

## [54] WINDOW CONSTRUCTION

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[22] Filed: Dec. 7, 1970

[21] Appl. No.: 95,602

[52] U.S. Cl. .... 49/209, 49/449

[51] Int. Cl. .... E05d 15/10

[58] Field of Search .... 49/209-210, 211, 49/212, 221, 225, 316-320, 395, 449

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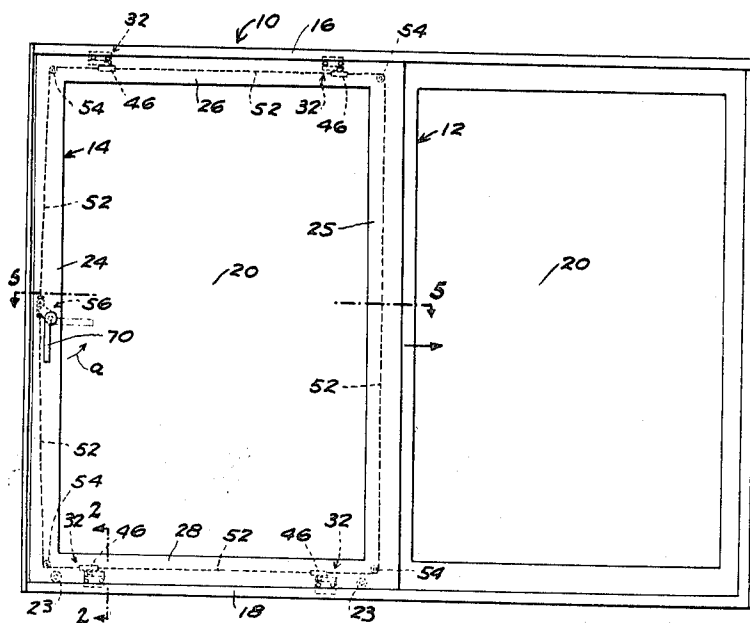
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## [57] ABSTRACT

A window construction having a sash supported on rollers for movement along a guideway on the window frame. With the sash in either the closed or opened position, it may be transversely moved into and out of sealing engagement with the frame by means of a mechanical linkage. This linkage comprises a first block transversely movable on the sash and engageable with the guideway, a second block on the window sash movable lengthwise of the guideway and means interconnecting the two blocks such that when the second block is shifted by means of an actuator operatively connected thereto by means of a cable extending around the periphery of the sash, the first block engages the guideway to shift the sash transversely of the frame. The blocks are concealed from sight within a hollow section of the sash.

12 Claims, 9 Drawing Figures



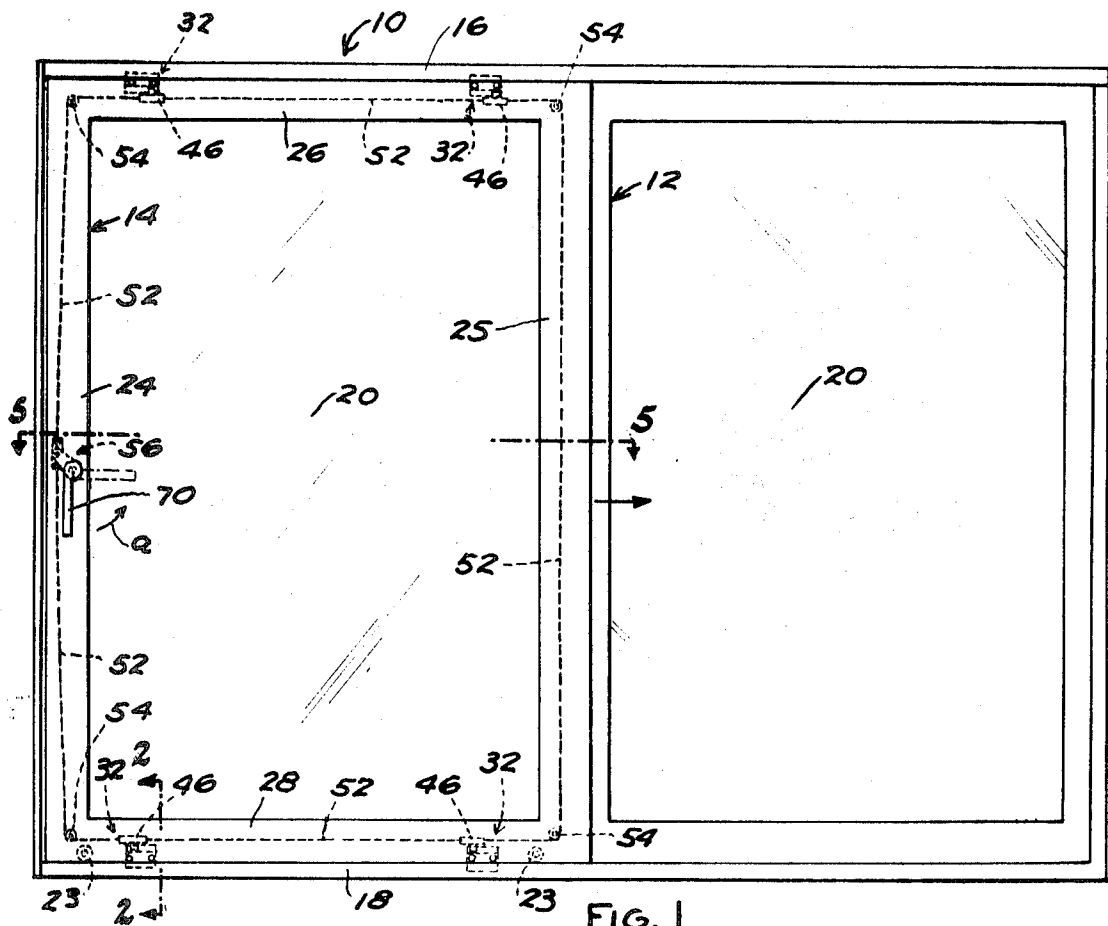


FIG. 1

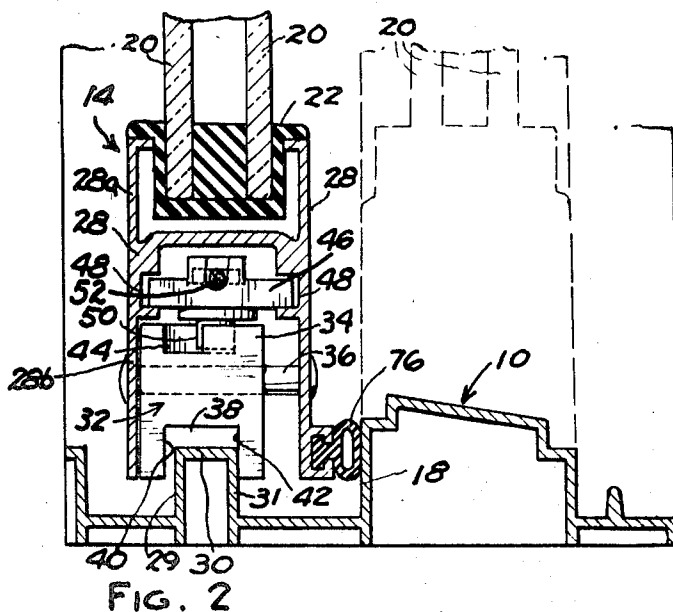


FIG. 2

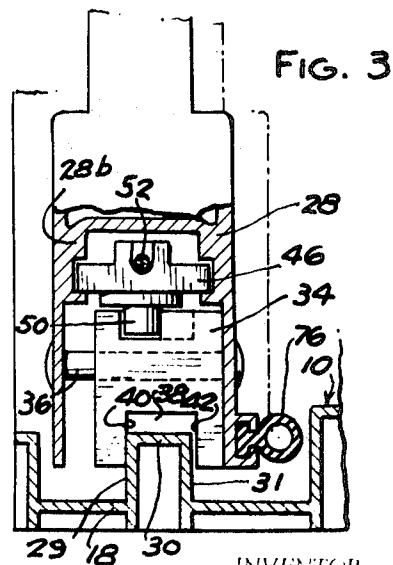


FIG. 3

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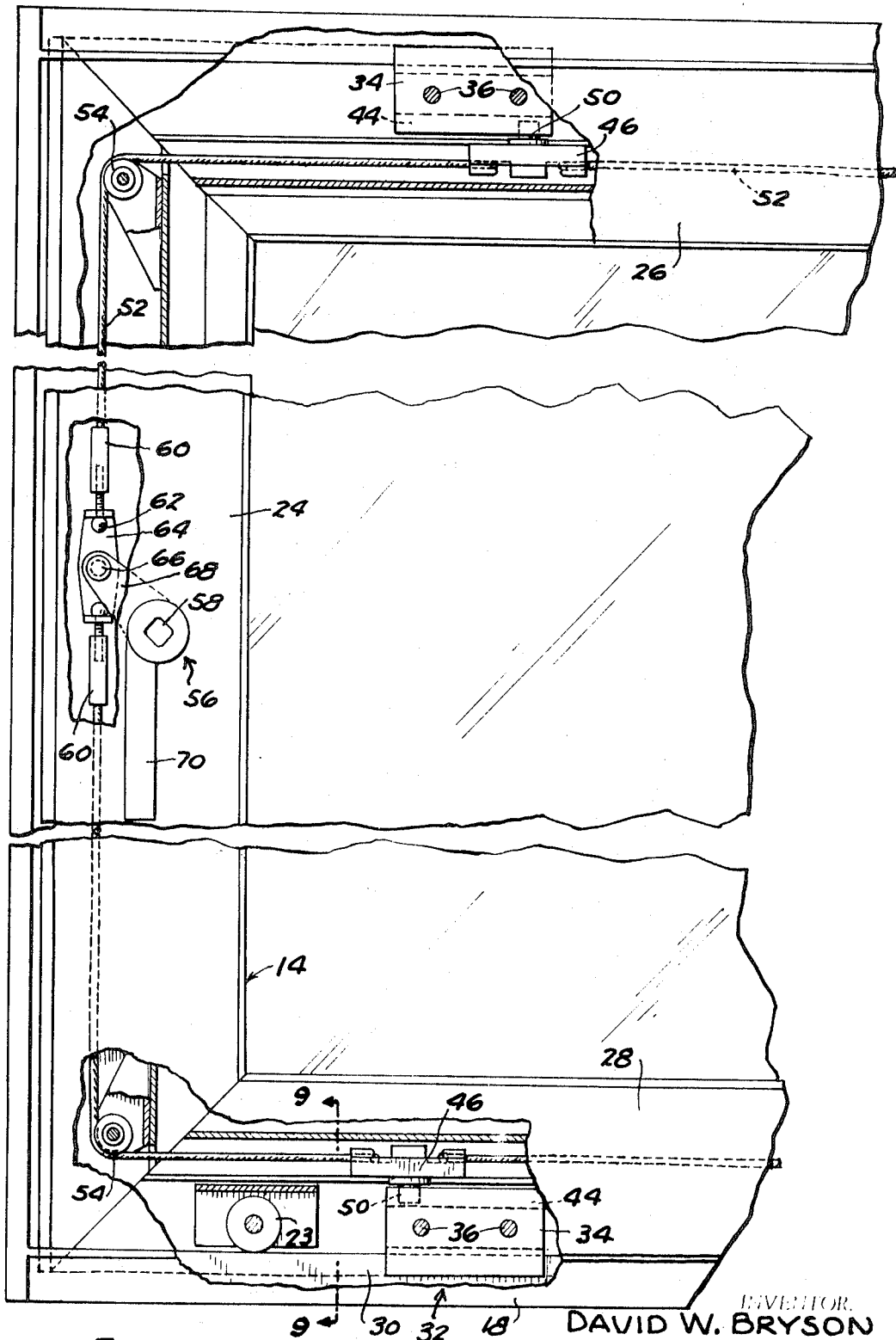


FIG. 4

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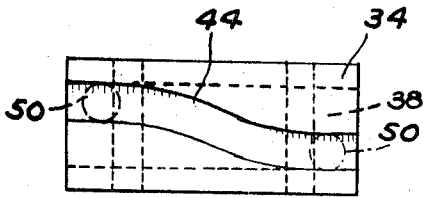


FIG. 6

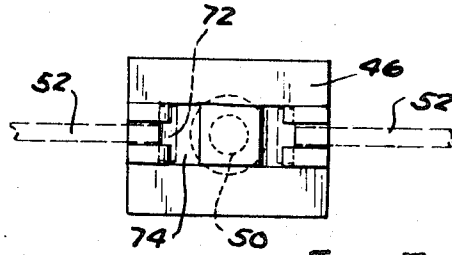


FIG. 7

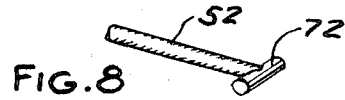


FIG. 8

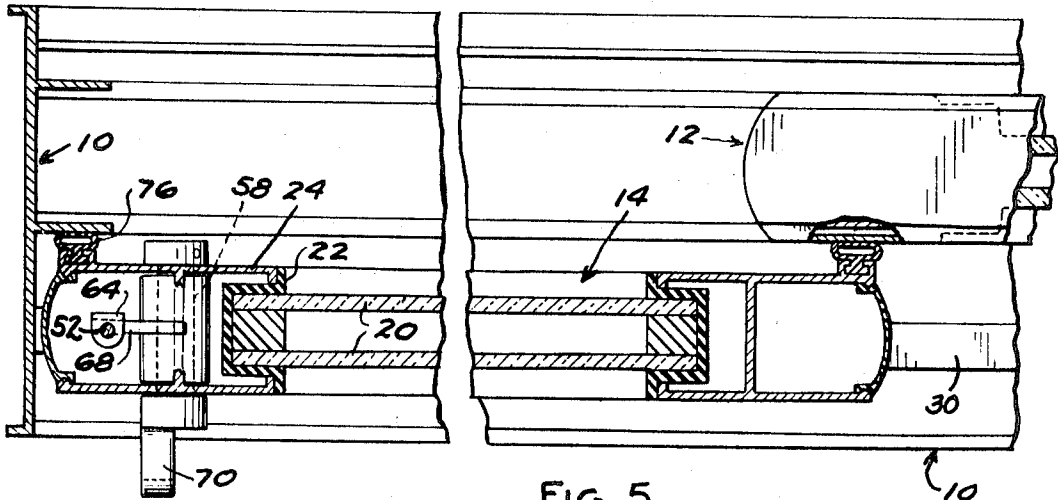


FIG. 5

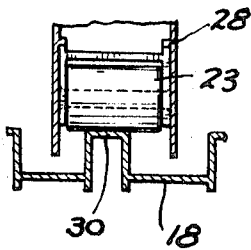


FIG. 9

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## WINDOW CONSTRUCTION

This invention relates to a window construction and more specifically to means for bringing a movable window sash into sealed engagement with a window frame.

In one type of window construction a window sash is movable lengthwise of the window frame between an open and a closed position. With the sash in the closed position it may be shifted transversely of the frame so that overlapping edge portions of the frame and sash interengage a seal extending around a periphery of either the sash or the frame. In one such arrangement for bringing a sash into sealing engagement with a frame, sufficiently large forces are applied at several points around the sash and sufficiently rigid sash members are provided so that the applied forces are transmitted to compress the seal between the sash and the frame. These forces are usually applied by an actuator and linkage arrangement. In order to provide a neat, clean appearance of the window construction, it is desirable to have the linkage concealed from sight.

Accordingly, it is an object of the present invention to provide a window construction in which the window is brought into sealing engagement with the window frame by means of a linkage arrangement which is concealed from sight.

It is also an object of this invention to provide a window construction having an improved linkage for bringing the window sash into sealing engagement with the window frame.

Another object of this invention is the provision of a window construction having an improved linkage for bringing the window sash into sealing engagement with the window frame comprising a transversely movable first block and a second block movable lengthwise of the window frame such that lengthwise actuation of the second block causes the first block to move transversely so as to bring the window sash into sealing engagement with the window frame.

Still another object of this invention is the provision of a window construction having a cable extending around the periphery of the window sash which actuates means for bringing the sash into sealing engagement with the window frame.

In the drawings:

FIG. 1 is a front elevational view of a window construction of the present invention.

FIG. 2 is a sectional view taken along line 2—2 in FIG. 1 and showing the sash in sealed relationship with the frame.

FIG. 3 is a view similar to FIG. 2 and showing the sash in unsealed relationship with the frame.

FIG. 4 is an enlarged view of a portion of FIG. 1 with parts being broken away.

FIG. 5 is an enlarged sectional view taken along lines 5—5 in FIG. 1 and having a portion broken away.

FIG. 6 is a top view of a cam block of the present invention.

FIG. 7 is a top view of a slide block of the present invention.

FIG. 8 is a perspective view of a portion of the actuating cable of the present invention.

FIG. 9 is a sectional view taken along line 9—9 in FIG. 4.

Referring to FIG. 1 a window frame shown generally at 10 supports a fixed sash 12 and a movable sash 14. Frame 10 is normally installed in an opening in a wall of a building and comprises upper and lower horizontal frame members 16 and 18. Sashes 12 and 14 each carry window panes 20 by means of moldings 22 in the customary manner.

Movable sash 14 comprises vertical sash members 24 and 25 and horizontal sash members 26 and 28 and is spaced in front of fixed sash 12 for horizontal movement lengthwise of frame 10 between an open position in front of sash 12 and a closed position as shown in FIG. 1. When sash 14 is in the closed position it overlaps frame 10 and may be shifted transversely relative thereto between a sealed position (FIG. 2) and an unsealed position (FIG. 3). Sash 14 is supported on member 18 by means of rollers 23 (see FIG. 4) and is guided thereon (FIGS. 2 and 3) by means of a guideway 30 extending lengthwise of frame 10. Guideway 30 has a cross section generally in the form of an inverted U and comprises sides 29 and 31. A similar guideway is provided in upper frame

member 16 for upper sash member 26. Sash members 26 and 28 each carry two shifters 32 which are adapted to transversely shift sash 14 into sealed relationship with frame 10, and which also serve to guide sash 14 on guideway 30.

FIGS. 2 and 3 show a section through sash member 28 and frame member 18 to illustrate typical shifter and member constructions. Member 28 has a generally H-shaped cross section which may be considered as two channels 28a, 28b placed back to back. Upper channel 28a supports pane 20 while lower channel 28b provides a cavity within which shifters 32 are carried. Sash members 26 and 28 are arranged and constructed in relation to frame members 16 and 18 so that shifters 32 are concealed from sight when viewed from a point transversely spaced from sash 14.

Referring additionally to FIGS. 6 and 7, shifter 32 comprises a cam block 34 slidably carried by pins 36 which extend transversely across lower channel 28b. Block 34 has a slot 38 formed in its lower surface and extending lengthwise of guideway 30, so as to interengage guideway 30. Slot 38 has vertical sides 40 and 42. A curved cam track 44 (FIG. 6) is formed in the upper surface of block 34, extending generally lengthwise of guideway 30 and having a transverse throw. Shifter 32 further comprises a slide block 46 guided for motion lengthwise of guideway 30 along member 28 as at 48. A downwardly projecting cam follower roller 50 on block 46 engages cam track 44. With this arrangement, as block 46 is shifted lengthwise of guideway 30, block 34 is transversely shifted on pins 36.

Referring now to FIGS. 1, 4 and 5, slide blocks 46 are interconnected by means of cables 52 extending around the periphery of sash 14. Cables 52 are guided by pulleys 54 at the four corners of the sash. Sash members 24, 25, 26 and 28 are arranged and constructed so that cables 52 and pulleys 54 are concealed within a peripherally extending passageway defined by the sash members. The portions of cables 52 within vertical sash member 24 terminate at an actuator 56 which is pivoted within member 24 as at 58. Turnbuckles 60 are provided for tension adjustment and have ball heads 62 which are seated in bracket 64 of actuator 56. Bracket 64 is in turn pivoted as at 66 on crank 68 of actuator 56. A handle 70 is provided externally of member 24 for operating the actuator. As shown in FIGS. 7 and 8 cables 52 are provided with pins 72 for engagement with T-slots 74 in slide blocks 46.

A compressible, resilient seal 76 extends around the periphery of sash 14 adjacent frame 10. As sash 14 is transversely shifted by shifters 32, seal 76 is interengaged with frame 10 to bring sash 14 into sealed engagement therewith.

In order to release sash 14 from sealed engagement with frame 10 handle 70 is rotated counterclockwise as shown by arrow a in FIG. 1. This causes bracket 64 to be shifted downwardly so as to move cables 52 in a counterclockwise sense around sash 14. As cables 52 are shifted, slide blocks 46 within upper sash member 26 are moved to the left in FIG. 1 while slide blocks 46 within lower member 28 are moved to the right. As block 46 slides along member 28, the action of follower 50 with cam track 44 tends to shift block 34 to the right in FIG. 2. However, the resiliency of seal 76 causes sash 14 to move to the left so that block 34 remains stationary relative to guide 30. When the resiliency of the seal is expended, continued shifting of block 46 causes block 34 to move to the right relative to guide 30 until side 40 abuts side 29. Now, with block 34 constrained relative to guideway 30, still further shifting of block 46 moves sash 14 further leftward so that seal 76 is disengaged from frame 10. Sash 14 is now free to be moved on rollers 23 to the open position in front of fixed sash 12.

In order to reseat sash 14, handle 70 is rotated in the clockwise direction from the broken line position of FIG. 1. With sash 14 in the unsealed position shown in FIG. 3, block 34 is transversely shifted on pins 36 until side 42 of slot 38 abuts side 31 of guideway 30. Continued shifting of slide block 46 causes sash 14 to shift toward frame 10 to interengage seal 76 thereon.

Slot 38 is preferably slightly wider than guideway 30 so as to facilitate the movement of sash 14 between open and closed positions. The transverse travel of block 34 on pins 36 must be greater than the allowable travel of block 34 relative to guideway 30 for moving sash 14 to and from the sealed position.

Although the outward appearance of the window construction is made neat and clean by concealing the operating linkage within sash 14, the linkage in and of itself affords an improved window construction. The cam arrangement of shifters 32 provides smooth operating efforts for sealing sash 14 with frame 10. Also the use of rollers 23 on guideway 30 allows sash 14 to be moved lengthwise with ease. Furthermore, it should be noted that not only may sash 14 be transversely moved into and out of sealing engagement with frame 10 when sash 14 is in the closed position, but also whenever sash 14 is anywhere intermediate the opened and closed positions. With this feature, sash 14 may be unsealed, moved from the closed position part of the way toward the open position and then moved back to the sealed position such that the sealing engagement thereof with frame 10 maintains sash 14 in this intermediate position.

I claim:

1. In a window construction the combination of a first frame having a guideway therein, a second frame on said guideway and movable lengthwise thereof, said frames having overlapping edge portions and said second frame being shiftable transversely of said guideway to bring said overlapping edge portions into and out of sealing engagement, a first block mounted on said second frame for movement relative thereto in a direction transversely of said guideway and substantially immovable lengthwise of said guideway relative to said second frame, means on said block interengaging said guideway such that transverse movement of said block relative to the second frame causes the second frame to shift transversely of said guideway to bring said overlapping edge portions into and out of sealing engagement and means for shifting said first block transversely relative to said second frame to thereby bring said overlapping edge portions into and out of sealing engagement comprising a second block on said second frame shiftable thereon in a direction lengthwise of said guideway and means interconnecting said first and second blocks for causing said first block to shift in said transverse direction in response to shifting of the second block lengthwise of the guideway relative to the second frame whereby said two frames may be transversely moved relative to each other into and out of sealing engagement.

2. The combination called for in claim 1 wherein said two blocks are mounted on the second frame for movement therewith lengthwise of said guideway and said second block is also mounted on the second frame for limited lengthwise movement relative to the second frame.

3. The combination called for in claim 2 wherein said means interconnecting said first and second blocks comprises cam

means.

4. The combination called for in claim 2 wherein said second frame includes a hollow section therein adjacent said guideway, said first and second blocks being within said hollow section.

5. The combination called for in claim 2 wherein said means for interengaging said first block on said guideway comprises a slot formed in said first block extending lengthwise of said guideway, said guideway projecting inwardly of said slot so that when said first block is transversely shifted in opposite directions the sides of said slot abut said guideway to constrain transverse movement thereof.

6. The combination called for in claim 5 wherein said guideway constrains said first block for transverse movement relative to said first frame a distance less than the distance which said first block may be transversely shifted relative to said second frame.

7. The combination called for in claim 3 wherein said cam means comprises a cam track on one of said blocks and a cam follower on the other of said blocks engaging said cam track, said cam track extending generally lengthwise of said guideway and having a throw transverse to said guideway to cause said second frame to be transversely shifted relative to said first frame when said follower moves lengthwise of said track.

8. The combination called for in claim 2 including means for shifting said second block on said second frame comprising cable means and an actuator on said second frame, said cable means operatively connecting said second block and said actuator such that operation of said actuator shifts said second block lengthwise of said guideway relative to the second frame.

9. The combination called for in claim 4 wherein said hollow section is defined by a generally U-shaped channel member extending parallel to said guideway and having two side walls transversely spaced apart so that said guideway is transversely spaced between said side walls and a connecting wall opposite said guideway connecting said two side walls, said two blocks being mounted on said second frame transversely between said two side walls and between said connecting wall and said guideway.

10. The combination called for in claim 8 wherein said cable means extends around the periphery of the second frame, said second frame comprising means for concealing said cable means and said two blocks therein.

11. The combination called for in claim 9 including first guide means on said second frame for guiding said first block for transverse movement thereon and second guide means on said second frame for guiding said second block for movement thereon lengthwise of said guideway.

12. The combination called for in claim 11 wherein said first guide means comprises a pin means extending transversely between said side walls of said channel, said first block being slidably carried on said pin means.

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