No. 1948

DESCRIPTION

OF

3-INCH TELESCOPIC SIGHT

MODEL OF 1917

(TWO PLATES)

AMI DEPOSIT 1969

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WASHINGTON
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WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ORDNANCE,
Washington, April 22, 1918.

This manual is published for the information and government of the Regular Army, the National Army, and National Guard of the United States.

By order of the Secretary of War:

W. S. PIERCE,
Brigadier General, Ordnance, National Army,
Acting Chief of Ordnance.

55407—18

3-INCH TELESCOPIC SIGHT, MODEL OF 1917.

(TWO PLATES.)

GENERAL DESCRIPTION.

1. The advantages gained by the use of a telescope in laying a piece consist of a decrease in personal error and an increase in power of vision. A telescopic sight enables a gunner to see clearly an object which is indistinct to the naked eye and to lay a gun on it with facility and accuracy.

2. The 3-inch telescopic sight, model of 1917, differs from most telescopic sights of earlier model in that the optical system is so arranged that the body of the sight is vertical, which permits the greater part of the sight and also the gun pointer to remain under the protection of the parapet of the battery. This arrangement is the same as in use in all periscopes. Provision is made for setting deflections by rotating the telescope tube about its vertical axis, while objects below the level of the top of the tube may be brought into view by depressing the head of the sight by means of the mechanism described later.

3. For the designation of parts see Plates I and II and the list giving the nomenclature. Plate I gives the assembled views and Plate II gives the sectional views through the telescope, and the deflection and depression mechanisms.

CONSTRUCTION.

4. The telescope tube (3) is the principal part of the telescope. Assembled to it are the optical parts, the deflection worm-wheel sector, and the depression mechanism.

5. The optical parts are the objective prism (26), achromatic objective lens (36), reticule lens (42), erecting lenses (44), reflecting prism (69), field lens (64) (55), and eye lenses (52) (59). The optical characteristics of the telescope are—

Clear aperature = 3″.
Field of view = 4° 30′ and 3°.
Powers = 10 and 15.
Focal length of objective = 32″.

OBJECTIVE.

6. The objective prism (26) is assembled and fastened in the objective-prism holder (30) by two prism-holder covers. The prism holder is fitted into the depression head (4) and retained by two

depression-head covers (6) that are locked in position by depression-head cover screws (27). A prism shield (25) of clear glass is located in front of the prism (26) in the depression head (4) to prevent the entrance of dust and moisture. The achromatic objective lens (36) is mounted in the lower part of the depression head (4) and held in place by the objective-lens retainer (37). The depression head (4) is fitted to the top of the telescope tube (3) and retained by the depression-head screws (5).

RETICULE.

7. The reticule lens (42) is mounted in the reticule-lens cell (41) and held in position by the reticule-lens retainer (40). The lens cell (41) is then screwed in place in the reticule-lens adapter (38) then the adapter is fitted into the telescope tube (3) and secured by reticule-lens adapter screws (39). Pinholes on the periphery of the reticule-lens cell (41) are provided to assist in adjusting the reticule (42) to make the cross lines vertical and horizontal, adjustment being made after assembly, by turning the cell with a pin, through a hole in the telescope tube. When the adjustment is correct the reticule is locked in position by the reticule-lens locking screw (100). The horizontal and vertical cross lines are etched on the plane surface of the reticule lens (42), after which the lines are filled in to make them more visible. For night use the reticule lens (42) is illuminated by an electric lamp contained in the reticule lamp shade (105), which is fastened to the telescope tube (3) by four screws.

ERECTING SYSTEM.

8. The erecting system consists of two erecting lenses (44), erecting-lens adapter (46), erecting-lens receptacles (45), and the erecting-lens retainers (43). The erecting lenses (44) are mounted in the erecting-lens receptacles (45) and secured by the erecting-lens retainers (43). The lenses in their receptacles are then screwed into the erecting-lens adapter (46), one in each end. The adapter is then fitted in its place in the telescope tube (3) and after adjustments are made the adpater is secured by the erecting-lens adapter screws (47).

EYEPIECE ELBOW.

9. The eyepiece elbow (67), which is fitted into the lower end of the telescope tube (3) and secured by eyepiece elbow screws (70), contains the reflecting prism (69), mounted on the reflecting-prism retaining plate (66). This is held in place by the lower reflecting-prism spring (68) and locked in position by two elbow covers (14). The horizontal arm of the elbow (67) has a threaded surface which forms a seat for the eyepieces.

EYEPIECE.

10. Two eyepieces are provided with this instrument, one of 10 power and one of 15 power, both being interchangeable on the eyepiece elbow. The eyepieces consist of the following parts: Eyepiece adapter (63) (92), eyelenses (59) (52), eyelens cell (62) (49), eyelens retainer (57) (53), stop collar (65) (101), diopter scale (61) (50), eye shield (51), field lens (64) (55), field-lens cell (56) (48), and field-lens retainer (106) (54). The eyelenses (59) are contained in the eyelens cell (62), which is screwed into the eyepiece adapter (63). To prevent the eyelens cell (62) from being taken out of the adapter while the sight is in use, a stop collar (65) is put on the end of the cell (62). The diopter scale (61) secured to the eyelens cell (62) by diopter scale screws (58) is to aid the observer in setting the lenses to suit his eyes. An engraved line on the adapter (63) acts as an index. A field lens (64) is contained in the field-lens cell (56), which is screwed into its place in the adapter (63) and then locked in place by a set screw. A soft rubber eye shield (51) is provided to protect the observer from injury during firing, and to prevent light coming between his eye and the lens. A ray filter (107) mounted in a ray-filter holder (108), which is sprung in place in the eyelens cell (62), is provided to protect the observer from a glare of light. When not in use on the sight it is kept in the loose eyepiece. The above construction applies to both the 10 power and 15 power, the difference being in the size of the parts for the respective powers.

DEPRESSION MECHANISM.

11. On the lower part of the telescope tube (3) the depression-knob bracket (89) is secured by depression-knob bracket screws (78). The depression-knob worm (75) is placed in its bearings in the bracket and held in place by the depression knob (74) pinned to the front end, and the depression-knob worm nut (76) held on the other end, by a depression-knob worm-nut screw (77). The depression-knob worm wheel (71), keyed to the connecting depression shaft (10), meshes with the depression-knob worm (75) and transmits motion to the depression-head worm (33), which in turn imparts motion to the objective-prism holder (30). The connecting depression shaft (10) and the depression-knob worm (75) are supported in the depression-knob bracket (89) by the depression-knob bracket plug (73), which screws into the lower part of the bracket and is retained by a depression-knob bracket screw (95).

12. The connecting depression shaft (10) passes through the connecting depression-shaft guides (11) and (9), which are secured to the telescope tube (3) by the depression-shaft guide screws (103) and (104). A coupling (8) pinned to the upper end of the connecting

depression shaft (10) connects it with the depression-head worm (33) through the worm shaft (7). The depression-worm bushing (upper) (31) and the depression-worm bushing (lower) (34) act as bearings for the worm shaft (7). These bushings are supported by special screws (21) and (22). Adjustment for wear in the depression-head worm (33) is made through depression-head adjusting screws (35) and (32), which also act as locking screws for the bushings.

DEFLECTION MECHANISM.

13. The deflection-worm bracket (81) is fastened to the sight bracket (1) by two dowel pins and four screws. The deflection worm (82) is put in its place and retained by the deflection-worm nut (80) on one end and the deflection-worm bushing (83), which is screwed into the bracket on the other. The deflection friction disk (84), fitting over the deflection-worm bushing (83), is intended to prevent the deflection worm from accidentally changing its position.

14. The friction between the deflection friction disk (84) and the deflection knob (86), which is keyed to the deflection worm (82), is caused by the pressure of six springs (85) between the deflection friction disk (84) and the deflection-worm bushing (83). The deflection dial (87) is put on the outside of the deflection knob (86) and held in place by the deflection-dial clamp screws (19), which screw into the knob. Loosening these screws permits the dial to be adjusted to set zero on the index (23).

15. Motion is transmitted from the deflection worm (82) to the telescope tube (3) by the deflection worm-wheel sector (88), which is fastened to the telescope tube (3) by three deflection worm-wheel sector screws. A deflection of twelve (12) degrees is allowed on this instrument, six (6) degrees in either direction, the scale being graduated from 0 to 12, number six (6) being the zero point. For night use the deflection dial (87) is illuminated by an electric lamp in a deflection-dial lamp shade (90), which is secured in place in the deflection-dial index (23).

MOUNT.

16. The sight bracket (1) is designed to give a strong and rigid support on the telescope tube (3). A ball bearing at the top carries the weight of the tube and permits of easy rotation by means of the deflection knob (86). The telescope-tube support (2), fastened to the telescope tube (3) by telescope-tube support screws (20), rests on the ball bearing (16) and (17). Three vertical bearings are provided to keep the telescope tube (3) in a true line. The upper bearing cap (15), the center bearing cap (12), and the lower bearing cap (13) hold the tube in place.

ACCESSORIES.

17. Canvas covers are issued with each instrument to protect the sight when not in use. A packing chest is provided for shipment, which can also be used for storing. Provision is also made for storing the eyepiece not in use, either in the packing chest or a separate chest. The ray filter issued with the instrument is kept in the eyepiece not in use when it is not in the eyepiece in the instrument.

ADJUSTING.

18. The optics of this sight provide a universal focus, hence no adjustment is required to procure a distinct view of a target. The cross lines are rendered distinct by screwing the eyepiece in or out; this adjustment has no other object. If the telescope is frequently used by the same observer, the eyepiece can be reset to the correct position by the use of the diopter scale. To adjust the deflection dial, loosen the deflection-dial clamp screws, which permits the dial to be turned to required adjustment.

CARE AND PRESERVATION.

19. Telescopic sights are necessarily delicate instruments and must not be subjected to rough usage. To obtain satisfactory vision, the glasses should be kept perfectly clean and dry. For cleaning the optical parts, only the material issued for the cleaning of such parts should be used and care should be taken to keep the material free from dust and grit. The glasses will seldom require cleaning on the inside. When the telescopes leave the manufacturer, all joints are sealed to prevent the entrance of dust and moisture and any disassembling of the instrument will break this seal. Cleaning of the interior should be done only by a competent person. The polished surfaces of the optics should not be touched with the bare fingers since this is likely to cause corrosion of the glass.

20. All bearing surfaces should be kept well oiled, particularly the ball bearing (16) and the deflection and depression worms. These parts are packed in heavy grease when the instrument is assembled, and should not require repacking for a considerable time, but a few drops of oil should be inserted into each bearing at regular intervals, through the oil holes provided. Care should be taken that no oil or grease is allowed to get on the polished surfaces of the optical parts, hence an excess of oil on the depression-head worm (33) should be avoided. When the sight is not in use, it should have the ends protected by the canvas covers provided for the purpose.

DISMANTLING AND ASSEMBLING.

21. General instructions for disassembling and cleaning are given in Pamphlet No. 1795—Instructions for the Care, Preservation, Repair, and Adjustment of Instruments for the Fire-Control Systems for Coast and Field Artillery.

If a sight is packed for shipment special attention should be given to the blocking of it in its packing box to prevent all movement of the sight during transit.

LIST OF PARTS.

Illustration No.	Piece mark.	Nomenclature.
1	CF4C	Sight bracket.
2	CF10T	Telescope-tube support.
3	CF9A	Telescope tube.
4	CF5I	Depression head.
5	CF5B	Depression-head screw.
6	CF5G	Depression-head cover.
7	CF7B	Worm shaft.
8	CF7C	Coupling.
9	CF9G	Connecting depression-shaft guide (upper).
10	CF7D	Connecting depression shaft.
11	CF9E	Connecting depression-shaft guide (lower).
12	CF4A	Center bearing cap.
13	CF4K	Lower bearing cap.
14	CF8G	Elbow cover.
15	CF4L	Upper bearing cap.
16	CF10G	Ball retainer.
17	CF10F	Ball race.
18	CF4B	Upper bearing cap screw.
19	CF3R	Deflection-dial clamp screw.
20	CF10U	Telescope-tube support screw.
21	CF5E	Depression-head guide screw (short).
22	CF5F	Depression-head guide screw (long).
23	CF4D	Deflection-dial index.
24	CF5Q	Prism-shield retaining piece.
25	CF10D	Prism shield.
26	CF10A	Objective prism.
27	CF5H	Depression-head cover screw.
28	CF5M	Prism retaining plate.
29	CF5P	Prism retaining-plate spring.
30	CF5N	Objective-prism holder.

List of Parts—Continued.

Illustration No.	Piece mark.	Nomenclature.
31	CF5U	Depression-worm bushing (upper).
32	CF5C	Depression-head adjusting screw (long)
33	CF7A	Depression-head worm.
34	CF5T	Depression-worm bushing (lower).
35	CF5D	Depression-head adjusting screw (short)
36	CF10C	Achromatic objective lens.
37	CF5S	Objective-lens retainer.
38	CF6D	Reticule-lens adapter.
39	CF9C	Reticule-lens adapter screw.
40	CF6G	Reticule-lens retainer.
41	CF6E	Reticule-lens cell.
42	CF10N	Reticule lens.
43	CF6C	Erecting-lens retainer.
44	CF10P	Erecting lens.
45	CF6A	Erecting-lens receptacle.
46	CF6B	Erecting-lens adapter.
47	CF9B	Erecting-lens adapter screw.
48	CF11N	Field-lens cell, 15 power.
49	CF11B	Eyelens cell, 15 power.
50	CF11D	Diopter scale, 15 power.
51	CF11F	Eye shield.
52	CF10L	Eyelens, 15 power.
53	CF11M	Eyelens retainer, 15 power.
54	CF11L	Field-lens retainer, 15 power.
55	CF10Q	Field lens, 15 power.
56	CF8K	Field-lens cell, 10 power.
57	CF8P	Eyelens retainer, 10 power.
58	CF8N	Diopter-scale screw, 10 power.
59	CF10E	Eyelens, 10 power.
60	CF8L	Eyelens separator.
61	CF8M	Diopter scale, 10 power.
62	CF8E	Eyelens cell, 10 power.
63	CF8D	Eyepiece adapter, 10 power.
64	CF10M	Field lens, 10 power.
65	CF8C	Stop collar, 10 power.
66	CF11G	Reflecting-prism retaining plate.
67	CF8A	Eyepiece elbow.
68	CF11K	Lower reflecting-prism spring.
69	CF10R	Reflecting prism.
70	CF9D	Eyepiece elbow screw.

List of Parts—Continued.

Illustration No.	Piece mark.	Nomenclature.
71	CF7F	Depression-knob worm wheel.
72	CF7G	Thrust collar.
73	CF7H	Depression-knob bracket plug.
74	CF7P	Depression knob.
75	CF7N	Depression-knob worm.
76	CF7Q	Depression-knob worm nut.
77	CF7R	Depression-knob worm-nut screw.
78	CF7M	Depression-knob bracket screw.
79	CF4E	Deflection-dial index screw.
80	CF3A	Deflection-worm nut.
81	CF3C	Deflection-worm bracket.
82	CF3G	Deflection worm.
83	CF3K	Deflection-worm bushing.
84	CF3M	Deflection friction dick.
85	CF3N	Spring.
86	CF3P	Deflection knob.
87	CF3Q	Deflection dial.
88	CF3S	Deflection worm-wheel sector.
89	CF7K	Depression-knob bracket.
90	CF9N	Deflection-dial lamp shade.
91	CF3B	Deflection worm-nut screw.
92	CF11A	Eyepiece adapter, 15 power.
93	CF4H	Lower bearing cap screw (long).
94	CF4B	Lower bearing cap screw (short).
95	CF7L	Depression-knob bracket set screw.
96	CF11E	Diopter-scale screw, 15 power.
97	CF4B	Center bearing cap screw.
98	CF3D	Deflection-worm bracket set screw.
99	CF10S	Reticule adjusting plug.
100	CF9K	Reticule-lens locking screw.
101	CF11H	Stop collar, 15 power.
102	CF7S	Taper pin, .135 x .625.
103	CF9F	Depression-shaft guide (upper) screw.
104	CF9F	Depression-shaft guide (lower) screw.
105	CF9M	Reticule-lamp shade.
106	CF8F	Field-lens retainer, 10 power.
107	CF12A	Ray filter.
108	CF12B	Ray-filter holder.
109	CF12C	Dust guard.

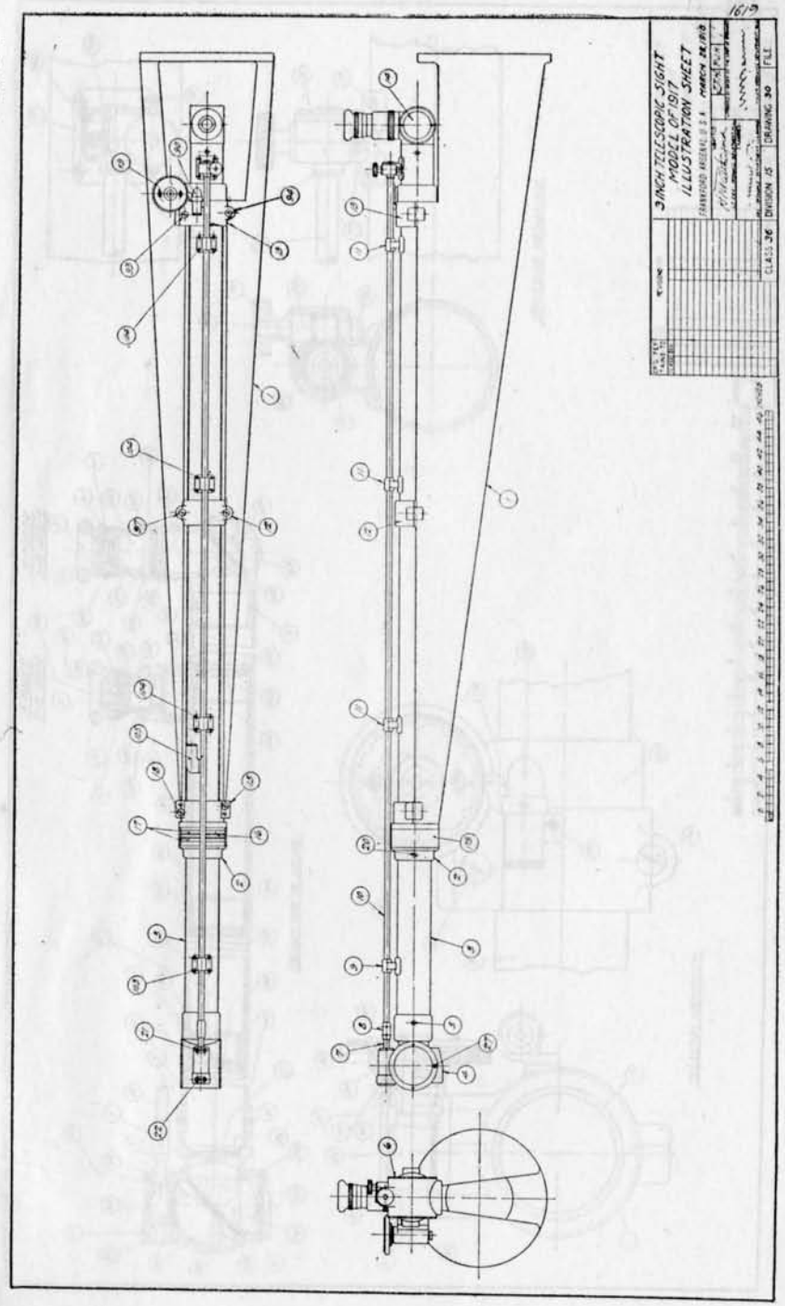
Parts Not on Illustration Sheets.

Piece mark.	Nomenclature.
CF10K	Ball, .5 diameter, hardened.
CF10B	Cork pad, .75 diameter x .05 thick.
CF8H	Cork pad, 1. diameter x .125 thick.
CF3F	Deflection-worm bracket screw.
CF8B	Eyepiece elbow set screw.
CF7E	Key, .125 x .156 x .75 round end, feather.
CF3H	Key, .156 x .187 x .4 round end, feather.
CF5R	Prism-shield retaining-piece screw.
CF5K	Prism-holder cover.
CF5L	Prism-holder cover screw.
CF9P	Reticule lamp-shade screw.

War Department,
Office of Chief of Ordnance,
Washington, April 22, 1918.

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PLATE I.


3 INCH TELESCOPIC SIGHT
MODEL OF 1917
ILLUSTRATION SHEET
CLASS 36
DIVISION 15
DRAWING 30
FILE

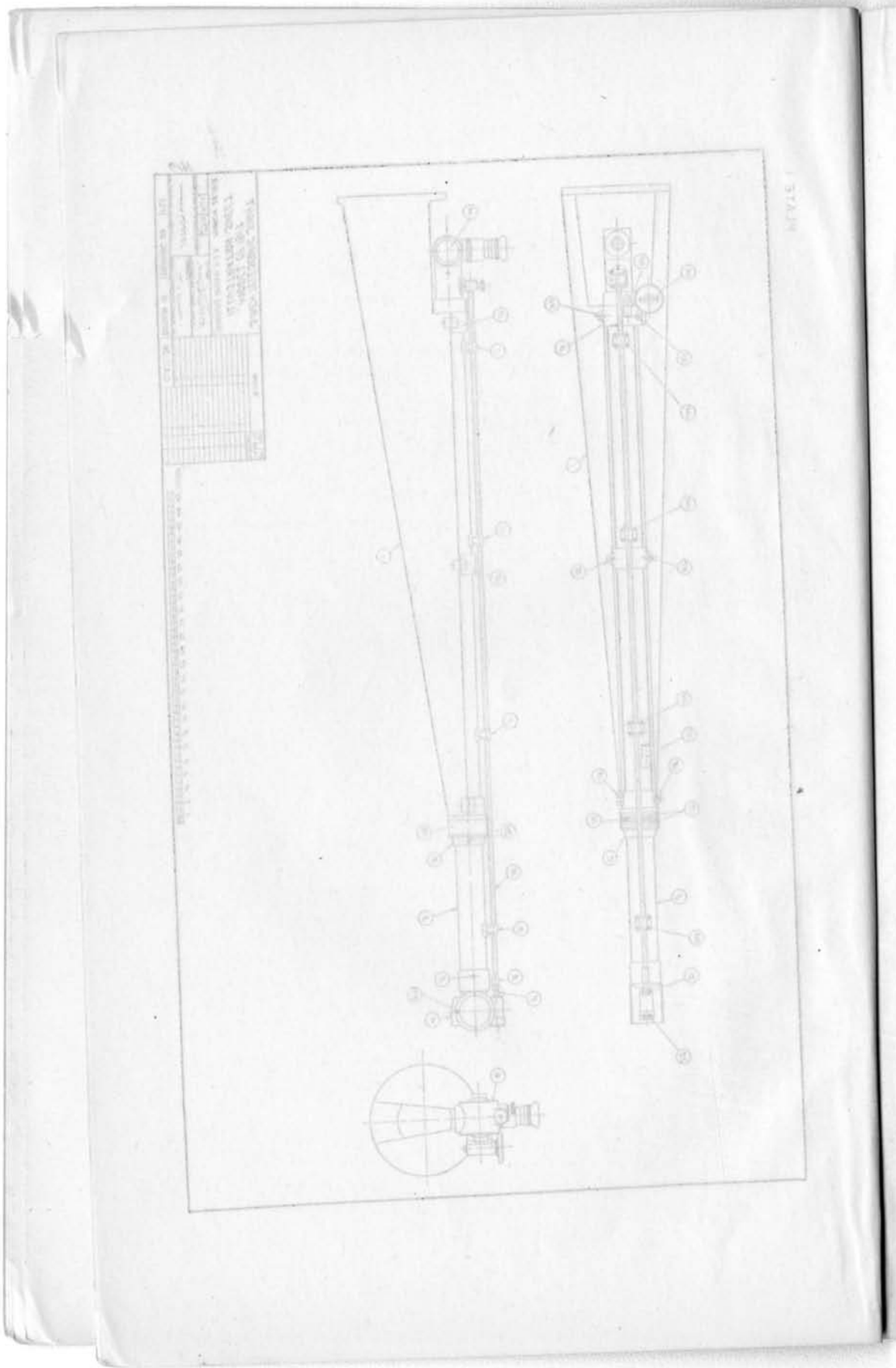
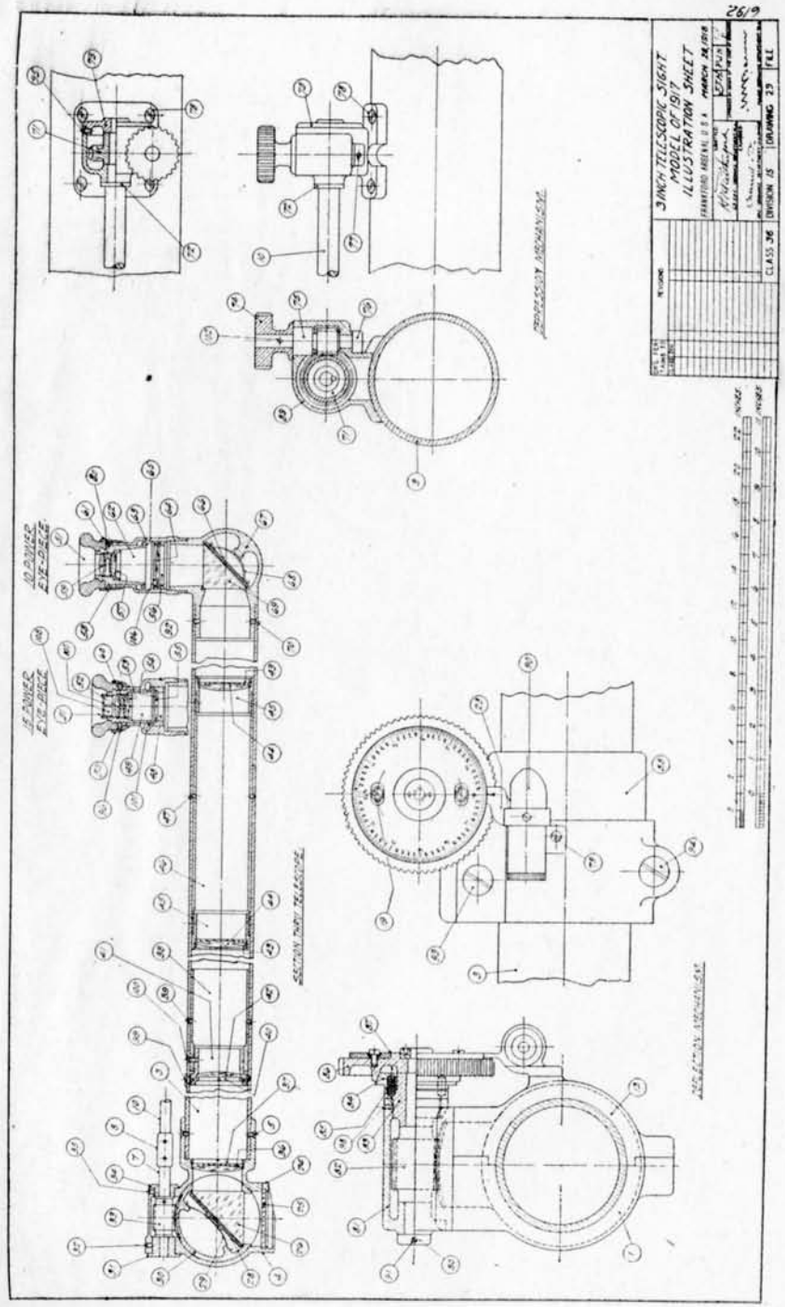


PLATE II.


3 INCH TELESCOPIC SIGHT
MODEL OF 1917
ILLUSTRATION SHEET
CLASS 36
DIVISION 13
DRAWING 23
FILE
26/9
ELEVATION OF TELESCOPE
SECTION THRU TELESCOPE
ELEVATION OF MOUNTING