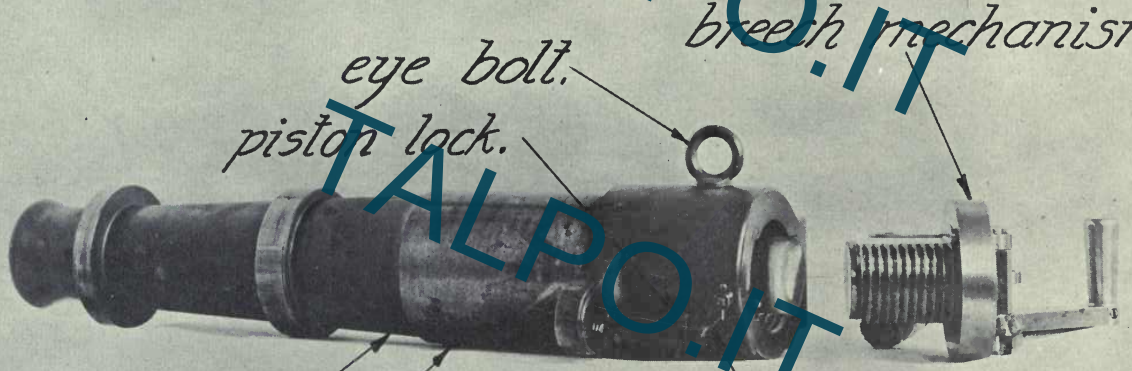
CONTENTS.

LIST OF PLATES.



2.95 In. Mountain Gun.

22527

Part I (a). THE GUN, AMMUNITION, AND ACCOMPANYING PARTS.

The gun, weights, dimensions, etc.

Weight of gun, including breech mechanism	pounds	236
Caliber	inches	2.953
Total length	do	35.85
Length of bore, including chamber	do	31.6
Length of rifled portion of bore	do	24.33
Rifling, uniform, 1 turn in 25 calibers, right-hand twist:		
Number of grooves		30
Width of groove	inch	.23
Depth of grooves	do	.023
Capacity of powder chamber	cubic inches	34.9
Weight of projectile	pounds	12.5 18
Weight of powder charge (N. C. smokeless):		
For 12½-pound projectile	ounces	8
For 18-pound projectile	do	7
Weight of cartridge case	pounds	1.45
Muzzle velocity:		
12½-pound projectile	feet per second	920
18-pound projectile	do	750
Maximum chamber pressure	pounds per square inch	18,000

Nomenclature of parts of gun.

Part.	Description or location.	Class.	Section.
Body	With lugs for carrier and piston rods integral	IV	2
Guide button	Screwed into barrel underneath		
Eyebolt	On rear of barrel, interchangeable with eyebolt in cradle.		
Breechblock	In breech of gun		
Pallet, hardened steel	Attached to breechblock with 2 screws		
Fixing screw	Secures cocking cam in breechblock		
Carrier	Pivoted to breech of gun body		
Carrier axis pin	With split pin fixes carrier to gun		
Cocking cam	In breechblock		
Extractor	Pivoted to breech near carrier hinge		
Extractor axis pin	With split pin fixes extractor to gun		
Firing pin	In center of breechblock		
Firing-pin point	Screwed into firing pin		
Guide plate	On rear of breechblock		
Hand lever	Pivoted to carrier		
Hand-lever axis pin	With split pin fixes lever to carrier		
Hand-lever catch	Locks hand lever in closed position to carrier		
Hand-lever catch spring	Actuates hand-lever catch		
Hand-lever catch pivot	Special split pin		
Locking bolt	In a recess in the carrier		
Locking-bolt rivet	Secures the locking-bolt spring to bolt		
Locking-bolt spring	Actuates the locking bolt		
Mainspring	Coiled spring in firing pin		
Trigger sear	Pivoted in carrier		
Trigger sear spring	Returns the trigger sear to engagement		
Trigger, complete, consisting of--			
Trigger	Assembled in breech of barrel, left side		
Trigger lever	With split pin, has an eye for lanyard		
Trigger spring	Coiled spring on trigger		

Serial list of component parts of breech mechanism.

[Numbers before components refer to numbers shown on Plates II and III.]

	Class.	Section.
1. Breechblock	IV	2
2. Carrier		
3. Hand lever		
4. Firing pin (with removable point)		
5. Mainspring		
6. Guide plate		
7. Extractor		
8. Locking bolt (with spring)		
9. Sear (with spring)		
9a. Sear stud		
9b. Sear bent		
9c. Sear safety arm		
9d. Sear actuating arm		
9e. Sear spring		
10. Trigger and spring with trigger lever and split pin		
11. Gear segment of breechblock		
12. Hand-lever bevel pinion		
13. Cocking piece, showing cams		
14. Studs on firing pin		
15. Safety groove in breechblock		
16. Groove in breechblock in which projection on trigger-sear safety arm travels during unlocking		
17. Protection on trigger-sear safety arm		
18. Carrier axis pin (with split pin)		
19. Hand-lever catch (lower portion)		
20. Hand-lever axis-pin lugs		
21. Hand-lever axis pin (with split pin)		
22. Hand-lever stop		
23. Hand-lever catch (with split pin)		
24. Hand-lever catch spring		
25. Firing-pin recocking hook		
26. Firing-pin		
27. Extractor axis pin (with split pin)		
28. Shoe of extractor		
29. Spring catches for piston rod (with screw, washer, and spring)		

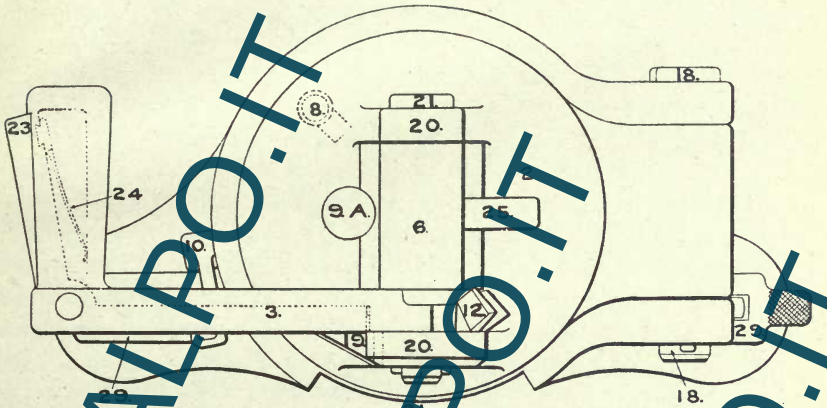
DESCRIPTION OF THE GUN.

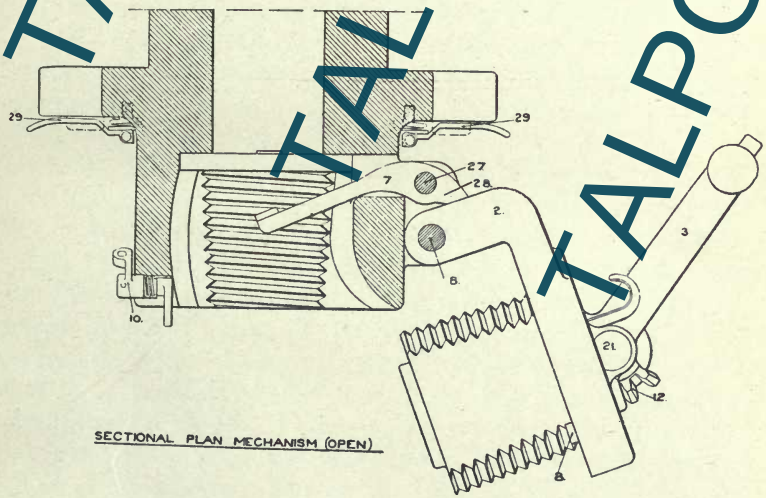
The 2.95-inch mountain gun is designed for pack transportation and consequent rapid assemblage to, and dismounting from, its carriage. The term "gun" is used to include the body of the piece and breech mechanism. The body is one piece of steel having in addition to the usual lugs provided for the hinge of a swinging breechblock two others, at right and left of the breech, for attachment to the piston rods of the carriage. The exterior of the body for a distance of 8.5 inches forward of these lugs is cylindrical and, supplemented by two collars of the same diameter formed farther forward, constitutes the bearing of the gun in the cradle. The guide button on the bottom of the barrel slides in a groove in the cradle and resists the twist due to the rifling. The vertical and horizontal planes passing through the axis of the bore are indicated on the muzzle by the grooves cut in the metal. Fine threads or wires may be stretched across in these grooves to make a front bore sight for use in verifying sights, etc. An eyebolt is threaded into the body at the breech for lifting the gun.

The breech mechanism consists of the breechblock and cocking cam, carrier, hand lever, firing pin, mainspring, guide plate, ex-

REAR VIEW BREECH (CLOSED)

Plate II





SECTIONAL PLAN MECHANISM (OPEN)

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Breechblock.—The breechblock locks into the body with an interrupted screw. The center of the block is chambered in front for the firing pin and in rear for the cocking cam, the latter being separate from the block for manufacturing reasons only and solidly secured to it by two lugs and the fixing screw. In the rear face of the breechblock are cut two concentric grooves and with the partition between them cut away in two places to allow the projection on the end of the safety arm of the sear which engages these grooves to pass from one to the other. On the rear face of the breechblock is a circular toothed segment which is engaged by the segmental bevel pinion of the hand lever. There is also a recess on the rear face of the block lined with a hardened steel pallet into which the locking bolt enters when the block is revolved sufficiently to disengage the interrupted threads; the locking bolt then preventing further rotation of the block while moving with the carrier in and out of the breech.

Carrier.—The carrier which holds the breechblock is pivoted to the right side of the breech by the carrier axis pin. It is bored partly through and threaded to engage the continuous threads at the rear end of the breechblock. A reduced bore passes through the carrier and receives a boss on the guide plate. A recess on the inner or front face receives the locking bolt and its spring, which is secured to the locking bolt by a rivet; a recess in the lower hand-lever axis-pin lug on the carrier engages the hand-lever catch, thereby securing the hand lever when the breech is closed. On the rear face of the carrier are two lugs. The hand-lever axis pin passes through holes in these and through a hole in the guide plate which it secures in place. Between the two lugs is a slot which embraces the stud on the rear face of the trigger sear.

Hand lever.—The hand lever is pivoted to the carrier by the hand-lever axis pin. The handle or grip is recessed to receive the hand-lever catch, which is pivoted in the hand lever by a large split pin (hand-lever catch pivot), a leaf spring (hand-lever catch spring) being seated in the catch to insure its engagement when the breech is closed. The segmental bevel pinion of the hand lever is concentric with the axis pin and engages the toothed segment of the breechblock. When the hand lever has been pulled around on its axis until the breechblock is properly disengaged, a projection on the hand lever adjoining the pinion contacts with the rear face of the block and prevents further rotation of the hand lever. The hand levers that were manufactured at Watervliet Arsenal are not interchangeable with those of guns purchased from Vicker's Sons & Maxim.

Firing pin.—The firing pin is a hollow sleeve provided with two lugs which ride upon the cam surfaces of the cocking cam. A hook, which extends to the rear through recesses in the carrier and the guide plate, prevents the firing pin from turning when the breechblock is

rotated and makes recocking possible without opening the breech. Near the rear end of the body of the firing pin the metal is cut away, forming a bend or notch into which an arm of the trigger sear drops. The firing-pin point is screwed into the firing pin and is replaceable.

Mainspring.—The mainspring is a helical spring which fits inside the hollow in the center of the firing pin and into a recess in the guide plate. The guide plate retains it in place.

Guide plate.—The hand-lever axis pin passes through a hole in the guide plate, thus retaining it in position. The guide plate is recessed to receive the mainspring, and recesses on the sides allow the recocking hook of the firing pin and the sear stud to pass through.

Extractor.—The extractor is pivoted near the carrier hinge on the extractor-axis pin. At the end of the extracting arms are claws which engage with the rim of the cartridge. It is actuated by the carrier striking against its short arm just before the breech is fully open.

Locking bolt.—The locking bolt fits in a recess in the front face of the carrier. When the breechblock is fully rotated ready to swing out, a recess formed in it comes opposite the bolt, which latter, acted on by its spring, moves forward and locks the block to the carrier. The locking bolt spring is secured to the locking bolt by a rivet.

Trigger sear.—The trigger sear is pivoted to the carrier by means of a stud which fits in a groove in the center of the carrier and is secured there by the guide plate. Safety during loading is provided by means of the arm, which has a projection at its outer extremity which engages in the groove during the period when the breechblock is being locked. While this projection is in this outer groove the firing pin is engaged by the sear, so that the firing pin can not move forward and strike the primer. The sear has also another arm the outer end of which lies above the trigger lever when the breechblock is home. The arm has the sear spring attached to it, which causes the sear to engage the firing pin in the cocked position.

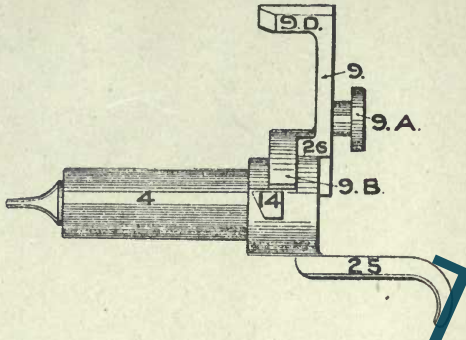
Trigger.—A square shaft on the trigger passes through a square hole in the trigger lever and is held in place by a split pin. The trigger is fitted in the breech of the gun; the trigger lever terminates in a loop to which a lanyard can be attached. When this is pulled the trigger revolves, causing the trigger to lift up the arm of the sear and so release the firing pin from the sear. The trigger is kept in its normal position by the small spring called the "trigger spring."

ACTION OF MECHANISM.

On grasping the handle of the hand lever the hand-lever catch is pressed in and its lower extremity thereby moved clear of the recess in the lower hand-lever axis-pin lug so that the hand lever is unlocked.

FIRING PIN AND SAFETY SEAR IN COCKED POSITION

FIG. 1



REAR VIEW OF BREECH BLOCK SHOWING SAFETY SEAR

FIG. 2

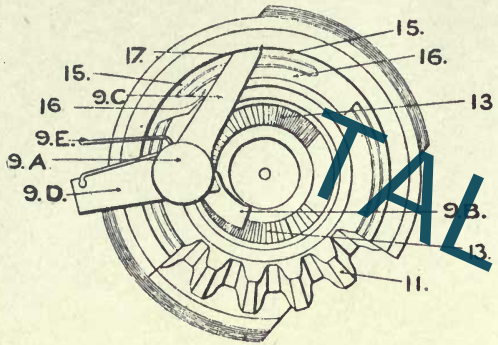
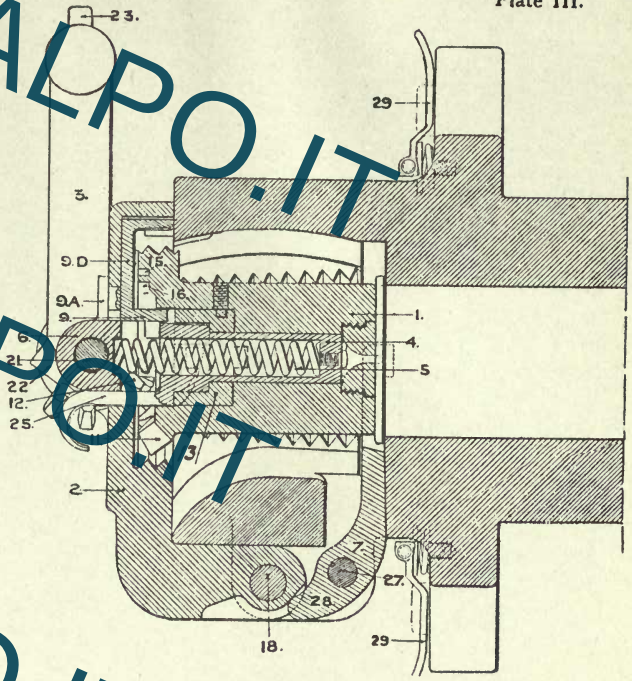
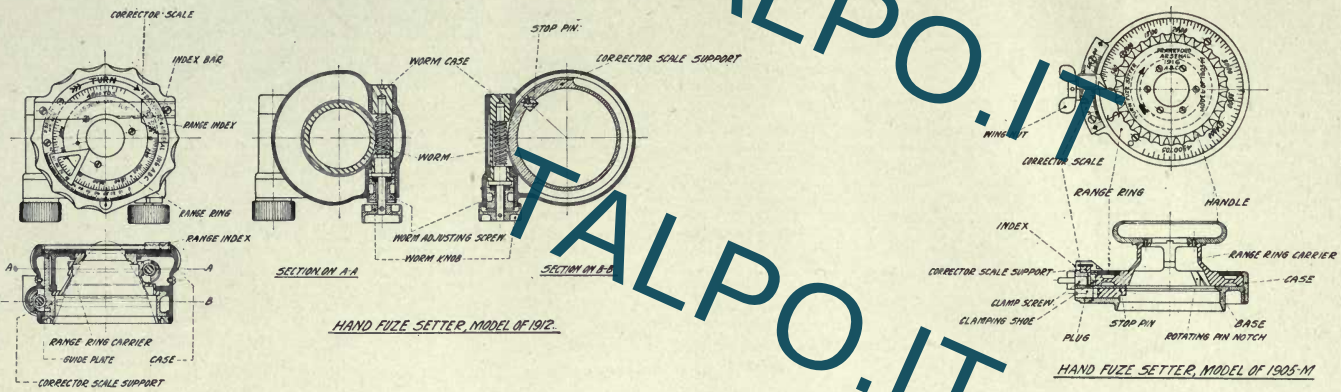


Plate III.



Sectional Plan Mechanism (closed).



HAND FUZE SETTER, MODEL OF 1912.

HAND FUZE SETTER, MODEL OF 1905-M

36-23-20

For setting the 15-second combination fuze, a number of which are still in the service, a suitable punch is provided. With this punch a hole is made through the cover, time train, and lead cone of the fuze at the point corresponding to the number of seconds desired.

Range table for 2.95-inch mountain gun.

PROJECTILE, 12½ POUNDS. MUZZLE VELOCITY, 920 FEET PER SECOND.

Range.	Angle of elevation.	Δ/x for ±Δ1 elevation.	Δx for Δ±10 f. s. m. v.	Δx for wind, 10 m. p. h.	Δ/ for change of ±t° C.	Time of flight.	Drift.	Deflection for cross wind, 10 m. p. h.	Angle of departure.	Slope of fall.	Terminal velocity.	Maximum ordinate.	Values of "C."	Values of $\frac{gc}{fa}$
Yds.	° ′	*Yds.*	*Yds.*	*Yds.*	*Yds.*	*Secs.*	*Mils.*	*Mils.*	° ′	*1 on—*	*f. s.*	*Feet.*		
100	13	5.0	2.2	0	0.1	0.3	0.02	0.05	20	144.5	914	1		
200	33	5.0	4.4	0	.2	.6	.05	.10	40	76.4	908	2		
300	53	5.0	6.6		.3	.9	.09	.15	[illegible]	51.3	902	4		
400	1 13	5.0	[illegible].7		.5	1.2	.14	.21	1 20	38.2	896	7		
500	1 33	5.0	[illegible].8		.8	1.6	.2	.27	1 40	30.4	890	11		
600	1 53	4.9	11.9		1.1	1.9	.3	.32	2 00	25.3	884	16		
700	2 14	4.8	14.9		1.5	2.3	.4	.38	2 21	21.6	878	22		
800	2 35	4.7	17.9		1.9	2.6	.4	.44	2 42	18.8	871	28		
900	2 57	4.5	18.8		2.4	3.0	.5	.50	3 4	16.5	865	36		
1,000	3 19	4.4	21.7		3.0	3.4	.6	[illegible]	3 26	14.6	859	46	2.328	[illegible]617
100	3 41	4.4	22.1	1.3	3.8	3.7	.7	.63	3 48	13.2	852	57		
200	4 4	4.3	24.3	1.5	4.7	4.0	.9	.70	4 11	12.0	845	68		
300	4 27	4.3	26.0	1.8	5.8	4.4	1.0	[illegible]	4 34	11.0	838	80		
400	4 51	4.2	27.7	2.2	7.0	4.8	1.2	.85	4 58	10.1	831	94		
500	5 15	4.2	29.3	2.7	8.4	5.2	1.4	.93	5 22	9.4	824	109		
600	5 39	4.1	30.9	3.3	9.9	5.5	1.6	1.02	5 46	8.7	816	125		
700	6 3	4.1	32.4	4.0	11.6	5.9	1.8	1.11	6 10	8.1	809	142		
800	6 28	4.1	33.9	4.8	13.5	6.3	1.8	1.20	6 34	7.6	802	161		
900	6 52	4.0	35.4	5.8	15.6	6.7	2.1	1.36	6 59	7.1	794	182		
2,000	7 17	3.9	36.8	6.9	17.9	7.1	2.3	1.41	7 24	6.7	786	205	.877	.765
100	7 42	3.8	38.2	8.1	20.4	7.5	2.6	1.52	7 50	6.3	778	230		
200	8 10	3.7	39.6	9.5	23.0	7.9	2.9	1.63	8 17	6.0	770	254		
300	8 38	3.6	40.9	11.0	25.7	8.3	3.2	1.75	8 45	5.7	762	281		
400	9 6	3.5	42.2	12.6	28.5	8.8	3.5	1.88	9 13	5.4	754	310		
500	9 35	3.4	43.5	14.3	31.4	9.2	3.9	2.01	9 42	5.1	746	342		
600	10 5	3.3	44.7	16.1	34.4	9.6	4.3	2.14	10 12	4.8	738	376		
700	10 36	3.2	45.9	18.0	37.5	10.1	4.7	2.28	10 43	4.5	729	413		
800	11 8	3.1	47.1	20.0	40.7	10.6	5.1	2.42	11 15	4.3	721	452		
900	11 41	3.0	48.2	22.0	44.1	11.0	5.6	2.56	11 48	4.0	713	491		
3,000	12 15	2.9	49.3	24.1	47.5	11.5	6.1	2.70	12 22	3.8	[illegible]	[illegible]	1.587	.905
100	12 50	2.8	50.4	26.2	51.1	12.0	6.6	2.84	12 57	3.6	696	587		
200	13 26	2.7	51.5	28.8	54.8	12.5	7.1	2.98	13 33	3.4	688	638		
300	14 3	2.7	52.6	31.1	58.6	13.0	7.7	3.12	14 10	3.2	680	692		
400	14 41	2.6	53.7	33.5	62.5	13.5	8.3	3.26	14 48	3.0	672	749		
500	15 20	2.5	54.7	36.0	66.5	14.0	8.9	3.40	15 27	2.9	665	809		
600	16 00	2.5	55.7	38.6	70.6	14.6	9.5	3.54	16 7	2.7	658	873		
700	16 41	2.4	56.7	41.3	74.8	15.2	10.2	3.68	16 48	2.6	652	941		
800	17 23	2.4	57.7	44.2	79.0	15.8	10.9	3.82	17 30	2.5	646	1,014		
900	18 6	2.3	58.7	47.3	83.3	16.4	11.6	3.96	18 13	2.3	641	1,093		
4,000	18 51	2.2	59.6	50.6	87.6	17.1	12.3	4.11	18 58	2.2	636	1,179	1.426	1.007
100	19 38	2.1	60.6	54.1	91.9	17.7	13.1	4.25	19 45	2.1	632	1,271		
200	20 27	2.0	61.6	57.8	96.3	18.4	13.9	4.40	20 34	2.0	628	1,369		
300	21 18	1.9	62.6	61.7	100.7	19.0	14.7	4.55	21 25	1.9	625	1,473		
400	22 10	1.9	63.5	65.8	105.1	19.7	15.6	4.70	22 17	1.8	622	1,583		
500	23 4	1.8	64.5	70.1	109.5	20.4	16.5	4.84	23 11	1.7	619	1,699		
600	24 0	1.8	65.4	74.6	114.0	21.1	17.4	4.99	24 7	1.7	617	1,821		
700	24 57	1.7	66.3	79.2	118.5	21.8	18.3	5.14	25 4	1.6	615	1,948		
800	25 56	1.7	67.2	83.9	123.0	22.5	19.3	5.28	26 3	1.5	613	2,280		
900	26 57	1.6	68.1	88.8	127.5	23.3	20.3	5.44	27 4	1.4	612	2,317		
5,000	27 59	1.6	69.0	93.9	132.0	24.1	21.3	5.58	28 6	1.3	611	2,360	1.421	1.010

HAND FUZE SETTER, MODEL OF 1912.

[Plate VI.]

The hand fuze setter is provided for the same purpose as the hand fuze setter, model of 1905 M. Plate VI shows assembled and sectional views and designation of parts. The principal parts are the case, the range-index mechanism, range mechanism, correction mechanism, and guide plate.

The case forms a housing for the movable parts and provides seats for the worm cases and the index bar. The slot cut in the top of the case limits the movement of the projecting segment of the corrector-scale support, which carries the corrector scale. The serrated rim forms a handle for turning. The arrow engraved upon the top and the lower center edge of the case coincides with the graduations of the corrector scale. Two oil-hole screws are located in the case directly under the serrated rim on both right and left sides and identified by the word "Oil."

The range-index mechanism consists principally of the index bar, range index, index plunger, and index spring. The index bar is retained in its seat, located in the case directly above the range ring and corrector scale, by two index-bar screws, and forms a slide for the range index. The V-shaped notches in the index bar are marked with numbers 1, 2, and 3, with the word "Zone." The range index sliding upon the index bar is held in position by the index spring, forcing the index plunger into the V-shaped notches of the index bar.

The range mechanism consists principally of the range ring, range-ring carrier, worm, worm case, worm-adjusting screw, and worm knob.

The correction mechanism consists principally of the corrector scale, corrector-scale support, worm, worm case, worm-adjusting screw, and worm knob.

The range ring is located upon the range-ring carrier by a steel dowel pin and secured in position by three range-ring screws. The scale is graduated for a range of 4,900 yards, least division is 50 yards, and numbered every 500 yards.

The data for graduating the range ring is computed from actual corrected firings, and then corrected for a suitable height of burst of 3 mils. The graduated surface is sandblasted and lacquered.

The corrector scale is mounted upon the projected segment of the corrector-scale support and secured by two corrector-scale screws. On this scale is graduated 120 equal divisions, 50 minutes apart, numbered every 10 divisions. Graduation numbered 30 is the normal or zero position, and is indicated by an arrow. The word "Turn" and an arrow engraved upon the corrector scale indicates the direction the fuze setter must be turned when setting a fuze. A pointer

is riveted and soldered to the top of the corrector scale in a certain position to coincide with the graduated line on the closing cap of the fuze.

The range-ring carrier is seated in the corrector-scale support. The worm teeth mesh with the threads of the worm on the right side of the fuze setter. The slot, which is cut in the bottom side of the range-ring carrier, engages with the rotating pin in the graduated time train ring of the fuze. The interior is conical in shape, to suit the exterior of the fuze.

The corrector-scale support is held within the case by the guide plate. The worm teeth mesh with the threads of the worm on the left side of the fuze setter. The movement of the corrector-scale support is limited in both directions by the slot in the case. The stop pin is secured in the interior of the corrector-scale support by the stop-pin screw, and engages with the fixed stop pin in the body of the fuze to limit the movement of the fuze setter.

The worms are mounted eccentrically in the worm cases, which, when turned provides an adjustment to take up the wear between the worm teeth of the range-ring carrier or corrector-scale support and the threads of their respective worms. The worm cases have screw-driver slots at their rear ends, which are provided for adjusting, and are locked in position by the worm-case clamp plugs, which are secured by the worm-case clamp screws. The worm-adjusting screws have fiber washers fitted in their ends that bear upon the collars of the worms for taking up end motion and to provide sufficient friction to resist accidental turning. A screw-driver slot is located at their front end for adjusting. The worm-adjusting screws are locked in position by the worm-adjusting screw clamp plugs which are secured by the worm-adjusting screw clamp screws. The worm knobs are secured to the worms by taper pins. The exterior of the worm knobs is straight knurled to facilitate turning. The guide plate is screwed in its threaded seat in the bottom of the case and retained in position by the guide-plate lock screw.

DISASSEMBLING AND ASSEMBLING.

To disassemble, remove the index-bar mechanism, which is held in place by two index-bar screws. Take out the three range-ring screws and the two corrector-scale screws and remove the range ring and the corrector scale. Remove the guide-plate lock screw and unscrew the guide plate, using a teat wrench. To remove the worm knobs from the worms, drive out the taper pins. Loosen the worm-adjusting screw clamp screws, which release the worm-adjusting screw clamp plugs. Remove the worm-adjusting screws. The worms can now be removed by turning. The corrector-scale support

and range-ring carrier can then be removed. To remove the worm cases, loosen the worm-case clamp screws, which release the worm-case clamp plugs.

Assemble in reverse order.

ADJUSTMENT.

Backlash or lost motion may appear between the collars of the worms and the fiber washers endwise; between the worm teeth of the range-ring carrier or the corrector-scale support and the threads of their respective worms.

To remove the end backlash, loosen the worm-adjusting screw clamp screw, which releases the worm-adjusting screw clamp plug; then turn the worm-adjusting screws clockwise, using a screw driver, until the end play is removed and there is sufficient friction to prevent accidental turning of the worms. The worm-adjusting screw clamp plugs must be firmly clamped after adjusting by tightening the worm-adjusting screw clamp screws, which secures the worm-adjusting screws against rotation.

Should backlash appear between the worm teeth of the range-ring carrier or the corrector-scale support and the threads of their respective worms, it can readily be removed by loosening the worm-case clamp screws, which release the worm-case clamp plugs, and then turning the worm cases, using a screw driver in the slot at the rear end, in which the worms are eccentrically mounted, so as to bring the worms in closer contact with the worm teeth. The worm-case clamp plugs must be firmly clamped after adjusting by tightening the worm-case clamp screws which secures the worms cases against rotation.

OPERATION.

First. Turn the worm knob, pinned to the worm and located at the front-right side of the fuze setter, until the desired range on the range ring registers with the range index.

Second. Turn the worm knob, pinned to the worm and located at the front-left side of the fuze setter, until the graduated line on the corrector scale, which indicates the desired correction for height of burst, registers with the engraved arrow on the case.

The graduation, numbered 30 and indicated by an arrow head, is the normal height of burst under normal conditions. A decreased reading on the corrector scale decreases the height of burst and increases the range, and increased reading increases the height of burst and shortens the range.

To set a fuze, remove the waterproof cover, place the fuze setter over the fuze and turn until the slot in the bottom of the range-ring carrier engages with the rotating pin in the graduated time train

ring of the fuze. The guide plate and conical interior of the range-ring carrier will then rest upon the fuze. Turn the fuze setter clockwise, as indicated by the arrow on the corrector scale, until the stop pin fastened to the corrector-scale support engages with the fixed stop pin in the body of the fuze and further motion is prevented.

The pointer, which is attached to the top of the corrector scale, should register with the graduated line on the closing cap, to indicate that the stop pin of the fuze setter and the fixed-stop pin of the fuze are in contact. This pointer is added as the graduated time train ring of the fuze has tendency to stick or to bind to such a degree as to indicate that the stop pin of the fuze setter and the fixed-stop pin of the fuze are in contact.

Cards for recording the results of tests of the fuze setters are furnished by the Ordnance Department for each size of gun, howitzer, or mortar, on which computed problems of inspection are given as indicated below. The examples given below are for 2.95-inch mountain gun. The cards for other calibers are similar.

Range ring.	Corrector scale.	Computed fuze settings.	Fuze settings.	
			Measure.	Error.
0	30	0	.....	.....
2000	4	7.84	.....	.....
3750	45	13.43	.....	.....
4900	30	20.95	.....	.....

To check the fuze setter, set the range ring and corrector scale to that tabular readings. Set the fuze with the fuze setter and compare the results with the computed setting in the table. Use shrapnel and not a drill cartridge in making this test. When the range index registers with 0 on the range ring and the corrector scale at 30, the fuze is set at 0, and will explode immediately on leaving the gun. When setting a fuze to explode on impact, set the range index at S and the corrector scale at 30.

CARE AND PRESERVATION.

The interior of the fuze setter can be oiled by removing the oil-hole screws; the locations are identified by the word "oil."

Range table for 2.95-inch mountain gun.

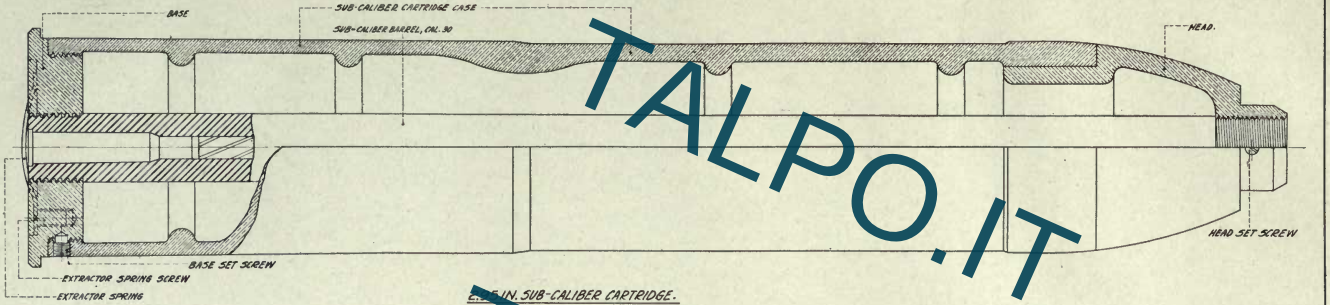
PROJECTILE, 18 POUNDS. MUZZLE VELOCITY, 750 FEET PER SECOND.

Range.	Angle of elevation.	Δx for ±Δi′ elevation.	Δx for ±C10 f. s. m. v.	Δx for wind 10 m. p. h.	Δx for change of ±βc.	Time of flight.	Drift.	Deflection for cross wind, 10 m. p. h.	Angle of departure.	Slope of fall.	Terminal velocity.	Maximum ordinate.	Values of "C."	Values of βc. fa.
Yds.	° ′	*Yds.*	*Yds.*	*Yds.*	*Yds.*	*Secs.*	*Mils.*	*Mils.*	° ′	*1 in.—*	*f. s.*	*Feet.*		
100....	22	3.5	2.5	0.0	0.1	0.3	0.09	0.01	29	118.5	749	2		
200....	51	3.5	5.0	.0	.2	.6	.2	.01	58	59.3	748	7		
300....	1 20	3.5	7.4	.1	.3	1.0	.3	.02	1 27	39.5	747	12		
400....	1 49	3.4	10.1	.1	.5	1.4	.4	.03	1 56	29.4	746	18		
500....	2 19	3.4	12.7	.2	.6	1.7	.5	.04	2 26	23.4	745	24		
600....	2 49	3.3	15.2	.2	.8	2.1	.6	.05	2 56	19.4	744	31		
700....	3 19	3.3	17.8	.3	1.0	2.5	.8	.06	3 26	16.5	743	38		
800....	3 50	3.2	20.3	.4	1.2	2.9	1.0	.07	3 57	14.4	741	46		
900....	4 21	3.2	22.9	.5	1.5	3.2	1.2	.09	4 28	12.7	738	56		
1,000....	4 52	3.1	25.4	.6	1.8	3.6	1.4	.11	4 59	11.3	738	67	8.916	0.232
100....	5 24	3.1	28.0	.7	2.1	4.0	1.6	.13	5 31	10.3	736	80		
200....	5 56	3.1	30.5	.9	2.5	4.4	1.8	.15	6 3	9.4	734	95		
300....	6 28	3.1	33.1	1.1	2.9	4.8	2.1	.17	6 35	8.6	732	112		
400....	7 00	3.0	35.8	1.3	3.3	5.2	2.4	.20	7 7	7.9	729	130		
500....	7 32	3.0	38.4	1.6	3.7	5.7	2.8	.23	7 39	7.3	727	150		
600....	8 4	3.0	41.0	1.9	4.2	6.2	3.2	.26	8 11	6.8	724	172		
700....	8 37	3.0	43.6	2.2	4.8	6.6	3.6	.30	8 44	6.4	722	196		
800....	9 10	2.9	46.2	2.5	5.4	7.0	4	.34	9 17	6.0	719	222		
900....	9 43	2.9	48.7	2.8	6.1	7.5	4.4	.38	9 50	5.6	716	250		
2,000....	10 16	2.8	51.2	3.2	6.9	8.0	4.8	.43	10 23	5.3	713	280	5.471	.378
100....	10 50	2.8	53.6	3.6	7.7	8.5	5.2	.48	10 57	5.0	710	311		
200....	11 25	2.8	56.0	4.1	8.6	9.0	5.8	.54	11 32	4.7	707	344		
300....	12 1	2.8	58.3	4.6	9.5	9.6	6.4	.60	12 8	4.4	704	379		
400....	12 38	2.7	60.6	5.2	10.5	10.0	7.0	.67	12 45	4.2	700	416		
500....	13 16	2.7	62.9	5.8	11.6	10.7	7.7	.74	13 23	4.0	697	456		
600....	13 55	2.6	65.1	6.5	12.8	11.0	8.4	.82	14 2	3.8	693	499		
700....	14 34	2.5	67.3	7.3	14.0	11.6	9.1	.90	14 41	3.6	689	545		
800....	15 15	2.4	69.5	8.2	15.3	12.1	9.8	.98	15 22	3.4	686	594		
900....	15 57	2.4	71.6	9.2	16.7	12.6	10.5	1.06	16 4	3.2	682			
3,000....	16 40	2.3	73.7	10.3	18.3	13.2	11.2	1.14	16 47	3.1	678	703	3.954	.523
100....	17 24	2.3	75.7	11.5	20.0	13.8	12.0	1.23	17 31	2.9	674	763		
200....	18 10	2.2	77.7	12.8	21.8	14.3	12.8	1.32	18 17	2.8	671	827		
300....	18 58	2.1	79.7	14.2	23.7	14.9	13.6	1.42	19 5	2.7	667	895		
400....	19 48	2.0	81.6	15.8	25.7	15.5	14.5	1.52	19 55	2.5	663	968		
500....	20 39	1.9	83.5	17.5	27.8	16.1	15.4	1.62	20 46	2.4	660	1,046		
600....	21 32	1.9	85.4	19.3	30.1	16.8	16.3	1.72	21 39	2.3	656	1,129		
700....	22 37	1.8	87.2	21.2	32.4	17.4	17.3	1.82	22 34	2.2	652	1,218		
800....	23 24	1.7	89.0	23.2	34.9	18.1	18.3	1.92	23 31	2.1	648	1,313		
900....	24 23	1.7	90.8	25.3	37.4	18.8	19.4	2.02	24 30	2.0	645	1,414		
4,000....	25 24	1.6	92.6	27.5	40.0	19.5	20.5	2.12	25 31	1.9	641	1,521	3.087	.670
100....	26 27	1.6	94.4	29.8	42.7	20.2	21.6	2.23	26 34	1.8	638	1,634		
200....	27 32	1.5	96.2	32.2	45.5	20.9	22.8	2.34	27 39	1.7	634	1,753		

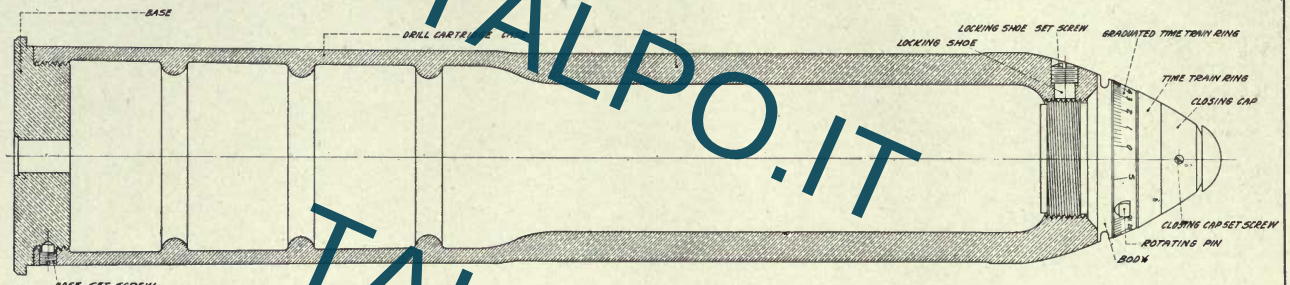
SUBCALIBER CARTRIDGE.

[Plate VII.]

The subcaliber cartridge is used for subcaliber practice. It consists of a .30-caliber subcaliber barrel 17.75 inches long, mounted axially in a bronze subcaliber cartridge case, and resembles in weight and exterior dimensions the ammunition regularly used with the gun. The breech end of the subcaliber barrel is screwed into the base of the subcaliber cartridge, while the muzzle end is threaded to take the ogival-shaped head, which accurately fits the bore at the front end of the subcaliber cartridge case and is capable of longitudinal



.30 IN. SUB-CALIBER CARTRIDGE.



2.95 IN. DRILL CARTRIDGE.

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TALPO.IT

motion to allow for expansion of the barrel. Two flat steel extractor springs are each assembled to the base by an extractor-spring screw.

During subcaliber practice the extractor of the gun will be removed in order to prevent the breechblock from defacing the base of the subcaliber cartridge. The subcaliber cartridge is inserted and pushed home in the gun. The subcaliber cartridge, caliber .30, is then inserted in the chamber of the subcaliber barrel until its rim comes in contact with the extractor springs. The breech of the gun is closed, the face of the breechblock coming in contact with the subcaliber cartridge, caliber .30, shoves it to its seat, compressing the extractor springs. When the breech is opened the extractor springs throw the case of the subcaliber cartridge, caliber .30, far enough to the rear to permit its removal by the fingers.

The ammunition for United States magazine rifles of any model must not be used in subcaliber cartridges, the primers not being adapted for the blow of the firing pins of cannon. A special caliber .30 cartridge has been adopted for this purpose, and requisitions for subcaliber ammunition should call for "subcaliber cartridges, caliber .30."

As the residue from smokeless powder, if not completely removed, corrodes the bore in a short time, the subcaliber cartridges should be carefully cleaned after use. The bore should be cleaned with a rag saturated with soda water (one-half pound sal soda to 1 gallon boiling water) and wiped thoroughly dry with a clean rag. Then oil the bore with a light coating of light slushing oil or other suitable oil.

DRILL CARTRIDGE.

[Plate VII.]

The "drill cartridge" is a dummy cartridge for use in drilling cannoneers in the service of the gun. It is a bronze casting of the shape of the service shrapnel ammunition and is fitted at the point with a Frankford Arsenal 21-second combination fuze. Burned-out fuze parts that have been condemned or parts rejected by inspectors of the regular service fuze may be used. Time trains, percussion and concussion elements will be omitted. Fixed stop pin and rotating pin of new design will be used. This arrangement is for the instruction of cannoneers in fuze setting.

Drill cartridges in the service, provided with a dummy fuze similar to the 15-second combination fuze, will be fitted with movable graduated rings when the batteries are provided with shrapnel having the 21-second combination fuze.

SUBCALIBER AND DRILL CARTRIDGE KIT.

The subcaliber and drill cartridge kit consists of:

3 drill cartridges.
1 subcaliber cartridge.
2 extractor springs.
2 extractor-spring screws.
1 cleaning rod.
1 eyepiece.
1 extension piece.
1 graduated time-train ring.
1 time-train ring.
1 locking-shoe set screw.
1 locking shoe.
1 bristle cleaning brush.
1 pin wrench.
1 storage chest.
3 rotating pins with locking pins.
1 closing cap.
1 closing-cap set screw.
1 closing cap wrench.
3 fixed stop pins with screws.

One subcaliber and drill cartridge kit is issued for each gun.

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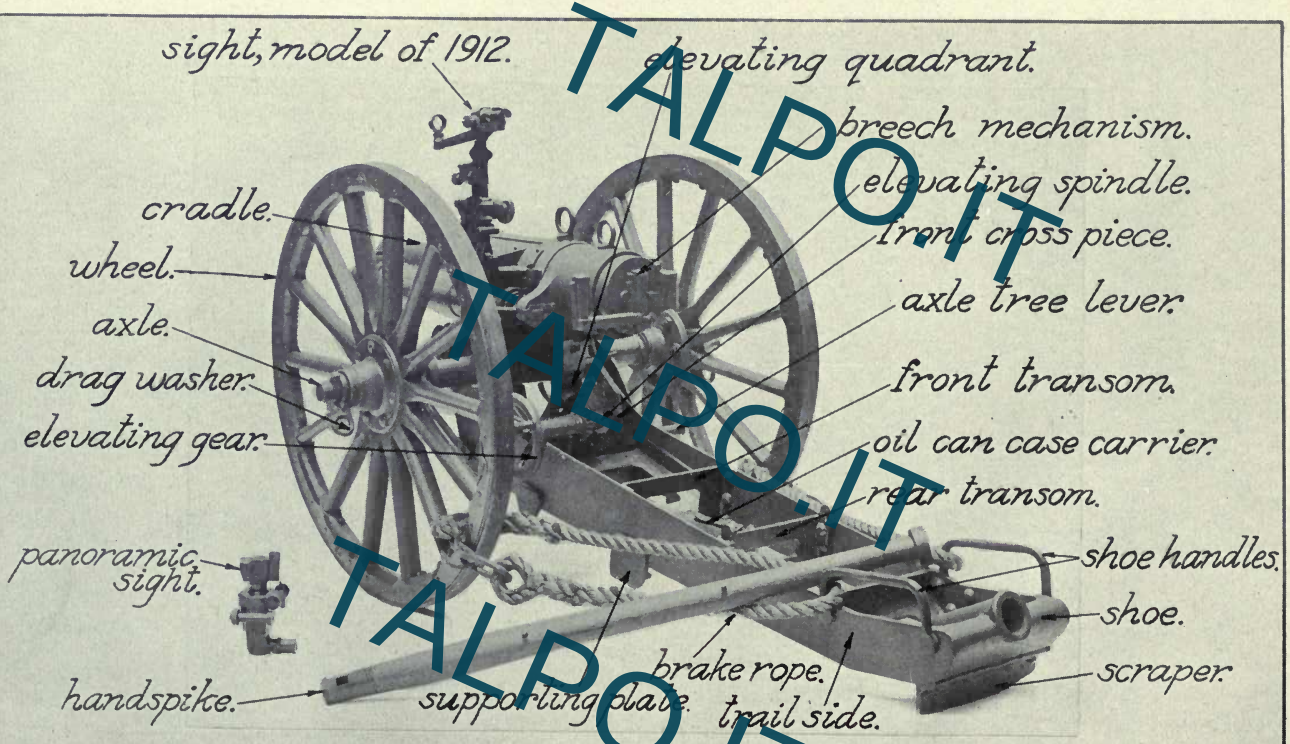


2.95 In. Mountain Gun Carriage.

24892.

Part I (b). THE 2.95-INCH MOUNTAIN-GUN CARRIAGE AND SIGHTS.

Weights, principal dimensions, etc.

Weight of carriage	pounds	595
Weight of gun and carriage	do	830
Diameter of wheels	inches	36
Width of track	do	32
Length of recoil of gun on carriage	do	14
Height of axis of gun	do	26
Maximum angle of elevation	degrees	27
Maximum angle of depression	do	10
Amount of traverse of gun on carriage	do	0

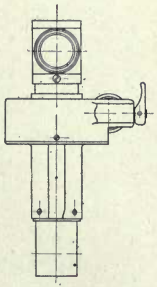
Nomenclature of parts of the carriage.

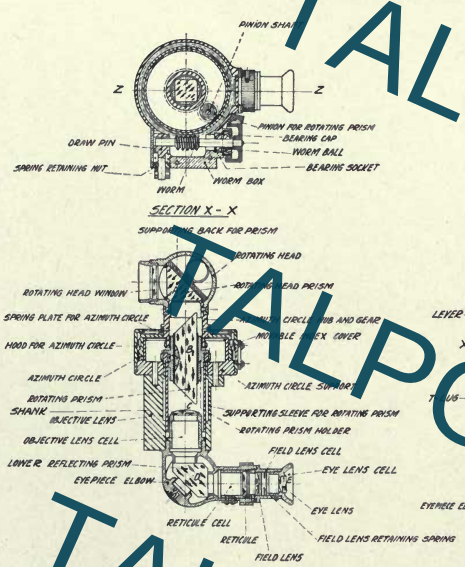
No.	Name of part.	Location, etc.	Class.	Section.
	Axletree, consists of—			
1	Axletree body			
1	Axletree lever	On axletree body		
1	Axletree-lever	Holds lever to axletree body		
1	Axletree-lever catch	In handle of axletree lever		
1	Axletree lever catch spring	do		
2	Linch pins	In ends of axletree		
2	Linch-pin springs	In linch pins		
1	0.062 ($\frac{1}{16}$) by 0.3[illegible] pin	do		
2	Drag [illegible]	On axletree, outside of wheels		
	Buffer, complete, consists of—			
2	Buffer springs	In cradle liners		
1	Piston rod, right	do		
1	Piston rod, left	do		
1	Piston-rod handle, right	On rear end of piston rod		
1	Piston-rod handle, left	do		
2	Piston-rod handle rivets	Connect handle to piston rod		
2	Piston heads	On front end of piston		
2	Piston screws	Lock heads to piston rod		
2	Buffer caps	On front end of buffer cylinder		
2	Buffer-cap packings	Behind buffer caps		
2	Glands	In rear end of buffer cylinder		
2	Cup-leather seatings	In front of glands		
2	Cup-leather packings	Between glands and seatings		
2	Cup rings	Secures packing to cup-leather seating		
2	Piston-rod packings	Between glands and cup rings		
4	Plugs	Closes filling and drain holes in cylinder		
2	Chains	Connect filling and drain plugs		
4	Filling plug packings	Under filling and drain plugs	IV	2
2	Loops	Secures plug chains to cradle		
2	Piston-lock screws	On rear of breechblock		
2	Piston locks	Hinged to lock screws		
2	Piston-lock rivet			
2	Piston-lock springs	On lock screw		
2	Piston-lock washers	do		
	Cradle, consists of—			
1	Cradle body	Holds gun and buffer details		
2	Cylinder liners	In buffer cylinders of cradle		
1	0.375 by 3.125 bolt	In left lug of cradle		
1	0.375 crown nut	On bolt		
2	Eyebolts	On top of cradle		
1	Instruction plate	Screwed to cradle		
4	Instruction-plate screws	Secures instruction plate to cradle		
2	Arrow plates	Soldered to cradle		
1	Sight bracket base	Riveted on cradle		
	Cradle axis bolt, consists of—			
1	Cradle axis bolt body	Secures cradle to trail		
1	Catch lever	In handle of cradle axis bolt		
1	Catch-lever spring	do		
1	Catch-lever split pin	Secures lever to cradle axis bolt		
1	Guard plate	On cradle axis bolt		
2	Guard-plate screws	Secures guard plate to cradle axis bolt		
1	Catch	On cradle axis bolt		
1	Shaft-locking screw	In right lug of cradle		
1	Washer	On cradle axis bolt left end		
1	0.187 ($\frac{3}{16}$) by 2.25 split pin	In cradle axis bolt, left end		

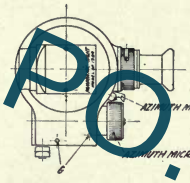
Nomenclature of parts of the carriage—Continued.

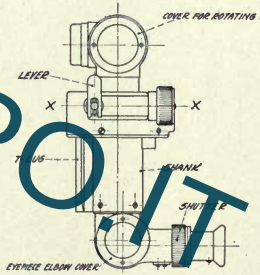
No.	Name of part.	Location, etc.	Class.	Section.
	Elevating mechanism, consists of—			
1	Elevating quadrant	Turns on axletree		
1	Guide arm	On elevating quadrant		
1	Guide-arm pin	Secures guide arm to quadrant		
1	Elevating spindle	Holds worm gear		
1	Elevating sleeve	On elevating spindle		
1	Elevating-sleeve key	Secures sleeve to spindle		
1	Elevating-worm spring	Against shoulder of sleeve		
1	Elevating-worm spring cup	Holds spring		
1	Elevating worm	On elevating sleeve		
1	Elevating-worm key	Secures worm to sleeve		
1	Elevating-sleeve [illegible]	On end of elevating sleeve		
1	Elevating-sleeve split pin	Secures sleeve and nut to spindle		
1	Elevating bevel wheel	On rear end of spindle		
1	Elevating bevel wheel key	Secures bevel wheel to spindle		
1	Elevating spindle [illegible]	On rear end of spindle		
1	0.25 by 1.75 split pin	In rear end of spindle		
1	Support	Bearing for front end of spindle		
1	Elevating [illegible] pin	Secures elevating quadrant to cradle		
1	Elevating joint-pin stop screw	Secures joint pin to quadrant		
1	Elevating pin	Shaft for handwheel		
1	0.203 by 1.25 split pins	In elevating pin		
1	Elevating pinion	On right end of elevating pin		
1	Elevating-pinion key	Secures pinion to pin		
	Elevating handwheel, consists of—			
1	Elevating-handwheel body	On left end of elevating pin		
1	Elevating-handwheel key	Secures handwheel to pin		
1	Elevating-handwheel handle	On handwheel		
1	Elevating-handwheel spindle	Secures handle to handwheel		
1	Elevating-handwheel washer	On spindle		
	Equalizing mechanism, consists of—			
1	Spring carrier	Near back on elevating quadrant		
2	0.093 ($\frac{3}{32}$) by 1 split pins	In spring carrier		
2	Equalizing springs	Between carrier and front crosspiece		
2	Equalizing-spring bushings	In front end of springs		
2	Equalizing-spring eyebolts	Through holes in front crosspiece		
2	Equalizing-spring eyelets	Hold springs to carriers		
	Oil can case body, consists of—			
1	Billet	Case body		
1	Body	Fastened to oil can case carrier	IV	2
1	Cap	Cover		
1	Cover	Fastened to body		
1	Cover chafe	On cover		
2	Filler	....do		
	Trail, consists of—			
1	Trail side, right			
1	Trail side, left			
1	Front crosspiece	In front portion of trail		
1	Front transom	In middle of trail		
1	Rear transom	In rear of middle trail		
1	Shoe	In rear portion of trail		
1	Scraper	Rear under side of trail		
2	Shoe handles	Riveted to trail sides		
2	Handspike twisted dog chain	On top of shoe		
1	Handspike chain eyebolt	....do		
1	Handspike chain hook	....do		
2	Handspike ring	....do		
1	Handspike key	....do		
1	Oil-can case carrier	Between front and rear transoms		
4	0.625 wood screws No. 8	In oil can case carrier		
1	Oil can case body	Screwed on carrier		
1	Oil can case cover	Over oil-can case body		
2	Supporting plates	In middle of lower edge of trail sides		
1	Strengthening plate	Between trail sides before front transom		
1	Catch button	On right side of trail		
1	Stop button	....do		
2	Distance plates	On bottom edges of trail near front		
1	Name plate	Screwed to front crosspiece		
2	Name-plate screws	Secures name plate to crosspiece		
2	Front handles	On front end of trail		
	Wheels, complete, consists of—			
2	Boxes			
2	Flanges			
14	Hub bolts with nuts			
14	Felloe segments			
28	Spokes			
14	Clips			
2	Tires			
28	Tire bolts			

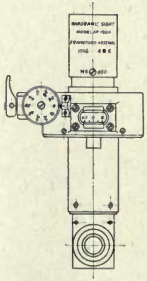
PLATE IX











PANORAMIC SIGHT MODEL OF 1904

4531

H.

I.

L.

M.

N.

O.

P.

June 10, 1912.
Revised September 15, 1916.
Form No. 1761.
Ed. Sept. 15-16-800