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TRAVERSE LOUVER FOR WINDOW OPENINGS AND THE LIKE

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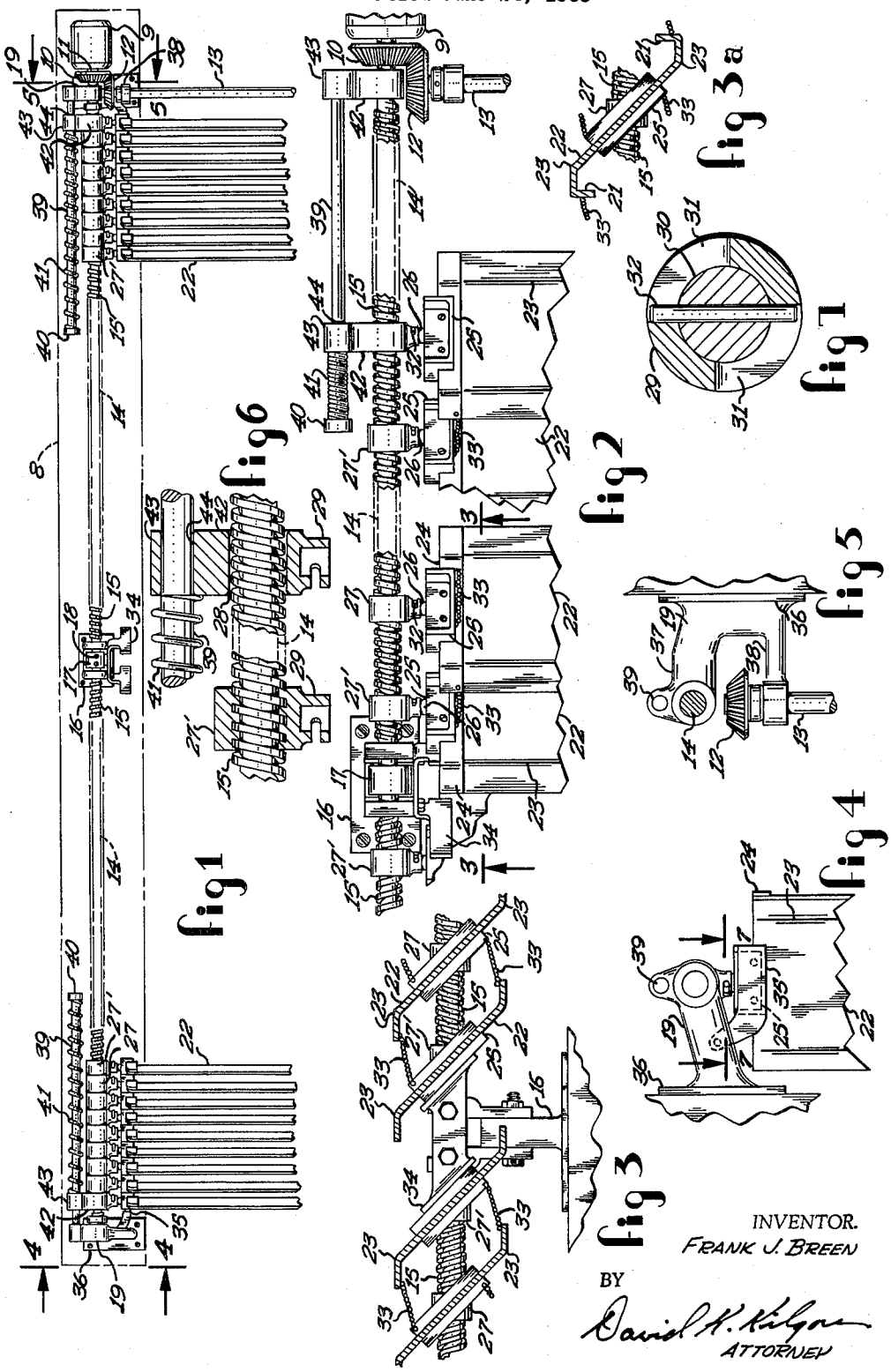

Fig 1

Fig 2

Fig 3

Fig 3a

Fig 4

Fig 5

Fig 6

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TRAVERSE LOUVER FOR WINDOW OPENINGS AND THE LIKE

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This invention relates broadly to closures for window openings, door openings, and the like; more particularly to a movable closure for such openings; and specifically to a vertically disposed plurality of inter-connected louver panels constructed and arranged to adjustably traverse such openings.

The principal object of this invention is to provide a traverse louver as a closure for window and door openings in a building structure said louver comprising a plurality of vertically disposed panels mounted on a common support and movable as a unit by manual or automatic means.

A further object of this invention is to provide a traverse louver for window and door openings that is mounted in such openings to afford a closure from each side portion of such openings, a plurality of the said vertically disposed louver panels being grouped at each side of said opening and movable to a common meeting point at the center thereof.

A further object of this invention is to provide a traverse louver as a closure for window and door openings wherein movement is imparted manually or automatically to the inner louver panel of each group thereof, the succeeding louver panels of each group being motivated by a flexible connection between one another and the first noted louver panel of each group which is the prime mover.

A still further object of this invention is to provide a traverse louver for window and door openings in a building structure wherein each group of vertically disposed louver panels is adjustable as a group about the longitudinal axis of each of said panels.

While the present invention has herein been referred to as a louver affording a closure for window and door openings in a building structure, it is to be understood that the same is primarily intended as a window opening closure specifically for the purpose of closing picture window openings having northwest, southwest, and west exposure against sun rays. These sun rays are practically impossible to eliminate with awnings or canopies, however, the invention is not intended to close out light entirely.

These and other objects of the invention will become apparent from the following specification and claims when taken in conjunction with the appended drawing which forms a part of this application and in which drawing, like characters indicate like parts throughout the several views.

To the above end, generally stated, the invention consists of the following devices and combination of devices hereinafter described and defined in the claims.

Referring to the drawing:

FIG. 1 is a front elevational view of the invention mounted on the frame of a window opening fragmentarily shown, with the louver panels in open position.

FIG. 2 is also a front elevational view of some of the parts shown in FIG. 1 on an enlarged scale, some parts being broken away and with the louver panels shown, in open position.

FIG. 3 is a fragmentary plan view showing the underside of one mounting bracket certain of the louver panels partly in section, taken on the line 3—3 of FIG. 2.

FIG. 3*a* is a plan view partly in section illustrating a modified form of a louver panel.

FIG. 4 is an end elevational view of one of the mounting brackets fragmentarily showing a portion of one louver panel, taken on the line 4—4 of FIG. 1.

FIG. 5 is a view similar to FIG. 4 with the exception that certain driving connections are included and the fragmentary showing of the louver panel omitted, taken on the line 5—5 of FIG. 1.

FIG. 6 is a fragmentary view on an enlarged scale of certain of the driven louver panel hangers and the positioning spring, and also showing the advancing screw having an acme thread fragmentarily.

FIG. 7 is a top plan view of the lower portion of one of the louver panels hangers on an enlarged scale and partly in section taken on the line 7—7 of FIG. 4.

It is highly important to note at this point before going into a detailed description of the invention that while the same has been illustrated on the drawing as being mounted overhead on a frame of a window or door opening, however, it is to be understood that all of the elements described herein are duplicated in an assembly that is mounted beneath the said window or door opening whereby the several louver panels extend between like parts and mounting means and motivation is coordinated so that said panels will transverse in parallel arrangement. Only the electric motor that supplies the power for semi-automatic motivation is not duplicated.

Accordingly, in the interest of brevity and clarity only the upper assembly will be described although it is to be understood that no limitations are intended to be imposed upon the appended claims by such omission.

The reference numeral **8** is directed to a fragmentary showing of a part of the frame structure around a window opening to which the invention is applied as a closure. The numeral **9** is directed to an electric motor and its gearing having a suitable power source and switch means, not shown, however, it will be understood that motivation may be imparted to the traverse louver by manually operated crank means, not shown.

The numeral **10** is directed to a bevel gear mounted on the armature shaft **11** of the electric motor **9**. This bevel gear **10** has meshing engagement with a second bevel gear **12** and an extension shaft **13** is secured to the bevel gear **12** and extends downwardly into driving connection, not shown, which impart synchronized movement to the drive for the lower driving assembly.

A relatively long advancing screw **14** having an acme thread **15** is connected by conventional means to the inner end portion of the armature shaft **11** of the electric motor **9** is preferably of two piece construction supported and at the longitudinal center thereof by a bracket **16** secured to the frame structure **8** affording means wherein the outer end portion of the respective section of the advancing screw are journaled. A sleeve **17** is provided with a bore to receive the said inner end portion of the advancing screw **14** with a close working fit and a pair of set screws **18** work in threaded bores in the sleeve **17** to impinge the advancing screw **14** to thus provide common axial rotation of the respective section of the said advancing screw **14**. A pair of mounting brackets **19** secured to the frame structure **8** support and journal the outer end portions of the advancing screw **14** said brackets **19** further affording mounting means above the advancing screw **14** for a pair of longitudinally disposed stub shafts that afford a mounting station for a pair of coiled springs the purpose of which springs will presently appear more in detail.

As best seen in FIG. 1 a plurality of vertically disposed louver panels **22** constructed and arranged to traverse and close a window or door opening.

These louvers **22** are of relatively thin blade-like construction and in the interest of rigidity, are formed with angular reverse bends along the edge portions thereof, see numeral **23**. In the further interest of rigidity, the upper

and lower ends portions of each louver panel 22 is provided with a capping flange 24, said flange also serving to facilitate the mounting of said louver panels as will presently appear.

Each louver panel 22 at the upper and lower end portion thereof, is provided with a transversely centered bracket 25 that is rigidly secured to said end portion of the louver panels and is provided with a relatively short upstanding stud 26 said stud being transversely centered in alignment with the longitudinal axis of the said louver panels 22 so that said louver panels may be rotated about their longitudinal axis.

As best illustrated in FIG. 2 it will be noted that the subject installation comprises only fragmentary portions of both the right and left hand groups of louver panels and reference is now made to the right hand group.

Having in mind the fact that each louver panel 22 is mounted on the advancing screw 14 at the upper and lower end portions thereof, it is important to note that a carrier 27 constructed and arranged for travel on the advancing screw 14 is provided for the upper and lower end portion of each louver panel 22, however, as best seen in FIG. 6, it is important to note that only the innermost carrier 27 of each section right and left hand, has screw threaded engagement with the acme thread 15 of the advancing screw 14. The remaining carriers for any specific group of louver panels 22 are provided with a smooth bore, see numeral 28, of FIG. 6, that merely rides on the acme thread 15 of the advancing screw 14 with a relatively close working fit to avoid binding of the carrier thereon. These carriers 27 are generally in the form of a block having a depending stem 29 that is provided with a central, vertically disposed bore 30, see FIG. 6, dimensioned to receive the studs 26 of the mounting brackets 25, on the respective end portions of the louver panels 22 and thus afford a coupling between the said carrier 27 and the mounting brackets 25.

As shown in FIG. 7 a pair of opposed segments are machined in the lower end portion of the stem 29 of the carrier 27 affording circumferentially disposed slots 31 to permit the 45 degree axial rotation of the end portion of a stop pin 32 that extends through a transverse bore in the upper end portion of the mounting brackets 25 mounted on the respective end portions of the louver panels 22. Obviously, this stop pin 32 also affords means whereby the said mounting brackets are pivotally secured to the carrier 27. It is important to note that this combination of elements will permit 45 degree movement of the louver panels 22 about a vertical axis to open or close the same as initiated by the driving connections.

It has been stated that only the innermost carrier 27' is a driven member and to motivate the idle louver panels 22, upper and lower flexible connections, as shown, a bead chain 33 are provided as a means whereby the said idle louver panels 22 are towed the one behind the other and motivated by the driven carrier 27' to the limit of one section of the advancing screw 14 across a window or door opening. It will be understood that the number of louver panels 22 is dictated by the width of the opening to be closed thereby.

It is important to note that normally the louver panels 22 assume the position as shown in FIG. 3 by the action of a positioning bracket 34 mounted on the center bracket 16 which engages the capping flange 24 on the innermost louver panel 22 and in this position the assembled louver panels will close the window or door opening to partial vision but not the circulation of air.

It will follow, of course, that to open the assembled louver panels the power source is reversed and by the engagement of the driven upper and lower carriers 27' and the idle carrier 27. When the assembled group of louver panels 22 are moved across the window or door opening to open the same, the outermost panel engages a stop member 35 mounted integral with the outermost upper and lower mounting brackets 19. When these upper and lower portions of the outermost louver panel 22 make abutting engagement with the stop member 35, the entire section of louvers will continue to move until all of said louver panels assume the position shown fragmentarily in FIG. 4.

Reference is now made to the outer end mounting brackets 19 which comprise a flange plate 36 and upper and lower outwardly projecting arms 37 and 38 respectively. The lower projecting arm 38 affords a mounting station for the bevel gear 12 and its shaft 13 that extends downwardly to the lower bracket, not shown, that is identical to the first noted upper brackets 19. The upper projecting arm of the brackets 19 affords means for rigidly mounting the inner end portion of a relatively long inwardly projecting shaft 39 having a base of resistance 40 for a coiled spring 41 that encircles the shaft 39 and when the assembled group of louver panels 22 are in open position this coiled spring 41 is only under slight compression as will presently appear. The outermost carrier member 42 is idle on the advancing screw 14 but in addition to its bore 28 through which the said advancing screw passes the said outermost carrier member 42 is provided with an upstanding boss 43 having a longitudinally disposed bore 44 to receive the shaft 39 with a close working fit. It is important to note at this point that the coiled spring 41 is positioned on the shaft 39 between its base of resistance 40 and the carrier member 42. FIG. 1 illustrates the compression of the spring 41 when the respective louver sections are open and FIG. 2 illustrates the compression of the spring 41 when the louver sections are closed.

The purpose of the coiled spring 41 interposed between its base of resistance 40 and the outermost carrier member 42 is to provide a constant tension on the flexible linkage connecting the several louver panels as the same are being traversed across a window or door opening thereby positioning each of said louver panels 22 to the full extent of the linkage 33 which is at an angle to the horizontal axis of the advancing screw 14. In the return movement of the said louver panels 22 to open the same the said spring will obviously urge the outermost carrier members 42 outwardly to the full extent of the coiled spring 41 until the same is almost completely relaxed to thereby also position said louver panels for engagement with the stop member 35 which adjusts said panels to open position at substantially 90 degrees to the horizontal axis of the advancing screw.

As indicated by the reference numeral 21, a relatively narrow downturned lip may be formed integral with the respective edge portion of thel ouver panels 22 if desired to afford a still more complete closure against the passage of light through the assembled louver panels 22. This lip 21 would be most useful for its intended purpose formed substantially at right angles to the outer edge portion of said louver panels 22.

While there are herein disclosed but a limited number of embodiments of the structure, process, and product of the invention herein presented, it is possible to produce still other embodiments without departing from the inventive concept herein disclosed, and it is desired, therefore, that only such limitations be imposed on the appended claims as are stated herein or required by the prior art.

What I claim is:

1. A traverse louver assembly for selectively closing and opening window and door openings in a building structure, comprising in combination a plurality of vertically disposed louver panels in right and left hand sections, said louver panels being supported by and extending between upper and lower advancing screws, one pair for each right and left hand section, said advancing screws having right and left hand acme threads, carrier means associated with each louver panel having screw threaded engagement with the said acme threads whereby when said advancing screws are motivated to turn

about their respective longitudinal axes the engagement of at least one carrier member of each section will cause the respective louver panels to traverse the length of the respective advancing screws of each section in opposite directions relative to the longitudinal center of the upper and lower advancing screws, a pair of laterally spaced mounting brackets secured to the building structure to support and journal the outer end portions of the right and left hand sections of the upper and lower advancing screws and a pair of central mounting brackets secured to the building structure substantially at the center of said window to support and journal the inner end portions of the respective sections of the advancing screws, stop means secured to the outer mounting brackets extending therefrom into the path of movement of the louvers to engage and thereby move the respective louver panels to a position of substantially 90 degrees to the axis of the advancing screws when the louver panel sections are positioned to expose the opening in the building structure, and secondary stop means integral with the central mounting bracket extending into the path of movement of the louvers and engaging said louvers in the closed position thereof whereby the respective louver panels are rotated about their vertical axes to close the said opening in a building structure when the leading panel engages the said secondary stop means thus positioning the outer edge portion of the said section of louver panels substantially parallel to the advancing screws.

2. The structure of claim 1 further including a coiled tensioning spring for each section of upper and lower

and right and left hand louver panels, said coiled tensioning spring being mounted to encircle an inwardly projecting shaft, said shafts being rigidly mounted at their outer end portions in the outer mounting brackets for the advancing screws and longitudinally supported in a longitudinal bore formed in a boss in the outermost carrier member, said bore having a relatively loose working fit with said shaft, said boss affording a base of resistance for the outer end of the coiled tensioning spring and a fixed base of resistance for the inner end portion of said coiled tensioning spring on the inner end portions of said shaft, said tensioning spring affording means whereby the idle louver panels are held in spaced relation as controlled by the linkage between said louver panels during travel thereof.

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