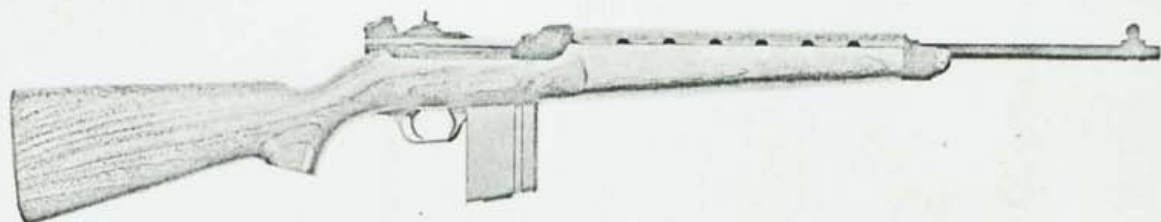


WINCHESTER
LIGHTWEIGHT MILITARY RIFLE
CALIBER .224



WINCHESTER
TRADEMARK

Western
TRADEMARK

OLIN MATHIESON CHEMICAL CORPORATION
WINCHESTER-WESTERN DIVISION
NEW HAVEN, CONNECTICUT

OLIN MATHIESON CHEMICAL CORPORATION
Winchester-Western Division
New Haven, Connecticut

WINCHESTER
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May 1, 1958

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INTRODUCTION

For some time now there has existed a requirement for a lightweight infantry weapon capable of selective semi-automatic or fully automatic fire. In the summer of 1957 Conarc expressed an active interest in a weapon of this type in caliber .22 centerfire capable of firing a 50 to 55 grain bullet at a muzzle velocity of approximately 3300 ft/sec. The weight of the rifle was not to exceed five pounds.

Consequently a development program was initiated by Winchester-Western Division of Olin Mathieson Chemical Corporation to produce a rifle and cartridge combination capable of fulfilling this requirement. The first Winchester Lightweight Military Rifle was completed in October 1957 and successfully demonstrated at Fort Monroe on October 25, 1957, and at Fort Benning on November 6, 1957.

This first prototype was followed by an experimental quantity of light rifles incorporating certain improvements in design which have been delivered to Ordnance and Conarc for evaluation purposes.



MAIN FEATURES

5 pound total weight (with empty magazine)
Selective, full or semi-automatic fire
20 round magazine
53 grain bullet
3300 ft/sec. muzzle velocity
1280 ft-lbs. muzzle energy
20" barrel length
Full stock with pistol grip
37.6" overall length

DESIGN PHILOSOPHY

From the very beginning of the development work on the Winchester Light Rifle it was considered of utmost importance that reliability must not be sacrificed to obtain low weight. As a consequence a policy decision was taken that the new Lightweight Rifle was to be designed on the basis of well proven earlier guns whose field reliability had been established in extensive tests. As a result the best elements were taken from the Winchester .30 Caliber Experimental Light Rifle, the G30R Semi-automatic Rifle, the WAR Automatic Rifle and the .50 Caliber Semi-automatic Anti Tank Rifle, to serve as a basis for development of the Winchester Lightweight Rifle.

By basing the development of the new rifle on proven elements, the extensive testing experience gained with the earlier rifles, was utilized for the new Lightweight Rifle, yielding a weapon design of good inherent reliability and short development time to production status.

During the extensive development of the weapon a great number of significant changes were incorporated, resulting in improved function and facilitated production. A key feature of the rifle is that all sub-assemblies are functionally self-contained. Since none of the sub-assemblies rely on adjacent components for primary function, difficulties due to tolerance accumulations are eliminated.

To assure reliability under field conditions it was decided from the start that only steel was to be used for primary action parts. Consequently, barrel, receiver and all parts subject to dynamic loading are manufactured from steel to obtain high strength and wear resistance. Aluminum 7075-T6 is used only in components where no dynamic forces or

impact occur. A typical example of such a part is the trigger guard which has to withstand only static forces. The stock of the Lightweight Rifle is American walnut.

Low weight is thus achieved by sound design using conventional materials without compromise of gun life.

DESCRIPTION OF DESIGN FEATURES

(1) Magazine

Aluminum magazine of 20 round capacity.

(2) Gas System

Short stroke piston requires no cleaning or disassembly during life of gun.

(3) Barrel

Externally fluted for weight reduction and increased cooling surface without sacrifice to rigidity. Separated by an annular air space from the stock to improve cooling and avoid stock burning.

(4) Fire Control

Full automatic firing is controlled by a timing bar, which is carried forward by the slide until the bolt is locked, and then released by a cam lug on the barrel. Flying rearward it strikes a rocker arm which trips the hammer catch thus firing the rifle. The type of fire is controlled by a change lever on the left side front end of the receiver. When this lever is turned forward, action is full automatic; when turned to the rear for semi-automatic fire the timing bar is sprung out preventing contact with the slide.

(5) Sights

The rifle is equipped with a blade type front sight and a two-position flip over sight, mounted

on the rear of the receiver. The low setting of the rear sight is adjusted for 250 yards and the high setting for 440 yards.

With the low sight setting a maximum mismatch between line of sight and point of bullet impact of 4 inches is obtained from the muzzle to 300 yards with the mismatch increasing to 12 inches at 360 yards. With the high setting a maximum mismatch of 12 inches is obtained from 360 yards to 500 yards.

This two-position flip-over rear sight is extremely simple and is capable of quick adjustment. A trajectory curve and the line of sights superimposed is shown on page 44.

(6) Safety

The safety sleeve retracts the hammer from the sear and also closes the opening in the receiver to prevent entry of sand or other foreign matter. Removal of the safety requires a combined rearward and lateral motion which prevents the safety from being easily knocked out of the safe position.

(7) Firing Pin

Retracted mechanically during the first part of the unlocking of the bolt and held in retracted position during the entire longitudinal movement of the gun mechanism. It is released only after bolt is closed and locked. This prevents the firing pin from contacting the primer during feeding or ejecting, and therefore the rifle can only be fired when the bolt is fully locked.

(8) Extractor

A mechanical feature of the extractor is that it is mechanically closed into the extractor cut in

the shell by the cam cut in the receiver when the bolt rotates and is locked in this position when the shell is fired.

(9) Bolt

The bolt incorporates the following design features: The lugs are exceptionally large relative to the size of the bolt. Locking surface rotates into a helix locking cam. The cam's surface that operate on the closing and opening cams on the operating slide equal a long helix. This long sloping cam allows the operating slide to exert greater force on locking and unlocking of the bolt. The surface that the slide contacts when carrying the bolt forward also has a helix cam. It is impossible to fire the gun when the bolt is open.

(10) Stock

One-piece American Walnut with pistol grip. In assembling the action into the stock there is an interference horizontally between the takedown pin and the guard shoulders, which have a narrow projection to prevent the stock from spreading due to climatic variations. The dimension from the upper to the lower takedown plates is greater than the spread between the bottom of the receiver and the tang on the guard. These features maintain the action under constant spring tension both horizontally and vertically, when assembled. The barrel is supported by the front band. When the gun is assembled there is a space between the barrel and the wood, the action being supported by the upper takedown plate and the front band. This

design feature prevents the stock from burning under intensive firing. The holes in the side of the hand guard are to allow the escape of trapped heat.

(11) Bolt Hold Open Device

The principle features of the bolt hold open device are that the bolt stop automatically locks the bolt open when the last shot is fired from the magazine. The bolt will remain open after the empty magazine is removed and a loaded one inserted. Following insertion of the loaded magazine the bolt stop is released by pulling the slide handle rearward.

(12) Field Stripping

This gun can be field stripped in a few second without tools. Details of field stripping are given on Page 18.

(13) Takedown and Assembly

The complete takedown and assembly is simple and can be accomplished with a few standard tools. An armorer's kit is available to facilitate takedown. (See page 24).

(14) Unit Design

Guard, bolt, and receiver units are self-contained and do not rely on adjacent parts for their primary operation. This permits interchangeability of units and facilitates function checks.

(15) Material

The material of all primary action parts is high grade alloy steel. Functional parts have a case hardened surface to assure and maintain reliability. The guard and magazine are made of 75ST6 aluminum; hardcoated; the butt plate and front barrel support band are of 24ST aluminum.

TECHNICAL DATA

GENERAL

Number of rifle components	71
Magazine capacity	20 rounds
Projectile weight	53 grains
Muzzle velocity	3300 ft/sec.
Muzzle energy	1280 ft-lbs.

WEIGHTS

Rifle less magazine	4.9 lbs.
Stock	1.4 lbs.
Action	3.5 lbs.
Magazine, empty	.14 lbs.

DIMENSIONS

Overall length	37.6 in.
Barrel length	20 in.
Stock length	31 in.
Length of trigger pull	13.2 in.
Sight radius	23.2 in.
Distance between swivels	28.5 in.
Drop of stock from line of sight	
at heel	2.55 in.
at comb	2.20 in.

NOMENCLATURE LIST

WINCHESTER LIGHT RIFLE - CALIBER .224

<u>PART NUMBER</u>	<u>PART NAME</u>
1	Barrel
2	Bolt
3	Bolt Stop
4	Bolt Stop Pin
5	Bolt Stop Pin Spring
6	Butt Plate
7	Butt Plate Screw - Toe
8	Butt Plate Screw - Heel
9	Butt Plate Trap
10	Butt Plate Trap Door Pin
11	Butt Plate Trap Door Spring
12	Butt Plate Trap Door Spring Screw
13	Change Lever
14	Change Lever Plunger
15	Change Lever Plunger Spring
16	Ejector
17	Ejector Spring

PART NUMBER

PART NAME

18	Extractor
19	Extractor Plunger
20	Extractor Plunger Spring
21	Firing Pin
22	Firing Pin Spring
23	Front Barrel Support & Band
24	Front Band Retainer
25	Front Sight
26	Front Sight Key
27	Front Sight Pin
28	Guard
29	Hammer
30	Hammer Pin
31	Hammer Spring
32	Hammer Spring Guide Rod
33	Hammer Spring Abutment
34	Hammer Catch
35	Hammer Catch Spring
36	Hand Guard

PART NUMBER

PART NAME

37	Magazine Case
38	Magazine Bottom
39	Magazine Follower
40	Magazine Spring
41	Magazine Spring Retainer
42	Magazine Catch
43	Magazine Catch Pin
44	Magazine Catch Spring
45	Operating Slide
46	Operating Slide Spring
47	Operating Slide Spring Guide Rod
48	Piston
49	Piston Bushing Nut
50	Piston Bushing Nut Lock
51	Rear Sight Base
52	Rear Sight Leaf
53	Rear Sight Leaf Pin
54	Rear Sight Leaf Spring
55	Receiver

PART NUMBERPART NAME

56	Rocker
57	Safety Sleeve
58	Safety Sleeve Catch
59	Safety Sleeve Catch Pin
60	Safety Sleeve Catch Plunger
61	Safety Sleeve Catch Plunger Spring
62	Stock
63	Takedown Plate (lower)
64	Takedown Plate (upper)
65	Takedown Stud Screw
66	Timing Bar
67	Timing Bar Spring
68	Timing Bar Spring Plunger (2)
69	Trigger
70	Trigger Pin
71	Trigger Spring
72	<i>Rocker Lock</i>

OPERATING INSTRUCTIONS
WINCHESTER LIGHT AUTOMATIC RIFLE
CALIBER .224

Loading the Magazine

Load magazine by normal method of pressing cartridges into place under the lips of the magazine with thumb. Capacity - 20 cartridges in staggered row.

Inserting the Magazine

Insert the open end of magazine into rectangular opening in underside of stock. Force it upward in place until it is held by magazine catch. When the magazine is locked in place the magazine catch will be flush with the outside of the trigger bow. Make certain that the magazine is securely locked.

To Remove Magazine

The magazine may be released by grasping the magazine with the left hand with the thumb in the trigger bow compressing the catch forward then exerting a downward pull on the magazine removing it from the guard. An alternate method is to push the magazine catch forward with the right hand thumb and pull the magazine downward with the left hand out of the trigger guard.

Feeding the Cartridge into the Chamber and Cock the Hammer

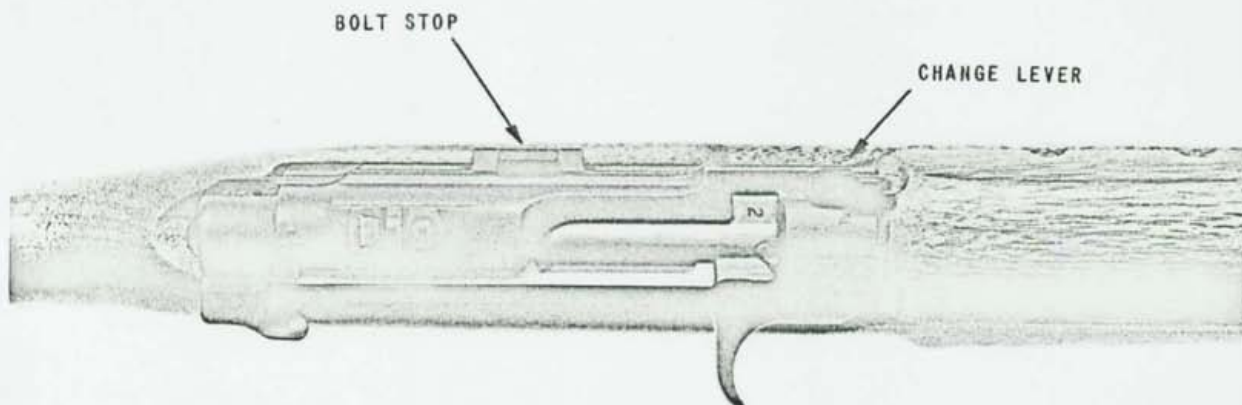
With the safety catch in the "off" position, grasp the handle of the operating slide with the right hand and pull it fully back cocking the hammer. Release the handle of the operating slide and allow the slide to go forward. This carries the cartridge into the chamber and the gun is now ready to fire when the trigger is pulled.

Change Lever - Full Automatic Fire

The change lever is located in the left hand side front end of the receiver. This lever allows the selection of full automatic or semi-automatic fire. When this lever is turned forward it will expose the letters "F.A." In this position on pulling the trigger the gun will fire continuously and automatically until the trigger is released or magazine becomes empty.

Change Lever - Semi-Automatic Fire

With the lever turned to the rear it will expose the letters "S.A." In this position it will fire semi-automatic. On pulling the trigger the gun will fire one shot and stop; to refire the trigger must be released after each shot and then pulled.



Bolt Hold Open Device

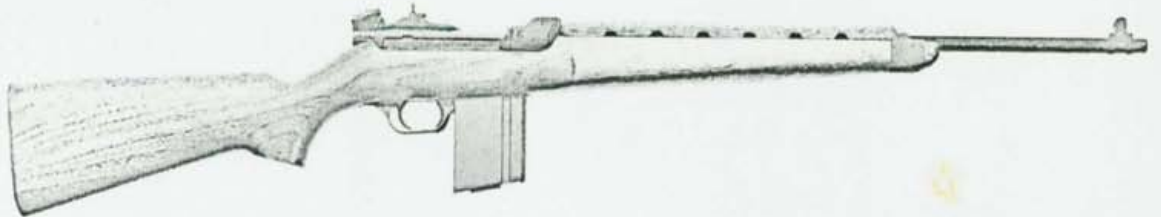
When the last shot is fired the magazine follower trips the bolt stop and the bolt is automatically locked open. When a new loaded magazine is inserted in the guard and locked in, the bolt stop may be released by pulling the slide handle rearward. This will release the bolt stop; the slide handle can then be released travelling forward, the bolt feeding a shell into the chamber.

To Pull Operating Slide Back
and Lock it in Open Position

Pull the operating slide to the rear with the right hand. With the left hand press the bolt stop, located on the left hand side center of the receiver, outward, letting slide forward easily until bolt contacts bolt stop. In this position the action will be locked open until released. By pulling the slide handle to the rear the bolt stop will release the bolt and allow it to return to firing position.

Safety "On"

Pull safety catch out and rotate to the left until it engages in the safety notch on the back end of the receiver. This movement cams the hammer down off of the sear notch and closes the opening necessary for the hammer to pass through the receiver when fired. With the safety in this position the opening on the side of the receiver is closed preventing the entry of sand, water, or foreign matter.



Safety "Off"

Raise safety catch slightly with thumb and press it down to the right. This movement opens the side of the receiver to permit normal bolt movement. The gun can now be fired.



FIELD STRIPPING INSTRUCTIONS

WINCHESTER LIGHT AUTOMATIC RIFLE - CAL..224

1. Pull the slide handle to the rear and return to its forward position. This movement will cock the hammer.
2. Put safety on.
3. Compress front band retainer with the thumb, at the same time pushing the front band upward with the fingers approximately 1/2". Then remove hand guard.
4. Pull front band clear off stock.

To Remove Complete Action From Stock

Grasp the front end of the barrel with the left hand holding the grip of the stock firmly with the right. Lift barrel up in an arc, it pivoting on the upper takedown plate at the rear end of the receiver until it comes clear of the stock. Then lift out and forward.

At this time the metal components are one completely assembled unit and cannot accidentally become disengaged one from the other.

To Remove Trigger Guard Assembly from Receiver

Put safety in "off" position. Pull trigger releasing hammer. Slide guard assembly to rear of receiver and lift out. Remove rocker arm by pivoting it rearward to relief cut then raising it out of the receiver.

To Remove Operating Slide Spring and Guide Rod

Grasp action in left hand by the gas port holding the slide in a forward position. With the right hand grasp

the front end of the operating slide spring and guide rod and pull rearward sufficient to release the plunger from the operating slide; then pull downward and out from hole.

To Remove Operating Slide

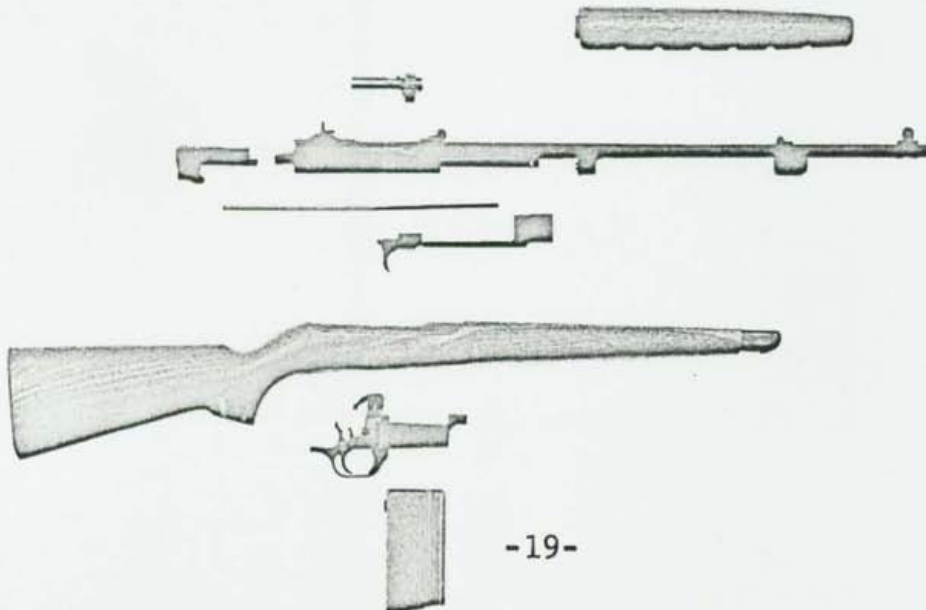
Move slide to the rear exerting a slightly upward pressure approximately 1/2" from rear slide position, causing the slide to rise into a relief cut. Move slide outwardly to the right to clear the track in which the rear shoe travels. Then move slide to the rear until it stops against the front end of the receiver. A slight upward twist of the handle will cause the slide to come free from the barrel lugs and drop from the receiver and barrel.

To Remove Safety Sleeve

Raise the safety catch and rotate it to the extreme left. This will permit the safety sleeve to be removed from the rear end of the receiver.

To Remove Bolt

Unlock and slide bolt to the rear until left hand lug stops at end of lug track in receiver. Move bolt to the right and remove from rear end of receiver.



TO REASSEMBLE GUN AFTER FIELD STRIPPING

To Reassemble Bolt

Check firing pin lug to make certain that it is in line with the bolt lug by rotating it to the right edge of the firing pin cut in the bolt. Rotate receiver assembly to bring right side of receiver up. Place bolt in safety sleeve hole with it bearing on the up side. Push forward until bolt is stopped by the front end of the safety sleeve hole. Grasp the exposed lug and shake it slightly allowing left hand lug to drop into lug slot in receiver. Push bolt forward and into place.

Caution: If the lower lug does not readily drop into place this is due to the fact that the lug on the firing pin has moved relative to the bolt lug. To correct this, turn receiver upside down, take the guide rod and push the firing pin lug downward into its proper location. Then turn receiver to the right (right side up) and the bolt will drop into its proper location. Push bolt forward to locked position.

To Reassemble Safety Sleeve

Place safety sleeve in the rear end of the receiver with safety catch pulled out as far as possible and rotated to the extreme left on top of the receiver ledge. Push safety sleeve in until it stops against the forward shoulder of the safety sleeve hole. Pull safety catch up and rotate safety sleeve to the extreme right, release safety catch locked in the "on" position.

Place timing bar in semi-automatic position.

To Reassemble the Operating Slide

Move bolt lug to rearmost position. Engage operating slide onto exposed bolt lug and right track on barrel. Turn slide handle down until it picks up the left hand track on the barrel. Push slide forward for approximately 1/2" by exerting pressure on it. The shoe on the slide will then drop into the relief cut in the side of the receiver and downward into the lower track. Push the slide forward.

To Reassemble Operating Slide Spring and Guide Rod

Insert operating slide guide rod into operating slide spring. Place spring and rod into operating slide spring hole in receiver. Hold the spring with the fingers in the right hand and feed approximately 2" of the spring onto the guide rod, then place end of operating slide guide rod into retaining hole for same in slide.

Caution: If, on assembly it is attempted to push the spring into the hole in the receiver, it can become bent or mutilated.

Turn receiver bottom side up and place trunnion on rocker arm in rocker arm hole in receiver with end of clearance cut on right hand side of receiver. Drop in place and rotate forward against timing bar.

To Reassemble Trigger Guard Assembly

With receiver bottom side up, place guard assembly into bottom side of receiver with end of hammer in line with rear cut in receiver. Place guard in receiver until stop shoulders on guard contact bottom of receiver. Push guard assembly forward until it comes in contact with stop in receiver and magazine cuts in receiver and guard are in alignment. Check and make sure that rocker arm is located properly between the end of timing bar and hammer catch.

Hold action in the left hand holding the guard forward with the fingers against the thumb on the front end of the receiver. This is necessary to hold the two components together.

Place the rear end of the guard against any stationary object. Place the left hand on the barrel forward of the gas piston pushing the action against the stationary object. With the right hand pull the slide to the extreme rear cocking the hammer. Return the operating slide with the hand to its forward position. With the hammer cocked the guard is locked into its position and the complete gun assembly will not come apart, only when the hammer is released.

To Reassemble the Action to Stock

Take the stock in right hand. Grasp the action near the piston and insert rear end of guard into stock until end of receiver contacts upper takedown plate. Using care hook hole in receiver over takedown pin, then slightly press fore-end of barrel downward in an arc into the stock, sliding the hand to the front end of the barrel. Push downward until action is straight in the stock. In performing this operation you will feel a normal spring tension between the takedown pin and the stop shoulders on the guard.

Caution: If excessive force is required for rotating the action into proper position, check to ensure that units are properly assembled and that there is not foreign matter lodged in stock or action.

Slide the front band onto the front end of stock. With the finger on the right hand compress the retainer and with the left hand push the front band to within approximately 1/4" to 1/2" of its final location. Holding the gun in the left hand and the

hand guard in the right, place hand guard on top of the stock with the rear tenons locked onto the receiver. In this position push the front band into its final location.

Note: The front band retainer has locked the band into place.

The gun is now ready to fire after inserting a magazine and feeding a shell into the chamber.

TAKEDOWN AND ASSEMBLY INSTRUCTIONS

TO DISASSEMBLE BUTTSTOCK ASSEMBLY

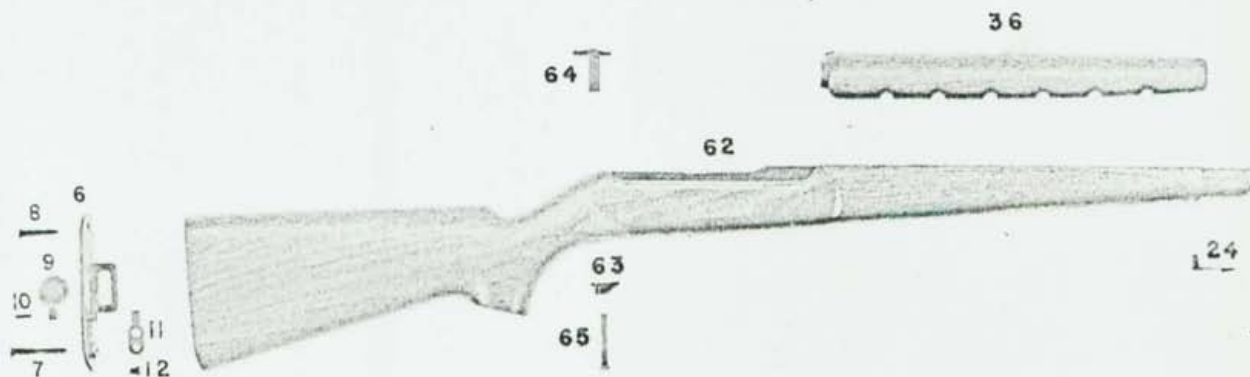
To Disassemble Butt Stock

Remove butt plate unit by loosening screws. Unscrew the takedown stud screw three or four turns, then tap the bottom of the screwdriver. This will raise the upper takedown plate a moderate amount and remove its stem from the recess in the lower plate. Then completely unscrew the takedown screw, remove and pull out the upper takedown plate. The lower plate can then be pushed forward and removed from the stock.

The front band retainer can be driven out with an ordinary punch.

To Disassemble Butt Plate Unit

Remove butt plate from stock. Loosen and remove butt plate trap door spring screw and spring. Drive out butt plate trap door pin and remove trap door.



TO ASSEMBLE BUTT STOCK ASSEMBLY

To Assemble Butt Plate Unit

Insert butt plate trap door in position in butt plate with holes in alignment. Insert butt plate

trap door pin and drive into place. Take butt plate trap door spring and place over screw hole in butt plate, insert butt plate trap door screw and tighten with a suitable screwdriver.

To Assemble Butt Stock

Place butt plate unit onto stock and tighten butt plate screws. Drive the front band retainer into place. Insert the lower takedown plate in the stock and push to the rear. Place upper takedown plate into the hole in the stock and push it into place. This will lock the lower plate into its position. Insert takedown stud screw and tighten securely.

TO DISASSEMBLE BARREL-RECEIVER ASSEMBLY

To Disassemble Gas Piston Bushing Lock

Place the end of the guide rod under the tail of the lock at the underside of the hole in the barrel and pry upward and out and lock will spring into hole and can then readily be lifted out of the top.

To Disassemble Gas Piston and Bushing Lock Nut

Using the wrench furnished with the armorer's kit, loosen and remove the piston bushing lock nut. The gas piston may then be lifted out of the cylinder.

Note: Normally it should never be necessary to disassemble and assemble the gas piston, bushing nut, etc. during the life of the barrel.

To Disassemble Timing Bar

Tip the gun with the left side of the receiver upward. Put the change lever onto "F.A.". Hold receiver with left hand and with the right hand spring bar upward slightly and slide it back until the lug on the bar comes out through the groove for it in receiver. The timing bar spring and plunger will now be free to be removed from the "T" slot in receiver.

To Disassemble Change Lever

To remove the change lever, place tapered end of guide rod under the change lever finger piece and pry upward releasing it from the plunger. Change lever can then be lifted out. With the guide rod the change lever plunger and spring can also be removed from the receiver.

To Disassemble Safety Sleeve

Hold safety sleeve in the left hand and with the thumb remove spring tension from safety catch pin. It can then be pushed out with the guide rod. The safety catch can now be lifted from the lug on the safety sleeve. The safety sleeve catch plunger and spring can then be removed.

To Disassemble Front Sight

Drive out the sight pin off front end of barrel. The front sight can then be readily removed. The front barrel support and band can now be slid off the front end of the barrel.

To Disassemble Rear Sight

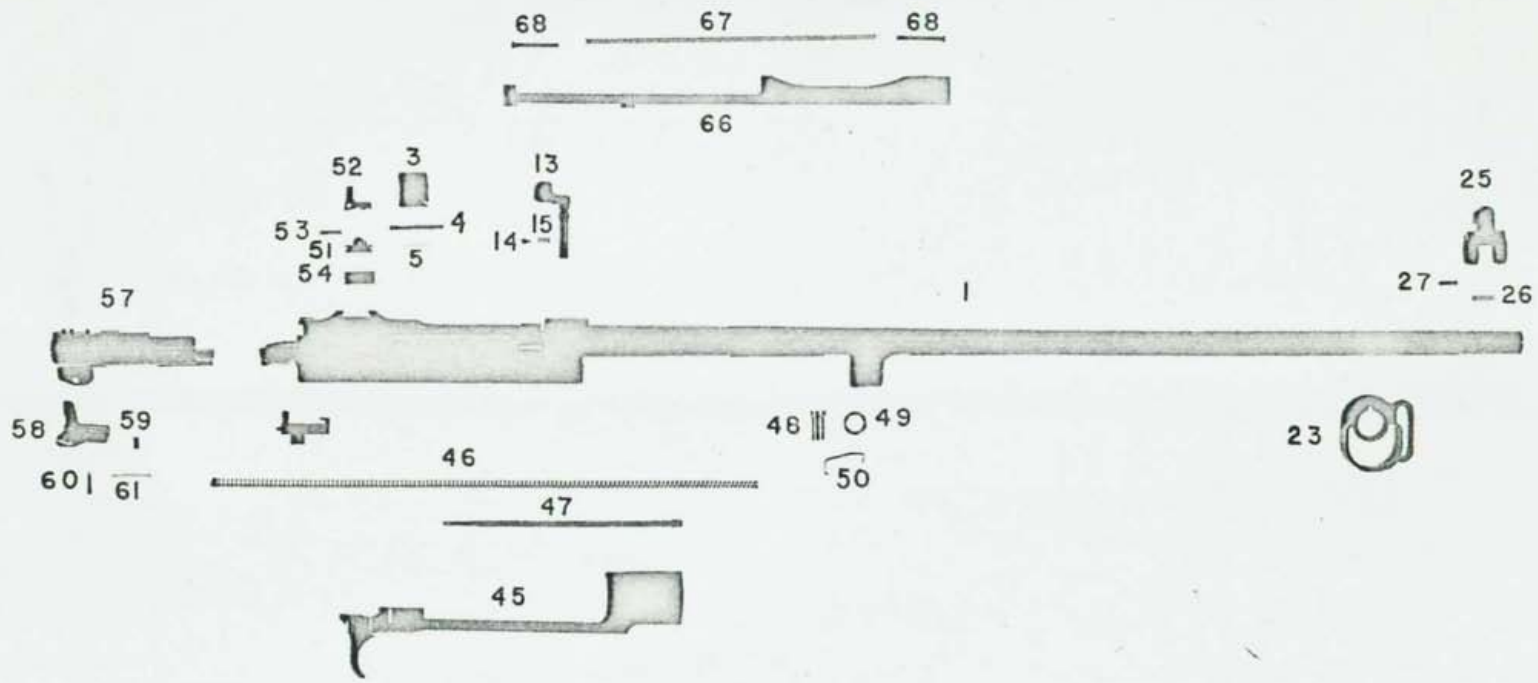
Press it downward removing the spring tension from the sight pin and push outward. This pin is held in place by a relief cut in the assembly.

Caution: To remove rear sight base or adjust for windage - the sight cut is tapered so that with the barrel pointing forward the sight is driven from the right to left. When assembling it drives from the left to right.

To Disassemble Bolt Stop

Drive out roll pin and remove bolt stop by pulling out and working it downward so as to relieve bolt stop spring.

Caution: When bolt stop comes loose spring is apt to fly and get lost as it is free in retaining hole.



BARREL-RECEIVER ASSEMBLY

TO ASSEMBLE BARREL-RECEIVER ASSEMBLY

To Assemble Gas Piston Bushing Lock

Insert straight end of bushing lock, from the front, into the slot in the cylinder and the slot in the piston nut. Press thumb on the end of the lock inserted, to retain it in place. Lift bushing lock up and rotate forward until it snaps into the lock hole in the cylinder. Tap spring until tail locks it into place on the underside of hole.

To Assemble Gas Piston and Bushing Lock Nut

Insert gas piston into cylinder on barrel and screw in gas piston bushing lock nut until it contacts stop shoulder and one of the cuts for the wrench is in line with the notch in the gas cylinder.

To Assemble Rear Sight

To assemble the base with the barrel pointing forward, drive from right to left. Lay spring on top of sight, press sight downward until sight pin holes line up, drive pin in place. The pin should remain locked in position due to the recess in pin.

To Assemble Front Sight

First place the front band on the barrel. Drive sight over key until sight pin hole lines up, then drive sight pin into place.

To Assemble Timing Bar

Tip the receiver with its left side up. Take the timing bar spring assembly (spring and two plungers) and insert in the top side of the "T" slot in receiver. Lay the timing bar lug over the relief cut in the receiver "T" slot. With the right hand press the timing bar down through the relief cut by

springing it and with the left hand slide the timing bar ahead approximately 1/8". With it locked in this position take the end of the operating slide guide rod and pull the operating slide spring back into its position until the plunger stops against the end of the change lever. Slide the timing bar forward letting it snap into its operating position. During the assembly of this component the change lever should be on "F.A." position.

To Assemble Change Lever

Insert the change lever plunger and spring into the change lever plunger hole. Locate in position with the end of the guide rod. Insert the change lever into the change lever hole in the receiver with the finger piece pointing to the right. Push downward until the increased diameter on the lever reaches the receiver then rotate to the front and compress into its normal position.

To Assemble Safety Sleeve

Insert the safety sleeve spring and plunger assembly into the plunger hole. Place the safety sleeve catch on top and compress until holes line up. Push in safety catch pin; the recess in center of pin will prevent it from falling out.

To Assemble Bolt Stop

Place bolt stop spring in hole in bolt stop. Enter bolt stop in receiver until spring contacts side of receiver. With armorer's assembly punch compress spring and push bolt stop into receiver until tool contacts wall of receiver. Pull assembly punch out of spring while holding the bolt stop in place. This will leave the spring half in the receiver. The bolt stop can then be pushed fully into its location and the spring will snap into the bolt stop spring hole in the receiver.

The bolt stop can be held in place with a 3/32" piece of rod and then a standard 3/32 x 1" roll pin driven into the bolt stop pin hole in the receiver.

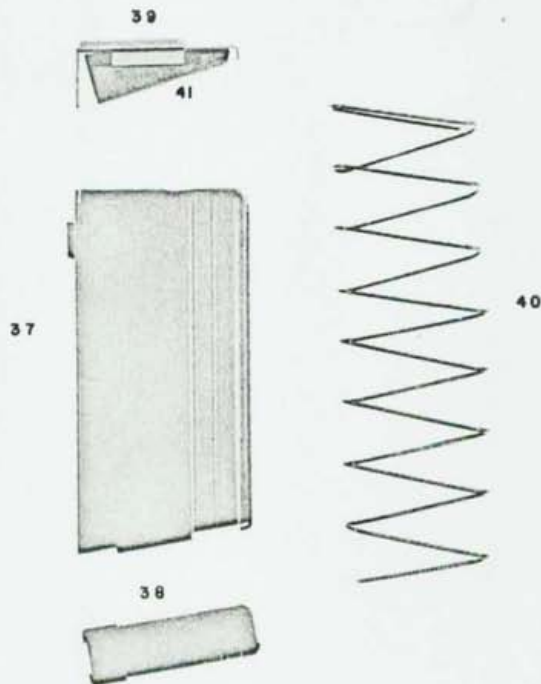
Note: Each time this component is disassembled and assembled, a new roll pin should be used to obtain the best results in preventing it from jarring loose due to the loss of spring tension.

Alternate Method of Assembling Bolt Stop

Place action in a suitable vise clamped by the barrel with the left side of receiver facing upward. Insert the bolt stop spring in spring hole in the receiver. Holding bolt stop in position being certain that the angular surface is towards the muzzle, take a small screwdriver and guide the opposite end of spring into the spring hole in the bolt stop. The bolt stop is then tipped inward slightly and eased into position in the receiver so that the pin may be driven in, be certain that spring has not been kinked when the bolt stop is eased into position. Insert bolt stop pin and drive into place.

TO DISASSEMBLE MAGAZINE ASSEMBLY

With a thin screwdriver or knife blade lift the back edge of the magazine bottom and slide it out. Remove the magazine spring. Drop the follower to the bottom of the magazine, tip the front end upward. This will allow the back end of the follower to come out between the rear bottom of the magazine and the lips that hold the bottom in place.



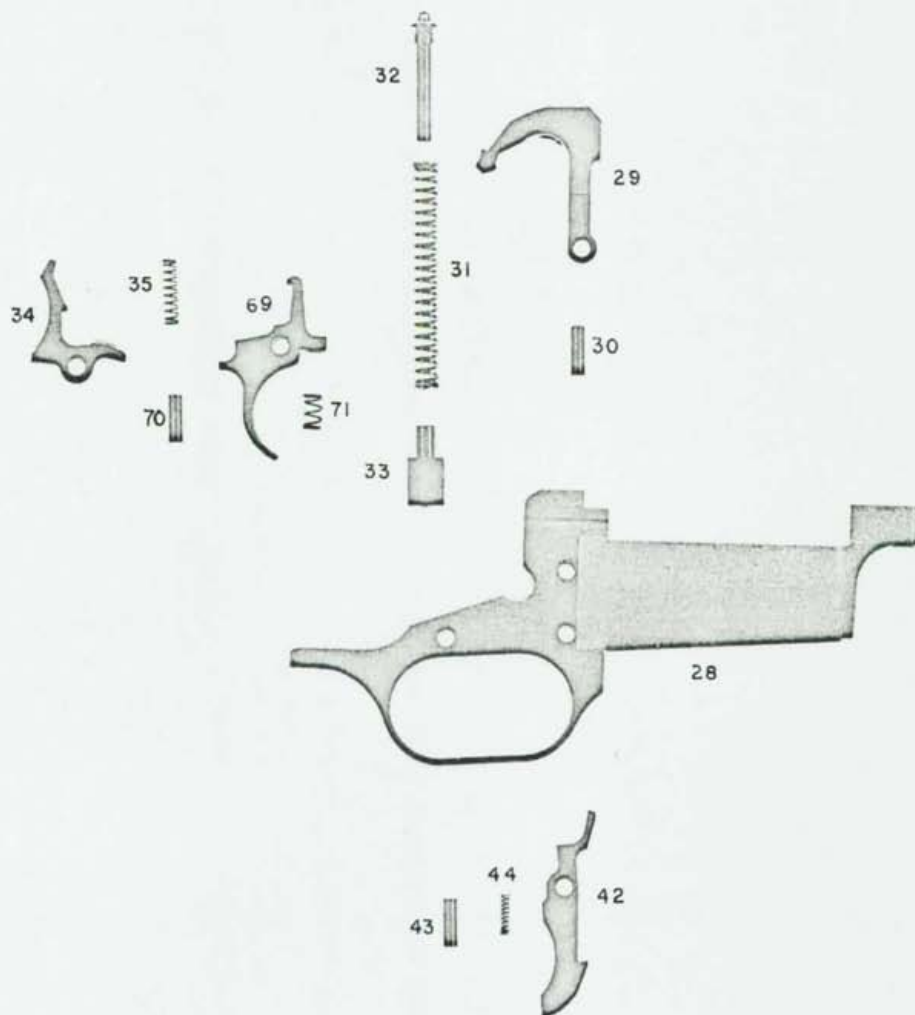
TO ASSEMBLE MAGAZINE ASSEMBLY

Insert the follower front end first thru the rear bottom of the magazine. Care should be used in assembling the magazine to make certain that the end of the spring with the full loop tilting upward is placed in first toward the rear of the magazine and rests against the back end of the follower. Caution: The improper assembly of the magazine spring will prevent proper function of the follower and feeding of shells into the chamber. Compress the magazine spring and replace bottom. After reassembly make

certain that shells lay properly between the follower and the lips on the magazine. If the shells are not resting in this position the bolt will not pick them up and feed them satisfactory. This condition can be corrected by making certain that the spring has been assembled properly or by increasing the angle slightly on the first coil of the spring that rests against the follower.

TO DISASSEMBLE GUARD ASSEMBLY

Grasp the guard in the left hand and push out the trigger pin with the end of the operating slide guide rod held in the right hand. The trigger and hammer catch can then be lifted out. Now place the guide rod under the hammer spring abutment with it resting on tail of guard, pry upward, slide the abutment rearward and remove the hammer spring assembly. Push out the hammer pin using the guide rod. The hammer can then be lifted out. Then push out the magazine catch pin. Push the hammer catch in trigger bow rearward as when normally operated. This will release the catch and it can then be lifted out.



TO ASSEMBLE GUARD ASSEMBLY

Place magazine catch spring into spring hole. Put magazine catch through top of guard, push downward and forward until it snaps into position. With the finger inside of the guard against the magazine catch and the thumb outside, press forward until the hole lines up with hole in guard. Insert magazine catch pin. Put hammer through top of guard lining it up with hammer pin hole. Insert hammer pin. Grasping the guard in the left hand take hammer spring assembly and locate the hammer spring guide rod in recess on underside of hammer. Feed abutment up angle on top side of guard until it snaps into place. Function hammer up and down to make sure that abutment and guide rod are properly located.

Assemble the trigger spring to the trigger and insert the hammer catch spring into the rear hole in the trigger. Assemble the hammer catch to the trigger first compressing the rear spring with the end of the guide rod to allow assembly. Take this assembly and insert it into the guard as near the rear as possible to make certain that the trigger spring is properly located in the cut in the guard. Holding the guard in the left hand with the thumb against the top of the hammer catch press downward until the hammer catch and trigger hole line up with the trigger pin hole in the guard. The use of the tapered slave pin would help to facilitate the assembly of these components. Push trigger pin into trigger pin hole in guard.

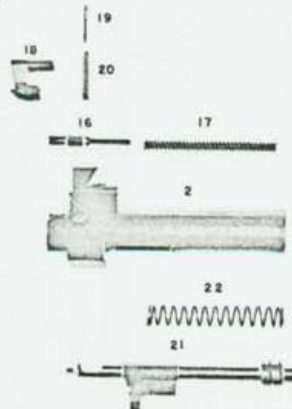
Caution: Do not pull trigger and release hammer allowing it to strike guard. Prevent this from happening with thumb when checking function.

TO DISASSEMBLE BOLT ASSEMBLY

When using disassembly kit furnished armorer, place bolt in fixture. Turn wing screw and compress ejector slightly. This will remove the tension from the extractor. With a small screwdriver compress extractor plunger. This will release the extractor and it can be lifted from the bolt. The extractor plunger and spring may now be removed. Release the wing screw in the fixture until the spring tension on the ejector ceases. On lifting the bolt out of the fixture the ejector and spring may be removed. Rotate the lug on the firing pin to the extreme left; this will cause it to be released and can then be withdrawn from the rear end of the bolt. The firing pin spring is threaded onto the firing pin through the spiral grooves at the rear end of the firing pin. It normally should not be necessary to remove this spring due to the possibility of it becoming mutilated. In assembling a new firing pin a new spring should be assembled to it.

Alternate Disassembly Method if Fixture is not Available

Turn the firing pin lug into its firing position to the extreme left of the left hand lug. Place the bolt between the jaws of a vise with an approximate .010 or greater piece of shim in front of the ejector. This will relieve its tension from the extractor stem. With a small screwdriver compress the extractor plunger and remove the extractor. Loosen the jaws of the vise and remove the ejector and spring, extractor plunger and spring, and the firing pin in the normal method.



TO ASSEMBLE BOLT ASSEMBLY

Insert the firing pin from the rear into the firing pin hole compressing the firing pin spring and rotate the firing pin lug to the right in line with the bolt lug. Insert the ejector and ejector spring assembly into the ejector hole with the extractor cut in a vertical position from the bolt lugs. Take the extractor spring and plunger assembly and insert in the extractor plunger hole. Place bolt with components as assembled into fixture and compress ejector by turning wing screw the amount necessary to locate the ejector below the outer rim of the bolt. Take the .160 slave pin and pass it through the extractor trunnion hole. In doing this the ejector will be rotated to proper alignment. Place extractor in bolt holding the fixture with the left hand with the thumb on top of the extractor. With a small screwdriver in the right hand, compress the extractor plunger with the thumb pressing the extractor in place.

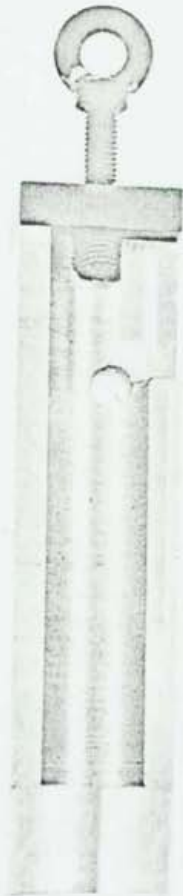
Release the wing screw in the fixture and remove the bolt.

Alternate Assembly Method if Fixture is not Available

Assemble the firing pin, ejector and spring, and extractor plunger and spring in the normal manner. Turn the firing pin to the left of the left lug on the bolt in the approximate firing position. Place the bolt between the jaws of a vise with a piece of shim in front of the end of the ejector, compress ejector to its location. (Note: Cut in ejector lines up with extractor hole). With the thumb on top of the extractor, with a small thin screwdriver or knife blade in the right hand, compress the extractor plunger with the thumb pressing the extractor into place.

The armorer's kit consists of (1) bolt holding fixture, (1) piston nut wrench, (1) .160 Dia. slave pin, for extractor pin holes and pin holes in guard, and (1) bolt lock spring assembly tool.

The tools pictured are not necessary for assembly of the weapon and are furnished as a convenience only. The weapon can be disassembled or assembled with any standard tool available.



BOLT HOLDING FIXTURE



PISTON NUT WRENCH



.160 SLAVE
PIN



BOLT LOCK SPRING
ASSEMBLY TOOL

Caliber .224 Winchester E2 Ammunition

This newly developed cartridge has the following characteristics:

Bullet: 53 grain Full Metal Case

Muzzle Velocity: 3300 ft/sec.

Max. Ave. Chamber Pressure: 52,000 psi

Barrel Length: 20"

Max. Cartridge Overall Length: 2.170"

The following figures show in detail the characteristics of this ammunition:

Photograph showing comparison of the Caliber .224 Winchester E2 Cartridge to other military cartridges.

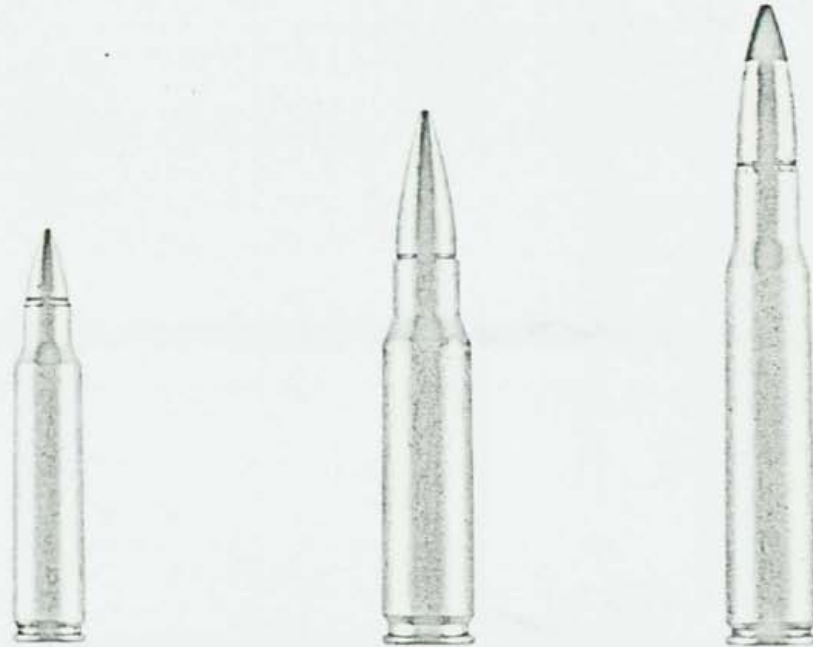
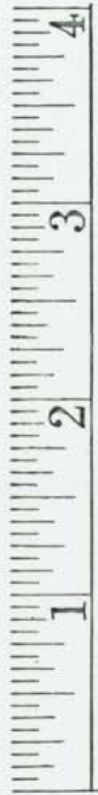
Drawing of maximum cartridge and minimum chamber dimensions.

Drawing of 53 grain Full Metal Case bullet.

Tabulation of velocity, energy and mid-range trajectory at range to 500 yards.

Trajectory curve showing bullet height above or below line of sight for both low and high Light Rifle sight settings at ranges to 500 yards.

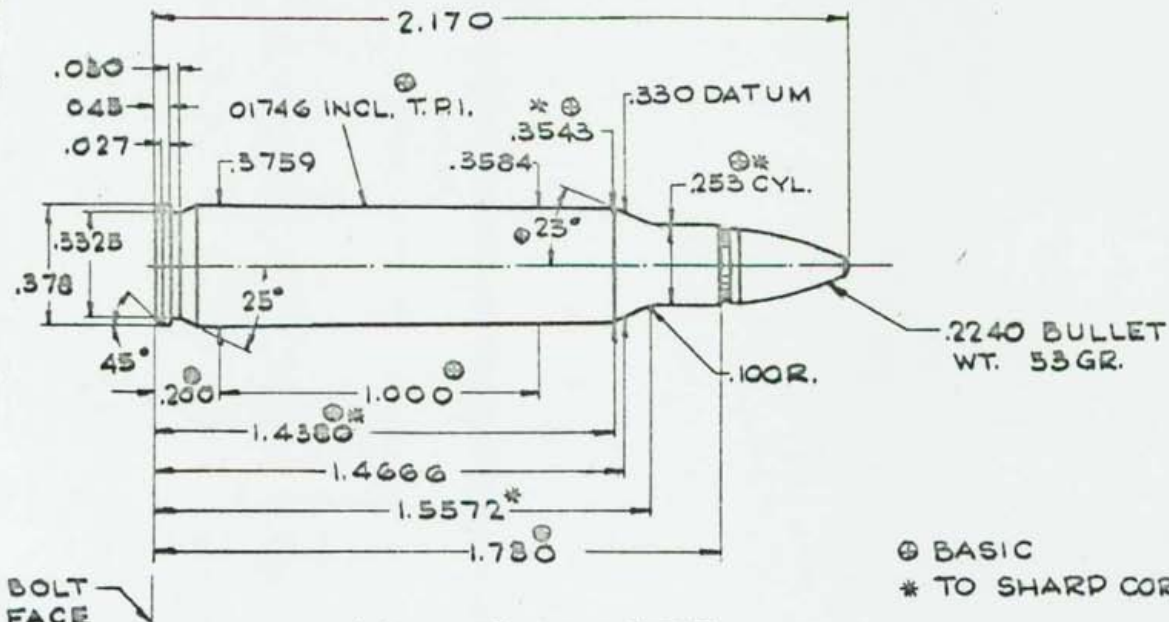
COMPARISON OF MILITARY CARTRIDGES



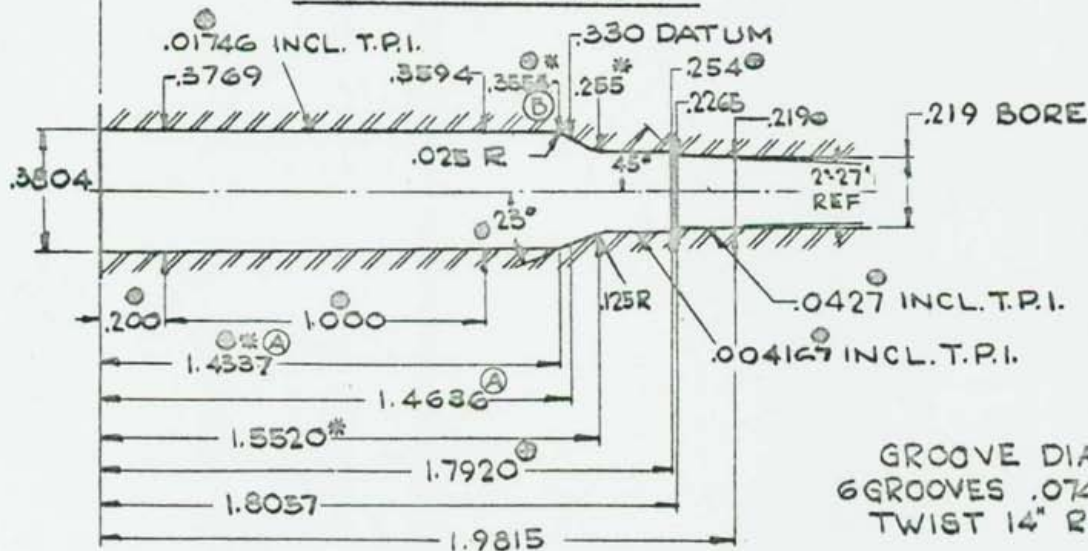
- 40 -

Cartridge Name:	Cal. .224 Winchester E2	7.62 mm Nato	Cal. .30 M2 A.P.
Bullet Weight (Grains):	53	150	166
Muzzle Velocity (ft/sec):	3300	2800	2770
Muzzle Energy (ft-lbs)	1280	2610	2825
Rifle:	Winchester Light Rifle	M-14	M-1
Rifle Weight Loaded (lbs):	5.5	9.7	10.1
Magazine Capacity:	20	20	8
Weight of Rifle & 200 Rds. of Ammunition (lbs):	10.0	19.2	21.5

MAX. CARTRIDGE



MIN. CHAMBER

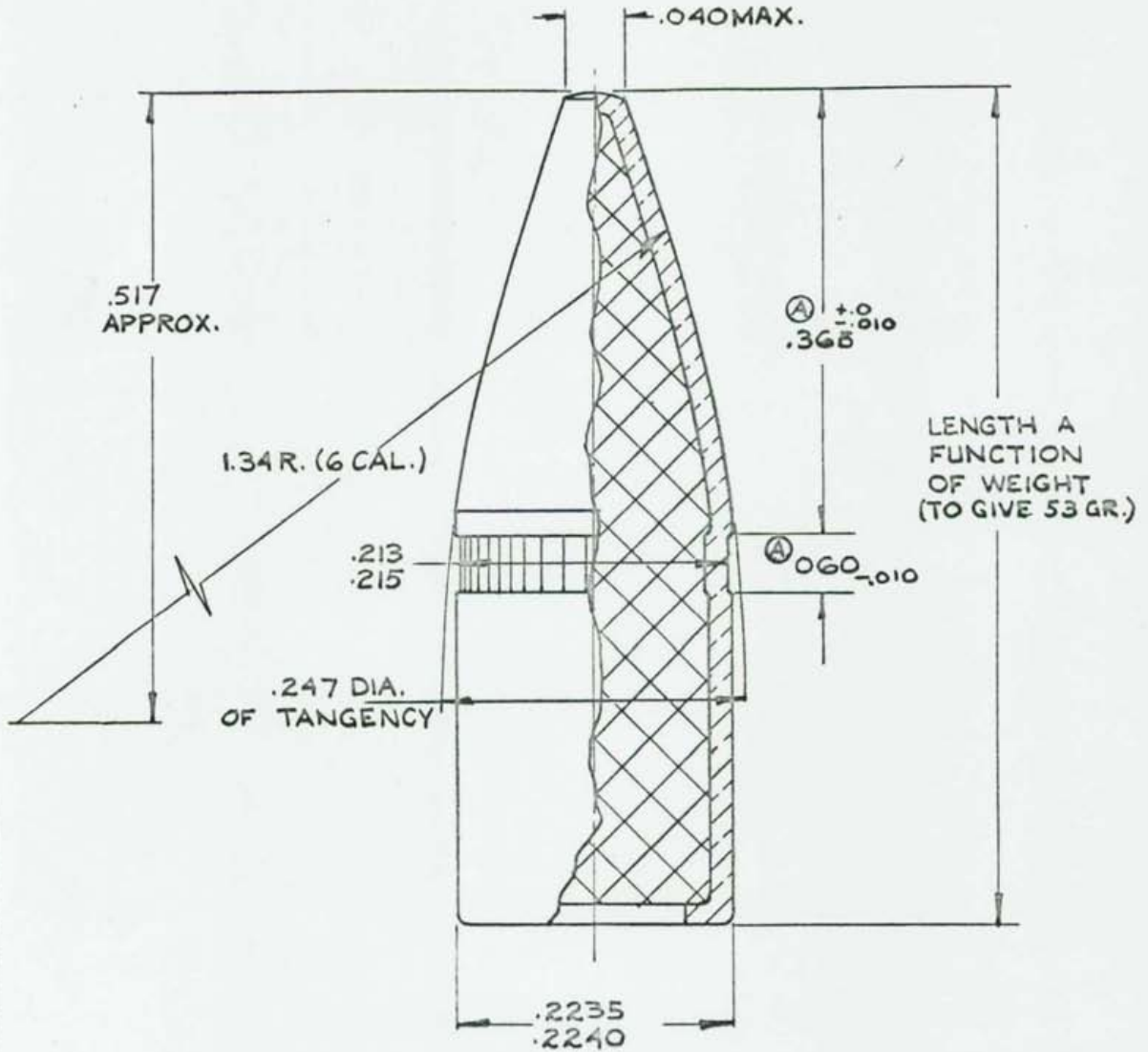


A	1.4337 WAS 1.4366				
	1.4636 WAS 1.4666				
B	3554 WAS 3555				
C	E2 WAS MK II				
SYM	ALTERATION	BY	DATE	CHK'D	APPR'D

WINCHESTER-WESTERN DIVISION
OLIN MATHIESON CHEMICAL CORPORATION
 NEW HAVEN 4, CONNECTICUT

TITLE
224 WINCHESTER E.2

DRAWN BY: <i>JWS</i>	DATE: 12-3-57	SCALE:
CHECKED:	DATE:	D'WG. No.:
APPROVED: <i>JWS</i>	DATE: 12-3-57	4213-7538A-P



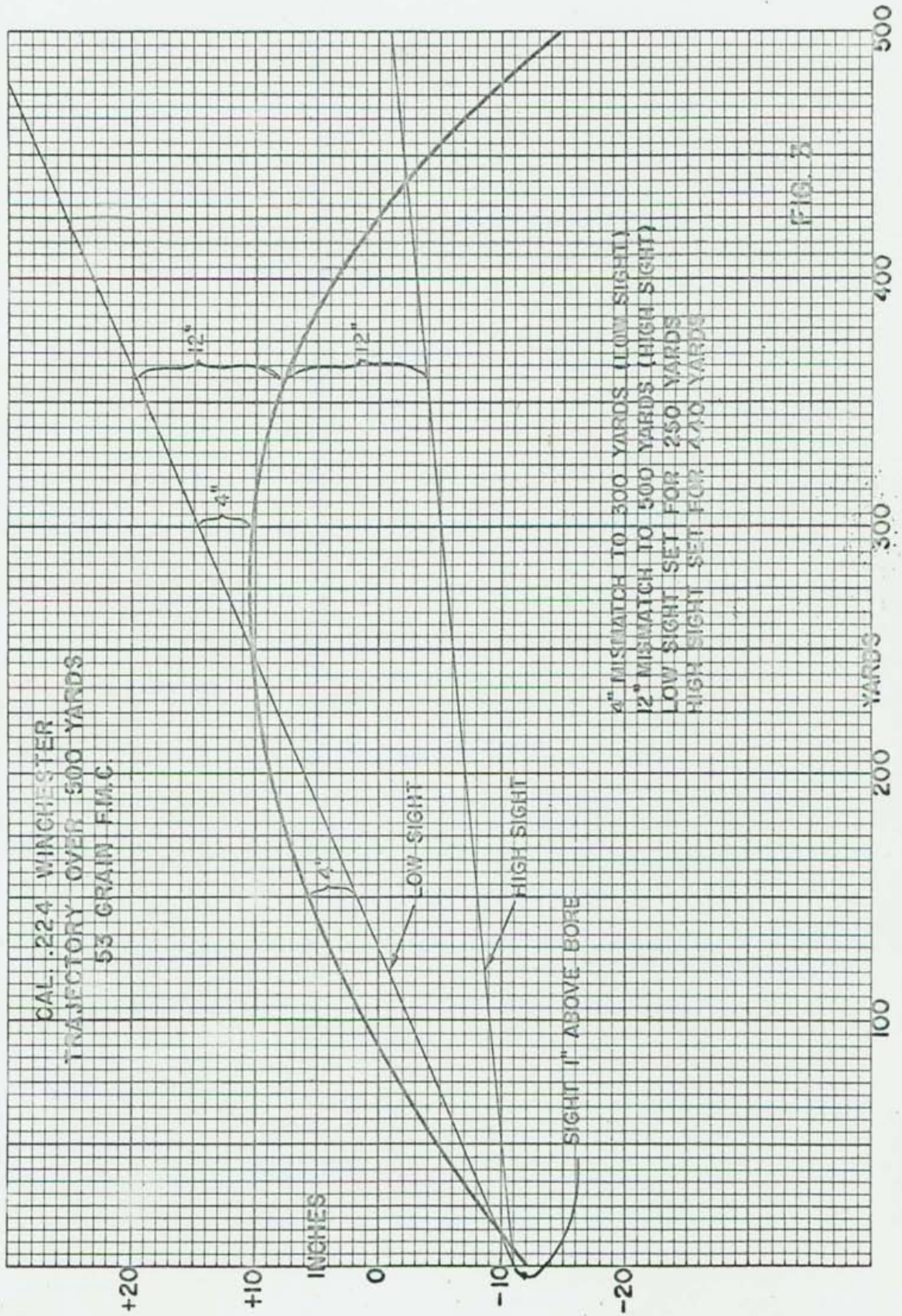
A .365 WAS .260				WINCHESTER-WESTERN DIVISION OLIN MATHIESON CHEMICAL CORPORATION NEW HAVEN 4, CONNECTICU			
A .060-.010 WAS .040MAX-.030MAX							
B E2 WAS MK. II				TITLE .224 WINCHESTER 53 GR. F.M.C. BULLET E2^(B)			
				DRAWN BY <i>FGP</i>		DATE 12/5/57	
				CHECKED		DATE	
				APPROVED <i>JPS</i>		DATE 12/5/57	
SYMBOL				ALTERATION		BY DATE CH'KD APP'G	

Cal. .224 Winchester E2 Cartridge

53 Grain F.M.C. Bullet

Velocity, Energy and Mid-Range Trajectory

<u>Range</u> <u>(Yards)</u>	<u>Velocity</u> <u>(ft/sec)</u>	<u>Energy</u> <u>(ft-lbs)</u>	<u>Mid-Range Trajectory</u> <u>(")</u>
Muzzle	3300	1280	---
100	2795	920	0.5
200	2340	645	2.5
300	1930	440	6.0
500	1275	190	25.5



July 22, 1963

HISTORY OF DEVELOPMENT OF CAL. 22
CENTER FIRE MILITARY CARTRIDGE

1. Remington, under contract with Springfield Armory, during 1957, developed a new Cal. 22 Center Fire cartridge, based on the 222 Remington but with overall length increased 0.2" This ammunition was used by Springfield Armory for an "in house" Light Rifle development program. This cartridge was designated by Remington as the "Cal. 22 Experimental", and is shown in the attached cartridge-chamber drawing #4213-7534A-P.
2. Winchester-Western, also during 1957, developed the Cal. 224 Winchester E2, which is shown in the attached drawing, #4213-7538A-P. This cartridge, also based on a modified 222 Remington case, was developed with company funds for the Winchester Cal. 224 Light Rifle.
3. Armalite developed the Cal. 22 AR-15 Rifle and chambered it for the Cal. 224 Winchester cartridge.
4. The Government purchased ammunition for their evaluation of the Cal. 224 AR-15 Rifle and the Cal. 224 Winchester Light Rifle from both Winchester and Remington.
 - a) Winchester's load was designated the Cal. 224 Winchester E2.
 - b) Remington's load was designated the "Cal. 222 Special".
5. Remington's Cal. 222 Special was identical to the Cal. 224 Winchester except in two minor respects.
 - a) Case length was .020" shorter
 - b) A different bullet was used, resulting in an increase in overall length from 2.170" for the Winchester cartridge to 2.260" for the Remington cartridge.

Both of these cartridges were fired from the Cal. 224 Winchester E2 chamber. The attached sketch, dated March 4, 1958, compares the two cartridges.

COMPARISON OF REM. 222 SPL. & .224 WINCHESTER E2

