

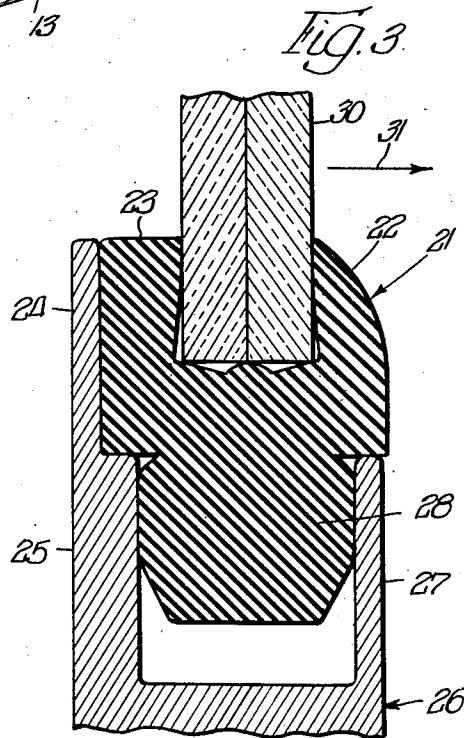
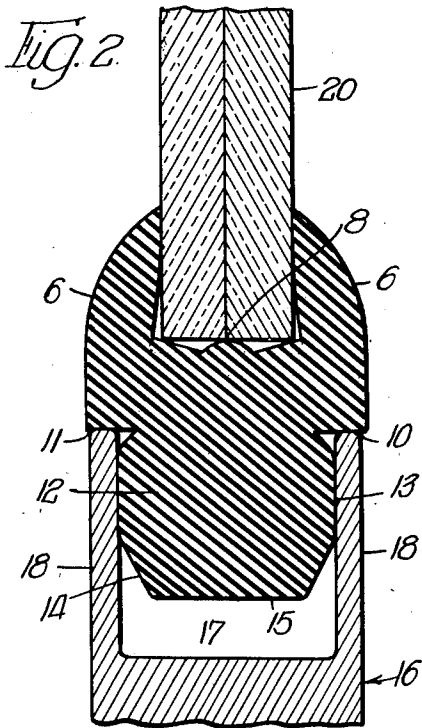
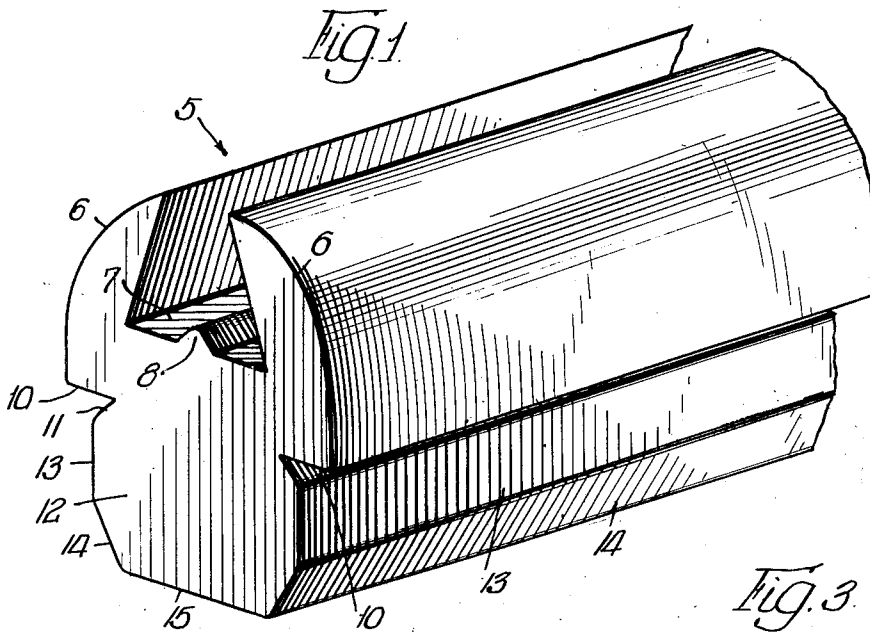
June 9, 1953

Y. W. EHRET
PUSH-OUT SASH

2,641,031

Filed Feb. 9, 1951

2 Sheets-Sheet 1



INVENTOR.
Yale W. Ehret,
BY
Cromwell, Christ & Warden
attys.

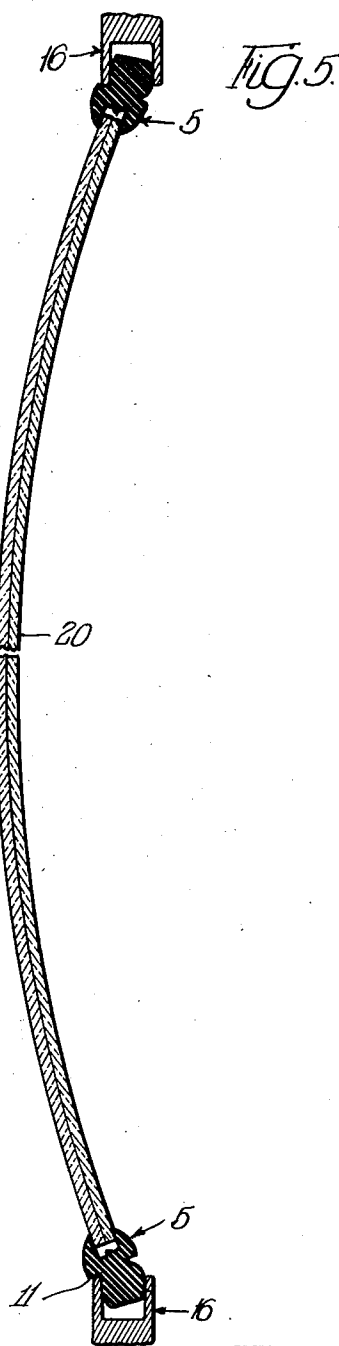
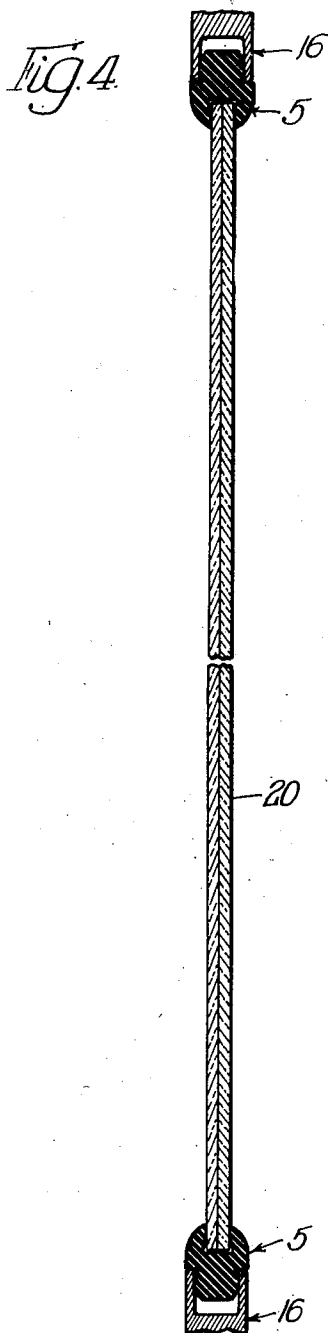
June 9, 1953

Y. W. EHRET
PUSH-OUT SASH

2,641,031

Filed Feb. 9, 1951

2 Sheets-Sheet 2



INVENTOR.

Yale W. Ehret,

BY

Cornwell, Shiest & Warden

attys.

UNITED STATES PATENT OFFICE

2,641,031

PUSH-OUT SASH

Yale W. Ehret, Elkhart, Ind., assignor to The
Adlake Company, Chicago, Ill., a corporation
of Illinois

Application February 9, 1951, Serial No. 210,255

9 Claims. (Cl. 20—56.4)

1

This invention relates, generally, to window construction and, more particularly, to certain improvements and innovations in window sash assemblies which permit the panes to be pushed out of the sash in one piece even though shattered (as characteristics of laminated glass when broken).

The primary object of the invention is to provide a window sash in which the pane of glass is so mounted and supported that it can be forcibly pushed out in the event of an emergency so as to provide an escape opening, and in which the glass pane is at all other times stably secured and supported in a marginally sealed position.

Another important object of the invention is the provision of a window sash for safety purposes in which the pane of glass is mounted and sealed in such a way as to be unaffected by the forces and conditions normally encountered in usage and which pane may be bodily pushed or forcibly snapped out in an emergency.

The improved sash and glazing strip therefor are particularly designed for use in the windows of passenger vehicles, such as railway cars, streetcars and busses, in connection with which serious accidents are so frequently aggravated by the entrapment of panic-stricken passengers vainly endeavoring to escape through closed windows. The sash assembly of the present invention is so constructed that the glass panes may be forcibly ejected in one shattered piece so as to completely clear the opening in the sash.

Certain other objects of the invention will, in part, be obvious and will, in part, appear hereinafter.

The invention contemplates the employment of a shatterproof, laminated, pane of glass of the type capable of being pushed or struck from a flat into a somewhat dished or bowed shape, a metal glazing rail formation presenting inwardly extending side flanges from the edges of which the glazing means is suspended, and a special glazing strip of resilient rubber-like material which is so constructed and arranged relative to the margin of the pane and the suspension flanges of the rail as to roll sideways free of either or both upon the application of substantial pressure forcibly applied to the pane.

The glazing strip is designed so as to allow for the commercial variations in glass thickness, commercial glass cutting tolerances, and also commercial fabrication tolerances on the glass supporting frame.

While the foregoing statements are indicative in a general way of the nature of the invention,

2

other objects and advantages will be apparent to those skilled in the art upon a full understanding of the construction and manner of cooperation of the parts constituting the improved sash assembly.

For a more complete understanding of the nature and scope of the invention reference may now be had to the following detailed description thereof taken in connection with the accompanying drawings, wherein:

Fig. 1 is a perspective view on magnified scale of a short length of a rubber glazing strip which constitutes one of the embodiments of the invention;

Fig. 2 is a fragmentary cross sectional view on the same scale as Fig. 1 showing the manner in which a pane of glass is supported in a sash by means of the glazing strip of Fig. 1;

Fig. 3 is a fragmentary sectional view corresponding to Fig. 2 but showing a modification of the invention;

Fig. 4 is a fragmentary sectional view through a glazed window in which the pane of glass is supported in the sash by the arrangement shown in Fig. 2; and

Fig. 5 is a fragmentary sectional view corresponding to Fig. 4 but illustrating the manner in which the pane of glass is ejected from the supporting sash upon the application of a sufficient force to dislodge it.

In Fig. 1 a continuous type glazing strip is indicated generally at 5, which may be extruded or molded from a material having suitable resiliency, such as rubber or a plastic material having physical properties similar to those of rubber.

The glazing strip 5 has two inwardly converging lip portions 6 projecting into the sight opening of a window sash which form the sloped sides of a pane-receiving channel opening. The floor of the channel is indicated at 7 and an integrally formed longitudinal rib 8 extends centrally along the floor 7 of the channel so as to serve as a pressure pad to produce gripping and sealing action by the lips 6 on opposite sides of the glass. The rib 8 also allows the variables and tolerances referred to above.

Preferably, the inner or free edges of the lips 6 are tapered in the manner shown so as to render them more flexible and more easily deformable for large area gripping engagement with the sides of a pane of glass. Also it is desirable that the lips 6 converge toward their free ends as shown so as to assist in providing the necessary gripping action.

The glazing strip 5 has a pair of oppositely

3

extending shoulders 10—10 formed as undercut portions of the bases of the converging lips 6. Each shoulder 10 forms one side of the V-shaped longitudinal groove 11 extending along each side of the glazing strip.

The glazing strip 5 has a sash retention or interfitting portion 12 which forms a substantial part of the glazing strip. This retention strip has opposed flat side faces 13—13 which intersect with the adjacent sides of the V-shaped grooves 11 along respective edges of the faces 13 and along the other respective edges intersect with sloping faces 14—14 which join and intersect the flat surface 15 on the base of the retention portion 12. It will be understood that the surfaces 11, 13 and 14 may be rounded or otherwise suitably shaped.

The glazing strip 5 is designed for use in connection with a metal window frame, the characteristic feature of which is that the rail members or glazing rail portions of the frame have two inwardly extending flanges for receiving and supporting the glazing strip 5. In Fig. 2 of the drawings such a rail portion or rail member is indicated generally at 16 and it has a channel 17 formed in the inner edge thereof, the side walls of which channel are provided by the inwardly extending flanges 18—18.

The glazing strip 5 seats and is retained in the rail member 16 in the manner shown in Fig. 2. An important feature of the invention is having the retention portion 12 of the glazing strip so proportioned in respect to the dimensions of the channel 17 that the outer face or the base surface 15 of the retention portion 12 will be spaced away from the floor of the channel 17. The flat side faces 13 of the portion 12 engage the confronting sides of the flanges 18 in sealing relationship as shown and the shoulders 10 are engaged against the upstanding edges of the flanges 18 so as to furnish supporting and sealing engagement of the glazing strip 5 with the rail member 16.

A laminated pane of glass 20 should be used in connection with the sash construction of the present invention. The pane 20 seats in the channel formed between the lips 6 and is supported from the base or floor 7 of the channel in part by the longitudinally extending rib or pressure pad 8 and in part by portions of the floor 7 on opposite sides of the pad 8 as shown.

Construction of the window sash, including the glazing strip 5 and the rail member 16, as shown and described in connection with Figs. 1 and 2, is of critical design since it allows the pane 20 to be supported in a normal fashion in marginally sealed relationship and in such a manner that the pane 20 is not dislodged by the forces of ordinary magnitude which are encountered, such as high winds, body pressure normally exerted through leaning or crowding, etc. Such ordinary forces will not produce any substantial deflection or distortion of the glass pane 20 from its flat, unstressed condition. However, when it is necessary, such as in the instance of a wreck, fire, or other emergency, the pane 20 may be forcibly ejected in one shattered, non-fragmentary piece by the application of a force which is adequate to bow or bend the pane. A hard blow by the foot or fist will be adequate to produce sufficient deflection to result in the dislodgment of the pane 20. One important characteristic of the sash construction is that no partial dislodgment of the pane 20 is produced when a force substantially short of that necessary for ejection is applied.

4

In Fig. 4 of the drawings the pane of glass 20 is shown supported in the sash construction comprising the rail members 16 and the glazing strip 5 with the pane 20 being in the flat, unstressed condition which it normally is in. Fig. 5 depicts what happens when a force is applied to the pane 20 sufficient to bend, distort or shatter it to the condition shown. The conformation of the glazing strip 5 is such that it permits the pane 20 to become ejected in one unit from the sash due to the combined rolling and snap action of the glazing strip 5. As shown in Fig. 5, one of the V-shaped grooves 11 engages the inner edge of one of the flanges 18 which serves as a fulcrum about which the glazing strip rolls. The sloping side faces 14 permit the channel retention portion 12 of the glazing strip 5 to roll out of the channel 17. At the same time that the retention portion 12 of the glazing strip 5 is being rolled out of the channel 17 the marginal edge of the pane 20 is pivoting on the rib 8 in the floor 7 of the channel formed between the pane engaging lips 6, as shown in Fig. 5. This particular construction contributes to the quick, snap-acting release of the pane 20 once the pane has been distorted beyond the critical release point encountered in normal use. Usually the pane 20 becomes disengaged from the glazing strip 5 at about the same time that the glazing strip becomes disengaged from the rail members 16.

In addition to contributing to the action of the pane in its ejection from the sash, the rib 8 has the additional function of cooperating with the pane engaging lips 6 so as to cause them to firmly grip and engage with the opposite sides of the pane. That is, the engagement of the edges of the pane 20 with the rib 8 so as to squash it as shown in Fig. 2 tends to cause the inner and thinned edges of the lips 6 to more firmly grip and engage the sides of the pane 20 and take care of the variables aforementioned.

The embodiment of the invention described above in connection with Figs. 1 and 2 and 4 and 5 is of a symmetrical type so that the window pane 20 may be dislodged by application of sufficient force from either side of the pane. When it is desired that a pane be supported so that it can be dislodged in only one direction a modified construction can be used, and one such embodiment of the invention is shown in Fig. 3. In this embodiment the glazing strip 21 is formed in such a way in comparison with the glazing strip 5 that it has one pane-engaging lip 22 which corresponds to one of the lips 6 of the glazing strip 5, while the other lip 23 is shaped so that it will not be deformable but will engage the inwardly extending support or wall portion 24 which extends from the side flange 25 of a rail member indicated generally at 26. The opposite flange 27 corresponds to one of the flanges 18 of the rail member 16. The glazing strip 21 has a retention portion 28 which corresponds to the retention portion 12 of the glazing strip 5.

When a pane of glass 30 is supported in a sash which includes the glazing rail member 26 and the glazing strip 21 it can be forcibly dislodged in a snap action, rolling type movement, as described above in connection with Fig. 5, but in this instance only in the direction indicated by arrow 31 in Fig. 3.

The supporting metal rails 16 and 26 have one removable side or section so as to permit assembly.

It will be understood that certain other changes and additional embodiments of the invention may

5

be made without departing from the spirit and scope thereof. Accordingly the embodiments of the invention described above and shown in the accompanying drawings are to be interpreted as illustrative and not in a limiting sense.

What I claim as new is:

1. In a sash of the character described for retaining a pane of laminated glass of slightly smaller dimensions than the sight opening in the sash in such a manner that the pane may be pushed out in emergencies, a metal frame having a rail portion wherein there is an inwardly opening channel having two opposed inwardly extending side wall flanges, and a glazing strip of resilient rubber-like material mounted in said channel and adapted to support a window pane in said sight opening, said strip being characterized in having opposed lip portions projecting into the sight opening to provide a channel in which the margin of a pane may be resiliently clamped, a longitudinal rib centrally located in the floor of the channel provided by said lip portions, a pair of oppositely directed shoulder portions adjacent the bases of said lip portions and adapted to seat on the edges of said rail portion flanges, and a bead-like retention portion projecting oppositely from said lip portions and adapted to seat within said channel in said rail portion with the opposite sides of said retention portion engaging the confronting faces of said rail portion flanges and said retention portion terminating short of the floor of said channel in said rail portion so as to be spaced away therefrom, said glazing strip and rail portion allowing a pane to be ejected from the sight opening upon sufficient distortion of the same.

2. An emergency sash assembly for retaining a pane of laminated glass having slightly smaller dimensions than the sight opening of the sash in such a manner that the pane may be pushed out in emergencies, comprising, a frame including a glazing rail wherein there is a channel facing the sight opening and formed by a pair of side wall flanges the free edges of which define the sight opening, and an integral glazing strip of deformable rubber-like material seated in said channel and projecting into said sight opening so as to support a glass pane therein, said glazing strip having a bead-like retention portion adapted to seat in said channel in the glazing rail in spaced relationship with the floor of said channel and with the sides of said retention portion engaging said side wall flanges, oppositely directed supporting shoulders resting on the free edges of said side wall flanges so as to space said retention portion from the floor of said channel, a pair of pane gripping lips protruding from said supporting shoulders into said sight opening and defining a channel for resiliently gripping the marginal edge of a glass pane, and a centrally located rib extending along the floor of said channel defined by said lips and serving to stress load the glazing strip where said lips engage said glass pane and said shoulders engage said side wall flanges.

3. An emergency sash assembly for retaining a pane of laminated glass having slightly smaller dimensions than the sight opening of the sash in such a manner that the pane may be pushed out in emergencies, comprising, a frame including a glazing rail wherein there is a channel facing the sight opening and formed by a pair of side wall flanges the free edges of which define the sight opening, and an integral glazing strip of deformable rubber-like material seated

6

in said channel and projecting into said sight opening so as to support a window pane therein, said glazing strip characterized in having spaced lip portions extending into said sight opening to provide a channel in which the margin of a pane may be resiliently clamped, said lip portions being tapered from their bases to their free ends to afford greater flexibility adjacent the free ends, a centrally located pressure pad formed on the floor of the channel defined by said lip portions, a bead-like retention portion projecting away from said sight opening and into said channel in said glazing rail, a pair of V-shaped grooves extending along opposite sides of said glazing strip with one side of each groove defining a support shoulder along the base of the adjacent lip portion and with the other side of each groove defining a portion of the adjacent side surface of said retention portion, said support shoulders engaging the free edges of said side wall flanges so as to space said retention portion away from the floor of the channel formed by said side wall flanges, the opposite side surfaces of said retention portion being cut away so that only intermediate portions of the side surfaces engage with said side wall flanges and said pressure pad serving to stress load the glazing strip at areas of contact with said pane and said glazing rail.

4. An emergency sash assembly for retaining a pane of laminated glass having slightly smaller dimensions than the sight opening of the sash on one side thereof so that the pane may be pushed out on said side, comprising, a sash frame including a glazing rail wherein there is a channel facing the sight opening and formed by a pair of side wall flanges one of which is longer than the other, and an integrally formed glazing strip of deformable rubber-like material seated in said channel and projecting into said sight opening so as to support a window pane therein, said glazing strip having a bead-like retention portion adapted to seat in said channel in the glazing rail in spaced relationship with the floor of said channel and with the mid-portions of the sides of said retention portion engaging said side wall flanges, a supporting shoulder formed on one side of said glazing strip so as to rest on the free edge of the shorter one of said side wall flanges and thereby support said retention portion away from the floor of said channel, a pane gripping lip projecting from said shoulder into said sight opening, a pane gripping flange abutting the longer portion of said side wall flange and spaced from said lip so as to define therewith a pane receiving channel for resiliently gripping the marginal edge of a pane, and a centrally located rib extending along the floor of said pane receiving channel.

5. A glazing strip as called for in claim 1 wherein the strip is continuous.

6. A glazing strip as called for in claim 3 wherein the strip is continuous.

7. A glazing strip as called for in claim 4 wherein the strip is continuous.

8. The safety sash assembly called for in claim 3 wherein the lips of said glazing strip converge toward the free ends thereof.

9. In a sash of the character described, a frame in which the rail members are provided with an inwardly opening channel having two inwardly extending flanges extending along opposite sides of the channel, a pane of glass of smaller dimensions than the opening in said frame defined

7

by said flanges, and a glazing strip of resilient rubber-like material mounted in said channel and in supporting engagement with said pane, said glazing strip being characterized by two inwardly converging lip portions which provide between the same a groove in which the margin of said pane of glass is resiliently clamped by said lip portions, by two oppositely extending shoulder portions which seat against the edges of said flanges, and by a bead-like body portion projecting between and outwardly of said shoulder portions so as to engage laterally with the inner faces of said flanges in spaced relation to the bottom of said channel, said bead-like body portion being of reduced width adjacent said

8

shoulder portions and also adjacent its outer edges, and said glazing strip being further characterized by an inwardly extending rib at the center of the base of said groove, which rib engages the edge of the pane of glass and supports the latter in spaced relation to the bottom of said groove.

YALE W. EHRET.

10 References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,233,335	Axe et al.	Feb. 25, 1941
2,255,725	Trescher	Sept. 9, 1941
2,509,362	Miller	May 30, 1950