
Instruction

NAMES OF THE PARTS

1. Dew cap (Lens hood)
2. Objective cell
3. Telescope tube
4. Telescope tube trunnion sleeves
5. Clamp lever for fastening telescope tube
6. Eye end
7. Microfousing knob with pinion
8. Focusing drawtube with rack
9. Focusing drawtube
10. Eyepiece adapter
11. Eyepiece
12. Declination axis
13. Clamp for fixing telescope to the Declination axis
14. Adjusting counter-poise (Balance weight)
15. Slow motion in Declination
16. Slow motion in Right Ascension

16-B. Horizontal slow motion

17. Polar axis
18. Clamp lever for fixing the telescope to the polar axis
19. Clamp lever for fixing the inclination
20. Mounting pillar
21. Tripod head
22. Finder telescope
23. Adjusting screw for optical axis of finder telescope

Fig. 2

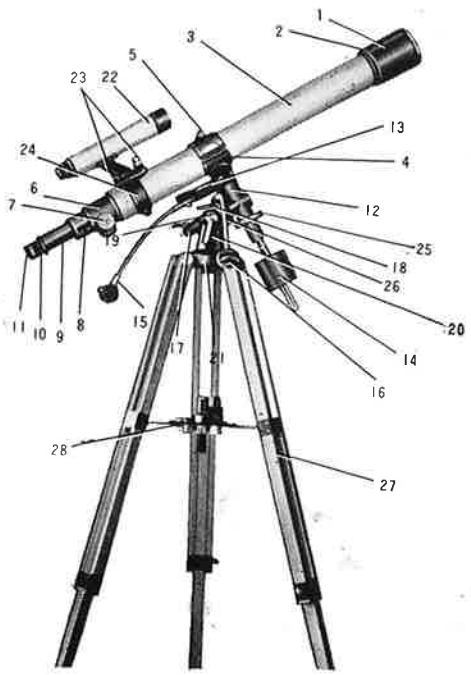


Fig. 1 — Equatorial posture of the telescope

24. Finder fixing band
25. Declination circle
26. Hour circle
27. Two-section wooden tripod
28. Accessory tray

FEATURES (Fig. 1, Fig. 2, Fig. 4)

1. Unique altazimuth equatorial combination mount contribute to versatility and ease of operation. The telescope moves on three axes, horizontal, polar, and declination. Since the polar axis is supported by the horizontal axis and can be fixed at any angle from vertical to horizontal, the telescope can be used as both an altazimuth telescope for terrestrial observation and equatorial telescope for astronomical observation.

2. The special design of the telescope permits its quick and easy assembly, and disassembly and it can be separated into three pieces, the telescope, mounting and tripod.

3. The free moving mechanism of the main tube permits positioning of the eyepiece and finder at will.

4. New designed optical parts and construction are superior and precise.

ASSEMBLING

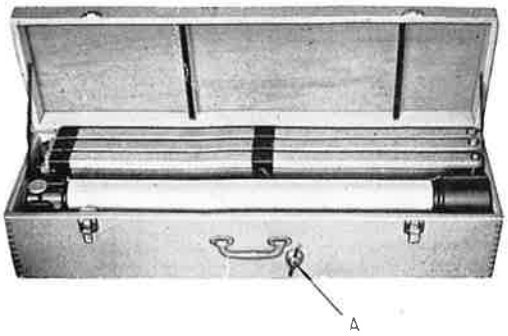


Fig. 3

1. As shown in Fig 3, the telescope is stored in wooden carrying box in three sections: main tube, tripod legs and mounting.
2. Take out the tripod and tripod head (Part No. 21), mount the tripod head with bolts and wingnuts and spread the tripod.
3. Remove the mounting, take away bolts "A" from the wooden box and fix with the bolt "A" after insert the mounting pillar (Part No. 20) into the tripod head.
4. Next, setting the main tube with the clamp lever (Part No. 5).
5. Fix rod of the flexible shaft to the slow motion worm for Declination and Right Ascension.
6. Fix the finder on the main tube with the band.
7. In the case of photo Fig 1 type, Lens hood (Part No. 1) draw out in completely on the observation.

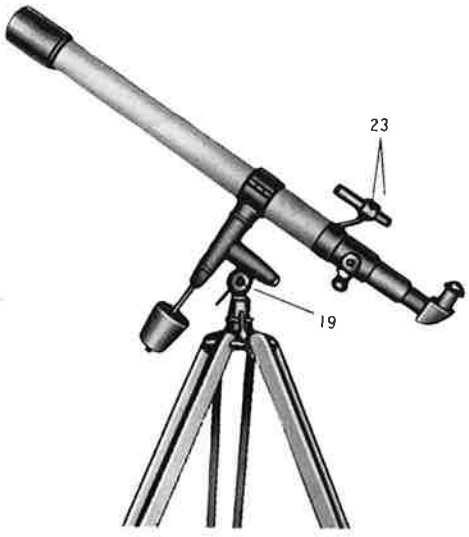
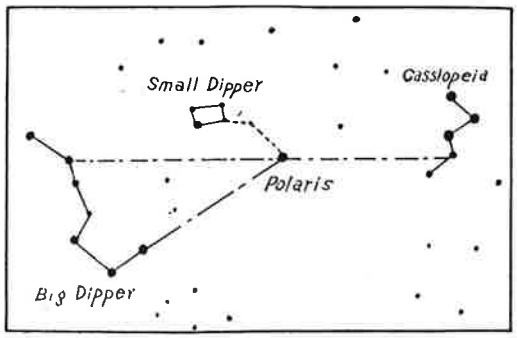


Fig. 4

TELESCOPE AS AN EQUATORIAL

1. Generally speaking, the day and night movements of heavenly bodies are regular and unvarying. This is because the celestial sphere turns on its axis of the north (south) pole of the heavens like the rotation of the earth on its axis. Accordingly, the movements of the heavenly bodies can be followed by letting the telescope rotate around the axis which is parallel to the earth's axis. This parallel axis called the polar axis.
2. The polar axis points to true north, and the angle of inclination is equal to the degree of latitude at the point of observation.
3. The equatorial mount of the telescope must be positioned as the polar axis of the telescope may point to the north pole of the heavens, as shown in Fig 1.
4. For practical use it is sufficient to point the polar axis of the telescope to the Polaris. Thus, fasten the clamp lever for fixing the inclination, adjusting the slow motion of right ascension.

Note: —A sketch of the area around North pole showing the Big Dipper (Ursa Major), the Small Dipper (Ursa Minor) and Cassiope'a.



THE TERRESTRIAL OBSERVATION

1. To observe the terrestrial objects, use the erecting prism and eyepicce.
2. In this case, it is easier to use the telescope in an altazimuth position.

NAMES OF THE PARTS

1. Telescope tube
2. Main mirror frame
3. Optical centering screw & nut
4. Eye-end
5. Draw-tube & rack
6. Pinion handle
7. Eyepiece adapter
8. Anti-diffraction support
9. Diagonal mirror & cell
10. Diagonal centering screw
11. Cap
12. Setting screws of finder mount
13. 4 X 10 finder
14. Telescope tube sleeve
15. Mounting pillar
16. Elevation arm
17. Clamp for elevation arm
18. Elevation rod
19. Clamp for elevation rod
20. Slow motion in altitude
21. Tripod head
22. Clamp for tripod head
23. Bolt & wing nut for holding tripod
24. Two section wooden tripod

ASSEMBLING

1. Take out the tripod (24) and extend the second legs, then secure it with wing-screws.
2. Mount the tripod head with bolts and wing-nuts (23) and spread the tripod.
3. Lift the telescope tube and insert the mounting pillar (15) into the tripod head (21). Elevation rod (18) and elevation arm (16) must be set in right position as shown in Fig 6.
4. Insert the elevation arm in the hole which is positioned at the lower part of tripod head and tighten the clamp for elevation rod (19). The posture must be as shown in Fig 6.

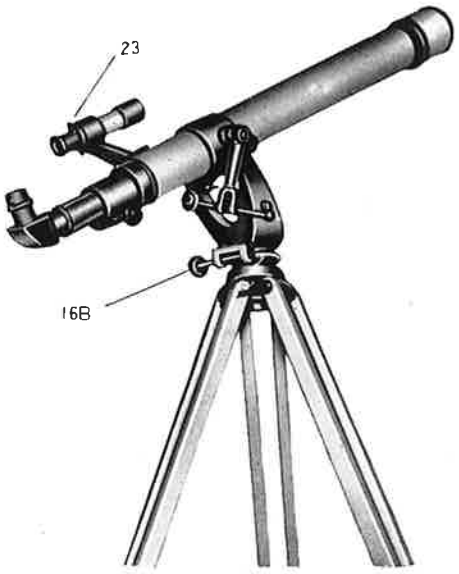


Fig. 5

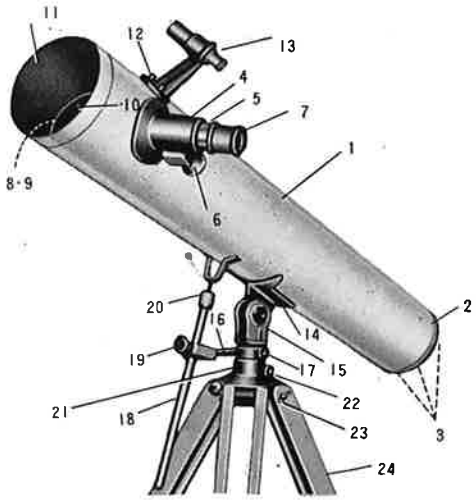


Fig. 6

Fig. 7

HOW TO ALIGN OPTICAL AXIS

1. Function of reflector cannot be expected unless the optical axis is well aligned, even though the optics are excellent. So, always be careful to keep the optical axis aligned.
2. Alignment of optical axis is determined as follows:

   a) Remove the eyepiece from eyepiece adapter (Part No. 7) and pull out the draw tube (Part No. 5) to its limit.

   b) Peeping in the diagonal mirror (Part No. 9) from the center of eyepiece adapter, the mirror must be accurately seen in the center.

   c) Circumference of main mirror must be seen concentrically in the center of diagonal mirror. If it looks eccentrically, correct the position of diagonal mirror by adjusting the diagonal centering screw (Part No. 10).

   d) In the image of main mirror which is reflected upon the diagonal mirror, the top of telescope tube is seen concentrically and the image of diagonal mirror looks in the center. Further, at the center of the image, you can see your own eye. If not, correct the alignment by adjusting three opitical centering screws and nuts (Part No. 3).

   e) Fig. 8 shows how it should appear to the eye.

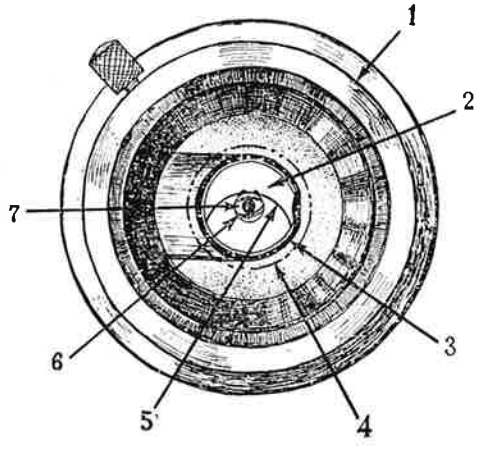


Fig. 8

1. Top of eyepiece adapter
2. Diagonal mirror
3. Image of main mirror frame
4. Top of telescope tube
5. Image of anti-diffraction support
6. Image of diagonal mirror
7. Observer's own eye

ACCESSORIES

ASTRONOMICAL EYEPIECES

Fig. 9—Inserting the eyepiece into the adapter

1. As shown in Fig. 9, the astronomical eyepiece is inserted into the adapter. To focus, turn the focusing slow-motion knobs.
2. The engraved ciphers on the eyepieces stand for types of ocular designs mentioned below:

   OR: Orthoscopic
   HM: Huygenian Mitzenway
   H: Huygenian

   The engraved numbers show the focal length of eyepieces in millimeters.
3. The magnifying power of the telescope can be obtained by dividing the focal length of the objective lens by the focal length of the eyepiece. Example, using a 4mm eyepiece on 1,000 mm focal length telescope, magnification is 25.8
4. For the person with myopia or hyperopia, it is recommended that sepectacles be removed in observation, but the person with astigmatism should use glasses in observation.

Fig. 10 Assembling the diagonal prism and eyepiece

DIAGONAL PRISM

1. The diagonal (right angle) prism is also known as the zenith prism. It permits greater ease in astronomical observation.
2. The diagonal prism is inserted as shown in Fig. 10. When the diagonal prism is inserted, the drawtube must be pushed in to a depth of approximately 2½″ to allow the diagonal prism's additional focal length.

SUN-GLASS AND MOON-GLASS

1. The sun-glass intercepting the heat and glare of the sun's rays, permits safe solar observation, for short time periods. (Do not view the sun without using the sun-glass).
2. The moon-glass should be used in observation of the moon at lower magnifications than 40x to intercept the glare of the moon's rays.
3. Use as shown in Fig. 11.

Fig. 11—Inserting the sun glass

FINDER TELESCOPE

1. The finder is a small guide telescope and enables the observer to sight the object easily.
2. The eyepiece of the finder has a cross hair. When the object, viewed through the finder is centered at the juncture of the crosshairs, it should be in the center of the view on the telescope. To adjust finder, sight a landmark as a smokestack or telephone pole about 1,500 yards away through main (large) telescope tube. When this object is centered in the telescope,

look through the finder and set the adjusting screws of its mount, moving the finder scope until the object appears.

3. The finder is equipped with an adjustable focusing eyepiece.

ERECTING PRISM

Any astronomical telescope shows an inverted image, and for terrestrial purposes the erecting prism is used. The image is erected by means of two right angle prisms. An ordinary astronomical eyepiece is attached to the erecting prism. Considerably less light is lost than with the ordinary erecting eyepieces, If the prism is used, the drawtube will require shortening by approximately 4″.

Fig. 12—Erecting prism

Fig. 13.—Assembling the sun projection screen

SUN PROJECTION SCREEN

1. The sun projection screen is used for the projection of the image of the sun, as observed through the telescope, on the screen.
2. The assembling of the sun screen is done as shown in Fig. 13.
3. The HM 12.5mm eyepiece is used for projection of an image occupying 4″ in diameter on the screen. Use the diagonal prism to get an upright image on the screen.
4. For best results, it is advisable to fasten a sheet of pure white paper on the reflecting side of the screen with paper clip.
5. To get a magnified image of sun-spots, use a high power eyepiece.

BARLOW LENS

1. The Barlow Lens functions to double the focal length of the objective lens and accordingly the magnification of each eyepiece is doubled. (Example: Magnification of a 12.5mm eyepiece with 1,000mm focal length telescoope is 80x. Using Barlow Lens magnification is 160x.)
2. Mount by screwing into the eyepiece adapter of the telescope draw tube. The eyepiece is mounted on the Barlow Lens.

Fig. 14—Barlow Lens

HOUR AND DECLINATION CIRCLES

Hour cicle (Right ascension circle) is fitted to the polar axis and Declination circle is fitted to the declination axis respectively. Hour circle graduated in 10 min. in time. and Declination circle graduated in 2° in degrees. These circles enable so helpful to the stellar observation or other as follows:

(1) To find the stellar time at the instant of the observation.

(2) To lead a faintest or discernible heavenly (but its position is known) into the field of the telescope.

(3) To observe the brilliant star as Venus in the day time.

(4) To know the apparent position of a Comet or a Nova.

(5) To set the telescope's polar exactly.

When the mounting being assembled as the equatorial mount, if not the polar axis installed exactly, the circle does not indicate true value. Enables to know the altitude and the azimuth of the object by these circles when the mounting is assembled for the altiazimuth mount.

CARE OF TELESCOPE

1. Place the tripod legs on a solid footing to avoid vibration. When using high power magnification choose a position sheltered from the wind.

2. To observe objects faintly lighted accustom your eyes to darkness for thirty minutes before through the telescope.

3. Do not disassemble lenses and prisms since experience is required to reassemble properly.

4. Avoid exposure to rain or moisture. If the lenses become wet, wipe them dry at once using a soft cloth as bleached cotton.

5. Store your telescope in a dry place to avoid damaging lenses and parts. Humidity will create fungus conditions.

6. Your telescope is a precision instrument assembled by competent technicians and is designed for long trouble free service. Even perfect mechanisms show wear in time and require adjustment of parts. If this situation occurs place the telescope with your dealer, or pack carefully and return prepaid for repair estimate to: