FABRIQUE NATIONALE
D'ARMES DE GUERRE
HERSTAL-LIEGE
BELGIUM

D E S C R I P T I O N

of

F.N. A U T O M A T I C C A R B I N E

CONTENTS

February 1950

INTRODUCTION

FABRIQUE NATIONALE D'ARMES DE GUERRE, S.A., Herstal-near-Liège (Belgium), present the particulars of their new infantry weapon which they have designed to fulfil the requirements of modern infantry. As a result of the experience and knowledge gained on all fronts during the last war, the tactics of modern infantry have undergone some change. It is no longer considered probable that the rifle will be used except at short ranges or that the light machine gun will influence the battle at ranges greater than 600 - 1.000 yards.

In this concept, it is possible to consider the abolition of several of the present arms which fire a small arm cartridge and to replace them by a single modern weapon. With this aim in view F.N. have designed this new arm embodying many of the characteristics of the machine carbine and the self loading rifle combined with a cartridge which is more accurate and powerful than that of the machine carbine but lighter and shorter than the rifle cartridge. This combination will give to the infantry one weapon to replace the machine carbine, magazine rifle and self loading rifle. Fitted with a light bipod, which is easily carried in the pocket, it can act as a light machine gun in firing short bursts with adequate accuracy up to ranges of 600 yards and even longer. A platoon completely armed with this weapon can develop a rate of fire and power greater than that possessed by the present day platoon.

The saving in training time, maintenance and production by having one weapon to replace three or four different types needs no stressing.

The new design is based on a locking system and method of gas operation which has been developed and thoroughly tested by F.N. over a period of many years. In principle, it is the same as the F.N. self loading rifle which has proved successful in many tests and is in production for several countries.

The new weapon is of the minimum weight consistent with stability and without excessive recoil. It combines lightness with robustness of all working components, an exterior free from moving parts, unsightly or dangerous excressences, and a completely enclosed mechanism to ensure certainty of functioning under the worst climatic conditions. It has behind it the accumulation of knowledge and experience of F.N., and they present this design as one tried and tested, based on sound principles and without fear that years of development will be required to bring it to perfection. They are confident that trials will show the new weapon is fit and ready for duty with modern infantry.

GENERAL CHARACTERISTICS

Several models have been prepared which are based on a common design but have been fitted with barrels of varying length and weight. The following is a brief summary of the principal characteristics common to all models.

1. Method of Operation - The weapon is gas operated with an adjustable regulator to ensure certainty and smoothness of operation without excessive recoil. The breech block is mechanically locked before firing can take place and is not unlocked until the bullet has left the barrel. The breech block being in the forward position when the trigger is pressed, there is no disturbance of aim due to a heavy mass moving forward, a drawback in many automatic weapons. After firing, the mechanism extracts the fired case and feeds a new cartridge into the chamber so long as there are rounds in the magazine. When the magazine is empty, the breech block remains to the rear, and indicates to the firer the need to replace the magazine.

2. Stability - By placing the gas cylinder above the barrel and by careful attention to design, the line of recoil has been kept as low as possible, resulting in a direct thrust against the firer's shoulder. This feature and the low centre of gravity give great steadiness during firing and reduce the tendency of the barrel muzzle to be thrown upwards. The firer is therefore able to keep his sights on the target without difficulty.

3. Gas Regulator - This is designed on the exhaust principle, in that the regulator only allows sufficient gas for correct functioning to act on the piston, the surplus being vented into the air. This ensures that fouling is kept to the minimum.

4. Sighting - A robust aperture back-sight, graduated up to 600 yards is fitted on the butt housing and a blade fore-sight with strong protectors is fixed at the forward end of the gas cylinder.

5. Stripping - Stripping and assembly for cleaning and normal maintenance can be done without the aid of any tools. The butt being hinged enables the internal mechanism to be withdrawn quickly for the replacement of any part or for oiling or cleaning.

6. Method of Feed - Is from a magazine housed under the body. Its capacity is 20 rounds. The number of rounds can be increased but the greater length of magazine may make holding and firing difficult under certain conditions.

7. Weather Proofness - All openings such as the ejector opening, are completely covered as a safeguard against dust and mud.

8. Portability - The weight and length of the new gun give it the same handiness as a light rifle. Fitted with a shoulder piece in place of a butt, it is ideal for air borne troops.

9. Calibre - Whilst the present weapon has been designed for a special cartridge it can be adapted to use the short 7,92 round or the normal rifle cartridge, or any ammunition within these limits.

10. Accessories - The design permits of the addition of various accessories if required e.g.

(1) Bipod
(2) Flash hider
(3) Muzzle brake
(4) Bayonet
(5) Grenade launcher.

GENERAL PARTICULARS

	Short barrel	Long barrel	Short model
1. WEIGHTS			
a) Gun without magazine	8 lbs 10 1/3 oz 3 kgs 920	8 lbs 15 oz 4 kgs 050	8 lbs 10 oz 3 kgs 910
b) Gun with empty magazine	9 lbs 2 oz 4 kgs 140	9 lbs 6 2/3 oz 4 kgs 270	9 lbs 1 2/3 oz 4 kgs 130
c) Gun with full magazine 130gr.bullets	10 lbs 4 kgs 535	10 lbs 4 2/3 oz 4 kgs 665	9 lbs 15 2/3 oz 4 kgs 525
Gun with full magazine 140gr.bullets	10 lbs 2/3 oz 4 kgs 555	10 lbs 5 1/3 oz 4 kgs 685	10 lbs 1/3 oz 4 kgs 545
d) Bipod	9 ½ oz 270 gr.		
e) Barrel	1 lbs 11 ½ oz 780 gr.	2 lbs 910 gr.	2 lbs 1/3 oz 918 gr.
2. LENGTHS			
a) Gun Overall	3 Ft 2 in.78 0,985 m.	3 Ft 5 in.73 1,060 m.	2 Ft 9 in.85 0,860 m.
b) Barrel	19 in.1 485 cm	22 in 05 560 cm	23 in 03 585 cm
c) Bipod	12 in.125 308 cm.		

3. METHOD OF OPERATION — Gas

4. METHOD OF FEED — Fixed magazine - 20 round capacity

5. LOCATION OF FEED OPENING — Underneath

6. LOCATION OF EJECTOR OPENING — Right side of body

7. LOCATION OF COCKING HANDLE — On slide, housed on left of body

8. SIGHT BASE — 22.16" 563 mm | 22.16" 563 mm | 20.44" 520 mm

9. SIGHT GRADUATION — Up to 600 yards in 100 yards steps

10. RIFLING OF BARREL
a) Type of Rifling : Square
b) Number of grooves: Four
c) Direction & pitch: Right handed, 1 in 8.66 ins.

11. RATE OF FIRE — 550 r.p.m.

OPERATION OF MECHANISM

1. Loading - Initial cocking is by hand, using the cocking handle situated on the left side of the body. The left hand is used for cocking, leaving the right hand on the pistol grip ready for firing. As the cocking handle does not move during firing, there is no danger to the firer's face or interference with aiming.

Pulling the cocking handle to the rear withdraws the breech block and compresses the return spring. The breech block is held in this position by the holding open device. The loaded magazine is now placed in the magazine housing and retained in position by the magazine retaining catch. The breech is now closed by pressing the stud on the left near the magazine retaining catch, which allows the breech block to run forward under the influence of the return spring. The return spring is housed in the butt and acts on the breech block slide through a rod pivoted on its rear face. During this movement, the breech block carries a round into the chamber and the extractor engages the rim of the cartridge. The gun is now loaded and ready to fire.

2. Firing Cycle - On the left side of the body is the change lever which can be set at safe, or for single shot, or automatic firing. The three positions are widely spaced so that the setting can be felt in the dark.

Set the change lever as for single shot firing. The trigger now being pressed, the hammer is released and strikes the rear face of the firing pin which fires the cartridge. It should be noted that the breech block being already in the locked position, there is no disturbance of aim through the mass of the breech block moving forward.

As the bullet leaves the bore of the barrel, part of the following gases pass through the gas port into the forward part of the barrel into the gas cylinder. Here, by means of the gas regulator only, sufficient gas is used to ensure that the piston is driven rearwards with sufficient power to operate the mechanism, the remainder of the gas passes to the open air through holes in the gas cylinder.

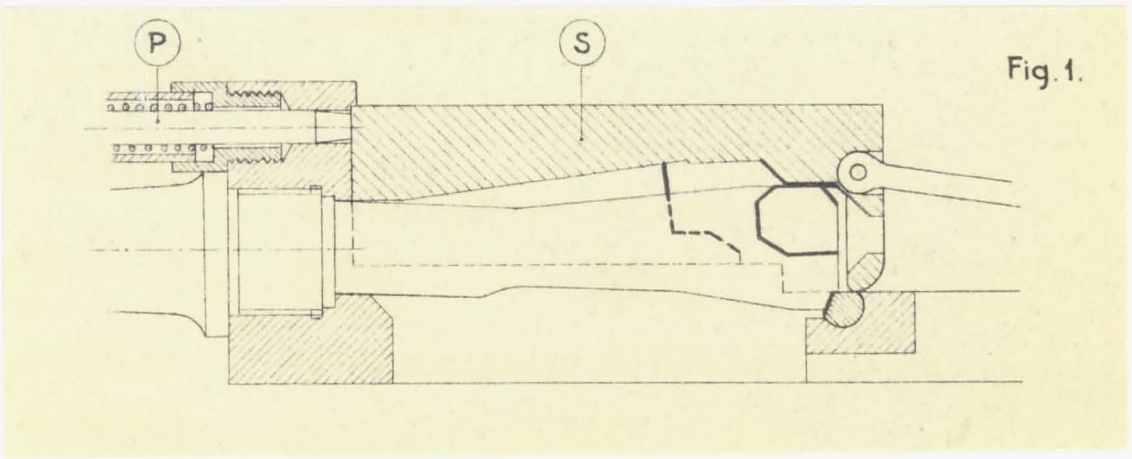


Fig. 1.

The piston P in its rearward movement strikes the breach block slide S and drives it backwards. See pos.1.

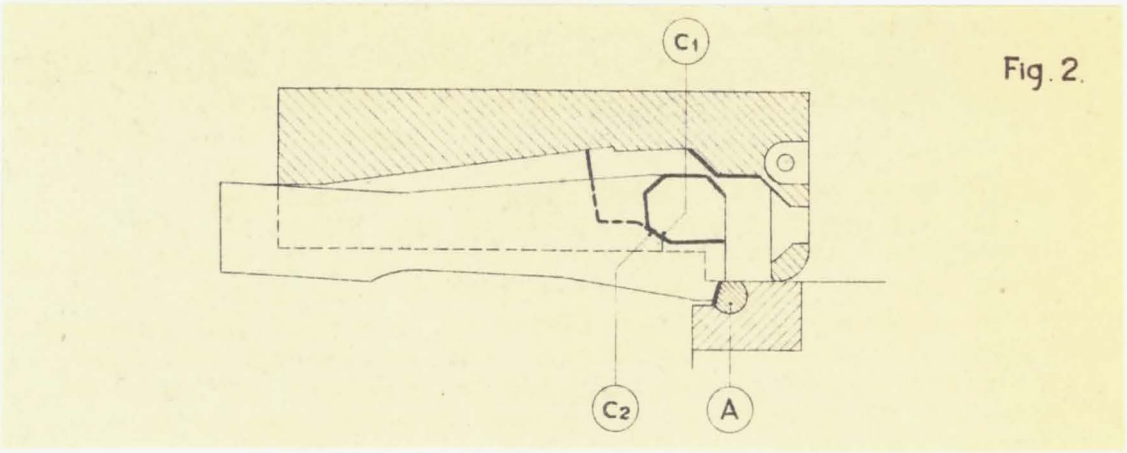


Fig. 2.

The ramps C2 of the breech block slide now engage the cam C^1 on the breech block. See pos.2.

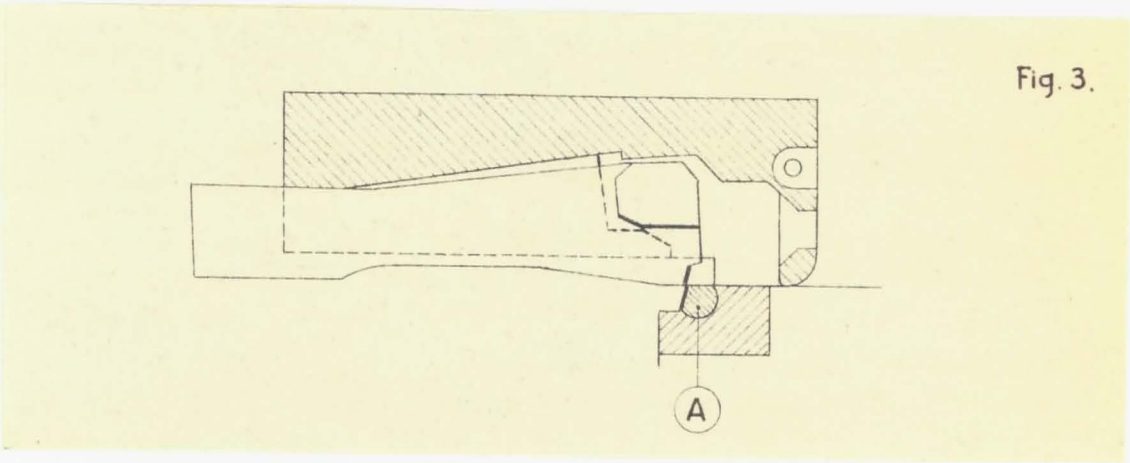


Fig. 3.

and lift it out of engagement with the locking shoulder A in the body, and the action is unlocked.

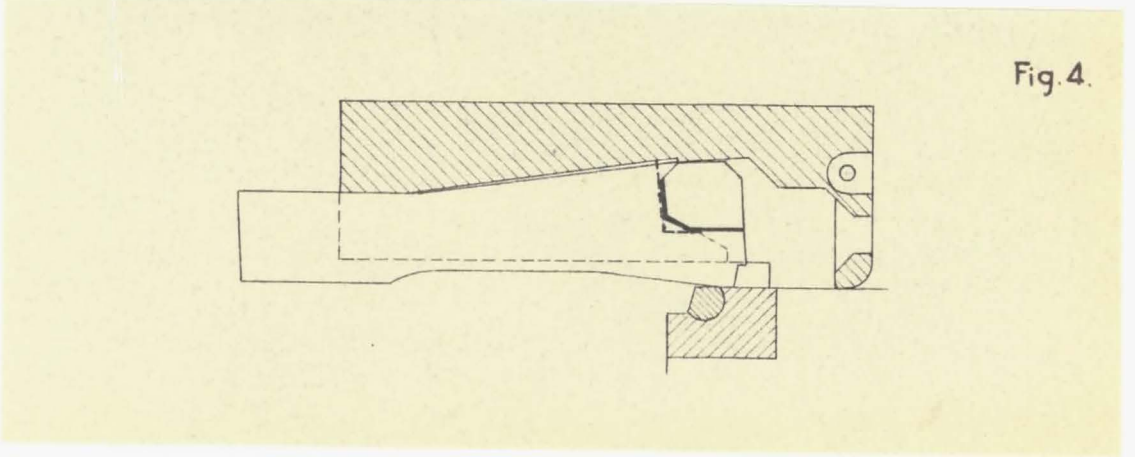
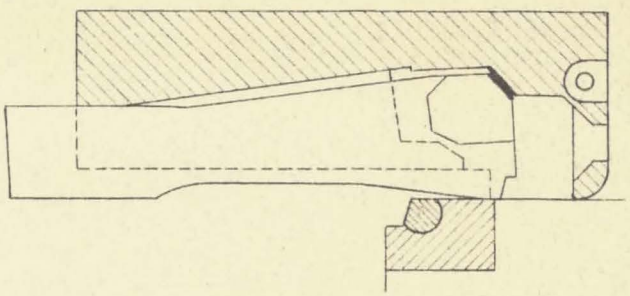


Fig. 4.

The breech block slide and breech block now travel to the rear together, and in their passage rotate the hammer to its cocked position (see figures 8 to 11). During this movement, the extractor has withdrawn the fired case from the chamber until it strikes the ejector (fig.12) when the case is thrown out of the gun to the right.

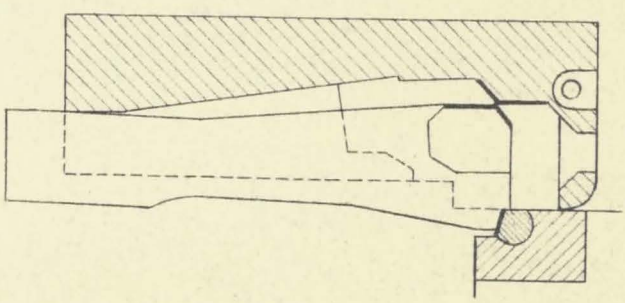
After the piston has struck the breech block slide and imparted the necessary impetus, the piston spring which has been compressed, reasserts itself and returns the piston to the forward position. The rearward action of the mechanism is now complete.

Fig. 5.



The forward action is caused by the return spring which have been fully compressed during the rearward movement, now driving the breech block slide and breech block forward (see pos.5). During this movement, the breech block pushes a round from the magazine forward and into the chamber.

Fig. 6.



When the front of the breech block reaches the barrel face, the breech block slide acting on the shoulders of the breech block forces the breech block down into engagement with this locking shoulder, thus locking the action (see pos.6)

The breech block slide continues its movement alone until it reaches its forward position where it is held in place by the return springs. As the breech block is locked in position, the extractor engages the rim of the cartridge in readiness to extract the round. The forward action is now complete and the gun ready to fire.

The above describes the mechanical movements when the change lever is set for single shot firing. When set for automatic firing, the sequence of events is the same except that the hammer is automatically released to fire the cartridge so long as the trigger is kept pressed. This is more fully described under the action of the trigger mechanism.

3. Action of the Gas Regulator and Gas Plug. See fig.7

These two components control the amount of gas allowed to act on the piston d. The gas plug a is fixed into the end of the gas cylinder b. It has two positions; in one it permits full access of the gas from the barrel to the gas cylinder. Turned through 180° it completely stops all entry of gas and the weapon will not then function automatically but can be operated by hand. In this position, the gun can be used with a grenade launcher as automatic action is not required.

The gas regulator c consists of a shroud round the end of the gas cylinder and has three holes of different sizes. When the largest is opposite the corresponding hole in the gas cylinder the amount of gas left in the gas cylinder to act on the piston will be small and may not be sufficient to operate the mechanism. By turning to the next smaller hole, more gas is available to act on the piston.

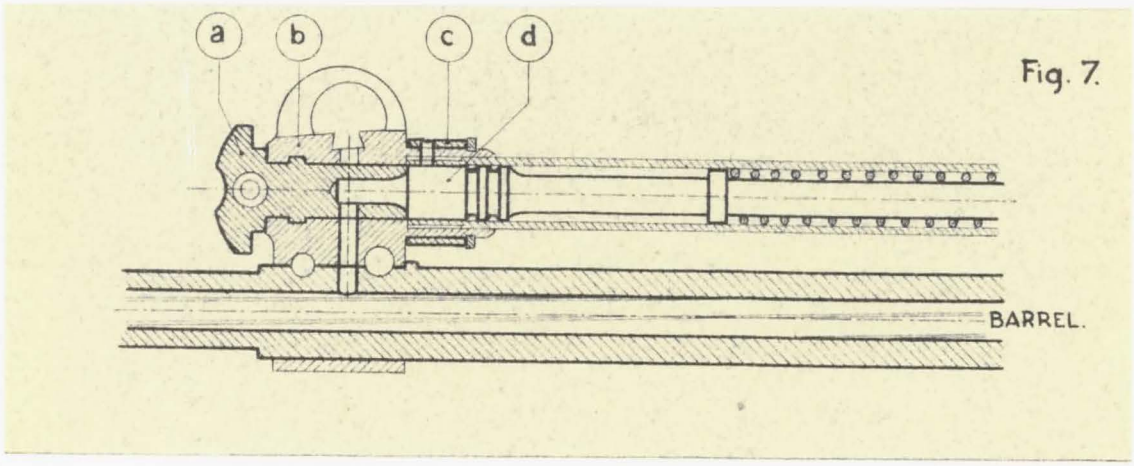


Fig. 7.

4. Trigger Mechanism

This is arranged to give a mechanical safe, a position for single shot firing, and a third position for automatic firing. The setting of the mechanism is indicated by the change lever on the left of the body, which can be turned to the requested position and alters the setting of the mechanism by means of a stop on the arm of the change lever.

Thus, when set for "safe", this stud is in the position shown at A in fig.8 and locks the trigger mechanically and prevents any possibility of accidental discharge.

When set for single shot firing, this stud is as shown in fig.9 when the hammer bent is caught by the sear each time the hammer is cocked. The sear mechanism is so designed that the trigger must be released and pressed again before the next shot can be fired.

When set for automatic fire as in fig.10 this sear is held out of engagement and the hammer is controlled by the safety sear.

The front or safety sear 8 incorporated in the mechanism has two functions. It prevents the hammer being released unless the breech block and breech block slide are fully home and when struck by the breech block slide at the final moment of its travel it releases the hammer and allows the trigger to function in the normal way. When set for automatic fire, this sear controls the hammer, which is only released when the breech is closed (fig.11 and 12).

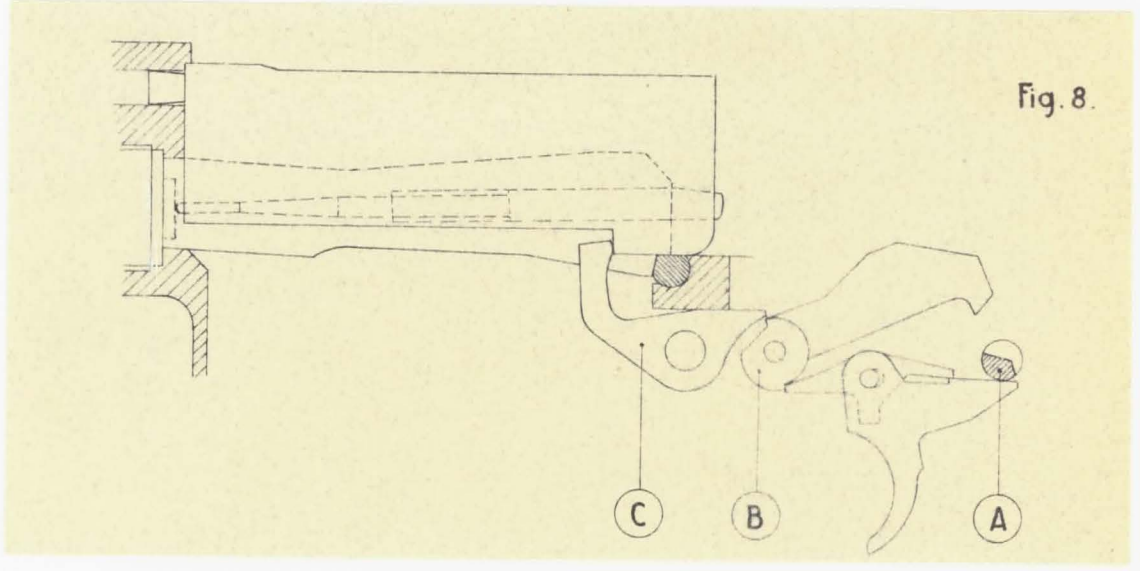


Fig. 8.

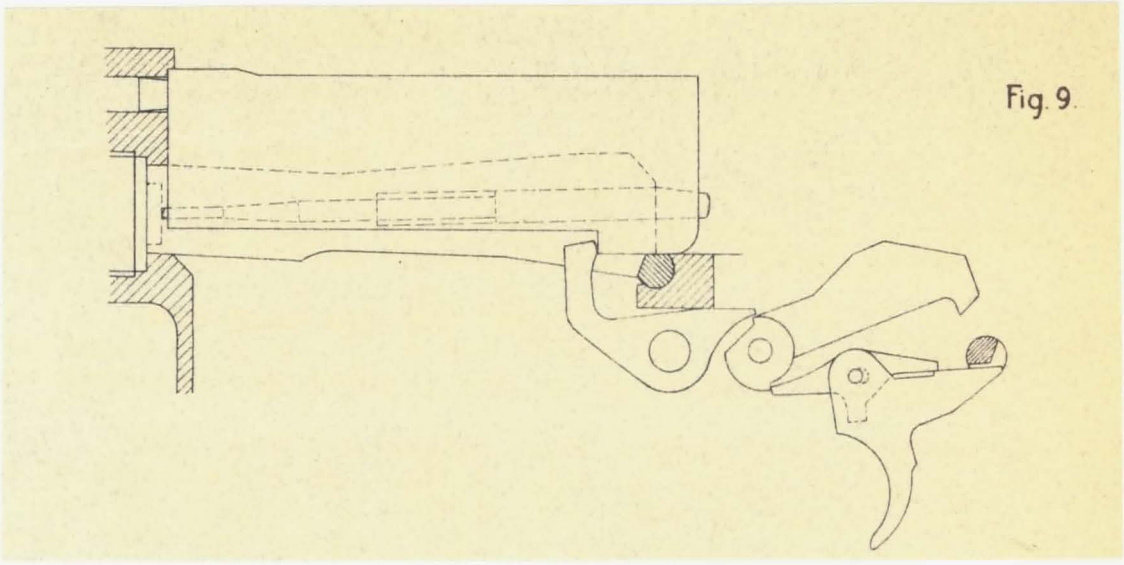


Fig. 9.

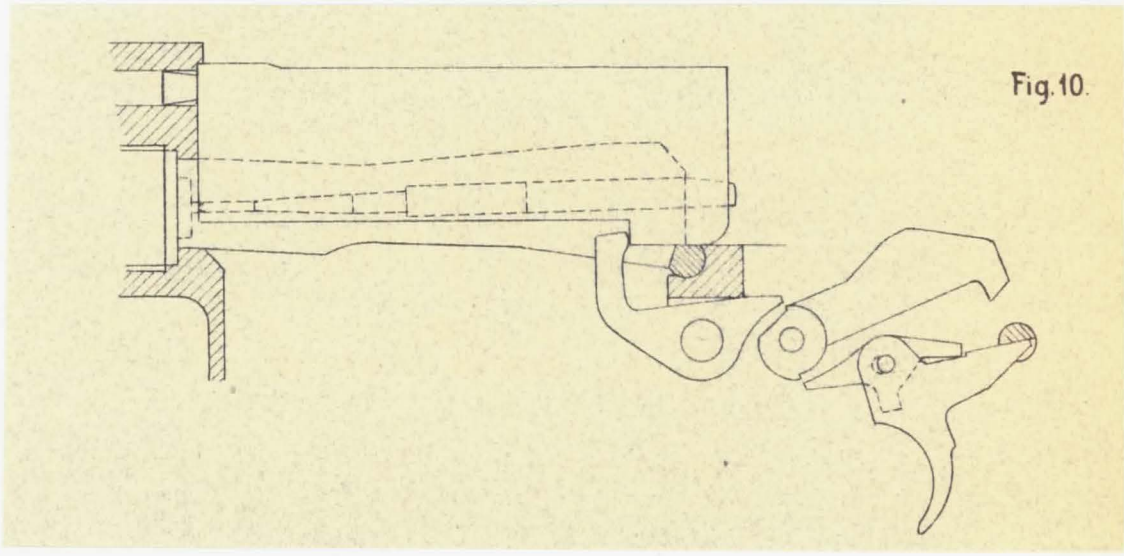


Fig. 10.

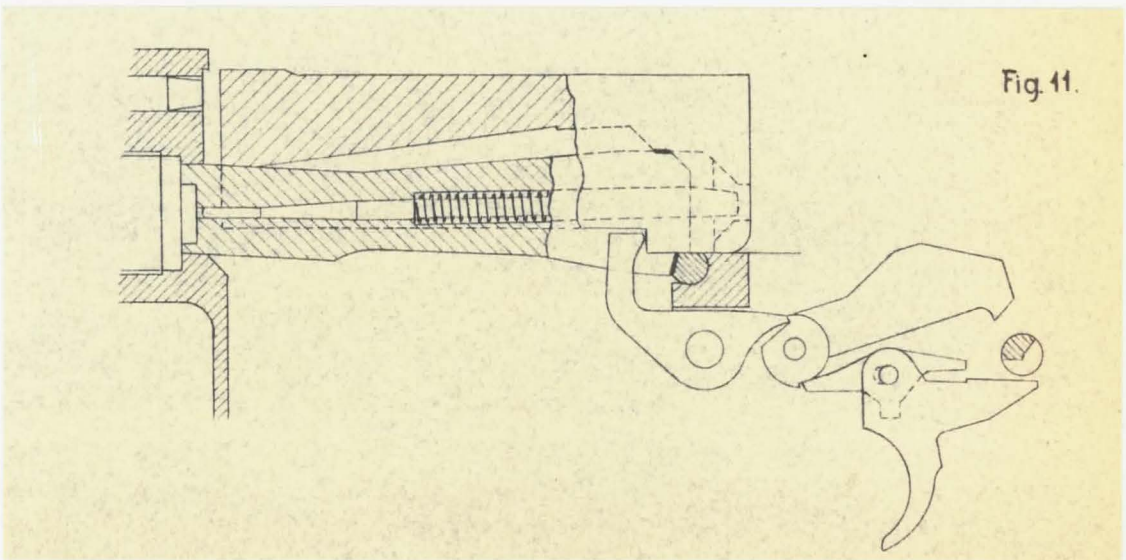


Fig. 11.

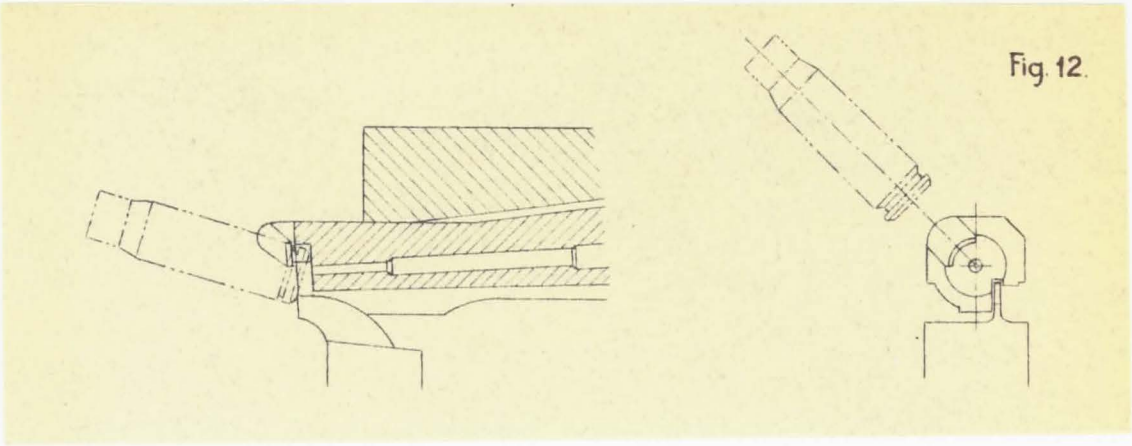


Fig. 12.

5. Return spring

The return spring is housed in the butt and acts through the rod on the rear face of the breech block slide. This method of housing has considerable advantages in that the spring is completely protected against dirt and accidental damage. It requires no attention unless it breaks or fails in some way, an event which will be extremely rare.

6. Holding open device (fig.13)

This device which holds the breech block in the rear position when the magazine is empty is housed to the right of the fixed ejector.

It consists of a robust plunger operated by the rear side of the magazine platform through a small pin acting in a slot. The plunger in its normal position is held down by its spring. When the platform of the magazine finally rises, the pin is pushed upwards by the pressure of the magazine spring. The plunger is raised to its full height when the magazine is empty. It thus projects in the forward path of the breech block and retains the latter here until a full magazine is fitted. To release the device, the breech block must then be withdrawn slightly when the plunger spring retracts the plunger and the breech block is free to move forward.

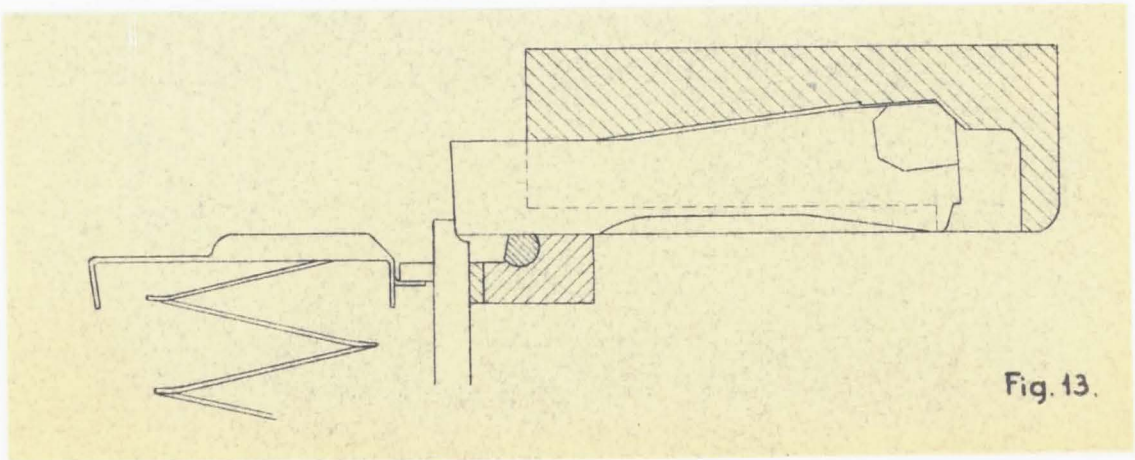


Fig. 13.

CARE AND MAINTENANCE

CLEANING

a) Barrel: The bore of the barrel should be kept slightly oiled when not in use, but should be clean and dry before firing.

After firing, barrel should be washed out, dried and oiled.

b) Gas Cylinder and Piston: The gas plug should be removed and wiped clean. A rod should be passed down the gas cylinder to clean out all fouling. The piston should be wiped clean.

c) Working Parts: The breech block and breech block slide should be wiped clean and slightly oiled.

In general, all moving parts should be kept lubricated to ensure good functioning but over lubrication must be avoided as surplus oil collects sand and dirt, and the gun when hot through firing will betray its position by smoke.

STRIPPING FOR CLEANING AND MAINTENANCE

1. Internal Mechanism - See that the gun is unloaded and the working parts are ~~forward~~ cocked. Push the butt locking lever on the left rear side of the body downwards as far as it will go. At the same time, press the butt downwards, when the butt will pivot and open the gun in a similar manner to opening a shot gun. Withdraw the breech block and slide by means of the spring rod fixed to the slide. Remove the body cover by sliding it off the body to the rear.

To separate the breech block from the slide, lift the breech block by the front end at the same time keeping it pressed home in the slide. Continue lifting by the front end and so lever out the rear end gently, against the pressure of the firing pin spring.

To remove the firing pin, push out the cross retaining pin, whilst retaining hold of the rear end of the firing pin, which under the pressure of its spring will be forced out of its housing.

To remove extractor, insert the nose of a bullet under the extractor claw and push outwards and upwards when the extractor will be drawn out of its seating. These parts are now ready for cleaning and oiling.

Reassembly is quite simple by following the above instructions in the reverse order.

2, Gas affected parts - By means of the nose of a cartridge, turn the gas plug and remove it. The piston and spring can now be withdrawn from the gas cylinder. Cleaning of these components can now be done and a rod pushed down the gas cylinder for the same purpose.

Reassemble in the reverse order.

No further stripping is necessary by the user. Stripping of the trigger mechanism should only be done by a trained armourer.

STOPPAGES

Stoppages should be of rare occurrence if proper attention is paid to care and maintenance. Their principal cause is lack of gas power, which may be due to incorrect setting of the gas regulator, excessive fouling on the piston head or inside the gas plug or grit in the mechanism. The attached table indicates the type of stoppage, its cause and cure.

TABLE OF STOPPAGES

Stoppage	Cause	Remedy
Mal ejection	1. Insufficient gas due to wrong adjustment of gas regulator or due to fouling affecting the action	1. Adjust gas regulator 2. If persistent, clean and oil working parts
Failure to Extract	1. Insufficient Gas 2. Hard extraction due to dirty chamber, or poor cartridges 3. Broken extractor cam.	1. Adjust Gas Regulator. If stoppages continue, examine chamber and mechanism for dirt etc or damaged extractor 3. Clean or replace broken extractor if this is found.
Misfeeds	1. Insufficient gas to drive the breech block far enough to the rear to feed the next round. 2. Incorrectly filled or damaged magazine. 3. Too much gas giving violent action and causing the breech block to over ride the round in the magazine. This stoppage SHOULD BE NOTICED from the violent recoil and the distance the empty case is thrown during ejection.	1. Adjust gas regulator 2. Examine magazine and replace if necessary 3. Adjust gas regulator
Failure to Fire	1. Defective cartridge - misfire 2. Broken firing pin 3. Dirt preventing breech closing fully or dirt jamming action of hammer.	1. Reload 2. Change firing pin 3. Clean gun
Failure to hold open empty magazine	1. Too much gas as above	1. Adjust gas regulator

CENTIMETRES


CENTIMETRES


CENTIMETRES