



de huse

USER HANDBOOK

STERLING

SUB-MACHINE GUN

9-mm. MK 4
(S.M.G. 9mm. L.2.A.3.)

STERLING ENGINEERING COMPANY LIMITED
DAGENHAM · ESSEX · ENGLAND

FOREWORD

This is primarily a hand-book for the user of the **STERLING SUB-MACHINE GUN**, a weapon designed and developed by Sterling Engineering Company Limited and adopted by H.M. Government, after extensive and very satisfactory troop trials, for the Field Armies of Great Britain under the Service name, Sub-Machine Gun 9 mm. L.2.A.3.

Sterling Engineering Company Limited have been designing and developing automatic small arms since 1939 when their first success, the **LANCHESTER SUB-MACHINE GUN**, was adopted and used by the Royal Navy.

To meet the need for a lighter weapon for use by the Commandos and the Airborne and Parachute troops, the Company in 1942 began to develop the present weapon which was brought into service just before the end of World War II. Since the War the Company have further developed and improved their Sub-Machine Gun to the requirement of a General Staff specification. The weapon is fully described in this hand-book.

After years of endeavour, the adoption of this weapon by H.M. Government reflects the achievement of the Company's skilled engineers and technicians whose knowledge, enthusiasm and untiring efforts—both in war and peace—have resulted in the **STERLING SUB-MACHINE GUN**.

K. Redgrave, M.C., M.I.Mech.E.
Managing Director.

STERLING ENGINEERING CO. LTD., STERLING WORKS, DAGENHAM, ESSEX, ENGLAND



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D A G E N H A M · E S S E X · E N G L A N D

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STERLING SUB-MACHINE GUN 9-mm MK. 4.



Above : Shown with butt extended and bayonet fitted
Below : Shown folded

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SECTION I—GENERAL

1.0 INTRODUCTION. This machine gun provides the soldier with a light and easily handled weapon which is capable of producing a volume of automatic fire at short notice.

It is a short range weapon normally used to engage the enemy at ranges up to 200 yards. It may be used with effect at longer ranges according to the skill of the firer, but the penetrative power of the bullet will seldom justify fire at ranges in excess of 200 yards.

The weapon is particularly suitable for street fighting, wood clearing, patrols and any other condition when the enemy may appear suddenly at close quarters and from different directions.

It is an automatic weapon, operated by case projection or blow back action, and can be fired in single rounds or bursts. Normally it may be fired in bursts of two or three rounds, but on many occasions the aimed single-shot will be found effective.

2.0 TECHNICAL DETAILS

Calibre	(.354")	9 mm
Length—butt folded	19 inches	48.2 cms
—butt extended	27 inches	69 cms
Weight—machine gun only	6 lbs (approx.)	2.7 Kg (approx.)
—with full magazine (34 rds)	7 lb 10 oz (approx.)	3.5 Kg (approx.)
—with full magazine and bayonet	8 lb 4 oz (approx.)	3.73 Kg (approx.)
Length of barrel	7.8 inches	19.8 cms
Number of grooves	6	
Pitch of rifling	1 turn in 9.84 inches	(25 cms)
Twist of rifling	Right hand	
Sight radius	16.1 inches	41 cms
Type of sights	Rear—aperture Fore—blade	
Sight range	100 and 200 yards	100 and 200 metres
Cyclic rate of fire	550 r.p.m. approx.	

TECHNICAL DETAILS (CONTINUED)

TERMINAL VELOCITY OF STANDARD 8 GRAMME BULLET

Range		Velocity		Kinetic Energy	
Yards	Metres	Ft/sec	M/sec	Ft/lbs	Kgm.
0	0	1280	390	447	62.2
109	100	1115	340	339	47.0
218	200	975	298	262	36.4
327	300	872	266	207	28.7
436	400	780	238	167	23.2
545	500	700	214	135	18.8
654	600	632	193	109	15.2
763	700	572	174	89	12.3
872	800	518	158	74	10.2

3.0 SPECIAL FEATURES

- 3.1 BUTT.** When not in use the butt is folded under the weapon thereby reducing the overall length by some 9 inches. The weapon can be used effectively with the butt folded.
- 3.2 BODY.** The forward part of the body, which provides a grip for the forward hand, is perforated to assist cooling of the barrel. It will be found that even after prolonged firing this part of the body remains quite cool causing no discomfort to the firer. A guard is fitted near the front of the weapon to prevent any possibility of the firer placing his finger too far forward.
- 3.3 TRIGGER AND SAFETY MECHANISM.** The trigger mechanism is fitted with a change lever which can be set to give either automatic fire or single-shot. The change lever also has a SAFE position which locks the trigger and sear, irrespective of the position of the bolt. Locking of the bolt in the forward position eliminates the possibility of the round being fired if the carbine is dropped or violently shaken.
- 3.4 BACKSIGHT.** The rear peephole sight is readily changed from 100 yards to 200 yards setting by rocking over.
- 3.5 BAYONET.** The bayonet is mounted so that it is off-set when the weapon is in the firing position. It will be found that, when the weapon is held in the "on-guard" position for bayonet fighting, the natural balance of the weapon, with or without magazine, brings the bayonet into the upright position.

SECTION 2—DESCRIPTION AND OPERATION

4.0 The weapon (Fig. 1) is operated by case projection or blow back operation.

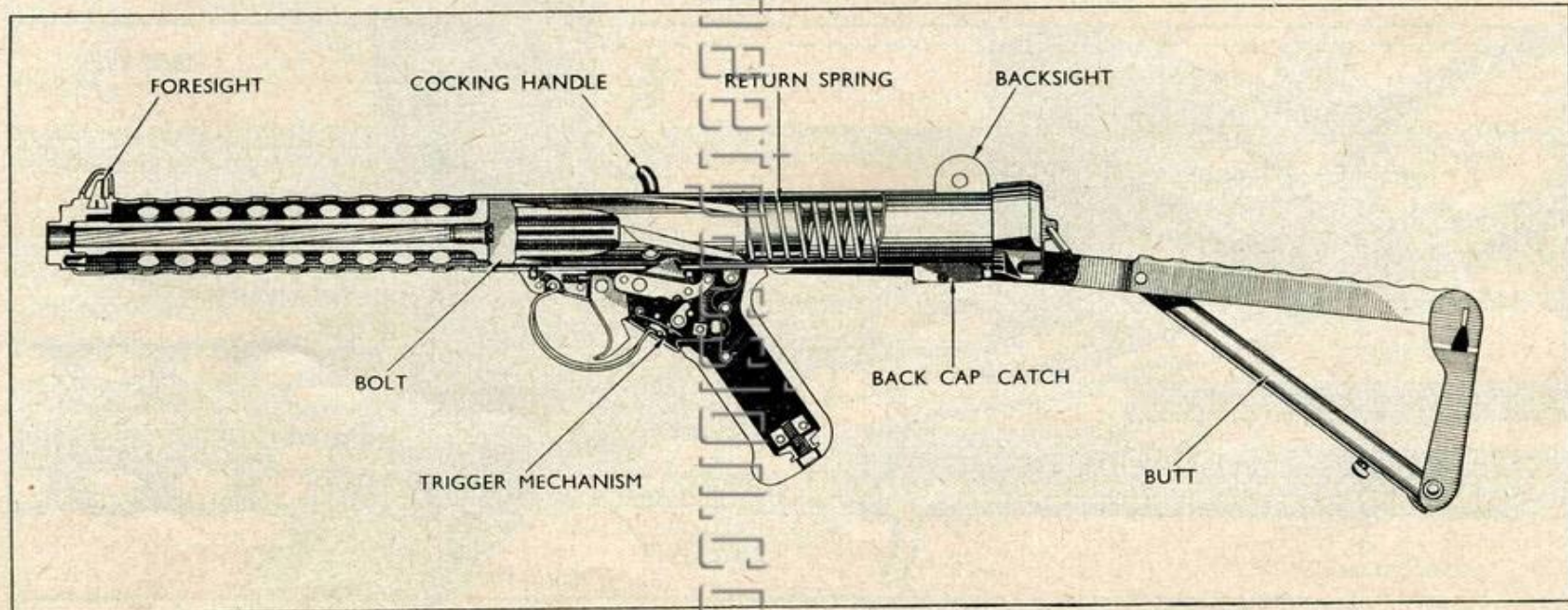


Fig. 1. Sectional arrangement

4.1 THE BACKWARD ACTION (Fig. 2). When the cartridge is fired the propellant gases exert an equal pressure against both the bullet and the cartridge case, the latter being supported by the bolt plus the pressure of the return spring. This pressure accelerates both the bullet and the bolt plus the cartridge case, but in opposite directions and, as the weight of the bullet is considerably less than that of the combined weight of the bolt and cartridge case, it attains a much greater velocity than that of the bolt and cartridge case. By the time the bullet clears the muzzle both have reached their maximum velocity, but the cartridge case has not yet cleared from the chamber thus preventing the gases from escaping through the breech. Immediately the bullet clears from the muzzle there is a rapid drop in pressure and it is safe when the cartridge case clears from the breech.

The bolt is now being decelerated by the compression of the return spring.

The empty cartridge case, held against the face of the bolt by the extractor, is carried to the rear where it strikes the ejector and is ejected through the opening on the right side of the weapon.

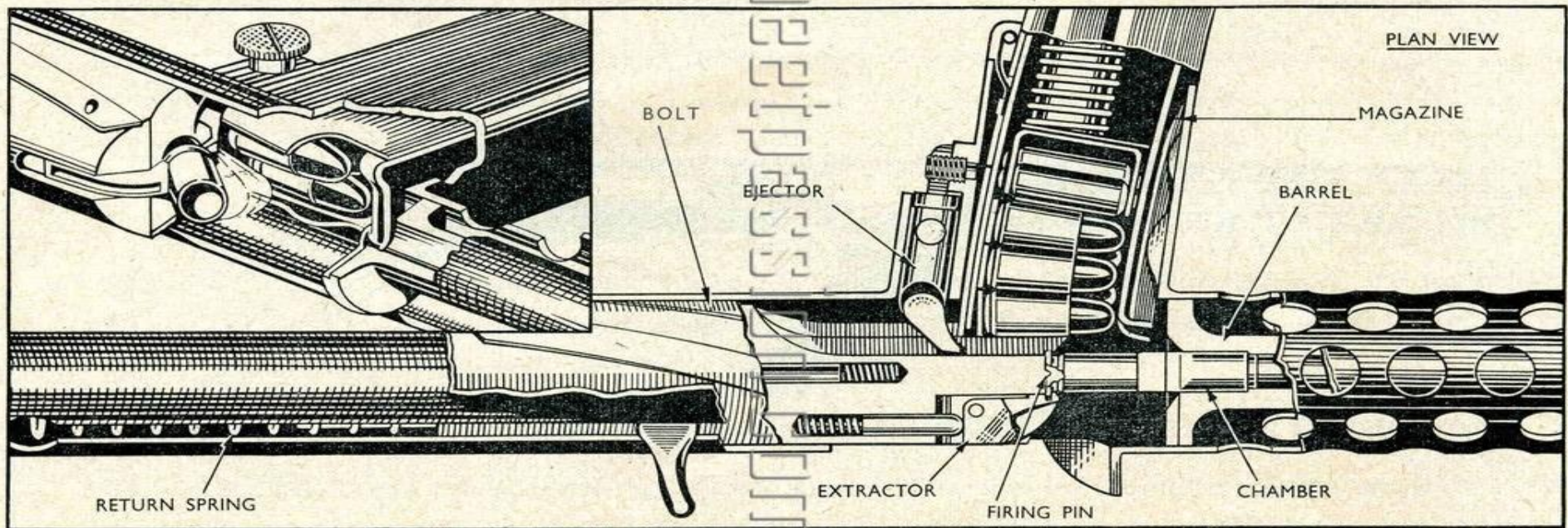
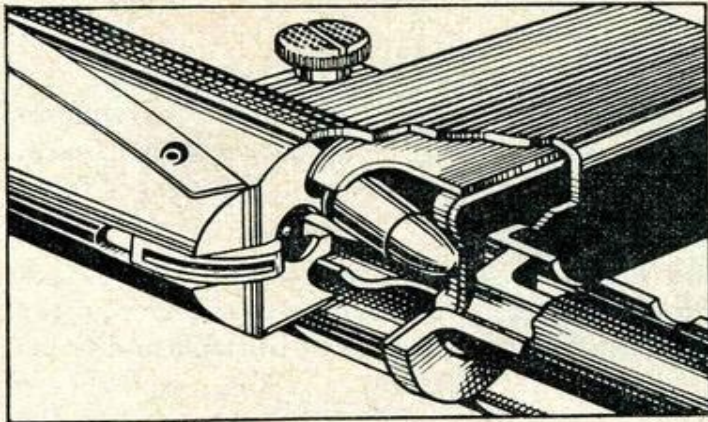


Fig. 2. Backward action

4.2 THE FORWARD ACTION (Fig. 3).



When the bolt reaches the limit of its rearward travel it is forced forward by the compression of the return spring. During its forward travel the bolt contacts the top round in the magazine and, guided by the magazine lips the round is fed into the chamber. The bolt then follows up on the round, finally positions it in the chamber, and fires it just before the forward movement ceases. During the forward movement of the round from the magazine, the firing pin of the bolt cannot come into line with the percussion cap of the cartridge until the round is actually in the chamber. This provides the mechanical safety for this type of weapon. Upon firing, the backward action again commences.

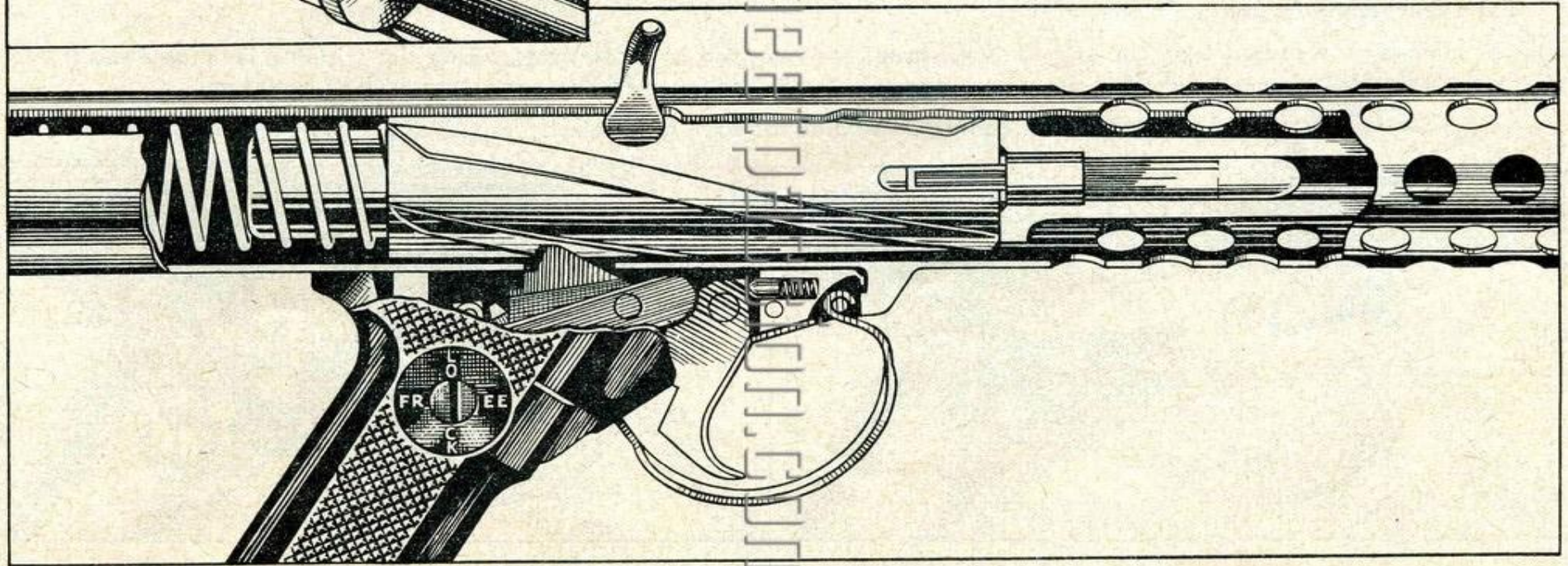


Fig. 3. Forward action

4.1 THE BACKWARD ACTION (Fig. 2). When the cartridge is fired the propellant gases exert an equal pressure against both the bullet and the cartridge case, the latter being supported by the bolt plus the pressure of the return spring. This pressure accelerates both the bullet and the bolt plus the cartridge case, but in opposite directions and, as the weight of the bullet is considerably less than that of the combined weight of the bolt and cartridge case, it attains a much greater velocity than that of the bolt and cartridge case. By the time the bullet clears the muzzle both have reached their maximum velocity, but the cartridge case has not yet cleared from the chamber thus preventing the gases from escaping through the breech. Immediately the bullet clears from the muzzle there is a rapid drop in pressure and it is safe when the cartridge case clears from the breech.

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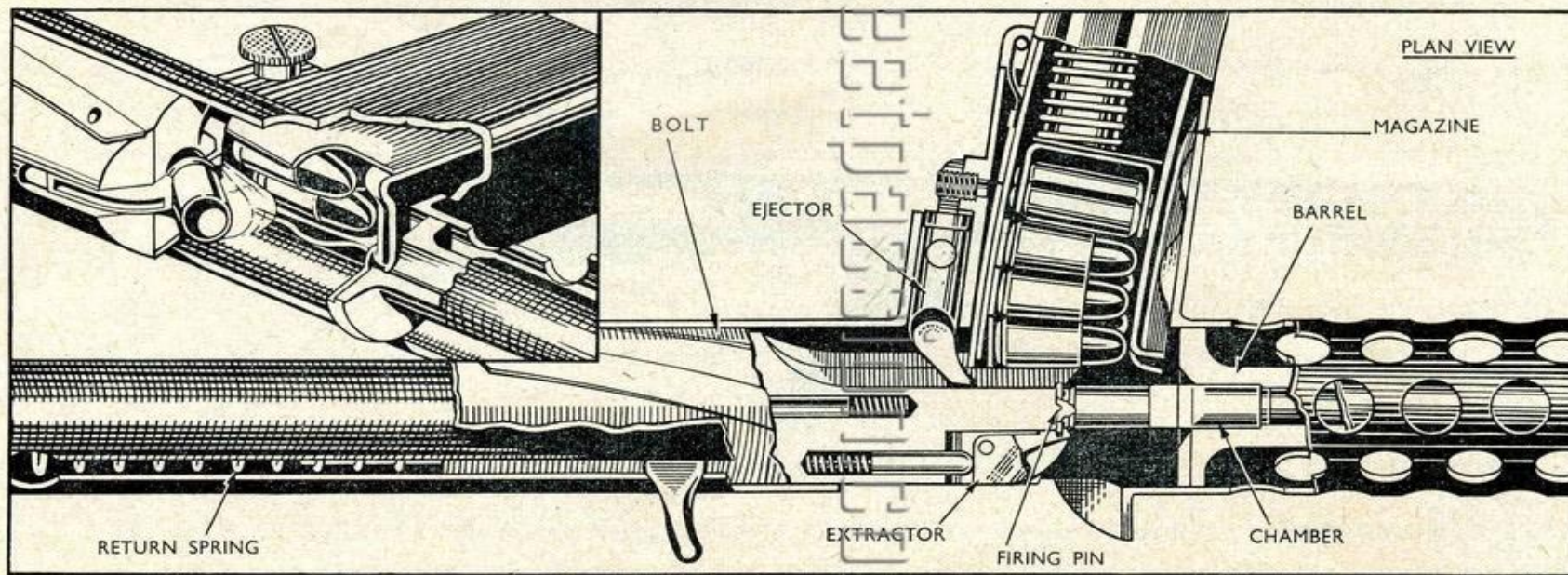


Fig. 2. Backward action

5.0 ACTION OF THE TRIGGER MECHANISM (Figs. 4, 5, 6 and 7).

5.1 SINGLE SHOT FIRE (Figs. 4 and 5). When the change lever (1) is set to the single shot position R, the inner arm of the change lever (1) is located under the tail of the tripping lever (2).

When with the weapon cocked, the trigger (3) is pressed, the sear cradle (4) is rotated about the sear axis pin (5), the sear (6) is lowered and the bolt is carried forward by the pressure from return spring. During this movement the tail of the tripping lever contacts the inner arm of the change lever causing the tripping lever to partially rotate. Continued pressure on the trigger causes further rotation of the tripping lever until the upper arm disengages from the step on the sear. At the same time the sear plunger and spring (7) are compressed.

When the round is fired, the sear is held down by contact with the under surface of the bolt, but as the bolt reaches the end of its rearward movement and is clear of the sear, the sear is forced upward by pressure of the sear plunger and spring (7). Then as the bolt is moving forward, the sear engages against the bent on the face of the bolt and holds the bolt in the cocked position.

When the pressure on the trigger is released, the rear end of cradle rises, lifting the tripping lever and causing it to rotate about its axis pin until the upper arm of the tripping lever re-engages on the step of the sear.

The trigger must be fully released and again pressed for each single-shot.

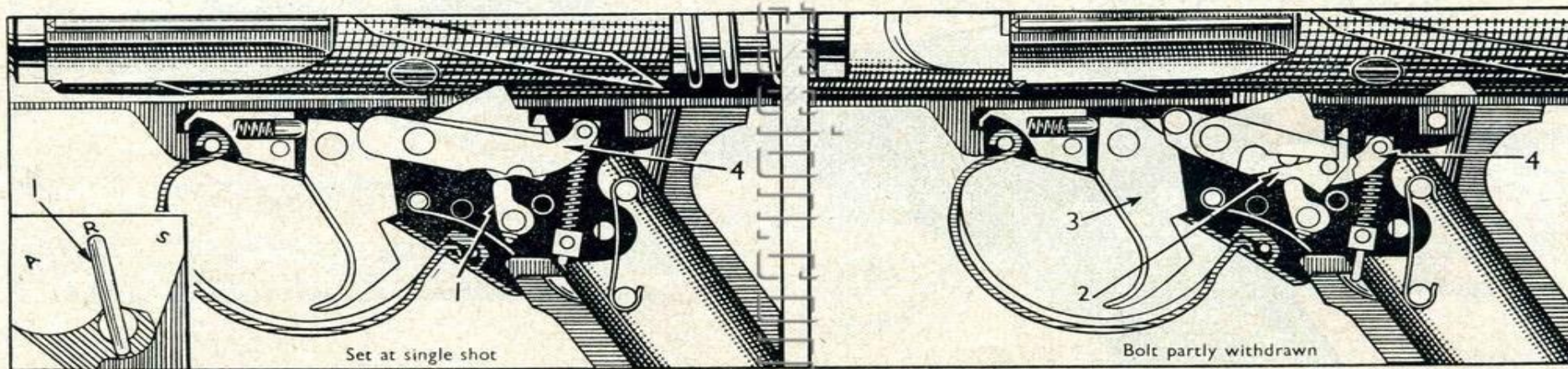
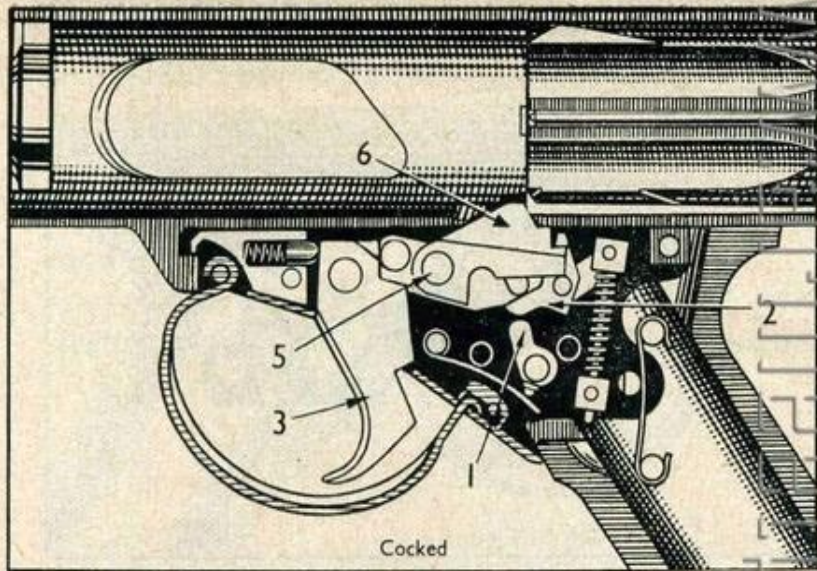
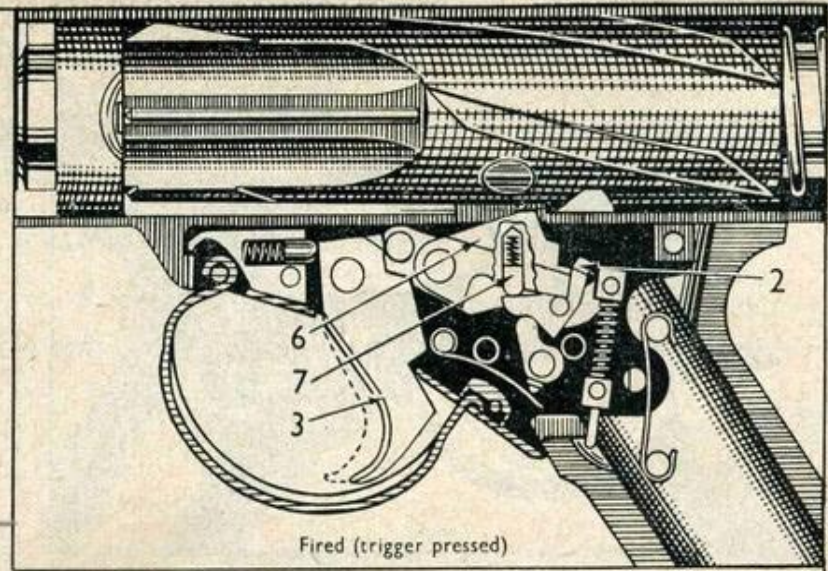


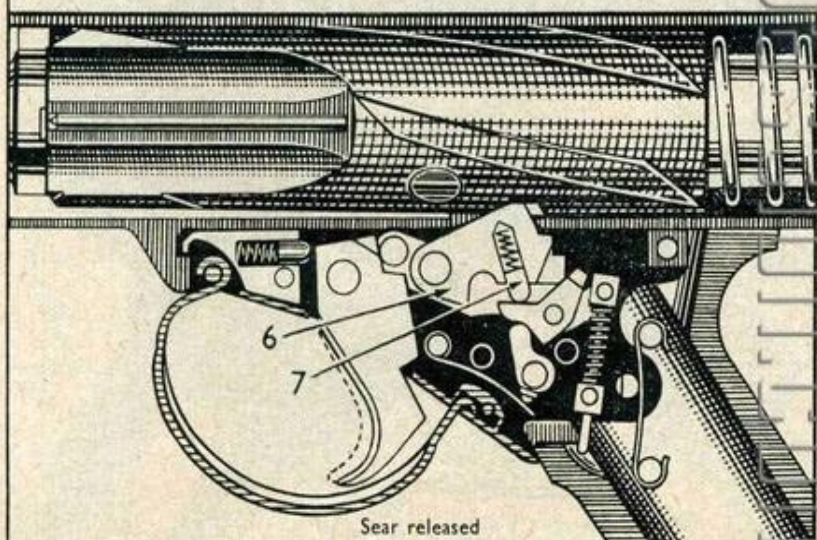
Fig. 4. Action of trigger mechanism (single shot fire)



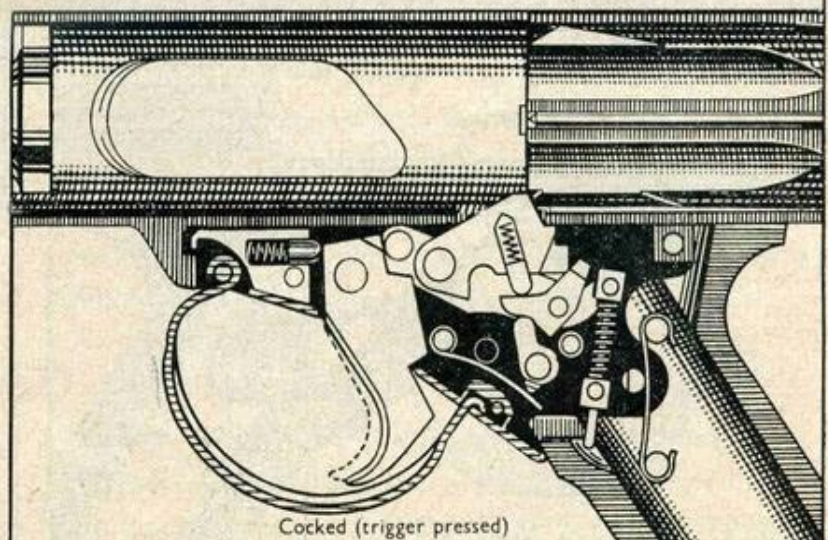
Cocked



Fired (trigger pressed)



Sear released



Cocked (trigger pressed)

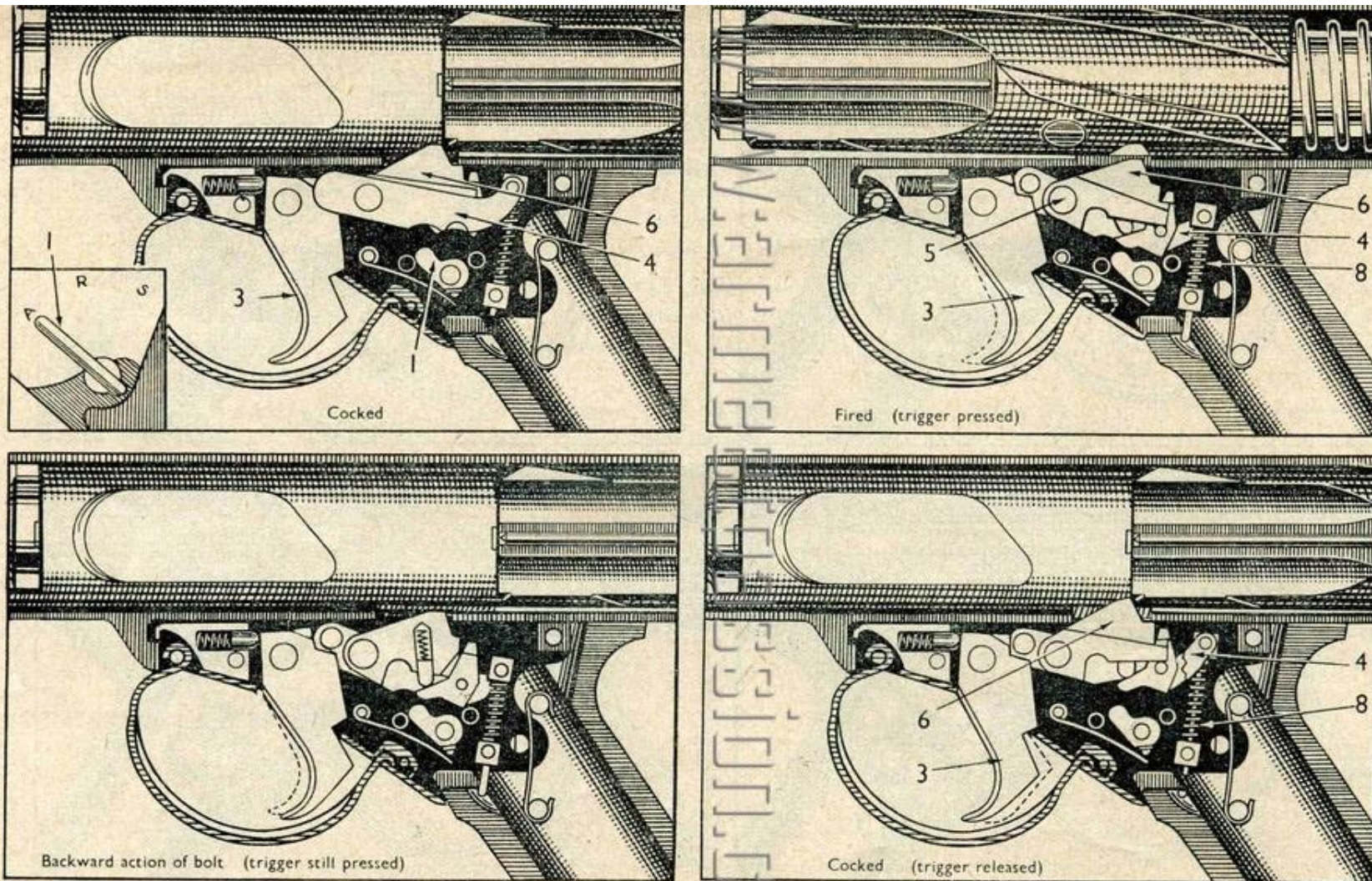


Fig. 6. Action of trigger mechanism (automatic fire)

5.2 AUTOMATIC FIRE (Fig. 6). When with the change lever (1) set at automatic A and the weapon cocked, the trigger is pressed, the projection on the upper part of the trigger lifts the end of the sear cradle (4) rotating it about its axis pin (5). This depresses the sear (6) freeing it from contact with the face of the bent on the bolt, and allowing the bolt to fly forward. The movement of the sear cradle compresses the sear cradle spring (8).

The weapon will now continue firing until either the trigger is released or the magazine is empty.

When the trigger is released the sear cradle returns to its former position under the action of the sear cradle spring, the sear is raised into the boltway and contacting the bent on the bolt, holds the bolt in the cocked position.

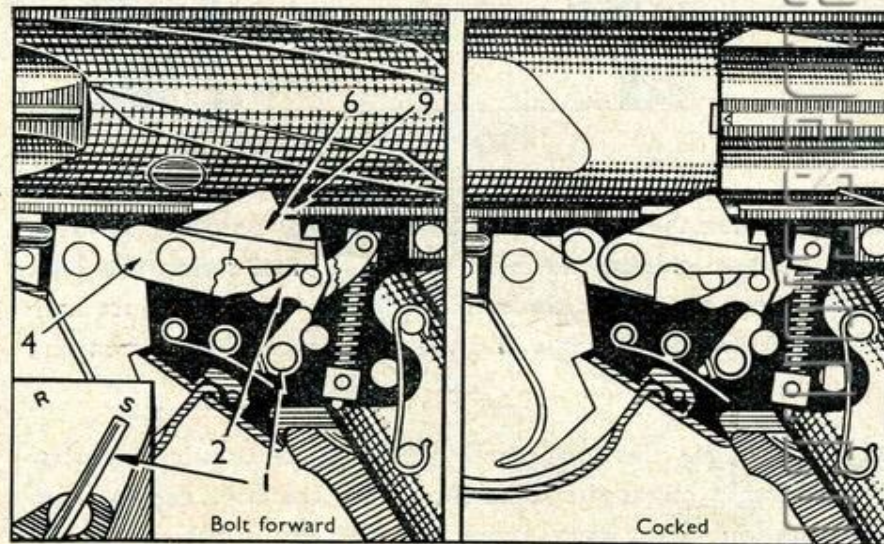


Fig. 7. Applied safety

5.3 APPLIED SAFETY (Fig. 7). When with the weapon cocked, the change lever set at safe S the inner arm of the change lever (1) is positioned directly under the short arm of the tripping lever (4). When the trigger is pressed the sear cradle and sear cannot be depressed because the short arm of the tripping lever is held immovable by the inner arm of the change lever.

When with the bolt forward, the change lever set at safe, the weapon cannot be cocked because the sear (6) is engaged in the safety slot (9) at the rear of the bolt, and the sear cannot be depressed because it is held immovable as described in previous paragraph.

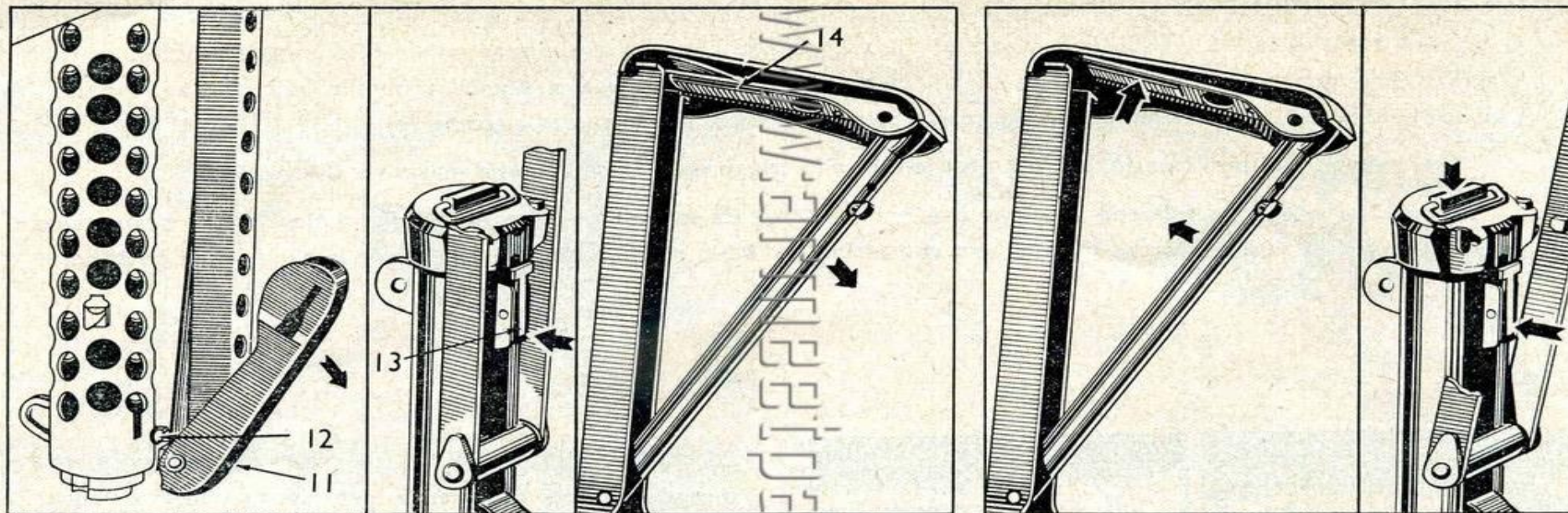


Fig. 8. To open butt

Fig. 9. To close butt

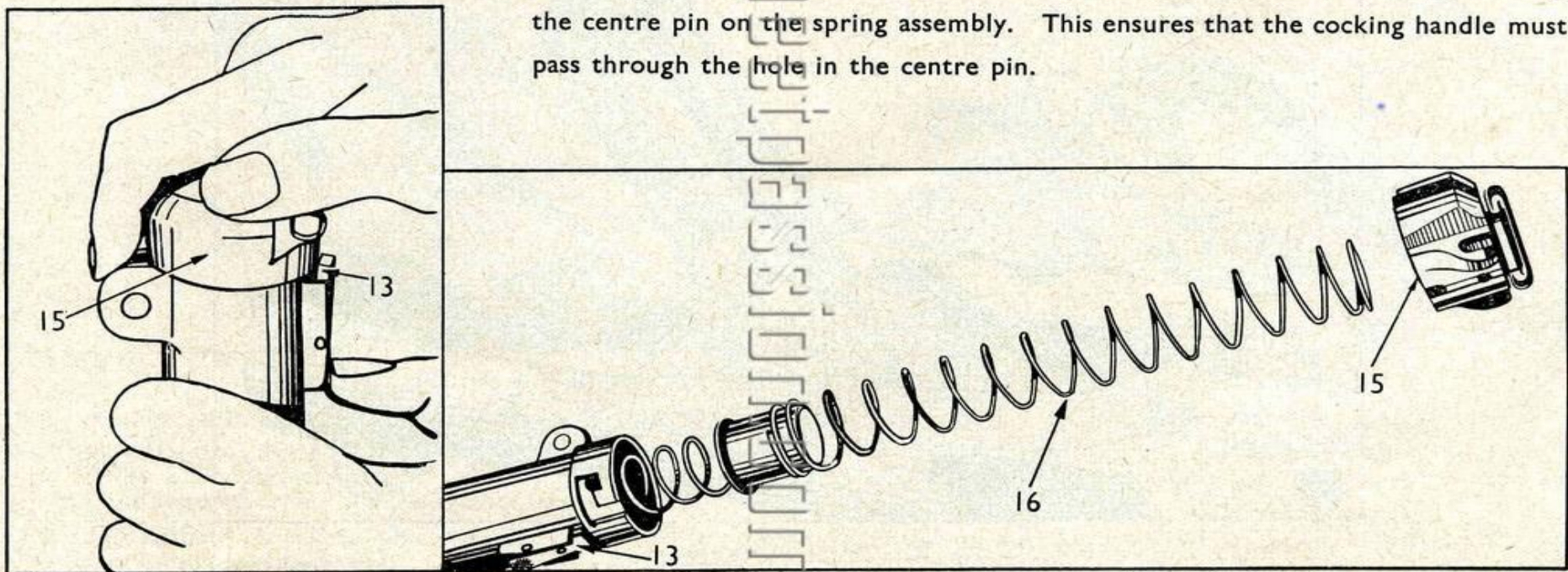
6.0 TO OPEN BUTT (Fig. 8). Hold the weapon with the left hand near the backsight with the barrel pointing towards the ground. Pull the butt plate (11) outwards with the right hand to release the butt catch (12) and swing the butt to the rear of the weapon. With the thumb of the left hand press the back cap catch (13) and snap the butt into engagement with the lugs on the back cap. Open the butt frame to form a triangle and the butt catch (14) will engage to lock.

7.0 TO CLOSE BUTT (Fig. 9). Release the butt plate catch and collapse the triangle by pushing the tubular member into the frame. With the thumb of the left hand press the back cap catch, at the same time push the back cap forward and swing the butt away from the back cap. Pivot the butt to its folded position, swing the butt plate out to operate the butt catch to engage in the barrel casing, then fold the butt plate flat to lock in position.

SECTION 3—STRIPPING AND ASSEMBLING

8.0 ELEMENTARY STRIPPING AND ASSEMBLING (Figs. 10 and 11). Before stripping, ensure that the weapon is not loaded and remove sling if fitted. Set change lever to A, place butt in the folded position and bolt forward.

8.1 TO REMOVE RETURN SPRING AND BOLT. Press back cap catch (13) for full depth. Push back cap (15) forward and rotate anti-clockwise until locking lugs disengage from locking recesses. Remove back cap (15) and draw cocking handle to rear of weapon. Lift cocking handle outwards and withdraw return spring assembly (16) from rear of body. Remove bolt from rear of body. Re-assemble in reverse order. The spring-loaded fouling pin will prevent mis-assembly since the cocking handle cannot be inserted until this pin is pushed forward by the centre pin on the spring assembly. This ensures that the cocking handle must pass through the hole in the centre pin.



8.2 TO REMOVE TRIGGER GROUP (Fig. 11). Set change lever at "Safe," and with a small coin or rim of a cartridge turn the slot in the head of the trigger group retaining pin (17) in line with the word "Free" on the right side of the pistol grip. With the nose of a bullet or the blunt end of the cocking handle push trigger group retaining pin (17) out and remove. Pull trigger group towards rear of weapon, disengage from step in underside of barrel case and swing front of trigger group out and remove from body. To remove trigger guard, push out forward pin, swing guard downward, pivoting about its rear fixing, and unhook from underplate.

NOTE.—Elementary stripping does not include any further stripping of trigger group.

8.3 ASSEMBLY. Assemble in the reverse order of stripping.

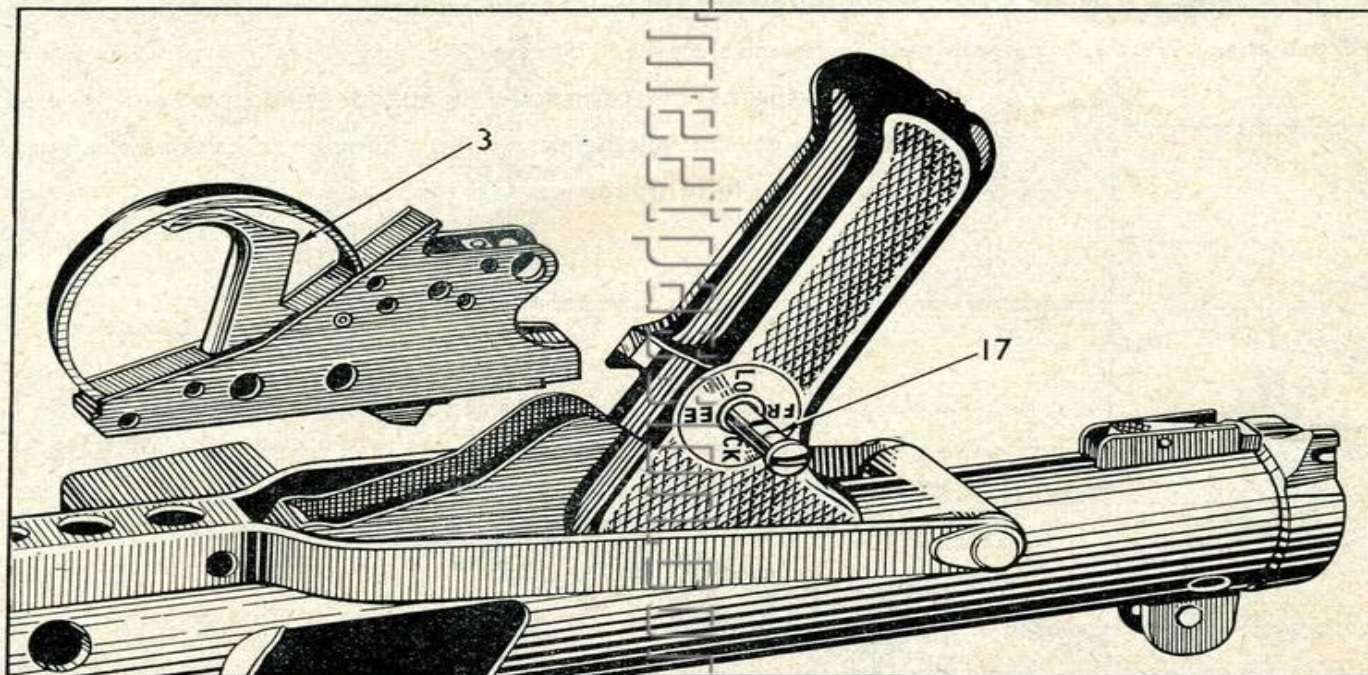


Fig. 11. To remove trigger group

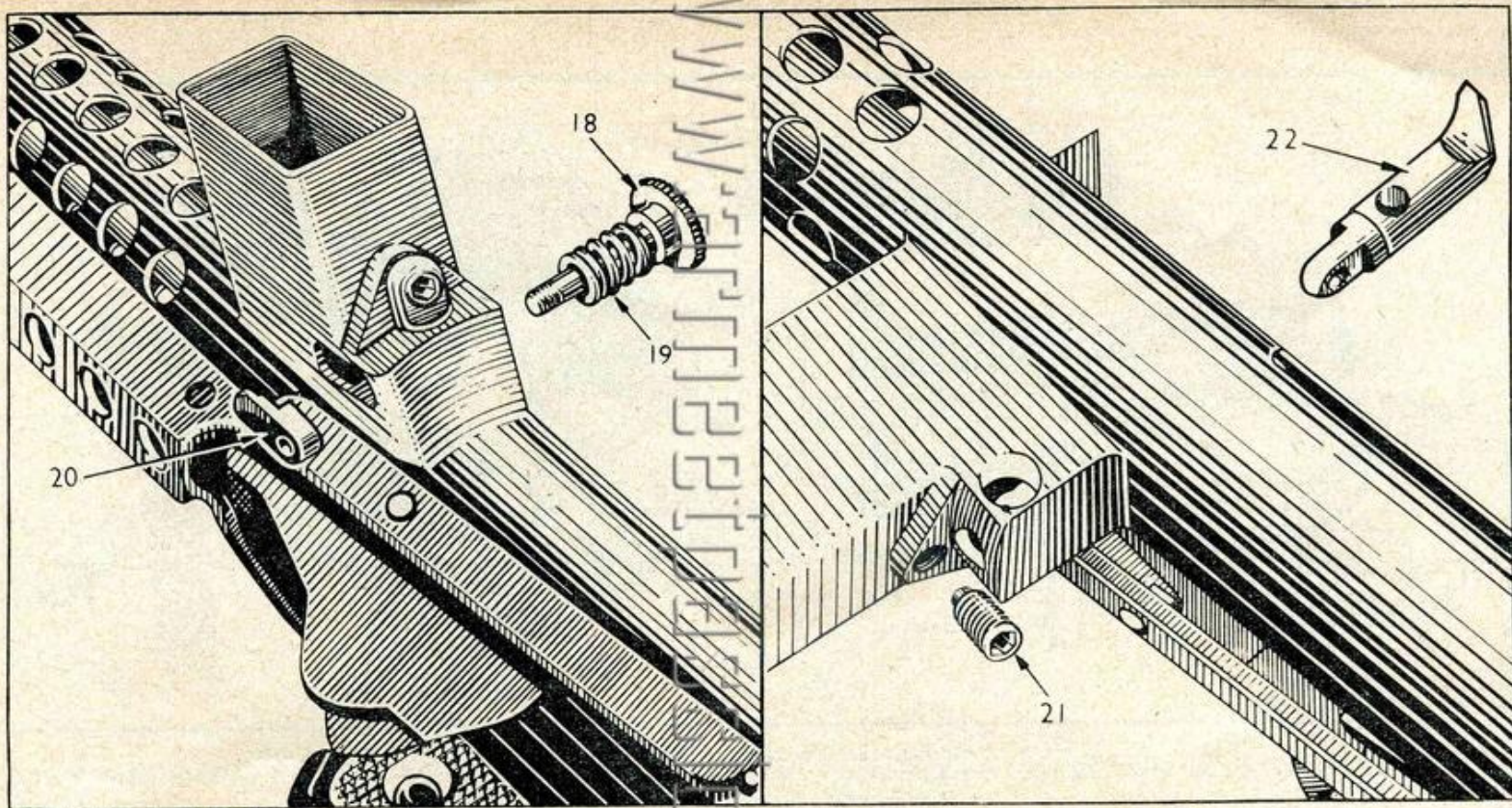


Fig. 12. To remove ejector

9.0 ADVANCED STRIPPING AND ASSEMBLY (Figs. 12, 13, 14, 15 and 16). **STRIPPING.**

NOTE.—This should only be carried out by a qualified armourer when it is required to replace worn or broken parts, or by a qualified instructor, when it is required to give instruction on the mechanism and operation of the weapon. Commence by carrying out elementary stripping.

9.1 TO REMOVE EJECTOR (Fig. 12). Using large screwdriver unscrew magazine catch screw (18), remove spring (19) and magazine catch (20). Using allen key remove ejector retaining screw (21). Tap out ejector (22) and remove through ejection opening in the body.

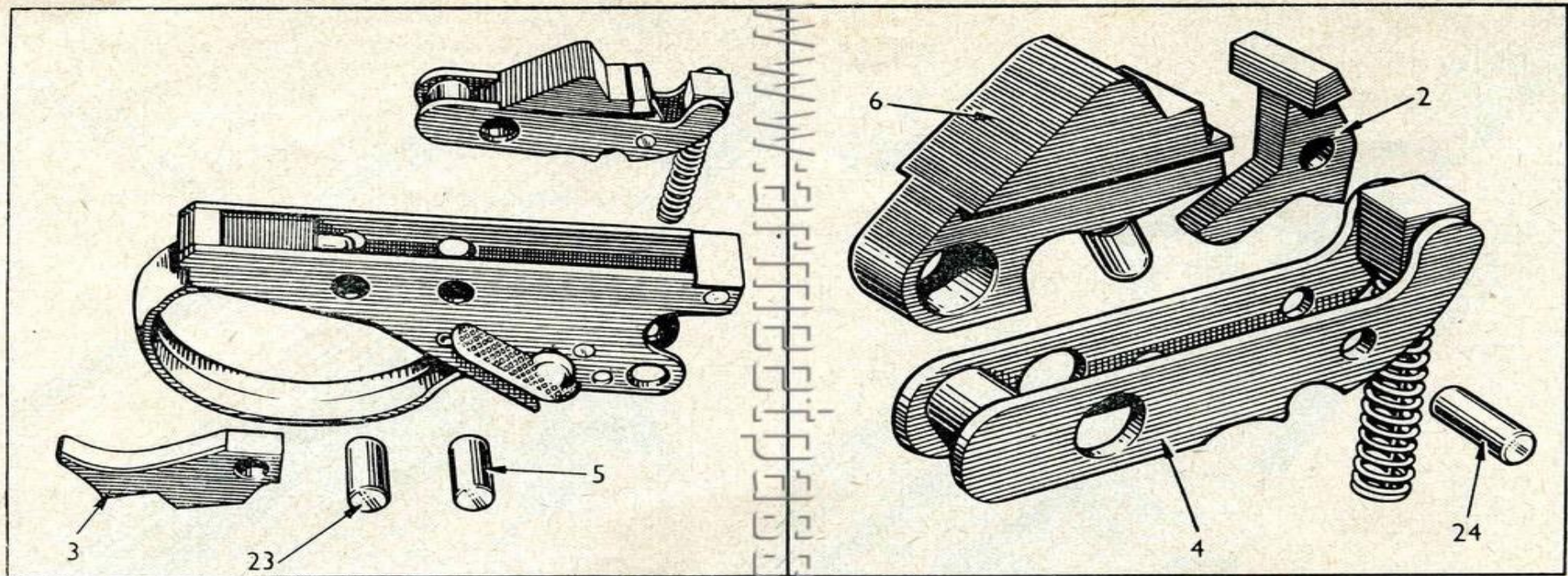


Fig. 13. To strip trigger group

9.2 TO STRIP TRIGGER GROUP (Fig. 13). Push out sear axis pin (5) and lift out sear group from trigger group. Push out trigger axis pin (23) and remove trigger (3) downwards through trigger guard.

Push out tripping lever axis pin (24) and lift tripping lever (2) from sear cradle (4) and lift sear (6) from sear cradle.

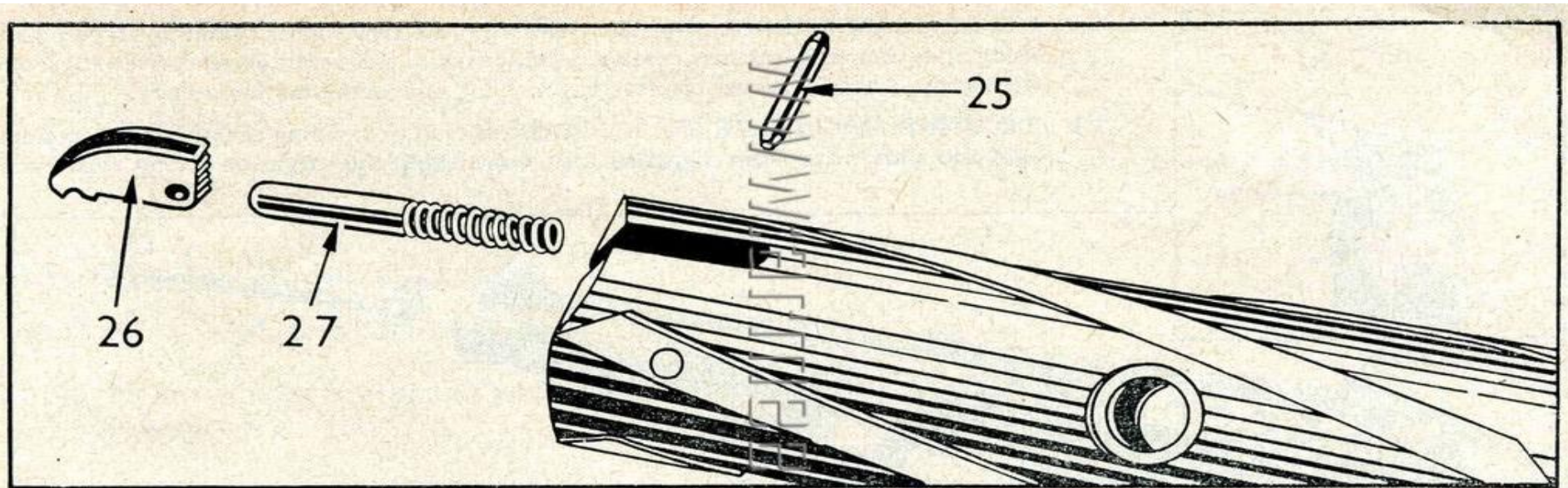


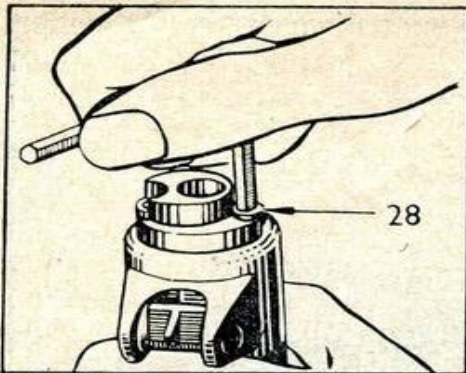
Fig. 14. To remove extractor

9.3 TO REMOVE EXTRACTOR (Fig. 14). Push out extractor retaining pin (25) and remove extractor (26). During this operation hold extractor with thumb or forefinger otherwise it may shoot out. Remove extractor plunger and spring (27).

Assemble in reverse order.

9.4 TO REMOVE PISTOL GRIP. Unscrew grip retaining screw using allen key. Withdraw grip.

Assemble in reverse order.



9.5 TO REMOVE BARREL (Fig. 15). Unscrew the two barrel retaining screws (28) using allen key and remove screws. Using barrel extractor drive barrel (20) from its seating. Rotate barrel to clear bayonet lug and withdraw from body.

9.6 TO STRIP MAGAZINE (Fig. 16). Depress stud protruding through bottom plate (30) and slide plate from magazine case, controlling the magazine spring with hand

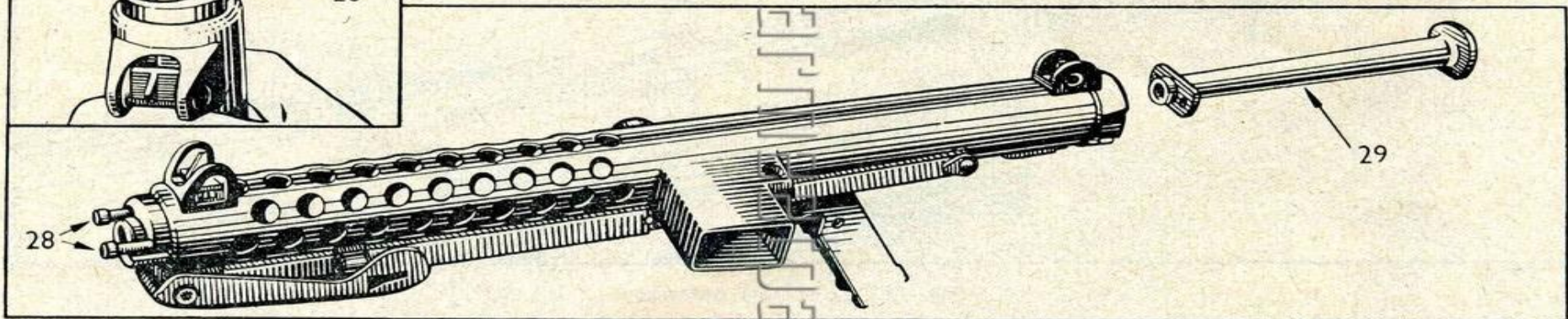
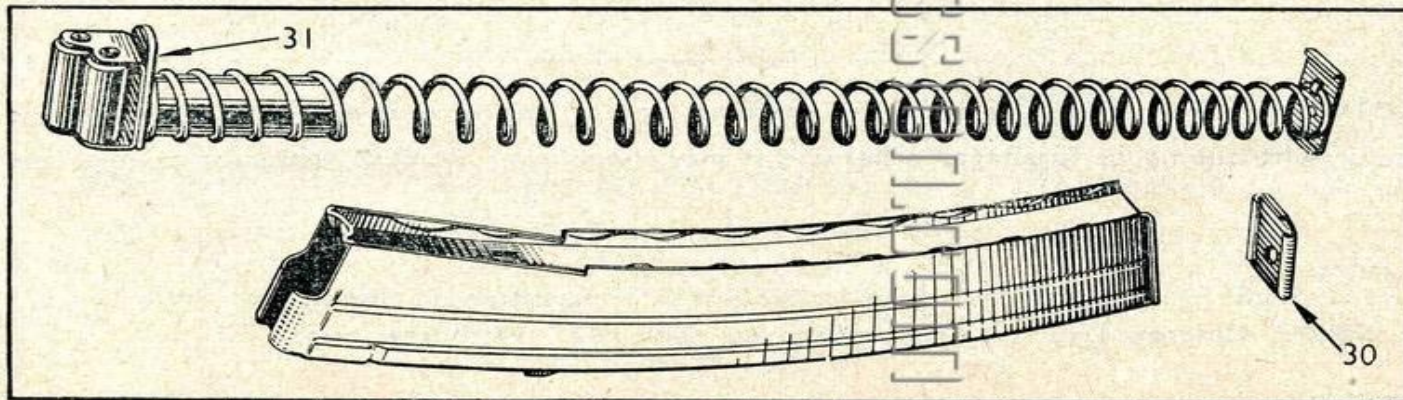


Fig. 15. To remove barrel



to prevent it flying free. Withdraw platform and spring assembly (31) rocking platform at bottom of magazine case to clear indentations.

Fig. 16. To strip magazine

9.7 FORESIGHT. The foresight fits into a dovetail in the barrel case. It is a spring fit, there being no retaining pin or screw. To remove, tap right out from either side with a drift.

9.8 BACKSIGHT. This should not be removed unless absolutely necessary.

To remove the backsight, drive out the pin, lift out sight and spring, taking care not to lose small collars.

ASSEMBLY

9.9 TRIGGER GROUP.

9.9.1 Ensure change lever is at automatic A.

9.9.2 Replace tripping lever and its axis pin in sear cradle, ensuring that the head of the tripping lever is engaged on the lower step of the sear.

9.9.3 Insert sear group into trigger group housing. Line up the sear, sear cradle and trigger housing, using trigger group retaining pin as a drift, and replace sear axis pin.

9.9.4 Insert trigger upwards through trigger guard ensuring that the trigger plunger is depressed within its housing. Line up, using trigger group retaining pin as a drift, and replace trigger axis pin.

9.9.5 Test trigger group for correct functioning at safe, single-shot and automatic.

9.10 BARREL.

9.10.1 Insert barrel into case and push forward, rotating the barrel to clear bayonet lug. The extractor clearance groove in the barrel face should be in line with the ejector opening.

9.10.2 Replace barrel retaining screws hand tight, then finally tighten, a little on each screw at a time using allen key.

9.11 FORESIGHT. To assemble, insert foresight into dovetail and tap into the required position.

- 9.12 BACKSIGHT.** Place spring and sight in housing, line up and insert pin. Insert collars and peen ends of pin over into countersinks in collars.
- 9.13 MAGAZINE.** Feed platform and spring into magazine casing, rocking past the indentations—the upper roller is on the left side when viewed from the rear of the magazine. Compress spring into casing and slide on bottom plate, engaging the stud in its hole in bottom plate.

SECTION 4—ZEROING

- 10.0** The weapon is zeroed before issue to the user and should require little attention other than correction for line, or direction. This is effected by tapping the foresight to left or right. The foresight is a spring fit in its seating and requires no securing screw.
- 10.1** Vertical zeroing is effected by loosening the 4 BA grub screw securing the blade (4 turns) with a $\frac{1}{16}$ " allen key and rotating the blade in or out as required, one or more full turns. The grub screw must be tightened to relock. One turn of the blade gives a variation of M.P.I. of $5\frac{1}{2}$ inches at 100 yards.
- 10.2** The weapon may be zeroed at either 100 yards or 100 feet. For 100 yards the Mean Point of Impact should be on sight line. For 100 feet M.P.I. should be 2 inches above sight line.

SECTION 5—CLEANING

CLEANING. Carry out elementary stripping.

Clean the bore of the barrel using a pull-through and flannelette size 4 inches x 3 inches. When the bore is clean, oil it, using flannelette size 4 inches x 2 inches. Clean and oil the chamber using a piece of stick with flannelette on it. Clean the remaining parts of the weapon with an oily rag. Particular attention being paid to the oiling of the face of the bolt, inside the bolt run and to the ejector.

Magazines should be cleaned with an oily rag.

Ensure that the platform is easy to move inside the magazine case.

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