Dec. 13, 1955 D. I. BIGGS 2,726,426

LOUVERED WINDOWS

Filed April 7, 1952 2 Sheets-Sheet 1

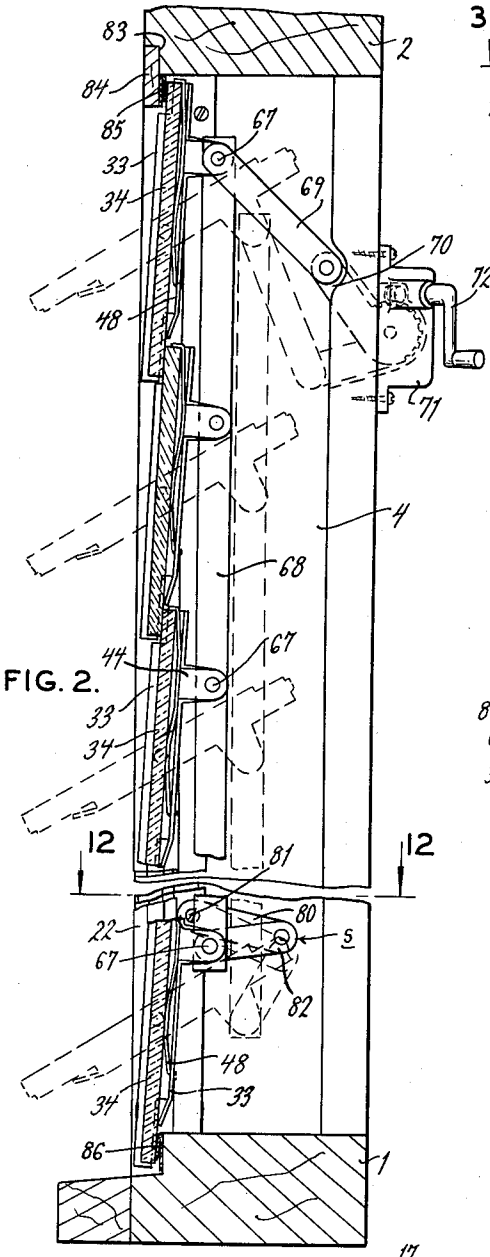


FIG. 2.

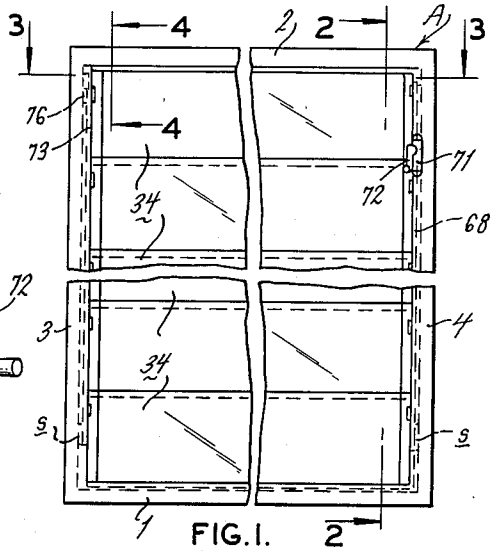


FIG. 1.

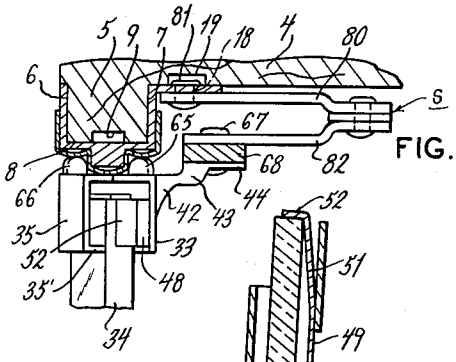


FIG. 12.

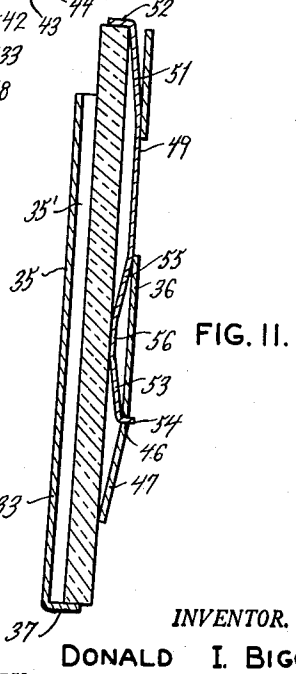


FIG. 11.

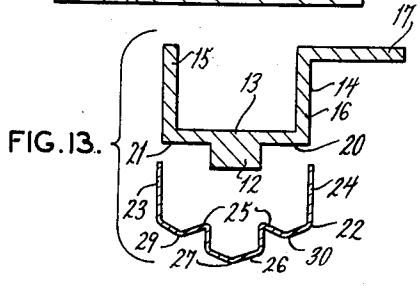


FIG. 13.

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LOUVERED WINDOWS

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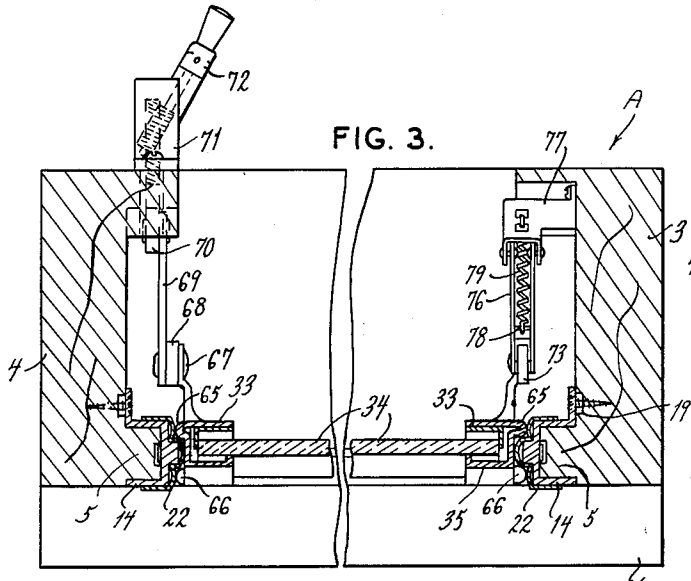


FIG. 3.

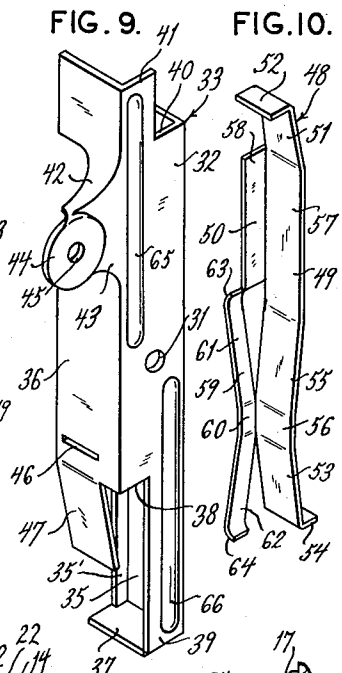


FIG. 9.

FIG. 10.

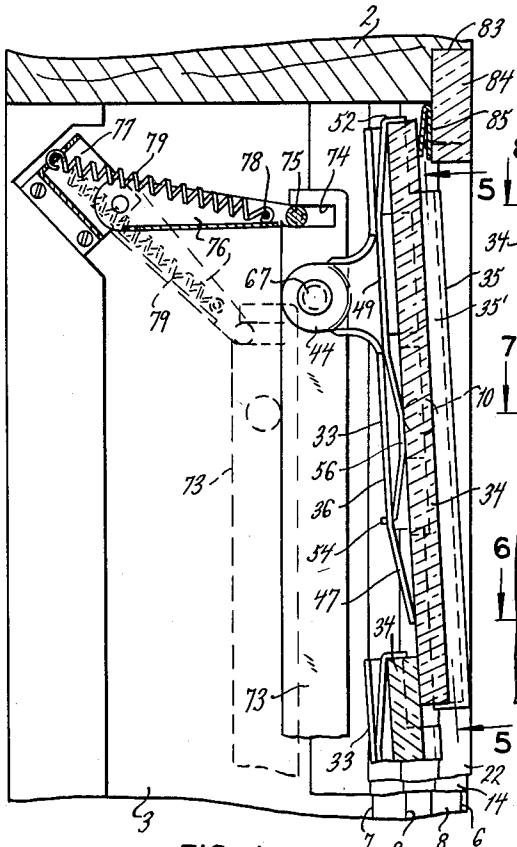


FIG. 4.

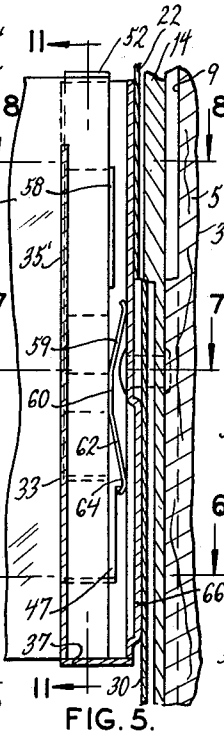


FIG. 5.

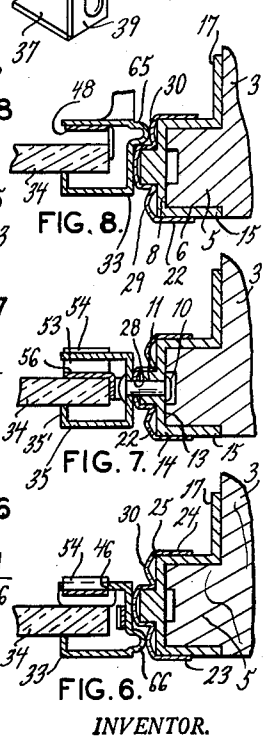


FIG. 8.

FIG. 7.

FIG. 6.

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LOUVERED WINDOWS

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Application April 7, 1952, Serial No. 280,993

6 Claims. (Cl. 20—62)

This invention relates in general to window construction, and, more particularly, to windows of the type comprising a plurality of louvers adapted for swingable shifting in a vertical plane.

It is a primary object of the present invention to provide novel brackets for supporting the ends of the several louvers, and being mounted for pivotal movement between closed position wherein the horizontal edges of the louvers are presented in overlapping relation in weathertight engagement, and open position wherein the louvers have been shifted jointly in an arc to permit ventilation therebetween.

It is a further object to provide novel end brackets having means associated therewith for positive engagement with the louvers to maintain same fixedly therein against unauthorized removal or shifting whereby the imposition of uneven stresses upon the louver due to displacement, with consequent breakage, is prevented as is any chattering or rattling such as occasioned by strong winds.

It is an additional object to provide a spacer member for disposition within the end brackets to prevent contact between the end face of the louvers and the heads of rivets projecting into the interior of the brackets which rivets form the pivots for the brackets.

A further object resides in cooperative means provided on the end face of the brackets and the frame jamb for obstructing the passage therebetween of light, air, and foreign elements, which means coact for mutual surface cleansing or wiping for the removal of dirt, dust, or other objectionable matter collected thereupon, whereby accumulations of such matter upon the operating parts with expected, serious diminution in operability is prevented.

Another important object of this invention resides in a spring actuated mechanism adapted for camming relation with a follower operating bar for biasing same into window-closed position for assuring that the ends of the louvers remote from the window operating means will be in snug, weathertight engagement.

A still further object resides in a mechanism for engaging the operating bars and the frame jamb for stabilizing said bars against lateral displacement whereby the bars will be constrained for efficient shifting in a vertical path.

An additional object is to provide a unique and novel louvered window which may be readily installed in existing structures; which is adaptable for various opening sizes; which is economic in construction, durable in wear, and reliable in operation.

With the above and other objects in view, my invention resides in the novel features of form, construction, arrangement, and combination of parts presently described and pointed out in the claims.

In the accompanying drawings (two sheets)—

Figure 1 is an inner elevational view of a window constructed in accordance with and embodying the present invention;

Figures 2, 3, and 4 are transverse sectional views taken along lines 2—2, 3—3, and 4—4, respectively, of Figure 1;

Figure 5 is a transverse sectional view taken along line 5—5 of Figure 4;

Figures 6, 7, and 8 are transverse sectional views taken along lines 6—6, 7—7, and 8—8, respectively, of Figure 5;

Figure 9 is a perspective view of an end bracket;

Figure 10 is a perspective view of an end bracket spring;

Figure 11 is a transverse sectional view taken along line 11—11 of Figure 5;

Figure 12 is a transverse sectional view taken along line 12—12 of Figure 2; and

Figure 13 is an exploded horizontal sectional view of the filler strip and the mounting strip.

Referring now to the drawings which illustrate a preferred embodiment of the present invention, A designates a wall-opening frame which may be conventionally made of wood and comprises a sill 1, header 2 and side jambs 3, 4, the latter each integrally incorporating adjacent its front end an inwardly projecting rib 5 having front, back, and central faces 6, 7, 8, respectively. Each rib 5 on its central face 8 is provided with a plurality of vertically aligned, spaced apart recesses 9, each of which is adapted for clearance reception of the head of a rivet 10 which is journalled for rotation in a registering bearing 11 drilled or otherwise provided in a boss 12 formed in the web 13 of a mounting strip 14, fabricated preferably of aluminum, and having front and back flanges 15, 16, for disposition in fitted, encasing relation upon each rib 5, throughout its length and being suitably secured thereto. Each mounting strip 14 is further provided with an end flange 17 normal to the back flange 16 for flushwise presentation against the inward face of each jamb 3, 4, said flange 17 being spacedly apertured as at 18 in alignment with recesses 19 arranged in each jamb 3, 4, for purposes appearing more fully hereinafter.

On either side of the bosses 12, each web 13 forms shoulders 20, 21. Coveringly mounted by suitable means on each mounting strip 14 is a generally channel-shaped filler strip 22, preferably of narrow gauge stainless steel, and having front and back flanges 23, 24, respectively, for disposition against the corresponding flanges 15, 16, of the mounting strip 14. Connecting said flanges 23, 24, is a plate section 25 formed to provide a central protuberance 26 for snugly receiving the boss 12 of the strip 14 and having its outer face reversely sloped for presenting a vertical spine or ridge 27; said outer face being apertured at intervals, as at 28, for receiving the rivets 10. On either side of said protuberance 26, the filler strip 22 is provided with lateral spines or ridges 29, 30, for respective overlying relation to the shoulders 20, 21, of mounting strip 14, said spines 29, 30, being axially parallel.

At their inner ends, each rivet 10 extends through an aperture 31 drilled at the midpoint of the end wall or web 32 of an end bracket or retainer 33 which in conjunction with an opposed bracket supports, in a manner to be described below, rectangular louvers or window panels 34. Said louvers 34 are horizontally arranged for transverse extension between pairs of opposed end brackets 33 and are swingable in a vertical plane by movement of the brackets 33 about the rivets 10 which thus provide the pivots therefor. The louvers 34 are preferably constructed of transparent material, such as glass, plastic, and the like, and may be, if desired, colored appropriately for controlling the intensity of light passing therethrough. Said louvers 34 thus provide window-closures and, as may best be seen in Figure 2, are disposed angularly with reference to the side jambs 3, 4, so that when in closed position said louvers 34 will be in overlapping and contacting relation throughout their length with the immediately adjacent louvers in tight sealing relation.

Each end bracket or retainer 33 being desirably formed from a single piece of metal, such as aluminum, stainless steel and the like, comprises front and back flanges 35, 36, respectively, at right angles to the end wall or web 32, the former of which is bent rearwardly at its inner vertical margin to provide a shallow rim 35' and at its lower end is similarly bent to provide a lip 37 and whereby each end bracket 33 is impressed with the character of a clip-like receptacle for receiving one end of a louver 34, wherein the bottom margin of said louver 34 will be supportedly engaged upon the lip 37 and the forward face thereof in abutment against the rim 35'.

The web 32 is cut away in its lower portion, as at 38, for presenting an elongated, relatively narrow extension 39. In its upper portion the web 32 is similarly cut away as at 40 to form a relatively short, upward extension 41 in offset or staggered relation to the extension 39 whereby the forward margin of the extension 41 is in substantial alignment with the rear margin of the extension 39. The upper edge of the front flange 35 is in planar alignment with the upper surface of the web 32 at the cut away section 40 to permit extension therebeyond of the forward upper portion of the louver 34 for surface abutting, weathertight engagement with the lower rearward portion of the immediately superjacent louver 34 (see Figure 4). The back flange 36 is suitably bent to provide a rearwardly extending reinforcement 42 for a boss 43 projecting from the web 32 in surface alignment therewith, and integrally having at its rearward end an offset lug 44 having a stud-receiving opening 45 gripped therethrough. Adjacent its lower margin, the back flange 36 is provided with a slot-like aperture 46 and is reduced in its lower end to form an inwardly bent arm 47 which terminates in upwardly spaced relation to the lip 37 for permitting the rearward lower portion of the louver 34 to engage the upper forward portion of the immediately subjacent louver. The arm 47 is so bent as to present its end margin for bracing engagement against the louver 34. It will thus be seen that the webs 32 of the end brackets 33 are relatively wider than the thickness of the louvers 34 therein supported.

Provided for disposition within each end bracket 33 is an angle-shaped spring 48 formed from flat spring stock and having a main leg or section 49 for positionment between the rearward face of the louver 34 and back flange 36 (see Figure 4), and a side leg or section 50 for location between the end of each louver 34 and web 32 (see Figure 5). The upper end of the main leg 49 inclines forwardly, as at 51, and terminates in a forwardly extending tab 52 for retentive engagement with the upper margin of the louver 34. The lower end portion of said leg 49 inclines rearwardly, as at 53, having at its extremity a rearwardly projecting tab 54 for extension through the aperture 46 in back flange 36 for locking the spring 48 within the end bracket 33. Spacedly from the inclined lower portion 53 the main leg 49 of the spring 48 is reversely inclined as at 55 to define a forwardly projecting abutment 56 for frictional engagement with the louver 34 to maintain same away from the back flange 36 and in firm engagement against the rim 35'. The inclined upper end section 51 of the leg 49 and the inclined portion 55 are connected by a relatively long, vertical planar section 57 in parallel relation to the back flange 36 for presentation thereagainst. The side leg 50 consists of a narrow upper flange 58 normal to planar section 57 of the leg 49 for flatwise disposition against the end face of the louver 34, and a lower flange 59 having an abutment 60 normal to abutment 56 and having integral upwardly and downwardly extending arms 61, 62, which are outwardly inclined and terminate in arcuate ends 63, 64, respectively, engaged on their outer surfaces with the inner face of web 32 respectively above and below the rivet 10. Thus, the lower flange 59 serves to maintain the end of the louvers 34 away from the webs 32 to prevent contact thereof with the rivets 10 so that the latter may be permitted free, unimpeded pivotal movement with coincidental avoidance of any breakage due to such contact.

The spring 48, as shown hereinabove, bracingly maintains the louvers 34 fixedly within the brackets 33 by the exertion of equalized pressure thereon to prevent same from unauthorizedly shifting to cause the development of uneven stresses with consequent shattering. Said springs 48 are anchored in position by extension of the tabs 54 through the apertures 46 whereby the upper tabs 52 are positioned for effecting a downward urging upon the upper edge of the louvers 34 to maintain same snugly between said tabs 52 and the bottom lip 37, thereby obviating any untoward vertical displacement of said louvers 34. Referring to Figure 11, it will be seen that the lower tabs 54 are of greater length than the distance between the louver 34 and the back flange 36 so that inward pushing on the projecting ends of the tabs 54 will not cause same to be dislodged from the apertures 46. Similarly, the upper tabs 52 are of greater length than the distance between the upper end of the back flange 36 and the rearward face of the louver 34 so that backwardly directed pressure upon the tabs 52 will not cause same to lose contact with the top margin of the louver 34 so that backwardly directed pressure upon the tabs 52 will not cause same to lose contact with the top margin of the louver 34. Thus, when the louver 34 is in position within the bracket 33, it cannot in any way be removed without breakage. Consequently, in such locked position, it is proof against any unauthorized or accidental movement. In installation, the springs 48 are placed within the bracket 33 and upon insertion of the louvers 34 are snapped into position by outward "popping" of the tab 54 through the aperture 46. As shown above, unauthorized endwise and forward or rearward shifting of the louvers 34 is inhibited by the abutments 56, 60, by the operation of which the contact between said louvers 34 and the end brackets 33 is restricted to a minimum, namely, by the rim 35' and the lower end of the arm 47 in addition, of course, to lip 37.

Protruding from the outer face of the webs 32 of each end bracket 33 are upper and lower vertically extending rounded bosses or protrusions 65, 66, respectively, being presented on opposite sides of the longitudinal center portion of the webs 32 and offset or staggered from each other with the lower end of the upper boss 63 terminating upwardly of the horizontal central section of the web 32 while the upper end of the lower boss 66 terminates downwardly thereof (see Figure 9). The bosses 65, 66, are respectively presented for surface engagement with the spines 30, 29, of the filler strip 32 (see Figures 6, 8 and 12), to thus conjunctively provide, when the louvers 34 are in closed position, weather seals for blockingly prohibiting the passage of light or air between the jambs 3, 4, and the brackets 33. The protuberance 26 of the filler strip 22 effectively prevents any light or weather transmission through the horizontal space intermediate the bosses 65, 66. The outward thrust of the arms 61, 62, of the springs 48 urges the web 32 outwardly in the direction of the filler strips 22 so that weatherstrip-providing contact is maintained between the bosses 65, 66, and the spines 29, 30, which latter under such engagement will tend to flatten partially for enhancing the area of contiguity. During swinging of the louvers 34 from closurewise disposition into open position, and conversely, the relative movement between the bosses 65, 66, and their associated spines 29, 30, will cause a mutual surface cleansing or wiping action therebetween so that any dirt, dust, or other foreign matter which might have collected upon such surfaces will be dislodged. With various types of windows heretofore known in the art, the accumulation of dust, sand, and other objectionable matter upon the operating parts of such windows have caused the same in time to become inoperable. Thus, the coaction between the bosses 65, 66, and spines 29, 30, overcome this difficulty by preventing any damaging

accumulation of foreign matter to thus insure reliable operation of the window herein described, in addition to providing weatherstripping and light obstruction.

Each of the end brackets **33** adjacent the side jamb **4** is connected by a stud **67** projecting through the opening **45** in the lug **44** to a vertical operating bar **68** which, adjacent its upper end, is, in turn, pivotally engaged to one end of a connecting link **69**, the other end of which is secured to the crank arm **70** of a window operating mechanism **71**. Said mechanism **71** does not form a part of the present invention and may be of any desired design, such as the conventional worm and wormwheel type and having an operating crank or lever **72**. Actuation of the lever **72** in louver-opening direction will cause the operating bar **68** to be shifted downwardly, lowering the upper portions of the brackets **33** with it to effect pivoting of the same about the rivets **10** to swing the lower portions of the louvers **34** upwardly and outwardly into open position.

Each of the end brackets **33** adjacent the side jamb **3** on the side of the frame remote from the operating mechanism **71** is connected to a vertical follower bar **73** in parallel relation to the operating bar **68** and adapted to be moved therewith upon rocking of the end brackets **33** pursuant to shifting of the bar **68** for assuring uniform, joint movement of the end brackets **33** engaged thereto.

Adjacent its upper end the follower bar **33** is provided with a cam forming recess **74** extending forwardly from its rear margin in axial normal relation to said bar **73** for receiving a cylindrical cam follower **75** mounted for transverse disposition across the forward end of an upwardly opening channel member **76** pivoted at its rearward end to a bracket **77** suitably mounted on the jamb **3** in proximity to the header **2**. Engaged at its forward end about a transverse pin **78** mounted in said member **76**, parallel to, and rearwardly of, the cam follower **75**, is a coil spring **79**, the other end of which is suitably engaged on the bracket **77**. It will be seen that, as the follower bar **73** is shifted downwardly during louver-opening operation, the cam follower **75** will be carried downwardly within the cam **74** with the spring **79** resisting such movement until it has been forced past the center whereupon such resisting action will terminate. Conversely, upon upward shifting of the follower bar **75** for louver-closure the initial portion of the upward movement of the member **76** will be resisted by action of the spring **79** until it has been, by cooperation of the cam **74** and cam **75**, forced back across its center. Whereupon snapping action of the spring **79** due to the release of energy will cause the follower bar **73** to be urged into full upward position for snug closure of the ends of the louvers **34**.

Provided for constraining the operating bar **68** and follower bar **73** to move in vertical paths by countering laterally-directed canting or buckling tendencies thereof is a plurality of so-called "helper" mechanisms *s* spacedly disposed on each side of the window for coaction with said bars **68**, **73**. Each of said mechanisms *s* comprises an outer link or arm **80** the forward end of which is pivotally secured to the flange **17** of the mounting strip **14** by a stud **81** projecting through the apertures **18** into the recesses **19**. At its rearward end the link **80** is inwardly offset for joint-forming engagement with the corresponding end of an inner link **82** which at its forward end is suitably connected to the outwardly presented face of the operating bar or follower bar **73**, as the case may be. As is indicated in Figure 2, the links **80**, **82**, are adapted to be moved relative to each other upon shifting of the bars **68**, **73**, with their longitudinal axes forming an enlarged angle when the louvers **34** are in opened position. Upon upward movement of the bars **68**, **73**, for louver closure, the links **80**, **82**, will assist such movement by causing the bars **68**, **73**, to follow a vertically straight path to attain their upper-most position for complete louver closure. Additionally, the inherent tendency of the links **80**, **82**, to revert to a relative position of least strain, will assist in the restoration of the bars **68**, **73**, to their upper-most position.

With reference now being made to Figure 2, the header **2** is cut away along its lower, forward longitudinal portion as at **83** for appropriately receiving a mounting bar **84** which projects beneath said header **2** for securement upon its inwardly presented face of a flexible sealing strip **85** for engaging the upper, forward longitudinal portion of the top louver **34** when the same is in closed position. A similar flexible sealing strip **86** is mounted on the forward face of the sill **1** for contact with the rearward bottom portion of the lowest louver **34**.

It should be understood that changes and modifications in the form, construction, arrangement, and combination of the several parts of the louvered window may be made and substituted for those herein shown and described without departing from the nature and principle of the present invention.

Having thus described my invention what I claim and desire to secure by Letters Patent is:

1. A window comprising a frame having side jambs, each side jamb having an inwardly projecting rib, a plurality of louvers extending transversely between said ribs, end brackets for supportedly receiving the ends of said louvers and being pivotally mounted on said ribs, the end surfaces of said end brackets being in confronting, face to face relation with the adjacent rib, each end bracket having a pair of elongated, vertically extending rounded protrusions in vertically spaced relation provided on its end surface, directed toward said rib, and a covering member mounted on said rib, said member having spaced, vertically extending spines in opposed relation to said protrusions on the end surface of the adjacent end bracket for respective contactive engagement therewith to blockingly seal the space between said end brackets and the ribs when the louvers are in window-closed position, said member further having a protuberance intermediate said spines for projection into the space between said bracket protrusions.

2. A window comprising a frame having side jambs, each side jamb having an inwardly projecting rib, a plurality of louvers extending transversely between said ribs, end brackets for supportedly receiving the ends of said louvers, and being pivotally mounted on said ribs, the end surfaces of said end brackets being in confronting, face to face relation with the adjacent rib, each end bracket having a pair of elongated, vertically extending rounded protrusions in vertically spaced relation provided on its end surface, directed toward said rib, a covering member mounted on said rib, said member having spaced, vertically extending spines in opposed relation to said protrusions on the end surface of the adjacent end bracket for respective contactive engagement therewith to blockingly seal the space between said end brackets and the ribs when the louvers are in window-closed position, said member further having a protuberance intermediate said spines for projection into the space between said bracket protrusions, and resilient means provided in said end brackets for urging same toward the covering member.

3. A window construction comprising a frame having spaced side jams, a louver extending transversely between said side jambs, and a channel-shaped end bracket having a web and a pair of flange portions pivotally mounted on each said side jamb for supportedly receiving the ends of said louver for pivotal movement of said louver between open and closed positions, at least one of said end brackets having on the outer face of its web portion at least one elongated, longitudinally-extending protrusion directed outwardly toward the side jamb adjacent said protrusion, said adjacent side jamb having at least one elongated, longitudinally-extending projecting portion directed inwardly toward said protrusion, the inner face of said projecting portion contacting and being laterally aligned with the outer face of said protrusion along its length

when said louver is in said closed position for blockingly sealing the space between said jamb and said end bracket.

4. A window comprising a frame having side jambs, a plurality of louvers extending transversely between said side jambs, and end brackets pivotally mounted on said side jambs for supportedly receiving the ends of said louvers for pivotal movement of said louvers between open and closed positions, said end brackets having on their end faces elongated, longitudinally-extending protrusions directed outwardly toward said side jambs, said side jambs having elongated, longitudinally-extending projecting portions directed inwardly toward said end bracket protrusions, the inner faces of said projecting portions contacting and being laterally aligned with the outer faces of said protrusions along their length when said louvers are in said closed position for blockingly sealing the space between said jambs and said end brackets.

5. A window comprising a frame having side jambs, a plurality of louvers extending transversely between said side jambs, and end brackets pivotally mounted on said side jambs for supportedly receiving the ends of said louvers for pivotal movement of said louvers between open and closed positions, each of said end brackets having on its end face a pair of spaced, elongated, longitudinally-extending protrusions directed outwardly toward said side jambs, each of said side jambs having spaced, elongated,

longitudinally-extending projecting portions directed inwardly toward the related end bracket protrusions, the inner faces of said projecting portions contacting and being laterally aligned with the outer faces of said protrusions along their length when said louvers are in said closed position for blockingly sealing the space between said jambs and said end brackets.

6. A window as described in claim 5, wherein the projecting portions on each side jamb comprise horizontally spaced, vertically extending spines.

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