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ACTUATOR FOR LOUVER SLATS

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2 Sheets-Sheet 1

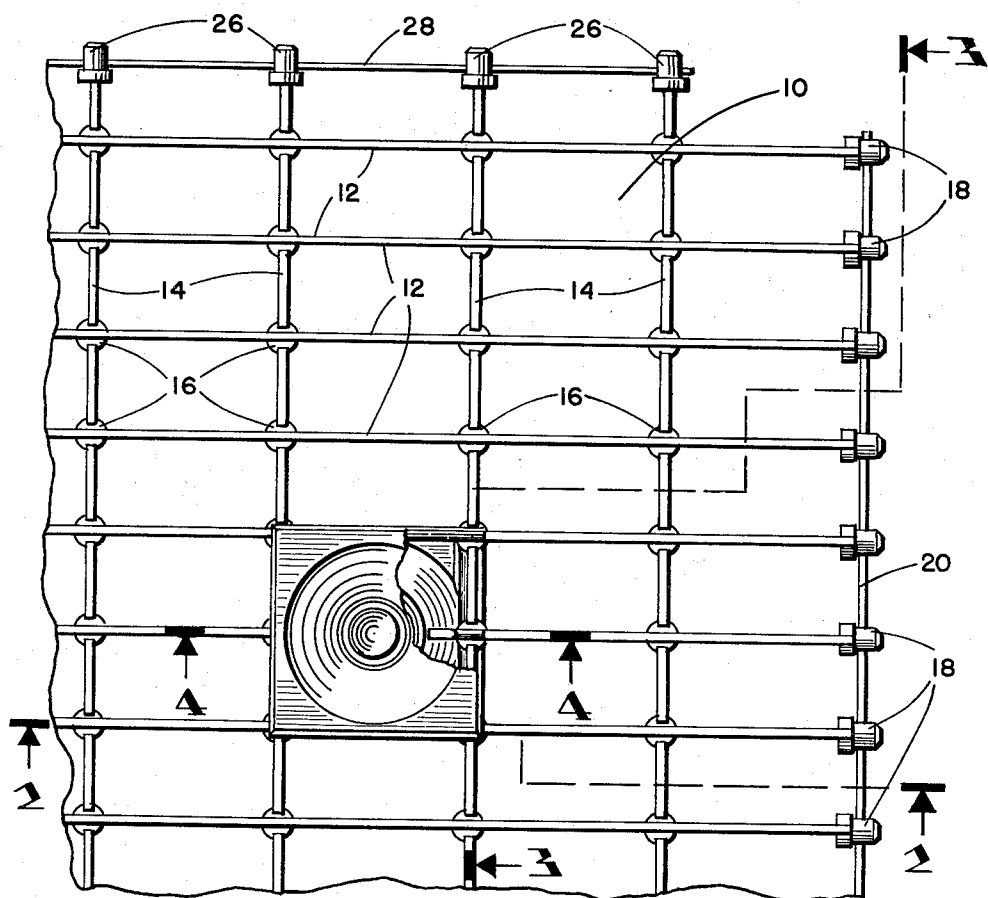


Fig. 1

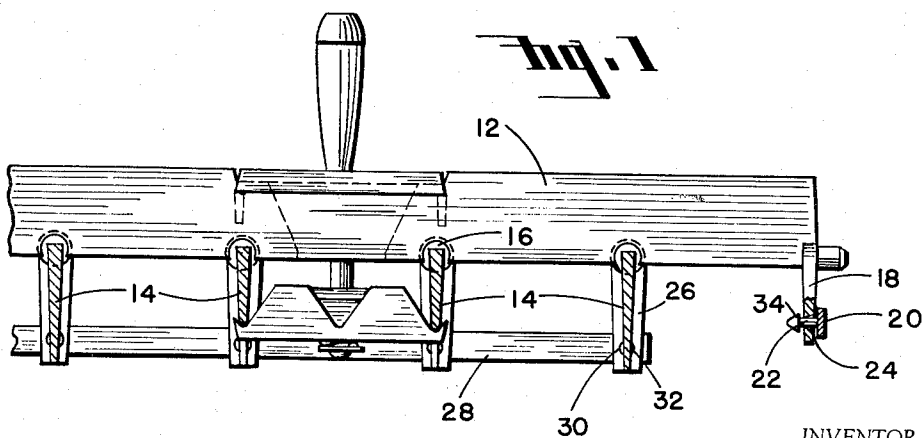


Fig. 2

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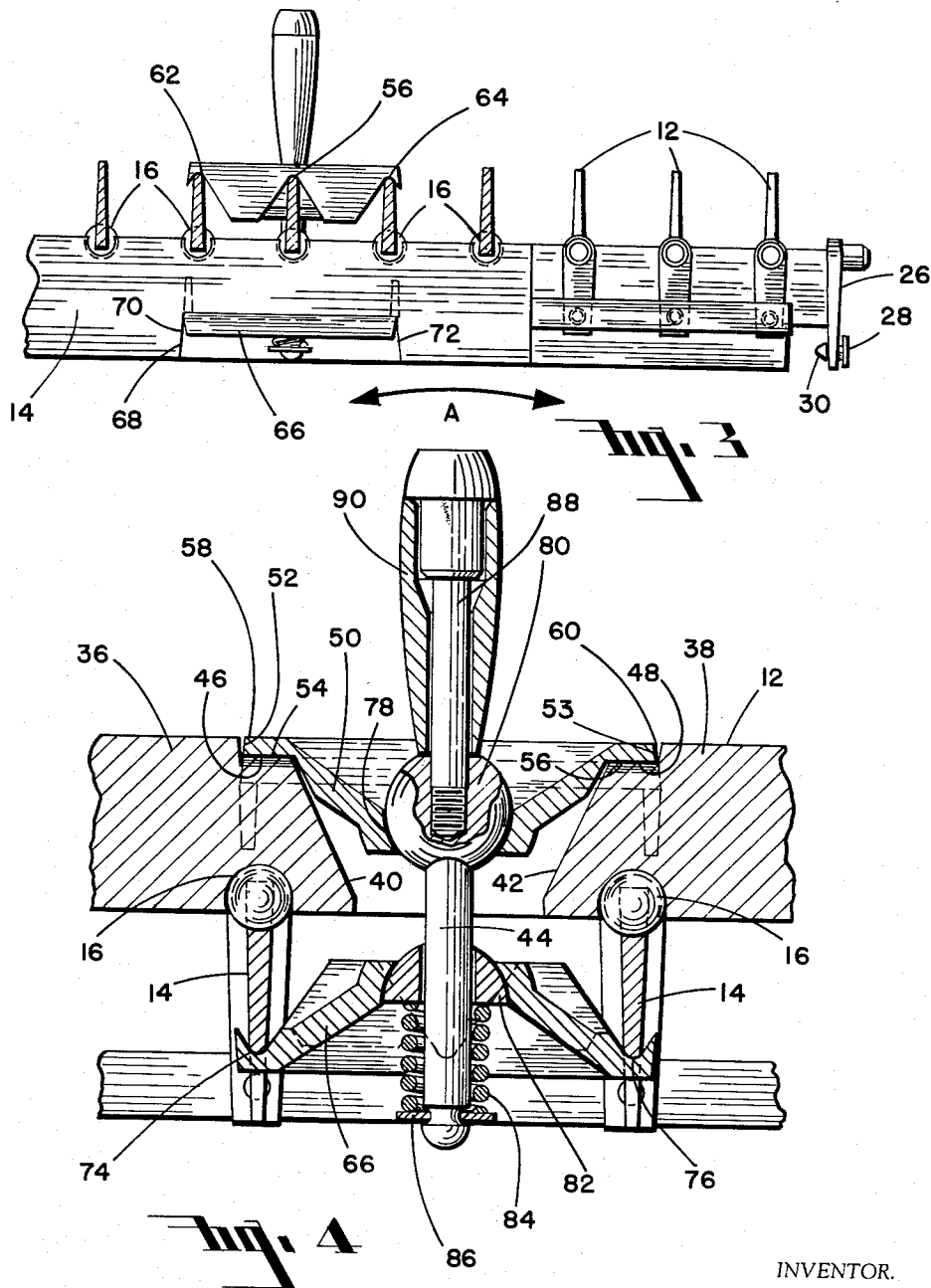
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ACTUATOR FOR LOUVER SLATS

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6 Claims. (Cl. 98-40)

This invention relates to an actuator for louver slats and more particularly to an actuator for louver slats wherein a common control lever is movable pivotally to adjust the angular disposition of pivoted intersecting louver slats.

Various devices for pivotally adjusting the angular relationship of intersecting louver slats are employed in louvered grills such as those used on evaporative coolers or the like.

Actuators for louver slats may be located adjacent the slat frame or in the assemblies and at the intersections of pivoted intersecting slats.

When such actuators are located in the middle of an assembly of pivoted intersecting louver slats structural problems arise particularly when such slats are made of plastic or other similar material having low tensile and shear strengths.

When intersecting louver slats are constructed of material having a low tensile strength and when they are actuated from the middle of an assembly thereof, the bearing relationship of the actuator relative to the slats must be ample in order to avoid undue stress concentrations in the slats.

Additionally, it is recognized that pivoted intersecting louver slats must be easily adjusted by a manual actuator in order to be useful and salable.

Accordingly, it is an object of the invention to provide an actuator for louver slats which is located directly in an assembly of intersecting louver slats and which maintains a proper bearing relation to the engaged portions of the slats so that stress concentrations in the slats are held at a minimum.

Another object of the invention is to provide an actuator for louver slats which may be utilized in connection with a plurality of intersecting slats and which maintains firm engagement with the slats regardless of their angularly pivoted dispositions.

Another object of the invention is to provide an actuator for louver slats which is very easy and smooth in operation and which utilizes abutments longitudinally of some of the slats to provide a support for a lever fulcrum to actuate other slats which are pivoted substantially transversally of the slats forming the abutment for the fulcrum of the lever.

Another object of the invention is to provide an actuator for louver slats having a pair of actuator plates which are spring loaded together in engagement with edges of angularly intersecting slats whereby a lever pivotally mounted in the plates is capable of pivotally adjusting the intersecting sets of slats to various pivotal angular positions as desired.

Further objects and advantages of the invention may be apparent from the following specification, appended claims, and accompanying drawings in which:

FIG. 1 is a fragmentary front elevational view of an assembly of intersecting louver slats wherein an actuator of the present invention is located and connected with the intersecting slats.

FIG. 2 is a fragmentary sectional view taken from the line 2-2 of FIG. 1.

FIG. 3 is a fragmentary sectional view taken from the line 3-3 of FIG. 1; and

FIG. 4 is an enlarged fragmentary sectional view taken from the line 4-4 of FIG. 1.

As shown in FIGS. 1 and 2 of the drawings, a louver slat assembly 10 is provided with a plurality of parallel

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pivotally mounted slats 12 which intersect a plurality of pivotally mounted slats 14 disposed at substantially right angles to slats 12. The slats 12 and 14 at their intersections, are interconnected by a spherical bearing 16 on which the intersecting slats are relatively pivotally mounted.

The slats 12 at their ends are provided with bell cranks 18 which are pivotally interconnected by a link bar 20 which is provided with trunnions 22 disposed in openings 24 of the bell cranks 18. Likewise, the slats 14 are provided with bell cranks 26 interconnected by a link bar 28 having trunnions 30 projecting through openings 32 in the bell cranks 26.

It will be seen that the trunnions 30 are each provided with a slightly compressible nib structure at their ends. The trunnions 22 having a nib 34 which is slightly larger than the opening 24 in the bell crank 18 whereby the trunnions 22 are forced through the openings 24 and are thus retained therein after the nib 34 has passed therethrough.

The trunnions 30 are also provided with similar nibs for holding the link bar 28 coupled to the bell cranks 26.

One of the slats 12 is divided into a pair of spaced sections 36 and 38 as shown in FIG. 4 of the drawings. These sections are longitudinally spaced at adjacent ends 40 and 42 thereof to permit the disposition of an actuating lever 44 therebetween.

Edges of the sections 36 and 38 are provided with abutment notches 46 and 48 which are engaged by an actuating plate 50. This plate 50 is provided with edges 52 and 54 which engage ends of the abutment notches 46 and 48 to provide abutment of the plate longitudinally of the slat sections 36 and 38 as hereinbefore described.

The plate 50, as shown in FIGS. 3 and 4 of the drawings, at its engagement with the notches 46 and 48 is provided with transversally disposed notches 54 and 56. These notches 54 and 56 are V-shaped and straddle the slat sections 36 and 38 of the middle slat 12 as shown best in FIG. 3 of the drawings. The plate 50 adjacent each of its edges 58 and 60 is provided with a pair of additional notches 62 and 64. These notches 62 and 64 engage abutment recesses similar to the recesses 46 and 48 in the edges of the slats 12. Thus the plate 50 is abutted longitudinally of the slats 12 but permits rockable freedom in the notches 54, 56, 62, and 64. A similar situation exists with respect to a plate 66 which engages edges of the intersecting slats 14.

The plate 66 is similar in construction to the plate 50 but is rotated substantially 90 degrees thereto in order to accommodate a structural relationship with the slats 14 similar to that as described in connection with the slats 12 and the plate 50. The plate 66 is thus structurally identical to the plate 50 in its engaged relationship with the edges of the slats. It will be noted however that the abutment notches in the slats 14 are deeper than the notches in the edges of the slats 12.

As shown in FIG. 3 of the drawings, the slats 14 are provided with notches 68 having opposite ends 70 and 72 providing abutments for the plate 66 longitudinally of the slats 14.

As shown in FIG. 4 of the drawings, the plate 66 is provided with V-shaped notches 74 and 76 which engage edges of the edges 14 in the notches 68. Rockable movement of the edges of the slats 14 in the V-shaped notches 74 and 76 is readily permitted so that these slats may pivot relative to the plate 66 as will be hereinafter described in detail.

Centrally of the plate 50 is a substantially spherical socket 78 which is open through the middle of the plate 50 and in which a spherical bearing member 80 of an actuating lever 44 is pivotally engaged.

Slidably mounted on the actuating lever 44 is another spherical bearing member 82 which pivotally engages a

conforming socket in the plate 66. The bearing member 82 is engaged by a spring 84 held on the lever by a snap ring 86. This spring 84 tends to apply tension in the lever 44 and thus forces the plates 50 and 66 together into firm engagement with the edges of the slats 12 and 14 regardless of their angularly pivoted positions as will be hereinafter described in detail.

Screw-threaded in the bearing member 80 is a handle rod 88 which is provided with a handle sleeve 90 thereon. The handle sleeve 90 projects outwardly of the front face of the grill assembly composed of the intersecting slats 12 and 14 and may be moved in any direction as desired to pivot the slats 12 and 14 relative to each other about the axes of the spherical bearings 16.

In operation, the handle 90 may be moved in either direction of the arrow A to cause a corresponding pivotal movement of the slats 14 while the plate 50 forms an abutment longitudinally of the slats 12 by means of the abutment notches 46 and 48 in which the edges 58 and 60 of the plate 50 are abutted. Likewise the handle 90 may be moved at right angles to the arrow A for pivotal movement of the slats 12 while the plate 66 is retained in the notches 68 and abutted therein longitudinally of the slats 14. Thus the abutment of the plates 50 and 66 provides a fulcrum support for pivotal actuation of the lever 44 in order to pivot either set of slats. Furthermore, it will be appreciated that any movement at 45 degrees to the arrows A will cause the lever 44 to actuate both sets of slats 12 and 14 pivotally about the axes of the bearing members 16 by providing a combined abutment of both plates 50 and a slight pivotal movement thereof with relationship to each respective set of slats. Thus both sets of slats may be pivotally actuated in unison by a movement of the handle 90 at an angle other than right angles to the direction of the arrow A in FIG. 4 of the drawings.

It will be appreciated that the spring 84 holds the plates 50 and 66 firmly engaged even though the spaced relation of the plates may vary with the angular dispositions of the slats 12 and 14.

It will be obvious to those skilled in the art that various modifications of the present invention may be resorted to in a manner limited only by a just interpretation of the following claims.

I claim:

1. In an actuator for louver slats the combination of: a plurality of first pivoted slats; a plurality of second pivoted slats angularly intersecting said first slats; all of said slats pivotal on axes disposed longitudinally thereof; first linkage pivotally connecting all of said first slats for cooperative pivotal actuation about said longitudinal axes thereof; second linkage pivotally connecting all of said second slats for cooperative pivotal actuation about said longitudinal axes thereof; a first plate; first edge portions of some of said first slats engaged by said first plate; said first edge portions pivotal laterally relative to said first plate; first means providing an abutment on some of said first slats preventing movement of said first plate longitudinally thereof; a second plate spaced from said first plate; second edge portions of some of said second slats pivotally engaging said second plate; second means providing an abutment on some of said slats preventing movement of said second plate longitudinally thereof; and an actuating lever pivotally engaging said first and second plates disposed pivotally to actuate said plates; and means tending to hold said first and second edge portions in frictional engagement with said first and second edge portions of said first and second slats.

2. In an actuator for louver slats the combination of: a plurality of first pivoted slats; a plurality of second pivoted slats angularly intersecting said first slats; all of said slats pivotal on axes disposed longitudinally thereof; first linkage pivotally connecting all of said first slats for cooperative pivotal actuation about said longitudinal axes thereof; second linkage pivotally connecting all of said second

slats for cooperative pivotal actuation about said longitudinal axes thereof; a first member; first edge portions of some of said first slats engaged by said first member; said first edge portions pivotal relative to said first member; first means providing an abutment on some of said first slats preventing movement of said first member longitudinally thereof; a second member spaced from said first member; second edge portions of some of said second slats pivotally engaging said second member; second means providing an abutment on some of said second slats preventing movement of said second plate longitudinally thereof; and an actuating lever pivotally engaging said first and second plates and disposed pivotally to actuate said first and second members and means tending to hold said first and second members in frictional engagement with said first and second edge portions of said first and second slats.

3. In an actuator for louver slats the combination of: a plurality of first pivoted slats; a plurality of second pivoted slats angularly intersecting said first slats; all of said slats having means pivotal on an axis disposed longitudinally thereof; first linkage pivotally connecting all of said first slats for cooperative pivotal actuation about said longitudinal axes thereof; second linkage pivotally connecting all of said second slats for cooperative pivotal actuation about said longitudinal axes thereof; a first plate having first notches therein; first edge portions of some of said first slats pivotally engaged in said first notches of said first plate; first means providing an abutment on some of said first slats preventing movement of said first plate longitudinally thereof; a second plate having second notches therein and spaced from said first plate; second edge portions of some of said second slats pivotally engaged in said second notches; second means providing an abutment on some of said second slats preventing movement of said second plate longitudinally thereof; and an actuating lever pivotally engaging both of said plates and thereby disposed to actuate said slats by means of their engagement with said notches in said spaced plates.

4. In an actuator for louver slats the combination of: a plurality of first pivoted slats; a plurality of second pivoted slats angularly intersecting said first slats; all of said slats having means providing pivotal axes disposed longitudinally thereof; first linkage pivotally connecting all of said first slats for cooperative pivotal actuation about said longitudinal axes thereof; second linkage pivotally connecting all of said second slats for cooperative pivotal actuation about said longitudinal axes thereof; a first member having means pivotally engaging said first slats disposed to apply force thereto laterally of their axes; first means providing an abutment on some of said first slats preventing movement of said first member longitudinally thereof; a second member having means pivotally engaging said second slats disposed to apply force thereto laterally of their axes, said second member spaced from said first member; second means providing an abutment on some of said second slats preventing movement of said second member longitudinally thereof; and an actuating lever pivotally engaging both of said members and disposed pivotally to actuate said members and thereby pivot said first and second slats about their pivotal axes.

5. In an actuator for louver slats the combination of: a plurality of first pivoted slats; a plurality of second pivoted slats angularly intersecting said first slats; all of said slats having means pivotal on axes disposed longitudinally thereof; first linkage pivotally connecting all of said first slats for cooperative pivotal actuation about said longitudinal axes thereof; said linkage pivotally connecting all of said second slats for cooperative pivotal actuation about said longitudinal axes thereof; a first member having notches therein; first edge portions of some said first slats engaged in said notches of said first member; said first edge portions pivotal in said notches

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of said first member; first means providing an abutment on some of said first slats preventing movement of said first member longitudinally thereof; a second member having notches therein and spaced from said first member; second edge portions of some of said second slats pivoted in said notch portions in said second member; second means providing an abutment on some of said second slats preventing movement of said second member longitudinally thereof; and an actuating lever pivotally engaging said first and second members to actuate the same; said lever extending through both of said members and having pivotal bearing means engaging each of said first and second members.

6. In an actuator for louver slats the combination of: a plurality of first pivoted slats; a plurality of second pivoted slats angularly intersecting said first slats; all of said slats pivotal on axes disposed longitudinally thereof; first linkage pivotally connecting all of said first slats for cooperative pivotal actuation about said longitudinal axes thereof; second linkage pivotally connecting all of said second slats for cooperative pivotal actuation about said longitudinal axes thereof; a first plate having notches therein; first edge portions of some of said first slats engaged in said notches of said first plate; said first edge

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portions pivotal relative to said notches in said first plate; first means providing an abutment on some of said first slats preventing movement of said first plate longitudinally thereof; a second plate having notches therein and spaced from said first plate; second edge portions of some of said second slats pivoted in said notches of said second plate; second means providing an abutment on some of said second slats preventing movement of said second plate longitudinally thereof; and an actuating lever pivotally engaging said first and second plate and disposed to actuate them, said lever extending through both of said plates and having bearing means engaging each of said first and second plates; said bearing means comprising a first abutment bearing fixed on said lever and a second abutment bearing slidable thereon, said plates disposed between said abutment bearings; and a coil spring carried on said lever, said spring being fixed at one end thereof to said lever and disposed to force said second abutment bearing toward said first abutment bearing whereby said first and second plates are resiliently held in engagement with said first and second edge portions of said first and second slats at said notch portions, in said first and second plates.

No references cited.