April 2, 1957 H. R. ANSEL 2,787,031

WINDOW

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Fig. 2.

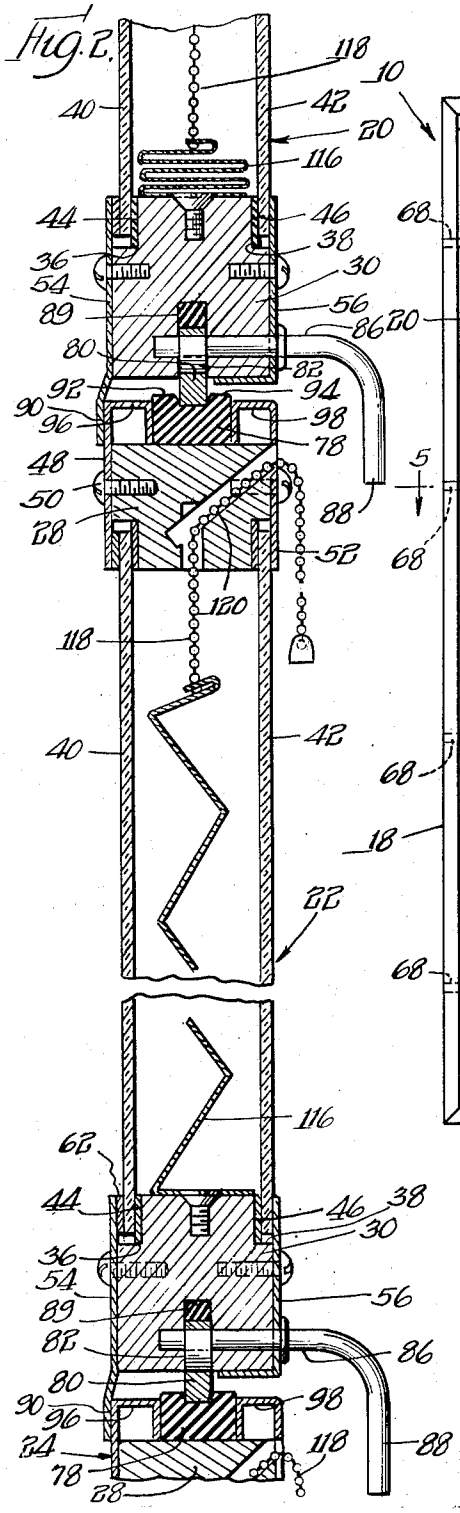
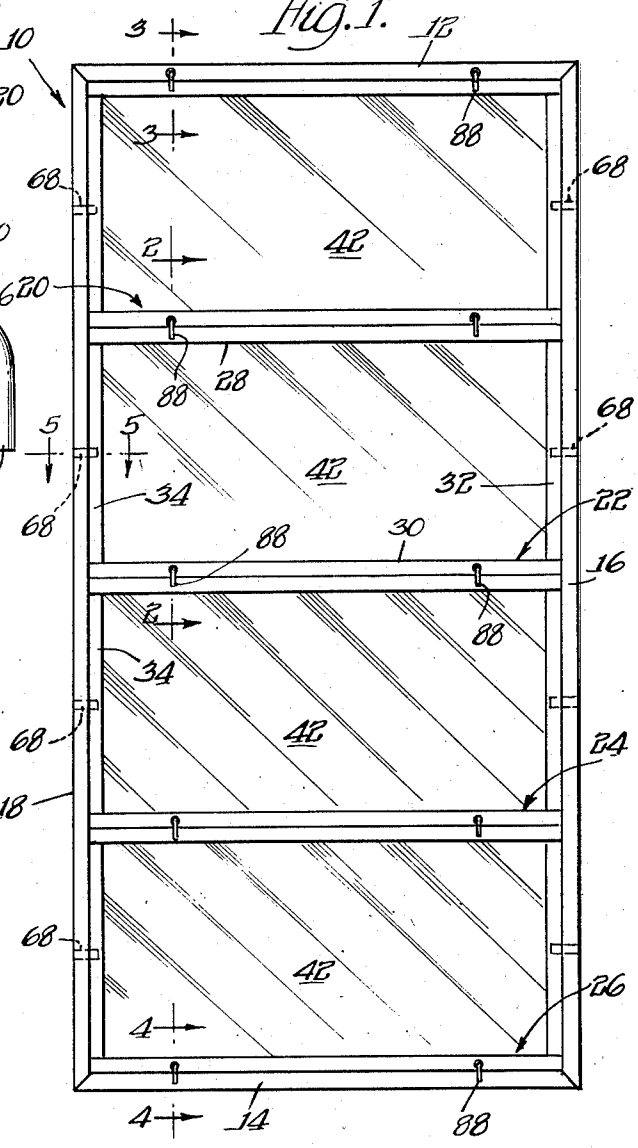



Fig. 1.




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Fig. 3.

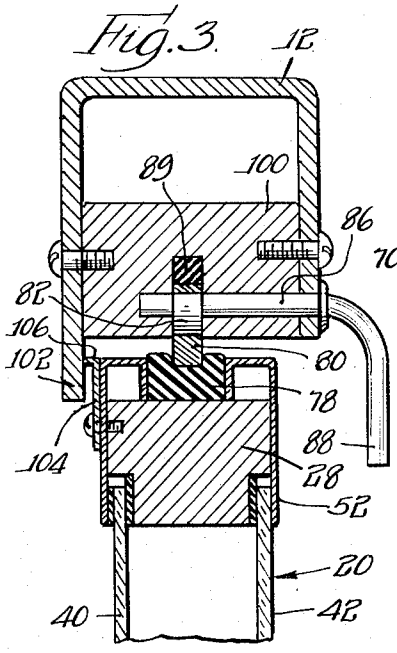



Fig. 5.

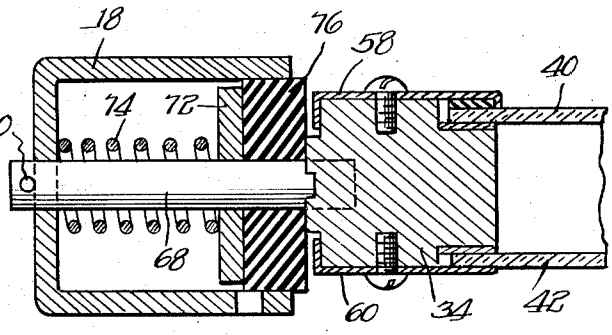



Fig. 6.

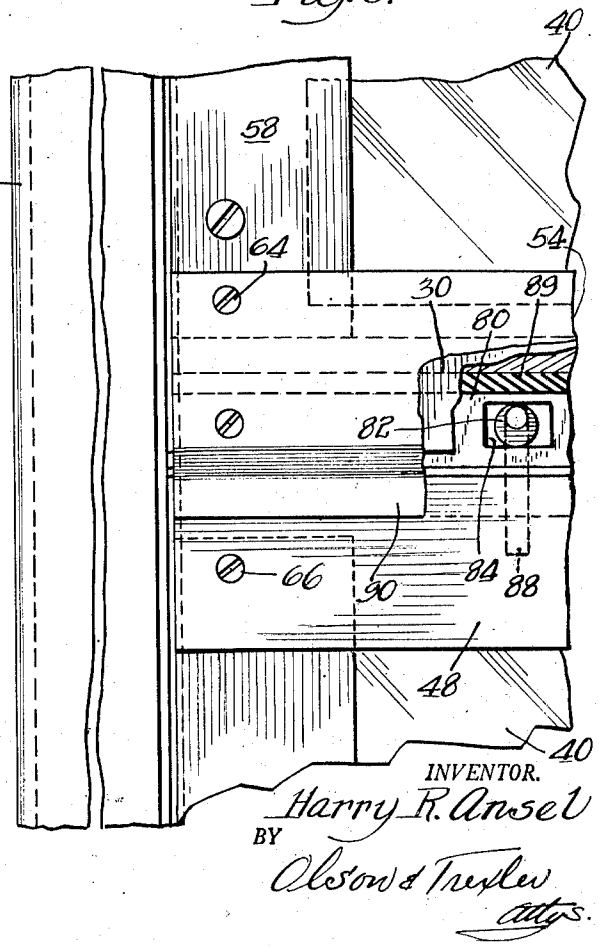
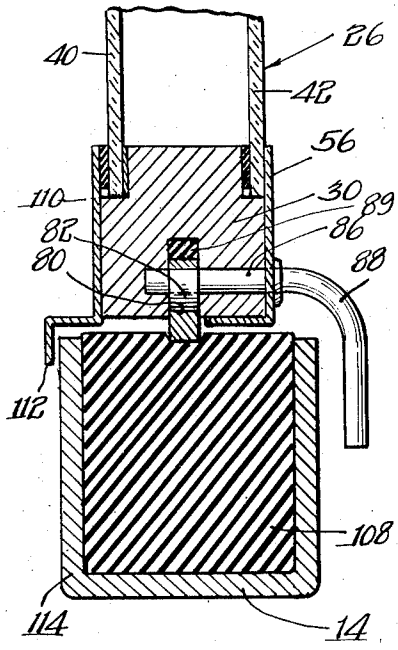



Fig. 4.




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# WINDOW

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Application July 3, 1953, Serial No. 365,799

7 Claims. (Cl. 20—56.5)

The present invention relates to a novel window structure, and more particularly to a window structure of the type having a plurality of sashes mounted for pivotal movement.

One problem encountered when using windows having pivotally mounted sashes is that of providing air and weather proof joints between adjacent sashes and between the sashes of the window frame. While certain prior art devices have been adequate in some respects, they have not been entirely satisfactory. It is, therefore, an object of the present invention to provide a novel window structure of the above described general type, wherein the joints between adjacent sashes and the sashes in the window frame are positively sealed to insure air and weather tightness.

Another object of the present invention is to provide a novel window structure of the above described type with novel means for locking the sashes in their closed position.

A more specific object of the present invention is to provide a window structure with novel means which locks the sashes in their closed position and also seals the joints between the sashes and between the sashes and the window frame.

Still another object of the present invention is to provide a novel window of simple structure, wherein glass window panes are removably retained in the sashes by elements also forming part of the sealing and locking means.

Other objects and advantages of the present invention will become apparent from the following description and the accompanying drawings, wherein:

Fig. 1 is an elevational view illustrating a window structure embodying the novel principles of this invention;

Fig. 2 is an enlarged fragmentary vertical cross sectional view taken along line 2—2 in Fig. 1;

Fig. 3 is an enlarged fragmentary vertical cross sectional view taken along line 3—3 in Fig. 1;

Fig. 4 is an enlarged vertical cross sectional view taken along line 4—4 in Fig. 1;

Fig. 5 is an enlarged fragmentary horizontal cross sectional view taken along line 5—5 in Fig. 1; and

Fig. 6 is an enlarged fragmentary elevational view illustrating novel features of this invention in greater detail.

Referring now more specifically to the drawings, wherein like parts are designated by the same numerals throughout the various figures, a window structure 10 embodying the principles of this invention is shown in Fig. 1. The window structure includes a frame having upper and lower horizontal members 12 and 14 and vertical side members 16 and 18. These frame members may be formed of any suitable material, such as steel, aluminum, or plastic. Preferably, the frame members are elongated channels with a generally U-shaped transverse cross section and are disposed so that the open end of the U faces inwardly of the frame. A plurality of sashes 20, 22, 24, and 26 are pivotally mounted within the frame by means fully described hereinbelow. While for the purpose of illustration the window structure 10 has been shown as including



four sashes mounted for pivotal movement about horizontal axes, it will be obvious from the following description that the principles of this invention might be applied to window structures having any number of sashes, which sashes might be mounted for pivotal movement about either horizontal or vertical axes.

Since all the sashes are substantially identical, only sash 22 will be described in detail. As shown in Figs. 1 and 2, the sash 22 includes a rectangular frame having upper and lower members 28 and 30, respectively, and vertical side members 32 and 34. These sash frame members are preferably constructed from a heat insulating material, such as plastic or wood. Preferably, the sash frame members are recessed on opposite sides thereof, as at 36 and 38 (see Fig. 2) in order to receive and hold a pair of window panes 40 and 42 in parallel spaced apart relationship. Sealing gaskets 44 and 46 are positioned against the vertical surfaces of the recesses 36 and 38, respectively, and the window panes 40 and 42 are clamped against these gaskets by means of plate members secured to the sash frame. As shown best in Fig. 2, the outer window pane 40 is clamped against the upper sash member 28 by a clamping plate 48, which clamping plate is secured to the sash by a plurality of screws 50. The inner glass 42 is similarly clamped against the upper sash member by a plate 52. The lower edges of the window panes 40 and 42 are clamped to the lower sash member by plates 54 and 56, respectively. As shown in Fig. 5, ends of the window panes 40 and 42 are clamped to the end sash member 34 by identical cover plates 58 and 60. It is understood, of course, that the opposite ends of the window panes are clamped against the sash member 32 by cover plate members similar to members 58 and 60. In order to insure that the outer window pane 40 is sealed against entry of moisture or air, a sealing gasket 62 (see Fig. 2) is positioned between the cover plate members and the glass, and the ends of the vertical and horizontal cover plate members overlap each other and are secured to the window sash by common screws 64 and 66, as illustrated in Fig. 6.

Each of the window sashes is pivotally supported within the window frame by pivot pins at opposite sides of the window frame. Preferably, the common axis of each pair of pivot pins coincides with the horizontal center line of their associated sash. The pivotal supporting structure, which is identical at both sides of each sash, is best illustrated in Fig. 5 and includes a pivot pin 68 slidably extending through a suitable aperture in the U-shaped window frame member for entry into an aperture in the vertical sash frame member. A cotter pin 70 is secured to the pivot pin to prevent complete removal of the pivot pin from the U-shaped frame member. In order to insure assembly of the pivot pin within the aperture in the sash, a plate member 72 is fixed to the pivot pin, and a compression spring 74 acts between the plate member 72 and the U-shaped frame member for urging the pivot pin into engagement with the sash. With this structure, the sash may be removed if desired merely by pressing the plate member 72 against the action of the spring, whereby the pivot pin is withdrawn from the sash. In addition, the plate member 72 extends for and coincides with the entire vertical height of the window sash, and a resilient sealing pad 76 overlies and coincides with the plate member 72 for engagement with the sash. With this structure, it is seen that the spring acting on the plate 72 not only maintains the pivot pin in engagement with the sash, but also urges the resilient sealing pad 76 into positive sealing engagement with the sash.

In accordance with a feature of this invention, novel means is provided for insuring an air and weather tight seal at the junction between marginal horizontal edge portions of adjacent sashes and between adjacent horizontal edge portions of the upper and lower sashes and the

window frame. This novel means is illustrated best in Fig. 2 and includes a resilient elongated sealing member 78 which is mounted on and extends along the entire upper surface of the upper frame member 28 of each sash. A complementary sealing member 80, which is constructed of any suitable relatively hard material, is slidably mounted for vertical movement in a suitable slot in each lower sash frame member 30. The member 80 is actuated by cam means disposed adjacent opposite ends thereof. This cam means is shown best in Figs. 2 and 6 and includes an eccentric cam 82 disposed in a suitable opening 84 in the member 80. The cam 82 is mounted on a shaft 86 journaled in the lower sash frame member and extending inwardly of the window. The inner end of the shaft 86 is provided with a handle 88 to facilitate operation thereof. With this structure, it is seen that upon rotation of the handle 88, the member 78 may be moved from a raised position downwardly into positive sealing engagement with the relatively soft member 78. The upper edge of the member 80 is continuously sealed with respect to the frame member 30 by an elongated strip of resilient sealing material 89 filling the portion of the slot in the frame member 30 above sealing member 80. While the cooperating elements 78 and 80 provide an air and weather tight seal, it is undesirable to permit moisture to enter the space between the sashes, and, therefore, the above described window pane clamping plate 54 is provided with an extension 90 which closes the gap between adjacent sashes and directs any moisture, such as rain water, directly to the surface of the adjacent sash.

Since the lower sash frame member 30 is preferably formed from wood or plastic, repeated operation of the cam means and shaft 86 may cause undesirable wear of the sash member 30. In order to prevent such wearing of the sash member, the clamping plate member 56, which is preferably made from metal, such as stainless steel or aluminum, extends down and around the lower edge of the sash member 30 and provides a bearing for the shaft 86. In accordance with another feature of this invention, the cooperable members 78 and 80 not only provide a positive seal, but also serve to lock the window sashes in their closed positions. This locking action takes place when the member 80 is partially imbedded in the resilient member 78, as shown in Fig. 2, whereby marginal portions 92 and 94 of the resilient member interengage with opposite sides of the member 80. In order to prevent the marginal portions 92 and 94 of the resilient member from collapsing whenever a force is applied to the sashes tending to open them, the window pane clamping plates 48 and 52 are provided with upward extensions 96 and 98, respectively, of generally inverted U-shape, which U-shaped extensions engage opposite longitudinal edges of the resilient member 78, thereby preventing undesirable flattening or collapse of the resilient member.

The junction between the upper edge of the sash 20 and the upper horizontal window frame member 12 is sealed and locked by substantially the same means as the junctions between adjacent sashes. Thus, as shown in Fig. 3, an elongated block-like member 100 is mounted within the U-shaped frame member 12, and a sealing and locking member 80 is mounted in the member 100 in substantially the same manner as the sealing members 80 are mounted in the lower sash frame members 30. It will be noted that the front leg 102 of the U-shaped window frame member 12 preferably extends below the upper edge of the sash 20 in order to direct rain water and the like past the junction between the sash and the window frame member. In addition, a plate member 104 having a flange 106 engageable with the front leg 102 is provided for obtaining at least a partial seal and also for properly locating the window sash 20 in a substantially vertical closed position. The remainder of the locking and sealing structure for the junction between the sash 20 and the window frame member 12 is identical to that described above, as shown by the application of identical numerals to identical parts.



The junction between the lower sash 26 and the lower window frame member 14 is sealed and locked by a structure substantially identical to that described above, except that the resilient member 78 is replaced by another resilient member 108 which is mounted in the U-shaped frame member 14. In addition, the lower edge of the window pane 40 in the sash 24 is clamped by a plate member 110 which is slightly different from the above described corresponding clamping plate 54 in that the plate 110 extends so as to provide a flange 112 overlying the front leg 114 of the U-shaped frame member 14. It will be understood that the flange 112, the portions 90 of the cover plates 54, and the depending leg 102 of the window frame member 12 all act to locate the window sashes in the vertical plane of the window frame when the sashes are in their fully closed positions.

In some instances, it is desirable to provide shade means for covering all or part of the window structure 10. Such means is shown in Fig. 2 and includes a shade 116 of pleated metal foil which is disposed between the window panes 40 and 42. The lower edge of the shade is preferably secured to the sash frame member 30, and the upper edge of the shade is connected with a suitable chain or the like 118 which extends out of the window sash through a suitable passageway 120 formed in the upper sash frame member 28. Thus, by adjusting the position of the chain 118, the shade 116 may be raised or lowered as desired.

From the above description, it is seen that the present invention has provided a novel and simple window structure, wherein combined means not only locks the various sashes in their closed positions, but also provides a positive air and weather tight seal between the sashes and other portions of the window structure. Furthermore, it is seen that in accordance with the present invention, certain elements not only clamp the window panes in the sashes, but also form elements of this sealing and locking means and act to locate the sashes properly in their closed positions.

While the preferred embodiment of the present invention has been shown and described herein, it is obvious that many structural details may be changed without departing from the spirit and scope of the appended claims.

I claim:

1. A window structure, comprising frame means, a plurality of sashes pivotally mounted within said frame means for movement to and from opened and closed positions, said sashes being disposed substantially in the plane of said frame means when in said closed positions so that certain marginal portions of the sashes pair with marginal portions of adjacent sashes, and other marginal portions of the sashes pair with adjacent marginal portions of the frame means, sealing means having cooperable elements mounted on each marginal portion of one of said pairs of marginal portions, and means for relatively moving said cooperable elements together for positive sealing engagement, one of said cooperable elements including a resilient member disposed along substantially its entire associated marginal portion and another of said cooperable elements including a relatively hard member extending along substantially its entire associated marginal portion so that upon relative movement of said cooperable elements toward each other said resilient member conforms to said relatively hard member.

2. A window structure, as defined in claim 1, which includes means mounting said relatively hard member for movement in the plane of its associated sash, and means for actuating said relatively hard member.

3. A window structure, as defined in claim 2, wherein said actuating means includes cam means engageable with said relatively hard member for moving said relatively hard member toward and away from said resilient member.

4. A window structure, comprising frame means, a

sash pivotally mounted within said frame means for movement to and from open and closed positions, said sash being adapted to receive a window glass, means for retaining a window glass on said sash, said means including a plate member secured to said sash and having a portion adapted to overlie a window glass, and said plate member extending below said sash and overlapping an adjacent portion of the window structure to restrain atmospheric moisture and the like from passing through the window structure.

5. A window structure, comprising frame means, a sash pivotally mounted within said frame means for movement to and from open and closed positions, said sash being disposed substantially in the plane of said frame means when in said closed position so that a marginal portion of the sash is adjacent another portion of the window structure, an elongated bar-like member movably mounted on said sash portion, means including an actuating rod journaled in said sash portion for moving said bar-like member into engagement with the other of said portions, said sash being adapted to receive a window glass and means including a plate member secured to said sash portion for retaining a window glass in said sash, said plate member also providing bearing means for said actuating rod.

6. A window structure, comprising frame means, a sash pivotally mounted within said frame means for movement from an open position to a closed position substantially in the plane of said frame means, said sash when in said closed position having a marginal portion disposed adjacent another portion of said window structure, an elongated resilient member disposed on said sash marginal portion for engagement with said other portion of the window structure, said sash being adapted to receive a window glass, and means including a plate member secured to said marginal sash portion for retaining the window glass in said sash, said plate member being disposed for engagement with a side of said resilient member to restrain collapsing of the resilient member when the resilient member engages said other portion of the window structure.



7. A window structure, comprising frame means, a pair of sashes pivotally mounted within said frame means for movement from open positions to closed positions substantially in a common plane, said sashes when in said closed position having marginal portions disposed adjacent each other, an elongated resilient member mounted on one of said marginal portions, an elongated relatively hard member movably mounted on the other of said marginal portions for engagement with said resilient member when said sashes are in their closed positions, means including an actuating rod journaled in said other of said portions for moving said relatively hard member into engagement with said resilient member, each of said sashes being adapted to receive window glass means, means including plate members secured to said marginal portions for retaining the window glass means in said sashes, the plate members on said one marginal portion being disposed for engagement with opposite sides of said resilient member to restrain collapsing of the resilient member, one plate member on said other of said marginal portions providing a bearing for said actuating rod, and another plate member on said other of said marginal portions having an extension projection across the junction between said adjacent marginal portions.

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