May 28, 1957 S. H. BINGHAM 2,793,722

EMERGENCY EXIT WINDOW STRUCTURE

Filed Sept. 1, 1954 2 Sheets-Sheet 1

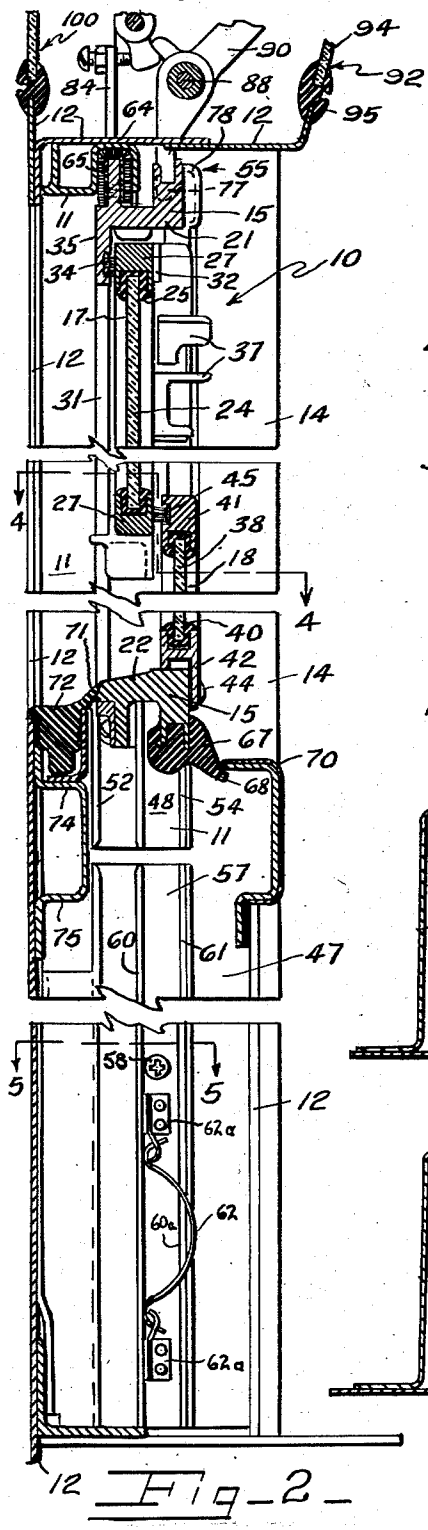


Fig. 2

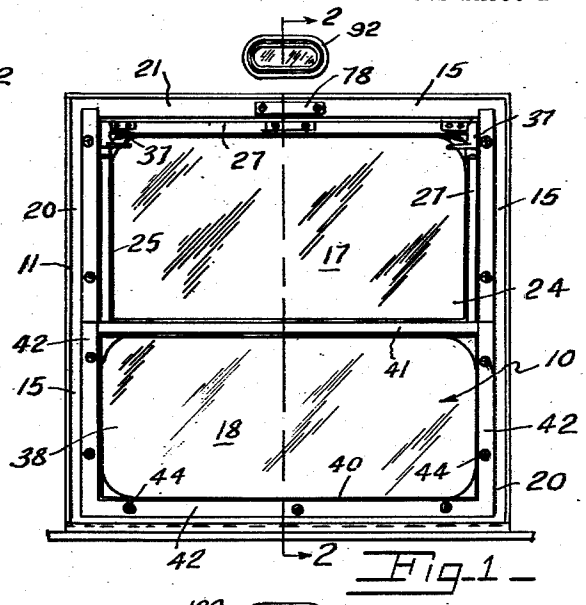


Fig. 1

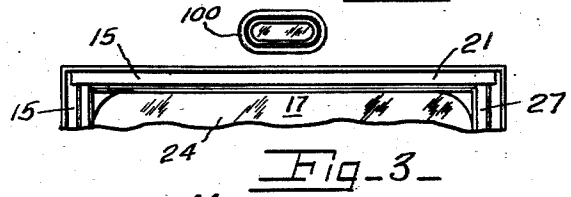


Fig. 3

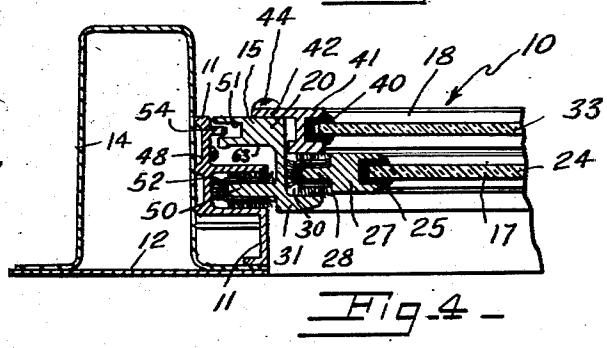


Fig. 4

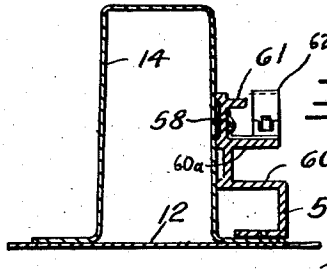


Fig. 5

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EMERGENCY EXIT WINDOW STRUCTURE

Filed Sept. 1, 1954 2 Sheets-Sheet 2

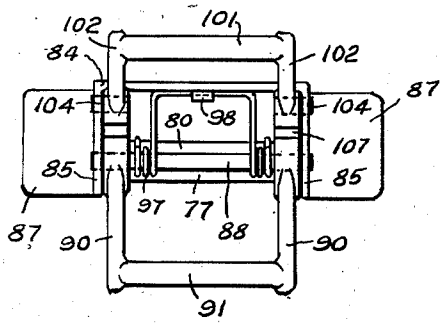


Fig-6-

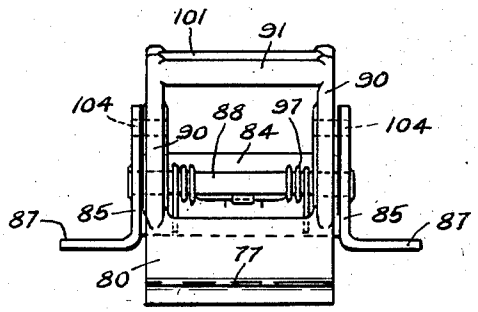


Fig-7-

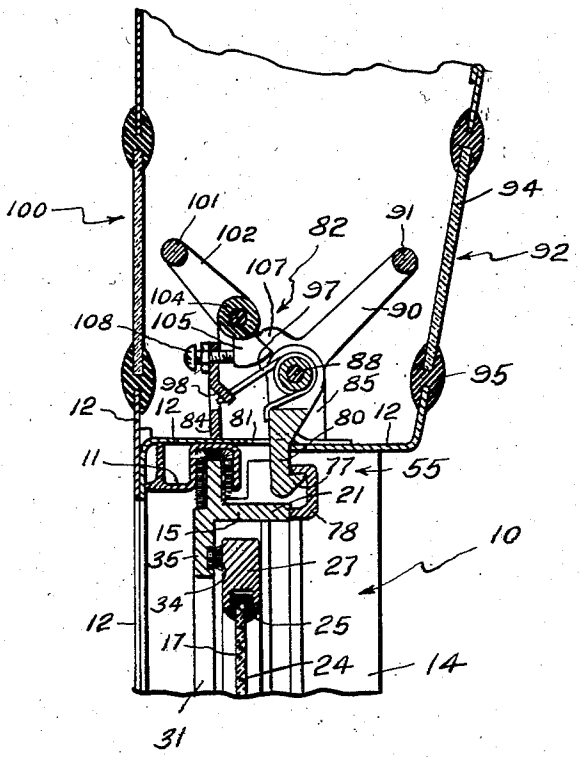


Fig-8-

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EMERGENCY EXIT WINDOW STRUCTURE

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Application September 1, 1954, Serial No. 453,527

3 Claims. (Cl. 189—64)

This invention relates to emergency exit structures and has particular reference to a novel emergency exit window which is broadly adapted for use in vehicles or buildings wherein the design of the window is such that the movable sash thereof fails to provide a sufficiently large or accessible escape opening, or the sash is fixed and normally provides no opening at all.

It is now common practice to equip busses and like public conveyances with emergency exit windows wherein the window sash can be removed from the window opening to provide an exit for trapped passengers in the event of an accident. In most of these emergency exit structures, the escape sash is removed by exerting an outward force upon the sash from within the vehicle so that it either swings outwardly in the opening if it happens to be hinged to the frame or falls entirely clear of the opening if it is not so hinged. These arrangements, however, are somewhat limited in use and, as a general rule, are not applicable to subway or railroad cars where it is neither practical nor permissable to have anything swing out or project out from the car body. This type of emergency exit is likewise impractical for use in buildings since the windows may be large and the sash too heavy to swing out, and it would be too dangerous to permit the sash to fall clear of the window opening into the street below.

The present invention therefore contemplates an emergency exit window which not only has practical application in busses and the like but is well adapted for use in subway and surface rail cars, and in large buildings. Briefly stated, the invention provides a novel emergency exit window wherein the actuation of a simple release mechanism permits the sash frame and sash panels to drop as a unit into a well below the window to completely clear the window opening. This arrangement is particularly adapted for subway cars, for example, since, as noted above, it is undesirable to have an escape sash which swings out from the car body, and there is no way of raising the sash frame as a unit because the body usually curves inwardly above the windows. Similarly, the structure of the invention is well adapted for air conditioned buildings having double glazed stationary window installations since it is not intended that such windows be opened, and the sash frames are generally too heavy to swing out or push up as a unit. The invention also has application in ships and other structures, and in general has very broad utility as will become more apparent as the description proceeds.

With the foregoing and other considerations in view, it is the primary object of this invention to provide an emergency exit window of a versatile nature, having wide application in vehicles, stationary structures and the like.

Another important object of the invention is to provide an emergency exit window having particular utility in subway and surface rail cars.

A further important object of the invention is to provide an emergency exit window wherein the escape sash frame moves as a unit and clears the window opening by means of a single actuating movement.

A more specific object of the invention is to provide an emergency exit window wherein the escape sash frame drops vertically as a unit into a well below the window opening.

Another specific object of the invention is to provide an emergency exit window wherein the release mechanism for the escape sash can be operated from either the inside or outside of the window.

Other objects and advantages will become apparent from the following detailed description read in conjunction with the accompanying drawings wherein like reference numbers refer to similar parts in all the views.

In the drawings:

Figure 1 is a side elevation of an emergency exit window structure embodying the invention, the elevation being taken from the interior side of the window;

Figure 2 is a greatly enlarged vertical section taken on line 2—2 of Figure 1;

Figure 3 is a fragmentary side elevation of the window structure shown in Figure 1, the elevation being taken from the exterior side of the window;

Figure 4 is a fragmentary horizontal section taken on line 4—4 of Figure 2;

Figure 5 is a horizontal section taken on line 5—5 of Figure 2;

Figure 6 is a plan view of the fastening and releasing mechanism for the emergency exit window structure;

Figure 7 is a side elevation of the mechanism shown in Figure 6; and

Figure 8 is a detailed vertical section through the fastening and releasing mechanism corresponding to the showing thereof in Figure 2.

For the purpose of disclosing the invention, the drawings illustrate a typical embodiment thereof as applied to a subway or surface rail car. Having reference now to these drawings, **10** generally indicates an escape sash which is normally held in a window frame **11** fixedly mounted in a window opening formed by body panels **12** and posts **14**. Escape sash **10** comprises a sash frame **15** and upper and lower sub-sash or panels **17, 18** mounted in the frame, the upper panel being movable and the lower panel fixed. The sash frame **15** includes side rails or stiles **20**, a top rail or header **21**, and a bottom rail **22**.

Upper and lower panels **17, 18** are of substantially conventional sash construction, the upper movable or drop panel **17** comprising laminated sheet glass **24**, sash glazing rubber **25** and a supporting frame **27**. Frame **27** is guided for vertical sliding movement by means of guide ribs **28** formed integrally with the frame, the ribs being received in weatherstripped channels **30** formed by flanges **31** on the escape sash frame **15** and the lower fixed panel **18**, Figure 4. When the panel **17** is in its raised or closed position, the top rail of its frame **27** is engaged by lugs **32**, and weatherstripping **34** supported by a flange **35**, the lugs and flange projecting from the escape sash frame **15** as is best shown in Figure 2. Panel **17** may be maintained in any adjusted position by sash locks **37** which coact in a well-known manner with stops (not shown) on the escape sash frame.

Lower panel **18** is similar in construction to upper panel **17** and comprises laminated sheet glass **38**, sash glazing rubber **40** and a supporting frame **41**. Frame **41** is formed with a flange **42** at its bottom and two sides, and this flange is secured as by screws **44** to the escape sash frame **15** to maintain the lower panel in fixed relation thereto. The upper rail of frame **41** is provided with suitable weatherstripping **45** which engages the bottom rail of panel **17** when the latter is in closed position.

Below the window opening, within the side wall formed by the body panels **12** and posts **14**, is an empty space or well **47** which is open at its top so that it communicates with the window opening. The side rails **48** of the

window frame 11 extend down into this well as may be best seen in Figure 2. The escape sash frame 15 is vertically slidable in the window frame and is guided in such movement by means of guide ribs 50 and channels 51 on the sash frame side rails 20 which respectively coact with weatherstripped channels 52 and guide ribs 54 on the window frame side rails 48, Figure 4. Normally, the sash frame is maintained in window closing position in the window frame by means of a fastening mechanism 55, to be described in detail hereinafter, but in the event of an accident the fastening means can be released to permit the sash frame and its panels 17, 18 to drop as a unit into the well 47 and thereby clear the window opening for use as an emergency exit.

To facilitate assembly and repair of the window structure, the window frame side rails 48 are cut off just below the top of the well 47. However, extension rails 57 are provided in the lower part of the well, in vertical alignment with the rails 48, so that the escape sash will be guided throughout the total length of its downward movement. Rails 57 are secured to posts 14 as by screws 58 and are of substantially the same conformation as rails 48, being formed with channels 60 and guide ribs 61 corresponding to the channels 52 and ribs 54 on the rails 48, Figures 2 and 5. To retard the fall of the escape sash and prevent damage thereto, spring retarders 62 are mounted on extension rail guide ribs 60*a* to frictionally engage the sash frame as it approaches the bottom of the well. The ends of the retarders are supported by brackets 62*a* which permit limited lengthwise movement thereof so that the retarders can be flattened into the area between the guide ribs and surfaces 63, Figure 4, on the sash frame side rails 20 when engaged by the frame.

When the escape sash frame 15 is in its normal window closing position, a rib 64 on its top rail 21 engages a weatherstripped channel 65 in the window frame 11, Figure 2. The bottom rail 22 of the sash frame is provided at its inner side with weatherstripping 67 of some suitable material such as rubber, the stripping being formed with an inwardly projecting edge 68 which resiliently engages a sill member 70 secured to body panel 12. The outer or exterior side of the bottom rail 22 is resiliently engaged by the edge 71 of weatherstripping 72 mounted in a channel formed by an angle member 74 and reinforcing bar 75. This weatherstripping at the top and bottom of the sash frame, together with the engagement of guide ribs 50 with weatherstripped channels 52 at the sides of the frame, serves to maintain a weather tight seal between the frame and associated window structure.

The fastening mechanism 55 which normally maintains the escape sash 10 in window closing position comprises a catch 77 which engages the upper side of a box or channel 78 fixed to the top rail 21 of the sash frame, Figures 1, 2 and 8. The catch is formed at the lower end of a plate 80 which passes through an opening 81 in the body plate 12 forming the top of the window opening. Secured to the top of plate 12 is the catch releasing mechanism 82 comprising a bracket having a side wall 84 and end walls 85, the latter being formed with flanges 87 for attaching the bracket to the plate. The end walls 85 support the ends of a shaft 88, and pivotally mounted on this shaft are a pair of lever arms 90 which project upwardly from either end of the catch plate 80. Above the shaft 88, the arms 90 are offset inwardly and the upper ends thereof are connected by a cross member or handle 91.

The handle 91 is positioned adjacent the inner side of the body side wall, the body panel 12 being formed with a window 92 adjacent the handle so that it is accessible from within the vehicle. Window 92 is normally covered with a piece of glass 94 which is releasably secured in position by a rubber gasket 95. When it become necessary to release the catch, the glass is pushed out of the window and the handle 91 pulled downwardly so that the arms 90 are rotated in a clockwise direction, Figure 8, about shaft 88 and withdraw the catch from the sash frame. This permits the sash frame 15 and its panels 17, 18 to drop as a unit into well 47 as previously described. The catch 77 is urged in a counter-clockwise direction, or into engagement with the escape sash, by means of a spring member 97. The central portion of this member is caught under a tab 98 formed in the bracket side wall 84 while the end portions thereof are coiled for several turns around the shaft 88 and then caught behind the catch plate 80, as is most clearly shown in Figure 8.

It is desirable that it be possible to actuate the catch releasing mechanism from the exterior as well as the interior of the vehicle and, to this end, there is an outside window 100 giving access to a second handle 101 which can also be pulled downwardly to release the catch 77. Handle 101 connects a pair of arms 102 pivotally mounted on a pair of stub shafts 104 respectively supported by the bracket end walls 84. Below the shafts 104, the arms are formed with lugs 105 which abut against lugs 107 on arms 90, the lugs being normally maintained in contact by means of adjustable set screws 108 which pass through the bracket side wall 84. With this arrangement, when the handle 101 is pulled downwardly, arms 102 and lugs 105 are rotated in a counter-clockwise direction forcing the lugs 107 and arms 90 to be rotated in a clockwise direction to withdraw the catch from the sash frame.

From the foregoing description it will be apparent that the invention disclosed herein provides a novel and very practical emergency exit window having wide application in stationary structures as well as in vehicles of many types. The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The embodiment disclosed is therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims.

What I claim is:

1. In an emergency exit window structure, a side wall formed with a window opening, a well in said wall positioned below said opening and in communication therewith, a window frame mounted in said opening, said frame having side rails formed with guide channels extending down into said well, a sash frame positioned in said window frame and having guide ribs slidably mounted in said side rail channels, a single pivotally mounted catch member at the top of said window frame engageable with the top of said sash frame to hold the latter in window closing position in the window frame, and pivotally mounted actuating means associated with said catch member and operable to release said sash frame from window closing position to permit it to slide down said rails into said well and thereby clear the window opening for use as an emergency exit.

2. In an emergency exit window structure a side wall formed with a window opening, a well in said wall positioned below said opening and in communication therewith, a window frame mounted in said opening, said frame having side rails extending down into said well, a sash frame positioned in said window frame and slidably mounted on said side rails, said sash frame and side rails having coacting channel and rib members to guide said slidable movement, means to normally hold said sash frame in window closing position in said window frame including a pivotally mounted catch member at the top of said window frame engageable with the top of said sash frame, and means to release said sash frame from window closing position to permit it to slide down said rails into said well and thereby clear the window opening for use as an emergency exit, said release means being operably connected to said catch member and accessible from either side of said side wall.

3. Structure as defined in claim 2 together with re-

silient retarding members yieldably secured to said side rails to retard the fall of said sash frame.

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