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1750.

HANDBOOK

OF THE

3-pounder

NORDENFELT QUICK-FIRING GUN.



(LAND SERVICE.)

1891.



LONDON:

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

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CONTENTS.

	PAGE.
Description of the Gun	3
Detail and Action of the Mechanism	4
Mounting and Dismounting the Mechanism	6
Sighting	7
Care and Preservation	7
Remarks on the Working	8
Description of Travelling Carriage	8
" " " Limber	9
Care and Preservation of Carriage	10
Ammunition	11
Range Table	14
Drill	15

PLATES.

Gun	I.
Breech Mechanism	II.
Travelling Carriage	III.
" Limber	IV.
Ammunition	V., VI., VII.
Fuzes	VIII.
Primer	IX.

MEMORANDUM.

This handbook is corrected up to November, 1891. Any alterations which may be suggested, should be forwarded to Assistant to Director of Artillery, Woolwich.

Nordenfelt 3-pr. Quick-firing Gun.

THE GUN

Mark I

Plate I



Material	Steel.	
Length, total (without trigger bracket)	91.5 inches.	
Weight of gun and fittings	4 cwt.	
Bore .. {	calibre	1.85 inches.
	length	84 inches.
	system	Polygroove, plain section.
Rifling.. {	twist	Increasing 1 in 100 at breech to 1 in 30 at 9.7 inches from muzzle, remainder uniform, 1 in 30.
	length .. .. .		68.217 inches.
	grooves {	number .. .. .	20.
depth .. .. .		.012 inch.
width .. .. .		.194 inch.

Description.

The gun is made entirely of steel, and consists of the A tube around which is shrunk the jacket, prolonged at the rear for the reception of the breech mechanism. The jacket is secured longitudinally by means of locking shoulders and the B hoop, which is shrunk over the A tube in front of the jacket and secured to the latter by a screw thread. The sight ring carrying an arm for the foresight is shrunk over the A tube in front of the B hoop and secured by a set screw.

Breech Closing Mechanism.

The breech is closed by a block and wedge, controlled by the action cam, which is secured to the axis pin of the "lever breech mechanism."

The breech block, which carries the firing pin, trigger lever, tappet trigger lever, and mainspring, is hinged in a recess at the breech, the wedge being attached to its rear face by dovetail projections. The wedge gears with the groove in the action cam by means

of a pin, so that, in drawing back the lever, the wedge is first forced downwards from its seating and then thrown back with the breech block—thus opening the breech.

The reverse action takes place in pushing forward the lever in order to close the breech.

NOTE.—A few of these guns were made with a slight difference in the dimensions of the width at shoulder and diameter of trunnion arms, but this will not affect interchangeability.

Firing Mechanism.

The cap of the cartridge is detonated by a firing pin, actuated by a mainspring. This pin has bevelled projections gearing with grooves in the wedge, so that the gun cannot be fired until the wedge is driven home; on the under side is a groove by which the trigger lever catches and retains it. The trigger lever engages with a trigger carried by a trigger bracket attached to the breech. The trigger bracket also serves for the attachment of the elevating gear, which is secured by means of a keep pin.

A tappet serves to ensure the trigger lever engaging with the firing pin.

The trigger lever is provided with a projecting stud on one side, which, engaging with the under portion of the mainspring, serves to retain the trigger lever in position after firing.

Extractor.

The extractor is of steel, and is pivoted on the axis pin of the drill stop. On the upper side are two arms which clip the rim of the cartridge when in the gun, and the under side is furnished with two projecting lugs by means of which the extractor is automatically actuated when the breech is opened.

Detail and Action of the Mechanism.

Plate II.

The mechanism is made of steel, and consists of the following principal parts:—

- | | |
|-------------------------------------|-----------------------------------|
| <i>a.</i> —Lever, Breech Mechanism. | <i>h.</i> —Action-pin. |
| <i>b.</i> —Action-cam. | <i>i.</i> —Bracket, Trigger. |
| <i>c.</i> —Block, Breech. | <i>j.</i> —Indicator, Drill Stop. |
| <i>d.</i> —Wedge. | <i>k.</i> —Pin, Firing. |
| <i>e.</i> —Extractor. | <i>l.</i> —Spring, Main. |
| <i>f.</i> —Tappet, Lever, Trigger. | <i>m.</i> —Trigger. |
| <i>g.</i> —Lever, Trigger. | |

a. Lever, breech mechanism has a vertical one-third circle motion from front to rear. It is one piece with the main axis.

b. Action cam is connected to the main axis and has a slot, a part of which is concentric with the arc described by the action lever.

c. Breech block carries the firing pin, mainspring, trigger lever,

tappet, and trigger lever. The firing pin has bevelled projections or cocking lugs on its base for the wedge to act on, and in the under part there is a groove in which the trigger lever catches and retains it. The mainspring is flat, of great power and strength. The trigger lever pivots on its pins, and its motion is regulated by a safety lug, moving round a corresponding lug on the wedge. On the trigger lever strikes the tappet lever trigger, acted on by the wedge.

d. The wedge has a vertical motion in the breech. On its lower end is a pin which fits in the slot of the action cam.

e. The extractor axis is one with the "drill stop." The extractor works on both sides of the cartridge case, and has two projections which abut on the lower part of the breech block.

Action of the Mechanism.

The action of the mechanism is as follows, supposing the gun to have just been fired, and therefore the lever breech mechanism in its most forward position :—

1st. The lever carries the action cam slot over the action pin in the part which is concentric to its own motion, and therefore no movement of the mechanism takes place.

2nd. The part of the action cam slot which is not concentric to its own motion now engages the action pin, forcing the wedge down, which, acting on the bevelled firing pin projections, forces it back and compresses the main or firing spring. When the firing pin lug is clear of the trigger lever, the wedge bearings act on the tappet trigger lever and force up the trigger lever, which catches and retains the firing pin.

3rd. The action pin having reached the end of the action cam slot, the lever still moving back causes the breech block to rotate and fall back to the rear. In the beginning of this movement the projections on the extractor have been slowly forced forward by the turning of the breech block, and the empty cartridge case is thus slowly started, and at the latter part of this movement the projections on the extractor get a much quicker motion forward, and the extractor thus throws the empty cartridge case rapidly to the rear. The lever is now at its furthest position to the rear.

1st. The breech block is brought up and carried forward, pushing a fresh cartridge into the barrel.

2nd. The cartridge being quite home, the action cam slot engages the action pin in the part of the slot which is not concentric, and forces the wedge up into position; the action pin then passes into the concentric portion of the action cam slot.

3rd. The forward motion of the lever continuing, the end of the trigger lever comes in contact with the trigger.

The "drill stop" is placed on the right side of the breech, and keeps the lever breech mechanism in its place. Firing the gun is effected by pulling the trigger by means of a lanyard.

The gun cannot be fired before the breech is secured by the wedge :—

1st. As the inclined surface inside the wedge is formed in such a manner that the firing pin cannot be made to strike the cap of the cartridge until the wedge is quite home and supported by the entire bearing surface, if the trigger is pulled before the breech is secured, the cocking lugs on the firing pin strike on the inclined

surface of the wedge, and the point cannot strike the cap of the cartridge.

2nd. The safety lug on the trigger lever is behind the corresponding lug on the wedge until the wedge is fully home, and the end of the trigger lever consequently cannot be forced to release the firing pin before the breech is secured.

Mounting and Dismounting the Mechanism.

1st. Place the drill stop in the position marked for taking out the mechanism.

2nd. Move the lever to the rear as far as possible.

3rd. Withdraw the lever completely, a man holding his hands beneath the mechanism in order to receive it.

With training, this operation may be performed by one man, who would steady the mechanism with his left hand whilst withdrawing the lever with his right; when the lever is withdrawn, he would support the mechanism with both hands.

4th. Place the mechanism on a support, with its left side downwards, unscrew the action pin from the right side of the breech block, to perform which the breech block must be driven back so as to admit of the lever of the axis pin clearing the projecting stop on the block (this may be performed by smartly knocking the upper end of the wedge upon the floor or bench), the action cam can then be withdrawn and the breech block slid from the wedge.

5th. Ease the mainspring by pulling the trigger lever, which then becomes free; turn the tappet lever trigger, so that it is out of the way of the mainspring, which remove by gently tapping its lower part, towards the left, with the hammer-like handle of the action pin.

6th. Remove the firing pin and tappet lever trigger.

The mounting or putting together the mechanism is performed in the reverse order to that of dismounting.

1st. Insert the firing pin.

2nd. Place the tappet lever trigger in the same position as when the mainspring was taken out.

3rd. Insert the mainspring from behind with half its breadth underneath its holder on the breech block, and drive it forward by the action pin as far as it has to go, and then to the right till it is home.

4th. Place the wedge with its bearing surface downwards, take the trigger lever in one hand, put it in its place, and force with the other hand the breech block into the wedge as far as it will go.

5th. Turn the mechanism with its left side downwards, insert the action cam, and screw in the pin, and let the end of its handle stop underneath the lug on the right-hand side of the breech block, which will thereby prevent it from sliding down.

6th. Lift the mechanism and place it in the breech in the position that it is in when the breech of the gun is fully open.

7th. Insert completely the lever in a position corresponding to that of the mechanism, viz., in the extreme rear position.

8th. Turn the handle of the action pin so as to allow the wedge to slide.

9th. Lock the mechanism by moving the lever into its extreme forward position.

10th. Lock the lever by placing the "drill stop" in the horizontal position.

NOTE.—The "drill stop" placed in the position marked enables it to be taken out; the extractor is then free to be removed.

Sighting.

The gun is sighted on the left side. The fore-sight is of the drop pattern, and consists of a pillar, jacket, and socket, with a steel acorn screwed into the pillar. The socket is permanently fixed in the gun. The pillar locks into the socket with a bayonet joint, and is secured from turning by a projection on the jacket which drops into a recess in the socket when the sight is in its true position. A spiral spring in the jacket serves to further secure the sight in the gun.

The tangent sight is of steel, having a rack on the bar gearing with the pinion of the automatic clamp. The crosshead is furnished with a screw deflection leaf having a slight notch, and giving 2 degrees deflection right and left. The bar is fitted with a removable range strip graduated in yards for a full charge, and stamped with the corresponding M.V.

The automatic clamp is of bronze, and is similar in construction to those with B.L. guns generally.

A box containing the following articles is issued with each gun :—

Brush, sponge, without rod	..	..	..	..	1	
Can, oil	..	..	..	..	1	
Clamp, tangent, sight, automatic	..	..	..	..	1	
Drifts	{	brass	..	..	..	1
		steel	..	..	..	1
Driver, screw	..	..	..	..	1	
Hammer	..	..	..	..	1	
Pins, firing	..	..	..	..	spare 6	
Sights	{	fore	..	..	..	1
		tangent	..	..	..	1
Springs	{	indicator, drill stop	..	..	spare 2	
		main.	..	..	..	4
Screws fixing bracket trigger	..	..	..	..	..	4
Tommy, steel	..	..	..	..	..	1

And also a

Brush, sponge, with rod, as a separate article, and 2 cleaning brushes.

Care and Preservation of Gun and Fittings.

The gun must be kept clean, free from rust and undefaced.

Brick-dust or substances of like nature must never be used on any part of the gun.

The parts of the mechanism must not be scraped or roughened in any way, but must be kept lightly oiled as a protection from rust.

After firing, every part of the gun must be thoroughly cleaned,

the mechanism dismantled, washed with fresh water and soap, well dried, and then lightly oiled.

When all parts of the gun are cleaned, dried, and oiled, the mechanism may be mounted, and the gun should be protected from the weather.

Remarks on the Working of the Gun.

The instructions given below will probably meet any difficulties that may occur during practice from these guns:—

1. If, from being apparently too large, the cartridge should prevent the easy closing of the breech, do not endeavour to force it home, but take it out and use another.

2. If a cartridge or case should jam and cannot be extracted, force it out from the muzzle.

3. If the extractor break, dismantle the mechanism and substitute a new one.

4. If the firing pin or main spring break, dismantle the mechanism and replace the broken part with a new one.

5. If the gun should constantly miss fire, open the breech, and examine the firing pin, and the cap of the cartridge; if all appear correct, the fault is probably that the mainspring is too weak, and it should be changed for a new one.

6. If cartridges can only be inserted with difficulty, examine the edge of the chamber for burrs in the metal, and if any are found, remove them carefully with a file.

7. If a cap should be not only indented, but pierced (which may be detected by the escape of gas), dismantle the mechanism, clean it, and examine the mainspring to ascertain if it has become softened or distended by the heat of the escaping gas, and, if necessary, replace it with a new one. Should the breech block stick when being opened, pour water over the mechanism.

Carriage, Q.F.,	.. .. .	..	Steel; without limber, for Hotchkiss, Mark II, and Nordenfelt, Mark I, Guns, with shield (and with socket for Hotchkiss Gun).
3-pr. Travelling, Mark I.			
	(Plate III).		
Limber, Q.F.,	.. .. .	..	Steel; Hotchkiss, Mark II, and Nordenfelt, Mark I, Guns.
3-pr. Travelling, Mark I.			
	(Plate IV).		
Socket Screw, Elevating, Mark I.			Metal; Hotchkiss Gun, Mark II.
For Carriage, Q.F.,	3-pr.,		
Travelling, Mark I.			

The carriage is intended to mount either the Hotchkiss, Mark II., or the Nordenfelt, Mark I, gun, a special socket joint being required for the Hotchkiss gun to suit the elevating screw of the carriage.

The carriage consists of a trail, *a*; a cradle with hydraulic buffers, *b*; a forked-shaped pivot, *c*, to carry the gun; elevating and traversing gears; an axletree; two wheels and a tire brake; and a shield, *d*, bolted to the front of the trail.

The trail consists of two steel side brackets, connected by the trail eye transom, and a cast steel bracket which is formed at the

bottom to receive the axletree, and at the top with guides along which the cradle, *b*, slides. The axletree is a steel forging with 3rd class arms, fixed to the trail by clips and bolts. The wheels are 3rd class, B. No. 51, 4 feet 4 inches in diameter, with $2\frac{1}{2}$ -inch tires, and metal naves.

The metal cradle, *b*, is formed with two hydraulic buffer cylinders, and a socket for the pivot, *c*. The buffers are connected by a passage to equalise the pressure, and are each fitted with a cap, gland, piston rod, and leather packings. The piston rods are secured by nuts to lugs on the steel bracket. On each piston rod, inside the cylinder, is a spiral spring, which is compressed during recoil, and by its reaction brings the gun to the firing position. The cylinders are each fitted with two tapering strips of metal, which vary the opening of two ports cut in the piston for the flow of the liquid during recoil; this ensures an approximately constant pressure.

The gun is elevated by the handwheel, *e*, which, by means of a nut, *f*, actuates the screw, *g*, attached to the breech of the gun by the socket, *h*. The handwheel, elevating nut, and screw, are carried by a traversing bracket, which is supported at one end by a traversing screw, and at the other by a V spring, which, by allowing the gear to "give" prevents damage by the shock of discharge. The movement of this spring is limited by a stop fixed to the carriage.

Traversing is effected by a handwheel fixed at the end of the traversing screw, which works in a thread cut in the traversing bracket.

The brake consists of a cross-bar fitted at each end with bronze shoes for the wooden brake blocks, *i*, which act on the wheels. The brake is actuated by the brake rods, *k*, which are connected to lugs formed on the tensile stays, in such a position that when the cross-bar is released from the trail, the brake comes at once into action, and prevents the wheels from revolving towards the rear. India-rubber pads are placed at the end of the brake-rods to act as a spring and reduce the strain. When travelling, the brake is hooked up out of action by a hook suspended from the V spring.

The shield, which is of steel, is attached to the front bracket by bolts, and stayed at the sides from the axletree; an opening is cut in the centre sufficiently large to allow of the gun being elevated or depressed and laid.

The carriage is furnished with two wooden seats for the service of the gun, a box between the trail transoms for carrying tools, and a traversing handspike, *l*.

NOTE.—This equipment is constructed for travelling on roads only. It must never be taken over rough ground or moved at a rapid rate.

Limber, Travelling.

The limber consists of a steel frame with a curved stay at the rear to support the limber box lid, so as to form a shelf on which to rest the ammunition carriers when serving the gun. A limber hook is riveted to the frame at *a*, and a box, *b*, for carrying tools is fitted to the front.

The axletree is connected to the frame by coach springs, *c*, and held in position by clips and plates. The splinter-bar is of trough-shaped steel filled in with ash. The "off" shaft is fitted with a branding iron, and the "near" shaft passing through a band on the

splinter-bar, is attached by a bolt to a band on the axletree. The wheels are of the same description as those for the carriage.

The limber box, which is of steel plate is bolted to the frame; it is divided internally into ten compartments, each to take an ammunition carrier capable of holding nine rounds. The box is fitted with guard irons, and a back strap.

Socket Screw, Elevating.

The socket is a metal casting fixed to the breech of the gun, to take the elevating screw *g*, to adapt the Hotchkiss gun for the carriage. It carries the trigger and attachments for lanyard.

		Nordenfelt, Mark I., Gun.	Hotchkiss, Mark II., Gun.
Elevation	.. .. .	15°	12°
Depression	.. .. .	5°30'	5°30'
Height at Axis of Trunnion	.. .. .	..	41·5 inches.
Track of Wheels	.. .. .	..	60·0 "
Length	Carriage ..	{ without Wheels ..	7 feet.
		{ with Wheels ..	8 feet 1 inch.
	Carriage and Limber	{ with Gun ..	23 feet.
		{ without Gun ..	19 feet 5½ inches.
Quantity of Oil for Buffers	.. .. .	..	2½ pints.
Weight of Carriage	.. .. .	..	11 cwt. 3 qrs. 0 lbs..
" Limber	.. .. .	..	10 " 2 " 21 "

Care and Preservation.

Care should be taken that all working parts are well lubricated, and kept free from all clotted grease, dirt or rust.

Care must be taken in painting the carriage that no working parts are painted, and intelligence must be exercised in keeping the working surfaces free from paint. Such parts must on the other hand on no account be polished, but kept clean by greasing or oiling. If they are not in constant action, a coating of boiled linseed oil will preserve them from rust, and not collect dust.

Hydraulic Buffer.

A leakage from the hydraulic buffer must be immediately stopped by tightening up the gland or cap where the leakage occurs. If "tightening up" will not stop the leakage, the leather packing must be replaced.

To replace the gland U leather packing.—Empty the buffers, take off the nuts from the ends of the piston rods, and slide the cradle from the guides to the top part of the trail, unscrew the gland, and replace the leather. Attention must be observed in replacing the U leather to see that the edges are evenly passed over the piston rod, and that it enters properly without being damaged.

To replace the cap leather packing.—Empty the buffers, unscrew the cap, and fit in a new leather.

To replace the spiral spring.—Empty the buffer, unscrew the cap and carefully undo the nut on the piston rod, to within two or three

threads of the end, so as to relieve the pressure of the spring on the piston; then with the hand force the piston in, and unscrew the nut from the rod, take out the piston and replace the spring. In replacing the spring the gland and U leather must be removed to prevent damage to the edge of the leather when inserting the piston rod, and great care must be taken to place the ports of the piston exactly opposite the metal strips of the cylinder; when this is done the pin hole at the end of the rod will be vertical.

If from remaining long in store the leathers become at all shrunk, they should be placed in lukewarm water to expand them before they are put into the buffer.

The buffers should always be kept filled with oil.

AMMUNITION.

Steel Shells, Mark II (*Plate V*).

Common Shell, Mark II (*Plate VI*).

Saluting, Mark III (*Plate VII*).

Dummy Drill, Mark I.

These guns are supplied with fixed ammunition.

The *Cartridge, Quick-firing, 3-pr. Shell, Mark II*, with steel shell fuze, consists of a capped cartridge case, with charge, wad, and steel shell, filled with powder, and fuze.

The case is of solid drawn brass, about 14·8 inches long, with the body slightly tapering, and with a rim at the base for extracting it. It is varnished inside, and has a hole in the base to contain the cap chamber. The latter is made of brass, raised in the middle to form an anvil, round which there are three fire holes. The cap is of copper, .05-inch thick, containing detonating composition, covered with tin-foil, and is fixed in the cap chamber, by the metal of the latter being spun over it. Some cases of a former pattern have a central tube, about 3 inches long, primed with F.G. powder to facilitate ignition.

A brass safety clip, with pad of felt or indiarubber, covers the cap to protect it, and is not to be removed, except for inspection, until just before loading.

The charge consists of 1 lb. 8 oz. Q.F.¹ powder, over which is placed about 2 inches of felt wad.

The shell is made of forged steel, with a groove about $1\frac{1}{2}$ inch from the base, to receive the driving band. The base is reduced slightly in diameter to facilitate insertion in the case. The head is formed to a radius of nearly three diameters, and brought to a point. The base is closed by a steel base piece, screwed 12 threads per inch left hand. Shell may, however, be supplied with a solid base. The centre of the base piece is bored and tapped 12 threads per inch left hand to receive the fuze. The shell is fitted with either a copper Vavasseur driving band, with two cannelures, or a brass Hotchkiss band, pressed into the groove round the shell. The interior of the shell is lacquered or varnished, and is filled with 1 oz. 12 drams of fine-grain powder.

The shell, except the driving band, is painted black, with a white band .5 inch wide, 1 inch from the point. The numeral II is stamped on the body above the band.

The shell is pressed into the case until the latter touches the driving band, and is fixed by three indentations of the case into a groove round the shell a little above the base.

The fuze may be either the Nordenfelt or the Hotchkiss, Mark II, pattern (Plate VIII).

The former consists of a metal body screwed 12 threads per inch left hand, with a percussion pellet, split safety collar, and screwed cap with needle.

The percussion pellet is made of metal, with a recess at the top, containing two grains of detonating composition, covered with a thin brass disc, over which the edge of the recess is spun. The safety collar is of metal, split down one side, and having the upper portion of a smaller internal diameter than the lower, which fits over the pellet. The needle is of steel, and is fixed in the screwed cap, which closes the end of the fuze. Two fire holes are bored through the cap, and are primed with pressed powder, the inner face of the cap being covered with muslin, and the outer with waterproof paper.

On the shock of discharge, the collar sets back over the pellet, and on impact collar and pellet fly forward together against the needle, which pierces the detonator and fires the fuze.

The Hotchkiss fuze consists of a metal body, screwed 12 threads to the inch left hand, with a percussion pellet and a gun-metal cap and plug containing the detonating cap. The detonator is inserted from inside the screwed cap, as shown in Plate. The percussion pellet is a brass casing filled with lead. It fits loosely inside the body. A roughened brass needle is embedded in the lead, so that the top of the casing projects above the point of the needle, and rests against the cap and plug which close the bottom. On the shock of discharge the pellet sets back along the needle, exposing the point; on impact it moves forward with the needle against the detonator, firing the latter and igniting the bursting charge.

The *Cartridge, Quick-firing, 3-pr. Common Shell, Mark II* is similar to the *Cartridge, Quick-firing (Steel) Shell*, but the iron shell is substituted; the head of the latter is struck with a radius of about 2 diameters, and its point truncated at $\frac{3}{4}$ inch diameter. The shell has not the yellow band. The bursting charge is 1 oz. 6 drs. F.G. powder.

The *Cartridge, Quick-firing, 3-pr., Saluting, Mark III*, complete, consists of a short solid drawn case, similar to the service case cut off below the shoulder, and the base fitted to take the removable primer (with cap), which is inserted in the case with the driver, screw, removing or inserting primer. The charge is 15 oz. blank L.G. in a red shalloon cartridge, choked and hooped with six blue worsted braids. It is secured in the case by a paper wad over which a thick felt wad is shellacked in.

The *Cartridge, Quick-firing Saluting Primer* (Plate IX) for Mark III saluting cartridge, consists of a body or chamber of brass $\frac{5}{16}$ inch long, in which is formed an anvil pierced with three fire holes; a percussion cap is contained in the head, and the lower part of the body is filled with a priming of F.G. powder. The bottom is closed with a paper disc. A brass pin is fixed in the head, which engages in a slot in the recess in the cartridge case, and secures the primer to the case. Two slots are cut in the head, for the reception of the screwdriver used when inserting or removing the primer.

Drill Cartridges.

The *Cartridge, Quick-firing, 3-pr., Dummy, Drill, Mark I*, consists of a solid drawn brass case, similar to that for the service cartridge.

The case contains a wooden block, which reaches to the bottom, the part projecting from the case being turned to the shape of the common shell, but without bands. The block is fixed in the case by three brass screws. Into the base of the case is screwed a hollow cylinder, closed at the inner end by a screw plug, and containing a spiral spring which presses against a pad of indiarubber, the latter receiving the blow of the striker.

Making Up and Preparation of Cartridges.

The service and practice cartridges are issued made up, packed in boxes, ammunition, Q.F., 3-pr. Marks II, III, or IV, 16 in a box. They require no preparation beyond the removal of the clip just before loading. The dummy drill cartridges are issued in Mark I unlined boxes, 16 in a box.

The Mark III saluting ammunition is issued in parts as follows:—

Ammunition.	For 3-pr.	Remarks.
Cartridges, Q.F., saluting, shalloon..	50	In case powder, metal-lined, half. In box, cartridge, Q.F., 3-pr., saluting; cartridge cases. (Mark III.)
" " " cases ..	20	
" " " wads, paper	250	
" " " felt ..	250	
" " " primers }	200	
in cylinders of 20 ..		In box, cartridge Q.F., 6-pr., saluting; tools (Mark III.)
Tools, cartridge, Q.F., saluting:—		
Rod, 12·7-inch ..	1	
Driver, screw, primer, 6-pr. and 3-pr.	1	

Complete boxes only are issued.

The shalloon cartridge and wads are inserted in the case when required for use.

To reprime a case, unscrew the primer with the screwdriver, and if necessary drive it out by means of the 12·7-inch rod, using a wooden mallet. The case, if serviceable, is then cleaned, and a new primer inserted, and screwed home with the screwdriver. The case is then ready for filling.

The boxes for cartridge cases and tools are of wood with hinged lids and rope handles attached by cleats. The former has two shelves with holes for the cartridge cases, and the latter has suitable partitions for tools, primers, and wads.

The 12·7-inch rod is ·5 inch in diameter, reduced for a length of ·65 inch to a diameter of ·17 inch; it is used to drive out the primer if jammed.

Q.F. cartridge cases after being fired will be immersed as soon as possible in warm fresh water with a little soda dissolved in it for two or three hours, and then taken out and thoroughly dried. About 1 lb. of soda is the proportion to two gallons of water. When quite dry, the cases are to be repacked, together with the clips, in the boxes in which they were supplied, and returned to store.

The fired service cartridge cases are not on any account to be repacked in boxes containing unfired cartridges.

The saluting cases, after being dried, will be reprimed and replaced in the box.

RANGE TABLE FOR 3-PR. Q.-F. NORDENFELT GUN.

(Made up by Maxim Nordenfelt Co., and checked by Practice of 16/9/91.)

Charge { weight—1 lb. 8 oz.
nature of powder—Q.F.¹
Projectile, weight—3·3 lb.
Muzzle velocity—1,920 f.s.
Nature of Mounting—Travelling field.

Range.	Elevation.	Angle of Descent.	Remaining Velocity.	5 minutes' eleva- tion increases or decreases the range by—	5 minutes' will alter point of impact vertically or later- ally at each range.	Time of flight.	Fuze Scale.
yards.	° /	° /	f.s.	yards.	yards.	seconds.	
0							
100	0 4	0 5	1,840	—	—	0·16	1·27
200	0 8	0 10	1,764	100	0·29	0·33	1·84
300	0 13	0 16	1,690	96	0·43	0·51	2·41
400	0 19	0 23	1,618	92	0·58	0·70	2·98
500	0 25	0 30	1,548	88	0·72	0·89	3·56
600	0 31	0 38	1,481	84	0·87	1·09	4·14
700	0 38	0 47	1,417	80	1·01	1·30	4·72
800	0 45	0 57	1,357	77	1·16	1·51	5·30
900	0 52	1 8	1,300	74	1·31	1·73	5·88
1,000	1 0	1 20	1,246	71	1·45	1·96	6·46
1,100	1 8	1 32	1,196	68	1·60	2·20	7·04
1,200	1 16	1 45	1,150	65	1·74	2·45	7·63
1,300	1 25	1 58	1,109	62	1·89	2·71	8·22
1,400	1 34	2 12	1,072	59	2·03	2·97	8·82
1,500	1 43	2 27	1,038	56	2·18	3·24	9·42
1,600	1 53	2 44	1,008	54	2·32	3·53	10·03
1,700	2 3	3 2	982	52	2·47	3·83	10·66
1,800	2 13	3 21	960	49	2·61	4·13	11·31
1,900	2 24	3 41	940	48	2·76	4·44	11·98
2,000	2 35	4 1	922	47	2·91	4·75	12·68
2,100	2 47	4 22	905	46	3·05	5·06	13·41
2,200	2 59	4 45	890	45	3·20	5·38	14·16
2,300	3 12	5 9	876	44	3·34	5·70	14·92
2,400	3 26	5 34	863	43	3·49	6·03	15·68
2,500	3 40	5 59	850	42	3·63	6·36	16·44
2,600	3 54	6 25	837	41	3·78	6·70	17·31
2,700	4 8	6 53	825	40	3·92	7·05	17·98
2,800	4 23	7 23	813	39	4·07	7·40	18·76
2,900	4 38	7 55	801	38	4·21	7·76	19·54
3,000	4 53	8 28	789	37	4·36	8·13	20·32
3,100	5 9	9 3	777	36	4·51	8·51	
3,200	5 25	9 39	765	35	4·65	8·90	
3,300	5 42	10 16	754	34	4·80	9·30	
3,400	5 59	10 54	743	33	4·94	9·71	
3,500	6 17	11 34	732	32	5·09	10·12	
3,600	6 35	12 16	721	31	5·23	10·54	
3,700	6 54	13 0	711	30	5·38	10·97	
3,800	7 13	13 46	701	29	5·52	11·41	
3,900	7 33	14 33	691	28	5·67	11·86	
4,000	7 54	15 21	681	27	5·81	12·32	

DRILL FOR 3-PR. NORDENFELT ON FIELD CARRIAGE.

The detachment consists of five numbers, and falls in two deep in rear of the gun, which is limbered up.

To TELL OFF.

<u>Officer.</u>		<u>No 1.</u>
Tell Off.		

At "Tell Off," No. 1 (who is on the left of the detachment) takes a pace to his front, turns to his right and numbers himself 1; the right-hand man of the rear rank numbers himself 2; the right-hand man of the front rank 3, and so on to the left.

After the detachment is told off, No. 1 falls in again on the left of the front rank.

To FORM THE ORDER OF MARCH.

<u>Officer.</u>		<u>No. 1.</u>
Form the Order of March.		Left Turn. Double March.

No. 1 turns with the detachment, takes a side pace to his left, and heads the rear rank, the rear rank filing on the left side of the gun and the front rank on the right, and halt as follows:—

No. 1 in line with the point of the near shaft and two yards on the left of it.

Nos. 2 and 3 in line with the axletree of the gun carriage.

Nos. 4 and 5 in line with the axletree of the limber.

To UNLIMBER.

<u>Officer.</u>		<u>No. 1.</u>
Action Rear.		Action Rear.

No. 3 unkeys, and with No. 2 lifts the trail; when the trail is clear of the hook No. 3 gives "limber drive on," and the trail is lowered to the ground.

No. 5 goes between the shafts, and No. 4 pushes in rear of the limber.

The limber moves forward one yard, inclines to the left, and then reverses to the right, and halts ten yards from the trail-eye, covering the gun.

The numbers take post as detailed below.

No. 1 satisfies himself that the extractor and firing pin are uninjured and in good working order, that the bore is clear, that the sights work easily, and that the buffers are filled with oil.

No. 2, that the breech block and lever work easily.

Nos. 4 and 5 bring up and open ammunition cases, in a convenient position for No. 2 to serve, and remove safety clips on base of cartridges.

POSITION AND GENERAL DUTIES IN ACTION.

No. 1 sits on seat on trail, commands, lays, and fires.

No. 2 sits on right of gun, attends to brake-catch, opens and closes breech, and loads.

No. 3 stands at end of trail, ships and unships handspike, traverses and assists to take off brake.

Nos. 4 and 5 bring up and open ammunition cases, remove safety clips on base of cartridge, and replace empty cases.

TO LOAD.

<u>Officer.</u>		<u>No. 1.</u>
* Load.		* Load.
Range — yards.		
(<i>Naming and pointing out object.</i>)		

No. 1 adjusts his tangent scale to the required elevation and deflection (if any) and proceeds to lay.

No. 2 takes hold of the arm of the lever with his right hand and pulls it smartly upwards to the rear, opening the breech, he places a cartridge in the bore and closes the breech.

No. 3 traverses as directed.

Nos. 4 and 5 keep up a supply of ammunition, bring the filled cartridge boxes up to No. 2, having previously removed safety clips.

COMMENCE FIRING.

<u>Officer.</u>		<u>No. 1.</u>
Rapid or Ordinary Fire } Commence.		

* Giving nature of projectile.

No. 1 looks over his sights, and takes the lanyard in his right hand and fires at his own discretion, taking care to keep his face and right hand clear of the recoil.

After firing the other numbers reload as before.

“Ordinary fire” is fire at the rate of 4 rounds per minute.

“Rapid fire” as quickly as possible.

CEASE FIRING.

No. 1 discontinues the firing, and sets his sights at zero.

No. 2 opens the breech, and hands the cartridge, if unfired, to No. 4.

No. 4 returns the cartridge, if unfired, to ammunition box, first replacing the safety clips.

No. 3 unships his handspike.

Nos. 2 and 3 lift the brakes, No. 2 fixing the catch.

TO LIMBER UP.

<u>Officer.</u>		<u>No. 1.</u>
Rear Limber Up.		Rear Limber Up. Halt, Limber Up.

No. 5 goes between the points of the shafts, No. 4 pushes in rear of the limber.

The limber inclines to the right and reverses to the left.

Nos. 2 and 3 lift the trail, No. 3 keys up and the whole form the order of march.

ON A MISS-FIRE.

No. 1.—Miss-fire.

After a pause of not less than 30 seconds No. 2 opens the breech; No. 4 carefully removes the cartridge, which is to be placed on one side if the cap has been struck. If time admits, as at practice, the cartridge should be tried again.

If the cap has not been struck it will be necessary to replace the striker by a new one.

TO CHANGE ROUNDS.

No. 2 becomes No. 1; 1, 5; 5, 4; 4, 3; 3, 2.

TO FORM DETACHMENT REAR.

Form the Order of March.

<u>Officer.</u>	<u>No. 1.</u>
Detachment Rear.	Right about-Turn, Double March. Halt, Front.

Nos. 2 and 3 close to the centre, and wheel to the left marking time when opposite the off wheel and two yards from it.

As soon as the detachment has closed up, it is halted and turned to the front.



ORDNANCE Q.F. NORDENFELT 3 PR. MARK I.

SCALE 1/16.

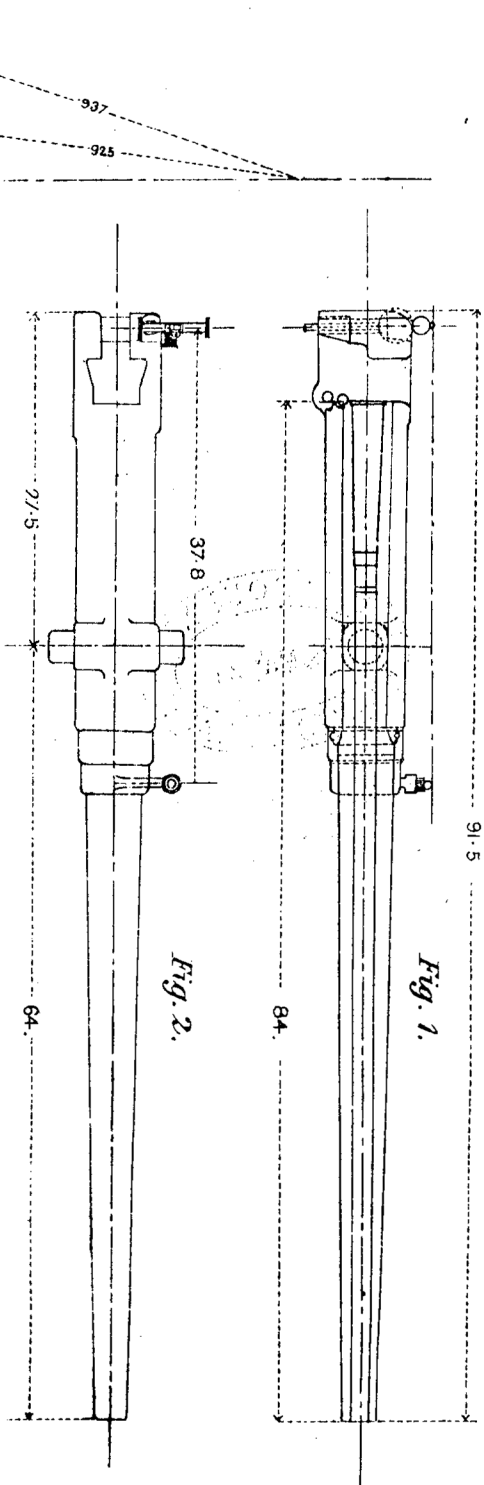


Fig. 1.

Fig. 2.

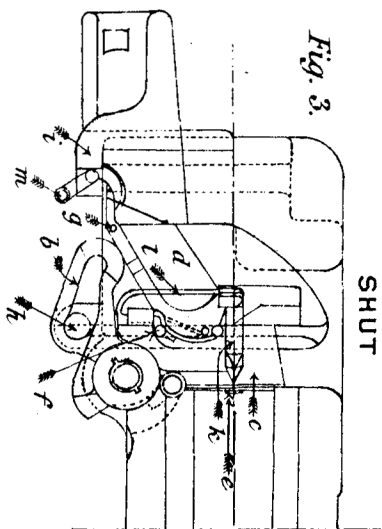


Fig. 3.

SHUT

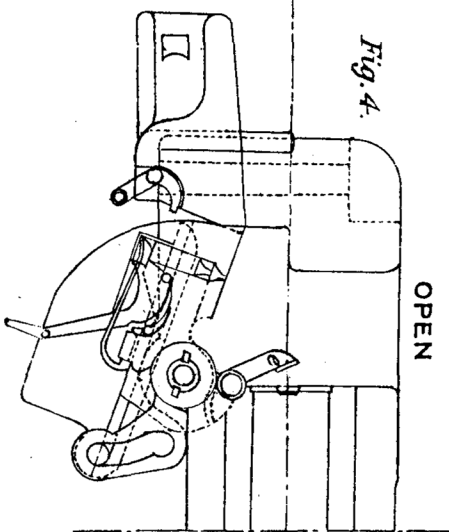


Fig. 4.

OPEN

PLAN

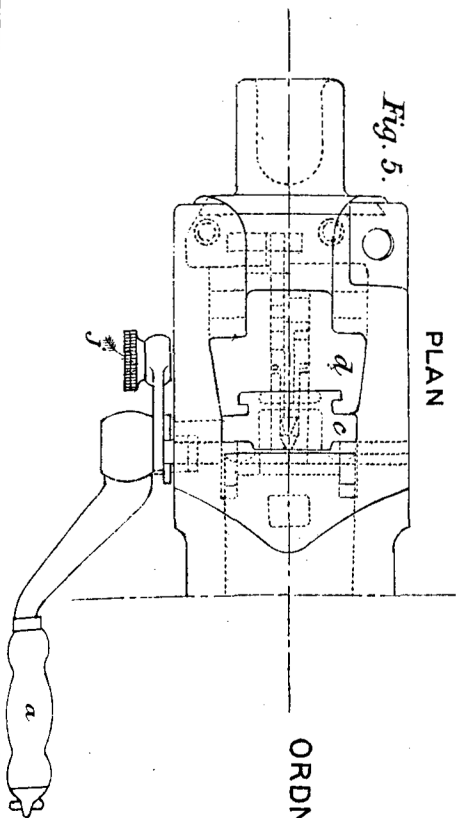


Fig. 5.

ORDNANCE Q.F. NORDENFELT 3 PR. MARK I.

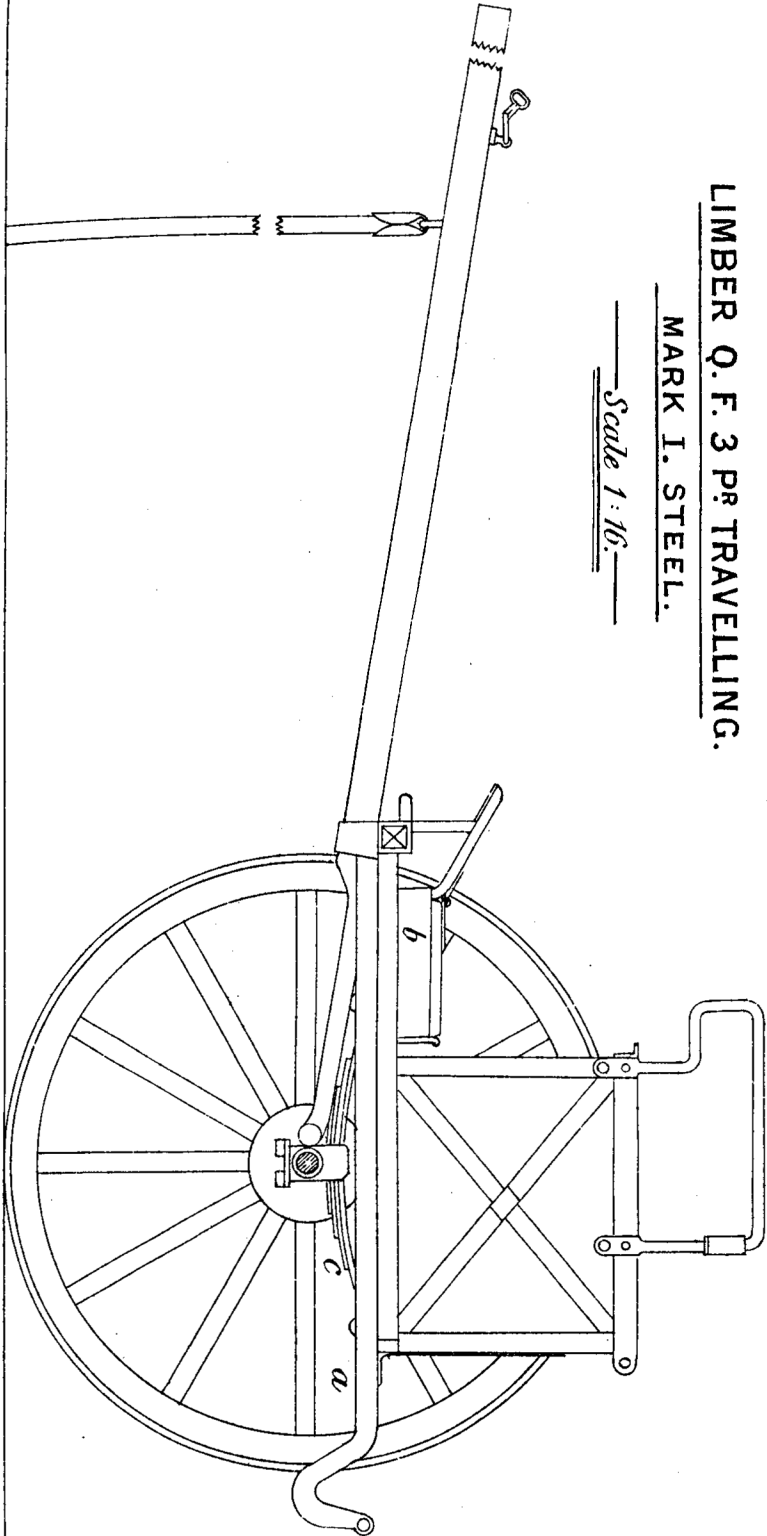
MECHANISM.

SCALE 1/16.

LIMBER Q. F. 3 PR TRAVELLING.

MARK I. STEEL.

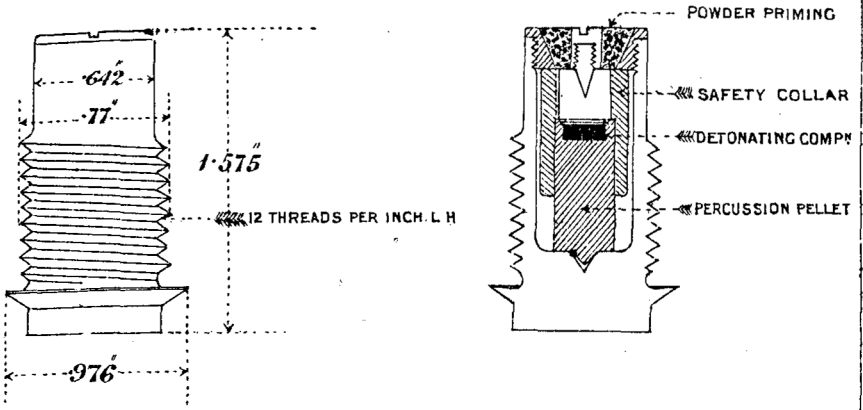
Scale 1:16.



FUZE PERCUSSION BASE 3 PR OR 6 PR

Q. F. NORDENFELT.

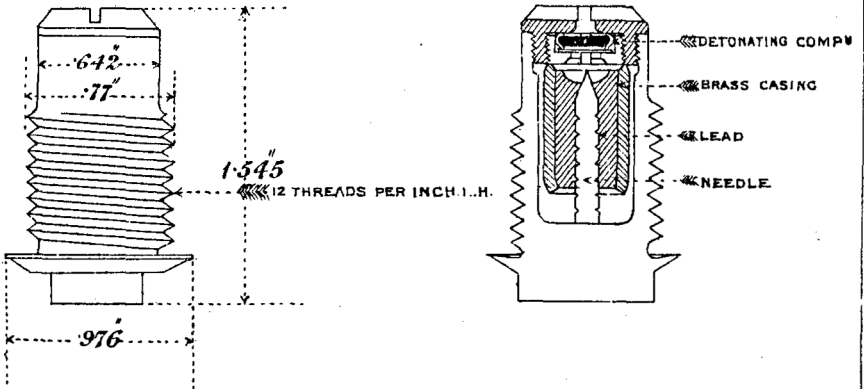
Full Size.



FUZE, PERCUSSION, BASE HOTCHKISS (MARK II.)

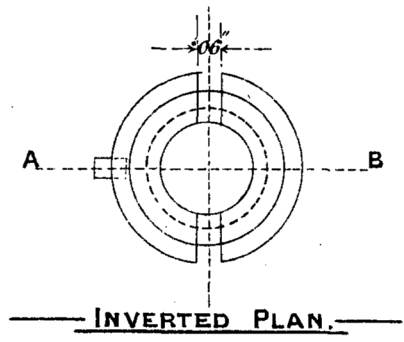
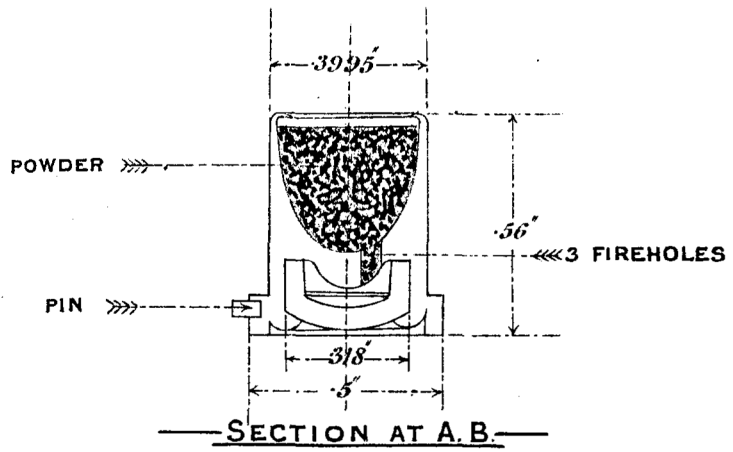
FOR 3 PR AND 6 PR Q. FIRING SHELL.

Full Size.



CARTRIDGE Q. F. SALUTING:-
PRIMER 6 OR 3 P^r MARK III.
WITH CAP; FOR MARK III CASE.

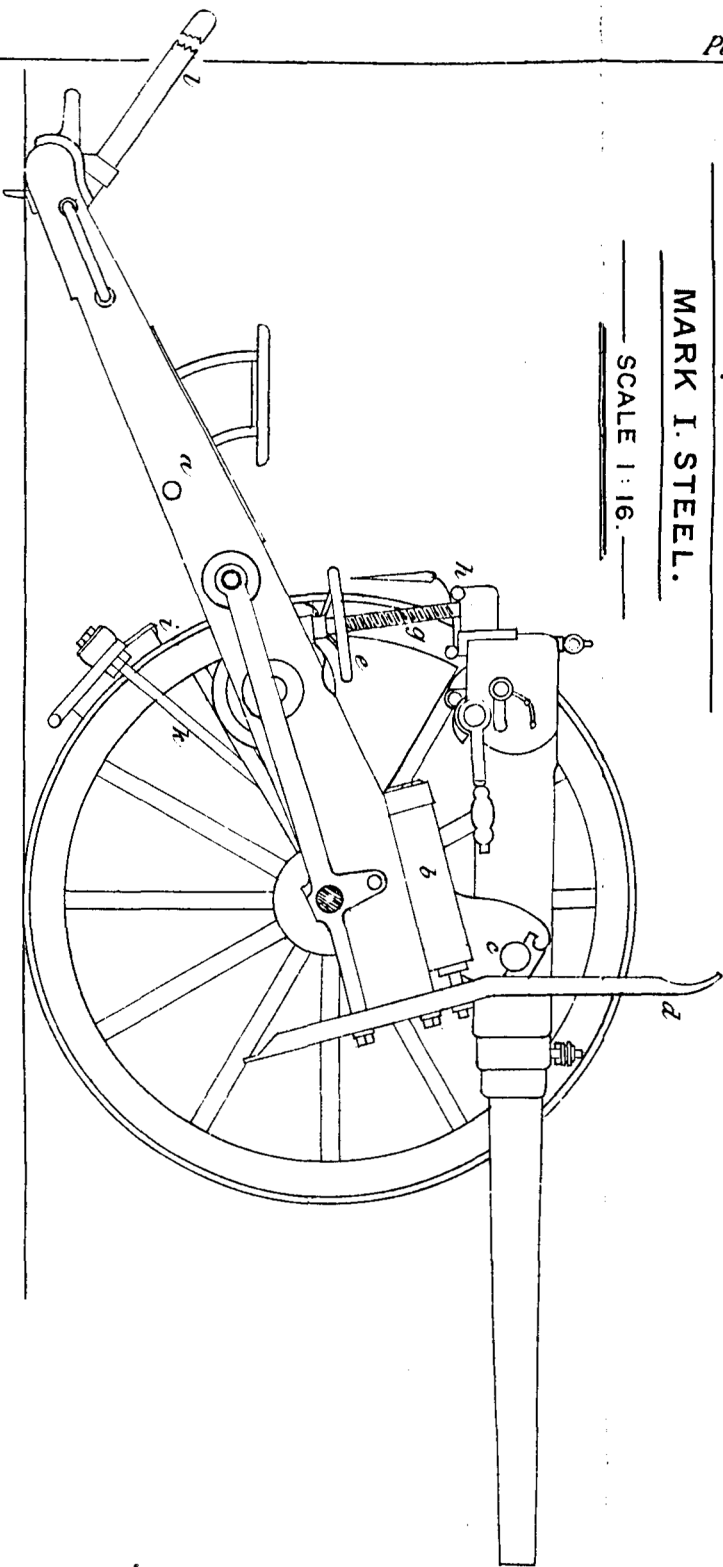
Twice Full Size.



CARRIAGE Q.F. 3 PR TRAVELLING.

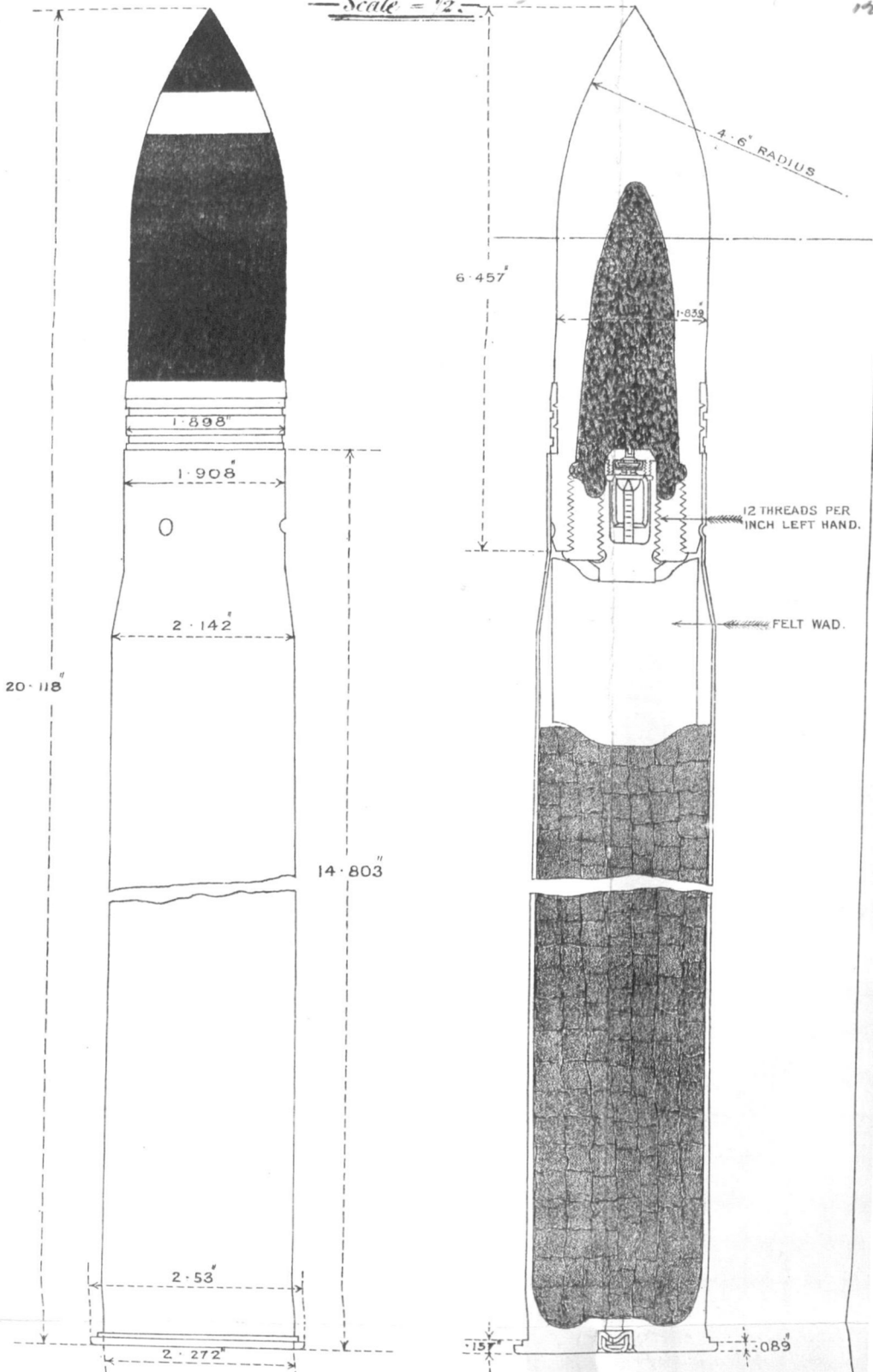
MARK I. STEEL.

SCALE 1:16.



CARTRIDGE QUICK FIRING 3 PR SHELL MARK II. WITH STEEL SHELL FUZED.

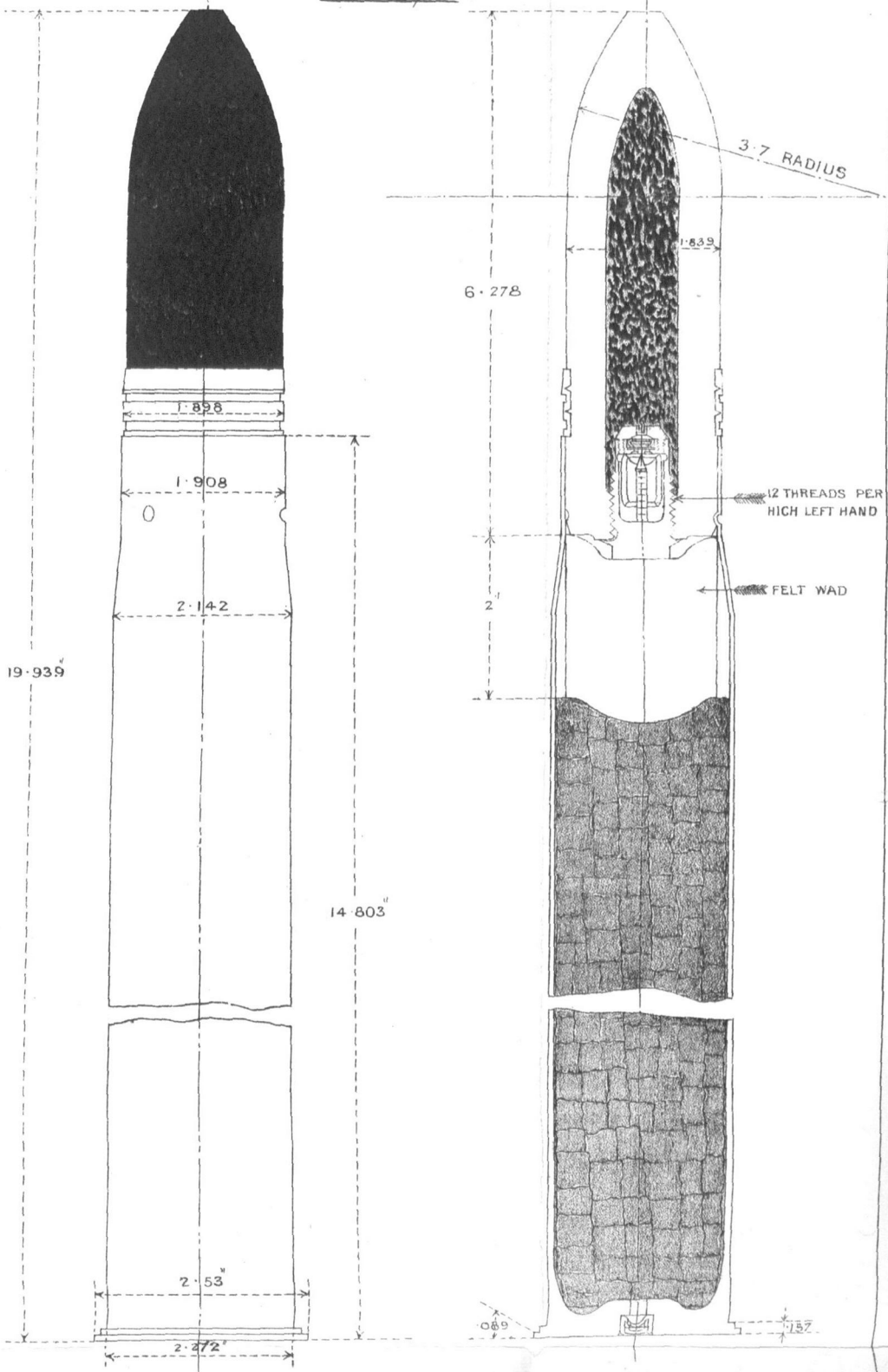
Scale = 1/2



CARTRIDGE QUICK FIRING 3 PR COMMON SHELL MARK II.

WITH IRON SHELL FUZED

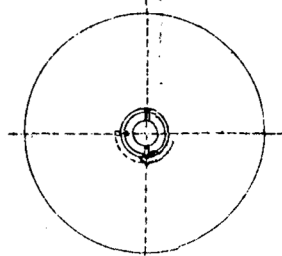
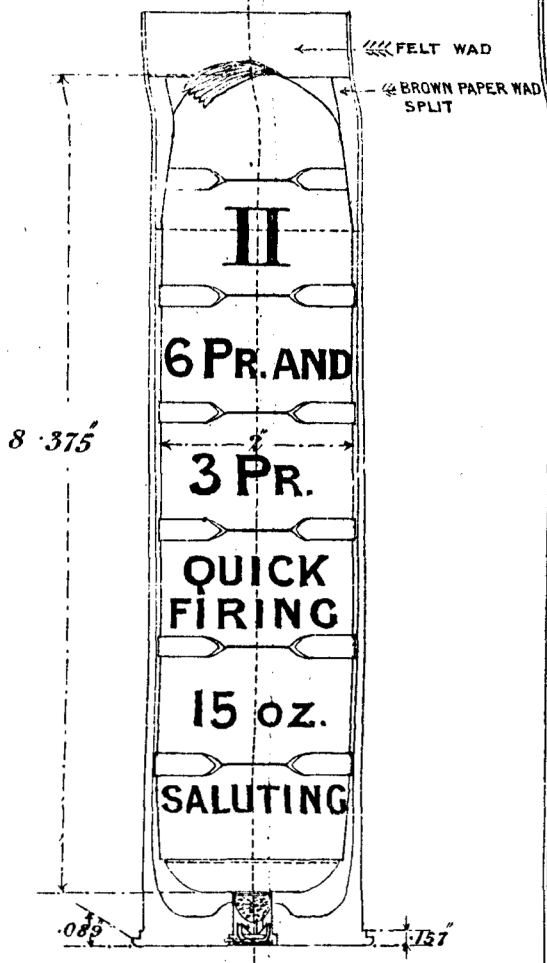
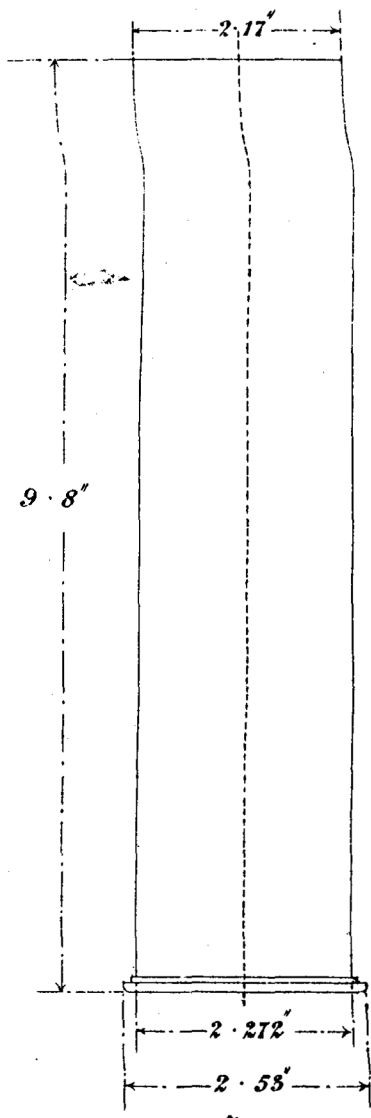
Scale 1/2



CARTRIDGE QUICK FIRING SALUTING 3 PR MARK III.

15 OZ. BLANK L C WITH REMOVABLE PRIMER.

Scale $\frac{1}{2}$:



PLAN OF BASE