

HANDBOOK
FOR THE
0.303" NORDENFELT 3-BARREL,
AND GARDNER 2-BARREL, CONVERTED
FROM 0.4 AND 0.45" M. H. CHAMBER.
(MAGAZINE RIFLE CHAMBER).

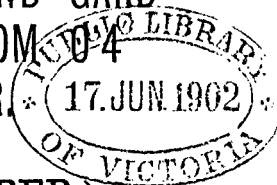
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NER 2-BARREL, CONVERTED FROM 0'4
AND 0'45" M.H. CHAMBER.

(MAGAZINE RIFLE CHAMBER.)



MOUNTED ON CARRIAGES, FIELD, MACHINE
GUN, INFANTRY AND CARRIAGE,
PARAPET, MACHINE GUN.

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Corrected up to February, 1900.

0·303" Gardner 2-barrel Magazine Rifle Chamber Machine Gun, converted from 0·4" and 0·45" M.H. Chamber.

NOMENCLATURE OF PARTS OF GUN.

Barrels ...	...	With fixing pin.
Breech casing ...	...	With hoods, left and right, with fixing and guide screws, joint pin for crosshead, joint pin, with fixing pin for elevating gear.
Cam slide.		
Cartridge carrier		With guide pins, ejectors with springs and fixing pins, ejector cone.
Cartridge feeder		With slides, top and bottom, springs top and bottom, with fixing screws, stop plates, top and bottom, with fixing screws.
Cover ...	...	With joint pin, cascable screw with knob, extractor guide plate, with fixing and pivot screws, extractor guide plate springs, cartridge feeder catch with collar, spring and fixing pin, stop screw, ammunition label with fixing screws.
Crank handle ...	...	With axis pin, right, with fixing pin, gunmetal grip, stem with fixing pin.
Disc crank ...	...	With axis pin, left. •
Fore sight.		
Locks ...	...	With plungers, left and right, butts, studs with fixing pins, extractors with fixing pins, firing pins, hammers, with axis and fixing pins, springs, friction rollers with axis pins.
Safety bar ...	...	With spring, centre stud, knob, and screw.
Tangent sight ...	...	With fixing pin, spring, and pinion.

GENERAL DESCRIPTION OF THE GUN.

Plates I to IV.

The axes of the barrels lie in a horizontal plane, and are parallel to each other. The exterior at muzzle end is reduced in diameter, so that the movable bush of cleaning rod may slide over it.

The breech casing consists of a rectangular gunmetal casing, closed in at the top by a cover which is pivoted to the fore-end, and locked down by means of a cascable screw. On the upper surface of the cover is the tangent sight, which is graduated up to 2,500 yards. The barrels are held in position in the fore part of the casing by means of a fixing pin, which passes through a groove cut on the outside of the barrels.

Barrels.

Breech casing.

Cover.

Tangent sight.

Locks. In the breech casing are the locks which carry the mechanism for exploding the cartridges and extracting the cartridge cases. The locks are driven backward and forward by means of the crank pins of the disc crank, which bear against cams in the butt of the lock. The disc crank is revolved by means of the crank handle. The butt of lock also carries the hammer and lock spring. The plunger of lock is attached to the butt by a stud and fixing pin, and carries the firing pin and extractor.

Cartridge feeder. The gun is fed from a vertical cartridge feeder holding 31 cartridges. It fits into a recess in the cover behind an opening through which the cartridges fall from the feeder to the cartridge carrier, and is held in position by the cartridge feeder catch. The feeder is kept supplied during firing from cartridge holders.

Cartridge holders. The cartridge holders are wooden blocks with holes sunk to contain 20 cartridges. The cover with its brass band slides on and prevents the cartridges from falling out.

Cartridge carrier. The cartridge carrier, which is in rear of the breech end of the barrels, has a transverse motion for the purpose of bringing the cartridges as they fall from the feeder through the opening in the cover to a position between the barrel chambers and the lock plungers right and left alternately. Attached to it are the ejectors, which also act as guides for the cartridges when being placed in the barrel chambers.

Safety bar. The safety bar passes through the casing in front of the hammers. When it is down (or in safe position) the hammers cannot complete their forward movement, and cartridges may be worked through the gun unfired.

Stop-off block. The object of the stop-off block is to enable the gun to be used as a 1-barrel gun in the event of one of the barrels or locks becoming unserviceable or jammed.

To use it:—Remove the lock of the barrel from which it was intended to discontinue the fire.

Drop the block on to the cartridge carrier with the bevelled edge towards the centre of the gun.

Feed and fire as usual.

The same block answers for either right or left by simply turning it end for end.

Weight of gun with feeder, 92 lbs.

Action of Mechanism.

Supposing the left-hand barrel of the gun to have just been fired, on revolving the crank handle the cam on disc crank causes the cam slide to advance and force the cartridge carrier to the right; the ejector, which has passed under the left plunger, rises to the right of it, forming, with the centre rib of the cartridge carrier, a trough under the opening in the cover, and into this trough the cartridge from the feeder falls ready for conveyance to the left barrel chamber. The disc then causes the hammer to be turned on its axis, drawing back the firing pin, and compressing the lock spring. The crank pin then strikes against the rear end of the butt of the lock and forces the lock and plunger backward, extracting the cartridge case.

The lock, being fully back, allows the extractor guide plate spring to come down in front of the extractor way in barrel and prevents the bullet end of cartridge from jumping up into it, when the cartridge is being pushed forward by the lock.

Action of
disc crank
and ejector.

Action of
lock.

Action of
extractor
guide plate
spring.

The cartridge carrier now moves to the left, bringing the cartridge from under the opening in the cover to a position in line with the barrel chamber, and with its rim or head between the face of the plunger and the hook of the extractor; at the same time the empty case is being thrown out of the port in the left side of the casing.

The lock now moves forward, pushing the cartridge into the chamber, at the same time forcing the extractor guide plate spring up and the ejector down, so that the latter may pass under the lock; the tail of the hammer flies up as it arrives at the opening in the disc crank, through the pressure of the spring; the short arm of the hammer drives the firing pin forward and explodes the cartridge. By continuing the revolution of the crank handle each barrel is fired alternately, the right advancing as the left is being withdrawn, and *vice versa*.

The cartridge carrier is actuated by a cam upon the disc crank, which gives a backward and forward movement to the cam slide. In the fore end of the cam slide are two diagonal slots, into which two bosses on the under side of the cartridge carrier engage. Therefore, as the cam slide moves backwards and forwards the diagonal slots force the carrier with its bosses from side to side.

Action of
cartridge
carrier.

The ejector cone is fixed to the bottom of the breech casing underneath the cartridge carrier. It only comes into action if the ejector spring fails. (through rust or corroded oil) to lift the ejectors up into correct position, in which case the cartridge carrier in moving transversely brings the bottom of the ejector up against the bevelled top of the ejector cone and forces the ejector up.

Ejector cone.

General Instructions.

The spare barrel is interchangeable as regards diameter; should the fixing pin be found difficult to enter, the groove in the barrel may be eased away with a round file until the pin goes home; copy the chamfer on the breech end of the barrel from the old one.

To replace a
barrel.

It should require a pressure of not less than 17 lbs. or more than 20 lbs. to press the point of the firing pin back slightly when in fired position.

Weight of
lock spring.

The crank handle must not be turned until the safety bar is placed at "safe" position, unless the gun is being fired, nor until the cover is closed; neglect of this last rule will cause serious damage to the chamber.

Use of safety
bar.

Two spare locks (one right and one left) are supplied with each gun, and if any part, such as a lock spring or firing pin, &c., become defective during firing, the lock should be removed and replaced by the spare one.

Use of spare
lock.

If, however, the defective lock is subsequently made serviceable by replacing the defective component with a serviceable one from the spare parts, then this lock should be taken into use again and the spare one (if correct) returned to the spare parts.

The lock or any other portion of the gun should not be stripped except by the armourer or those thoroughly trained to do so. Tools are supplied for the purpose.

Points to be attended to before firing:—

Points before
firing.

(a) Wipe out and examine the barrel to see that the bore is clear.

(b) Examine the mechanism to see that it is correct. Oil the

parts that have to be oiled (see page 8). Turn the crank handle a few times to see that it runs smoothly.

- (c) See that the cartridge holders are correctly filled and that the covers are in the proper position to retain the cartridges in the holder.

Points during firing.

Points to be attended to during firing :—

- (a) When cartridges are being fed into the cartridge feeder, great care should be taken to hold the cartridge holder cover firmly down in the guide, otherwise the cartridges will get out of position and fail to enter the feeder.
- (b) See that the cartridge holders are refilled without delay and the covers replaced.

Points after firing.

Points to be attended to after firing :—

- (a) See that the gun is unloaded, and that no live cartridges have been left in the feeder or cartridge carrier.
- (b) Oil the bore and chamber *immediately* after firing with rifle-oil to prevent erosion.
- (c) On return to barracks the barrel must be thoroughly cleaned as soon as possible, and the interior left coated with "rifle-oil." The locks must be taken out and the extractor, firing pin, and the lock springs, and the extractor guide plate examined to see that they are not damaged. It will not be necessary to strip the lock for this.
- (d) The number of rounds of ball ammunition fired from the gun is to be entered on the inside sheet of the memorandum of examination.

Parts of the mechanism to be oiled.

Before taking a gun into action the surfaces of moving parts in contact should be thoroughly well oiled with Rangoon oil, especially the following :—

- (a) Bearing surfaces of extractor guide plate spring and top of extractor.
- (b) Bearing surfaces of disc-crank and cam.
- (c) Bearing surfaces of cam slide.
- (d) Bearing surfaces of butts of locks.

How to use the cleaning rod.

To clean the barrel.—Unload, unscrew the cascade screw and open the cover. Remove the lock in Gardner guns and cartridge carrier in Nordenfelt guns, and place a piece of flannelette 4 inches by 2 inches in each eye or slot of the cleaning rod, care being taken that the latter is surrounded with the flannelette, which should be well oiled with rifle-oil, then insert the rod into the muzzle of the barrel, slide the movable bush (if the rod is provided with one) on to the muzzle, and pass the rod up and down till the barrel is clean, replace the oiled flannelette by dry pieces, and finally pass fresh oiled pieces through, leaving the barrel well oiled with rifle-oil. This oil should always be well shaken up before use.

How to use the double pull through.

If slight rust or metallic fouling occurs the *double pullthrough* should be used as follows :—

Open the cover, remove the lock in Gardner guns, and cartridge carrier in Nordenfelt guns, drop the weight through the barrel from the breech, then, having well oiled the gauze, two men pull it backwards and forwards until the fouling or rust is loosened; the barrel can now be cleaned with the cleaning-rod and flannelette as previously described.

When by compression the gauze fits too loosely to clean the grooves of the barrel, its diameter can be increased by inserting under each side narrow strips of flannelette or paper. When the

gauze is worn out it should be replaced by one of the spare pieces which are issued with each double pullthrough.

Failures that may Occur and How to Remedy them.

The causes of failure are probably :—

Probable
cause of
failure.

I. Missfires, caused by—

- (a) A weak lock spring.
- (b) A firing-pin being broken or worn flat on the point.
- (c) Lock mechanism being dirty or corroded.
- (d) A deep recess in barrel chamber.
- (e) Bearing surfaces of mechanism badly worn.
- (f) A defective cartridge.

II. Non-extraction, caused by—

- (a) An extractor cutting through the rim of the cartridge.
- (b) Broken extractor.
- (c) Extractor hook worn to an obtuse angle.

III. Jams, caused by—

- (a) Any case of non-extraction.
- (b) Firing pin breaking in hammer slot.
- (c) Rear ends of butts of locks being closed in.
- (d) Broken extractor guide plate spring.
- (e) Broken ejector spring.
- (f) Hang fire.
- (g) Cartridge being nipped between the carrier and extractor guide plate.
- (h) Obstruction in chamber due to defective ammunition.

The above may be remedied as follows :—

First case.

I. (a, b, and c) Replace the lock by the spare one.

- (d) Replace the barrel by the spare one.
- (e) For this, the gun should be returned to store for repair.
- (f) Revolve the crank handle and eject the defective cartridge through the openings in the sides of the breech casing.

II. (a) This is probably caused by a rusty or damaged chamber. Draw back the lock and drive out the empty case with the cleaning rod inserted from the muzzle. The barrel should be removed and replaced by the spare one.

Second case.

- (b and c) Replace the lock by the spare one.

III. (a) See how to remedy the failures of extraction as previously described.

Third case.

- (b and c) Replace the lock by the spare one.
- (d) Replace the broken spring by the spare one.
- (e) Remove the broken spring.

N.B.—As there are no spare ejector springs, it will be necessary to make a new one, taking the broken one as a pattern.

- (f) If the cartridge case is burst open and jammed in the mechanism take out the cartridge feeder, open the cover, and remove the obstruction, then take out the locks, clean and examine the mechanism to see if any parts have been damaged.
- (g) The last cartridge in the feeder falls more slowly into the carrier than the others, as it is not forced down by the

weight of any cartridges above it. When firing quickly, it is sometimes caught between the carrier and the extractor guide plate. When a cartridge is caught thus release it by turning the handle back a little and fire it in the usual manner.

- (h) This is usually caused by the cartridge case separating and leaving a portion in the chamber. In this case introduce the clearing plug Mark I, guns, machine, as follows:— Remove the cartridge feeder, open the cover, and draw back the lock. See that the centre pin of the plug is fully back, push the threaded part of the plug into the chamber until the shoulder bears against the breech end of the barrel. Lift up the extractor and force the lock plunger forward against the centre pin, at the same time giving the handle of the plug a slight rocking motion from side to side. Draw back the lock plunger and depress the handle of the plug; this will loosen the case, which may then be drawn out.

Tap the centre pin back and remove the cartridge case from the plug, clean all fouling from the thread before putting the plug away.

Spare Parts and Implements issued with each Gun.

SPARE PARTS.

Barrels	1
Extractors	4
* Feeders, cartridge	1
Hammers	1
Handles, crank	1
Locks, left... ..	1
" right	1
Pins, extractor	4
" firing	4
* " joint for crosshead	1
* " " elevating screw with pin	1
Sights, fore	1
" tangent, with fixing pin	1
Springs, lock	4
" tangent sight	1
" extractor guide plate	2

IMPLEMENTS.

Drifts, copper and steel, 6" $\times$ $\frac{11}{16}$ "	1
" " " 6" $\times$ $\frac{7}{16}$ "	1
" " " 6" $\times$ $\frac{9}{32}$ "	1
Plugs, clearing, Mark I, guns, machine '303'	1
Punches, $\frac{5}{32}$ "	1
" $\frac{3}{16}$ "	1
Rods, cleaning, Mark I, guns, machine '303'	1
Pullthrough, double	1
Gauzes, spare, for double pullthrough	2
Spanners	1
Twisters, barrel	1

* For guns on carriages, field infantry.

APPURTENANCES.

Blocks, stop-off
 *Holders, cartridge, with cover and brass band.

Instructions for Armourers in Stripping and Assembling the Gun.

TO STRIP THE GUN.†

Remove cartridge feeder, and unscrew the cascable screw, drive out the cover joint pin, and remove the cover.

See that the safety bar is in the firing position, and turn the crank handle until the crank pin is uppermost; when in this position the fore end of the lock plunger will be about two inches from the breech end of the barrel. Take hold of the plunger and raise it, at the same time revolve the crank handle slightly; the lock will now come away.

Turn the crank handle until the cartridge carrier is to the left, lift up the right-hand hood, push out the guide pins, then, with the fingers inserted through the discharge ports, lift out the carrier. It will be found easier to remove the cartridge carrier if both hoods are first taken from the casing, but with a little practice it may be removed without. Now draw out the safety bar.

Place the flat part of the spanner in the slot in the left axis pin, letting the crosspiece or screwdriver end rest upon the frame at the rear; take hold of the crank handle and give a sharp backward turn. This will loosen the left axis pin. Do not take it *quite* out until the right axis pin is loosened, which is accomplished by placing a piece of hard wood between the crank and rear end of the breech casing and turning the crank handle backwards. Both axis pins being removed, the crank and cam slide may be lifted out.

To remove the hoods, take out the fixing and guide screws, drive the barrel fixing pin out of the casing, and drive the barrel forward with a piece of hard wood and hammer.

Metal drifts must not be used for this purpose.

TO ASSEMBLE THE GUN.

Reverse the foregoing operations, taking care in replacing locks to have the crank pins in the same position as directed for stripping, and that the end of the hammer is under the crank and *not* in the opening of the disc. See that the locks are placed right and left as marked.

TO STRIP THE COVER.

Drive out the fixing pin and remove the tangent sight, spring and pinion. Unscrew the fore sight, fixing and pivot screws, and remove the extractor guide plate. With the special end of the small tommy, slightly raise the fixed end of the extractor guide plate spring, and *whilst in this position*, drive it out towards the tommy. Drive out the fixing pin and remove the feed catch, collar and spring.

* 96 for guns on infantry field carriages and 60 (in 3 cartridge holder boxes) for parapet carriages.

† In all operations of stripping and assembling, pins are invariably driven out from the left and inserted from the right.

TO ASSEMBLE THE COVER.

Reverse the foregoing operations.

TO STRIP A LOCK.

Compress the spring by means of the hammer; place the jaws of the spanner over the spring as low as possible. To keep the spring compressed, release the hammer and take the spring from the lock. Drive out the fixing pin and axis pin and take out the hammer.

Drive out the fixing pin from the plunger, draw the latter off the butt, and take out the firing pin. Drive out the fixing pin, and remove the extractor. If it is necessary to remove the spring from the spanner, compress the open end of the spring in a vice or between the casing and the cover of the gun, when it will be left free of the spanner.

TO ASSEMBLE A LOCK.

Reverse the foregoing operations.

TO STRIP THE CARTRIDGE CARRIER.

Drive out fixing pins and remove ejectors and ejector springs.

TO ASSEMBLE THE CARTRIDGE CARRIER.

Reverse the foregoing operations.

(It is a good plan, before assembling the guns, to try the parts in their places separately, to see that they work freely.)

Instructions for the Care, Preservation, and Examination of converted Gardner and Nordenfelt Machine Guns.

The barrels should be examined and cleaned (as explained on p. 8) daily.

Rangoon oil
to be used for
lubrication.

In cleaning the mechanism of the guns, turpentine or paraffin oil should be used to clean off dried oil or dirt. In lubricating the mechanism, Rangoon oil should be used. When the gun is in use, and is found to work stiffly on account of partly dried oil, a little paraffin oil will make it run freely.

Preserving
mixture.

When guns are returned to store, packed for transmission, or stowed away in any place where they cannot be readily examined, the barrels and unpainted iron or steel parts should be coated with the following mixtures:—

Wax, bees' ...	...	...	...	4 lbs.
Paraffin, hard, yellow scale	...	...	...	4 "
Chalk, white	...	...	...	2 "
Oil, Rangoon	...	...	...	6 quarts

The mixture is to be made hot and a piece of flannel dipped in it, with which the exterior parts will be dabbed. To coat the inside of the barrels, draw a bunch of lamp cotton, well saturated with the mixture, through from both ends; the lamp cotton is to be attached to a piece of twisted copper wire.

Monthly
examination.

Every machine gun will be thoroughly examined every month by a qualified armourer sergeant or armament artificer, and left in a properly lubricated and serviceable condition.

The locks of Gardner guns, and the cartridge carrier, action block, breech block, action lever, and hand lever of Nordenfelt guns, should therefore be removed, properly cleaned, and re-oiled or greased.

N.B.—It will not be necessary to strip any of these parts for this.

The locks of Gardner guns, and the action block and breech block of Nordenfelt guns, will be stripped, examined, re-oiled, and assembled every six months. Parts to be stripped every six months.

Upon any transfer, or when returning guns to store, the "Memorandum of Examination" is always to be packed in the chest with the gun. Memo. of examination to be kept with guns.

For cleaning and oiling materials for machine guns and their carriages see Part I, "Equipment Regulations," paragraph 150.

Three special dummy cartridges, as described in paragraph 6489, "List of Changes in War Material," will be supplied for the use of armourers or armament artificers for testing the distributors, feed guides, cartridge feeders, cartridge carriers, &c., of the various machine guns in their charge. Dummy cartridges

They are not to be used for drill purposes.

The carriages must be overhauled every month and all parts stripped and properly cleaned and re-oiled or greased. See that all taper pins and fixing screws are tight, all adjusting screws and nuts are properly adjusted, and that the carriage is left in a properly lubricated and serviceable condition.

Before travelling the wheels must be removed, the pipe boxes and axle-tree arms thoroughly cleaned, and fresh grease applied.

Defects or damages should be reported directly they are discovered, so that such defects or damages may be remedied without delay.

0.303" Nordenfelt 3-barrel, Magazine Rifle Chamber Machine Gun, converted from 0.45" M.H. Chamber.

NOMENCLATURE OF PARTS OF GUN.

Action block	...	With hammers, lock springs, spring bar, trigger comb, and trigger-comb spring.
Action lever	...	With friction roller, stud, and cross pin.
Barrels	...	With key, fixing.
Breech block	...	With extractors and firing pins.
Cartridge carrier.		
Cover	...	With cascable screw, knob, and fixing pin, sand plate, joint pin, hopper catch, with fixing screw.
Distributor	...	With cut-off lever.
Feed guide	...	With spring and fixing screws.
Fore sight	...	With fixing screws.
Frame	...	With joint pin for crosshead, joint pin for elevating gear, with stop screw; drill stop with spring and knob.
Hand lever.		
Tangent sight	...	With split pin, spring, pinion with milled head and taper pin, stop ring with set screw, spring washer.

General Description.

Plates V to X.

Barrels. The axes of the barrels lie in a horizontal plane and are parallel to each other. They are held in position by the frame and centre crosspiece. The exterior at the muzzle end is reduced in diameter so that the movable bush of the cleaning rod may slide over it.

Frame. The frame, which is rectangular, is divided across by the centre crosspiece. The part in rear of the centre crosspiece contains the breech block, cartridge carrier, and action block.

Cover. This rear part is closed in by a cover, which is pivoted to the centre crosspiece and locked down by means of a cascable screw. On the upper surface of the cover is the sand plate, which prevents sand or grit getting into the mechanism of the gun when the distributor is removed. The hopper catch is attached to the cover by a fixing screw. The barrels are passed through the centre crosspiece and fore end of frame and secured in position by the joint of the cover bearing upon a fixing key. At the rear end of the frame is

the tangent sight, which is graduated up to 2,300 yards, and in the centre of the right-hand side is the fore sight, fixed by two screws.

Tangent sight.
Fore sight.
Drill stop.

The drill stop is carried in a bracket on the right-hand side of the frame. When the knob is turned to the rear the stop projects below the bracket and prevents the hand lever from passing it.

The breech block consists of a cam plate having three parallel plungers on the upper side. In the under side of the cam plate is a cam-shaped slot, which receives the friction roller of the action lever. By moving the hand lever to the front and rear a backward and forward motion is given to the breech block through the friction roller working in the cam slot. The plungers on the upper surface of the cam plate carry the extractors and the firing pins (free to move within the limits allowed by a stud on the extractor, working in a recess in the firing pins). On the two front corners of the breech block are two angular faces, which, on coming into contact with the angular faces of the cartridge carrier, give to the latter a transverse motion. There are three cocking studs on the breech block, which act on the lower studs of the hammers, forcing them back and compressing the lock springs.

Breech block.

The cartridge carrier lies directly behind the centre crosspiece and under the openings in the cover through which the cartridges fall from the distributor. It has three parallel recesses for holding the cartridges and through which the plungers work. The carrier has a transverse motion in order to convey the cartridges to a position opposite the barrel chambers and in line with the plungers. It is so constructed that it retains the cartridges dropping into it from the distributor, but allows the cartridges or cases to fall through when they are extracted from the barrels. When the breech block is in its most forward position the plungers fill these recesses and the breech block lies underneath the cartridge carrier.

Cartridge carrier.

The action block lies behind the cartridge carrier and extends from it to the rear crosspiece of frame. The under side is grooved to receive the plungers of the breech block when they are withdrawn from the carrier to the rear. It also carries the hammers and lock springs in three parallel channels cut in the solid parts of the action block between the plunger grooves.

Action block.

Through the middle part of the action block a channel passes from side to side for the reception of the trigger comb, which is pressed to the right by the trigger comb spring. On the under side of the trigger comb are three studs, which retain the hammers in the cocked position as will be explained when describing the action of the mechanism. The trigger comb projects from the right of the action block, and is forced against the right side of the frame when the action block moves to the right. The continued motion of the latter releases the hammers.

The action block has a transverse motion given to it by the tail of the action lever when the hand lever is approaching or leaving its most forward position. By this transverse motion the solid parts of the action block are brought behind and give support to the plungers on firing. After firing, the action block is moved to one side to enable the latter to be withdrawn.

The gun is fed by means of a distributor, a feed guide, and feed boxes.

The distributor is attached to the gun by the hopper catch and remains in position during firing.

Distributor.

It has a separate vertical compartment for each barrel, and down the rear face of each compartment is a guide which holds the

cartridges by their rims. The cartridges lie in columns one above another in an inclined position, with the bullet slightly raised and touching the front inner face of the distributor. The cartridges are retained in the distributor until required by means of a cut-off bar running across the bottom of the rear side. This bar can be thrown in and out of action by the cut-off lever on the left side of the distributor. To allow the cartridges to fall into the cartridge carrier the cut-off lever is first pressed in towards the side of the distributor and then turned downwards until the lever springs back into a recess cut in the bottom of the guide arc.

Feed guide.

The feed guide is attached to the top of the rear face of the distributor and forms a continuation of it upwards. It has a guide for the rims of the cartridges for each barrel, precisely the same as in the distributor. The distributor and feed guide together hold 108 cartridges.

Feed boxes.

The feed boxes hold 27 cartridges, and consist of wooden blocks and strips, strengthened by canvas. The cartridges are arranged in three rows, the same distance apart as the guides of the feed guide. Each cartridge is in a separate compartment, with the base projecting above the level of the box. The rims of the whole of the cartridges can be slid into the guides of the feed guide and the box withdrawn, leaving the cartridges in the feed guide. The box is provided with a cover, to prevent the cartridges falling out.

Weight of gun without distributor 98 lbs.

Action of Mechanism.

Action of.
hand lever,
action lever,
action block,
breech block
and carrier.

Supposing the gun to have been fired and the hand lever to be fully forward, the motion of the lever to the rear causes the tail of the action lever to engage the spring bar and carries the action block to the left.

The friction roller of the action lever then moves the breech block backwards, and the extractors draw out the cases, which fall through the openings in the cartridge carrier.

At the same time the cocking studs on the upper surface of the breech block bear against the lower studs of the hammers and force the angular studs on the hammers back against the angular faces of the trigger comb studs. This forces the trigger comb to the left until the angular studs on the hammers have passed the trigger comb studs, when the spring carries the trigger comb back to its normal position. Its studs are now in front of the studs on the hammers. When the breech block is almost fully back, the angular studs on the breech block push the carrier to the left, placing its recesses under the openings in the cover. The bottom cartridge from each column in the distributor then falls into the corresponding recess in the carrier. On pushing the hand lever forward, the angular studs on the breech block drive the cartridge carrier back again to the right, placing the cartridges in line with the barrel chambers. The breech block then moves forward, leaving the hammers held back by the trigger comb studs.

The plungers, as they advance, push the cartridges into the chambers.

The breech block having been carried forward to its full extent, the extractors rise over the rims of the cartridges. The tail of the action lever then engages in the spring bar, and moves the action block to the right until the plungers are fully supported and the

hammers are in line with the firing pins. During this movement the trigger comb is stopped by the frame and is forced into the action block. The studs on the hammers are then no longer held back by the studs on the trigger comb; therefore the lock springs drive the hammers forward against the rear end of the firing pins and explode the cartridges. The barrels are not fired quite simultaneously, but in the following order, Nos. 2, 1, 3.

When the drill stop is put down into its lowest position—with the hand lever to the rear of it—it acts as a drill stop, preventing the action block completing its transverse movement to the right, consequently the trigger comb studs are not pushed from in front of the hammer studs, and cartridges may be worked through the gun unfired. If the hand lever is in front of the drill stop when it is put down, it acts as a hand lever catch, as the hand lever cannot then be moved.

Drill stop.

General Instructions.

The spare barrel is interchangeable with the others as regards the diameter of the breech end and muzzle where they pass through the frame. Should the fixing key be found difficult to enter, the groove in the barrel may be eased away with a flat file, until the key beds down into position.

To replace a barrel.

It should require a pressure of not less than 8 lbs. or more than 10 lbs. to press the point of hammers back slightly when in the cocked position, i.e., when the springs are compressed and the hammers are behind the studs on the trigger comb.

Weight of lock spring.

The lock springs should just stand through the action block, when the spring bar is removed and the hammers are fully forward.

It should require a pull of not less than 8 lbs. or more than 12 lbs. to just lift the hook end of the extractor off the plunger.

Weight of extractor.

If any part of the gun, such as a lock spring, firing pin, &c., becomes defective, it should be removed and replaced by a spare one from the spare part box. The defective part should not be put in the spare part box, which is only intended for serviceable parts. It should be repaired or exchanged.

Use of spare parts.

The gun should not be stripped except by the armourer or those thoroughly trained to do so. Tools are supplied, in the spare part box, for the purpose.

Points to be attended to before firing :—

Points before firing.

- (a) Wipe out and examine the barrels to see that the bore is clear.
- (b) Examine the mechanism to see that it is correct. Oil the parts that have to be oiled (see page 18.) Move the hand lever backwards and forwards a few times to see that all parts work smoothly.
- (c) See that the feed boxes are correctly filled and that the covers are put on.

Points to be attended to during firing :—

Points during firing.

- (a) When the cartridges are to be fed into the feed guide, first take off the cover of a feed box and hold the outside of the cover against the heads of the cartridges. This will prevent them from falling out of the box. Hold the cover upright on the top of the feed guide with the cartridges to the front, and slide the box downwards so that the rims of the cartridges enter into the three columns of the feed guide. When all the cartridges are fed in, draw the box away

to the front; this will leave the cartridges in the feed guide.

- (b) See that the feed boxes are filled without delay and the covers replaced.
- (c) Be careful to work the hand lever as far as it will go, both to the front and to the rear.

Points after firing.

Points to be attended to after firing:—

- (a) See that the gun is unloaded and that no live cartridges have been left in the feed guide, distributor, or cartridge carrier.
- (b) Oil the bore and chamber *immediately* after firing, with rifle oil, to prevent erosion.
- (c) On return to barracks, the barrels must be thoroughly cleaned as soon as possible and the interior left coated with rifle oil. Remove the mechanism and examine the extractors, firing pins and lock springs to see that they are not damaged.

It will not be necessary to strip the mechanism for this.

- (d) The number of rounds of ball ammunition fired from the gun are to be entered on the inside sheet of the Memorandum of Examination.

Parts of the mechanism to be oiled.

Before taking a gun into action, the surfaces of moving parts in contact should be thoroughly well oiled with Rangoon oil, especially the following:—

- (a) Bearing surfaces of the hand lever and action lever that work in the bearing in the bottom plate of frame.
- (b) Bearing surfaces of the friction roller on the action lever and the cam slot in the cam plate.
- (c) Bearing surfaces of the firing pins and firing pin channels.
- (d) Bearing surfaces of the hammers, hammer channel and trigger comb.
- (e) Bearing surfaces of the angular faces on breech block and cartridge carrier.

How to use the cleaning rod and double pull-through.

To clean the barrel.—See page 8.

FAILURES THAT MAY OCCUR AND HOW TO REMEDY THEM.

The causes of failure are probably:—

Probable cause of failure.

I. Missfires caused by—

- (a) A weak lock spring.
- (b) A firing pin being broken or worn flat on the point.
- (c) The firing pin and hammer channels becoming dirty or rusty.
- (d) Slots of hammer channels burred.
- (e) Bearing surfaces of mechanism badly worn.
- (f) A defective cartridge.

II. Non-extraction caused by—

- (a) A weak or broken extractor.
- (b) Extractor hook worn to an obtuse angle.
- (c) Extractor ways in barrel becoming filled up with scale or dirt.
- (d) A rusty chamber. This may cause the extractor to cut through or slip over the rim of the cartridge.
- (e) The bottom surfaces of recesses in cartridge carrier being badly worn. This allows the rim of the cartridge case to

get down too low, so that the hooks of the extractor pass over it.

III. Jams caused by—

- (a) Any case of non-extraction.
- (b) Hangfire.
- (c) A damaged cartridge.
- (d) Obstruction in chamber due to defective ammunition.

The above may be remedied as follows :—

Missfire.

- Missfires.—I. (a and b) Replace the component by a spare one from the spare part box.
- (c) Remove the dirt or rust from the channels and components, oil all parts, and re-assemble the action block.
 - (d) File the burrs off with a smooth file, clean and oil all parts, and re-assemble the action block.
 - (e) For this the gun should be returned to store for repair.
 - (f) Draw back the hand lever. This will extract the defective cartridge, which will then fall through the recess in the cartridge carrier.

Non-extraction.—II. (a and b). Replace the component by a spare one from the spare part box.

Non-extraction.

- (c) Remove the scale or dirt from the extractor ways; the hooks of the extractor will then go down properly and get a firm hold of the rim of the cartridge.
- (d) Draw back the hand lever and drive out the empty case with the cleaning rod inserted from the muzzle. The barrel should be removed and replaced by the spare one.
- (e) For this the gun should be returned to store for repair.

Jams.—III. (a) See how to remedy the failures of extraction as previously described.

Jams.

- (b) If the cartridge case is burst open and jammed in the mechanism, take off the feed guide and distributor, open the cover, and remove the obstruction. Then take out the cartridge carrier, action block and breech block, clean and examine the mechanism to see if any parts have been damaged.
- (c) Draw back the hand lever and extract the defective cartridge.
- (d) This is usually caused by the cartridge case separating and leaving a portion in the chamber. In this case use the clearing plug, Mark I, guns, machine, as follows. Remove the distributor and feed guide, open the cover, then extract and remove all live cartridges from the cartridge carrier. See that the centre pin of the clearing plug is fully back, push the threaded part of the plug into the chamber until the shoulder bears against the breech end of the barrel, force the plunger forward against the centre pin, at the same time giving the handle of the plug a slight rocking motion from side to side. Draw back the plunger and depress the handle of the plug; this will loosen the case, which may then be drawn out.

Tap the centre pin back, and remove the cartridge case from the plug. Clean all fouling from the threads of the plug before putting it away.

Spare Parts and Implements issued with 3-Barrel Nordenfelt '303" Machine Gun.

SPARE PARTS.

Barrels	1
Catches, hopper	1
Distributors	1
Extractors... ..	3
Guides, feed	1
Hammers	3
Levers, hand	1
Pins, firing	3
Sights, fore, with fixing screws...	1
„ tangent, with split pin ...	1
Springs, lock	6
„ sight, tangent	1
„ trigger comb	2

IMPLEMENTS.

Cans, oil	1
Drifts, brass wire... ..	2
Drivers, screw, for extractor ...	1
Plugs, clearing, Mark I, Guns, Machine '303 ...	1
Pullthrough, double	1
Gauzes, spare, for double pullthrough...	2
Rods, cleaning, Mark I, Guns, Machine '303 ...	1

APPURTENANCES.

Boxes, feed	100
„ spare parts and implements ...	1

Instructions for Armourers in Stripping and Assembling the Guns.

TO STRIP THE GUN.

Remove the distributor and feed guide and unscrew the cascable screw, unscrew the cover joint pin and remove the cover and sand plate.

See that the drill stop is in the upper position, draw back the hand lever, and remove the cartridge carrier, action block, and breech block. See that the tail end of action lever is clear of the frame, then disengage it from the hand lever by lifting it straight up. Shaking the hand lever at the same time will facilitate this operation. Remove the hand lever.

Take out the barrel fixing key, and with a piece of hard wood and hammer drive out the barrels from front to rear.

TO ASSEMBLE THE GUN.

Reverse the foregoing operations, taking care that the friction roller on action lever engages in the cam slot in the breech block.

TO STRIP THE FRAME.

Take out the split pin and remove the tangent sight and spring. Take out the set screw and draw out the pinion, drive out the fixing pin and remove the milled head, stop ring, and spring washer, unscrew the knob, and remove the drill stop and spring. Take out the fixing screws and remove the fore sight. Take out the stop screw and remove elevating joint pin. Unscrew cross-head joint pin.

TO ASSEMBLE THE FRAME.

Reverse the foregoing operations.

TO STRIP THE COVER.

Take out the fixing screw of hopper catch and remove the catch.

TO ASSEMBLE THE COVER.

Reverse the foregoing operations.

TO STRIP THE ACTION BLOCK.

Release the lock springs, by pushing the trigger comb to the left, drive down the spring bar, and remove the lock springs and hammers. Drive out the trigger comb spring to the rear and remove the trigger comb.

TO ASSEMBLE THE ACTION BLOCK.

Reverse the foregoing operations, taking care in replacing the trigger comb spring that the trigger comb is pushed over to the right, also in replacing the spring bar the lock springs must be kept under the surface of the end of action block. Neglect of this will cause damage to the springs.

TO STRIP THE BREECH BLOCK.

Insert the screwdriver in the slot at the rear end of the plunger and under the tail end of the extractor. Prise up the tail end of the extractor until the lug is clear of the slot. Now force the extractor to the rear. The hook of the extractor will then disengage from its seating and the extractor will spring out. Draw out the firing pin. Repeat this operation for each of the plungers.

TO ASSEMBLE BREECH BLOCK.

Reverse the foregoing operations, taking care that the firing pin is right forward, so that the stud of extractor can spring into the recess in firing pin and retain it.

TO STRIP THE ACTION LEVER.

Drive out the fixing pin and remove the stud and friction roller.

TO ASSEMBLE ACTION LEVER.

Reverse the foregoing operation.
(It is a good plan before assembling the guns to try the parts in their places separately to see if they work freely).

CARRIAGE PARAPET, MACHINE GUN (MARK I).

Nomenclature.

Axletree	...	With drag washers, lynch pins with leather thongs, axletree socket, fixing pin, taper pin, chain and steel, wheels and tool case.
Crosshead	...	With clip screws, nuts and washers; traversing gear, consisting of worm, adjusting nuts and collar, traversing handle, gun-metal grip, and cross-pin, spring (traversing handle) and fixing screw; elevating gear, consisting of gun-metal nut, inner screw, outer screw, hand wheel and key, pivot screws and check nuts, strap and fixing screw, shoe, stop spring and fixing screw, set screw, milled head and fixing pin, brake spring.
Worm-wheel socket.		With lifting handles, clamping screw, set screw, hand nut with cross pin, collar.
Stem	...	With feather and fixing screws, foot, handle and taper pin, arms left and right, with leather loops, T-socket and three taper pins.

General Description.

Plates XI and XII.

This carriage is arranged to combine a steady adjustable rest, from which the gun may be fired over a parapet, with a wheeled carriage, on which it may be quickly transported from one part of the work to another. To meet these requirements the gun with the elevating and traversing gear is made to slide upon a stem, so that when in firing position it is above the level of the parapet, but when in the travelling position it is close to the axletree.

The chief parts of the carriage are the stem, crosshead, worm wheel socket and wheels.

Stem. The stem is tubular, fitted at its lower end with a spiked foot, and at its upper end with a T-socket, in which are fixed two cross-arms; these arms are curved and spiked at the extremities. When in firing position the arms rest upon the top of the parapet; when in the travelling position, the arms are used as handles by which to wheel the gun. On the under side of the stem is a feather, which prevents the crosshead and axletree socket turning upon it.

Crosshead elevating and traversing gears. The crosshead to which the gun is pivoted carries the elevating gear and traversing worm. The elevating gear consists of right and left-hand telescopic screws; the inner screw is pivoted at its upper end to the gun, and runs in the outer screw, which is furnished with a hand-wheel and runs in a gun-metal nut pivoted to the crosshead. The traversing worm gears into a worm wheel. This worm wheel is furnished with a socket which slides upon the stem, and may be fixed in any desired position upon it by the clamping screw.

Axletree. The wheels run upon an axletree fitted with lynch pins and drag-washers. The axletree is fitted to a socket which slides upon the stem, and is held either in firing or travelling position by the taper pin. When in firing position the wheels are off the ground, and the foot takes a bearing on the banquette.

Tool case. A tool case is attached to the axletree in which the clearing plug, spanner, and tommyes are carried when the gun is in action. The

traversing handle is also placed in this case before the gun is lowered to the travelling position.

The cleaning rod is carried upon the arms, loops of leather being attached for that purpose.

General Instructions.

If the nut of the clamping screw should not tighten in a convenient position, the set screw of the worm wheel socket must be slacked out, and the clamping screw turned round to suit the nut, after which the set screw must again be tightened.

The nuts on the end of the traversing worm must be kept adjusted, so that the traversing handle can be turned freely, but *without any side play*.

For convenience of packing, the stem and arms can be taken apart. These, when once assembled, are not to be again separated, unless for the purpose of re-packing.

Drive the taper pin out of the T-socket, insert the stem, and drive in the pin.

To assemble
the carriage.

Slacken out the clamping screw, and slide the socket of the worm wheel on to the stem. Fasten it by means of the clamping screw.

Slide the axletree socket on to the stem with its longest boss next to the worm wheel socket. Put in the taper pin.

Place the foot on the end of the stem, and fix it with the pin.

Place the wheels on the axletree. Put on the drag washers, linch pins and leather thongs.

Turn both the inner and outer elevating screws as low as they will go, and take out the joint pins from the gun. Mount the gun, and replace the joint pins.

When the axletree socket is fastened against the foot, and the worm wheel socket is clamped against the axletree socket, the gun can be wheeled to any required position.

When the gun is placed in the firing position, care should be taken to see that the clamping screw is screwed tightly up.

Instructions for Armourers in Stripping and Assembling the Carriage.

To STRIP THE ELEVATING GEAR.

Unscrew the check nuts and turn out the pivot screws. Unscrew the fixing screw, and remove the strap and shoe. Remove the gun-metal nut and the inner screw. Unscrew the fixing screw, and remove the stop spring, take out the brake spring, drive out the fixing pin, take off the milled head and remove the set screw.

To ASSEMBLE THE ELEVATING GEAR.

Reverse the foregoing operations.

To STRIP THE CROSSHEAD AND AXLETREE.

Unscrew the adjusting nuts and remove the collar and worm, and the traversing handle, taking care that the stud on the spindle is opposite the slot in the crosshead. Take out the fixing screw and remove the traversing handle spring. Unscrew the nuts and remove

the clip screws and the crosshead. Drive out the taper pin and remove the foot. Take out the taper pin and remove the axletree socket; remove the leather thongs, linch pins, drag washers and wheels. Drive out the taper pin and remove the axletree from the socket; turn out the hand nut and remove the collar; unscrew the set screw and remove the clamping screw. Remove the worm wheel socket from stem. Drive out the taper pins and remove the arms, right and left, and the T-socket.

TO ASSEMBLE THE CROSSHEAD AND AXLETREE.

Reverse the foregoing operations.

Spare Parts and Implements issued with each Carriage Parapet, Machine Gun.

SPARE PARTS.

Springs, brake	2
„ traversing handle, with screw ..	1
Screws, clamping, with collar and hand nut ..	1

IMPLEMENTS.

*Tommies, small	2
Spanners, shifting	1

CARRIAGE, FIELD, MACHINE GUN, INFANTRY NORDENFELT, 3-BARREL, MARK I.

(Plates XIII and XIV.)

This carriage is intended to carry either a 3-barrel Nordenfelt or a 2-barrel Gardner gun, with a supply of ammunition packed in Nordenfelt hoppers or feed boxes, or in Gardner holders, for immediate use. It is fitted with elevating and traversing gear, and with shafts and a slat for either animal or man draught. The slat, when not in use, is strapped to the side of the carriage.

The body of the carriage consists of a wrought-iron frame, formed to support two steel ammunition boxes (*a a*) and an under box (*b*); two Nordenfelt distributors, feed slide, and box containing spare parts and tools; and with the Gardner, spare parts and tools only are carried in the under box.

The frame is partly covered with a steel sloping top (*c*). At the rear of the body is fixed a wire net receptacle (*d*) for carrying drag ropes, &c. The frame is riveted to the axletree, at each end of which a loop is forged for the attachment of the shafts, which are further secured to the frame by the bands. The shafts are cased on the outside with a steel plate to strengthen and protect them.

Fittings are attached to the under part of the frame to carry intrenching tools.

* One of these has been altered for the purpose of removing the extractor guide plate spring in the 2-barrel Gardner gun.

The wheels are 3 ft. 9 in. in diameter, having 2-inch tires, rounded off at the edges, and having metal naves, and have a track of 3 ft. 11½ in.

The gun is pivoted to a crosshead (e), which is secured to the socket by a hand nut; the socket is keyed to a metal bracket (g), cast with bearings for elevating and traversing gears, and to which the stem of the crosspiece is attached by a fixing-screw (f).

The elevating gear consists of telescopic right (h) and left-hand (i) screws, working in a nut (j) pivoted to the bracket (g); it is furnished with a clamping lever (k).

Traversing is effected by means of a worm spindle (l), gearing with a worm-wheel segment (m) fixed to a pedestal, attached to the top of the carriage, in the socket of which the stem of the crosspiece revolves. The gear is worked by the hand wheel (n), and is prevented from going too far on either side by stops on the guide.

The ammunition boxes (a a) slide in the frame, where they are secured by pins and leather ties. Each box is divided into 12 compartments, each compartment carrying one hopper, or four feed boxes full for Nordenfelt, and five cartridge holders filled for Gardner; or a total of 936 rounds in hoppers; or 2,592 with feed boxes; or 2,400 in Gardner holders.

One half of the box is furnished with a hinged lid (o); the remaining half has sliding cover, which can be pushed back when the box is in position to admit of half the ammunition being withdrawn. The rest of the ammunition cannot be taken out unless the box is removed from the carriage.

Weight		6 owt. 3 qrs. 13 lbs.
Tonnage	{ for shipment.. ..	2.65 tons.
	{ for transport in boats	5.36 "
Rectangular space occupied in boats		12 ft. × 4 ft. 8 in. × 3 ft. 10 in.

DRILL FOR GARDNER AND NORDENFELT RIFLE CALIBRE MACHINE GUNS.*

Where the instruction does not apply to all the guns, a separate detail is given.

All movements of the guns and detachments are to be carried out in quick time, unless otherwise ordered.

The front is that direction in which the gun is pointed in action; at all other times the direction in which the shafts point.

The gun on the line of march will be drawn by a horse or mule.

In action it will be moved by "man draught" with drag ropes.

† The detachment for each gun will consist of 1 Non-Commissioned Officer and 9 men; they will fall in two deep five yards in front of the shafts, at "the order," with loose slings, the N.-C. Officer placing himself as the right-hand man of the front rank. Those not required to work the gun in action should be conveniently disposed of, using their rifles against the enemy.

* In the case of artillery working field mountings or cavalry or infantry working parapet mountings, each will use the words of command and procedure to which it is accustomed. See footnotes on pp. 26 and 33.

† Where the country is heavy it will be found necessary to increase the strength of the detachment so as to furnish assistance when required, and to provide for casualties.

The words of command in "capitals" are given by the Instructor, Officer, or N.-C. Officer in charge of the gun, those in "italics" by No. 1, who (in action) is always to be a good shot.

It must always be stated by the Officer or N.-C. Officer in charge of the gun whether the fire is to be "deliberate" or "rapid."

TELL OFF.

The right-hand man of the front rank takes a pace to his front, turns to his left, and numbers himself 1, the right-hand man of the rear rank numbers 2, and so on, the men of a file numbering in succession. After the detachment is told off, No. 1 falls in again on the right of the front rank.

FOR 2-BARREL GARDNER AND 3-BARREL NORDENFELT, ON FIELD CARRIAGE.

(For Cavalry and Infantry.)*

TAKE POST IN ORDER OF MARCH.

Right Turn, Double march.—The Detachment takes post as under:—

Odd numbers on the right, even numbers on the left of the gun; Nos. 2 and 3 in line with the axletree, 4 and 5 in line with the centre of the shafts; 6 and 8, 7 and 9, in line with the points of the shafts, leading men taking outside, 10 between the points of the shafts, 1 on the right of the gun, well clear, or in that position from which he can best superintend his detachment. Each number halts when at his post; they turn to the front together, looking to No. 2, who turns right about as soon as he arrives at his post.

Sling Arms.—The rifles will be slung as follows:—Front rank on the left shoulder, rear rank on the right.

Stand to.—Nos. 2 and 3 take drag ropes from the carriage and hook on to washers, then pass them on to the numbers in front; 10 raises the shafts. The ropes should be stretched to their full extent, each man holding them in the appointed place.

When the gun has to be taken down hill, the command, "*Hold Back,*" will be given by No. 1, when the drag ropes will be brought to the rear, the detachment hanging back so as to prevent the gun travelling too rapidly. On gaining level ground, the command "*Forward*" will be given, when the ropes will be moved to the front.

REFORM DETACHMENT.

Reform Detachment.—Nos. 2 and 3 unhook the drag ropes from the washers, coil up and place them in the carriage, 10 placing the points of the shafts on the ground; then all unsling arms and form up as for "Telling off."

TAKE POST IN ORDER OF MARCH.

Right Turn, Double March.—As before detailed.

* For artillery employed to work the 2-barrel Gardner on field mounting, the commands and procedure in action will be the same in principle as for the parapet mounting.

"ACTION FRONT" (RIGHT, LEFT, OR REAR).

Right about, left or right wheel, or halt, as the case may be; then "Halt—Action," or "Action."—Nos. 2 and 3, without unhooking them from the washers, will coil the ropes and place them on the ground, close to the wheels, and then with 1 take post at the gun, as under:—

No. 1 between the shafts—about six inches from body of carriage.

No. 2 six inches in rear of right wheel.

No. 3 six inches in rear of left wheel.

The remainder will be disposed of, using their rifles against the enemy, under the orders of the Officer or Non-Commissioned Officer in charge.

As soon as the gun is in position, No. 1 must be careful to see that the wheels are in the same horizontal plane; if the ground is uneven it must be levelled with an entrenching tool, which should always be carried with the gun.

For Nordenfelt.

No. 1 takes distributor (and feed guide when used) from box, hands them to No. 3, and sees elevating and traversing gear clear, by roughly directing his gun into the line of fire.

No. 3 opens sand plate, puts distributor on cover, with cut-off lever vertical, takes hopper from ammunition box and fixes it (or feed guide as the case may be) on distributor. When slide is used he fills distributor with cartridges.

For Gardner.

No. 1 sees elevating and traversing gear clear by roughly directing his gun into the line of fire.

No. 3 raises cartridge feeder with bottom slide closed and top slide open, and taking cartridge holder from ammunition box, fills feeder with cartridges.

It may be necessary to remove the ammunition boxes from the carriage. When this is done, one placed across the shafts and resting against the iron staples will serve as a seat for No. 1.

ON—AT—YARDS LAY.

(Object to be fired at always to be named.)

On—at—Yards Lay.—No. 1 adjusts the sight and lays the gun.

DELIBERATE FIRE. COMMENCE.

Deliberate Fire. Commence.—No. 3 places cut-off lever of distributor horizontal, and keeps the distributor filled with cartridges; then

No. 2 raises drill stop, draws back hand lever to the full extent, and forces it forward half way, and fires by order of No. 1, by forcing the hand lever right forward; he then draws it back to its full extent, again forcing it forward half way.

The position of the hand lever when at rest is in front of the drill stop.

No. 1 having obtained aim, gives command, "*Fire,*" retaining his hold of elevating and traversing gear, and correcting aim after each discharge.

No. 3 puts safety bar to fire, and keeps feeder filled with cartridges.

No. 2 opens the bottom slide of feeder, revolves crank handle, to the vertical position downwards, fires by order of No. 1 by continuing the revolution and bringing the handle to the vertical position upwards, and so on alternately, moving the crank handle half a revolution after each command, "*FIRE.*"

The position of the crank handle when at rest is forward, one inch below the top of the cover.

No. 1 as for Nordenfelt.

RAPID FIRE. COMMENCE.

Rapid Fire. Commence.—No. 1 having obtained aim, gives the command, "Commence."

No. 2 raises drill stop and moves hand lever backward and forward quickly, taking care to make a slight pause at the end of the backward and forward motions, until the command, "STAND FAST," or "CEASE FIRE," is given.

No. 3 as for deliberate fire.

No. 1 having obtained aim, gives the command, "Commence."

No. 2 opens the bottom side of feeder, and revolves crank handle quickly, but uniformly (without jerking) until the command "STAND FAST" or "CEASE FIRE," is given.

No. 3 as for deliberate fire.

STAND FAST.

Stand Fast.—No. 2 lowers drill stop. He will raise it when the command, "COMMENCE FIRE," is again given.

No. 3 puts safety bar to "safe." He will place it at "fire" when the command, "COMMENCE FIRE," is again given.

CEASE FIRE.

Cease Fire.—No. 1 lowers sight, raises cover, removes cartridges from the gun, lowers cover, receives distributor (and guide) from No. 3, and returns them to the box, which he closes.

No. 2 lowers drill stop, extracts any cartridges or cases there may be in the chambers, and as soon as the gun is clear secures hand lever by placing it in front of drill stop.

No. 3 places the cut-off lever of distributor vertical, removes and clears distributor, hands it (and feed guide) to No. 1, closes ammunition box and sand plate.

No. 1 lowers sight, unscrews cascable knob, raises cover, removes cartridges from the gun, lowers cover, and screws home cascable knob.

No. 2 closes top and bottom slides of feeder, extracts any cartridges or cases there may be in the chambers, leaving crank handle in its normal position at rest.

No. 3 puts safety bar to "safe," removes and clears feeder of cartridges, and returns it to its place on cover.

For instructional purposes the position of the numbers working the gun may be changed as follows:—

CHANGE ROUNDS.

Change Rounds.—On this command No. 1 becomes No. 3, 3—2, and 2—1, turning to the right about, doubling round the points of the shafts, and passing each other left arm to left arm.

TAKE POST IN ORDER OF MARCH.

Double March.
Slung Arms.
Stand to. } As before detailed.

OR

REFORM DETACHMENT.

Reform Detachment.—As before detailed.

Before moving the gun the Officer or Non-Commissioned Officer in command must satisfy himself that the instructions for "Cease Fire" have been properly carried out, and that the gun is perfectly clear.

These guns can be worked by two men, No. 1 performing the duties of No. 1 and 2.

No. 3 as before detailed.

The foregoing drill is also applicable to the 5-barrel Gardner and 5-barrel Nordenfelt, when mounted on the "Steel Field Carriage."

FOR 5-BARREL GARDNER AND 5-BARREL NORDENFELT, UNLIMBERED.

The gun is unlimbered, and the limber placed at about 10 yards in rear of the trail eye; the five men required to work the gun fall in two deep, about 5 yards in rear of trail, the remainder being disposed of as ordered.

TAKE POST AT GUN.

Left Turn, Double March.—Numbers take post as follows:—

- No. 1 at end of trail.
- „ 2 six inches in rear of right wheel.
- „ 3 „ „ left wheel.
- „ 4 five yards in rear of left wheel.
- „ 5 in rear of limber.

Sling Arms.—As before detailed.

REFORM DETACHMENT.

Reform Detachment.—Unslung arms, and form up as for telling off.

TAKE POST AT GUN.

Left Turn, Double March.—As before detailed.

ACTION.

Action.—No. 1 hands distributor (and feed guide, when used) to No. 3, fixes seat, and sees elevating and traversing gear clear, by roughly guiding the gun into the line of fire.

No. 2 releases hand lever.

No. 3 raises sand plate, puts distributor on cover, with cut-off lever vertical, and places hopper on top of distributor.

No. 4 provides No. 3 with filled hoppers, and returns empties to No. 5.

No. 5 provides No. 4 with filled hoppers, and refills empty ones.

No. 1 places himself astride the trail, sees elevating and traversing gear clear, by roughly guiding the gun into the line of fire.

No. 2 screws home fixing screw when cartridge feeder is adjusted.

No. 3 places cartridge feeder on hopper, with bottom slide closed and top slide open, fills feeder with cartridges, and returns empty holders to No. 4.

No. 4 provides No. 3 with filled holders, and returns empties to No. 5.

No. 5 provides No. 4 with filled holders, and refills empty ones.

When the shield is in use,—on the command, "ACTION," Nos. 2 and 3 step outside the wheels facing each other, seize front corner of shield with one hand, and spring bolt with the other, compress the spring, draw bolt, raise shield, and when perpendicular replace bolt, then return to position at gun.

ON—AT—YARDS LAY.

(Object to be fired at always to be named.)

On—at—Yards Lay.—No 1 adjusts the sight and lays the gun.

DELIBERATE FIRE. COMMENCE.

Deliberate Fire. Commence.—No. 3 places cut-off levers of distributor and hopper horizontal, and as soon as the last cartridge passes the side hole of distributor, replaces the hopper with a full one. When the feed guide is used he will keep the distributor filled with cartridges.

No. 2 draws back drill stop, then draws back hand lever to full extent, and forces it forward half way, and fires by order of No. 1, by forcing it right forward, then drawing it back to its full extent, again forces it forward half-way.

The position of the head lever when at rest is forward, secured by the chain.

No. 1 having obtained aim, gives command, "Fire," retaining his hold of elevating and traversing gear, and correcting aim after each discharge.

Nos. 4 and 5, as detailed for action.

No. 3 opens bottom slide of feeder and keeps it filled with cartridges.

No. 2 puts safety bar to fire, revolves crank handle, bringing it forward to a horizontal position, fires by order of No. 1, by continuing the revolution with a uniform motion and without a jerk, bringing the handle back to the same horizontal position.

The position of the crank handle when at rest is forward, with the handle in line with the front bottom corner of casing.

No. 1 having obtained aim, gives command, "Fire," retaining his hold on elevating and traversing gear, and correcting aim after each discharge.

Nos. 4 and 5, as detailed for action.

RAPID FIRE. COMMENCE.

Rapid Fire, Commence.—No. 1 having obtained aim, gives the command, "Commence."

No. 2 draws back drill stop, and moves hand lever backward and forward quickly, taking care to make a slight pause at the forward and backward motions, until the command, "STAND FAST" or "CEASE FIRE," is given.

Nos. 3, 4, and 5, as for deliberate fire.

No. 1 having obtained aim, gives the command, "Commence."

No. 2 puts safety bar to fire, revolves crank handle quickly but uniformly (without jerking) until the command, "STAND FAST" or "CEASE FIRE," is given.

Nos. 3, 4, and 5, as for deliberate fire.

STAND FAST.

Stand Fast.—No. 2 places drill stop forward; he will draw it back when the command, "COMMENCE FIRE," is again given.

N.B.—The drill stop of the 5-barrel Nordenfelt guns at present in the service is underneath, and when forward prevents the springs being compressed only, but cartridges that are in the gun may be fired. To avoid this, on the command, "STAND FAST," No. 2 should at once quit the hand lever.

No. 2 puts safety bar to "safe," he will place it at "fire" when the command, "COMMENCE FIRE," is again given.

CEASE FIRE.

Cease Fire.—No. 1 lowers sights, raises cover to remove cartridges from the gun, lowers it, receives distributor (and guide) from No. 4, and returns it to trail box.

No. 2 pushes drill stop forward, and as soon as the gun has been cleared, forces the lever to the rear, thus extracting cases, then to the front, and fixes it by its catch.

No. 3 places the cut-off levers of distributor and hopper vertical, removes them, hands them to No. 4.

No. 4 returns hoppers to No. 5 at

No. 1 lowers sight, unscrews cascable knob, raises cover, removes cartridges from the gun, lowers cover, and screws home cascable knob.

No. 2 puts safety bar to "safe," unscrews fixing screw, and assists No. 1 to clear cartridges from gun.

No. 3 closes top and bottom slides of feeder, removes it, hands it to No. 4; and returns it to its place on shield.

No. 4 returns holders to No. 5, and when he has cleared the feeder of cartridges, returns it to No. 3.

limber, and when he has cleared the distributor of cartridges, hands it to No. 1.

No. 5 replaces hoppers and closes limber box.

No. 5 replaces holders, and closes limber box.

To lower shield after the gun is clear, Nos. 2 and 3 seize it as in raising, draw the bolt, lower shield, and secure it on frame.

CHANGE ROUNDS.

Change Rounds.—No. 1 becomes No. 5, No. 5—4, 4—3, 3—2, 2—1. Nos. 2 and 3 turning outwards passing each other left arm to left arm, all moving at the double.

To work the Gun with Reduced Numbers.

With 4 men—No. 4 will perform the duties of 4 and 5. 1, 2, and 3 as detailed.

With 3 men—No. 1 will perform the duties of 1 and 2. 2 those of 4 and 5. 3 as detailed.

With 2 men—No. 1 will perform the duties of 1 and 2. 2 those of 3, 4, and 5; in the latter case it would be necessary to have the supply of ammunition convenient to the post of No. 3 at the gun.

FOR 5-BARREL GARDNER AND 5-BARREL NORDENFELT, ON CONE MOUNTING.

The detachment consists of one Non-Commissioned Officer and two men, who fall in in single rank five yards in rear of the gun, the Non-Commissioned Officer placing himself on the right.

TELL OFF.

The Non-Commissioned Officer takes a pace to his front, turns to his left, and numbers himself 1; the remainder telling off in succession. After the detachment is told off, No. 1 falls in again on the right of the front rank.

TAKE POST AT GUN.

Right Turn, Double March.—No. 1 twelve inches in rear of breech.

No. 2 twelve inches from right of gun } in line with the breech.

" 3 " from left of gun }

The ammunition must be packed in holders, hoppers, or feed boxes and arranged close to No. 3.

ACTION, &c.

The working of the gun in action will be carried out by Nos. 1, 2, and 3, as in 5-barrel guns of this description on wheeled carriage.

DRILL, WITH DRAG ROPES, FOR GUNS MOUNTED ON FIELD CARRIAGES WITH LIMBERS.

The gun is limbered up, and the detachment falls in as for telling off. (See footnote, page 26.)

Tell off.—As before detailed.

TAKE POST IN ORDER OF MARCH.

Right Turn, Double March.—The detachment takes post as under: odd numbers on the right, even numbers on the left of gun. Nos. 2 and 3 in line with the axletree of the gun carriage, 4 and 5 in line with the centre of the trail, 6 and 7 in line with the axletree of the limber, 8 and 9 in line with the point of the shaft, No. 10 at the end of shaft, No. 1 in line with the trail-eye on the right.

Each number halts when at his post; they turn to the front together, looking to No. 2, who turns right about as soon as he arrives at his post.

Sling Arms.—As before detailed.

STAND TO.

Stand to.—Nos. 4 and 5 pass gun drag ropes to 2 and 3, who hook them on to the drag washers of the gun on their own sides, 6 and 7 hook on limber drag ropes; the drag ropes being manned as follows: gun drag ropes by 3 and 5, and 2 and 4, limber drag ropes by 7 and 9, and 6 and 8, No. 10 guides limber shaft.

ACTION FRONT (*if on the move*).

Halt, Action, Front.—No. 1 unkeys; 2 and 3 unhook drag ropes, then man the wheels; 4 and 5 coil up drag ropes and place them on limber; when the trail is clear No. 1 gives the command, "*Limber—forward*;" the limber moves forward about a yard, wheels right about and the trail is carried round a half-circle to the left, No. 1, assisted by 2 and 3 at the wheels, shifting round the trail as soon as the limber makes room, to avoid walking backward; the detachment told off to work the gun then take post as detailed *for action*. The limber is taken to the rear; when sufficiently so it again wheels right about, and halts 10 yards in rear of the trail-eye covering the gun (if cover is available close at hand, it should be taken advantage of). The limber numbers are disposed of as ordered.

ACTION REAR.

Action Rear.—The gun is unlimbered by the same numbers as in "*Action Front*," but the trail is not carried round, the limber moves forward 1 yard, inclines to its left, then wheels right about, and is disposed of with numbers as above.

ACTION RIGHT.

Action Right.—Is the same as "*Action front*," but the trail is carried round a quarter of a circle only to the left; the limber moves round 1 yard, then moves to its left and wheels left about, and is disposed of with numbers as above.

ACTION LEFT.

Action Left.—Is the same as "*Action front*," but the trail is carried round a quarter of a circle only to the right; the limber moves

forward 1 yard, then moves to its right and wheels right about, and is disposed of with numbers as above.

FRONT LIMBER-UP.

Front Limber-up.—No. 1 places himself at the trail eye, lifts the end of the trail, and carries it round a half circle to the right, and lowers it gently to the ground, Nos. 2 and 3 man the wheels, and, as soon as the trail is round, get under cover between the muzzle and wheels; 4 and 5 attend to drag ropes, and take cover if necessary between the breech and wheels, No. 1 in front of 5, the whole with their backs to the axletree. The limber comes up on the right of the gun, and, when it is square, No. 1 gives, "*Halt—limber-up,*" lifts the trail by the handle, places the eye on the hook of the limber, and keys, assisted by 2 and 3, who man the wheels; the detachment then takes post in order of march.

REAR LIMBER-UP.

Rear Limber-up.—The numbers perform the same duties, but the limber wheels to the left about as soon as it arrives at the trail, which is not carried round.

RIGHT LIMBER-UP.

Right Limber-up.—Is the same as front limber-up, except that the trail is only carried round a quarter of a circle to the right.

LEFT LIMBER-UP.

Left Limber-up.—Is the same as front limber-up, except that the trail is only carried round a quarter of a circle to the left.

RE-FORM DETACHMENT.

Re-form Detachment.—As before detailed.

FOR 2-BARREL GARDNER ON PARAPET MOUNTING.

(For Artillery.)*

The detachment consists of two numbers. Before action No. 1 will see that the locks, firing pins, sights, and elevating and traversing gear are in good order and work easily, and that all bearing parts of the mechanism are slightly oiled, and that the box of spare parts and tools is complete and handy for use.

ACTION.

Action.—No. 1 assisted by number 2 raises the arms on parapet, and taking position right of gun with his left leg against wheel, slacks out the clamping screw with his right hand, takes the handle on worm wheel socket in his left, and assisted by No. 2 raises the gun and clamps it in position. He sees that the crank handle is in the rest position, namely forward, and about one 1 inch below the top of the cover.

* For cavalry and infantry employed to work parapet mountings, the commands and procedure will be the same in principle as for field carriage.

No. 2 places himself on the left of the gun, and, with right leg against the wheel, takes handle on worm wheel socket in his right hand, assists No. 1 to run the gun up to position, raises feeder, with bottom slide closed and top slide open, and fills it with cartridges from holder; then No. 1 takes handle on foot in his left hand, withdraws the pin from the axletree socket to allow the foot of the shaft to rest on the ground, runs the wheels up to the top, fixes with pin, places handle in traversing worm, and sees elevating and traversing gear clear, by roughly laying the gun in the required direction.

TO LAY AND FIRE.

The orders of fire are as follows:—

Slow Fire.—The G.G.C. will point out the target and order—

“A GROUP.....YARDS.”

“SLOW FIRE. A1 SHOT.”

On the order, “.....yards,” No. 1 will adjust the sight and lay the gun, standing with the foot of shaft between his feet.

On the order, “*Slow Fire*,” he opens the bottom slide of feeder, revolves the crank handle to the vertical position downwards (the position when at rest is forwards), and fires on the order, “Shot,” by continuing the revolution and bringing the handle to the vertical position upwards, and so on alternately, thus making half a revolution for each shot. He should correct the aim and use the traversing gear as required.

No. 2 puts the safety bar to “fire,” and keeps the feeder filled with cartridges.

Rapid Fire.—The G.G.C. will point out the target, and order—

“A GROUP,” or “A1,”

“.....YARDS.”

“RAPID FIRE.”

No. 1 will adjust his sights and lay as above, open the bottom slide of feeder, and fire by revolving crank handle quickly, but uniformly (without jerking), until “*Cease firing*” is given or whistle sounded.

No. 2 as for deliberate fire.

INDEPENDENT FIRE.

GUN GROUP COMMANDER.

“A GROUP,” or “A1.”

“INDEPENDENT FIRE.”

Same as “*Rapid Fire*,” except that the No. 1 selects his own target and estimates the range himself, and will correct the elevation from time to time in accordance with his observation of the fire.

TRAVERSING FIRE.

When this is ordered at Slow or Rapid Fire, that order of fire is maintained, but the No. 1 will slowly traverse the gun backwards

and forwards between the limits of traverse or points ordered by the G.G.C.

ACTION ON A MISS-FIRE.

The crank handle is turned again, which withdraws the cartridge.

TO CEASE FIRING.

No. 2 puts the safety bar to "Safe." He will place it at "Fire" when the command "*Slow Firing*," "*Rapid*," or "*Independent Firing*," is given again.

TO CEASE FIRING AND REPLACE STORES.

No. 1 lowers sight, unscrews cascable knob, raises cover, removes any cartridges or cases from the gun, lowers cover, runs home elevating screw, places traversing handle in socket, raises foot of shaft, withdraws pin to allow axletree to run down, and fixes with pin, and, as soon as No. 2 is ready to assist, slacks out clamping screw, lowers gun, re-tightens clamping screw, and removes the arms from the parapet, when the gun can be moved to any position required.

No. 2 puts safety bar to "Safe," closes top and bottom slides of feeder, removes and clears it of cartridges, returns it to its place on cover, assists No. 1 to lower gun, and remove the arms from the parapet.

FOR 1-BARREL GARDNER, FOR MULE TRANSPORT, ON ENFIELD COMBINED MOUNTING.

The mules and detachment for this gun will form as under:—

Nos. 1 and 2 mules in front at two paces interval, carrying the gun and mounting, covered by 3 and 4 carrying ammunition, at full mule length distance. Men to work the gun, viz.: 1, 2 and 3, four paces from right of and in dressing with 1 and 2 mules' heads. Drivers 4, 5, 6 and 7, with rifles slung on right shoulder, on the inner side, holding the reins in the right hand near the rings of the bit, with the ends in the left hand, remainder 8, 9 and 10 in rear of 1, 2 and 3, and in line with 3 and 4 mules' heads.

On the march the mules will be led in single file in their numerical order, the detachment escorting as directed. Their position when the gun is being mounted or dismounted must depend on the nature of the ground, but, when practicable, they must be kept under cover.

If the mules are easily managed, drivers of Nos. 2 and 4 may hand their mules to drivers of Nos. 1 and 3, who will take a pace to the front, turn about, and receive the reins from them. Nos. 5 and 7 will then be available to assist in bringing up ammunition, or to use their rifles against the enemy as well as the three spare men.

Drag ropes fitted with hooks and handles are to be carried on No. 2 mule, so as to move the gun when required in action. When in action the ropes need not be unhooked, but coiled on the ground close to the wheels.

c To mount the gun on wheeled carriage:—

ON WHEELS MOUNT.

On Wheels Mount.—Men to work the gun are to at once sling arms, and the mules' heads are to be turned to the rear by left about.

No. 1 brings up trail and mallet, removes cleaning rod, drives out cotters, receives axle from No. 2, places it in socket, and drives in cotters; then holds trail and axle in position ready for wheels.

No. 3 opens wheel strap and box from right side of mule.

No. 2 brings up axle and hands it to No. 1.

Nos. 2 and 3 then bring up wheels and drag washers, place them on axle, and secure with lynch pins.

As soon as the axle rests on the wheels, No. 1 places trail on ground, brings up crosshead, places socket on pivot, gives it a quarter turn to fasten it, and secures with split pin; then, holding the top of the inner elevating screw with the left hand to prevent it turning, turns the hand-wheel with the right hand until the top of the inner screw is in line with the top of the crosshead, holding the elevating gear in this position till it is attached to the gun by the joint pin.

Nos. 2 and 3 bring up gun, passing to the right of No. 1, place it on crosshead, No. 2 holding cascable knob with the left hand, and the barrel with the right; No. 3 removes joint pins, and when the gun is in position replaces them, No. 1 brings up crank and traversing handles and places them in gun.

No. 2 brings up ammunition box and places it on trail.

No. 3 brings up and fixes seat and crossbar, then Nos. 1, 2, and 3 take post for action, as follows:—

No. 1 at end of trail.

No. 2 six inches in rear of right wheel.

No. 3 six inches in rear of left wheel.

No. 3 loads and unloads from right side of No. 2 mule, and No. 2 from left side.

ACTION.

Action.—No. 1 sees elevating and traversing gear clear by roughly directing his gun into the line of fire.

No. 3 raises cartridge feeder with bottom slide closed and top slide open, and taking cartridge holder from ammunition box, fills feeder with cartridges.

ON—AT—YARDS “LAY.”

(Object to be fired at always to be named.)

On—at—Yards Lay.—No. 1 adjusts the sight and lays the gun.

DELIBERATE FIRE. COMMENCE.

Deliberate Fire. Commence.—No. 3 puts safety bar to “fire,” and keeps the feeder filled with cartridges.

No. 2 opens the bottom slide of feeder, revolves the crank handle to nearly the horizontal position forward, fires by order of No. 1, by continuing the revolution with a uniform motion, and without a jerk, bringing the handle back to the same horizontal position. (*The position of the crank handle when at rest is forward, with the handle inclining downwards.*)

No. 1 having obtained aim, gives the command "*Fire*," retaining his hold on elevating and traversing gear, and correcting aim after each discharge.

RAPID FIRE. COMMENCE.

Rapid Fire. Commence.—No. 1, having obtained aim, gives the command, "*Commence*."

No. 2 opens the bottom slide of feeder and revolves crank handle quickly but uniformly (without jerking), until the command, "*STAND FAST*," or "*CEASE FIRE*," is given.

No. 3, as for deliberate fire.

STAND FAST.

Stand Fast.—No. 3 puts safety bar to "*safe*;" he will place it at "*fire*" when the command, "*COMMENCE FIRE*," is again given.

CEASE FIRE.

Cease Fire.—No. 1 lowers sight, unscrews cascable knob, raises cover, removes cartridges from the gun, lowers cover, and screws home cascable knob.

No. 2 closes top and bottom slides of feeder, extracts any cartridges or cases there may be in the chambers, leaving crank handle in its normal position.

No. 3 puts safety bar to "*safe*," removes and clears feeder of cartridges, and returns it to its place on cover.

When only two men are available to work the gun, No. 1 will perform the duties of 1 and 2. No. 3 as detailed.

To dismount the gun:—

DISMOUNT.

Dismount.—No. 1 traverses the gun until it is in line with the trail, removes traversing and crank handles, hands them to No. 2, who replaces them in crosshead box; removes crossbar and seat, hands them to No. 3, who replaces them in cradle, removes ammunition box, which is taken to its place on mule by No. 2.

No. 2 seizes cascable knob with the left hand and the barrel with the right (when the barrel is hot, the feeder), supports the gun, while No. 3 removes joint pins, which he replaces in gun as soon as it is raised.

No. 3 then assists No. 2 to place gun in the cradle.

No. 1 turns both elevating screws home, removes split pin, then taps the foot of the worm wheel on the left with the mallet to loosen it, gives it a quarter turn, removes crosshead and replaces it in box. Nos. 2 and 3 remove linch pins, drag washers and wheels, replacing them in their proper places on cradle.

No. 1 drives out cotters, removes axletree, hands it to No. 2, who replaces it in box, then he replaces the cotters and cleaning rod in trail, the trail in the cradle, and mallet in crosshead box.

Nos. 1, 2, 3, 8, 9, and 10 take post on right, the mules being again turned to the front.

To mount gun on tripod mounting:—

ON TRIPOD MOUNT.

On Tripod Mount.—The mules being turned about No. 1 brings

up the trail (which in this mounting forms the long leg), and mallet, and drives out cotters.

Nos. 2 and 3 bring up short legs belonging to their respective sides, placing them in the sockets, No. 2 drives in the cotters, and No. 3 turns up the tripod, then all proceed to mount gun as for wheeled carriage.

To dismount from tripod mounting:—

DISMOUNT.

Dismount.—Dismount gun and head stock and pack in cradle as in dismounting from wheels, then No. 3 turns up tripod, and No. 2 drives out cotters, and having removed short legs from the sockets, replaces them in cradle, No. 1 replacing the trail.

Nos. 1, 2, 3, 8, 9, and 10 take post on the right, the mules being turned to the front.

DRILL FOR 3 AND 6-PR. NORDENFELT AND HOTCHKISS Q.F. GUNS, 1900.

17 JUN 1902

Insert fresh paragraph at end of drill
as follows:—

AIMING RIFLE.

The pattern of Aiming Rifle used is the "Rifle Aiming, M.H. Chamber, Morris Q.F."

Description.

It consists of a steel barrel, fitted in front with an expanding cylinder cone, and two retaining screws, and in rear with a gunmetal collar and fixing screws.

The expanding cylinder centres the rifle in front, when screwed up from the rear, by means of a wrench provided for the purpose.

The gunmetal collar in rear can be moved to the front or rear by withdrawing the fixing screws, and turning it on the screw thread on the barrel, and when in the gun fits the chamber, and centres the rifle in rear; by moving the collar to the front, the rifle is drawn to the rear, and *vice versa*.

Adjustment.

To adjust the rifle.—Set the gunmetal collar sufficiently to the front to cause the rear end of the rifle to be flush with the rear end of the bore, and see if the breech or wedge can be closed, when loaded with a cartridge case and holder. If not, set the collar back, a thread at a time, until the breech or wedge can just be closed without forcing it. Then screw up the expanding cylinder.

Use.

During practice the dummy cartridge cases should be slightly oiled outside, and should be thoroughly cleaned inside and outside after practice. Fouling may cause a jam. The rifle cannot be unscrewed until cool, but if necessary it can be knocked out from the front while warm by means of a wooden stave. It must be thoroughly cleaned after practice.

If the instructions given above for adjusting the rifle are not carried out carefully, the rifle may be left too far to the front. This will cause the cartridge holder to be practically unsupported, and it will probably split and become unserviceable.

EXPLANATION OF PLATES I TO IV.

For Guns, Gardner 2-Barrel '303", converted from '4'
and '45" M.H.

Similar numbers indicate corresponding parts in all the plates.

- | | |
|-------------------------------|----------------------------------|
| 1. Cascable knob. | 28. Butt of lock. |
| 2. Cascable screw. | 29. Plunger of lock. |
| 3. Breech casing. | 30. Firing pin. |
| 4. Cover. | 31. Hammer. |
| 5. Elevating bracket (front). | 32. Extractor. |
| 6. Elevating bracket (rear). | 33. Lock spring. |
| 7. Cartridge feeder. | 34. Friction roller. |
| 8. Top slide. | 35. Stud. |
| 9. Bottom slide. | 36. Hammer axis pin. |
| 10. Top spring. | 37. Tangent sight. |
| 11. Bottom spring. | 38. Tangent sight spring. |
| 12. Stop screw. | 39. Pinion. |
| 13. Guide pins. | 40. Cam for ejector. |
| 14. Barrels. | 41. Cover joint pin. |
| 15. Crank handle. | 42. Crosshead joint pin. |
| 16. Hood (right). | 43. Elevating joint pin. |
| 17. Hood (left). | 44. Barrel fixing pin. |
| 18. Safety bar. | 45. Extractor guide plate spring |
| 19. Disc crank. | 46. Fore sight. |
| 19A. Crank pin. | 47. Ammunition label. |
| 20. Axis pin (left). | 48. Ejector. |
| 21. Axis pin (right). | 49. Ejector spring. |
| 22. Cam, disc crank. | 50. Ejector cone. |
| 23. Cam slide. | 51. Cartridge carrier. |
| 24. Extractor guide plate. | 52. Stop-off block. |
| 25. Cartridge feeder catch. | 53. Cartridge holder. |
| 26. Spring, feeder catch. | 54. Cartridge holder cover. |
| 27. Collar, feeder catch. | |

EXPLANATION OF PLATES V TO X.

For Guns, Nordenfelt 3-Barrel '303", converted from
'45" M.H.

Similar numbers indicate corresponding parts in all the plates.

- | | |
|---------------------------------|--------------------------------|
| 1. Frame. | 22. Hopper catch fixing screw. |
| 1A. Centre crosspiece. | 23. Cover, joint pin. |
| 1B. Rear crosspiece. | 24. Cascable knob. |
| 2. Action block. | 25. " screw. |
| 3. Spring bar. | 26. Sand plate. |
| 4. Trigger comb. | 27. Ammunition label. |
| 5. Hammer. | 28. Barrels. |
| 6. Lock spring. | 29. Barrel fixing key. |
| 7. Angular studs, trigger-comb. | 30. Hand lever. |
| 8. Angular stud, hammer. | 31. Action lever. |
| 8A. Lower stud of hammer. | 32. Friction roller. |
| 9. Trigger comb spring. | 33. Drill stop. |
| 10. Breech block. | 34. Tangent sight. |
| 11. " plunger. | 35. Milled head and pinion. |
| 12. Cocking stud. | 36. Stop ring. |
| 13. Angular faces. | 37. " set screw. |
| 14. Cam slot. | 38. Joint pin, crosshead. |
| 15. Extractors. | 39. " elevating gear. |
| 16. Firing pin. | 40. Stop screw. |
| 17. Cartridge carrier. | 41. Fore sight. |
| 18. Angular faces. | 42. Distributor. |
| 19. Recesses. | 43. Feed guide. |
| 20. Cover. | 44. Box, feed. |
| 21. Hopper catch. | 45. Cut-off lever. |
- } shown on Plate
XII.

EXPLANATION OF PLATES XI AND XII.

For Carriage, Parapet, Machine Gun (Mark I).

The numbers apply to both the above plates.

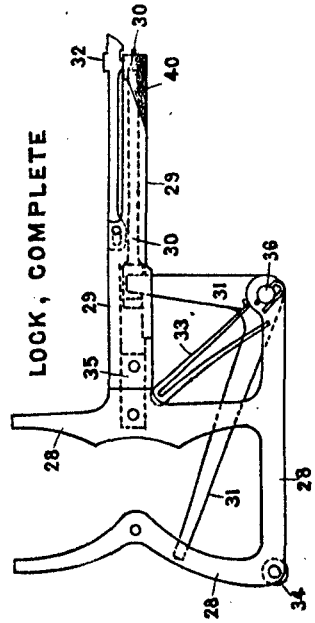
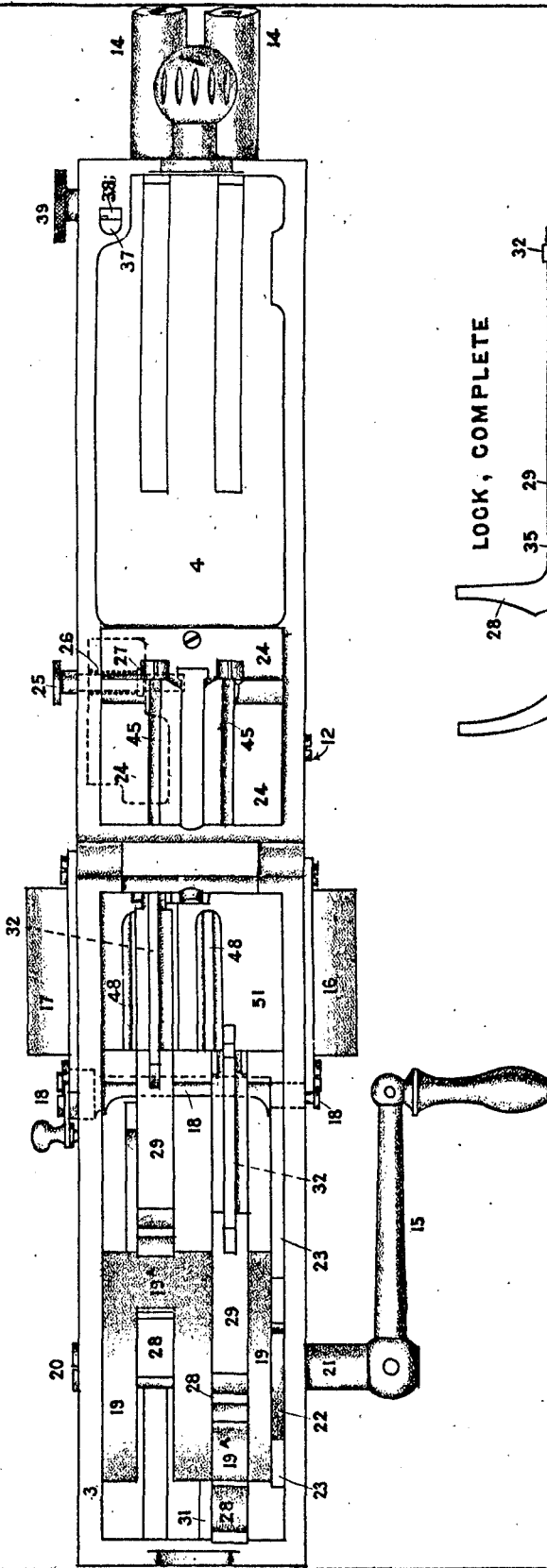
1. Arms (right).
2. Arms (left).
3. T socket.
4. Worm wheel socket.
5. Lifting, handles.
6. Crosshead.
7. Clamping arrangement.
8. Adjusting nuts, worm traversing.
9. Traversing handle.
10. Clip screws and nuts.
11. Inner screw.
12. Outer screw.
13. Hand wheel.
14. Gunmetal nut.
15. Brake.
16. Pivot screws and check nuts.
17. Stem.
18. Axletree socket.
19. Taper pin with chain and stud.
20. Axletree.
21. Wheels.
22. Foot.
23. Handle.
24. Loops, leather.
25. Rod, cleaning.
26. Tool case.
27. Drag washer, lynch pins and leather thongs.

LONDON:

PRINTED FOR HER MAJESTY'S STATIONERY OFFICE,
BY HARRISON AND SONS, ST. MARTIN'S LANE.

GUN GARDNER 2B $\frac{1}{2}$.

PLAN OF ACTION, COVER OPEN.



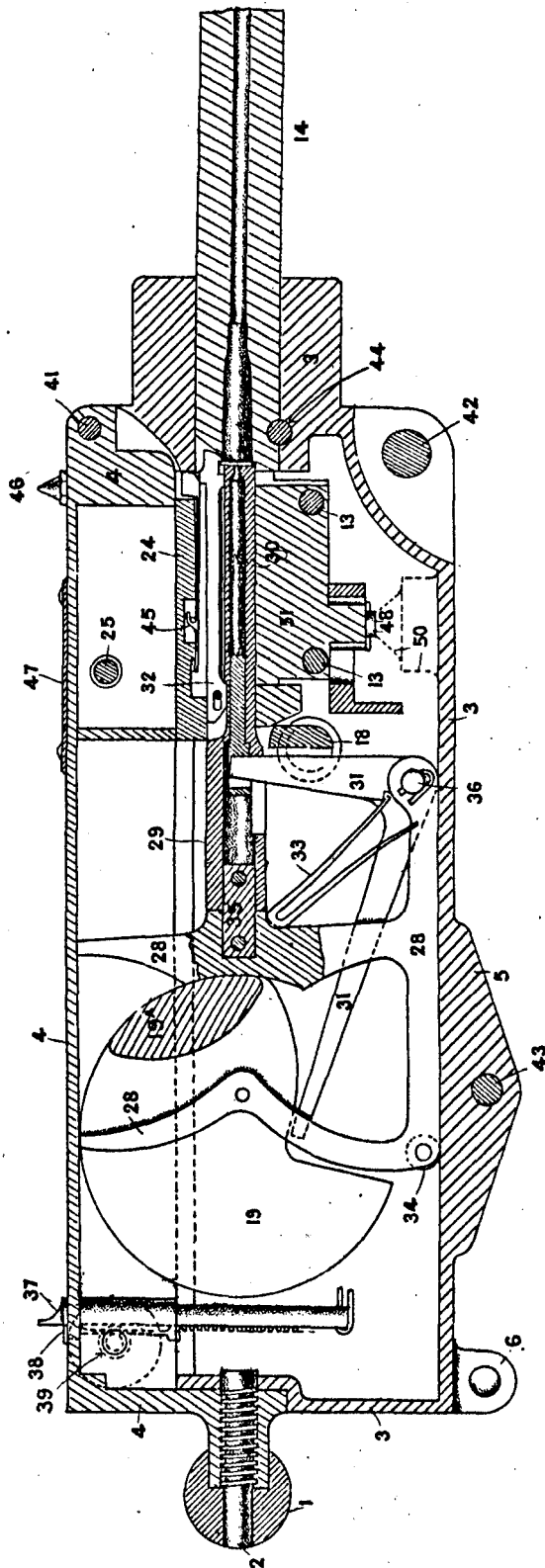
LOCK, COMPLETE

SCALE 3" = 1 FOOT

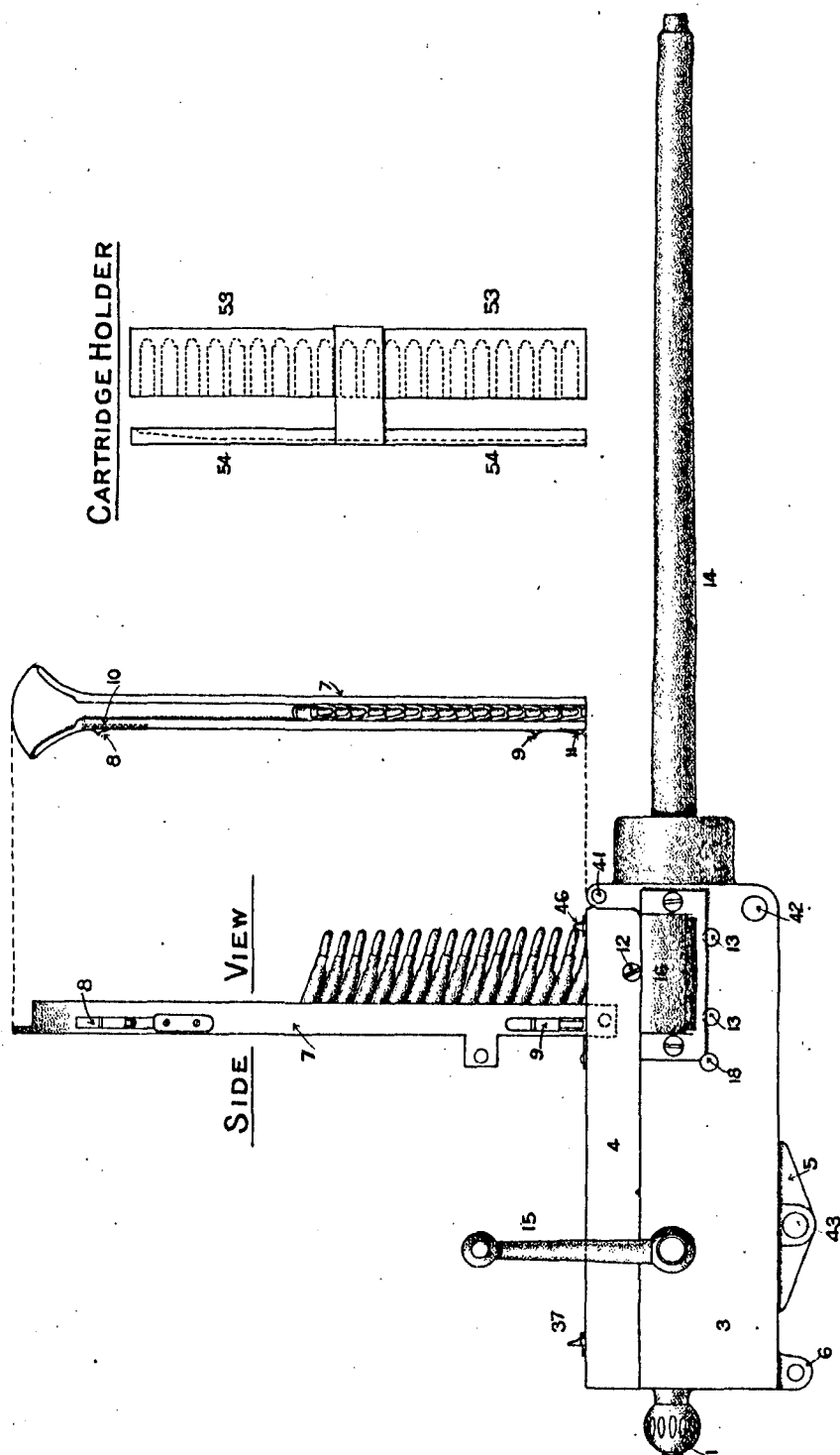
GUN GARDNER. 2 B¹.

LONGITUDINAL SECTION THROUGH LEFT HAND BARREL.

SCALE 4'-1 FOOT.



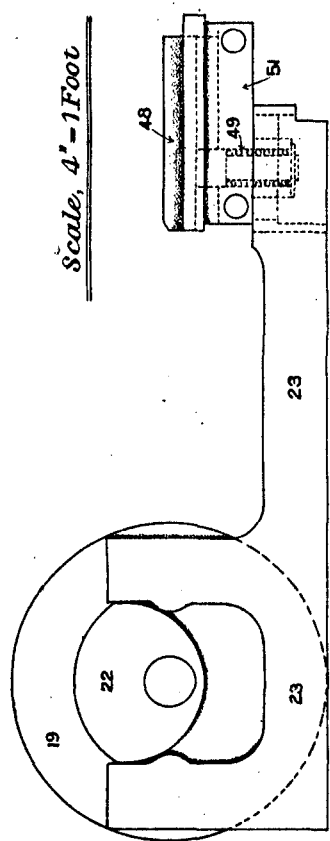
GUN GARDNER 2 B^L



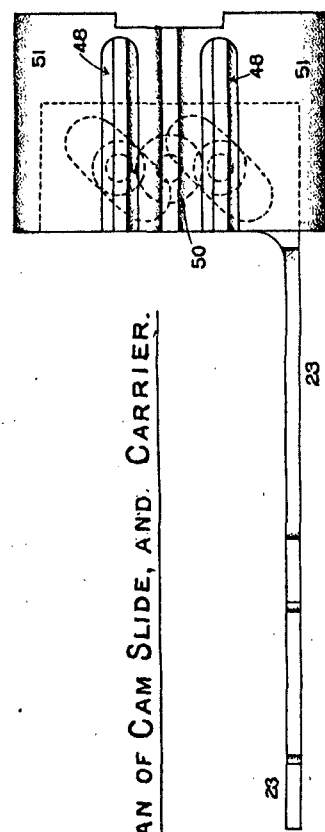
Scale, 2" - 1 Foot

GUN GARDNER 2 B^L

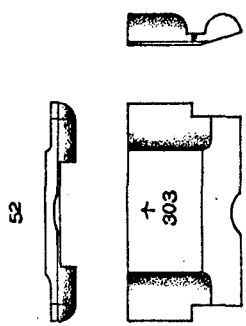
ELEVATION OF CRANK DISC, CAM SLIDE, AND CARRIER.



PLAN OF CAM SLIDE, AND. CARRIER.

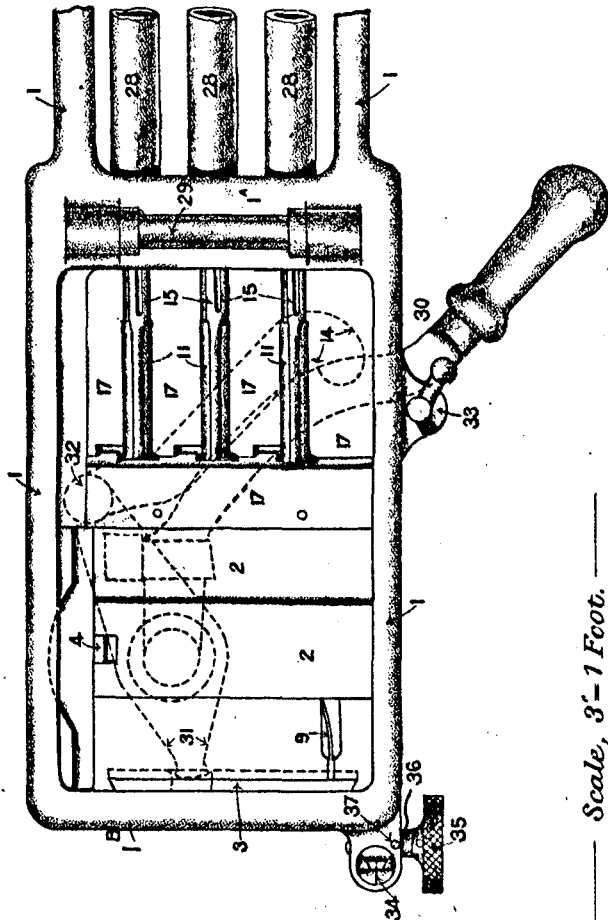


STOP-OFF BLOCK.



GUN NORDENFELT 3 B4

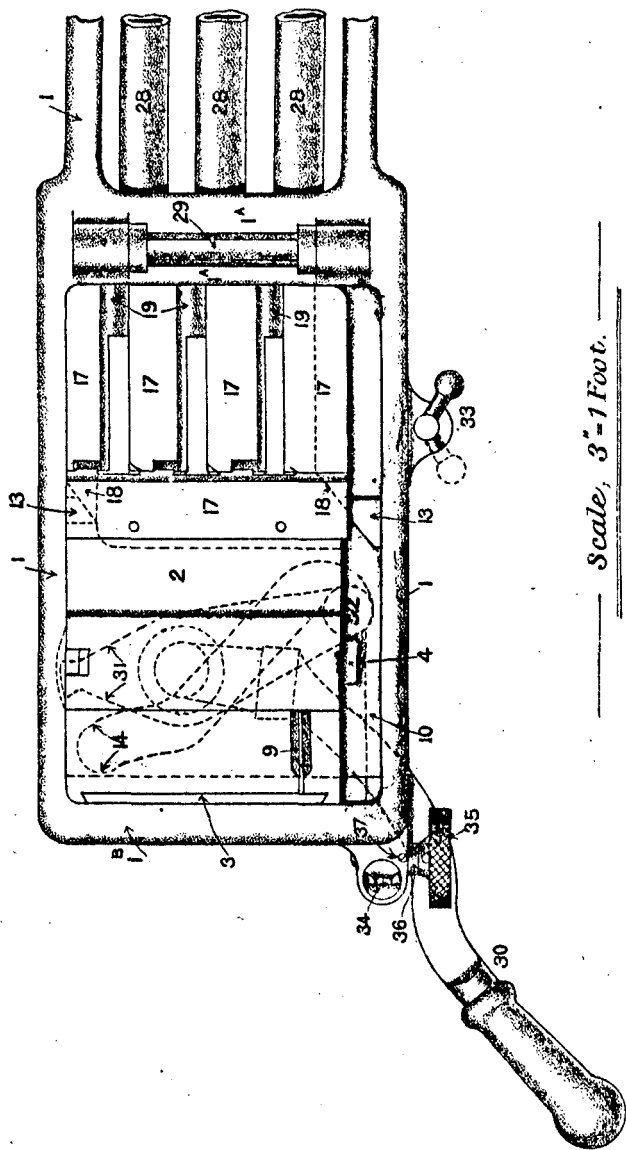
FIRING POSITION, COVER REMOVED.



Scale, 3' = 1 Foot.

GUN NORDENFELT 3B^L

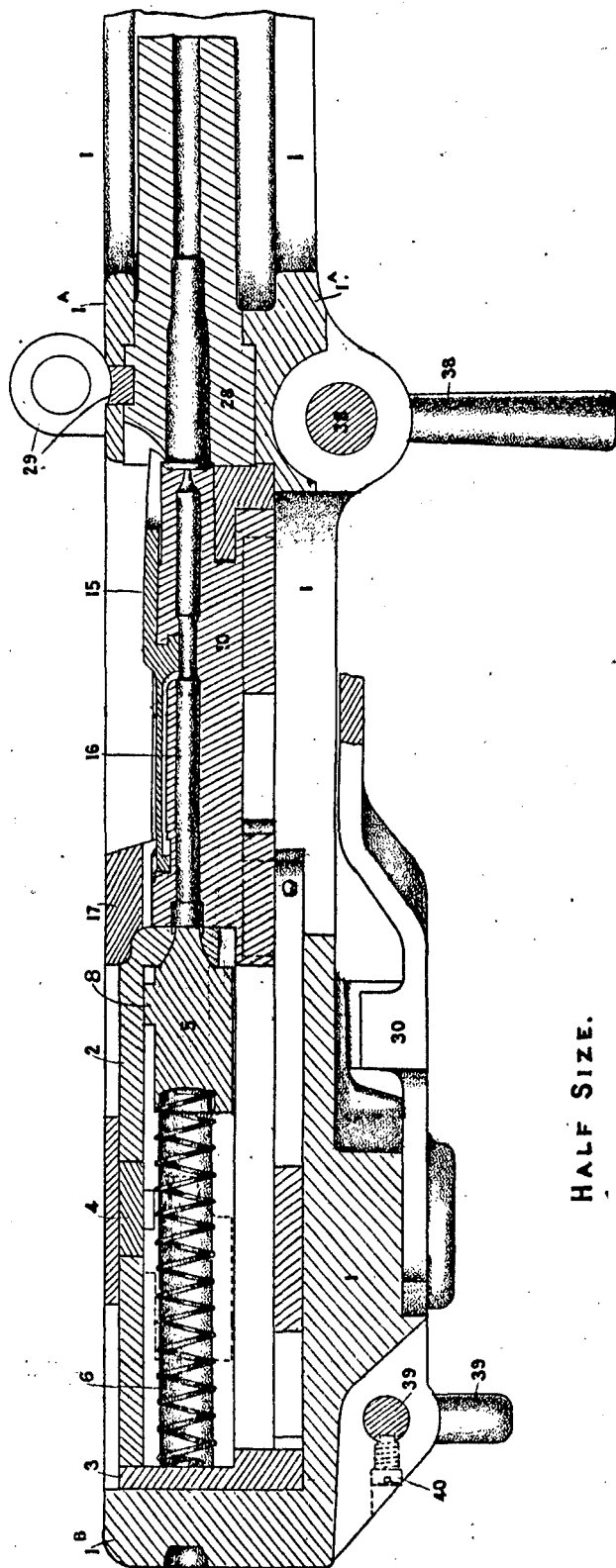
LOADING POSITION, COVER REMOVED.



Scale, 3"-1 Foot.

GUN NORDENFELT 3B $\frac{1}{2}$.

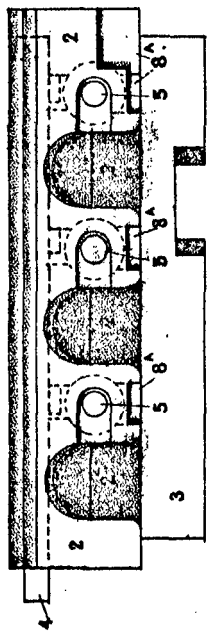
LONGITUDINAL SECTION THROUGH CENTRE BARREL.



HALF SIZE.

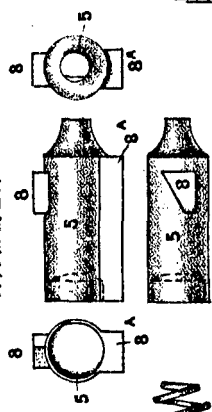
GUN NORDENFELT. 3 B^L.

END VIEW OF ACTION BLOCK.



HALF SIZE.

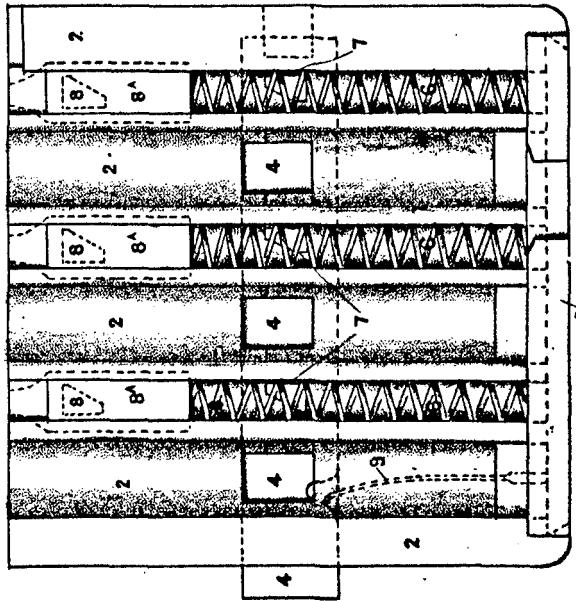
HAMMER



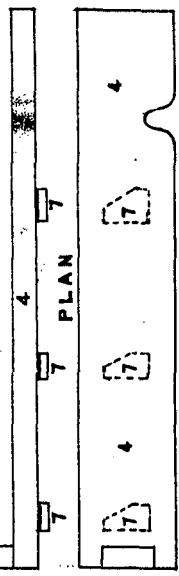
LOCK SPRING



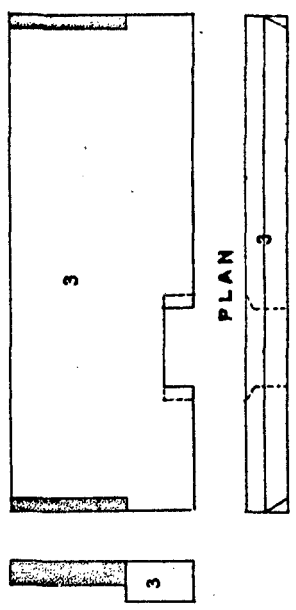
UNDER PLAN OF ACTION BLOCK



ELEVATION OF TRIGGER COMB.

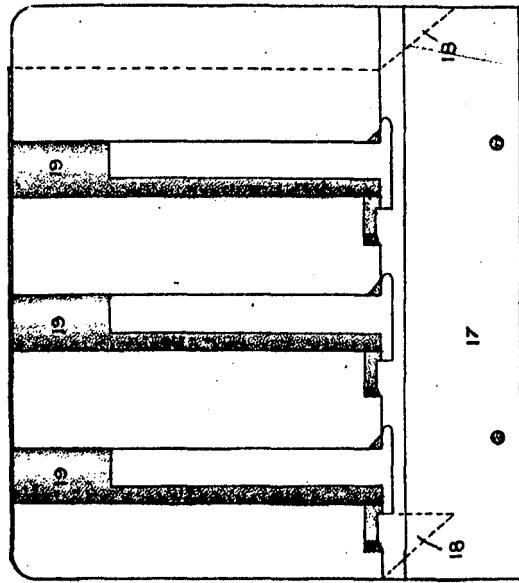


ELEVATION OF SPRING BAR.

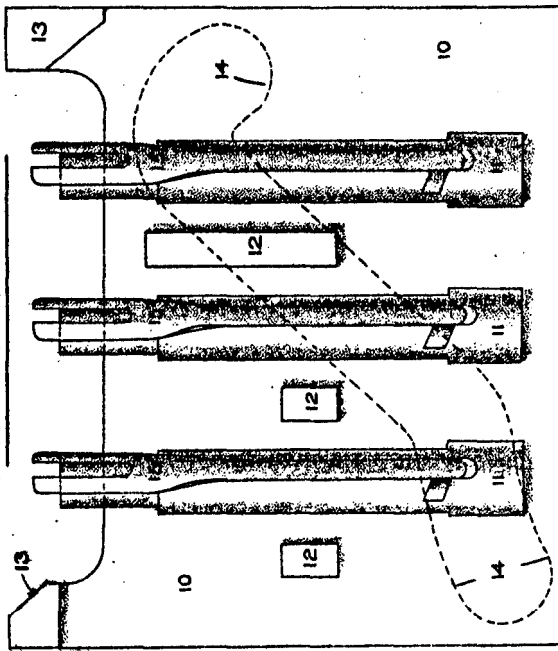


GUN NORDENFELT 3 B.

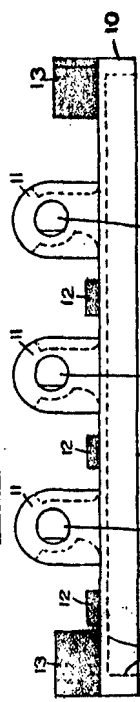
PLAN OF CARTRIDGE CARRIER.



PLAN OF BREECH BLOCK.



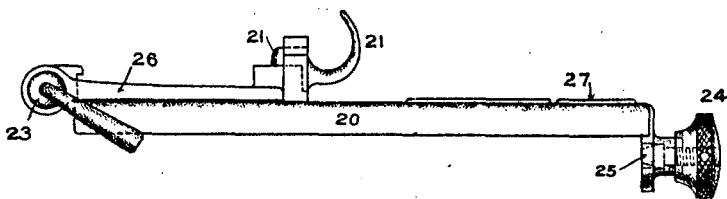
END VIEW OF BREECH BLOCK.



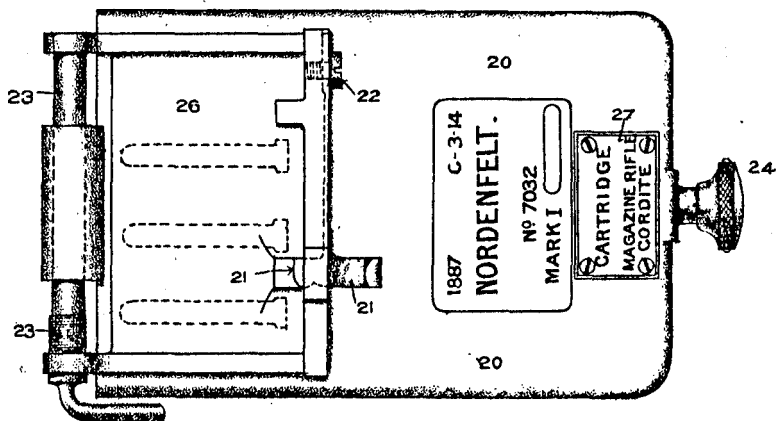
Half Size.

GUN NORDENFELT 3 B $\frac{1}{2}$

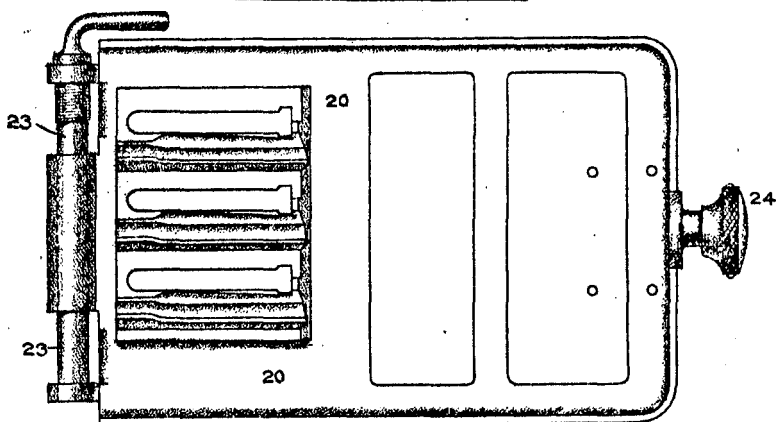
SIDE ELEVATION OF COVER



TOP PLAN OF COVER.



UNDER PLAN OF COVER.

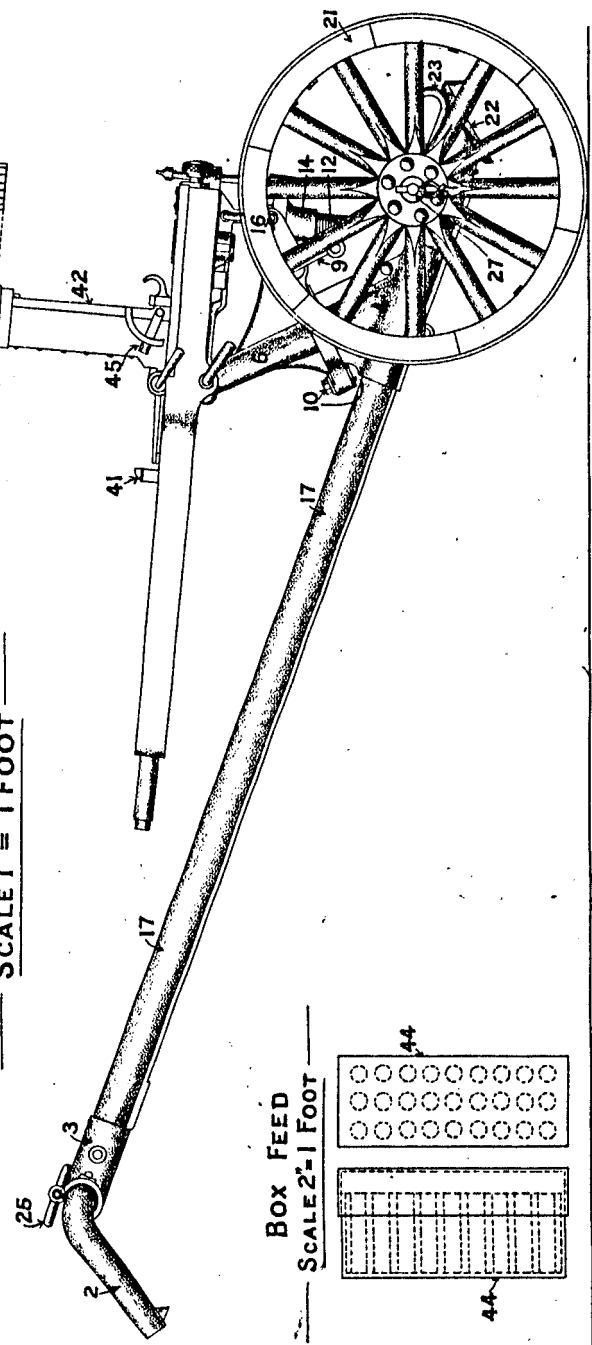


Scale 3" - 1 Foot

CARRIAGE PARAPET MACHINE GUN 2 B^L GARDNER & 3 B^L NORD^T

TRAVELLING POSITION SHEWING 3 B^L NORDENFELT

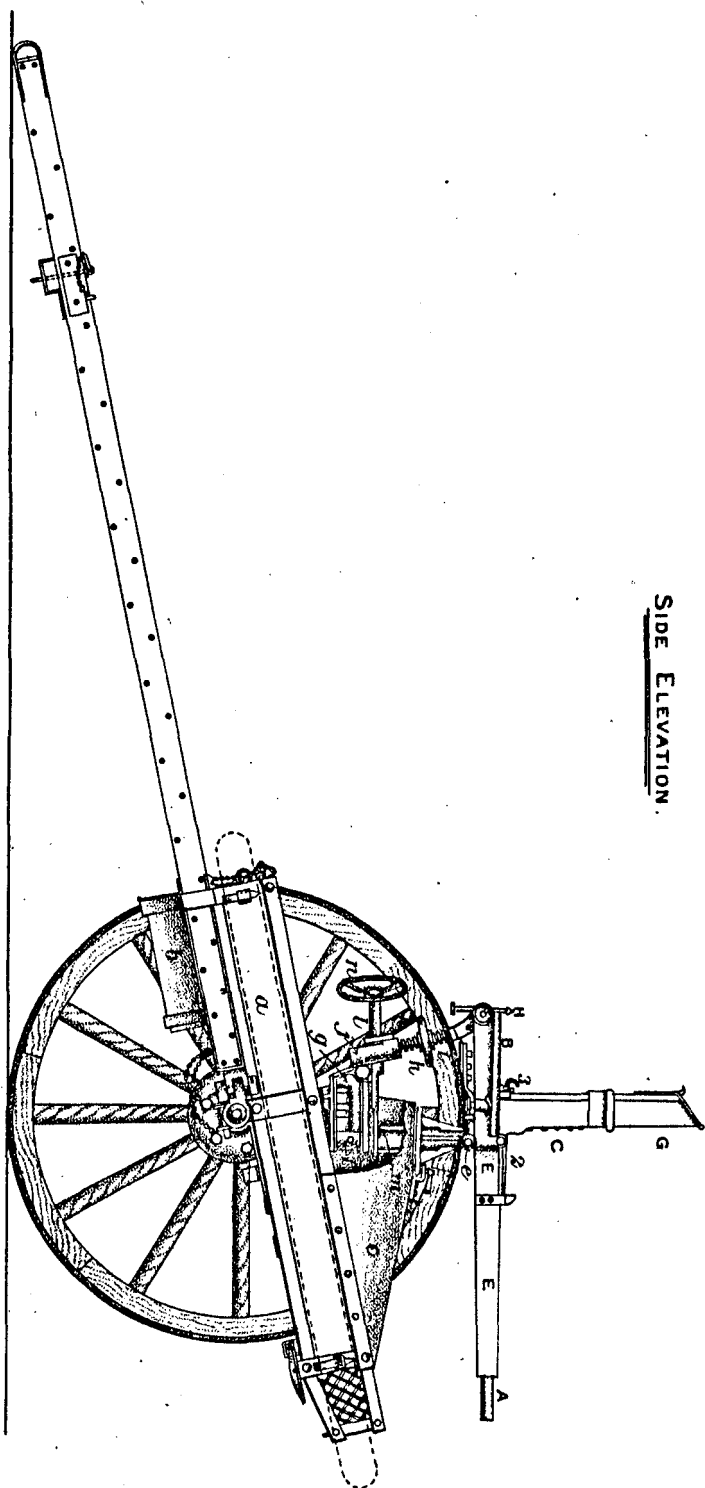
— SCALE 1" = 1 FOOT —



CARRIAGE, FIELD, MACHINE GUN, INFANTRY, NORDENFELT. 3 B $\frac{1}{2}$ MARK I.

Scale $\frac{5}{8}$ Inch = 1 Foot.

SIDE ELEVATION.



CARRIAGE, FIELD, MACHINE GUN, INFANTRY, NORDENFELT, 3 B¹ MARK I.

Scale $\frac{5}{8}$ Inch = 1 Foot.

PLAN.

