

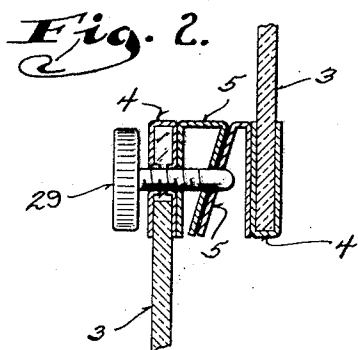
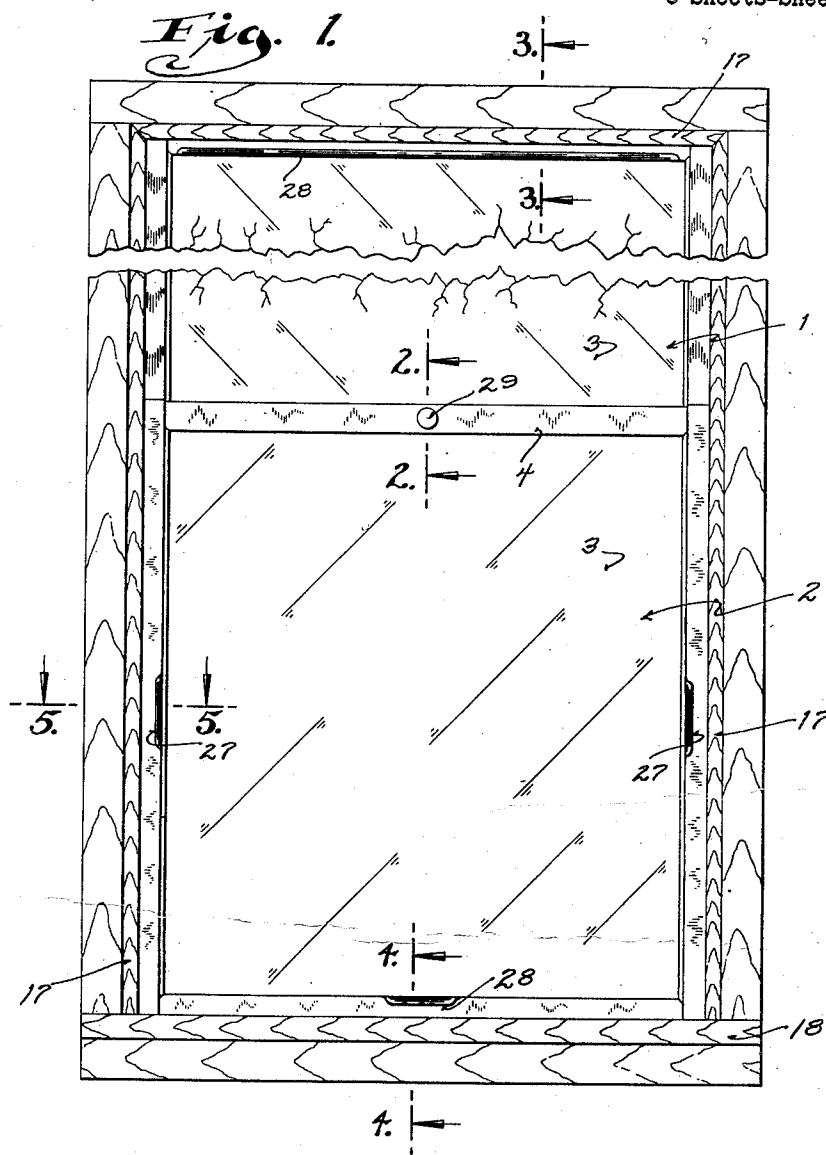
June 30, 1953

P. L. GOTTSCHALK
WINDOW CONSTRUCTION

2,643,422

Filed Oct. 4, 1947

6 Sheets-Sheet 1



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Fig. 3.

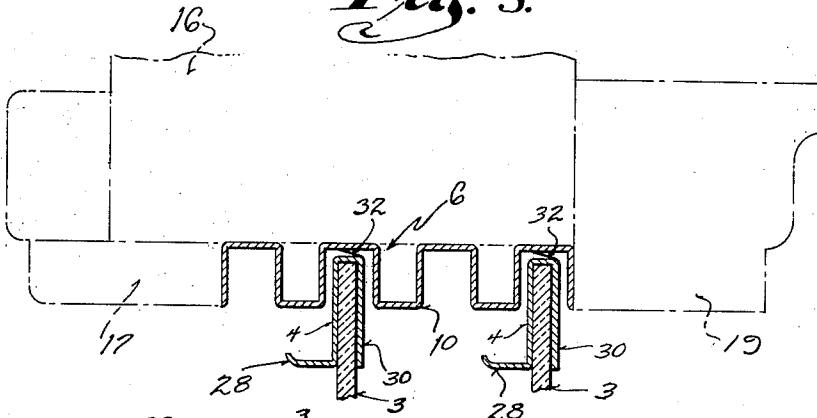


Fig. 4.

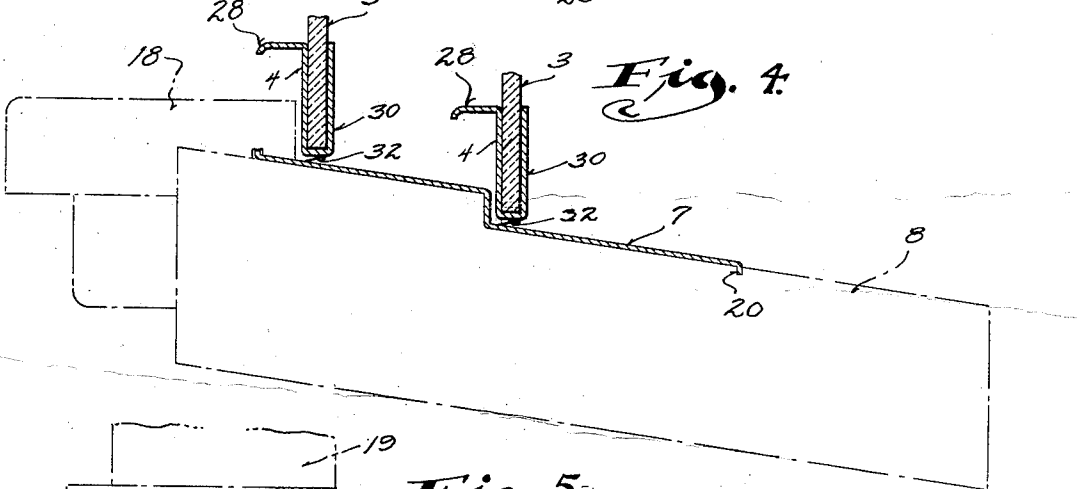


Fig. 5.

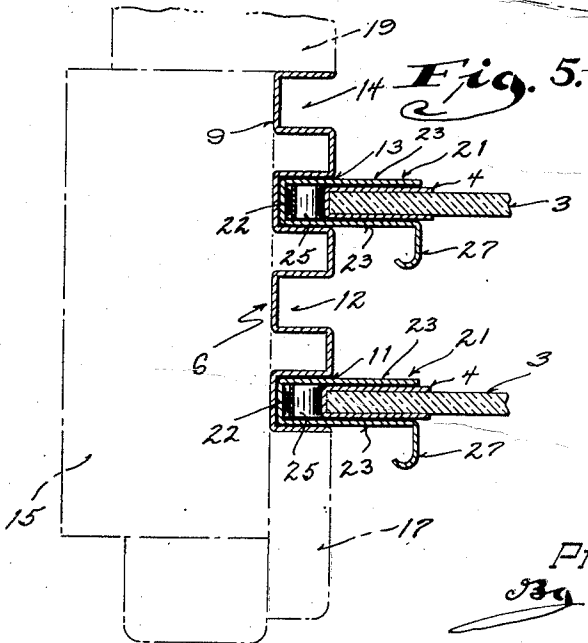
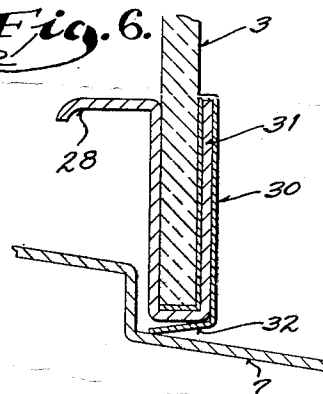


Fig. 6.



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Fig. 7.

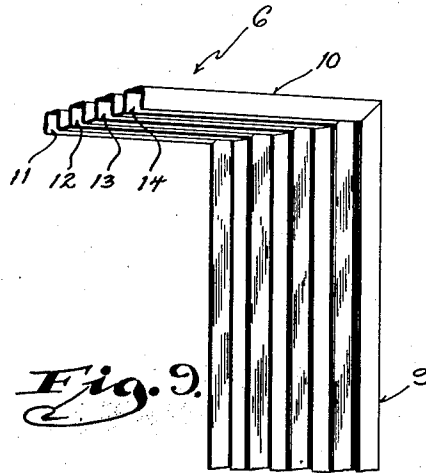
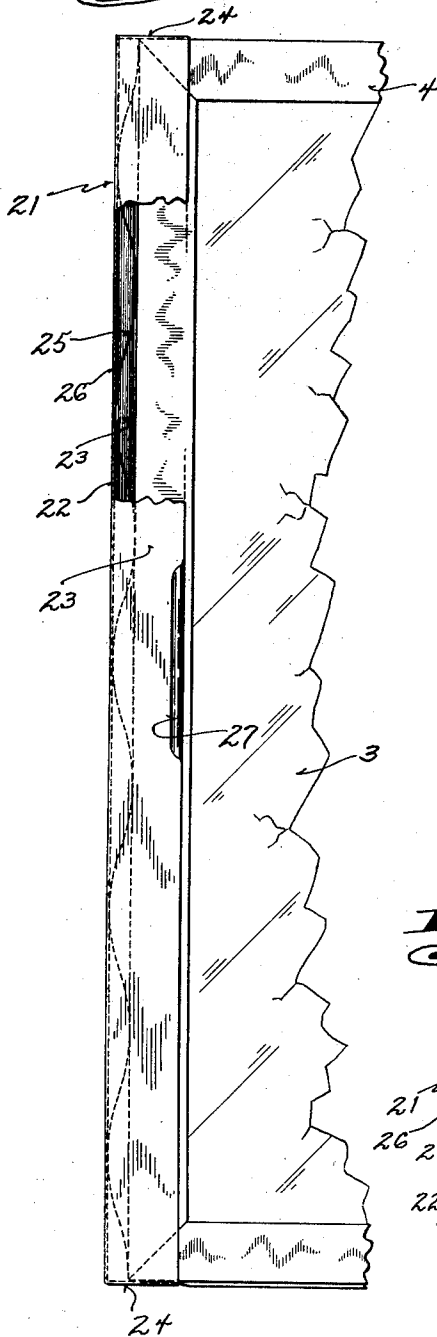


Fig. 9.

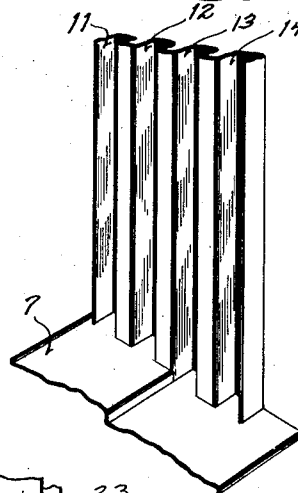
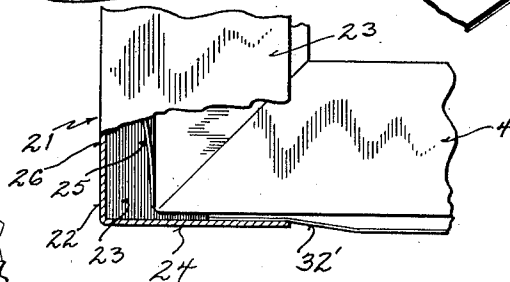


Fig. 8.



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Fig. 10.

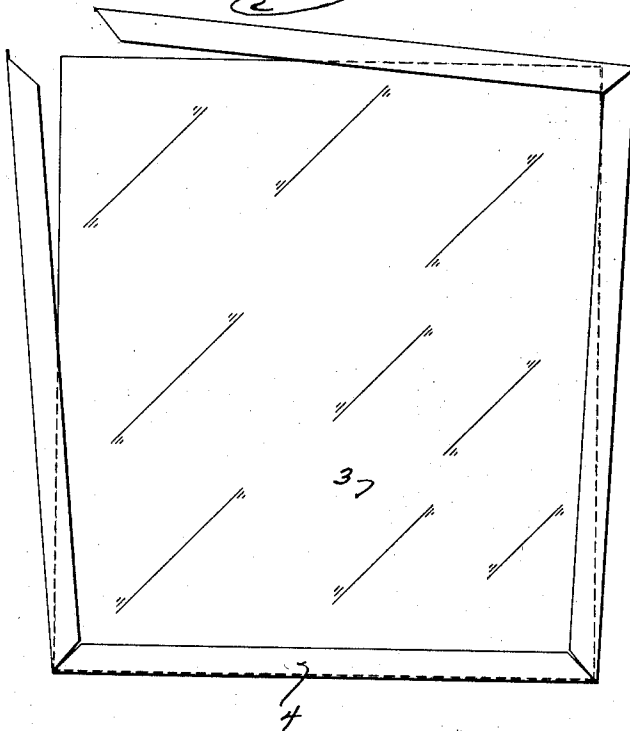


Fig. 11.

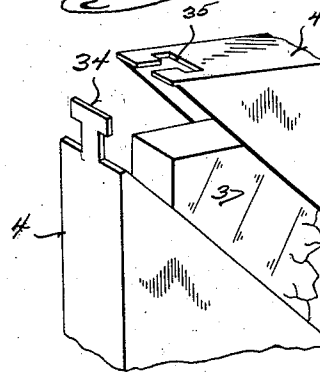


Fig. 12.

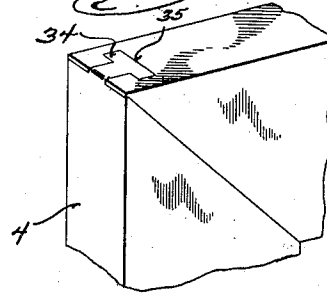
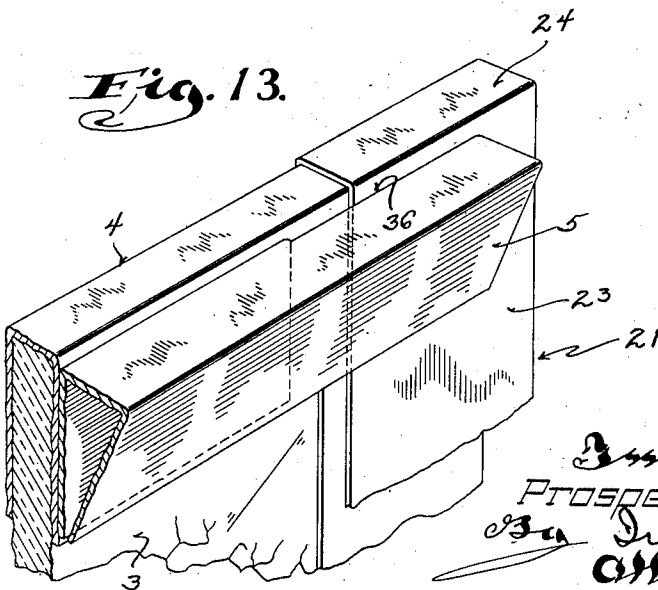


Fig. 13.



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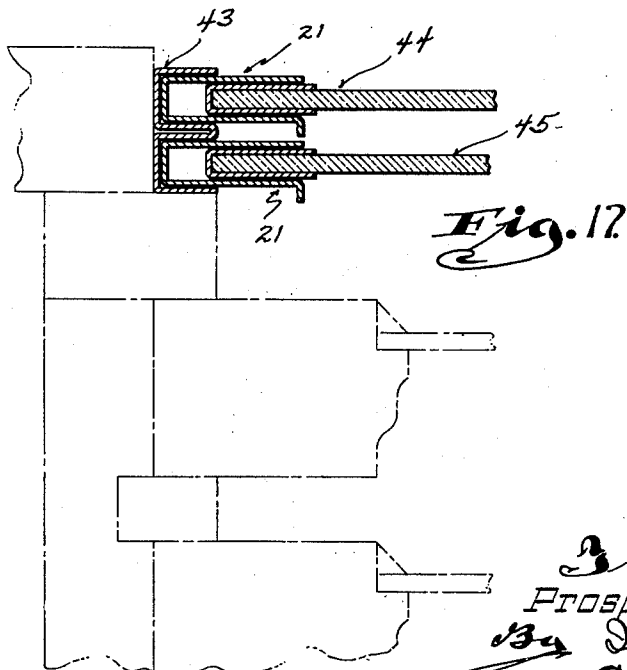
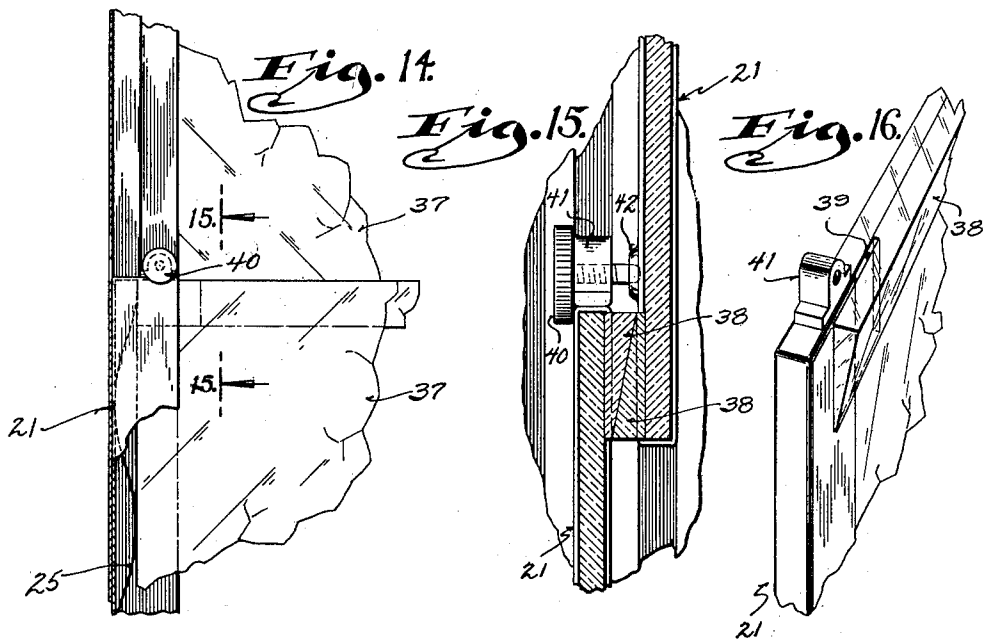
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Fig. 18. *Fig. 19.* *Fig. 20.* *Fig. 21.*

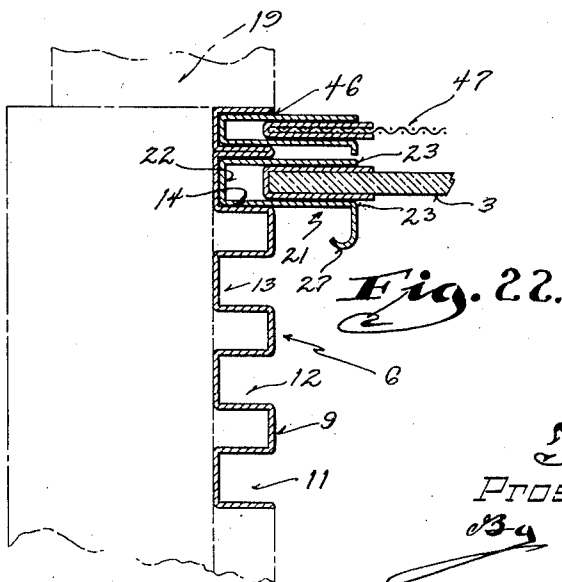
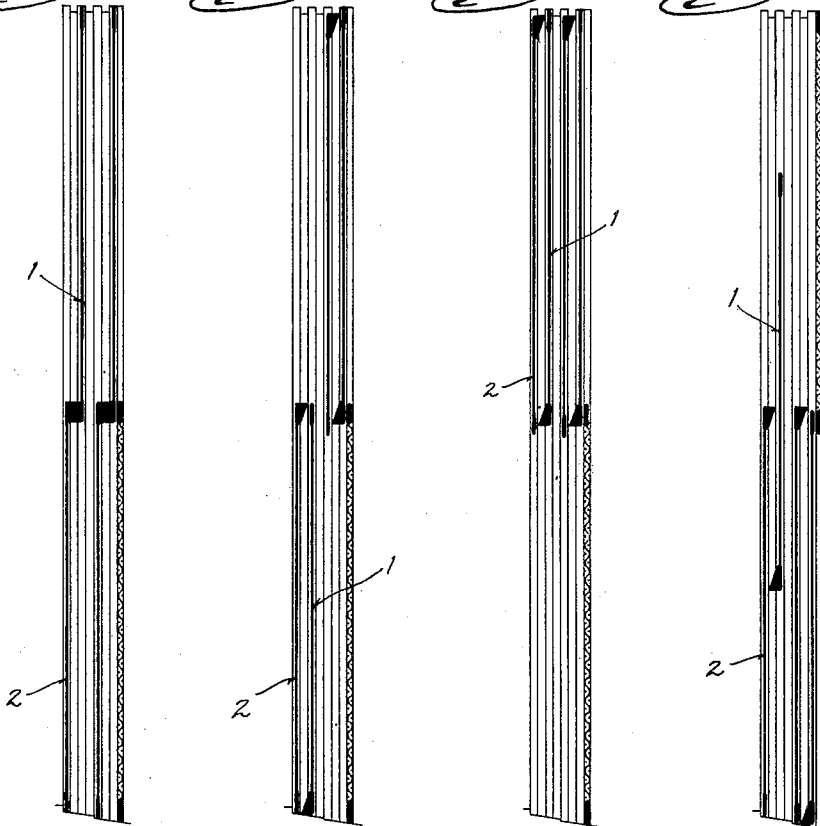
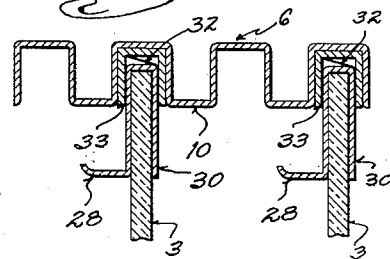


Fig. 23.



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UNITED STATES PATENT OFFICE

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WINDOW CONSTRUCTION

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2 Claims. (Cl. 20—52.2)

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This invention relates to windows and has as its object to provide a simple, practical metal frame construction for windows of the check rail type.

Metal framed windows have been in use heretofore but invariably they were clumsy and expensive. Often they merely duplicated the conventional wooden frame construction. The matter of providing for the insertion and removal of the sash always presented a problem. Removable window stops or guides as employed in the conventional wooden frame construction was the usual solution to the problem, but removable stops or guides are objectionable for many reasons, notably the difficulty of removing the stops after painting.

It is, therefore, an object of this invention to provide an improved metal framed window construction of the check rail type wherein the guides along which the sash slide are a permanent part of the stationary metal window frame and wherein easily actuated retaining means movable with the sash are employed to slidably mount the sash in the frame.

Another disadvantage of the metal framed window constructions heretofore available resided in the fact that when installed they did not lend themselves readily to architectural treatment especially as to the interior trim. To obviate this disadvantage the present invention contemplates as another of its objects a metal window frame so designed and constructed that the conventional wood trim may be employed, and which when installed is entirely inconspicuous.

The check rail type is undoubtedly the most practical form of window, but the presence of the check rail extending transversely across the middle of the window opening is often regarded as an objection. It is, of course, an obstruction. With this in mind the present invention has as another of its objects to provide a window in which the check rails are formed of glass as an integral part of the window panes so that when the window is closed no objectionable obstruction to the view exists within the window opening as defined by the frame.

Another object of this invention is to provide a novel combination sash balance and sash retainer by which the sash is held in any desired position of elevation and also removably held in the window frame.

A further object of this invention is to provide a metal framed window construction wherein the storm windows and screens may be mounted and removed from the inside.

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With the above and other objects in view, which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

The accompanying drawings illustrate several complete examples of the physical embodiment of the invention constructed according to the best modes so far devised for the practical application of the principles thereof, and in which:

Figure 1 is an inside elevational view of a window constructed in accordance with this invention;

Figure 2 is a detail sectional view taken through Figure 1 on the plane of the line 2—2 and illustrating the manner of locking the window closed;

Figure 3 is a detail sectional view taken through the top portion of the window on the plane of the line 3—3 in Figure 1;

Figure 4 is a cross-sectional view through the lowermost portion of the window or the window sill, said view being taken on the plane of the line 4—4 in Figure 1;

Figure 5 is a cross-sectional view through one side of the window on the plane of the line 5—5 in Figure 1;

Figure 6 is an enlarged detail sectional view through the lower portion of one of the sash and illustrating particularly the way in which weather stripping is attached;

Figure 7 is an enlarged inside front elevational view showing one side portion of a sash and illustrating particularly the application thereto of the combination sash balance and sash retainer;

Figure 8 is a fragmentary detail view showing a lower corner of the sash and the combination sash balance and sash retainer to illustrate the manner in which the weather stripping along the bottom of the sash is disposed at this juncture;

Figure 9 is a detail perspective view in vertical section of the stationary window frame, said view showing one side and a portion of the top and bottom of the frame;

Figure 10 is a front elevational view of one of the sash showing the manner in which its frame is applied;

Figure 11 is a detail perspective view illustrating particularly the ends of the continuous sash frame prior to inter-engagement;

Figure 12 is a view similar to Figure 11 but

showing the parts in their interlocked relationship;

Figure 13 is a detail perspective view in section through the upper part of the lower sash and illustrating the manner in which the check rail accommodates lateral movement of the combination sash balance and sash retainer;

Figure 14 is a front elevational view of a portion of a window illustrating a modified adaptation of this invention;

Figure 15 is a vertical sectional view through Figure 14 on a plane of the line 15—15;

Figure 16 is a perspective view showing a corner of the lower sash of the construction shown in Figures 14 and 15;

Figure 17 is a horizontal sectional view through one side of a conventional window construction and illustrating the manner in which this invention may be employed to provide storm windows for the ordinary wood framed window;

Figures 18 to 21 inclusive are diagrammatic views illustrating the different positions in which the sash and a screen mounted in a fifth guide may be placed to secure different ventilating arrangements;

Figure 22 is a view similar to Figure 5 but illustrating the provision of a fifth guide for the reception of a screen; and

Figure 23 is a sectional view similar to Figure 3 but illustrating another modification of the invention.

Referring now particularly to the accompanying drawings in which like numerals indicate like parts, the numerals 1 and 2 respectively designate the upper and the lower sash of a check rail type window, and which in the embodiment of the invention shown in Figures 1 to 13, inclusive, each comprises a glass pane 3 mounted in a metal sash frame 4.

The upper rail of the lower sash frame and the lower rail of the upper sash frame have complementary check rails 5 welded or otherwise secured thereto. These check rails consist of sheet metal channels each having an inclined flange, the inclined flanges of the two check rails being adapted to have surface to surface engagement when the window is closed.

Both sash are slidably mounted in a metal window frame 6 adapted to be mounted in a building wall. All portions of this frame are permanently fixed. There are no removable window stops or guides as in the conventional window frame.

The bottom 7 of the frame 6 may be a sheet metal stamping having two flat offset portions to fit the conventional window sill 8 as shown in Figure 4, or it may be cut from a length of extruded or appropriately formed rolled stock. The sides 9 and top rail 10 of the frame are formed from a length of extruded or suitably rolled stock having a plurality of channel shaped guideways 11, 12, 13 and 14.

At the places where the upper corners are to be located, ninety-degree V-shaped notches are cut into the inner faces of the formed stock down to the bottoms of the channels 11—14. Then by bending the uncut webs of the channels 11—14 mitered 90° joints are formed as shown in Figure 9. These joints may be reinforced by welding, brazing or the like. The bottom ends of the sides 9 are, of course, cut off at the proper angle to accommodate and receive the bottom rail 7 which is welded or mechanically secured in place.

As will be readily apparent to those skilled in

the art the channel guides 11 and 12 accommodate and receive the lower and upper sash respectively of the main window while the channel guides 13 and 14 receive either the storm sash or screens.

In mounting the frame 6 in position one side 9 thereof is first secured to the adjacent rough studding 15 (see Figure 5). The securing of the frame side to the studding can be effected in any suitable manner as by nails or flat-headed screws driven through the bottom of the channel guides. At the other side of the frame the stud is left loose until the frame side is secured thereto, after which it is fastened in place.

In mounting the frame its bottom rail 7 is set down on the sill 8 as shown in Figure 4 and the top rail 10 fits under a lintel 16 to which it may be secured. Attention is directed to the fact that when the frame is secured in position no part thereof need be exposed either at the inside or the outside of the building wall. On the inside the regular wooden finishing strips 17 cover the inner edge of the sides and top of the frame while the regular wooden stool 18 covers the inner edge of the bottom rail 7. On the outside the conventional trim molding 19 hides the outer edge of the sides and top of the frame while the outer edge of the bottom rail has a tongue 20 to engage in an appropriate groove in the window sill 8. The metal frame 6 is thus entirely inconspicuous and inasmuch as all parts thereof are permanently fixed in place the optimum in simplicity is achieved.

Insertion of the sash into and removal thereof from the main frame is enabled through the use of novel combination sash balances and sash retainers indicated generally by the numeral 21. These devices are applied to the side edges of the sash and slidably engage in the respective sash guideways 11—14. Each sash balance and sash retainer 21 consists of a channel 22, preferably formed of sheet metal, with the flanges 23 thereof so spaced as to embrace the side edge portion of a sash frame in a manner allowing lateral movement of the channel with respect to the sash frame. The ends of the channel are closed by end walls 24 which engage over the top and bottom of the sash frame to hold the channel against endwise displacement with respect to the sash.

A spring 25 of any suitable construction but preferably consisting of an undulating strip of flat spring stock is interposed between the web 26 of the channel and the adjacent outer edge of the sash frame to yieldingly urge the channel outwardly. The extent of spring resisted movement permitted the two channels, that is, one at each side of the sash frame, is sufficient to enable reduction of the overall width of the assembled sash unit an extent required to permit insertion of the assembly into the main frame. In other words, the sash has a width sufficiently less than the distance between the bottom of one guideway and the mouth of the opposite guideway, that by drawing the combination sash balances and sash retainers at the opposite sides of the sash frame toward each other the overall width of the sash unit can be made less than said distance between the bottom of one guideway and the mouth of the other, thus enabling insertion of the sash unit into the frame and tracking engagement of the channels 22 in the guideways 11—14.

When so positioned a snug sliding engagement

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is effected between the combination sash balances and sash retainers and the guideways of the main frame allowing the sash to be moved up and down to any position of adjustment, and the tension of the springs 25 holds the sash in such adjusted position by virtue of the frictional engagement engendered thereby between the sash balance (i. e. the device 21) and the guideways of the main frame. To facilitate drawing the sash balances toward each other handles 27 are formed on their inner flanges. This same construction is employed for all of the sash, that is, the upper and lower main sash as well as the upper and lower storm sash. Hence all of the sash can be inserted or removed from inside the building.

The raising and lowering of the individual sash is done in the conventional manner and to facilitate the same handles 28 are provided on the bottom rails of the lower sash and on the top rails of the upper sash. The window may be locked closed by means of a locking screw 29 threaded into the top rail of the lower sash and projecting through aligned openings in the check rails 5 as shown in Figure 2.

At the sides of the window the fit between the parts is sufficiently close to obviate the need for weather strips but at the top and bottom weather strips may be desirable, especially since a space is left between the faces of the sash frame and the guideways of the main frame equivalent to the thickness of the metal of which the combination sash balance and sash retainer is formed. A simple manner of providing weather stripping at these points is illustrated in Figure 6. As here shown a thin metal weather strip 30 is folded around the outer flange 31 of the sash frame with a part thereof confined between the glass and the sash frame and with its outer portion formed to provide a resilient blade 32 extending across the width of the sash frame. Though Figure 6 illustrates the bottom of the window the same arrangement is employed at the top, and in Figures 3 and 4 heavy solid lines represent this weather stripping. At its ends the spring blade 32 is received within the combination sash balances and sash retainers as at 32' in Figure 8.

Further assurance against leakage at the top can be had, if desired, through the use of inserts 33 (see Figure 23) pressed into the guideways 11-14 of the top rail 10. These inserts are channels of the same metal thickness as the combination sash balance and sash retainer and thus when in place duplicate the condition which obtains at the sides of the window.

It is to be understood that where the term sash frame is used herein it contemplates a frame around a window pane or around a screen for obviously screens equipped with the same frames can be substituted for storm sash so that by replacing one of the storm sash with a screen any desired arrangement of window opening can be obtained. For instance, if the lower storm sash is replaced by a screen and the top main sash is opened, ventilation can be had without danger of having it rain in. Also through the provision of a lock such as that shown in Figure 2 on the storm sash as well as on the main sash the screen and upper storm sash can be locked closed, thus affording some security even though the window is half open.

The sash frame, like the main frame, is made from continuous lengths of channel stock cut and mitered at the locations of the corners. All

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four sides of the sash frame are thus made from a single length of stock.

The one open corner is closed by the novel locking device shown in Figures 11 and 12. This locking device has the advantage of obviating the need for welding or similar forms of securement and consists merely of a T-shaped tongue 34 formed on one open end of the frame and a complementary T-shaped notch formed in the other open end of the frame. After the frame is applied around the window pane, it is only necessary to bend over the T-shaped tongue and drive it down into the notch 35.

It is, of course, understood that suitable binding is applied to the edges of the glass pane before the frame is applied, and when the frame is used for a screen any suitable manner of securing the wire mesh to the frame may be employed.

As best shown in Figure 13 the ends of the check rails 5 are cut away to provide slots 36 to accommodate the adjacent side walls of the combination sash balances 21. In this manner the check rails may extend into close juxtaposition to the inner faces of the window frame sides without interfering with inward movement of the sash balances against the tension of their springs.

A feature of the present invention is the all glass check rail type window shown in Figures 14, 15, and 16. As here shown both upper and lower sash consist merely of a pane of glass 37, the side edges of which have a combination sash balance and sash retainer 21 applied directly thereto, the springs 25 bearing directly against the side edges of the glass pane. The check rails comprise strips of glass 38 adhered to the panes 37, one at the bottom of the top sash and the other at the top of the bottom sash. The exposed faces of these strips are inclined at complementary angles to have intimate surface-to-surface engagement with each other when the window is closed, as shown in Figure 15.

The ends of the strips 38 are cut to provide notches 39 for the reception of the adjacent flanges of the channel-shaped sash balances 21. The locking of this type of window may be accomplished by a screw 40 threaded into a block 41 suitably secured to the top of each lower sash combination balance and retainer 21 with the ends of the screws projecting into openings in raised portions or "blisters" 42 on the flanges of the combination balances and sash retainers of the upper sash.

Although the window construction of this invention is primarily intended for original installation its advantages can be realized to an extent as a storm window for existing window frames. Figure 17 illustrates the manner in which this is done. As here shown a frame 43 constructed along the lines of the frame 6, that is, of a continuous rolled strip, is permanently secured in the space on a window frame which ordinarily receives the storm sash. This frame 43 has two guideways similar to the guideways 11-14 in which upper and lower storm sash 44 and 45 respectively are mounted in the manner hereinbefore described.

Ordinarily for summer weather one of the storm sash is replaced by a screen but if desired the frame 6 can have a fifth guideway 46 (see Figure 22) in which a screen 47 is mounted in the manner hereinbefore described. In this way the storm sash need never be removed as ade-

quate ventilation can be obtained without such removal as shown in Figures 19, 20 and 21.

As noted hereinbefore the sash frame may have a glass pane or a screen mounted therein so that when the term "sash frame" is employed it is not to be considered as limited to the frame of a window pane. Likewise, inasmuch as the upper and lower sash may consist merely of panes of glass without a frame, the term "sash" as employed herein is to be understood as encompassing the unframed as well as the framed pane and, of course, also the framed screen.

From the foregoing description taken in connection with the accompanying drawings it will be readily apparent to those skilled in the art that this invention provides a practical, simple, metal framed window construction which has none of the disadvantages of previous metal framed windows and in addition has the advantage of enabling all sash, as well as screens, to be mounted and removed from inside the building.

What I claim as my invention is:

1. A window construction comprising: a frame having sash guides immovably fixed on opposite sides thereof to define opposite parallel trough-like guideways; a sash of a width less than the distance between the bottom of one guideway and the mouth of the other; a channel embracing each side edge portion of the sash and extending for the full length thereof, said channels being slidably received in the sash guideways; means for restraining the channels against all but sidewise movement relative to the sash, toward and from one another; spring means reacting between the sash and the web of each channel and urging the channels away from the sash to projected sash retaining positions engaged with the bottoms of the guideways, and yieldingly resisting motion of the channels to-

ward one another to retracted positions reducing the overall width of the sash to a dimension less than the distance from the bottom of one guideway to the mouth of the other and at which the sash may be disengaged from the frame; and means on said channels, accessible outside of said guideways, by which the channels may be manually moved toward one another to said retracted positions thereof at which the sash may be installed in or removed from the frame.

2. The window construction set forth in claim 1 wherein said channels have portions at their ends closing the same, and which portions engage over the top and bottom sides of the sash to preclude lengthwise motion of the channels relative to the sash.

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