Jan. 29, 1963

M. ROSEN

3,075,257

TILTABLE TAPERED SLAT CANOPY

Filed July 27, 1961

7 Sheets-Sheet 1

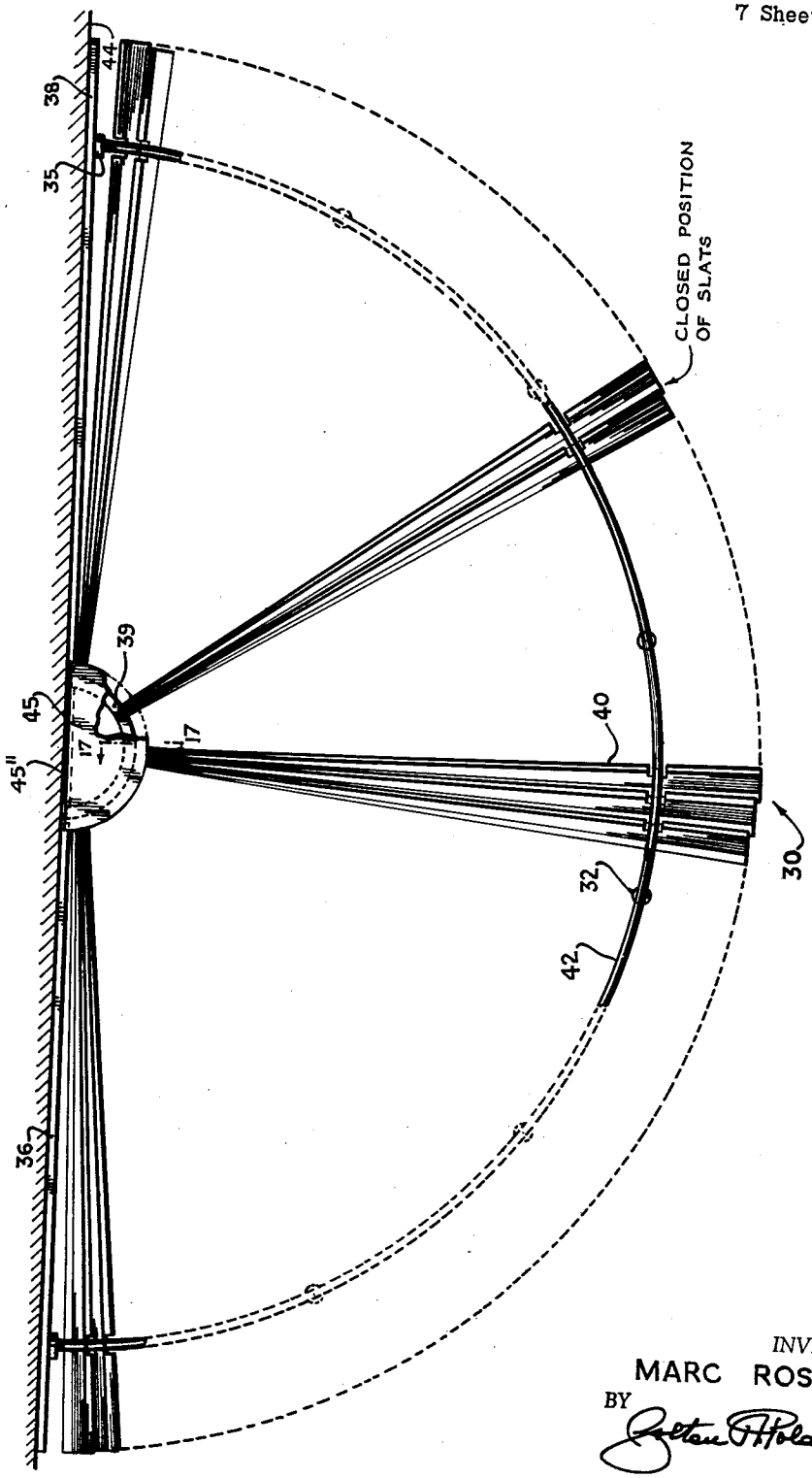


FIG. 1

INVENTOR.
MARC ROSEN
BY
ATTORNEY

Jan. 29, 1963

M. ROSEN

3,075,257

TILTABLE TAPERED SLAT CANOPY

Filed July 27, 1961

7 Sheets-Sheet 2

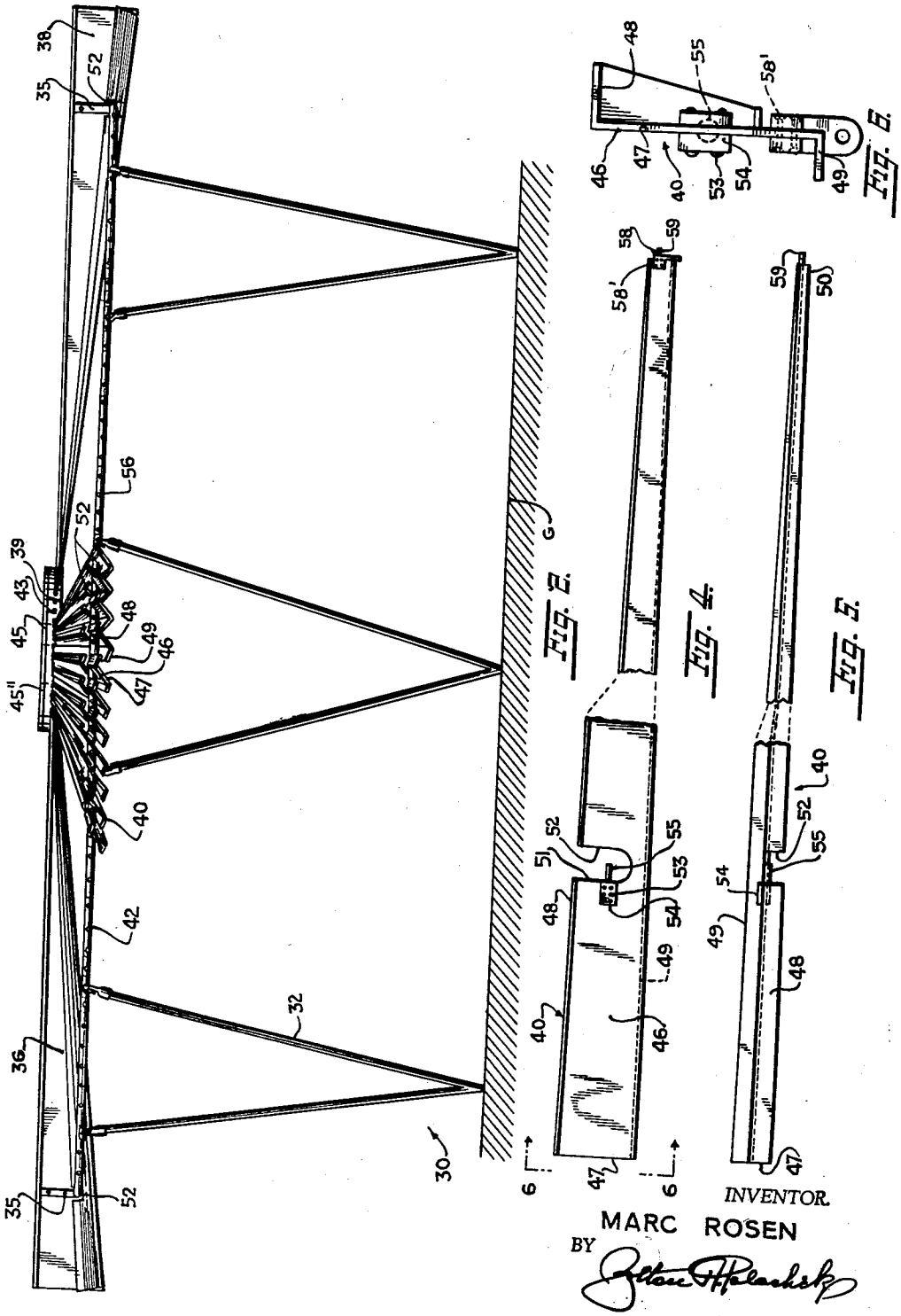


Fig. 2.

Fig. 4.

Fig. 5.

Fig. 3.

INVENTOR.

MARC ROSEN

BY

ATTORNEY

Jan. 29, 1963 M. ROSEN 3,075,257

TILTABLE TAPERED SLAT CANOPY

Filed July 27, 1961

7 Sheets-Sheet 3

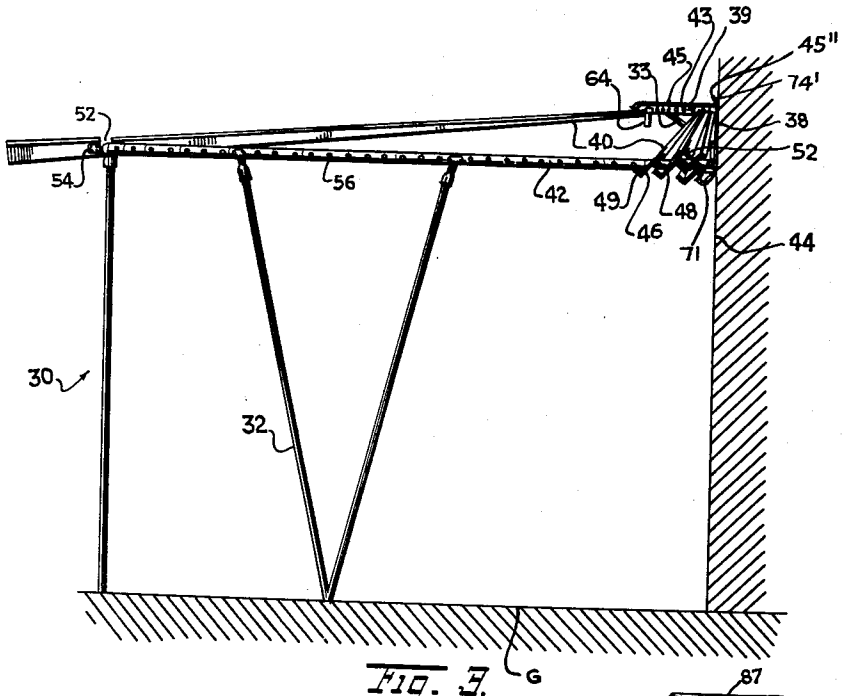


Fig. 3.

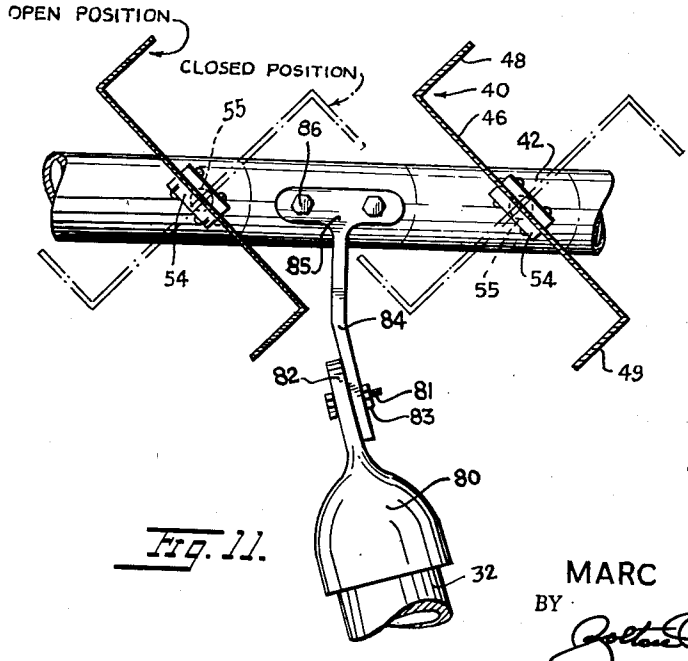


Fig. 11.

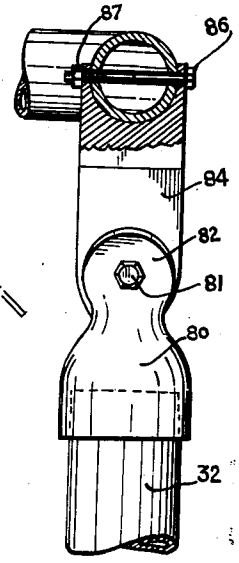


Fig. 12.

INVENTOR.
MARC ROSEN
BY
ATTORNEY

Jan. 29, 1963 M. ROSEN 3,075,257

TILTABLE TAPERED SLAT CANOPY

Filed July 27, 1961 7 Sheets-Sheet 4

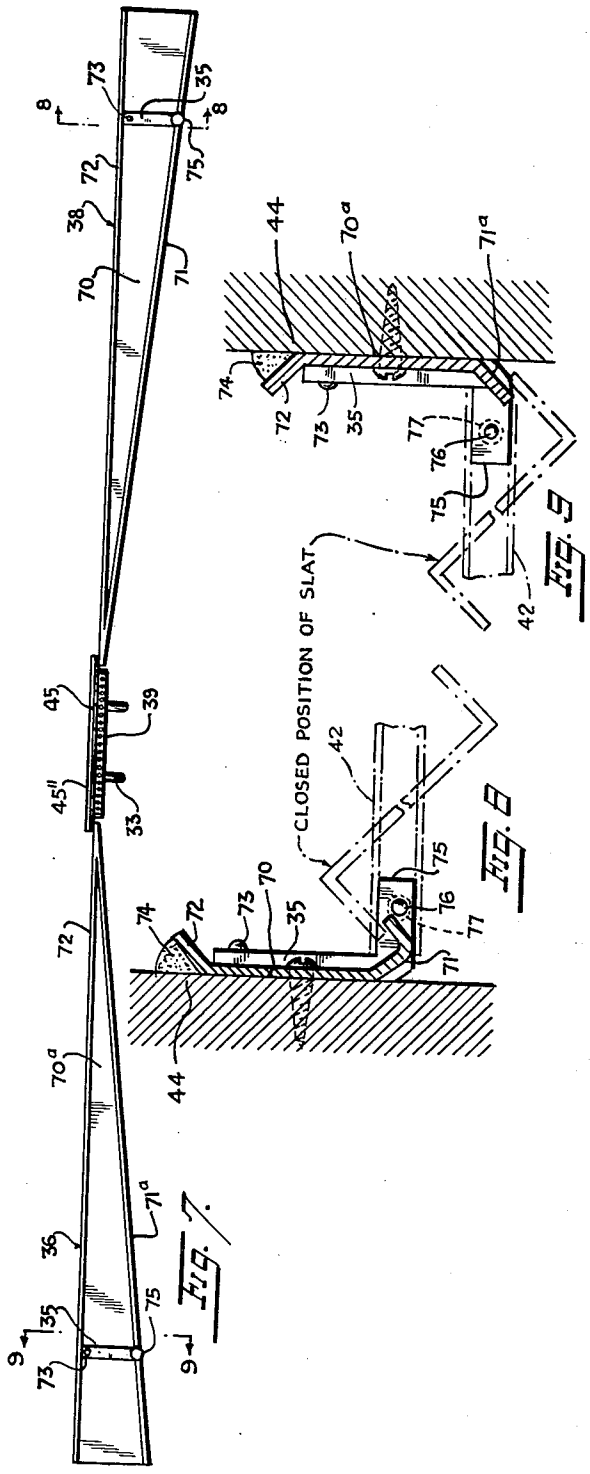


Fig. 7

Fig. 9

Fig. 8

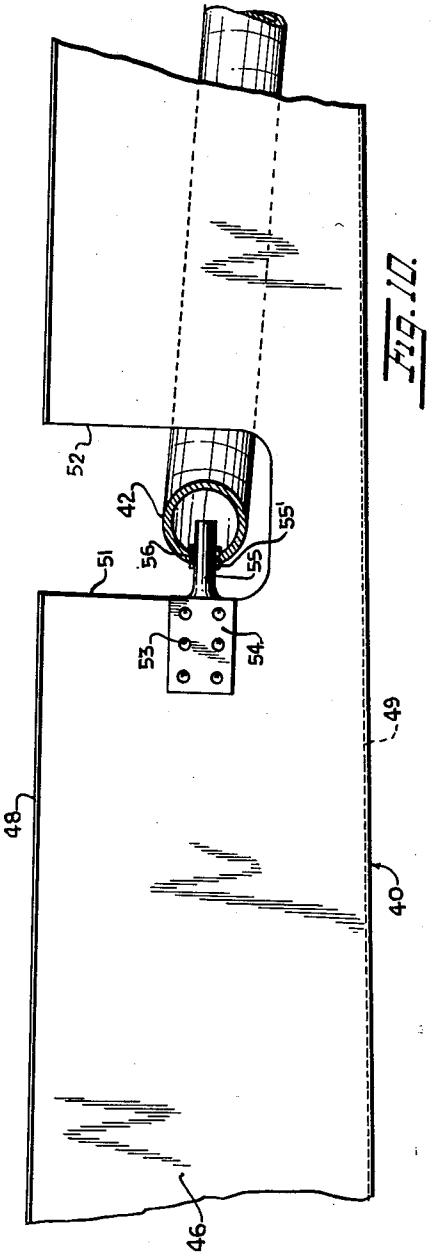


Fig. 10

INVENTOR.
MARC ROSEN
BY
ATTORNEY

Jan. 29, 1963

M. ROSEN

3,075,257

TILTABLE TAPERED SLAT CANOPY

Filed July 27, 1961

7 Sheets-Sheet 5

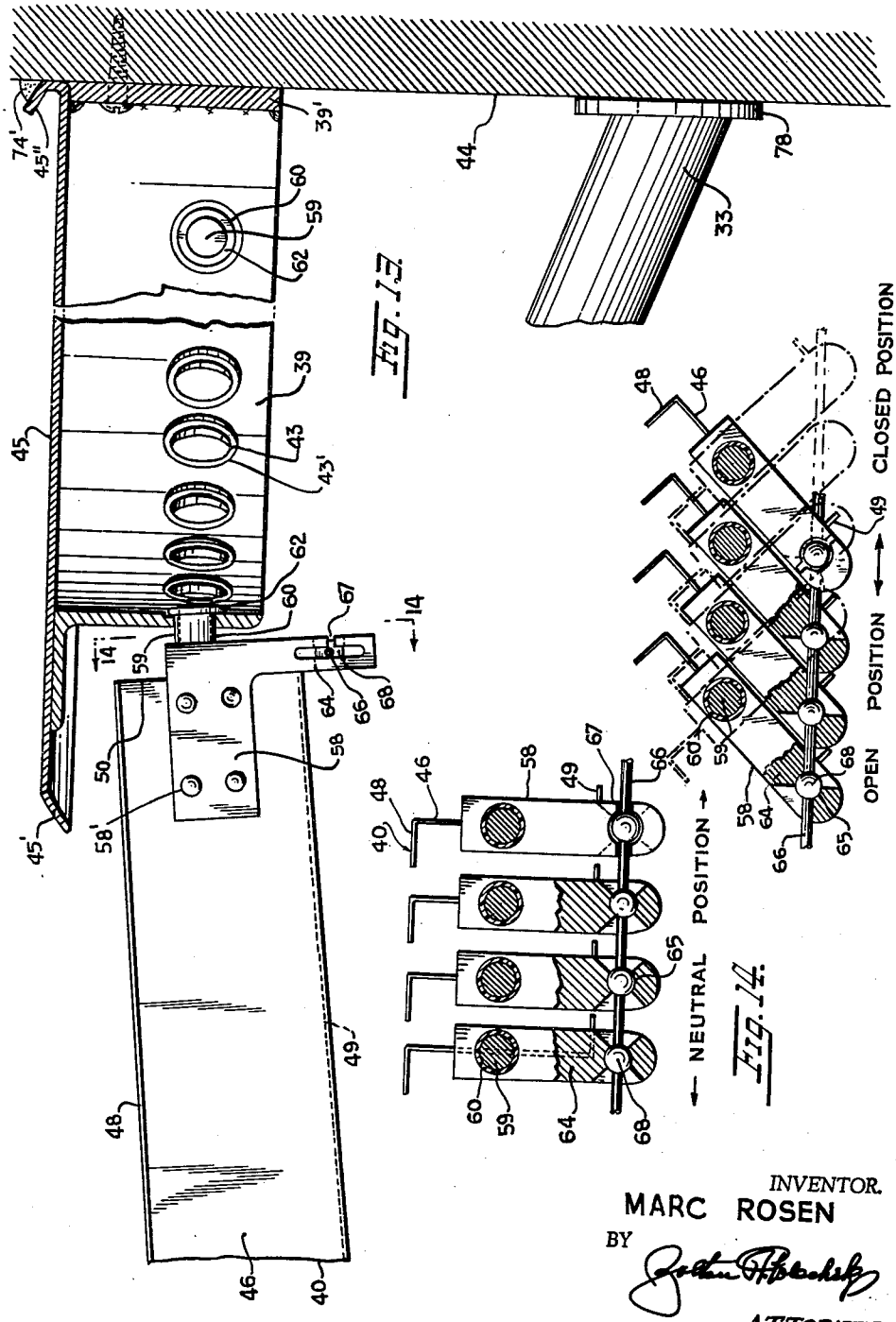


Fig. 13

Fig. 15

Fig. 14

INVENTOR.
MARC ROSEN
BY
ATTORNEY

Jan. 29, 1963 M. ROSEN 3,075,257

TILTABLE TAPERED SLAT CANOPY

Filed July 27, 1961 7 Sheets-Sheet 6

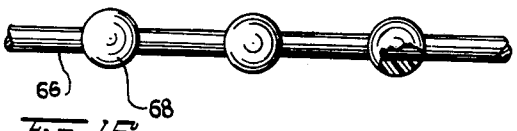


Fig. 16.

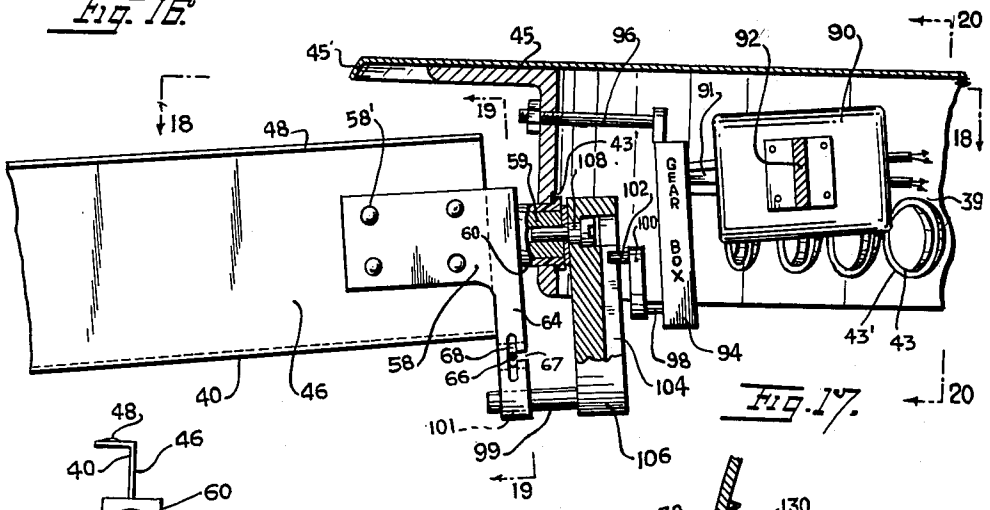


Fig. 17.

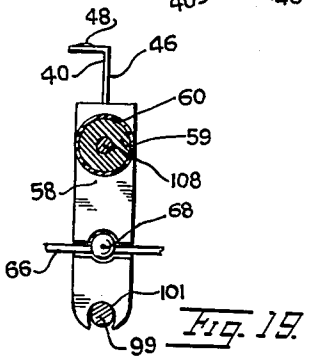


Fig. 19.

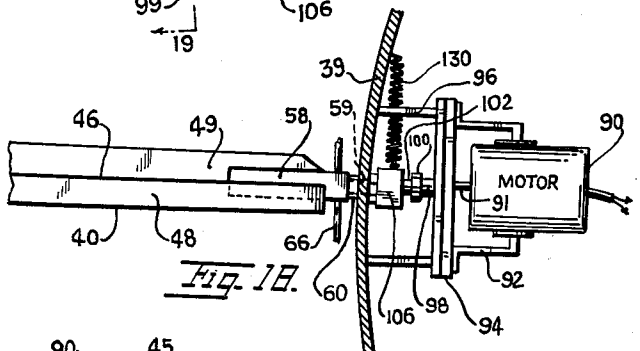


Fig. 18.

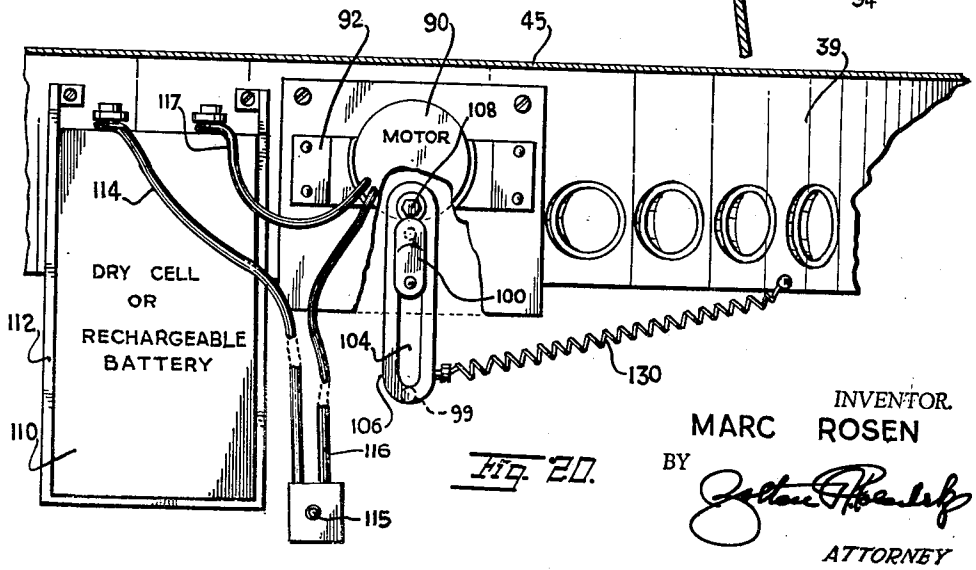


Fig. 20.

INVENTOR.
MARC ROSEN
BY
ATTORNEY

Jan. 29, 1963 M. ROSEN 3,075,257

TILTABLE TAPERED SLAT CANOPY

Filed July 27, 1961 7 Sheets-Sheet 7

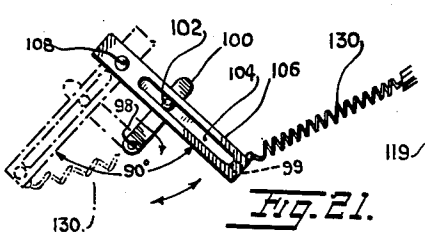


Fig. 21.

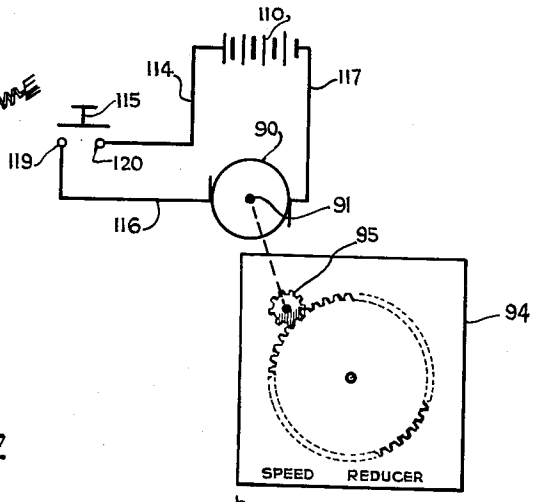


Fig. 22.

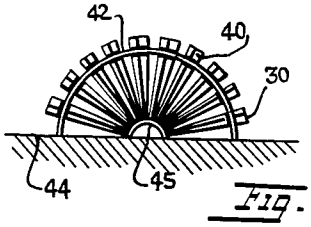


Fig. 23.

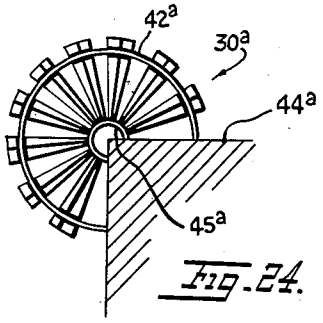


Fig. 24.

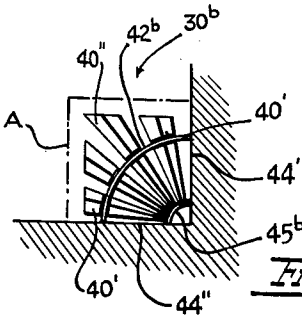


Fig. 25.

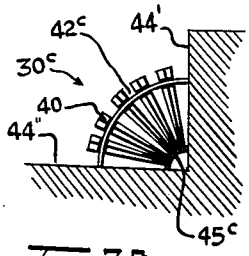


Fig. 26.

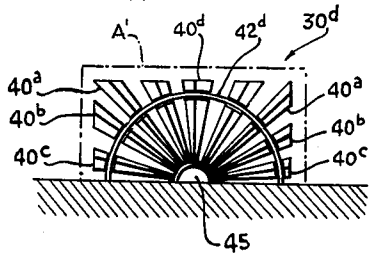


Fig. 27.

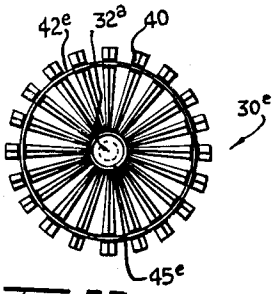


Fig. 28.

INVENTOR.
MARC ROSEN
BY
ATTORNEY

United States Patent Office 3,075,257 Patented Jan. 29, 1963

3,075,257

TILTABLE TAPERED SLAT CANOPY

Marc Rosen, 500 Atlanta Ave., Massapequa, N.Y.

Filed July 27, 1961, Ser. No. 127,322
3 Claims. (Cl. 20—57.5)

This invention concerns a canopy having multiple, tapered, tiltable slats.

According to the invention the slats are substantially S-shaped in cross section and overlap each other in closed position so that falling rain can drain off from one slat to the other. The slats are disposed in a partial or wholly conical array on a pipe frame. A motor driven assembly is provided for tilting the slats which are linked by a beaded actuator rod. The slats may be formed of thin metal or plastic material. If made of metal the slats may be painted or anodized in various colors. The canopy can withstand year round out-of-door use. It is intended for outdoor or indoor functional or decorative use. It is light in weight, easy to assemble, and inexpensive in construction.

It is therefore one object of the invention to provide a canopy having a plurality of tiltable, tapered, S-shaped slats.

A further object is to provide a canopy having a plurality of tiltable, tapered S-shaped slats interconnected by a beaded actuator rod, for simultaneous tilting, and a motor driven assembly operatively connected to said rod for tilting the slats.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

FIG. 1 is a top plan view of a semi-conical canopy embodying the invention, only a few of the slats being shown thereon.

FIG. 2 is a front elevational view of the canopy of FIG. 1, showing portions of a mounting frame carrying several slats thereon.

FIG. 3 is a side elevational view of the canopy of FIG. 2.

FIG. 4 is a side elevational view of one slat, part of the slat being broken away.

FIG. 5 is a top plan view of the slat of FIG. 4, part of the slat being broken away.

FIG. 6 is an end view on an enlarged scale taken on line 6—6 of the slat of FIG. 4.

FIG. 7 is a front elevational view of a rain trough and shield associated with the canopy.

FIGS. 8 and 9 are sectional views on enlarged scales taken on lines 8—8 and 9—9, respectively, of FIG. 7.

FIG. 10 is a side elevational view on an enlarged scale of a portion of a slat and a part of the mounting frame therefor.

FIG. 11 is an elevational view on an enlarged scale showing part of a mounting assembly for the frame.

FIG. 12 is a side elevational view on an enlarged scale of part of a mounting assembly for the frame, with part of the frame and assembly shown in vertical section.

FIG. 13 is a sectional view on an enlarged scale through another part of the mounting frame and shield, with parts broken away, and a portion of a slat tiltably engaged on the frame.

FIG. 14 is a vertical sectional view taken on line 14—14 of FIG. 13 showing a plurality of slats in neutral vertical positions.

FIG. 15 is a view similar to FIG. 14 showing by solid lines the slats tilted in fully open position, and further

showing by dotted lines the slats tilted in fully closed position.

FIG. 16 is a side elevational view on an enlarged scale of portions of the beaded actuator rod, parts being broken away.

FIG. 17 is a sectional view on an enlarged scale taken on line 17—17 of FIG. 1, showing parts of the slat tilting assembly in section and in elevation.

FIGS. 18, 19 and 20 are sectional views taken on lines 18—18, 19—19 and 20—20, respectively, of FIG. 17.

FIG. 21 is a diagram illustrating the mode of operation of a drive mechanism and linkage employed in the slat tilting assembly.

FIG. 22 is a diagram of an electrical circuit and mechanical drive employed in the slat tilting assembly.

FIGS. 23–28 are plan view diagrams of various possible canopy arrangements, according to the invention.

Referring to FIGS. 1, 2 and 3, the canopy 30 is shown elevated above the ground G by three pairs of posts 32. Each pair of posts is disposed in a V-shaped array with the posts joined at the apex of the V, but any type of support can be used. The posts support a semi-conical array of slats 40. Each slat is S-shaped in cross section or substantially so. The slats are tiltably suspended from an arcuate pipe frame 42 disposed in a horizontal plane and supported on the posts 32. At its free ends the pipe frame is secured to hangers 35 carried by rain trough member 38 and rain deflector member 36. Holes 56 in the pipe frame are engaged by hanger members on the slats.

The slats are tapered in width and height from the outer ends to their inner ends. The inner ends are tiltably engaged on an arcuate angle bar 39 carried by a vertical supporting wall 44 of a building or the like. A semi-circular rain shield 45 is secured to the angle bar and extends radially outward over the narrow inner ends of the slats. Braces 33 support the angle bar on wall 44. The slats thus extend radially outward from the angle bar beyond the pipe frame 42 in downwardly inclined overlapping positions as clearly shown in FIG. 2. The number of slats will depend on the particular installation, its size, location, etc. In one particular installation, the pipe frame 42 was designed with a radius of about nine feet and the slats were ten feet long so that the canopy could cover a semicircular area of about 300 square feet extending outwardly from the wall 44. The canopy was designed to include seventy slats disposed in semi-conical array as indicated in FIGS. 1–3.

In FIGS. 4, 5, 6, 10 and 13 the slat 40 is shown in detail. The slat has a flat elongated web 46 with flanges 48, 49 extending outwardly in opposite lateral directions substantially perpendicularly to web 46 at opposite edges of the web. The web 46 tapers in height from its wide end 47 to its narrow end 50. A cutout 52 is formed in the plate near the outer, wider end 47 through the top flange 48. On the forward or outer edge 51 of the cutout is secured by rivets 53 a hanger bracket 54. This bracket has a pin 55 extending into the cutout for engagement in a hole 56 in the pipe 42. At its narrow end, the slat carries another hanger bracket 58 attached to the slat by flush rivets 58'. This bracket has a pin 59 extending outwardly of the slat to engage in one of holes 43 formed in the angle bar 39; see FIG. 13. A bearing or grommet 55' is inserted in hole 50 to receive pin 55; see FIG. 10.

The pins 59 bear in and are retained in hole 43 by bearing sleeves 60. Each sleeve has a flange 62 disposed inside the curved bar 39. The thrust-bearing faces of the sleeves bear on spot-faces 43'. Hanger bracket 58 is provided with a depending foot 64 in which is formed a recess or cage 65; see FIGS. 13–15. The foot is laterally slotted at 67 to permit insertion of a rod 66 having spaced

beads 68 attached thereto. The circular spacing between beads 68 is equal to the circular spacing between cages 65.

The beaded rod 66, having as many bears as there are slats, is disposed in a horizontal plane and each bead is inserted into its corresponding cage 65. This rod serves to tilt all of the slats simultaneously between open and closed positions as indicated in FIG. 15. In the closed position of the slats (also see FIG. 2), any rain falling on flange 48 of any slat will flow off the inclined flange 48 to the web 46 of the next adjacent slat. Any rain falling on web 46 or flange 49 will flow into the trough defined thereby and will drain off the downwardly inclined salt at end 47. In the neutral position with wegs 46 vertical and flanges 48, 49 horizontal, in the open position, and in the infinite intermediate positions between fully open and fully closed, light and air freely pass between the slats. The range of adjustment of the slats between open and closed positions is about 90°. The neutral position is the winter position in that it is the optimum position for carrying snow loads.

FIG. 13 also shows the shield 45 overlying the arcuate angle bar 39 formed with holes 43 and spot-faces 43' to receive the hanger pins 59. The shield has a bent outer lip 45' so that rain may flow off the shield onto the overlapped slats 40 beneath and flow downwardly in the slat troughs to the outer perimeter of the canopy. Braces 33 are attached to the bottom edge of the arcuate bar 39 and are anchored in flange plates 78 secured to wall 44. Arcuate bar 39 is stiffened in its semicircular shape by bar 39' which is welded or otherwise fastened to bar 39. Shield 45 is cemented to arcuate bar 39. The portion of shield 45 adjacent to building 44 is bent up to form a recess 45'' for caulking 74.

FIGS. 7, 8 and 9 show details of the rain trough, rain deflector and mounting plate structure. Rain trough 38 has a generally triangular vertical rear plate 70. The trough portion, which catches and channels off rain cascading down wall 44 and deflecting from flange 48 of the slat next to it, is formed by the upturned end 71 of the plate 70. Rain deflector 36 has a generally triangular vertical plate 70^a. The deflector portions, which deflects rain cascading down wall 44 into the trough formed by flange 49 and web 46 of the slat next to it, is formed by the bent end 71^a of the plate 70^a. The slats in FIGS. 8 and 9 are shown in their closed position. The top edge of each plate is bent forwardly at 72 and caulking 74 is applied therein at wall 44. Hangers 35 are carried by rivets or bolts 73 on the plates near their wider end and have forwardly extending pins 75 with holes 76. Each pin 75 receives the open free end of pipe frame 42. Nuts and bolts 77 fasten the frames 42 to pins 75.

FIGS. 11 and 12 show details of the fittings connecting pipe frame 42 and posts 32. On top of each post is a cap 80 terminating in a flat flange 82. This flange is secured by a bolt 81 and nut 83 to a depending flange 84 integral with a U-shaped bracket plate 85. The bracket plate is secured to the outer sides of the pipe frame 42 by a pair of bolts 86 and nuts 87. FIG. 11 also shows parts of two slats 40 tilted in open position on frame 42.

FIG. 16 shows part of the actuator rod 66 used for tilting the slats. This rod has a series of spaced beads 68 which fit into the recesses or cages 65 in the slat hanger 58. This rod is preferably made sufficiently flexible, such as of wire rope with spaced steel balls, staked in place.

In FIGS. 17–21 is illustrated the motor drive assembly for tilting the slats. A motor 90 is secured by a bracket 92 to a speed reducing gear box 94. The box is supported by bolts 96 on the arcuate angle bar 39. A shaft 98 extends from the gear box. Crank 100 is secured to the shaft and is turned thereby. Crank 100 has a forwardly extending pin 102 which moves in a slot 104 in lever 106. The lever is attached by a bolt 108 to pin 59 of one of the slat hangers 58. A battery 110 is supported in a bracket 112 on bar 39. Wires 114, 116 are connected between the battery and mootr respectively to a push button switch. Wire 117 is connected to the motor from battery 110. FIG. 22 shows the electric circuit for the assembly with push button 115. Switch contacts 119, 120 are in series circuit with the battery 110 and motor 90 via wires 114, 116 and 117. The motor shaft 91 is indicated operatively connected to shaft 93 of a small gear 95 in the gear box 94. A suitable speed reducer, such as is shown in FIG. 22, is used. A crank-pin 99 extends outwardly of the lower end of lever 106 and engages in an arcuate groove 101 formed in the lower end of hanger leg 64; see FIG. 19.

When the motor 90 rotates shaft 91 the gear train in box 94 is driven and crank 100 rotates through 360°. The motor is energized only when push button 115 is depressed to close contacts 119, 120. Crank 100 causes lever 106 to pivot angularly laterally through an angle of 90° as indicated in FIG. 21. Spring 130 attached to the lever assists the lever to tilt angularly to the closed position in one direction, when pin 102 is located in the upper part of a slot 104 and exerts minimum leverage to turn the slat. As the lever 106 tilts, it advances or retracts the beaded chain 66 axially to tilt all the other slats correspondingly. For as long as the push button is actuated, the motor will be energized and the slats will oscillate between fully open and fully closed postiions. The push button can be released at any time to set the slats in any selected angle of tilt at or between open and closed positions as indicated in FIG. 15.

An alternate, purely mechanical drive system, consisting of hand crank, pulley and wire rope can be used.

In FIGS. 23–28 are shown schematically various arrangements of the slats 40 to form different canopies. In FIG. 23 the canopy arrangement 30 is semi-conical as explained in connection with FIGS. 1–3. The slats are pivotally supported on pipe frame 42 and at their radially inner ends under shield 45. The canopy covers a semicircular area extending outwardly from wall 44.

In FIG. 24, the canopy 30^a extends around an exterior corner 44^a and covers an area which is three-quarters of a circle. Shield 45^a is a three-quarters segment of a circle. Pipe frame 42^a extends arcuately 270°.

In FIG. 25, the canopy 30^b extends over a rectangular area A inside a corner 44', 44''. The slats 40' at walls 44' and 44'' are shorter than the inner slats 40'' disposed between slats 40'. Pipe frame 42^b and shield 45^b extend arcuately 90°.

In FIG. 26, the canopy 30^c extends over a quadrant or quarter of a circle at inside corner 44', 44''. Pipe frame 42^c and shield 45^c extend arcuately 90°. All of the slats 40 are of the same length.

In FIG. 27, pipe frame 42^d extends through 180°. Canopy 30^d covers a wide rectangular area A' since slats 40^a at the corners are lengthened while the intermediate slats 40^b are shorter and the outer slats 40^c and 40^d are shorter than the other slats. Shield 45 is semicircular like the shield in FIG. 23.

In FIG. 28, the canopy 30^e has slats 40 of equal length supported on a circular pipe frame 42^e. Shield 45^e is circular and may be carried on a central vertical post 32^a, or left unsupported at the center as for a dome-type structure. The rain trough and deflector will not be needed for this arrangement.

In all the canopies 30–30^e of FIGS. 23 to 28, the slats will be tiltable by a mechanism carried on a curved angle bar under the shield as illustrated in FIGS. 18–22.

All of the canopies have the common feature of employing slats which are tapered in form from radially outer to radially inner ends. The slats are generally S-shaped in cross section to overlap in closed position for draining off rain water from one slat to the other. The canopies are all light in weight, easy to assemble, and permanent in character, designed for year-round use in any climate. While the canopies are especially intended for outdoor use as awnings over patios, windows, porches,

entranceways, stairways and the like, they can be used indoors for decorative and commercial displays.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise constructions herein disclosed and that various changes and modifications may be made within the scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent is:

1. A canopy comprising an arcuate horizontal pipe frame, an arcuate horizontal bar disposed radially inward of said pipe frame and elevated above the frame, a plurality of elongated tapered slats tiltably supported in a conical array on said frame and bar, each of said slats being generally S-shaped in cross section to overlap each other when the slats are tilted, means interconnecting the slats so that all slats tilt simultaneously and at the same angle, and a drive mechanism engaging said means to tilt the slats through approximately 90° between open and closed positions thereof, a rain shield over the arcuate bar, a rain trough and a rain deflector extending in a vertical plane away from said shield, and hangers carried by said rain trough and rain deflector and engaging ends of said frame.

2. A canopy comprising an arcuate horizontal pipe frame, an arcuate horizontal bar disposed radially inward of said pipe frame and elevated above the frame, a plurality of elongated tapered slats tiltably supported in a conical array on said frame and bar, each of said slats being generally S-shaped in cross section to overlap each

other when the slats are tilted, means interconnecting the slats so that all slats tilt simultaneously and at the same angle, a drive mechanism engaging said means to tilt the slats through aproximately 90° between open and closed positions thereof, a rain shield over the arcuate bar, a rain trough and a rain deflector extending in a vertical plane away from said shield, hangers carried by said rain trough and rain deflector engaging ends of said frame, and posts disposed in vertical planes engaged with said frame between the ends thereof to support the frame horizontally.

3. A canopy comprising an arcuate horizontal pipe frame, an arcuate horizontal bar disposed radially inward of said pipe frame and elevated above the frame, a plurality of elongated tapered slats tiltably supported in a conical array on said frame and bar, each of said slats being generally S-shaped in cross section to overlap each other when the slats are tilted, means interconnecting the slats so that all slats tilt simultaneously and at the same angle, a rain shield over the arcuate bar, a rain trough and a rain deflector extending in a vertical plane away from said shield, hangers carried by said rain trough and rain deflector engaging ends of said frame, and posts disposed in vertical planes engaged with said frame between the ends thereof to support the frame horizontally.

References Cited in the file of this patent

UNITED STATES PATENTS

Re. 23,734	Korman et al.	Nov. 10, 1953
1,447,189	Simon	Mar. 6, 1923
2,584,982	Burke	Feb. 12, 1952