

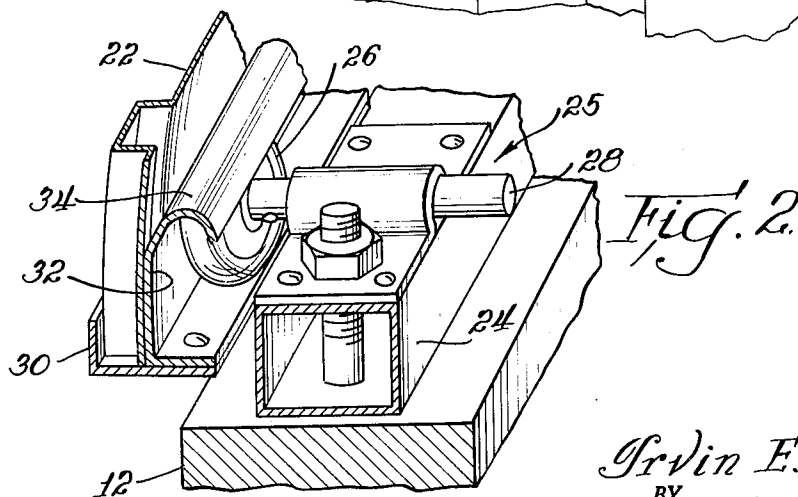
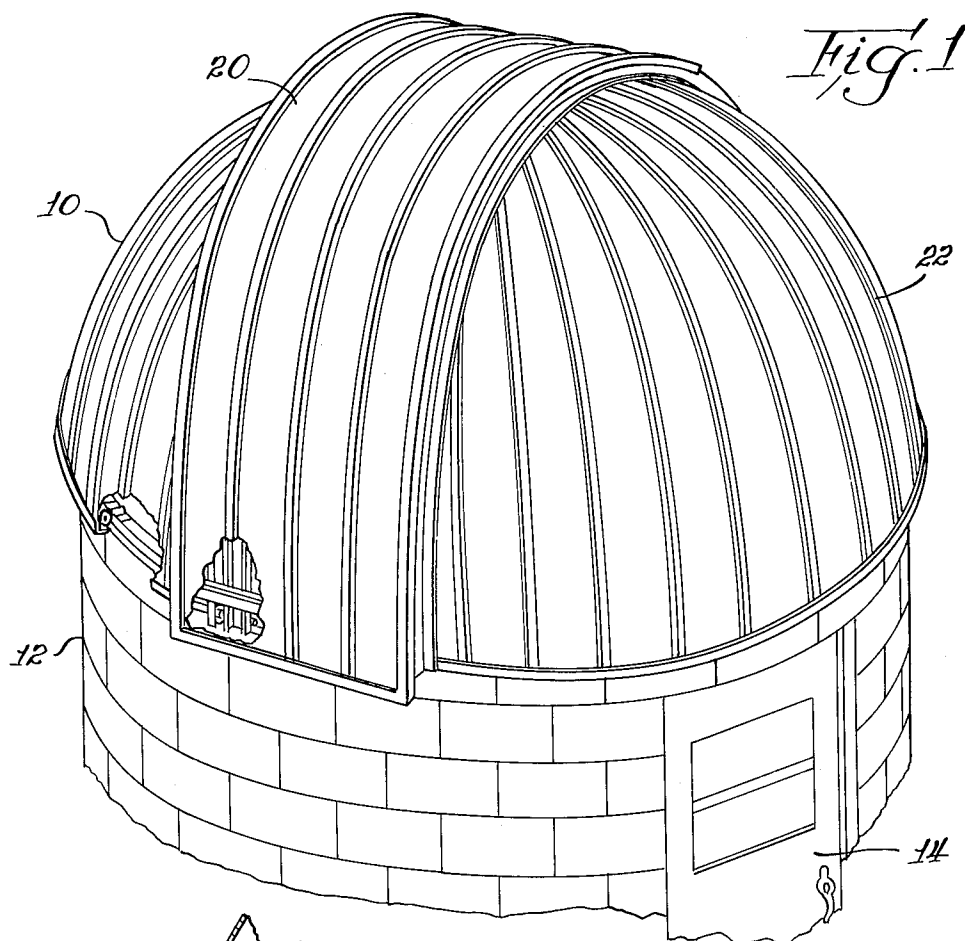
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I. E. OLSON
OBSERVATORY DOME

3,213,571

Filed Aug. 8, 1961

3 Sheets-Sheet 1



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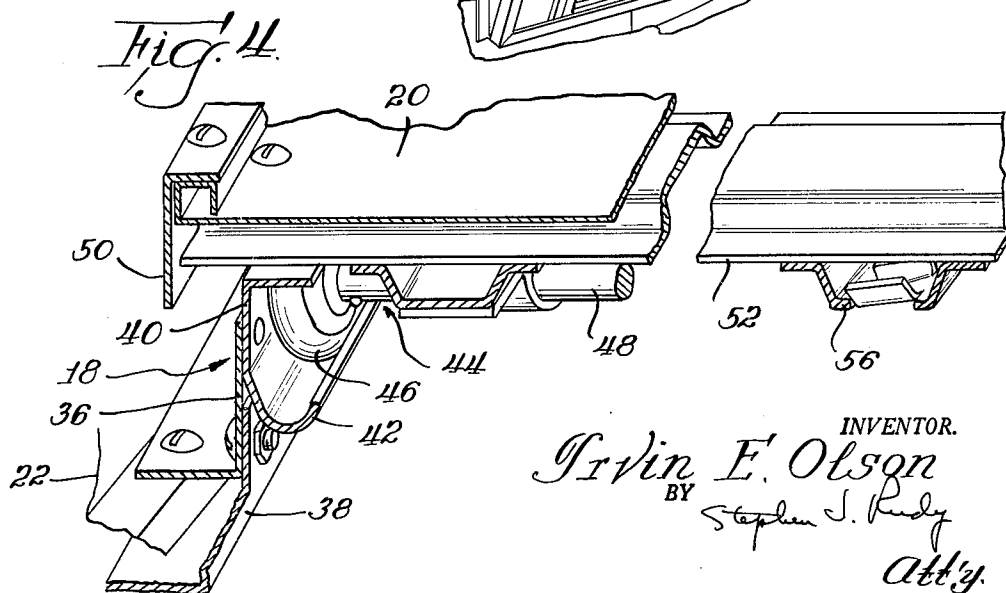
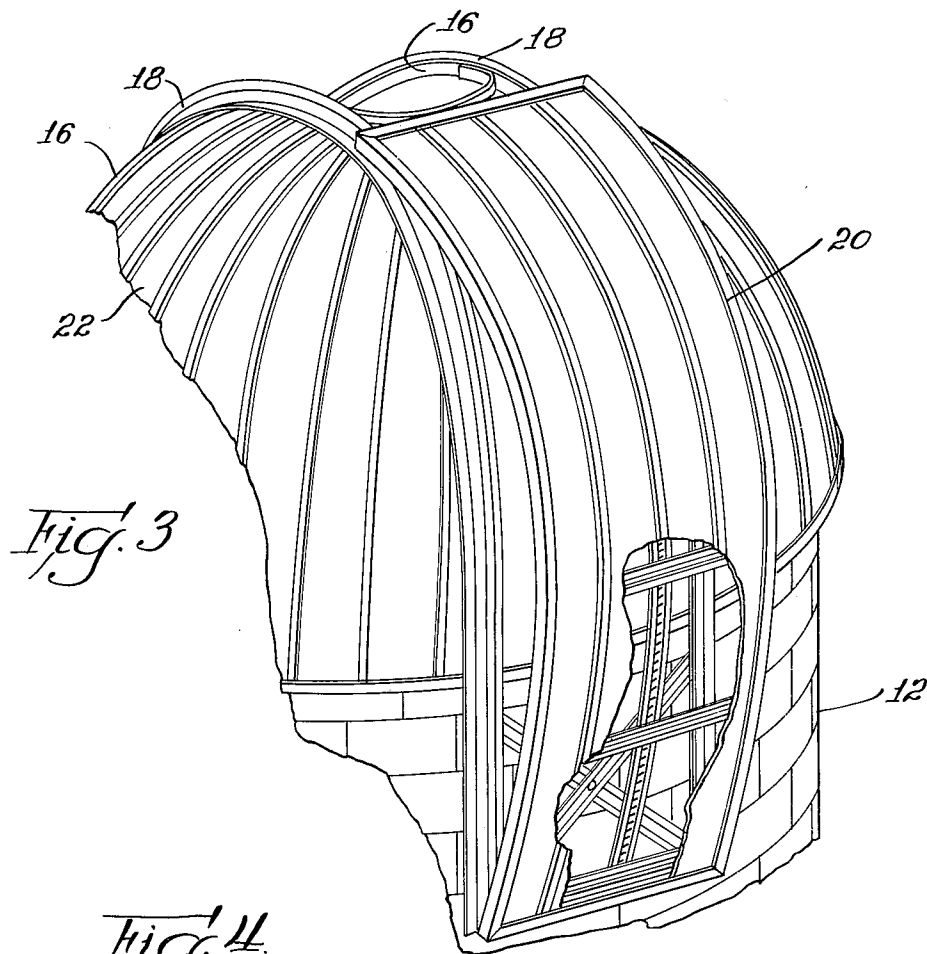
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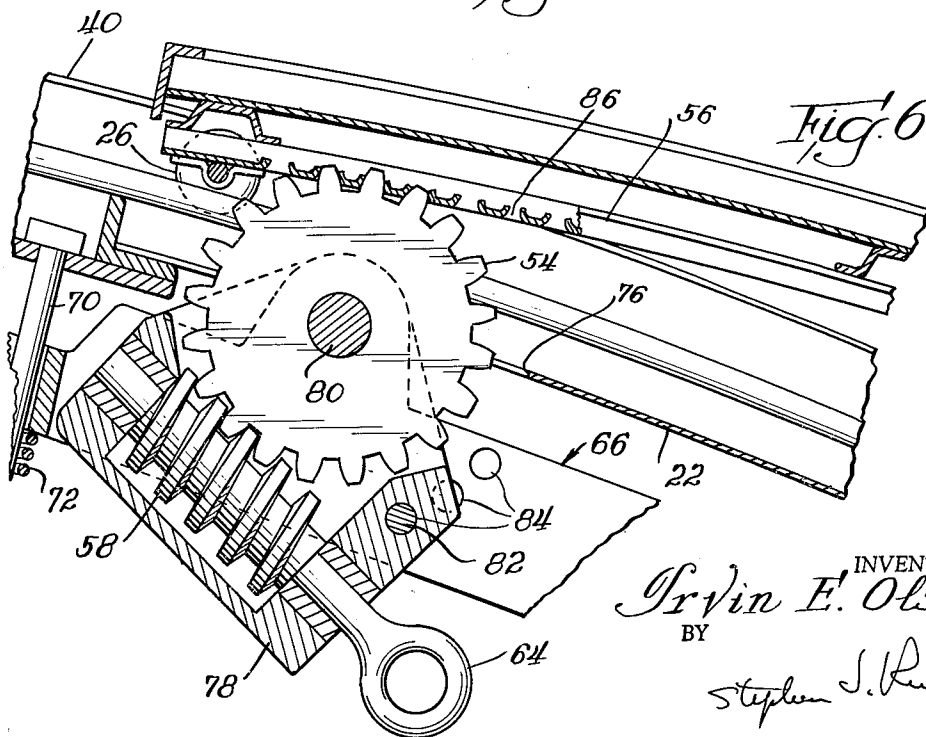
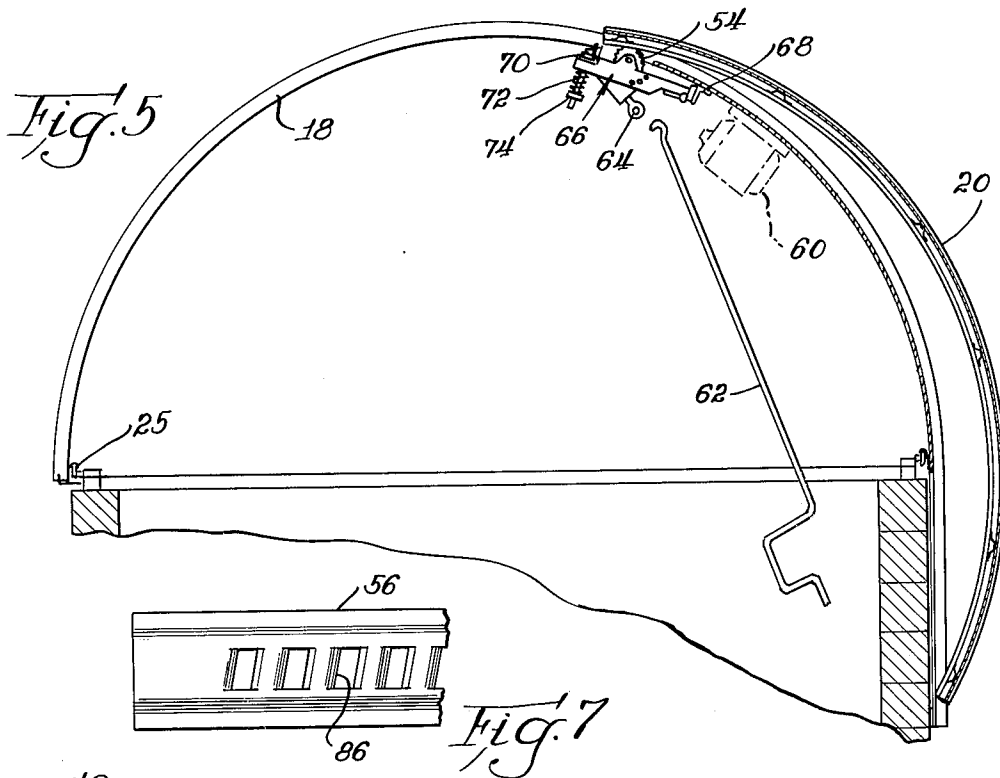
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3 Sheets-Sheet 3



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3,213,571

OBSERVATORY DOME

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3 Claims. (Cl. 52-66)

This invention relates to an improvement in rotatable roof structures and more particularly in observatory domes.

Among the features of the invention constituting an improvement over known domes of the prior art is a combination of elements providing: low weight coupled with high strength; minimum resistance to rotation; maximum length of observation slot including full zenith exposure; all weather protection of movable parts; substantial elimination of "sail effect" when slot door, or shutter, is in open position; ease of opening and closing slot door, as well as maintaining door in any position of movement; and relatively low manufacturing, installation and maintenance cost.

Briefly, the observatory dome of the invention is formed of a plurality of arcuate sector-shaped sheet material sections which are adapted to be interlocked by sliding action to form a hemispherical structure. A uniform width opening, or slot is formed in a vertical portion of the dome. A pair of curved beams are arranged adjacent the slot, one at each edge, which beams assist in the support of the dome. The beams extend over the entire periphery of the roof and overhang a lower edge thereof opposite the portion of the dome in which the slot is formed. A curved door is arranged to ride upon a semi-enclosed track affixed to the curved beams, which door is positionable to cover all, or any portion of the slot. The entire dome is rotatably supported upon rollers which engage a semi-enclosed circular track arranged at the lower edge of the roof. Movement of the door is effected by a sprocket wheel adapted to engage a rack-like track secured to the under surface of the door. A major portion of the assemblage, is preferably made from a light weight metal such as aluminum, and has a clean, pleasing, and stable appearance.

The main object of this invention is to provide an improvement in observatory domes.

A more particular object is to provide an observatory dome which has low weight coupled with high strength.

Another object is to provide an observatory dome which has minimum resistance to rotation, as well as all weather protection of movable parts.

Still another object is to provide an observatory dome having maximum length of observation slot including full zenith exposure.

Another object is to provide an observatory dome with substantial elimination of "sail effect" when the slot door is in open position.

Still another object is to provide an observatory dome having a slot door which is easily opened, closed, or maintained in any position of movement.

A further object is to provide an observatory dome having relatively low manufacturing, installation and maintenance cost.

These and further objects and features of the invention will become more apparent from the following description and accompanying drawings wherein:

FIG. 1 is a perspective-like view of an observatory dome embodying the principles of the invention, and showing a slot door in closed position;

FIG. 2 is a fragmentary perspective-like view of a dome supporting roller;

FIG. 3 is a view similar to FIG. 1, but showing the slot door in open position;

FIG. 4 is a fragmentary perspective-like view of a slot door supporting roller;

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FIG. 5 is a vertical section view of the observatory dome showing the arrangement of a slot door opening mechanism;

FIG. 6 is an enlarged section view of the same; and FIG. 7 is a plan view of a portion of a rack-like element on the slot door.

Referring now to the drawings, numeral 10 identifies an observatory dome embodying the principles of the invention, which dome is hemispherical in shape and forms the roof portion of a partially shown building 12 of generally cylindrical form and having a door 14. An observatory slot 16 is formed in the dome, which slot extends from the lower edge of the dome to a distance approximately half of the slot width past the center of the dome. A pair of beam assemblies 18 are arranged one on each edge of the slot 16, which beams extend over the entire roof and overhang the lower edge of the dome on the side opposite the slot. The beams 18 are adapted to guidingly support a slot door 20, which is vertically curved to conform with the curve of the dome, and which is somewhat longer than the slot 16.

The dome 10 is preferably formed from a plurality of arcuate sector-shaped sheet metal sections 22, the edges of which are adapted to provide an interlocking fit. Such a roof structure may in general be of the type disclosed in the patent to Walter Rutten, 2,769,409, which issued on November 6, 1956. The door 20 is formed of longitudinal sheets with interlocked edges, which are parallel rather than tapered as in the case of the sections 22.

Extending about the upper edge of the building 12 and secured thereto, is a channel plate 24 to which is affixed a plurality of dome supporting assemblies 25 each including a roller 26 mounted upon the end of a shaft 28 (FIG. 2). A dome support angle 30, which is L-shaped, is arranged about the lower perimeter of the dome 10, and is secured to a dome track member 32 fastened to the dome. The track member 32, which is L-shaped, is secured along its lower leg to the support angle 30, while the other leg, is bent over to provide a track 34 which engages the rollers 26. In such manner, it will be seen that the dome 10 is not only supported for easy rotation by the rollers 26, but is prevented from movement off of the rollers because of the roller enclosing configuration of the track member 32. Brake means (not shown) may be provided to lock the dome in any rotary position.

Each beam assembly 18 is formed of an L-shaped channel 36 arranged on the upper surface of the roof sections 22, and an L-shaped channel 38, one leg of which extends underneath the roof section, the other leg of which is secured to the channel 36. Affixed to the channel 36, is a door track 40, which is L-shaped and has one leg bent over to provide a track 42. Roller assemblies 44 each of which includes a roller 46 affixed to a shaft 48, are secured to the door 20, at each end, or corner, thereof. The rollers 46 are adapted for riding in the track 42, which prevents the rollers from disengagement therefrom because of the roller enclosing configuration of the track. Bumper means (not shown) are arranged to limit travel of the door for either full-open or full-closed position. A door trim angle strip 50 may be arranged about the edges of the door, while one or more door sheet supports 52 may be disposed horizontally on the under-surface of the door.

Movement and positioning of the door 20 is effected by a sprocket wheel 54 which engages a rack-like track 56 secured to the underside of the door. The sprocket wheel 54 is rotated by a worm gear 58 which may be driven by a power means, such as an electric motor 60, or manually by an elongated crank 62 removably hooked into an eyelet 64 formed on the end of the worm gear 58.

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A frame means 66 is adapted to support the sprocket and rack, one end of the frame means 66 being pivotably secured to a bracket 68 affixed to the underside of a dome section 22, the other end being guidingly supported upon a bolt 70 which is affixed to the dome. A helical spring 72 is compressively arranged between an adjusting nut 74 on the bolt 70 and the underside of the frame means to urge the frame means clockwise about its pivoted end. An opening 76 is formed in a dome section 22 to provide clearance for the sprocket wheel. The worm gear 58 is supported in a housing 78 which is pivotally suspended from a shaft 80. The sprocket wheel is mounted upon the shaft 80. The housing 78 is arranged within the frame means 66 and is secured thereto by a pin 82 which may be inserted in any one of a plurality of holes 84 formed in the frame means 66. In such manner, the axis of the worm gear 58 may be adjusted relative to the dome section 22. The track 56 has a plurality of openings 86 which are adapted to receive the teeth of the sprocket wheel 54.

It will be seen that the spring 72 keeps the sprocket wheel 54 in engagement with the track openings 86 as the curved door 20 is moved into full open or full closed position.

From the foregoing it will be seen that the disclosed invention will satisfy all of the objectives set forth hereinbefore.

The foregoing description has been given in detail without thought of limitation since the inventive principles involved are capable of assuming other forms without departing from the spirit of the invention or the scope of the following claims.

What is claimed is:

1. An observatory dome possessing all-weather protection of movable parts comprising, in combination, a plurality of arcuate sector-shaped sheet material sections arranged to form a hemispherical dome, a uniform width vertically extending slot in said dome extending from the base of said dome to at least slightly beyond the top center, a pair of curved beams arranged one on each edge of the slot and extending over the entire periphery of said dome, a vertically curved door larger than said slot and overlying said beams, said door being glidingly connected to said beams, means for vertical slide movement of said door on said beams, said means comprising a rack-like track secured to the underside of said door, a sprocket wheel engaging said track, drive means for said sprocket wheel and support means for said sprocket wheel, said sprocket wheel being rotatably secured to said support means and said support means being pivotally mounted to the underside of said dome and biased toward said rack-like track to effect continued engagement

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of said sprocket wheel and said track whereby vertical slide movement of said door on said beams may be positively effected in either direction, and dome support means secured to the base of the dome adapted to allow rotary movement of said dome.

2. The observatory dome of claim 1 wherein said beams overhang the base of the dome on the side of the dome opposite to said slot whereby said door may be vertically moved beyond said slot.

3. An observatory dome possessing all-weather protection of movable parts comprising, in combination, a plurality of arcuate sector-shaped sheet material sections interlocked by slide action therebetween during assembly to form a hemispherical dome, a uniform width vertically extending slot in said dome extending from the base of said dome to at least slightly beyond the top center, a pair of curved beams arranged one on each side of said slot and extending over the entire periphery of said dome and overhanging the base of the dome on the side of the dome opposite to said slot, a track affixed to said beams, a pair of rollers affixed to each end of said door and arranged to ride in said track, said track partially enclosing said rollers to glidingly connect said door to said beams, means for vertically slide movement of said door on said beams, said means comprising a rack-like track secured to the underside of said door, a sprocket wheel engaging said track, drive means for said sprocket wheel and support means for said sprocket wheel, said sprocket wheel being rotatably secured to said support means and said support means being pivotally mounted at one end to the underside of said dome and biased at its other end to effect continued engagement of said sprocket wheel and said rack-like track whereby vertical slide movement of said door on said beams may be positively effected in either direction, and dome supporting means secured to the base of the dome comprising a track and a plurality of rollers arranged to ride in said track to allow rotary movement of said dome.

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