ROSS RIFLE HANDBOOK 1907

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HANDBOOK

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ROSS RIFLE HANDBOOK

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Hood, sight, front.
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Spring, main.
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Stop bolt.
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TO STRIP THE ROSS RIFLE MARK I.

NOTE.—Such terms as right, left, top, bottom, front, rear, etc., are assuming the rifle to be in the normal firing position.

1. Remove the bolt.
2. Take out the strap link screw.
3. Unscrew the four screws and remove the front sight hood.
4. Unscrew the front sight clamp screw and remove the front sight.
5. Take out the front band screw and tap off the front band.
6. Take out the rear band screw and slip forward the front handguard until the rear band can be removed.
7. Remove the front handguard.
8. Push forward the sight slide and remove the rear hand guard levering it up from the rear end.
9. Remove the dust cover by inserting a dummy cartridge or punch and springing the front end out of its recess when it can be slid forward and removed.
10. Remove the receiver rear screw and front screws.
11. Remove the barrel and receiver.
12. Remove the bolt stop spring and bolt stop.
13. Remove the trigger guard.
14. Take out the front and rear bushings from the stock.
15. Unscrew the lifter bearing nut and screw and remove the lifter and lifter spring.
16. Unscrew the stock clamp and nut.
17. Unscrew the butt plate and remove the butt trap.
18. Unscrew the butt trap spring screw and remove the butt trap spring from the butt plate. (This should not be removed except to replace a broken one.)
19. Remove the cut off (or rear portion of the magazine) which is loose.
20. Unscrew the cut off retainer screw from the trigger guard.
21. Remove the cut off retainer, and cut off retainer spring (spiral).
22. Drift the cut off spring (flat) to the rear out of its groove. (This should not be removed except to replace a broken spring.)
23. Drive out the trigger pin from either side of the trigger guard.
24. Drift forward the trigger spring. (This should not be removed except to replace a broken spring.)
25. (*a*) Screw off the micrometer thimble.
    (*b*) Push forward and remove the index slides when the sight slide and its components will slip off.
    (*c*) Drive out the sight axis pin from either side and remove the sight leaf spring. (The sight slide pins are a driving fit and must not be removed.)
26. The windgauge collar is a driving fit and should only be removed when absolutely necessary to repair the windgauge.

27. Unscrew the windgauge screw and slip off the windgauge.
28. Drive out the sear pin from either side and remove the pawl (with pawl spring assembled) and sear.
29. Slip out the pawl spring from its seating in the pawl.
30. Raise the rear end of the ejector spring from its seating in the receiver and press forward the ejector until its slot is free from the ejector pin, when the ejector (with spring assembled) can be removed.
31. The ejector spring should not be removed from the ejector except to replace a broken one.
32. Unscrew the barrel.

To Strip the Bolt of Mark I Rifle.

33. Put the safety catch "off" by pressing it to the right.
34. Pull the bolt head forward until the notches on the bolt and cocking piece are heard to engage.
35. Turn the extractor until its lower edge is against the rib underneath the bolt sleeve when it can be prized off frontwards.
36. Return the bolt head by *pulling back the "bent" of the cocking piece* with the flat of a screw driver or any convenient tool. (No attempt must be made to push or hammer back the bolt head itself.)
37. Put the safety catch "on" by pressing it to the left.
38. Pull back and unscrew the firing pin nut.
39. Put the safety catch "off" by pressing it to the right.
40. Slip off the cocking piece, cocking piece spring, and cocking piece washer.
41. Remove the bolt from the bolt sleeve.
42. Place the mouth of an empty cartridge case over the firing pin and press forward until the stud on the retainer is forced out of the slot in the bolt—give it a right handed turn until the same stud is opposite the groove in the bolt spiral when the weight of the main-spring will force the retainer off the bolt—(care must be taken not to lose the retainer by the sudden releasing of the mainspring). The mainspring and firing pin can now be removed.
43. Remove the safety catch by pressing it to the left.
44. Remove the safety catch spring and plunger from the bolt sleeve.
45. Unscrew the cover screw and prize off the bolt sleeve cover. This is a driving fit and should not be removed except to replace a broken part.

TO ASSEMBLE THE ROSS RIFLE, MARK I.

1. Screw the barrel to the receiver.
2. Assemble the stock clamp screw and nut from either side.
3. Screw the butt trap spring into the butt plate and insert the butt trap.
(Knob of trap to be towards toe of butt plate.)
4. Screw on the butt plate.
5. (*a*) Put in the lifter.
   (*b*) Screw in the lifter bearing nut and screw from either side.
   (*c*) See that the lifter works freely.
6. Put in the lifter spring with its coil towards the muzzle and square end downwards.

7. See that the ejector spring is in the ejector and unbroken.
8. See that the ejector is smooth and free from "burrs."
9. See that the ejector slot in the receiver is clean and the ejector pin smooth.
10. Put the ejector (with spring assembled) into the ejector slot allowing the spring to pass to the rear (above the ejector pin) until its point engages the cross cut slot in the receiver at the same time guide the slot in the ejector over the ejector pin. See that the ejector works freely.
11. Assemble the pawl to the sear (pawl to the front with spring seating underneath; long arm of the sear to the rear, short arm downwards).
12. Insert the pawl spring (concave side outwards) with its wide end in the seating in the pawl and the narrow end resting against the front of the short arm of the sear.
13. Holding with a drift the axis holes of the pawl and sear in line with those in the lugs underneath the receiver, insert the sear pin from either side.
14. Assemble the trigger spring to the trigger guard (hole to the rear). Punch the metal of the trigger guard to secure the spring.
15. Assemble the trigger to the trigger guard (finger grip to the rear and downwards) and insert the trigger pin from either side.
16. Assemble the cut off spring (flat) to the trigger guard (hole to the front). Punch the metal of the trigger guard to secure the spring.
17. Insert the cut off retainer (with catch upwards and to the front) behind the cut off spring.
18. Insert the cut off retainer spring so that one end of it is in the seating in the back of the cut off retainer and the other end is in the seating in the slot of the trigger guard.
19. Press down the cut off retainer until its axis hole is in position and screw in the cut off retainer screw from the right of the trigger guard.
20. Assemble the cut off (rear part of the magazine) to the trigger guard depressing it, until it is held firmly by the catch of the cut off retainer.
21. Insert the front bushing from underneath the stock with its closed end downwards.
22. Assemble the trigger guard with the cut off (rear part of the magazine) held by the cut off retainer, being careful that the magazine platform is not above the upper edges of magazine.
23. Insert the rear bushing.
24. Assemble the windgauge to the rear sight leaf.
25. Insert the windgauge screw from left to right.
26. Drive on the windgauge collar which is a driving fit.
27. Assemble the sight slide clamp spring in the slot of the sight slide; points to be so arranged as to project into the notches of the sight slide clamps which fit one on each side of it; the milled grips of the clamps to be flush with the top and bottom of the sight slide. (The points of the spring must not protrude above the clamps or they will prevent free movement of the slide along the rear sight base.)
28. Assemble the rear sight leaf and sight leaf spring to the rear sight base; (horns of the spring to rest on the barrel with their points towards the muzzle).
29. Drive in the sight axis pin from either side.
30. (*a*) Turn the rear sight leaf over on to its back.
   (*b*) Invert the sight slide and place it over the rear sight leaf just in front of the sight axis pin.

(*c*) See that the sight slide pins are one below and one above the flanged edges of the rear sight leaf.

(*d*) When so inverted the bevelled edge of the sight slide should be towards the muzzle.

(*e*) Turn the leaf and slide together on to the rear sight base.

(*f*) Insert the index slides from the front, notches outwards; the slotted ends to be towards the muzzle, with the chamfering upwards.

(*g*) Push the rear ends of the index slides into the slots on the sight slide.

(*h*) Place the micrometer thimble over the index slides with the chamfered ends of the slides in the grooves across the thread of the rear sight base. Screw home the micrometer thimble until the O is on the cross line cut on the rear sight base.

(*k*) Should the micrometer thimble work too loosely it can be tightened by removing it and expanding the screw part of the rear sight base which is slotted underneath for the purpose.

NOTE.—Rear sight base and front sight sleeve are driven on and fixed with a pin. The barrel will, as a rule, be issued with these parts assembled. Should it, however, be necessary to replace them, they should be sheared off and the greatest care taken not to bend or dent the barrel when drilling the hole for the fixing pin.

31. Insert the bolt stop spring in the bolt stop.

32. Insert the bolt stop (with spring assembled) in the stock—thumb piece upwards—taking care that the spring drops correctly into its seating.

33. Assemble the barrel and receiver to the stock.

34. Insert the receiver rear screw and front screws (2).

35. Assemble the dust cover (concave side upwards and hole towards muzzle). To do this enter its rear end in the grooves in the trigger guard pressing it backwards and upwards with a dummy cartridge inserted into the hole of the dust cover.

36. Assemble the hand guards (front and rear) being careful that the recessed ends are properly fitted under the rear sight base.

37. Assemble the rear band, sliding forward the front hand guard until the band is in its seating. Draw back both together to their proper position and screw in the rear band screw from the left.

38. Assemble the front band with piling swivel assembled, inserting the screw from the left.

39. Assemble the front sight to the front sight sleeve. (Slope towards muzzle.)

40. Screw in the front sight clamp screw.

41. Screw the front sight hood to the front sight sleeve. (Slope towards muzzle.

42. Screw the strap link screw with strap link assembled into the butt.

TO ASSEMBLE THE BOLT OF MARK I RIFLE.

43. Drive on the bolt sleeve cover from front to rear and screw in the cover screw.

44. Assemble the safety catch spring and safety catch plunger to the bolt sleeve (point of plunger to the rear).

45. Insert the safety catch from the left.

46. Press in the plunger until the safety catch has ridden over it and the notches engage its point correctly both at "on" and "off" positions. When correctly assembled the milled grip of the safety catch will be to the right.

47. Insert the firing pin into the bolt.

48. Insert the main spring.

49. Insert the retainer with milled edge outwards.

50. Using an empty cartridge case press home the retainer guiding the stud on its surface into the groove in the bolt spiral.

51. As soon as the stud can be seen through the slot in the bolt turn the retainer to the left until the stud is held in its recess under the action of the mainspring.

52. Enter the bolt in the bolt sleeve so that when pushed home the ejector slot in the bolt head is underneath.

53. Place the cocking piece washer over the firing pin.

54. Place the cocking piece spring over the firing pin (this spring must always be in the rear of the cocking piece washer and it is most important that neither the spring nor washer should be omitted).

55. Turn the firing pin so that its flats are vertical.

56. Place the cocking piece over the firing pin, cocking piece spring and cocking piece washer; (with its "bent" in the slot underneath the bolt sleeve.)

57. Place the safety catch to "on" by pressing it to the left.

58. Screw on the firing pin nut until the stud on the rear face of the cocking piece engages firmly one of the notches in the front face of the firing pin nut.

59. Release the safety catch.

60. Pull the bolt head forward until the notches on the cocking piece and bolt are heard to engage. If the firing pin nut is properly screwed home the point of the firing pin should not protrude from the face of the bolt head when in this position.

61. Insert the extractor between the bolt sleeve and bolt sleeve cover.

62. Insert the bolt, pressing down the bolt stop until the lug on the bolt sleeve has passed it.

63. See that the "bent" of the cocking piece is "cammed" back clear of the sear when the safety catch is placed at safety.

64. Test the free action of the main spring.

65. Pull off 4 to 7 lbs.

NOTES ON MARK I BOLT.

1. It is important to see the cocking piece spring assembled before putting on the firing pin nut—in order to take up back lash and prevent the firing pin nut becoming unscrewed.

2. Be sure that the firing pin nut is screwed entirely home so that the ribs on the rear of the cocking piece firmly engage the notches in the front of the firing pin nut.

3. If the cocking piece washer or cocking piece spring is left out, the firing pin nut can be so far screwed home that the point of the firing pin will not strike the cap of the cartridge and a miss fire will be the result.

4. When the bolt is properly assembled to the bolt sleeve the ejector slot in the bolt head should lie underneath, assuming the bolt to be in the firing position.

5. The retainer should be inserted with its milled edge outwards and care must be taken that the nib on the retainer is carried over the shoulder in the bolt and down into its slot.

6. It will be found advantageous to press down on the firing pin nut with the thumb of the right hand in order to lessen the friction when pressing the safety catch to the left to put it "on."

NAMES OF THE PARTS OF ROSS RIFLE, MARK II.

Band, front.
Band, rear.
Barrel.
Bolt.
Base sight, rear.
Catch, safety.
Clamps, slide, sight (2).
Collar, windgauge.
Cover, dust.
Cut-off.
Ejector.
Extractor.
Guard, hand, front.
Guard, hand, rear.
Guard, trigger.
Hood, sight, front.
Knob catch, safety.
Leaf, sight, rear.
Lifter.
Link, strap, rear.
Link, strap.
Magazine.
Nut, clamp, stock.
Nut, bearing, lifter.
Pawl.
Piece, cocking.
Piece, finger, lifter.
Pin, base, sight, rear.
Pin, axis, sight.
Pin, cam.
Pin, ejector.
Pin, link strap (2).
Pin, sear.
Pin, firing.
Pin, sleeve, sight, front.
Pin, slide, sight (2).
Pin, trigger.
Plate, butt.
Platform.
Plunger, catch, safety.
Plunger, piece, cocking.
Receiver.
Retainer, spring, main.
Rivets, finger (2).
Rivets, guard, hand, rear (2).
Rivets, platform (2).
Screws, band (2).
Screw, bearing, lifter.
Screw, clamp, sight, front.
Screw, clamp, stock.
Screws, front, receiver (2).
Screws, hood, sight (4).
Screw, locking, barrel.
Screw, link, strap.
Screws, magazine (2).
Screws, plate, butt (2).
Screw, rear, receiver.
Screw, windgauge.
Sear.
Sight, front.
Sleeve, bolt.
Sleeve, sight, front.
Slide, index, right.
Slide, index, left.
Slide, sight.
Spring, clamp, slide, sight.
Spring, cut-off.
Spring, plunger, catch, safety.
Spring, ejector.
Spring, guard, hand, rear.
Spring, leaf, sight.
Spring, lifter.
Spring, main.
Spring, pawl.
Spring, sear.
Spring, stop bolt.
Spring, trap, butt.
Stock.
Stud, link, strap.
Stop, bolt.
Swivel piling.
Thimble, micrometer.
Trigger.
Trap butt.
Washer, pin firing.
Washer, stock.
Windgauge.

DESCRIPTION OF ROSS RIFLE, MARK II.

Barrel.—The barrel screws into the receiver with 1½ turns of a very coarse left handed thread and is secured by a locking screw which passes through the receiver into a slot cut in the thread of the barrel. The sights, front and rear, are mounted on sleeves which are driven on and pinned to the top of the barrel by a parallel pin.

The rifling which is of the concentric type consists of four grooves having a right handed twist of 1 turn in 10 inches.

Sights.—The front sight is a barleycorn which is dovetailed into the front sight sleeve and secured by a clamping screw. It is protected by a hood screwed to the sleeve.

The sleeve which connects the rear sight to the barrel is called the Rear Sight Base. Its top surface is flat and is graduated from 100 to 2,200 yards, each range having a line drawn through the figures to indicate the correct "setting" of the sight for that range. The sides of the rear sight base are grooved to receive moveable racks called index slides, the notches of which engage the clamps of the slide by which the sight is fixed.

The front end of the rear sight base is threaded to engage a ring for fine adjustment. Both its front and rear ends project over the barrel in such a manner that they secure the handguards. Fine adjustment is obtained by the ring already mentioned which is termed the "micrometer thimble." It engages the front ends of the index slides and when revolved gives them a forward or backward movement carrying with them the sight slide and raising or lowering the rear sight leaf. It is graduated in tens from 0 to 100, the even numbers being marked in plain figures and the odd numbers being indicated by a line.

These graduations represent a horizontal increase or decrease of ten yards at any range, the curve of the sight leaf giving the extra height of backsight required.* The micrometer is at zero when the 0 rests on the cross line cut on the rear sight base from which position an increase or decrease of 50 yards range can be given.

The value of each graduation on a vertical target is roughly 1 inch per 100 yards.

The male thread on the rear sight base is slit crossways underneath to allow the natural spring of the metal to take up any looseness from wear.

The sight slide moves horizontally along the rear sight base. It contains two clamps which actuated by a V spring engage the notches of the index slides. From its upper surface two horns project, each containing a pin driven in and not meant to be removed. These pins are so arranged as to engage one above and one below the flange of the rear sight leaf.

The rear sight leaf is of sheet steel pressed into a U section. It is curved to give the necessary changes of elevation, and its lower edges are flanged to engage the pins of the sight slide. It is hinged to the rear sight base at the front end by an axis pin which also keeps in place the sight leaf spring. This spring is formed like a saddle spring and keeps the rear sight leaf pressed against the upper pin of the sight slide.

The rear end of the rear sight leaf is bent round to form a female thread for the windgauge screw which secures the windgauge to it.

The windgauge works transversely across the rear sight leaf by the windgauge screw. Its rear edge has a 110è V notch cut in it. Lines for wind allowance are marked on its upper surface, each graduation giving roughly 4″ per 100 yards. It is read by a centre line on the rear sight leaf.

(In the latter issues of Mark II Rifles this line may sometimes be found placed slightly to the right to counteract the "throw" of the rifle.)

To adjust the sight: Presuming the micrometer thimble to be at zero, press inwards, with the thumb and finger, the milled heads of the sight

* This method of adjustment was adopted in order to lessen the number of shots frequently wasted by the firer in picking up the correct elevation for different ranges, *e.g.:* A soldier at target practice on any particular day finds that at 500 yards he requires 520 yards elevation. When he moves to 800, he would easily remember to put on 820 yards and be far nearer the correct elevation for that day than if he endeavoured to work out for himself a proportionate increase.

slide clamps until they are released from the notches of the index slides; push the slides forward until the rear (bevelled) edge is cutting the line through the required graduation. Release the pressure of the thumb and finger when the clamp will engage the notch on the right or left of the rear sight base according as the range required is an odd or an even number. If the micrometer thimble is above zero the notch will be above the line indicating the range, if below zero it will be below this line. The amount above or below will of course vary according to the micrometer reading.

Receiver.—The receiver is practically a hollow cylinder machined to take the various components which are assembled to it. It is open on top to allow cartridges to be inserted and on the bottom are openings for the magazine, pawl and sear. Ribways are cut on the inside right and left to guide the bolt sleeve and in front of these are the resisting shoulders against which the lugs of the bolt take their bearing to lock the rifle during discharge. The faces of these resisting shoulders are cam shaped to allow for the rearward movement of the bolt during primary extraction.

The left side has a slot for the ejector terminating at its rear end in a seating for the ejector spring also a slot for the "bolt stop" and a recess in which the "safety catch" engages.

Projecting below the receiver are two bosses recessed to take the sear pin; the left one also takes the ejector pin.

Immediately behind the barrel thread is placed a pin called the "cam pin" whose function is simply to give the first turning movement to lock the bolt when closing the breech.

The receiver is secured to the trigger guard through the stock by two screws at its front end and one at its rear end.

Bolt Sleeve.—The bolt sleeve is a cylindrical part which acts as a carrier in which the whole of the bolt action is contained. Its rear end is bent to form a handle and recessed to form a seating for the safety catch and its components.

On the right and left are ribs which travel in ribways in the receiver, the rib on the left having a lug at its front end which engages with the bolt stop to prevent the removal of the sleeve until the bolt stop is lowered by depressing the bolt stop spring.

On its upper side are undercut grooves for the extractor.

There are two longitudinal ribs on its under side bevelled gently at the front end and steeply at the rear end.

A slot is cut at the rear end to guide the cocking piece.

The inside is hollowed to receive the bolt and has four threaded spirals two of which engage with corresponding spirals on the bolt and cause the turning movement necessary to lock it.

Bolt.—The bolt and bolt head form one cylindrical piece, hollowed to take the mainspring and firing pin and having on its front end lugs which engage with the resisting shoulders of the receiver to support the bolt on firing. The front face of the smaller lug is cam shaped, so designed to follow the slope of the receiver and effect primary extraction. The rear faces of both lugs are similarly cammed to allow of this movement.

Two partially threaded spiral ribs cut on its outside give the rotary or locking movement to the bolt when actuated by spiral grooves in the

bolt sleeve. The engagement of these threads prevents the tendency of the bolt to turn in the spirals when being entered or withdrawn and so prevents friction between the bolt head lugs and the receiver.

There are also two short spirals cut at the rear end of the bolt which are left threaded only for convenience in manufacture but their front faces are of great importance as on coming in contact with opposing faces on the bolt sleeve they locate the position from which the threads on the long spirals will correctly engage the corresponding threads in the bolt sleeve.

A slot is cut on the front end of the bolt leaving a cam at the bottom to operate the ejector.

The face of the bolt head is recessed leaving a rim to centre the cartridge. The rear edge of the bolt head against which the lug of the extractor works is cammed, so designed to tighten the grip of the extractor on the cartridge while the bolt is being unlocked, thus pressing it against the above mentioned face and carrying it back correctly to the ejector.

There is a gas escape hole underneath the bolt head.

The interior of the bolt has a shoulder to engage the collar of the firing pin and is threaded at its rear end to receive the main spring retainer, a groove being left for the nib on the firing pin washer.

Main Spring.—The mainspring consists of fifty-three (53) coils of .032" wire set to a length of $7\frac{3}{8}$ inches.

Mainspring Retainer.—The mainspring retainer is a threaded bushing which screws into the rear end of the bolt to secure the mainspring. It is hollowed to allow the travel of the firing pin; its rear face has lugs by which it can be screwed and unscrewed and its front face has recesses for the nibs of the firing pin washer to engage and prevent the retainer from unscrewing during the opening and closing of the bolt.

Firing Pin Washer.—The firing pin washer is a small ring placed between the main spring and main spring retainer to prevent the latter being unscrewed by the former. Its outer circumference has a lug which keeps it from turning by fitting into a groove in the bolt and its rear face has two nibs which engage corresponding recesses in the main spring retainer as already described.

Firing Pin.—The firing pin passes through the bolt; its rear end screws into the cocking piece; two flats are cut on the thread against one of which the cocking piece plunger bears and prevents the firing pin from unscrewing when assembled to the bolt sleeve. It has a collar near its front end for the main spring to bear against. In this collar are cut three grooves intended partly as gas escapes and partly to prevent any accumulation of dirt or grit around the collar.

(These have been found unnecessary and are no longer made.)

Cocking Piece.—The cocking piece is bored through and tapped for a portion of its length from the front to receive the firing pin.

Its outer surface is cut away at the front and rear ends to form seatings for the safety catch, both at the cocked and fired positions, the front cut being placed so as to assist the camming action of the safety catch.

A hole is drilled right through its left side into the screw thread and a small hardened, pointed pin, called the cocking piece plunger, is inserted in this hole which is afterwards slightly closed with a hammer to prevent the plunger from falling out. It cannot fall inwards as the hole is drilled slightly off centre to the thread which accordingly forms a shoulder for it.

When the bolt is assembled, this plunger engages one of the flats on the firing pin to prevent it from turning and is itself prevented from coming out by contact with the inner surface of the bolt sleeve, its point being rounded off to prevent friction or burrs.

From the underneath side of the cocking piece a rib projects which travels along the slot in the bolt sleeve and keeps the cocking piece from turning, and on this rib is a "bent" which is engaged by the nose of the sear to hold back the cocking piece and firing pin at full cock.

Safety Catch.—The safety catch consists of a bolt into which is driven a pin having a milled knob. A vertical hole is drilled in which a punch can be inserted to depress the safety catch plunger spring when removing the safety catch.

On the under side is a flat in which are cut transversely two grooves. The safety catch plunger actuated by its spring engages these grooves to prevent the accidental slipping of the safety catch from the "locked" and "unlocked" positions respectively.

On the rear surface is a cam which engages the front cut of the cocking piece already mentioned and withdraws the "bent" from the nose of the sear when the action is placed at "safety."

The right end of the safety catch is cut at an angle to come flush with the bolt sleeve when assembled, and the left end acts as a locking bolt, a flat being cut to engage against a corresponding flat on the left side of the receiver and so prevent the opening of the bolt when set at "safety."

Ejector.—The ejector is a flat piece of steel which works in a slot on the left side of the receiver, being held by a pin and actuated by a spring which presses its point inwards towards the bolt. Its right side is shaped so that by contact with the cam in the left side of the bolt it is withdrawn when the rifle is being loaded but its pointed front end is allowed to intercept and eject the empty case when the bolt is withdrawn.

Extractor.—The extractor is of sheet steel with a claw at its front end, and a lug on its underside which engages the rear edge of the bolt head and takes the resistance during extraction. This lug also prevents the extractor from dropping out when the bolt is not in the rifle.

Towards its rear end is a slot which can be used in case of necessity to hold the firing pin by its flats when stripping or assembling the bolt.

It is secured to the bolt sleeve by fitting into two undercut grooves on its upper surface and is so placed that it will prevent the bolt head from turning beyond its pathway when the bolt lugs are unlocked. The front of the hook is rounded to let the natural spring of the extractor carry it over the rim of the cartridge on closing the bolt.

Sear.—The sear is a triangular piece of steel of U section which fits inside the pawl to which it is attached by the sear pin. It is drilled to take the trigger pin which connects the trigger to it and is slotted and

recessed for the sear spring and pawl spring which control its action in connection with the pawl and receiver.

Its rear angle forms the "nose" to take the "bent" of the cocking piece.

Pawl.—The pawl is also a triangular piece of steel of U section drilled to take the sear pin and recessed and grooved to form a seating for the pawl spring.

Trigger.—The trigger is in the form of a bent lever with an axis hole at its bend. Its long arm is curved to form a finger grip and its short arm projects to the rear and bears against the bottom of the receiver to lever the sear from the cocking piece when trigger is pressed.

Magazine.—The magazine is a vertical box entirely enclosed by the stock and fastened to the trigger guard by two screws on its underside. The front end is left open for the up and down movement of the lifter.

It contains five cartridges. Its rear end is brazed for strength and has two slots on top to form guides for the horns of the cut off.

Lifter.—The lifter is a long steel bar having the magazine platform rivetted on to its rear end and working inside the magazine. It is situated below the barrel in the stock to which it is pivotted at its front end by a nut and screw.

About half way along it the lifter finger piece is rivetted which projecting from the right side of the stock forms a grip for the left hand to work it up and down against a spring on the controllable platform principle.

Cut Off.—The cut off is a sheet steel stem passing behind the magazine and through a hole in the top of the trigger guard. It is curved at its lower extremity to form a hook for the thumb.

It has two projections pressed out respectively to the front and rear of the stem.

The front one forms a "bent" which engaging a slot in the front of the trigger guard holds it in its downward or "on" position. The rear one forms a seating for the cut off spring whose upper end has a point which enters vertically into a small hole in this projection.

The lower end of the cut off spring has a similar point which enters a similar hole in the top of the trigger guard.

The top of the cut off is bent to the front to form two horns which lie over the magazine platform and are kept in place by the slots in the rear end of the magazine in which they work.

Bolt Stop.—The bolt stop is a pin which works vertically in a dovetailed seating on the left side of the receiver at its rear end. Its top is rounded and knurled to form a thumb grip. Its bottom end is recessed to receive the bolt stop spring which lies in the stock below it.

Its right face projects through a slot in the receiver and intercepts the lug on the front end of the bolt sleeve until the bolt stop is pressed down to allow it to pass.

Trigger Guard.—The trigger guard has the usual bow to protect the trigger and is screwed to the receiver by two screws at its front end and one at its rear end. It forms the base of the magazine which is attached to it. The centre is hollow for cleaning purposes, but is normally closed by a flat cover, which, fitting into under cut grooves, can be sprung in and out as required.

There is the usual trigger slot and also a hole through which the stem of the cut off projects.

Just in front of the trigger bow a stud with a strap link is pivotted.

Butt Trap and Spring.—The butt plate is secured to the butt by two screws. It has a hole in its centre which admits the oil bottle and pull through to the stock, but can be closed by a shutter called the butt trap which can be slid open and shut by means of a stud on its under surface. This shutter is kept from working loose by a flat spring let into the stock which presses it against the butt plate.

Bands.—The front band slips over the barrel connecting it to the stock to which it is secured by a screw. The barrel hole is left large to allow for expansion of the barrel on firing. It has a bayonet stud on its under side, also a piling swivel.

The rear band slips over the front hand guard and stock and is secured by a screw on its under side.

Stock.—The stock is of walnut, in one piece. It is grooved to take the barrel, receiver, magazine and lifter and is recessed at various portions of its length for lightness.

The barrel groove is really intended as a clearance and not to form a bearing for the barrel at any point.

The butt is drilled to take the oil bottle and pull through with a separate hole for the pull through weight.

A strap link is attached by a screw in the usual way.

Unloading Action.—Suppose the rifle to have been fired.

On drawing back the bolt sleeve handle the backward movement of the sleeve imparts a rotary motion to the bolt by means of the spirals. In order to effect primary extraction, i.e., the loosening of the fired case in the chamber, the bolt is forced backward by the contact of the front of the small lug against the rear of the receiver thread (both being cut to the same screw pitch). At the moment the lugs on the bolt head become disengaged from the resisting shoulders in the receiver the sleeve has moved back until the threads on the bolt and sleeve engage, thus transferring all the weight of the mainspring to the latter. On further drawing back the bolt the extractor withdraws the empty case from the chamber; the turning of the bolt causes the extractor to grip it more firmly due to the lug on the extractor rising up a cam on the rear edge of the bolt head. The projecting rims of the bolt head prevent it from falling away from the extractor claw and it is carried back until the ejector acting in the groove of the bolt head intercepts and throws it out to the right.

The action of drawing back the sleeve causes it to engage and withdraw the cocking piece (with firing pin attached) holding the mainspring compressed by the locking of the threads on the bolt and sleeve. In this position the extractor prevents the bolt from unduly rotating when not in the rifle.

Loading Action.—On pushing forward the bolt the nose of the sear engages the bent of the cocking piece and thus takes the weight of the mainspring as the threads disengage. The bolt and sleeve travelling forward push a cartridge into the chamber. The left front corner of the lower resisting lug encounters the cam pin of the receiver which turns the threads of the bolt from those of the sleeve and thus allows the rotary or locking movement of the bolt to be completed by the spirals of the sleeve, leaving the cocking piece and firing pin held by the sear.

Firing Action.—On pressing the trigger its short arm being forced upwards against the bottom of the receiver gives the necessary leverage to revolve the sear round the sear pin, thus withdrawing the "nose" of the sear from the "bent" of the cocking piece and allowing the firing pin under the action of the main spring to fly forward and strike the cap.

As long as the long arm of the trigger is pressed the action of the pawl spring causes the pawl to rise through its slot in the receiver and prevent any backward movement of the bolt sleeve at the instant of firing by engaging behind the ribs on the sleeve.

When the finger pressure on the trigger is released the sear spring re-asserts itself raising the sear nose and lowering the pawl.

Action of the Cut Off.—On depressing the hook of the cut off with the thumb the horns press on the top cartridge and the contents of the magazine are carried downwards until the "bent" of the cut off engages the slot of the trigger guard. The rifle can then be used as a single loader. This "bent" and slot are held together by the compressed cut off spring.

When the hook is further depressed and slightly pulled back the "bent" and slot are released from one another and the platform under the action of the lifter spring carries the contents of the magazine up into the position for loading.

Action of the Safety Catch. (a) *At full cock.*—On pressing the safety catch button to the left the "cam" on its rear surface acts on the front face of the cocking piece and forces it back, thus releasing it from the "nose" of the sear. The left extremity of the safety catch enters the recess in the left side of the receiver and locks the action. On pressing the safety catch button to the right the above movement is reversed and "bent" of the cocking piece is again held by the "nose" of the sear.

(b) *In the fired position.*—On pressing the safety catch button to the left or right the action is respectively locked or unlocked as above.

Action of the Lifter.—On depressing the lifter finger piece with the fingers of the left hand the platform is lowered to the bottom of the magazine and five cartridges can be poured in from above. These lie zig-zag one above the other owing to the platform being bent in such a manner that its left side is higher than the right, and on the lifter finger piece being released the top cartridge rises until held by the side of the receiver, from which position it is carried forward into the chamber by the bolt being closed.

TO STRIP THE ROSS RIFLE, MARK II.

NOTE.—Such terms as right, left, top, bottom, front, rear, etc., are assuming the rifle to be in the normal firing position.

1. Remove the bolt.
1*a*. Take out the strap link screw.
2. Unscrew the 4 screws and remove the front sight hood.
3. Unscrew the front sight clamp screw and remove the front sight.
4. Take out the band screw and tap off the front band.
5. Take out the band screw and slip off the rear band.
6. Remove the hand guard front.
6*a*. Push forward the sight slide and remove the hand guard rear levering it up from the rear end.
7. Remove the dust cover (under the magazine) by inserting a dummy cartridge or punch and springing the front end out of its recess when it can be slid forward and removed.
8. Remove the receiver rear screw and front screws.
9. Remove the barrel and receiver.
10. Remove the bolt stop spring and bolt stop.
11. Remove the trigger guard.
12. Remove the stock washer.
13. Unscrew the lifter bearing nut and screw and remove the lifter and lifter spring.
14. Unscrew the butt plate and remove the butt trap.
15. Prize out the butt trap spring.
16. Unscrew the stock clamp screw and nut (between receiver and trigger guard).
17. Remove the cut off spring.
18. Remove the cut off.
19. Screw off the micrometer thimble. Push forward and remove the index slides when the sight slide and its components will slip off. Drive out the sight axis pin from either side and remove the sight leaf spring. The sight slide pins are a driving fit and must not be removed.
20. The windgauge collar is a driving fit and should only be removed when absolutely necessary to repair the windgauge.
21. Unscrew the windgauge screw, slip off the windgauge.
22. Drive out the sear pin from *left* to *right* and remove the pawl, sear, pawl spring and sear spring.
23. Press down the ejector pin and remove the ejector and ejector spring. The ejector pin can then be removed by being pushed upwards out of its seating.
24. Unscrew the barrel locking screw.
25. Unscrew the barrel.
26. For repair only, drive out the trigger pin from either side and remove the trigger from the sear.

TO STRIP THE BOLT.

27. (*a*) Pull the bolt head forward.
(*b*) Spring the lug on the extractor over the bolt head and remove the extractor.
(*c*) Return the bolt head to ease the main spring.

28. Pull back the cocking piece until a flat wrench can be inserted to prevent the firing pin from turning (the slot in the extractor will answer the purpose in case of necessity).
29. Unscrew the cocking piece.
30. Remove the bolt from the bolt sleeve.
31. Using a retainer wrench unscrew the main spring retainer, when the firing pin washer, main spring, and firing pin will be removed. Care must be taken in this operation not to lose the components by the sudden releasing of the main spring. (The slot in the extractor will answer the purpose of the wrench.)
32. With a small punch depress the safety catch plunger and while depressed lightly tap off the safety catch by the knob.
33. Remove the safety catch spring and plunger.

TO ASSEMBLE THE ROSS RIFLE, MARK II.

1. Screw the barrel to the receiver and carefully screw in the barrel locking screw until no movement of the barrel can be detected. See that the cam pin in the receiver has its flat quite flush with the face of the barrel.
2. Assemble the stock clamp screw and nut from either side.
3. Put the butt trap spring in the stock with its short arm in the wood and its long arm towards the oil bottle hole.
4. Screw on the butt plate with the butt trap underneath (knob of trap to be towards the toe of butt).
5. Put in the lifter, screw in the lifter bearing nut and screw from either side; see that the lifter works freely.
6. Put in the lifter spring with its coil towards the muzzle and square end downwards.
7. Put the ejector pin (point upwards) in its recess in the receiver.
8. Put in the ejector spring.
9. Put the ejector into its slot in the receiver securing it against the ejector spring by the point of the ejector pin. See that it works freely.
10. If stripped for repair, assemble the trigger to the sear, (sear axis hole in front of the trigger axis hole and above the recess for the pawl spring).
11. Insert the trigger pin from either side of the sear and prick, punch it on both sides to prevent it falling out.
12. (*a*) Assemble the pawl (with hollow side upwards) to the sear, spring seat of pawl downwards.
(*b*) Insert the pawl spring between the sear and pawl and the sear spring in its seat on the top side of the sear.
13. Assemble the pawl, sear, trigger, and springs to the receiver driving in the sear pin from *right* to *left* (the taper point of the sear pin pushes the ejector pin into its place).
14. Assemble the cut off to the magazine.
15. Assemble the cut off spring between the cut off and the trigger guard.
16. Assemble the trigger guard with cut off spring compressed. See that the strap link revolves freely round the strap link stud on the trigger guard. See that the horns of the cut off are above the magazine platform.

17. Assemble the windgauge to the rear sight leaf.
18. Insert the windgauge screw from left to right.
19. Drive on the windgauge collar which is a driving fit.
20. Assemble the sight slide clamp spring in the slot of the sight slide; points to be so arranged as to project into the notches of the sight slide clamps which fit one on each side of it; the milled grip of the clamps to be flush with the top and bottom of the sight slide. (The points of the spring must not protrude above the clamps or they will prevent free movement of the slide along the rear sight base.)
21. Assemble the rear sight leaf and sight leaf spring to the rear sight base; horns of the spring to rest on the barrel with their points towards the muzzle.
22. Drive in the sight axis pin from either side.
23. (*a*) Turn the rear sight leaf over on to its back.
    (*b*) Invert the sight slide and place it over the rear sight leaf just in front of the sight axis pin.
    (*c*) See that the sight slide pins are one below and one above the flanged edges of the rear sight leaf.
    (*d*) When so inverted the bevelled edge of the sight slide should be towards the muzzle.
    (*e*) Turn the leaf and slide together on to the rear sight base.
    (*f*) Insert the index slides from the front, notches outwards; the slotted ends to be towards the muzzle, with the chamfering upwards.
    (*g*) Push the rear ends of the index slides into the slots on the sight slide.
    (*h*) Place the micrometer thimble over the index slides with the chamfered ends of the slides in the grooves across the thread of the rear sight base. Screw home the micrometer thimble until the 0 is on the cross line cut on the rear sight base.
    (*k*) Should the micrometer thimble work too loosely it can be tightened by removing it and expanding the screw part of the rear sight base which is slotted underneath for the purpose.

NOTE.—Rear sight base and front sight sleeve are driven on and fixed with a pin. The barrel will as a rule be issued with these parts assembled. Should it however be necessary to replace them, they should be sheared off and the greatest care taken not to bend or dent the barrel when drilling the hole for the fixing pin.

24. Insert the stock washer in the stock above the receive rear screw hole.
25. Insert the bolt stop spring in the bolt stop.
26. Insert the bolt stop (with spring assembled) in the stock thumb piece upwards taking care that the spring drops correctly into its recess.
27. Assemble the barrel and receiver to the stock, taking care that the bolt stop enters the dovetailed groove in the receiver.
28. Insert the receiver rear screw and front screws (2).
29. Assemble the dust cover (concave side upwards and hole towards muzzle). To do this enter its rear end in the grooves in the trigger guard, pressing it backwards and upwards with a dummy cartridge inserted into the hole of the dust cover.

30. Assemble the hand guards (front and rear) being careful that the recessed ends are properly fitted under the sight base.
31. Assemble the rear band, inserting the screw from the left.
32. Assemble the front band with piling swivel assembled, inserting the screw from the left.
33. Assemble the front sight to the front sight sleeve; (slope towards muzzle).
34. Screw in the front sight clamp screw.
35. Screw the front sight hood to the front sight sleeve (slope towards muzzle).
36. Screw the strap link screw with a strap link assembled into the butt.

TO ASSEMBLE THE BOLT.

37. Assemble the safety catch spring and safety catch plunger to the bolt sleeve (plunger uppermost).
38. Insert the safety catch from the right into the bolt sleeve taking care that the point of the plunger engages firmly in the notches of the safety catch both at the "on" and "off" position.
39. Insert the firing pin into the bolt.
40. Insert the main spring.
41. Insert the firing pin washer with nibs away from the spring.
42. Start the main spring retainer in the threads of the bolt, with the recesses next to the nibs on the firing pin washer, taking care that the nib on the side of the firing pin washer enters the recess in the bolt.
43. Using a retainer wrench, screw home the retainer. (Should no wrench be available the slot in the extractor will answer the purpose). Be careful that when screwed home the nibs on the firing pin washer are held in the recesses on the mainspring retainer. They can be heard to engage.
44. (*a*) Enter the bolt into the front of the bolt sleeve with the largest bolt lug upwards.
    (*b*) Push the bolt in as far as possible, then continuing the pressure give the bolt a right handed twist until the spirals on the bolt take the corresponding grooves in the bolt sleeve and the bolt head comes against the front end of the sleeve.
    (*c*) Pull the bolt head slowly forward and at the same time try to give the bolt a right handed twist.
    (*d*) As soon as the bolt turns slightly, push the bolt head back against the end of the sleeve. (When correctly assembled the gas escape hole in the bolt head should be underneath.)
45. (*a*) See that the cocking piece plunger works freely in the cocking piece (this plunger should not be removed).
    (*b*) Start the cocking piece on to the firing pin.
    (*c*) Keeping the firing pin from turning by a flat wrench, screw home the cocking piece until the threads on the firing pin are all taken up except those covered by the flat wrench (the slot in the extractor will answer the purpose in case of emergency).
    (*d*) Bring the flats on the firing pin to a vertical position.
    (*e*) Turn the cocking piece until its "bent" is opposite the slot in the bolt sleeve and the plunger in the cocking piece can be pressed home against the flat on the firing pin.

(*f*) Carefully withdraw the wrench (or extractor) when the cocking piece will fly forward into its slot.

46. (*a*) Pull the bolt head forward only just sufficiently to retain the lugs in a vertical position.

(*b*) Insert the extractor in the extractor grooves of the bolt sleeve, springing the lug on the extractor over the bolt head.

When in position the extractor should have a slight spring *towards* the bolt and *not away from it.*

47. Insert the bolt, pressing down the bolt stop until the lug on the bolt sleeve has passed it.

48. With the present single bent cocking piece see that it is "cammed" back clear of the sear when the safety catch is placed at safety.

49. Test the free action of the main spring.

50. Pull off 4 to 7 lbs.

NOTES.

The following notes may be found useful in assisting the soldier to overcome difficulties which are likely to be experienced until he has got accustomed to the arm.

Bolt.—The bolt sleeve should be pushed right home when closing the bolt, otherwise the first effort of the main spring is used to close it so the proper blow is not given to the cap. This is especially liable in rapid firing unless the above instruction is carried out.

Cut Off.—The cut off is put in action by depressing the hook and pushing it toward the front with the thumb until the catch is heard to engage. In this position it lies close against the front of the trigger guard and is free from shake. To release the cut off pull the hook downward with the thumb until it is free of the catch when it will rise by the action of its spring. In this position it has very perceptible play backward and forward.

Front Sight.—Should this work loose it should be tightened by the clamp screw in front of the hood. When required to adjust the front sight care must be taken to previously loosen the clamp screw.

Extractor.—Failure in extraction may be due to the bolt sleeve not being pushed right home after the bolt is closed—in which case the extractor would fail to ride over the rim of the cartridge.

Magazine.—Failure to feed will generally be overcome by working the lifter finger piece up and down a few times. This should not occur if when charging the magazine, the muzzle of the rifle is inclined slightly upwards, thus allowing the cartridges to take up their proper position.

Care must be taken to prevent the lifter finger piece being jammed against the stock by a blow as this may stop the free action of the platform.

Micrometer Thimble.—This component is at zero when the O is on the cross-line of the rear sight base, and should only be moved to give either 50 yards elevation or 50 yards depression. It should never be screwed tight against the lugs of the rear sight base nor against the front hand guard.

Sight Slide.—The soldier must be careful to see that the clamps are properly engaged in the notches when setting the sight. When properly set at even ranges such as 200, 400, 600, etc., the clamp on the right sight will be flush with the slide and at odd number ranges such as 100, 300, 500, the clamp on the left will be flush; otherwise the slide is not fixed.

Safety Catch.—In putting on the safety catch the cocking piece is withdrawn from the sear by a cam. The resistance met with necessitates that the soldier should be sure the movement is complete. This can be ascertained by a backward pull on the bolt sleeve handle. If correctly placed to "safety" the bolt sleeve should be found locked in position.

Dust Cover.—Should the dust cover be removed (to clean the magazine) care must be taken to replace it with the concave side upwards and the hole towards the front. This can be easily effected by using a dummy cartridge as a lever.

Missfires.—In the event of a missfire care should of course be taken to keep the rifle pointed in the direction of the target, while opening the bolt.

PROPOSED CHANGES IN ROSS RIFLE, MARK II.

1. *Front Sight.*—(*a*) New method of attaching sleeve to barrel. In place of the present dowel pin the sleeve will be secured to the barrel by a screw having a blunt tapered point which can be screwed home against the tapered recess in the barrel and tightened up as necessary.

(*b*) Clamping screw will be longer and stronger.

(*c*) Barleycorn will be black and of four different heights, the difference in each being roughly equivalent to 3″ per 100 yards on a vertical target.

2. *Backsight.*—(See description of Mark III backsight.)

3. *Ejector.*—Stronger pattern of spring steel, hardened and tempered, and having the front edge sharger and more square than the present pattern.

4. *Front Band.*—New design having its front end solid like a nose cap, and surrounding both barrel and stock for its entire length, secured by a screw passing through the rib on its underside. A stouter piling swivel is attached to it with greater inside width to take the sling if required.

5. *Rear Band.*—New design $\frac{7}{8}$″ wide, screwed to the stock by a screw through the rib on its underside, and carrying a stouter strap link with greater inside width to take the sling more easily.

6. *Cocking Piece.*—New design has a safety "bent" which is not designed to lock the action but to prevent accidental discharge in case the safety catch is not fully "on." The full bent is so designed that its edge engages the "nose" of the sear. The figure of this "full bent"

should not be altered and any adjustment of the pull off should be made on the sear and not on the cocking piece. It is hardened and tempered. It is sloped gently upwards in front of the "full bent" to give a more regular "pull off." (*See* Sear.)

7. *Firing Pin.*—The new design has no grooves in the collar. It is a straight taper from collar to point and is hardened and tempered.

8. *Lifter.*—The new issues are made of spring steel.

9. *Main Spring.*—The new design has 31 coils of ·045″ wire. It weighs 11 to 13 lbs. at full cock. It is much shorter and stiffer than the present pattern in Mark II, rifles.

10. *Strap Link (on Butt).*—Stouter design. The inside width is increased to take the sling more easily.

11. *Sear.*—The new design is of high steel hardened and tempered, its upper surface is so arranged that it travels down the slope of the cocking piece with the object of giving a uniform engagement with the "bent" and a more regular "pull off."

12. *Butt Plate.*—The new design (submitted but not yet decided upon) has the toe and heel rounded off to preserve the stock and is of much thicker metal than the present one. The trap is larger and better protected on account of the increased thickness of the butt plate.

13. *Trigger Guard.*—The new design (submitted but not yet decided upon) is longer inside the bow. A strap link will be attached to it of the same size as the other new strap links. The dust cover will not be fitted the trigger guard being left solid.

14. *Trigger.*—A new design will be submitted for trial—slightly wider in the finger grip. It will be hardened and tempered.

15. *Stock.*—(*a*) The hole for the oil bottle and pull through will be made larger and a recess will be counterbored to facilitate inserting and withdrawing the pull through weight.

(*b*) The "small" of the butt will be strengthened by two screwed wire rivets.

NAMES OF THE PARTS OF THE MARK III. SIGHT.

Base, leaf, sight.
Cam, micrometer, right.
Cam, micrometer, left.
Collar, milled, windgauge.
Leaf, sight, rear.
Pin, axis, sight.
Pins, fixing, ring, base, sight (2).
Pins, guide (for index slide springs), (2).
Ring, base, sight.
Screw, set, micrometer.
Screw, base, leaf, sight.
Screw, windgauge.
Slide, index, right.
Slide, index, left.
Slide, sight.
Spring, leaf, sight.
Spring, ratchet, windgauge.
Springs, slide, index (2).
Springs, slide, sight (2).
Thimble, micrometer.
Windgauge.

Description of Mark III. Sight.

The leaf of the Mark III. sight is attached by means of a ring called the sight leaf base which surrounds the barrel and is secured underneath to it by a screw.

Ranges from 100 to 2,200 yards are marked by notches on the top surfaces of two strips called Index Slide Right and Left, the Right Index Slide bearing the odd numerals and the Left Index Slide bearing the even numerals. Their front ends interlock and rest in a groove on the sight leaf base. The rear ends are supported and guided by slots in a ring called the sight base ring which surrounds the barrel and is secured to it by two dowel pins one above and the other below.

These dowel pins have a notch cut on them by which they can be prized out of their place when it is required to strip the sight.

Each of the Index Slides is kept pressed to the rear by a spiral spring which engages and surrounds an ear extending from underneath the Index Slides. The front ends of these spiral springs surround and are held in position by guide pins which are driven into either side of the sight leaf base.

A divided ring (the two parts of which are called the micrometer cams) rests in a groove cut in the sight leaf base and surrounds the Index Slides.

The front edge of this divided ring is cam shaped (hence its name) and engages a projection on the front of the right Index Slide in such a manner that the Index Slides (which interlock) are carried forward and back by the revolution of the micrometer cams.

The exterior of the micrometer cams are threaded to engage a corresponding thread on the inside of a knurled ring called the micrometer thimble which thus holds the micrometer cams together.

The micrometer thimble is threaded to receive a small set screw whose hardened point projects below its inner surface between the division of the micrometer cams and so locks the micrometer cams and causes them to revolve with the micrometer thimble.

The micrometer thimble revolves freely round the sight leaf base. Thus the action of revolving the micrometer thimble revolves also the the micrometer cams and carries forward the index slides as already described.

This micrometer thimble is graduated on its rear (or bevelled edge) from 0 to 100, each graduation representing 10 yards of range.

The sight slide is a metal bridge mounted on the Index Slides, its lower ends being so formed as to encircle and slide backwards and forwards along them. Two teeth (one on either side) project downwards and engage the notches of the sight slides under the action of two flat springs which are secured to the sight slide and bear upwards against the Index Slides. At the top of the sight slides two horns project to regulate the height of the rear sight leaf.

The rear sight leaf is a flat U shaped piece of metal hinged at its front end to the sight leaf base by an axis pin which also keeps in place the sight leaf spring. The sides of the U are cam-shaped to give the necessary elevation and are provided with flanged edges which bear against the horns on the sight slide under the action of the sight leaf spring.

As a precaution against accidental bending the sight leaf is so arranged that it can yield downwards to the pressure of a blow. On the re-

moval of the pressure the sight leaf spring will reassert itself and bring the rear sight leaf back to its former position.

At the rear end of the rear sight leaf is a wind gauge with a V notch cut on its upper edge and capable of lateral adjustment by means of a screw with a milled collar.

A scale is marked on the rear sight leaf, each division of which represents roughly 4 inches per 100 yards.

A thin wire spring is inserted under the curved rear end of the rear sight leaf with its point protruding through the right side so as to form a ratchet and engage a small recess in the left side of the milled collar. This can be both felt and heard to engage whenever the centre line of the windgauge is opposite one of the marks on the scale. It also prevents the windgauge from slipping from the required position.

To adjust the sight.—Raise the sight slide by the finger grips until its teeth are released from the notches of the index slides. Push forward or draw back the sight slide until the numeral denoting the required range is wholly visible in rear of the finger grip, release the finger grip, when the teeth will engage the notches at the required range under the action of the index slide springs.

To obtain fine adjustment.—Revolve the micrometer thimble until the figure denoting the required adjustment in yards is opposite the centre of the rear sight leaf.

NOTE.—The fine adjustment is designed to give elevation only and not depression from the different hundred yard graduations on index slides. It will be noticed that when the micrometer thimble is revolved from left to right between O and 95 the index slides will advance, but if the revolution be continued from 95 to O the index slides will return to their normal position. Consequently if it be desired to give *depression from any hundred yard range* the sight must be set at the next lowest hundred yard range and elevation given by means of the micrometer thimble as required.

Examples.

When firing at 500 yards.

To give 560 yards elevation, revolve the micrometer thimble from *left* to *right* until the figure 60 is opposite the centre of the rear sight leaf.

To reduce this to 530 yards elevation revolve the micrometer thimble from *right* to *left* until the line representing 30 yards is opposite the centre of the rear sight leaf.

To reduce this to 480 yards elevation, set the sight slide at 400 yards and revolve the micrometer thimble from *left* to *right* until the figure 80 is opposite the centre of the rear sight leaf.

To increase this to 500 yards, set the sight slide at 500 yards and revolve the micrometer thimble *either way* until the figure O is opposite the centre of the rear sight leaf.

To Strip the Mark III. Sight.

1. Set the sight at 1,000 yards with the micrometer thimble at zero and measure the height of the sight above the barrel. (*See* Para. 42 in Assembling the Mark III. sight.)

2. Set the sight to lowest range.
3. Unscrew the set screw from micrometer thimble.
4. Hold the micrometer cams from turning with a small screw driver or other pointed instrument inserted from the rear under the micrometer thimble into a notch cut for the purpose on the right micrometer cam and screw off the micrometer thimble.
5. Loosen the screw in the sight leaf base.
6. Drive the sight leaf base forward from the underside sufficiently to withdraw the index slides from the sight base ring.
7. Raising the finger grips slip the sight slide off the rear ends of the index slides.
8. Remove the index slides and index slide springs.
9. Start the sight axis pin with a drift from the right side (about $\frac{1}{16}$ of an inch).
10. Using a screw driver or small pointed tool press the right coil of the sight leaf spring towards the right and out of the groove in the sight axis pin.
11. Finish driving out the sight axis pin from the right.
12. Remove the sight leaf and sight leaf spring.
13. Remove sight slide springs from the sight slide.
14. Screw the windgauge to the right as far as it will go.
15. If necessary for repair (not otherwise) hold the milled collar of the windgauge screw in a vice and with a small punch drive the windgauge screw out of the milled collar.
16. Unscrew the windgauge screw from the windgauge.
17. Remove the ratchet spring from the rear sight leaf prizing it out of the seating under the rear end of the rear sight leaf.
18. If necessary for repair (not otherwise) prize out the two dowel pins which secure the sight base ring to the barrel, inserting a screw driver or other tool to lever them up by the notches which will be found cut on them.

To Assemble the Mark III. Sight.

19. If stripped for repair, secure the sight base ring by the two dowel pins which must be flush with the outer circumference of the sight base ring.
20. Replace ratchet spring in rear sight leaf, entering the point of its short arm in the small hole drilled in the right hand side of the rear sight leaf, and prizing the long arm of the spring into its seating under the rear end of the rear sight leaf.
21. Place the windgauge in position on the rear sight leaf and screw home the windgauge screw from the left.
22. Bring the windgauge to its central position, taking care that the head of the windgauge screw is right up against the side of the rear sight leaf.
23. Start the milled collar on to the end of the windgauge screw in such a position that the recess on its inner side shall be directly opposite the protruding end of the ratchet spring.
24. Drive the milled collar on to the windgauge screw in such a position that the recess in the milled collar engages the point of the ratchet spring while the windgauge is central.

NOTE.—The ratchet should engage the recess whenever the centre line on the windgauge is opposite a line on the rear sight leaf—the engagement of these can be felt and the "click" heard.

25. Assemble the sight slide clamps to the sight slide.

26. Place the rear sight leaf on the sight leaf base.

27. Insert the sight leaf spring between the lugs of the sight leaf base with its horns upwards and bearing against the under side of the rear sight leaf.

28. Start the sight axis pin in from either side taking care to guide it through the sight leaf spring in such a manner that the sight leaf spring is not buckled either by the end or the grooves of the sight axis pin when the latter is being driven home.

29. When the sight axis pin is home see that the outer coils of the sight leaf spring enter the grooves on the sight axis pin.

30. Place the index slide springs over the pins on either side of the sight leaf base.

31. Enter the hooks (which are underneath the index slides) into the rear ends of the index slide springs and drop the index slides into their respective positions over the sight leaf base so that their front ends interlock.

32. Slip on the sight slide from the rear (with finger grips to the front).

33. Enter the protruding ends of the sight slide springs under the U shaped ends of the index slides.

34. Raise the sight slide by the finger grips until it can be pushed over the index slides.

35. Lower the rear sight leaf back on to the sight slide until the lugs on the sight slide can be entered under the rear end of the flanges of the rear sight leaf.

36. Push forward the sight slide until it is caught by the first notch in the index slides.

37. Push back the sight leaf base until the rear ends of the index slides can be entered into the slots on either side of the sight base ring.

38. Place the hole (for screw) in the sight leaf base in line with the hole in the barrel and drive back the sight leaf base with a block until the dowel pin can be entered. (Care must be taken that the screw holes are correctly covering each other.)

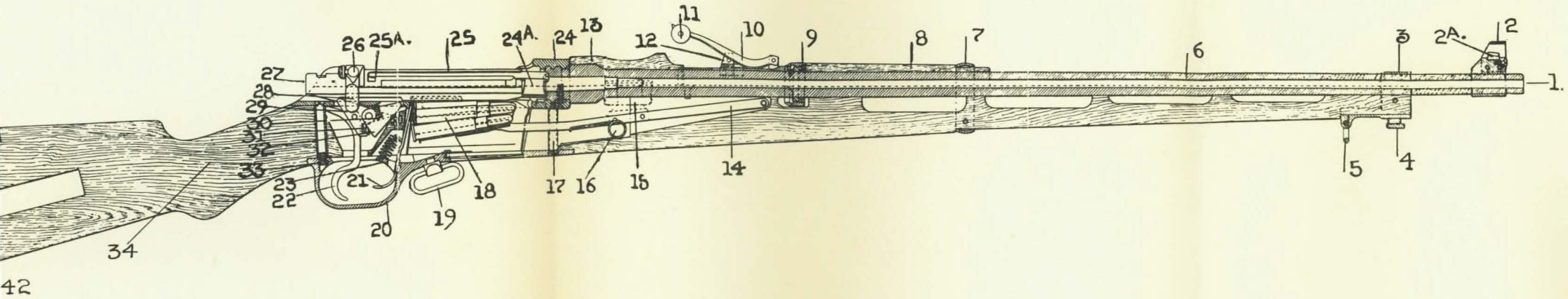
39. Screw in the screw until it bottoms on the barrel.

40. Place the micrometer cams over the front ends of the index slides but behind the lug on the right index slide and in such a position that the spiral edges are to the front and the notched cam is on the right with the notch to the rear.

41. Screw the micrometer thimble on to the micrometer cams taking care to engage corresponding threads on both cams.

42. Holding the micrometer cams from turning, with a small screw driver or other pointed tool, screw home the micrometer thimble until the height of the sight at 1,000 yards is the same as it was before stripping. (*See* para. 1 in Stripping the Mark III. sight.)

43. Still holding the micrometer cams from turning slightly move the micrometer thimble until the set screw can be inserted, *from above*, through the micrometer thimble and between the micrometer cams.



Complete and sectional views of the Ross Rifle.

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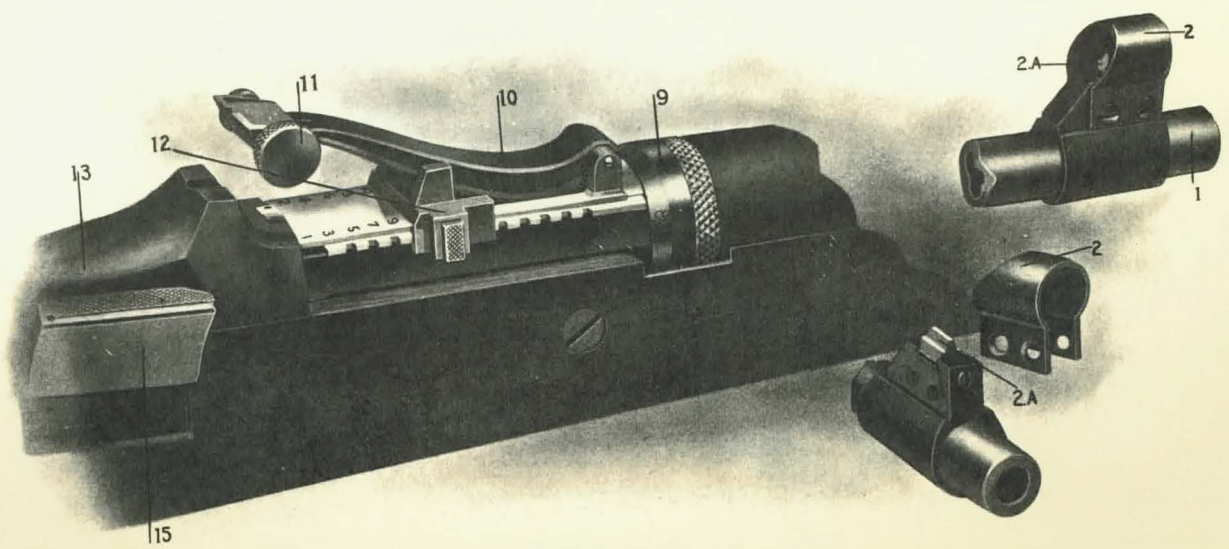
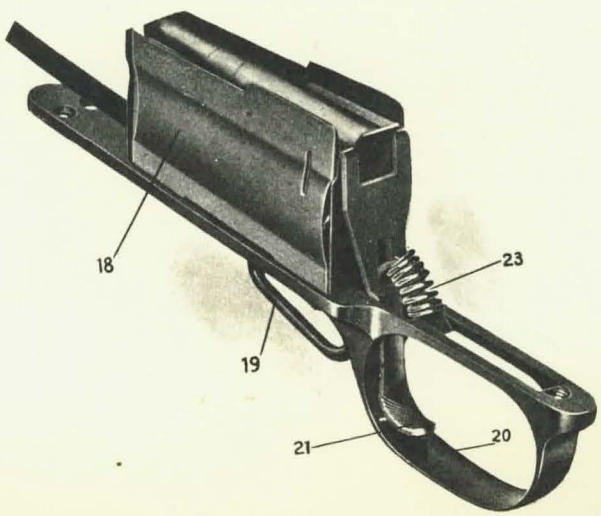
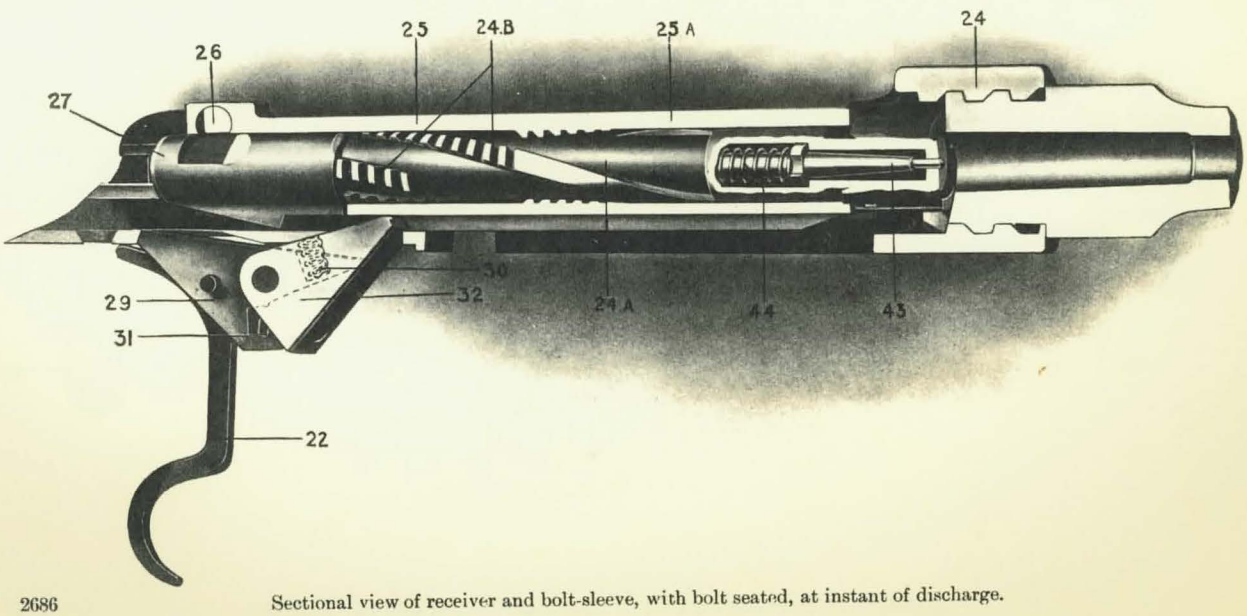


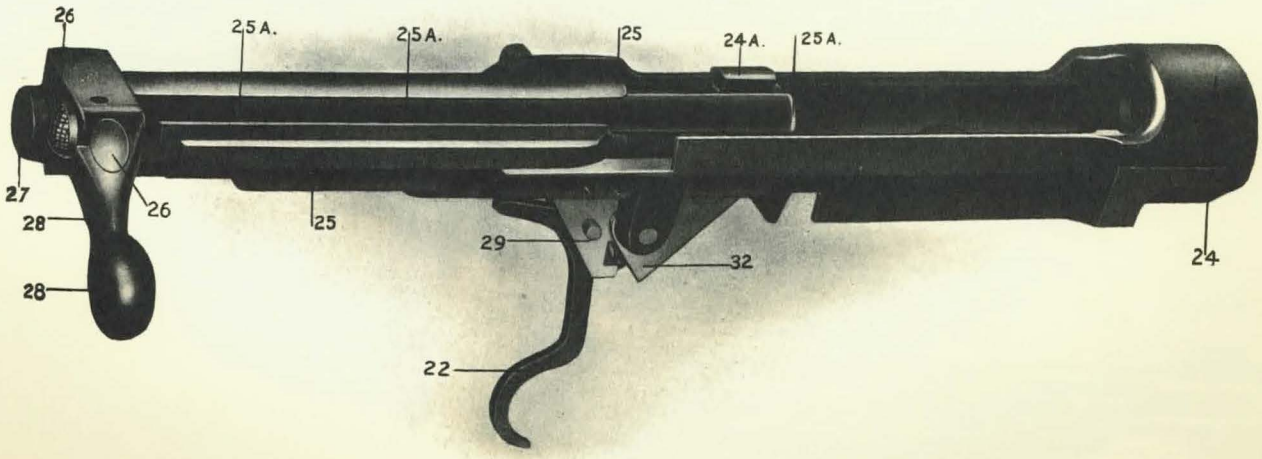
Details of front and rear sights.



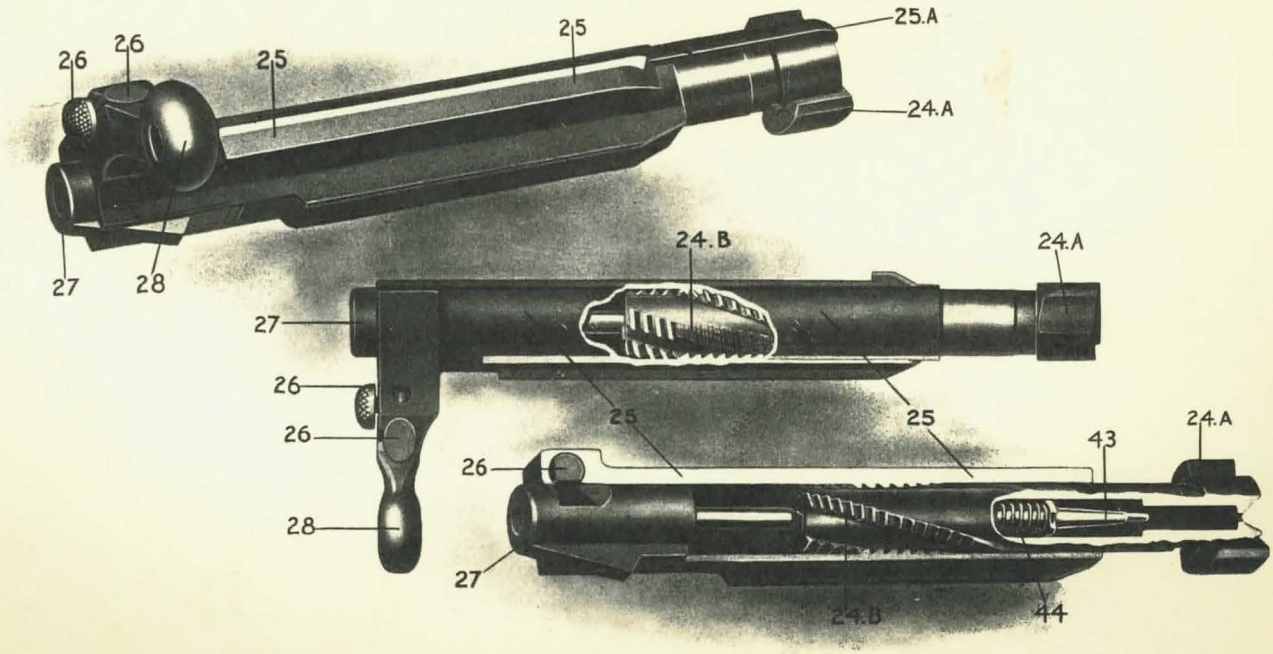
2686 Magazine—cut off.



2686 Sectional view of receiver and bolt-sleeve, with bolt seated, at instant of discharge.



2686 The Receiver—The bolt has been drawn back for the first operation in loading.



Bolt complete.