May 9, 1939. R. B. NELSON 2,157,425

WINDOW CONSTRUCTION

Filed April 24, 1937 2 Sheets-Sheet 1

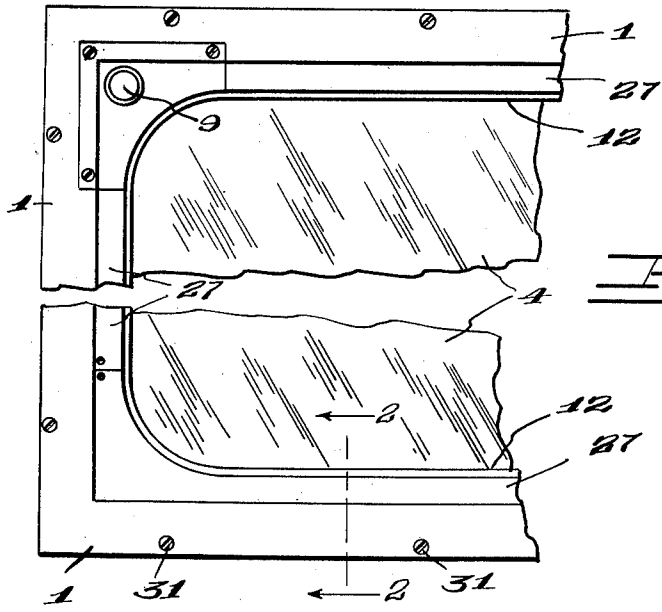


Fig-1-

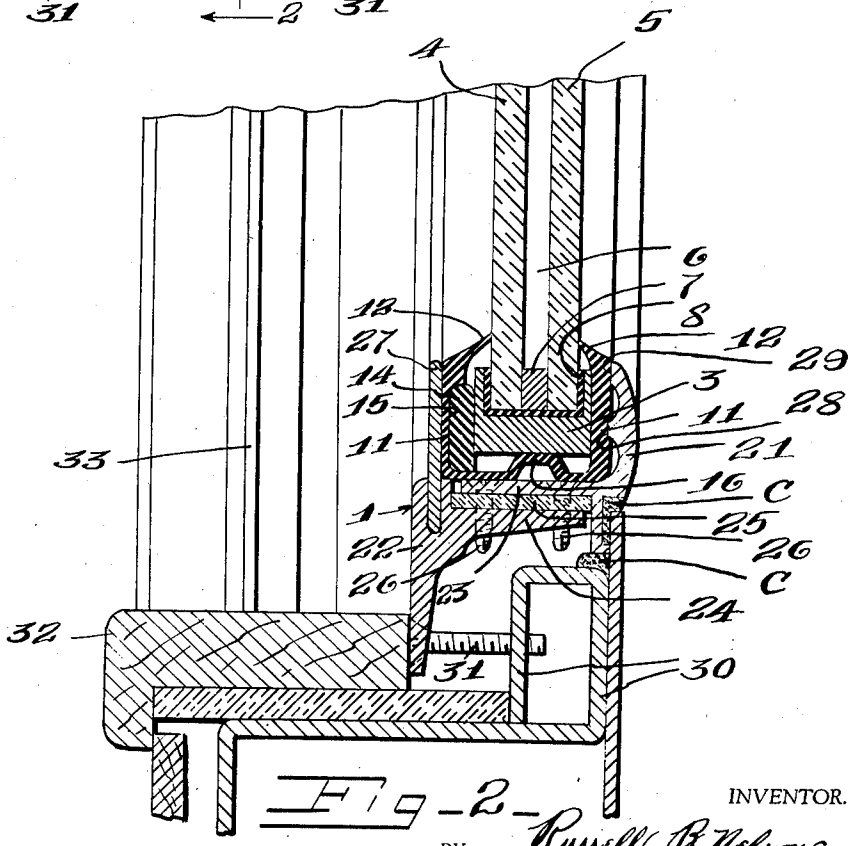


Fig-2-

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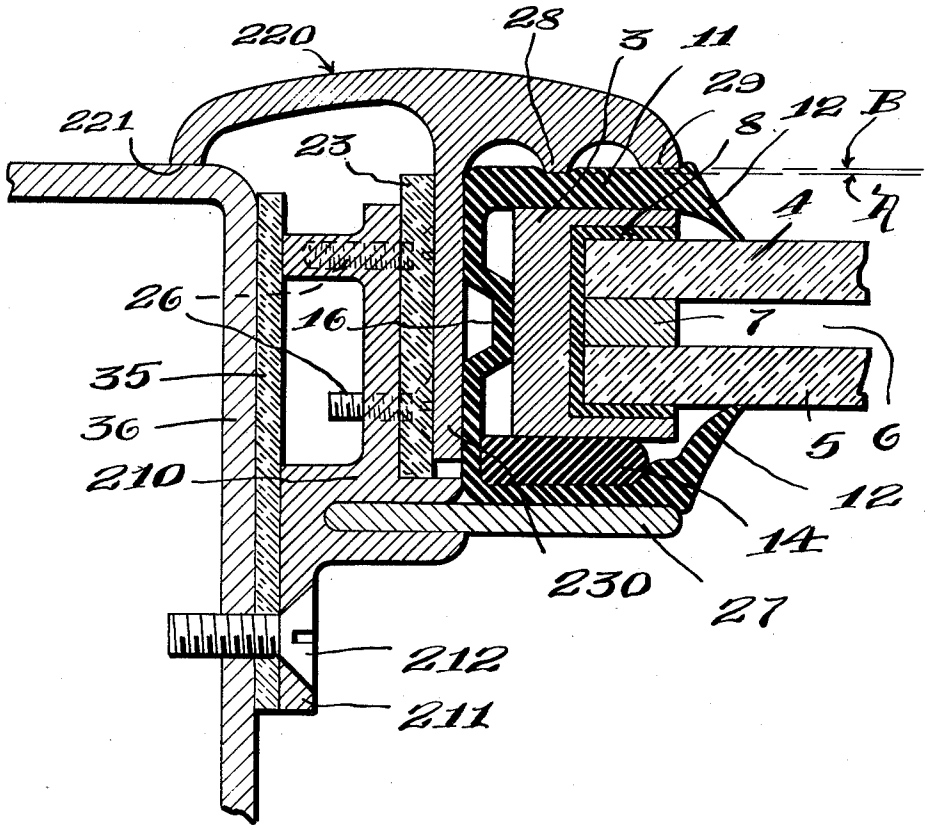


Fig. 3

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UNITED STATES PATENT OFFICE

2,157,425

WINDOW CONSTRUCTION

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Application April 24, 1937, Serial No. 138,831

9 Claims. (Cl. 189—64)

This invention relates to window constructions, particularly for fast moving vehicles, as the air conditioned cars of a streamline train, and has for its object a particularly simple, economical and efficient means for cushioning the sash against transverse shocks and edgewise shocks.

It further has for its object a window construction in which the sash is entirely relieved of strains, due to irregularities and distortion in the vehicle body around the window opening and the sash is so mounted in the window frame as to be cushioned against shocks and against strains, due to weaving and distortion of the vehicle body and against strains due to the securing or clamping of the sash in the window frame, or, in other words, a window construction in which any variations in the car construction are taken up between the window construction and the car construction by gasket means between the window frame and the car body, and the sash so mounted in the frame, that it is not subject to strains and shocks and remains in a true plane.

It further has for its object the shock relieving means combined with sealing means for sealing the sash frame, particularly sashes in which two glass panes are mounted and spaced apart forming a space between them for dehydrated air or a gas, or air containing a gas for preventing clouding of the glass panes.

It further has for its object a window frame construction by which an exchange of heat between the outside of the frame to the inside is prevented, and also a construction by which the window frame is heat insulated from the metallic car body.

It also has for its object a construction in which the sash or the glass thereof is so mounted as to be cushioned against lateral and edgewise shocks and the clamping strains holding the sash frame in the window frame are transmitted transversely through the sash frame outside of the glass area and not through the glass area.

Other objects appear throughout the specification.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is a fragmentary elevation of a window frame embodying this invention.

Figure 2 is an enlarged sectional view on the plane of line 2—2, Figure 1, the contiguous portion of the walls of the car structure being shown.

Figure 3 is a transverse sectional view through the sash frame illustrating another form of sash embodying the invention, the contiguous part of the vehicle body around the window opening being also shown.

1 designates the window frame generally, this being formed with a channel for receiving a sash frame 3. The sash frame 3 is also formed with a channel for receiving the margins of the glass of the sash. In the window here shown, there are two glass panes 4, 5 spaced apart which provide a space 6 between them. The margins of the glass panes 4, 5 are seated in a channel in the frame 3 with a spacer 7 between them. Also, a U-shaped sealing strip 8 of rubber is interposed between the walls of the channel of the frame 3 and the glass panes. The corners of the channel 2 are rounding but the window frame is squared at the corners, in order to fit the rectangular window opening of the vehicle body. In one or more of the square corners may be located a chamber 9 communicating with the space 6 between the glass panes for changing the air or the gas between the panes, or this chamber 9 may be provided with a moisture absorbing material. This feature forms no part of the invention.

The sash frame 3 may be of any suitable construction and is formed in sections which are separable for permitting placement, removal and replacement of the glass. This feature forms no part of the invention, and one construction of the sash frame is shown in the patent to Fox et al. No. 2,054,856 issued September 22, 1936.

11 is a U-shaped weather strip usually of extruded rubber, this fitting the channel of the window frame and embracing the sash frame 3 and extending beyond the edges of the sash frame and pressing against the glass panes at 12 and serving to seal the joint between the glass panes and also to shield the joint between the U-shaped strip 8 and the glass panes.

The feature of this invention for relieving the sash of shocks and strains includes two elements. 14 designates one of these elements and 16 the other element. The element 14 is a cushioning strip usually formed of sponge rubber. It is interposed between one side of the sash frame 3 and the opposing wall of the channel of the window frame, it being preferably located within the U-shaped weather strip 11, one side of the U formation of which is preferably formed with a recess at 15 for receiving the cushioning strip 14. The cushioning strip extends to the bottom

of the channel of the U formation but terminates short of the top of the U formation and short of the top or open side of the channel of the window frame. This strip 14 is so located as to take direct shocks in one direction, as to the left. (Figure 2) and to re-act against the shocks or to take the back-bound of shocks to the right (Figure 2).

The other element 16 of the shock relieving or absorbing means for relieving or absorbing the shocks of the sash in an edgewise direction is interposed between the edge of the sash frame 3 and the bottom of the channel of the window frame and is preferably of less width than the bottom of the channel of the window frame. It is here shown as a hollow rib or corrugation extending lengthwise of the bottom of the channel of the window frame between the sides of the U formation of the weather strip 11, the corrugation providing enough cushioning effect or resiliency to absorb the shocks or relieve the sash of edgewise shocks. The U-shaped weather strip 11 is usually of extruded rubber, and therefore, the hollow corrugation provides an easier yielding effect than a solid block of extruded rubber.

The walls of the U-shaped weather strip provide little cushioning effect, when held tightly between the sash frame and the walls of the channel of the window frame, but are practically incompressible when so clamped between surfaces of comparatively large areas, and act as a gasket. However, the strip 14, which is usually sponge rubber, is always compressible and capable of yielding locally in any spot or area, and this quality is not destroyed when the strip is clamped throughout its surface area. It does not act as a gasket. The same is true of the element 16. Therefore, the sash frame may be tightly clamped in the channel of the window frame without the gasket or packing effect and have a floating movement transversely and edgewise.

The frame 1 comprises two laterally separable sections or outer and inner sections 21, 22, one of these sections, as the section 21, being provided with a flange 23 forming the bottom of the channel 2, and the other section, as the inner section 22, being formed with a corresponding flange 24 lapping the flange 23. The two flanges are separated by a heat insulating strip 25. The sections 21, 22 are detachably secured together, preferably by fastening members, as screws 26, extending through the flanges 23, 24 and the interposed insulating strip 25. The inner section 21 is formed with the demountable section or glazing strip 27 forming one side of the channel 2, it being demountable for the purpose of assembling the sash with the weather strip 11 thereon in the window frame. The strip 27 is secured to the window frame or section 22 outside or beyond the bottom of the channel in which the sash frame is located and the side of the channel opposite the strip 27 is formed with grooves providing an intermediate rib 28, which is slightly higher than the surface 29 at the inner edge of this wall of the channel, as indicated by the lines A and B in Figure 3. The rib 28 presses against the strip 11 in a transverse direction located in a line outside of the glass area, so that the transverse strains are transmitted through the solid portion of the sash frame outside of the glass area, and hence, the glass relieved of transverse strains.

As seen in Figure 3, a heat insulated strip 35 is interposed between the window frame and the car framing 36 or box post structure around the window opening, and in the construction shown in Figure 3, the outer section 220 of the window frame is T-shaped, the head of the T formation bearing at one edge at 221 on the car body or post structure and at its other edge pressing lightly against one side of the U formation of the strip 11. The leg of the T formation provides the flange 230 corresponding to the flange 23 (Figure 2). The flange of the inner section is opposed to the wall of the post structure around the window opening and insulated therefrom by the strip 35. The section 210 is also formed with a groove for receiving the glazing strip 27 and also with a flange 211 by means of which it is secured to the post structure, as by screws 212. The outer section 220 is secured to the inner section 210 in the same manner, as in Figure 2, as by screws 26, extending through the flange 230, the interposed strip 25 and into the section 210. By either of the constructions shown in Figures 2 or 3, no attaching screws are exposed on the outside of the car body, and no screws on the inside in the construction shown in Figure 2, as the heads of screws 31 are concealed by the sill 32 and curtain guides 33. In the construction shown in Figure 3, the screws 212 are inconspicuous and not exposed on the inner face of the sash frame. The strip of insulation 35 also serves to compensate for variations in the window openings.

As here shown, the cushioning strip 14 is located in the portion of the channel adjacent the removable strip 27.

In Figure 2, 30 designates the framing of the vehicle body around the window opening and the window frame is secured in the window opening or to the framing 30 in any suitable manner, as by screws 31, extending through the section 22 of the window frame 1 and into the framing 30. Additional parts of the car body are also shown including a sill 32 and curtain guides 33. The window frame may be sealed in the window opening in any suitable manner, as by plastic cement or gasket C.

The insulating strip 25 prevents the exchange of heat between the sections 21 and 22.

By this construction, not only is the sash sealed in the window frame, particularly a double sash, but also the sash is cushioned against transverse and edgewise shocks, due to the cushioning strip elements 14, 16 without breaking the seal or opening the crevices by which the space between the glass panes will be open to the inlet of the outer air or the exhaust of the treated air or medium between the glass panes.

The use of the so-called glazing strip in the manner shown and described prevents uneven pressure against the sash frame which would otherwise be applied, if screws were used, due to varying tightening of the screws. The use of the strip 14 and its location on the inner side of the frame not only absorbs transverse shocks generally but also absorbs shocks due to sudden air pressure placed on the window glass, as when two trains are passing.

What I claim is:

1. In a window construction, the combination with a window frame formed with a channel, and a sash frame mounted in the channel and having means for receiving the margins of the glass of the sash, and a resilient cushion strip between one side of the sash frame and the opposing wall of the channel for relieving the sash frame of

transverse shocks, and additional cushioning means, located between the edge of the sash frame and the bottom of the channel, for relieving the sash frame of edgewise shocks.

2. In a window construction, the combination with a window frame formed with a channel, and a sash mounted in the channel and having means for receiving the margins of the glass of the sash, a U-shaped weather strip located in the channel between the sash frame and the walls of the channel, said strip enclosing the sash frame, and a resilient cushioning strip in the channel and extending along one of the sides of the U formation of the weather strip for relieving the sash frame of transverse shocks.

3. In a window construction, the combination with a window frame formed with a channel, and a sash frame mounted in the channel and having means for receiving the margins of the glass of the sash, a U-shaped weather strip located in the channel between the sash frame and the walls of the channel, said strip enclosing the sash frame, and a resilient cushioning strip in the channel and extending along one of the sides of the U formation of the weather strip for relieving the sash frame of transverse shocks, and a resilient element extending lengthwise of the bottom of the U formation of the weather strip for relieving the sash frame of edgewise shocks.

4. In a window construction, the combination with a window frame formed with a channel, and a sash frame mounted in the channel and having means for receiving the margins of the glass of the sash, and a weather strip located in the channel of the window frame, said strip being U-shaped in cross section and enclosing the sash frame, and a resilient cushioning strip between one side of the sash frame and one of the walls of the U formation for relieving the sash of lateral shocks.

5. In a window construction, the combination with a window frame formed with a channel, and a sash frame mounted in the channel and having means for receiving the margins of the glass of the sash, and a weather strip located in the channel of the window frame, said strip being U-shaped in cross section and enclosing the sash frame, a resilient cushioning strip between one side of the sash frame and one of the walls of the U formation for relieving the sash of lateral shocks, and an additional cushioning strip between the edge of the sash frame and the bottom of the channel for relieving the sash frame of edgewise shock.

6. In a window construction, the combination with a window frame formed with a channel, and a sash frame mounted in the channel and having means for receiving the margins of the glass of the sash, and a weather strip located in the channel of the window frame, said strip being U-shaped in cross section and enclosing the sash frame, a resilient cushioning strip between one side of the sash frame and one of the walls of the U formation for relieving the sash of lateral shocks, an additional cushioning strip between the edge of the sash frame and the bottom of the channel for relieving the sash frame of edgewise shock, the latter cushioning strip being a hollow corrugation provided on the bottom of the U-shaped weather strip.

7. In a window construction, the combination with a window frame formed with a channel, and a sash frame mounted in the channel and having means for receiving the margins of the double, spaced apart glass panes, and a weather strip located in the channel of the window frame, said strip being U-shaped in cross section and enclosing the sash frame, the margins of the sides of the U formation extending beyond the inner edges of the sash frame and pressing against the outer faces of the panes, a resilient cushioning strip between one side of the sash frame and one of the walls of the U formation for relieving the sash of lateral shocks.

8. In a window construction, the combination with a window frame formed with a channel, and a sash frame mounted in the channel and having means for receiving the margins of the double, spaced apart glass panes, and a weather strip located in the channel of the window frame, said strip being U-shaped in cross section and enclosing the sash frame, the margins of the sides of the U formation extending beyond the inner edges of the sash frame and pressing against the outer faces of the panes, a resilient cushioning strip between one side of the sash frame and one of the walls of the U formation for relieving the sash of lateral shocks, the bottom of the U-shaped strip being provided with a cushioning strip for relieving the sash of edgewise shocks.

9. In a window construction, the combination of a window frame formed with a channel, and a sash frame mounted in the channel and having means for receiving the margins of the glass of the sash, and a weather strip located in the channel of the window frame and being U-shaped in cross section and enclosing the sash frame, a cushioning strip in the channel arranged to receive transverse shocks, one side wall of the channel being removable and the other wall of the channel being formed with a rib midway between the bottom and the outer edge of said wall and located to receive and transmit strains transversely through the sash frame outside of the edges of the glass of the sash.

RUSSELL B. NELSON.