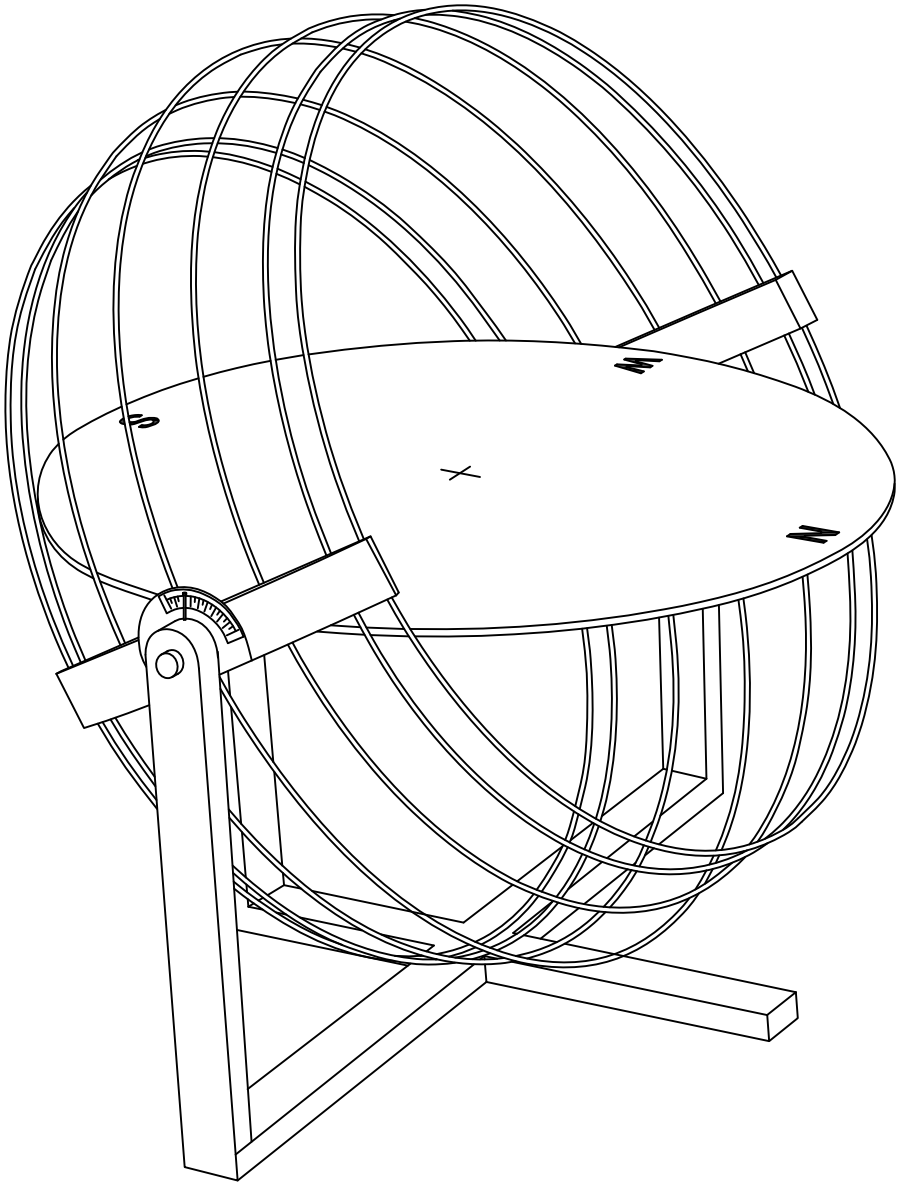
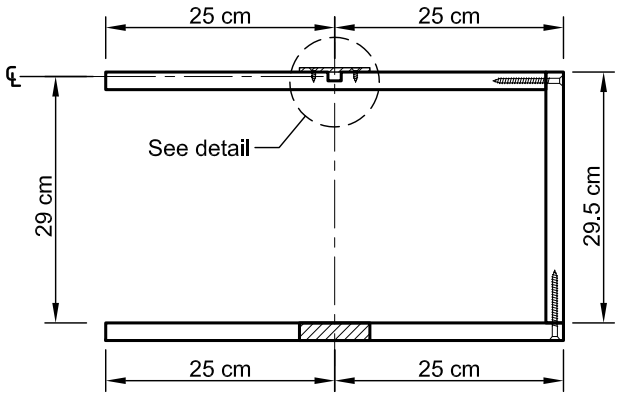
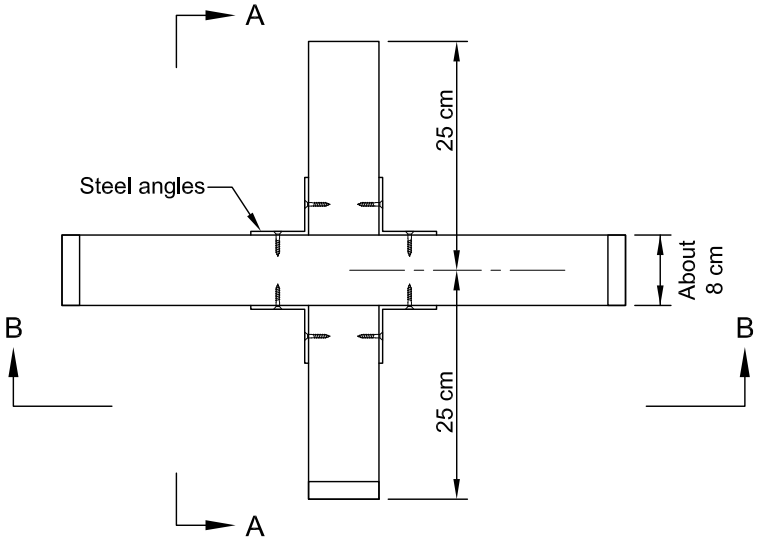
Solar Geometry Demonstration Heliodon

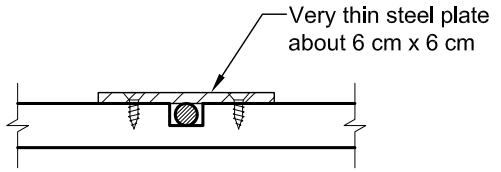




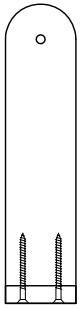
SECTION A-A



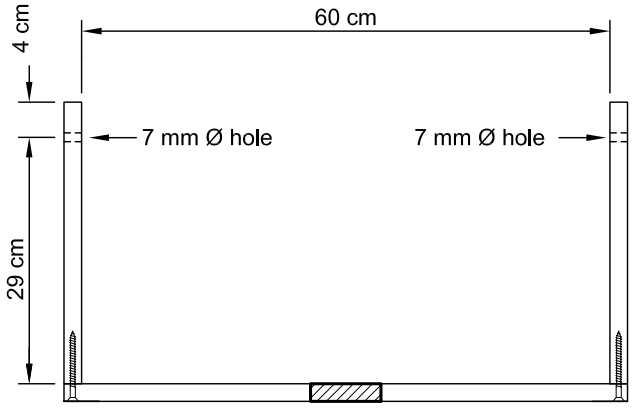
TOP VIEW



DETAIL



WEST SIDE

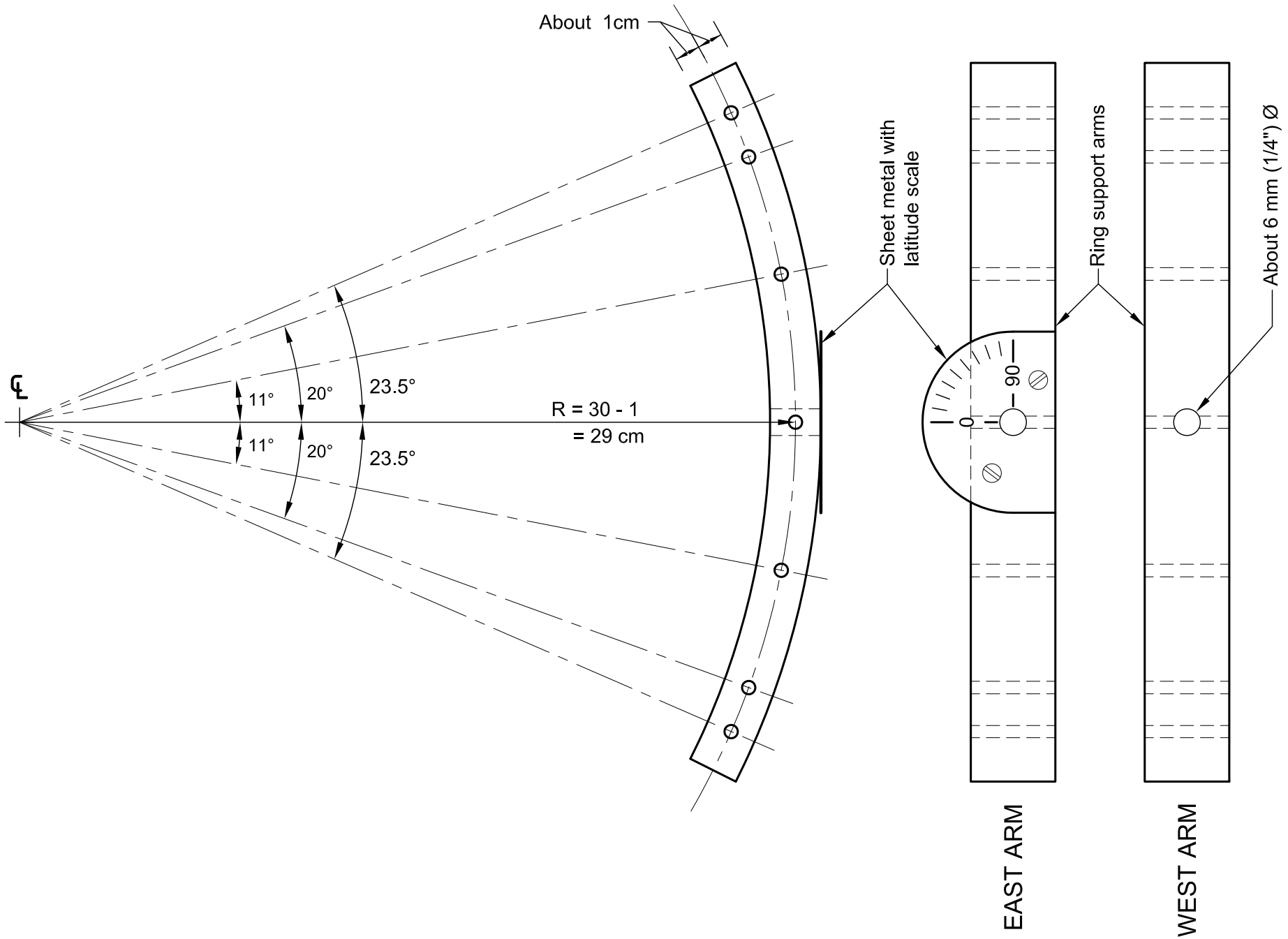


SECTION B-B

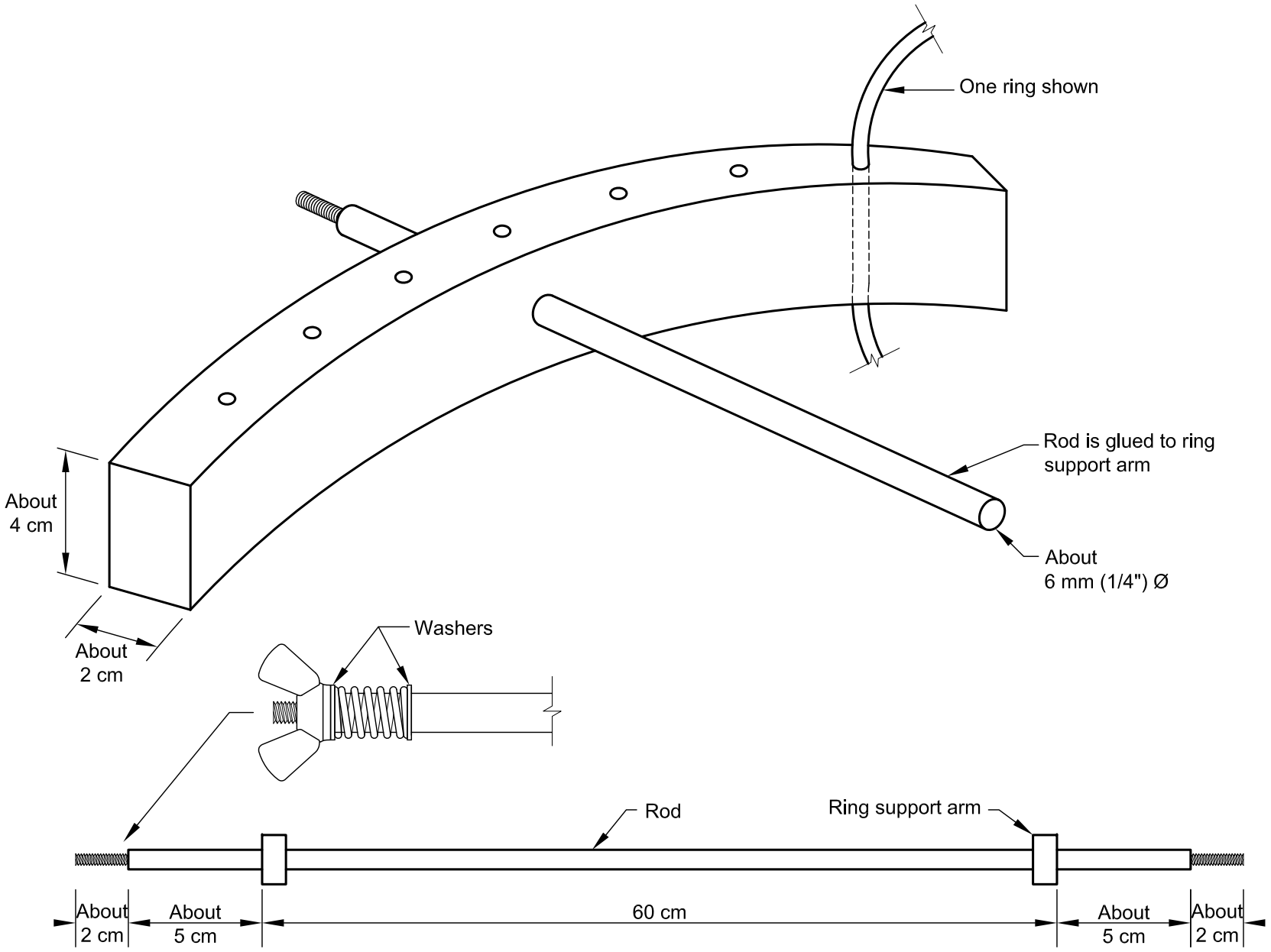
EAST SIDE

NOTE: Screws are shown as if in section.

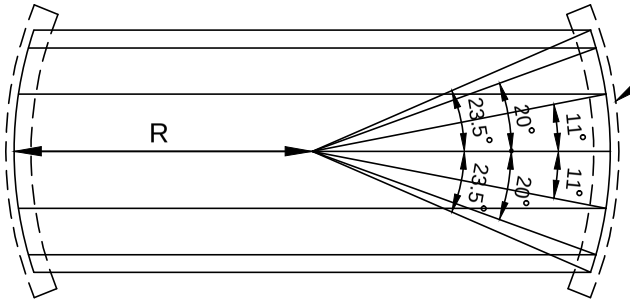
Support Structure Details



Construction of Ring Support Arm

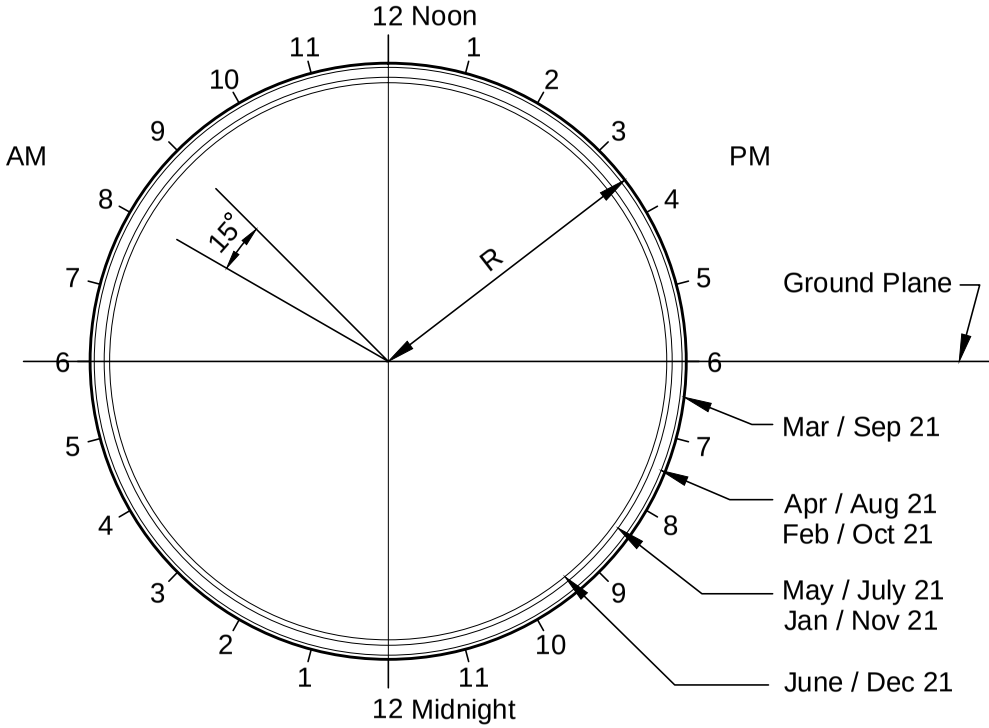


Ring Support Arm Details

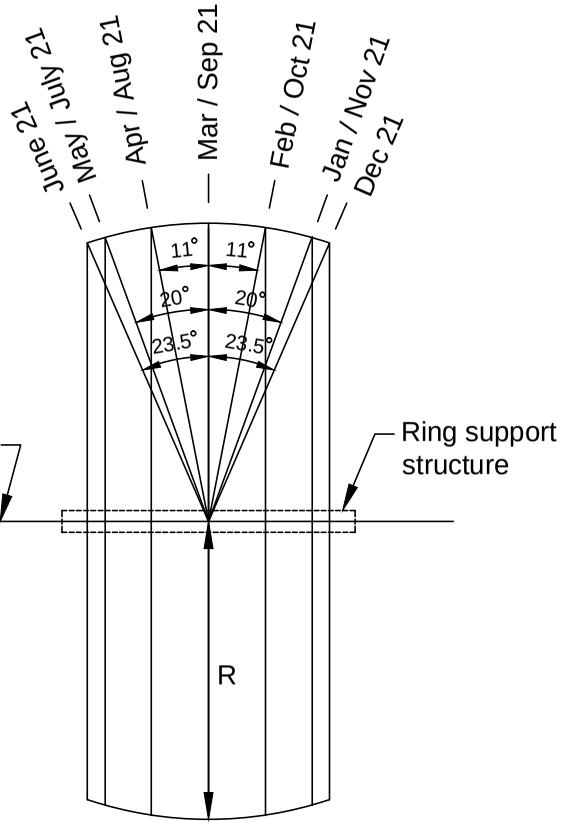


TOP VIEW

R= Radius of
Heliodon

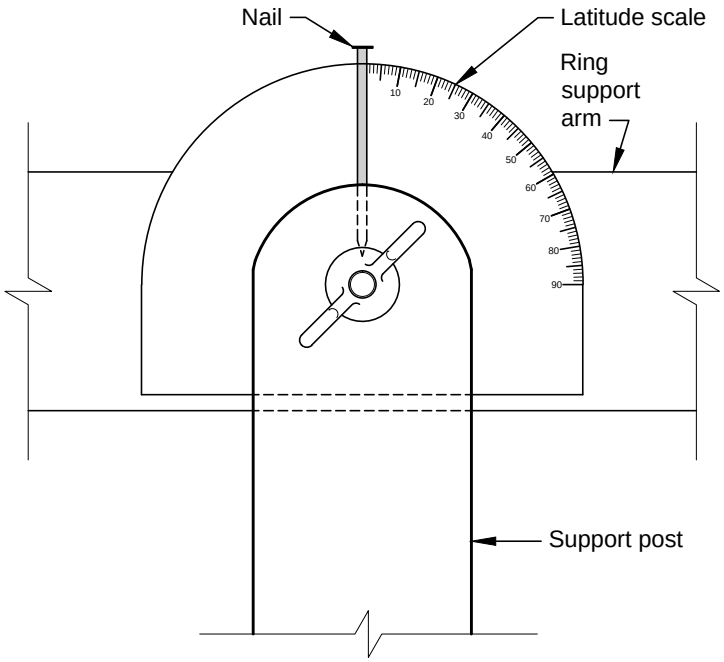


FRONT VIEW

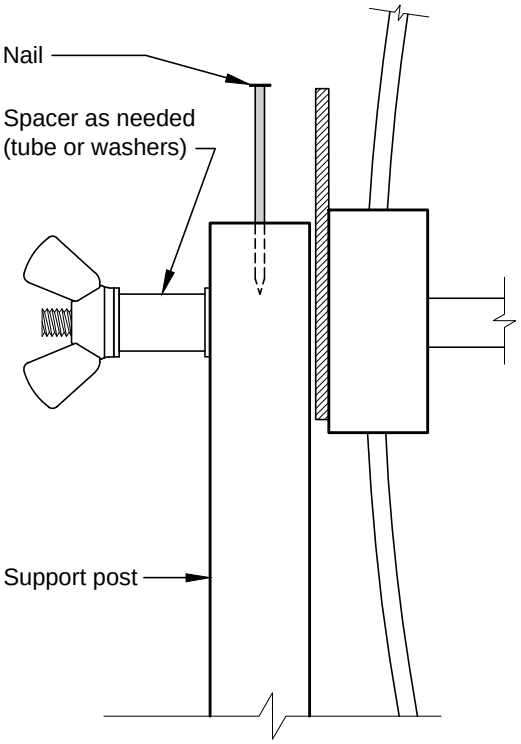


SIDE VIEW

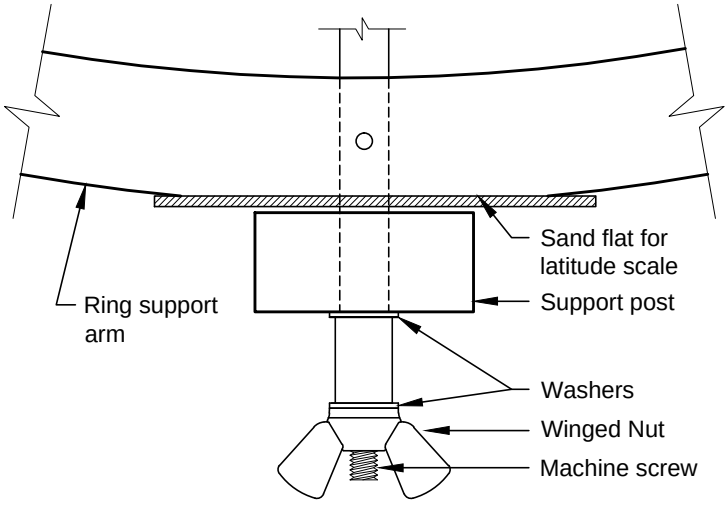
Heliodon Geometry



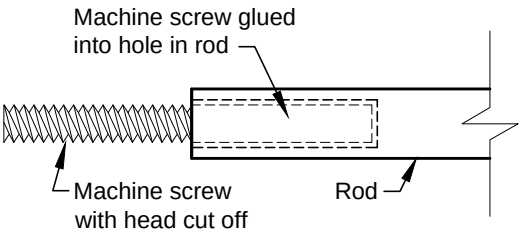
FRONT VIEW



SIDE VIEW



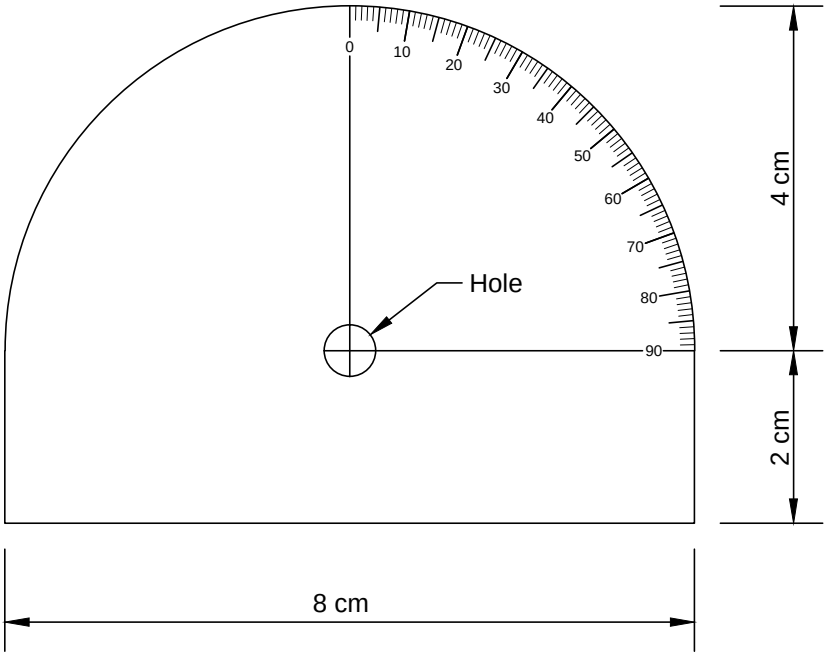
PLAN VIEW



ROD DETAIL

At larger scale

East Side Latitude Adjustment Detail



LATITUDE SCALE

NOTES:
1. Reduce drawing until given dimensions are actual dimensions.

2. Glue on one of the following:
   a. Sheet metal
   b. Thin but very stiff cardboard
   c. Thin plastic

3. Glue on east support ring after sanding a flat spot about 6mm wide.

Latitude Scale

Notes on constructing a Solar Geometry Demonstration Heliodon

1. The rings representing the paths of the sun are made of fiberglass rods ___ mm (__in.) in diameter. Fiberglass rods are inexpensive and form a smooth curve which would be hard to do with wire. Each ring is made in 2 parts each creating a semicircle.
2. Rings can be painted yellow to represent the sun and black lines can define the hours of the day. The hour marks are 15 ^{o} apart, and the distance between hour marks depends on the radius of the ring.
3. Keep in mind that the rings have different lengths (circumferences). The 7 rings have 4 different lengths as follows: December and June are the same length, January and November are the same, February and October are the same, while there is only one length for the March and September ring.
4. Important! Draw a dark line 2 cm from the end of each fiberglass rod to mark how far the rod should be inserted into the support arm (i.e. half the depth of the support arm). A rod not properly inserted could break loose and swing out like a whip. Note that in Fig. 3 the last 2 cm of each rod are painted black to indicate the insertion distance.
5. Make a full-size drawing of the top of the ring support arm as shown in the drawing labeled "Construction of Ring Support Arm", and make 2 copies. Glue each one on quality wood 4 cm thick (1 ½ in. thick wood is close enough to 4 cm to work). Use a band saw to cut the arms, and use a drill press to drill accurate vertical holes through each arm for the 7 rings and one axis rod.
6. One end of the wooden axis rod has a compression spring to create friction so that the ring-arm assembly will stay at whatever latitude it is rotated to.
7. The other end of the rod has a winged nut that can lock the ring-arm assembly into any latitude position.
8. The ground plane can be made of foam-core board and should be as large as possible (about 50 cm in diameter) so that it is easy to see where the sun rises and sets (azimuths) at different months and latitudes. Mark N, S, E, and W to show the compass directions. Also add a small (+) mark in the center. The ground plane shown in Fig. 3 is folded in half because this heliodon is collapsible to fit in a suitcase for travel.
9. Place a very small model of a building at the center of the ground plane. The models largest dimension should be less than 3 cm to better fit the scale of the heliodon.
10. The latitude scale could be made of thin metal, plastic, or very stiff cardboard. Make a print of the latitude scale drawing so that it's actual dimensions match the dimensions on the drawing. Cut out the scale and glue it to the thin support material (e.g. metal).
11. Since the ring support arms are curved, a flat spot about 6 cm wide should be sanded to one of the arms onto which is glued the latitude scale. A small nail on the appropriate support post will then act as a pointer.
12. Add labels to the top of the support arm to indicate which month(s) each ring represents (see Fig. 4). The months will be reversed from the Northern to the Southern Hemispheres.