May 30, 1950 R. A. MILLER 2,509,362

EMERGENCY CLOSURE STRUCTURE

Filed Dec. 27, 1946

Fig. 1.

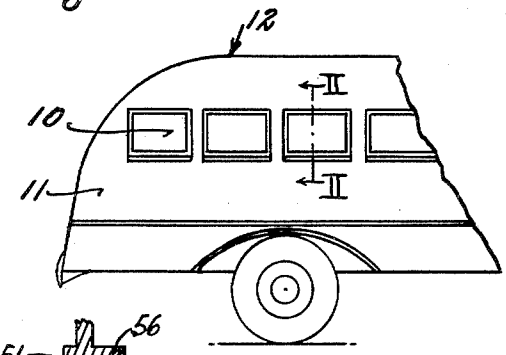
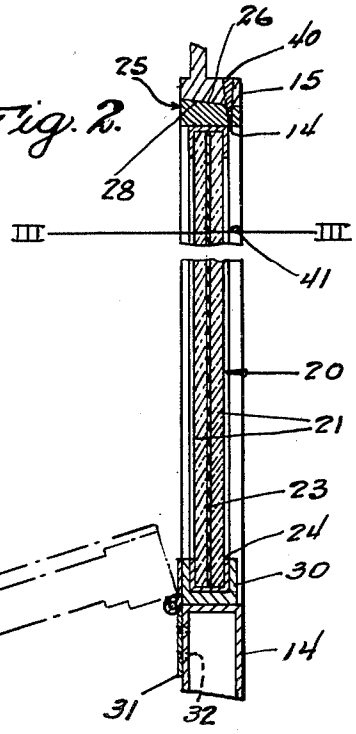


Fig. 2.



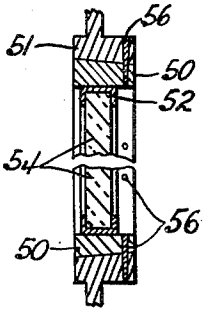


Fig. 5.

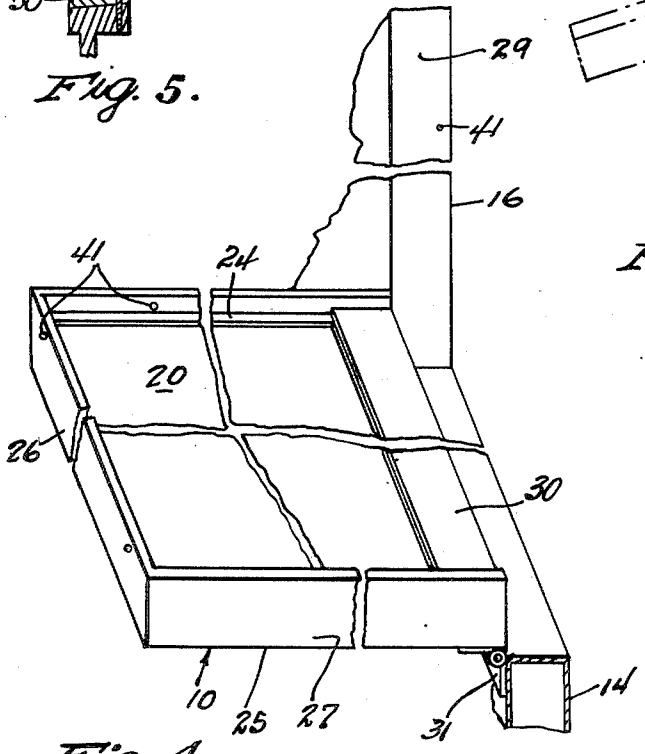
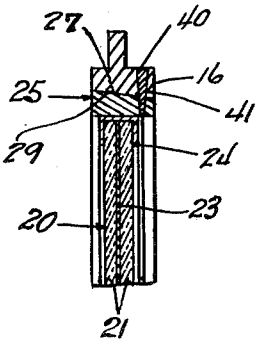


Fig. 4

Fig. 3.



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EMERGENCY CLOSURE STRUCTURE

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1 Claim. (Cl. 296—44)

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This invention relates to closure structures and it has particular relation to windows which can be forced out to permit the escape of persons that otherwise might be trapped in vehicles, buildings or other inclosures in which windows are employed.

One object of the invention is to provide an improved window equipped with mounting elements which will yield under predetermined pressure to permit the forcing of the window panel or sash outwardly from its mountings without necessity of cracking or disrupting the glazing material.

Another object of the invention is to provide an improved window so mounted as to have along at least one side thereof a set of retaining elements which can be sheared off in response to predetermined pressure to permit the opening of the window under conditions of emergency.

Emergencies arise occasionally in operating passenger vehicles, such as buses, automobiles, railway trains, etc. It is very important that windows be so mounted that they can be forced open without difficulty and thereby permit passengers to escape through an opening entirely free of fragments of glazing material which would otherwise present a hazard of injury by cutting.

One of the important phases of this invention involves the structure of a closure panel which can be forced out under predetermined pressure and the elements of the structure are so designed that the force required to open the closure can be calculated at any desired value. It is of course desirable to maintain the windows permanently mounted and operable under normal conditions. To this end, the improved window construction included in this invention involves elements which traverse the joints between the windows and surrounding frames and are adapted to be sheared off to release the window when predetermined pressure is applied thereto. The elements are composed of relatively soft metal or alloy selected according to its capacity to respond to shearing action and commensurate with the number and size of the elements to be installed.

In the drawing:

Figure 1 is a fragmentary side elevation of a vehicle in which the invention has been incorporated; Figure 2 is a fragmentary vertical section, on a larger scale, taken substantially along the line II—II of Figure 1; Figure 3 is a horizontal section taken substantially along the line III—III of Figure 2; Figure 4 is a fragmentary perspective, on a larger scale, of the window panel

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mounting in a supporting structure; and Figure 5 is a fragmentary vertical section similar to Figure 2 illustrating another form of structure.

In one form of the invention, closure panels 10 are mounted in a body 11 of a vehicle 12 which includes for each panel a lower sill frame 14, a horizontal upper frame member 15 and vertical side frame members 16. In one form of structure the panel includes a transparent unit 20 which is composed of superposed sheets of glass 21 adherent and laminated to an intervening layer of organic plastic 23 to form a conventional safety glass structure. The edges of this transparent unit are surrounded and embraced in a metal channel member 24 welded or otherwise rigidly secured to a metal sash or frame 25.

The top and side portions of this frame are provided with faces 26 and 27, respectively, which fit against correspondingly shaped faces 28 and 29 of the top and side frame members 15 and 16, respectively. If desired these faces can be bevelled as shown in the drawing. The lower section of the sash is in the form of a channel member 30 in which the lower portion of the glass receiving channel member 24 is rigidly supported. Hinges 31 are rigidly secured, as indicated at 32, to the channel member 30 and to the sill frame 14. Thus the closure panel can swing outwardly on the hinges. It is to be noted that the bevelled faces 28 and 29 provide an opening which flares outwardly so as to obviate frictional binding of the closure panel when its swinging action on the hinges is initiated.

Advantages of using strong glass in vehicle windows are common knowledge, as well as methods of treating transparent panels so as to render them strong and resistant to splintering. Glass panels can be laminated, annealed or otherwise treated to secure the desired characteristics. Therefore, in cases of emergency it would be difficult to break through the strong glass to permit the escape of persons who might be trapped in a vehicle when an accident occurs. In order that the safety advantages of using glass of this kind may be available, as well as a structure which will permit without difficulty the escape of passengers, the closure unit and surrounding frames are provided with tapered shear pins 40, composed of relatively soft metal, such as copper, zinc, lead, aluminum, or a suitable alloy, which can be processed to any desirable specification as to shear resistance. These relatively soft shear pins can be tapered if desired and inserted in tapered openings 41 which are formed in the upper and side frame members of the closure panel and

extend into the surrounding frame structure. The respective openings in the closure panel and surrounding frame structure register when the panel 10 is closed and the shear pins can then be inserted in the openings so as to traverse the window joints. The size and resistance of the shear pins are such that a passenger inside the vehicle can exert force to shear off the pins and to push the panel outwardly upon its hinges 31 when it is necessary to do so. By utilizing pins of this kind they can be designed to fail and permit opening of the closure panel in response to any calculated force which may be selected.

Referring to Figure 5, a metal sash 50 is mounted in a surrounding frame support 51 similar to the support 15, and a channel member 52 embracing the marginal portion of a monolithic glass plate 54 is welded or otherwise rigidly secured peripherally to the surrounding sash. This glass plate can be of such thickness, or treated in such manner as to make it strong, or otherwise resistant to splintering by subjecting it to annealing or other known treatment.

In this arrangement hinges, such as those shown in Figures 2 and 4, are omitted and the sash 50 with the glass mounted therein can be fitted in the surrounding frame support 51 so as to have its outer faces releasably held against the surrounding frame support by means of shearable pins 56 which correspond to the pins 40 previously described. These pins can be of such size and distributed in such manner as to offer calculated resistance in shearing them before the window can be forced from its mounting. As shown in Figure 5, the pins 56 are disposed at, and extend through, the top, sides, and bottom of the sash and surrounding frame support, in the same manner as the pins 40 are mounted in the top and side portions of the window shown in Figures 2 and 4. In a construction of this kind the window can be forced out by predetermined pressure exerted at the top, bottom or sides thereof.

Although illustrative forms of the invention have been shown and described in detail it will be apparent to those skilled in the art that the invention is not so limited but that various changes can be made therein without departing from the scope and spirit of the invention as exemplified in the appended claim.

I claim:

In a vehicle glazing structure, a panel including a glass plate and a recessed sash receiving rigidly the edge portions of the glass plate, a frame surrounding the sash and defining a window opening, the outer peripheral portions of the sash being bevelled and converging in outward directions, the inner surrounding surfaces of the frame converging correspondingly to the converging portions of the sash in face to face relation therewith, and shear pins transversing joints between the sash and the surrounding frame and said pins passing through the correspondingly converging portions of the frame and sash and being shearable in response to predetermined pressure applied to said panel, said glass plate offering greater resistance to pressure than the resistance offered by the shear pins in response to pressure applied to the panel in shearing said pins.

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