April 29, 1958 D. CRITOPH 2,832,362

RETRACTILE AWNINGS

Filed June 19, 1956 2 Sheets-Sheet 1

Fig. 1

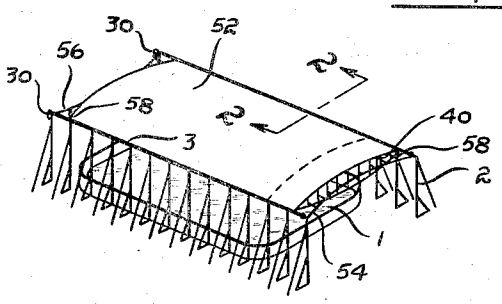
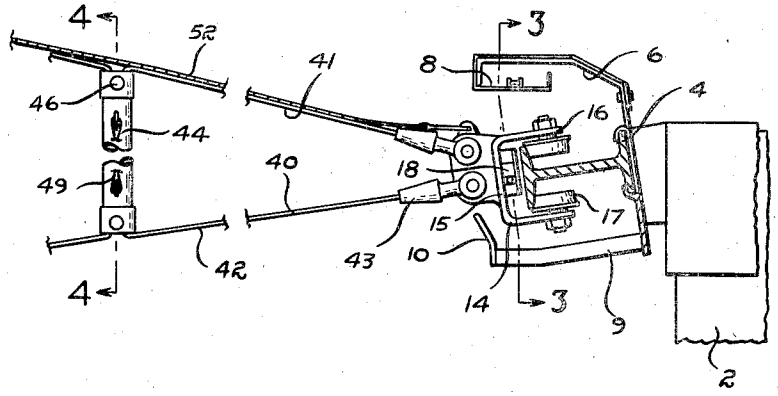


Fig. 2



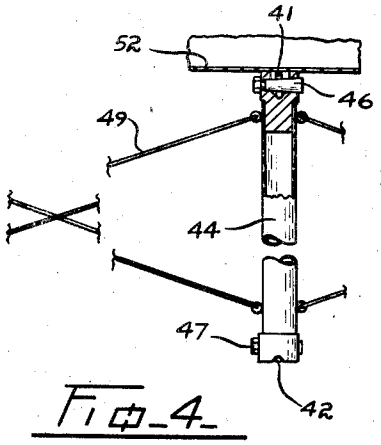


Fig. 4

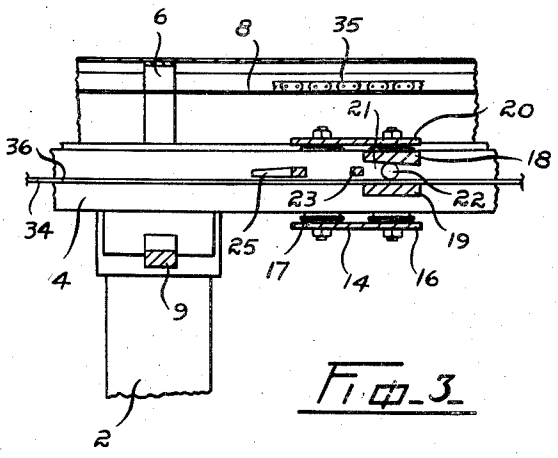


Fig. 3

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April 29, 1958 D. CRITOPH 2,832,362

RETRACTILE AWNINGS

Filed June 19, 1956 2 Sheets-Sheet 2

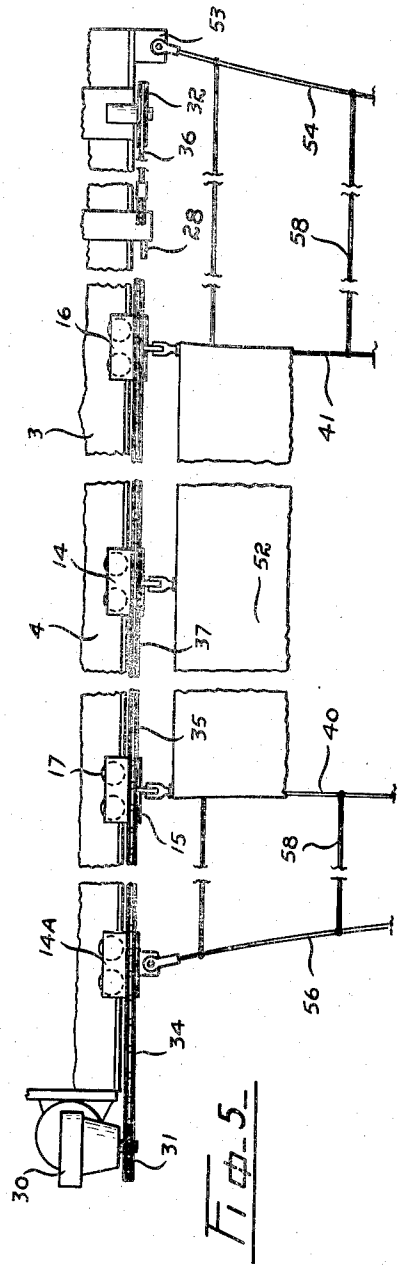


Fig. 5

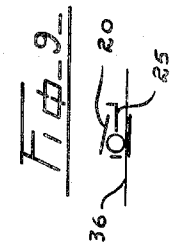


Fig. 9

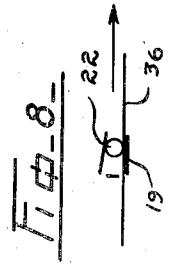


Fig. 8

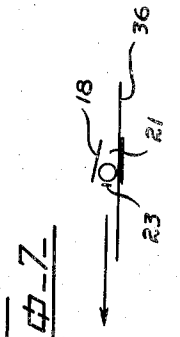
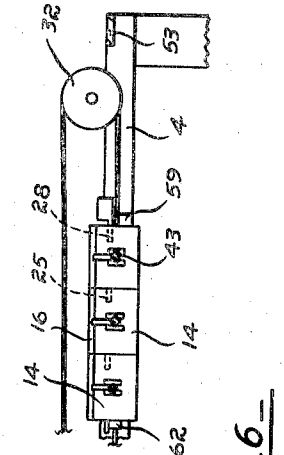
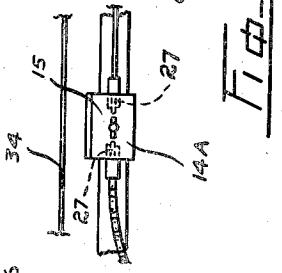
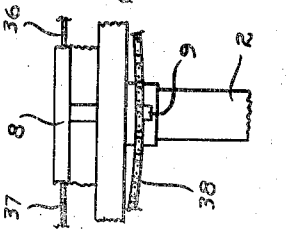


Fig. 7







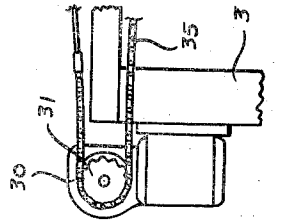


Fig. 6

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RETRACTILE AWNINGS

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Application June 19, 1956, Serial No. 592,450

11 Claims. (Cl. 135—7.1)

My invention relates to improvements in retractile awnings.

The object of the present invention is to provide an awning or roof of textile or other material which may be applied to cover large areas such as outdoor skating rinks etc. and which may be retracted mechanically to one end of the playing area.

Further objects are to provide a flexible trussing structure whereby the roof may be substantially cambered when extended so that no depressed or pocketed areas can develop to cause water to collect on said roof, also to provide that when extended the roof shall be tensioned transversely and longitudinally of the field and that the gable edges of the roof material shall extend across the area in a straight line.

A still further object is to make the roof bellows fashion and to utilize a pair of endless members mounted longitudinally of the roof to cause said roof to progressively fold towards one end, and also to be moved to cover the area and progressively straighten out said folds.

Other objects and advantages will appear as the specification proceeds.

Referring to the accompanying drawings:

Figure 1 is a perspective view of the invention on a reduced scale.

Figure 2 is a vertical sectional detail view taken on the line 2—2 of Figure 1.

Figure 3 is a section taken on the line 3—3 of Figure 2.

Figure 4 is a section taken on the line 4—4 of Figure 2.

Figure 5 is a fragmentary plan view showing one side of the structure with the awning extended.

Figure 6 is a fragmentary elevational view of one side showing the disposition of the carriages when the awning is retracted.

Figures 7, 8 and 9 are diagrammatic views showing different positions of the automatic cable grip as the awning is being extended and retracted.

In the drawings like characters of reference indicate corresponding parts in each figure.

The numeral 1 indicates a playing area such for instance as an outdoor skating rink. A plurality of vertical standards 2 are erected in rows to form sides 3. Connecting the upper ends of each standard 2 of each side 3 is a horizontal track rail 4 which is preferably a structural steel H-section extending beyond the playing area. At each standard a bracket 6, see Figures 2 and 3, is attached, which extends over and inwardly of the track and supports an inwardly turned shelf member 8. An inwardly projecting rod 9 having an upwardly projecting lip 10 is fitted at the base of each bracket 6. The purpose of the shelf member 8 and the projecting rod 9 will be hereinafter described.

Mounted on each track rail is a plurality of carriages 14, each of which is U-shaped in cross section, see Figure 2, having a face plate 15 from which lugs 16 extend to carry freely rotatable track wheels 17. On the inside of the face plates of the carriages 14 is a grip member 18, see Figure 3, having a horizontal lug or bed 19 and an inclined lug 20 which combine to form a tapered slot 21, and freely movable within the slot 21 is a roller 22, which roller is kept within the length of the slot by a stop

23. At the left end of each carriage a horizontal finger 25 is provided which lies in the path of a roller 22 in the next adjacent carriage to the left as indicated in dotted line in Figure 6. The carriage to the left of Figures 5 and 6 is designated as 14A and may be referred to as the master carriage. The carriage 14A is provided on its inner face with horizontally disposed lugs 27 for the attachment of pulling means to be later referred to. Mounted in fixed position at the right end of the track rails 4, as shown in Figures 5 and 6, is a finger 28 which is aligned with the roller 22 of the next adjacent carriage 14 to the left.

Mounted upon the standards 2 at the left end of Figure 6 are two synchronous motors 30 driving chain sprockets 31 and mounted at the right end of said track are coacting sheaves 32. Each sprocket 31 and its coacting sheave 32 is connected by an endless driving element 34 which is made up of a length of chain 35 connected to one of the lugs 27 on the master carriage 14A and wound around the sprocket 31 and a length of cable 36 leading in the opposite direction from the master carriage 14A around the sheave 32 and from thence back to connect with the end of the chain 35, as shown in Figure 6. The endless driving element 34 will obviously have upper runs 37 which will be intermittently supported on the shelf members 8 and lower runs 38 will in part run through the tapered slots 21 of the grip members 18 under the rollers 22, and in part ride on the rod 9 to prevent undue sagging.

It will be noticed that the master carriages 14A will always be spaced some little distance from the next adjacent carriage, see Figure 6, and that they are disposed, when the awning is extended, near the left end of Figures 5 and 6. The carriages 14 are obviously arranged in pairs, one on each track rail 4 and each pair, except the carriages 14A, will be connected together with what may be called a flexible truss 40. Each truss 40 consists of an upper cable 41 and a lower cable 42, the ends of which are secured by clevises 43 to a pair of carriages. The cable 42 forms a suspension member which carries a plurality of struts 44 which are of various length and are spaced apart as shown in Figure 2, the upper cable 41 is supported on the top of each of the struts and is cambered thereby. Both cables 41 and 42 are firmly connected to the struts so that there will be no slackening of truss members either when at rest with the awning extended or retracted, or when being moved from one position to another. The struts 44 are preferably tubular members into the ends of which the cables 41 and 42 are looped and secured by tapered pins 46 having nuts 47 by which the pins may be moved endwise into gripping engagement with said cables.

The trusses 40 are connected one to another by a cable 49 which cross each other intermediate their length as shown in Figure 4. An awning 52 overlies all the trusses 40 and is suitably secured thereto.

An eyed plate 53 is secured at the end of each track rail 3, see Figures 5 and 6. A cable 54 extends in a horizontal curve between said eyed plates. A similar cable 56 extends in a horizontal curve between the carriages 14A and from each of the cables 54 and 56 short tensional members 48 extend horizontally to each of the adjacent trusses 40, so that when the awning is fully extended the end edges of the awning remain straight due to the pull transmitted to it through the endmost pair of trusses, the struts 44, the tension members 58 and the cables 54 and 56.

The fingers 28 adjacent the sheaves 32 are coupled with stops 59 against which the carriages 14 nearest those sheaves are brought to rest when retracting the awning to folded position. Since the trusses are cross braced

longitudinally of the playing area they will remain in strictly vertical position when the awning is extended and since they are adapted to ultimately move in sequence, one toward another as the awning is retracted, there will be very little tendency for any one of them to swing from a vertical position and if any of them do swing it will be to a slight extent only.

A stop collar **62** may be applied to each of the cables **36** at one carriage spacing from the carriage **14A**, so that when the pull is exerted on the cables **36** to fully retract the awning, the carriage **14A** will not be brought into close proximity to the nearest truss **40** and a minimum amount of cable movement will be required to fully retract the awning above the playing area.

Assuming the awning to be fully extended as shown in Figure 5, on starting the motors **30** to rotate the sprockets **31** in an anticlockwise direction the lower run of the cable **36** will cause the rollers **22** to move from the position shown in Figure 7 to the position shown in Figure 8, thus causing said cable to become locked in the tapered slot **21**. The awning **52** is then moved to the right with the several carriages moving in unison along the track rails until the extreme right hand pair of carriages abut the stops **59**, whereupon the fingers **28** dislodge the rollers of said pair of carriages from gripping engagement with the cable **36** and the cable is free to run through the stationary carriages. The next adjacent pair of carriages are moved into abutment with the stationary carriages and their rollers are dislodged by the fingers **25** of the latter carriages. Thus the awning is folded in accordion fashion with each bay forming one fold until the entire awning is fully retracted and is disposed at one end of the playing area. As the last pair of carriages is brought to a stop by the adjoining fingers **28** it is intended that a suitable limit switch, not shown, should be actuated to shut off the motors **30**.

As previously stated when the carriages are in contact with each other as shown in Figure 6, all the rollers **22** are held out of gripping engagement with the cable so that when the motors are again energized to turn in a reverse direction the master carriages **14A** first move to the left to stretch the awning of the first bay and cause the next adjacent carriage to follow said master carriages along the track rails **4**. Thus the several pairs of carriages are moved progressively endwise along the rails until the awning is fully extended to cover the entire playing area. Obviously a second limit switch, not shown, would be provided to switch off the motors **30** and prevent the awning from being stretched beyond a desired limit.

What I claim as my invention is:

1. A retractile awning comprising a pair of elevated spaced track rails extending lengthwise of an area to be covered, a plurality of pairs of carriages movable along the rails, said pairs of carriages being connected together transversely with flexible trusses having upper and lower cables, an awning supported upon one of the cables of said trusses, and means for imparting movement to the carriages to retract the awning towards one end of the track rails.

2. A retractile awning comprising a pair of elevated spaced track rails extending lengthwise of an area to be covered, a plurality of pairs of carriages movable along the rails, said pairs of carriages being connected together transversely with flexible trusses having upper and lower cables, an awning supported upon one of the cables of said trusses, and means for imparting movement to the carriages to retract the awning towards one end of the track rails into folds with one fold lying between each pair of trusses.

3. A retractile awning as claimed in claim 1, the means for imparting movement to the carriages being endless flexible members extending the length of the awning and engaging one of at least one pair of carriages.

4. A retractile awning as claimed in claim 1, wherein a cable is tensioned transversely between the track rails adjacent at least one end of the awning and said cable is connected at spaced intervals of its length to the adjacent end edge of a truss to maintain said adjacent end edge in a substantially vertical plane.

5. A retractile awning comprising a pair of elevated spaced track rails extending lengthwise of an area to be covered, a plurality of pairs of carriages movable along said rails, said pairs of carriages being connected together by flexible trusses and an awning carried upon said trusses adapted to be retracted into folds as the pairs of carriages are moved toward each other adjacent a given position lengthwise of the track rails, each of said trusses having an upper cable and a lower supporting cable and a plurality of vertical struts extending between said cables.

6. A retractile awning as claimed in claim 5, the struts of one truss being cross braced with similar struts of an adjacent truss.

7. A retractile awning as claimed in claim 5, the cross bracing between the struts of a truss being of flexible material.

8. A retractile awning comprising a pair of elevated spaced track rails extending lengthwise of an area to be covered, a plurality of pairs of carriages movable along the rails, some of said pairs of carriages being connected together transversely to support an awning, endless flexible members for imparting movement simultaneously to the carriages of each pair to retract and extend the awning lengthwise of the track rails, each of said flexible members having running engagement with some of the carriages, some of said carriages having a one-way gripping element to automatically grip the flexible members whereby the carriages having said gripping elements are moved in one direction to retract the awning and stop means carried by some of the carriages for disconnecting the gripping element from the flexible member.

9. A retractile awning as claimed in claim 8, and a stop carried on each of the track rails for disengaging the gripping element of the adjacent carriage, as said carriage approaches the end of its awning retracting movement.

10. A retractile awning comprising a pair of elevated spaced track rails extending lengthwise of an area to be covered, a plurality of pairs of carriages movable along the rails, said pairs of carriages being connected together transversely with flexible trusses having upper and lower cables, an awning supported upon one of the cables of said trusses, an endless member extending along each track rail, a master carriage upon each track rail, one of said endless members being connected to each master carriage to move it endwise of the track, said master carriages being spaced from one end of the awning and one of the trusses, and cable means connecting the master carriages to said truss at intervals of its length to maintain the truss in a substantially straight line vertical plane when the awning is extended.

11. A retractile awning comprising a pair of elevated spaced track rails extending lengthwise of an area to be covered, a plurality of pairs of carriages movable along the rails, said pairs of carriages being connected together transversely with flexible trusses having upper and lower cables, an awning supported upon one of the cables of said trusses, and means for imparting movement to the carriages to retract the awning towards one end of the track rails and a transversely extending cable tensioning structure indirectly connected to the end edges of the awning to keep said edges substantially parallel with each other when the awning is extended, said tensioning member being disposed in a substantially horizontal plane.

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