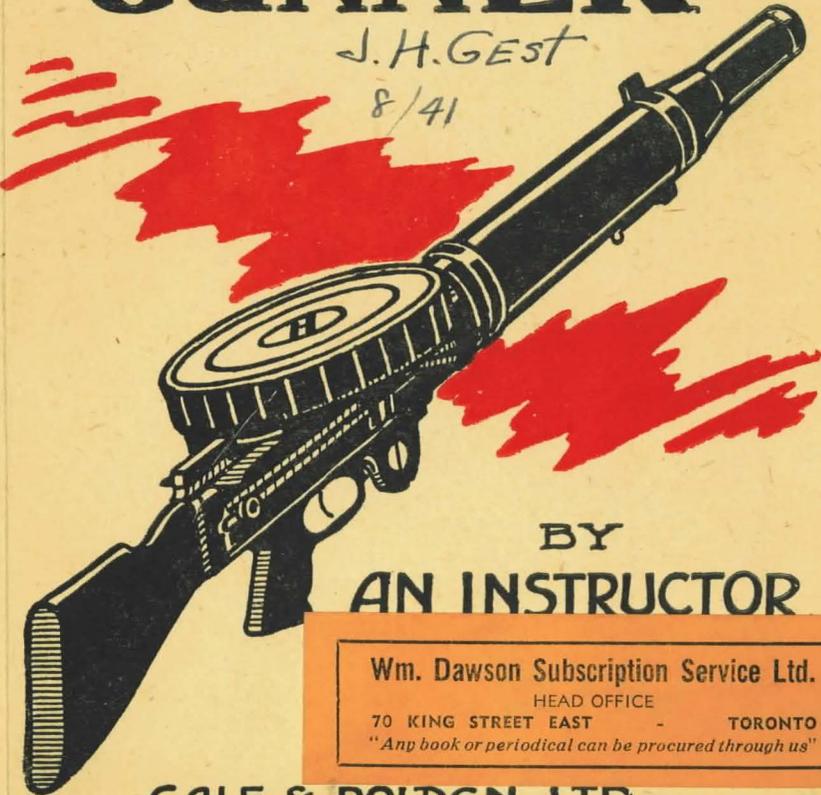


WITH NOTES ON THE .300 (AMERICAN) LEWIS GUN

THE COMPLETE **LEWIS** GUNNER

J. H. GEST

8/41



BY
AN INSTRUCTOR

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FOREWORD BY THE AUTHOR

THE sequence of instruction set out in this book has been found by experience to be very practical and to give good results. The author claims that it is natural and rational, and the methods followed are the crystallized results of some ten years' experience as an instructor.

The book opens with a General Introduction to the gun. A man's interest is aroused, he is taught the immense possibilities of the weapon, and is straightway shown how the gun is loaded, fed, fired, cooled, and operated. With his attention thus riveted by a good general knowledge, he is now keen and ready to go into technical details. A book which commences with a catalogued description of the parts misses the mark, and resembles too much the old history primer, which at the outset handed out that long list of dates, which was the bane of our schooldays.

Tactics have been omitted—~~an ounce of practice is worth a ton of theory.~~

The language used is simple, and contains as few technicalities as is compatible with efficiency.

With a sincere desire to help instructors, the author, with all humility, wishes to offer a few suggestions. He strongly recommends the method of "MUTUAL INSTRUCTION." The last ten minutes of each hour might well be set apart for this purpose. A man's knowledge is tested, any misconceptions he may have are cleared up, and he gains confidence. The instructor should frequently question his men, and above all DEMONSTRATE AND ILLUSTRATE, and "make haste slowly."

He should not talk too much, but try and make them think. Men love to find out things for themselves; they should always be encouraged to do this, and to ask questions.

The General Description, which calls for little comment, is divided into three parts:—

1. Stationary Parts in Front of the Body Locking-Pin.
2. Stationary Parts Behind the Body Locking-Pin.
3. Moving Portions.

Men have very great difficulty in understanding the construction of the *magazine*. The author recommends that a bent or worn magazine be stripped. The parts can be easily seen and understood, and the construction made quite simple.

The illustrations of the magazine at the end of the book show the lines on which to work. In description the best method to adopt is in that of reconstruction from the parts. For this purpose a little plasticine will be found extremely useful. *E.g.*, if a little plasticine is placed under the ring and gentle pressure applied, when in its correct position inside the pan, the two parts can be easily fixed together.

It will be seen that "Stripping and Assembling" are dealt with before "Mechanism."

This has been done with a purpose, as a man, in handling the gun, is instinctively and unconsciously learning Mechanism.

The "Order of Stripping and Assembling" has a few new points. In stripping and assembling the Body Group the author has found by repeated experiments and tests that better results are obtained by first of all dealing with the parts below the body cover (*i.e.*, cocking-handle, piston-rod, bolt, pinion and pistol-grip).

He has seen novices change the bolt in fifteen seconds by this method, and after only two or three trials.

The mechanism has been thoroughly and logically analysed, and the method of setting it out will be found to be superior to most other stereotyped descriptions. A good method of illustrating the mechanism is to remove the Barrel Group, and to use the assembled parts of the Body Group. These can easily be held in any position, as they are so light, and the various actions can clearly be seen.

"Stoppages" are dealt with in Chapter VIII; some additional notes are added in Chapter XII for those who wish to make themselves thoroughly conversant with the subject.

The importance of practice in the rectification of stoppages cannot be over-emphasized.

Chapter IX deals with Elementary Drill and Tests. Some of its movements should also be done wearing respirator.

The importance of Care and Cleaning is well known, and the subject has been fully treated in Chapter X. Men should be taught to treat the gun with as much care as they would a motor-cycle of their own. If that is done, stoppages are reduced to a minimum, as 90 per cent. of the stoppages with the Lewis Gun are caused through lack of care.

It is hoped that this book will be found useful in all branches of the Service where the Lewis Gun is used.

The author's purpose will then be amply justified and his labours rewarded.

T.J.

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THE COMPLETE LEWIS GUNNER

CHAPTER I.

GENERAL INTRODUCTION—THE EVOLUTION OF THE LEWIS GUN: ITS ADVANTAGES AND CHARACTERISTICS

1. **It enables you to bring a large volume of fire to bear on any target, with no loss of time.**

Rate of fire, 600—700 rounds per minute.

Time taken to load the gun is a matter of a few seconds (four seconds—compare with rifle). Also compare with the *fire orders*, etc., that would have to be given to a platoon, necessarily spread out.

A Lewis Gun in the hands of good gunners will work as much destruction as (fifty average rifle-men.)

2. Its Great "Moral" Effect.

The "rat-tat-tat" of a Lewis Gun has a great "moral" effect. Against a machine gun a man stands little chance, and human flesh will not face it.

A machine gun has terrible "killing" powers.

3. Reduces the "Human" Element.

Out of fifty riflemen, owing to awful din of guns, etc., probably a good number might misunderstand a fire order; also a number might quite conceivably miss the target, besides having too many bullets on one spot, leaving others neglected.

With the Lewis Gun fire control is very easy.

A machine is always more accurate than a man ("to err is human"), and the machine gun being so perfect, and operated by one man only, the "human" element is thus reduced to one-fiftieth, and is practically negligible.

4. Its Invisibility and Invulnerability.

I.e., hard to "pick up" and knock out.

The Lewis Gun occupies a frontage of about 3 feet, and a depth of about 9 feet, *i.e.*, it occupies space equivalent to that of two men. Compare with space occupied by fifty men.

Thus the Lewis Gun offers a *very small target*, and at 400 yards, specially if concealed in grass or shrubs, or on uneven ground, it is practically invisible. Hence it is very hard to pick up and knock out.

A Lewis Gun gives a maximum volume of fire from a minimum of front.

5. Its Mobility.

Its weight is 26 to 28 pounds, and it can easily be manœuvred by one man—hence change of position is very easy.

Changing Direction of Fire.—Compared with fifty men—they would have to swing right round, and so are unwieldy, besides offering a good target; whilst the Lewis gunner has nothing to do but turn his gun in the required direction.

6. Its Great Simplicity.

Consists of only sixty-two parts. The gun can be stripped (with the exception of two parts) with the nose of a bullet.

Each part has only one position, and cannot be put together wrongly.)

Its *cooling system* is very simple, and requires no attention or *water*.

It is well protected, very strong, and is not likely to be damaged in moving.

The gun can be "fed" in any position, and has hardly any "kick" or recoil, etc., and is easy to handle.

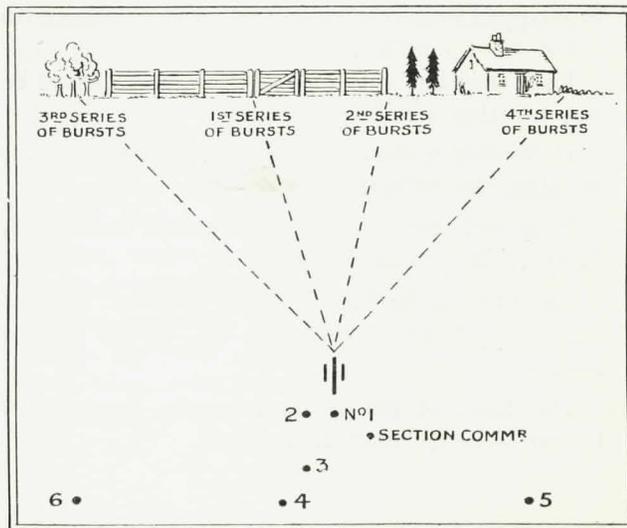
The blast of gas tends to make the gun go forward—hence easy to mount.

7. **The Lewis Gun is essentially a weapon of opportunity.**

The position of a Lewis Gun is not advertised, but is kept dark—a sort of “trump card up the sleeve.”

The Lewis Gun resembles a submarine. It does its work best by popping up when and where it is least expected and delivering a smashing blow in a trice. Before the enemy has time to recover from its surprise it escapes, by reason of its mobility and invisibility, to some other spot, from which it can repeat the dose.

“*Cross Fire*” or *Oblique Fire*.—Two guns can be arranged to set up a “belt of fire,” through which nothing can pass, and in which life is an impossibility.



“*The Layer System*” (see diagram above) enables you to sweep a large stretch of ground by overlapping cones, and the enemy does not know where he will next be fired upon.

The Lewis Gun can be used with great effect in the *attack* and in *open fighting*.

In this respect some of its uses are :—

- (a) To knock out *enemy* machine guns—a very important function.
- (b) To give “*covering fire*” to their own infantry when advancing.
- (c) To cover the forced retirement of their own men.

CHAPTER II

A BRIEF RÉSUMÉ OF THE GUN AND SEQUENCE
OF INSTRUCTION

Name.—'303 Lewis (Light Automatic) Machine Gun.

Weight of gun, 26 to 28 pounds. Rate of fire, 600 per minute. Velocity of bullet, 2,460 feet per second—20 feet per second faster than rifle. Compare with velocity of sound—1,100 feet per second. Weight of magazine (holds 47 rounds): —*Empty*, 1½ pounds; *full*, 4½ pounds. Air cooled, gas operated, ranged up to 1,900 yards. Can be fed in any position. Can be stripped with nose of bullet.

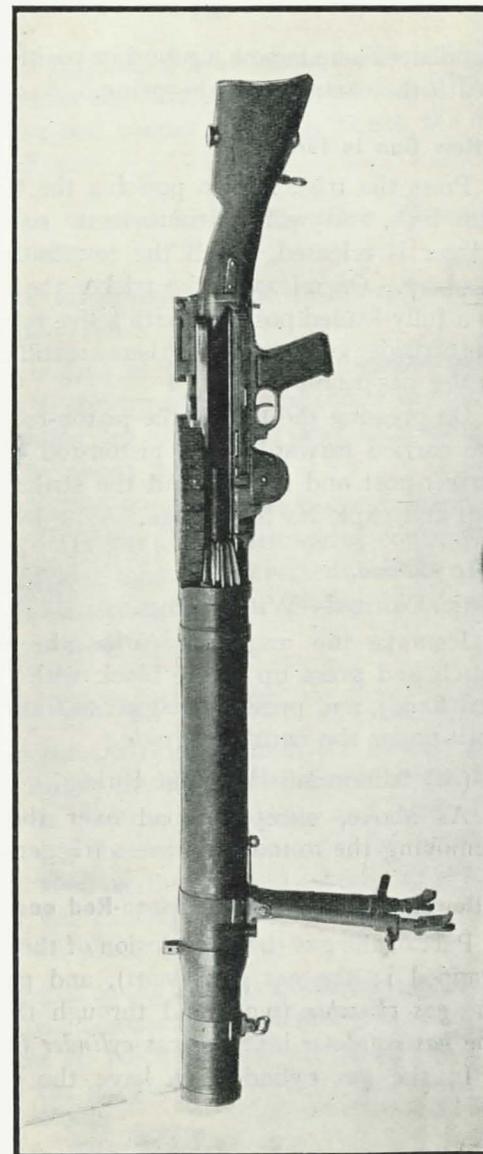
The gun is worked automatically by two forces:—

- (a) *The force or pressure of the gas* resulting from explosion of cartridge (19 tons to square inch).
- (b) *The return spring* (in pinion casing).

I. How Gun is Loaded and Fed.

To load gun, place magazine on magazine post, with *white* part to rear or the catch to right (thumb on centre block, and fingers lying across white part).

Ease on to post and rotate with right hand from right to left (clockwise). Pull back cocking-



Gun Complete with Magazine and Bipod.

handle. There is now a round in position, underneath the cartridge guide spring.

2. How Gun is Fired.

Press the trigger. On pressing the trigger the gun fires, and will continue to do so until the trigger is released, or all the rounds have been used up. On releasing the trigger the gun stops in a fully-loaded position, with a live round under the cartridge guide (provided there are still cartridges in the magazine.)

On pressing the trigger the piston-rod and bolt are carried forward. The piston-rod carries the striker-post and striker, and the striker hits the cap and explodes the charge.

3. To Unload.

(i.) Normal—With Firing.

Remove the magazine (press the magazine catch and press up centre block with fingers of left hand), and press the trigger to fire the round still under the cartridge guide.

(ii.) Abnormal—Without Firing.

As above, except unload over the top by removing the round, and press trigger.

4. How the Gas Operates Piston-Rod and Bolt.

Part of the gas (from explosion of the charge) is trapped in the *gas port* (vent), and passes into the *gas chamber* (p.c.), and through the hole in the *gas regulator* into the *gas cylinder* (r.c.).

In the gas cylinder we have the *piston-rod*.

This has a *cup-shaped* head, against which the gas strikes violently, forcing the piston-rod back. The piston-rod carries the bolt, hence the bolt goes back also.

5. How the Return Spring Operates Piston-Rod and Bolt.

On the under-side of the piston-rod are the *teeth on the rack*.

These engage in the *teeth of the pinion* (which contains the return spring), and rotate the pinion, thus winding up the spring and increasing its tension by about 12 pounds.

This tension now carries the piston-rod and bolt forward. The gas and return spring continue the backward and forward movement of the piston and bolt—alternately—thus giving us the automatic action *ad infinitum*.

6. How the Gun is Cooled.

When the cartridge is fired, the powder gases, rushing out of the barrel, strike against the *barrel mouthpiece* (which is choked), and against the *front part of the radiator casing* (which is tapered)—thus expelling the air, and setting up a *partial vacuum*, and causing cold air to be drawn through to take its place.

Sprung on to the barrel is an *aluminium* radiator, which has *seventeen longitudinal fins*, and these allow the air to circulate freely along them, thus cooling the gun.

NOTE.—When the gun is firing, if small pieces of paper are placed near the air openings in the rear part of the radiator casing, they will be sucked through, and will pass along the fins of the radiator, and can be seen passing out of the front part of the radiator casing, being carried through by the inrush of cold air.

Aluminium is very suitable as a radiator on account of its lightness and high heat conductivity.

CHAPTER III

GENERAL DESCRIPTION—STATIONARY PARTS IN FRONT OF BODY LOCKING-PIN

The gun may be divided into two portions:—

1. The Stationary Portions (Chapters III and IV).
2. The Moving Portions (Chapter V).

The Stationary Portions may be further subdivided:—

- (a) Those in front of the *body locking-pin*, i.e., the *Barrel Group*.
- (b) Those behind the *body locking-pin*, i.e., in the *Body Group*.

Strip the gun down to the barrel group, giving the *order of stripping* and names of parts *en passant*.

Now strip the barrel group, giving the names, etc.

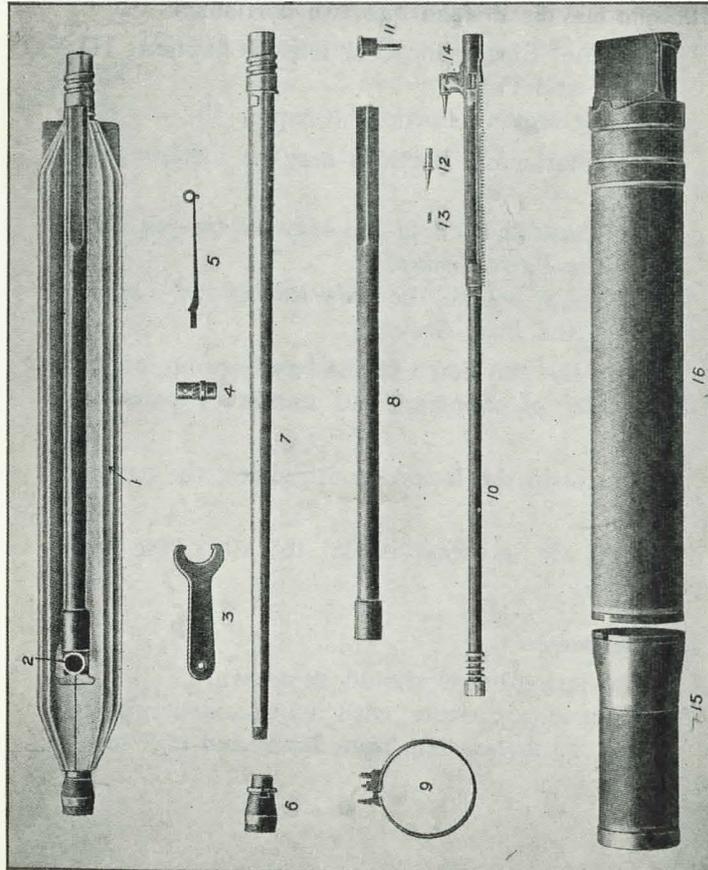
N.B.—It is inadvisable to strip the *gas chamber*.

I. The Barrel.

The spare barrel should be shown.

Calibre, .303 inches, with right-handed twist to rifling, 26 inches long (four lands and grooves).

1. Radiator.
2. Gas Chamber.
3. Barrel Mouthpiece Spanner.
4. Gas Regulator.
5. Gas Regulator Key.
6. Barrel Mouthpiece.
7. Barrel.
8. Gas Cylinder.
9. Clamp Ring.
10. Piston-Rod.
11. Cocking-Handle.
12. Striker.
13. Striker Keeper Pin.
14. Striker-Post.
15. Fore Radiator Casing.
16. Rear Radiator Casing.



The barrel tapers (why?) towards the muzzle, where it is threaded to receive the *barrel mouth-piece*.

A gas *port* (or vent) is bored in the barrel 4 inches from the muzzle to allow the gases to pass into the gas chamber.

A recess is cut in the barrel around the gas port, and fitting over this recess and round the gas port we have the *barrel band*.

At the breech end the barrel has a square thread, to connect it to the *body*.

A stud in front of the square thread fits in a slot in the flat of the radiator and aligns it with the barrel. It is sometimes called the *barrel positioning stud*.

At the breech end is a projection which coincides with the cut-away portion of the bolt face when the bolt is closed. The rim of a cartridge bears against it, in order to give room for the extractor to grip over the rim.

It is sometimes called the *barrel register*, because it registers the amount the rim of the cartridge must protrude so as to allow the extractors to do their work.

In stripping and assembling the gun *great care must be taken to prevent damage to this part*.

The upper part of the entrance to the chamber is grooved (oval-shaped), to direct the nose of the bullet downwards, as the Lewis Gun has a downward feed.

2. The Barrel Mouthpiece.

The barrel mouthpiece is a tubular nut, which screws on to the barrel by means of a left-handed thread. It has a left-handed thread to prevent it from working loose or being detached from the barrel during the firing, as owing to right-handed rifling the firing of the gun tends to tighten it.

It is choked, and serves two purposes:—

- (a) It keeps the radiator in position on the barrel.
- (b) It directs the powder gases in their rush outwards, and by reason of its being "choked" sets up a partial vacuum (thus aiding the cooling), and increases the pressure of the gases, giving an added velocity of 20 feet per second to the bullet and checking the recoil.

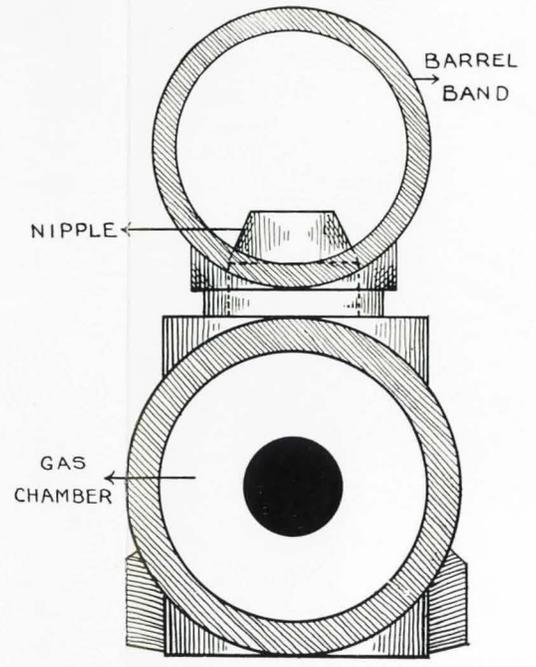
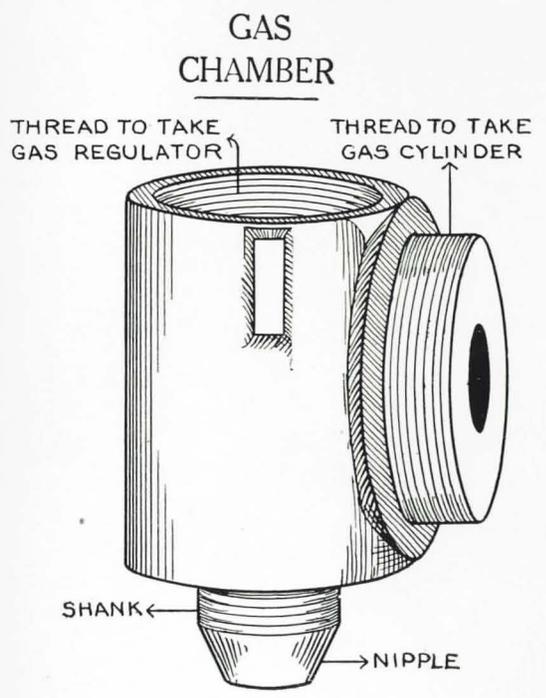
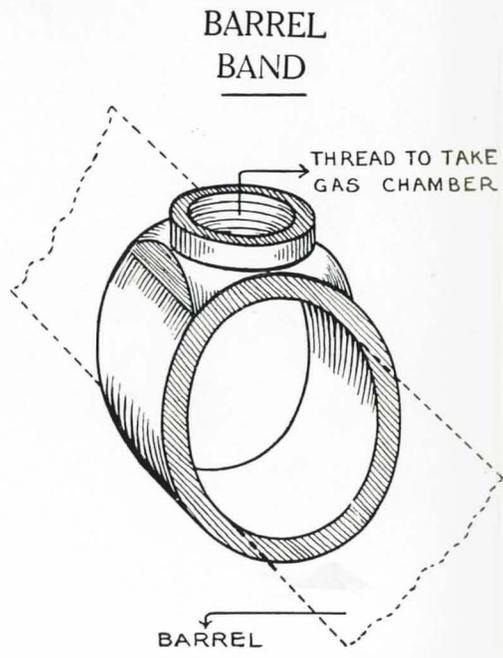
3. The Barrel Band.

The barrel band encircles the barrel and fits over the gas port. It has an internal thread, and into it screws the shank of the gas chamber.

4. The Radiator.

The radiator is of aluminium, and has seventeen longitudinal fins, and is sprung on to the barrel. The fins give a larger cooling surface, and assist in dissipating the heat of the barrel.

A *recess* for the gas chamber is provided at the forward end, and a *flat*, which corresponds with



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one on the radiator casing, is made at the rear end, to assist in alignment.

The under-side of the radiator has a bed to take the gas cylinder.

5. **The Radiator Casing.**

The radiator casing is made of steel, and is "engine-turned," to prevent the reflection of light.

It consists of a *front* and *rear* portion, connected by a *clamp ring*.

The *front portion* is tapered, and extends beyond the barrel mouthpiece, giving extra muzzle control.

The rear portion is cylindrical, and confines the passage of the cool air within, and thus in contact with the aluminium of the radiator.

It has an opening for the gas regulator, and also one for the stud on the gas regulator key.

At the rear end a *flat is provided*, to correspond with the flat on the radiator, and the rear face is drilled to take the barrel, gas cylinder, and the body locking-pin.

On the top is a flat, which forms the *front* portion of the magazine platform. Note the large air openings to allow passage of cool air. Note also the band near rear for aeroplane mounting.

On both portions of the radiator casing is a slot to take the positioning stud on the *clamp ring*, which joins both parts together by means of the *clamp ring screw*.

6. The Clamp Ring.

The clamp ring is turned up at both ends to form a foresight protector, and the inner portion on the right forms the foresight *block*, and is dovetailed to receive the foresight, which is of blade pattern.

7. The Gas Chamber.

The gas chamber has a shank with external thread, which screws into the barrel band, and the nipple sits in the gas port.

The rear face of the gas chamber is threaded to receive the *gas cylinder*. It is "tapped," or has an internal thread for the *gas regulator*, and has *wings*, which the spanner grips when stripping.

8. The Gas Regulator.

The gas regulator screws into the internal thread of the gas chamber, and has a large and small hole marked "L" and "S" respectively, either of which can be placed opposite the hole in the rear face of the gas chamber, thus regulating the gas supply.

NOTE.—For *air service*—L hole to rear; for *land service*—either hole to rear, but the small hole is generally used.

It is held in position by means of the gas regulator key, which fits into the dome-shaped head of the gas regulator.

9. Gas Regulator Key.

The *key* is sprung in and out of a hole in the rear radiator casing by means of a *loop* large enough to take the nose of a bullet, and is kept doubly secure by the bipod.

10. The Gas Cylinder.

Fitting into a recess or bed in the under-side of the radiator (and enclosed by the radiator casing) is the *gas cylinder*.

The gas cylinder is tubular, and the front end screws on to the rear face of the gas chamber.

It is shaped at the rear end to admit the rack on the piston-end.

In assembling *great* care must be taken not to burr the ends of the gas cylinder. It must be adjusted in position on the gas chamber, so as to enter the opening in rear part of radiator casing without forcing.

The foregoing parts, when assembled, complete the **Barrel Group**.

CHAPTER IV

GENERAL DESCRIPTION—Continued: THE STATIONARY PARTS BEHIND THE BODY LOCKING-PIN (i.e., IN THE BODY GROUP)

THESE consist of—

I. The Body.

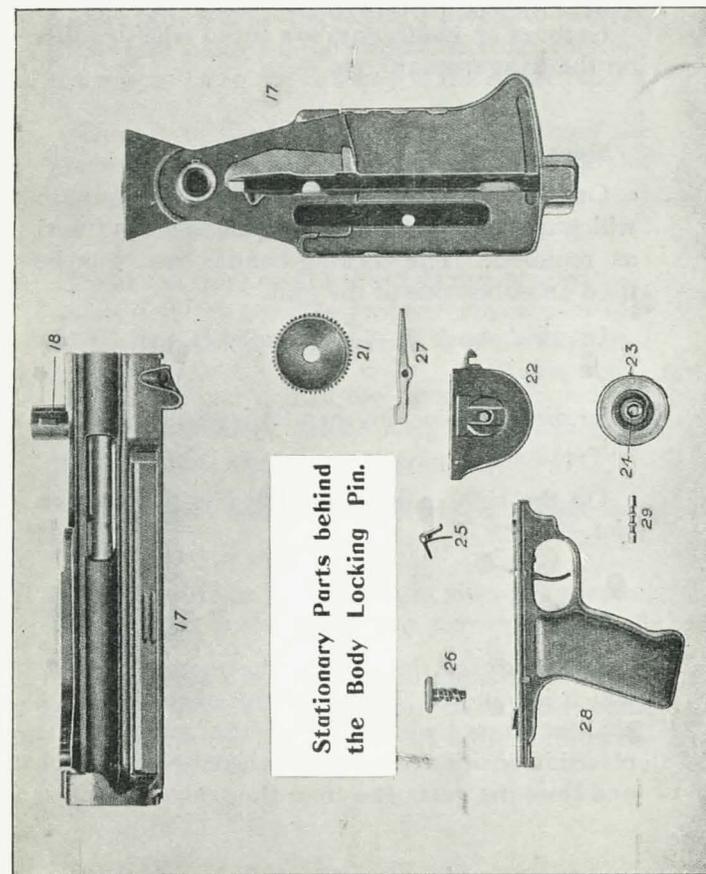
In description follow a definite sequence, such as the following:—

- (a) *Front* (three holes).
- (b) *Bottom* (three holes).
- (c) *Sides*.
- (d) *Top*.
- (e) *Interior*.

(a) Front.

The body has an internal square thread to take the barrel, and is also drilled to take the piston-rod and body locking-pin. A groove is cut in the right side, through which the pin is operated when stripping. The other side of the body is grooved for symmetry.

The pin has three grooves cut in it, to allow of its being easily removed by means of the nose of a bullet.



- 17. Body—Side View.
- ” Top View.
- 18. Magazine Post.
- 21. Pinion.
- 22. Pinion Casing.
- 23. Return Spring and Casing.
- 24. Hub.
- 25. Pinion Pawl and Spring.
- 26. Tension Screw.
- 27. Sear.
- 28. Trigger Guard and Pistol-Grip.
- 29. Body Locking-Pin.

(b) Bottom.

Underneath the body is a hinged pin, on to which the *pinion casing* hooks by means of its claw. This pin is therefore called *the pinion casing claw hinge pin*.

Openings are cut to allow the *pinion, plunger, and sear* to enter.

Grooves or guide-ways are cut to take the rails on the trigger-guard, etc.

(c) Sides.

Openings are cut on either side of the body, in which the *shank of the cocking-handle* can travel as required. The cocking-handle can thus be used on either side of the gun.

In *land* work cocking-handle is usually on right side.

In *air* work cocking-handle is usually on left side.

On the right side of the body is the *ejection slot*.

(d) Top.

The body carries on top the *magazine post*, which is hollow. In the interior of the post is a shallow cone, which (when the magazine is placed in position) disengages the *magazine catch* and frees the *outer pan* from the *centre block*.

Below the cone on the left side is a recess, with which the hook on the magazine catch engages.

The nib is thus kept disengaged from the recesses of the pan, and the pan is free to rotate.

Also, the post has on its front face a saw cut, to take the *hinged latch* of the *feed arm*.

The post has on the exterior a *key*, to prevent the centre block of the magazine from rotating (by engaging in the *key-way* in the centre block).

The top of the body is slotted throughout the greater part of its length, the front part of the slot taking the shape of a cartridge, while the rear part takes the *boss* on the *feed arm actuating stud*.

Near the front end of the cartridge-shaped slot, on its left, is a small groove, which coincides with a depression in front portion of the feed arm.

Near the rear end of the cartridge-shaped slot are two shoulders, which keep the cartridge in position until the bullet enters the chamber.

They are called the *cartridge positioning shoulders*.

At the rear end, on the right side, is a groove, into which fits the rim of the cartridge.

The *ejection seating* lies on the left side of the slot, and is closed by a spring cover, and a hole is drilled in the body, into which the stud on the ejector fits.

A *groove* is cut at the rear end of the body, in which the stud on the under-side of the feed arm finger moves.

This groove limits the play of the feed arm from right to left.

Interrupted *flanges* and *projections* are provided to correspond with similar ones on the body cover, thus locking the two parts.

(e) **Interior.**

Inside the body are drilled the *bolt-way* and the *piston-way*.

The bolt-way has four *grooves* in the form of a cross, which admit the lugs on the bolt and feed arm actuating stud. They are sometimes called the *longitudinal guide-ways*.

Recesses are provided near the rear end, to retain the cruciform lugs on the butt cap, to attach the butt stock to the body.

At the forward end of the bolt-way are the recesses, in which the locking lugs on the rear end of bolt lie, when the bolt is locked.

NOTE.—Show them and the rotation of the bolt.

On the left of the bolt-way *slots* are cut to allow the ends of the ejector to project alternately into the bolt-way.

The bolt-way (opposite the ejection slot) is slightly chamfered, to allow room for the extractors to expand (during the forward movement of the bolt).

The *piston-way* is flat-bottomed, to take the rack.

2. The Body Cover.

The body cover fits on top of the body.

(a) **Top.**

At the front end on the left is the projecting *tongue*, which has an undercut recess, and is a seating for the cartridge guide.

On top and at rear is the *tangent sight* bed, fixed by a dovetail to the top of body cover.

Why is it called the tangent sight?

The tangent sight *leaf* is hinged to it, and fixed by washer and split pin, and kept in position (or actuated) by the tangent sight *spring*—a flat spring.

Protectors for the backsight—when leaf is lowered.

The *tangent sight* is of the aperture pattern, and is graduated up to 1,000 yards—odd numbers on right, even on left.

The *slide* is operated by an elevating screw, which is itself worked by a *milled head*, with a *nib* and *spring*.

(b) **Underneath.**

At the front end is the *cartridge guide*, fitting in the undercut recess in the tongue. The *cartridge guide* has a positioning stud, which fits in a hole in the tongue.

The two ends of the *cartridge guide* are turned over, and the left hand lies over the right and controls it.

Note the depression on right-hand side of the spring to take shape of cartridge.

The *cartridge guide* has also a hinge and an auxiliary spring.

Show a "feed" with the cartridge guide removed, note jamb, owing to cartridge rising.

The cartridge guide prevents the cartridge from jumping up when struck by the bolt.

Pass around the spare cartridge guides.

To *strip*, press stud with nose of bullet and pull out. Can be changed in three or four seconds.

Requires changing after firing 2,000 rounds.

Next, we have the axis studs for the *left stop* and *right stop pawls*. Pass round spare pawls.

The studs and pawls are both numbered 1 and 2 respectively.

When in position on the body, the right stop pawl is on right, and the left stop pawl is on left.

The *right stop pawl* has an enlarged head or thick lip to bring it on a level with the under-side of the cover, and to thus keep the pawls in the same place.

The *stop pawl spring* lies behind the pawls, and a stud on its back fits a hole in the rib behind it. Part of the spring is turned over to embrace the stop pawl.

NOTE.—(1) Two ribs on body cover, to keep feed arm down and prevent it springing up.

(2) Bullet-shaped slot to strip pawls and spring.

- (3) The interrupted flanges and projections on the sides which correspond to similar ones on top of body, thus locking the body cover to the body.

3. Pinion Casing.

The *pinion casing* is shaped to contain the *pinion* and *return spring*.

At the front end of the pinion is the *pinion casing claw*, which connects it to the body (fastens on to pinion casing claw hinge pin).

Recess inside to take projection on pinion.

The pinion casing is drilled to take the tension screw, and the hole has a shoulder on either side, forming a recess, and into this the T-shaped end of the tension screw fits, thus locking the tension screw to the casing when in position.

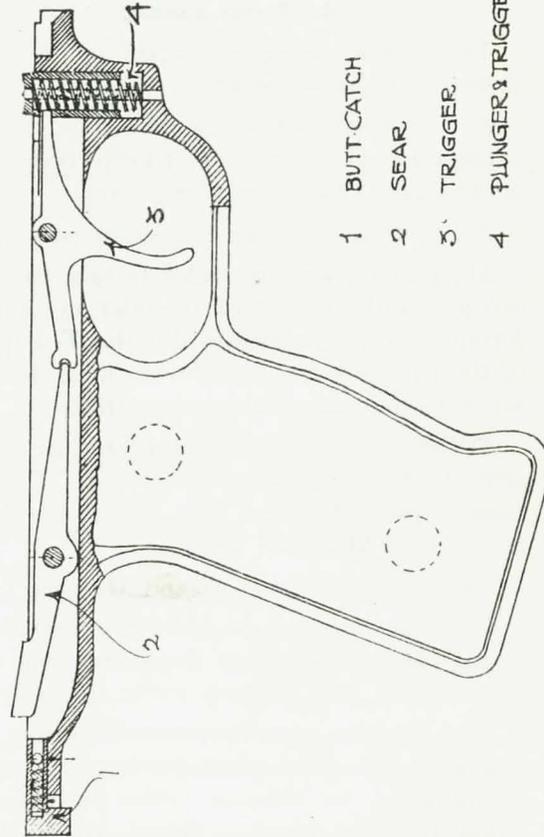
At the rear end is the *pinion pawl*, a rib on one arm of which engages in the pinion. The pinion pawl is pivoted on an axis pin, and is kept in action by a U-shaped spring.

Show spare pinion pawl and U spring.

The other arm of the pawl projects from the casing, and is lifted by the pistol-grip, as the latter is slid into position under the body.

Thus the pinion pawl prevents the return spring unwinding when the pinion is not engaged with the rack, as, for example, when the pinion and casing are allowed to drop prior to altering tension of spring or when the gun is being stripped.

SECTION OF TRIGGER GUARD AND PISTOL-GRIP:



- 1 BUTT-CATCH
- 2 SEAR
- 3 TRIGGER
- 4 PLUNGER & TRIGGER SPRING

The assembling of the trigger guard disengages the rib on the pawl from the teeth, leaving the pinion and spring controlled by the rack.

4. The Trigger Guard and Pistol-Grip.

The trigger guard and pistol-grip serves as a grip for the gunner's hand (right), and consists of a frame which is channelled to contain the *plunger*, *trigger*, *sear*, and *butt catch*.

Guide grooves or rails are cut in its sides to connect it with the body.

At the forward end is a *recess* for the pinion pawl—the *pinion pawl release*.

The *plunger* is a hollow cylinder (which plunges), containing the trigger spring (which is spiral and coiled inside).

Show spare trigger spring.

The plunger has two functions:—

- (a) It is a cover for the trigger spring.
- (b) Absorbs shock and stress of recoil from return spring.

It has a slot or saw cut to take the front end of the trigger.

The *sear* and *trigger* are both pivoted on axis pins. The rear end of the trigger, which is shaped like a *jaw* (or has a knuckle joint), takes the front end of the sear, and thus controls it.

NOTE.—Nose on sear to engage with bent on rack.

When the trigger is pressed, the plunger is depressed, and the nose of sear is also depressed,

thus freeing the bent on the rack. Hence the piston is now free to move forward.

At the rear end is the *butt catch*.

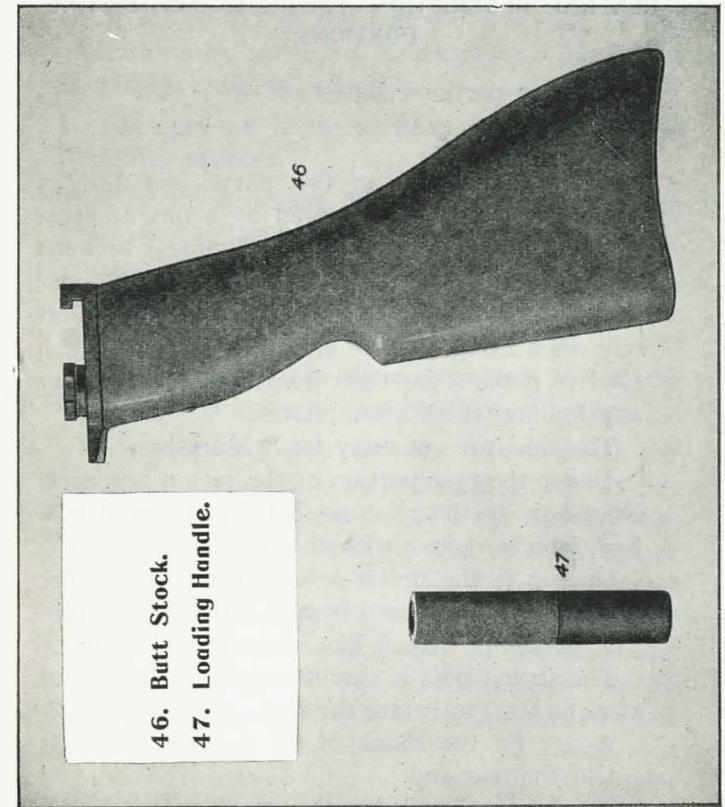
5. The Butt Stock.

The butt stock has on the front face the *butt cap*. It has four cruciform lugs for attaching it to the body, and a shoulder and recess, into which the tooth on the butt catch fits.

The *flat part* is called the *tang*. The bottom part of tang acts as stop for bolt and piston.

Top tang is stop for body cover.

The butt stock locks the component parts of the body.



CHAPTER V

GENERAL DESCRIPTION—Continued: THE MOVING PORTIONS.

THE moving portions consist of:—

I. **The Piston-Rod.**

The piston-rod is in two parts, joined by a loosely-fitting thread, secured by a pin, to compensate for any slight want of alignment between cylinder and body.

The head is cupped, and should never be left oily when firing. There are four gas rings, which tend to make a gas-tight joint, and scrape away any fouling which accumulates.

The sides are cut away for lightness.

Under the rear portion of the piston is a *rack*. Note how teeth are cut. Behind the rack is a *bent*, which engages with the nose of the sear.

On top is the *striker-post*, which is drilled for the *striker*, and secured by the striker-keeper pin. The striker is shaped like a champagne bottle.

The striker-post is chamfered at left front and at right rear, to rotate the bolt.

A slot for the shank of the cocking-handle is cut in the rear end.

A hole is also drilled at the rear to withdraw the piston-rod, should the cocking-handle get lost.

2. **The Bolt.**

The bolt is cylindrical in shape, and has on the face a rim to support the base of the cartridge, and a firing-pin hole or *striker-way*.

A *slot* is cut in the rim for the head of the ejector; also there is a clearance-way for empty cartridge cases to fall off.

Gaps are cut in the surface of the bolt for the *extractor seatings*.

The extractors are flat springs, with a hook or claw on the head, to engage the rim of the cartridge. They are fitted with a stud and shoulders, which spring into a groove and undercut recess in the seating.

Note space left to allow extractors to expand and to allow room to remove them if broken.

A *cammed slot* is cut into the bolt, in which the striker-post travels, $1\frac{1}{8}$ inch straight, $\frac{5}{8}$ inch curved.

Four lugs at the rear end take the shock of discharge. The left one is grooved to allow tail of ejector to ride over.

The tail of the ejector, when struck by the left lug of the feed actuating stud (in the backward movement), may rebound, but this groove in the lug ensures that as the bolt goes forward the tail is forced out of the bolt-way.

At the rear is an internal square thread, to take the external square thread of the feed (arm) actuating stud.

Note small hole to assist in cutting the square thread. Two-claw stops on the square thread of bolt correspond to two similar stops on the actuating stud, to prevent binding.

3. The Feed Arm Actuating Stud.

The feed arm actuating stud, with exterior square thread and stop, etc., screws into the rear of the bolt. It has four guide *lugs*, to correspond with the lugs on the bolt. These lugs work in the longitudinal guide-ways, and the top lug carries a heart-shaped *boss*, which travels in the long slot in the body, and actuates the feed arm.

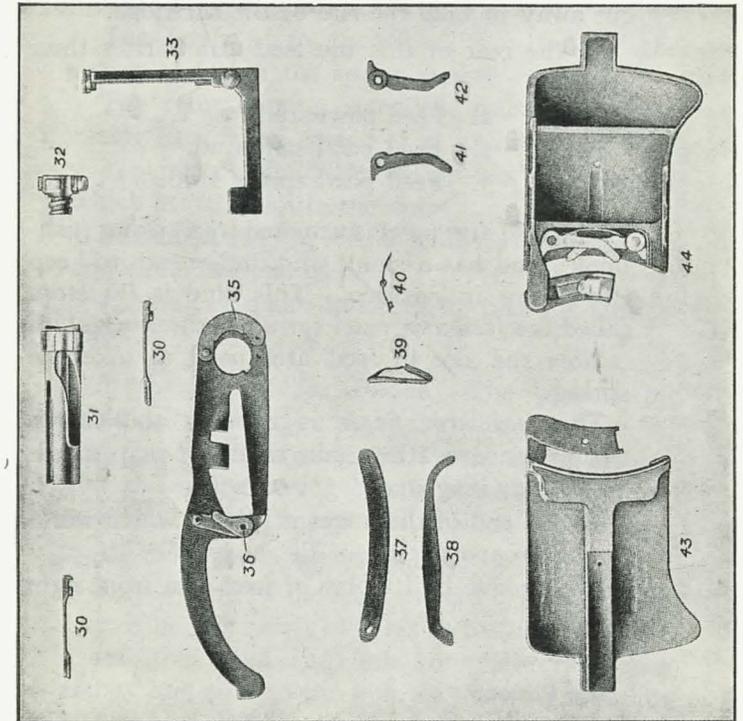
4. The Feed Arm.

The feed arm has an axis hole, which passes over the magazine post, and a *key-way* to clear the key on the post when stripping.

A hinged *latch* (with shoulder) secures the feed arm to the magazine post, by engaging in a cut on the front face of post.

A slot or opening is cut in the feed arm to allow the cartridges to pass from the magazine to the body. This opening is, therefore, called the *cartridge opening* in the feed arm.

A small depression on its left acts as a bullet stop. Next to this is a clearance (part cut away) for the separating pegs of the magazine.



- 30. Extractors.
- 31. Bolt.
- 32. Feed Arm Actuating Stud.
- 33. Tangent Sight.
- 35. Hinged Latch } on
- 36. Feed Arm Pawl } Feed
- 37. Ejector Spring Cover.
- 38. Ejector.
- 39. Cartridge Guide
- 40. Stop Pawl Spring.
- 41. Left Stop Pawl.
- 42. Right Stop Pawl.
- 43. Body Cover—Top.
- 44. Body Cover—Bottom.

A *tongue* slightly farther in rear acts as a cartridge stop, and prevents the cartridge from jumping up after leaving the cartridge guide spring. The latter presses the round down—hence the cartridge on leaving it has a tendency to jump up.

This tongue prevents this.

Behind the tongue is a clearance for pan of magazine.

In rear of the cartridge opening a small part is cut away to take the rim of the cartridge.

In the rear of this the feed arm carries three studs:—

1. Feed pawl stud.
2. Feed pawl *stop* stud.
3. Feed pawl spring stud.

The feed arm pawl is actuated by a spring (fish-hook), and has a small stud underneath to keep the spring in position. This stud is therefore called the *feed arm pawl spring positioning stud*.

Note the slot in feed arm pawl to take the spring.

The *feed arm finger* is curved, and has a channel underneath to take the heart-shaped boss on the *actuating stud*.

At the end of the finger is a stud, which works in the groove on top of the body.

The groove limits play of feed arm from right to left.

5. The Pinion.

The pinion casing, pinion pawl, and tension screw have already been described.

NOTE.—*Very careful attention is necessary to thoroughly understand its mechanism.*

The *pinion* is shaped like a cylindrical pan.

On its outside are the *teeth*.

Inside we have a *recess* to correspond with projection on *spring casing*, thus locking these two parts.

The *return spring* is fixed to the spring casing.

The *casing* has two slots in it; and

The *spring* has two studs on it.

The studs fit in the slots, thus locking the *return spring* to the spring casing.

The return spring is coiled inside the spring casing (just like a spring of an alarm clock).

The inner end of the spring has a *lip* on it, which fits in a slot in the *drum*.

Fitting inside the drum is the *hub* (both hub and drum are one piece).

The hub is square threaded, to take the tension screw.

Mechanism of the Pinion.—The piston (by means of the teeth on the rack) rotates the pinion. The pinion carries round with it the spring casing, and the spring casing carries round with it the outer end of the return spring (with two studs).

All these parts are locked one to another.

The one end of the spring rotating *tries* to take round the other end, but this end is locked to the drum (the drum and hub are really the same thing), and thus to the hub, *i.e.*, it tries to rotate

the hub ; but the hub is held fast by the tension screw, which is itself locked by two shoulders on outside of pinion casing. Thus one end of the spring rotates, while the other end is fixed, and tension is thereby put on the return spring, just as the winding up of an alarm clock puts the tension on the spring which is needed to run the works.

Before *action* with gun, see tension is 13 to 14 pounds. The backward travel of piston-rod puts on an extra tension of about 12 pounds, and this tension carries the piston-rod and bolt forward.

6. The Magazine.

See illustrations at end of book.

Illustrate with a stripped magazine, which can easily be reconstructed with plasticine.

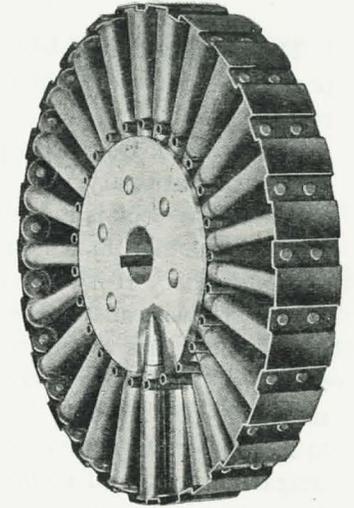
The *magazine* is a circular pan, with *rectangular corrugations* on outer circumference or rim, inside which are riveted plates to hold base of cartridges and to strengthen magazine.

The corrugations are engaged by the pawls.

The pan has a hole cut out of the centre of it with twenty-five recesses, to take nib of the magazine catch.

Over this hole is riveted a *ring*, carrying twenty-five separating pegs. The shoulders of the cartridge are held between the pegs.

On the inner circumference of the ring are twenty-five recesses, to correspond with those on the inside of the pan.



Magazine—Bottom View.



Magazine—Top View.

CHAPTER VI

STRIPPING AND ASSEMBLING.

- (A) Order of and Practice in Stripping.
 (B) Stripping and Changing Various Components.

NOTE.—When *stripping* (and assembling) always have *cocking-handle forward*.

NOTE.—With the exception of the gas chamber and the barrel mouthpiece (for which a spanner has to be used) and the clamp ring (which can be taken off with the gas regulator key), the whole of the gun can be stripped by means of the nose of a bullet.

(A) **Order of and Practice in Stripping.**

1. With cocking-handle in forward position, press forward the tooth on the butt catch, and remove the *butt stock* by turning it one-eighth of a turn to left.
2. With *feed arm* over to right, pull back the *body cover* and lift off.
3. Open the latch, turn the key-way opposite the key on the magazine post, and lift off the *feed arm*, taking care not to strain it in doing so.
4. Remove the *pinion*.
5. Pull back *cocking-handle* to fullest extent and withdraw it.

6. Remove *bolt* and *piston-rod*.
7. Press the trigger and withdraw the *pistol grip*.

NOTE.—The stripping and assembling of the Barrel Group should not be done more often than is considered necessary for instructional purposes.

8. Remove the *body locking-pin* and unscrew the *body* $2\frac{1}{2}$ turns from the barrel. (*Great care must be taken to prevent damage to the barrel register*.)
9. Lift *gas regulator key* out of the hole in radiator casing, remove and unscrew the *gas regulator*.
10. Unscrew the *clamp ring* and remove the *front radiator casing*, sliding the *rear part of casing* off to rear.
11. Insert the piston to form a wrench and unscrew the *gas cylinder*.
12. With the spanner unscrew the *barrel mouth-piece* to the right.

The following parts should be stripped as seldom as possible :—

13. With the spanner unscrew the *gas chamber*.
14. Remove the barrel, take out barrel band with jack and collar.

Reassemble parts 8—14 in the reverse order. The best order to assemble parts 1—7 (*i.e.*, in the

Body Group) is:—Piston-rod, bolt, cocking-handle, pinion, pistol-grip (all on bottom); and then feed arm, body cover, and butt stock.

NOTES.—(1) The *feed arm* is over to *right* before *removing* or *replacing* the body cover. Over to *left* when replacing *bolt* (useful in changing the bolt).

(2) See that feed arm actuating stud is screwed up.

(3) See that cocking-handle is right home and forward before replacing pistol-grip.

(4) In stripping and assembling the parts in the body group always deal with the parts *below* the body cover *first of all*.

(B) **Stripping and Changing Various Components.**

1. To remove an *extractor*. With the nose of a bullet, raise the hook until the stud is clear of the recess in the bolt, and push the extractor out, care being taken not to strain it.

2. *Left and Right Stop Pawls*.—Force stud on pawls spring out of its seating and lift the *pawls* off their studs.

Note *left stop* pawl is numbered 1, and *right stop* pawl is numbered 2, to ensure their being reassembled in the right order.

3. To remove the *cartridge guide*, press the stud down and slide spring out.

4. Raise the rear end of the ejector cover and slide off to rear to remove the *ejector*.

5. To remove *pinion* and *spring casing*, press up the arm of the pinion pawl to release the spring. Unscrew the tension screw. Allow pinion to drop out of its casing. With the point of a bullet press the hub and push the spring casing out of the pinion.

Changing Various Components.

Practice in this is important, in order to be able to change parts (without loss of time) should they get damaged or broken in action.

Change cartridge guide Time, 4 seconds.

To Change Bolt (in Case of Broken Extractor).

Cocking-handle forward. Remove butt stock. Withdraw pistol-grip slightly to rear. Pull back cocking-handle, remove it, and pull out the piston-rod and bolt.

Don't remove piston-rod entirely.

Take off bolt and change.

On assembling, see that feed arm is over to left before replacing bolt, and hold feed actuating stud lightly when replacing bolt to prevent it rotating. Time, 20 seconds.

To Change Pinion.

Remove butt stock and withdraw pistol-grip slightly to rear. Remove pinion and change Reassemble. Time, 9 seconds.

To Change Ejector.

Remove butt stock and body cover and ejector spring cover, then ejector.

Reassemble, and see that feed arm is over to right before replacing body cover. Time, 20 seconds.

To Change Feed Arm Pawl or Spring.

Remove butt stock and body cover. Lift off feed arm pawl and spring. Change. Reassemble.

NOTES.—(1) After the first few times, stripping should be practised in a sitting or lying position.

- (2) When replacing damaged parts, the gun should be stripped as little as possible, and no parts removed unless absolutely necessary, *e.g.*, in *changing bolt*.

Don't remove pistol-grip — simply slide it back a little.

Don't remove body cover.

But see feed arm is over to left when replacing bolt.

- (3) It may be necessary to move the cocking-handle slightly when raising the pinion casing into position before the rack will engage with the pinion.

Note to Instructors.—The stripping and assembling may be conveniently divided into five practices. Arrange class so that each man in turn performs each practice.

No. 1.—Strips parts *behind body locking-pin*.

No. 2.—Strips parts *in front of locking-pin* (except gas chamber).

No. 3.—Strips and assembles pinion, left and right stop pawls and feed arm pawl and spring.

No. 4.—Assembles part *in front of body locking-pin*.

No. 5.—Completes the assembling of gun.

CHAPTER VII

MECHANISM.

- (A) How to Load, Fire, and Unload.
- (B) Backward Action.
- (C) Forward Action.

SEQUENCE OF INSTRUCTION.

(A) HOW TO LOAD, FIRE, AND UNLOAD

Show each action as it takes place. Dummies should always be used. The magazine may be removed after first cartridge has dropped, to show the action more clearly.

Or hold the gun high up and let men stand on right of gun and look upwards.

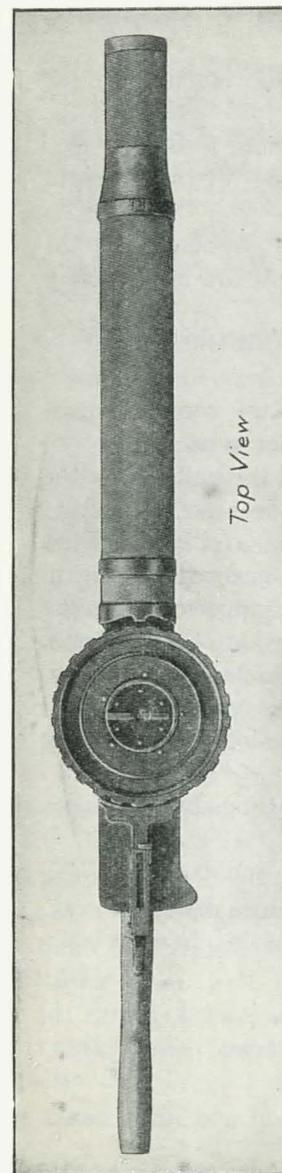
(Or hold the loading handle vertically in hand and place over it the spare feed arm. This will represent the magazine post of gun with its feed arm. Then place on the handle a magazine in which is a dummy and show action.)

On pressing the trigger the gun fires, and continues to fire until the pressure is released or magazine is empty.

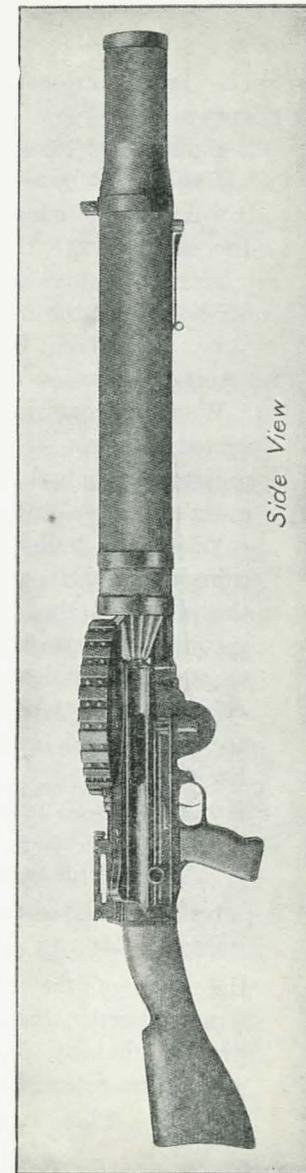
On releasing the trigger the gun stops in a fully cocked position, with a live round under the cartridge guide spring.

There are nine sequences in the *backward* movement.

There are five sequences in the *forward* movement.



Top View



Side View

5. Extraction.

When the bolt has been unlocked, the rear end of the striker-post bears against the rear end of the cammed slot, thereby causing the bolt and piston-rod to move backwards as a whole.

In the forward movement the extractors spring over and grip the rim of the cartridge, and in this portion of the backward movement the extraction of the empty case from the chamber commences.

NOTE.—The extraction does not commence until the bolt has been unlocked and is starting to move backward.

6. Ejection.

As the piston-rod and bolt move backward, the left-hand guide lug on the *actuating stud* strikes the tail of the ejector. This forces the head of the ejector smartly across the face of the bolt, striking the empty case and ejecting it through the ejection slot.

NOTE.—Show the positioning of ejector by bolt.

7. Action of Feed Arm and Pawls.

As the piston-rod and bolt move backward, the boss on the *actuating stud*, working in the curved channel of the feed arm finger, causes the feed arm to move from right to left.

The feed arm carries on it the *feed arm pawl*, which, being engaged behind one of the corrugations of the pan of the magazine, carries the pan round with it—clockwise.

The *left stop pawl*, which is actuated by a spring, is depressed by this corrugation on the magazine, and then comes up and engages behind it, and prevents the magazine from coming back in opposite direction.

The *feed arm pawl spring stud*, moving to the left, releases the *right stop pawl*, and allows it to come into action (actuated by the spring), and it bears against front of next corrugation and prevents the magazine from rotating too far.

Notes on Feed Mechanism.—Show feed arm moving to left and right by boss.

Remove body cover, place magazine on post, and show pan being carried round.

Also show how it rebounds or comes back, thus neutralizing the feeding (first) motion.

To prevent this, press against pan of magazine with thumb or bullet. Thus explain and illustrate function of left stop pawl.

Show feed arm pawl spring stud and how it releases the stop pawl by bearing away from it. This is best seen from the side in a position about 1 foot in front of the body cover.

Now assemble body cover and magazine, etc., and show actions of the three pawls.

8. Feeding Down of Cartridge by Magazine.

As the magazine rotates, a cartridge is forced down the slope of the centre block, and when clear of the lip falls through the cartridge opening in

the feed arm on to the top of the body, the tongue on the body ensuring that the cartridge drops.

It is carried to the left by the rim plates and separating pegs, and is forced under the cartridge guide spring, aided by the right side of the cartridge opening in the feed arm.

The bullet stop on the left of feed arm controls it in this position.

NOTE.—Hold gun up above head and let class see action from below. Also show with slightly cut magazine.

(C) THE FORWARD ACTION.

- I. **On pressing the trigger, the nose of the sear is disengaged from the bent on the rack, and the teeth of the rack being engaged with the teeth of the pinion, the tension of the return spring causes the piston-rod and bolt to fly forward.**

The left-hand side of the striker-post bearing against the left side of the curved portion of the cammed slot *tries* to rotate the bolt.

The bolt is, however, prevented from rotating by the resistance lugs and guide lugs moving in the longitudinal guide-ways, and the bolt and piston-rod are thus drawn forward.

NOTES.—(I) Place the piston-rod and bolt in position on top of trigger guard. Hold piston with left hand. Release pinion pawl and press trigger and show piston-rod and bolt going forward.

(2) Press trigger and ease cocking-handle forward slowly, with gun assembled.

2. **Striking of Live Round into Chamber and the Positioning of Ejector.**

When the piston-rod and bolt have completed a small portion of their forward movement, the *top extractor* strikes the lower edge of the cartridge rim, thereby forcing it forwards and downwards into the chamber.

The bolt following up the round strikes it again, and the extractors open out and grip the cartridge by the rim as it is going home into the chamber.

The head of the bolt in its forward movement strikes the head of the ejector, causing it to rotate about its pivot, and the head swings out of the bolt-way and the tail swings in, ready for its action in the backward movement.

NOTE.—Remove butt stock, body cover, and ejector spring cover, and show positioning of ejector ; also demonstrate with dummy round and top extractor removed from bolt.

3. **Action of Feed Arm and Pawls.**

As the piston-rod and bolt move forward, the boss on the actuating stud, working in the curved channel of the feed arm finger, causes the feed arm to move from left to right.

The feed arm carries on it the feed arm pawl, and the feed arm pawl, which is actuated by a

spring, is depressed by a corrugation on the magazine, and rides over it and engages behind this corrugation.

While the feed arm pawl is thus riding over the magazine, the *left stop pawl* (which was depressed by a corrugation as the magazine rotated) comes out and engages behind it, and prevents the magazine from slipping back or rebounding.

The *feed arm pawl spring stud* on the feed arm moves over to the right, and bears along and against the *right stop pawl*, and depresses it out of the path of the magazine pan, so that the magazine may rotate during the backward movement.

Note on Action of Feed Mechanism.—Follow same method as in 7 and 8 of Backward Movement.

4. Locking of the Bolt.

When the bolt has gone forward so that the resistance lugs have come into alignment with the locking recesses, the left side of the striker-post, bearing against the left side of curved position of cammed slot, causes the bolt to rotate from left to right, through 45° .

This places the resistance lugs in correct position in the locking recesses and locks the bolt.

NOTE.—Remove butt stock and body cover, and let pinion drop and show rotation of bolt.

Try and pull bolt back by the boss, thus showing that it is locked.

5. Firing of the Cartridge.

After the bolt has been locked, the striker-post travels forward another $1\frac{1}{8}$ inches, and, passing through the firing pin hole, strikes the cap and explodes the charge.

This further travel of $1\frac{1}{8}$ inches is a safety device, to ensure that the bolt is locked before the cartridge is fired

6. Engagement of Sear.

When the backward movement has been completed, the rear end of the piston-rod meets the tang of butt stock. When pressure on the trigger is released, the piston will move forward $\frac{5}{8}$ inch before the nose of the sear will engage with the bent on the rack. When the trigger is released and the sear engages with the rack, great stress is placed on the return spring (tension 25 pounds). Most of this stress is absorbed by the plunger, which intervenes.

Compare with kick of rifle when rested on parapet. Ground absorbs shock.

CHAPTER VIII

STOPPAGES

It has been found as a result of a large number of experiments that 90 per cent. of the stoppages with the Lewis Gun are due to want of care.

Always use special ammunition issued for the Lewis Gun.

NOTE.—Before firing, weigh the tension of the return spring, and see that the weight is about 14 pounds.

There are three main stoppages :—

No. 1 Stoppage, Cocking-Handle Right Forward.**Immediate Action.**

- (i) Rotate magazine ; if it rotates, change the magazine, load, aim, fire. *Stoppage is due to empty magazine.*
- (ii) Rotate magazine ; if no rotation, pull back cocking-handle, aim, fire. *Stoppage is due to missfire.*
- (iii) If, after immediate action has been performed, the gun will not fire, feel for cocking-handle, change magazine, reload, aim, fire. *Stoppage is due to damaged magazine,*

Stoppages Proper.**Gun Still Stops.**

Examine feed mechanism for—

- (iii) Worn or broken feed pawl ; or weak or broken feed pawl spring.
- (iv) Bent or worn magazine.
(If defective, then change and replace with new ones.)

Still Stops.

- (v) Examine for worn or broken striker (rare).
- (vi) When pulling back cocking-handle, if there is little resistance, examine *return spring*, which may be weak.

TO SET UP NO. 1 STOPPAGE.**In Barracks, etc.**

Stoppage due to :—

- (i) *Missfire.*—Load with dummy and press trigger.
- (ii) *Empty Magazine.*—Place empty magazine on gun, or load magazine with dummy and leave space (*i.e.*, chamber will be empty.)
- (iii) *Worn or Broken Feed Pawl, Weak or Broken Feed Spring.*—Remove feed pawl spring.
- (iv) *Damaged Magazine.*—Remove feed pawl spring.

- (v) *Worn or Broken Striker*.—Load and press trigger. Gun still stops.
- (vi) *Weak Return Spring*.—Same as (v).

On Range.

- (i) Place dummy in magazine.
- (ii) Leave space in magazine.
- (iii) Remove feed pawl spring.
- (iv) Replace feed pawl spring.
- (v) Place two dummy cartridges in magazine.

No. 2 Stoppage, Cocking-Handle over Thumbpiece on Safety-Catch.**Immediate Action.**

Pull back cocking-handle and carry on. If stoppage still occurs, *oil all working parts behind the body locking-pin*. (If time permits, clean gas cylinder.)

Two Causes.

- (i) *Hard extraction* (round may have expanded, etc.).
- (ii) *Excessive friction due to lack of oil*.

NOTE.—(ii) Shows *great* importance of keeping the gun clean.

TO SET UP NO. 2 STOPPAGE.**In Barracks or on Range.**

Withdraw cocking-handle far enough to eject empty case, but not enough for the bolt to engage behind fresh round, and push cocking-handle slightly forward.

Mechanical Cause.

Too much of the "gas force" is expended in extracting the round, etc., hence cocking-handle does not travel right back. The cocking-handle tries to go forward again, and the round which is not properly fed down is jammed up against the lip of the centre block.

No. 3 Stoppage, Cocking-Handle Behind Thumbpiece on Safety-Catch.**Immediate Action.**

(1) Pull back cocking-handle and carry on firing.

Gun Still Stops.

Remove magazine, clear gun.

Change *cartridge guide spring*, as the stoppage is due to weak or broken cartridge guide spring.

(2) If empty case is left in chamber, *change bolt, eject case, and carry on*.

(Stoppage due to *broken extractors, or dirt under them*.)

(3) If there is an empty case on bolt or in bolt-way, change *ejector*.

(Stoppage due to *broken ejector*.)

TO SET UP NO. 3 STOPPAGE.

In Barracks.

(1) *Weak Cartridge Guide Spring*.—Press down nose of cartridge and allow bolt to go forward and replace magazine. For broken cartridge guide spring, remove spring or use broken one.

(2) *Broken Extractor*.—Load, place empty case in chamber, and press trigger.

(3) *Broken Ejector*.—Remove ejector or place an empty case in the ejector way.

On Range.

(1) For broken cartridge guide spring, remove spring, or use broken one.

(2), (3) Not advisable to set up on range.

In addition to the above three stoppages, there is also a stoppage due to a bulged round or separated case. This stoppage rarely occurs if the ammunition is carefully examined before filling the magazine.

They usually give a second position stoppage "in front of trigger."

Bulged Round.—Cleared by placing lanyard or wooden handle on cocking-handle and pulling back.

Separated Case.—Cleared by means of clearing plug.

If no clearing plug is available, reload and press trigger, and obstruction will probably adhere to next cartridge.

If it does not, increase tension of return spring and repeat.

NOTE.—The slowest moving part of a Lewis Gun is "flying," hence practice in rectifying stoppages should be given, until the work can be done *instinctively* and with *rapidity*. The importance of frequent practice cannot be over-emphasized. When this is done in barracks, etc., always examine dummy rounds most carefully; also carry out the practices in sitting and lying positions, and with gas helmets and respirators.

CHAPTER IX
ELEMENTARY DRILL

MAGAZINE Carrier containing magazines on left of gun at two paces interval.

All "drill" with the gun must be done smartly.

To meet the exigencies of present-day warfare, it is advisable that some of the following movements be done with box respirator, etc. :—

Command—"Fall In."

Section falls in, in single rank, in rear of gun.

Command—"Number."

As usual.

Command—"Take Post."

No. 1 :—

- (i) Lies down behind gun.
- (ii) Examines gun.
- (iii) Takes magazine from No. 2 and places it on the gun.
- (iv) Reports "Gun ready."

No. 2 :—

- (i) Takes up position 2 yards to left of gun.

- (ii) Examines all magazines, and holdall.
- (iii) Reports correct, or otherwise, to No. 1, and passes him loaded magazine.

On the Command—"Action."

No. 1 :—

Runs forward (about 5 yards) and gets into firing position on target indicated, and loads.

No. 2 :—

Runs forward carrying magazines and holdall, and lies down on the left of No. 1. Takes out a magazine from magazine carrier.

On the Command—"Range."—"Aiming Mark."

No. 1 :—

Raises leaf, adjusts sights, rotates magazine, pulls back cocking-handle, and lays on the target.

No. 2 :—

When No. 1 is ready to fire, No. 2 holds out his right hand just above No. 1's back, and looks out for signals from Section Commander.

Command—"Fire."

No. 2 repeats section commander's order.

No. 1 then presses the trigger, and fires in bursts of about one second, stopping to notice fire and aim between bursts. He will continue to fire at the rate of 5 bursts a minute.

Command—"Change."

No. 1 grips magazine with right hand, pressing back the catch with thumb.

No. 2 presses up the *centre block* with the tips of fingers of the left hand.

No. 1 takes off empty magazine and passes it *upside down under gun* to No. 2.

No. 2 places it inside magazine carrier.

No. 2 takes full magazine in his right hand, and, holding it with the white portion to rear, places it on the magazine post and eases it down.

No. 1 rotates magazine (with right hand) as far as it will go, *pulls back cocking-handle*, relays, and carries on.

Command "Stop."

No. 1 :—

Helped by No. 2 will change magazines, place butt of gun on ground, and await further orders.

Command—"Cease Firing."

No. 1 :—

- (i) Takes off magazine.
- (ii) Presses trigger.
- (iii) Unloads the gun, leaving cocking-handle forward.
- (iv) Lowers leaf of backsight.
- (v) Carries gun to "Cease Firing" position, 5 paces to rear.

No. 2 :—

- (i) Helps No. 1 with (i) and (ii).
- (ii) Places new magazine on gun.
- (iii) Replaces magazines in carrier, and goes to "Cease Firing" position.

Signals Used in Drill, etc.**"Stand By, Ready to Fire."**

Hand raised.

"Fire."

Hand brought smartly to side.

"Stop."

Hand waved across body three or four times.

"Cease Firing."

Arm waved in circular motion from shoulder three or four times.

"Action."

Both arms raised and lowered in line with the shoulder three or four times.

CHAPTER X

CARE AND CLEANING

IN a dry climate once a week should be sufficient, but in situations where the barrel is exposed to a moist atmosphere, *daily cleaning* is necessary.

When ball ammunition has been fired, *daily cleaning of barrel* is necessary for at least ten days.

After Firing More Than 600 Rounds.

Strip the gun and pour boiling water down barrel and gas cylinder until too hot to handle.

Clean *barrel* with an *oily piece of flannelette*, 4 inches by 1½ inches, cleaning-rod and oil. Clean gas cylinder with wire brush, oil, and mop.

When Not in Use.

Strip parts behind body locking-pin and clean every day. Also clean the barrel.

The *gas chamber* must be cleaned as often as the barrel. It will not, however, be removed, but cleaned while in position on the barrel.

Cleaning.

Completely strip gun and clean all parts, when considered necessary.

Special Oil for Low Temperatures,

Use mixture of half Rangoon and half instrument oil.

To Clean Barrel, when Gun has been kept in Store.

Pull cocking-handle right back. Place piece of flannelette 4 inches by 2 inches in eye of cleaning rod, *taking care to surround the metal of the cleaning-rod with the flannelette*, which must be well oiled. Insert rod into muzzle and pass up and down till all fouling is removed.

Replace with fresh, 4 inches by 2 inches, and repeat till quite clean; then oil well. If flannelette is tight, and is pushed through the breech, reverse it before pulling it back, to avoid a jamb.

If the chamber has not been properly cleaned by the above process, then strip parts in front of body locking-pin, and place a *larger* piece of flannelette in eye of rod; insert from *breech* end, and clean the chamber first with oiled, and then with dry, 4 inches by 2 inches.

To inspect barrel, use barrel reflector, and place in chamber at breech end.

To Use the Double Pull-Through.

If rust or metallic fouling is present in barrel, and after firing strip parts in front of body locking-pin.

Thoroughly oil gauze on pull-through, and drop weight through bore from breech, care being taken to pull it through in line with axis of bore. Continue motion, till all rust or fouling is

loosened. Now clean with cleaning rod and flannelette as before.

When the gauze fits *too loosely* to clean the grooves of rifling, place under each side of gauze narrow strips of flannelette or paper.

Don't use worn-out gauze.

To Clean Gas Cylinder.

Join up the cylinder cleaning-rod and screw on wire brush well oiled. Remove the cylinder when necessary and work rod to and fro a few times. Remove wire brush and replace with mop and clean again.

To Clean the Mechanism.

A mixture of equal parts of Russian petroleum and paraffin should be used.

If any parts are clogged with dried oil, etc., remove with paraffin.

After cleaning each part, dry thoroughly and leave slightly oiled. Don't use too much oil, as it will collect dust and clog. Apply a little oil to magazine catch and round the exterior of centre-disc.

The exterior of the gun, and exterior and interior of magazine, should be rubbed over with a *slightly* oiled rag. Any excess of oil in interior of magazine is likely to be carried into chamber.

Examination and Repairs of the Gun.

It is most important that any signs of wear, friction, or play should be at once reported to the armourer for adjustment or repair.

Examine.

Barrel.—Condition of bore, rifling for metallic fouling, or erosion.

Barrel register and thread on muzzle for damage.

Pinion and Casing.—Teeth for breakage.

Pinion pawl and spring for dirty, thick oil and weakness.

Return Spring.—For breakage.

Ejector.—For roughness.

Feed Arm.—Latch for weakness.

Axis hole for play on magazine post.

Thin portion of feed arm for bending or strain.

Stud and groove for wear.

Top of feed arm for friction against ribs on body cover. Pawl for wear and spring for weakness.

Body Cover.—Pawls and spring for damage.

Bolt—See that the edges of cammed slot and sides of striker-post are smooth. Remove any roughness or "burring" with very fine oil-stone.

Examine top extractor for *strain*.

CHAPTER XI

POINTS BEFORE, DURING, AND AFTER FIRING**Points Before Firing.**

1. Remove oil from bore.
2. Oil all frictional parts behind body locking-pin, especially cammed slot and striker-post, and exterior of bolt and piston.
3. Weigh return spring (13 to 15 pounds), with cocking-handle forward, at moment when cocking-handle *begins* to move (use the spring balance).
4. Test feed mechanism.
5. Carefully examine magazines and ammunition when filling.
6. Examine spare parts.
7. See that barrel mouthpiece is tightly screwed up, and that the small hole in gas regulator is to the rear.

To *increase* the tension of return spring:— Withdraw pistol-grip and allow pinion pawl to engage in pinion, press up pinion casing with left hand, in order to keep the pinion engaged with the rack, and draw back the cocking-handle. Release pinion, push cocking-handle forward, and reassemble and weigh.

To *decrease* the tension of the return spring:— Allow pinion casing to drop so as to disengage the pinion from the rack, draw back cocking-handle, press the pinion casing up to engage pinion with rack, then push pistol-grip forward into position, and allow piston-rod to fly forward.

Reassemble and weigh as before.

To avoid alteration in the weight of return spring, when stripping, etc., see that cocking-handle is *forward* before removing or replacing pistol-grip.

Points During Firing.

1. Replace empty magazines in magazine carrier.
2. Oil bolt and striker-post and magazine post.
3. Weigh return spring.
4. Replace partially-used magazine with a full one.
5. Send empty magazines back for refilling.

Points After Firing.

1. Unload, press trigger, and ease return spring to 4 pounds.
2. Oil bore and chamber, piston-rod and all gas portions.

On Return from Firing.

1. Strip gun and clean thoroughly. (See "Care and Cleaning.")
2. Carry out necessary repairs.
3. Wash, dry, and oil dirty magazines.
4. Scrape off all gas portions.

CHAPTER XII

ADDITIONAL NOTES ON STOPPAGES, Etc.**To Remove a Round which has passed under Cartridge Guide when there is an Empty Case or live round in Chamber.**

1. Pull back cocking-handle.
2. Take a spare round in right hand, and with the point draw back and depress base of round under tongue.
3. Seize bullet of round in left hand, draw it forward and, place the spare round bullet downwards behind its base.
4. Hold cocking-handle in right hand, press trigger, and allow cocking-handle to move slightly forward to bring feed arm over to the right.
5. Pull forward to right front the offending round.

Friction, Fouling.

In very bad cases gun may stop in No. 1 position, especially if gas chamber or regulator is fouled.

Magazines Damaged or Broken.

1. If rim is bent, or corrugations are worn, feed pawl will not rotate the magazine, hence No. 1 stoppage results.

2. If magazine is badly bent, the stop pawl may not do its work, and No. 3 stoppage will result, owing to too many cartridges being fed down. To prevent this, always carefully examine magazines when filling by rotating them on the loading handle.

Piston-Rod Broken.

The gun may fire for a considerable time with this breakage. Eventually it will fire erratically, and finally stop, owing to the "burring" up of the broken ends.

Left Stop Pawl Worn or Broken.

Gun will probably fire single shots, stopping in No. 1 position.

Return Spring.

When spring is *weak*, gun may stop in No. 1, 2 or 3 position.

When spring is *broken*, gun may stop in No. 3 position.

Striker-Post Broken.

Mechanism may jamb in any position.

Right Stop Pawl.

If worn, No. 3 may occur.

If *spring* is broken, gun will either give a No. 1 or No. 3.

Bulged Rounds and Separated Cases.

Usually give No. 2 stoppage. (Already dealt with in Chapter VIII.)

NOTE.—The teeth on rack and the pinion are cut at an angle. This is to ensure even and level riding, and prevent "jumping" and friction. In making the gun the inventor had to invent and patent a special machine to cut these teeth.

Gas Attacks.

During a gas attack occasional bursts should be fired. This prevents the gun from being corroded, and has a moral effect on the enemy. The gun should not be *too oily*, otherwise the gas will thicken the oil and probably clog the gun.

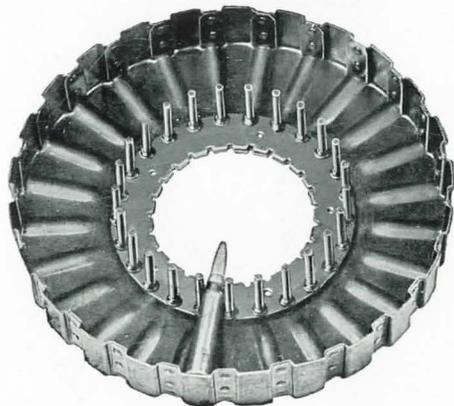
APPENDIX.

DIFFERENCES BETWEEN .300-INCH LEWIS MACHINE GUN (GROUND ACTION) AND THE .303-INCH LEWIS MACHINE GUN.

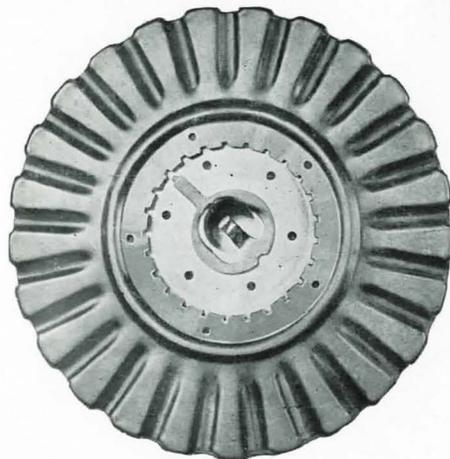
1. There is no latch to the feed arm. Instead there is a tongue which fits under a recess in the front of the body.
2. In addition to the gas chamber there is also a gas-chamber gland. This is removed by unscrewing—thread is left-handed. When the barrel comes out of the gas-cylinder casing the gas chamber is left lying in its recess in the gas cylinder.
3. The gas regulator has four holes instead of two, numbers 1, 2, 3 and 4, No. 1 being the smallest. The smallest hole that gives reliable functioning should be used.
4. The trigger group is different—there is no plunger. To strip, remove the sear axis pin, sear and spring. The sear spring is held in two recesses, one in the bottom of the pistol grip, the other on the underside of the sear. Push out trigger axis pin, remove trigger. Assembly is done in the reverse order.
5. The cocking handle being on the left-hand side, the left hand is used for feeling its position in the Immediate Action and Stoppages.
6. The pinion casing of the .300-inch Lewis gun (ground or air pattern) is not interchangeable with that of the .303-inch Lewis gun. In order to avoid any possibility of confusion, .300 type casings will have a red band painted on them, similar to that which is painted on all weapons using .300 American ammunition.

No. 1.**No. 2.**

No. 3.



No. 5.



No. 7.



No. 4.



No. 6.



THE MAGAZINE.

Photographs of a Stripped Magazine Illustrating its Construction.

1.—*The Magazine Pan*, showing recesses on inner circumference of pan, and also how base of cartridge is held by rim plates.

2.—*The Ring*, showing the recesses and 25 separating pegs; it is riveted to the pan.

3.—*The Ring* in position in the pan, showing cartridge held at base by rim plates and at shoulders by the pegs. This plate shows the moving portions.

4.—*The Centre Block*, showing a spiral groove, ramp and lip, axis hole, and key-way.

5.—*The Magazine*, with centre disc removed. When the nib is out of the recesses (as when the magazine is on the magazine post) the pan is free to rotate. Note rivet holes to attach centre disc to centre block.

6.—*Under-side of Centre Disc*, showing magazine catch, nib, and spring.

7.—*Top View of Centre Disc*. Note white portion.