

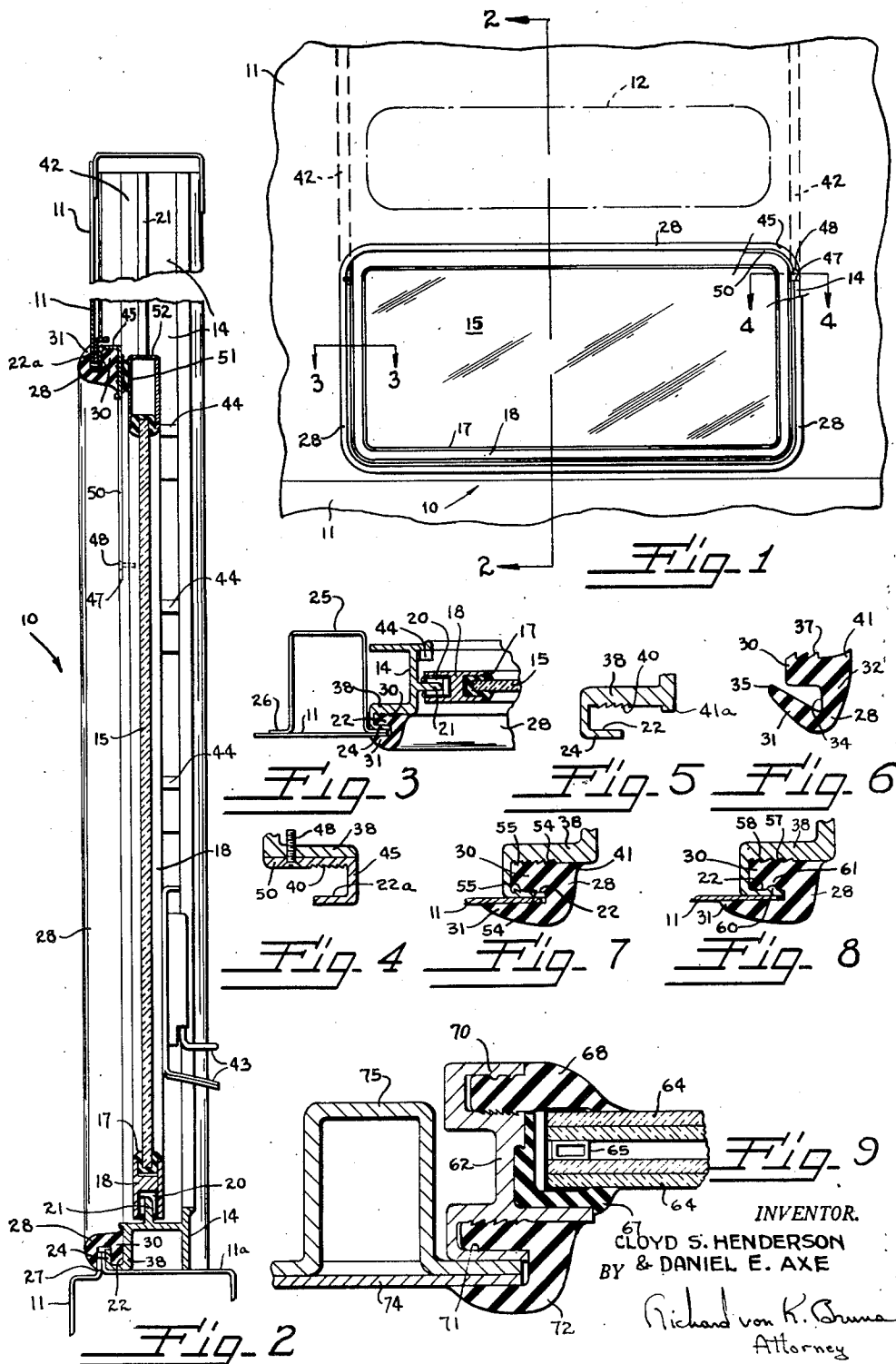
April 2, 1957

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2,787,347

UNIT FRAME MOUNTING MEANS

Filed Oct. 12, 1953



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UNIT FRAME MOUNTING MEANS

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Application October 12, 1953, Serial No. 385,498

3 Claims. (Cl. 189—64)

This invention relates to window constructions for vehicles such as busses, railway cars and the like, and has particular reference to an improved unit frame mounting means for such window constructions.

Heretofore, it has been the practice of manufacturers of busses, railway cars, taxi cabs and the like to purchase their window frame and sash requirements in disassembled form and to assemble them in their vehicles as the latter neared completion. This practice had numerous disadvantages, among which were the high cost of labor in assembling and installing the frames and sash and the frequent failure of the window assembly to operate satisfactorily after having been installed. Thus, even though the frame and sash elements had been carefully manufactured to close tolerances for specified window openings by the supplier, distortion of the window openings due to welding or riveting of the vehicle panels or improper installation, or both, caused poor operation of the window assembly, as for example where it contained a movable sash.

To eliminate some of the disadvantages of the above-described installation method, the more recent practice has been to install the frame and sash as an assembled unit furnished in properly assembled form by the supplier. This, of course, in the case of a movable sash, insures that the sash will raise or lower or otherwise move as it should. The conventional way of attaching these window assemblies at the present time is to secure them by screws or rivets to the panels or posts surrounding the window openings in the vehicle. This latter procedure, however, entails further difficulties because the vehicle has already been painted by the time the window assemblies are installed and the operation of riveting or screwing invariably results in mars or scratches in the finish whenever a workman is the least bit careless. And since the mars and scratches must be touched up after the window assembly has been installed, more man-hours are required to do the job and the cost is higher than it should be. It should be noted at this point, perhaps, that the reason the vehicle must be painted before the installation of the window assemblies is because if the latter were installed first they would have to be completely masked which is time consuming and expensive. In addition, the paint baking oven might cause distortion in the glass or cause the plastic safety sheet between the glass plates to cloud over.

The present invention overcomes the aforementioned problems and difficulties by providing a very simple unit frame mounting means whereby a frame and sash assembly may be quickly and easily secured as a unit in a window opening without the use of fastening screws or rivets. Briefly stated, this improved mounting means comprises a window frame assembly formed with a continuous external retaining channel or groove and a resilient retaining strip which compressively engages the channel and adjacent vehicle panels to hold the frame and its sash assembly in installed position. Since no

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screws or rivets are needed and the actual holding member is of resilient material, the window assembly can be installed with a minimum amount of damage to the finish of the freshly painted vehicle. Furthermore, the installation can be accomplished in a fraction of the time required by present methods and the job can be done by an unskilled worker so that the saving in labor costs is substantial. The invention also greatly facilitates the replacement or repair of the window assemblies whenever such becomes necessary, and this ease of replacement or repair enables maintenance time and expense to be kept at a minimum. An additional advantage of the improved mounting means that is very important is that the window assembly is flexibly mounted with respect to the vehicle body which means that any twisting or distortion in the body due to bumpy roads is not transmitted to the assembly as is the case when the latter is rigidly mounted. This, of course, eliminates any serious distortion in the unit frame and thus insures ease of sash operation and minimum glass breakage.

With the foregoing and other considerations in view, it is the primary object of this invention to provide an improved and greatly simplified mounting means for securing a unit window frame and its sash assembly in a window opening.

A more specific object of the invention is to provide a unit frame mounting means which eliminates the need for fastening screws, rivets or the like.

Another object of the invention is to provide an improved mounting means which enables a unit frame to be quickly and easily mounted in a window opening by unskilled labor.

A further object of the invention is to provide an improved unit frame mounting means which enables the frame and its sash assembly to be quickly and easily removed from the window opening to permit replacement or repair.

Other objects and advantages of the invention will become apparent from the following detailed description read in conjunction with the accompanying drawings, and from the appended claims. The accompanying drawings, in which like reference numerals are used to designate similar parts throughout, illustrate typical embodiments for the purpose of disclosing the invention. The drawings, however, are not to be taken in a limiting or restrictive sense since it will be apparent to those skilled in the art that various changes in the illustrated constructions may be resorted to without in any way exceeding the scope of the invention.

In the drawings:

Figure 1 is a side elevation of a unit frame and sash assembly mounted in a vehicle window opening in accordance with the improved mounting means of the invention, the elevation being taken from the outside of the vehicle.

Figure 2 is a vertical section taken along line 2—2 of Figure 1.

Figure 3 is a horizontal section taken along line 3—3 of Figure 1.

Figure 4 is a horizontal section taken along line 4—4 of Figure 1.

Figure 5 is an enlargement of the frame retaining channel section illustrated in Figure 3.

Figure 6 is an enlargement of the retaining strip section illustrated in Figure 3.

Figure 7 is an enlarged transverse section through a modified form of the frame retaining channel and retaining strip.

Figure 8 is an enlarged transverse section through another modification of the frame retaining channel and retaining strip.

Figure 9 is a transverse section illustrating the manner in which the mounting means of the invention might be applied to a different type of unit frame and sash assembly than that shown in Figures 1-3.

Having reference now to the drawings, and in particular to Figures 1, 2 and 3, the assembled unit frame and sash assembly are indicated generally at 10 in Figure 1, and are shown as they might be mounted in the window opening of a vehicle such as a bus. Surrounding the window assembly 10 are panels 11 comprising the exterior wall of the bus, and indicated above the window assembly at 12 is a conventional standee window, the construction of which plays no part of this invention.

The unit frame 14 is preferably formed of some material such as extruded aluminum, and may have a cross section as indicated in Figures 2 and 3 for a single glazed movable sash. It should be understood, however, that other than as hereinafter specifically pointed out, the frame may have any conformation necessary to support single or double glazed, fixed or movable sash, and it is not intended that the invention be confined to any particular frame conformation or sash arrangement. As illustrated for the purposes of disclosure, the sash assembly in Figures 1-3 is a single glazed, movable sash comprising laminated sheet glass 15, sash glazing rubber 17 and a sash frame 18, all of which are conventional. Sash frame 18 is provided with weather stripping 20 which receives the guide rib 21 on the frame 14.

In accordance with the invention, the unit frame 14 is provided with a channel forming extension which projects outwardly from the frame towards the exterior of the bus or other vehicle. This extension is made integral with the unit frame either by fixedly securing a separate extension element to the frame or by forming the frame and extension from a single piece of material. The extension in either case forms a continuous retaining channel 22 adjacent the periphery of the window opening when the frame is mounted therein. Channel 22 opens towards the center of the window opening and has an outer wall 24 that is substantially parallel to the plane of said opening.

The window opening of the bus or similar vehicle is defined by the structural members thereof as for example the adjacent side post 25, Figure 3, and bordering panels 11 which may be secured to outwardly turned flanges 26 on the post as by welding. The bottom of the window opening may be defined as shown in Figure 2 by outer and inner panels 11 and 11a, respectively, welded or otherwise secured together as at 27. The unit frame 14 and its sash assembly are inserted in the window opening from the interior of the vehicle and the outer wall 24 of the retaining channel 22 is positioned against the marginal portions of the posts and panels adjacent the window opening. The frame and sash assembly are securely held in this position by means of a resilient retaining strip 28 of some suitable material such as rubber, which strip compressively engages the outer channel wall 24 and marginal portions of the posts and panels in the manner described hereinafter.

Referring now particularly to Figure 6 wherein the retaining strip 28 is shown in section, it will be seen that the strip is substantially U-shaped or C-shaped in cross section and comprises a pair of legs 30, 31 joined together by a back portion 32. The legs and back portion define a channel or groove 34 between the legs, and the strip is of such material and so formed that the end 35 of leg 31 is resiliently biased towards leg 30 so that the open side of groove 34 is considerably narrower than the closed side thereof when the strip is in its normal condition. Leg 30 is substantially equal in thickness to the width of the retaining channel 22 and is provided on one side thereof with a series of projections or barbs 37. The inner wall 38, Figure 5, of channel 22 is similarly provided with a series of barbs 40 which, however, project in a direction opposite to that of the barbs 37 on the strip.

When the frame and sash assembly are positioned in the window opening with outer channel wall 24 abutting the marginal portions of the posts and panels adjacent the opening as above described, the leg 30 of strip 28 is inserted in the channel 22 in such a manner that the outer channel wall 24 and marginal portions of the vehicle structural members extend into groove 34 and leg 31 is forced outwardly to overlie the outer surfaces of the panel marginal portions as is best shown in Figures 3 and 9. Since the projections or barbs 37, 40 on leg 30 and channel wall 38 are oppositely disposed, it will be apparent that barbs 37 will slide over barbs 40 while leg 30 is being positioned in the channel but will interlock when the leg is inserted all the way. This interlocking action, which is aided by the fact that leg 30 must be slightly compressed to get it into the channel, serves to effectively hold the leg in inserted position and prevent its removal except by deliberate, positive action. At the same time, the leg 31 which overlies the outer surfaces of panels 11 will tend to squeeze or compress the outer channel wall 24 and panels together since it is normally resiliently biased inwardly as shown in Figure 6. Thus the double holding action resulting from the coaction of channel, structural members and retaining strip serves, when the strip is applied around the periphery of the window opening, to securely mount the unit frame and sash assembly in the opening without the use of screws, rivets or the like. Retaining strip 28 is also provided with a projecting lip 41, Figure 6, at the inner corner thereof, and when the strip is properly inserted in channel 22 this lip will fit below a narrow flange 41a, Figures 2 and 5, on the inner wall 38 of the channel and will insure an effective seal between the strip and channel and prevent any moisture from gaining entrance into the channel or between the latter and the adjacent vehicle structural members. Flange 41a serves to indicate to a workman that the retaining strip 28 is properly inserted when the lip 41 fits therebelow, and, in addition, coats with the barbs 37, 40 to hold the strip securely in position. It should also be noted here that the outer leg 31 of strip 28 functions as a suitable outer finish or garnish moulding around the window assembly as well as exerting a compressive holding force on the channel and panels.

Since the construction illustrated in Figures 1-3 provides for a vertically movable sash assembly, the sides or uprights of the unit frame 14 must extend above the top of the window opening as indicated at 42 to provide a guide for the sash as it is raised and lowered. The sash may be moved and adjusted in any desired position by well known means, as for example by levers 43 mounted on sash frame 18, which levers actuate a pawl (not shown) engageable with stops 44 on the frame uprights. In order to permit the frame uprights to extend above the window opening as guides, and at the same time provide a continuous retaining channel adjacent the periphery of the window opening as called for hereinabove, a separate channel forming extension 45 is mounted between the frame uprights adjacent the top of the window opening and this extension or rail provides a channel 22a, Figures 2 and 4, which communicates with and forms a continuation of the channel 22. While the major portion of rail 45 is straight and extends horizontally between the frame uprights, the end portions thereof are curved downwardly in an arc of substantially the same radius as the arc at the corners of the window opening, Figure 1, and the downwardly extending ends are secured to the frame uprights at 47 as by screws 48 or rivets. The inner wall 50 of the channel 22a is substantially thinner than the inner wall 38 of channel 22, and the latter is therefore milled away above points 47 an amount equal to the thickness of wall 50, as may be best seen in Figures 2 and 4, so that the respective inner walls of channels 22 and 22a will lie in the same plane. As shown in Figure 2, rail 45 may be provided with

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weatherstripping 51 abutting the top rail 52 of the sash frame 18. It will be apparent that in the case of a fixed sash assembly a construction that is somewhat simpler than that just described will suffice. For example, with a fixed sash the extended guides and sash lifting means will be unnecessary, and the top of the frame will correspond to the bottom and sides thereof and will engage the top rail 52 of the sash frame. In such a construction, the retaining channel can be made to extend continuously around the unit frame without the need for a separate channel top rail as described hereinabove.

A modified form of channel and retaining strip is shown in Figure 7 wherein the inner surfaces of both channel walls are provided with projecting barbs 54, and the leg 30 of retaining strip 28 is correspondingly provided with oppositely projecting barbs 55 on both sides thereof. A further modification is shown in Figure 8 wherein the inner surface of one channel wall and one side of leg 30 are provided with coacting barbs 57, 58, respectively, while the inner surface of the opposite channel wall is provided with a single continuous rib 60 which is received in a corresponding groove 61 on the opposite side of leg 30. As will be readily understood, the additional interlocking means of the above-described modifications result in exceptionally good holding characteristics for application where such may be necessary or desirable.

In Figure 9 the mounting means of the invention is shown as it might be applied to a window assembly for a railway car. In this application, the frame unit 62 is adapted to support a double glazed, fixed sash assembly comprising a pair of laminated glass panels 64 separated by a spacer element 65 and held in position by weatherstripping 67 and a retaining strip 68 positioned in channel 70. As in frame unit 14, the frame 62 is provided with an outwardly extending retaining channel 71 which coacts with a retaining strip 72, panel 74 and posts 75 as described hereinbefore to securely mount the frame and sash assembly in the window opening. Since the frame and sash construction shown in Figure 9 would normally be larger and heavier than that disclosed in Figures 1 and 3, its retaining strip 72 and channel 71 would, of course, also need to be proportionately larger in order to support the added weight.

From the foregoing description it will be apparent that the present invention provides a greatly improved unit frame mounting means which may be adapted to securely yet flexibly mount any type of frame and sash assembly in a vehicle window opening. Since this novel mounting means is of relatively simple construction and eliminates the need for fastening screws, rivets or the like, it permits easy, low cost window installation with a minimum amount of damage to the finish of a freshly painted vehicle. This invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The embodiments disclosed are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims.

What is claimed and desired to be secured by U. S. Letters Patent is:

1. In a mounting means for detachably securing a unit window frame and sash assembly in a vehicle window opening without the use of screws, rivets or the like, said window opening being bordered by vehicle body panels;

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a continuous window frame having top, bottom and side rails, a continuous retaining channel formed with the rails of said window frame on the exterior side thereof, said frame being positioned inwardly of said window opening with the outer wall of said channel abutting the inner surfaces of the marginal portions of the panels bordering said window opening; and a resilient retaining strip of substantially U-shaped cross section having a first leg, a second leg the free end of which is resiliently biased towards the first leg and a relatively thick back portion joining said legs together, said first leg being positioned in said window frame channel and said second leg extending over the edges of the channel and said abutting body panels and overlying the outer surfaces of the latter to hold said channel and panels together whereby the outer channel wall and marginal portions of said panels are confined between the legs, said second leg being of sufficient size to compress said channel and marginal portions into tight engagement and securely yet resiliently support said unit frame and sash assembly in the window opening.

2. Structure as defined in claim 1 together with coacting holding means on said first retaining strip leg and said channel walls to maintain said leg in position in said channel.

3. In a mounting means for detachably securing a unit window frame and sash assembly in a vehicle window opening without the use of screws, rivets or the like, said window opening being bordered by vehicle body panels; a continuous window frame having top, bottom and side rails, a continuous retaining channel formed with the rails of said window frame on the exterior side thereof, said channel being located outwardly of the main plane of the sash assembly mounted in the window frame, said frame being positioned inwardly of said window opening with the outer wall of said channel abutting the inner surfaces of the marginal portions of the panels bordering said window opening; and a resilient retaining strip of substantially U-shaped cross section having a first leg, a second leg the free end of which is resiliently biased towards the first leg and a relatively thick back portion joining said legs together, said first leg being positioned in said window frame channel and said second leg extending over the edges of the channel and said abutting body panels and overlying the outer surfaces of the latter to hold said channel and panels together whereby the outer channel wall and marginal portions of said panels are confined between the legs, said second leg being of sufficient size and resiliency to compress said channel and marginal portions into tight engagement and securely yet resiliently support said unit frame and sash assembly in the window opening; and coacting engaging means to fixedly maintain said retaining strip in position in said frame channel comprising an upwardly projecting lip on the strip and a flange on said frame overlying said lip.

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