COURSE 107

Small Arms

Prepared by

AIR TRAINING COMMAND
AIR FORCE OFFICER CANDIDATE SCHOOL
LACKLAND AIR FORCE BASE
SAN ANTONIO, TEXAS

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USAF EXTENSION COURSE INSTITUTE

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Preface

PURPOSE. The purpose of this course is to give the student the information he will need to become familiar with the operation, care, and capabilities of the small-arms weapons employed by the United States Air Force for defense against ground attack.

SCOPE. The scope of this course includes the general uses and characteristics of the weapons, statistics on their performance, disassembly and assembly procedures, care and cleaning methods, safety precautions, and characteristics of the ammunition used.

Much of the material has been taken from field manuals and technical manuals on the nomenclature, operation, care and cleaning, range procedures, and tactical employment of the carbine, the .45-caliber automatic pistol, and the submachine gun. This material will give the student a well-rounded idea of the small-arms weapons employed in the United States Air Force.

INSTRUCTIONS. It is difficult for the student to obtain the maximum benefit from a course in the operation of small arms without access to the weapon being discussed. However, the average American of military age has had at least a limited acquaintance with some form of weapon comparable to the weapons discussed in this text and is able to realize the importance of proper care and the necessity for safety precautions. Often, too, the student will have recourse to weapons at a military base or weapons issued to National Guard or Reserve units.

Keep this pamphlet for your own use.

VALUE. This course is valued at 18 hours (6 points).

Contents

Glossary

AUTOMATIC—A firearm that fires continuously until the pressure on the trigger is released. It is activated by a single, prolonged tripping of the trigger.

BLOWBACK-OPERATED—Operated by utilizing the backward thrust on the face of the bolt to accomplish the required functions. *Example*: the M3 caliber .45 submachine gun. As differentiated from the gas operation, the blowback operation employs the rapidly expanding gases formed by the burning powder directly on the face of the bolt, pushing the bolt to the rear and compressing the powerful springs that return the bolt forward when the gas pressure is dissipated.

CARBINE—Similar to a rifle except that the barrel is less than 20 inches in length.

GAS-OPERATED—Operated by the action of expanding powder gases, which are utilized by a cylinder and piston to perform the required operations. *Example*: M1 (Garand) rifle or .30-caliber carbine.

MACHINE GUN—A weapon that fires small-arms ammunition automatically and is capable of sustained rapid fire. It is conventionally used in conjunction with a mount or tripod. It is water- or air-cooled and recoil- or gas-operated.

MANUAL OPERATION—The operation, performed manually by the shooter, of ejecting the previously spent shell, cocking and loading the weapon, and tripping the trigger for the next shot. *Example*: any bolt-action rifle.

PISTOL—A hand-operated weapon that fires one cartridge per semiautomatic or automatic operation.

RECOIL-OPERATED—Operated in such a way that the recoil of the weapon is mechanically harnessed to eject the spent shell and cock and load the weapon for the next shot. *Example*: caliber .45 pistol.

REVOLVER—A hand-operated weapon that fires one cartridge per manual operation.

RIFLE—A shoulder-operated weapon that fires one cartridge per operation and has a barrel 20 inches in length or longer.

SEMIAUTOMATIC—A firearm that is automatically loaded and prepared for firing after each shot, but that fires only one shot with each trigger pull.

SHOTGUN—A weapon that fires a pattern of shot from a single shell per operation.

SMALL ARM—Any hand- or shoulder-operated weapon, of .60 caliber or smaller in bore, easily transportable and fired by one individual.

SUBMACHINE GUN—An automatic, hand- or shoulder-operated weapon with a foreshortened barrel and a bore designed for pistol or revolver ammunition.

Chapter 1

INTRODUCTION TO SMALL ARMS

NO WEAPON is effective unless the bullet strikes the target intended by the firer. The person firing the weapon with which he is armed must realize the capabilities of his weapon and use it in the most practical and efficient manner. The M1 rifle, which is not a standard weapon in the United States Air Force, is a weapon capable of accurately striking a target at great ranges. It is semiautomatic, giving the firer appreciable fire power, and it is clip-fed, meaning that the firer has some relief from feeding fresh rounds into his weapon. The carbine (M1 and M1A1) has these same advantages and, in addition, is very light in weight and considerably less cumbersome to handle. On the other hand, the carbine does not have the accuracy, the range, and the all-round sturdiness of the M1 rifle.

The caliber .45 pistol has little range. It is limited in its accuracy to very short ranges. Its advantages are convenience, light weight, semiautomatic operation, and great shocking power.

The M3 caliber .45 submachine gun, like the pistol, is noted not for its range or accuracy particularly but for its ability to lend great fire power to the shooter employing it as a weapon. In considering the tactical capabilities of these basic weapons, we use the terms "fire power" and "shocking power." What do we mean by these terms?

"Fire power" is the ability to deliver fire. When fire power is delivered rapidly and continuously on a target, the stream of fire drives an enemy to cover and reduces his retaliatory fire. Thus a weapon, to be classified as one with great fire-power potential, must—

a. Be automatic or semiautomatic in operation.
b. Contain a magazine capable of sustaining continued fire.
c. Have sufficient recoil control to enable the shooter to hold his fire on the target.
d. Have sufficient range to protect the firer.

"Shocking power," on the other hand, is the ability of the bullet to damage or completely stop a target at the point of impact by the sheer impact of the bullet. A rifle, employing high velocity ammunition, may fail to stop an onrushing target because the projectile tears through the target with little real resistance. There is an interesting story on the origin of the caliber .45 revolver as the official sidearm of the various services. At the time of the Filipino insurrection, while United States troops were occupying the Philippine Islands following the Spanish-American War, the standard weapon used for a sidearm was the caliber .38 revolver.

Many casualties resulted among United States troops at the hands of fanatic Moro native fighters who launched sporadic suicidal attacks swinging razor-edged machetes or "cane knives" called "bolos." The caliber .38, even when fired with considerable accuracy, did not have the impact power to stop the natives before they reached close quarters with their knives. This led to the development of the caliber .45 with its heavy, low-velocity slug that ordinarily will knock down a man with a hit anywhere on his body.

However, regardless of the characteristics of the weapon, its primary employment is to deliver fire on a designated target. To accomplish this effectively, the shooter must understand the theory of sighting and its application to firing. This understanding demands more than the ability to line the target up between the sights, hold the sights squarely on the target, and "squeeze off" the shot with the least disturbance to

the sight picture formed in the sights. It demands an understanding of the various forces affecting the flight of the bullet, the physical properties of the propellant charge, and the influences exerted by the bore of the weapon.

1. Flight of the Projectile

The first of the forces affecting the flight of the projectile from the mount of the barrel to the target is gravity. According to Newton's law of gravity, distance equals one-half of the acceleration of the bullet times the time squared. Thus it is evident that the speed of the bullet does not influence its free fall time and that the shooter must allow for the force of gravity in sighting. Another force is the wind, which, according to its degree of strength and direction, affects the flight of the bullet. Both these forces act on the flight of the bullet and on its inflight time.

The bullet in flight is also affected by the spinning motion given the bullet by "lands" and grooves in the surface of the bore—much like the spinning motion given a football in a forward pass. This spinning motion is helpful in improving the stability of a bullet, because a rapidly spinning or rotating wheel in space will tend to remain in the same plane of rotation when not affected by outside forces. This is called gyroscopic action.

The average person perhaps does not realize how snugly the bullet fits in the bore of the weapon on its flight through the bore after firing. The rifle barrel actually stretches outward along the points affected by the bullet speeding through it. Thus it is easy to realize the effect on the flight of the bullet from any inequality in the surface of the bore caused by corrosion, by dirt or foreign matter, by warping as a result of intense heat, or even by very tight retaining bands that bind the barrel to the stock. Naturally, these have only slight effect on the bullet at short ranges, but their effect increases with additional ranges.

2. Aiming and Sighting

Aiming the weapon is purely a physical accomplishment that can be mastered by anyone. True, some persons are better shots than others, but this is not a natural ability. It is, rather, the result of better training, more confidence, better health, or some other factor. Anyone with normal ability can learn to aim and sight with a fair degree of accuracy.

The actual mechanics of aiming a weapon and getting an accurate sight on a target are simple. The shooter should adopt the desired or indicated position—standing, kneeling, sitting, or prone—in such a manner that the weapon naturally points toward the target through the relationship of the body and the weapon. Generally the shooter will sit or lie prone at about a 45-degree angle from his target. Even in a standing or kneeling position he will not face the target head on. Try it yourself. This 45-degree angle is not a hard and fast rule, but rather a guide. The shooter will learn through experience the angle at which he shoots best.

The usual military rifle sight is a peep sight, meaning that the rear sight leaf has a small aperture or hole through which the shooter looks to line up the front sight with the target. The shooter should be able to do this without muscular strain. Next, the shooter must estimate the effect the wind will have on his bullet and make adjustment for it. On most target ranges, the drift of the bullet resulting from "rifling" (the term for "lands" and grooves), from bore and barrel discrepancies, and from gravity is negligible.

Finally, the shooter must "squeeze off" the shot without deranging the sight picture.

In his first operation—lining up the target with the aid of his sights—the student might be helped by knowing exactly what to look for through his sights (the sight picture). The front sight blade should vertically divide the circle made by the aperture of the rear sight leaf. Next, the front sight blade should be lowered so that the top of the blade is visible about midway on the horizontal plane of the circle and with the black bull's-eye balanced on the tip of the sight blade. (See fig. 1.)

Now, depending on the allowance for

FIG. 1. Sight alignment.

wind drift on the bullet, the shooter is ready to fire. The allowance for wind drift may sometimes require what is called "Kentucky windage"—that is, learning by experience how much to move the sight off the target bull to counteract the wind drift. However, the "Kentucky windage" method is not always reliable, and later-model carbines and other military weapons make provision for allowing for the effect of wind drift by means of an adjustable sight leaf.

In firing, the center of the bull's-eye is of prime concern. We must have a thorough understanding of the sights and of how the movement of the rear sight affects the impact of the bullet on the target at 1,000 inches—the range at which the carbine is fired for record score.

Lateral movement of the rear sight is calibrated in mils—a unit of measurement of angles for military purposes. Each mil is $^1/_{17.8}$ of a degree. As you adjust the operating screws that change the angle of the rear sight, each click (or mil) means that you have changed the impact point of the bullet one-quarter inch on the target at a range of 1,000 inches. Imagine you are firing on the range with a strong, steady wind blowing from your left. After squeezing off your five familiarization shots and checking your target, you find that you have hit the bull's-eye but that your shots are grouped about one inch to the right of the center of the bull. You would assume that the wind was diverting your bullets one inch in the 1,000-inch path to the target. You would move your rear sight four mils to the right to compensate for the wind drift. (See fig. 2.)

3. Triangulation, Breathing, and Trigger Squeeze

We must crawl before we can walk. In the foregoing section we have discussed shooting in general, the sight picture, and how to adjust our weapons for windage. In this section we will take up the exercises necessary before we actually go on the firing range and fire for "record."

Triangulation. Generally, dry firing, as preparatory marksmanship training is sometimes called, is done by the coach-and-pupil method. The instructor prepares a weapon on a solid mount so that the weapon points toward the target without being held by the student. He shows the student the prone position and explains the correct

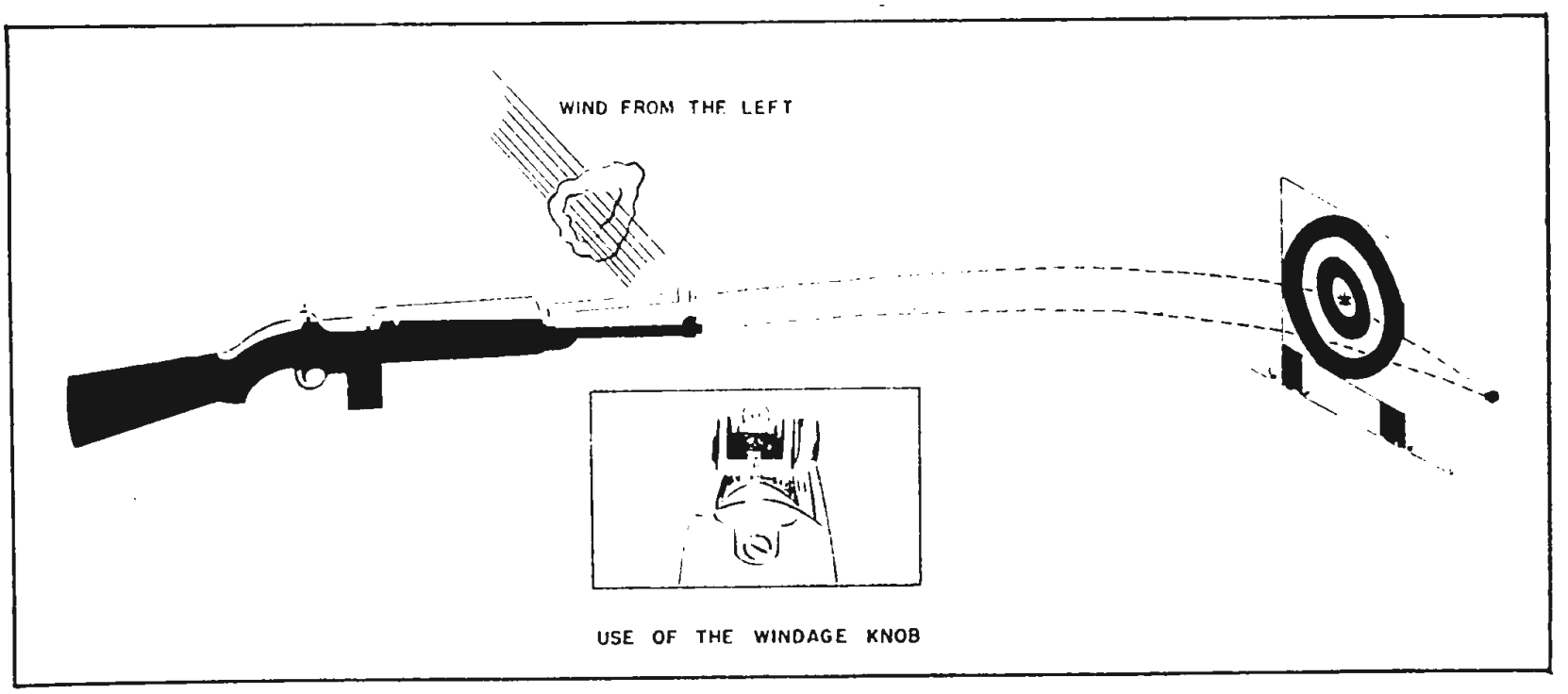

FIG. 2. Firing on the range with a strong wind blowing.

way to obtain a correct sight picture. Bracing himself on his elbows, the student learns to line up the target with the front sight blade and the rear sight aperture. Then an assistant instructor takes his position on an ammunition box about 25 to 30 yards out in front of the rifle, armed with a pencil and a round disk painted in concentric rings like a target. In the exact center of the bull's-eye a small hole is drilled. The assistant pins a sheet of plain white paper to the end of the ammunition box and holds the disk over the paper. The student describes the position of the disk to his coach, who signals the assistant which way he is to move the disk to bring it into the student's sights. When the student has the correct sight picture, the assistant marks the spot through the hole in the bull's-eye. This procedure is carried out at least three times. Each time a mark is left on the white paper. At the end of the lesson, the student is able to see how closely he grouped his theoretical "shots." The marks should form a small triangle when connected with pencil marks. This explains the derivation of the word "triangulation."

Breathing. Breathing is also of prime importance in shooting accurately. The student is taught to take a deep breath, slowly let out part of the air in his lungs, and hold the remainder until he has squeezed off the shot. The student should be aware of the importance of correct breathing. Holding the breath while shooting helps maintain a steady platform for the weapon when it is aimed and fired.

Trigger squeeze. Correct trigger squeeze is one of the most important functions for the student to learn to master if he wishes to shoot accurately. To the uninitiated, the blast as the gun fires is almost unnerving, but this factor rapidly decreases as the shooter continues firing. However, unless the shooter guards vigilantly against the fault, he will find himself flinching at the moment the shot is fired. Needless to say, this tendency to flinch throws away all the careful aiming and proper breathing the shooter has done. (The placement of the hands on the weapon is covered in later chapters.) The untrained shooter should be assured that he will not be injured by the mechanism of the weapon, and he should be taught to squeeze the trigger steadily with a slow, constant force until the weapon fires. If the student is able to do this, he knows exactly where his weapon is aimed at the time it is fired and can "call the shot"—i.e., forecast the location of his shots.

CARBINES, CALIBER .30, M1 AND M1A1

UNITED STATES carbines, caliber .30, M1 and M1A1, are gas-operated, self-loading, and air-cooled. They deliver semi-automatic fire controlled by the firer. Each weapon is fed by a box magazine with a capacity of 15 cartridges. (See figs. 3 and 4.)

The model M1 is the basic carbine. It has a one-piece wood stock and hand guard, with a sling attached to the swivel fastened to the front band which retains the stock and hand guard. An oiler is inserted into the rear end of the stock on the right side. (See fig. 5.)

The model M1A1 is identical with the M1 with the exception of the stock. A separate grip is attached to the stock, and a folding skeleton stock extension of metal is hinged to the grip and to the rear end of the wood stock. The metal stock is folded by swinging it around on the hinge pins until it rests alongside the left side of the carbine. The sling is attached at the front to the sling swivel. At the rear the sling is attached to an eye on the lower hinge assembly on the grip. With the extension folded, the over-all length of the M1A1 is approximately 25 inches.

4. Dimensions, Weights, and Other Data

Barrel dimensions: Diameter of bore, .30 inches; 4 grooves; length of barrel, 18 inches.

Carbine dimensions: Over-all length of carbine, 35.5 inches; sight radius, 21.4 inches.

Weights: Carbine with sling, 5.25 pounds; total weight with sling and loaded magazine, 5.75 pounds.

Miscellaneous data: Muzzle velocity, 2,000

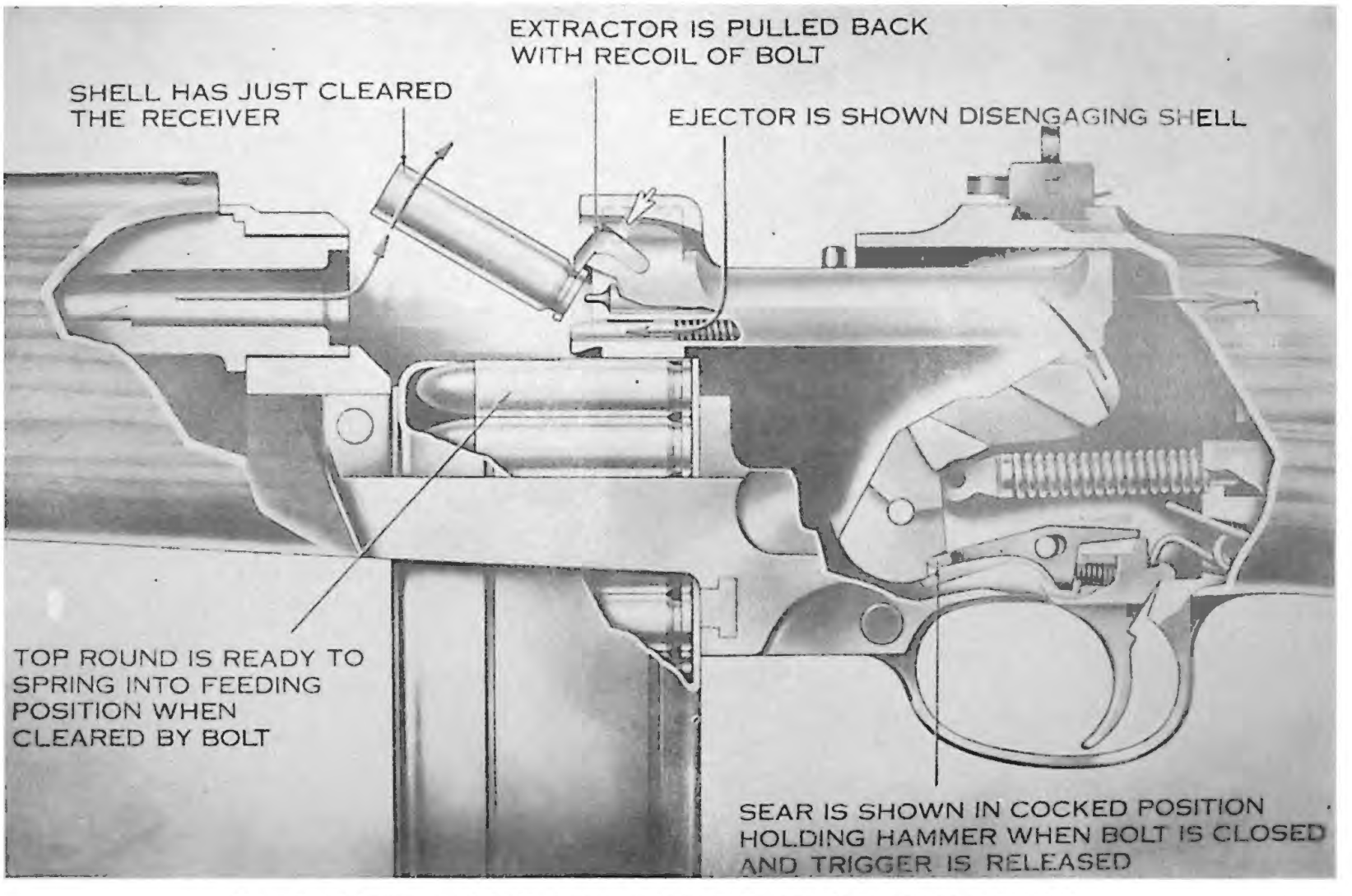

FIG. 3. Trigger and bolt functioning, U.S. carbine, caliber .30, M1.

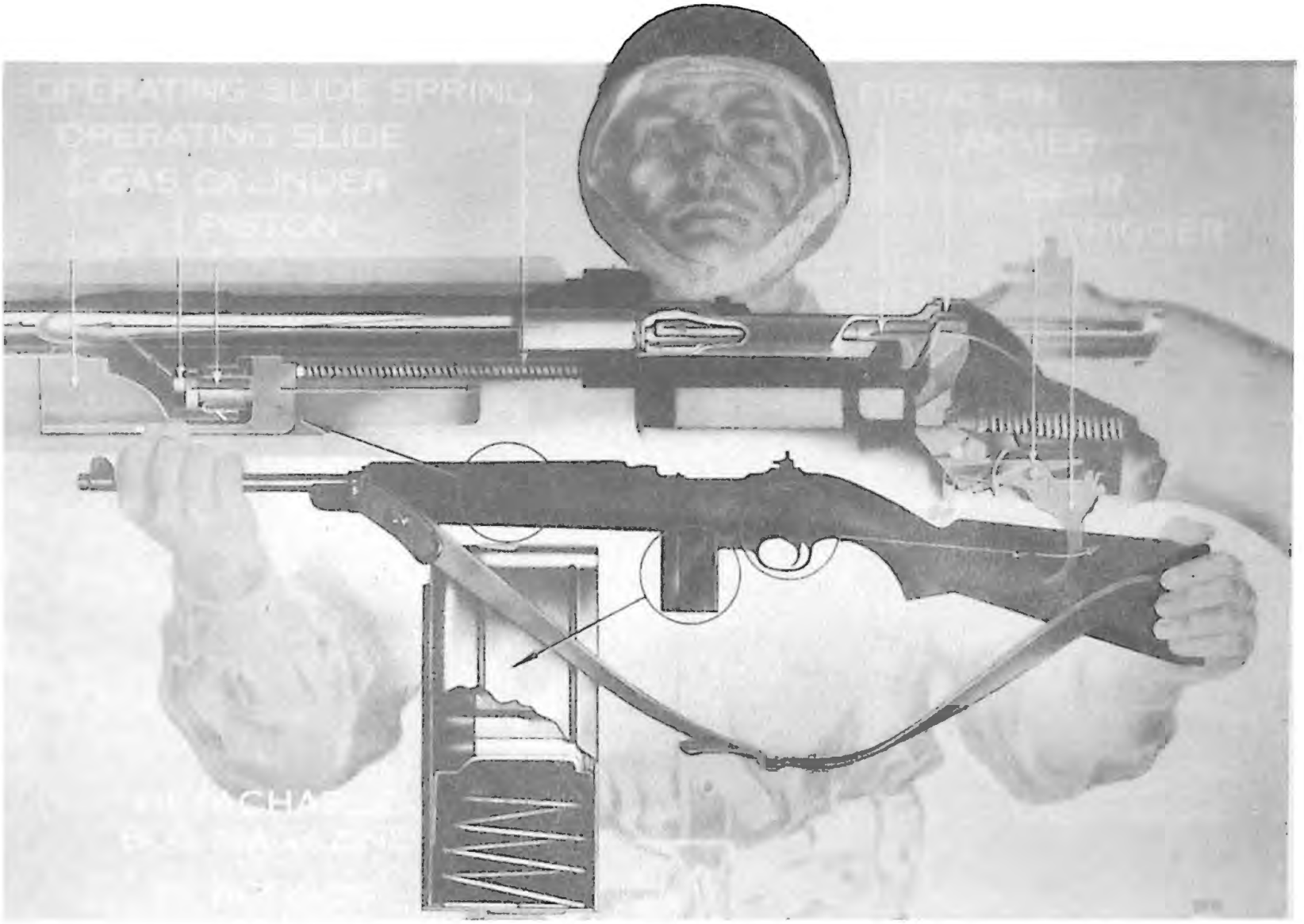

FIG. 4. Complete functioning, U.S. carbine, caliber .30, M1.

feet per second; pressure in chamber, about 40,000 pounds per square inch; weight of ball cartridge, about 193 grains; weight of bullet, about 110 grains; effective range, 300 yards; maximum range, 2,200 yards.

5. Sights

Rear sight. Late model carbines are equipped with a ramp sight that is adjustable. It consists of a base, windage yoke, slide aperture, and windage knob. (See fig. 2.) The range scale is marked for ranges of 100, 200, 250, and 300 yards. The setting for 150 yards is the same as that for 100 yards. With the thumb and forefinger, the slide aperture can be moved up and down this scale for various ranges. The windage knob, at the right of the windage yoke, enables the firer to adjust for right and left windage. Only ordnance personnel may disassemble the ramp sight.

L-*type sight.* Carbines of earlier manufacture are equipped with an **L**-type rear sight, consisting of two arms at right angles, each pierced with an aperture. A flat spring is placed between the sight leaf and sight base to retain the sight leaf in position. The two apertures are for ranges of 150 and 300 yards. With this type of sight it is necessary to aim off the target to secure windage corrections and intermediate changes in range.

Front sight. The front sight is the post type, protected by wings and adjusted laterally during assembly at the arsenal. It is locked in position, after adjustment, by riveting part of the metal base into the lock seat with a punch.

6. Disassembly and Assembly

Training in disassembly and assembly should be taken up as soon as practicable after the airman receives his carbine. This training should be completed before the individual does any firing with the weapon.

The carbine can be readily disassembled

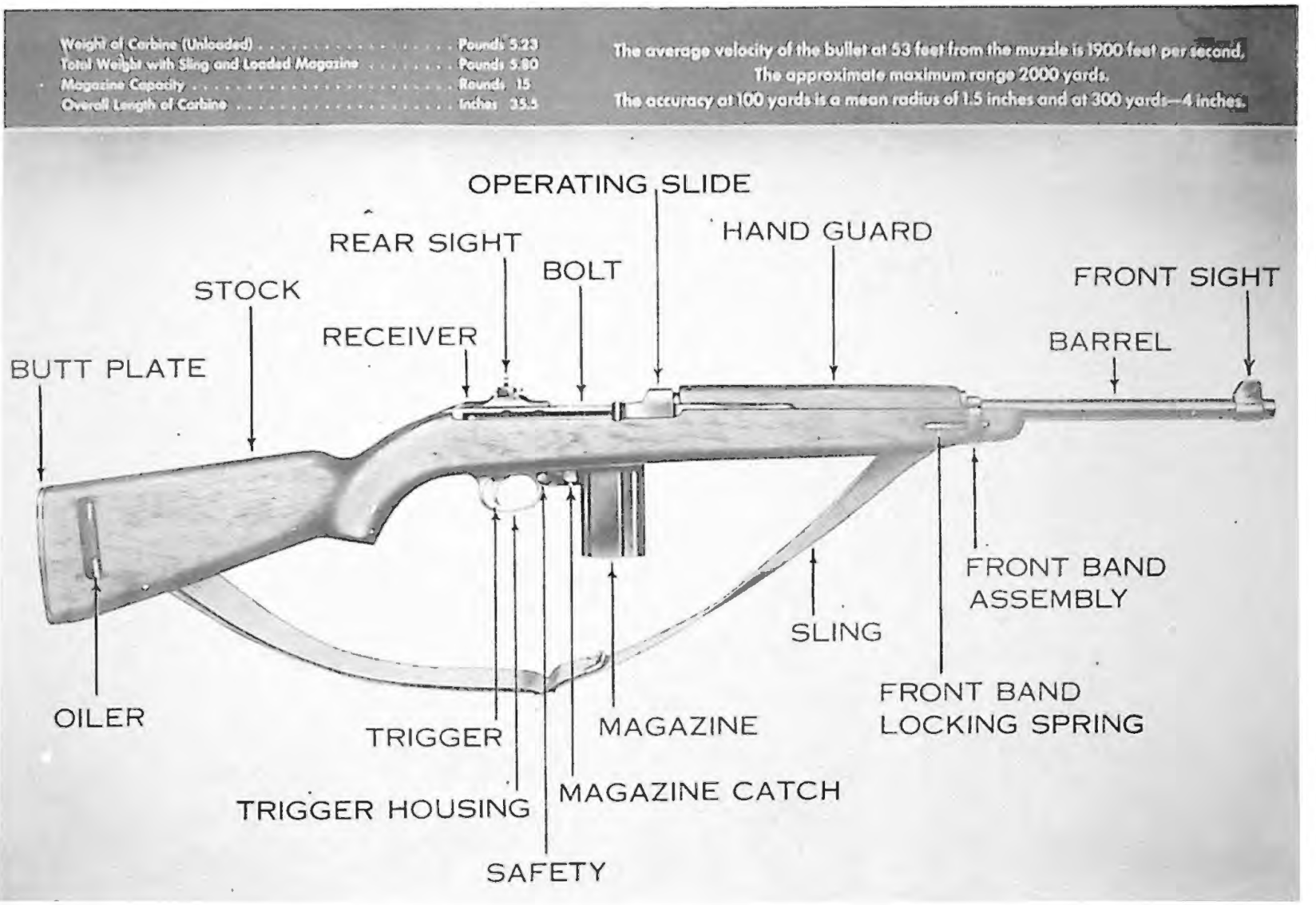

FIG. 5. Basic nomenclature, U.S. carbine, caliber .30, M1.

and assembled without applying force. The application of force is prohibited.

The weapon should not be disassembled or assembled against time. In all practice in disassembling the carbine, individuals should be taught to lay the parts out on a smooth, clean surface in the proper sequence for assembling. (See figs. 6 and 7.)

Disassembly. The disassembly of the carbine falls into two classifications: (1) such disassembly as the trained airman may perform without supervision and (2) such disassembly as the airman may perform only under the supervision of an officer, a competent noncommissioned officer, or ordnance personnel.

When disassembling without supervision, the airman first dismounts the *three main groups* of the carbine: the barrel and receiver group, the trigger housing group, and the stock group. He removes the magazine, removes the sling and oiler, loosens the front band and removes the hand guard, and finally dismounts the barrel and receiver group and the trigger housing group from the stock. The next step is to disassemble the barrel and receiver group. The airman accomplishes this by performing the following four operations: (1) he removes the operating slide spring and the operating slide spring guide; (2) he separates the trigger housing group from the barrel and receiver group; (3) he removes the operating slide; and (4) he removes the bolt assembly.

When disassembling under supervision, the airman removes parts in the following order: (1) the hammer spring and the hammer spring plunger; (2) the hammer; (3) the hammer pin; (4) the trigger pin; (5) the sear; (6) the sear spring; (7) the trigger and the trigger spring; (8) the magazine catch, the magazine catch plunger, and the magazine catch spring; and (9) the safety spring, the safety spring plunger, and the magazine catch retainer plunger.

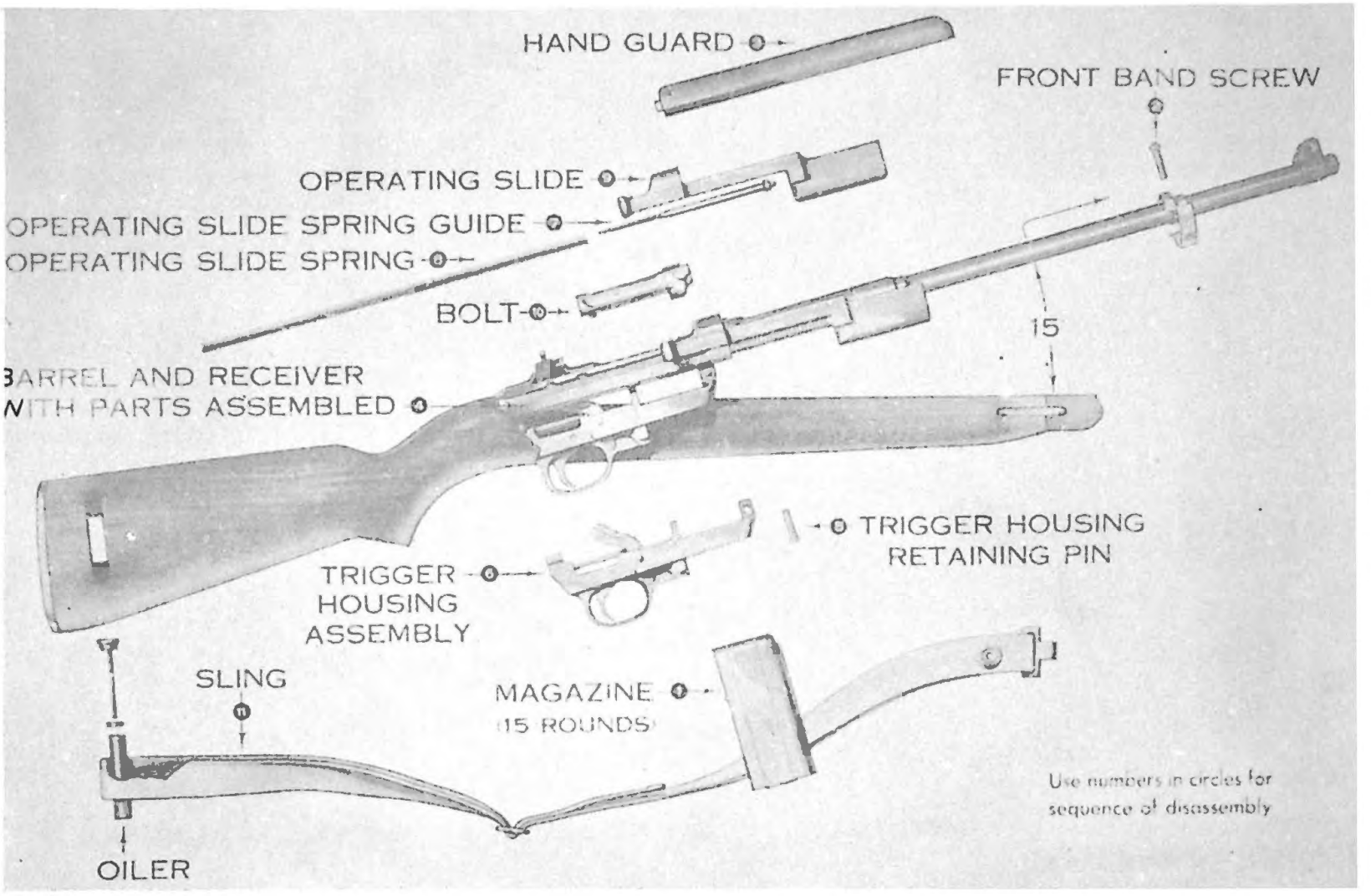

FIG. 6. Field stripping, U.S. carbine, caliber .30, M1.

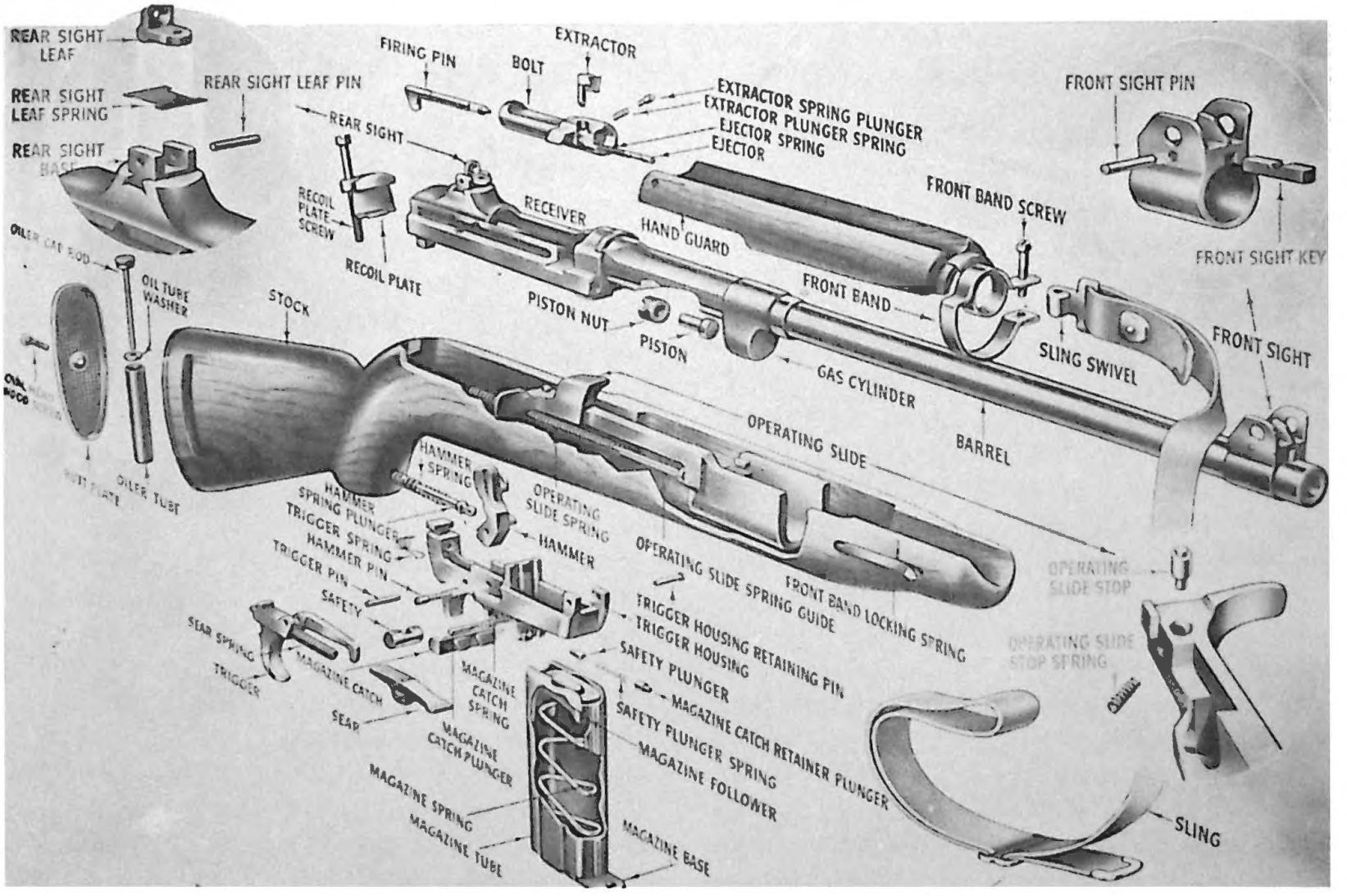

FIG. 7. Detail stripping, U.S. carbine, caliber .30, M1.

The disassembly of the stock group is performed only when replacement is necessary. It is done only under supervision.

Under supervision the airman also disassembles the operating slide group. The parts are removed in the following sequence: (1) the operating slide stop retaining pin, (2) the operating slide stop spring, and (3) the operating slide stop.

The airman is forbidden to disassemble the bolt assembly, the front sight, the gas cylinder piston and piston nut, and the rear sight. The disassembling of these parts should be done only by ordnance personnel.

Assembly. The carbine and its component groups are assembled in the reverse order of their disassembly.

7. Method of Disassembling and Assembling

Disassembly. The method of disassembling the carbine into the three main groups is explained in the following eight steps:

(1) Magazine. Hold the carbine, muzzle to the front, between the right side of the body and right forearm. Hold the magazine with the left hand. With the forefinger of the right hand, press the magazine catch from the right to the left and withdraw the magazine downward out of the receiver. CAUTION: Do not let the magazine drop to the ground.

(2) Sling and oiler (lower sling swivel). Unsnap and remove sling from the upper sling swivel. Remove the lower loop of the sling from the adjusting buckle and withdraw the free end of the sling from around the oiler. Remove the oiler from the recess in the right side of the stock.

(3) Front band and hand guard. Place the carbine on a level surface, resting the muzzle so that the head of the front band screw is up and to the left. Using the rim of a carbine cartridge, loosen the front band screw about one-eighth inch. Depress the front band locking spring with the base of the cartridge and slide the front band over the locking spring and off the stock. With the left hand, slide the hand guard forward until its rear end is disengaged from the groove in the front end of the receiver, and remove the hand guard from the barrel.

(4) Stock. Push the safety to the left. grasp the small of the stock with the right hand and the barrel with the left hand, palm up. Raise the muzzle end of the barrel from the stock about 15 degrees until the receiver is released from the recoil plate. Remove the stock from the barrel and receiver group and from the trigger housing group.

(5) Operating slide spring and guide. Place the barrel and attached groups on a level surface, muzzle to the left, operating slide handle up. Grasp the operating slide spring and guide between the thumb and forefinger of the right hand and pull to the rear, disengaging the guide from its seat in the operating slide. Raise the guide slightly and withdraw the operating slide spring to the left from its well in the receiver. Separate the spring from its guide.

In receivers where the operating slide spring functions in an operating slide spring housing, which is a tube bedded in the right side of the receiver, remove the parts as follows: Retract the guide and spring and swing the tube out and down, away from the receiver, and withdraw by pulling forward. The spring and guide may then be withdrawn from the housing tube.

(6) Trigger housing group. Cock the hammer by pulling the operating slide to the rear and pushing it forward. Turn the barrel so that the operating slide handle is down. Push the trigger housing retaining pin from its seat by starting it with the small end of the operating slide spring guide held in the right hand. Remove the pin. Grasp the barrel with the left hand, and the trigger housing group with the right hand. Remove the trigger housing group by sliding it to the left and disengaging its undercut grooves from the corresponding grooves in the receiver. (See fig. 8.)

(7) Operating slide. Rest the barrel on a level surface, muzzle to the front, sights up. Hold the rear end of the receiver against the body. Grasp the operating slide handle with the thumb and forefinger of the right hand and draw the slide all the way to the rear. With a slight upward pressure, move the slide forward until the guide lug on the handle engages in the dismount notch,

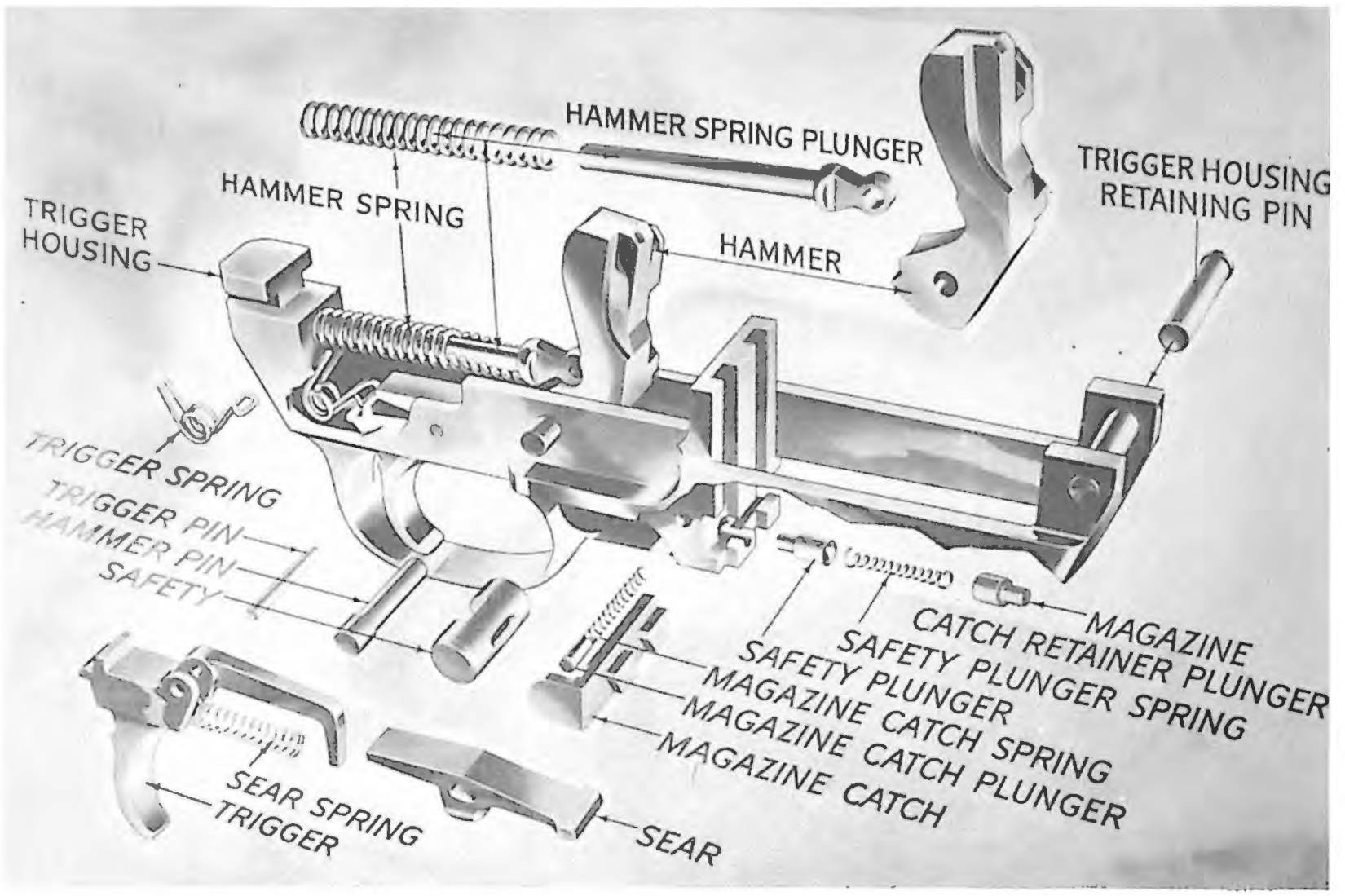

FIG. 8. Trigger housing assembly, U.S. carbine, caliber .30, M1.

and pull to the right and up on the operating slide handle, partially disengaging the slide from the operating slide in the palm of the left hand, thumb resting on the top of the left side of the operating slide. Move the slide forward about one-quarter inch, so that the left front lug on the slide is opposite the relief cut in the groove on the left underside of the barrel. Remove the slide by applying downward pressure with the left thumb on the left side of the slide.

(8) Bolt. Hold the rearmost portion of the barrel in the palm of the left hand, muzzle to the front, sights up. Grasp the operating lug of the bolt with the right thumb and forefinger. Slide the bolt forward until its face is just in the rear of the locking recesses. Rotate the bolt until the operating lug is straight up, disengaging the left locking lug. Rotate the bolt to the right until it is level, and raise it to an angle of about 45 degrees. Draw the bolt forward and remove it. (See fig. 9.)

Assembly. In assembling the parts of the carbine, the order is the reverse of the order for disassembly. The method is explained in the following eight steps:

(1) Bolt. With the right hand, grasp the operating lug of the bolt with the operating lug to the right, hold the bolt at an angle of 45 degrees, and place its base over the bridge of the receiver. Engage the left locking lug in its groove and slide the bolt to the rear.

(2) Operating slide. Slide the bolt forward until its forward end is one and a half inches from the chamber. Grasp the rear of the receiver in the left hand, holding the bolt in place with the left thumb. Grasp the forward end of the slide in the palm of the right hand, and engage the operating lug of the bolt in the camming recess in the hump of the operating slide. Raise the forward end of the slide so that the front lug on the left side is opposite the relief cut; then, by slightly twisting the slide to the left (clockwise), engage the front lugs in

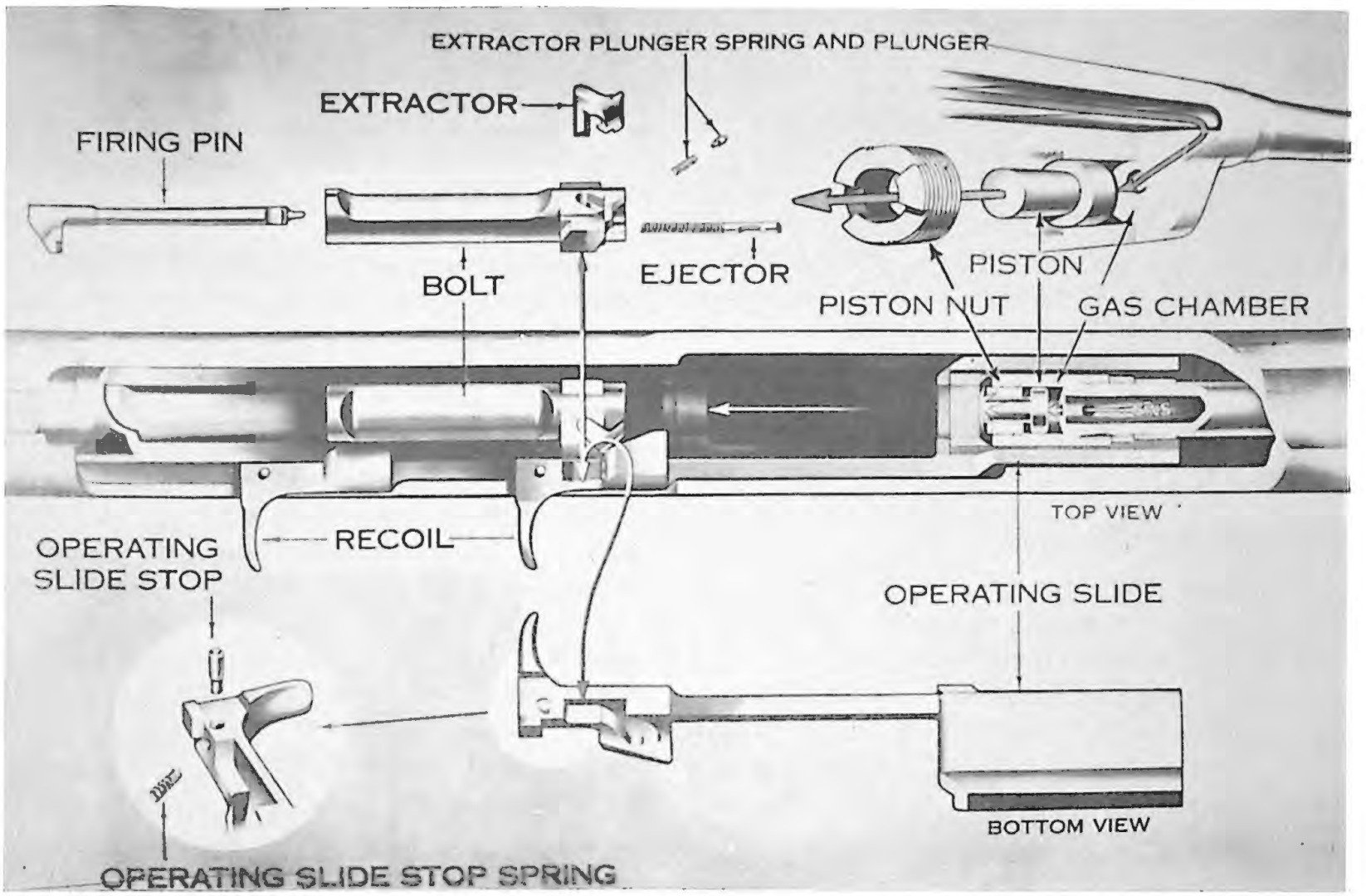

FIG. 9. Bolt and operating slide assemblies, U.S. carbine, caliber .30, M1.

the operating groove of the barrel. Move the slide and bolt to the rear until the operating slide handle guide lug engages in the dismount notch and is seated in its guide groove in the receiver. Push the slide and bolt forward, closing the bolt.

(3) Trigger housing group. Place the barrel and receiver group on the table, sights down, muzzle to the left, operating the slide handle toward the body. Cock the hammer. Insert the undercut groove into the corresponding grooves on the rear of the receiver. Seat the trigger housing retaining pin (from the operating slide handle side).

(4) Operating slide spring and guide. Insert the guide into the operating slide spring and place the loose end of the spring in its well in the receiver. With the operating slide fully forward, steady the barrel with the left hand; and with the thumb and forefinger of the right hand on the shoulder of the guide, compress the spring so that the end of the guide may be inserted in its seat in the slide.

If the receiver is assembled with an operating slide spring housing, assemble the guide and spring and insert the spring into the housing tube. With the operating slide full forward, seat the rear end of the spring housing retainer in its seat in the rear of the housing bed in the right side of the receiver, so that the lug on the tube mates with the slot in the receiver, and the slot in the rear of the tube mates with the projection in the housing bed. Retract the guide against the spring and swing the housing into its bed in the receiver. Then allow the guide to move forward and insert the nose of the guide head into its seat.

(5) and (6) Stock and hand guard. Replace the barrel and assembled groups in the stock with the barrel at an angle of 15 degrees. Push the back end down until the retaining lug on the rear of the receiver is behind the lip of the retaining undercut in the forward face of the recoil plate. Depress the barrel, at the same time pressing to the rear. If the barrel does not position easily, do not force it, but raise the muzzle again and repeat the operation. Replace the hand-

guard, engaging the liner into its groove on the receiver. Slide the front band over the ends of the hand guard and stock. Make sure it engages over the front band locking spring. Tighten the front band screw.

(7) Sling and oiler (lower sling swivel). Replace the oiler in its recess in the stock. Thread the end of the sling through the aperture in stock from the left, around the oiler, and back through the aperture and into the adjusting buckle. Attach the upper end of the sling at the upper sling.

(8) Insert the magazine back in the receiver.

8. Care and Cleaning

The care and cleaning of the carbine is an important duty to be performed by all personnel armed with this weapon and merits serious consideration. Experience has shown that the majority of the carbines that become unserviceable do so through the lack of intelligent and proper care and not from firing.

Lubricants, cleaning materials, and rust preventives. The following are the only materials authorized and issued for cleaning the carbine: soap, water, rifle bore cleaner, light preservative lubricating oil, medium preservative lubricating oil, special preservative lubricating oil, light rust-preventive compound, rifle grease, dry-cleaning solvent, raw linseed oil, and standard decontaminating agents. The use of unauthorized materials such as abrasives is forbidden.

Soap and water may be used for swabbing the barrel after firing. The bore should then be dried with clean cloth patches.

Rifle bore cleaner is issued for cleaning the bore of the carbine after firing. It possesses rust-preventive properties and will provide temporary protection against rust.

Rifle bore cleaner will freeze at temperatures below 32° F. If frozen, it must be thawed and shaken well before using.

Light preservative lubricating oil has rust-preventive as well as lubricating properties but cannot be depended upon to provide protection from rust for long periods. It is used for the lubrication of all moving parts and for short-term protection against rust of all metal parts of the carbine. When it is used on moving parts, it is necessary to maintain a thin film of oil to provide the necessary lubrication.

Medium preservative lubricating oil is superior to light preservative lubricating oil for small arms exposed to salt-water atmospheres.

Special preservative lubricating oil is a thin oil chosen for lubricating at low temperatures and for providing temporary protection against corrosion.

Light rust-preventive compound is issued for protecting metal parts for long periods while the carbines are boxed and in storage.

Rifle grease is a lubricant that has excellent resistance to the action of water. It should be used sparingly to avoid the collection of dust or sand.

Dry-cleaning solvent is a noncorrosive petroleum solvent used for degreasing the carbine. It will remove grease, oil, or rust-preventive compound. Dry-cleaning solvent is highly inflammable and should not be used near an open flame. Smoking is prohibited where the solvent is used. The surfaces must be thoroughly dried with clean rags immediately after the removal of the solvent. Gloves should be worn by persons handling such parts after cleaning, to avoid leaving finger marks, which are ordinarily acid and induce corrosion.

Raw linseed oil is used on wooden parts of the carbine to prevent drying. This preserves the stocks and hand guards.

Care and cleaning when no firing is done. Care of the carbine is necessary to preserve its condition and appearance even during periods when no firing is being done.

Always clean the bore of the carbine by inserting a cleaning rod with patch attached into the muzzle end. Remove the magazine before cleaning the bore. Move the patch forward and backward, several times, the entire length of the bore and chamber, and replace with a new patch. Repeat until the patch comes out clean.

CAUTION: In cleaning the bore, care must be taken not to catch the cleaning patch in the gas port.

To clean the metal surfaces, rub with a dry cloth to remove moisture, perspiration, and dirt, then wipe with a cloth dampened

with a small quantity of light preservative lubricating oil. To clean the outer wood surfaces of the carbine, wipe off the dirt with a slightly oiled cloth and clean with a soft dry one.

After cleaning and protecting the carbine as described in the foregoing paragraphs, place it in the rack without covering and *without* a plug in the muzzle or bore. Muzzle covers, gun covers, and plugs must not be used, because they cause sweating and promote rust.

Before firing. To assure efficient functioning of the carbine, the airman should, before firing, do the following: (1) dismount the main groups, (2) remove all dirt and oil from the bore and chamber with clean patches, and (3) thoroughly clean and lightly oil all metal parts that do not come in contact with ammunition.

The oil used should be a light preservative lubricating oil. The bore or chamber must not be oiled, since hazardous chamber pressure may develop. The following parts should be lightly lubricated with a drop of oil from the oiler rod: bolt lugs (locking and cam); bolt guide grooves in receiver; cocking cam on rear of bolt and the firing pin tang recess; contact surfaces of barrel and operating slide; operating slide spring guide; operating slide grooves in barrel; operating slide (handle) grooves on receiver; contacting surface of receiver and operating slide; and the piston.

CAUTION: Do not oil the face or underside of the bolt, since oil may thus get into the chamber of the barrel.

A drop of oil should occasionally be placed on the operating slide stop, magazine catch, magazine catch retainer plunger, trigger pin, and hammer plunger.

Oil should be applied lightly, since too much oil collects grit and foreign matter, which will cause excessive wear and possible malfunction.

When the bore and mechanism have been cleaned and oiled as described, assemble the carbine and rub all outer surfaces with a lightly oiled rag.

After firing. All bores of all carbines must be cleaned thoroughly by the evening of the day on which they are fired. They should be cleaned in the same way for the next three days.

CAUTION: Under no circumstances will a metal fouling solution be used in the carbine.

The following is the cleaning procedure after firing: Hold the carbine bottom side up so that no cleaning fluid (or water) will enter the gas port in the bore. Run several patches saturated with rifle bore cleaner through the bore. If rifle bore cleaner is not available, warm soapy water (issue soap) or warm water alone should be used. Care should be taken to insure that the brush goes all the way through the bore before the direction is reversed, and that the chamber is thoroughly cleaned its entire length. After using the brush, run several wet patches through the bore and chamber, removing them from the breach end. Continue this procedure until patches come out clean and dry. *Saturate a patch in light preservative lubricating oil and push it through the bore and chamber,* holding the carbine top side up so that some of the oil will flow into the gas port in the bore.

CAUTION: In cleaning the bore, care must be taken not to catch the cleaning patch in the gas port.

Complete cleaning should be done with the groups dismounted, and as soon as possible after the procedure described in the foregoing paragraphs. In addition, wipe off the exterior of the carbine with a dry cloth to remove dampness, dirt, and perspiration. Wipe all metal surfaces with light preservative lubricating oil; and the stock and hand guard with raw linseed oil.

On range or in field. The carbine must be kept clean and free from dirt and properly lubricated with light preservative lubricating oil. To obtain its maximum efficiency, observe the following precautions:

Keep the bore clean. Never fire a carbine with any dust, dirt, mud, or snow in the bore.

Keep the chamber clean and free from oil and dirt.

Never leave a patch, a plug, or other obstruction in the chamber or bore. **Failure to observe this precaution may result in serious injury if the carbine is fired.**

Look out for excessive friction. If the carbine gives indications of excessive friction and lack of lubrication, apply additional lubricating oil to the parts that require it. Excessive friction may exist if the empty cases are being ejected to the right rear, and oil should be applied at the first opportunity, because failures to feed and eject will occur if the condition is not corrected.

Use rifle grease when necessary. Exposure to rain or sea water may cause the bolt to fail to open. It is then necessary to use rifle grease, which possesses excellent resistance to the action of water. When there is exposure to rain or sea water, the following lubrication procedure is prescribed:

Apply oil to the parts that require it.
Dismount the carbine in the three main groups. With a clean dry cloth, wipe the parts clean. Rifle grease should not be applied to any other points.
Assemble the carbine, and work the bolt several times to spread the grease.

Keep a light coating of light preservative lubricating oil on all other metal parts for protection.

Remove carbon. When necessary have the carbon removed from the head of the piston nut only. (Sluggish action of the carbine may indicate a clogged piston.)

Preparation for storage. Medium preservative lubricating oil is the most suitable oil for preserving the mechanism of the carbine for a short period. Carbines so protected may be stored for periods up to 30 days without inspection. For periods of more than 30 days, carbines should be protected with light rust-preventive compound.

Light rust-preventive compound is efficient for preserving the carbine for a period of one year or less, depending on the climatic and storage conditions.

The carbine should be cleaned and prepared for storage with particular care. The bore, all parts of the mechanism, and the exterior of the carbine should be thoroughly cleaned and then completely dried with rags. Under no circumstances should a carbine be placed in storage while it is contained in a cloth or other cover or with a plug in the bore.

Cleaning as received from storage. Carbines that have been stored in accordance with the foregoing directions for storage will be coated with either medium or light preservative lubricating oil or light rust-preventive compound. When you receive them from storage, use dry-cleaning solvent to remove all traces of the compound or oil, taking particular care that all recesses in which springs or plungers operate are cleaned thoroughly. After using the cleaning solvent, make sure it is completely removed from all parts.

Failure to clean the firing pin and the recess in the bolt in which it operates may result in failure to fire at normal temperatures, and will most certainly result in serious malfunctions if the carbines are operated in low-temperature areas. Rust-preventive compound and other foreign matter will cause the lubricating oil to congeal or frost on the mechanism.

Care and cleaning under unusual conditions. In cold climates the following procedures must be observed:

In temperatures *below freezing,* it is necessary that the moving parts of the carbine be kept absolutely free from moisture.

In temperatures *below 0° F.,* the metal parts of the carbine should be taken apart and completely cleaned with dry-cleaning solvent before use.

When brought *indoors,* the carbine should be allowed first to come to room temperature. (Frozen oily surfaces render the weapon inoperative.) It should then be disassembled, wiped completely dry of the moisture that will have condensed on the cold metal surfaces, and thoroughly oiled with light preservative lubricating oil.

In hot climates the following procedures must be observed:

In *tropical climates* where temperature and humidity are high or where rainy seasons occur, the carbine should be thoroughly inspected daily and kept lightly oiled when not in use. Light preservative lubricating oil should be used. However, when the carbine is exposed to salt-water atmospheres, medium preservative lubricating oil should be used.

In *hot, dry climates,* where sand and dust

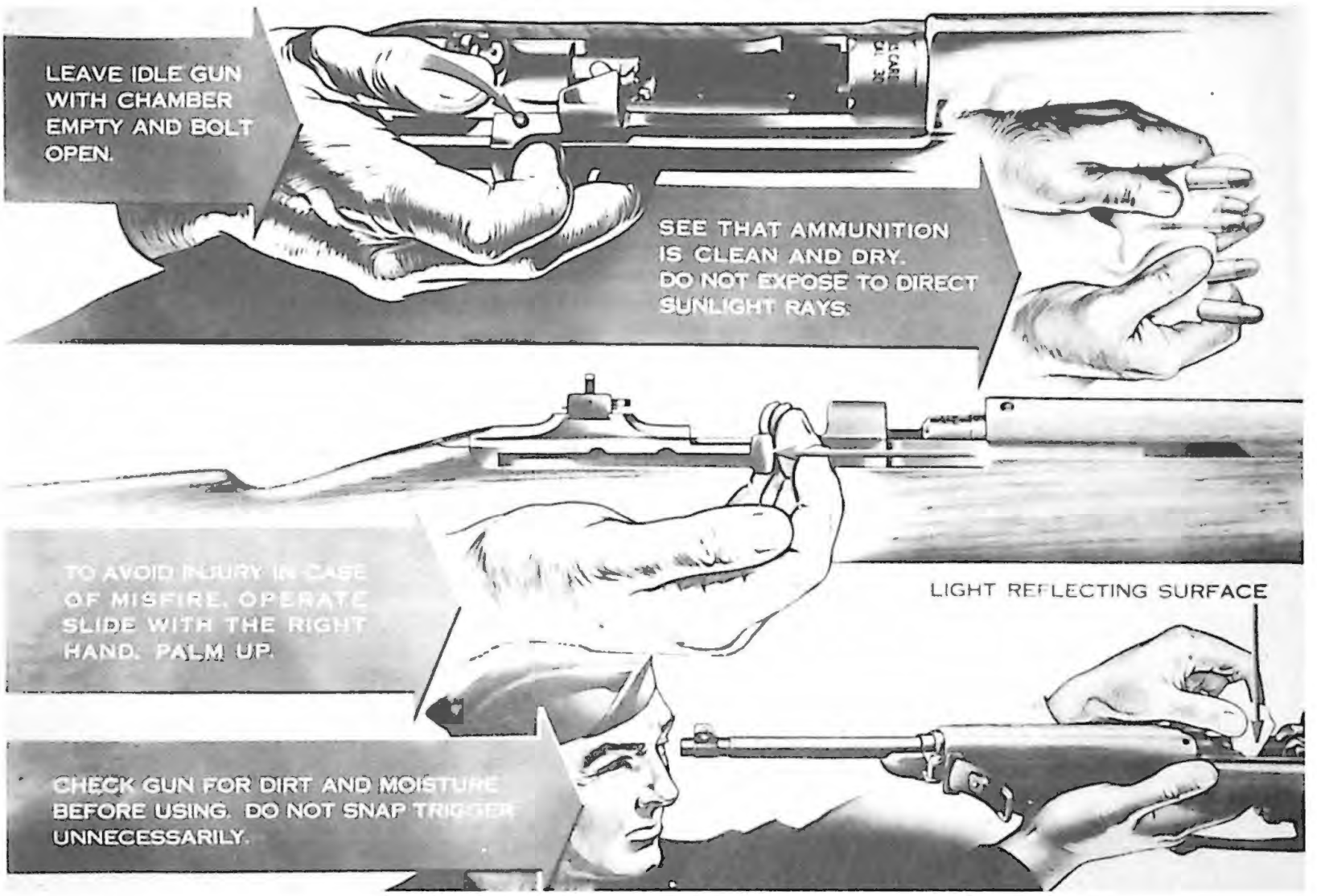

FIG. 10. Precautions, U.S. carbine, caliber .30, M1.

are apt to get into the mechanism and bore, the carbine should be wiped clean daily, or oftener if necessary. Groups should be dismounted and disassembled as far as necessary to facilitate thorough cleaning.

9. Immediate Action and Stoppages

Immediate action is the quick application of a probable remedy for a stoppage.

If the carbine fails to fire, follow this procedure: With the right hand, palm up, use the lttle finger to pull the operating slide to the rear. Release the slide, aim, and fire. If the bolt locks and the carbine still does not fire, pull the operating slide all the way to the rear, and look for cartridges in the chamber and clip. (See fig. 10.)

Stoppages can usually be avoided through proper care and handling of the carbine before, during, and after firing. Sometimes stoppages cannot be remedied by the application of immediate action. If the airman has an understanding of the weapon and the causes of stoppages, he will have a better chance to correct any defects.

There are three reasons for stoppages: (1) failure to fire, (2) failure to feed, and (3) failure to extract.

Failure to fire is generally caused by the bolt not being fully closed when the hammer strikes the firing pin, by a defective firing pin, or by defective ammunition.

Failure to feed is caused by the failure of the bolt to go far enough to the rear to pick up a new round from the magazine. Other causes are a battered round, dirt in locking recesses, obstruction of the face of the bolt, a dirty chamber, a ruptured cartridge case, or a faulty or damaged magazine.

Failure to extract is generally caused by an extremely dirty chamber, extremely dirty ammunition, a cartridge case chambered in a hot barrel, or a broken extractor or spring.

REVIEW QUESTIONS

The following questions are study aids. Your answers are not to be submitted to the USAF Extension Course Institute for grading. Correct answers will be found at the end of this text.

1. Explain the operation of the M1 and M1A1 carbines.
2. Can the weapon be adjusted to automatic fire?
3. What are the three main groups of the carbine?
4. Name one outstanding difference between the early model of the M1 carbine and the later model.
5. How soon after firing should the carbine be cleaned?

MARKSMANSHIP WITH THE CARBINE

WITHOUT proper training a man instinctively does the wrong thing in firing the carbine. However, if he is thoroughly instructed and drilled in the mechanics of correct shooting and is carefully and properly coached when he begins firing, he rapidly acquires correct shooting habits. The purpose of this chapter is to provide a thorough and uniform method of training individuals to be good carbine shots and of testing their proficiency in firing at known-distance targets.

Carbine firing is a mechanical operation that anyone who is physically and mentally fit to be an airman can learn to do well if he is properly instructed. The methods of instruction are similar to those used in teaching any mechanical operation. The training is divided into steps, which must be taught in proper sequence. The airman should be carefully coached and corrected whenever he makes a mistake.

To become a good carbine shot, the airman must be thoroughly trained in the following essentials of good shooting: correct sighting and aiming, correct positions, correct trigger squeeze, correct application of sustained-fire principles, and proper sight adjustments.

10. Preparatory Marksmanship Training

The purpose of preparatory marksmanship training is to teach the airman the essentials of good shooting and to develop fixed and correct shooting habits before he undertakes range practice.

In all preparatory exercises involving aiming and in all range firing, both sights of the carbine, if not already sufficiently black, should be blackened. Before blackening, the sights should be cleaned and ali traces of oil removed. By cutting down reflected light, the airman gets a clearer sight picture.

11. First Step—Sighting and Aiming

The instructor shows the group the correct sight alignment (the relationship of the front sight blade and the peep sight) and the correct aim on the bull's-eye (the sight picture). He does this by using a model sight picture device or by using the blackboard. He explains that although the wings of the front sight are visible when looking through the peep sight, they play no part in the sight alignment. He also explains that the shooter, as he progresses in his training, quickly learns to ignore the wings. (See fig. 1.)

12. Second Step—Positions

Instruction in positions with the carbine includes holding the breath while aiming.

Holding the breath. If a man breathes while aiming, the body motions caused by the breathing are transmitted to the carbine, and an exact aim cannot be held. In firing sustained fire, the firer should breathe after each shot—never while he is squeezing the trigger.

Aiming. The carbine is carefully aimed at a target each time a firing position is assumed.

General rules for position. The exact details of a position for an individual depend on his physical conformation. (See figs. 11, 12, and 13.) The following ten rules are common to the prone, sitting, squatting, kneeling, and standing positions:

(1) Each position must be steady and must require a minimum of muscular effort for its maintenance during prolonged firing.

(2) In assuming any position, there is one point at which the carbine points naturally and without effort. If this point is not the center of the target, the whole body and carbine must be shifted so as to bring the carbine into proper alignment.

(3) The right hand grasps the small of

FIG. 11. Prone position.

FIG. 12. Kneeling position.

FIG. 13. Standing position.

the stock. The right thumb may be either over the small of the stock or on top of the stock; it should not be placed alongside the stock.

(4) The left hand is in the rear of the front band swivel. The hand and wrist joint are straight. The carbine rests in the crotch formed by the thumb and index finger and on the base of the thumb and heel of the palm of the hand.

(5) The left elbow is placed as nearly under the carbine as possible without appreciable effort.

(6) The trigger finger is in contact with the trigger at the most comfortable point between the tip and the second joint, the remainder of the forefinger being out of contact with the stock. The exact part used depends on the size of the shooter's hand and the length of his arm. It is desirable that there be no contact between the trigger finger and the stock, in order to make sure that trigger pressure is straight to the rear and that all pressure is applied on the trigger and not partly on the stock.

(7) The cheek rests firmly against the stock, and if possible on top of the thumb. This is best accomplished by relaxing the neck muscles and allowing the head to drop forward and downward.

(8) The butt of the carbine is held firmly against the shoulder.

(9) A slight cant of the carbine may be disregarded.

(10) Left-handed men who have difficulty with the right-hand position should be allowed to use the left-hand position.

REVIEW QUESTIONS

The following questions are study aids. Your answers are not to be submitted to the USAF Extension Course Institute for grading. Correct answers will be found at the end of this text.

1. What is meant by the term "sight picture"?
2. What is the purpose of preparatory marksmanship training?
3. When should sights be blackened?
4. Why should you hold your breath while aiming the carbine?
5. Should left-handed men be made to use the right-handed position?

AUTOMATIC PISTOLS, CALIBER .45, M1911 AND M1911A1

THE AUTOMATIC pistols, caliber .45, M1911 and M1911A1, are recoil-operated, magazine-fed, self-loading hand weapons. The gas generated in a cartridge fired in the pistol is utilized to perform the functions of extracting and ejecting the empty cartridge case, cocking the hammer, and forcing the slide to the rearmost position, thereby compressing the recoil spring. The action of the recoil spring forces the slide forward, feeds a live cartridge from the magazine into the chamber, and leaves the weapon ready to fire again.

The M1911A1 pistol is a modification of the M1911 pistol. The operation of both models is exactly the same. The following are the modifications to be found in the M1911A1:

(1) The tang of the grip safety is extended to protect the hand.

(2) A clearance cut is made on the receiver for the trigger finger.

(3) The face of the trigger is cut back and knurled.

(4) The mainspring housing is raised in the form of a curve to fit the palm of the hand and is knurled.

(5) The top of the front sight is widened.

The M1911 and the M1911A1 pistols are designed to fire ball ammunition, caliber .45, M1911. The magazine holds seven cartridges. The upper cartridge is stripped from the magazine and forced into the chamber by the forward motion of the slide. The pistol fires but once at each squeeze of the trigger. When the last cartridge in the magazine has been fired, the slide remains open. The magazine is then depressed, and the empty magazine falls out. A loaded magazine is then inserted, making seven more shots available.

13. Dimensions, Weights, and Other Data

Barrel dimensions: Caliber of bore, .45 inch; 6 grooves; left-hand twist in rifling, one turn in 16 inches; length of barrel, 5.03 inches.

Pistol dimensions: Over-all length of pistol, 8.593 inches; height of front sight above axis of bore, .5597 inch.

Weights: Pistol with magazine, 2.437 pounds; loaded magazine (7 rounds), .481 pound; empty magazine, .156 pound.

Trigger pull: Pistols, new or repaired, 5½ to 6½ pounds; pistols in hands of troops, 5 to 6½ pounds.

The drift or deviation due to the rifling in this pistol is to the left, but it is more than neutralized by the pull of the trigger when the pistol is fired from the right hand. The drift is slight at short ranges. For long ranges it is immaterial, since the pistol is a comparatively short-range weapon.

14. Method of Disassembling and Assembling

Disassembling. Remove the magazine by pressing the magazine catch. Press the recoil spring plug inward and turn the barrel bushing to the right until the recoil spring plug and the end of the recoil spring protrude from their seat, releasing the tension of the recoil spring. As the recoil spring plug is allowed to protrude from its seat, the finger or thumb should be kept over it so that it will not jump away or strike the operator. Draw the slide rearward until the smaller rear recess in its lower left edge stands above the trigger guard, and remove the slide stop. (See fig. 14.)

This releases the barrel link, thus allowing the barrel with the barrel link and the slide to be drawn forward together from the receiver. The barrel link and the slide carry with them the barrel bushing, recoil spring, recoil spring plug, and recoil spring guide.

Remove these parts from the slide by withdrawing the recoil spring guide from

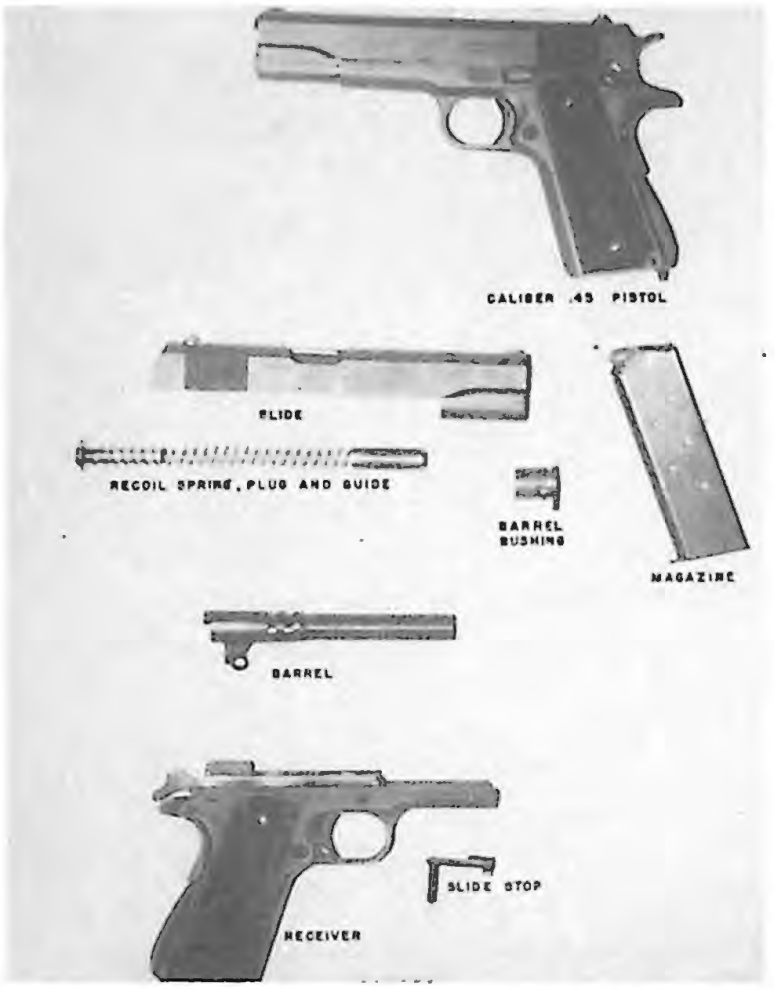

FIG. 14. Disassembly of the caliber .45 pistol.

the rear of the recoil spring and drawing the recoil spring plug and the recoil spring forward from the slide. Turn the recoil spring plug to the left to remove it from the recoil spring. Turn the barrel bushing to the left until it may be drawn forward from the slide. This releases the barrel, which, with the barrel link, may be drawn forward from the slide. By pushing out the barrel link pin, the barrel link is released from the barrel.

Press the rear end of the firing pin forward until it clears the firing pin stop, which is then drawn downward from its seat in the slide. The firing pin, the firing pin spring, and the extractor are then removed from the rear of the slide.

Assembling. The pistol is assembled in the reverse order of its disassembly.

When replacing the slide and barrel on the receiver, care must be taken that the barrel link is tilted forward as far as possible and that the barrel link pin is in place.

15. Care and Cleaning

Careful, conscientious work is required to keep automatic pistols in a condition that will insure perfect functioning of the mechanism and continued accuracy of the barrel. It is essential that the entire mechanism be kept cleaned and oiled to avoid jams.

The condition and appearance of the pistol should be preserved. Care is required to prevent rust or an accumulation of sand or dirt in the interior of the mechanism, Pistols are easily disassembled for cleaning and oiling.

Damp air and sweaty hands are great promoters of rust. The pistols should be cleaned and protected after every drill or handling. Special precautions are necessary when the pistols have been used on rainy days and after tours of guard duty.

To clean the pistol, rub it with a rag that has been lightly oiled, and then clean with a perfectly dry rag. Swab the bore with an oily flannel patch and then with a perfectly dry one. Dust out all crevices with a small, clean brush.

Immediately after cleaning, in order to protect the pistol, swab the bore thoroughly with a flannel patch saturated with oil, wiping over all metal parts and dropping a few drops of oil on all cams and working surfaces of the mechanism.

After cleaning and protecting the pistol, place it in the pistol rack without any covering. The use of canvas or similar covers is prohibited because they collect moisture and rust the metal parts.

After firing. When a pistol has been fired, the bore should be cleaned thoroughly not later than the evening of the day on which it is fired. Thereafter is should be cleaned and oiled each day for at least the next three succeeding days.

To clean the bore after firing, first remove the slide and the barrel. Use a cleaning rod with a patch saturated in rifle bore cleaner. If rifle bore cleaner is not available, use some form of dry-cleaning solvent or hot soapy water, and run it back and forth through the bore and breech several times. After completing this step, run a cleaning brush attached to a cleaning rod through the bore several times. Again run saturated patches through the bore, following them with dry patches until the bore is free of

all residue and dirt particles. When the bore is clean, saturate a patch in special preservative lubricating oil and run it back and forth through the bore several times.

CAUTION: After firing, do not oil the bore before cleaning.

Swab all surfaces of the slide and receiver with a saturated oily patch, followed by dry patches to remove all traces of dust and dirt. Particular attention must be paid to crevices, guides, and guide grooves. When all parts are thoroughly dry and clean, they should be covered with a light coat of oil.

Rules for care of the pistol on the range. Always clean at the end of each day's firing. A pistol that has been fired should not be left overnight without cleaning.

Keep the bore clean. Never fire a pistol with any dust, dirt, mud, or snow in the bore.

Before loading the pistol, make sure that no patch, rag, or other object has been left in the barrel. Such articles collect moisture and are a hazard if the pistol is fired. Keep the chamber free from oil and dirt.

Care and cleaning under unusual climatic conditions. In cold climates the following procedures must be observed:

In temperatures *below freezing* it is necessary that the moving parts of the weapon be kept free from moisture. Excess oil on working parts will solidify and cause sluggish operation or complete failure.

In temperatures below 0° F., the weapon should be taken apart and cleaned with dry-cleaning solvent before use. Working surfaces that show signs of wear may be lubricated by rubbing lightly with a cloth that has been wetted with a special lubricating and preservative oil.

In hot climates the following procedures must be observed:

In *tropical climates* where temperatures and humidity are high, or where salt air is present, and during the rainy seasons, the weapon should be inspected daily. It should be kept lightly oiled when not in use. It should be disassembled daily, and all parts should be dried and oiled.

In *hot, dry climates* where sand and dust may get in the mechanism and bore, all lubricants should be removed from the pistol, and it should be disassembled daily for thorough cleaning. It should be wiped clean as often as required.

Perspiration from the hands is a contributing factor to rust because it contains acid. Metal parts should be wiped frequently.

Care after gas attacks. Pistols should be cleaned as soon as possible after a gas attack.

Oil will prevent corrosion for about 12 hours.

Clean all parts in boiling water containing a little soda, if it is available.

All traces of gas must be removed from ammunition with a slightly oiled rag. Then the ammunition must be thoroughly dried.

If the weapon is actually contaminated with a liquid blister gas, soak up such liquid as soon as possible, using rags or paper.

Gasoline, oil, alcohol, or dry-cleaning solvent, if they are readily available, may be applied to other cloths and used to wipe off the traces of blister gas that remain in the blotted-up areas. Do not spread the solvent beyond the area of the spots, because a thin film of agent will remain.

Lewisite may be destroyed with water. Soapy water is especially effective. Thorough scrubbing is necessary to remove the blister-reaction product formed by the water.

To eliminate remaining traces of blister gas, apply DANC or protective ointment. After approximately 15 minutes, wipe off the decontaminant with a clean cloth.

Coat the decontaminated surface of the weapon (not ammunition) with oil.

Bury or burn cloths used in removing blister gas.

Important rules to be observed. After firing a pistol, never leave it uncleaned over night. The damage done would be irreparable.

Keep the pistol clean and lightly lubricated, but do not let it become gummy with oil.

Do not place the pistol on the ground where sand or dirt might enter the bore or mechanism.

Do not plug the muzzle of the pistol with a patch or plug. One might forget to remove

the plug before firing, in which case the discharge might bulge or burst the barrel at the muzzle.

A pistol kept in a leather holster might rust because of moisture absorbed by the leather from the atmosphere, even though the holster may appear to be perfectly dry. If the holster is wet and the pistol must be carried in it, cover the pistol with a thick coat of oil.

The hammer should not be snapped when the pistol is partially disassembled.

The trigger should be squeezed with the forefinger. If the trigger is squeezed with the second finger, the forefinger extending along the side of the receiver is apt to press against the projecting pin of the slide stop and cause a malfunction when the slide recoils.

Pressure on the trigger must be released sufficiently after each shot to permit the trigger to re-engage the sear.

To remove cartridges not fired, disengage the magazine slightly and then extract the cartridge in the barrel by drawing back the slide.

Care should be taken to see that the magazine is not dented or otherwise damaged.

Care must be exercised in inserting the magazine to insure its engaging with the magazine catch. Never insert the magazine and strike it with the hand to force it home, because this might spring the base of the inturning lips at the top. It should be inserted by a quick continuous movement.

16. Method of Operation

A loaded magazine is placed in the receiver and the slide is drawn fully back and released, thus bringing the first cartridge into the chamber. (If the slide is open, push down the slide stop to let the slide go forward.) The hammer is thus cocked, and the pistol is ready for firing.

If it is desired to make the pistol ready for instant use and for firing the maximum number of shots with the least possible delay, draw back the slide, insert a cartridge by hand into the chamber of the barrel, allow the slide to close, then lock the slide with the cocked hammer by pressing the safety lock upward, and insert the loaded magazine. The slide and hammer being thus positively locked, the pistol may be carried safely at full cock and it is only necessary to press down the safety lock (which is located within easy reach of the thumb) when raising the pistol to the firing position.

The grip safety is provided with an extending horn, which not only serves as a guard to prevent the hand of the shooter from slipping upward and being struck or injured by the hammer, but also aids in accurate shooting by keeping the hand in the same position for each shot. Furthermore, the extending horn permits the lowering of the cocked hammer with one hand by automatically pressing in the grip safety when the hammer is drawn slightly beyond the cocked position. In order to release the hammer, the grip safety must be pressed in before the trigger is squeeeezed.

Safety devices. It is impossible for the firing pin to discharge or even touch the primer except on receiving the full blow of the hammer.

The pistol is provided with two automatic safety devices: (1) the disconnector, which positively prevents the release of the hammer unless the slide and barrel are in the forward position and safely interlocked, and which controls the firing and prevents more than one shot from following each squeeze of the trigger; and (2) the grip safety, which at all times locks the trigger unless the handle is firmly grasped and the grip safety pressed in.

In addition, the pistol is provided with a safety lock by which the closed slide and the cocked hammer can be positively locked in position.

17. Individual Safety Precautions

Before ball ammunition is issued, the airman must know the essential rules for safety when handling the pistol. They should be enforced by constant repetition and coaching until their observance becomes the airman's fixed habit. When units carrying the pistol are first formed, the officer or noncommissioned officer in charge

orders the men to execute "INSPECTION . . . PISTOL!"

The following rules are taught as soon as the recruit is sufficiently familiar with the pistol to understand them:

Execute UNLOAD every time the pistol is picked up for any purpose. Never trust your memory. Consider every pistol as loaded until you have proved otherwise.

Always unload the pistol if it is to be left where someone else may handle it.

Always point the pistol up when snapping it after examination. Keep the hammer fully down when the pistol is not loaded.

Never place the finger within the trigger guard until you intend to fire or to snap for practice.

Never point the pistol at anyone you do not intend to shoot, nor in a direction where an accidental discharge may do harm. On the range, do not snap for practice while standing back of the firing line.

Before loading the pistol, draw back the slide and look through the bore to see that it is free from obstruction.

On the range, do not insert a loaded magazine until the time for firing.

Never turn around at the firing point while holding a loaded pistol in your hand, because by so doing you may point it at the man firing alongside you.

On the range, do not load the pistol with a cartridge in the chamber until immediate use is anticipated. If there is any delay, lock the pistol, and only unlock it immediately before extending the arm to fire. Do not lower the hammer on a loaded cartridge; the pistol is much safer cocked and loaded.

In reducing a jam, *first remove the magazine.*

To remove a cartridge not fired, *first remove the magazine* and then extract the cartridge from the chamber by drawing back the slide.

In a campaign when early use of the pistol is not foreseen, it should be carried with a fully loaded magazine in the socket, with the chamber empty and the hammer down. When early use of the pistol is probable, it should be carried loaded and locked in the holster or hand. In a campaign, extra magazines should be carried fully loaded.

When the pistol is carried in the holster loaded, cocked, and locked, the butt should be rotated away from the body while drawing the pistol, in order to avoid displacing the safety lock.

Safety devices should be frequently tested. A safety device is a dangerous thing if it does not work when expected.

REVIEW QUESTIONS

The following questions are study aids. Your answers are not to be submitted to the USAF Extension Course Institute for grading. Correct answers will be found at the end of this text.

1. How does the M1911A1 pistol differ from the M1911?
2. What are the steps in the assembling and disassembling of the pistol?
3. Describe the care and cleaning of the pistol necessary after firing.
4. What must the airman know before he is issued ball ammunition for the pistol?
5. What are the safety devices on a pistol?

MARKSMANSHIP WITH THE PISTOL

THE OBJECTIVE of training in marksmanship with the automatic pistol is to develop the ability to fire one or more accurate shots quickly. To attain accuracy, training must include, in its initial phases, carefully coached slow fire. Only after accuracy has been attained should practice be directed toward development of speed. Extreme care must be exercised to see that speed is not achieved at the expense of accuracy. (See fig. 15.)

Training in marksmanship with hand weapons includes preparatory instruction, range practice, firing for record, and combat firing.

18. Methods of Instruction

Firing the automatic pistol is a purely

FIG. 15. Firing the pistol.

mechanical operation. Training is divided into progressively arranged phases, each of which the airman must learn in proper sequence. Further, his work throughout the course of instruction must be supervised with a view to detecting and correcting his mistakes and preventing the fixation of undesirable shooting habits.

Coach-and-pupil method. The coach-and-pupil method of instruction is particularly applicable to training in marksmanship. By working in pairs when receiving instruction, the two members of the team are enabled to learn while acting alternately as coach and pupil. As coach, each man watches the action and corrects the mistakes of his partner; as pupil, he performs the exercises himself. In order to receive maximum benefit from the coach-and-pupil method of instruction, each man must thoroughly understand its purpose and his individual responsibility both as a coach and as a pupil.

Individual instruction. Instruction must be directed toward the individual airman.

Practice. Properly supervised practice is essential to good marksmanship, but practice undertaken haphazardly and supervised inadequately is likely to be harmful rather than beneficial.

Importance of correct trigger squeeze. The pupil can readily learn to aim and hold the aim either on the bull's-eye or very close to it for at least 10 seconds. When he has learned to squeeze the trigger in such a manner as not to spoil his aim, he becomes a good shot. All men flinch in firing the pistol if they know the exact instant at which the discharge is to take place. This is an involuntary action and cannot be controlled. A sudden pressure of the trigger may derange the aim slightly, but the extreme inaccuracy of the shot fired in this way is due mainly to the flinch (that is, the thrusting forward of the hand to meet the shock of recoil). Any man is a good shot who holds the sights of the pistol as nearly on the bull's-eye as possible and continues to squeeze the trigger with a uniformly increasing pressure until the pistol goes off. Any man is an excellent shot if he can increase the pressure on the trigger only when the sights are in alignment with the bull's-eye and hold it when the muzzle swerves, and continue to hold it when the sights are again in alignment. Any man who tries to catch his sights as they touch the bull's-eye and to set the pistol off at that instant is a very bad shot.

Calling the shot. To call the shot is to state where the sights were pointed at the instant the hammer fell. The firer calls out where he thinks the shot hit. If the firer cannot call his shot correctly in range practice, he has not pressed the trigger properly and consequently does not know where the sights were pointed when the hammer fell.

Timed fire. Timed fire is the same as slow fire except that the time between shots is limited. The restrictions placed on the time limit makes the step from slow fire, without any time limit, to sustained fire, with only a few seconds allowance, an easier one.

In timed fire the first shot should be fired without undue delay. Succeeding shots should be approximately evenly spaced in order that the last shot will be fired immediately before the expiration of the time limit, although still observing all rules of correct firing and safety precautions.

Sustained fire. Sustained fire is the firing of the automatic pistol in rapid succession with the best possible results and still observing all safety rules and correct firing procedures.

Quick fire. In quick fire the pistol is brought from the RAISE PISTOL position to the correct firing position, and the airman squeezes off one shot and again goes back to RAISE PISTOL. This procedure is repeated until the desired number of rounds have been fired.

Safety precautions on the range. Never place a loaded magazine in the automatic pistol until you have taken your place at the firing line.

Always remove the magazine and unload the pistol before leaving the firing point.

Always hold the loaded pistol at the position of RAISE PISTOL except when aiming.

When firing ceases temporarily, lock the piece and hold it at RAISE PISTOL. Do not assume any position except RAISE PISTOL with-

out first removing the magazine and unloading.

If one or more cartridges remain unfired at the end of a timed-fire, sustained-fire, or quick-fire score, remove the magazine and unload immediately.

REVIEW QUESTIONS

The following questions are study aids. Your answers are not to be submitted to the USAF Extension Course Institute for grading. Correct answers will be found at the end of this text.

1. Will any type of practice with the pistol lead to good marksmanship?
2. What is the main cause of inaccuracy in squeezing the trigger?
3. What is meant by the term "calling the shot"?
4. What does training in marksmanship consist in?
5. When you fire on the range, should you insert the magazine in the pistol while waiting to take your place on the firing line?

SUBMACHINE GUN, CALIBER .45, M3

THE SUBMACHINE gun, caliber .45, M3, is an air-cooled, blowback-operated, magazine-fed, shoulder weapon weighing about 10.25 pounds with a full magazine. It is relatively light, compact, and rugged, and can be easily converted to fire 9-mm ammunition. The construction is entirely of metal. The stock is one piece of a formed-steel rod that can be telescoped for ease of handling. The ends of the stock are drilled and tapped for use as cleaning rods. There is no provision for semiautomatic fire, but because of the very low cyclic rate a little practice will enable a gunner to fire single rounds whenever he desires. The weapon is fed from a box-type magazine having a capacity of 30 rounds of caliber .45 ammunition, or 32 rounds of 9-mm ammunition. Swivels are welded to the left side of the receiver for attachment of a web sling. (See fig. 16.)

Since 9-mm ammunition is nonstandard, this course deals only with caliber .45 ammunition in the use of the submachine gun. Conversion and reference data are included.

19. Dimensions, Weights, and Other Data

Barrel dimensions: Diameter of bore, .45 inch; 4 grooves; uniform twist in rifling, one right turn in 16 inches; length of barrel, 8 inches.

Gun: Over-all length, 29.8 inches; distance between sights, 10⅞ inches.

Weights: Weight without magazine, about 8.15 pounds; weight of loaded 30-round magazine, 2.1 pounds; weight of un-

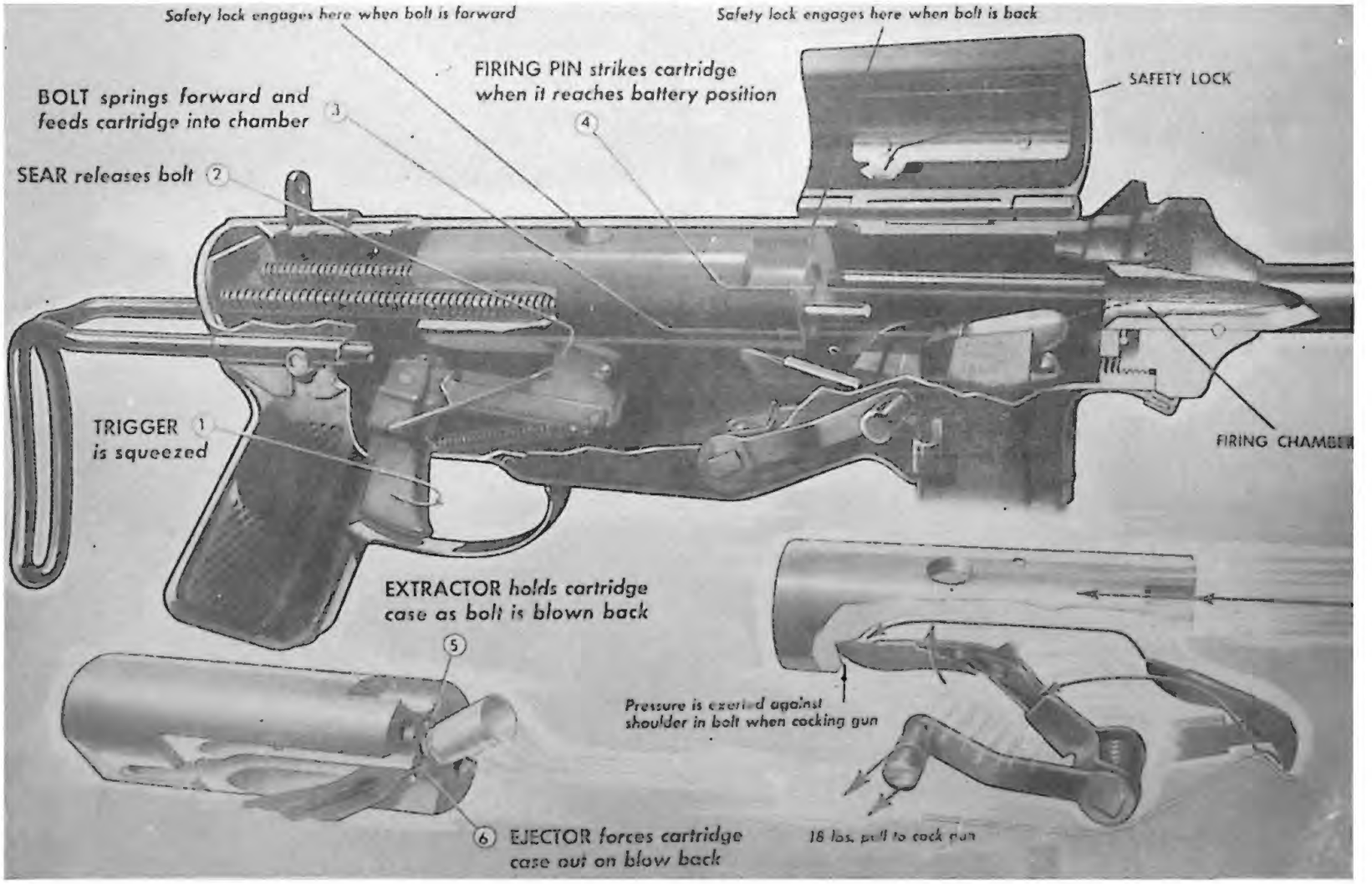

FIG. 16. Basic functioning, U.S. submachine gun, caliber .45, M3.

loaded 30-round magazine, .75 pound.

Miscellaneous data: Initial velocity, 900 feet per second; pressure in chamber, about 12,000 to 16,000 rounds per square inch; weight of bullet, about .53 ounce; weight of .45-caliber powder charge, about .011 ounce; rate of automatic fire (cyclic rate), 450 shots per minute; weight of 9-mm conversion parts (magazine adapter, barrel, and bolt), about 3½ pounds; 100-yard fixed peep sight; pull to cock weapon, 18 to 23 pounds; trigger pull, 5 to 7 pounds; standard .45-caliber ball ammunition; maximum range, 1,700 yards; maximum effective range, 200 yards.

20. Disassembly and Assembly

Disassembly comes under two general headings: removal of groups and disassembling of the groups.

A group is a number of components that either function together in the gun or are intimately related to each other, and should be considered together.

First the three groups—the magazine assembly, the housing assembly, and the bolt and guide rod group—are removed from the submachine gun. Then each group is disassembled. The housing assembly, however, should not be disassembled except for replacement of broken parts. (See fig. 17.)

In assembling the submachine gun, the first step is to reassemble each group. The three groups are then replaced in the gun.

21. Care and Cleaning

The simplicity and reliability of the submachine gun M3 should be an incentive to maintain the weapon in perfect condition. Even though the weapon will function under conditions that would hopelessly clog most automatic weapons, the life of the piece is shortened by such abuse, and its reliability and accuracy may be permanently impaired. The chamber and bore must be kept in perfect condition. The receiver and moving parts must be kept clean and lubricated at all times. The same care

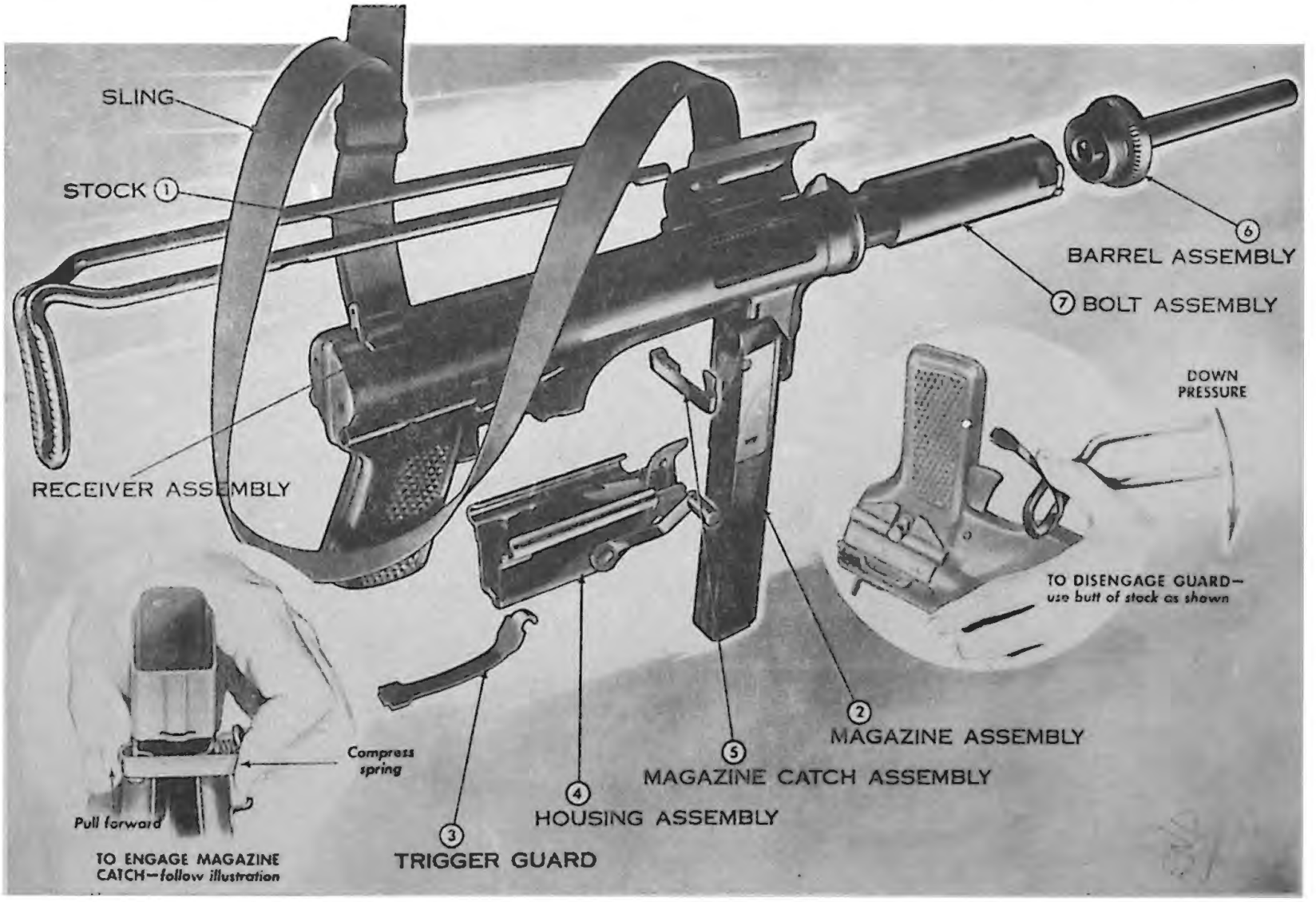

FIG. 17. Field stripping, U.S. submachine gun, caliber .45, M3.

must be given magazines. Dirty magaines are the cause of nearly all stoppages in firing this weapon.

Lubricants, cleaning agents, and rust preventives. The following are the only materials authorized and issued for cleaning and lubricating the submachine gun: rifle bore cleaner, soda ash, issue soap, light preservative lubricating oil, lubricating oil for aircraft instruments and machine guns, light rust-preventive compound, dry-cleaning solvent, and decontaminating agents. The use of unauthorized materials such as abrasives is forbidden.

Rifle bore cleaner is issued for cleaning the bore of the submachine gun after firing. This material possesses rust-preventive properties and will provide temporary protection against rust. It is better practice, however, to dry the bore immdeiately after cleaning with rifle bore cleaner and then coat lightly with a light preservative lubricating oil.

Rifle bore cleaner will freeze at temperatures below 32° F. If frozen, it must be thawed and shaken well before using. To prevent containers from bursting, they should not be filled more than three-fourths full in freezing weather.

Soda ash is a white, odorless powder that is soluble in water. For use, it is dissolved in boiling water with one and a half tablespoons of soda ash to one pint of water. If boiling water is not available, hot or cold water may be used. This solution can be used to clean the gun bore when rifle bore cleaner is not available.

Soap should be used for cleaning the bore if neither rifle bore cleaner nor soda ash is available. Prepare a solution by dissolving issue soap, which has been broken or cut up, in hot water in the proportion of one-quarter pound of soap to one gallon of water. This solution should be used hot but can also be used cold.

Light preservative lubricating oil has rust-preventive as well as lubricating properties but cannot be depended upon to provide protection from rust for long periods. It is used for the lubrication of all moving parts and for short-term protection against rust. Preservative action results partly from the oil film on the metal parts and partly from the chemical combination of inhibitors in the oil with the metal. It will protect the metal surfaces from rust even though no appreciable film of oil is present on the metal parts. When it is used on moving parts, a thin film of oil must be maintained to provide the necessary lubrication.

Lubricating oil for aircraft instruments and machine guns may be used for lubricating the submachine gun when light preservative lubricating oil is not available. It is a light lubricating oil possessing only slight rust-preventive properties. When it is used, the metal parts must be inspected daily for rust. If rust is found, parts should be cleaned and again lightly coated with oil.

Light rust-preventive compound is issued for the protection of metal parts for long periods of time while the parts are boxed and in storage. It can be applied with a brush at temperatures of about 60° F., but the preferable method is to apply the hot compound either by brushing or by dipping.

Dry-cleaning solvent is a noncorrosive petroleum solvent. It will remove grease, oil, or rust-preventive compound. Dry-cleaning solvent is highly inflammable and should not be used near open flames. Smoking is prohibited where dry-cleaning solvent is used. The solvent is generally applied with rag swabs to large parts, and used as a bath for small parts. The surfaces must be thoroughly dried with clean rags immediately after using the solvent. Gloves should be worn by persons handling such parts after cleaning in order to avoid leaving finger marks, which are ordinarily acid and induce corrosion. Dry-cleaning solvent will attack and discolor rubber.

Cleaning instruments. The following are the only instruments authorized and issued for cleaning the submachine gun: chamber-cleaning brush, M6; cleaning brush, M5, caliber .45; submachine gun stock, M3.

Care and cleaning when no firing is done. Care of the submachine gun is necessary to preserve its condition and appearance even during periods when no firing is being done.

Always clean the bore by pushing a dry patch through the bore. Repeat this procedure until the patch comes out clean.

After the bore has been thoroughly cleaned, saturate a dry patch with light preservative lubricating oil and push it through the bore.

The barrel is removed to clean the chamber. Wrap a dry patch around the chamber-cleaning brush and push it into the chamber. Remove all old oil and dirt by twisting the patch in the chamber. Change the patch several times until one comes out clean. Saturate a clean patch with light preservative lubricating oil and apply this liberally to the chamber.

Disassemble the receiver, then clean and oil all the moving parts. Clean the screw heads and crevices by using a small cleaning brush or a small stick. To clean the metal surfaces, rub with a dry cloth to remove moisture, perspiration, and dirt. Then wipe with a cloth that has been wetted with a small quantity of light preservative lubricating oil. This protective film must be maintained at all times. To clean the outer surfaces of the gun, wipe off the dirt with a dry cloth and then wipe with a slightly oiled cloth.

The gun, when in the hands of troops, should be inspected daily to insure proper condition and cleanliness. When the submachine gun is not carried on the person, it must be transported in a suitable boot that is equipped with the necessary brackets for attachment.

Before firing. To assure efficient functioning of the submachine gun, the airman should, before firing, do the following: (1) dismount the groups, (2) remove all dirt and oil from the bore and chamber with clean patches, and (3) thoroughly clean and lightly oil the guide rods and the grooves and sear notch in the bottom of the bolt.

The oil used should be a light preservative lubricating oil. Grease must not be used. Oil should be dropped over the pivot points of the trigger, sear pin, connector pin, and retracting lever pivot.

After returning the housing assembly to the receiver, work the retracting lever back and forth several times to insure thorough lubricating. Rub all outer surfaces with a lightly oiled rag to remove dust.

Magazines should be cleaned and lightly oiled with a light preservative lubricating oil.

After firing. The bore of the submachine gun must be thoroughly cleaned by the evening of the day the gun is fired. It must be cleaned in the same way for the next three days.

Firing the submachine gun causes powder and primer fouling to form in the bore and chamber and on the locating plate. There primer salts absorb and retain moisture from the air, which causes rust. Primer salts must be removed by cleaning with rifle bore cleaner, soda ash solution, soap solution, or water.

To clean the gun after firing, proceed as follows: Disassemble the groups. Clean the bore and all working parts. If this cannot be done at once, apply oil to prevent rust. Clean, oil, and inspect all parts at the first opportunity, and make needed repairs and replacements. On reassembly, check the operation of the gun with dummy cartridges to insure correct functioning.

On the range or in the field. To obtain maximum efficiency of the gun on the range or in the field, observe the following: Carefully check the bore for obstructions before firing. Never fire a gun with any dust, dirt, mud, or snow in the bore. Keep the chamber free from oil and dirt when firing. Never leave a patch, plug, or other obstruction in the chamber or bore. Neglect of this precaution may result in serious injury.

If the gun gives indication of lack of lubrication and excessive friction, apply a light coating of oil to the guide rods. Guide rods should be oiled frequently to insure smooth functioning of the gun.

In general it should not be necessary to remove any of the parts of the gun in the field for cleaning. However, if the mechanism of the gun becomes very dirty, the gun may be disassembled into its main groups for the necessary cleaning and lubrication.

In emergencies when the prescribed lubricant is not available, use lubricating oil for aircraft instruments and machine guns or any clean light mineral oil such as engine oil.

Preparation for storage. Light preserva-

tive lubricating oil is the most suitable oil for preserving the mechanism of the submachine gun for a short period. It is effective for storage periods ranging from two to six weeks, depending on climatic conditions. However, guns in short-time storage must be inspected every five days, and the preservative film must be renewed if necessary. For longer periods, guns should be protected with light rust-preventive compound.

Light rust-preventive compound is a semisolid material. It is efficient for preserving the polished surfaces, the bore, and the chamber for one year or less, depending on storage and climatic conditions.

Cleaning weapons received from storage Weapons that have been stored in accordance with these instructions should be coated either with light preservative lubricating oil or with light rust-preventive compound. Weapons received from ordnance storage will, in general, be coated with rust-preventive compound. Use dry-cleaning solvent to dissolve and remove all traces of the compound or oil. Failure to thoroughly clean the recoil spring recesses in the bolt and the guide rods may cause malfunctioning at normal temperatures and will certainly do so when the rust-preventive compound congeals at low temperatures. After using the cleaning solvent, wipe with a dry cloth to make sure that it is completely removed from all parts.

Care and cleaning under unusual conditions. In *cold climates* it is necessary that the moving parts of the weapon be kept absolutely free from moisture. It has also been found that excess oil or rust-preventive compound on the working parts will solidify to such an extent as to cause sluggish operation or failure.

Before use in temperatures *below 0° F.*, the gun should be completely disassembled and all parts thoroughly cleaned with dry-cleaning solvent.

When the weapon is brought *indoors,* it is first allowed to come to room temperature. It is then disassembled, wiped completely dry of the moisture that will have condensed on the cold metal surfaces, and oiled thoroughly with light preservative lubricating oil. If possible, such condensation should be avoided by providing a cold place in which to keep the gun when not in use.

In *tropical climates* where temperature and humidity are high, or where salt air is present, and during rainy seasons, the weapon must be thoroughly inspected daily and kept lightly oiled when not in use. The groups are dismounted at regular intervals and, if necessary, disassembled for drying and oiling of parts. Unexposed parts and surfaces must be kept clean and oiled. Light preservative lubricating oil is used for lubrication.

In *hot, dry climates* where sand and dust are likely to get into the mechanism and bore, the weapons must be wiped clean daily, or oftener if necessary. Groups are dismounted and disassembled for thorough cleaning.

When the weapon is being used under sandy conditions, all oil must be wiped off. Immediately after exposure to sandy terrain, the weapon must be relubricated with light preservative lubricating oil. During sand or dust storms, the muzzle, the ejection port, and the magazines are kept covered if possible.

Perspiration from the hand, since it contains acid, is a contributing factor to rust. Metal parts must be wiped dry frequently.

Care during gas attack. It is important to prevent the chemicals used in a gas attack from getting in or on the gun and ammunition. When a gas attack is anticipated, steps should be taken to cover and protect the gun, ammunition, spare parts, and accessories. Apply oil to the surfaces of all parts of the weapon, ammunition, and spare parts. If the gun need not be used during the gas attack, put covers over the oiled gun or place it in a container so that it cannot come in contact with any contaminating agents.

Decontamination. When the gun has been contaminated, the following action must be taken to decontaminate it:

A complete suit of impermeable clothing and a service gas mask must be worn for decontamination.

Materiel contaminated with chemicals other than mustard or lewisite must be

cleaned as soon as possible with dry-cleaning solvent or denatured alcohol.

Do not allow the chemical agents to come in contact with the skin. Always bury all rags or wiping materials used for decontamination.

If the surface of the materiel is coated with grease or oil and has been in a mustard or lewisite attack, first remove the grease or oil by wiping with rags wetted with dry-cleaning solvent.

Decontaminate metal surfaces with a solution of decontaminating, noncorrosive agent. Prepare this by mixing one part decontaminating, noncorrosive agent to fifteen parts solvent (acetylene tetrachloride).

After decontamination, clean the materiel thoroughly and prepare it for use.

22. Stoppages and Immediate Action

In the event of a misfire, remove the magazine and cock the bolt with a sharp, quick pull on the retracting lever to insure ejection of the misfired cartridge. *Always inspect the chamber and bore after a stoppage to see that it does not contain an unexpended round or any other obstruction.*

For any other malfunctions remove the magazine and retract the bolt as explained in the foregoing paragraph. Any loose cartridge in the receiver well should fall out of the magazine guide recess. If a cartridge is lodged in the chamber, cock the gun and, *holding the cover down firmly with the left hand,* insert a ramrod or the end of the stock in the muzzle and press the cartridge into the receiver. Do not hammer. If time and conditions permit, it is always better to remove the barrel before attempting to clean the chamber. *On the range this is the only method permitted.*

23. Individual Safety Precautions

The submachine gun M3 lacks the safety features that distinguish other small arms. Therefore the following two safety rules should be rigidly observed in the use of this weapon: (1) Load the gun only when it is ready to fire. (2) Unlock the loaded gun only when raised to fire.

Before firing. The airman should do the following before firing the submachine gun.

See that the bolt is clear and clean.

Work the bolt back and forth rapidly several times to see that it slides freely on well-oiled guide rods.

Examine magazines and eliminate faulty ones.

See that each magazine is free from dirt and that it is properly loaded.

Insert a loaded magazine only when ready to fire.

For range practice, insert the loaded magazine only on order of the officer in charge of firing.

Carry the gun locked, with the bolt forward, until ordered to insert the magazine. Cock and lock the bolt before inserting the magazine. Leave the bolt cocked and locked until it is raised to fire.

Keep the finger outside the trigger guard until you are ready to squeeze the trigger.

During firing. From the time the magazine is inserted until the gun is cleared and the clearance checked, keep the gun pointed toward the target, whether firing dismounted or from a vehicle. For vehicular firing at moving ground targets, keep the gun locked at all times while the vehicle is moving, except when firing.

Habitually lock the gun during lulls in firing.

Always check the bore for obstruction after a stoppage.

After firing. At cease firing, and upon halting after each section of a vehicular run, remove the magazine, inspect the chamber to see that no cartridge remains in it, then lock the gun before turning away from the firing point.

After the gun has been cleared and checked for clearance, let the bolt go forward on an empty chamber and lock the gun.

REVIEW QUESTIONS

The following questions are study aids. Your answers are not to be submitted to the USAF Extension Course Institute for grading. Correct answers will be found at the end of this text.

1. What is the weight of the submachine gun with a full magazine?
2. What is the principal cause of failure to fire of the submachine gun?
3. What effect do sweaty hands have on the submachine gun or any other weapon?
4. What effect does the low cyclic rate have on the operation of the submachine gun?
5. How soon after firing should the submachine gun be cleaned?

MARKSMANSHIP WITH THE SUBMACHINE GUN

PREPARATORY training in submachine gun marksmanship teaches the gunner the essentials of good shooting and develops and fixes correct shooting habits before he undertakes range practice. (See fig. 18.)

To become a good submachine gunner, an airman must be thoroughly trained in the following essentials of good shooting: correct sighting and aiming, correct range estimation, correct positions, and correct trigger squeeze.

24. Preparatory Marksmanship Training

A thorough course in preparatory training precedes any range practice. Before undergoining this training, the airman should be proficient in the mechanics of the submachine gun. The preparatory training is given to all airmen (including those previously qualified) expected to fire the submachine gun during range practice.

25. Firing on the Range

After the airman has completed the preparatory training, he is ready to fire the submachine gun on the range. The airman must remember the following points when firing the M3: (1) The sights on the submachine gun M3 are not adjustable. (2) No correction for windage or drift is necessary for the ranges at which this gun is

FIG. 18. Firing the submachine gun.

used. Under 300 yards the sight and windage factors are negligible when using the submachine gun.

The weapon is primarily intended for firing at short ranges where quick shooting is required. Its maximum effective range is stated at 200 yards, but only a skilled gunner can deliver effective fire beyond 150 yards.

The trajectory of the submachine-gun bullet is less flat than that of the rifle bullet. It is important that the gunner be taught to allow for this characteristic in aiming and to understand the effect of the trajectory on his line of sight.

26. Moving Ground Targets

All units armed with the submachine gun will be trained to fire at moving targets, both vehicular and personnel. Normally such fire will be delivered at short ranges in short bursts of fire. The high rate of fire and the submachine gunner's ability to move the trajectory of fire at will, makes the submachine gun particularly effective against moving personnel (either individuals or groups).

Moving targets are seldom exposed for long periods and can be expected to move at maximum speed during exposure. Moving personnel are especially difficult to hit.

Leads. Targets that cross the line of sight require the gunner to aim ahead of the target so that the bullet and target will meet. The distance ahead of the target is called the "lead." Targets that approach directly toward the gunner or recede directly from the gunner require no lead. For personnel targets moving across the line of sight, the point of aim should be slightly in front of the body and the lead should be corrected by observation of the fire.

The lead necessary to hit a moving vehicle is dependent on the speed of the target, the distance to the target, and the direction of movement with respect to the line of sight. Moving at 10 miles an hour, a vehicle moves approximately its own length at 5 yards in 1 second. The velocity of a bullet from the submachine gun is approximately 900 feet, or 300 yards, in 1 second. Therefore, to hit a vehicle moving at 10 miles an hour at a range of 300 yards, the lead should be 5 yards. At a speed of 20 miles an hour the lead should be 10 yards.

Leads are applied by using the length of the target, as it appears to the gunner, as the unit of measure. This eliminates the necessity for corrections due to the angle at which the target crosses the line of sight, because the more acute the angle the smaller the target appears and the less lateral speed it attains.

A lead table that serves as a guide for firing at moving vehicles is given in table 1.

TABLE 1

GUIDE FOR FIRING AT A MOVING VEHICLE

Speed of vehicle	*Range*	
	100 yards or less	200 yards
10 mph	1/3 TL*	2/3 TL
20 mph	2/3 TL	1¼ TL

*Target length

Technique of fire. The following technique is used by the gunner for firing at moving targets:

(1) Approaching or receding targets. The gunner holds his aim on or above the center of the target (depending on the range) and fires in short bursts.

(2) Crossing vehicular targets. The gunner estimates the proper number of leads, aligns his sights on or above the bottom of the target at its rearward point (depending on the range), swings straight across the target to the estimated lead, and fires short bursts of fire, keeping the weapon at the proper lead.

(3) Crossing personnel targets. The gunner takes aim slightly in front of the center of the body of the target, with proper adjustment for range, and fires short bursts. The lead and range are changed after observation of the effect of the bursts.

The high rate of fire of the submachine gun allows the gunner to spray the target with fire and to improve his lead and range estimation by actual observation of the effectiveness of his fire.

27. Air Targets

Combat arms take the necessary meas-

ures for their own immediate protection against low-flying hostile aircraft. All available weapons are normally employed in this defense. The low muzzle velocity, the short effective range, and the tactical employment of the submachine gun are factors that militate against its effective use on air targets.

The submachine gun is issued as an individual weapon. More effective vehicular weapons, such as the .30-caliber and .50-caliber machine guns, are available and will be employed for fire at aircraft. In comparison with these other weapons, submachine-gun fire is relatively ineffective against hostile aircraft.

REVIEW QUESTIONS

The following questions are study aids. Your answers are not to be submitted to the USAF Extension Course Institute for grading. Correct answers will be found at the end of this text.

1. Are the sights on the submachine gun adjustable?
2. What must a submachine gunner do to hit a target that crosses his line of sight?
3. What is the purpose of preparatory training in submachine gun marksmanship?
4. What makes the submachine gun effective against moving personnel?
5. What determines the lead necessary to hit a moving target when the firer is armed with the submachine gun?

AMMUNITION

PRECISE terms applicable to modern military small-arms cartridges are illustrated in figure 19. A cartridge is a complete assembly consisting of all the components necessary to fire the weapon once—the bullet, cartridge case, propellant powder, and primer.

The term *bullet* refers only to a small-arms projectile. The term *ball*, originally used to describe the actual ball of very early small-arms ammunition, no longer accurately describes the shape of the modern solid bullet. However, the term is still applied to the modern type of bullet and ammunition used for the same purpose. The base end of a bullet (or an artillery projec-

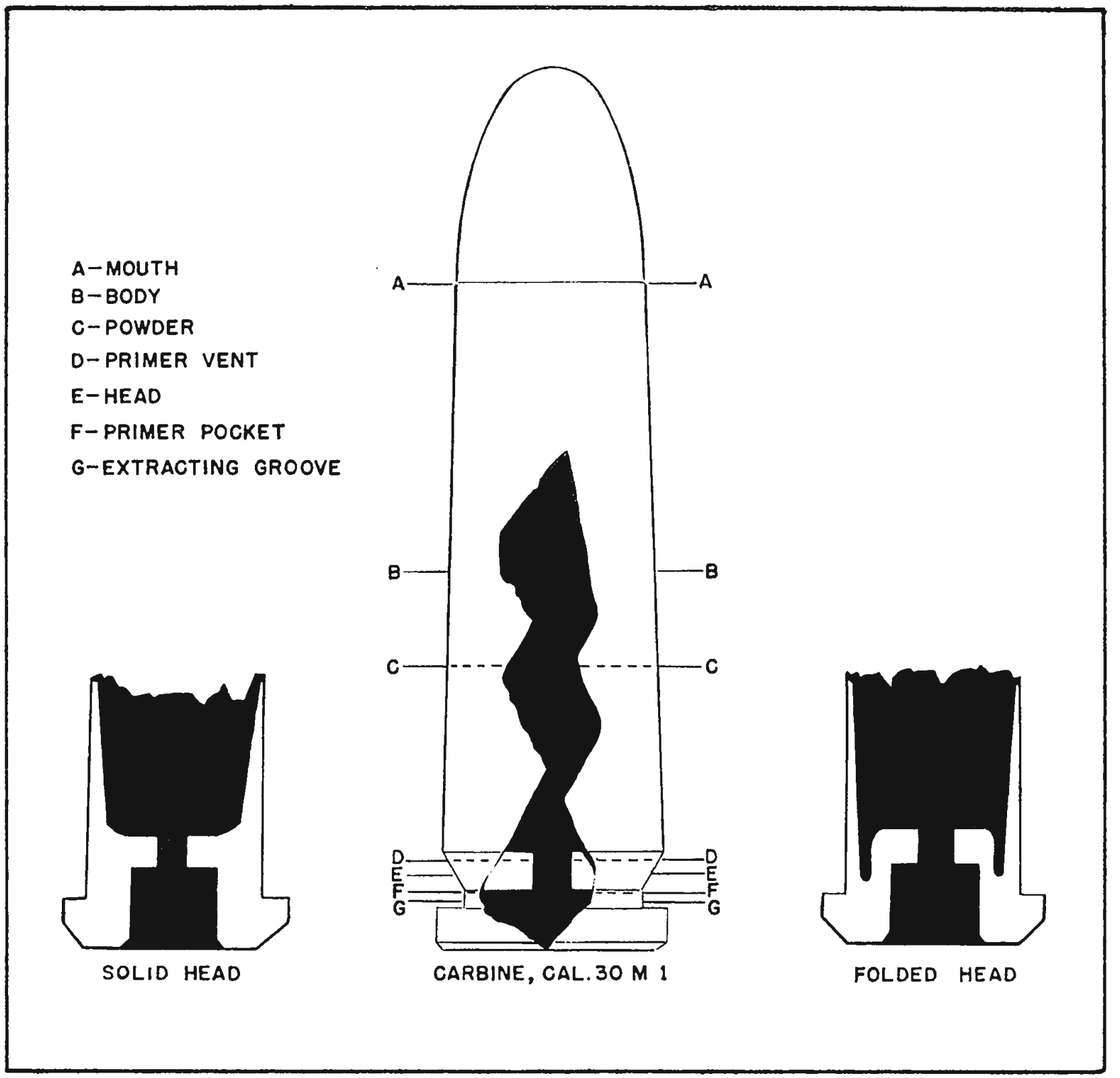

FIG. 19. Cartridge terminology.

tile) is called a *boat-tail* when it is tapered or conical; it is called a *square base* when it is cylindrical.

The type of cartridge used in shotguns has been referred to as shotgun shell, shotgun cartridge, shot shell, or shot cartridge. In military terminology the term *shotgun shell* is used. However, the special caliber .45 cartridge containing pellets is known as a *shot cartridge*. The *charge,* or *load,* of a shotgun shell consists of *shot* (or pellets), a single *ball,* or a single cylindrical *slug*.

28. Classification

Small-arms cartridges are classified, according to the type of the case, as center-fire or rim-fire. Caliber .22 cartridges are the only current rim-fire type used for military purposes. Center-fire cartridges may be classified as rimless, semirimmed, or rimmed.

Small-arms ammunition is classified in two categories—service type and special type—depending on its purpose.

Service Types

Ball: for use against personnel and light materiel targets.

Armor-piercing: for use against personnel and lightly armored vehicles, concrete shelters, and other bullet-resisting targets.

Incendiary: for incendiary effect, especially against aircraft.

Tracer: for observation of fire. Secondary purposes are for incendiary effect and for signaling.

Armor-piercing inciendiary: for combined armor-piercing and inciendiary effect.

Armor-piercing incendiary-tracer: for combined armor-piercing and incendiary effect, with the additional tracer feature.

Shot: for use in hunting small game.

Shotgun shells: for guard purposes, aerial gunner training, target practice, and hunting.

Grenade: for use in projecting grenades by means of a rifle or carbine having a grenade launcher attached to it.

Special Types

Blank: for simulated fire and for salutes. (The blank type contains no bullet.)

Dummy: for training. (The dummy type is completely inert.)

High-pressure test: for use only in proof-firing of weapons and barrels.

Subcaliber: for use in subcaliber weapons.

Frangible: for target practice against aircraft. (The bullet disintegrates on hitting the target.)

29. Grades and Uses

Ammunition is manufactured to rigorous specifications and is inspected and tested thoroughly before acceptance. Since the various types of weapons—rifles, ground machine guns, aircraft machine guns, etc.—have different requirements, production orders and specifications call for the classification of lots for use in specific weapons. Variations in manufacture may occur because of problems of mass production of ammunition. Considering variations from lot to lot and the different requirements for each type of weapon, grades are assigned to each lot of ammunition in accordance with acceptance tests. The grades designate the use of the ammunition for the different types of weapons. Grade designations do not signify that one grade is better than another, but rather that it is better for some particular class of weapon.

Ammunition code symbol. Current grades of all existing lots of small-arms ammunition are established by the Chief of Ordnance after inspection. Grades are not marked on packing boxes or on slips inside the box. However, the grade appropriate to the ammunition contained in the packing is indicated by the ammunition code symbol (AIC) stenciled on each box. No lot other than that of the grade appropriate for the weapon will be issued or fired.

Regrading. Ammunition in storage is periodically retested to insure that its characteristics have not changed. If changes have occurred, as shown by surveillance tests, the ammunition is regraded and the new grades are published.

30. Identification

The type, caliber, model, and ammunition lot number, including the symbol of the manufacturer, are necessary for com-

plete identification of small-arms ammunition.

From the *cartridge* itself, identification may be made (except for lot number) by—

(1) The appearance of the cartridge and the painting on the bullet.

(2) The stamping on the base of the cartridge case. Because of the small size of small-arms ammunition, the marking consists only of the manufacturer's initials and year of manufacture, stamped on the base of the cartridge case. For example: "FA 45" means the lot was loaded at Frankford Arsenal in 1945. Ammunition manufactured during 1944 is stamped "4" or "44" to indicate the year of manufacture. On lots manufactured before 1940 the caliber is also stamped on the base of some cartridge cases. National Match ammunition has the initials "NM" stamped alongside the date of loading.

From *packings and containers*, ammunition can generally be completely identified by—

(1) Markings on the original packing boxes and cartons.

(2) A repacked reference data card inserted in each packing box containing repacked lots of ammunition. Formerly an identification card, usually 6½ by 15 inches, was sealed inside the metal liner on top of the ammunition in each box.

(3) Identification stamped on the pockets of each bandoleer. Before 1 February 1945, a reference card was inserted in the bandoleer for ammunition packed in clips and bandoleers. This reference card is no longer required.

(4) The stamping of the repacked lot number on the web belt.

31. Care, Handling, and Preservation

The provisions contained in this section are specific for small-arms ammunition only.

Boxes. Small-arms ammunition, as compared with other types of ammunition, is not dangerous to handle. However, care must be taken to keep the boxes from becoming broken or damaged. All broken boxes must be repaired immediately, and all markings must be transferred to the new parts of the box. If there is a metal liner, it should be air-tested and sealed, provided equipment for this work is available.

Boxes should be opened carefully, since they are to be used as long as they are serviceable.

An ammunition box or metal can should not be opened, nor should a metal liner be broken until the ammunition is required for issue or use. Ammunition removed from airtight containers is apt to become unserviceable because of corrosion. This applies particularly in damp climates.

Handling cartridges. After a box of ammunition has been opened and cartridges have been issued, each man should take care of his own ammunition. The primer should be protected from blows by sharp instruments, since such a blow might explode the cartridge.

Ammunition should be protected from mud, sand, dirt, and water. If it gets wet or dirty, it should be wiped off at once.

If verdigris or light corrosion forms on cartridges, they should be wiped off with a dry wiping cloth. However, cartridges should not be polished to make them look better or brighter. The use of abrasives is forbidden.

Ammunition should not be exposed to the direct rays of the sun for any length of time. If the powder is heated, it is likely to cause excessive pressure when fired and will affect the performance of the ammunition.

The use of oil or grease on cartridge cases is prohibited. Greasing or oiling cartridges used in machine guns and automatic arms causes the collection of dust and other abrasives, which are injurious. Grease or oil on cartridges will cake on the walls of the chamber in nonautomatic rifles, creating excessive and hazardous pressure on the rifle bolt, which results in damage. When there is oil on the cartridge case, there is no adhesion of the case to the chamber. When the case expands upon firing, the case slips back and the bolt receives a greater than normal rearward thrust. Use a clean, dry wiping cloth for removing oil or grease from a cartridge. There is an

apparent exception with caliber .22 and caliber .38 lead bullets. For these items, only the bullet is waxed or greased as issued.

Whenever cartridges are taken from cartons and loaded into belts or clips, the latter will be tagged or otherwise so marked that the ammunition may be identified by lot number. Such identification is necessary to prevent otherwise serviceable ammunition from being placed in grade 3 because of loss of lot number. (Grade 3 indicates unserviceable ammunition that will not be fired.)

Defective cartridges. Cartridges having nonpermissible dents or scratches, cartridges with loose bullets, or otherwise defective rounds should not be fired. Lots having more than 5 percent of defective cartridges will be subjected to 100 percent inspection. Defective rounds will be culled out, the serviceable cartridges will be repacked prior to issue, and a report will be made to the Chief of Ordnance. If 20 percent or more are defective, the lot will be withdrawn from service and held for disposition. Particular attention should be paid to incipient cracks that are not easily detected unless the thumb is pressed against the bullet, thus exposing the crack in the cartridge case. Defective cartridges will be considered as grade 3 ammunition.

If a cartridge case becomes so corroded that a perceptible amount of metal is eaten away, the cartridge is dangerous to fire and should not be used.

Destruction of ammunition. When it is necessary to destroy unserviceable small-arms ammunition locally, such destruction will be accomplished in accordance with TM 9-1900.

In storage. Small-arms ammunition is not an explosive hazard in storage, although under adverse conditions of storage it may become a fire hazard.

Small-arms ammunition should be stored and piled according to type and ammunition lot number. Extreme care must be exercised to prevent the mixing of ammunition lots in one pile. When small-arms ammunition is received, issued, checked, stacked, or restacked, reliable personnel should be in charge, and a check should be made of the ammunition lot number on each box.

Protection. Whenever practicable, small-arms ammunition should be stored under cover. This applies particularly to tracer and shotgun ammunition. Tracer ammunition is subject to rapid deterioration if it becomes damp and may even ignite spontaneously. Shotgun shells are normally not packed in waterproof metal-lined boxes except for overseas shipment.

Although small-arms ammunition is packed in metal containers in wooden boxes, actual tests have shown that leaks may develop in handling and shipping. The leaks, though small, will admit moisture if the ammunition is exposed to damp weather or extreme variations in temperature.

Should it become necessary to leave small-arms ammunition out of doors, it should be raised on dunnage at least 6 inches from the ground and the pile should be covered with a double thickness of serviceable tarpaulin. The tarpaulin should be so positioned as to offer the maximum protection to the ammunition and to allow free circulation of air. Suitable trenches should be dug to prevent water from flowing under the pile.

High temperatures. Small-arms ammunition in storage should be protected from extreme heat to avoid decomposition of the propellant powder. The combination of high temperature and a damp atmosphere is particularly detrimental to the powder.

Opened boxes. When only part of a box is used, the remaining ammunition in the box should be protected against unauthorized handling and use by fastening the cover firmly in place.

Fire hazard. If placed in a fire, small-arms ammunition does not explode violently. There are small individual explosions of each cartridge, the case flying in one direction and the bullet in another. It is unlikely that the bullets and cases will fly more than 200 yards.

32. Precautions in Firing Blank Ammunition

It is dangerous to fire blank cartridges at personnel representing an enemy at distances of less than 20 yards, since the wad

or paper cup may fail to break up.

No blank cartridges other than those authorized will be used for blank firing. The following four precautions should be carefully observed:

(1) All cartons are plainly marked and markings should be strictly checked before the ammunition is issued. The M1909 blank cartridge is similar in appearance to some of the caliber .30 grenade cartridges, used for propelling rifle grenades.

(2) Only blank ammunition, packed in the original package or carton, will be issued for use in machine guns or automatic rifles. Any ammunition on hand that has been removed from the original package or carton (usually termed "broken" or "loose" ammunition), should be reissued for use in bolt-action rifles only. These instructions serve the purpose of eliminating the danger of firing a high-pressure blank cartridge or a blank cartridge fitted with a felt or thick paper wad in an automatic weapon equipped with a blank ammunition firing attachment. Such firing would greatly endanger personnel and probably damage the gun.

(3) Blank cartridges with felt or thick paper wads should not be used in any weapon. The mark of distinction between the paper cup and the felt wad closing is the depth of seating in the neck of the cartridge, the paper cup being seated much deeper (about ¼ inch) than the felt wad, which is approximately 1/16 inch deep. Ammunition containing the felt wad is cannelured at a point about 1/10 inch from the mouth of the cartridge case, whereas ammunition containing the paper cup is cannelured at 2/10 inch from the mouth.

(4) Only ammunition containing the paper cup will be used in automatic arms.

Misfires in which the primer explodes but fails to ignite the powder charge are dangerous when blank ammunition is fired in automatic arms. In such misfires, some of the powder is blown into the bore of the weapon. A series of such rounds will result in an accumulation of powder sufficient to cause serious damage when ignited by the firing of a normal cartridge. When misfires are encountered in blank ammunition in excess of 5 percent, the lot will be suspended and reported to the Chief of Ordnance.

33. Defects That Cause Misfires

Misfired cartridges should be handled with care, since subsequent rough handling may cause the cartridge to explode.

The following types of defects cause misfires:

Primer defects. If, after a misfire, the primer shows a normal impression of the firing pin, indicating that a blow sufficiently hard to ignite a primer in perfect condition has been delivered, the primer is defective. This defect may be caused by thick metal in the base of the primer cup, thick primer pellet that cushions the blow, no primer mixture or insufficient primer mixture, no anvil, no vent, excessive moisture, or various combinations of these defects.

If, after a misfire, the primer shows a light impression of the firing pin, indicating the force of the blow was not sufficient to ignite the primer, the misfire may have been caused by any of the following defects: a mechanical defect in the weapon, a short or broken firing pin, a weak firing-pin spring, the incomplete locking of the bolt, grease in the firing-pin hole that cushions the blow of the firing pin, a very short primer cup, a too deep seating of the primer in the primer socket, an improper angle of the shoulder of the cartridge case, or a defective primer.

If, after a misfire, the primer shows a normal, but off center, impression of the firing pin, there is a defect in the weapon.

If, after a misfire, the primer shows a heavy impression of the firing pin, the defect may be due to the primer being too high in the primer socket, a long firing pin, or excessively high chamber pressure.

Hangfire. Delayed ignition of the powder in the cartridge may be due to a small or decomposed primer pellet, damp powder, a light blow of the firing pin caused by dirt, or a defect in the weapon. While a hangfire is a serious defect if the delay is long enough to permit the bolt to be opened before the powder burns completely, such a delay is rarely found in practice. Should a

hangfire of several seconds' delay occur, and the bolt be opened before the powder explodes, injury to the firer or damage of the weapon, or both, may result.

Failure of the case to extract. The cause of failure of the case to extract may be a defective extractor, a defective cartridge, or dust in the chamber.

Blowback. An escape of gas under pressure to the rear is commonly referred to as a blowback. It may result from a pierced primer, primer leak, blown primer, primer setback, or ruptured cartridge.

Split neck. The neck of the cartridge case splits in firing and is accompanied by an escape of gas. (This should not be confused with a split neck due to season cracking, which can be observed before firing.)

Split body. A more or less regular longitudinal split in the body of the case allows gas to escape, thereby reducing the velocity of the bullet. This defect is generally found in cartridge cases that have a deep draw scratch or in those that are made from defective brass.

Stretch. A continuous ring around the body of a fired cartridge case shows that the metal was stretched to such an extent when the cartridge was fired that slightly more stretching would probably result in a partial or complete rupture. This is generally due to improper timing, failure of the bolt to lock, or improper head space.

Complete rupture. A complete rupture is a circumferential separation of the metal completely around the body of the fired cartridge case, causing it to separate into two parts. If such a rupture occurs upon extraction, the forward part of the fired cartridge case remains in the chamber of the weapon. This is a serious defect. It will cause the next round of ammunition to jam. It is usually caused by bad bolt locking, improper timing, excessive head space, a defective cartridge case, or a combination of these.

Partial rupture. A partial rupture is a partial circumferential separation around the body of the fired cartridge case. Like a complete rupture, this is a serious defect. It, too, is usually caused by improper timing, bad bolt locking, an excessive headpiece, or a defective cartridge case.

Fluting near shoulder. A characteristic fluting may be found near the shoulder, indicating excessive pressure resulting from grease or oil in the chamber or on the case.

Deformed cartridge case. A deformed cartridge case may take the form of stretching of the body, shortening of the neck, or an annular bulge toward the rear of the cartridge case. This is generally due to excessive head space, a defective chamber, or improper timing. An annular bulge immediately forward from the thick head section may be due to excessive pressure and is generally accompanied by a flattening of the primer cup.

Caliber .30 Carbine Ammunition

The cartridge case for carbine cartridges has a slight taper from the base to a short distance from the mouth and is cylindrical for the remaining portion of its length. Cartridge cases used at present have a taper of 0.027-inch inclination to the cylindrical portion, which extends 0.32 inch at the mouth end of the case. Cases manufactured before 11 June 1943 had a taper of 0.031-inch inclination to the cylindrical portion, which extended 0.39 inch at the mouth end of the case. Steel cartridge cases were used in some lots.

34. Carbine Ball Cartridge, Caliber .30, M1

The .30-caliber ball cartridge M1 is a current standard item of issue for use in .30-caliber carbines. It is intended for use against personnel and light materiel targets for ranges up to 300 yards. Its length is 1.68 inches.

Bullet. The bullet consists of two parts—a lead alloy core and a jacket of either gilding or gilding metal and steel. It is 0.69 inch in length. It is similar in appearance to the caliber .45 ball bullet M1911. Bullets manufactured before 14 February 1942 had a hollow cup formation in the base of the core. Those of present manufacture have a solid flat base core.

Accuracy. When the ball cartridge is test-fired for accuracy, it will group within a

mean radius of 4 inches at 400 yards. Actual firing-table results indicate the mean radii and extreme spreads. (See table 2.)

TABLE 2

ACCURACY OF CARBINE BALL CARTRIDGE, CALIBER .30, M1

Range (yards)	*Mean radius* (inches)	*Extreme spread* (inches)
100	0.7	2.2
200	1.5	4.7
300	3.1	10.5
400	4.0	11.2
500	5.8	16.3

Drift. Drift for this ball cartridge is negligible.

Penetration. The bullet will penetrate twelve ⅞-inch pine boards at 100 yards, eight boards at 200 yards, and seven boards at 300 yards.

35. Carbine Tracer Cartridge, Caliber .30, M16

The .30-caliber M16 tracer cartridge is a limited standard item of issue for use in .30-caliber carbines. It is intended for use against personnel and light materiel targets and has an incendiary effect as well as illuminating the path of flight. Its length is 1.68 inches.

Bullet. The bullet consists of three parts: a gilding-metal clad steel jacket, a lead alloy slug, and a tracer and igniter composition. The over-all length of this bullet is 0.88 inch and the point is painted red for a distance of approximately ⅛ inch.

Accuracy. Average of mean radii at 300 yards is 8.42 inches, at 200 yards it is 5.38 inches, and at 100 yards it is 3.67 inches.

Penetration. The bullet will penetrate eleven ⅞-inch pine boards at 100 yards, eight boards at 200 yards, and seven boards at 300 yards.

36. Carbine Tracer Cartridge, Caliber .30, M27 (T43)

The .30-caliber M27 (T43) tracer cartridge is a standard item of issue for .30-caliber carbines. It is intended for use against personnel and light materiel targets—for incendiary purposes and for illuminating the path of flight. It has a dim trace, for a short distance of flight from the muzzle, which is followed by a bright trace. Its length is 1.68 inches.

Bullet. The bullet consists of three parts: a gilding-metal clad steel jacket; a lead alloy slug; and a tracer and igniter composition. The over-all length of this bullet is 0.88 inch. The point is painted orange for a distance of approximately ⅛ inch.

Accuracy. The average of the mean radii at 100 yards is 4.0 inches.

37. Carbine Dummy Cartridge, Caliber .30, M13

The .30-caliber M13 dummy cartridge is a current standard item of issue. It is used for training personnel in the operation of loading and unloading carbines and in simulating carbine fire. The cartridge is 1.68 inches long. Cartridges manufactured after 6 March 1944 are identified by an empty primer pocket and two holes drilled in the cartridge case. The case is not tinned. Before that date the cartridges had a tinned case with no drilled holes. Before 7 December 1943 this cartridge was known as the M1 dummy cartridge and was used only in the inspection of weapons.

38. Carbine High-Pressure Test Cartridge, Caliber .30, M18

The .30-caliber M18 high-pressure test cartridge is used for proof-firing of carbines. It is loaded with a powder charge sufficient to produce a chamber pressure of 45,000 minimum to 50,000 maximum pounds per square inch. Because of this excessive pressure and the consequent danger involved in firing, the guns under test are fired from a fixed rest under a hood by means of a mechanical device. This cartridge will be fired only by authorized personnel. Its length is 2.0 inches. The cartridge is identified by its tinned cartridge case. Cases manufactured before 9 December 1943 were not always tinned.

The bullet consists of a gilding-metal (or a gilding-metal clad steel) jacket and a lead alloy slug. It has a square base. Before 20 May 1943, the ball bullet, caliber .30, M2, was used in this cartridge. The present

bullet is similar in appearance to the ball bullet, caliber .30, M2, except that it does not have a cannelure in its jacket. The bullet is 1.123 inches long.

Caliber .45 Ammunition

39. Ball Cartridge, Caliber .45, M1911

The .45-caliber M1911 ball cartridge is a current standard item of issue. It is used against personnel in .45-caliber automatic pistols, revolvers, and submachine guns. It is also authorized for guard purposes. To adapt it for use in the revolvers, it must be assembled in clips designed for this purpose. The cartridge is 1.275 inches long.

Bullet. The bullet consists of two parts: (1) a gilding-metal jacket, a gilding-metal clad steel jacket, or a copper-plated steel jacket, and (2) a slug of lead hardened with antimony.

Accuracy with muzzle rest. In the automatic pistol M1911 and M1911A1, the mean variations for several ranges is given in table 3.

TABLE 3

ACCURACY OF BALL CARTRIDGE, CALIBER .45, M1911, IN PISTOL

Range (yards)	Mean radius (inches)
25	0.86
50	1.36
75	2.24

40. Tracer Cartridge, Caliber .45, M26 (T30)

The .45-caliber M26 (T30) tracer cartridge is standard for use in all .45-caliber weapons for observation of fire, incendiary, and signal purposes. It is essentially the M1911 ball bullet with a tracer filled cavity in the base. The length of the cartridge is 1.275 inches.

Bullet. The bullet consists of three parts: (1) a copper-plate steel or gilding-metal clad steel jacket, which is painted red for a distance of about 3/16 inch from the tip; (2) a slug of lead hardened with antimony in the forward portion of the jacket; and (3) a tracer mixture in the rear portion. The over-all length of the bullet is 0.690 inch.

Accuracy. The tracer cartridge fires within a mean radius of 8 inches at 100 yards and 5 inches at 50 yards.

41. Blank Cartridge, Caliber .45, M9

The .45-caliber M9 blank cartridge is a current standard item of issue for use in .45-caliber automatic pistols and, by the use of 3-round clips, in .45-caliber revolvers. It is used for signaling purposes, firing salutes, and training horses and dogs, and in maneuvers where simulated fire is desired. This cartridge can be fired only by single shot in the automatic pistol. Its length is 1.108 inches. The cartridge is identified by the absence of a bullet and by its tapered mouth.

42. Dummy Cartridge, Caliber .45, M1921

The .45-caliber M1921 dummy cartridge is a current standard item of issue. It is used to train personnel in the operation of loading and unloading a revolver and to simulate firing. It is also used as a range dummy cartridge in the automatic pistol. In the latter use it is mixed with live ammunition in pistol magazines, the purpose being to detect and correct flinching and faulty trigger sueeze. The cartridge is 1.275 inches long. The ball bullet M1911 is used in this cartridge.

43. High-Pressure Test Cartridge, Caliber .45, M1

The .45-caliber M1 high-pressure test cartridge is used for the proof-firing of .45-caliber weapons and barrels at the place of their manufacture. It contains a powder charge that will develop a breech pressure of about 21,000 to 23,000 pounds per square inch—a pressure that is about 4,000 pounds in excess of the pressure required in .45-caliber service ammunition. Because of the danger involved in firing this cartridge it should be fired only from a fixed rest under a hood, by means of a mechanical firing device, and only by authorized personnel. This cartridge is 1.275 inches long.

REVIEW QUESTIONS

The following questions are study aids. Your answers are not to be submitted to the USAF Extension Course Institute for grading. Correct answers will be found at the end of this text.

1. Define the term cartridge.
2. What is the principal use of dummy cartridges in small-arms marksmanship?
3. Who establishes the current grades of small-arms ammunition?
4. How should high-pressure test cartridges be fired?
5. What is the .30-caliber tracer bullet composed of?

ANSWERS TO REVIEW QUESTIONS

CHAPTER 2

1. The carbine is gas-operated, self-loading, and air-cooled.
2. No.
3. The barrel and receiver group, the trigger housing group, and the stock group.
4. The ramp sight.
5. By evening of the day on which it was fired.

CHAPTER 3

1. The portion of the target outlined in the sight.
2. To teach the airman the essentials of good shooting and to develop fixed and correct shooting habits.
3. For all aiming, both in practice and on the range.
4. If you breathe while aiming, your body motions are transmitted to the carbine.
5. No. They may fire left-handed.

CHAPTER 4

1. In the M1911A1 the tang of the grip safety is extended. The receiver has clearance cut for trigger finger. The face of the trigger is cut back and knurled. The mainspring housing is raised and knurled. The top of front sight is widened.
2. *Disassembly*: unseat barrel bushing; draw slide back and remove slide stop; remove barrel and slide from receiver; extract recoil spring and guide, and barrel from slide. *Assembly*: insert barrel, and replace recoil spring and guide; slide receiver into grooves at rear of slide, holding the slide upside down in the left hand; line up link with slide stop apertures, and replace stop; compress recoil spring and reseat barrel bushing.
3. Pistol should be cleaned as soon as possible after firing by swabbing out the barrel with soap and water, bore cleaner, or some form of dry-cleaning solvent. Dry thoroughly by running clean dry patches through the barrel until no discoloration appears on the clean patches. Clean all guides and crevices of the receiver and slide with an oiled patch, removing all gummy oil or dirt. Lightly coat all the metal parts with light oil.
4. The essential rules for safety concerning the pistol.
5. The half cock, the grip safety, the disconnector, and the manual safety.

CHAPTER 5

1. No. Only properly supervised practice will lead to good marksmanship.
2. The flinch.
3. Giving an opinion of where the shot strikes before the actual point is announced.
4. Preparatory instruction, range practice, firing for record, and combat firing.
5. No. The magazine should be inserted only after you have taken your place on the firing line.

CHAPTER 6

1. The weight is 10.25 pounds.
2. Dirty or faulty magazines.
3. The acid in sweat promotes corrosion.
4. It allows the gunner with a little practice to fire single rounds.

CHAPTER 7

1. No.
2. Aim ahead of the target.
3. It teaches the gunner the essentials of good shooting and develops correct shooting habits before he undertakes range practice.
4. Its high rate of fire and mobility.
5. The speed of the target, the distance to the target, and the direction of movement with respect to the line of sight.

CHAPTER 8

1. The cartridge is a complete assembly consisting of all the components necessary to fire the weapon once. These are the bullet, cartridge case, propellant powder, and the primer.
2. For training purposes.
3. The Chief of Ordnance.
4. From a fixed rest under a hood by means of a mechanical device.
5. A gilding-metal clad steel jacket, a lead alloy slug, and a tracer and igniter composition.

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