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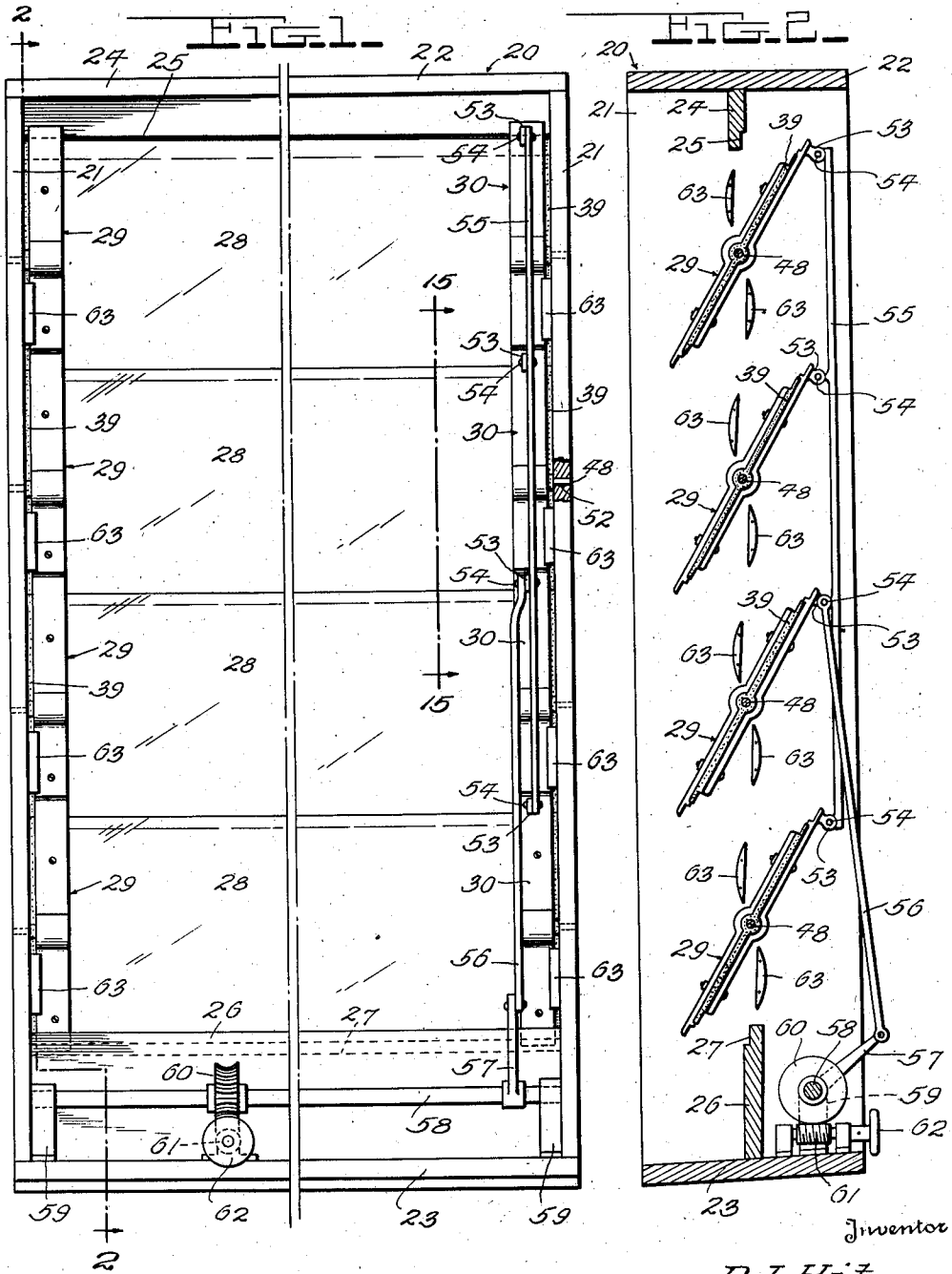
D. I. HITE

2,394,059

SHUTTER STRUCTURE

Filed Sept. 1, 1944

3 Sheets-Sheet 1



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By

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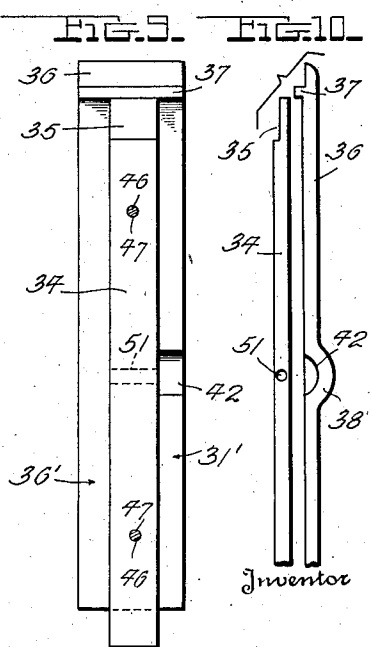
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Fig. 11.

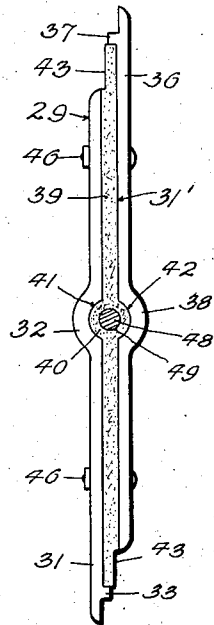


Fig. 12.

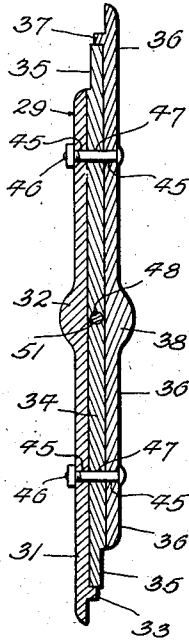


Fig. 15.

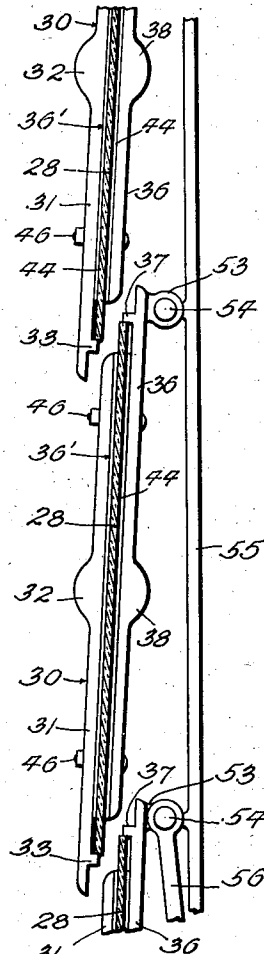


FIG-13.

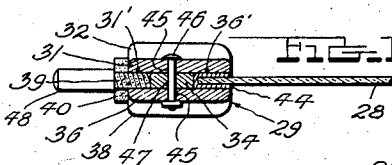
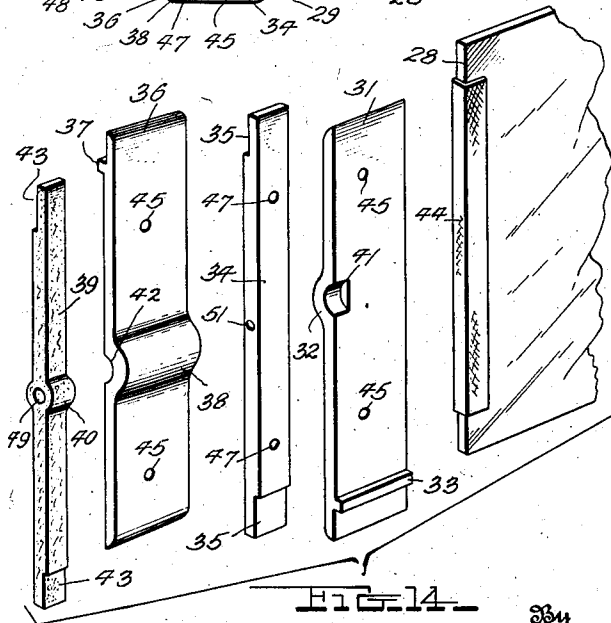
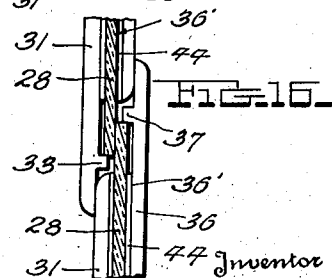


FIG 14.



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2,394,059

SHUTTER STRUCTURE

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Application September 1, 1944, Serial No. 552,344

7 Claims. (Cl. 20—62)

My invention relates to a shutter structure.

An important object of the invention is to provide a shutter structure embodying louvers which may be closed to exclude the rain, air or the like and shifted to positions for providing proper ventilation.

A further object of the invention is to provide a shutter structure having louvers which may be moved to completely opened positions to provide maximum ventilation or to partly open positions to provide ventilation while preventing rain or the like passing into the room.

A further object of the invention is to provide end-holders for the louvers which are preferably formed of glass and which will permit of the proper contacting relation of the louvers when they are closed.

A further object of the invention is to provide end holders which are clamped to the ends of the louver and form a rain and air tight joint with the louver.

A further object of the invention is to provide an end-holder having packing to engage the louver and also having packing to engage the frame to form a rain and air tight joint therewith.

A further object of the invention is to provide means to move the louvers in unison to opened and closed positions.

Other objects and advantages of the invention will be apparent during the course of the following description.

In accompanying drawings forming a part of this application and in which like numerals are employed to designate like parts throughout the same:

Figure 1 is a side elevation, viewed from the inner side, of a shutter structure embodying my invention,

Figure 2 is a vertical section taken on line 2—2 of Figure 1,

Figure 3 is an inner side elevation of one end-holder complete, with the louver held therein,

Figure 4 is a similar view with the inner strap removed,

Figure 5 is a similar view with all parts removed excepting the outer strap and spacing strip,

Figure 6 is an edge elevation of the outer strap and spacing strip, showing the same separated,

Figure 7 is an elevation of the outer side of the same end-holder,

Figure 8 is a similar view with the outer or near strap removed,

Figure 9 is a similar view with all parts re-

moved excepting the inner or far strap and spacing strip,

Figure 10 is an edge elevation of the inner or far strap and the spacing strip of Figure 9, showing the same separated,

Figure 11 is a transverse section taken on line 11—11 of Figure 3,

Figure 12 is a similar view taken on line 12—12 of Figure 3,

Figure 13 is a horizontal section taken on line 13—13 of Figure 3,

Figure 14 is an exploded perspective view of one of the end-holders and associated elements,

Figure 15 is an enlarged section taken on line 15—15 of Figure 1, showing the louvers open, and,

Figure 16 is a similar view upon an enlarged scale showing the louvers closed.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of my invention, the numeral 20 designates a frame, shown as rectangular and including vertical sides 21, a top 22, and bottom 23. Arranged adjacent to the top 22 is a strip 24 having a recess or groove 25. A strip 26 is disposed at the bottom 23, having a groove or recess 27.

Disposed within the frame 20 are louvers 28, which are preferably formed of glass. These glass louvers may be transparent or they may be colored or translucent. They may be of any desired width and any suitable number of louvers may be used in connection with the frame 21. The frame may be of the construction shown or it may be a window case. End-holders 29 and 30 are provided for each louver 28. Each pair of end-holders 29 and 30 is substantially identical and a description of one will suffice. Each end-holder comprises an outer rigid strap or clamp-member 31, which may be formed of metal, plastics, or the like. The outer strap or clamp-member 31 is provided at a point approximately equidistantly spaced from its ends with a cylindrically curved outwardly bulging hub-portion 32. The strap or clamp-member 31 is provided upon its inner face and near its lower end with a horizontal flange 33. Disposed upon the inner face of the outer strap or clamp-member 31 is a spacing strip 34, which is rigid and may be formed of metal, plastics or the like. The spacing strip 34 is provided at its opposite ends and upon its opposite faces with transverse recesses 35. Arranged upon the inner face of the spacing strip 34 is an inner rigid strap or clamp-member 36, which may be formed of metal, plastics or the like. At its upper end, the strap or clamp-member 36 has a horizontal flange 37, upon its outer face. The

flange 37 is spaced from the upper end of the strap 36, as shown. The strap or clamp-member 36 is provided approximately equidistantly spaced from its opposite ends with a cylindrically curved hub-portion 38 which projects outwardly. The rigid straps or clamp-members 31 and 36 are in transverse alignment and the hub-portions 32 and 38 are opposed to form a hub. The straps or clamp-members 31 and 36 are longitudinally staggered so that the lower end of the strap 31 and spacing strip 34 extends beyond the lower end of the strap 36 while the upper end of the strap 36 and spacing strip 34 extends beyond the strap 31. The faces of the recesses 35 of the spacing strip 34 are flush with the faces of the flanges 33 and 37, as shown. The spacing strip 34 retains the straps or clamp-members 31 and 36 spaced and this spacing strip is in turn spaced from the opposite edges of the straps or clamp-members 31 and 36, providing grooves 37 and 38, as shown. The groove 37 receives and holds a packing strip 39, having a hub-portion 40 to enter recesses 41 and 42. The packing strip 39 projects laterally beyond the groove 37 and engages with the adjacent side 21 to form a tight joint, to prevent the passage of rain or air. The packing strip 39 has recesses 43, at its opposite ends and upon its opposite faces to register with recesses 35, as shown. This packing strip 39 may be formed of any suitable material, such as felt, rubber, asbestos, or the like. The grooves 38 receives one end of the louver 28, having a packing strip 44 folded about such end. This packing strip 44 is U-shaped in cross-section and is arranged within the groove 38, and terminates at the inner ends of the recesses 35, short of the longitudinal edges of the louver 28, leaving uncovered portions of the same, as shown. The straps or clamp-members 31 and 36 have transverse openings 45, to receive bolts 46 also passing through openings 47 in the spacing strip 34. These bolts serve to draw the straps or clamp members 31 and 36 together, clamping the packing strip 39 in groove 36 and the end of the louver 28 in the groove 38 through the medium of the packing strip 44.

Means are provided to pivotally support each end-holder at a point equidistantly spaced from the ends of the end-holder. This means comprises a pin 48 extending through an opening 49 in the hub 40 and extending into a semi-cylindrical recess 50, formed upon the inner face of the strap or clamp-member 31. This pin also extends into a semi-cylindrical recess 51 formed in the spacing strip 34. The pin 48 is preferably clamped to the strap 31 and strip 34 while its outer end is pivotally mounted in a bearing 52, carried by the side 21.

The straps or clamp members 36 of the end-holders 30 are provided with apertured knuckles 53, receiving pins 54, connected with a link 55. The link causes the several louvers to move in unison. Pivotaly connected with one pin 54 is a connecting rod 56, pivotally connected with a crank 57, rigidly mounted upon a horizontal rock shaft 58. This rock shaft is journaled in bearings 59 and is turned by a worm wheel 60, driven by a worm 61, which is turned by a hand wheel 62. It is thus seen that by turning the hand wheel 62, the louvers 28 may be shifted to opened or closed positions and will be locked in the selected adjusted position. Any other suitable means may be employed to move and hold the louvers. The operating means may also be concealed, and when the shutter structure embodies a window case the operating means would

be mounted within the case. The numeral 63 designates stationary stops, arranged to engage the end-holders when the louvers are shifted to the closed positions.

As more clearly shown in Figure 2, the louvers have been shifted to the partly opened inclined position and will thereby permit of the proper ventilation without liability of rain or the like entering the room. When the louvers are shifted to the closed position, Figure 16, the lower end of one end-holder overlaps with the upper end of the next end-holder. The flange 37 near the upper end of the lower end-holder will be arranged beneath the lower end of the inner strap 36 of the next upper end-holder and the upper end of the lower strap 36 will overlap the lower end of the next upper strap 36. The flange 33 near the lower end of the strap 31 of the upper end-holder will be arranged above the upper end of the strap 31 of the next lower end-holder while the lower end of the upper strap 31 will overlap the upper end of the next lower strap 31. The upper louver 28 will overlap and engage the next lower louver 28 and there will be a firm contact between these louvers since they extend laterally beyond the flanges 33 and 37 for a slight distance. In order to insure a tight or close fit the contacting faces of the overlapping louvers 28 may be ground to insure uniform engagement throughout their entire area. When the louvers are closed, the uppermost louver 28 will overlap the face of the groove 25 and the upper end of the inner clamp-member 36 will overlap the strip 24. The lowermost louver 28 will also then overlap the face of the groove 27 and the lower end of the outer clamp-member 31 will overlap the strip 26.

It is to be understood that the form of my invention herein shown and described is to be taken as a preferred example of the same and that various changes in the shape, size, and arrangement of parts may be resorted to without departing from the spirit of my invention or the scope of the subjoined claims.

Having thus described my invention, what I claim is:

1. In a shutter structure, a frame having sides, a plurality of louvers for the frame, end-holders for each louver, each end-holder comprising outer and inner elongated clamp-members, a spacing strip between the clamp-members, one end of the outer clamp-member extending beyond the corresponding end of the inner clamp member and the opposite end of the inner clamp member extending beyond the corresponding end of the outer clamp member, the free projecting ends of the outer and inner clamp members having transverse flanges, the spacing strip being spaced from the longitudinal edges of the outer and inner clamp members for providing outer and inner longitudinal grooves closed at their ends by the transverse flanges, means to draw the outer and inner clamp members together, a packing strip arranged within the outer groove and projecting laterally beyond the same to contact with the side of the frame, a packing strip applied to the louver adjacent to its vertical edge, such vertical edge being positioned within the inner groove, the last named packing strip terminating with the ends of the inner and outer clamp members which terminate short of the other ends of such clamp members, a pivot pin engaging each end-holder and secured to the side of the frame, and means to move the louvers.

2. In a shutter structure, a frame having sides,

a plurality of louvers for the frame, end-holders for each louver, each end-holder comprising outer and inner elongated clamping members, a spacing strip between the clamping members, one end of the outer clamping member extending beyond the corresponding end of the inner clamping-member and the opposite end of the inner clamping-member extending beyond the corresponding end of the outer clamping-member, the free projecting end portions of the outer and inner clamp-members having transverse flanges which are spaced from the ends of such end portions, the spacing strip being spaced from the longitudinal edges of the outer and inner clamp-members for providing outer and inner longitudinal grooves closed at their ends by the transverse flanges, means to draw the outer and inner clamp members together, a packing strip arranged within the outer groove to contact with the side of the frame, one end of the louver extending into the inner groove, a pivot pin engaging each end-holder and secured to the side of the frame, and means to move the louvers, the arrangement being such that the lower end of the upper outer clamp-member is adapted to overlap the upper end of the next lower outer clamp-member and the upper end of the lower inner clamp-member is adapted to overlap the lower end of the next upper inner clamp-member when the louvers are closed.

3. In a shutter structure, a frame having sides, a plurality of louvers for the frame, end-holders for each louver, each end-holder comprising outer and inner elongated clamp-members, a spacing strip between the clamp-members, the clamp-members being longitudinally staggered so that the outer clamp-member has a lower free end-portion and the inner clamp-member has an upper free end portion, the free end-portions having transverse flanges spaced inwardly from their ends, the spacing strip being disposed inwardly of the transverse flanges and spaced from the inner longitudinal edges of the outer and inner clamp-members for providing an inner longitudinal groove for receiving the end of the louver, packing means arranged between the inner and outer clamp members and the end of the louver, means to draw the inner and outer clamp members together, a pivot pin engaging each end-holder and secured to the side of the frame, and means to move the louvers.

4. In a shutter structure, a louver, end-holders for the louver, each end-holder comprising outer and inner elongated clamp-members, the clamp-members being longitudinally staggered so that

the outer clamp-member has a free end-portion and the inner clamp-member has a free end-portion, the free end-portions having transverse flanges spaced from their ends, a spacing strip arranged between the clamp-members and spaced from their longitudinal edges to provide inner and outer longitudinal grooves, packing held within the outer longitudinal groove, the inner groove receiving the end of the louver, means connecting the outer and inner clamp members, and a pin connected with each end-holder.

5. In a shutter structure, an end-holder comprising opposed outer and inner clamp-members which are longitudinally staggered to provide the outer clamp-member with a free end-portion and the inner clamp-member with a free end-portion, the free end-portions having transverse flanges which are spaced from their ends, a spacing strip arranged between the outer and inner clamp members and spaced from their longitudinal edges to provide an outer longitudinal groove to receive packing and an inner longitudinal groove to receive the end of a louver, means to draw the outer and inner clamp-members together, and a pivot pin engaging the end-holder.

6. In a shutter structure, an end-holder comprising outer and inner clamp-members, a spacing strip arranged between the clamp-members and spaced from their longitudinal edges to provide outer and inner longitudinal grooves, the outer groove receiving packing and the inner groove receiving the end of the louver, the spacing strip having an opening, a pin extending into the opening, and means to draw the outer and inner clamping members together.

7. In a shutter structure, a louver, end-holders for the louver, each end-holder comprising outer and inner elongated clamp-members, the clamp-members being longitudinally staggered so that the outer clamp-member has a free end-portion extending beyond the inner clamp-member and the inner clamp-member has a free end-portion extending beyond the outer clamp-member, a spacing strip arranged between the clamp-members and spaced from their longitudinal edges to provide inner and outer longitudinal grooves, compressible packing held within the outer longitudinal groove, the inner longitudinal groove receiving the end of the louver, compressible packing within the inner longitudinal groove adjacent to the end of the louver, means to draw the outer and inner clamp-members together, and a pin connected with each end-holder.

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