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FM 23-15

DEPARTMENT OF THE ARMY FIELD MANUAL

BROWNING AUTOMATIC RIFLE CALIBER .30 M1918A2

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DEPARTMENT OF THE ARMY • JULY 1951

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FIELD MANUAL
BROWNING AUTOMATIC RIFLE
CALIBER .30 M1918A2

FM 23-15 } DEPARTMENT OF THE ARMY
CHANGES No. 3 } WASHINGTON 25, D. C., 22 May 1957

FM 23-15, 9 July 1951, is changed as follows:

13. Disassembly of the Trigger Group

To disassemble the trigger group—

* * * * *

c. To remove the * * * the sear spring. **An alternate method of removing the sear spring can be used as follows. Place the trigger group on a flat surface with the magazine guides toward your body. Using a dummy cartridge, insert the point into the notch on the square end of the sear spring, and push forward unseating the sear spring (fig. 38.1). Remove the sear spring.**

21. General

(Superseded)

An automatic rifleman is not expected to be a technical expert on the automatic rifle, but must understand functioning, or how and why the automatic rifle operates. With an understanding of functioning, stoppages can be located and reduced quickly.

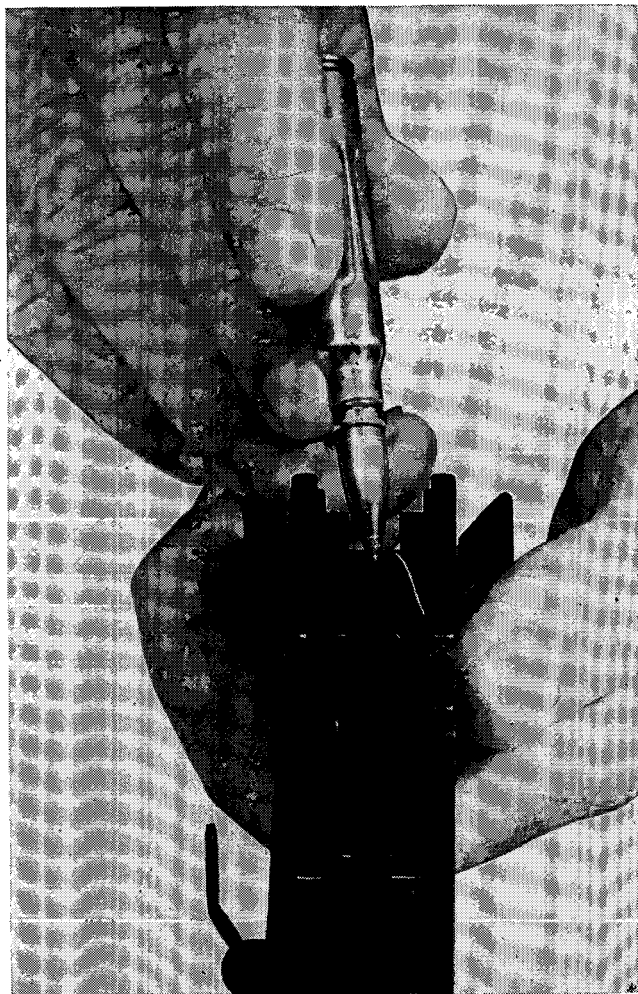


Figure 38.1. (Added) Alternate method of removing the sear spring.

22. What Functioning Is

(Superseded)

a. Functioning is the operations of loading, firing, and unloading of a firearm. This is known as the *cycle of operation*. This cycle is similar in all small arms weapons.

b. The cycle of operation is broken down into eight steps—

- (1) Feeding.
- (2) Chambering.
- (3) Locking.
- (4) Firing.
- (5) Unlocking.
- (6) Extracting.
- (7) Ejecting.
- (8) Cocking.

c. As functioning of the operating group is discussed, remember that some of the steps occur at the same time.

22.1 Feeding

(Added)

a. Feeding is the action of placing a cartridge in the receiver in back of the barrel ready for chambering.

b. This action is accomplished by the magazine exerting an upward pressure on the bottom of the magazine follower causing the cartridge to be forced up into the path of the feed rib ready for chambering.

c. Feeding starts during the rearward movement of the bolt. As the feed rib clears the top round in the

magazine on the rearward movement, the compressed magazine spring moves the top round up into the path of the feed rib.

22.2 Chambering

(Added)

a. Chambering is the action of stripping the round from the magazine and loading it into the chamber ready for firing.

b. As the operating parts move forward, the front of the feed rib contacts the base of the top round in the magazine (fig. 94). As soon as the cartridge moves forward about one-fourth inch, the nose of the cartridge strikes the bullet ramp and is deflected upward toward the chamber. As the cartridge continues forward, its base approaches the center of the magazine

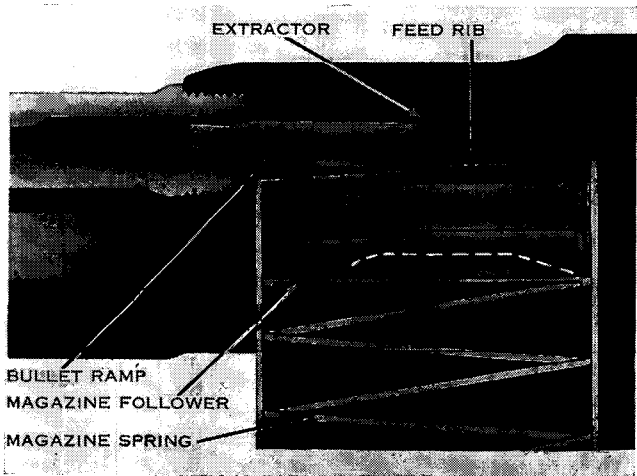


Figure 94. (Superseded) Chambering.

where it is forced out of the magazine by the magazine follower and spring. When the cartridge is released by the magazine, the nose of the bullet is far enough into the chamber so that it is guided by the chamber from this point on. The base of the cartridge slides up the face of the bolt and under the extractor. (The cartridge may fail to slide under the extractor at this time. If it does, the extractor will snap over the base of the cartridge as the bolt reaches its most forward position and the cartridge is seated in the chamber.)

22.3 Locking

(Added)

a. Locking is the action of blocking the barrel behind the cartridge so that the cartridge case will not be driven back by the high pressure of the gases, and the gases will not escape and harm the firer.

b. For simplicity, locking is broken down into three steps—when locking begins, what takes place during locking, and when locking is completed. Locking begins when the circular cam surfaces on the underside of the bolt lock contact the rounded rear shoulders of the bolt supports (fig. 95C). The bolt continues forward and the bolt link moves upward and to the rear about the hammer pin. As the bolt link moves upward, it forces the bolt lock upward and into the locking recess in the top of the receiver (fig. 95B). In its forward movement, the speed of the bolt assembly decreases gradually from the instant the bolt lock starts to rise until the hammer pin passes under the bolt link pin. This reduces the possibility of damaging the firing pin. Locking is completed when the

hammer pin is directly under the bolt link pin (fig. 95A).

22.4 Firing

(Added)

a. Firing is the action of igniting the primer, or actually firing the cartridge.

b. The tang of the firing pin is buried in the slot on the underside of the bolt lock at all times except when the bolt lock is in the locking recess. This keeps the head of the firing pin locked away from the center rib of the hammer during the rearward and forward motion of the bolt assembly, so that the weapon cannot fire. When locking is completed and the bolt lock is in the locking recess, the tang of the firing pin is no longer buried in the bolt lock, and the head of the firing pin can be struck by the center rib of the hammer. The slide and hammer continue forward another one-tenth inch after the bolt lock is in the locking recess. The center rib of the hammer strikes the head of the firing pin, driving the firing pin forward a short distance through the feed rib. The firing pin striker hits the cartridge primer and fires the cartridge.

c. The forward movement of the slide is completed when the forward shoulders of the slide strike the rear shoulders of the gas cylinder tube. This action cushions the shock of the hammer striking the firing pin and reduces breakage of the firing pin.

d. When a cartridge is fired, the bullet is driven through the barrel by the pressure from the expanding powder gas. About 6 inches from the muzzle, the bullet passes a small hole in the bottom of the barrel. This hole is called the barrel port (fig. 96).

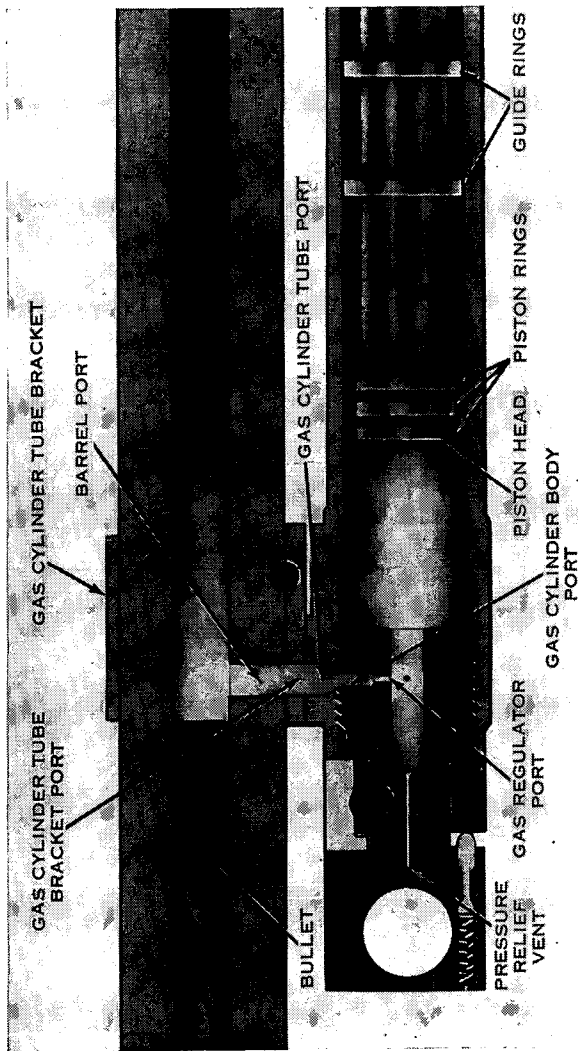


Figure 96. (Superseded) Firing.

e. As the bullet passes the barrel port, some of the gas under high pressure passes through it. Gas continues to pass through the gas ports for the short time that it takes the bullet to travel the 6 inches from the barrel port to the muzzle. Figure 96 shows the path taken by the gas. First it goes through the barrel port, then the gas cylinder tube bracket port, the gas cylinder tube port, the gas cylinder body port, the gas regulator port, and then into the gas cylinder well. The gas regulator port is the smallest of the four gas ports. It controls the amount of gas entering the gas cylinder assembly. All of the gas ports are stationary except the gas regulator port. There are three different sized gas regulator ports.

f. When the gas rushes into the gas cylinder, it strikes the gas piston head a sharp blow, moving the piston to the rear. Note the three piston rings near the head of the gas piston. When the gas piston has moved approximately nine-sixteenth of an inch, the three piston rings and the gas piston move out of the gas cylinder assembly. The gas then expands around the piston head and escapes from the six gas escape ports in the gas cylinder tube and the pressure relief vent in the gas cylinder assembly. Any gas remaining in the barrel escapes as soon as the bullet leaves the muzzle.

g. The two guide or bearing rings on the gas piston serve two purposes. They prevent the escape of gas back into the operating parts, and hold the front end of the gas piston in the center of the gas cylinder tube after the gas piston head has moved out of the gas cylinder assembly.

h. Because the slide is attached to the piston, it

moves when the piston moves. As the piston and slide move to the rear, the recoil spring is compressed, storing energy for the forward movement, and the weapon is unlocked. The center rib of the hammer is withdrawn from the head of the firing pin during the initial movement of the slide to the rear.

23. The Functioning Cycle

Rescinded

24. Functioning of the Operating Group

Rescinded

25. Action of the Gas

Rescinded

26. Movement of the Slide of the Rear

Rescinded

27. Unlocking

(Superseded)

a. Unlocking is the action of unblocking the breech end of the rifle. For simplicity, unlocking is studied in three steps—when unlocking begins, what takes place during unlocking, and when unlocking is completed.

b. When the operating parts are completely forward, the hammer pin is 0.19 inch ahead of the bolt link pin. The center rib of the hammer is slightly in rear of the head of the firing pin. During the first 0.19-inch movement of the slide assembly to the rear, the bolt and bolt lock do not move. The gas pressure is being reduced. The unlocking action begins when the

hammer pin is directly under the bolt link pin (A, fig. 95).

c. As the slide continues to the rear, the bolt link moves forward and downward about the hammer pin (B, fig. 95) The bolt lock is drawn downward, to the rear, and out of the locking recess.

d. Unlocking is completed when the bolt lock is completely down and out of the locking recess (C, fig. 95). At this point the slide has moved 1.39 inches to the rear, and the bolt, bolt lock, and slide are moving to the rear at the same speed. The bolt lock is now supported by the bolt supports. The bolt and bolt lock do not attain the speed of the slide until the bolt lock has moved 1.39 inches to the rear. This is very important for two reasons. First, the parts are not subjected to an undue strain because of the sudden start when the cartridge explodes. Second, the slow initial movement delays the opening of the chamber. By the time the chamber opens, the gas pressure has been reduced.

e. As the bolt lock moves downward from the locking recess, the firing pin is withdrawn (B, fig. 95). A cam surface in the slot on the underside of the bolt lock operates on a cam surface on the tang of the firing pin. This action withdraws the striker of the firing pin back into the face of the bolt.

28. Withdrawal of the Firing Pin

Rescinded

29. Extraction

(Superseded)

a. Extraction is the action of removing the cartridge or fired cartridge case from the chamber.

b. The extractor is located on the upper right side of the bolt next to the ejection opening. Keep in mind that the extractor grasps the base of the cartridge. This action holds the base of the cartridge firmly against the face of the bolt. When the automatic rifle is fired, the empty cartridge case expands and binds against the chamber, so there must be some means of loosening the cartridge case before removing it. During their initial movement, the bolt and bolt lock move slowly in comparison with the movement of the slide. As the bolt lock moves downward from the locking recess during unlocking, the circular cam surfaces on the underside of the bolt lock act on the rounded rear shoulders of the bolt supports (B, fig. 95). This contact produces a strong lever action, known as slow initial extraction, that loosens the empty cartridge case. When the bolt lock is down and out of the locking recess, the bolt drawn by the bolt lock and bolt link moves to the rear with the same speed as the slide assembly. The empty case is carried with and held against the face of the bolt by the extractor.

30. Ejecting

(Superseded)

a. Ejecting is the action of removing the cartridge or fired cartridge case from the rifle after it has been extracted from the chamber.

b. The ejector is located on the trigger group. When the slide reaches a point approximately one-fourth inch from the end of its travel, the base of the cartridge case strikes the ejector. The cartridge case pivots about the extractor and passes through the

ejection opening. As the bolt continues to the rear, the cartridge case strikes the side of the receiver to the rear of the ejection opening and is ejected to the right front.

30.1 Cocking

(Added)

a. Cocking is the action of placing the parts in readiness for firing.

b. Cocking begins with the initial movement of the slide to the rear, and is completed when the rear of the slide strikes the sear release and buffer head, and the recoil spring is fully compressed.

c. As the parts move to the rear, the recoil spring is being compressed. This action stores the necessary energy for the forward movement. The operating parts will move forward if the trigger is held or pressed to the rear. If the trigger is released, the sear will engage the sear notch on the underside of the slide, halting the firing cycle. When the trigger is pressed, the sear nose is depressed and is disengaged from the sear notch on the slide. The slide assembly is then free to move forward under the force of the expanding recoil spring. As the slide moves forward, it carries the operating parts with it.

32. Action of the Recoil Spring

Rescinded

33. Feeding

Rescinded

34. Locking

Rescinded

35. Firing the Cartridge

Rescinded

36. Termination of the Forward Movement

Rescinded

53. Gas Adjustment

* * * * *

d. (Added) A new gas cylinder assembly has been devised and is composed of the following parts: gas cylinder body, body lock key, regulator, and the body lock spring pin (fig. 111). On the face of the regulator there are three circles of different sizes. These circles correspond with similar size gas ports in the body of the regulator. The rifle is normally operated with the regulator on the smallest port and the setting is not varied unless the rifle shows signs of insufficient gas.

e. (Added) The disassembly and assembly of the gas cylinder assembly may be facilitated by first removing the gas cylinder tube and wooden forearm from the rifle.

f. (Added) To disassemble the gas cylinder assembly, first drift out the body lock spring pin from its recess in the gas cylinder body. This can be accomplished using a drift or nail and tapping lightly with the combination tool (care must be taken to insure that the body lock spring pin is not damaged). Next, remove the gas regulator by pulling it out of its recess in the gas cylinder body. Lift out the body lock key from its locking recess in the gas cylinder body, then unscrew the body from the gas cylinder tube in a counterclockwise manner.

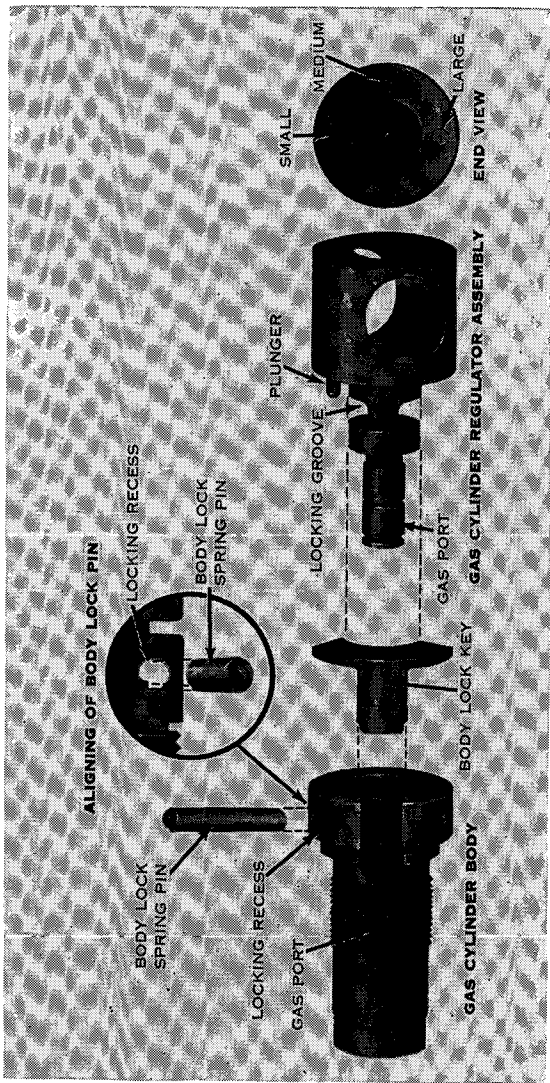


Figure 111. (Superseded) Gas cylinder assembly.

g. (Added) To assemble the gas cylinder assembly, screw the gas cylinder body into the gas cylinder tube fingertight, and back off until the gas cylinder body port is perfectly alined with the gas cylinder tube port (this can be accomplished by observing the alinement of the gas ports when held up to the light as viewed from the gas cylinder tube port). If the gas cylinder tube is not disassembled from the rifle, this alinement can be accomplished by screwing the gas cylinder body into the gas cylinder tube fingertight, and backing off until the locking recess on the gas cylinder body is directly under the barrel. If the locking recess is not under the barrel in either case, the alinement of the gas ports has not been completed and the rifle will not function. Next, lock the gas cylinder body in position by inserting the body lock key into its recess. Insert the regulator into the gas cylinder body making sure that the regular plunger does not rest on any portion of the body lock key, and lock it in position with the body lock spring pin (before the body lock spring pin is inserted, push in lightly on the regulator to compress the regulator plunger so the holes in the gas cylinder body are alined with the locking groove on the regulator to receive the body lock spring pin). The body lock spring pin must be so positioned so that the groove in the spring is alined with either edge of the regulator groove. This prevents binding and damaging of the body lock spring pin.

h. (Added) In turning the regulator, notice that it turns under pressure. The regulator plunger is constantly exerting pressure on the gas cylinder body when the regulator is assembled and locked in position.

This prevents the regulator from turning during firing. Also, as the regulator moves, notice that it moves in clicks, each click being a gas setting. If the regulator is positioned between ports or clicks, no gas will pass through the regulator as the gas ports are out of alinement.

i. (Added) To adjust the gas setting on the smallest port, turn the regulator to the extreme clockwise position. It is prevented from turning further by the regulator plunger contacting the body lock key. To check this, see that the small circle on the face of the regulator is directly under the barrel.

j. (Added) If upon firing, the rifle shows signs of insufficient gas, adjust the regulator to the next larger port (medium). This is done by backing the regulator off one click to the left, or counterclockwise, until the medium hole on the face of the regulator is alined under the barrel.

k. (Added) If the rifle still shows signs of insufficient gas, adjust the regulator to the large port by turning the regulator to the extreme left or counterclockwise position until the large hole on the face of the regulator is alined under the barrel.

l. (Added) The large port is provided for use in case the action of the rifle becomes sluggish through the collection of dirt or the lack of oil under conditions which render prompt corrective action impractical. In the absence of the above conditions, continued use of the regulator adjusted on the large port indicates either a poor alinement of the gas ports, a dirty gas cylinder assembly, or worn parts in the gas system.

Section V. STOPPAGES AND IMMEDIATE ACTION

(Superseded)

55. General

a. A *stoppage* is any unintentional interruption in the cycle of operation. In other words, a stoppage occurs when the rifle stops firing or fails to fire, through no fault of the automatic rifleman. A stoppage may be a failure to feed, chamber, fire, extract, or eject. It is caused by faulty operation of the automatic rifle, magazine, or ammunition.

b. A *malfunction* is a failure of the weapon to function satisfactorily. A malfunction may or may not become evident by actual stoppage of fire. In some cases, for example, when the trigger group does not function satisfactorily, the malfunction may be evidenced by a runaway rifle or one which fires semiautomatic fire when full automatic fire is desired. Malfunctions may also be caused by forces and factors which do not exist at all times. Foreign material, such as dust, mud, or ice, may enter the mechanism and also produce malfunctions. A malfunction may result in a stoppage.

c. *Immediate action* is the prompt action taken by the firer to reduce a stoppage. It is an unhesitating action performed when his rifle fails to fire.

56. Common Causes of Stoppages

a. *Stoppages* are caused by worn, weak, broken, or dirty operating parts. An automatic rifleman must train himself to watch for these defects and correct them before they cause a stoppage. The primary

cause of stoppages with the automatic rifle is a defective magazine. For this reason it is particularly important that the magazine be handled carefully. Take proper care of the magazines and the weapon itself, and the automatic rifle can be relied upon to function properly when it is needed. There are five types of stoppages common to the automatic rifle. Their usual causes and the action necessary to reduce them are described below. Examine the automatic rifle before, during, and after firing with these causes in mind. In this manner many stoppages can be prevented.

b. Five Common Stoppages.

Nature of stoppage	Usual causes	Corrective action
Failure to feed.....	Dirty or dented magazine. Weak or broken magazine spring. Worn magazine notch.	Replace the magazine.
	Worn or broken magazine catch or spring. Corroded or bent ammunition.	Replace magazine catch or spring. Replace ammunition.
	Failure to chamber...	Dirty or dented magazine. Weak or broken magazine spring. Worn magazine notch. Ruptured cartridge.....
Failure to fire.....	Worn or broken magazine catch or spring. Corroded or bent ammunition. Excessive friction in operating parts.	Replace magazine catch or spring. Replace ammunition. Clean and properly lubricate operating parts.
	Excessive friction in operating parts.	Clean and properly lubricate operating parts.
	Weak recoil spring..... Worn or broken firing pin... Faulty ammunition.....	Replace recoil spring. Replace firing pin. Replace ammunition.