the rear.

In the rearward travel of the bolt the cartridge case is extracted and, on contact with the ejector (an integral part of the receiver), it is ejected up and to the right. The bolt is grooved to provide clearance for the ejector. The bolt slide rotates the hammer back and downward for engagement with the automatic sear.

Counterrecoil travel of the bolt and bolt slide is actuated by the operating spring which was compressed in recoil.

After the last round has been fired an extension of the magazine follower actuates the bolt stop which retains the bolt in the rear position. The magazine is released by depressing the magazine catch positioned at the rear of the magazine wel

5. Trigger Action

The sear is provided with a slotted hole, and since it is under spring tension from the rear, it is forced forward until the rear side of the slot bears against the sear pin. However, when it is in engagement with the hammer, which is under greater spring tension than the sear, the sear is forced rearward and the hammer rotates upward until the front side of the slot contacts the sear pin. When the trigger is pulled to fire the chambered round, the sear is forced up at the rear, down and out of engagement with the hammer at the front. On disengagement with the hammer, the sear is forced forward by the spring loaded plunger. After the round is fired, the bolt slide, in recoil with the bolt, rotates the hammer into engagement with the automatic sear. In the final counterrecoil movement of the bolt slide, the hammer is disengaged from the automatic sear allowing the hammer to rotate upward slightly and into engagement with the sear. When the sear if forced rearward by the hammer and the trigger is fully to the rear, travel of the sear is blocked by a shoulder of the trigger. Firing of the chambered round cannot be accomplished until the trigger is released to allow the sear to complete its rearward travel and override the shoulder of the trigger. After release of the trigger the weapon is ready to repeat the cycle.

6. Automatic Fire

A cycle initiated with the action open, a loaded magazine in place, and the selector in the A (automatic) position will be described.

Moving the selector from the R to the A positions results in additional travel of the trigger to the rear. Consequently, the sear is rotated further down at the front and out of position for engagement with the hammer.

A round is chambered as for semi-automatic fire. When the trigger is pulled the hammer is disengaged by the sear to fire the round. The front of the sear is forced beyond the hammer engaging position due to the increased travel of the trigg

Firing of the chambered round initiates the cycle of events described in semi-automatic fire with the exception that, with the sear rendered inoperative, the hammer is locked in the cocked position by the automatic sear. Release of the hammer occurs after the bolt is locked and when the rear of the automatic sear is contacted by the left rear of the bolt slide in its final forward movement. Engagement of the ham with the automatic sear occurs when the rear end of the bolt slide passes over the hammer in recoil.

The rifle will continue to fire until the trigger is released, a stoppage occurs, or all ammunition in the magazine has been fired.

If the trigger is released before the magazine is empty, the front end of the sear automatically rises into position for engagement with the hammer. As the action closes, the automatic sear is tripped and the disengaged hammer rotates upward and into engagement with the sear.

7. Safety Features

The selector also serves as a safety. When it is rotated to the rear (on the S position), the trigger is blocked.

In the event that the closing of the bolt is incomplete, release of the hammer cannot be accomplished by a pull of the trigger. The automatic sear locks the hammer in the cocked position until the bolt is closed and the bolt slide reaches its final forward movement.

The firing pin cannot be contacted by the hammer unless the action is closed.

C. Rifle, Lightweight, Caliber .280, EM2

1. General Description

The EM2 rifle is an air-cooled, gas-operated, magazine-fed (20-round), shoulder weapon which delivers both semi-automatic and automatic fire through selective control by the operator.

The unusual features of the rifle are the lack of a stock, placement of the trigger forward of the chamber, and a telescopic sight having no magnification.

The rifle is equipped with a rubber padded metal butt, and front and pistol grips of wood. The pistol grip assembles to the trigger casing at the rear of the trigger. Wood veneering is applied to the exterior of the body to protect the shooter. In sighting, the shooter's face rests against the body. Recoil is taken up in a straight line with the bore and the tendency of the muzzle to jump, as in firing conventional weapons, is not apparent.

The butt is locked to the rear of the body by retaining lugs and a spring loaded catch. This arrangement affords quick removal of the return spring, piston, cocking handle, and the breech block assembly. The trigger group can be disassembled from the body by withdrawing the fixing pin.

The telescopic sight has range graduations and an inverted pointer incorporated within the sight. Range graduations are for 300, 500, 700 and 900 yards. These graduation lines are broken in the center, beneath the pointer; the object being that the width of the central gap should represent the width of a man at the range indicated.

The sight frame is used as a carrying handle.

The line of sight from the line of bore is approximately 3.3 inches.

2. Accessories

a. Bipod

The bipod mounts to the bipod adapter, an integral part of the forearm It folds under the weapon in either a forward or rearward direction. No positive locking is provided for retaining the bipod in either the open or folding position.

b. Grenade Launcher

The grenade launcher is of a design which permits it to slide for some distance over the barrel leaving a comparatively small chamber within the launcher. The outside of the launcher is conventional in design; it is a cylindrical and flanged steel tube with a grenade retaining clip fastened to the body at the rear. The launcher is assembled to bayonet lugs which are an integral part of the barrel.

c. Bayonet

Of knife-type design, it is fitted with a handle. Before assembling the bayonet to the rifle the rear portion of the handle is rotated 180 degrees to align the hole with that of the barrel band. A steel bayonet scabbard is provided.

d. Sling

The sling is of a similar type and material as the U.S. M1 web sling but it is of a more complicated design.

e. Arctic Trigger Assembly

The standard trigger guard is replaced with an enlarged type which contains a trigger bar and a safety lever attachment, both of which engage in the bottom of their respective pieces. The assembly is attached to the rifle by means of the trigger guard pin and the pistol grip screw.

3. General Operation

In loading, the top front of the loaded magazine is positioned in the magazine opening and then rotated to the rear into engagement with the magazine catch.

4. Semi-automatic Fire

A complete cycle initiated with the action open and the selector on R (repeat) will be described.

Upon inserting a loaded magazine into the magazine opening, the breech block (together with the piston) is disengaged and driven forward under energy of the return spring. In its forward travel it forces a round from the magazine into the chamber.

Pressure on the trigger actuates the tripping lever, the rear of which cams the sear lever up and into engagement with the front of the sear in the breech block, releasing the firing pin. The firing pin is driven forward under energy of the compressed firing pin spring.

As the round is fired, the bullet passes through the bore uncovering the gas port, gas enters the gas cylinder and forces the piston (together with the block) to the rear. In its rearward travel the return spring is compressed.

In the initial travel of the piston, which is in engagement with the firing pin sleeve within the breech block, the firing pin is drawn rearward and engaged by the sear. In its rearward travel, the firing pin cams the locking levers out of engagement permitting the breech block to travel to the rear. In the initial movement of the breech block, the tripping lever is cammed downward at the rear, forcing the front end upward and out of engagement with the trigger.

The piston, on reaching the end of its recoil stroke, is forced forward by the return spring. A stud on the under side of the piston engages with the piston catch (component part of the breech block assembly) and carries the breech block forward. The breech block forces a round out of the magazine and into the chamber, the claw-type extractor engaging the base of the cartridge.

As the breech block closes, the piston catch is cammed downward (by a cam surface of the body) and out of engagement with the piston lug permitting the piston to continue its forward movement and carrying with it the firing pin sleeve. In this movement, the firing pin sleeve cams the locking levers into the locked position, the levers are retained there through force exerted by the return spring on the piston and to the sleeve.

When the trigger is released, it is forced forward under energy of the trigger spring and into engagement with the tripping lever, and held in engagement by the tripping lever spring. The weapon is then ready to repeat the cycle.

After the last round has been fired from the magazine, the magazine platform lug cams the loading slide rearward, permitting the breech block retainer to be forced down at the front end and up at the rear by action of the breech block retainer spring. The rear end of the retainer rises into the path of the breech block and stops it in its initial forward travel.

The magazine is removed by pushing the magazine catch forward and rotating the magazine down and forward.

5. Automatic Fire

Upon movement of the change pin from R (repeat) to A (automatic), the tripping lever is forced down into the flat of the pin by the tripping lever spring, thus dropping the tripping lever out of position for contact by the breech block. As the trigger is pulled, the tripping lever moves rearward and cams the sear lever up and into engagement with the sear.

The cycle of events is identical to that of semi-automatic fire with the following exceptions:

In recoil, the tripping lever (operating on a lower plane) is not disengaged from the trigger as in semi-automatic fire.

The firing pin is released from the sear as the breech block assembly moves forward and before the sleeve has forced the locking levers into the locked position. The breech block moves forward with the sleeve forcing the locking levers into the locked position as the firing pin is moving forward to ignite the primer of the round which is also being chambered by the block. These parts are all in operation at the same time and the timing is critical.

6. Safety Features

A safety bar, operated by a safety lever located at the forward of the trigger guard, is moved to the rear to prevent the sear from disengaging the firing pin.

The firing pin cannot contact the primer of the chambered round without first pushing the sleeve forward. The sleeve in turn forces the locking levers into the locked position.

D. A complete description of the U.S. Rifle, Caliber .30, M1, used as a control weapon in the abuse tests, is given in FM23-5.

E. Cartridge, ball, mild steel core, caliber .280, used in the EM2 and FN rifles in this test, weighed 322 grains (average of 10 rounds from lot 194). An average powder charge of 30.7 grains is used in a 151.7 grain case to propel the 139.7 grain bullet.

F. Cartridge, ball, caliber .30, T104, used in the T25 rifles in this test, weigh 364 grains (average of 10 rounds from lot FAX 30-1358). An average powder charge of 46.6 grains is used in a 180.3 grain case to propel the 136.8 grain steel core bullet.

G. A description of standard ammunition used in this test is given in TM9-1990.

III DETAILS OF TEST

A. PROCEDURE

A copy of the directed technical test is also inclosed as Appendix A. Several changes in the test plan were made by the working committee. In order to obtain the greatest amount of information from the limited number of weapons submitted, the tests were not fired in the order listed in the plan. Additional details on test procedure are given below.

1. Dust test procedure (Test V).

a. Rifles were cleaned, lightly oiled, and the muzzles taped shut. A round was placed in the chamber and the safety placed in the "on" position. The dust cover was closed on the FN2 rifle.

b. One rifle of each type (total of 4) was placed in the dust box at one time. The rifles were exposed to the dust for one minute top side up and for one minute upside down.

c. The dust mixture, which was made up by mixing 9 pounds of Grade O Albany sand with 1 pound of clean Silica core sand which passed 100% through a 30 mesh sieve, 80% through a 50 mesh and 3.4% through a 100 mesh, was poured at a rate of 5 pounds per minute through the pour-hole while the blower was turned at a handle-speed of 60 revolutions per minute.

d. The shooter attempted to clean the weapon by wiping with his bare hands and by blowing sharply on the congested sections of the action. It was attempted to fire 20 rounds in semi-automatic fire. A magazine not subjected to the dust was then placed in the weapon and an attempt made to fire 20 rounds automatically. The tape was removed from the muzzle prior to firing.

2. Mud test procedure (Test VI).

a. Rifles were prepared in the same manner as for the dust test.

b. The weapon was completely immersed in the mud for a period of 15 seconds. The mud mixture was made in the proportion of 10 pounds of red clay and 2 pounds of clean river sand with 8 quarts of water. The sand was approximately the same grading as that used in the dust test.

c. The shooter attempted to clean the weapon prior to firing by wiping with his bare hands and by blowing sharply on the congested areas of the action. It was attempted to fire 20 rounds in semi-automatic fire. A magazine not subjected to the mud was then placed in the weapon and an attempt made to fire 20 rounds automatically.

3. Rain test procedure (Test VII).

Rifles were cleaned and lubricated with "T" (note Code Sheet) grease supplied by Springfield Armory. A spray of water from rain test equipment was directed on the breech end of the rifle. After 5 minutes in the spray with the bolt open, the magazine was inserted and the bolt closed. After an additional 5 minutes, 80 rounds were fired semi-automatically. The rifle was again subjected to the spray for 5 minutes with the bolt open and 5 minutes with the bolt closed. Eighty rounds were then fired automatically. This cycle was repeated until a total of 600 rounds had been fired or until the rifle could not be operated.

4. Test IX was conducted at ambient temperature only, due to inadequate facilities at this station for repeating the test at temperatures of +125°F and -65°F.

5. In the semi-automatic phase of the accuracy test (Test X) 3 targets were fired by each of 3 riflemen from each rifle using a bench rest. Targets were obtained simultaneously at 100, 300 and 600 yards. The A target center was used as an aiming point.

6. An additional accuracy test was conducted to investigate the accuracy that could be obtained when the rifles were fired under various conditions similar to those encountered by the combat rifleman. Three riflemen fired the following course with each rifle:

a. With sights properly adjusted and with a fouled bore, one 10-round target was fired from a bench rest.

b. The rifle was disassembled (field stripped), cleaned, oiled and reassembled.

c. Starting with a cold and oiled bore, one 10-round target was fired from a bench rest.

d. One 10-round target was fired from the prone position using a sling.

e. Sixty rounds were fired at a rate of between 15 and 20 rounds per minute.

f. Immediately after firing the 60 rounds, one 10-round target was fired from a bench rest.

g. Another 10-round target was fired immediately from the prone position using a sling.

Firing was conducted at a range of 100 yards. The A target center was used as an aiming point.

7. Additional accuracy firing was conducted at 100 yards to investigate the cause for a large dispersion when firing the FN rifle and to obtain a comparison between the accuracy obtained with lead and steel core ball ammunition when fired in the EM2 and T25 rifles.

8. Flash test procedure (Test XIII).

a. Twenty rounds were fired semi-automatically from each rifle within a completely dark, closed range. Cumulative muzzle flash was recorded photographically by means of 2 "X" cameras using "Y" film. One camera was placed 4.5 feet to the left of the muzzle and the other 3.5 feet behind and 2 feet to the left of the muzzle.

b. This test was conducted both with and without flash hiders on the rifles except with the EM2 rifle which was not supplied with a flash hider.

9. Extreme cold test procedure (Test XIV).

a. Rifles and magazines were cleaned with carbontetrachloride and placed in a cold room, maintained at -65°F, for a period of 12 hours prior to firing. No lubricant was used on the rifles in this phase. An attempt was made to fire 20 rounds using semi-automatic fire. Weapons which gave satisfactory performance in semi-automatic fire were left in the cold room for 2 additional hours and an attempt made to fire 20 rounds using automatic fire.

b. Rifles and magazines were again cleaned, and lubricated with aircraft instrument lubricating oil (low volatility) specification AN-O-11. The rifles were subjected to the cold test as previously described.

c. An additional test was conducted in which one rifle of each type was lubricated with "M" oil and one rifle of each type was lubricated with cold test oil No. 2 to which sufficient kerosene to make a 50% mixture had been added. The cold test oil No. 2 mixture was furnished by the United Kingdom. The rifles were subjected to the cold test as previously described.

d. Two rifles, U.S., caliber .30, M1 were lubricated with the oil furnished by Springfield Armory and subjected to the test as control weapons. They were each fired 16 rounds.

10. Sea water immersion (Test XV) and salt spray (Test XVI) tests.

a. Chemicals used per leader of salt water mixture:

Magnesium chloride	11 grams
Calcium chloride	1.2 grams
Sodium sulphate	4 grams
Sodium chloride	25 grams

b. Rifles were lubricated with "T" grease.

11. Test XVII was deleted by the working committee.

12. Tests XIX and XX were transferred to the ammunition test.

B. RESULTS

TEST I

Parts lists are attached as Appendix B. Information on weights, measurements and number of parts is given below.

WEIGHTS AND MEASUREMENTS

Weights are given in pounds and measurements in inches.

WEIGHTS

	RIFLE		
	EX2	FN	T25
*Rifle without magazine or accessories	8.06	8.70	7.74
Empty magazine	.53	.48	.62
Sling	.20	.20	.25
Grenade launcher	.72	.53	.33
Bipod	.71	.58	.82
Bayonet without scabbard	.81	**.62	.62
Bayonet scabbard	.35	.34	
Flash hider		.09	.56
Stabilizer		.11	***
20 Rounds of ball ammunition	.91	.91	1.03
Weight of rifle with loaded magazine and sling	9.70	10.29	9.64
Recoiling parts	1.17	1.31	1.03

* Average weight of 3 rifles.
** Bayonet and flash hider combination.
*** Stabilizer is part of rifle.

MEASUREMENTS

Overall length	34.8	38.8	43.3
Barrel length	24.6	19.2	22.1
Sight radius		22.1	27.0
Barrel Rifling	Left Hand 1 turn in 8.25"	Right Hand 1 turn in 240 mm	Right Hand 1 turn in 12"
Number of grooves		4	4

[redacted]

	RIFLE		
	EM2	FN	T25
PARTS			
Number of parts	133*	103	128
Number of coil springs	16	17	15
Number of flat springs	5	1	1

* Sight assembly not included.

Photographs showing the rifles in various conditions of assembly and disassembly and with accessories are attached as Appendix C.

TEST II

Complete data on this test are attached as Appendix D. There follows a summary of results. Time given is the average for 3 individuals.

To Disassemble the Rifle (Complete Disassembly)

Time	9 min 27 sec	5 min 55 sec	4 min 30 sec
Tools	5	4	7

To Assemble the Rifle (After Complete Disassembly)

Time	21 min 31 sec	10 mn 35 sec	10 mn 10 sec
Tools	5	4	7

To Dismount the Breech and Magazine Mechanism (Field Strip)

Time	13 Sec	11 sec	39 sec
Tools	1	0	2

To Assemble the Breech and Magazine Mechanism (After Field Strip)

Time	29 sec	24 sec	1 min 15 sec
Tools	0	0	2

[redacted]

TEST III

Complete data on this test are included in the function reports attached as Appendix E. There follows a summary of results:

RIFLE	NUMBER OF MALFUNCTIONS	REMARKS
EM2, Serial No. 6	2	Failures to fire.
EM2, Serial No. 8	2	Failures to fire.
FN, Serial No. 6	0	1 Punch-out in primer.
FN, Serial No. 7	0	
T25, Serial No. 14	1	Round fired on closure of bolt.
T25, Serial No. 15	1	Round fired on closure of bolt.

TEST IV

Complete data on this test are included in the function reports attached as Appendix E. There follows a summary of results.

RIFLE	ROUNDS FIRED	NUMBER OF MALFUNCTIONS	TIME FOR FIRING	COOK-OFF
EM2, Serial No. 6	329	12	3 min 35 sec	None

Firing was discontinued after 329 rounds due to excessive stoppages. The butt assembly became disassembled during firing. The return spring guide was bent. Both locking levers were broken.

The front grip burst into flames after 250 rounds.

EM2, Serial No. 6	Withdrawn from test.			
FN, Serial No. 7	398	8	4 min 8 sec	Occurred in 59 sec

Photograph A61176, attached as Appendix F, shows damage to the handguard, barrel, gas cylinder and piston resulting from this test. The receiver was cracked on the left side at the rear of the cocking handle cut. The front sight fell off during firing. The thumbpiece, screw and lock fell off the bolt stop assembly during the test.

Handguard burst into flames after 300 rounds.

Rifle was unserviceable as the result of this test.

T25, Serial No. 15	300	3	2 min 4 sec	Occurred in 26 sec

Stock and handguard burst into flames after 300 rounds.

250	13	2 min 42 sec	Occurred in 44 sec
200	8	1 min 30 sec	Occurred in 2 min 6 sec
175	5	1 min 3 sec	None

Photograph A61204, attached as Appendix F, shows the damage to the stock and handguard resulting from this test.

[redacted]

TEST V

Complete data on the dust test are included in the function reports attached as Appendix E. There follows a summary of results.

RIFLE	ROUNDS FIRED	NUMBER OF MALFUNCTIONS	REMARKS
EM2, Serial No. 6	20	2	Semi-automatic fire
	20	0	Automatic fire
EM2, Serial No. 8	20	1	Semi-automatic fire
	20	0	Automatic fire
FN, Serial No. 6	20	4	Semi-automatic fire
	20	3	Automatic fire
FN, Serial No. 7	20	2	Semi-automatic fire
	20	1	Automatic fire
T25, Serial No. 14	20	9	Bolt closed by hand on 4 occasions. Semi-automatic fire
	20	2	Automatic fire
T25, Serial No. 15	20	4	Semi-automatic fire
	20	1	Automatic fire
			Trigger difficult to operate.
M1, Serial No. 3830493	1	1	Second round could not be chambered.
M1, Serial No. 3835151	1	1	Second round could not be chambered.

TEST VI

Complete data on the mud test are included in the function reports attached as Appendix E. There follows a summary of results.

EM2, Serial No. 6	20	0	Semi-automatic fire
			Trigger did not return freely to forward position.
	20	0	Automatic fire
EM2, Serial No. 8	20	0	Semi-automatic fire
	20	0	Automatic fire

[redacted]

[redacted]

RIFLE	ROUNDS FIRED	NUMBER OF MALFUNCTIONS	REMARKS
FN, Serial No. 6	15	3	Stoppages occurred on last 3 rounds fired. Semi-automatic fire
It was impossible to feed a round from a clean magazine after the above firing.			
FN, Serial No. 7	20	1	Semi-automatic fire
	20	0	Automatic fire
T25, Serial No. 14	10	11	Satisfactory operation on first 3 round Semi-automatic fire
Bolt could not be operated by hand.			
T25, Serial No. 15	6	4	Satisfactory operation on first 3 round
Clean magazine			
	3	5	
Bolt could not be operated by hand.			
M1, Serial No. 3830498	1	1	Failure occurred on second round and bolt could not be operated by hand.
M1, Serial No. 3035151	4	1	Bolt could not be operated by hand.

TEST VII

Complete data on the main test are included in the function reports attached as Appendix E. There follows a summary of results.

EM2, Serial No. 6	600	25	Seven failures of the bolt to go forward due to a faulty magazine.
The breech block was difficult to operate by hand at the end of the firing.			
EM2, Serial No. 8	179	2	

The sear spring moved out of position causing binding on the body. The piston was badly burred at point of contact with piston catch. The piston was replaced. Burrs were removed inside body at points of contact with locking levers.

Retest of rifle EM2, Serial No. 8

108	14	Improper assembly of the rifle caused 10 failures to eject.

It was impossible to retract the breech block due to a broken sear being wedged between the block and body. Rifle withdrawn from test.

[redacted]

[redacted]

RIFLE	ROUNDS FIRED	NUMBER OF MALFUNCTIONS	REMARKS
FN, Serial No. 6	600	11	Broken hammer caused 1 failure. Part replaced.
FN, Serial No. 7	600	18	Broken hammer caused 1 failure. Part replaced.
			It was impossible to retract the bolt by hand after the failures to feed.
T25, Serial No. 14	600	3	
T25, Serial No. 15	600	220	No malfunctions in first 320 rounds. Necessary to close bolt by hand on 67 occasions after clearing stoppage.
			On disassembly it was noted that the operating slide was binding on the stock (caused by the expansion of the wood due to water). The stock was relieved to permit free operation of the slide and a retest made.
	600	2	Retaining lug broke on trigger housing permitting part to drop out of position. Part replaced.
M1, Serial No. 3830498	577	94	Impossible to retract bolt by hand after last failure.
M1, Serial No. 3835151	449	41	Impossible to retract bolt by hand after last failure.

TEST VIII

Complete data on the grenade test are attached as Appendix G. There follows a summary of results.

RIFLE	RANGE	REMARKS
		Without Auxiliary Cartridge
EM2, Serial No. 6	731	(Average for 6 having normal flight). Three stabilizer tubes ruptured and 1 fin was lost in flight.
EM2, Serial No. 8	668	(Average for 3 having normal flight). Seven stabilizer tubes ruptured.

[redacted]

[redacted]

RIFLE	RANGE	REMARKS
FN, Serial No. 6	723	(Average for 9 having normal flight). One fin lost in flight.
FN, Serial No. 7	708	
T25, Serial No. 14	617	
T25, Serial No. 15	589	
		With Auxiliary Cartridge
T25, Serial No. 14	955	(Average of 9).
T25, Serial No. 15	911	(Average for 9 having normal flight) One fin lost in flight.

TEST IX

Complete data on the elevation firing are included in the function reports attached as Appendix E. There follows a summary of results.

	NUMBER OF MALFUNCTIONS			
	+80°		0°	
RIFLE	SEMI	AUTO	SEMI	AUTO
EM2, Serial No. 6	0	4	5	10
EM2, Serial No. 8	1	1	0	11
FN, Serial No. 6	1	2	1	*2
FN, Serial No. 7	5	3	2	0
T25, Serial No. 14*	1	0	2	0
T25, Serial No. 15	2	1	2	2

*Small piece broken from cover. Cover was replaced.

* 120 rounds were first fired using a small gas port. Due to excessive malfunctions the test was refired using the large port. Results listed are for the retest.

[redacted]

[redacted]

TEST X

Complete data on the accuracy test are attached as Appendix H. There follows a summary of results.

AUTOMATIC FIRE

Figures are averages of 3 20-round targets by each of 3 riflemen . Measurements are given in inches.

RIFLE	EVD	EHD	ES	SCORE
		Prone Position		
EM2, Serial No. 6	31.08	29.99	40.17	90
FN, Serial No. 7	33.90	39.73	46.34	89
T25, Serial No. 14	33 shots missed 10' x 12' target			64
		Bench Rest		
EM2, Serial No. 8	11.24	12.57	15.15	100
FN, Serial No. 6	12.17	17.54	18.84	99
T25, Serial No. 15	20.26	22.05	26.33	97

SEMI-AUTOMATIC FIRE BEFORE ENDURANCE TEST

Targets obtained at 100, 300 and 600 yards simultaneously. Figures are averages of 3 10-round targets by each of 3 riflemen from bench rest.

Measurements are given in inches.

RIFLE	MR	MVD	MHD	EVD	EHD	ES
			100 Yard Targets			
EM2, Serial No. 6	1.64	1.21	.91	5.42	3.97	5.92
EM2, Serial No. 8	1.67	1.21	.92	4.97	4.03	5.76
Average	1.66	1.21	.92	5.20	4.00	5.84
FN, Serial No. 6	3.19	2.45	1.55	10.30	6.81	11.39
FN, Serial No. 7	3.28	2.98	.89	10.57	3.91	11.17
Average	3.24	2.72	1.22	10.44	5.36	11.28
T25, Serial No. 14	1.53	1.07	.82	4.16	3.59	5.05
T25, Serial No. 15	1.27	.94	.68	3.73	2.57	4.27
Average	1.40	1.01	.75	3.95	3.08	4.66

[redacted]

[redacted]

RIFLE	MR	MVD	MHD	EVD	EHD	ES
			300 Yard Targets			
EM2, Serial No. 6	4.99	3.65	2.70	16.26	11.83	17.58
EM2, Serial No. 8	5.12	3.78	2.71	15.26	12.39	17.50
Average	5.06	3.72	2.71	15.76	12.11	17.54
FN, Serial No. 6	5 shots missed target					
FN, Serial No. 7	9 shots missed target					
T25, Serial No. 14	4.65	3.19	2.59	12.73	10.58	14.70
T25, Serial No. 15	3.84	2.78	2.16	10.93	8.46	12.41
Average	4.25	2.99	2.38	11.83	9.52	13.56
			600 Yard Targets			
EM2, Serial No. 6	10.47	7.76	5.32	34.31	23.29	36.47
EM2, Serial No. 8	11.14	8.61	5.44	35.36	25.16	40.01
Average	10.81	8.19	5.38	34.84	24.23	38.24
FN, Serial No. 6	10 shots missed target					
FN, Serial No. 7	10 shots missed target					
T25, Serial No. 14	9.58	6.49	5.68	25.10	23.35	30.25
T25, Serial No. 15	7.92	5.71	4.51	22.96	18.21	26.00
Average	8.75	6.10	5.10	24.03	20.78	28.13

AFTER ENDURANCE TEST

Targets at 100 yards only. Figures are averages of 3 targets by each of 3 riflemen from bench rest.

Measurements are given in inches.

EM2, Serial No. 6	1.63	1.19	.86	5.21	3.86	5.89
EM2, Serial No. 8	1.86	1.35	1.37	5.15	4.08	6.67
Average	1.75	1.27	1.12	5.68	3.97	6.28
FN, Serial No. 6	2.31	1.90	.97	8.16	3.85	8.88
FN, Serial No. 7	2.37	2.00	.93	8.60	3.64	8.86
Average	2.34	1.95	.95	8.38	3.75	8.87
T25, Serial No. 14 With Original Stock	1.53	1.03	.74	4.55	2.73	4.87
T25, Serial No. 14 With Replacement Stock	1.67	1.21	.87	4.53	3.52	5.14
T25, Serial No. 15	1.49	1.07	.82	4.23	3.36	4.96
Average	1.56	[redacted]	.81	4.44	3.20	4.99

[redacted]

[redacted]

COMBAT ACCURACY TEST

Figures are averages of 15 targets (1 by each of 3 riflemen under each of 5 conditions).

Measurements are given in inches.

RIFLE	AVERAGES MEAN FROM NORMAL C.I.	MR	ES	EXTREME SHOT TO NORMAL C.I.
EM2, Serial No. 6	6.40	1.81	5.80	14.90
EM2, Serial No. 8	3.58	1.65	5.67	13.43
Average	4.99	1.73	5.74	14.17
FN, Serial No. 6	6.44	2.06	7.05	19.53
FN, Serial No. 7	5.39	2.31	7.84	14.50
Average	5.92	2.19	7.45	17.02
T25, Serial No. 14	3.83	1.54	4.84	9.75
T25, Serial No. 15	3.68	1.47	4.86	8.60
Average	3.76	1.51	4.85	9.18

TEST XI

Complete data on weapon performance during the endurance test are included in the function reports attached as Appendix E. Velocity data are attached as Appendix I. There follows a summary of results.

FIRST RIFLE SUBJECTED TO TEST

	RIFLE EM2, No. 6	FN, No. 7	T25, No. 14
Modifications made during test	1	5	0***
Broken parts replaced during firing cycle	4	0	1
Broken or damaged parts replaced between firing cycles	7	0	3***
Malfunctions	58****	74*	249
Average velocity drop (fps)	13	45	11
Average accuracy (MR at 100 yards) before test	1.64	3.28	1.53
Average accuracy (MR at 100 yards) after test	1.63	2.37	1.53**
Increase in headspace	.009"	.002"	.001"

* Only 14 malfunctions occurred in last 4800 rounds.
** Results with same stock as in original test.
*** Does not include magazines.
**** Includes 1 failure due to defective round.

[redacted]

SECOND RIFLE SUBJECTED TO TEST

	RIFLE		
	EM2, No. 8	FN, No. 6	T25, No.
Modifications made during test	0	0	2**
Broken parts replaced during firing cycle	4	2	0
Broken or damaged parts replaced between firing cycles	7**	0	0**
Malfunctions	72****	35***	76*
Average velocity drop (fps)	50	37	(32 fps increase
Average accuracy (MR) before test	1.67	3.19	1.27
Average accuracy (MR) after test	1.86	2.31	1.49
Increase in headspace	.012"	.001"	None

* Sixty-five failures occurred in firing 360 rounds with rifle held in various abnormal ways.
** Does not include magazines.
*** Nineteen failures occurred in firing 360 rounds with rifle held in various abnormal ways.
**** Two failures caused by defective rounds.

TEST XIII

Photographs of the flash test are attached as Appendix J. The following observati were made when firing 20 rounds semi-automatic fire from each rifle in a completely dar range:

EM2 (No Flash Hider Supplied)

The flash was small, orange in color, and oval shaped with a large number of sparklers.

FN Without Flash Hider

The flash was larger than that resulting on firing the EM2 and it was orange in color with a large number of sparklers in the forward direction. Some flash and sparkle were seen at the breech.

FN With Flash Hider

A large number of sparklers but no appreciable flash was noted. Some flash and sparklers were seen at the breech.

T25 Without Flash Hider

The flash was not as large as that resulting on firing the M1 rifle. It was bell shaped, red in color with a white center, and there were some sparklers in a forward direction. No flash was seen on one round and on another round one sparkler was seen.

T25 With Flash Hider

The flash was irregular, dull in color, and there were some sparklers in a forward direction. One sparkler was seen at the breech.

M1 Without Flash Hider

The flash was red in color with a white center and oval shaped with some sparklers.

M1 With Flash Hider

The flash was dull in color with some sparklers and not appreciably greater than that resulting when firing the T25 with a flash hider.

TEST XIV

Complete data on the cold test are included in the function reports attached as Appendix E. There follows a summary of results.

RIFLE	ROUNDS FIRED	NUMBER OF MALFUNCTIONS	REMARKS
EM2, Serial No. 6	20	2	Rifle fired semi-automatic without lubricant.
	6	6	Rifle fired automatic without lubricant. Breech block difficult to retract.
	0	10	Attempts were made to fire 5 rounds semi-automatic fire with the rifle lubricated with aircraft instrument lubricating oil.
	20	0	Fired semi-automatic with the rifle lubricated with oil mixture supplied by the UK.
	20	0	Fired automatic with the rifle lubricated with oil mixture supplied by the UK.

RIFLE	ROUNDS FIRED	NUMBER OF MALFUNCTIONS	REMARKS
EM2, Serial No. 7	20	1	Fired semi-automatic with the rifle lubricated with "M" oil.
	20	0	Fired automatic with the rifle lubricated with "M" oil.
EM2, Serial No. 8	20	0	Rifle fired semi-automatic without lubricant.
	20	1	Rifle fired automatic without lubricant.
	4	7	Attempts were made to fire 5 rounds semi-automatic fire with the rifle lubricated with aircraft instrument lubricating oil.
FN, Serial No. 4	20	1	Fired semi-automatic with the rifle lubricated with oil mixture supplied by the UK. Twelve attempts were made before round was chambered. Fifteen unsuccessful attempts were made to chamber a round after subjecting the rifle, lubricated with oil mixture supplied by the UK, to the cold room for 3 additional hours.
FN, Serial No. 6	5	8	Rifle fired semi-automatic without lubricant. Difficult to operate bolt. The rifle could not be fired after being lubricated with aircraft instrument lubricating oil.
	20	1	Fired semi-automatic with the rifle lubricated with "M" oil. Nine attempts were made before round was chambered.
	20	0	Fired automatic with the rifle lubricated with "M" oil.
FN, Serial No. 7	5	7	Rifle fired semi-automatic without lubricant. The rifle could not be fired after being lubricated with aircraft instrument lubricating oil.

[redacted]

RIFLE	ROUNDS FIRED	NUMBER OF MALFUNCTIONS	REMARKS
T25, Serial No. 10	5	5	Fired semi-automatic with the rifle lubricated with oil mixture supplied by the UK. All feeding was manually assisted.
T25, Serial No. 14	5	5	Rifle fired semi-automatic without lubricant.
	5	5	Fired semi-automatic with the rifle lubricated with aircraft instrument lubricating oil.
	20	0	Fired semi-automatic with the rifle lubricated with "M" oil.
	2	2	An attempt was made to fire automatic with the rifle lubricated with "M" oil. The bolt would not push the round from the magazine.
T25, Serial No. 15	5	5	Rifle fired, semi-automatic without lubricant.
	4	6	It was attempted to fire 5 rounds semi-automatic with the rifle lubricated with aircraft instrument lubricating oil.
M1, Serial No. 3830498	16	0	Rifle lubricated with aircraft instrument lubricating oil.
M1, Serial No. 3835151	16	0	Rifle lubricated with aircraft instrument lubricating oil.

TEST XV

Complete data on the sea water immersion test are included in the function reports attached as Appendix E. There follows a summary of results.

EM2, Serial No. 6	40	6	
EM2, Serial No. 8	40	4	Necessary to actuate trigger several times before round was fired.

[redacted]

[redacted]

[redacted]

RIFLE	ROUNDS FIRED	NUMBER OF MALFUNCTIONS	REMARKS
FN, Serial No. 6	40	2	
FN, Serial No. 7	40	7	Change lever could not be rotated to "Auto" position by hand.
T25, Serial No. 14	40	0	
T24, Serial No. 15	40	0	

TEST XVI

Complete data on the salt spray test are included in the function reports attached as Appendix E. There follows a summary of results.

Salt Spray Test

EM2, Serial No. 6	20	8	Failures occurred in automatic fire.
EM2, Serial No. 8	20	1	Failure occurred in automatic fire.
FN, Serial No. 6	20	0	
FN, Serial No. 7	20	0	
T25, Serial No. 14	20	1	
T25, Serial No. 15	20	0	

Salt Water Immersion

EM2, Serial No. 6	20	0	
EM2, Serial No. 8	16	2	Test discontinued due to a broken sear.
FN, Serial No. 6	20	2	Two rounds were damaged in feeding.
FN, Serial No. 7	20	0	
T25, Serial No. 14	20	0	
T25, Serial No. 15	20	2	

TEST XVII

Deleted by working committee.

TEST XVIII

Complete data on the rifles when fired without lubricant are included in the function reports attached as Appendix E. There follows a summary of results.

EM2, Serial No. 6	40	3	
EM2, Serial No. 8	40	0	
FN, Serial No. 6	40	44	Bolt difficult to retract after [redacted] rounds.

[redacted]

[redacted]

RIFLE	ROUNDS FIRED	NUMBER OF MALFUNCTIONS	REMARKS
FN, Serial No. 7	40	16	
T25, Serial No. 14	33	25	Bolt failed to push round from magazine after malfunction on several occasions.
T25, Serial No. 15	40	42	Bolt difficult to operate.

TESTS XIX and XX Transferred to Ammunition Test.

C. OBSERVATIONS

1. An inadequate amount of development prior to submitting the rifles for test is indicated by the large number of malfunctions and broken parts occurring in all models in this test. Modifications made on several weapons during the test resulted in improved performance. However, an accurate evaluation of the operating principles of the different models on the basis of these test results is impossible as the best performance was not obtained. The test results do show the weak points of various features incorporated on the different models when subjected to different conditions. The rifles should be given a field test before a final evaluation of many features is made. Each model submitted for test had several desirable features not found on the other models but no model was free from undesirable features.

2. The EM2 rifle has the advantages of in-line recoil, a short overall length with a normal length barrel, a convenient means for carrying, a well designed and constructed magazine, a means of protecting the operating parts from foreign matter, and a design which permits convenient field stripping. In field tests the sight may prove to be advantageous over conventional sights. Undesirable features on this rifle are: A design for firing from the right shoulder only, a complicated breech block assembly which gave excessive malfunctions and breakages, a poorly designed cocking handle, an unprotected gas cylinder, a large number of parts many of which are not conveniently disassembled or fail to stay in assembly during firing, an undesirable trigger pull, and a front grip design which caused a large change in the center of impact when firing under various conditions.

a. Desirable Features

(1) The recoil on the EM2 is taken up in a straight line with the bore permitting maximum stability during firing. This was demonstrated in the automatic accuracy test in which this rifle gave the best performance of the 3 models tested. In accomplishing this feature the gas system is placed on top of the barrel permitting access to the operating parts and greater support in the grip.

[redacted]

(2) The design, which eliminates the need for a butt stock, has an overall length much less than the conventional rifle. The rifle, which is 4 inches shorter than the FN and 8.5 inches shorter than the T25, would be advantageous for use in vehicles or close quarters. However, this design necessitates a type of sight as supplied with this model, for maximum accuracy. The sight and bracket provide a convenient handle for carrying the weapon.

(3) The magazine is well designed and constructed permitting rapid magazine change with a minimum number of failures due to feeding. The magazine is supported in the rifle at both the front and rear permitting maximum support with a minimum of wear. The magazine is also equipped with a charger. However, the magazine must be removed from the weapon for charging. The magazine is located in a convenient position for the rifleman. The feature which permits the block to close automatically on inserting a loaded magazine eliminates a movement by the rifleman. The magazine catch is conveniently located and proved dependable.

(4) The ejection opening cover undoubtedly attributed to the superior performance of the rifle in the mud and dust tests. There are few openings which permit access of foreign matter to the operating parts.

(5) The design of the operating parts and the butt assembly permit convenient field stripping for cleaning. However, on one occasion (in the "cook-off" test) the butt assembly became accidentally disassembled in firing. A damaged spring guide resulted. A modification of the catch spring would eliminate the possibility of this occurrence.

b. The sight should be given a thorough field test under all conditions before an evaluation is made. In the accuracy tests the sight proved desirable. It was removed from the weapon in the abuse tests and its value when used under adverse conditions was not determined. The field of view may prove to be too small when firing at moving targets. For this reason it might be advantageous to increase the diameter of the tube. This could be accomplished without making the sight too large to be used as a handle. No means were provided by which quick and accurate adjustments could be made for "zeroing". As each individual rifleman can be expected to require a different sight adjustment, it will be necessary to use "hold-off" in firing. In doing this, maximum accuracy can not be obtained.

c. Undesirable Features

(1) The rifle cannot be safely fired from the left shoulder due to the ejection opening being at a point where the rifleman's face would normally be placed. This feature would prevent the rifle from being a standard issue to all troops.

(2) The complicated breech block assembly gave excessive malfunctions and breakages. Photographs numbers A61185, A61187 and A61188, attached as Appendix F show some of the parts which failed in the test. The rearward movement of the recoiling parts was rapid and probably contributed to the breakage of parts. The fired

cases were ejected about 20 feet. The most common malfunction was a failure to fire, occurring most frequently in automatic fire. A small indent in the primer showed that a light blow of the firing pin was the cause of this failure. The breech block assembly is so designed that the firing pin is disengaged from the sear on the forward movement of the block. If there is a sufficient delay in the forward movement of the recoiling parts, the firing pin spring expends its energy in forcing the sleeve forward. The sleeve in turn forces the locking levers into position. Consequently a failure to fire results.

(3) Several riflemen received uncomfortable burns on the cocking handle when they attempted to clear stoppages during the endurance test. Gloves were worn by the rifleman in the "cook-off" test to prevent this. The cocking handle is attached to the piston near its forward end. The piston, and consequently the handle, becomes very hot on firing. The handle was provided with a cover but this cover broke off during firing.

(4) The gas cylinder is exposed and it is possible for the rifleman to receive burns on contacting it during firing. An additional piece of wood has been placed on the grip in order to keep the rifleman's hands off the cocking handle and gas cylinder during normal firing. When firing from the hip or when carrying the rifle with a hot barrel there is inadequate protection.

(5) The rifle has a large number of parts (133 without including the parts in the sight assembly). It will be noted that in Test III that approximately twice as much time was required for complete disassembly and assembly than was required for similar operations on the other 2 models tested. Many of the parts are pins which are peened or staked in position after assembly. Several times during the test, pins or screws became disassembled during firing.

(6) The trigger mechanism is complicated and the trigger pull is undesirable. Due to the trigger mechanism being some distance forward of the breech block assembly, 2 levers, the tripping lever and the sear lever, were used to operate between the trigger and sear. The sear was located on the breech block. The large number of moving parts creates points of friction and results in a heavy irregular trigger pull. The average pull taken before the test was 11.2 pounds and 7.4 pounds after the endurance test. The weight of pull was irregular depending on the rate of pressure applied to the trigger. In order to reduce the pull to near the minimum the trigger spring was adjusted to give a light pressure against the trigger. In the abuse tests this pressure was insufficient to properly return the trigger to the forward position in many instances. The trigger assembly adjustment was critical. An adjustment which did not permit the trigger to move to the rear sufficiently would prevent disengagement of the sear from the firing pin. When the trigger was permitted to move too far to the rear, the sear lever was raised sufficiently to cause interference with the end of the sear.

[redacted]

(7) The accuracy obtained with this rifle does not compare favorably with that obtainable in manually operated service rifles nor was it as good as that obtained in the T25 rifle even with any advantage gained by the use of an optical sight.

(a) The average of 36 targets fired with 2 rifles (9 before and 9 after the endurance test with each rifle) was 6.06 inches extreme spread at 100 yards. The firing was conducted by 3 riflemen whose ability is well known in competitive shooting. The firing was done from a bench rest to assure a minimum aiming error. An aiming error of about one inch per 100 yards can normally be expected when using metallic sights of good design.

(b) The results of the ammunition test, reported in the Ninth Report of Project No. TS2-2015, show that the ammunition was of poor quality. This was probably the most important factor causing the large dispersion. When using ammunition lot number 19A (mild steel core ball) which was used in the light rifle test, the average mean radius was 9.76 inches and the average extreme spread 32.45 inches for 5 targets from each of 2 test weapons when fired from a machine rest at a range of 600 yards. For a comparison, 5 targets fired from one test weapon using a lot loaded with a 130 grain lead core bullet gave an average mean radius of 6.31 inches and an extreme spread of 21.02 inches. The dispersion with the lead core bullet was about 30 percent less than with the mild steel core bullet.

(c) An additional accuracy test, the complete results of which are included in Appendix H, was conducted at 100 yards to obtain a comparison of the accuracy obtained with the 2 types of ball bullets when fired in the EX2 rifle. The average extreme spread for 5 targets fired from a bench rest by one rifleman using one rifle was 5.32 inches when using the mild steel core bullet and 4.31 inches when using the lead core bullet. This improvement in accuracy is appreciable.

(d) A large change in the center of impact was noted when the rifle was fired under various conditions simulating those encountered by the combat rifleman. The combat accuracy test, fired at 100 yards, shows that the average center of impact with 2 rifles and 3 riflemen was 6.42 inches lower when firing from the prone position using a sling than when firing from a bench rest without a sling. On firing from a hot barrel (barrel heated by firing 60 rounds at a rate of between 15 and 20 rounds per minute) the center of impact of one rifle moved an average of 1.53 inches to the right and .97 inch above the normal center of impact and the other rifle moved an average of 1.06 inches to the right and 8.79 inches below the normal center of impact. This indicates that the rifle is sensitive to changes in barrel temperature and that individual weapons perform in a different manner. The center of impact when firing rifle serial number 6 from the prone position using a sling and with a hot barrel, moved an average of 1.79 inches to the right and 11.27 inches below the normal center of impact. When fired by one rifleman this rifle moved 2.75 inches to the right and 12.65 inches below his normal center of impact. The extreme shot when firing 50 rounds under various conditions was 14.9 inches from the normal center of impact. The center of impact of the normal bench rest group was used as the normal

[redacted]

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center of impact. With a minimum aiming error one could expect to keep all shots in a circle approximately 30 inches in diameter at 100 yards. When using this combinat of rifle and ammunition, not all of the shots could be expected to hit a man-sized target at 100 yards.

(e) The front grip design is probably the cause for the large center of impact change. Two brackets are solidly attached to the barrel to support the front grip. The grip is screwed tightly to these brackets and no allowance is made for barrel expansion. The front grip on both rifles tested broke out at the rear of the short grip screw. Photograph A61188 (Appendix F) shows a long grip screw broken during firing. The long grip screw loosened and fell out during firing on several occasions. During the accuracy test a change in the center of impact of the group being fired was noted when the long grip screw loosened.

(f) The breech block assembly is designed to permit considerable free forward movement after the locking levers are pushed out into the locking recesses in the body. This feature is not considered to be good from the accuracy view point. The cartridges are permitted to be crushed in various amounts, depending upon the velocity of the recoiling parts on forward movement. The recoiling parts will have less energy in feeding the first round from the magazine as the friction caused by the compressed magazine spring must be overcome. The last round in the magazine will be crushed a greater amount as less energy is required to push that round from the magazine and consequently the recoiling parts go forward with greater velocity. The affect would be the same as excessive headspace.

d. Photographs A61207 and A61242 attached as Appendix F show examples of ammunition casualties occurring in the EM2 rifle.

(1) A large number of the fired cases showed considerable flow of primer metal into the firing pin hole and on several occasions punch-outs occurred.

(2) The case which gave the blown primer and the case which gave the punch-out in the primer (photograph A61242) were given a hardness test. The average Rockwell "B" value for 2 normal caliber .280 cases at a point just ahead of the extract groove was 72 as compared with 48 for the case giving the blown primer and 45 for the case giving the punch-out. There was a considerable flow of brass into the extractor cut on both of these cases. The average reading on 3 normal T104 cases taken at the same point was 83.

(3) Ten M1[illegible] grenade tubes ruptured during the grenade test due to a poorly designed launcher. [illegible]e rifleman was injured on one occasion; a fragment from the tube cut him in the leg. Photograph A61207 shows examples of ruptured tubes.

3. The FN rifle has the advantage of a well designed and constructed operating mechanism which has a small number of parts and permits easy disassembly and assembly. Undesirable characteristics of this weapon are poor accuracy, poor stock and hand guard design, short sight radius, low line of sight, poorly located change lever and magazine catch, inadequate means of manual operation, exposed gas cylinder, gas escapage in line of aim, and heavy trigger pull.

a. Desirable features

The operating mechanism in this rifle, which is quite similar to that of the Russian Tokarev, is well designed. It gave the best performance of the 3 models in the endurance test and it permitted faster and more complete disassembly and assembly.

b. Undesirable Features

(1) The modifications from the Tokarev result in a heavier and more complicated rifle. The feature of the trigger housing being pivoted at its forward end does permit rapid disassembly of the bolt assembly but it also adds to the weight and number of parts in the weapon. On the Tokarev a rapid means of disassembling the bolt assembly is made possible by cuts in the receiver which permit the assembly to be lifted out vertically. The feature of the operating spring being placed in the stock of the FN rifle, instead of in the receiver as on the Tokarev, further complicates the design of the rifle and adds to the number of parts.

(2) The most common stoppage when firing the FN was a failure to eject the fired case. Two things contributed to this stoppage. Insufficient recoil of the operating parts would not bring the fired case against the ejector with sufficien force to pivot it around the extractor to clear the weapon. This resulted in the case being caught by the bolt assembly on its return movement. The stamped cover also acts as a case deflector. The fired cases normally hit the ejector with sufficient force to be pivoted around the extractor and then hit the cover to be deflected in a downward and forward direction. If the case has not been pi ed far enough to the right it may be deflected into the path of the bolt asse ly on its forward movement. A modification of the cover would reduce the number of ilures to eject.

(3) The poor accuracy obtained with the FN rifle was large due to a change in the center of impact. When firing in a normal manner using a maga ne the center of impact moved progressively higher until the magazine was empty. A check of the accuracy test results shows that the vertical dispersion in most cases is between 2 and 3 times as great as the horizontal. Results of the additional accuracy test, included in Appendix H, show that when the weapon was loaded singly without a magazine, or when the magazine was refilled after each shot in order to fire the same round number from the magazine each time, this center of impact change was not apparent. It is apparent that this center of impact change is due to the relationship of the magazine with the receiver and barrel. Improved accuracy was noted after firing the endurance test. In the combat accuracy test, fired at 100 yards, the extreme shot was 19.53 inches from the normal center of impact with rifle serial number 6. Therefore, one would expect to keep the normal group in a circle approximately 40 inches in diameter at this range when firing under various conditions similar to those encountered by the combat rifleman.

(4) The stock and handguard design is poor. The riflemen firing the accuracy test experienced discomfort from contact with the improperly shaped stock. The low line of sight necessitated placing the face firmly against the stock in firing. The recoil was not taken up in a straight line as on the other 2 models tested; instead, there was an upward movement as when using a conventional stock. Due to this feature greater dispersion resulted in the automatic accuracy test than with the EM2. The sharp corners of the handguard caused discomfort in firing.

(5) The sight radius on the FN rifle is about 5 inches shorter than on the T25 rifle. This feature would permit a larger aiming error.

(6) The low line of sight is not a good feature for the following reasons:

(a) After firing a few rounds heat waves from the exposed gas cylinder, which is close to the line of aim, distort the view of the target. This results in a greater aiming error.

(b) The upward movement of the muzzle during firing obscures the target. A high line of sight would permit the target to remain in view with a normal upward movement during semi-automatic fire.

(c) A low line of sight prevents the use of an in-line stock.

(7) The change lever is located in such a position that it interferes with the finger of the rifleman during firing. In the early part of the test the change lever was accidentally moved from the automatic fire to the semi-automatic fire position during firing. Modified change levers were installed which did not move accidentally but these were found to be difficult to operate, especially in the abuse tests.

(8) The magazine catch, which is located between the trigger guard and the magazine, is inconvenient for rapid magazine change.

(9) The rifle is provided with a cocking handle similar to that used on the M1918 Browning automatic rifle. No means is provided for applying manual pressure to the forward movement of the bolt. Under normal conditions manual operation is not required but in several adverse conditions tests the rifle could not be fired because of this feature. The rifle could have been fired in many cases had a means of manual operation been provided.

(10) There is a possibility of the rifleman being burned on contact with the exposed gas cylinder which becomes very hot, especially during automatic fire.

(11) The escapage of gas from the gas cylinder during firing is undesirable. On each shot some gas escapes through a port and the gunner's view of the target is momentarily obscured. A modification which would permit this gas to escape to the side would eliminate this undesirable characteristic.

(12) The average trigger pull of 11.3 pounds for the 2 rifles tested is considered too great for accurate fire. Excessive vibration of the trigger during automatic fire was noted.

(13) There were few parts failures during the test. Photograph A61177, (Appendix F) shows the broken parts which caused stoppages. Photograph A61178 shows a crack in the receiver of rifle serial number 6. Both rifles fired in the endurance test developed cracks at this point. The cracks did not affect the functioning of the rifles. Failure in the design to include a fillet at the rear of the cocking handle guide caused the receivers to crack at this point.

4. The T25 rifle has the advantages of using a round giving approximately the same ballistics as the present U.S. service round, a simple and efficient locking mechanism, an in-line stock used with a high line of sight and a stabilizer for minimized recoil, and a long sight radius. Undesirable features on this rifle are: A deficient magazine system, top ejection of fired cases, a design which does not permit rapid removal of the bolt assembly, irregularity of the bolt position in automatic fire, an undesirable trigger pull, and a stock design which gave excessive breakage and probably contributed to a large center of impact change when firing under various conditions.

a. Desirable Features

(1) The strength and efficiency of the locking system used in this rifle was demonstrated in the endurance test. In firing a cartridge which gave approximately the same ballistics as the present service round and considerable more velocity for approximately the same bullet weight than in the caliber .280 round used in the other 2 rifle models in this test, no appreciable increase in headspace was noted during the firing of 6000 rounds in one rifle and a change of only .001 inch in the other rifle. This change was smaller than that in the other models in firing the same number of rounds.

(2) The stock design permits the recoil to be taken up in a direct line, and with the use of a stabilizer, the recoil and upward movement are minimized. This stock design necessitates a high line of sight which is advantageous for the following reasons:

(a) There is less interference in aiming due to mirage, caused by heat from the barrel, than when firing with conventional height sights.

(b) It is possible to keep the target in view during firing. In firing a conventional rifle the target is often obscured by the barrel during recoil.

(c) Due to a greater amount of elevation being required to bring the center of impact of the group up to the line of sights on this rifle, the result would be the same as a flatter trajectory in a rifle using conventional height sights.

The high line of sight does necessitate hinged sights which add to the total number of parts and introduces a possibility of increased mechanical error in aiming.

(3) The sight radius, which is about 5 inches greater than that on the FN rifle, would reduce the aiming error.

b. Undesirable Features

(1) The magazine system was responsible for a large percentage of the malfunctions which occurred in this rifle. During the endurance test all of the malfunctions except one, caused by a part breakage, were either failures to feed or failures of the bolt to remain at the rear. Failure of the bolt to have sufficient rearward travel did undoubtedly contribute to the failures to feed. However, the magazine system has much to be desired.

(a) The magazine catch is inconvenient to operate.

(b) The magazine is not properly supported. It is held in the magazine guard by the magazine catch which engages in an aperture on the right side of the magazine. There must be a tolerance between the magazine and the magazine guard to insure easy insertion of the magazine under all conditions. Therefore, the magazine is pivoted on the catch and there is considerable movement during firing, causing wear on the guard and receiver at points of contact.

(c) There is not sufficient support between the receiver and magazine guard. The guard is a part of the trigger housing assembly. This assembly is positioned by 2 lugs which fit into recesses in the receiver and the trigger housing pin. Several lugs were broken from the housing and the receivers were battered at points of contact with the lugs during firing.

(d) The magazine cannot be easily disassembled for cleaning. A tool must be inserted between the base and the tube and another tool inserted at the rear of the base in order to force the base out of assembly. There is danger of parts damage in disassembling the magazine.

(2) The fired cases are ejected up and to the rear. Most of the cases are deflected off the rear sight and may go forward or to the rear. Some of the cases go in front of the rifle, some hit the rifle, some hit the rifleman on the head, and others pass over his head. Many of the cases go some distance in the air. There is a possibility that these ejected cases might disclose the position of the rifleman under certain circumstances. When firing from the hip many of the cases would hit the rifleman in the face. The cases have sufficient velocity to cause injury to the rifleman.

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(3) In order to remove the bolt from the rifle it is necessary to first remove the stock assembly, trigger housing assembly, automatic fire assembly and cover. The average time required for field stripping this rifle was 39 seconds as compared with 13 seconds for the EM2 and 11 for the FN.

(4) In automatic fire the bolt may remain at the rear or go to the closed position after a burst. If the bolt stays at the rear, an exceptionally heavy trigger pull is required to fire the next burst. The average trigger pull from the open bolt position was 20 pounds and from the closed bolt position 8 pounds, on the 2 rifles fired in the endurance test. The difference in trigger pull from the 2 positions tends to confuse the rifleman. The 8 pound trigger pull is too heavy for best results in semi-automatic fire.

(5) The extremely light stock gave poor endurance. Photographs A61203, A61204 and A61206 (Appendix F) show examples of stock failures. The stock forearm is cut away on the inside to permit free operation of the operating slide. As the gas system is on the underside of the barrel, the barrel cannot be fitted to the stock. The escaping gas from the gas cylinder eroded the stock and caused discomfort on the bare hand of the rifleman.

(6) A large center of impact change was noted when firing the rifle under various conditions similar to those encountered by the combat rifleman. Rifle serial number 14, which showed a slightly greater change than rifle serial number 15, changed an average of .55 inch left and 2.98 inches lower when fired under normal conditions from the prone position with a sling than when fired from a bench rest. It changed an average of 1.17 inches left and 5.54 inches lower when fired with a hot barrel but using the same position. The average change from the normal center of impact was 1.46 inches left and 6.48 inches lower when fired with a hot barrel from the prone position using a sling. The extreme shot from the normal center of impact in firing 5 10-shot targets under various conditions by each of 3 riflemen was 9.75 inches. Therefore, a rifleman could expect to keep his normal group in a circle approximately 20 inches in diameter at 100 yards when firing under various conditions similar to those encountered by the combat rifleman. The light-weight barrel and the extremely light stock and the relationship of these parts to the receiver is probably the most important factors to affect the accuracy and center of impact change.

(7) Although the center of impact change was the main cause for the large dispersion obtained with this rifle, the groups obtained under favorable conditions were not as good as those which could be obtained with manually operated service rifles. Considerable free movement was noted in both the front and rear sights. The following measurements of free lateral movement were obtained by the Physical Test Laboratory at this station:

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RIFLE SERIAL NUMBER	SIGHT	
	REAR	FRONT
14 (Previously fired 6623 rounds)	.0125"	.0095"
15 (Previously fired 395 rounds)	.012"	.0055"

The error in rifle serial number 14 would permit a maximum error of approximately 3 inches at 100 yards. It is improbable that this error did occur in any target but this did undoubtedly increase the dispersion appreciably. The normal bench rest accuracy would probably have been good had this free movement in the sights not been present.

c. Any advantage of the operating system used in the T25 rifle over conventional systems was not apparent in this test. The rifle appeared to be even more critical as to the size of gas port used than did the systems used on the other models tested. In theory, the operating power is derived from a "gas cutoff and expansion system" whereby a metered quantity of gas is bled from the barrel, trapped, and allowed to expand in a unique gas cylinder and piston arrangement. There is a possibility that the time required for the gas to enter the chamber and move the piston and operating slide in order to cutoff the gas would be considerable longer than the duration of high pressure within the barrel. If this be true the system would operate in a similar manner to that of the conventional.

d. Each of the 2 T25 rifles, subjected to the endurance test, fired a round when the bolt was closed on a chambered round. These malfunctions occurred in the velocity test with the change lever on the "REPEAT" position. Several similar malfunctions occurred in the ammunition test in rifle serial number 10 but here the malfunctions were attributed to a broken front firing pin. A test was conducted to investigate the cause of this malfunction in a rifle in good mechanical condition. A cartridge was seated in the chamber of a rifle without a magazine and the bolt closed on it in a normal manner. After 25 bolt closures the indent in the primer caused by the inertia of the front firing pin was .017 inch. This shows a possibility of a round being fired on closure of the bolt due to firing pin inertia.

5. A true comparison of the rifles subjected to this test is not possible due to the different cartridges used. The average muzzle energy of the T104 round when fired in the T25 rifle was approximately 2300 foot pounds as compared with an average of 1605 foot pounds for the mild steel core ball round when fired in the EM2 rifle and 1635 foot pounds when fired in the FN rifle. It can be seen that the weight, size, endurance and performance would all be affected by the cartridge size. It is reasonable to assume that the T25 rifle can be modified to use a round having similar ballistics to the caliber .280 used in this test, but unreasonable to expect the other 2 models to be converted to use the caliber .30, T104 cartridge without a major redesign which would result in an increase in size and weight.

6. A greater number and more complicated parts and an increase in weight are necessities in incorporating a full-automatic feature on rifles of this type. An increase in malfunctions and parts breakage can be expected. Photographs attached as Appendix F show damage to the rifle after several minutes of automatic fire. The rifles become uncomfortable to hold in less than one minute of automatic fire and the wood parts burst into flames in from 2 to 3 minutes of continuous firing. As results of tests conducted at Aberdeen Proving Ground, Quantico and Fort Benning show a decrease in the number of hits obtainable when using full-automatic fire as compared with semi-automatic fire in the same time interval, it would seem desirable to conduct various tests to thoroughly investigate the worth of this feature. Tests can be conducted to simulate any imaginable circumstance in which automatic fire would be used. The test can be fired with both semi and full-automatic fire and a comparison of results made. The elimination of this feature would simplify and expedite the development of a suitable lightweight rifle.

D. OBSERVERS

REPORTING DATE	NAME	REPRESENTING
3 February 1950	Capt. J. W. Moore	British Army
13 February 1950	Mr. F. K. Wolfe	Springfield Armory
14 February 1950	Brig. J. A. Barlow	British Army
	Maj. J. F. May	British Army
	Mr. A. W. Duneclift	British Army
	Mr. K. Januszenski	British Army
	Mr. R. W. Frost	British Army
	RSM A. J. Martin	British Army
	EQMS F. A. Herbert	British Army
	QMSI J. H. Thwaites	British Army
	QMSI D. T. Maber	British Army
	Maj. F. R. Milne	Canadian Army
	Capt. R. M. Mac Gibbon	Canadian Army
	Mr. R. A. M. Laloux	Fabrique Nationale
	Mr. D. J. Saive	Fabrique Nationale
	Lt. Col. A. Feldman	Springfield Armory
	Col. R. Studler	OCO, ORDTS
	Col. J. W. Hammond	OCO, ORDTS
	Brig. G. Morrison	Canadian Army
	Lt. Col. Maddox	Canadian Army
	Major J. T. Woolsey	Canadian Army
28 February 1950	Mr. R. Masco	Springfield Armory
	Mr. E. W. Kent-Lemon	Great Britian
2 March 1950	Mr. E. W. Harvey	Springfield Armory
3 March 1950	Lt. Col. Glenn C. Funk	U. S. Marine Corps
	Capt. H. Osborne	U. S. Marine Corps
	Lt. R. McGrew	U. S. Marine Corps
	Brig. R. C. M. King	British Army
	Brig. F. W. Gordon Hall	British Army
	Lt. Col. G. Kelly	British Army

[redacted]

REPORTING DATE	NAME	REPRESENTING
8 March 1950	Mr. A. C. Bonkemeyer	OCO, ORDTS
24 March 1950	Gen. Shoos-Smith	British Army
	Sir Alwyn Crowe	British Army
	Col. Butler	British Army
	Major Beale	British Army
28 March 1950	Major Miller	U. S. Air Forces
3 April 1950	M/Sgt. R. Hawkins	Frankford Arsenal
	Mr. A. Benson	Frankford Arsenal
17 April 1950	Mr. J. Kirk	Frankford Arsenal

IV CONCLUSIONS

A. A true comparison of the rifles could not be made since the T25 used a cartridge delivering approximately 40 percent more muzzle energy than that delivered by the other cartridge in the other rifles.

B. No model was sufficiently developed to give its best possible performance. Several modifications were made during the test which resulted in improved performance.

C. It was possible to evaluate certain features incorporated in the different models.

1. The EM2 rifle has the advantages of in-line recoil, a short overall length, a well designed magazine, an ejection opening cover, and a design which permits convenient field stripping. Undesirable features are, a design for firing from the right shoulder only, a complicated breech block assembly which gave excessive malfunctions and breakages, a poorly designed cocking handle, an unprotected gas cylinder, a large number of parts many of which are not conveniently disassembled or fail to stay in assembly during firing, an undesirable trigger pull, and a front grip design which caused a large center of impact change. The sight may prove advantageous over conventional sights in field tests.

2. The FN rifle has the advantage of a well designed operating mechanism which has a small number of parts and permits easy disassembly. Undesirable characteristics of this rifle are; poor accuracy, poor stock and handguard design, short sight radius, low line of sight, poorly performing change lever, poorly located magazine catch, inadequate means of manual operation, exposed gas cylinder, gas escapage in line of aim, and heavy trigger pull.

3. The T25 rifle had the advantages of using a round giving approximately the same ballistics as the present U. S. service round, a simple and efficient locking mechanism, an in-line stock used with a high line of sight and a stabilizer for minimized recoil, and a long sight radius. Undesirable features on this rifle are; a deficient magazine system, top ejection of fired cases, inconvenient disassembly of the bolt assembly from the rifle, irregularity of the bolt position in automatic fire, an undesirable trigger [redacted] and a stock design which gave excessive breakage and probably contributed to a large center of impact change.

[redacted]

[redacted]

V RECOMMENDATIONS

It is recommended that:

A. The rifles be subjected to field tests to find desirable and undesirable characteristics from the "users" standpoint.

B. The desirable features of all rifles tested be combined and incorporated in future models where possible.

C. In future rifle comparison tests the rifles be chambered for a common cartridge, or if this is impractical, the rifles be chambered for cartridges giving similar ballistics. This should be done before further comparison tests of any weapons and ammunition are made.

APPROVED:

C. F. COLLERAN
Director, Dev. & Proof Services

H. F. BIGELOW
Lt. Col., Ord. Dept.,
Chief, Arms & Am Div.

L. F. MOORE
WDJO, Proof Officer

[redacted]

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APPENDICES

APPENDIX A - Correspondence.

APPENDIX B - Parts Lists.

APPENDIX C - Photographs of Rifles and Accessories.

APPENDIX D - Data on Test II (Disassembly and Assembly).

APPENDIX E - Function Reports.

APPENDIX F - Photographs of Damaged Parts and Ammunition Casualties.

APPENDIX G - Test VIII (Grenade Test).

APPENDIX H - Test X (Accuracy Test).

APPENDIX I - Velocity Data.

APPENDIX J - Photographs.

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APPENDIX A

DIRECTIVE LETTER - O.O. 474/2 (c). APG (c) 474/21

WITH ENCLOSURES

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APPENDIX A

RECORD
ACBonkemeyer/bhy/3085

WAR DEPARTMENT
OFFICE OF THE CHIEF OF ORDNANCE
WASHINGTON, D.C.

O.O. 474/2(c)

APG (c) 474/21

ORDTS

3 February 1950

SUBJECT: Comparative Tests of Light Rifles
(Project TS2-2015, Priority 1-C)

TO: Commanding Officer
Aberdeen Proving Ground, Md.

1. Reference is made to file APG (c) 474.14 (O.O. 474/317 - C), basic dated 2 Nov 1949, and file APG 474.1/144 (O.O. 474/1388), regarding comparative tests of United States and United Kingdom lightweight rifles and ammunition. It is requested that necessary action be taken by the Proving Ground to conduct these tests.

2. It is understood that the Technical Test and the Phase II Ammunition Test will be conducted concurrently, and that an estimated time of one hundred sixty-eight (168) working days will be required for completion of the tests. It has been agreed by representatives of the United States and the United Kingdom that the tests will begin on 14 February 1950, and that the test material will be delivered to the Proving Ground prior to that date.

3. Copies of the agreement covering these tests and the detailed plans of tests are attached herewith for retention by the Proving Ground.

BY COMMAND OF MAJOR GENERAL FORD:

3 Incls
1. Cy of Agreement
2. Cy Phase II Ammunition Test
3. Cy Technical Test

/s/ RENE' R. STUDLER
Colonel, Ord Dept
Assistant

[redacted]

[redacted]

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[redacted]

(APPENDIX A)

14 Oct 49

STANDARD LIGHT AUTOMATIC RIFLE TEST

TEST I

a. The rifle shall be disassembled and an examination made of all working parts.

b. The number and names of all parts and the types of springs will be recorded, including weight of component parts and accessories.

c. The weight and length of the rifle will be recorded.

d. The rifle will be photographed in various conditions of assembly and disassembly.

TEST II

The time, also the number and kind of tools required for each of the following operations will be recorded.

a. To disassemble the rifle.

b. To assemble the rifle.

c. To dismount the breech and magazine mechanism with the exception of the bolt or block.

d. To assemble the breech and magazine mechanism with the exception of the bolt or block.

e. United States and United Kingdom representatives will repeat this test with each rifle under test.

This test will be carried out at beginning and end of the firings.

TEST III

Function fire the weapon 100 rounds to insure proper operation.

TEST IV

If the rifle is of such design that it fires full automatic from the open bolt and semi-automatic from the closed bolt or full automatic from the closed bolt, it shall be submitted to a test to determine minimum number of rounds which may be fired before sufficient heating of the chamber occurs to result in premature explosion of the cartridge. In this test

[redacted]

firing shall be conducted as rapidly as is feasible employing preloaded magazines. This phase of the program may be discontinued when it can be shown that the rapid firing of 500 rounds can be accomplished without danger of "cook-off" otherwise the point of "cook-off" (in number of rounds fired) shall be bracketed. This test to be carried out at or near the end of the program.

TEST V

With the rifle in the cleaned and lightly oiled condition. it will be subjected to the standard dust test in accordance with the program as described in the 299th report on Ordnance Program No. 5082 and fired semi-automatic. The Ll Rifle shall be fired as control.

TEST VI

With the rifle in the cleaned and lightly oiled condition, it will be subjected to the standard mud test in accordance with the program as described in the 299th report on Ordnance Program No. 5082 and fired semi-automatic. The Ll Rifle shall be fired as control.

TEST VII

The rifle will be given a standard rain test by directing a spray of water from rain test equipment on to the breech end. The gun is to be fired 300 rounds full automatic and 300 rounds semi-automatic, or until the rifle freezes, whichever shall occur first. Best methods and materials for lubricating the rifles under these conditions shall be determined. The Ml Rifle shall be fired as control.

TEST VIII

Ten (10) practice grenades will be launched with the butt of the rifles resting on firm ground. If an auxiliary grenade cartridge is provided, an additional ten (10) grenades will be launched using the auxiliary cartridge. The range obtained in each case will be recorded.

TEST IX

The rifle will be fired 160 rounds (80 semi and 80 full automatic) at elevation of +80° and 160 rounds (80 semi and 80 full automatic) at elevation of -80°. Half of the firing in each case will be done with the

rifle held loosely in the hands. The test will be repeated with rifle and ammunition at +125 F and -65 F. Cyclic rates will be determined with the rifle in the horizontal position at all three temperatures.

TEST X

The rifle will be fired for accuracy in accordance with the following:

a. Fire full automatic, prone position, range of 50 yards in bursts of 5 to 10 rounds, 3 targets of 20 rounds each per each of 3 firers. Firing will be for group only.

b. Fire semi-automatic, 3 targets of 10 rounds each at 100 yards, 3 targets at 300 yards, and 3 targets at 600 yards by an expert rifleman from bench rest. Firing will be for group only.

TEST XI

The rifle will be fired 6000 rounds for endurance, firing alternately 100 rounds, semi-automatic and 100 rounds full automatic. In semi-automatic fire the rate shall be at least 15 rounds per minute. The barrel will be cooled and parts oiled without disassembly after approximately each 100 rounds. The entire mechanism may be disassembled, cleaned, oiled, etc. after 600 rounds. All malfunctions, breakages and replacing of components will be recorded. The general working of the rifle will then be examined. The head space will be measured after each 1500 rounds of the test. Breech bore and head space readings will be taken before and after the endurance test. The instrumental velocity will be measured on 20 rounds, before and after the endurance test. Accuracy will be checked at the beginning and end of test. Of the 6000 rounds fired above:

a. 60 rounds will be fired, semi-automatic, with the gun held loosely in the hands.

b. 60 rounds will be fired, full automatic, with the gun held loosely in the hands.

c. 60 rounds will be fired, semi-automatic, with the gun held right side up and 60 rounds left side up.

d. 60 rounds will be fired, full automatic, with the gun held right side up and 60 rounds left side up.

[redacted]

(Appendix A)

29 Sep 49

TEST XIII

The rifle will be fired in the dark and the flash compared with that of the present standard weapon (US Rifle M1).

TEST XIV

The rifle will be cleaned, lightly oiled, and placed with loaded magazine in a cold room maintained at -65° F. for a twelve-hour period prior to firing. The rifle will be removed and an attempt made to fire it twenty rounds semi-automatically. The test will then be repeated when the rifle has been cleaned and left in a dry condition. If satisfactory semi-automatic functioning is attained, the tests will be repeated with the rifle set for full automatic operation.

TEST XV

Object

To determine the functioning of the rifles after immersion in sea water.

Method

The rifles will be prepared for this test as for Test VI.

The sea water bath with sand in suspension will be prepared by adding 10% of marine sand to 90% sea water by volume; this sand will be kept in suspension by the turbulence caused by releasing a jet of compressed air near the base of the tank.

Follow standard Ordnance procedure for mud test, modified as necessary.

TEST XVI

Object

To determine functioning of the rifles after being subjected to salt spray.

Method

Rifle and loaded magazine will be sprayed with salt water simulating sea water, for a period of 15 minutes with the bolt open and 15 minutes with the bolt closed. After standing for a period of one hour the rifle will be fired automatically ten rounds and semi-automatically ten rounds. Malfunctions and failures will be noted. The above will be repeated after 5 minutes immersion in salt water and 2 hours exposure to air.

[redacted]

53

[redacted]

(Appendix A)

29 Sep 49

TEST XVIII

Object

To determine what malfunctioning will be given when the rifles are fired without lubrication.

Method

Rifles of each type will be cleaned and all lubricant removed; these rifles will then each fire a total of 40 rounds, alternating 10 rounds in single shots and 10 rounds in short bursts. Malfunctions will be noted.

TEST XIX

Object

To determine the recoil energy and recoil velocity given by the subject rifle and ammunition.

Method

The subject rifles will be attached to a standard ballistic pendulum.

A series of five rounds will be fired from each subject rifle; the recoil energy and recoil velocity will be determined for each round fired.

TEST XX

Object

To determine the recoil energy and recoil velocity given by the subject rifle when firing grenades.

Method

The subject rifles will be attached to a standard ballistic pendulum.

A series of five 1½ lb grenades will be fired from each subject rifle; the recoil energy and recoil velocity will be determined for each grenade fired.

[redacted]

[redacted]

54

[redacted]

APPENDIX B

PARTS LISTS

11 Pages

[redacted]

[redacted]

[redacted]

(Appendix B)

PARTS LIST FOR RIFLE, LIGHTWEIGHT, CALIBER .280 E12

Part names correspond to numbers on Photograph Number A60690

1. Pin, hinge, cover
2. Catch, cover
3. Cover, ejection opening, assembly, consisting of:
   - Cover
   - Stud, catch, retaining
   - Stud, operating cover
   - Washer, stud, cover operating
   - Washer, stud, retaining catch
   - (Above 2 parts are similar)
4. Spring, cover, ejection, opening
5. Screw, sight, lateral adjustment locking
6. Shim, sight, lateral adjustment
7. Screw, sight, vertical adjustment locking
8. Shim, sight, vertical adjustment
9. Protector, unit sight
10. Sight, unit, assembly and mounts, ring (2)
    (Parts list for sight not available)
11. Screw, sight retaining
12. Same as Part 11
13. Pin, bracket, sight
14. Frame, unit sight, assembly, consisting of:
    - Bed
    - Frame
    - Screw, retaining bed
15. Barrel, gas cylinder and body group consisting of:
    - Barrel
    - Block, gas
    - Body
    - Bracket, casing, trigger
    - Bracket, sight
    - Cylinder, gas
    - Guard, body
    - Hinge, cover, ejection opening
    - Pins, block retaining (2)
    - Pin, bracket, sight
    - Pin, casing, trigger
    - Pin, retaining, gas cylinder
    - Studs, hinge, cover (3)

[redacted]

[redacted]

[redacted]

(Appendix B)

16. Pad, butt, assembly, consisting of:

    Pad
    Plate (bonded to pad)

17. Butt, assembly, consisting of:

    Butt
    Guide, return spring
    Loop, sling, butt (this part is formed welded and polished after assembly to butt)

18. Washer, butt
19. Screw, butt
20. Pin, catch, butt
21. Spring, catch, butt
22. Catch, butt
23. Ejector
24. Spring, ejector
25. Plate, ejector
26. Screw, ejector
27. Screw, retainer, breech block
28. Spring, retainer, breech block
29. Retainer, breech block
30. Spring, catch, magazine
31. Catch, magazine
32. Pin, catch, magazine
33. Pin, fixing, trigger casing
34. Plunger, pin, fixing
35. Spring, plunger, fixing pin
36. Cover, barrel
37. Grip, front, assembly, consisting of:

    Adapter, bipod
    Bush, grip screw (long)
    Grip
    Rivets, adapter, bipod (2)

38. Screw, grip, front, short
39. Screw, grip, front, long
40. Band, front, grip
41. Loop, sling, front
42. Screw, loop, sling, front
43. Spring, return
44. Piston
45. Handle, cocking, assembly, consisting of:

    Handle, cocking
    Guard

[redacted]

[redacted]

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[redacted]

(Appendix B)

46. Regulator, gas, assembly, consisting of:
    - Plunger
    - Regulator
    - Spring, plunger
47. Catch, piston
48. Spring, catch, piston
49. Lever, locking
50. Sleeve, pin, firing
51. Pin, firing, assembly, consisting of:
    - Body, pin, firing
    - Rivet, striker, retaining
    - Striker
52. Spring, pin, firing
53. Plug, end, breech block
54. Block, breech
55. Same as part 49
56. Sear
57. Spring, sear
58. Pin, extractor
59. Spring, extractor
60. Extractor
61. Spring, slide locking
62. Slide, loading, assembly, consisting of:
    - Pawl
    - Pin, pawl
    - Slide
63. Spring, pawl, slide
64. Platform, magazine
65. Case, magazine
66. Plate, magazine
67. Spring, magazine
68. Plate, retainer, magazine spring
69. Casing, trigger, assembly, consisting of:
    - Pin, trigger stop
    - Stud, change pin spring retaining
    - Stud, sear lever spring retaining
    - Studs, tripping lever spring retaining (2)
70. Bar, safety
71. Spring, change pin
72. Pin, change
73. Spring, lever, tripping
74. Lever, tripping
75. Nut, stop, trigger
76. Spring, plunger, trigger stop
77. Plunger, trigger stop

[redacted]

[redacted]

[redacted]

(Appendix B)

78. Stop, trigger
79. Spring, trigger
80. Trigger
81. Pin, trigger
82. Lever, safety
83. Pin, plunger, safety lever
84. Plunger, lever, safety
85. Spring, plunger, safety lever
86. Lever, sear
87. Pin, lever, sear
88. Spring, lever, sear
89. Grip, pistol
90. Screw, grip, pistol
91. Cover, trigger
92. Pin, guard, trigger
93. Guard, trigger
94. Screw, guard, trigger

[redacted]

[redacted]

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(Appendix B)

PARTS LIST FOR RIFLE, LIGHTWEIGHT, CALIBER .280 FN

Parts names correspond to numbers on Photograph Number A60692.

1. Plug, gas cylinder, assembly, consisting of:
   - Plug, gas cylinder
   - Plunger, gas cylinder
   - Retainer, plunger
   - Spring, plunger
2. Piston
3. Spring, piston
4. Lock, gas regulator
5. Cover, bolt
6. Slide, bolt, assembly, consisting of:
   - Pin, connecting rod
   - Plunger, connecting rod
   - Rod, connecting
   - Slide, bolt
   - Spring, connecting rod
7. Extractor, assembly, consisting of:
   - Extractor
   - Spring, extractor
8. Bolt
9. Pin, firing pin retaining
10. Spring, firing pin
11. Pin, firing
12. Swivel, front
13. Screw, front swivel
14. Screw, hand guard
15. Guard, hand, assembly, consisting of:
   - Bushing, left
   - Bushing, right
   - Guard, hand
16. Barrel and receiver, assembly, consisting of:
   - Barrel
   - Block, gas
   - Block, bolt locking
   - Bushing, gas cylinder
   - Collar, hand guard
   - Cylinder, gas
   - Handle, cocking
   - Pin, gas block
   - Pin, gas cylinder
   - Plunger, gas regulator
   - Plunger, cocking handle
   - Receiver

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[redacted]

(Appendix B)

Regulator, gas
Rivet, cocking handle stud
Sight, front
Spring, gas regulator
Spring, cocking handle
Stud, cocking handle

17. Screw, slide retaining
18. Screw, rear sight adjusting
19. Ramp, rear sight
20. Same as part 18
21. Spring, rear sight lock
22. Lock, rear sight
23. Slide, rear sight
24. Pin, trigger housing
25. Screw, trigger housing
26. Trigger housing, assembly, consisting of:
    - Housing, trigger
    - Screw, grip retaining
    - Tube, operating spring
27. Stock, assembly, consisting of:
    - Screw, sling swivel
    - Swivel, sling
    - Stock
28. Plate, butt
29. Screw, butt plate
30. Same as part 29
31. Sear, automatic
32. Spring, automatic sear
33. Spring, magazine catch
34. Catch, magazine
35. Stop, bolt, assembly, consisting of:
    - Lock, screw, bolt stop
    - Plunger, bolt stop
    - Screw, bolt stop
    - Spring, bolt stop
    - Stop, bolt
    - Thumbpiece, bolt stop
36. Screw, magazine catch
37. Lever, change
38. Cover, trigger housing
39. Hammer, assembly, consisting of:
    - Guide, hammer spring
    - Hammer
    - Pin, hammer spring guide
40. Spring, hammer
41. Retainer, hammer spring

[redacted]

[redacted]

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[redacted]

(Appendix B)

42. Sear
43. Plunger, sear
44. Spring, sear
45. Trigger
46. Plunger, trigger
47. Spring, trigger
48. Guard, trigger
49. Lever, opening
50. Grip
51. Nut, grip retaining screw
52. Latch
53. Plunger, latch
54. Spring, latch
55. Spring, latch retaining plate
56. Plunger, latch retaining plate
57. Plate, latch retaining
58. Plunger, operating spring
59. Spring, operating
60. Washer, operating spring tube
61. Screw, operating spring tube
62. Follower, magazine
63. Tube, magazine
64. Base, magazine
65. Spring, magazine

[redacted]

[redacted]

(Appendix B)

PARTS LIST FOR RIFLE, LIGHTWEIGHT, CALIBER .30, T25

Part names correspond to numbers on Photograph Number A60667.

1. Sight, rear, assembly, consisting of:
   - Aperature
   - Base, rear sight
   - Knob, elevation
   - Knob, windage
   - Lock, windage knob
   - Pin, elevation knob (4)
   - Pin, post
   - Pin, windage lock
   - Plunger, post spring
   - Post
   - Scale, elevation
   - Screw, aperature zeroing
   - Screw, windage
   - Screw, windage lock
   - Slide, windage
   - Spring, elevation knob
   - Spring, post
   - Spring, windage knob
   - Spring, windage slide
2. Screw, rear sight base
3. Nut, rear sight base
4. Guard, hand, assembly, consisting of:
   - Guard, hand
   - Liner, hand guard
   - Rivets, hand guard (2)
5. Sight, front and stabilizer, assembly, consisting of:
   - Blade, front sight
   - Pin, front sight
   - Plunger, front sight spring
   - Post, front sight
   - Spring, front sight
   - Stabilizer
6. Screw, stabilizer nut lock
7. Nut, stabilizer
8. Cover
9. Latch, cover
10. Barrel and receiver assembly, consisting of:
    - Barrel
    - Receiver
11. Buffer
12. Lock, hammer

[redacted]

[redacted]

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[redacted]

(Appendix B)

13. Lock, bolt
14. Bolt
15. Spring, extractor
16. Plunger, extractor
17. Extractor
18. Pin, rear firing
19. Pin, front firing
20. Pin, bolt assembly
21. Ejector, assembly, consisting of:
    - Ejector
    - Seat, ejector spring
    - Spring, ejector
22. Cylinder, gas
23. Piston
24. Band
25. Lock, gas cylinder
26. Plug, gas cylinder
27. Guide, operating slide, assembly, consisting of:
    - Guide, operating slide
    - Pin, operating slide guide
    - Pin, retaining
28. Slide, operating
29. Spring, operating, assembly, consisting of:
    - Guide, operating spring
    - Spring, operating, inner
    - Spring, operating, outer
30. Pin, trigger housing retaining
31. Retainer
32. Sear, automatic
33. Selector
34. Plunger, selector, assembly, consisting of:
    - Plunger, selector
    - Spring, selector
35. Cam, selector
36. Spring, automatic sear
37. Pin, automatic sear
38. Sear
39. Pin, sear
40. Pin, trigger
41. Trigger
42. Spring, hammer
43. Hammer
44. Pin, hammer
45. Trigger housing, assembly, consisting of:
    - Clamp
    - Catch, magazine
    - Guard, magazine

[redacted]

[redacted]

[redacted]

(Appendix B)

Guide, plunger, hammer lock
Housing, trigger
Pin, clamp
Pins, clamp screw (2)
Pin, magazine catch
Plunger, hammer lock
Plunger, magazine catch
Plunger, safety
Safety
Screw, stock clamp
Screws, magazine guard (2)
Screw, plunger guide
Spring, hammer lock
Spring, magazine catch
Spring, safety

46. Tube, magazine
47. Base, magazine
48. Follower, magazine
49. Spring, magazine
50. Stock, assembly, consisting of:
    Bolt, grip
    Ferrule, stock
    Grip, stock
    Nut, grip bolt
    Nuts, sling swivel (2)
    Plate, butt
    Plates, stock recoil (2)
    Rivets, ferrule (2)
    Screws, butt plate (2)
    Screws, sling swivel (2)
    Screws, stock recoil plate (2)
    Stock
    Swivels, sling (2)
    Washers, grip bolt (2)
    Washer, lock

[redacted]

[redacted]

[redacted]

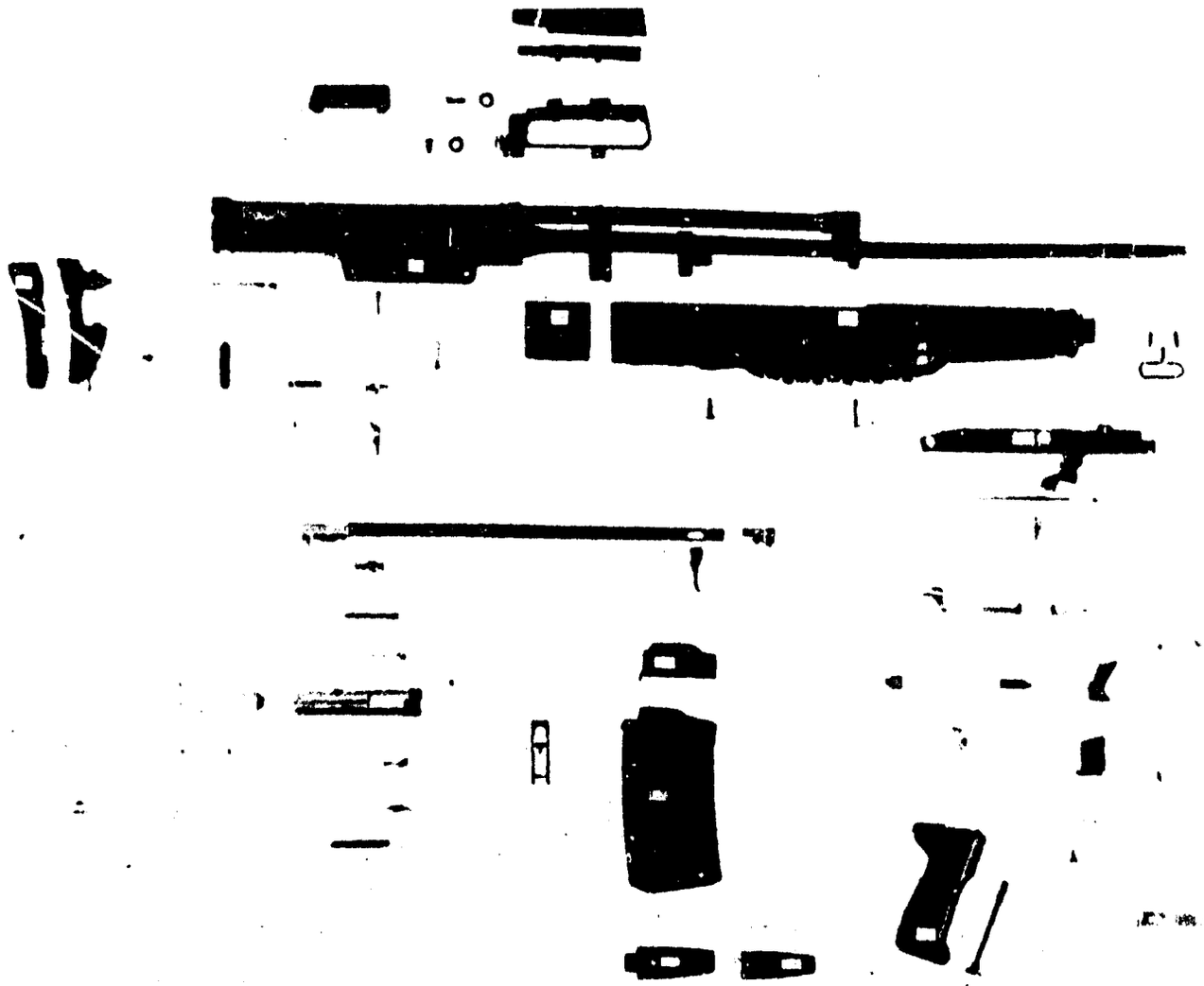
APPENDIX C

PHOTOGRAPHS OF RIFLES AND ACCESSORIES

A-60690
A-61186
A-61175
A-60667
A-60689
A-60693
A-60692
A-60665
A-61202
A-60691
A-60688
A-60664
A-60666

[redacted]

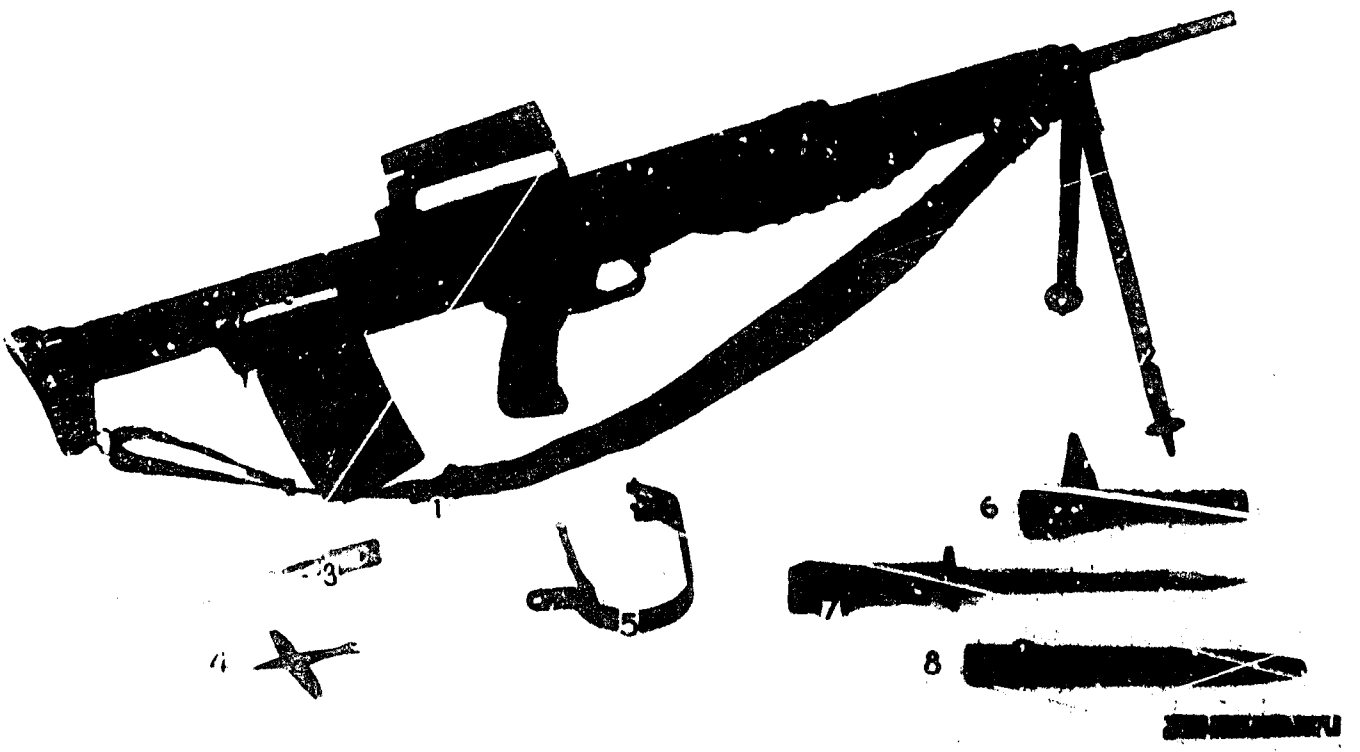
[redacted]



ABERDEEN PROVING GROUND

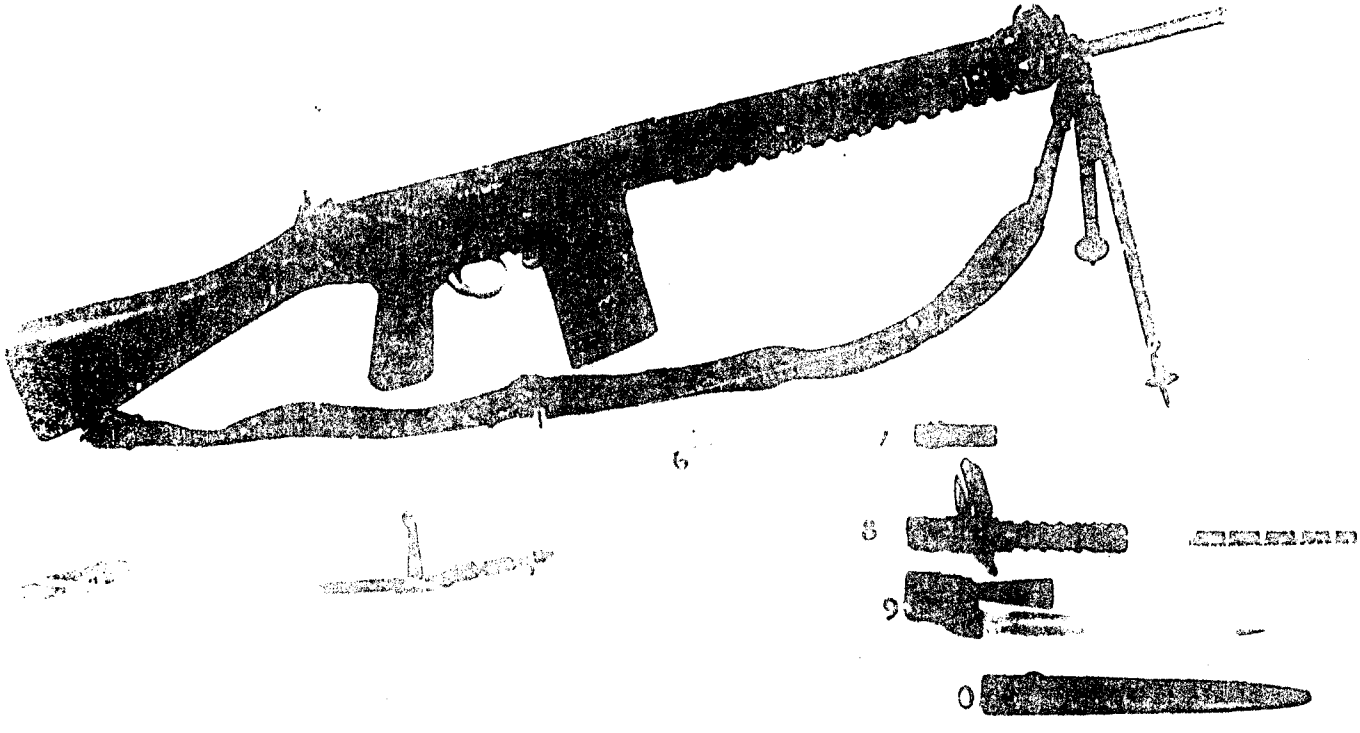
21 February 1950

-2015. Rifle, Lightweight, Caliber .280, EM 2.

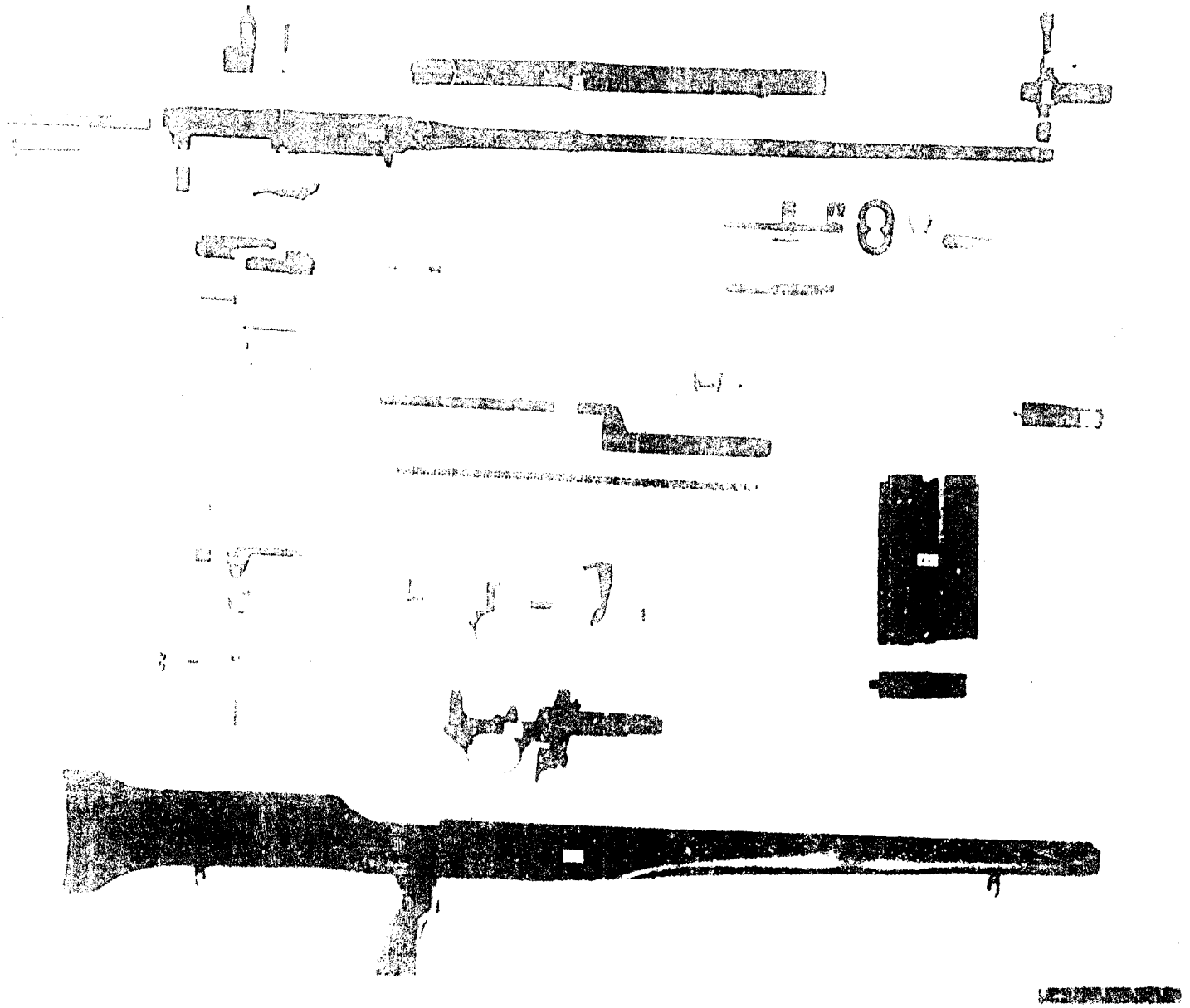


A61198 [redacted] ABERDEEN PROVING GROUND 7 April 1950

Project No. TS2-2015. Rifle, Lightweight, Caliber .280, [redacted], with Accessories. 1. Sling. 2. Bipid. 3. Cylinder Carbon Removing Tool. 4. Combination Tool. 5. Winter Trigger. 6. Grenade Launcher. 7. Bayonet 8. Bayonet Scabbard.

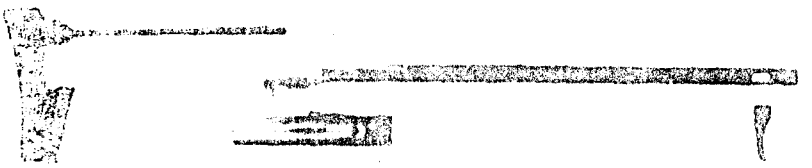


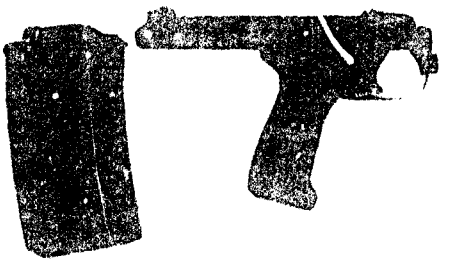
Project No. T32-2015. Rifle, Lightweight, Caliber .280, FN, with Accessories. 1. Sling. 2. Bipod. 3. Flash Hider. 4. Tube Borew Reaming Tool. 5. Combination Tool. 6. Cylinder Carbon Removing Tool. 7. Stabilizer. 8. Grenade Launcher. 9. Combination Bayonet and Flash Hider. 10. Bayonet Scabbard.



ABERDEEN PROVING GROUND 16 February 1950

No. T32-2015. Rifle, Lightweight, Caliber .30, T25. Disassembled.



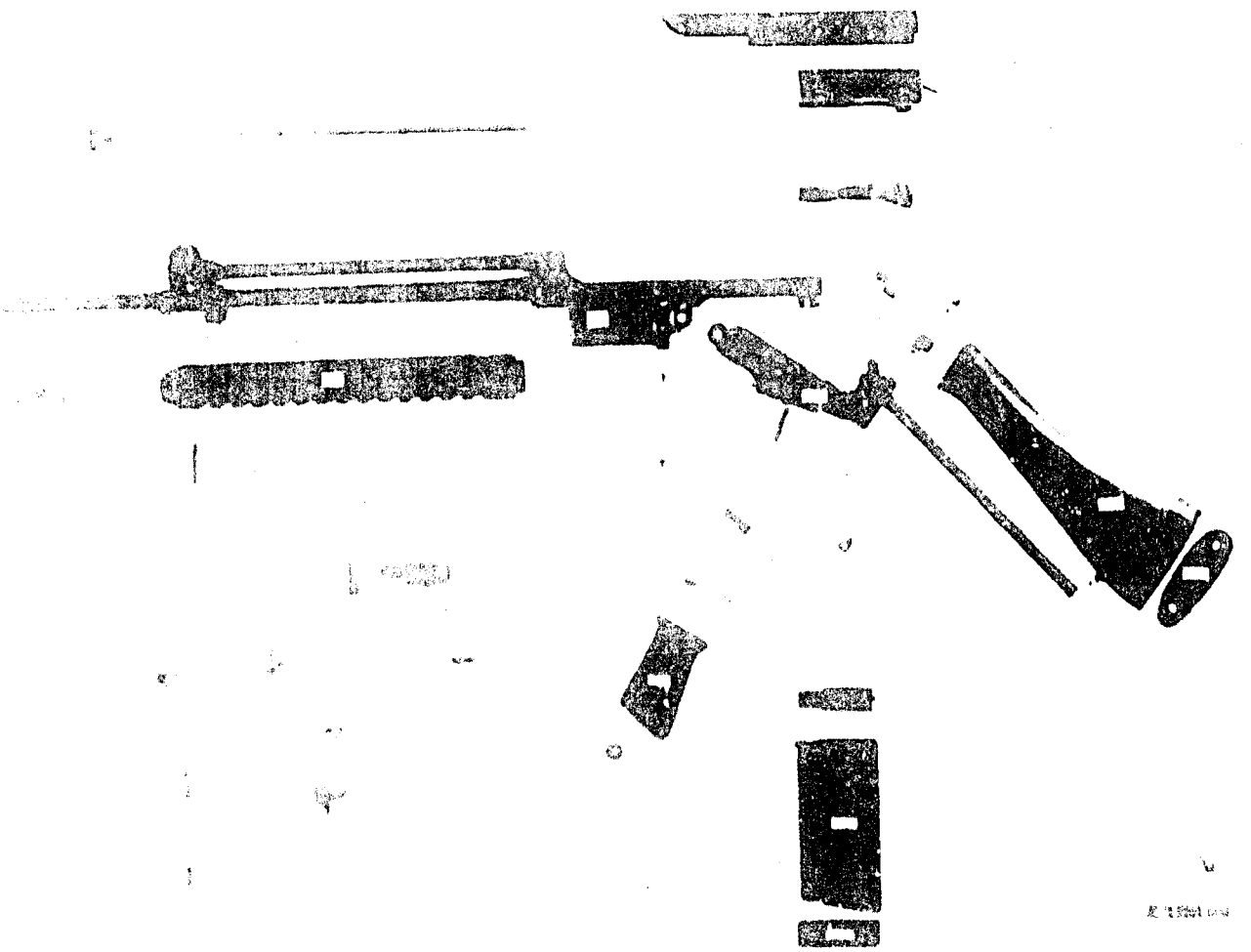


[redacted] ABERDEEN PROVING GROUND 21 February 1950

Project No. T3E-2016. Rifle, Lightweight, Caliber .280, EM 2. Field [illegible].

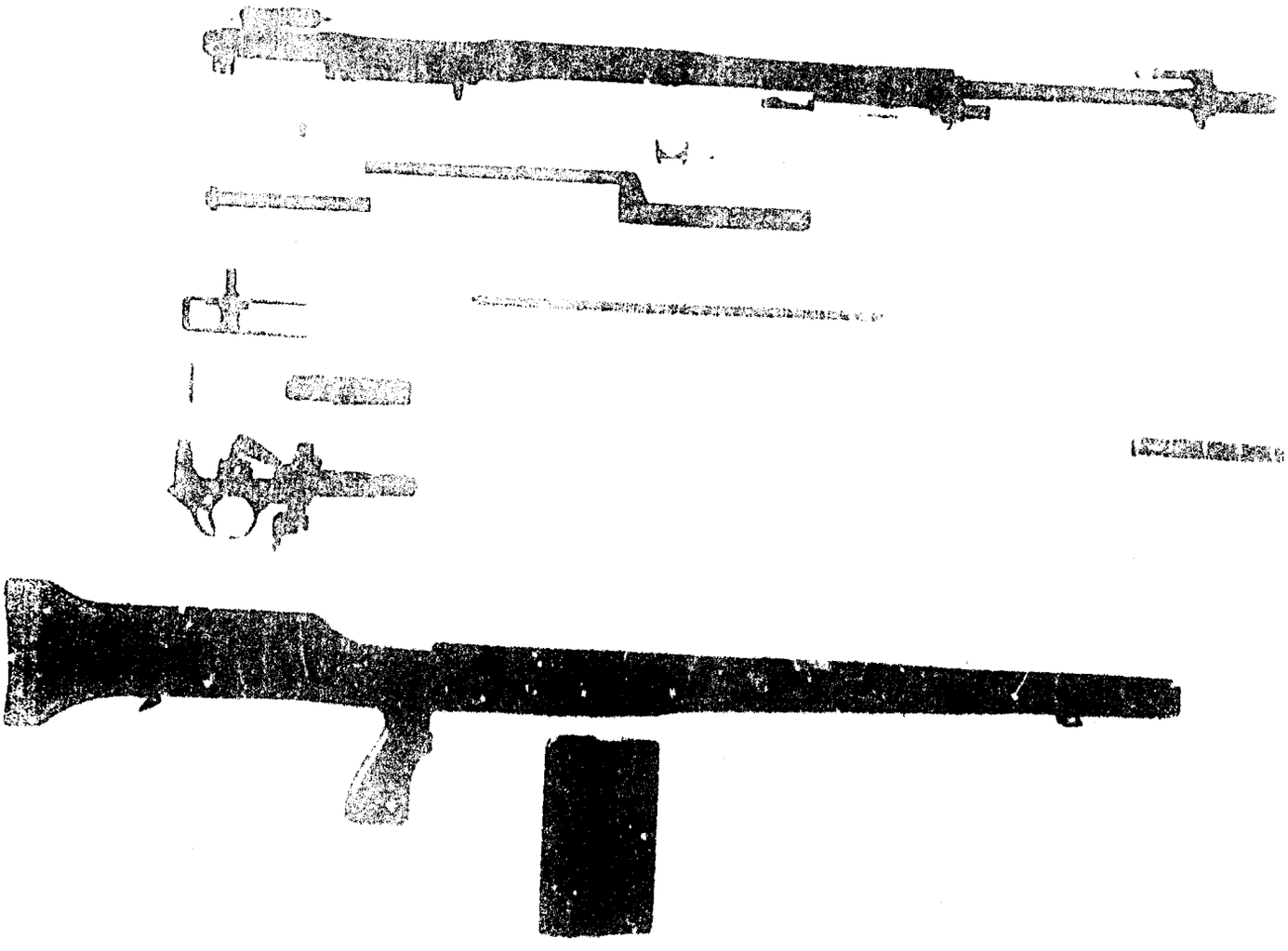
[redacted] ABERDEEN PROVING GROUND 20 February 1950

Project No. T82-2015. Rifle, Lightweight, Caliber .280, FN. Field strip.



ABERDEEN PROVING GROUND 20 February 1950

Project No. T32-2015. Rifle, Lightweight, Caliber .30, M1. Disassembled.



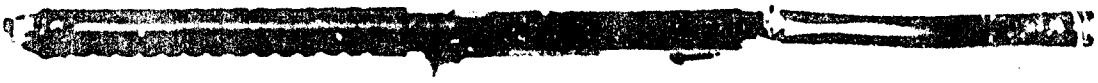
ABERDEEN PROVING GROUND

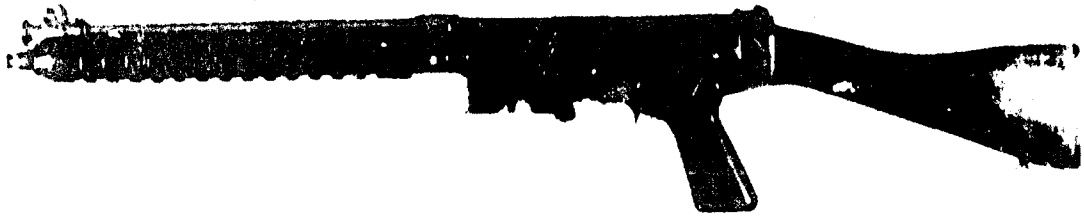
16 February 1950

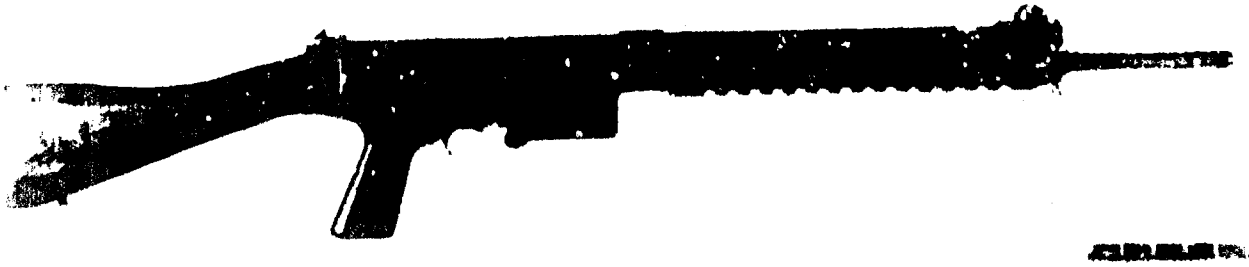
Project No. TSE-2012. Rifle, Lightweight, Caliber .30, T25. Field Strip.

AG 120[redacted] ABERDEEN PROVING GROUND 10 April 1950

Project No. T82-[redacted]15. Rifle, Lightweight, Caliber .30, T25 with Accessories. 1. Sling. 2. Bipod. 3. Stabilizer Nut Wrench. 4. Combination Tool. 5. Recoil Plate Screw Wrench. 6. Grenade Launcher. 7. Flash Rider. 8. Bayonet. 9. Bayonet Scabbard.





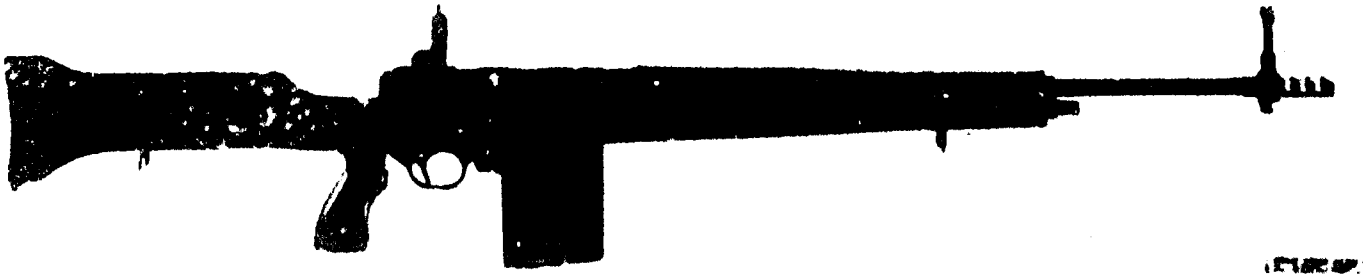


ASOS91[redacted]. ABERDEEN PROVING GROUND 20 February 1950

Project No. T32-2015. Rifle, Lightweight, Caliber .280, M[illegible]. Top and side views.

ABERDEEN PROVING GROUND 21 February 1950

Project No. T52-2015. Rifle, Lightweight, Caliber .280, M [illegible]. Top and side views.



AD[redacted] ABERDEEN PROVING GROUND 16 February 1950

Project No. TS2-2016. Rifle, Lightweight, Caliber .30, T25. Top and side views.

[redacted]

[redacted] ABERDEEN PROVING GROUND [redacted] 15 February 1960

Project No. [redacted]. Rifle, Lightweight, Caliber .30, T25. Rifle with [redacted] removed.

[redacted]

APPENDIX D

Data on Test II (Disassembly and Assembly)

(8 SHEETS)

[redacted]

APPENDIX D

TEST II
DISASSEMBLY AND ASSEMBLY TEST

Dates of Trials: Trials 1 and 2 - 14 and 15 March
Trials 3 and 4 - 6 to 10 April

1. Time and tools required to disassemble rifles

a. Rifle, Lightweight, Caliber .280 EM2 (as shown in Photograph Number A60690).

Tools required:
1. Tool, combination
2. Screwdriver, small
3. Screwdriver, offset
4. Drift
5. Hammer, small

TRIAL NO.	INDIVIDUAL FRIEND	HERBERT	THWAITES
1	9 min. 48 sec.	10 min. 41 sec.	15 min. 30 sec.
2	9 min. 6 sec.	10 min. 50 sec.	8 min. 41 sec.
3	7 min. 24 sec.	10 min. 8 sec.	8 min. 48 sec.
4	6 min. 34 sec.	8 min. 30 sec.	7 min. 27 sec.
Average	8 min. 13 sec.	10 min. 2 sec.	10 min. 6 sec.

b. Rifle, Lightweight, Caliber .280 FN (as shown in Photograph Number A60692).

Tools required:
1. Tool, combination
2. Tool, removing, tube screw
3. Cartridge
4. Screwdriver

TRIAL NO.	INDIVIDUAL FRIEND	HERBERT	THWAITES
1	5 min. 16 sec.	6 min. 30 sec.	7 min. 50 sec.
2	4 min. 46 sec.	5 min. 43 sec.	6 min. 35 sec.
3	6 min. 9 sec.	7 min. 3 sec.	6 min. 24 sec.
4	5 min. 24 sec.	4 min. 12 sec.	5 min. 12 sec.
Average	5 min. 24 sec.	5 min. 52 sec.	6 min. 30 sec.

c. Rifle, Lightweight, Caliber .30, T25 (as shown in Photograph Number A60667)

Tools required:
1. Tool, combination
2. Wrench, Allen
3. Drift
4. Hammer, small
5. Screwdriver
6. Wrench, spanner
7. Cartridge

TRIAL NO.	INDIVIDUAL		
	FRIEND	HERBERT	THWAITES
1	4 min. 51 sec.	5 min. 55 sec.	5 min. 46 sec.
2	4 min.	5 min. 37 sec.	5 min. 24 sec.
3	2 min. 27 sec.	4 min. 39 sec.	4 min. 18 sec.
4	2 min. 20 sec.	4 min. 40 sec.	4 min. 2 sec.
Average	3 min. 25 sec.	5 min. 13 sec.	4 min. 52 sec.

2. Time and tools required to assemble rifle after disassembly.

a. Rifle, Lightweight, Caliber .280 EM2

Tools required:
1. Tool, combination
2. Screwdriver, small
3. Screwdriver, offset
4. Drift
5. Hammer, small

TRIAL NO.	INDIVIDUAL		
	FRIEND	HERBERT	THWAITES
1	19 min. 39 sec.	26 min. 48 sec.	29 min. 4 sec.
2	18 min. 33 sec.	24 min. 26 sec.	24 min. 37 sec.
3	16 min. 56 sec.	21 min. 16 sec.	23 min. 52 sec.
4	14 min. 10 sec.	20 min. 12 sec.	18 min. 42 sec.
Average	17 min. 20 sec.	23 min. 10 sec.	24 min. 4 sec.

b. Rifle, Lightweight, Caliber .280 FN

Tools required: 1. Tool, combination
2. Tool, removing, tube screw
3. Cartridge
4. Screwdriver

TRIAL NO.	INDIVIDUAL		
	FRIEND	HERBERT	TEWAITES
1	9 min. 14 sec.	14 min. 5 sec.	11 min. 59 sec.
2	9 min. 57 sec.	13 min. 58 sec.	10 min. 14 sec.
3	10 min. 50 sec.	11 min. 47 sec.	9 min. 23 sec.
4	7 min. 16 sec.	8 min. 41 sec.	9 min. 40 sec.
Average	9 min. 19 sec.	12 min. 8 sec.	10 min. 19 sec.

c. Rifle, Lightweight, Caliber .30, T25

Tools required: 1. Tool, combination
2. Wrench, Allen
3. Drift
4. Hammer, small
5. Screwdriver
6. Wrench, spanner
7. Cartridge

TRIAL NO.	INDIVIDUAL		
	FRIEND	HERBERT	TEWAITES
1	7 min. 35 sec.	14 min. 48 sec.	14 min. 2 sec.
2	5 min. 53 sec.	12 min. 37 sec.	9 min. 4 sec.
3	6 min. 7 sec.	14 min. 48 sec.	10 min. 22 sec.
4	5 min. 30 sec.	12 min. 56 sec.	8 min. 38 sec.
Average	6 min. 16 sec.	13 min. 47 sec.	10 min. 31 sec.

3. Time and tools required to field strip rifles

a. Rifle, Lightweight, Caliber .280, EM2 (as shown in Photograph Number A60689).

Tool required: Cartridge

[redacted]

APPENDIX D

TRIAL NO.	INDIVIDUAL		
	FRIEND	HERBERT	THWAITES
1	10 sec.	16 sec.	19 sec.
2	10 sec.	12 sec.	14 sec.
3	13 sec.	14 sec.	13 sec.
4	11 sec.	13 sec.	13 sec.
Average	11 sec.	14 sec.	15 sec.

b. Rifle, Lightweight, Caliber .280 FN (as shown in Photograph Number A60693)

Tools required: None

TRIAL NO.	INDIVIDUAL		
	FRIEND	HERBERT	THWAITES
1	8 sec.	16 sec.	11 sec.
2	8 sec.	17 sec.	9 sec.
3	11 sec.	12 sec.	8 sec.
4	9 sec.	12 sec.	8 sec.
Average	9 sec.	14 sec.	9 sec.

c. Rifle, Lightweight, Caliber .30, T25 (as shown in Photograph Number A60665)

Tools required: 1. Cartridge
2. Tool, combination

TRIAL NO.	INDIVIDUAL		
	FRIEND	HERBERT	THWAITES
1	30 sec.	43 sec.	1 min. 7 sec.
2	26 sec.	43 sec.	37 sec.
3	27 sec.	59 sec.	33 sec.
4	24 sec.	40 sec.	34 sec.
Average	27 sec.	46 sec.	43 sec.

4. Time and tools required to assemble rifles after field strip.

a. Rifle, Lightweight, Caliber .280, EM2

Tools required: None

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APPENDIX D

TRIAL NO.	INDIVIDUAL		
	FRIEND	HERBERT	THWAITES
1	26 sec.	25 sec.	43 sec.
2	20 sec.	27 sec.	29 sec.
3	24 sec.	28 sec.	36 sec.
4	22 sec.	31 sec.	32 sec.
Average	23 sec.	28 sec.	35 sec.

b. Rifle, Lightweight, Caliber .280 FN

Tools required: None

TRIAL NO.	INDIVIDUAL		
	FRIEND	HERBERT	THWAITES
1	21 sec.	25 sec.	23 sec.
2	20 sec.	30 sec.	19 sec.
3	25 sec.	26 sec.	33 sec.
4	19 sec.	24 sec.	26 sec.
Average	21 sec.	26 sec.	25 sec.

c. Rifle, Lightweight, Caliber .30, T25

Tools required: 1. Cartridge
2. Tool, combination

TRIAL NO.	INDIVIDUAL		
	FRIEND	HERBERT	THWAITES
1	47 sec.	2 min. 45 sec.	1 min. 12 sec.
2	49 sec.	1 min. 30 sec.	1 min. 4 sec.
3	42 sec.	1 min. 40 sec.	56 sec.
4	52 sec.	1 min. 43 sec.	1 min.
Average	48 sec.	1 min. 55 sec.	1 min. 3 sec.

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APPENDIX D

INDIVIDUAL AVERAGES FOR TEST II

Each figure is an average of 4 trials
Time required to disassemble rifles
Rifle, Lightweight, Caliber .280 EM2

1. Friend	8 min. 13 sec.	Average of 4 trials
2. Herbert	10 min. 2 sec.	
3. Thwaites	10 min. 6 sec.	
Average	9 min. 27 sec.	

Rifle, Lightweight, Caliber .280 FN

1. Friend	5 min. 24 sec.	Average of 4 trials
2. Herbert	5 min. 52 sec.	
3. Thwaites	6 min. 30 sec.	
Average	5 min. 55 sec.	

Rifle, Lightweight, Caliber .30 T25

1. Friend	3 min. 25 sec.	Average of 4 trials
2. Herbert	5 min. 13 sec.	
3. Thwaites	4 min. 52 sec.	
Average	4 min. 30 sec.	

Time required to assemble rifle after disassembly
Rifle, Lightweight, Caliber .280 EM2

1. Friend	17 min. 20 sec.	Average of 4 trials
2. Herbert	23 min. 10 sec.	
3. Thwaites	24 min. 4 sec.	
Average	21 min. 31 sec.	

Rifle, Lightweight, Caliber .280 FN

1. Friend	9 min. 19 sec.	Average of 4 trials
2. Herbert	12 min. 8 sec.	
3. Thwaites	10 min. 19 sec.	
Average	10 min. 35 sec.	

Rifle, Lightweight, Caliber .30 T25

1. Friend	6 min. 16 sec.	Average of 4 trials
2. Herbert	13 min. 47 sec.	
3. Thwaites	10 min. 31 sec.	
Average	10 min. 10 sec.	

APPENDIX D

Time required to field strip rifles
Rifle, Lightweight, Caliber .280 EM2

1. Friend	11 sec.	Average of 4 trials
2. Herbert	14 sec.	
3. Thwaites	15 sec.	
Average	13 sec.	

Rifle, Lightweight, Caliber .280 FN

1. Friend	9 sec.	Average of 4 trials
2. Herbert	14 sec.	
3. Thwaites	9 sec.	
Average	11 sec.	

Rifle, Lightweight, Caliber .30 T25

1. Friend	27 sec.	Average of 4 trials
2. Herbert	46 sec.	
3. Thwaites	43 sec.	
Average	39 sec.	

Time required to assemble rifles after field strip
Rifle, Lightweight, Caliber .280 EM2

1. Friend	23 sec.	Average of 4 trials
2. Herbert	28 sec.	
3. Thwaites	35 sec.	
Average	29 sec.	

Rifle, Lightweight, Caliber .230 FN

1. Friend	21 sec.	Average of 4 trials
2. Herbert	26 sec.	
3. Thwaites	25 sec.	
Average	24 sec.	

Rifle, Lightweight, Caliber .30 T25

1. Friend	48 sec.	Average of 4 trials
2. Herbert	1 min. 55 sec.	
3. Thwaites	1 min. 3 sec.	
Average	1 min. 15 sec.	

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APPENDIX E

Function Reports
(92 sheets)
Legend for Function

FF = Failure to feed.
FJ = Failure to eject.
FX = Failure to extract.
FBF = Failure of bolt to go forward.
FBR = Failure of bolt to remain to rear after last round in magazine.
FCB = Fired on closure of bolt.
FFR = Failure to fire.
F2R = Fired 2 rounds in semiautomatic fire on one rearward movement of trigger.
FBRM = Failure of bolt to remain at rear on removal of magazine.
FJC = Failure to eject clip.

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APPENDIX E

RIFLE, LIGHTWEIGHT, EM2, SERIAL NO. 3

DATE 1950	ROUNDS FIRED	FUNCTION	REMARKS
18 April	103	5 FFR	One round fired when an attempt was made to retract breechblock after failure. Soar failed to release firing pin on 3 occasions. Four punch-outs in primer.

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APPENDIX E

RIFLE, LIGHTWEIGHT, EM2, SERIAL NO. 6

Inspected: 16 February 1950
Head space: .218" shim Pin protrusion: .091"
Trigger pull with empty chamber: 11.4 pounds.
With dummy round in chamber the trigger pull varied from 8.75 to 13.60 pounds in 5 trials.
Free length of operating spring: 18.50"
Free length of firing pin spring: 3.37"

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
17 Feb	32	32	Satisfactory	Velocity test.
	68	100	2 FFR	Light blows of firing pin.
				Function test (Test III).
20 Feb	180	280	Satisfactory	Accuracy test (Test X). Automatic fire. Gas port at normal.
21 Feb	130	410	Satisfactory	Accuracy test (Test X). Semi-automatic fire.
				Long grip screw became loose after 20 rounds. Reassembled without lock washer.
Rifle cleaned and inspected. Head space .218" shim. Burr on sear was removed.				
24 Feb	100	510	Satisfactory	Endurance test (Text XI). Semi-automatic fire.
	100	610	2 FDF	Magazine No. 61. Automatic fire.
	100	710	Satisfactory	Semiautomatic fire.
	45	755	5 FFR	Light blows of firing pin. Automatic fire. Trigger adjusted.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	2	757	2 FFR	Light blows of firing pin. Automatic fire.
Right locking lever was broken. New lever fitted.				
	53	810	Satisfactory	Automatic fire.
	100	910	Satisfactory	Semiautomatic fire.
Ejection cover pin and barrel cover loose. Ejection pin peened in position.				
	100	1010	Satisfactory	Automatic fire.
Rifle cleaned and inspected. Head space .219" shim. Long grip screw had fallen out during firing. It was found and reassembled.				
27 Feb	100	1110	1 FFR	Light blow of firing pin. Semi-automatic fire.
	100	1210	1 FF	Defective round. Automatic fire.
	100	1310	1 FBR	Magazine No. 53. Semiautomatic fire.
	100	1410	1 FFR	Light blow of firing pin.
			1 FF	Round damaged in feeding. Automatic fire.
	100	1510	1 FFR	Light blow of firing pin. Semi-automatic fire.
Grip screws became loose. Screws tightened.				
	100	1610	1 FFR	Light blow of firing pin. Automatic fire.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
				Rifle cleaned and inspected. Head space .222" shim. Long grip screw threads were stripped. Screw replaced with one having .080" greater length. A lock washer was assembled with screw. Radius of firing pin modified by stoning. Magazines cleaned and oiled.
20 Feb	100	1710	1 FTR	Light blow of firing pin.
			1 FF	Magazine No. 47. Semiautomatic fire.
	100	1810	Satisfactory	Automatic fire.
	100	1910	Satisfactory	Semiautomatic fire.
	100	2010	6 FTR	Light blows of firing pin. Breechblock failed to close completely on one occasion. Automatic fire.
	100	2110	Satisfactory	Semiautomatic fire.
	100	2210	3 FTR	Light blows of firing pin. Automatic fire.
				Rifle cleaned and inspected. Head space as in previous inspection. Left locking lever broken. Sear burred. Broken part replaced.
	100	2310	4 FTR	Light blows of firing pin. Semiautomatic fire.
	100	2410	1 FF	Breechblock failed to close due to round being damaged. Automatic fire.
	100	2510	3 FTR	Light blows of firing pin. Semiautomatic fire.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
Covering on operating handle chipped off causing the handle to become excessively hot for operation with the bare hand.				
	100	2610	2 FFR	Light blows of firing pin. Automatic fire.
	100	2710	5 FFR	Light blows of firing pin. Semiautomatic fire.
	100	2810	3 FFR	Light blow of firing pin. Automatic fire.
Rifle cleaned and inspected. Head space as in previous inspection. Free length of firing pin spring 3.31". Spring replaced with one having a free length of 3.50"				
1 March	100	2910	Satisfactory	Semiautomatic fire.
	100	3010	Satisfactory	Automatic fire.
Rifleman's fingers burned in effort to retract breechblock.				
	100	3110	Satisfactory	Semiautomatic fire.
	100	3210	Satisfactory	Automatic fire.
	100	3310	Satisfactory	Semiautomatic fire.
	100	3410	Satisfactory	Automatic fire.
Rifle cleaned and inspected. Head space .223" shim. Free length of firing pin spring 3.38". Magazines cleaned and oiled.				
2 March	40	3450	Satisfactory	Semiautomatic fire.
Rifle held loosely in hands.				

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	60	3510	Satisfactory	Semiautomatic fire.
	40	3550	Satisfactory	Automatic fire.
Rifle held loosely in hands.				
	60	3610	1 MFR	Breechblock failed to close. Light indent in primer. Automatic fire.
	40	3650	Satisfactory	Semiautomatic fire.
Rifle held right side up.				
	60	3710	Satisfactory	Semiautomatic fire.
	40	3750	Satisfactory	Automatic fire.
Rifle held right side up.				
	60	3810	1 FFR	Breechblock failed to close. Light indent in primer. Automatic fire. Rifleman struck in face with ejected cases.
	40	3850	1 FFR	Light blow of firing pin. Semiautomatic fire.
Rifle held left side up.				
	60	3910	Satisfactory	Semiautomatic fire.
	40	3950	Satisfactory	Automatic fire.
Rifle held left side up.				
	60	4010	Satisfactory	Automatic fire.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
				Rifle cleaned and inspected. Head space as in previous inspection. Free length of firing pin spring 3.35". Firing pin spring replaced with one having a free length of 3.50". Cracks were noted in the breechblock at the following points: 1. Top rear corner of the right locking lever slot. 2. Both rear corners of the piston catch slot.
	100	4110	Satisfactory	Semiautomatic fire.
	100	4210	1 FFR	Breechblock failed to close. Light indent in primer. Automatic fire.
	100	4310	Satisfactory	Semiautomatic fire.
	100	4410	2 FFR	Breechblock failed to close. Light indent in primer. Automatic fire.
	100	4510	Satisfactory	Semiautomatic fire.
	100	4610	Satisfactory	Automatic fire.
				Rifle cleaned and inspected. Head space as in previous inspection. Free length of firing pin spring 3.36". No appreciable increase in cracks in breechblock. Right bolt locking lever cracked. Both levers replaced.
3 March	100	4710	Satisfactory	Semiautomatic fire.
	100	4810	Satisfactory	Automatic fire.
	100	4910	Satisfactory	Semiautomatic fire.
	100	5010	1 FF	Round was damaged in feeding. Automatic fire.
	100	5110	Satisfactory	Semiautomatic fire.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	100	5210	Satisfactory	Automatic fire.

Rifle cleaned and inspected.
Head space .224" shim.
Free length of firing pin spring 3.30".
Firing pin spring replaced with one having a free length of 3.50".
An increase in cracking of the breechblock was noted as follows:

1. Crack of approximately 1" in length at top rear corner of the left locking lever slot.
2. Crack at top rear corner of right locking lever slot increased to approximately 1" in length.
3. Crack at bottom rear corner of right locking lever slot approximately 1/8" in length.

6 March	100	5310	Satisfactory	Semiautomatic fire.
	85	5395	1 FA	Extractor cracked. Extractor and spring replaced. Automatic fire.
	15	5410	Satisfactory	Automatic fire.
	100	5510	Satisfactory	Semiautomatic fire.
	100	5610	Satisfactory	Automatic fire.

Cyclic rate recorded for 20 rounds was 655 rounds per minute.

	49	5659	1 FFR	Broken firing pin. New pin installed. Pin protrusion .093". Semiautomatic fire.
	51	5710	Satisfactory	Semiautomatic fire.
	100	5810	1 FFR	Light blow of firing pin. Automatic fire.

Rifle cleaned and inspected.
Head space as in previous inspection.
Free length of firing pin spring 3.34".

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS

An increase in cracking of the breechblock was noted as follows:

1. Crack of approximately 1/2" at bottom rear corner of left locking lever slot.
2. Crack at bottom rear corner of right locking lever slot increased to approximately 3/8" in length.

A 1/4" wide section broken from grip at rear of short screw.

100	5910	Satisfactory	Semiautomatic fire.
100	6010	1 FFR	Light blow of firing pin. Automatic fire.

Cyclic rate recorded for 20 rounds was 660 rounds per minute.

100	6110	Satisfactory	Semiautomatic fire.
100	6210	1 FFR	Light blow of firing pin. Automatic fire.
100	6310	1 FFR	Light blow of firing pin. Semiautomatic fire.
100	6410	Satisfactory	Automatic fire.

Rifle cleaned and inspected.
Head space: .227" shim. Pin protrusion: .092"
Free length of firing pin spring 3.30" (spring distorted).
Free length of operating spring 18.40".
Trigger pull with empty chamber 7.0 pounds.
Firing pin sleeve broken at forward under side.
An increase in cracking of the breechblock was noted as follows:

1. Crack at top rear corner of left locking lever slot increased to approximately 1-1/4" in length.
2. Crack at top rear corner of right locking lever slot increased to approximately 1-1/4" in length.
3. Crack at bottom rear corner of right locking lever slot increased to approximately 1" in length.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
				Long grip screw bushing worn at inside. Wood charred at this point. Crack in grip from short guard screw hole forward to enlarged portion.
7 March	25	6435	Satisfactory	Velocity test.
	93	6528	Satisfactory	Accuracy test.
				Following parts replaced: 1. Firing pin sleeve. 2. Grip. 3. Firing pin spring.
				Rifle and magazines cleaned with carbon tetrachloride for test No. XVIII. Large gas port used.
8 March	10	6538	Satisfactory	Semiautomatic fire.
	10	6548	1 FBR	Magazine No. 9. Automatic fire.
	10	6558	Satisfactory	Semiautomatic fire.
	10	6568	1 FFR	Automatic fire.
			1 FBR	Magazine No. 9.
				Rifle cleaned and oiled for test No. IX. Large gas port used.
21 March	40	6608	2 FFR	Semiautomatic fire.
			1 FF	Rifle held accurely at an angle of -80°.
	40	6648	2 FFR	One failure caused by sear spring moving out of position. Semi-automatic fire. Rifle held loosely at an angle of -80°.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	40	6688	6 FFR	Automatic fire. Rifle held securely at an angle of -80°.
	40	6728	4 FFR	Automatic fire. Rifle held loosely at an angle of -80°.
	40	6768	Satisfactory	Semiautomatic fire. Rifle held securely at an angle of +80°.
	40	6808	Satisfactory	Semiautomatic fire. Rifle held loosely at an angle of +80°. Butt pad fell off.
	40	6848	2 FFR	Automatic fire. Rifle held securely at an angle of -80°.
	40	6888	2 FFR	Automatic fire. Rifle held loosely at an angle of +80°.
Rifle and magazines cleaned with carbon tetrachloride and left dry for test No. XIV. Rifle subjected to a temperature of -65°F for 12 hours prior to firing.				
22 March	20	6908	2 FJ	Difficult to clear stoppage as one round has been partially fed from magazine and when the breechblock is retracted to clear fired case the second round is fed from magazine. Semiautomatic fire.
Rifle permitted to cool for 1-1/2 hours.				
	6	6914	6 FJ	Automatic fire.
Breechblock difficult to retract.				

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
Rifle and magazines cleaned in carbon tetrachloride and lubricated with Oil, Lubricating, Aircraft Instrument (Low Volatility) Specification AN-O-11. Rifle subjected to a temperature of -65°F for 12 hours prior to firing.				
23 March	Attempts were made to fire 5 rounds.			
			5 FF	
			5 FFR	
Rifle cleaned and oiled for test No. VI. Fully loaded rifle submerged in mud for 15 seconds.				
	20	6934	Satisfactory	Semiautomatic fire. Trigger did not return freely to forward position.
Clean magazine (not subjected to mud).				
	20	6954	Satisfactory	Automatic fire.
Rifle and magazines cleaned and oiled for test No. V. Rifle subjected to dust as described in the 299th Report on Ordnance Program No. 5082.				
24 March	20	6974	2 FJ	Semiautomatic fire.
	20	6994	Satisfactory	Clean magazine. Automatic fire.
Rifle and magazines cleaned and oiled.				
27 March	226	7220	Satisfactory	Accuracy test.
28 March	113	7333	Satisfactory	Accuracy test.
Rifle cleaned and friction points lubricated with special grease, supplied by Springfield Armory, for test No. XVI. Rifle and loaded magazine subjected to a salt water spray for a period of 15 minutes with the bolt open and 15 minutes with the bolt closed. Rifle permitted to stand for a period of 1 hour before firing.				

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
29 March	10	7343	Satisfactory	Semiautomatic fire.
	10	7353	8 FFR	Automatic fire.
Long grip screw broken during firing. Part replaced. After cleaning and lubricating as noted above, rifle and loaded magazine immersed in salt water for a period of 5 minutes and permitted to stand for a period of 2 hours before firing.				
	10	7363	Satisfactory	Semiautomatic fire.
	10	7373	Satisfactory	Automatic fire.
Rifle and magazine cleaned and lubricated as for test XVI. Rifle and loaded magazine immersed in a sea water bath, with sand in suspension, for a period of 15 seconds (test XV).				
30 March	20	7393	2 FFR	Semiautomatic fire.
Clean magazine (not subjected to bath).				
	20	7413	4 FFR	Automatic fire.
Rifle and magazines cleaned and lubricated as for test XVI. Rifle subjected to rain test.				
31 March	80	7493	Satisfactory	Semiautomatic fire.
	80	7573	8 FFR	Automatic fire.
	80	7653	Satisfactory	Semiautomatic fire.
	80	7733	Satisfactory	Automatic fire.
	80	7813	Satisfactory	Semiautomatic fire.
	80	7893	2 FFR	Automatic fire.
			7 FBF	Faulty magazine No. 52. Magazine catch pin out of position. Placed in proper position.

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APPENDIX E

DATE 1960	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	80	7973	2 FFR	Semiautomatic fire.
	40	8013	6 FFR	Automatic fire.

Bolt difficult to operate by hand.
Rifle and magazines cleaned and oiled.

3 Apr Test VIII (Grenade Test)

Ten M11A2 practice grenades were launched without the use of an auxiliary cartridge.
Stabilizer tubes on 3 grenades ruptured on launching.
Rifle fired with heel of butt down.
Ejection of fired case irregular. Necessary to clear case by hand on several occasions.

Test IV (Cook-Off Test)

5 Apr	329	8342	10 FFR	Automatic fire.
			2 FBF	329 rounds fired in 3 minutes 35 seconds. Firing discontinued due to excessive stoppages.

No cook-off occurred.
Front grip burst into flames after about 250 rounds.
Extremely large muzzle flashes noted after 300 rounds. One large breech flash noted. Rate of fire decreased as temperature of weapon increased.
Butt assembly became disassembled from body during firing. Return spring guide was bent.
Rifle cleaned and inspected.
Both locking levers were broken.
Considerable damage to front grip assembly by fire.
Broken locking lugs replaced.
Rifle and magazine lubricated with cold test oil No. 2 to which sufficient kerosene had been added to make a 50% mixture (furnished by the United Kingdom) and subjected to a temperature of -65°F for 17.5 hours prior to firing.

12 Apr	20	8362	Satisfactory	Semiautomatic fire.

Rifle subjected to a temperature of -65°F for 3 additional hours.

	20	8382	[redacted] Satisfactory	Automatic fire.

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APPENDIX E

RIFLE, LIGHTWEIGHT, E.2, SERIAL NO. 7

Inspected: 16 February 1950
Head space: Pin protrusion: .091"
Trigger pull with empty chamber: 13.3 pounds.
Free length of operating spring: 18.20".
Free length of firing pin spring: 3.35".

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
Rifle cleaned and friction points lubricated with special grease, supplied by Springfield Armory, for test No. VII (rain test).				
4 Apr	80	80	Satisfactory	Semiautomatic fire.
	80	160	6 FPR	Automatic fire.
	80	240	Satisfactory	Semiautomatic fire.
	80	320	2 FPR	Automatic fire.
	80	400	Satisfactory	Semiautomatic fire.
	60	460	1 FF	Bullet struck ramp. Automatic fire.
	3	463	1 FPR	Punch-out in primer.
Rifle disassembled and inspected. Primer punch-out was in firing pin hole. Locking shoulders in body were burred. Burrs were removed.				
	77	560	Satisfactory	Semiautomatic fire.
	40	600	2 FPR	Automatic fire.
			4 FF	Block not completely forward. Feeding was accomplished by hand on 2 occasions.

Difficult to retract block after malfunctions.
Rifle and magazines lubricated with "2" oil and subjected to a temperature of -65° for 17.5 hours prior to firing.

[redacted]

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[redacted]

APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
12 Apr	20	620	1 FBR	Semiautomatic fire.
Rifle subjected to a temperature of -65°F for 3 additional hours.				
	20	640	Satisfactory	Automatic fire.

[redacted]

[redacted]

APPENDIX E

RIFLE, LIGHTWEIGHT, EM2, SERIAL NO. 8

Inspected: 16 February 1950.
Head space: .210" shim Pin protrusion: .090".
Trigger pull with empty chamber: 11.1 pounds.
Free length of operating spring: 18.10".
Free length of firing pin spring: 3.38".

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
17 Feb	34	34	Satisfactory	Velocity test.
	66	100	2 FFR	Light blows of firing pin. Function test (Test III).
23 Feb	181	281	5 FFR	Light blows of firing pin. Accuracy test (Test X). Automatic fire. Gas port at normal.
24 Feb	115	396	1 FFR	Bolt failed to lock. Accuracy test (Test X). Semiautomatic fire. Stock screw loosened during firing. Re-tightened screw.

Rifle cleaned and inspected in preparation for endurance test (Test No. XI).
Head space: .213" shim.
Small crack at rear of rear grip screw hole in grip.
Firing pin radius modified by stoning.
Following new parts installed:

1. Locking levers.
2. Long grip screw having greater length.
3. Lock washer for long grip screw.

Breech bore gage reading: .2775" at 5.2" from barrel face.
Normal gas port used.

9 Mar	100	496	Satisfactory	Semiautomatic fire.
	100	596	Satisfactory	Automatic fire.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	100	696	1 FF	Magazine No. 47. Semiautomatic fire.
	100	796	1 FF	Magazine No. 47. Automatic fire.
Magazine No. 47 replaced.				
	100	896	Satisfactory	Semiautomatic fire.
	100	996	Satisfactory	Automatic fire.

Cyclic rate recorded for 20 rounds was 615 rounds per minute.
Rifle cleaned and inspected.
Head space: .215" shim.
Free length of firing pin spring: 3.37".
A section of wood 1/8" in width broken out at rear of rear grip screw in grip.

100	1096	Satisfactory	Semiautomatic fire.
100	1196	Satisfactory	Automatic fire.
100	1296	Satisfactory	Semiautomatic fire.
100	1396	Satisfactory	Automatic fire.
100	1496	Satisfactory	Semiautomatic fire.
100	1596	Satisfactory	Automatic fire.

Cyclic rate recorded for 20 rounds was 610 rounds per minute (625 rounds per minute for 18 rounds).
Rifle cleaned and inspected.
Head space as in previous inspection.
Free length of firing pin spring: 3.35".
Breechblock cracked at the following points:

1. Crack 1/8" long at top rear corner of right locking lever slot.
2. Crack 1/8" long at bottom rear corner of right locking lever slot.

[redacted]

[redacted]

APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
				Breechblock burred at point of contact with piston catch. Long screw bushing in grip battered at top. Wood supporting bushing also battered and cracked. Magazines cleaned and oiled.
10 Mar	100	1696	Satisfactory	Semiautomatic fire.
	100	1796	Satisfactory	Automatic fire.
	100	1896	Satisfactory	Semiautomatic fire.
	100	1996	1 FFR	Block not completely forward. Light primer indent. Automatic fire.
	100	2096	Satisfactory	Semiautomatic fire.
	100	2196	Satisfactory	Automatic fire.
				Cyclic rate recorded for 20 rounds was 645 rounds per minute. Rifle cleaned and inspected. Head space as in previous inspection. Free length of firing pin spring: 3.33". Wood support in grip at long grip screw further damaged. Additional cracks were noted in the breechblock as follows: 1. Crack 1/8" long at top rear corner of left locking lever slot. 2. Crack 1/8" long at bottom rear corner of left locking lever slot.
	100	2296	Satisfactory	Semiautomatic fire.
	100	2396	2 FFR	Light blow of firing pin. Automatic fire.
	17	2413	2 FFR	Block failed to go completely forward.
			1 FJ	Semiautomatic fire.
				The breechblock was disassembled for inspection. The left locking lever was found to be broken. The right locking lever was also replaced.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	83	2496	2 FFR	Light blows of firing pin. Semiautomatic fire.
	100	2596	Satisfactory	Automatic fire.
	100	2696	Satisfactory	Semiautomatic fire.
	100	2796	2 FFR	Light blows of firing pin indent. Automatic fire.
				Rifle cleaned and inspected. Head space: .217" shim. Free length of firing pin spring: 3.33". Spring replaced with one having a free length of 3.49". Top rear of sear was burred. Magazines cleaned and oiled.
14 Mar	2	2798	2 FJ	Caused by cleaning patch threads on ejector left there during cleaning.
	98	2896	Satisfactory	Semiautomatic fire.
	100	2996	1 FFR	Light blow of firing pin. Automatic fire.
	100	3096	Satisfactory	Semiautomatic fire.
	100	3196	1 FFR	Bolt not fully forward. Light primer indent. Automatic fire.
	100	3296	Satisfactory	Semiautomatic fire.
	100	3396	1 FFR	Light blow of firing pin. Automatic fire.
				Cyclic rate recorded for 20 rounds was 630 rounds per minute. Rifle cleaned and inspected. Head space: .220" shim. Free length of firing pin spring: 3.35" (back end of spring distorted). Grip charred at gas cylinder [redacted] ing support.

[redacted]

APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	100	3496	1 FF	Block jammed by blown primer. Semiautomatic fire.
	100	3596	1 FFR	Light blow of firing pin.
			3 FBF	Magazine No. 22. Automatic fire.
Magazine No. 22 replaced with No. 33.				
	100	3696	2 FFR	Light blow of firing pin. Semiautomatic fire.
	100	3796	1 FFR	Light blow of firing pin. Automatic fire.
	100	3896	Satisfactory	Semiautomatic fire.
	100	3996	3 FFR	Light blow of firing pin. Automatic fire.
Rifle cleaned and inspected. Head space: .221". Free length of firing pin spring: 3.31". Spring replaced with one having a free length of 3.5". Additional damage of wood support in grip at long grip screw. Covering on operating handle chipped off.				
15 Mar	40	4036	Satisfactory	Semiautomatic fire.
Rifle held loosely in hands.				
	60	4096	Satisfactory	Semiautomatic fire.
	40	4136	Satisfactory	Automatic fire.
Rifle held loosely in hands.				
	60	4196	1 FFR	Light blow of firing pin.
			1 FBF	Automatic fire.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	40	4236	Satisfactory	Semiautomatic fire.
Rifle held right side up.				
	60	4296	1 FFR	No indent in primer. Semiautomatic fire.
	40	4336	2 FFR	Light blows of firing pin. Automatic fire.
Rifle held right side up.				
	60	4396	Satisfactory	Automatic fire.
	40	4436	Satisfactory	Semiautomatic fire.
Rifle held left side up.				
	60	4496	1 FFR	Light blow of firing pin. Semiautomatic fire.
	40	4536	Satisfactory	Automatic fire.
Rifle held left side up.				
	60	4596	2 FFR	Light blow of firing pin. Automatic fire.

Cyclic rates recorded for 2 20-round bursts were 675 and 670 rounds per minute.
Rifle cleaned and inspected.
Head space as in previous inspection.
Free length of firing pin spring: 3.36".
Left locking lever was broken. Both locking levers were replaced.
Additional cracking of breechblock noted as follows:

1. Crack at top rear corner of right locking lever slot increased in length to 9/16".
2. Crack at bottom rear corner of left locking lever slot increased in length to 1/4".

Additional damage of grip at [redacted]y noted.

[redacted]

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
16 Mar	100	4696	2 FFR	Light blow of firing pin. Semiautomatic fire.
	100	4796	3 FFR	Light blow of firing pin. Automatic fire.
Magazine No. 53 which was dented was replaced with No. 19.				
	100	4896	1 FFR	Light blow of firing pin. Semiautomatic fire.
	14	4910	1 FFR	Light blow of firing pin.
			2 FJ	Automatic fire.
Breechblock removed from rifle for inspection. The extractor was found to be cracked. Extractor replaced.				
	86	4996	2 FFR	Light blows of firing pin. Automatic fire.
	100	5096	Satisfactory	Semiautomatic fire.
	100	5196	9 FFR	Automatic fire.
Magazine No. 28 which could not be inserted in the rifle was replaced with No. 18. Rifle cleaned and inspected. Head space: .223" chim. Free length of firing pin spring 3.36". New spring having a free length of 3.5" installed. Free length of operating spring: 17.97". Spring replaced with one having a free length of 18.47". Additional damage to grip at bushing support. Burr filed from rear edge of sear slot in breechblock. Cracks at rear radii of piston catch slot on breechblock. Magazines cleaned and oiled.				
	100	5296	Satisfactory	Semiautomatic fire.
	83	5379	2 FF	Block failed to close.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
			2 FFR	Light blow of firing pin. Automatic fire.
Breechblock disassembled for inspection. Broken firing pin was replaced. Four malfunctions noted above occurred immediately before disassembly.				
	17	5396	Satisfactory	Automatic fire.
	100	5496	Satisfactory	Semiautomatic fire.
	100	5596	3 FFR	Automatic fire.
	100	5696	Satisfactory	Semiautomatic fire.
	100	5796	3 FFR	Automatic fire.
Cyclic rates recorded for 1 18-round and 1 20-round bursts were 637 and 635 rounds per minute. Rifle cleaned and inspected. Head space: .225" shim. Free length of firing pin spring: 3.36". Sear, which had excessive free movement, was replaced. Free length of operating spring: 18.36".				
17 Mar	100	5896	Satisfactory	Semiautomatic fire.
	100	5996	1 FFR	Automatic fire.
			1 FF	Bolt failed to close. Bullet was pulled on extraction. Piece of brass on bullet caused failure.
	100	6096	Satisfactory	Semiautomatic fire.
	100	6196	1 FFR	Automatic fire.
	100	6296	Satisfactory	Semiautomatic fire.
	4	6300	1 FF	Bolt failed to close. Automatic fire.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
Breechblock disassembled for inspection. Sear spring was partially disassembled.				
	76	6376	1 FFR 1 FF	Automatic fire.
Breechblock disassembled for inspection. Sear spring again partially disassembled.				
	20	6396	Satisfactory	Automatic fire.

Cyclic rates recorded for 1 19-round and 1 20-round bursts were 679 and 675 rounds per minute.
Rifle cleaned and inspected.
Head space: .225" shim. Pin protrusion: .093".
Trigger pull with empty chamber: 7.9 pounds.
Free length of operating spring: 18.3".
Free length of firing pin spring: 3.34".
Breech bore gage reading: .2825" at 5.2" from face of barrel.
Long grip screw was replaced due to breakage.
Further damage to grip at point of contact with gas cylinder bracket lug.
Firing pin sleeve cracked at both bottom front corners and at top right rear corner of locking lever slots.
Crack in breechblock at top rear corner of right locking lever slot increased in length to 1". Block also burred at ejection slot.

23	6419	Satisfactory	Velocity test.
93	6512	Satisfactory	Accuracy test.

Breechblock replaced.

30	6542	Satisfactory	Semiautomatic fire.
40	6582	Satisfactory	Automatic fire.

Rifle and magazines cleaned with carbon tetrachloride in preparation for test No. XVIII.
Largest gas port used.

10	6592	Satisfactory	Semiautomatic fire.
10	660[redacted]	Satisfactory	Automatic fire.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	10	6612	Satisfactory	Semiautomatic fire.
	10	6622	Satisfactory	Automatic fire.
Breechblock difficult to retract after 40 rounds. Rifle cleaned and oiled for test No. IX. Large gas port used.				
21 Mar	40	6662	Satisfactory	Semiautomatic fire. Rifle held securely at an angle of -80°.
	40	6702	Satisfactory	Semiautomatic fire. Rifle held loosely at an angle of -80°.
	40	6742	9 FFR	Automatic fire. Rifle held securely at an angle of -80°.
	40	6782	2 FFR	Automatic fire. Rifle held loosely at an angle of -80°.
Normal gas port used.				
	40	6822	Satisfactory	Semiautomatic fire. Rifle held securely at an angle of +80°.
	40	6862	1 FJ	Semiautomatic fire. Rifle held loosely at an angle of +80°. Possibility of stoppage caused by case hitting rifleman's arm.
	40	6902	Satisfactory	Automatic fire. Rifle held securely at an angle of +80°.
	40	6942	1 FBF	Automatic fire. Rifle held loosely at an angle of +80°.

Rifle and magazines cleaned with carbon tetrachloride and left dry for test No. XIV.
Rifle subjected to a temperature of -65°F for 12 hours prior to firing.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
22 Mar	20	6962	Satisfactory	Semiautomatic fire.
Rifle permitted to cool for 1-1/2 hours.				
	20	6982	1 FJ	Automatic fire.
Rifle and magazines cleaned in carbon tetrachloride and lubricated with Oil, Lubricating, Aircraft Instrument (Low Volatility) Specification AN-O-11. Rifle subjected to a temperature of -65°F for 12 hours prior to firing.				
23 Mar	Attempts were made to fire 5 rounds.			
	4	6986	5 FF	Semiautomatic fire.
			1 FJ	
			1 FFR	
Rifle cleaned and oiled for test No. VI. Fully loaded rifle submerged in mud for 15 seconds.				
	20	7006	Satisfactory	Semiautomatic fire.
Clean magazine (not subjected to mud).				
	20	7026	Satisfactory	Automatic fire.
Rifle and magazine cleaned and oiled for test No. V. Rifle subjected to dust as described in the 299th Report on Ordnance Program No. 5082.				
24 Mar	20	7046	1 FDR	Semiautomatic fire. Clean magazine.
	20	7066	Satisfactory	Automatic fire.
Rifle and magazines cleaned and oiled.				
27 Mar	226	7292	1 FJ	Accuracy test.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
				Magazine catch pin moved out of position during firing. Pin normally staked in position.
28 Mar	113	7405	1 FFR	Accuracy test.
				Rifle cleaned and friction points lubricated with special grease, supplied by Springfield Armory, for test No. XVI. Rifle and loaded magazine subjected to a salt water spray for a period of 15 minutes with the bolt open and 15 minutes with the bolt closed. Rifle permitted to stand for a period of 1 hour before firing.
29 Mar	10	7415	Satisfactory	Semiautomatic fire.
	10	7425	1 FFR	Automatic fire.
				After cleaning and lubricating as noted above, rifle and loaded magazine immersed in salt water for a period of 5 minutes and permitted to stand for a period of 2 hours before firing.
	10	7435	Satisfactory	Semiautomatic fire.
	6	7441	1 FF	Block failed to push round completely from magazine.
			1 FFR	Broken sear. Automatic fire.
				Test discontinued due to broken part. New sear installed. Rifle and magazine cleaned and lubricated as for test XVI. Rifle and loaded magazine immersed in a salt water bath, with sand in suspension, for a period of 15 seconds (test XV).
30 Mar	20	7461	1 FDR	Semiautomatic fire.
				Clean magazine (not subjected to bath).
	20	7481	1 FFR	Automatic fire.
			1 FF 1 FK	Failure to feed and failure to extract occurred on same round. Necessary to [redacted] actuate trigger several times before round was fired.

[redacted]

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
Rifle and magazines cleaned and lubricated as for test XVI. Rifle subjected to rain test.				
31 Mar	80	7501	Satisfactory	Semiautomatic fire. Necessary to actuate trigger several times in order to fire round.
	80	7641	1 FBF	Breechblock retainer functioned with rounds in magazine. Automatic fire.
	19	7660	1 FF	Block failed to close completely.
Sear spring moved out of position causing binding on the body. Parts properly assembled. Piston badly burred at point of contact with piston catch. Piston replaced. Burrs removed inside body at points of contact with locking levers. Rifle and magazines again cleaned and lubricated as for test XVI. Rifle again subjected to rain test.				
3 Apr	10	7670	10 FJ	Ejector spring not assembled in rifle.
			1 FF	
	80	7750	Satisfactory	Semiautomatic fire.
	18	7768	1 FFE	Automatic fire.
			2 FF	Block failed to contact round in magazine on 1 occasion and block failed to go completely forward on other failure.
Impossible to retract breechblock by hand. Broken sear contacted body preventing rearward movement without disassembly of parts. Broken sear replaced. Rifle withdrawn from rain test. Rifle and magazines cleaned and oiled.				
4 Apr	Test VIII (Grenade Test) [redacted]			
Ten M11A2 practice grenades were [redacted] launched without the use of an auxiliary cartridge.				

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
				On launching the first 6 grenades all stabilizer tubes ruptured. The sleeve at the forward portion of the launcher was then disassembled from the launcher and 4 grenades launched. The first 3 were launched properly but the stabilizer tube ruptured on the last round. The gunner was injured when a portion of the ruptured tube struck him on the right leg.
				Rifle fired with heel of butt down.
				Ejection of fired case irregular. Necessary to clear case by hand on several occasions.

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APPENDIX E

RIFLE, U. S., CALIBER .30, M1, SERIAL NO. 3830498

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
			Test VI	
Rifle subjected to mud test.				
23 Mar	1	1	1 FFR	Failure occurred on second round and bolt could not be operated by hand.
			Test V	
Rifle subjected to dust test.				
24 Mar	1	2	1 FJ	Second round could not be chambered.
			Test VII	
Rifle subjected to rain test. Rifle lubricated with "T" grease.				
31 Mar	80	82	Satisfactory	
	80	162	Satisfactory	
	80	242	1 FFR	Misfire.
	80	322	2 FF	Bolt failed to contact base of one round and bolt passed under another round in feeding (round damaged).
	80	402	13 FF	Bolt failed to contact base of 12 rounds, and 1 round failed to rise sufficiently.
			3 FJC	
	80	482	23 FF	Bolt failed to contact base of round.
			3 FJC	

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	80	562	32 FF	Bolt failed to contact base of round.
			6 FJC	Very difficult to insert clip and retract bolt after malfunctions.
	17	579	1 FF	Impossible to retract bolt by hand after this failure.

Test XIV

Rifle lubricated with Oil, Lubricating, Aircraft Instrument (Low Volatility) Specification AN-O-11 and subjected to a temperature of -65°F for a period of 17.5 hours prior to firing.

12 Apr	16	595	Satisfactory

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APPENDIX E

RIFLE, U. S., CALIBER .30, M1, SERIAL NO. 3835151

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
			Test VI	
Rifle subjected to mud test.				
23 Mar	4	4	1 FX	Bolt could not be operated by hand.
			Test V	
Rifle subjected to dust test.				
24 Mar	1	5	1 FJ	Second round could not be chambered.
			Test VII	
Rifle subjected to rain test.				
31 Mar	80	85	Satisfactory	
	80	165	Satisfactory	
	80	245	Satisfactory	
	80	325	1 F JC	
	80	405	1 FF	Bolt failed to contact base .. round.
	49	454	31 FF	Bolt failed to contact base of rounds.
			3 FJ	
			5 FJC	Impossible to retrac bolt by hand.
			Test XIV	
Rifle lubricated with Oil, Lubricating, Aircraft Instrument (Low Volatility) Specification AN-O-11 and subjected to a temperature of -65°F for a period of 17.5 hours prior to firing.				
12 Apr	16	470	[redacted]	

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APPENDIX E

RIFLE, LIGHTWEIGHT, FN, SERIAL NO. 4

Inspected: 16 February 1950
Head space: Pin Protrusion: .079"
Trigger pull: 8.5 pounds
Free length of operating spring: 18.07".
Free length of piston spring: 10.70".

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
28 Feb	186	186	7 FJ	Accuracy test.

Rifle and magazines lubricated with cold test oil No. 2 to which sufficient kerosene had been added to make a 50% mixture (furnished by the United Kingdom) and subjected to a temperature of -65°F for 17.5 hours prior to firing.

12 Apr	20	206	1 FBR	Semiautomatic fire. 12 attempts were made before round was chambered.

Rifle subjected to a temperature of -65°F for 3 additional hours.
Fifteen unsuccessful attempts were made to chamber a round.

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APPENDIX E

RIFLE, LIGHTWEIGHT, FN, SERIAL NO. 6

Inspected: 16 February 1950
Head space: .204" shim Pin protrusion: .073".
Trigger pull: 11.4 pounds.
Free length of operating spring: 18.5".
Free length of piston spring: 10.5".

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
17 Feb	28	28	Satisfactory	Velocity test.
	72	100	Satisfactory	Function test (test III). 1 punch out in primer.
21 Feb	60	160	Satisfactory	Accuracy test (Test X). Semiautomatic fire.
23 Feb	180	340	3 FJ	Accuracy test (Test X). Automatic fire. Gas port on No. 2 position.
24 Feb	85	425	Satisfactory	Accuracy test (Text X). Semi-automatic fire. Gas port on No. 2 position.

The following modifications were made:

1. Redesigned change lever installed.
2. Diameter of port in gas plug increased to 3/16" as on rifle serial No. 7.
3. Operating springs reduced 5 coils in length. Free length of spring now 17.5".

3 Mar	20	445	Satisfactory	Semiautomatic fire.
	20	465	Satisfactory	Automatic fire.

Rifle cleaned and inspected in preparation for endurance test (Test No. XI).
Head space: .205" shim.
Front of cover and receiver burred at points of contact.
Breech bore gage reading: .277" at 3.64" from barrel face.

[redacted]

APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
9 Mar	100	565	Satisfactory	Semiautomatic fire.
	100	665	Satisfactory	Automatic fire.
	100	765	Satisfactory	Semiautomatic fire.
	100	865	Satisfactory	Automatic fire.
	100	965	1 FF	Magazine No. 15. Semiautomatic fire.
	100	1065	Satisfactory	Automatic fire.

Cyclic rate recorded for 20 rounds was 550 rounds per minute.
Rifle cleaned and inspected.
Head space as in previous inspection.
Necessary to force piston from gas cylinder.

	100	1165	Satisfactory	Semiautomatic fire.
	100	1265	Satisfactory	Automatic fire.
	100	1365	Satisfactory	Semiautomatic fire.
	100	1465	Satisfactory	Automatic fire.
	100	1565	Satisfactory	Semiautomatic fire.
	100	1665	Satisfactory	Automatic fire.

Cyclic rate recorded for 20 rounds was 570 rounds per minute.
Rifle cleaned and inspected.
Head space as in previous inspection.
Considerable accumulation of fouling in gas plug.
Slight wear on hammer and receiver at points of contact. Burr on receiver at this point.
Difficult to adjust gas regulator with tool provided.
Magazines cleaned and oiled.
Gas port on No. 3 position.

10 Mar	100	1765	Satisfactory	Semiautomatic fire.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	100	1865	Satisfactory	Automatic fire.
Handguard cracked at 3 points; two 1" cracks at rear and a 1-1/4" crack at front. Receiver cracked at top left side into operating slide cut.				
	100	1965	Satisfactory	Semiautomatic fire.
	100	2065	1 FF	Magazine No. 15. Automatic fire.
	100	2165	Satisfactory	Semiautomatic fire.
	100	2265	Satisfactory	Automatic fire.
Cyclic rate recorded for 20 rounds was 555 rounds per minute. Rifle cleaned and inspected. Head space as in previous inspection. Heavy fouling noted in gas plug.				
	100	2365	Satisfactory	Semiautomatic fire.
	100	2465	1 FJ	Automatic fire.
Impossible to change gas port position with wrench provided without first removing regulator spring lock. Gas port on No. 2 position.				
	100	2565	1 FJ	Semiautomatic fire.
	100	2665	Satisfactory	Automatic fire.
	100	2765	Satisfactory	Semiautomatic fire.
	2	2767	2 FJ	
			1 FF	Bolt failed to feed first round from magazine.
Bolt removed for inspection. Brass chips noted in receiver. Gas port on No. 1 position.				
	98	2865	Satisfactory	Automatic fire.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
				Rifle cleaned and inspected.
				Head space as in previous inspection.
				Gas plug 50% filled with fouling.
				Front of cover and receiver burred at points of contact.
				Front crack in handguard increased in length to 1-5/8". Rear cracks are 1-3/4" and 1" in length.
				Receiver burred at point of contact with bolt.
				Gas port on No. 3 position.
14 Mar	100	2965	Satisfactory	Semiautomatic fire.
	1	2966	1 FFR	Bolt failed to go completely forward.
				Bolt removed for inspection. A large chip of brass on bullet ramp prevented bolt from locking.
	99	3065	Satisfactory	Automatic fire.
	100	3165	Satisfactory	Semiautomatic fire.
	100	3265	Satisfactory	Automatic fire.
	100	3365	1 FJ	Semiautomatic fire.
	100	3465	1 FJ	Automatic fire.
				Cyclic rate recorded for 20 rounds was 565 rounds per minute.
				Rifle cleaned and inspected.
				Head space: .206" shim.
				No fouling noted in gas plug.
				Crack at front of handguard increased to 1-3/4".
				Cracks at rear of handguard are 2-1/8" and 1".
				Gas port on No. 2 position.
	100	3565	Satisfactory	Semiautomatic fire.
	100	3665	Satisfactory	Automatic fire.
				A piece of the receiver approximately 3/32" x 3/16" was broken out at round No. 3600 at the point of the crack noted in the left side.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	100	3765	Satisfactory	Semiautomatic fire.
	100	3865	Satisfactory	Automatic fire.
	100	3965	Satisfactory	Semiautomatic fire.
	100	4065	1 FJ	Automatic fire.
Rifle cleaned and inspected. Head space as in previous inspection. No fouling noted in gas plug. Crack 1/4" in length at front end of cover. The folded edge of the case deflecting surface of the cover was broken for 3/4". The cover was also slightly bent at point of crack in receiver. Forward shoulder of retaining slot of firing pin was burred. All magazines cleaned and oiled. Gas port on No. 2 position.				
15 Mar	40	4105	Satisfactory	Semiautomatic fire.
Rifle held loosely in hands.				
	60	4165	Satisfactory	Semiautomatic fire.
	40	4205	Satisfactory	Automatic fire.
Rifle held loosely in hands.				
	60	4265	2 FJ	Automatic fire.
			2 FBR	
	40	4305	Satisfactory	Semiautomatic fire.
Rifle held right side up.				
	60	4365	12 FJ	Semiautomatic fire.
			2 FBR	
Gas port on No. 1 position.				

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	40	4405	Satisfactory	Automatic fire.
Rifle held right side up.				
	60	4465	Satisfactory	Automatic fire.
	40	4505	Satisfactory	Semiautomatic fire.
Rifle held left side up.				
	60	4565	Satisfactory	Semiautomatic fire.
	40	4605	Satisfactory	Automatic fire.
Rifle held left side up.				
	60	4665	1 FJ	Automatic fire.

Cyclic rates recorded for 2 20-round bursts were 630 and 640 rounds per minute.
Rifle cleaned and inspected.
Head space as in previous inspection.
Fouling noted in gas plug and in gas cylinder.
Largest crack at rear of handguard increased in length to 2-7/8".

16 Mar	100	4765	Satisfactory	Semiautomatic fire.
	100	4865	Satisfactory	Automatic fire.
	100	4965	1 FJ	Semiautomatic fire.
	100	5065	Satisfactory	Automatic fire.
	100	5165	Satisfactory	Semiautomatic fire.
	100	5265	Satisfactory	Automatic fire.

Rifle cleaned and inspected.
Head space as in previous inspection.
Portion of metal which was folded back over the ejection slot was completely cracked off leaving a jagged edge.
Magazines cleaned and inspected.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	100	5365	1 FJ	Semiautomatic fire.
	100	5465	Satisfactory	Automatic fire.
	100	5565	Satisfactory	Semiautomatic fire.
	100	5665	Satisfactory	Automatic fire.
	100	5765	Satisfactory	Semiautomatic fire.
Gas port changed to No. 3 position.				
	100	5865	Satisfactory	Automatic fire.
Cyclic rates recorded for 2 20-round bursts were 625 and 635 rounds per minute. Rifle cleaned and inspected. Head space as in previous inspection. Crack at left guide in cover increased in length to 3/4". Small piece broken from extractor at point of contact with lower end of extractor spring. Gas port on No. 2 position.				
17 Mar	100	5965	Satisfactory	Semiautomatic fire.
	100	6065	Satisfactory	Automatic fire.
	100	6165	Satisfactory	Semiautomatic fire.
	100	6265	Satisfactory	Automatic fire.
	100	6365	2 FJ	Semiautomatic fire.
	3	6368	1 FF	Extractor broken. Extractor and extractor spring replaced.
	97	6465	Satisfactory	Automatic fire.
Cyclic rates recorded for 2 20-round bursts were 630 and 605 rounds per minute.				

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
				Rifle cleaned and inspected.
				Head space: .206" shim. Pin protrusion: .074".
				Trigger pull: 12.1 pounds.
				Free length of operating spring: 17.53".
				Free length of piston spring 10.50".
				Breech bore gage reading: .284" at 3.64" from barrel face.
				Crack in handguard increased in length to 7-1/2".
				Receiver burred at points of contact with cover.
	33	6498	Satisfactory	Velocity test.
20 Mar	93	6591	Satisfactory	Accuracy test.
				Rifle and magazines cleaned with carbon tetrachloride in preparation for test No. XVIII.
				Gas port on No. 3 position.
	10	6601	10 FJ	Semiautomatic fire.
			1 FBR	
	10	6611	10 FJ	Automatic fire.
			1 FBR	
	10	6621	10 FJ	Semiautomatic fire.
			1 FBR	
	10	6631	10 FJ	Automatic fire.
			1 FBR	
				Bolt difficult to retract after 40 rounds.
				Rifle cleaned and oiled for test No. IX.
				Gas port on No. 3 Position.
21 Mar	40	6671	Satisfactory	Semiautomatic fire. Rifle held securely at an angle of -80°.
	40	6711	1 FBR	Semiautomatic fire. Rifle held loosely at an angle of -80°.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	33	6744	1 FBC	Automatic fire. Rifle held securely at an angle of -80°.
Bolt could not be operated by hand due to a small piece of metal broken from cover. Cover was replaced.				
	7	6751	Satisfactory	Automatic fire. Rifle held securely at an angle of -80°.
	40	6791	1 FJ	Automatic fire. Rifle held loosely at an angle of -80°.
Gas port on No. 2 position.				
	40	6831	Satisfactory	Semiautomatic fire. Rifle held securely at an angle of +80°.
	40	6871	1 FJ	Semiautomatic fire. Rifle held loosely at an angle of +80°.
Gas port on No. 3 position.				
	40	6911	Satisfactory	Automatic fire. Rifle held securely at an angle of +80°.
	40	6951	2 FJ	Automatic fire. Rifle held loosely at an angle of +80°.
Rifle and magazines cleaned with carbon tetrachloride and left dry for test No. XIV. Rifle subjected to a temperature of -65°F for 12 hours prior to firing.				
22 Mar	5	6956	4 FF	Bolt difficult to operate.
			4 FJ	
Rifle and magazines cleaned with carbon tetrachloride and lubricated with Oil, Lubricating, Aircraft Instrument (Low Volatility) Specification AN-O-11. After being subjected to a temperature of -65°F for 12 hours the rifle could not be fired as the bolt could not be completely closed. Rifle and magazines cleaned and oiled for test No. VI. Operating spring shortened 2 coils. Fully loaded rifle submerged in mud for 15 seconds.				

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
23 Mar	15	6971	3 FJ	Semiautomatic fire. Stoppages occurred on last 3 rounds fired.
				Clean magazine (not subjected to mud).
				Round could not be fed into chamber.
				Rifle and magazines cleaned and oiled for test No. V.
				Rifle subjected to dust as described in the 299th Report on Ordnance Program No. 5082.
24 Mar	20	6991	3 FJ	Semiautomatic fire.
			1 FF	
	20	7011	2 FJ	Clean magazine.
			1 FDR	Automatic fire.
				Rifle and magazines cleaned and oiled.
27 Mar	226	7237	3 FJ	Accuracy test.
			3 FDR	Bolt stop screw became loose.
28 Mar	113	7350	1 FF	Bolt overrode base of cartridge in feeding from magazine. Accuracy test.
				Rifle cleaned and friction points lubricated with special grease, supplied by Springfield Armory, for test No. XVI.
				Rifle and loaded magazine subjected to a salt water spray for a period of 15 minutes with the bolt open and 15 minutes with the bolt closed. Rifle permitted to stand for a period of 1 hour before firing.
29 Mar	10	7360	Satisfactory	Semiautomatic fire.
	10	7370	Satisfactory	Automatic fire.
				After cleaning and lubricating as noted above, rifle and loaded magazine immersed in salt water for a period of 5 minutes and permitted to stand for a period of 2 hours before firing.
	10	7380	Satisfactory	Semiautomatic fire.
	10	7390	[redacted]	overrode base of round in feeding from magazine. Rounds damaged and were replaced. Automatic fire.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
Rifle and magazine cleaned and lubricated as for test XVI. Rifle and loaded magazine immersed in a salt water bath, with sand in suspension, for a period of 15 seconds (test XV).				
30 Mar	20	7410	Satisfactory	Semiautomatic fire.
Clean magazine (not subjected to bath).				
	20	7430	2 FJ	Automatic fire.
Rifle and magazines cleaned and lubricated as for test XVI. Rifle subjected to rain test.				
31 Mar	80	7510	Satisfactory	Semiautomatic fire.
	80	7590	Satisfactory	Automatic fire.
	14	7604	FJ	Broken hammer, part replaced. Semiautomatic fire.
	66	7670	1 FF	Bolt overrode base of round in feeding from magazine. Semiautomatic fire.
	80	7750	Satisfactory	Automatic fire.
	80	7830	Satisfactory	Semiautomatic fire. Floor plate became disengaged during firing.
	80	7910	Satisfactory	Automatic fire.
	80	7990	Satisfactory	Semiautomatic fire.
	40	8030	9 FJ	Automatic fire.
			1 FF	Bolt overrode base of round in feeding from magazine.
Rifle and magazines cleaned and oiled.				

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
4 Apr	Test VIII (Grenade Test)			
	Ten M11A2 practice grenades were launched without using an auxiliary cartridge. Gas cylinder plug adjusted to permit no gas to enter cylinder. Bolt was operated by hand to accomplish extraction and ejection. Rifle and magazines lubricated with "L" oil and subjected to a temperature of -65°F for a period of 17.5 hours prior to firing.			
12 Apr	20	8050	1 FJ	Semiautomatic fire. 9 attempts were made before round was chambered.
	Rifle subjected to a temperature of -65°F for 3 additional hours.			
	20	8070	Satisfactory	Automatic fire.

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APPENDIX E

RIFLE, LIGHTWEIGHT, FN, SERIAL NO. 7

Inspected: 16 February 1950
Head space: .204" shim Pin protrusion: .081"
Trigger pull: 10.9 pounds
Free length of operating spring: 18.5".
Free length of piston spring: 10.55".

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
17 Feb	28	28	Satisfactory	Velocity test.
	72	100	Satisfactory	Function test (Test III).
20 Feb	201	301	Satisfactory	Accuracy test (Test X). Automatic fire. Gas port on No. 2 position.
21 Feb	129	430	2 FF	Accuracy test (Test X). Semi-automatic fire.
				Rifle cleaned and inspected. Head space: .204" shim. The change lever handle was slight loosened permitting it to rotate without turning the body. This defect was corrected by peening and the handle bent to obtain a more positive selection of fire. Gas port on No. 3 position.
24 Feb	100	530	3 FJ	Endurance test (Test XI). Semi-automatic fire. No. 24 magazine base loosened during firing.
	100	630	12 FJ	Gas port on No. 2 position.
			3 FBR	Magazines No. 6, 9 and 18. Automatic fire.
	100	730	8 FJ	Gas port on No. 1 position. Semi-automatic fire.
	60	790	22 FJ	Automatic fire.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
Gas port in plug was found to be fouled. The plug was cleaned and the diameter of the port increased from 2.75 mm to 3.00 mm.				
	40	830	1 FJ	Gas port on No. 3 position. Automatic fire.
	100	930	2 FJ	Gas port on No. 1 position. Semi-automatic fire. Variation in force of ejected cases noted.
	100	1030	Satisfactory	Automatic fire. Force of ejected cases decreases as the weapon becomes heated.
Rifle cleaned and inspected. Head space: .204" shim. Port in gas plug partially filled with fouling. Five coils removed from the operating spring reducing its length from 18-1/2" to 17-3/8". The gas plug was modified by drilling a .120" diameter hole 1/16" deep on the inside of the gas plug opposite the port and by extending the central hole 1/16" past the port opening.				
27 Feb	100	1130	1 FJ	Gas port on No. 3 position. Semi-automatic fire.
	100	1230	3 FJ	Automatic fire.
			1 FFR	Light indentation in primer. Impossible to retract bolt by hand. Operating handle was forced against firing bench in order to retract bolt. Deposit of carbon on shoulder of round.
	100	1330	Satisfactory	Semiautomatic fire.
	100	1430	1 FFR	Bolt failed to close completely. Necessary to force bolt to the rear as previously noted. Automatic fire.
	100	[redacted]		Semiautomatic fire. No. 8 magazine base loosened during firing.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	100	1630	Satisfactory	Automatic fire.

Rifle cleaned and inspected.
Head space: .204" shim.
Heavy deposit of fouling in gas plug; port was approximately 1/3 closed. Necessary to force piston from cylinder.
Front of cover and mating shoulder in receiver burred.
Magazines cleaned and oiled.
Gas port on No. 3 position.

28 Feb	100	1730	Satisfactory	Semiautomatic fire.
	100	1830	Satisfactory	Automatic fire.
	100	1930	Satisfactory	Semiautomatic fire.
	100	2030	Satisfactory	Automatic fire.
	100	2130	Satisfactory	Semiautomatic fire.
	100	2230	Satisfactory	Automatic fire.

Rifle cleaned and inspected.
Head space: .205" shim.
Port in gas plug about 40 percent filled with fouling. Necessary to force piston from cylinder. Increase in burring noted in previous inspection.

100	2330	Satisfactory	Semiautomatic fire.
100	2430	Satisfactory	Automatic fire.
100	2530	Satisfactory	Semiautomatic fire.
100	2630	1 FFR	Bolt failed to close completely. Light primer indent. Automatic fire.
100	2730	Satisfactory	Semiautomatic fire.
100	2830	[redacted]	Automatic fire.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
Rifle cleaned and inspected. Head space and other conditions as noted in previous inspection.				
1 Mar	100	2930	Satisfactory	Change lever accidentally rotated by rifleman during firing causing automatic fire. Semiautomatic fire.
	100	3030	Satisfactory	Automatic fire.
	100	3130	Satisfactory	Change lever again accidentally rotated during firing. Semi-automatic fire.
	100	3230	1 FJ	Automatic fire.
	100	3330	2 FJ	Semiautomatic fire.
Gas port changed to No. 1 position.				
	100	3430	2 FJ	Automatic fire.
			1 FBR	
			1 FX	
Rifle cleaned and inspected. Head space and other conditions as noted in previous inspection except as follows: Port in gas plug about 60 percent filled with fouling. Reaming and drilling necessary in order to remove fouling from gas plug. Magazines cleaned and oiled. Redesigned change lever installed. Port and central hole in gas plug increased in diameter from 3.0 mm to 3/16". Gas port on No. 3 position.				
2 Mar	40	3470	Satisfactory	Semiautomatic fire.
Rifle held loosely in hands.				

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	60	3530	Satisfactory	Semiautomatic fire.
	40	3570	Satisfactory	Automatic fire.
Rifle held loosely in hands.				
	60	3630	Satisfactory	Automa c fire.
	40	3670	Satisfactory	Semiautomatic fire.
Rifle held right side up.				
	60	3730	1 FJ	Semiautomatic fire.
	40	3770	Satisfactory	Automatic fire.
Rifle held right side up.				
	60	3830	Satisfactory	Automatic fire.
	40	3870	Satisfactory	Semiautomatic fire.
Rifle held left side up.				
	60	3930	Satisfactory	Semiautomatic fire.
	40	3970	1 FJ	Automatic fire.
Rifle held left side up.				
	60	4030	Satisfactory	Automatic fire.

Rifle cleaned and inspected.
Head space as in previous inspection.
Practically no accumulation of fouling in gas plug.
Gas piston easier to remove than in previous inspections due to smaller accumulation of fouling.
Gas port on No. 3 position.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	100	4130	1 FJ	Semiautomatic fire.
	100	4230	Satisfactory	Automatic fire.
	100	4330	1 FJ	Semiautomatic fire.
Gas port on No. 2 position.				
	100	4430	Satisfactory	Automatic fire.
	100	4530	1 FJ	Semiautomatic fire.
	100	4630	1 FJ	Automatic fire.
Rifle cleaned and inspected. Head space and other conditions as noted in previous inspection. Gas port on No. 2 position.				
3 Mar	100	4730	Satisfactory	Semiautomatic fire.
	100	4830	Satisfactory	Automatic fire.
	100	4930	Satisfactory	Semiautomatic fire.
	100	5030	Satisfactory	Automatic fire.
	100	5130	1 FJ	Semiautomatic fire.
	100	5230	Satisfactory	Automatic fire.
Rifle cleaned and inspected. Head space and other conditions as noted in previous inspection. Gas port on No. 2 position.				
6 Mar	100	5330	Satisfactory	Semiautomatic fire.
	100	5430	Satisfactory	Automatic fire.
	100	5530	Satisfactory	Semiautomatic fire.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	100	5630	Satisfactory	Automatic fire.
Cyclic rate recorded for 20 rounds was 645 rounds per minute.				
	100	5730	Satisfactory	Semiautomatic fire.
	100	5830	Satisfactory	Automatic fire.
Rifle cleaned and inspected. Head space: .206" shim. Slight burring of the hammer check.				
	100	5930	Satisfactory	Semiautomatic fire.
	100	6030	Satisfactory	Automatic fire.
Cyclic rate recorded for 20 rounds was 670 rounds per minute.				
	100	6130	Satisfactory	Semiautomatic fire.
	100	6230	Satisfactory	Automatic fire.
	100	6330	Satisfactory	Semiautomatic fire.
	100	6430	Satisfactory	Automatic fire.
Rifle cleaned and inspected. Head space: .206" shim Trigger pull: 10.9 pounds. Free length of operating spring: 17.78" (spring was stretched slightly in disassembly). Free length of piston spring: 10.54". Crack in left front end of cover approximately 3/4" long.			Pin protrusion: .091".	
7 Mar	25	6455	Satisfactory	Velocity test.
	93	6548	Satisfactory	Accuracy test.
Broken extractor spring was replaced. Rifle and magazines cleaned with carbon tetrachloride in preparation for test No. XVIII. Gas port on No. 2 position [redacted]				

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
8 Mar	10	6558	1 FJ	Semiautomatic fire.
			1 FBR	
	10	6568	6 FJ	Automatic fire.
	10	6578	2 FJ	Semiautomatic fire.
			1 FBR	
Gas port on No.3 position.				
	10	6588	1 FF	Block overrode round in feeding. Automatic fire.
			3 FJ	
			1 FBR	
Rifle cleaned and oiled for test No. IX. Gas port on No. 3 position.				
21 Mar	40	6628	Satisfactory	Semiautomatic fire. Rifle held securely at an angle of -80°.
	40	6668	2 FBR	Semiautomatic fire. Rifle held loosely at an angle of -80°.
	40	6708	Satisfactory	Automatic fire. Rifle held securely at an angle of -80°.
	40	6748	Satisfactory	Automatic fire. Rifle held loosely at an angle of -80°.
Gas port on No. 2 position.				
	40	6788	1 FJ	Semiautomatic fire. Rifle held securely at an angle of +80°.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	22	6810	2 FJ	Semiautomatic fire. Rifle held loosely at an angle of +80°.
Gas port on No. 3 position.				
	18	6828	2 FJ	Semiautomatic fire. Rifle held loosely at an angle of +60°.
	40	6868	Satisfactory	Automatic fire. Rifle held securely at an angle of +80°.
	40	6908	3 FJ	Automatic fire. Rifle held loosely at an angle of +80°.
Rifle and magazines cleaned with carbon tetrachloride and left dry for test No. XIV. Rifle subjected to a temperature of -65°F for 12 hours prior to firing.				
22 Mar	5	6913	4 FF	Bolt difficult to operate.
			3 FJ	
Rifle and magazines cleaned with carbon tetrachloride and lubricated with Oil, Lubricating, Aircraft Instrument (Low Volatility) Specification AN-O-11. After being subjected to a temperature of -65°F for 12 hours the rifle could not be fired as the bolt could not be completely closed. Rifle and magazines cleaned and oiled for test No. VI. Operating spring shortened 2 coils.. Fully loaded rifle submerged in mud for 15 seconds.				
23 Mar	20	6933	1 FJ	Semiautomatic fire.
Clean magazine (not subjected to mud). Change lever impossible to operate by hand.				
	20	6953	Satisfactory	Automatic fire.
Rifle and magazines cleaned and oiled for test No. 5. Rifle subjected to dust as described in the 899th Report on Ordnance Program No. 5082.				

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
24 Mar	20	6973	2 FJ	Semiautomatic fire.
	20	6993	1 FJ	Clean magazine. Automatic fire.
Rifle and magazines cleaned and oiled.				
27 Mar	226	7219	7 FJ	Accuracy test.
			3 FF	
			1 FBR	
28 Mar	113	7332	5 FJ	Accuracy test.
Rifle cleaned and friction points lubricated with special grease, supplied by Springfield Armory, for test No. XVI. Rifle and loaded magazine subjected to a salt water spray for a period of 15 minutes with the bolt open and 15 minutes with the bolt closed. Rifle permitted to stand for a period of a 1 hour before firing.				
29 Mar	10	7342	Satisfactory	Semiautomatic fire.
	10	7352	Satisfactory	Automatic fire.
After cleaning and lubricating as noted above, rifle and loaded magazine immersed in salt water for a period of 5 minutes and permitted to stand for a period of 2 hours before firing.				
	10	7362	Satisfactory	Semiautomatic fire.
	10	7372	Satisfactory	Automatic fire.
Rifle and magazine cleaned and lubricated as for test XVI. Rifle and loaded magazine immersed in a salt water bath, with sand in suspension, for a period of 15 seconds (test XV).				
30 Mar	20	7392	4 FFR	Semiautomatic fire.
			1 FJ	
Clean magazine (not subjected to [redacted])				

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	20	7412	2 FJ	Automatic fire. Change lever could not be rotated to automatic position by hand.
Rifle and magazines cleaned and lubricated as for Test XVI. Rifle subjected to rain test.				
31 Mar	68	7480	2 FJ	Semiautomatic fire. Hammer broke on second stoppage. Broken part replaced.
	12	7492	1 FJ	Semiautomatic fire.
	80	7572	1 FJ	Automatic fire.
	80	7652	2 FJ	Semiautomatic fire.
	80	7732	2 FJ	Automatic fire.
	80	7812	2 FJ	Semiautomatic fire.
	80	7892	2 FJ	Automatic fire.
			2 FF	Bolt failed to close completely. Impossible to retract bolt by hand after each malfunction.
	80	7972	3 FJ	Semiautomatic fire.
	40	8012	1 FJ	Automatic fire. One rear sight screw became disassembled and was lost during firing.

Rifle and magazines cleaned and oiled.

4 Apr Test VIII (Grenade test).

Ten M11A2 practice grenades were launched without using an auxiliary cartridge.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS

Gas cylinder plug adjusted to permit no gas to enter cylinder. Bolt was operated by hand to accomplish extraction and ejection.

Test IV (Cook-Off Test)

5 Apr	398	8410	3 FJ	Automatic fire.
			3 FF	1 round damaged.
			2 FBR	398 rounds fired in 4 min 8 sec.
	1	8411		Cook-off occurred in 59 sec.

Front sight fell off during firing.
Thumb piece, screw and lock fell off bolt stop assembly in firing.
Handguard burst into flames after about 300 rounds.
Barrel, gas cylinder and piston bent downward.
Rifle cleaned and inspected.
Handguard broke into 2 pieces on disassembly.
Receiver was cracked on left side at rear of cocking handle cut.
Rifle withdrawn from test.

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APPENDIX E

RIFLE, LIGHTWEIGHT, T25, SERIAL NO. 10

Inspected: 16 February 1950
Head space: 1.546" Pin Protrusion: .049"
Trigger pull: Semi - 7.8 pounds, Auto - 16.2 pounds.
Free length of operating springs: outer - 11.8"
inner - 11.7".

DATE 1950	ROUNDS FIRED	FUNCTION	REMARKS
6 Mar	80	Satisfactory	Automatic fire.
			Cyclic rate recorded for 20 rounds was 780 rounds per minute.
			Rifle and magazines lubricated with cold test oil No. 2 to which sufficient kerosene had been added to make a 50% mixture (furnished by the United Kingdom) and subjected to a temperature of -65°F for 17.5 hours prior to firing.
12 Apr	5	5 FJ	Semiautomatic fire. All feeding was manually assisted.
18 Apr	103	Satisfactory	Accuracy test. Semiautomatic fire.

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APPENDIX E

RIFLE, LIGHTWEIGHT, T25, SERIAL NO. 14

Inspected: 16 February 1950
Head Space: 1.547" Pin protrusion: .048"
Trigger pull: Semi - 7.7 pounds, Auto - 18.0 pounds.
Free length of operating springs: outer - 12.0"
inner - 11.7"

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
17 Feb	33	33	1 FCB	Velocity test.
20 Feb	67	100	Satisfactory	Function test (Test III).
	200	300	1 FBR	Accuracy test (Text X). Automatic fire.
21 Feb	115	415	Satisfactory	Accuracy test (Text X). Semiautomatic fire.

Rifle cleaned and inspected.
Head space 1.548".
Burring was noted on the following parts:

1. Hammer at points of contact with bolt lock.
2. Automatic sear at points of contact with bolt.
3. Operating slide at upper front and lower rear surfaces of actuating lug.
4. Receiver at points of contact with top front of magazine.

24 Feb	100	515	Satisfactory	Endurance test (Test XI). Semiautomatic fire.
	100	615	1 FBR	Automatic fire.
	100	715	1 FF	Bullet struck front of magazine.
			1 FBR	Magazine No. 24. Semiautomatic fire.
	100	815	1 FBR	Magazine No. 30. Automatic fire.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	100	915	2 FBR	Magazines No. 30 and 15. Semi-automatic fire.
	100	1015	2 FF	Bullets struck front of magazines No. 2 and 26.
			3 FBR	Automatic fire.
				Rifle cleaned and inspected. Head space 1.548" Burring noted on previous inspection not noticeably increased. Bolt lock slightly burred at point of contact with hammer.
27 Feb	100	1115	1 FBR	Semiautomatic fire.
	100	1215	Satisfactory	Automatic fire.
	100	1315	Satisfactory	Semiautomatic fire.
	100	1415	Satisfactory	Automatic fire.
	100	1515	1 FF	Bullet struck front of magazine No. 2. Semiautomatic fire.
	100	1615	1 FBR	Magazine No. 24. Automatic fire.
				Rifle cleaned and inspected. Head space 1.546" Slight increase in burring previously noted. Magazine No. 2 slightly burred at aperture by catch. Handguard has a 3/4" crack at front. Magazines cleaned and oiled.
28 Feb	100	1715	Satisfactory	Semiautomatic fire.
				Gas escaping between handguard and stock contacts bare hand of rifleman causing discomfort.
	100	1815	2 FF	Bullets struck front of magazines [redacted] No. 24 and 26. Automatic fire.
	100	1915	Satisfactory	Semiautomatic fire.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	100	2015	Satisfactory	Automatic fire.
	100	2115	4 FF	Bullets struck front of magazine on 2 occasions and on 2 occasions rounds were partly out of magazine. Magazines No. 26, 24 and 2. Semi-automatic fire.
	100	2215	2 FF	Bullets struck front of magazines No. 2 and 26. Automatic fire.
Rifle cleaned and inspected. Head space as in previous inspection. Magazines No. 2, 24 and 26 replaced with No. 4, 11 and 25.				
	100	2315	1 FF	Bullet struck front of magazine No. 11.
			2 FBR	Magazines No. 23 and 25. Semiautomatic fire.
	100	2415	1 FF	Bullet struck front of magazine No. 15. Automatic fire.
	100	2515	1 FBR	Magazine No. 4.
			2 FF	One failure caused by bullet hitting the front of magazine No. 15 and other was caused by sharp forward corner of bolt cutting into round in magazine, under round being fed, sufficiently to stop forward movement of bolt. Semiautomatic fire.
	100	2615	4 FF	Bullets struck front of magazines No. 30, 25 and 15.
			1 FBR	Automatic fire.
	100	2715	3 FBR	Magazines No. 30 and 4.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
			4 FF	Three failures caused by bullets hitting front of Magazines No. 25, 4 and 11. Other failure caused by bolt cutting into round, under round being fed, sufficiently to stop forward movement of bolt. Semiautomatic fire.
	100	2815	5 FF	Bullets struck front of magazines No. 15, 25 and 11.
			2 FBR	Magazines No. 15 and 4. Automatic fire.

Rifle cleaned and inspected.
Head space as in previous inspection.
Broken front firing pin was replaced. Pin protrusion with new part .045".
Bolt and bolt lock worn from contact with hammer.
Stock slightly eroded by gas at a point opposite gas escape port in cylinder.
Retainer shows wear and deformation at forward end.
Selector cam hole in retainer shows wear.
Burrs on actuating lug of operating slide.

1 Mar	100	2915	3 FF	Two failures caused by bullets hitting front of magazines No. 30 and 25. Bolt failed to engage round on one occasion from magazine No. 15.
			1 FBR	Magazine No. 4. Semiautomatic fire.
	100	3015	3 FF	Bullets struck front of magazines No. 11 and 25.
			2 FBR	Magazines No. 11 and 25. Automatic fire.
	100	3115	Satisfactory	Semiautomatic fire.
	100	3215	2 FBR	Magazines No. 4 and 11.
	[redacted]			Bullet struck front of magazine No. 11. Automatic fire.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	100	3315	2 FF	One failure caused by bullet hitting front of magazine No. 11. Other failure caused by bolt cutting into round in magazine, under round being fed, sufficiently to stop forward movement of bolt. Semiautomatic fire.
	100	3415	7 FF	Five failures caused by bullets hitting front of magazines No. 15, 25 and 11. Other failures caused by bolt cutting into round in magazine, under round being fed, sufficiently to stop forward movement of bolt.

Rifle cleaned and inspected.
Head space as in previous inspection.
Increase in burring at points previously noted.
Burrs removed from operating slide, bolt and hammer.
Magazines No. 25 and 11 replaced with No. 3 and 21.
Crack in handguard increased to a length of 1".
Magazines cleaned and oiled.

2 Mar	40	3455	Satisfactory	Semiautomatic fire.

Rifle held loosely in hands.

	60	3515	8 FF	Bolt failed to contact base of round on 4 occasions. Bolt overrode base of cartridge on 4 occasions. Magazines No. 30, 15 and 4.
			1 FBR	Magazine No. 30. Automatic fire.
	40	3555	1 FF	Bullet hit front of magazine No. 21. Semiautomatic fire.

Rifle held loosely in hands.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	60	3615	2 FF	Bolt overrode base of cartridge on one occasion and bullet hit front of magazine on other failure. Magazine No. 4. Automatic fire.
	40	3655	1 FF	Bullet hit front of magazine No. 21.
			2 FBR	Magazines No. 30 and 21. Semiautomatic fire.
Rifle held right side up.				
	60	3715	1 FF	Bolt overrode base of cartridge in feeding from magazine No. 15.
			1 FBR	Magazine No. 4. Semiautomatic fire.
	40	3755	2 FF	Bullet hit front of magazine No. 21 and bolt failed to contact base of another round in same magazine.
			1 FBR	Magazine No. 4. Automatic fire.
Rifle held right side up.				
	60	3815	2 FF	Bullet hit front of magazine No. 15 and bolt failed to contact base of another round in same magazine.
			1 FBR	Magazine No. 15. Automatic fire. Ejected cases hit shooter in chest.
	40	3855	1 FF	Bullet hit front of magazine No. 4.
			2 FBR	Magazines No. 4 and 30. Semiautomatic fire.
Rifle held left side up.				

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	60	3915	3 FF	Bullets hit front of magazines No. 15 and 21. Bolt overrode base of cartridge in feeding from magazine No. 21. Semiautomatic fire.
	40	3955	5 FF	Bullets hit front of magazines No. 21 and 4. Bolt failed to contact base of cartridge on 2 occasions from magazine No. 21.
			1 FBR	Magazine No. 4. Automatic fire.
Rifle held left side up.				
	60	4015	2 FBR	Magazines No. 15 and 3. Automatic fire.
Rifle cleaned and inspected. Head space as in previous inspection. Gas plug loosened during firing. Additional burring noted in receiver at points of contact with magazine and with trigger housing lugs. Operating slide contacts stock. Stock relieved to permit free movement. Stock cracked at 2 points. A 5" crack extends forward of magazine cut and a 3" crack is located in forearm. Additional wear and burring in trigger housing at points of contact with magazine. Front of retainer deformed. A new part was installed. Burrs removed from bolt and operating slide.				
	100	4115	4 FF	Bullets hit front of magazines No. 21, 15 and 4. Bolt failed to contact base of one round.
			1 FBR	Magazine No. 21. Semiautomatic fire.
	100	4215	6 FF	Bullets hit front of magazines No. 3, 4 and 21.
			2 FBR	Magazines No. 15 and 3. Automatic fire.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	100	4315	2 FF	Bullets hit front of magazines No. 30 and 21.
			2 FBR	Magazines No. 15 and 30. Semiautomatic fire.
	100	4415	6 FF	Bullets hit front of magazines No. 3 and 4. Bolt overrode base of cartridge in feeding on 3 occasions from magazines No. 30 and 3. Automatic fire.
Modified magazines No. 16 and 18 used for the following 100 rounds.				
	100	4515	2 FF	Bullets hit front of magazines.
			1 FBR	Magazine No. 16. Semiautomatic fire.
	100	4615	10 FF	Bullets hit front of magazines No. 21, 15, 4 and 30. Block overrode base of cartridge on 2 occasions from magazines No. 15 and 4.
			4 FBR	Magazines No. 21, 15, 4 and 3. Automatic fire.
Rifles cleaned and inspected. Head space as in previous inspection. Increase in burring at points previously noted. Additional burring at locking shoulder in receiver. Crack in stock forward of magazine cut increased in length to 8-1/4". Modified springs installed in magazines No. 15, 21, 30, 4, 16, 18 and 3.				
3 Mar	100	4715	2 FF	Bullet hit front of magazine No. 15. Bolt failed to contact base of cartridge in magazine No. 30.
			2 FBR	Magazines No. 15 and 21. Semiautomatic fire.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	100	4815	2 FF	Bullet hit front of Magazine No. 3. Bolt failed to contact base of cartridge in magazine No. 21.
			2 FBR	Magazines No. 21 and 15. Automatic fire.
	100	4915	2 FBR	Magazines No. 15 and 3 . Semiautomatic fire.
	100	5015	2 FF	Bolt failed to contact bases of cartridges from magazines No. 21 and 30.
			4 FBR	Magazines No. 15, 21, 4 and 30. Automatic fire.
	100	5115	6 FF	Bolt failed to contact bases of cartridges from magazines No. 30, 15 and 21 on 5 occasions. Bullets hit front of magazines No. 4 and 3. Bolt overrode base of cartridge in feeding 1 round from magazine No. 21.
			2 FBR	Magazines No. 15 and 21. Semiautomatic fire.
	100	5215	6 FF	Bolt failed to contact base of cartridges on 4 occasions from magazines No. 21, 3 and 30. Bolt overrode bases of cartridges in feeding from magazines No. 15 and 30. Automatic fire.

Rifles cleaned and inspected.
Head space 1.549".
Increase in burring at points noted in previous inspection.
Retainer worn at forward end as was the previous part. Selector cam hole in retainer also shows wear.
Retainer also burred at point of contact with automatic sear.
Front firing pin shows wear.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
Rear firing pin burred at all points of contact. Automatic sear pin burred. Crack in stock forward of magazine cut increased in length to 10". Stock ferrule loose. Top rear of stock grip cracked. Stock scraped at front end to form a channel for gas to escape. New operating slide installed. New magazines No. 23, 14, 22, 10, 13, 9 and 23, having modified springs, placed in service.				
6 Mar	100	5315	7 FF	Bullets hit front of magazines No. 23, 10 and 22.
			3 FBR	Magazines No. 23, 10 and 22. Semiautomatic fire.
	100	5415	15 FF	Bullets hit front of magazines No. 10, 14, 22, 23 and 9. Bolt overrode cartridge in feeding on 1 occasion from magazine No. 14.
			3 FBR	Magazines No. 10, 14 and 22. Automatic fire.
Cracked stock was replaced.				
	100	5515	5 FF	Bullets hit front of magazines No. 14, 10, 9 and 22.
			2 FBR	Magazines No. 10 and 22. Semiautomatic fire.
	100	5615	3 FBR	Magazines No. 10 and 22. Automatic fire.
Cyclic rate recorded for 20 rounds was 900 rounds per minute.				
	100	5715	1 FF	Bullet hit front of magazine No. 22.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
			1 FBR	Magazine No. 10.
			1 FBRM	Semiautomatic fire.
	100	5815	1 FF	Bullet hit front of magazine No. 23.
			1 FBF	Magazine No. 10. Automatic fire.

Rifle cleaned and inspected.
Head space as in previous inspection.
Handguard cracked at 3 points at forward end and charred in area near the gas cylinder.
Stock cracked for a length of 3-1/8" forward of magazine cut. Interference between stock and forward portion of operating slide. Stock relieved to prevent interference.
Left retaining lug broken from trigger housing during firing.
Additional burring of actuating lug on operating slide.

100	5915	6 FF	Bullets hit front of magazines No. 10, 23, 9 and 22. Bolt overrode cartridge in feeding on one occasion from magazine No. 10. Semiautomatic fire.
100	6015	4 FF	Bullets hit front of magazines No. 9, 22 and 23. Bolt overrode cartridge in feeding on one occasion from magazine No. 22.
		1 FBR	Magazine No. 10. Automatic fire.

Cyclic rate recorded for 20 rounds was 800 rounds per minute.

100	6115	6 FF	Bullets hit front of magazines No. 23, 14, 22 and 9. Bolt overrode cartridge on one occasion from magazine No. 9.
		2 FBR	Magazines No. 23 and 10. Semiautomatic fire.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	86	6201	1 FFR	Broken hammer spri[illegible].
			2 FF	Bullets hit front of magazines No. 9 and 22.
			2 FBR	Magazines No. 10 and 22. Automatic fire.
	14	6215	Satisfactory	Automatic fire.
	100	6315	2 FF	Bullets hit front of magazine No. 23.
			2 FBR	Magazines No. 23 and 22. Semiautomatic fire.
	100	6415	1 FF	Bolt overrode cartridge in feeding from magazine No. 14.
			2 FBR	Magazines No. 14 and 10. Automatic fire.

Rifle cleaned and inspected.
Head space: 1.549" Pin protrusion: .040".
Trigger pull: Semi - 8.0 pounds, Auto - 17.7 pounds.
Free length of operating springs: outer - 11.9"
inner - 11.5"
Front firing pin was broken. Pin replaced.
Crack in stock increased in length to 8.5".
Additional burring on actuating lug of operating slide.

7 Mar	25	6440	Satisfactory	Velocity test.
	93	6533	Satisfactory	Accuracy test.

Original stock installed.

	90	6623	Satisfactory	Accuracy test.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
Following parts replaced: 1. Extractor. 2. Extractor spring. 3. Extractor plunger. 4. Ejector spring. 5. Trigger group (formerly installed in rifle Serial No. 10). Free lateral movement of front sight: .0095". Free lateral movement of rear sight: .0125". Rifle and magazines cleaned with carbon tetrachloride in preparation for test No. XVIII.				
8 Mar	10	6633	2 FF	Bolt overrode base of cartridge in feeding from magazine and on one occasion bolt failed to engage base of cartridge in magazine. Semiautomatic fire.
	10	6643	7 FF	Bolt failed to engage base of cartridge in magazine on 5 occasions. Bolt overrode base of cartridge in feeding from magazine on 2 occasions. Bolt failed to push round from magazine on 3 occasions after malfunction.
			1 FBR	Automatic fire.
	10	6653	7 FF	As in previous 10 rounds.
			3 FJ	Bolt failed to push round from magazine on 5 occasions after malfunction. Semiautomatic fire.
	3	6656	3 FF 2 FJ	Bolt failed to engage base of cartridge in magazine on 1 occasion and bolt failed to push round from magazine on 2 occasions after malfunction.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
Test No. XVIII discontinued due to 100% failures. Rifle cleaned and oiled for test No. IX. Small gas port used.				
21 Mar	20	6676	16 FF	Bolt overrode base of round in feeding 7 rounds from magazine and bolt failed to engage base of round in magazine on 9 occasions.
			1 FBR	Semiautomatic fire. Rifle held securely at an angle of -80°.
	20	6696	15 FF	Bolt overrode base of round in feeding 7 rounds from magazine and bolt failed to engage base of round in magazine on 8 occasions.
			1 FBR	Semiautomatic fire. Rifle held loosely at an angle of -80°.
	40	6736	6 FF	Bolt overrode base of round in feeding 3 rounds from magazine and bolt failed to engage base of round in magazine on 3 occasions. Automatic fire. Rifle held securely at an angle of -80°.
	40	6776	19 FF	Bolt overrode base of round in feeding 9 rounds from magazine and bolt failed to engage base of round in magazine on 10 occasions.
			1 FBR	Automatic fire. Rifle held loosely at an angle of -80°.
Large gas port used. Test refired.				
	40	6816	Satisfactory	Semiautomatic fire. Rifle held securely at an angle of -80°.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	40	6856	2 FF	Bolt overrode base of rounds in feeding from magazine. Semiautomatic fire. Rifle held loosely at an angle of -80°.
	40	6896	Satisfactory	Automatic fire. Rifle held securely at an angle of -80°.
	40	6936	Satisfactory	Automatic fire. Rifle held loosely at an angle of -80°.
	40	6976	Satisfactory	Semiautomatic fire. Rifle held securely at an angle of +80°.
	40	7016	1 FBR	Semiautomatic fire. Rifle held loosely at an angle of +80°.
	40	7056	Satisfactory	Automatic fire. Rifle held securely at an angle of +80°.
	40	7096	Satisfactory	Automatic fire. Rifle held loosely at an angle of +80°.
				On disassembly it was noted that the operating slide guide had been improperly assembled. The pin was not in the groove provided for it on the barrel. Rifle and magazines cleaned with carbon tetrachloride and left dry for test No. XIV. Rifle subjected to a temperature of -65°F for 12 hours prior to firing.
22 Mar	5	7101	5 FF	Bolt failed to push round from magazine.
				Bolt could be operated by hand. Rifle and magazines cleaned with carbon tetrachloride and lubricated with Oil, Lubricating, Aircraft Instrument (Low Volatility) Specification AN-O-11. Rifle subjected to a temperature of -65°F for 12 hours prior to firing.
23 Mar	5	7106	5 FF	Bolt failed to push round from magazine.
				Bolt could be operated by hand.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
Rifle and magazines cleaned and oiled for test No. VI. Fully loaded rifle submerged in mud for 15 seconds.				
	10	7116	7 FF	Satisfactory function on first 3 rounds.
			4 FFR	Bolt failed to lock.
Bolt could not be operated by hand. Rifle and magazine cleaned and oiled for test No. V. Rifle subjected to dust test as described in the 299th Report on Ordnance Program No. 5082.				
24 Mar	20	7136	8 FF	Bolt closed by hand on 4 occasions.
			1 FBR	Semiautomatic fire.
	20	7156	2 FF	Clean magazine. Automatic fire.
Rifle and magazines cleaned and oiled.				
27 Mar	229	7385	1 FF	Accuracy test.
			1 FBR	
28 Mar	113	7498	Satisfactory	Accuracy test.
Rifle cleaned and friction points lubricated with special grease, supplied by Springfield Armory, for test No. XVI. Rifle and loaded magazine subjected to a salt water spray for a period of 15 minutes with the bolt open and 15 minutes with the bolt closed. Rifle permitted to stand for a period of 1 hour before firing.				
29 Mar	10	7508	1 FF	Bullet struck front of magazine. Semiautomatic fire.
	10	7518	Satisfactory	Automatic fire.
After cleaning and lubricating as noted above, rifle and loaded magazine immersed in salt water for a period of 5 minutes and permitted to stand for a period of 2 hours before firing.				

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	10	7528	Satisfactory	Semiautomatic fire.
	10	7538	Satisfactory	Automatic fire.
Rifle and magazine cleaned and lubricated as for test XVI. Rifle and loaded magazine immersed in a sea water bath, with sand in suspension, for a period of 15 seconds. (Test XV)				
30 Mar	20	7558	Satisfactory	Semiautomatic fire.
Clean magazine (not subjected to bath).				
	20	7578	Satisfactory	Automatic fire.
Rifle and magazines cleaned and lubricated as for test XVI. Rifle subjected to rain test.				
31 Mar	80	7658	2 FBR	Semiautomatic fire.
	80	7738	Satisfactory	Automatic fire.
	80	7818	Satisfactory	Semiautomatic fire.
	80	7898	1 FBR	Automatic fire.
	80	7978	Satisfactory	Semiautomatic fire.
	80	8058	Satisfactory	Automatic fire.
	80	8138	Satisfactory	Semiautomatic fire.
	40	8178	Satisfactory	Automatic fire.
Rifle and magazines cleaned and oiled.				
3 Apr	Test VIII (Grenade test)			
Eleven M11A2 practice grenades were launched without using the auxiliary grenade cartridge and an additional 10 were launched using the auxiliary cartridge.				

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
				When firing with the auxiliary grenade cartridge, the cover became disengaged from the receiver on firing, permitting the operating slide to become disengaged from the bolt. The fired cases ejected but the bolt did not remain at the rear. Rifle and magazines lubricated with "A" oil and subjected to a temperature of -65°F for 17.5 hours prior to firing.
12 Apr	20	8198	Satisfactory	Semiautomatic fire.
				Rifle subjected to a temperature of -65°F for 3 additional hours. Selector set on Auto
	2	8200	2 FF	Bolt would not push round from magazine. An attempt was made to start firing with the bolt closed with the same result.
17 Apr				Additional firing on Test VIII (Grenade test).
				Twenty-five M11A2 practice grenades were launched without using the auxiliary grenade cartridge. The fired cases ejected but the bolt failed to stay to the rear. The cover became disengaged and fell off rifle on one occasion.

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APPENDIX E

RIFLE, LIGHTWEIGHT, T25, SERIAL NO. 15

Inspected: 16 February 1950
Head space: 1.546" Pin protrusion: .048".
Trigger pull: Semi - 7.7 pounds, Auto - 19.3 pounds.
Free length of operating springs: outer - 11.9".
inner - 11.7".

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
17 Feb	34	34	1 FCB	Velocity test.
20 Feb	66	100	Satisfactory	Function test. (Test III).
23 Feb	160	260	1 FBR	Accuracy test (Test X). Automatic fire.
24 Feb	115	395	Satisfactory	Accuracy test (Test X). Semi-automatic fire.

Rifle cleaned and inspected in preparation for endurance test (Test No. XI).
Head space: 1.548".
Following new parts installed:

1. Modified piston having 2 gas ports of different diameters.
2. Modified gas cylinder to accommodate piston.
3. Stock.

Large gas port used.

9 Mar	100	495	Satisfactory	Semiautomatic fire.
	100	595	1 FBR	Magazine No. 8. Automatic fire.
	100	695	Satisfactory	Semiautomatic fire.
	100	795	Satisfactory	Automatic fire.
	100	895	Satisfactory	Semiautomatic fire.
	100	995	Satisfactory	Automatic fire.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
				Cyclic rate recorded for 20 rounds was 900 rounds per minute. Rifle cleaned and inspected. Head space as in previous inspection. Stock cracked for a length of 1" forward of magazine cut. The following parts were burred: 1. Actuating lug of operating slide. 2. Automatic sear at points of contact with bolt. 3. Hammer at points of contact with bolt lock. 4. Bolt lock at points of contact with hammer. Small gas port (.076") used.
	100	1095	Satisfactory	Semiautomatic fire.
	100	1195	Satisfactory	Automatic fire.
	100	1295	Satisfactory	Semiautomatic fire.
	100	1395	Satisfactory	Automatic fire.
	100	1495	Satisfactory	Semiautomatic fire.
	100	1595	Satisfactory	Automatic fire.
				Cyclic rate recorded for 20 rounds was 850 rounds per minute. Rifle cleaned and inspected. Head space as in previous inspection. Retainer burred by contact with automatic sear. Additional burring on operating slide and automatic sear. All magazines cleaned and oiled. New piston installed having a .070" diameter port. Bolt stop on follower modified by bending upward.
10 Mar	100	1695	Satisfactory	Semiautomatic fire.
	100	1795	Satisfactory	Automatic fire.
	100	1895	Satisfactory	Semiautomatic fire.
	100	1995	Satisfactory	Automatic fire.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	100	2095	Satisfactory	Semiautomatic fire.
	100	2195	Satisfactory	Automatic fire. Rifleman prevented a malfunction by clearing an ejected case from receiver. Ejected case fell into receiver after burst (bolt remained at rear).

Cyclic rate recorded for 20 rounds was 760 rounds per minute.
Rifle cleaned and inspected.
Head space as in previous inspection.
Crack 1/2" in length in handguard.
Additional burring on operating slide.

100	2295	Satisfactory	Semiautomatic fire.
100	2395	Satisfactory	Automatic fire.
100	2495	Satisfactory	Semiautomatic fire.
100	2595	Satisfactory	Automatic fire.
100	2695	Satisfactory	Semiautomatic fire.
100	2795	Satisfactory	Automatic fire.

Rifle cleaned and inspected.
Head space as noted in previous inspection.
Two small cracks at top of pistol grip.
Cracks in handguard 3" and 1/2" in length.
Additional burring on operating slide.

100	2895	Satisfactory	Semiautomatic fire.
100	2995	1 FF	Magazine No. 5. Automatic fire.
100	3095	Satisfactory	Semiautomatic fire.
100	3195	1 FF	Bolt overrode base of cartridge in feeding from magazine No. 12. Automatic fire.

[redacted]

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[redacted]

APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	100	3295	1 FF	Similar to previous stoppage. Semiautomatic fire.
	100	3395	Satisfactory	Automatic fire.

Cyclic rate for 20 rounds was 875 rounds per minute.
Rifle cleaned and inspected.
Head space as in previous inspection.
Additional burring noted on operating slide hammer and automatic sear.
Three additional 1" cracks noted in stock; 2 at magazine cut and 1 at front of forearm.

	100	3495	Satisfactory	Semiautomatic fire.
	100	3595	Satisfactory	Automatic fire.
	100	3695	Satisfactory	Semiautomatic fire.
	100	3795	Satisfactory	Automatic fire.
	100	3895	Satisfactory	Semiautomatic fire.
	100	3995	Satisfactory	Automatic fire.

Rifle cleaned and inspected.
Head space as in previous inspection.
Additional burring on operating slide.
Crack in handguard increased to 4".
Front firing pin was broken. Pin was replaced with one having a protrusion of .049".
Piston replaced with one having a standard and a .066" port diameter.
The follower in magazine No. 12 was replaced due to part being damaged.
Magazine springs modified to obtain proper positioning of followers. Magazines No. 1, 5, 8, 12 and 29 in service.

15 Mar	40	4035	1 FF	Bolt failed to contact base of cartridge in magazine No. 5.
			2 FBR	Magazines No. 12 and 5. Semiautomatic fire.

Rifle held loosely in hands.

[redacted]

[redacted]

APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	60	4095	28 FF	Bolt failed to contact base of cartridge on 12 occasions and bolt overrode base of cartridge in feeding on 16 occasions.
			2 FBR	Semiautomatic fire.
Piston having a port .070" in diameter (previously used) installed.				
	40	4135	Satisfactory	Automatic fire.
Rifle held loosely in hands.				
	60	4195	1 FF	Bolt overrode base of cartridge in feeding from magazine No. 8. Automatic fire.
	40	4235	Satisfactory	Semiautomatic fire.
Rifle held right side up.				
	60	4295	4 FF	Bolt overrode base of rounds in feeding from magazines No. 1, 12 and 5. Semiautomatic fire.
Front sling swivel fell off gun during firing.				Part was reassembled.
	40	4335	Satisfactory	Automatic fire.
Rifle held right side up.				
	60	4395	2 FBR	Automatic fire.
			11 FF	Bolt overrode base of cartridge in feeding 7 rounds. Bolt failed to contact base of cartridge in magazine on 1 occasion. Bolt failed to push round from magazine on 3 occasions.

[redacted]

[redacted]

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[redacted]

APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	40	4435	Satisfactory	Semiautomatic fire.
Rifle held left side up.				
	60	4495	13 FF	Bolt overrode bases of cartridges in feeding 11 rounds from magazines No. 29 and 5. Bolt failed to contact base of round in magazine on 1 occasion and bolt failed to push round completely from magazone on 1 occasion.
			3 FBR	Magazines No. 8, 29 and 5. Semiautomatic fire.
Magazines No. 13, 14, 22, 23 and 28 in service.				
	40	4535	Satisfactory	Automatic fire.
Rifle held left side up.				
	60	4595	1 FF	Bolt overrode base of cartridge in feeding from magazine No. 22. Automatic fire.

Cyclic rates recorded for 2 20-round bursts were 800 and 805 rounds per minute.
Rifle cleaned and inspected.
Head space as in previous inspection.
Crack in trigger housing at left retainer lug.
A total of 7 cracks noted in stock ranging from 3/8" to 2-1/2" in length. Stock also charred at point of vent in gas cylinder.
Crack in handguard increased in length to 4-1/2".
Additional burring of operating slide, automatic sear, hammer and bolt.
Extractor was worn and slight burred at bottom front and upper rear of guides.

16 Mar	100	4695	Satisfactory	Semiautomatic fire.
	100	4795	Satisfactory	Automatic fire.
	100	4895	Satisfactory	Semiautomatic fire.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	100	4995	1 FBR	Automatic fire.
	100	5095	Satisfactory	Semiautomatic fire.
	100	5195	Satisfactory	Automatic fire.

Rifle cleaned and inspected.
Head space as in previous inspection.
Crack in handguard increased in length to 4-3/4".
Additional burring noted on operating slide.
Receiver battered at points of contact with trigger housing retaining lugs.
Receiver also burred and worn at points of contact with magazine.
Magazines cleaned and oiled.

	100	5295	Satisfactory	Semiautomatic fire.
	100	5395	Satisfactory	Automatic fire.

Left retaining lug of trigger housing broken off.

	100	5495	Satisfactory	Semiautomatic fire.
	100	5595	Satisfactory	Automatic fire.
	100	5695	Satisfactory	Semiautomatic fire.
	100	5795	Satisfactory	Automatic fire.

Cyclic rates recorded for 2 20-round bursts was 735 rounds per minute on each.
Rifle cleaned and inspected.
Head space as in previous inspection.
Additional burring noted on operating slide.

17 Mar	100	5895	Satisfactory	Semiautomatic fire.
	100	5995	Satisfactory	Automatic fire.
	100	6095	Satisfactory	Semiautomatic fire.
	100	6195	Satisfactory	Automatic fire.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	100	6295	1 FF	Bolt overrode base of cartridge in feeding. Semiautomatic fire.
	100	6395	2 FF	Bolt overrode base of cartridge in feeding. Automatic fire.

Cyclic rates recorded for 2 20-round bursts was 780 and 775 rounds per minute.
Rifle cleaned and inspected.
Head space: 1.548".
Firing pin protrusion: .049".
Free length of operating springs: outer - 11.86".
inner - 11.47".
Trigger pull: Semi - 8.0 pounds. Auto - 7.2 pounds.
Crack in handguard increased in length to 5".
Additional burring and wear noted on automatic sear, operating slide, hammer, retainer, bolt lock and receiver.

	23	6418	Satisfactory	Velocity test.
20 Mar	123	6541	Satisfactory	Accuracy test.

Rifle and magazines cleaned with carbon tetrachloride in preparation for test No. XVIII.
Small gas port in piston used.

	10	6551	6 FF	Semiautomatic fire.
			3 FJ	
			1 FBR	
	10	6561	6 FF	Automatic fire.
			3 FJ	
			1 FBR	

Large gas port in piston used.

	10	6571	9 FF	Semiautomatic fire.

[redacted]

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[redacted]

APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	10	6581	6 FF	Automatic fire.
			2 FFR	
			3 FJ	
			1 FBR	
Operating slide difficult to operate after 40 rounds.				
	5	6586	5 FF	Additional firing.
Rifle cleaned and oiled for test No. IX.				
21 Mar	40	6626	Satisfactory	Semiautomatic fire. Rifle held securely at an angle of -60°.
	40	6666	2 FF	Bolt overrode base of rounds in feeding from magazine. Semiautomatic fire. Rifle held loosely at an angle of -60°.
	40	6706	Satisfactory	Automatic fire. Rifle held securely at an angle of -60°.
	40	6746	2 FF	Bolt overrode base of round in feeding from magazine on 1 occasion and bolt failed to engage base of round in magazine on other. Automatic fire. Rifle held loosely at an angle of -60°.
	40	6786	Satisfactory	Semiautomatic fire. Rifle held securely at an angle of +60°.
	40	6826	2 FF	Bolt overrode base of rounds in feeding from magazine. Semiautomatic fire. Rifle held loosely at an angle of +60°.

[redacted]

APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	40	6866	Satisfactory	Automatic fire. Rifle held securely at an angle of +80°.
	40	6906	1 FF	Bolt overrode base of round in feeding from magazine. Automatic fire. Rifle held loosely at an angle of +80°.
				Rifle and magazines cleaned with carbon tetrachloride and left dry for test No. XIV. Rifle subjected to a temperature of -65°F for 12 hours prior to firing.
22 Mar	5	6911	5 FF	Bolt overrode base of rounds in feeding from magazine.
				Bolt could be operated by hand. Rifle and magazines cleaned in carbon tetrachloride and lubricated with Oil, Lubricating, Aircraft Instrument (Low Volatility) Specification AN-O-11. Rifle subjected to a temperature of -65°F for 12 hours prior to firing.
23 Mar	4	6915	5 FF	Attempted to fire 5 rounds.
			1 FFR	Light blow of firing pin.
				Bolt could be operated by hand. Rifle cleaned and oiled for test No. VI. Fully loaded rifle submerged in mud for 15 seconds.
	6	6921	4 FF	Bolt failed to contact base of round in magazine on 1 occasion and bolt overrode base of round in feeding from magazine on 3 occasions. Round following last one fired also failed to feed. Satisfactory function on first 3 rounds.
				Clean magazine (not subjected to mud).
	3	6924	3 FF	Bolt overrode base of round in feeding from magazine on 2 occasions and bolt failed to contact base of round in magazine on 1 occasion. Round following last one fired also failed to feed.

[redacted]

APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
			2 FFR	Bolt failed to lock.
Bolt could not be operated by hand. Rifle and magazines cleaned and oiled for test No. V. Rifle subjected to dust as described in the 299th Report on Ordnance Program No. 5082.				
24 Mar	20	6944	4 FF	Bolt overrode base of 2 rounds in feeding from magazine and bolt failed to contact base of round on 2 occasions. Semiautomatic fire.
	20	6964	1 FF	Clean magazine. Automatic fire. Trigger difficult to operate.
Rifle and magazines cleaned and oiled.				
27 Mar	115	7079	Satisfactory	Accuracy test.
28 Mar	226	7305	1 FBR	Accuracy test.
Rifle cleaned and friction points lubricated with special grease, supplied by Springfield Armory, for test No. XVI. Rifle and loaded magazine subjected to a salt water spray for a period of 15 minutes with the bolt open and 15 minutes with the bolt closed. Rifle permitted to stand for a period of 1 hour before firing.				
29 Mar	10	7315	Satisfactory	Semiautomatic fire.
	10	7325	Satisfactory	Automatic fire.
After cleaning and lubricating as noted above, rifle and loaded magazine immersed in salt water for a period of 5 minutes and permitted to stand for a period of 2 hours before firing.				
	10	7335	1 FF	Bullet struck front of magazine. Semiautomatic fire.
	10	7345	1 FBR	Automatic fire.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
Rifle and magazine cleaned and lubricated as for test XVI. Rifle and loaded magazine immersed in a sea water bath, with sand in suspension, for a period of 15 seconds (test XV).				
30 Mar	20	7365	Satisfactory	Semiautomatic fire.
Clean magazine (not subjected to bath).				
	20	7385	Satisfactory	Automatic fire.
Rifle and magazines cleaned and lubricated as for Test XVI.				
Rifle subjected to rain test.				
31 Mar	80	7465	Satisfactory	Semiautomatic fire.
	80	7545	Satisfactory	Automatic fire.
	80	7625	Satisfactory	Semiautomatic fire.
	80	7705	Satisfactory	Automatic fire.
	80	7785	19 FF	Bolt failed to completely feed round from magazine.
			1 FBR	Semiautomatic fire.
	80	7865	76 FF	Bolt failed to contact base of rounds in magazine on 15 occasions and bolt overrode base of 61 rounds in feeding from magazine. Necessary to complete feeding by hand on 5 occasions after clearing stoppage.
			4 FBR	Automatic fire.
	80	7945	76 FF	Bolt failed to contact base of rounds in magazine on 21 occasions and bolt overrode base of 55 rounds in feeding from magazine. Necessary to complete feeding by hand on 25 occasions after clearing stoppage.

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
			4 FBR	Semiautomatic fire.
	40	7985	37 FF	Bolt failed to contact base of rounds in magazine on 16 occasions and bolt overrode base of 21 rounds in feeding from magazine. Necessary to complete feeding by hand on 37 occasions after clearing stoppage.
			1 FJ	Automatic fire.
			2 FBR	
On disassembly it was noted that the operating slide was binding on the stock. Stock relieved to permit free operation of slide. Rifle and magazines again cleaned and lubricated as for test XVI. Rifle again subjected to rain test.				
3 Apr	80	8065	Satisfactory	Semiautomatic fire.
	80	8145	Satisfactory	Automatic fire.
	80	8225	Satisfactory	Semiautomatic fire.
	80	8305	Satisfactory	Automatic fire.
	20	8325	1 FF	Bolt overrode base of round in feeding.
			1 FBR	
Right retaining lug on trigger housing broke permitting this part to drop down out of position (left lug had broken previously). Trigger housing assembly from rifle serial No. 14 installed. Original hammer, sear, trigger, hammer spring and sear pin used.				
	60	8385	Satisfactory	Semiautomatic fire.
	80	8465	Satisfactory	Automatic fire.

[redacted]

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	80	8545	Satisfactory	Semiautomatic fire.
	40	8585	Satisfactory	Automatic fire.

On inspection, a 1-3/4" crack at the top rear of trigger housing out in stock was noted.
Rifle and magazines cleaned and oiled.

4 Apr	118	8703	1 FF	Cyclic rate test.

Cyclic rate recorded for 2 20-round bursts was 820 and 875 rounds per minute when using a .144" diameter port in the piston. A hesitation in firing caused the slower rate in the first burst.
Cyclic rates recorded for 2 20-round bursts were 655 and 685 rounds per minute when using a .070" diameter port in the piston.

4 Apr Test VIII (Grenade test)

Eleven M11A2 practice grenades were launched without using the auxiliary grenade cartridge and an additional 11 were launched using the auxiliary cartridge.
The grenade launcher unlatched on 2 occasions during firing.
The cover became disassembled from the rifle on the last round.
The fired cases ejected but the bolt did not remain at the rear.

Test IV (Cook-Off Test)

5 Apr	300	9003	3 FF	Automatic fire. Bolt overrode base of 2 rounds in feeding and 1 bullet struck front of magazine. 300 rounds fired in 2 minutes 4 seconds.
	1	9004		Cook-off occurred in 26 seconds. Forearm of stock and handguard burst into flames after about 300 rounds.

Rifle inspected and lubricated.
Handguard so badly burned that it was impossible to retain it in position with the band. Guard wired in place.
Forearm of stock charred and cracking slightly increased.

[redacted]

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APPENDIX E

DATE 1950	ROUNDS FIRED	TOTAL NO. OF ROUNDS FIRED ON TEST	FUNCTION	REMARKS
	250	9254	13 FF	Automatic fire. Bolt overrode base of 7 rounds in feeding. Bolt failed to contact base of 3 rounds in magazine. 3 rounds struck front of magazine. 250 rounds fired in 2 minutes 42 seconds.
	1	9255		Cook-off occurred in 44 seconds.
Rifle inspected and lubricated. Stock charred at forearm permitting ferrule to drop off in disassembly.				
	200	9455	8 FF	Automatic fire. Bolt overrode base of 5 rounds in feeding and bolt failed to contact bases of 3 rounds in magazine. 200 rounds fired in 1 minute 30 seconds.
	1	9456		Cook-off occurred in 2 minutes 6 seconds.
Rifle inspected and lubricated. Punch-out of primer occurred, plugging firing pin hole in bolt.				
	175	9631	3 FF	Automatic fire. Bolt overrode base of 1 round in feeding and 2 rounds hit front of magazine. 175 rounds fired in 1 minute 3 seconds.
No cook-off occurred.				
	1	9632		Round fired by releasing hammer.
17 Apr	Additional firing on test VIII (Grenade test).			
Fifteen M11A2 practice grenades were launched without using the auxiliary grenade cartridge. The fired cases ejected but the bolt failed to stay to the rear.				

[redacted]

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APPENDIX F

PHOTOGRAPHS

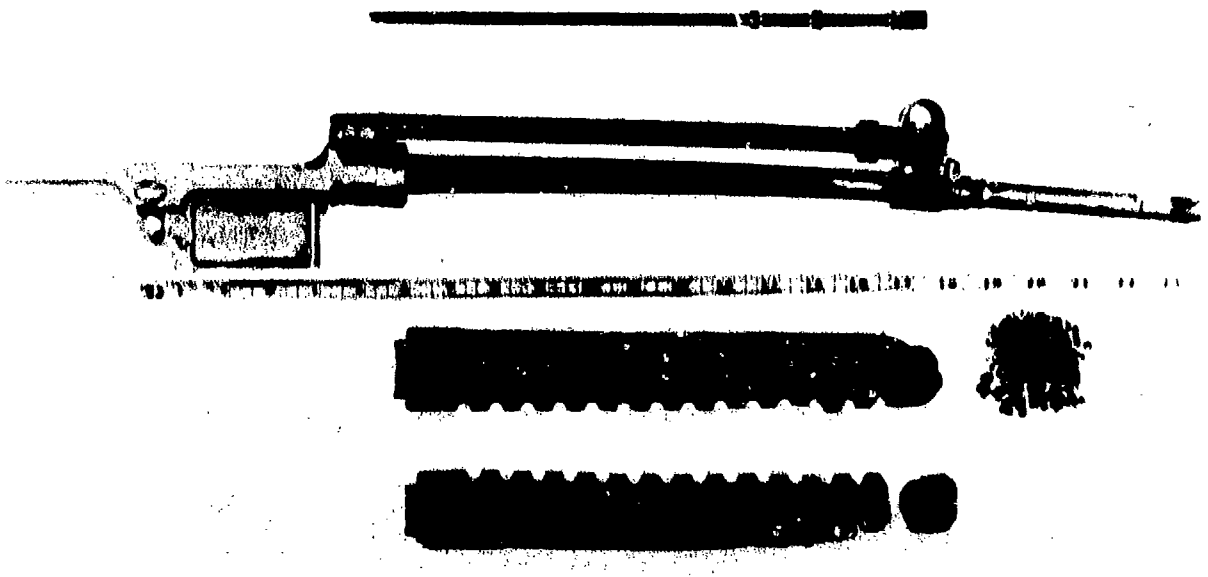
OF

DAMAGED PARTS AND AMMUNITION CASUALTIES

A-61205
A-61177
A-61178
A-61176
A-61242
A-61207
A-61203
A-61204
A-61206
A-61185
A-61187
A-61188

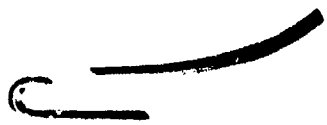
[redacted]

[redacted]



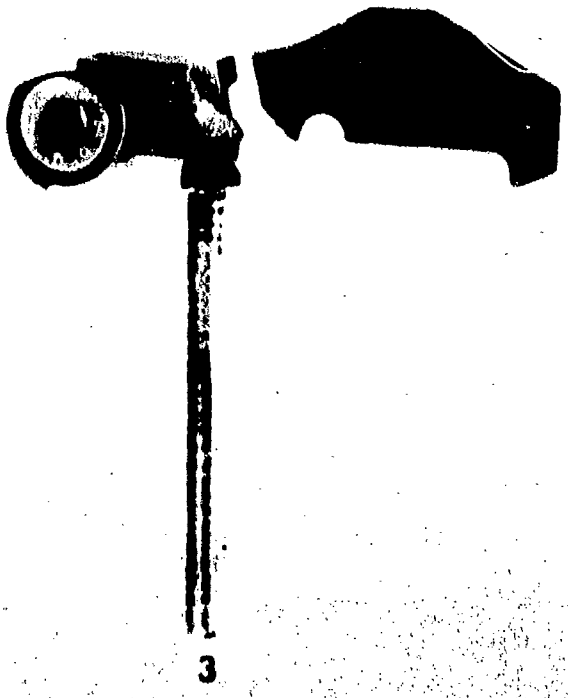
AG1176 [redacted]L ABERDEEN PROVING GROUND 6 April 1950

Project No. TS2-2015. Rifle, Lightweight, Caliber .280, FN, No. 7.
Parts damaged in cook-off test.



1

2



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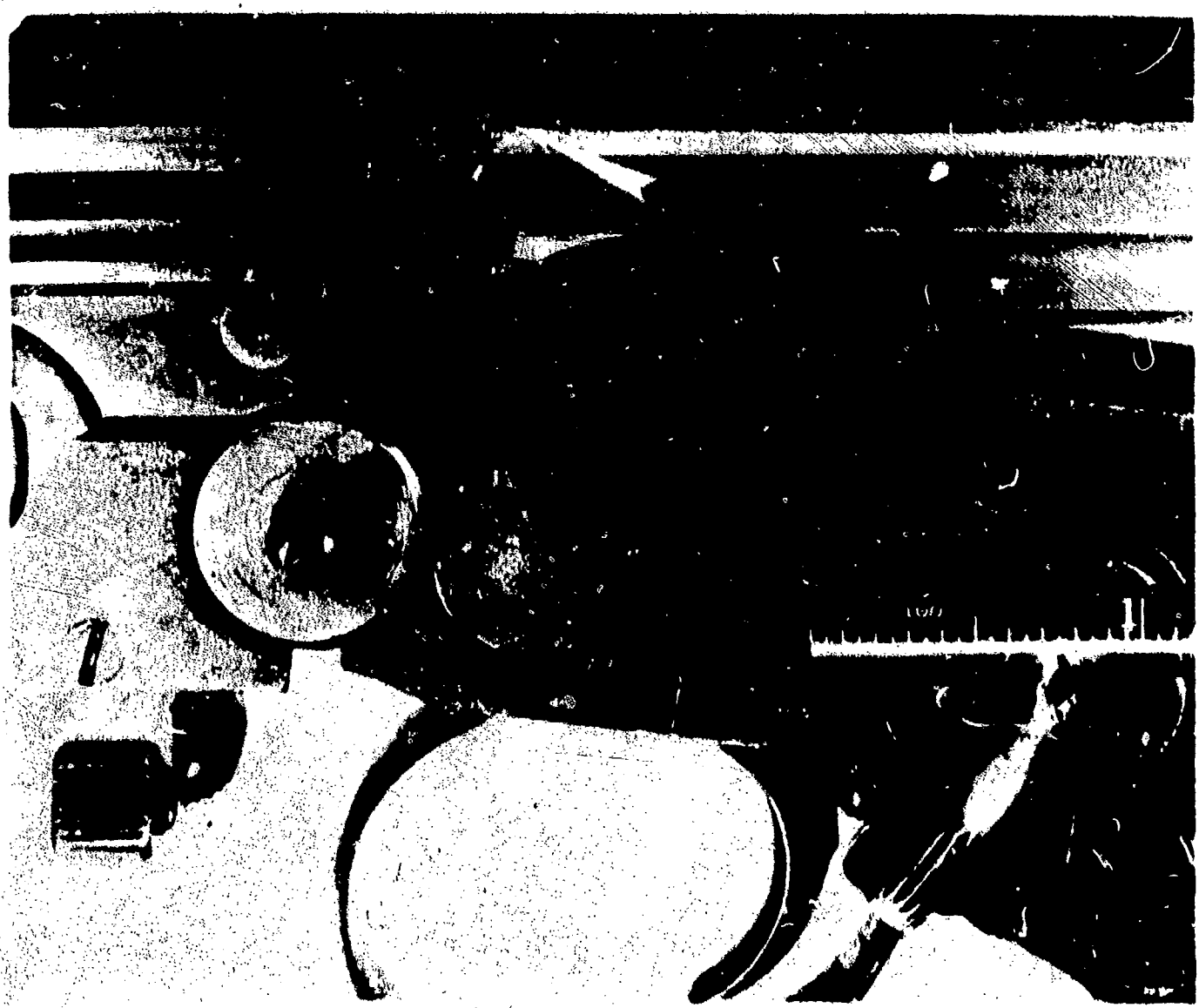
4

[redacted]

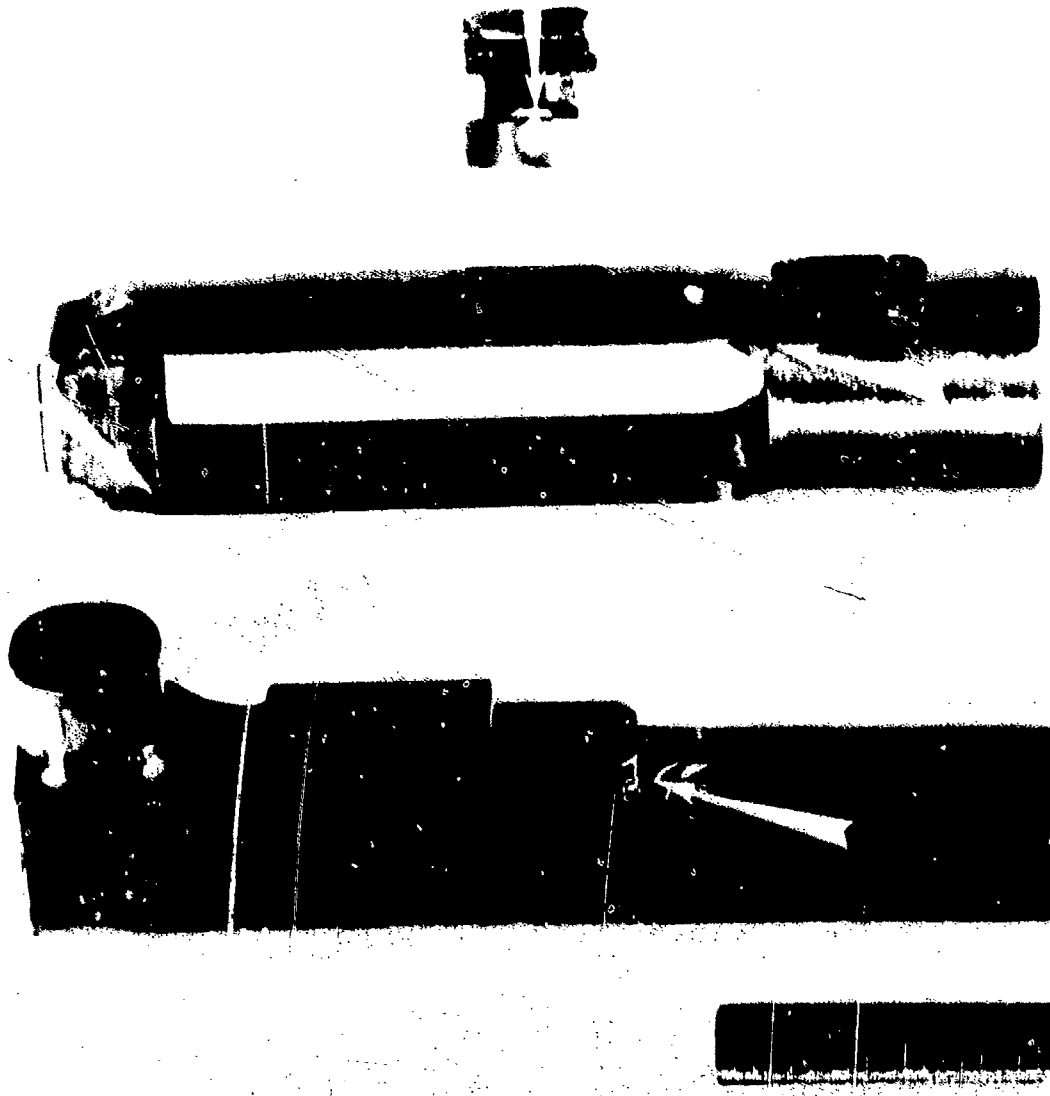
AG 1177 [redacted] ABERDEEN PROVING GROUND 6 April 1950

Project No. TS2-2016. Rifle, Lightweight, Caliber .280, FN. Broken parts. 1. Extractor Spring. 2. Extractor. 3. and 4. Hammers.



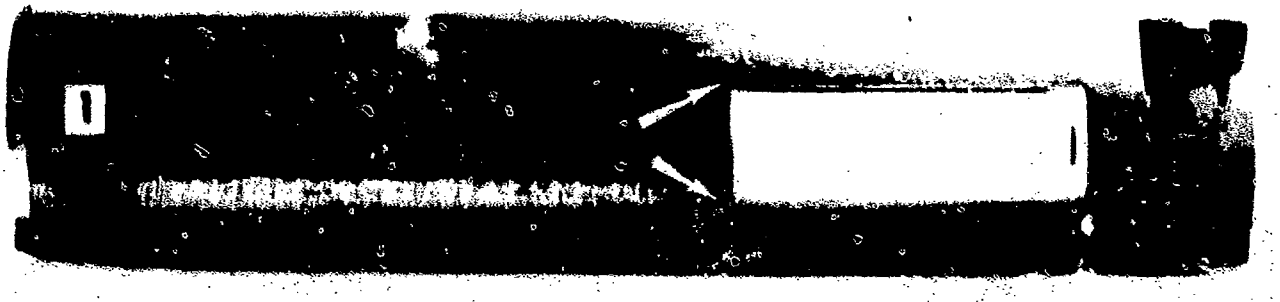
A61178 [redacted] ABERDEEN PROVING GROUND 6 April 1950

Rifle, Lightweight, Caliber .280, FN, No. 6. Crack, indicated by arrow, which developed during the endurance test.



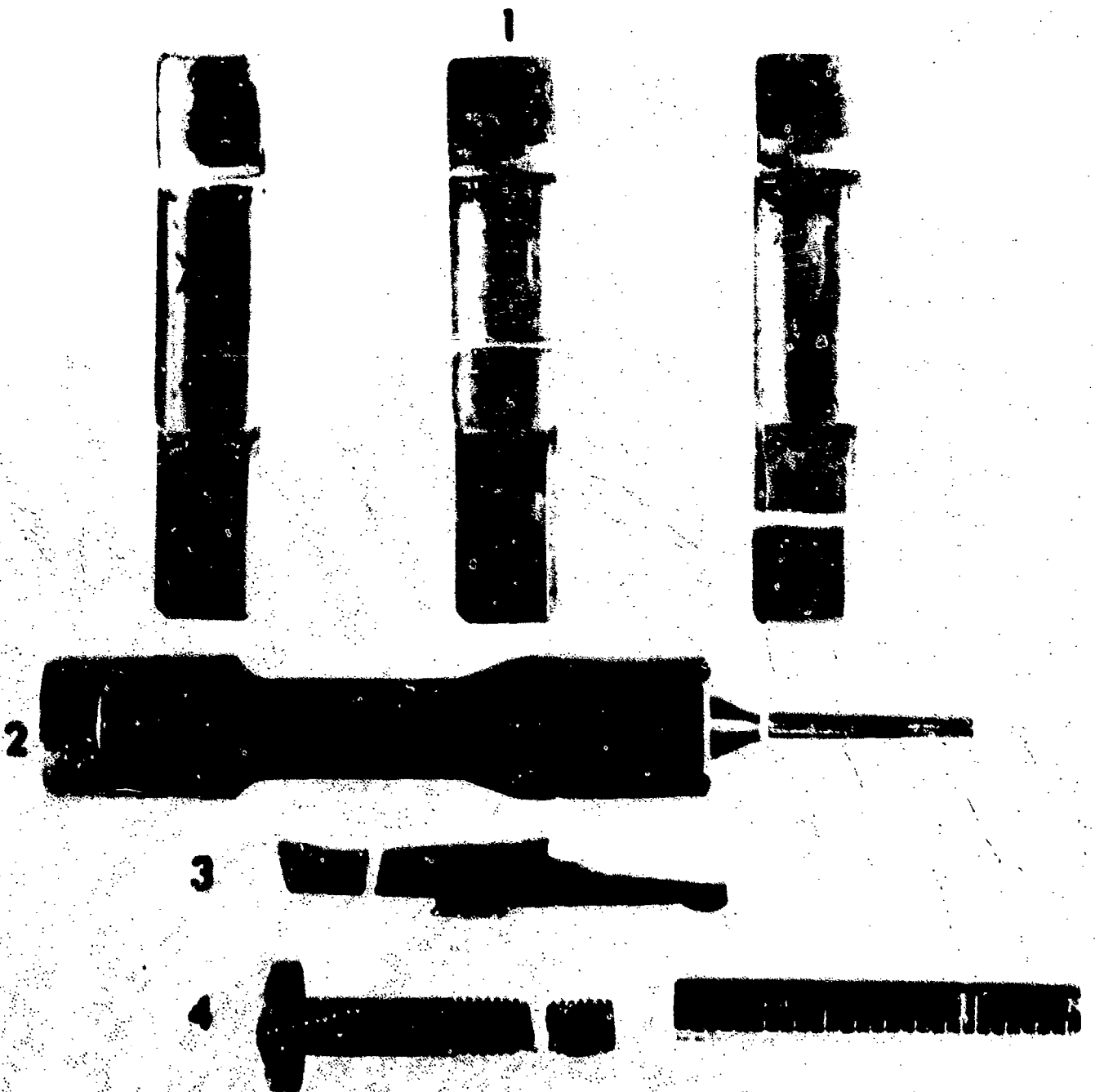
AG1185 [redacted] ABERDEEN PROVING GROUND 7 April 1950

Project No. T52-2015. Rifle, Lightweight, Caliber .280, XM2. Cracked parts. TOP: Extractor. CENTER: Firing Pin Sleeve. BOTTOM: Piston.



AC 11187 [redacted] ABERDEEN PROVING GROUND 7 April 1950

Project No. TS2-2015. Rifle, Lightweight, Caliber .280, [redacted]. Breech block. 1. Side view. 2. Top view. Cracking occurred at points indicated by arrows.

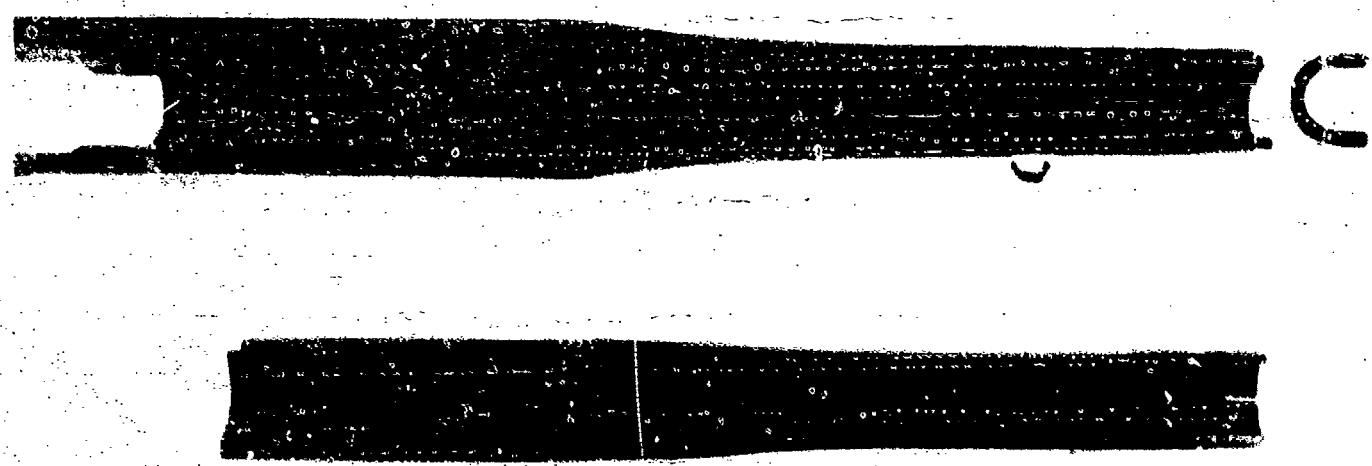


AG 11108 [redacted] ABERDEEN PROVING GROUND 7 April 1950

Project No. T52-3015. Rifle, Lightweight, Caliber .280, M52. Broken parts. 1. Locking Lugs. 2. Firing Pin. 3. Gear. 4. Grip Screw.

[redacted] ABERDEEN PROVING GROUND 10 April 195-

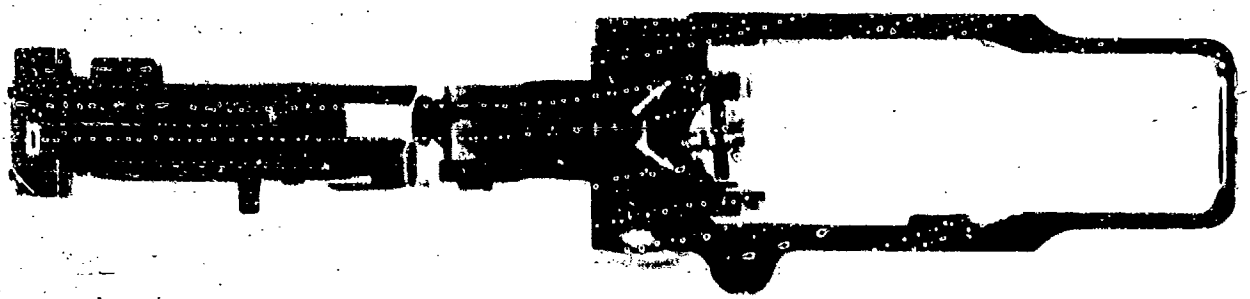
Project No. T32-2015. Rifle, Lightweight, Caliber .30, T25, No. 15. Crack developed as result of rain test.



A61204 [redacted] ABERDEEN PROVING GROUND 10 April 195[illegible]

Project No. TS2-2015. Rifle, Lightweight, Caliber .30, T25, No. 15. Damage to stock and hand guard after completion of cook-off test. Stock used in firing approximately 0200 rounds and hand guard 0600 rounds.

[redacted] USE ONLY



2 [redacted]

3 [redacted]

[redacted]

[redacted] CONFIDENTIAL

A01205 [redacted] ABERDEEN PROVING GROUND 10 April 1950

Project No. TS2-2016. Rifle, Lightweight, Caliber .30, T25. Broken parts. 1. Trigger Housing Assembly. Arrows indicate points from which retaining lugs were broken. 2. Front Firing Pin. 3. Hammer Spring.

AG1206 [redacted] ABERDEEN PROVING GROUND 10 April 1950

Project No. T58-2015. Rifle, Lightweight, Caliber .30, T25, No. 14. Cracks in stock developed in firing approximately 5500 rounds.

AG1207 [redacted] ABERDEEN PROVING GROUND 10 April 1950

Project No. TS2-2015. Rifle, Lightweight, Caliber .280, EM2. Casualties occurring in grenade test.

[redacted] ABERDEEN PROVING GROUND 12 April 1950

Project No. T32-2015. Case Casualties Occurring in Rifle, Lightweight, Caliber .30, M2. LEFT: Punch-out in primer cup. CENTER: Blown primer. RIGHT: Flow-back of primer in firing pin hole.

"FOR OFFICIAL USE ONLY",

[redacted]

APPENDIX G

TEST VIII (GRENADE TEST)

(9 Sheets)

[redacted]

[redacted]

[redacted]

APPENDIX G

GRENADE TEST

DATE: 3 April 1950 RIFLE: T25, Serial Number 14.

GRENADE: A.T., practice, M11A2, lot E-19.

AMMUNITION: Cartridge, grenade, rifle, caliber .30, T116, experimental lot FA X30-1367 and cartridge, auxiliary, grenade, M7, lot FA S-31.

FIRED FROM: Butt resting on firm ground.

ANGLE OF DEPARTURE: 30°.

DIRECTION OF FIRE: SW WIND: Calm

WITHOUT AUXILIARY CARTRIDGE		WITH AUXILIARY CARTRIDGE	
GRENADE NO.	RANGE (FEET)	GRENADE NO.	RANGE (FEET)
1	649	12	963
2	590	13	1024
3	605	14	960
4	595	15	894
5	*	16	936
6	609	17	Not recovered
7	633	18	906
8	615	19	967
9	609	20	977
10	625	21	971
11	641		
AVERAGE	617		955

* = Fin struck wood frame on departure.

[redacted]

[redacted]

[redacted]

APPENDIX G

GRENADE TEST

DATE: 3 April 1950 RIFLE: EM2, SERIAL NUMBER 6.

GRENADE: A.T., practice, M11A2, lot E-19.

AMMUNITION: Cartridge rifle grenade, caliber .280, lot 20A.

FIRED FROM: Butt resting on firm ground.

ANGLE OF DEPARTURE: 30°

DIRECTION OF FIRE: SW WIND: Calm

GRENADE NO.	RANGE (FEET)	REMARKS
22	711	
23	800	
24	708	
25	*	Stabilizer tube ruptured.
26	477	Fin lost in flight.
27	747	
28	*	Stabilizer tube ruptured.
29	*	Stabilizer tube ruptured.
30	719	
31	700	
AVERAGE	731	(for 6 having normal flight).

* = 150 feet or less.

Gas regulator set at "normal" for first 8 grenades and at "excess" for last 2.

[redacted]

[redacted]

APPENDIX G

GRENADE TEST

DATE: 3 April 1950 RIFLE: FN, Serial Number 6.

GRENADE: A.T., practice, M19A2, lot E-19.

AMMUNITION: Cartridge, rifle grenade, caliber .280, lot 20E

FIRED FROM: Butt resting on firm ground.

ANGLE OF DEPARTURE: 30°.

DIRECTION OF FIRE: SW WIND: Calm

GRENADE NO.	RANGE (FEET)	REMARKS
32	479	Fin lost in flight.
33	730	
34	730	
35	733	
36	766	
37	730	
38	731	
39	697	
40	703	
41	690	
AVERAGE	723	(for 9 having normal flight).

[redacted]

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APPENDIX G

GRENADE TEST

DATE: 4 April 1950 RIFLE: T25, Serial Number 15.

GRENADE: A.T., practice, M11A2, lot E-19.

AMMUNITION: Cartridge, grenade, rifle, caliber .30, T116, experimental lot FA K30-1367 and cartridge auxiliary, grenade, M7, lot FA S-31.

FIRED FROM: Butt resting on firm ground.

ANGLE OF DEPARTURE: 30°.

DIRECTION OF FIRE: SW WIND: SSW, 21 to 28 mph

WITHOUT AUXILIARY CARTRIDGE		WITH AUXILIARY CARTRIDGE	
GRENADE NO.	RANGE (FEET)	GRENADE NO.	RANGE (FEET)
42	472	52	901
43	576	53	*462
44	583	54	896
45	616	55	901
46	621	56	891
47	625	57	934
48	582	58	872
49	586	59	950
50	619	60	923
51	612	61	930
AVERAGE	589		911**

* = Fin lost in flight.

** = For 9 grenades having normal flight.

[redacted]

[redacted]

[redacted]

APPENDIX G

GRENADE TEST

DATE: 4 April 1950 RIFLE: M2, Serial Number 8.

GRENADE: A.T., practice, M11A2, lot D-19.

AMMUNITION: Cartridge, rifle grenade, caliber .30, lot 20E.

FIRED FROM: Butt resting on firm ground.

ANGLE OF DEPARTURE: 30°.

DIRECTION OF FIRE: SW WIND: SSW, 21 to 26 mph.

GRENADE NO.	RANGE (FEET)	REMARKS
64	*	Stabilizer tube ruptured.
65	*	" " "
66	*	" " "
67	*	" " "
68	*	" " "
69	*	" " "

Sleeve removed from forward portion of launcher.

60	628	
62	701	
64	675	
66	115	Stabilizer tube ruptured.
AVERAGE	668	for 3 having normal flight.

* = Tube failed to leave launcher. Body traveled between 50 and 75 feet.

[redacted]

[redacted]

"FOR OFFICIAL USE ONLY"

APPENDIX G

GRENADE TEST

DATE: 4 April 1950 RIFLE, FN, serial number 7

GRENADE: A.T., practice, M11A2, lot E-19.

AMMUNITION: Cartridge rifle grenade, caliber .280, lot 20-E.

FIRED FROM: Butt resting on firm ground.

ANGLE OF DEPARTURE: 30°.

DIRECTION OF FIRE: SW WIND: SSW, 21 to 28 mph.

GRENADE NO.	RANGE (FEET)
70	671
71	693
72	696
73	699
74	742
75	720
76	707
77	742
78	707
79	693
AVERAGE	708

[redacted]

[redacted]

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[redacted]

APPENDIX G

GRENADE TEST

DATE: 17 April 1950 RIFLE: T25, serial number 15

GRENADE: A.T., practice, M11A2 , lot E-19

FIRED FROM: Butt resting on firm ground.

ANGLE OF DEPARTURE: 45°

DIRECTION OF FIRE: SW WIND: S to SW, 10 to 12 mph.

AMMUNITION: Cartridge, grenade, caliber .30, T116.

Powder charge

41 grs IMR 4895
1 gr Black Powder A-4

GRENADE NO.	RANGE
1	695
4	687
6	646
18	624
31	669
AVERAGE	662

[redacted]

- 7 -

[redacted]

[redacted]

APPENDIX G

GRENADE TEST

DATE: 17 April 1950 RIFLE: T25, serial number 15

GRENADE: A.T., practice, M11A2, lot E-19.

FIRED FROM: Butt resting on firm ground.

ANGLE OF DEPARTURE: 30°

DIRECTION OF FIRE: SW WIND: S to SW, 10 to 12 mph

AMMUNITION: Cartridge, grenade, caliber .30, T116.

Powder charge

41 gr IMR 4895
1 gr Lack Powder A-4

GRENADE NO.	RANGE
21	590
22	610
23	553
24	621
25	603
26	345*
27	650
28	615
29	617
30	580
AVERAGE	604 for 9 having normal flight.

* = Fin lost in flight.

[redacted]

[redacted]

[redacted]

APPENDIX G

GRENADE TEST

DATE: 17 April 1950 RIFLE: T25, serial number 14

GRENADE: A T., practice, M11A2, lot E-19.

FIRED FROM: Butt resting on firm ground.

ANGLE OF DEPARTURE: 30°.

DIRECTION OF FIRE: SW WIND: S to SW, 10 to 12 mph

AMMUNITION: Cartridge, grenade, caliber .30, T116.

Powder Charge: 41 grs IMR 4895, 1 gr Black Powder A-4		Powder Charge: 41 grs IMR 4895, 1 gr 60 mm Mortar Ignition Powder	
GRENADE NO.	DISTANCE (FEET)	GRENADE NO.	DISTANCE (FEET)
1	589	11	575
2	592	12	593
3	599	13	586
4	621	14	560
5	616	15	561
6	618	16	607
7	592	17	576
8	625	18	621
9	602	19	607
10	588	*20	595
AVERAGE	604		590

* = The cover became disengaged and fell off rifle.

[redacted]

[redacted]

[redacted]

APPENDIX H

TEST X (ACCURACY TEST)
(49 shoots)

[redacted]

[redacted]

[redacted]

ACCURACY TEST

Appendix H

DATE: 20 Feb. 1950 [redacted]

RIFLE: EM2, Serial Number 6

AMMUNITION: Cartridge, ball, Caliber .280, Lot 19A

RANGE: 50 yards

FIRED FROM: Prone position with sling using automatic fire

DIRECTION OF FIRE: S-SW

Targets are 20 rounds each. Measurements are in inches.

RIFLEMAN	TARGET NUMBER	NUMBER OF BURST	EVD	EHD	ES	SCORE*
Naber	1	5	50.5	39.25	62.5	50
"	2	5	44.25	23.25	47.75	91
"	3	5	31.5	21.0	41.5	93
Average			42.08	27.83	50.58	78
Gustafson	1	4	27.5	49.0	50.6	92
"	2	4	30.0	39.0	43.25	98
"	3	3	33.5	35.4	39.1	96
Average			30.33	41.13	44.32	95
Thwaites	1	5	23.25	23.25	23.5	96
"	2	4	16.75	18.50	24.25	100
"	3	4	22.5	21.25	29.1	96
Average			20.83	21.00	25.62	97

* C target used.

[redacted]

[redacted]

180

ACCURACY TEST

Appendix H

DATE: 23 Feb. 1950

RIFLE: EL2, Serial Number 8

AMMUNITION: Cartridge, ball, Caliber .280, Lot 19A

RANGE: 50 yards

FIRED FROM: Bench rest using automatic fire

DIRECTION OF FIRE: S-SW

Targets are 20 rounds each. Measurements are in inches.

RIFLEMAN	TARGET NUMBER	NUMBER OF BURSTS	EVD	EHD	ES	SCORE
Maher	1	4	11.6	14.6	17.5	100
"	2	4	17.0	12.75	18.0	100
"	3	4	11.6	12.6	13.75	100
Average			13.40	13.32	16.42	100
Thwaites	1	4	10.5	6.25	11.0	100
"	2	4	13.6	8.5	14.0	100
"	3	4	11.0	18.75	19.0	100
Average			11.70	11.17	14.66	100
Gustafson	1	4	10.5	17.5	20.4	100
"	2	4	8.5	11.75	12.25	100
"	3	4	6.9	10.4	10.5	100
Average			8.63	13.22	14.38	100

[redacted]

ACCURACY TEST

Appendix H

DATES: 23 Feb. 1950

RIFLE: FN, Serial Number 6

AMMUNITION: Cartridge, ball, Caliber .280, Lot 19A

RANGE: 50 yards

FIRED FROM: Bench rest using automatic fire

DIRECTION OF FIRE: S-SW

Targets are 20 rounds each. Measurements are in inches.

RIFLEMAN	TARGET NUMBER	NUMBER OF BURSTS	EVD	EHD	ES	SCORE*
Maber	1	4	21.9	26.1	26.25	96
"	2	5	17.25	37.25	37.5	99
"	3	4	11.0	16.75	17.25	100
Average			16.72	26.70	27.00	98
Thwaites	1	4	12.75	8.4	13.4	100
"	2	5	8.6	9.6	9.75	100
"	3	5	13.75	12.0	15.6	100
Average			11.70	10.00	12.92	100
Gustafson	1	4	8.6	11.0	11.4	100
"	2	4	6.4	12.25	12.9	100
"	3	4	9.25	24.5	25.5	100
Average			8.08	15.92	16.60	100

* C target used.

[redacted]

[redacted]

[redacted]

ACCURACY TEST

Appendix H

DATE: 20 Feb. 1950

RIFLE: FN, Serial Number 7

AMMUNITION: Cartridge, ball, Caliber .280, Lot 19A

RANGE: 50 yards DIRECTION OF FIRE: S-SW

FIRED FROM: Prone position with sling using automatic fire

Targets are 20 rounds each. Measurements are in inches.

RIFLEMAN	TARGET NUMBER	NUMBER OF BURSTS	EVD	EHD	ES	SCORE*
Maher	1	7	49.0	53.5	59.75	83
"	2	4	35.6	60.25	62.9	87
"	3	4	29.25	24.75	29.75	96
Average			37.95	46.17	50.80	89
Gustafson	1	4	45.5	31.6	46.5	70
"	2	4	46.4	40.9	52.75	91
"	3	4	40.25	50.25	63.25	93
Average			44.05	40.92	54.17	85
Thwaites	1	5	22.6	48.4	48.9	89
"	2	5	20.0	21.0	22.25	93
"	3	4	16.5	26.9	31.0	96
Average			19.7	32.1	34.05	93

* C target used.

[redacted]

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ACCURACY TEST

Appendix H

DATE: 20 Feb. 1950

RIFLE: T25, Serial Number 14

AMMUNITION: Cartridge, ball, caliber .30, T104, Lot FAX30-1358

RANGE: 50 yards

FIRED FROM: Prone position with sling using automatic fire

DIRECTION OF FIRE: S-SW

Targets are 20 rounds each. Measurements are in inches.

RIFLEMAN	TARGET NUMBER	NUMBER OF BURST	EVD	EHD	ES	SCORE*
Maber	1	4	16 shots hit 10'x12'target			64
"	2	5	18 shots hit 10'x12'target			74
"	3	4	19 shots hit 10'x12'target			77
Average						72
Gustafson	1	4	16 shots hit 10'x12'target			59
"	2	5	17 shots hit 10'x12'target			54
"	3	3	17 shots hit 10'x12'target			57
Average						57
Thwaites	1	5	16 shots hit 10'x12'target			65
"	2	6	11 shots hit 10'x12'target			49
"	3	5	17 shots hit 10'x12'target			71
Average						62

* C target used.

[redacted]

4, Lot FAX30-1358

are in inches.

	EV	MD	ES	SCORE*
		.75	37.9	96
		.0	35.25	95
		.75	41.75	88
		13	38.30	93
		2.25	19.4	100
		.4	23.5	99
		.9	24.0	95
		.85	22.3	98
		6.4	18.5	100
		1.1	24.25	100
		2.0	12.4	100
		.17	18.38	100

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[redacted]

ACCURACY TEST

Appendix H

DATE: 21 Feb. 1950 DIRECTION OF FIRE: SW

FIRED FROM: Bench rest SKY CONDITION: Broken clouds

WIND: S, 10 mph

AMMUNITION: Cartridge, ball, MS Core, Cal..280, Lot 19A

RIFLE: EM2 Sorial Number 6 RIFLEMAN: Gustafson

Measurements are in inches

100 Yard Targets

TARGET NO.	MR	MVD	MHD	EVD	EHD	ES
1	1.80	1.37	1.01	5.03	4.74	6.80
2	1.77	1.35	.72	6.66	4.34	6.90
3	1.55	1.08	.90	5.10	3.42	5.30
Average	1.71	1.27	.88	5.60	4.17	6.33

300 Yard Targets

1	5.37	3.95	3.20	15.15	14.05	20.45
2	5.33	4.35	2.11	19.44	13.15	20.10
3	4.40	3.00	2.60	13.07	10.42	13.52
Average	5.03	3.77	2.64	15.89	12.54	18.02

600 Yard Targets

1	10.53	7.08	6.78	29.53	28.22	39.40
2	11.01	9.35	3.65	38.42	25.35	38.48
3	7.66	4.46	5.05	21.49	17.98	23.70
Average	9.73	6.96	5.16	29.81	23.85	33.86

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ACCURACY TEST

Appendix H

DATE: 21 Feb. 1950 DIRECTION OF FIRE: SW

FIRED FROM: Bench rest SKY CONDITION: Broken clouds

WIND: NNE, 7 mph

AMMUNITION: Cartridge, ball, MS core, Cal..280, Lot 19A

RIFLE: EM2 Serial Number 6 RIFLEMAN: Herbert

Measurements are in inches

100 Yard Targets

TARGET NO.	MR	MVD	MHD	EVD	EHD	ES
1	.77	.56	.45	2.21	1.48	2.21
2	1.94	1.64	.85	8.58	4.00	9.10
3	1.41	1.00	.98	4.49	4.12	5.65
Average	1.37	1.07	.76	5.09	3.20	5.65

300 Yard Targets

1	2.05	1.25	1.34	6.52	5.12	6.52
2	5.64	4.83	2.23	25.49	10.19	26.56
3	4.62	3.08	3.10	13.87	12.18	17.65
Average	4.10	3.05	2.22	15.29	9.26	16.91

600 Yard Targets

1	4.31	2.86	2.60	12.16	10.70	12.16
2	10.92	9.12	4.64	49.18	17.50	51.18
3	9.64	6.34	5.90	32.40	28.47	35.75
Average	8.29	6.11	4.38	31.25	18.39	33.03

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ACCURACY TEST

Appendix H

DATE: 21 Feb. 1950 DIRECTION OF FIRE: SW

FIRED FROM: Bench rest SKY CONDITION: Overcast

WIND: Calm

AMMUNITION: Cartridge, ball, WS core, Cal..280, Lot 19A

RIFLE: EL2 Serial Number 6 RIFLEMAN: Thwaites

Measurements are given in inches

TARGET NO.	MR	MVD	MHD	EVD	EHD	ES
			200 Yard Targets			
1	1.74	1.06	1.07	4.21	4.41	4.50
2*	1.85	1.29	1.17	4.16	4.58	5.80
3	1.74	1.16	1.00	7.23	5.00	7.30
4.	2.08	1.61	1.19	5.24	4.25	5.50
Average (3 targets)	1.85	1.28	1.09	5.56	4.55	5.77
			300 Yard Targets			
1	5.70	3.64	3.32	14.56	13.00	14.70
3	5.56	3.88	2.91	23.16	14.92	23.25
4	6.28	4.84	3.47	15.09	13.17	15.50
Average	5.85	4.12	3.23	17.60	13.70	17.82
			600 Yard Targets			
1	13.65	10.24	6.44	42.59	25.52	42.59
3	13.19	9.93	5.67	52.95	30.10	52.95
4	13.33	10.46	7.12	30.05	25.75	32.00
Average	13.39	10.21	6.41	41.86	27.12	42.51

* Grip screw became loose. Target not considered in average.

[redacted]

[redacted]

ACCURACY TEST

Appendix H

DATE: 24 Feb. 1950 DIRECTION OF FIRE: SW

FIRED FROM: Bench rest SKY CONDITION: Broken clouds to overcast

WIND: SSW to SW, 17 to 30 mph

AMMUNITION: Cartridge, ball, MS core, Cal..280, Lot 19A

RIFLE: EM2 Serial Number 8 RIFLEMAN: Thwaites

Measurements are given in inches

TARGET NO.	MR	MVD	MHD	EVD	EHD	ES
			100 Yard Targets			
1	2.02	1.51	1.02	5.40	4.97	6.20
2	2.02	1.67	.95	5.15	3.54	5.85
3	1.69	1.10	1.28	4.36	5.04	6.30
Average	1.91	1.43	1.08	4.97	4.52	6.12
			300 Yard Targets			
1	5.80	4.59	2.76	16.09	13.30	17.85
2	6.09	5.09	2.88	16.42	12.53	17.80
3	5.54	3.25	3.91	14.24	16.50	21.05
Average	5.81	4.31	3.18	15.58	14.11	18.90
			600 Yard Targets			
1	11.55	10.33	3.96	36.30	21.52	37.80
2	13.31	11.61	4.76	45.02	23.87	45.65
3	11.27	7.25	7.50	40.27	29.78	48.25
Average	12.04	9.73	5.41	40.53	25.06	43.90

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ACCURACY TEST

Appendix H

DATE: 24 Feb. 1950 DIRECTION OF FIRE: SW

FIRED FROM: Bench rest SKY CONDITION: Broken clouds to overcast

WIND: SSW to SW, 17 to 30 mph

AMMUNITION: Cartridge, ball, MS core, Cal..280, Lot 19A

RIFLE: EM2 Serial Number 8 RIFLEMAN: Herbert

Measurements are given in inches

TARGET NO.	MR	MVD	MHD	EVD	EHD	ES
			100 Yard Targets			
1*	1.43	1.12	.54	5.94	3.16	5.94
2**	2.15	1.73	.99	8.00	5.40	8.50
3	1.67	1.16	1.06	6.00	3.80	6.30
4	1.98	1.33	1.15	5.30	5.21	5.70
Average (3 targets)	1.69	1.20	.92	5.75	4.06	5.98
			300 Yard Targets			
1	4.72	3.65	1.74	19.15	10.65	19.15
3	5.11	3.78	2.84	17.91	11.47	18.10
4	5.93	4.02	3.48	15.67	16.07	17.75
Average	5.25	3.82	2.69	17.58	12.73	18.33
			600 Yard Targets			
1	11.24	9.30	4.47	44.80	21.10	45.00
3	11.89	9.37	5.76	34.98	22.96	35.30
4	10.73	8.04	7.15	31.42	35.43	40.60
Average	11.29	8.90	5.79	37.07	26.50	40.30

* Center of impact is 1.94" above and .90" right of point of aim.

** Long grip screw loosened and fell out. Center of impact is 10.76" above and .40" left of point of aim.

ACCURACY TEST

Appendix H

DATE: 24 Feb. 1950 DIRECTION OF FIRE: SW

FIRED FROM: Bench rest SKY CONDITION: Broken clouds to overcast

WIND: SSW to SW, 17 to 30 mph

AMMUNITION: Cartridge, ball, MS core, Cal..280, Lot 19A

RIFLE: EM2 Serial Number 8 RIFLEMAN: Gustafson

Measurements are given in inches

TARGET NO.	MR	MVD	MHD	EVD	EHD	ES
100 Yard Targets						
1	1.58	1.35	.57	4.83	2.43	4.85
2	1.41	.77	1.02	3.32	5.12	6.15
3	1.21	.88	.69	4.43	2.95	4.50
Average	1.40	1.00	.76	4.19	3.50	5.17
300 Yard Targets						
1	4.69	4.06	1.55	13.43	6.55	13.55
2	4.06	2.07	2.98	9.55	14.60	17.45
3	4.12	3.23	2.23	14.84	9.80	14.84
Average	4.29	3.12	2.25	12.61	10.32	15.28
600 Yard Targets						
1	10.17	9.31	3.54	31.30	11.25	31.40
2	8.40	3.54	6.58	15.92	33.68	36.95
3	11.73	8.74	5.27	38.23	26.82	39.15
Average	10.10	7.20	5.13	28.48	23.92	35.83

ACCURACY TEST

Appendix H

DATE: 24 Feb. 1950 DIRECTION OF FIRE: SW

FIRED FROM: Bench rest SKY CONDITION: Broken clouds to overcast

WIND: SSW to SW, 17 to 30 mph

AMMUNITION: Cartridge, ball, MS core, Cal..280, Lot 19A

RIFLE: FN Serial Number 6 RIFLEMAN: Thwaites

Measurements are given in inches

TARGET NO.	MR	MVD	MHD	EVD	EHD	ES
100 Yard Targets						
1	3.58	2.76	1.37	12.60	8.36	12.60
2	3.40	2.44	2.01	10.98	7.35	13.20
3	3.30	2.30	1.96	8.76	8.23	9.22
Average	3.43	2.50	1.78	10.78	7.98	11.67
300 Yard Targets						
1	7 shots hit target					
2	9 shots hit target					
3	10.10	7.21	5.80	27.34	24.22	28.65
600 Yard Targets						
1	6 shots hit target					
2	9 shots hit target					
3	9 shots hit target					

ACCURACY TEST

Appendix H

DATE: 24 Feb. 1950 DIRECTION OF FIRE: SW

FIRED FROM: Bench rest SKY CONDITION: Broken clouds to overcast

WIND: SSW to SW, 17 to 30 mph

AMMUNITION: Cartridge, ball, MS core, Cal..280, Lot 19A.

RIFLE: FN Serial Number 6 RIFLEMAN: Gustafson

Measurements are given in inches

TARGET NO.	MR	MVD	MHD	EVD	EHD	ES
			100 Yard Targets			
1	2.10	1.43	1.12	5.78	4.80	5.82
2	3.88	2.82	2.33	11.92	12.35	14.60
3	2.70	1.66	1.80	9.10	8.10	12.04
Average	2.89	1.97	1.75	8.93	8.42	10.82
			300 Yard Targets			
1	5.95	4.22	3.43	15.54	14.27	15.90
2	9 shots hit target					
3	8.27	4.82	5.68	26.96	25.55	35.50
			600 Yard Targets			
1	12.53	8.45	7.18	27.15	31.28	37.70
2	9 shots hit target					
3	9 shots hit target					

[redacted]

ACCURACY TEST

Appendix H

DATE: 21 Feb. 1950 DIRECTION OF FIRE: SW

FIRED FROM: Bench rest SKY CONDITION: Overcast

WIND: Calm

AMMUNITION: Cartridge, ball, MS core, Cal..280, Lot 19A

RIFLE: FN Serial Number 6 RIFLEMAN: Herbert

Measurements are given in inches

TARGET NO.	MR	MVD	MHD	EVD	EHD	ES
			100 Yard Targets			
1	3.18	2.74	1.34	10.39	4.30	11.00
2	3.86	3.33	1.47	11.92	6.13	12.70
3	2.73	2.55	.59	11.25	1.67	11.30
Average	3.26	2.87	1.13	11.19	4.03	11.67
			300 Yard Targets			
1	9.63	8.36	4.17	30.85	13.31	33.10
2	11.80	10.42	4.23	35.89	17.82	39.05
3	8.32	7.74	1.89	33.26	5.86	33.45
Average	9.92	8.84	3.43	33.33	12.33	35.20
			600 Yard Targets			
1	20.07	18.47	6.41	65.15	23.32	67.60
2	9 shots hit target					
3	9 shots hit target					

[redacted]

[redacted]

[redacted]

ACCURACY TEST

Appendix H

DATE: 21 Feb. 1950 DIRECTION OF FIRE: SW

FIRED FROM: Bench rest SKY CONDITION: Broken clouds

WIND: SSW, 10 mph

AMMUNITION: Cartridge, ball, MS core, Cal..280, Lot 19A

RIFLE: FN Serial Number 7 RIFLEMAN: Thwaites

Measurements are given in inches

TARGET NO.	MR	MVD	MHD	EVD	EHD	ES
			100 Yard Targets			
1	2.34	2.05	.84	8.93	3.45	9.30
2	2.60	2.04	1.14	8.09	5.11	8.30
3	2.60	2.28	.75	4.66	3.07	8.10
Average	2.51	2.12	.91	7.23	3.88	8.57
			300 Yard Targets			
1	7.54	6.27	3.01	25.89	12.10	27.55
2	7.78	6.16	3.57	24.43	15.35	25.10
3	9 shots hit target					
			600 Yard Targets			
1	15.15	12.92	5.71	49.49	24.00	51.50
2	9 shots hit target					
3	9 shots hit target					

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[redacted]

ACCURACY TEST

Appendix H

DATE: 21 Feb. 1950 DIRECTION OF FIRE: SW

FIRED FROM: Bench rest SKY CONDITION: Broken clouds

WIND: S, 10 mph

AMMUNITION: Cartridge, ball, MS core, Cal..280, Lot 19A

RIFLE: FN Serial Number 7 RIFLEMAN: Gustafson

Measurements are given in inches

TARGET NO.	MR	MVD	MHD	EVD	EHD	ES
			100 Yard Targets			
1	4.06	3.81	.89	12.60	4.10	12.70
2	3.56	3.44	.62	12.72	3.03	12.90
3	3.48	3.33	.76	10.62	3.79	10.80
Average	3.70	3.53	.76	11.98	3.64	12.13
			300 Yard Targets			
1	9 shots hit target					
2	7 shots hit target					
3	10.23	9.72	2.48	30.98	12.29	32.20
			600 Yard Targets			
1	9 shots hit target					
2	7 shots hit target					
3	18.17	16.84	5.05	58.07	24.89	61.52

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ACCURACY TEST

Appendix H

DATE: 21 Feb. 1950 DIRECTION OF FIRE: SW

FIRED FROM: Bench rest SKY CONDITION: Broken clouds

WIND: S, 10 mph

AMMUNITION: Cartridge, ball, MS core, Cal..280, Lot 19A

RIFLE: FN Serial Number 7 RIFLEMAN: Herbert

Measurements are given in inches

TARGET NO.	MR	MVD	MHD	EVD	EHD	ES
			100 Yard Targets			
1	2.96	2.65	1.01	12.80	5.32	12.90
2	4.35	4.02	1.07	13.92	4.00	14.37
3	3.62	3.16	.96	10.80	3.30	11.13
Average	3.64	3.28	1.01	12.51	4.21	12.80
			300 Yard Targets			
1	9 shots hit target					
2	7 shots hit target					
3	10.30	9.53	3.01	31.45	10.23	32.25
			600 Yard Targets			
1	9 shots hit target					
2	7 shots hit target					
3	19.98	18.60	5.35	61.50	19.57	61.50

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ACCURACY TEST

Appendix H

DATE: 21 Feb. 1950 DIRECTION OF FIRE: SW

FIRED FROM: Bench rest SKY CONDITION: Broken clouds

WIND: SSW, 10 mph

AMMUNITION: Cartridge, ball, Cal..30, T104, Lot FAX30-1358

RIFLE: T25 Serial Number 14 RIFLEMAN: Herbert

Measurements are given in inches

TARGET NO.	MR	MVD	MHD	EVD	EHD	ES
			100 Yard Targets			
1	1.69	1.33	.65	5.53	3.41	5.60
2	1.54	.85	1.16	2.61	3.71	4.20
3	1.17	.73	.78	3.02	2.48	3.10
Average	1.47	.97	.86	3.72	3.20	4.30
			300 Yard Targets			
1	4.95	3.77	2.03	16.10	10.27	16.15
2	4.54	2.75	3.16	7.93	10.25	12.60
3	3.51	2.12	2.29	8.75	7.31	8.03
Average	4.33	2.88	2.49	10.93	9.28	12.53
			600 Yard Targets			
1	9.58	7.47	4.46	29.13	19.86	29.35
2	10.55	6.54	7.19	16.65	32.44	35.25
3	6.94	4.21	4.81	15.03	13.50	15.20
Average	9.02	6.07	5.49	20.27	21.93	26.60

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ACCURACY TEST
Appendix H

DATE: 21 Feb, 1950 DIRECTION OF FIRE: SW

FIRED FROM: Bench rest SKY CONDITION: Broken clouds

WIND: NNE, 7 mph

AMMUNITION: Cartridge, ball, Caliber .30, T104, Lot FAX30-1358

RIFLE: T25 Serial Number 14 RIFLEMAN: Thwaites

Measurements are given in inches

TARGET NO.	MR	MVD	MHD	EVD	EHD	ES
100 Yard Targets						
1	1.58	.81	1.17	3.65	5.00	5.20
2	2.00	1.40	.91	6.07	5.32	6.10
3	1.36	.84	.89	2.92	4.37	4.77
Average	1.65	1.02	.99	4.21	4.90	5.36
300 Yard Targets						
1	4.98	2.48	3.51	11.11	13.62	14.30
2	5.80	4.31	2.41	18.01	14.41	18.01
3	4.65	2.41	3.57	8.31	12.51	13.53
Average	5.14	3.07	3.16	12.48	13.51	15.28
600 Yard Targets						
1	9.73	4.50	7.49	23.80	26.56	27.15
2	12.23	9.24	4.90	36.50	29.86	36.50
3	9.87	5.68	6.95	20.10	27.00	29.48
Average	10.61	6.47	6.45	26.80	27.81	31.04

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ACCURACY TEST

Appendix H

DATE: 21 Feb. 1950 DIRECTION OF FIRE: SW

FIRED FROM: Bench rest SKY CONDITION: Broken clouds

WIND: NNE, 7 mph

AMMUNITION: Cartridge, ball, caliber .30, T104, Lot FAX30-1558

RIFLE: T25 Serial Number 14 RIFLEMAN: Gustafson

Measurements are given in inches

TARGET NO.	MR	MVD	MHD	EVD	EHD	ES
			100 Yard Targets			
1	1.29	.89	.79	2.94	2.88	4.00
2	1.85	1.65	.59	5.49	3.20	5.90
3	1.31	1.13	.43	6.45	1.90	6.53
Average	1.48	1.22	.60	4.56	2.66	5.48
			300 Yard Targets			
1	3.52	2.59	1.89	9.30	7.85	11.00
2	5.76	4.78	2.72	15.28	11.70	17.35
3	4.20	3.46	1.76	19.80	7.32	20.48
Average	4.49	3.61	2.12	14.79	8.96	16.28
			600 Yard Targets			
1	7.54	5.51	4.04	20.51	15.97	24.20
2	10.90	8.50	6.63	25.66	25.52	33.50
3	8.88	6.76	4.64	38.48	19.47	41.60
Average	9.11	6.92	5.10	28.22	20.32	33.10

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ACCURACY TEST

Appendix H

DATE: 20 March 1950 RANGE: 100 yards

FIRED FROM: Bench rest DIRECTION OF FIRE: SW

WIND: E to SSE, 7 to 10 mph SKY CONDITION: Cloudy

AMMUNITION: Cartridge, ball, MS core, Caliber .280, Lot 19A

RIFLE: EM2 Serial Number 8 previously fired 6419 rds.

Measurements are in inches

RIFLEMAN	TARGET NO.	MR	MVD	MHD	EVD	EHD	ES
Gustafson	1	2.27	1.73	1.20	6.55	4.72	6.80
"	2	2.15	1.46	1.36	5.04	4.32	5.55
"	3	2.00	1.54	.97	6.50	3.78	6.60
Average		2.14	1.58	1.18	6.03	4.27	6.32
Herbert	1	1.87	1.54	.75	7.60	3.19	7.70
"	2	1.95	1.23	1.10	8.60	4.48	8.70
"	3	1.80	1.45	.78	7.35	4.01	7.40
Average		1.87	1.41	.88	7.86	3.89	7.93
Thwaites	1	1.19	.60	.93	2.78	4.68	5.25
"	2	1.79	1.17	1.27	3.96	4.36	5.10
"	3	1.76	1.37	.82	6.91	3.17	6.94
Average		1.58	1.05	2.05	4.55	4.07	5.76
Average for 9 targets		1.86	1.35	1.37	6.15	4.08	6.67

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ACCURACY TEST

Appendix H

DATE: 20 March 1950 RANGE: 100 yards

FIRED FROM: Bench rest DIRECTION OF FIRE: SW

WIND: E to SSE, 7 to 10 mph SKY CONDITION: Cloudy

AMMUNITION: Cartridge, ball, MS corc, Caliber .280, Lot 19A

RIFLE: FN Serial Number 6 previously fired 6498 rds.

Measurements are in inches

RIFLEMAN	TARGET NO.	MR	MVD	MHD	EVD	EHD	ES
Gustafson	1	1.76	1.27	1.05	7.46	5.13	8.65
"	2	1.92	1.58	.92	5.81	3.69	6.50
"	3	2.85	2.50	1.33	7.56	4.02	8.40
Average		2.18	1.78	1.10	6.94	4.28	7.85
Herbert	1	2.87	2.69	.39	9.70	2.93	9.80
"	2	2.86	2.58	.78	12.63	2.87	12.63
"	3	2.29	1.61	1.03	9.67	4.04	9.67
Average		2.67	2.29	.73	10.67	3.28	10.70
Thwaites	1	1.80	1.23	1.13	3.35	5.23	5.93
"	2	2.20	1.88	.90	10.25	2.77	10.35
"	3	2.20	1.77	1.17	6.98	4.01	8.00
Average		2.07	1.63	1.07	6.86	4.00	8.09
Average of 9 targets		2.31	1.90	.97	8.16	3.65	8.88

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ACCURACY TEST

Appendix H

DATE: 20 March 1950 RANGE: 100 yards

FIRED FROM: Bench rest DIRECTION OF FIRE: SW

WIND: E to SSE, 7 to 10 mph SKY CONDITION: Cloudy

AMMUNITION: Cartridge, ball, Caliber .30, T104, Lot FAX30-1358

RIFLE: T25 Serial Number 15 previously fired 6418 rds.

Measurements are in inches

RIFLEMAN	TARGET NO.	MR	MVD	MHD	EVD	EHD	ES
Gustafson	1	1.63	1.38	.67	5.50	2.95	7.20
"	2	1.90	1.65	.84	6.04	5.40	6.08
"	3	1.61	1.30	.76	4.77	3.40	4.90
Average		1.71	1.44	.76	5.77	3.25	6.06
Herbert	1	1.77	1.10	1.12	5.20	4.39	5.98
"	2	1.72	1.38	.76	5.05	3.59	5.25
"	3	1.32	.92	.69	3.34	3.00	3.82
Average		1.60	1.13	.86	4.53	3.59	5.02
Thmaites	1	1.27	.37	1.06	1.44	4.61	4.80
	2	1.14	.34	.68	3.07	3.08	3.40
	3	1.11	.68	.75	2.62	2.06	3.20
Average		1.17	.63	.83	2.38	3.25	3.80
Average for 9 targets		1.49	1.07	.82	4.23	3.36	4.96

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ACCURACY TEST

Appendix H

DATE: 7 March 1950 RANGE: 100 yards

FIRED FROM: Bench rest DIRECTION OF FIRE: SW

WIND: SE to S, 8 to 10 mph SKY CONDITION: Overcast to scattered clouds

AMMUNITION: Cartridge, ball, Caliber .30, T104, Lot FAX30-1358

RIFLE: T25 Serial Number 14 (replacement stock) previously fired 6440 rds.

Measurements are in inches

RIFLEMAN	TARGET NO.	MR	MVD	MHD	EVD	EHD	ES
Gustafson	1	1.43	.84	1.04	3.29	3.90	4.90
"	2	1.30	.89	.68	4.20	2.91	4.20
"	3	1.74	.98	1.20	4.57	4.07	5.50
Average		1.49	.90	.97	4.02	3.63	4.87
Herbert	1	2.34	1.87	1.00	5.10	5.12	6.30
"	2	1.55	1.19	.62	4.57	3.13	4.60
"	3	1.53	1.14	.79	4.65	3.53	5.80
Average		1.81	1.40	.80	4.77	3.93	5.57
Thwaites	1	1.72	1.32	.90	5.28	3.21	5.30
"	2	1.64	.97	1.21	4.14	4.18	4.55
"	3	1.76	1.70	.39	5.01	1.57	5.10
Average		1.71	1.33	.83	4.81	2.99	4.98
Average for 9 targets		1.67	1.21	.87	4.53	3.52	5.14

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ACCURACY TEST

Appendix H

DATE: 7 March 1950 RANGE: 100 yards

FIRED FROM: Bench rest DIRECTION OF FIRE: SW

WIND: SE to S, 8 to 10 mph SKY CONDITION: Overcast to scattered clouds

AMMUNITION: Cartridge,ball, Caliber .30, T104, Lot FAX30-1358

RIFLE: T25 Serial Number 14 (original stock) previously fired 6533 rds.

Measurements are in inches

RIFLEMAN	TARGET NO.	MR	MVD	MHD	EVD	EHD	ES
Gustafson	1	1.23	1.03	.39	4.29	1.90	4.30
"	2	1.15	.93	.50	4.84	1.51	4.84
"	3	1.65	1.29	.68	5.99	2.97	6.00
Average		1.34	1.08	.52	5.04	2.13	5.05
Herbert	1	1.20	.77	.79	3.10	2.90	3.35
"	2	1.75	1.38	.78	6.80	3.05	6.90
"	3	1.28	.77	.85	2.84	3.01	3.20
Average		1.41	.97	.81	4.25	2.99	4.48
Thwaites	1	2.42	1.02	.88	3.82	2.60	4.35
"	2	1.42	.80	1.05	4.12	3.52	4.85
"	3	1.64	1.32	.73	5.16	3.05	6.00
Average		1.83	1.05	.89	4.37	3.06	5.07
Average for 9 targets		1.53	1.03	.74	4.55	2.73	4.87

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ACCURACY TEST

Appendix H

DATE: 7 March 1950 RANGE: 100 yards

FIRED FROM: Bench rest DIRECTION OF FIRE: SW

WIND: SE to S, 8 to 10 mph SKY CONDITION: Overcast to scattered clouds

AMMUNITION: Cartridge, ball, MS core, Cal..280, Lot 19A

RIFLE: EM2 Serial Number 6 previously fired 6435 rds.

Measurements are in inches

RIFLEMAN	TARGET NO.	MR	MVD	MHD	EVD	EHD	ES
Gustafson	1	1.68	1.43	.64	6.00	3.27	6.00
"	2	1.05	.77	.62	4.11	3.13	4.65
"	3	1.28	1.07	.57	4.53	2.49	4.60
Average		1.34	1.09	.61	4.88	2.96	5.08
Herbert	1	1.51	.97	.98	3.70	4.12	4.80
"	2	1.70	1.45	.60	7.76	2.14	7.85
"	3	2.20	1.27	1.46	5.62	7.55	7.90
Average		1.80	1.23	1.01	5.69	4.60	6.85
Thwaites	1	2.22	1.43	1.28	6.54	6.28	7.60
"	2	1.49	1.10	.87	3.23	2.86	3.70
"	3	1.56	1.21	.73	5.45	2.95	5.90
Average		1.76	1.26	.96	5.07	4.03	5.73
Average for 9 targets		1.63	1.19	.86	5.21	3.86	5.89

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ACCURACY TEST

Appendix H

DATE: 7 March 1950 RANGE: 100 Yards

FIRED FROM: Bench rest DIRECTION OF FIRE: SW

WIND: SE to S, 8 to 10 mph SKY CONDITION: Overcast to scattered clouds

AMMUNITION: Cartridge, ball, MS core, Cal..280, Lot 19A

RIFLE: FN Serial Number 7 previously fired 6455 rds.

Measurements are in inches

RIFLEMAN	TARGET NO.	MR	MVD	MHD	EVD	EHD	ES
Gustafson	1	2.11	1.61	1.03	7.37	3.50	7.37
"	2	2.91	2.41	1.29	12.50	6.96	14.10
"	3	3.08	2.50	1.33	10.64	5.27	10.80
Average		2.70	2.17	1.22	10.17	5.24	10.76
Herbert	1	2.89	2.35	1.08	10.20	3.52	10.20
"	2	2.10	1.85	.77	7.15	2.28	7.20
"	3	1.36	1.08	.60	4.25	2.60	4.25
Average		2.12	1.76	.82	7.20	2.80	7.22
Thwaites	1	1.96	1.78	.54	4.73	2.02	4.80
"	2	2.84	2.70	.75	12.62	2.93	13.00
"	3	2.10	1.69	.94	7.97	3.65	8.00
Average		2.30	2.06	.74	8.44	2.87	8.60
Average for 9 targets		2.37	2.00	.93	8.60	3.64	8.86

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ACCURACY TEST

Appendix H

DATE: 24 Feb. 1950 DIRECTION OF FIRE: SW

FIRED FROM: Bench rest SKY CONDITION: Broken clouds to overcast

WIND: SSW to SW, 17 to 30 mph

AMMUNITION: Cartridge, ball, Caliber .30, T104, Lot FAX30-1358

RIFLE: T25 Serial Number 15 RIFLEMAN: Thwaites

Measurements are given in inches

TARGET NO.	MR	MVD	MHD	EVD	EHD	ES
			100 Yard Targets			
1	1.12	.69	.66	4.09	2.38	4.09
2	1.17	.79	.84	2.94	2.72	3.90
3	1.17	.92	.57	3.92	2.36	4.33
Average	1.15	.80	.69	3.65	2.49	4.11
			300 Yard Targets			
1	3.23	2.07	1.95	11.54	7.92	11.60
2	3.66	2.02	2.72	8.21	9.32	11.10
3	3.21	2.44	1.70	11.20	6.24	11.72
Average	3.37	2.18	2.12	10.32	7.83	11.47
			600 Yard Targets			
1	6.02	3.84	3.87	21.43	15.52	22.00
2	7.80	3.98	6.09	16.86	23.06	23.85
3	5.86	4.65	2.43	21.92	9.24	22.00
Average	6.56	4.16	4.13	20.07	15.94	22.62

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ACCURACY TEST

APPENDIX H

DATE: 24 Feb. 1950 DIRECTION OF FIRE: SW

FIRED FROM: Bench rest SKY CONDITION: Broken clouds to overcast

WIND: SSW to SW, 17 to 30 mph

AMMUNITION: Cartridge, ball, Caliber .30, T104, Lot FAX30-1358

RIFLE: T25 Serial Number 15 RIFLEMAN: Norbert

Measurements are given in inches

TARGET NO.	MR	MVD	MHD	EVD	EHD	ES
			100 Yard Targets			
1	1.22	1.00	.62	3.65	2.43	3.90
2	1.51	1.26	.61	4.90	2.24	5.00
3	1.66	1.41	.61	5.34	2.83	5.60
Average	1.46	1.22	.61	4.63	2.50	4.83
			300 Yard Targets			
1	3.99	3.21	2.07	10.98	7.87	12.00
2	4.59	3.80	2.20	14.62	8.75	14.65
3	4.91	4.20	1.83	15.70	8.67	16.35
Average	4.50	3.74	2.03	13.77	8.43	14.33
			600 Yard Targets			
1	8.48	6.80	4.24	26.26	13.93	28.75
2	9.64	7.73	5.07	29.42	22.23	32.50
3	10.58	9.07	4.47	32.00	19.20	33.30
Average	9.57	7.87	4.59	29.23	18.45	31.52

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ACCURACY TEST

Appendix H

DATE: 24 Feb. 1950 DIRECTION OF FIRE: SW

FIRED FROM: Bench rest SKY CONDITION: Broken clouds to overcast

WIND: SSW to SW, 17 to 30 mph

AMMUNITION: Cartridge, ball, Caliber .30, T104, Lot FAX30-1358

RIFLE: T25 Serial Number 15 RIFLEMAN: Gustafson

Measurements are given in inches

TARGET NO.	MR	MVD	MHD	EVD	EHD	ES
			100 Yard Targets			
1	1.07	.81	.58	2.65	2.70	3.40
2	1.23	.95	.65	3.14	1.81	3.50
3	1.27	.65	1.00	2.95	3.68	4.70
Average	1.19	.80	.74	2.91	2.73	3.87
			300 Yard Targets			
1	3.30	2.45	1.87	7.43	8.43	9.25
2	3.93	2.85	2.19	9.83	8.47	11.40
3	3.71	1.98	2.92	8.86	10.48	13.63
Average	3.66	2.43	2.33	8.71	9.13	11.43
			600 Yard Targets			
1	7.78	6.12	4.06	19.40	18.54	19.60
2	7.30	5.07	4.47	20.40	20.00	23.50
3	7.77	4.09	5.86	18.97	22.22	28.50
Average	7.62	5.09	4.80	19.59	20.25	23.87

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ACCURACY TEST

Appendix H

DATE: 28 Feb. 1950

RIFLE: FN, Serial Number 4

AMMUNITION: Cartridge, ball, MS core, Caliber .280, Lot 19A

RANGE: 100 yards DIRECTION OF FIRE: SW

FIRED FROM: Bench rest RIFLEMAN: Thwaites

WIND: S-SW, 20 to 28 mph SKY CONDITION: Overcast

Targets are of 10 rounds each. Measurements are in inches.

TARGET NO.	MR	MVD	MHD	EVD	EHD	ES	CENTER OF IMPACT FROM POINT OF AIM
1	Normal group (rifle previously fired 14 rounds)						Right 1.08
	3.56	3.18	1.27	12.12	4.65	12.30	Below .25
2	Normal group						Right .59
	3.00	2.66	.91	12.60	4.82	12.63	Above .81
3	Normal group						Right 1.00
	2.55	2.22	.91	7.64	4.11	7.70	Above 1.83
Average	3.04	2.69	1.03	10.79	4.53	10.88	Right
							Above
4	Each shot was the first from a fully loaded magazine						
	2.42	2.03	1.08	8.70	4.48	8.70	Right .86
							Below 2.08
5	Each shot was the 11th from the magazine (9 rounds remained in weapon)						
	1.58	.73	1.28	3.39	6.63	7.00	Right .05
							Below .76
6	Each shot was the last from the magazine						Left 1.12
	2.35	1.67	1.39	5.70	5.92	8.15	Below 1.98
7	Each round loaded directly into chamber and bolt closed as gently as possible. Magazine not attached to rifle						Left .50
	1.57	.97	1.02	3.51	3.30	4.40	Below 3.07

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ACCURACY TEST

Appendix H

TARGET NO.	MR	MVD	MHD	EVD	EHD	ES	CENTER OF IMPACT FROM POINT OF AIM
8	After firing 40 rounds automatic fire to heat barrel. Each round loaded directly into chamber as for target 7.						Left 1.50
	2.39	1.41	1.51	6.06	7.90	8.65	Below 3.50
9	First 10 rounds from a fully loaded magazine. One minute cooling period between shots						Left .55
	2.74	1.90	1.70	6.36	7.24	8.30	Below .66
10	Last 10 round from a fully loaded magazine. One minute cooling period between shots.						Right .19
	1.65	1.19	.73	6.30	3.27	6.35	Above 1.55
11	Fired without grip in normal manner.						Right 1.77
	1.77	1.57	.63	5.51	2.82	5.80	Above 3.47

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TEST FOR INVESTIGATION OF COMBAT ACCURACY

Appendix H

Target Number 1 = Normal bench rest group

Target Number 2 = Bench rest group starting with a cold and oiled bore

Target Number 3 = Normal prone group

Target Number 4 = Bench rest group with a hot barrel

Target Number 5 = Prone group with a hot barrel

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TEST FOR INVESTIGATION OF COMBAT ACCURACY

Appendix H

DATES: 27 and 28 March 1950 RANGE: 100 yards

WIND: 27 March - ENE to SSW, 0 to 9 mph
28 March - SSW to WNW, 6 to 20 mph

SKY CONDITION: 27 March - Overcast with fog
28 March - Overcast to partly cloudy

DIRECTION OF FIRE: WSW

AMMUNITION: Cartridge, ball, MS ccre, Caliber .280, Lot 19A

RIFLE: EM2 #6 PREVIOUSLY FIRED: 6994 rds.

All target data are given in inches

RIFLEMAN: Gustafson

TARGET NO.	Mean FROM C.I of GROUP NO.1	MR	MVD	MHD	EVD	EHD	ES	C.1 FROM NORMAL C.I	EXTREME SHOT TO NORMAL C.1
1	1.58	1.58	1.21	.87	4.80	3.66	5.20		3.70
2	2.40	1.99	1.48	.99	5.30	3.44	5.60	Right .15 Below 1.95	5.05
3	5.41	1.93	1.05	1.54	3.53	5.40	5.90	Right .63 Below 5.07	6.65
4	9.03	1.93	1.32	1.01	5.16	4.59	5.75	Left .14 Below 8.90	11.90
5	10.43	1.92	1.32	1.14	4.94	5.98	6.00	Right .90 Below10.30	12.90
Average	5.77	1.87	1.28	1.11	4.75	4.61	5.69	Right .31 Below 5.24	8.04

RIFLEMAN: Herbert

1	1.63	1.63	1.27	.86	5.72	3.17	6.52		3.40
2	2.04	1.44	1.00	.86	4.33	4.41	5.05	Left 1.10 Above1.30	4.60
3	7.50	1.52	1.13	.83	4.47	3.18	5.30	Right 1.05 Below 7.35	9.50
4	7.91	1.63	1.31	.73	4.13	3.02	4.20	Right 1.07 Below 7.78	9.95
5	11.09	1.69	1.30	.86	5.34	3.39	5.34	Right 1.72 Below 10.86	13.90
Average	6.03	1.58	1.20	.83	4.80	3.43	5.28	Right .55 Below 4.94	8.27

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Appendix H

RIFLEMAN: Thwaites

TARGET NO.	MEAN FROM C.I OF GROUP NO.1	MR	MVD	MHD	EVD	EHD	ES	C.I FROM NORMAL C.I	EXTREME SHOT TO NORMAL C.I
1	1.42	1.42	1.20	.65	4.17	3.05	4.80		2.55
2	3.32	1.66	1.54	.39	7.72	1.98	7.90	Right 2.63 Below .85	6.52
3	9.11	2.35	1.91	1.17	7.14	4.27	7.20	Right 2.85 Below 8.50	12.90
4	10.09	2.49	1.51	1.42	5.70	5.60	5.76	Right 2.25 Below 9.68	12.45
5	13.09	1.91	.78	1.60	4.14	6.33	6.50	Right 2.75 Below 12.65	14.90
Average	7.41	1.97	1.39	1.05	5.77	4.25	6.43	Right 2.10 Below 6.34	9.86
				Average of 15 targets					
	6.40	1.81	1.29	1.00	5.11	4.10	5.80	Right .99 Below 5.51	8.72
				Average of targets fired by 3 individuals					
1	1.54	1.54	1.23	.79	4.90	3.29	5.51		3.22
2	2.59	1.70	1.34	.75	5.78	3.28	6.18	Right .56 Below .50	5.39
3	7.34	1.93	1.36	1.18	5.05	4.28	6.13	Right 1.51 Below 6.97	9.68
4	9.01	2.02	1.38	1.05	5.00	4.40	5.24	Right 1.06 Below 8.79	11.43
5	11.54	1.84	1.13	1.20	4.81	5.23	5.95	Right 1.79 Below 11.27	13.90

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TEST FOR INVESTIGATION OF COMBAT ACCURACY

Appendix H

DATES: 27 and 28 March 1950

RANGE: 100 yards

WIND: 27 March - ENE to SSW, 0 to 9 mph
28 March - SSW to WNW, 6 to 20 mph

SKY CONDITION: 27 March - Overcast with fog
28 March - Overcast to partly cloudy

DIRECTION OF FIRE: WSW

AMMUNITION: Cartridge, ball, MS core, Caliber .280, Lot 19A

RIFLE: EM2 #8

PREVIOUSLY FIRED: 7066 rds.

All target data are given in inches

RIFLEMAN: Gustafson

TARGET NO.	MEAN FROM C.I. OF GROUP NO. 1	MR	MVD	MHD	EVD	EHD	ES	C.I. FROM NORMAL C.I.	EXTREME SHOT TO NORMAL C.I.
1	1.52	1.52	1.26	.81	4.75	3.20	5.40		3.63
2	2.04	1.44	.97	.82	4.23	3.90	4.85	Left .65 Above 1.30	3.30
3	5.88	1.51	1.18	.76	4.44	2.76	4.75	Left .73 Below 5.74	8.60
4*	4.53	2.99	1.40	2.10	6.28	13.89	14.00	Right 2.98 Above 2.80	13.43
5	3.29	2.16	1.18	1.54	5.96	5.48	6.30	Right 2.93 Below .20	6.00
Average	3.45	1.92	1.20	1.21	5.13	5.85	7.06	Right .89 Below .37	6.99

RIFLEMAN: Herbert

1	1.35	1.35	1.11	.59	3.72	2.43	4.05		2.10
2	2.18	1.72	1.32	.87	5.02	3.10	5.60	Left 1.12 Below .94	4.22
3	5.35	1.53	.97	.80	5.72	3.72	5.72	Left .06 Below 5.35	7.60
4	1.50	1.30	.60	1.03	2.17	4.42	4.50	Right .45 Above .48	3.10
5	7.20	1.27	.84	.79	3.21	3.54	3.95	Right 1.6 Below 6.93	8.80
Average	3.52	1.43	.97	.81	3.97	3.44	4.76	Right .18 Below 2.55	5.16

* 9 Shots in ES 6.25 [redacted]

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TEST FOR INVESTIGATION OF COMBAT ACCURACY

Appendix H

RIFLE: EM2 #8

RIFLEMAN: Thwaites

TARGET NO.	MEAN FROM C.I. OF GROUP NO. 1	MR	MVD	MHD	EVD	EHD	ES	C.I. FROM NORMAL C.I.	EXTREME SHOT TO NORMAL C.I.
1	1.70	1.70	1.21	.96	5.80	4.04	6.15		3.50
2	1.73	1.55	1.25	.84	4.25	3.56	4.95	Left .62 Below .32	3.05
3	6.65	1.46	1.10	.76	4.50	2.76	4.70	Left .58 Below 6.55	9.05
4	2.13	1.60	1.06	1.04	4.40	4.80	5.15	Right 1.25 Below .38	3.95
5	6.68	1.62	.86	1.11	4.14	4.99	4.95	Right 1.53 Below 6.34	8.25
Average	3.78	1.59	1.10	.94	4.62	4.01	5.18	Right .32 Below 2.72	5.56
					Averages of 15 Targets				
	3.58	1.65	1.09	.99	4.57	4.43	5.67	Right .46 Below 1.88	5.90
					Averages of Targets Fired by 3 Individuals				
1	1.52	1.52	1.19	.78	4.76	3.22	5.20		3.08
2	1.98	1.57	1.18	.84	4.50	3.52	5.13	Left .80 Above .01	3.52
3	5.96	1.50	1.08	.77	4.89	3.08	5.06	Left .46 Below 5.88	8.42
4	2.72	1.96	1.02	1.39	4.28	7.70	7.88	Right 1.53 Above .97	6.85
5	5.72	1.68	.97	1.15	4.44	4.64	5.07	Right 2.03 Below 4.49	7.69

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TEST FOR INVESTIGATION OF COMBAT ACCURACY

Appendix H

DATES: 27 and 28 March 1950 RANGE: 100 yards

WIND: 27 March - ENE to SSW, 0 to 9 mph
28 March - SSW to WNW, 6 to 20 mph

SKY CONDITION: 27 March-Overcast with fog
28 March-Overcast to partly cloudy

DIRECTION OF FIRE: WSW

AMMUNITION: Cartridge, ball, MS core, Caliber .280, Lot 19A

RIFLE: FN #6 PREVIOUSLY FIRED: 7011 Rds.

All target data are given in inches

RIFLEMAN: Herbert

TARGET NO.	MEAN FROM C.I. OF GROUP NO.1	MR	MVD	MHD	EVD	EHD	ES	C.I. FROM NORMAL C.I.	EXTREME SHOT TO NORMAL C.
1	1.92	1.92	.93	1.59	3.96	5.39	6.42		4.00
2	3.68	3.16	2.70	1.36	7.42	6.27	8.15	Left .32 Below 2.44	6.40
3	15.20	1.93	1.43	1.09	5.22	3.45	6.15	Right 1.80 Below 15.04	17.22
4	12.40	2.15	1.86	.79	5.94	3.07	6.40	Right 3.17 Below 11.93	14.25
5	16.82	1.92	1.63	.72	6.23	3.24	6.35	Right 1.90 Below 16.65	19.53
Average	10.00	2.22	1.71	1.11	5.75	4.28	6.69	Right 1.31 Below 9.21	12.28

RIFLEMAN: Thwaites

1	2.69	2.69	1.89	1.55	9.37	5.23	9.50		4.85
2	3.16	2.09	1.31	1.50	5.72	5.89	7.03	Left 1.92 Above 1.54	5.45
3	8.20	2.44	1.98	1.20	11.62	4.64	12.30	Left 2.48 Below 7.50	13.78
4	6.68	1.99	1.55	.87	6.22	3.73	6.60	Right 2.12 Below 6.15	9.70
5	11.74	1.75	1.25	1.01	4.42	4.84	6.10	Right .02 Below 11.66	14.08
Average	6.49	2.19	1.60	1.23	7.47	4.87	8.31	Left .45 Below 4.75	9.57

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TEST FOR INVESTIGATION OF COMBAT ACCURACY

Appendix H

RIFLEMAN: Gustafson

TARGET NO.	MEAN FROM C.I. OF GROUP NO.1	MR	MVD	MED	EVD	EHD	ES	C.I. FROM NORMAL C.I.	EXTREME SHOT TO NORMAL C.I.
1	1.48	1.48	1.03	.89	4.09	3.16	4.20		2.45
2	2.63	2.17	1.73	1.01	7.74	4.50	7.80	Left .42 Below 1.61	1.90
3	3.76	2.36	2.08	.88	8.41	3.40	8.41	Right .46 Below 3.06	8.10
4	2.11	1.52	.91	.98	4.82	3.94	5.25	Right .71 Below 1.17	4.25
5	4.23	1.30	1.04	.64	4.66	2.60	5.05	Right .54 Below 4.11	6.88
Average	2.84	1.77	1.36	.88	5.94	3.52	6.14	Right .26 Below 1.35	5.32
Average of 15 targets									
	6.44	2.06	1.56	1.07	6.39	4.22	7.05	Right .37 Below 5.10	9.06
Averages of targets fired by 3 individuals									
1	2.03	2.03	1.20	1.34	5.81	4.59	6.71		3.77
2	3.16	2.47	1.91	1.29	6.96	5.55	7.66	Left .89 Above .24	5.58
3	9.05	2.24	1.83	1.06	8.42	3.83	8.95	Left .07 Below 8.53	13.03
4	7.06	1.89	1.44	.88	5.66	3.58	6.08	Right 2.00 Below 6.42	9.40
5	10.93	1.66	1.31	.79	5.10	3.56	5.83	Right .82 Below 10.81	13.50

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APPENDIX H

TEST FOR INVESTIGATION OF COMBAT ACCURACY

DATES: 27 and 28 March 1950 RANGE: 100 Yards

WIND: 27 March - ENE to SSW, 0 to 9 mph
28 March - SSW to WNW, 6 to 20 mph

SKY CONDITION: 27 March - Overcast with fog
28 March - Overcast to partly cloudy.

DIRECTION OF FIRE: WSW

AMMUNITION: Cartridge, Ball, MS Core, Caliber .280, Lot 19A.

RIFLE: FN No. 7 PREVIOUSLY FIRED: 6993 rounds.

All target data are given in inches.

TARGET NO.	MEAN FROM C. I. OF GROUP NO. 1	MR	MVD	MHD	EVD	EHD	ES	C. I. FROM NORMAL C. I.	EXTREME SHOT TO NORMAL C. I.
Rifleman: Gustafson									
1	2.41	2.41	2.03	.99	6.64	4.20	6.75		3.95
2	5.93	3.53	2.76	1.74	9.54	7.06	10.00	Right .78 Above 5.38	9.28
3	2.54	2.16	1.47	1.12	5.54	6.68	6.80	Left .80 Below 1.10	3.85
4	2.40	2.41	1.29	1.86	4.53	7.55	8.10	Right 2.53 Below 4.72	4.70
5	7.09	1.79	1.00	1.34	3.44	5.72	6.30	Right .46 Below 6.84	8.65
Average	4.07	2.46	1.71	1.41	5.94	6.24	7.59	Right .59 Below 1.46	6.09
Rifleman: Herbert									
1	2.38	2.38	1.71	1.39	5.04	6.11	6.80		3.62
2	3.52	2.63	2.49	.78	10.95	3.22	11.40	Right 2.08 Below .34	6.10
3	5.74	3.42	2.91	1.41	14.42	6.43	15.80	Right 1.52 Below 5.16	14.45
4	7.49	2.42	1.72	1.32	7.74	5.33	8.20	Right 2.03 Below 7.15	9.80
5	10.17	1.92	.97	1.51	3.95	6.82	7.45	Right 1.86 Below 9.85	12.65
Average	5.86	2.55	1.96	1.28	8.54	5.58	9.93	Right 1.50 Below 4.50	9.32

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APPENDIX H

TEST FOR INVESTIGATION OF COMBAT ACCURACY

RIFLE: FN No. 7

TARGET NO.	MEAN FROM C. I. OF GROUP NO. 1	MR	MVD	MHD	EVD	EHD	ES	C. I. FROM NORMAL C. I.	EXTREME SHOT TO NORMAL C. I.
				Rifleman: Thwaites					
1	1.80	1.80	1.28	.95	4.75	4.00	5.20		3.35
2	3.70	2.54	1.78	1.43	7.07	5.65	8.20	Right .73 Below 3.04	7.33
3	4.99	2.04	1.34	1.13	5.14	5.52	5.60	Left .21 Below 4.75	7.00
4	9.09	1.41	1.02	.83	5.30	3.25	5.60	Right 2.33 Below 8.70	10.75
5	11.55	1.78	1.44	.88	5.24	3.30	5.40	Right 1.95 Below 11.35	14.50
Average	6.23	1.91	1.37	1.04	5.50	4.34	6.60	Right .96 Below 5.57	8.59
				Averages of 15 targets					
	5.39	2.31	1.68	1.24	6.66	5.39	7.84	Right 1.02 Below 5.84	8.00
				Averages of targets fired by 3 individuals					
1	2.20	2.20	1.67	1.11	5.68	4.77	6.25		3.64
2	4.38	2.90	2.34	1.32	9.19	5.31	9.87	Right 1.20 Above .67	7.57
3	4.42	2.54	1.91	1.22	8.37	6.21	9.40	Right .17 Below 5.67	8.43
4	6.33	2.08	1.34	1.34	5.86	5.38	7.30	Right 2.30 Below 6.86	8.42
5	9.60	1.83	1.14	1.24	4.21	5.28	6.38	Right 1.42 Below 9.35	11.93

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APPENDIX H

TEST FOR INVESTIGATION OF COMBAT ACCURACY

DATES: 27 and 28 March 1950 RANGE: 100 Yards

WIND: 27 March - ENE to SSW, 0 to 9 mph
28 March - SSW to WND, 6 to 20 mph

SKY CONDITION: 27 March - Overcast with fog
28 March - Overcast to partly cloudy

DIRECTION OF FIRE: WSW

AMMUNITION: Cartridge, Ball, Caliber .30, T104, Lot FAX30-1358

RIFLE: T25, No. 14 PREVIOUSLY FIRED: 7156 rounds.

All target data are given in inches.

TARGET NO.	MEAN FROM C. I. OF GROUP NO. 1	MR	MVD	MHD	EVD	EHD	ES	C. I. FROM NORMAL C. I.	EXTREME SHOT TO NORMAL C. I.
Rifleman: Gustafson									
1	1.73	1.73	1.58	.57	4.39	2.36	4.60		2.00
2	1.54	1.41	1.01	.82	3.53	3.25	4.15	Right .80 Above .30	3.40
3	4.22	1.43	.86	.85	5.60	3.08	5.80	Right .15 Below 4.08	8.15
4	6.02	1.69	1.43	.63	4.93	2.97	4.93	Left 1.07 Below 5.81	8.22
5	8.04	1.43	1.03	.73	5.23	3.06	5.40	Left 2.11 Below 7.65	9.75
Average	4.31	1.54	1.18	.72	4.74	2.94	4.98	Left .45 Below 3.45	6.42
Rifleman: Herbert									
1	1.38	1.38	.93	.94	3.18	3.25	3.70		1.97
2	1.76	1.79	1.20	.99	4.65	3.20	4.65	Left .07 Below .22	3.05
3	3.53	1.56	.99	.92	5.52	4.38	5.60	Left .67 Below 3.36	7.00
4	5.34	1.47	1.13	.76	4.77	2.90	4.80	Left 1.46 Below 4.99	7.40
5	7.04	1.37	1.15	.52	4.41	1.88	4.50	Left 1.17 Below 6.97	9.20
Average	3.81	[redacted]				3.12	4.65	Left .67 Below 3.11	5.72

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APPENDIX H

TEST FOR INVESTIGATION OF COMBAT ACCURACY

RIFLE: T25, No. 14

TARGET NO.	MEAN FROM C. I. OF GROUP NO. 1	MR	MVD	MHD	EVD	EHD	ES	C. I. FROM NORMAL C. I.	EXTREME SHOT TO NORMAL C. I.
				Rifleman: Thwaites					
1	1.69	1.69	.83	1.36	3.69	3.83	4.92		2.60
2	1.76	1.80	1.26	.98	4.94	4.47	4.94	Left .34 Above .03	3.65
3	2.19	1.38	.94	.79	3.87	4.17	4.22	Left 1.12 Below 1.50	4.30
4	6.10	1.47	.62	1.14	2.90	5.45	5.45	Left .99 Below 5.81	7.60
5	5.10	1.49	.79	1.14	3.46	4.39	4.85	Left 1.10 Below 4.82	6.90
Average	3.37	1.57	.89	1.08	3.77	4.46	4.88	Left .71 Below 2.42	5.05
				Averages of 15 targets					
	3.83	1.54	1.05	.88	4.34	3.51	4.84	Left .61 Below 2.59	5.73
				Averages of targets fired by 3 individuals					
1	1.61	1.61	1.11	.96	3.75	3.15	4.41		2.39
2	1.69	1.67	1.16	.93	4.37	3.64	4.58	Right .13 Above .04	3.37
3	3.31	1.46	.93	.85	5.00	3.88	5.21	Left .55 Below 2.98	6.55
4	5.82	1.54	1.06	.84	4.20	3.77	5.06	Left 1.17 Below 5.54	7.44
5	6.73	1.43	.99	.80	4.37	3.11	4.92	Left 1.46 Below 6.48	8.62

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APPENDIX H

TEST FOR INVESTIGATION OF COMBAT ACCURACY

DATES: 27 and 28 March 1950 RANGE: 100 Yards

WIND: 27 March - ENE to SSW, 0 to 9 mph
28 March - SSW to WNW, 6 to 20 mph

SKY CONDITION: 27 March - Overcast with fog
28 March - Overcast to partly cloudy

DIRECTION OF FIRE: WSW

AMMUNITION: Cartridge, Ball, Caliber .30, T104, Lot FAX30-1358

RIFLE: T25, No. 15 PREVIOUSLY FIRED: 6964 rounds

All target data are given in inches.

TARGET NO.	MEAN FROM C. I. OF GROUP NO. 1	MR	MVD	MHD	EVD	EHD	ES	C. I. FROM NORMAL C. I.	EXTREME SHOT TO NORMAL C. I.
				Rifleman: Thwaites					
1	1.96	1.96	1.38	1.14	5.40	4.10	6.80		4.05
2	1.81	1.72	1.12	1.10	3.92	5.37	6.00	Right .35 0.00	3.70
3	1.72	1.51	1.07	.91	4.03	3.23	4.15	Left .11 Below .80	3.35
4	3.61	1.02	.88	.46	3.80	1.96	4.30	Left 2.16 Below 2.83	6.10
5	4.36	1.76	.96	1.32	2.91	4.60	4.90	Left 2.45 Below 3.33	5.85
Average	2.69	1.59	1.08	.99	4.01	3.85	5.23	Left .87 Below 1.39	4.61
				Rifleman: Gustafson					
1	1.53	1.53	1.01	1.04	3.12	3.97	4.50		2.40
2	3.01	1.79	1.28	.90	6.48	4.32	6.90	Right .08 Below 2.67	6.80
3	4.79	1.75	1.34	.94	4.69	3.85	5.68	Right .45 Below 4.66	7.45
4	5.86	1.13	.91	.50	4.36	1.94	4.53	Left .54 Below 5.84	8.00
5	7.78	.96	.79	.43	3.92	1.88	4.10	Left .61 Below 7.71	8.60
Average	4.59	1.43	1.07	.76	4.51	3.19	5.14	Left .12 Below 4.18	6.65

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APPENDIX H

TEST FOR INVESTIGATION OF COMBAT ACCURACY

RIFLE: T25, No. 15

TARGET NO.	MEAN FROM C. I. OF GROUP NO. 1	MR	MVD	MHD	EVD	EHD	ES	C. I. FROM NORMAL C. I.	EXTREME SHOT TO NORMAL C. I.
				Rifleman: Herbert					
1	1.97	1.97	1.23	1.17	4.88	4.76	5.40		3.35
2	1.91	1.30	.82	.80	3.57	3.15	3.57	Left .66 Below 1.42	3.40
3	3.51	1.54	1.18	.69	3.61	3.13	3.61	Right .07 Below 3.37	5.30
4	5.30	1.00	.61	.66	2.49	3.30	3.50	Left 1.85 Below 4.95	6.55
5	6.17	1.08	.92	.82	4.68	3.17	4.95	Left .37 Below 5.68	8.30
Average	3.77	1.38	.95	.83	3.85	3.50	4.21	Left .56 Below 3.08	5.38
				Averages of 15 targets					
	3.68	1.47	1.03	.86	4.12	3.51	4.86	Left .52 Below 2.88	5.55
				Averages of targets fired by 3 individuals					
1	1.82	1.82	1.21	1.12	4.47	4.28	5.57		3.27
2	2.24	1.60	1.07	.95	4.66	4.28	5.49	Left .08 Below 1.36	4.63
3	3.34	1.60	1.20	.85	4.11	3.40	4.48	Right .14 Below 2.94	5.37
4	4.92	1.05	.80	.54	3.55	2.40	4.11	Left 1.52 Below 4.54	6.88
5	6.10	1.27	.89	.86	3.84	3.22	4.65	Left 1.14 Below 5.57	7.58

[redacted]

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Appendix H

DATE: 18 April 1950
FIRED FROM: Bench Rest
WIND: S to SW, 10 to 12 mph
RIFLE: EM2, Serial Number 3
RIFLEMAN: Gustafson

RANGE: 100 Yards
DIRECTION OF FIRE: W SW
SKY CONDITION: Overcast

TARGET NUMBER	MR	MVD	MHD	EVD	EHD	ES
		Cartridge, Ball, Caliber .280, Lot 12A (Lead Core Bullet)				
1	1.39	1.03	.75	4.53	2.18	4.55
2	1.44	1.12	.72	3.97	2.60	4.17
3	1.30	.75	.87	2.95	3.81	3.95
4	1.28	.99	.56	3.62	2.47	3.70
5	1.22	.64	.87	3.71	4.59	5.20
Average	1.33	.91	.75	3.76	3.13	4.31
		Cartridge, Ball, Caliber .280, Lot 19A (Steel Core Bullet)				
1	1.06	.65	.66	3.35	2.84	3.35
2	2.37	1.73	1.10	7.61	4.73	7.61
3	1.49	.89	1.09	4.12	4.65	4.65
4	1.28	1.18	.33	4.50	1.88	4.50
5	1.67	1.46	.66	6.02	2.44	6.50
Average	1.57	1.18	.77	5.12	3.31	5.32

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Appendix H

DATE: 18 April 1950
FIRED FROM: Bench Rest
WIND: S to SW, 10 to 12 mph
RIFLE: T25, Serial Number 10
RIFLEMAN: Gustafson

RANGE: 100 Yards
DIRECTION OF FIRE: WSW
SKY CONDITION: Overcast

TARGET NUMBER	MR	MVD	MHD	EVD	EHD	ES
	Cartridge, Ball, Caliber .30, T65E2, Lot FAX 30-1290 (Lead Core Bullet)					
1	1.34	.96	.66	3.83	2.40	4.00
2	1.73	1.54	.55	5.28	2.55	5.40
3	1.43	1.04	.65	5.40	2.97	5.45
4	1.13	.84	.59	3.51	2.43	3.55
5	1.70	1.17	.93	3.74	3.64	3.80
Average	1.47	1.11	.68	4.35	2.80	4.44
	Cartridge, Ball, Caliber .30, T104, Lot FAX 30-1358 (Steel Core Bullet)					
1	1.28	1.05	.61	4.65	2.30	4.75
2	1.40	1.00	.73	4.46	2.98	4.60
3	1.45	1.11	.72	4.29	3.26	4.95
4	1.17	.94	.58	3.40	2.77	3.80
5	1.36	.88	.75	3.52	3.91	4.00
Average	1.33	1.00	.68	4.06	3.04	4.42

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APPENDIX I

VELOCITY DATA

(2 sheets)

[redacted]

APPENDIX I

VELOCITY TEST

CHRONOGRAPH TYPE - COUNTER. INITIATOR TYPE - LUMILINE

DATE 1950	TIME START	TIME FINISH	TEMP °F RANGE	ROUNDS	INSTRUMENTAL VELOCITY AT 78' fps
					AMMUNITION: CARTRIDGE, BALL, CAL . .280, LOT 19A
					RIFLE, LIGHTWEIGHT, CAL. .280, E12, SERIAL NUMBER 6
17 Feb.	1135	1200	37	1-20	2214, 2234, 2220, 2242, 2138, 2226, 2200, 2250, 2214, 2210, 2205, 2193, 2211, 2157, 2212, 2211, 2236, 2176, 2227, 2242.
7 Mar.	0928	0945	34	1-20	2201, 2213, 2232, 2183, 2218, 2206, 2219, 2224, 2198, 2198, 2225, 2168, 2198, 2213, 2203, 2214, 2150, 2196, 2177, 2203.
					RIFLE, LIGHTWEIGHT, CAL. .280, E12, SERIAL NUMBER 8
17 Feb.	1420	1444	39	1-20	2336, 2291, 2283, 2342, 2245, 2197, 2237, 2243, 2203, 2193, 2210, 2191, 2197, 2230, 2176, 2214, 2189, 2204, 2182, 2162.
17 Mar.	1311	1331	48	1-20	2247, 2225, 2197, 2198, 2151, 2167, 2186, 2188, 2177, 2175, 2155, 2168, 2174, 2139, 2190, 2208, 2014, 2187, 2176, 2187.
					RIFLE, LIGHTWEIGHT, CAL. .280, FN, SERIAL NUMBER 6
17 Feb.	1046	1107	37	1-20	2274, 2273, 2236, 2252, 2201, 2232, 2240, 2267, 2243, 2175, 2252, 2248, 2232, 2216, 2218, 2218, 2260, 2254, 2240, 2216.
17 Mar.	1245	1305	48	1-20	2180, 2228, 2199, 2213, 2189, 2189, 2193, 2187, 2195, 2211, 2246, 2201, 2171, 2189, 2229, 2196, 2152, 2236, 2178, 2214.

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APPENDIX I

RIFLE, LIGHTWEIGHT, CAL. .280, FN, SERIAL NUMBER 7

DATE 1950	TIME START	TIME FINISH	TEMP °F RANGE	ROUNDS	INSTRUMENTAL VELOCITY AT 78' fps
17 Feb.	1111	1131	37	1-20	2245, 2264, 2254, 2244, 2264, 2226, 2224, 2267, 2254, 2242, 2236, 2220, 2226, 2273, 2228, 2259, 22 0, 2240, 2222, 2256.
7 Mar.	0909	0923	34	1-20	2196, 2188, 2208, 2190, 2197, 2241, 2205, 2196, 2193, 2191, 2195, 2227, 2194, 2197, 2250, 2162, 2194, 2160, 2210, 2197

AMMUNITION, CARTRIDGE, BALL, CAL. .30, T104, LOT FA X30-1358

RIFLE, LIGHTWEIGHT, CAL. .30, T25, SERIAL NUMBER 14

17 Feb.	0901	0927	36	1-20	2709, 2728, 2664, 2688, 2762, 2680, 2651, 2670, 2660, 2662, 2668, 2650, 2643, 2678, 2660, 2723, 2747, 2680, 2703, 2697
7 Mar.	1030	1050	35	1-20	2690, 2703, 2680, 2695, 2697, 2662, 2677, 2680, 2648, 2693, 2677, 2678, 2628, 2694, 2684, 2655, 2667, 2698, 2661, 2627.

RIFLE, LIGHTWEIGHT, CAL. .30, T25, SERIAL NUMBER 15

17 Feb.	0940	1003	36	1-20	2677, 2654, 2694, 2668, 2654, 2671 2717, 2687, 2682, 2660, 2671, 2643, 2680, 2678, 2640, 2677, 2661, 2651, 2664, 2685
17 Mar.	1339	1400	48	1-20	2726, 2714, 2709, 2688, 2680, 2711, 2687, 2694, 2716, 2740, 2684, 2721, 2684, 2711, 2698, 2687, 2682, 2698, 2741, 2685

Temperature of Ammunition (All Rounds) = 70° F.

Density: 1.074 - 17 February
Density: 1.103 - 7 March.
Density: 1.054 - 17 March.

[redacted]

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[redacted]

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APPENDIX J

PHOTOGRAPHS

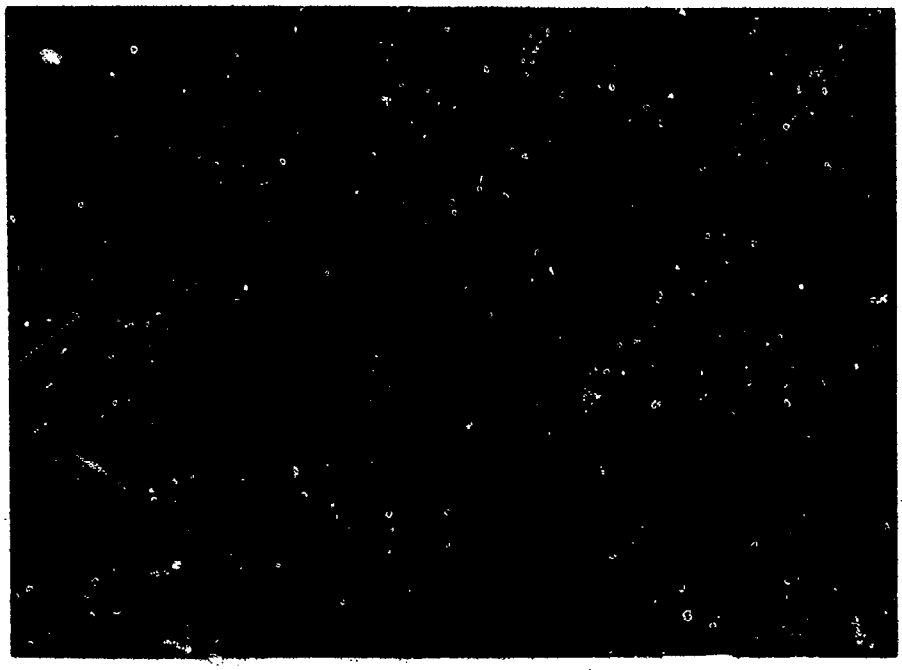
A-61318
A-61324
A-61323
A-61322
A-61320
A-61321
A-61319

[redacted]

[redacted]

[redacted]

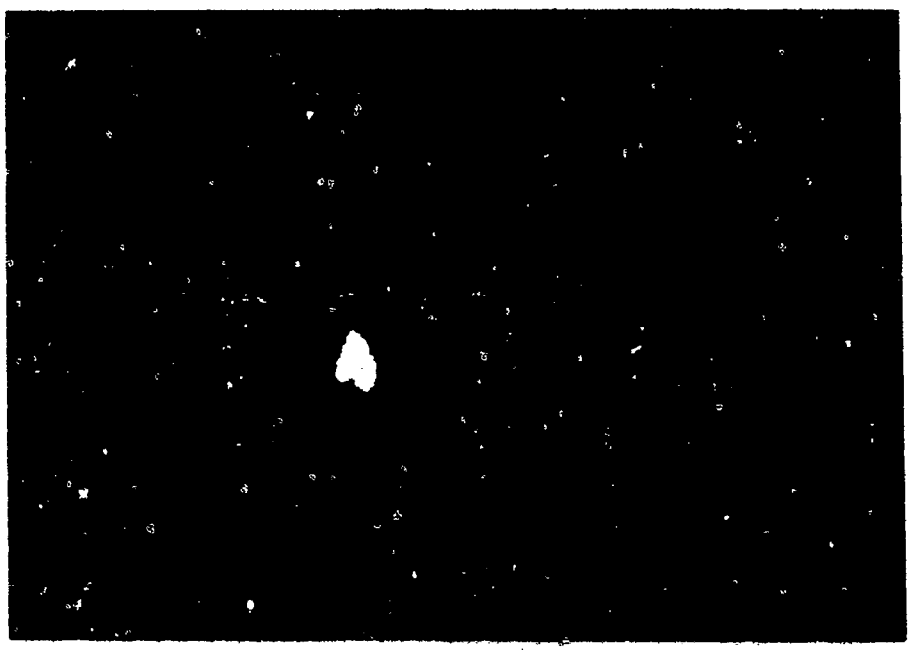
[redacted]

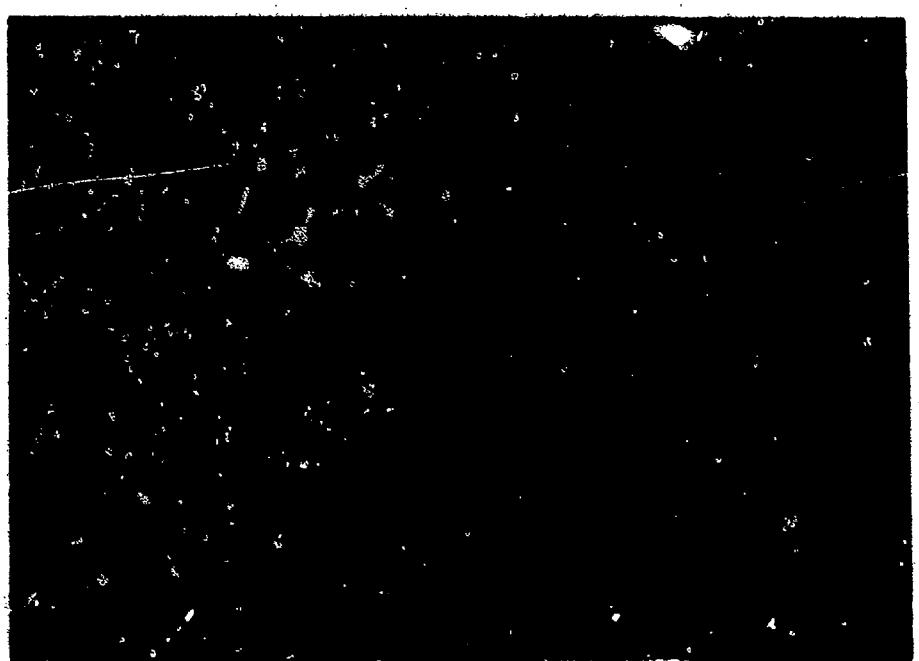


A61318 [redacted] ABERDEEN PROVING GROUND 28 March 1950

Project No. TS2-2015. 10th Report. Cumulative Flash from 20 Rounds of Ball Ammunition Fired Semi-Automatic from Rifle, Light-weight, Caliber .30, T25. (TOP) w/o Flash Hider, (BOTTOM) with Flash Hider. Camera Position B.

[redacted]



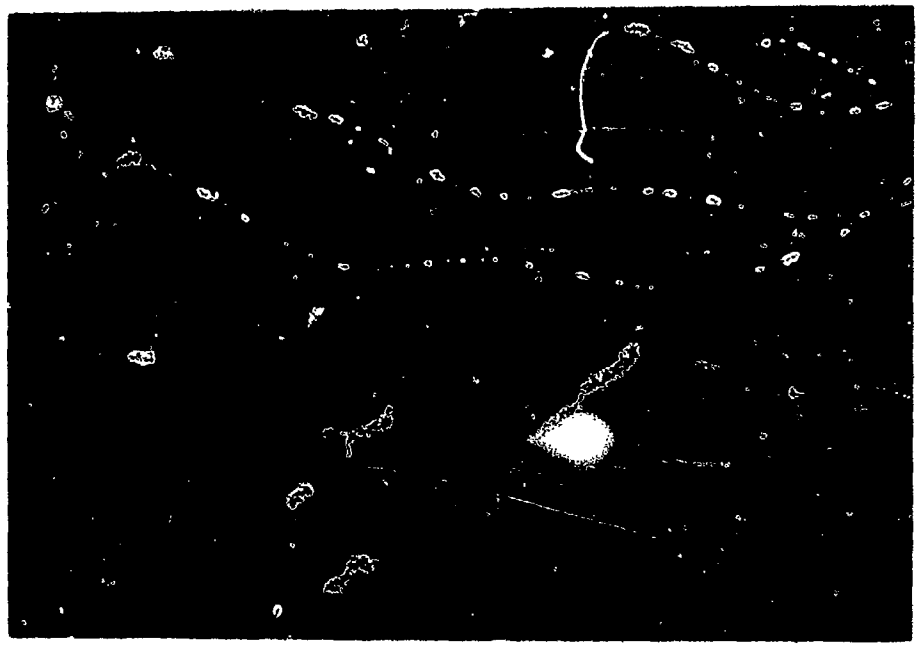


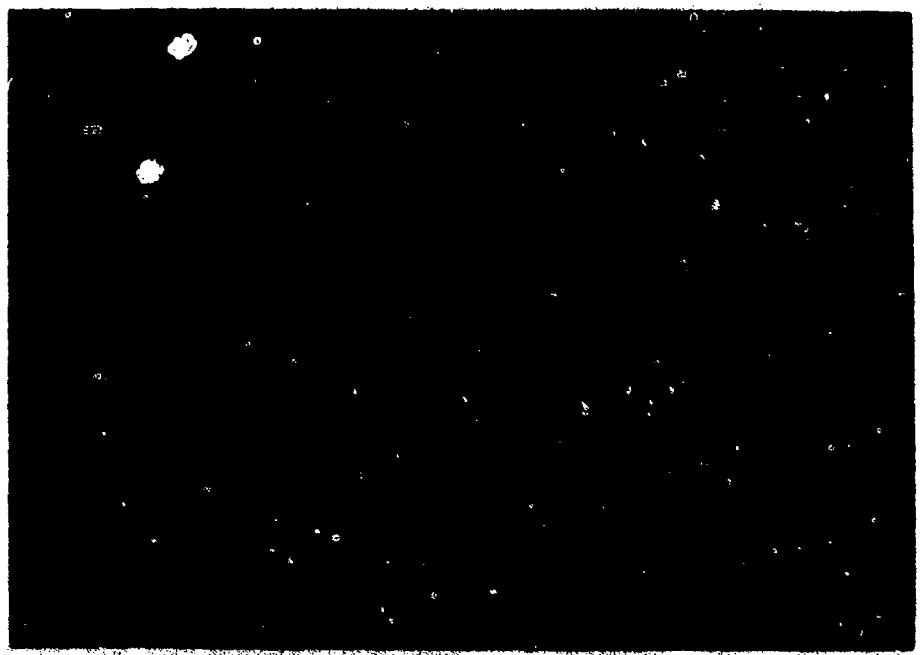
A61319 [redacted] ABERDEEN PROVING GROUND 26 March 19[redacted]

Project No. TS2-2015. 10th Report. Cumulative Flash from 20 Rounds [redacted] Ball Ammunition Fired Semiautomatic from Rifle, Light-weight, Caliber .30, T25. (TOP) w/o Flash Hider. (BOTTOM) with Flash Hider. Camera Position A.

AS 1320 [redacted] ABERDEEN PROVING GROUND 28 March 195

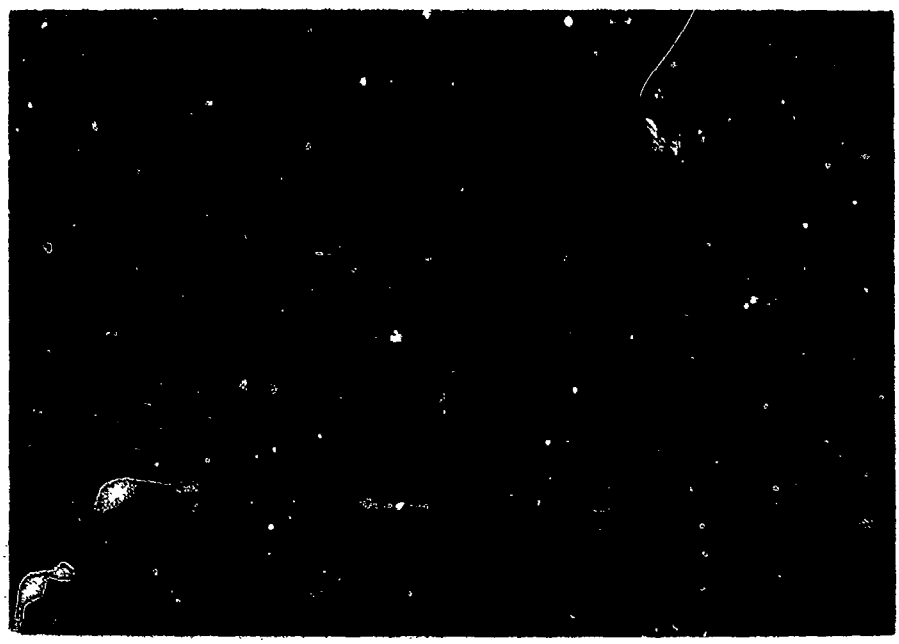
Project No. TS2-2015. 10th Report. Cumulative Flash from 20 Rounds of Ball Ammunition Fired Semi-Automatic from Rifle, Light-weight, Caliber .280, FN. (TOP) w/o Flash Hid[redacted] Flash Hider. Camera Position A.

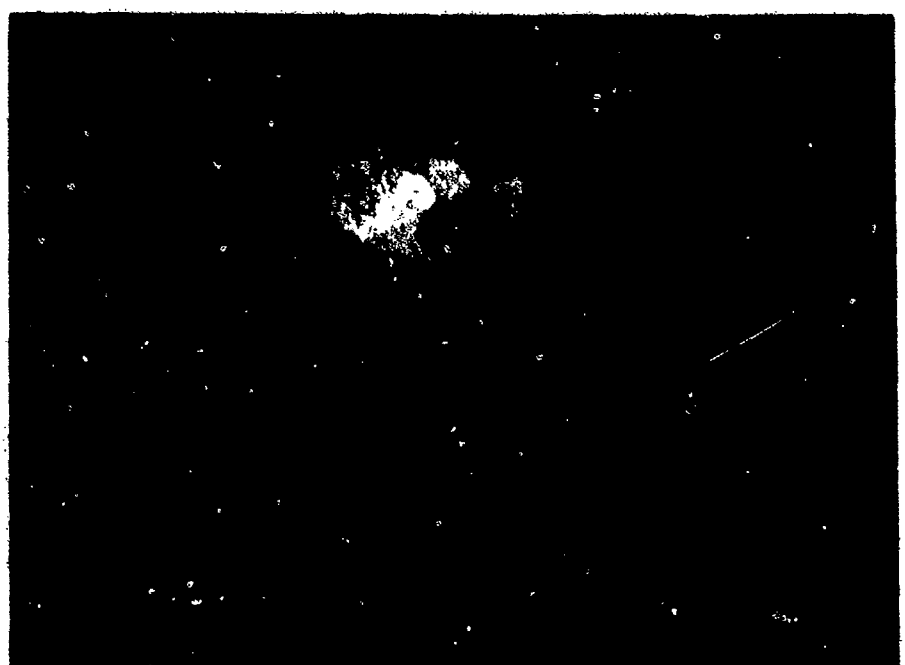




A61321 [redacted] ABERDEEN PROVING GROUND 28 March 1950

Project No. TS2-2015. 10th Report. Cumulative Flash from 20 Rounds of Ball Ammunition Fired Semi-Automatic from Rifle, Light-weight, Caliber .280, FN. (TOP) w/o Flash Hider. (BOTTOM) Camera Position B.



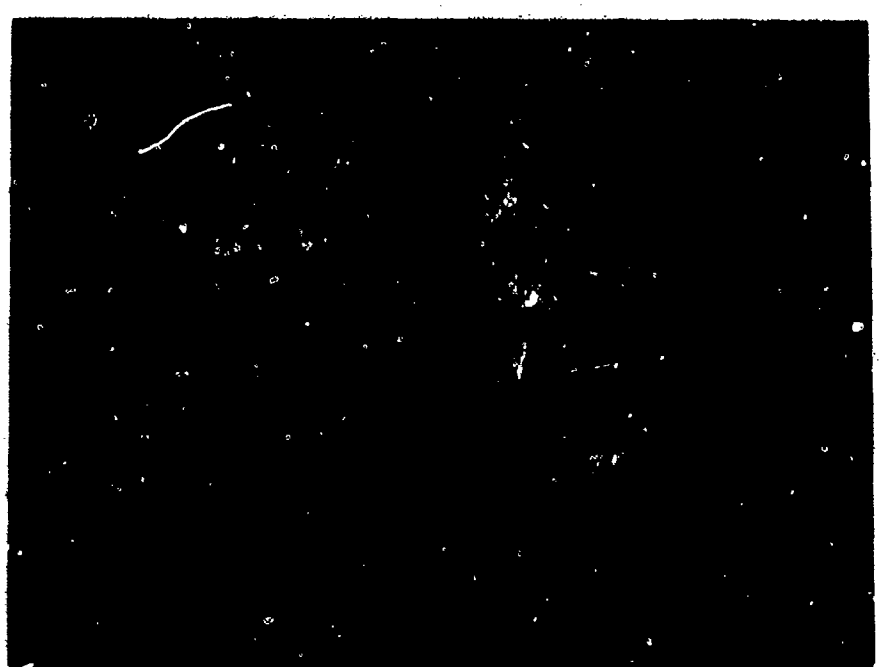


AG 1322 [redacted] ABERDEEN PROVING GROUND 28 March 195(

Project No. TS2-2015. 10th Report. Cumulative Flash from 20 Rounds of Ball Ammunition Fired Semi-Automatic from Rifle, Light-weight , Caliber .280, EM2. (TOP) Camera Position A. (BOTTOM) Camera Position B.

A61324 [redacted] ABERDEEN PROVING GROUND 28 March 1950

Project No. TS2-2015. 10th Report. Cumulative Flash from 20 Rounds of Ball Ammunition Fired from Rifle, Caliber .30, M1. (TOP) w/o Flash Hider. (BOTTOM) w/Flash Hider. Camera Position [redacted]



A61323 [redacted] ABERDEEN PROVING GROUND 28 March 1950

Project No. TS2-2015. 10th Report. Cumulative Flash from 20 Rounds of Ball Ammunition Fired from Rifle, Caliber .30, M1. (TOP) w/o Flash Hider (BOTTOM) with Flash Hider. Camera Position A.

[redacted]