

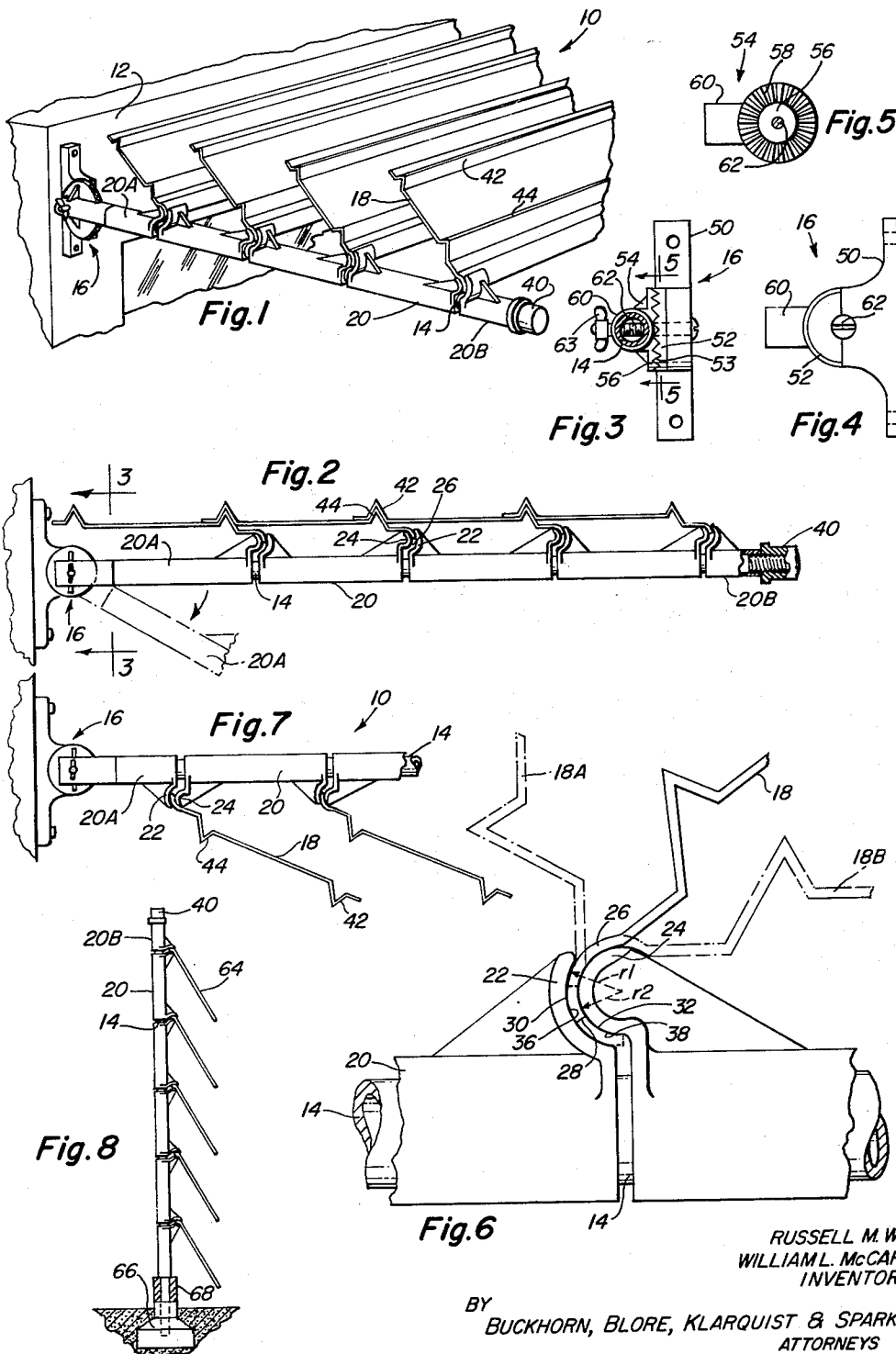
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ADJUSTABLE LOUVER STRUCTURE

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ADJUSTABLE LOUVER STRUCTURE

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The present invention relates to louver structures for use as awnings, patio covers, fencing and the like, and more particularly to an angularly adjustable louver structure.

Louver structures are widely used as sunshades for reducing heat, glare and reflection from direct sunlight while permitting light to enter and air to circulate beneath the sunshade. Nevertheless the angular inclination of the louvers in such structures cannot usually be adjusted to admit more or less light as desired, to account for the different positions of the sun in the sky, and to shut out rain when necessary.

Accordingly, a primary object of the invention is to provide a new and improved adjustable louver structure which eliminates the above objections.

More specifically, an object of the invention is to provide a louver structure having angularly adjustable louver blades.

Another object is to provide a new and improved louver structure in which the entire louver-supporting framework is adjustable.

Still another object is to provide a new and improved louver structure in which the louver blades are so shaped and can be so adjusted as to provide a rainproof cover.

Another object is to provide a new and improved louver structure including an adjustable bracket support for varying the inclination of the entire louver-supporting framework.

A further object is to provide a louver structure that is economical to manufacture and easy to install.

In furtherance of the foregoing objects and in accordance with an illustrated embodiment, the invention comprises a plurality of parallel louver blades spanning spaced support rods, each of which rods supports a series of sleeve members. Both ends of each sleeve member has a curved clamping jaw that cooperates with a clamping jaw on the next adjacent sleeve member in retaining a curved trailing edge of a louver blade therebetween. A screw cap threaded onto one end of each support rod when screwed tightly against an endmost sleeve forces all of the sleeves on one rod and therefore their cooperating jaws together to clamp the louver blades in their desired angular positions. The curved trailing edge of each louver blade defines an arc having a constant radius of curvature, and the curved clamping surface of each jaw conforms with the curvature of the curved louver surface it engages, so that when the screw caps are unthreaded to release clamping pressure from the louver blades, the curved louver edges can be rotated within their clamping jaws to permit adjustment of the projecting planar portions of the blades to any desired angle of inclination.

The above and other objects and advantages will become more apparent upon inspection of the following detailed description together with the accompanying drawing, in which:

FIG. 1 is a perspective view showing a louver structure in accordance with the invention used as an awning;

FIG. 2 is an enlarged side elevational view of the structure of FIG. 1 but with the louvers in a closed position;

FIG. 3 is a view on a slightly enlarged scale taken along the line 3—3 of FIG. 2;

FIG. 4 is a side view of the mounting bracket shown in FIG. 3;

FIG. 5 is a view taken approximately along the line 5—5 of FIG. 3;

FIG. 6 is an enlarged view showing the clamping jaw assembly of the structures of FIGS. 2 and 7;

FIG. 7 is a side elevational view of a portion of a modified structure in accordance with the invention; and

FIG. 8 is a side view of a louver structure in accordance with the invention used as fencing.

With reference to the drawings, FIG. 1 illustrates a louver structure 10 mounted as an awning to protect a glassed portion of a store front 12 from the glare of direct sunlight. The louver structure includes a plurality of spaced-apart support rods 14, only one of which is shown, cantilevered out from an adjustable mounting bracket 16 affixed to the store front 12. Four identical louver blades 18 span the support rods 14 and are supported parallel to one another by clamping means on the support rods.

As shown most clearly in FIG. 2, the clamping means comprises a series of elongate sleeves, or clamping members 20 slidably mounted on each support rod 14. Each sleeve 20 intermediate the opposite ends of the rod 14 has a pair of curved clamping jaws 22, 24 protruding laterally from the same side but opposite ends of the sleeve. Each curved jaw 22 on one sleeve 20 cooperates with a complementally curved jaw 24 on an adjacent end of the adjacent sleeve 20 to clamp a curved trailing edge portion 26 of a louver blade 18 therebetween when the two sleeves are forced together end-to-end.

Referring to FIG. 6, the curved trailing edge portion 26 of the louver blade 18 describes an arc of a circle from the trailing edge extremity 28 to the juncture of the trailing edge portion with the planar portion of the blade. The trailing edge portion has, therefore, a pair of concentric curved surfaces, including an outer curved surface 30 having a predetermined, constant radius of curvature r_1 and an inner curved surface 32 having a slightly smaller, but constant radius of curvature r_2 , both with respect to the same center of curvature.

The clamping jaws 22 and 24 have curved clamping surfaces 36 and 38 respectively, the concavely curved clamping surfaces 36 conforming in curvature to the outer curved louver surface 30, and the convexly curved clamping surface 38 conforming to the curvature of the inner louver surface 32. In other words, the concave clamping surface 36 has the same constant radius of curvature r_1 as the outer louver surface 30, and the convex clamping surface 38 has a slightly smaller, but constant radius of curvature r_2 equal to that of the inner louver surface 32. Thus when the jaws 22, 24 are not exerting clamping pressure on the curved louver edge portion 26, the edge portion 26 can be rotated within the jaws to change the angularity of the projecting planar portion of the blade 18. The extent of adjustment possible will, of course, depend on the circumferential lengths of the curved edge portion 26 and curved jaw surfaces 36 and 38. With the illustrated embodiment of FIG. 6, the blade 18 can be adjusted at any angle between a fully open, vertical position 18-A to a fully closed, horizontal position 18-B. The most common, sun-shading position of the blade 18, however, would lie somewhere between the two extremes such as, for example, at the forty-five degree inclination illustrated in solid lines.

Referring to FIG. 2, a screw cap 40 threaded onto the outer end of each support rod 14 retains the sleeves 20 on each rod, and, when screwed tightly against the outermost sleeve, the cap forces all of the sleeves 20, and therefore all the paired clamping jaws 22, 24, on one rod 14 together end-to-end to clamp the curved louver edges 26 between their respective pairs of clamping jaws 22, 24. By unscrewing the cap 40 slightly, clamping pressure against the blades 18 is released so that the louver blades can be readjusted. As shown most clearly in

FIG. 6, a slight clearance exists between adjacent sleeves 20 when a louver blade is clamped within the jaws 22, 24 of such sleeves. Thus when two sleeves 20 are forced together, all of the force of one sleeve against the other will be transmitted as clamping pressure by the jaws 22, 24.

The innermost and outermost end sleeves 20-A and 20-B, respectively, on each rod 14, each have only a single clamping jaw inasmuch as only one louver blade 18 is retained between each such sleeve and the single adjacent full sleeve 20. The end sleeves may be made by cutting a full sleeve 20 in two. The length of each rod 14, will, of course, depend on the number and width of louvers used. Similarly, the length of each sleeve will depend on the width of each blade, it being desirable to provide a sleeve length slightly shorter than the width of the blades so that the blades overlap slightly in their closed positions as shown in FIG. 2.

Each blade includes a pair of longitudinally extending V-shaped channels or grooves 42, 44 along its inner surface, one channel 42 being adjacent the leading edge and the other channel 44 being adjacent the curved trailing edge of the blade. The blades are so spaced by the sleeves 20 that the V-shaped ridge formed by the rear channel 44 of one louver extends within the V-shaped groove 42 at the leading edge of the rearwardly adjacent louver blade so as to prevent water on the upper surface of the louvers from seeping between adjacent blades to the protected area below. This feature is particularly useful when the structure is used as a patio cover in preventing rain showers from interrupting outdoor activities in progress beneath the cover.

As illustrated in dashed lines in FIG. 2, the support bracket 16 is angularly adjustable for mounting the support rod 14 at an inclination or declination with respect to the horizontal if desired. For this purpose the bracket includes a flanged base portion 50 that is fastened to the wall 12 by suitable anchor bolts (not shown). The base portion includes an integral face plate 52 having an annular toothed face 53 that extends, when the base is fastened to a vertical wall 12, in a vertical plane normal to the vertical plane of the wall. The bracket also includes a rod-holding portion 54 which is separable from the base portion 50 and has an annular face plate 56, the face of which has radially extending gripping teeth 58 for interengaging the gripping teeth 53 on the face plate 52 of the base portion. A barrel 60 on the rod-holding portion has a bore of a diameter for slidably receiving an inner end portion of the support rod 14. A bolt 62 extending through aligned apertures in the rod-holding portion, support rod 14 and base portion 50 fasten the support rod 14 within the barrel 60 and the rod-holding portion to the base portion with the aid of a wing nut 63. Because the bolt 62 extends centrally through the two annular face plate portions 52 and 56, the toothed face plate 56 can be rotated relative to the face plate 52 when the base and rod-holding portions are loosely fastened together, for adjusting the inclination of the barrel and thus the support rod 14. By tightening the wing nut 63, the toothed face plates 52 and 56 become interengaged to lock the barrel and rod in their adjusted positions.

FIG. 7 illustrates the same structure as that of FIG. 2 but with the sleeves 20 reversed and rotated 180 degrees on the support rod 14 so that their jaws 22, 24 depend from beneath the rod. The louver blades 18, therefore, depend from their clamping jaws 22, 24. With the blades in this position, the positions of the inner and outer end sleeves 20-A and 20-B of FIG. 2 are reversed so that the sleeve 20-A is at the outer end and the sleeve 20-B at the inner end of the support rod 14.

FIG. 8 illustrates the same basic structural elements as previously described, including a support rod 14, clamping sleeves 20, louver blades 64 and screw cap 40 assembled with the support rod 14 vertical so that the louvers also

are arranged vertically for use as fencing. The support rods, of course, must be suitably anchored in the ground, as, for example, in concrete footings 66 shown. A spacer sleeve 68 at the lower end of each support rod 14 supports the lowermost clamping sleeve 20 at a high enough elevation above the ground surface to prevent the lowermost louver blade 64 from engaging the ground. The louver blades 64, unlike the louver blades 18 of FIGS. 2 and 7, are not channeled inasmuch as such channels would have little if any useful purpose when the structure is assembled as fencing.

By slight obvious modifications the same louver structures as illustrated above may be adapted for other uses such as, for example, patio covers and vertical partitioning having vertically extending louvers. Having illustrated a preferred form of the invention, it should be obvious to those skilled in the art that the invention permits of modification in arrangement and detail. We claim as our invention all such modifications as come within the true spirit and scope of the following claims.

We claim:

1. An adjustable louver structure comprising:
a louver blade having a curved side edge portion,
the opposed curved surfaces of said edge portion having, respectively, constant radii of curvature both with respect to substantially the same center of curvature,

cooperative clamping means, including a pair of separable curved clamping surfaces for clamping said curved edge portion therebetween,
the curvature of each said clamping surface conforming, respectively, to the curvature of the one of said opposed curved surfaces that said clamping surface is adapted to engage such that said curved edge portion is slidable relative to and between said curved clamping surfaces to adjust the angle of inclination of said blade,

and pressure means in association with said clamping means for applying clamping pressure through said curved clamping surfaces to clamp said curved side edge portion therebetween.

2. An adjustable louver structure comprising:
a plurality of louver blades,
a series of longitudinally separable clamping members aligned end to end transversely of said blades for clamping said blades in generally parallel relationship to one another,
a support member for slidably supporting said series of clamping members,

each of said blades including a curved longitudinal edge portion defining in cross section through said blade an arc of a circle from the longitudinal edge extremity inwardly transversely of said blade,

said clamping members including cooperative pairs of curved clamping jaws for clamping said curved longitudinal edge portions therebetween, one of each said pair of jaws being on one end of one of said clamping members and the other of each said pair of jaws being on the opposite end of an adjacent aligned one of said clamping members,

each of said curved clamping jaws having a curved clamping surface with a curvature conforming to the curvature of the curved louver surface that said clamping surface is adapted to engage such that said curved louver edge portions are slidable between said pairs of jaws to effect adjustment of said blades,

and pressure-applying means on said support member for applying force against opposite ends of each aligned series of said clamping members so as to transmit clamping pressures to all of said pairs of clamping jaws between said opposite ends such that louver blades within said pairs of jaws are clamped in place.

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3. An adjustable louver structure comprising:
 a plurality of laterally spaced-apart and parallel support rods,
 a series of elongate, louver-clamping members slidably supported by each said support rod,
 each of said clamping members including a curved clamping jaw protruding laterally from adjacent one end thereof for cooperation with a mating curved clamping jaw on the adjacent end of a longitudinally adjacent one of said clamping members.
 a plurality of louver blades extending transversely between said support rods,
 each of said louver blades having a curved trailing edge portion adapted for being clamped between an adjacent pair of said cooperative clamping jaws,
 said curved trailing edge portion having a constant curvature throughout its curved extent such that the outer and inner curved louver surfaces thereof in any cross section through said louver blade have constant radii of curvature, respectively, both with respect to a common center of curvature,
 each of said clamping jaws having a curved clamping surface defined by a constant radius of curvature equal to the radius of curvature of the curved louver surface that said clamping surface is adapted to engage so as to permit relative sliding movement between said jaws and the curved louver edge portion therebetween,
 and pressure-applying means for selectively applying pressure to opposite ends of each series of longitudinally

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nally aligned clamping members such that said louver blades are clamped in preselected positions within said jaws when pressure is applied and further such that said blades are rotatable within said jaws when said pressure is released.

4. An adjustable louver structure according to claim 3 wherein a leading edge portion of one of said blade overlaps a trailing edge portion of the next forwardly adjacent said blade and wherein there is provided a longitudinally extending raised surface portion on one of said overlapping edge portions and a recessed surface portion on the other of said overlapping edge portions, said raised and recessed surface portions nesting one within the other in the fully closed position of adjustment of said louver blades to provide a water seal therebetween.

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