April 20, 1943. E. C. SWANSON ET AL 2,317,312

WINDOW CONSTRUCTION

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Fig. 2.

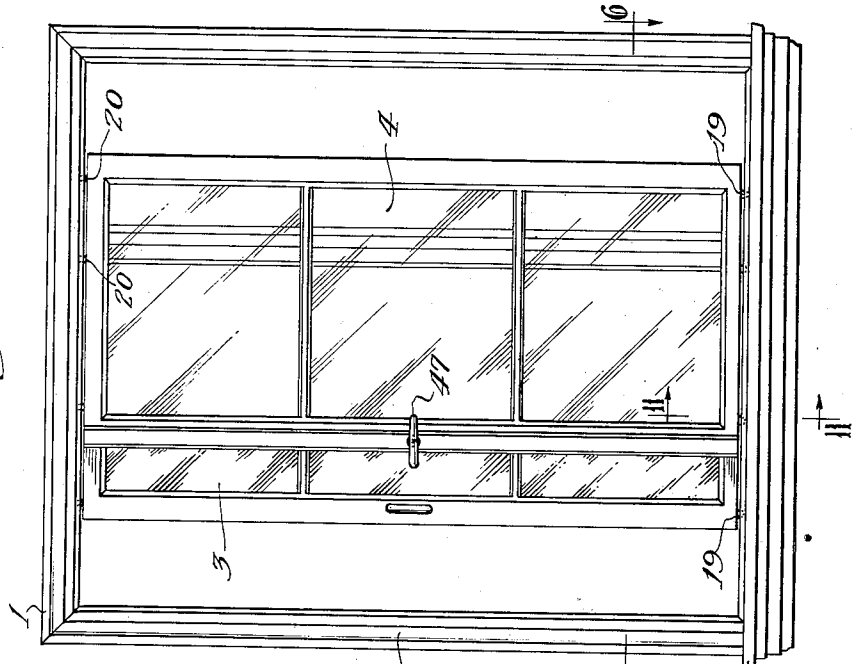
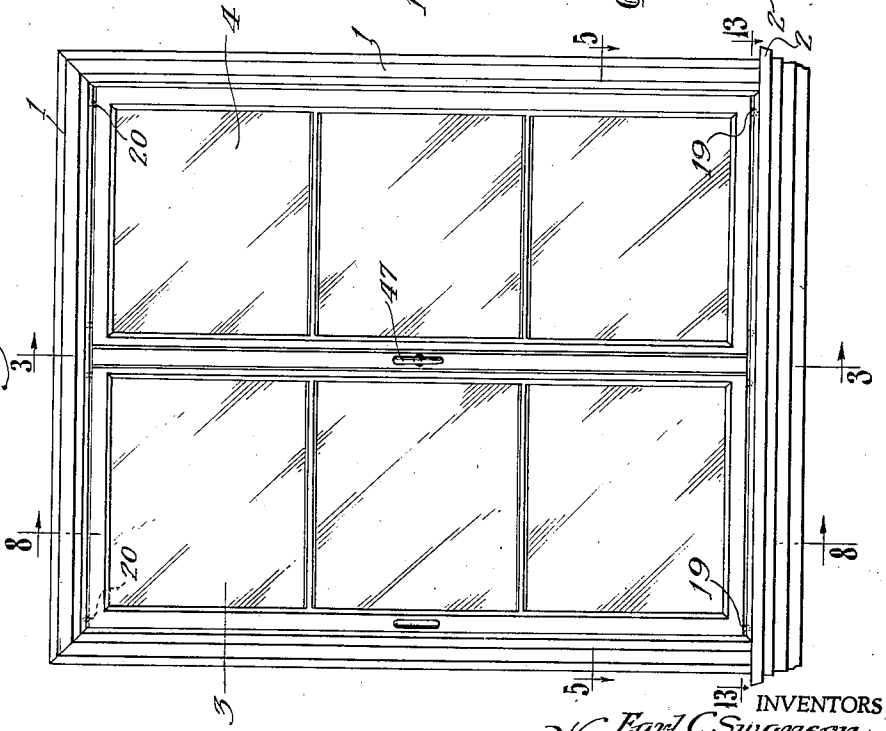


Fig. 1.



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Fig. 3.

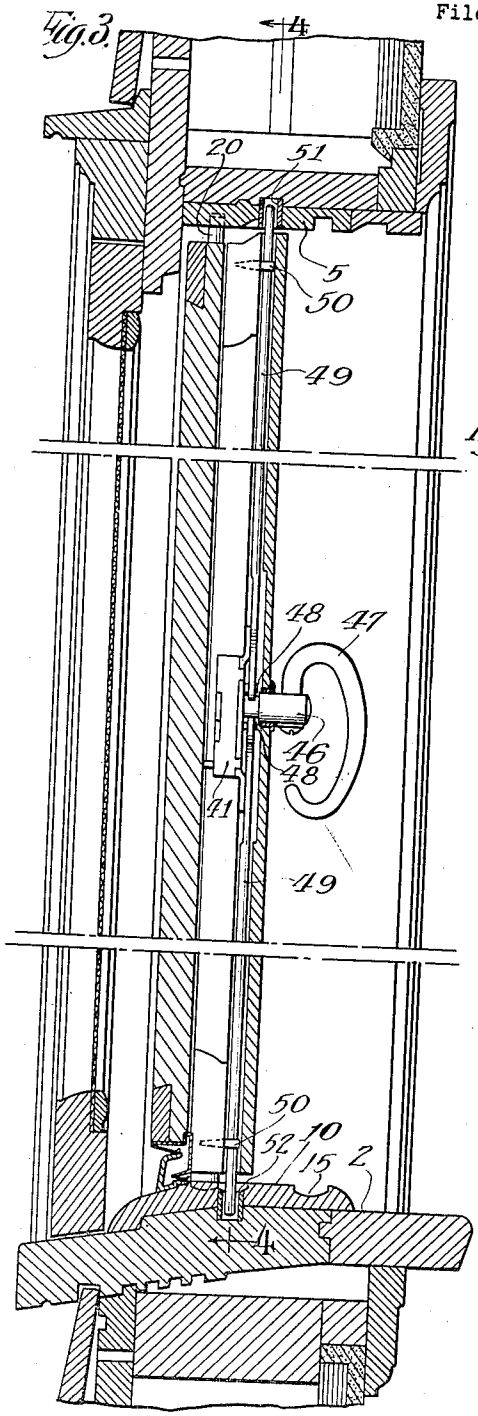
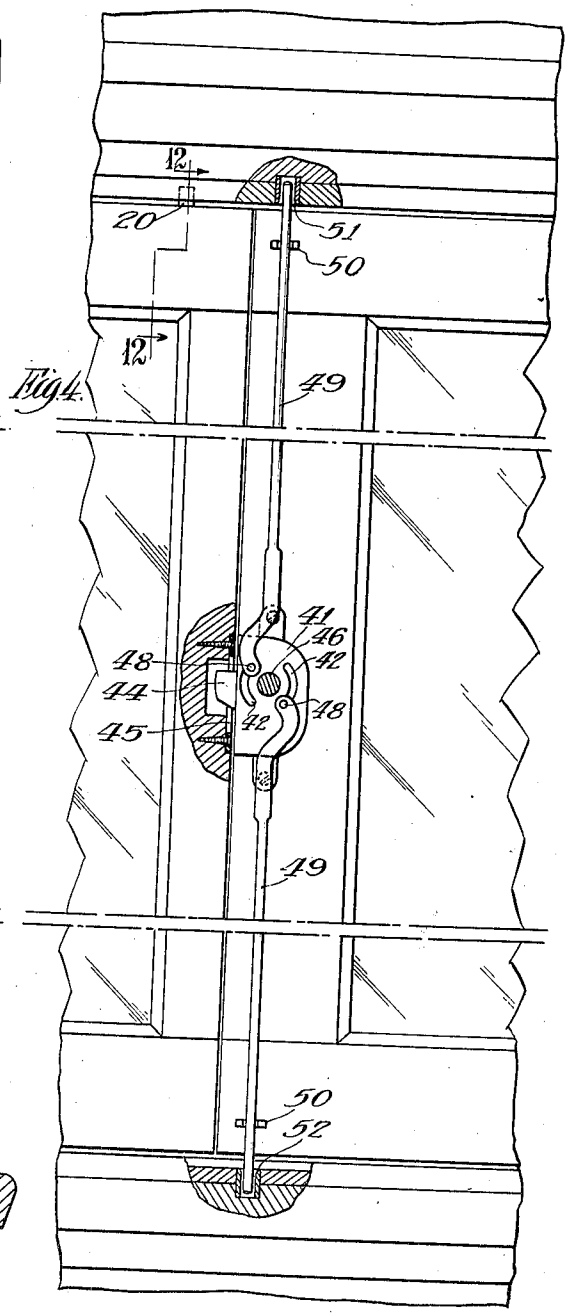


Fig. 4.



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WINDOW CONSTRUCTION

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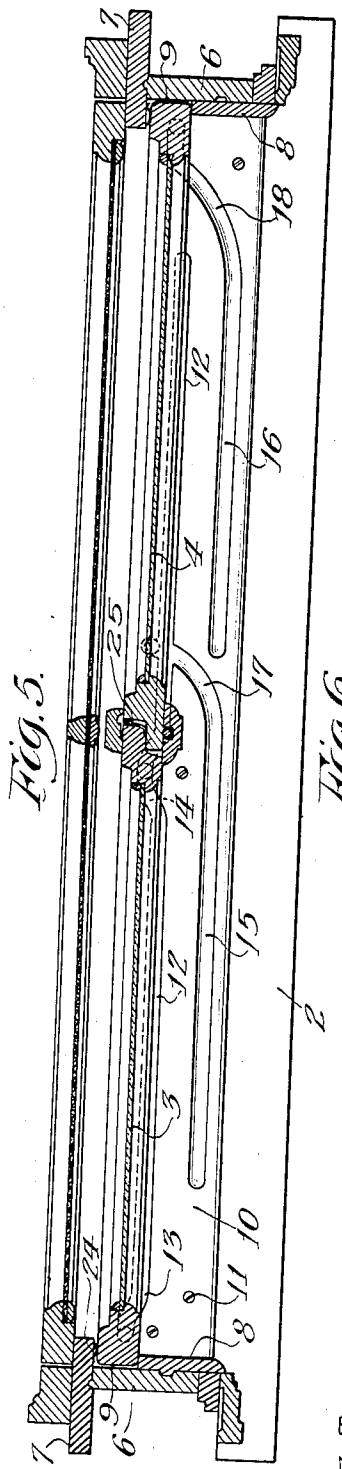


Fig. 5.

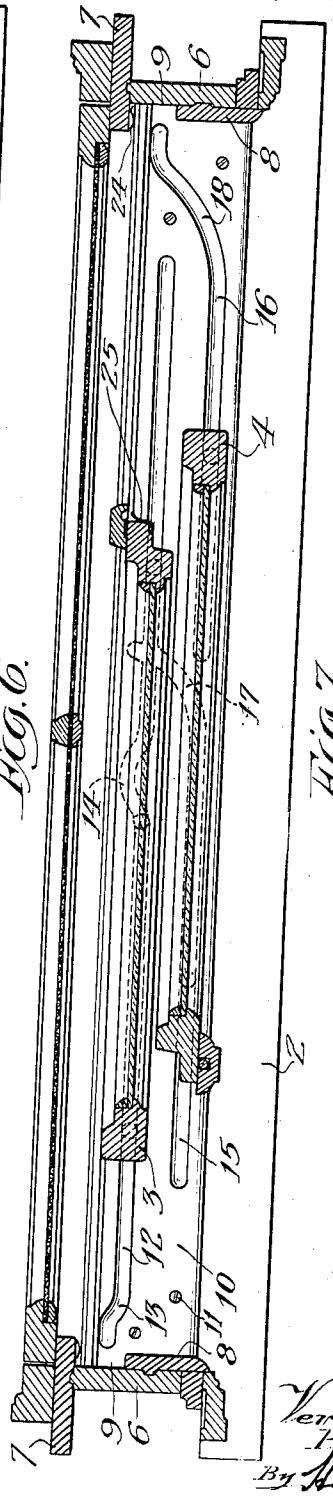


Fig. 6.

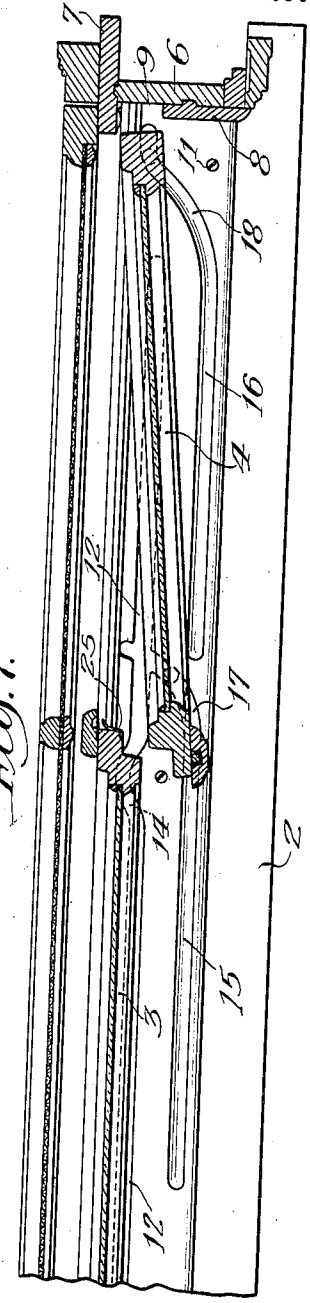


Fig. 7.

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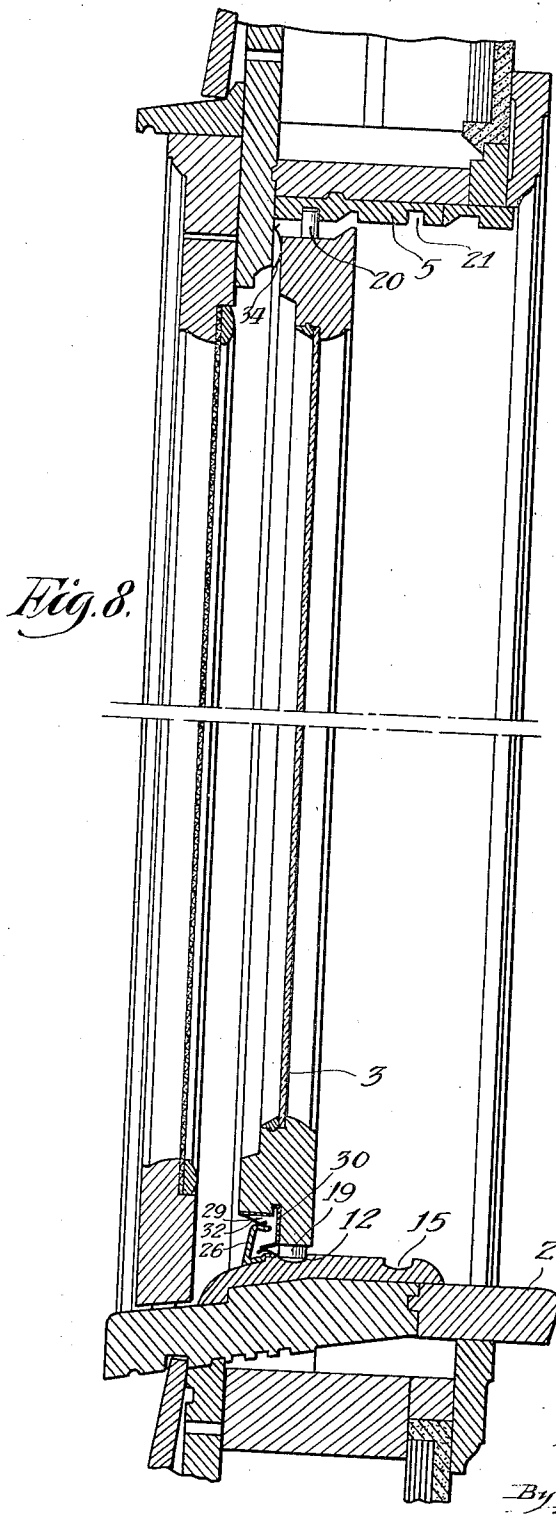


Fig. 8.

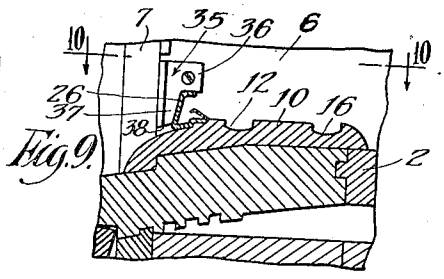


Fig. 9.

Fig. 10.

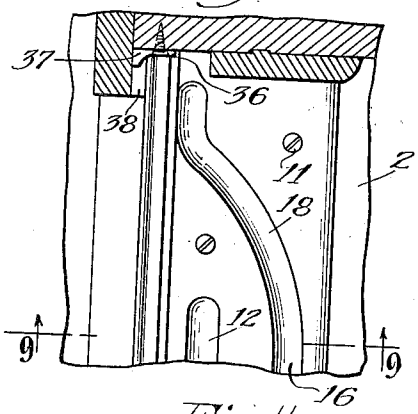
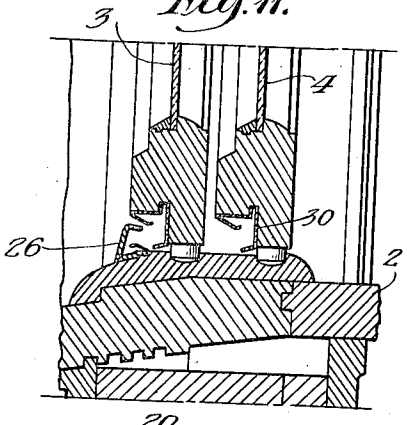


Fig. 11.



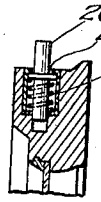


Fig. 12.

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WINDOW CONSTRUCTION

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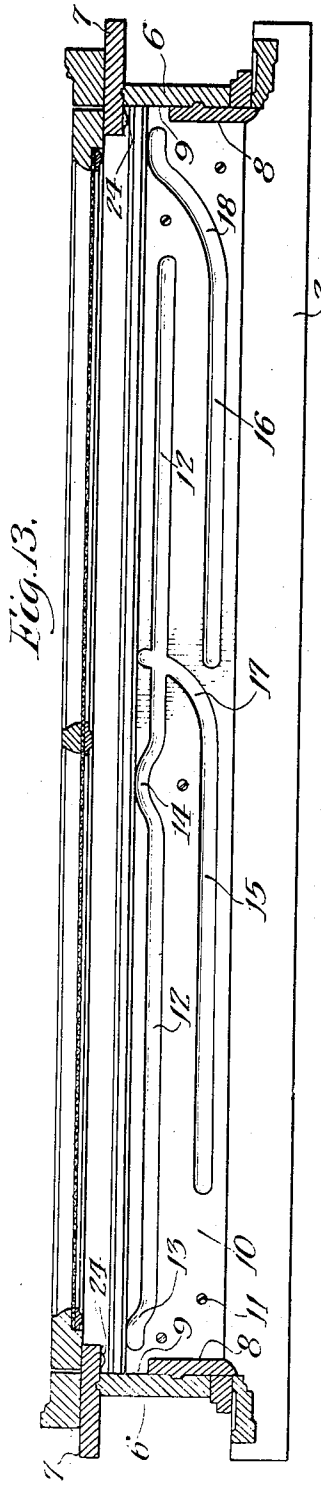


Fig. 13.

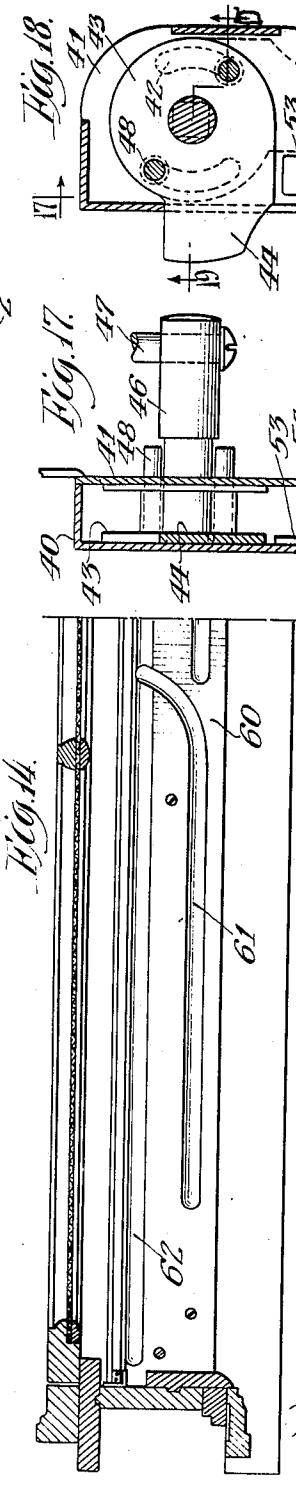


Fig. 14.

Fig. 17.

Fig. 18.

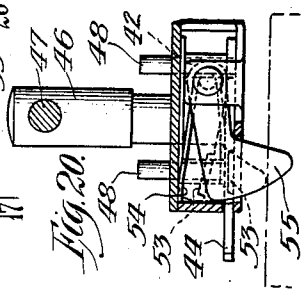


Fig. 20.

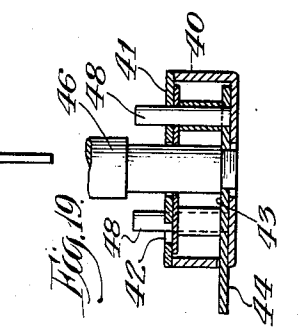


Fig. 19.

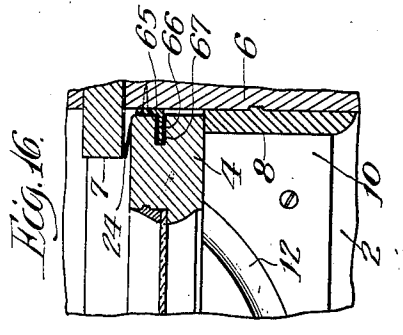


Fig. 16.

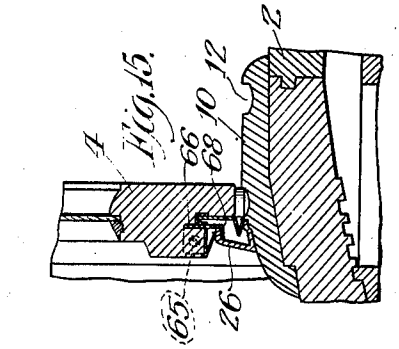


Fig. 15.

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April 20, 1943. E. C. SWANSON ET AL 2,317,312

WINDOW CONSTRUCTION

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Fig. 21.

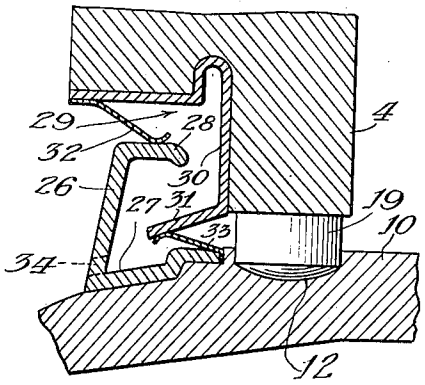
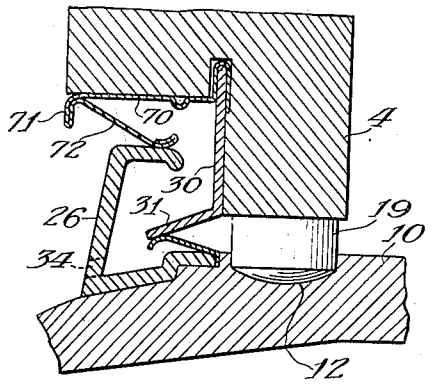


Fig. 22.



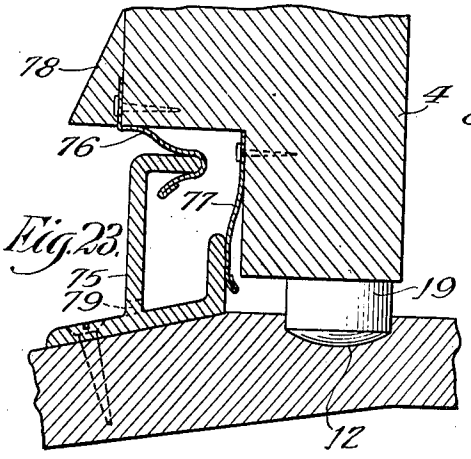


Fig. 23.

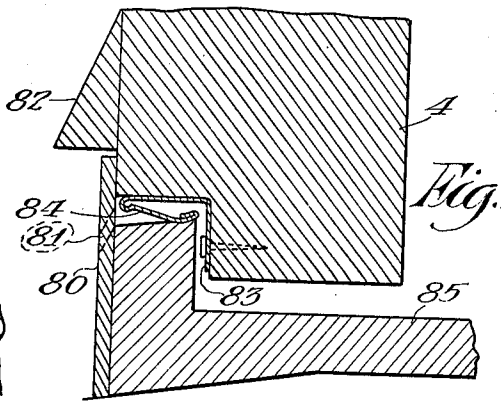
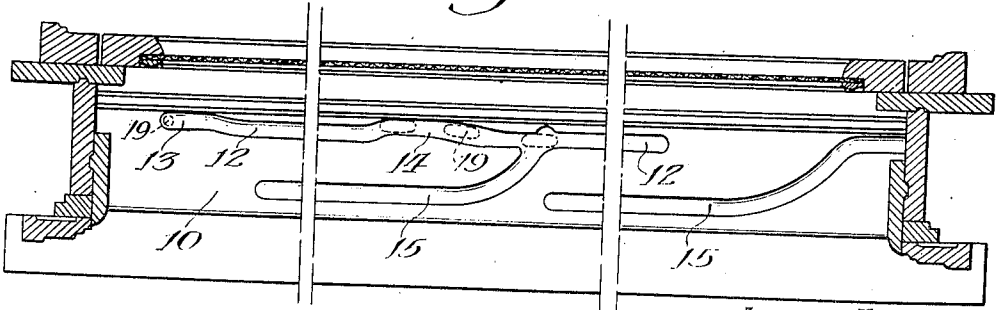


Fig. 24.

Fig. 25.



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Patented Apr. 20, 1943 2,317,312

UNITED STATES PATENT OFFICE

2,317,312

WINDOW CONSTRUCTION

Earl C. Swanson, Vernon P. Fredricksen, and Perry Craig Gaskell, Bayport, Minn., assignors to Andersen Corporation, Bayport, Minn., a corporation of Minnesota

Application October 18, 1940, Serial No. 361,670

10 Claims. (Cl. 20—42)

Our invention relates to improvements in window constructions of the type in which a plurality of sashes are mounted for horizontal sliding movement, such as that shown in Patent No. 2,144,782, granted January 24, 1939.

It is an object of our invention to provide a window construction of the type stated in which when the sashes are in closed position there will be adequate protection against the entrance of air, moisture and dust and in which the sashes are freely slidable to open position.

A further object of the invention is to provide a window construction of the type stated in which the frame and sashes have contacting or interlocking or interengaging weatherstrip elements and in which means is provided for breaking strip contact or engagement upon movement of the sashes from closed to open position.

Still another object of our invention is to provide a window construction of the stated type in which novel means is provided for protecting the corners of the structure so as to prevent the entrance of moisture, air or dust therethrough and also to prevent what in the art is known as flue action.

A further object of our invention is to provide a window construction of the stated type with locking means operable only when adjacent sashes are in contact and ready to be locked.

Other objects of the invention and the manner of attaining them will be more fully explained as the description of our invention proceeds.

In the accompanying drawings we have disclosed a practical embodiment of our invention including the various features heretofore mentioned, together with some alternate arrangements or modifications thereof. It is to be understood, of course, that these drawings are only for the purpose of illustrating practical embodiments of our invention and that we do not intend to limit ourselves to the details of construction illustrated as other forms will readily occur to those skilled in the art when the invention is understood.

In these drawings,

Fig. 1 is a front elevation (looking through the window from the inside out) showing a window embodying horizontal sliding sashes of our invention;

Fig. 2 is a view similar to Fig. 1 showing the sashes in open position;

Fig. 3 is a vertical sectional view taken on line 3—3 of Fig. 1;

Fig. 4 is a vertical sectional view taken on line 4—4 of Fig. 3;

Fig. 5 is a cross-sectional view taken on line 5—5 of Fig. 1;

Fig. 6 is a cross-sectional view taken on line 6—6 of Fig. 2;

Fig. 7 is a fragmentary cross-sectional view like Fig. 5 but showing the position of the inner sash just as it is moving into or out of closed position;

Fig. 8 is a vertical sectional view taken on line 8—8 of Fig. 1;

Fig. 9 is a fragmentary view in section and elevation showing a corner protecting element of our invention;

Fig. 10 is a fragmentary view partly in section and partly in elevation taken on line 10—10 of Fig. 9;

Fig. 11 is a fragmentary vertical cross-sectional view taken on line 11—11 of Fig. 2;

Fig. 12 is a fragmetnary view in longitudinal section showing one of the spring pressed guide pins in the upper rail of the sashes;

Fig. 13 is a plan view of the sill of the frame showing the arrangement of the tracks thereon;

Fig. 14 is a fragmentary plan view similar to Fig. 13 showing a modification of the track arrangement;

Fig. 15 is a fragmentary view in longitudinal section of a modification of our corner protecting means;

Fig. 16 is a fragmentary view in horizontal section of the same corner protecting element shown in Fig. 15;

Figs. 17, 18, 19, and 20 are detail views partly in section and partly in elevation of the locking mechanism for our sashes, Fig. 17 being taken on line 17—17 of Fig. 18, Fig. 19 on line 19—19 of Fig. 18, and Fig. 20 on line 20—20 of Fig. 18;

Fig. 21 is a view partly in section and partly in elevation and on a very much enlarged scale showing the weatherstripping arrangement on the sill and cooperating members on the bottom of the sash;

Fig. 22 is another fragmentary sectional view on an enlarged scale showing a modified form of sill weatherstripping;

Fig. 23 is a fragmentary view in cross-section on an enlarged scale of another modified form of sill weatherstripping;

Fig. 24 is another fragmentary sectional view on an enlarged scale showing another modified form of sill weatherstripping; and

Fig. 25 is a fragmentary plan view of a modified track arrangement showing particularly means for assuring sliding movement of the outer sash in a straight line without binding.

Referring now to the drawings, and particularly to Figs. 1 and 2, we have here illustrated a window embodying our invention, these views being front elevations looking from the inside out. The window opening is framed on the inside by any usual or suitable casing members or trim elements 1 and is provided with a sill 2. In this embodiment of the invention we have shown two sashes arranged for horizontal sliding movement, the outer sash being marked 3 and the inner sash, 4. The stiles and rails of these sashes may be made of wood or other suitable material and the sashes may be divided into any desired number of lights arranged in any desired pattern.

When in closed position the sashes are in a common plane as shown in Figs. 1 and 5 and when in open position they are in spaced parallel planes as shown in Figs. 2 and 6.

The window frame itself comprises a head jamb 5, side jambs 6, and the sill 2 heretofore mentioned. Each of the side jambs is provided with a blind stop 7 which cooperates with inner stop members or trim elements 8 to form grooves 9 in which the edges of the sashes seat when they are in closed position.

On the sill 2 is located a track member 10 which may be made of wood or metal or other suitable material and which may be formed integrally with the sill, or if separate, secured thereto by any suitable fastening means, such as screws 11 or the like.

Referring particularly to Fig. 13, which is a plan view showing the track member 10, it will be seen that it is provided with a track 12 for the outer sash, the said track extending for the greater part of its length parallel to and adjacent the outer edge of the track member 10. The track 12 has bent portions 13 and 14 for a purpose presently to be described.

The track for the inner sash comprises parallel straight sections 15 and 16 and bent portions 17 and 18. As shown in said Fig. 13 the bent portion 17 intersects the outer track 12 at a point to the right of the center of the window as shown in said figure.

The bottom rails of the sashes are provided with followers or guide members 19 which seat in the respective tracks. As illustrated in this embodiment of our invention the tracks are in the form of grooves in the track member 10 but it will be understood that other types of tracks may be used and with such other types different guide members or followers will be provided on the sashes to cooperate therewith.

The top rails of the sashes are provided with guide pins 20 moving in grooves 21 formed in the head jamb or in a separate track member secured thereto (see Figs. 3 and 8). One of said guide pins is shown in detail in Fig. 12 by reference to which it will be seen that the pin seats in a recess 22 in which is located a spring 23 for projecting the pin outwardly of the sash and into the groove 21. The purpose of providing such a spring-pressed guide pin at the heads of the sashes is to permit removal of the sashes from the frame.

To remove the sashes from the frame it is only necessary to lift them up, thereby compressing the spring 23 sufficiently for the guide members 19 at the bottom of the sashes to clear their respective tracks. Thereupon, the bottom of the sashes may be pulled inwardly into the room and as soon as they are clear of the track member 10 the sashes may be lifted out completely.

An important feature of our invention resides in the weather protection we have provided for this window. Weatherstrips 24 of the tension type are provided on each of the blind stops 7 and also upon the head blind stop, as shown in Fig. 8. A tension weatherstrip 25 is secured to the meeting stile of the outer sash as shown in Figs. 5, 6, and 7.

But the greatest necessity for adequate protection against the weather is at the bottom of the window, that is to say, along the bottom stiles and the track member upon which the sashes slide. Upon the said track member 10 and near its outer edge extends a weatherstrip comprising a channel-shaped member 26 having a lower inwardly extending leg 27 suitably secured to the track member and an upper leg 28 extending inwardly towards the bottom stile of the sashes. The bottom stiles of the sashes are provided with a rabbet 29 in which is located a weatherstrip 30 having a baffle member 31 extending into the channel-shaped member 26. A tension strip 32 is secured to the sash and bears against the top leg 28 of the said channel member and another tension member 33 secured to the bottom leg of the channel or to the track member 10 bears against the said baffle 31. This part of the construction will be clear from an examination of the enlarged detail shown in Fig. 21.

By the arrangement thus described, it will be seen that any moisture which may flow downwardly along the outer surface of the sashes, should it pass the contact between the tension member 32 and the leg 28, will be directed by the baffle 31 into the channel 26 and thus prevented from passing around across the sill and into the interior. The channel member 26 is provided with drainage apertures 34 through which any accumulated moisture may flow to the outside of the structure.

The weatherstrips which have thus far been described may be made of suitable material of the non-corrosive type such as zinc, bronze, aluminum, and the like. The heavier members such as the channel 26 and the member 30 will be made of sufficiently heavy gauge to be quite rigid. These members are most usually formed by the so-called extrusion process although they may also be formed by bending. The tension members 32 and 33 are made of lighter gauge so that they will retain their resiliency and tend always to remain in firm contact with their respective cooperating members.

Wherever we have used the expression "weather protection" it is to be understood that we mean not only the exclusion of moisture but also of air and dust.

It will be seen that when the sashes are in closed position and occupying a common plane their weatherstrips are in continuous contact with the weatherstrip on the track member as shown in Figs. 3 and 8 and also in the enlarged detail view Fig. 21. When the sashes are in open position their weatherstrips are both completely out of contact with the weather strips on the track member as shown particularly in Fig. 11. The arrangement by which this is accomplished is an important feature of our invention.

Referring back to the track arrangement and particularly to Figs. 5, 6, and 7, the movements of the sashes will be readily understood. In Fig. 5 the sashes are shown in closed position. Because of the bent portions 13 and 14 in the track 12 for the outer sash, the said outer sash is constrained to move inwardly, that is to say, away

from a weatherstrip on the track member, when the outer sash is moved away from closed position. Because of the location of these bent portions on the track it will be seen that this inward movement takes place almost instantly when the sash is moved away from its closed position.

Similarly, the inner sash by reason of the bent portions 17 and 18 on the inner track 16 is constrained to move inwardly and thus to break contact between its weatherstrip and that on the track member. This inward movement of the inner sash is made sufficiently great to permit it to slide past the outer sash when the latter is open so that the sashes occupy spaced parallel planes as shown in Fig. 6.

It will be understood, also, that when the sashes are thus moved out of the plane which they occupy when closed the pressure of the upper sash rails against the weatherstrip 24 on the head blind stop is relieved. Thus, the breaking of weatherstrip contact is accomplished not only at the bottom of the sash but also at the top.

This substantially instant breaking of weatherstrip contact is a great advantage of our construction. The weatherstrips are designed to be in firm engagement when the sashes are closed so as to perform their function most effectively. But if these weatherstrips remained in such firm contact during movement of the sashes, freely sliding movement would be inhibited and there would also be wear on the weatherstrips and danger that they would be distorted from their original shape. Consequently, the provision of the bent portions on the tracks for both sashes accomplishes the very useful purpose of breaking weatherstrip contact almost instantly when the sashes are moved away from closed position.

The breaking of weatherstrip contact in the manner thus described also facilitates the removal of the sashes from the frame regardless of what type of interlocking or interengaging weatherstripping may be employed.

Another and important part of our invention resides in the weather protection provided at the lower corners of our window construction. By referring particularly to Figs. 9 and 10 it will be seen that additional protection is provided at the joint between the side jamb and the track member. This additional protection comprises a member 35 which has a part 36 overlying the channel member 26, a part 37 extending downwardly between said channel member and the strip 24 on the blind stop 7, and a third part 38 extending along the track member outside of and at the base of said channel. This member 35 is preferably made of metal and may be die cast or formed in any other suitable manner. A modification of the arrangement will presently be described in connection with Figs. 15 and 16.

By reason of the construction of the member 35 and its location, it will effectually prevent passage of moisture, air and dust around the lower edges of the sashes. This member also serves to prevent what in the art is called "flue action" by which is meant the upward flow of air and dust from the bottom of the window and along and around the outer sash stiles.

We will now describe the means we have provided for securely locking the sashes when in closed position. The locking mechanism is shown in Figs. 3, 4, and 17 to 20, inclusive. Generally speaking, this is a three point locking mechanism having locking engagement not only at the meeting stiles of the sashes but also in the head jamb and the sill.

Suitably secured to the meeting stile of the inner sash is a casing 40 having a cover plate 41 provided with slots 42. Within this casing is a rotatable plate 43 having a locking bolt or lug 44 adapted to engage a suitable keeper 45 on the meeting stile of the outer sash. The plate 43 is adapted to be rotated by a shaft 46 to which is secured an operating handle 47.

Upon the plate 43 are secured the pins 48 which extend through the slots 42 and are connected at their other extremities to vertically moving locking bars or rods 49. These bars or rods are guided in their vertical movement by the slots 42 and suitable guides or retainers 50. As will be seen particularly in Fig. 4, the upper locking rod will engage in a recess 51 formed in the head jamb or in a track and the lower bar in a similar recess 52 formed in the sill.

It will be apparent from the description thus far made that turning the handle 47 will rotate the lock plate 43 so as simultaneously to cause the locking lug 44 to engage the keeper 45 on the other sash and at the same time to project the locking rods 49 into their respective recesses.

We have also provided mechanism for preventing operation of the lock until the sashes are in substantially closed position and ready to be locked in that position. Without such a mechanism a person might turn the handle while the sashes are open with the result that the locking rods 49 would be projected and if the sash were then moved the sill and head jamb or track members thereon would be scratched or marred by contact with the locking pins.

To accomplish the purpose last described there is mounted within the casing 40 an element 53 which is arranged to be normally in the path of travel of the locking lug 44 on the plate 43 and is held in such position by a suitable spring 54. Connected with the element 53 and movable therewith is a detent or trigger 55 which projects through the casing 40 and is held in such projected position by the spring 54. This arrangement is such that when the sashes are moved together into closed position the meeting stile on the outer sash will press upon the detent or trigger 55 thus moving it into the casing 40 against the action of the spring 54. When the said detent or trigger 55 is moved into the casing the element 53 is moved out of the path of the locking lug 44 so that the same may by turning of the handle be projected into the keeper 45. At the same time the locking rods 49 are projected vertically, one up and the other down, into their respective recesses in the head jamb and the sill.

It will thus be seen that when the sashes are in any position other than closed, or substantially closed, the detent 55 will be projected outwardly from the casing 40 and therefore the element 53 will occupy the position in which it prevents rotation of the plate 43.

We will now describe certain modifications we propose as to several of the features of our invention. First, with respect to the track arrangement we have shown in Fig. 14 a plan view of a slightly modified form. In this figure the track member is indicated by the reference numeral 60. The track 61 for the inner sash is in this embodiment the same as in the preferred embodiment heretofore described. The modification is with respect to the track 62 for the outer sash. In this modification the said track 62 is straight throughout its entire length, which is to say, that it does not include bent portions similar to the portions 13 and 14 heretofore de-

scribed. Therefore, in this form of track the outer sash when moved to open position will remain continuously in contact with the weatherstrip on the track member. In other words, in this form the advantage of immediately breaking weatherstrip contact is not realized.

In Figs. 15 and 16 we have illustrated a modification of the corner protecting element. In this modification we provide a metallic member of substantially L-shape which has a part **65** secured to the jamb **6**, an inwardly extending leg **66** which seats in a recess **67** formed in the sash stile, and another leg **68** which bears on the underside of the channel **26**. This member also serves, as does the member **35** heretofore described, to prevent the passage of moisture around the edge of the sash stile and around the ends of the weatherstrips.

In Fig. 22 we have illustrated a modification of the sill weatherstripping. In this modified form the channel member **26** is of the same construction as that shown in Fig. 21. We also provide a substantially similar member **30** and baffle member **31**. It is to be noted, however, that we provide a flexible member **70** at the top of the rabbet in the sash which has a depending portion **71** constituting a drip and an inwardly extending flexible member **72** which bears on top of the channel **26**.

In Fig. 23 we have shown still another modification of the sill weatherstripping. In this form a channel member **75** is secured to the sill or track member in any suitable manner. The sash **4** is again provided with a rabbet. On the outer edge of the sash there is mounted a flexible weatherstrip element **76** which is bent around the top edge of the channel **75**. Within the rabbet in the sash we have mounted a flexible weatherstrip **77** which bears against the inner leg of the channel **75**. Upon the outside of the sash **4** we provide a suitable drip cap **78**. In this construction, also, we have the advantage of sure contact between the weatherstrip elements to exclude the entrance of dust, air and moisture around or under the sash. In this form the channel member **75** is also provided with a drainage aperture **79** so that any moisture which may enter the channel will find its passage outwardly therefrom.

In Fig. 24 we have illustrated still another modification of the sill weatherstripping. In this form instead of a channel member we provide a vertically extending rigid strip **80** which has a drainage aperture **81**. As will be seen in Fig. 24 the said strip extends upwardly to a point above the lower edge of the sash **4**. Adjacent the top of said member **80** we have secured to the sash a suitable drip cap **82**. In this form, also, the sash is rabbeted and within the same there is secured a flexible weatherstrip **83** having a bent portion **84** bearing on the top edge of a modified form of sill or track member **85**. Here, also, adequate protection is provided against the entrance of air, dust and moisture and means is provided for the escape of moisture if it should run down the sash and into the space between it and the sill or track member.

In Fig. 25 we have illustrated a slight modification of the track arrangement which is illustrated in Fig. 13. In this figure the track member **10** and the inner tracks **15** and **16** are the same as in Fig. 13. The outer track comprises the substantially straight portions **12** and the bent portions **13** and **14**. It will be noted, however, that the bent portion **14** is somewhat enlarged and that we have illustrated in connection with it an elongated follower on the bottom rail of the sash. The purpose of this arrangement is to assure free, smooth sliding of the outer sash away from its closed position and to assure its passage across the intersection between the tracks without sticking or binding.

It will now be apparent to those skilled in the art that we have provided a window construction embodying horizontal sliding sashes which possesses many practical advantages. Our window may be made in all suitable sizes and proportions and may be employed in all types of building constructions. The objects of our invention as set forth at the beginning of this specification are fully realized in the principal embodiment of our invention herein described as well as in the several modifications of certain features thereof.

It will be readily appreciated that window constructions embodying our invention possess many advantages over those now generally known and commonly employed. With horizontal sliding sash embodying our invention we eliminate counterweights, sash cord or chain, and pulley and pulley pockets which are all necessary in the usual double hung vertically sliding sashes. Also, our invention possesses many advantages over casement windows. While casement windows do not require counterweights, they are, nevertheless, open to many practical objections. If the casements swing outwardly, it is necessary to have the screens upon the inside of the window and expensive operating hardware is required; if the casements swing inwardly, they interfere with many styles of draperies and curtain arrangements. Our window is very simple in construction and effectively solves many existing difficult problems connected with windows.

Wherever in the appended claims we refer to the sill we mean to include thereby not only the sill member itself but also the same with a track member whether integrally or separately formed. Also, wherever we refer to the head jamb we mean to cover not only the jamb itself but also the head jamb with an integrally formed or separate track member.

We claim as our invention:

1. A window construction comprising a frame, a sash mounted in said frame for sliding movement to open and to closed position, weatherstrips on said frame and said sash adapted to interchange when the sash is in closed position and thereby prevent removal of said sash from said frame, means for guiding the movement of said sash to open position and breaking engagement between said weatherstrips, and means operable after weatherstrip engagement has been broken for removing the sash from the frame.

2. A window construction comprising a frame having a sill, inner and outer tracks on said sill, a plurality of sashes in said frame mounted for horizontal sliding movement on said tracks, said sashes being in a common plane when in closed position, means on said tracks for guiding each of said sashes out of said common plane when moved to open position, and means on said sashes cooperating with said tracks to confine the movement of said sashes within the compass of said frame.

3. A window construction comprising a frame having a sill, inner and outer tracks on said sill, a plurality of sashes mounted in said frame for horizontal sliding movement on said tracks, said tracks having intersecting portions, an enlarged

portion on said outer track adjacent said intersection, and elongated guide means on said outer sash cooperating with said enlarged track portion to guide said outer sash to and across said intersection.

4. A window construction comprising a frame having a side jamb and a sill, a blind stop on said jamb having a weatherstrip, a weatherstrip on said sill, and a member at the joint between said jamb and sill having portions cooperating with said weatherstrips to direct moisture outwardly from said frame.

5. A window construction comprising a frame having a side jamb and a sill, a blind stop on said jamb having a weatherstrip, a channel shaped weatherstrip on said sill, and a member at the joint between said jamb and sill having a portion overlying said channel shaped strip and a portion lying betwen said strip and the strip on said blind stop, whereby moisture is directed outwardly from said frame and prevented from passing around the edges of said weatherstrips.

6. A window construction comprising a sill, a channel-shaped weatherstrip mounted thereon and facing inwardly thereof, a sash having a rail provided with a rabbet facing towards said channel strip, a baffle member secured to said sash rail and extending outwardly therefrom and into said channel, a flexible weatherstrip secured to said sash rail and bearing against said channel, and a flexible weatherstrip secured to said sill and bearing against said baffle member.

7. A window construction comprising a plurality of movable sashes having stiles adapted to meet when the sashes are in closed position, cooperating locking members on said stiles, and means on said stiles for preventing operation of said locking members until said stiles are substantially in contact.

8. A window construction comprising a frame having a sill and a head jamb, a plurality of sashes movably mounted in said frame, said sashes having stiles adapted to meet when the sashes are in closed position, cooperating locking means on said stiles, locking means on one of said stiles adapted to engage with said sill and head jamb, means for simultaneously operating said locking means, and means on said stiles for preventing operation of said locking means until said meeting stiles are substantially in contact.

9. A window construction comprising a frame having a head and a sill, a sash mounted in said frame for sliding movement with respect to said head and sill, cooperating means on said sash and said head and sill confining the movement of said sash within the compass of said frame, a weatherstrip on said sill, a weatherstrip on said sash, and means for guiding the movement of said sash to bring said weatherstrips into engagement when the sash is closed and for separating said weatherstrips when the sash is opened.

10. A window construction comprising a frame having a head and a sill, a plurality of sashes mounted in said frame for sliding movement with respect to said head and sill, cooperating means on said sashes and said head and sill confining the movement of said sashes within the compass of said frame, a weatherstrip on said sill, weatherstrips on each of said sashes, and means for guiding the movement of each of said sashes to bring its weatherstrip into engagement with the weatherstrip on said sill when the sash is closed and for separating said weatherstrips when the sash is opened.

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