

Description

BACKGROUND OF THE INVENTION

The present invention relates to a window structure of a vehicle, and more particularly to a window structure for a railway car, in which a window glass is adapted to be applied to a window opening portion of a body composed of upper and lower frame members, right and left pillar members and corner members.

In railway cars, since a window opening portion of a vehicle body is subjected to various forces which cause strains at the window opening portion due to distribution loads imposed on a vehicle body floor, machine loads under the body floor, body end loads imposed on connecting means, reaction forces from chassis to frame members and the like, it is necessary to construct the window opening portion to have rigidity and mechanical strength enough to withstand these forces.

In the conventional window opening portion of the vehicle body, as shown in Figs. 7 and 8, a window frame assembly having a glass 1 fitted in and along a frame body 3 through a glass seal rubber 2 is mounted by mounting screws 4 through a vehicle body outer panel 5 onto upper and lower frame members 6 and right and left side pillar members 7 which constitute the vehicle body window opening portion. Accordingly, when various loads imposed to the vehicle body are applied to the opening portion constituting components such as the upper and lower frame members 6 and right and left side pillar members 7, although the opening portion constituting components share parts of the imposed loads, the imposed loads are substantially applied to corner outer panel portions 8 as best shown in Fig. 9. As a result, strains are generated at the corner outer panel portions 8. To eliminate the strains, as shown in Figs. 11 and 12, attempt is made to provide corner reinforcing members 9 at the corner outer panel portions 8, thereby obtaining satisfactory rigidity and mechanical strength over the entire window opening portion as well as at the corner outer panel portions 8.

On the other hand, in order to maintain a water- and air-tight effect of the vehicle body interior and to ensure the seal effect for sealing the outer peripheral edges of the frame body 3 against the vehicle body outer panel 5 with seal members 10, it is necessary to shorten an interval of the mounting screws 4 of the frame body 3 as shown in Figs. 13 and 14. Therefore, screw seats 11 for the mounting screws 4 must be provided inside of the corner outer panel portions. Such an arrangement is intricate.

Furthermore, in the conventional arrangement, it is very complicated to carry out a maintenance

work for the seal portion due to, for example, damages of the seal members 10 after the sealing work between the frame body 3 and the vehicle body outer panel 5 with the seal members 10. Thus, the conventional arrangement suffers from various disadvantages.

SUMMARY OF THE INVENTION

An object of the present invention is to overcome the above-noted various disadvantages inherent in the conventional arrangement in which a window frame assembly is mounted onto a window opening portion of a vehicle body by mounting screws.

The present invention provides a window structure provided on the framework of a vehicle, in which framework there are respective corner members at the junctions of upper and lower framework members with left and right framework members, characterized in that the window structure comprises a window opening defined by:

the upper and lower framework members, the left and right framework members and respective corner members; at the junctions of the upper and lower framework members with the left and right framework members, each being formed with an inner wall bounding the window opening,

a projecting edge integrally formed on the upper and lower framework members, on the left and right framework members, and on the corner members along one side edge of the inner wall,

a groove formed along the opposite side edge of the inner wall,

and a pane retainer located in the groove, the pane being held at its circumference between the projecting edge and the pane retainer.

In such a structure, no conventional screws are needed and the window opening has rigidity and mechanical strength sufficient to withstand various loads transmitted thereto from the vehicle body. At the same time, this makes it possible to considerably simplify the window assembling work and structure.

Further developments in line with the claimed invention are referred to in the dependent claims.

BRIEF DESCRIPTION OF THE DRAWING

In the accompanying drawings:

Fig. 1 is an inside view of a window structure according to the present invention;

Fig. 2 is an side elevational cross-sectional view taken along the line II-II OF FIG. 1;

FIG. 3 is a transverse cross-sectional view taken along the line III-III of Fig. 1;

Fig. 4 is an enlarged view of a corner portion shown in Fig. 1;

Fig. 5 is a cross-sectional view taken along the line V-V of Fig. 4;

Fig. 6 is a partially fragmentary perspective view of the corner portion shown in Fig. 1;

Fig. 7 is an outside view of a window structure according to the prior art;

Fig. 8 is a cross-sectional view taken along the line VIII-VIII of Fig. 7;

Fig. 9 is an enlarged view of a corner portion shown in Fig. 7;

Fig. 10 is a cross-sectional view taken along the line X-X of Fig. 9;

Fig. 11 is an enlarged view similar to Fig. 9;

Fig. 12 is a cross-sectional view taken along the line XII-XII of Fig. 11;

Fig. 13 is an enlarged view similar to Fig. 11; and

Fig. 14 is a cross-sectional view taken along the line XIV-XIV of Fig. 13;

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention will now be described with reference to the accompanying drawings.

In figs. 1 to 5, a vehicle body generally designated reference numeral 20 includes a window opening portion 24 composed of upper and lower frame members 21, right and left side pillar members 22 and corner members 23 which are integrally formed with the vehicle body 20.

Along one side peripheral edge, that is, a peripheral edge confronting the outside, of the above-described window opening portion 24, there is formed a projecting edge 26 normal to an inner circumferential wall 25 of the window opening portion 24.

The above-described projecting edge 26 is constructed by integrally formed which are lateral edge forming pieces 21a integrally formed with the upper and lower frame members 21, longitudinal edge forming pieces 22a integrally formed with the right and left side pillar members 22 and corner edge forming pieces 23a integrally formed with the corner members 23.

A groove 27 having a trapezoidal cross-section is formed over the window opening portion 24 inside of the inner circumferential wall 25. A glass retainer 28 made of elastic material is fitted in the groove 27. Both surfaces of a window glass 29 fitted in the window opening portion 24 between the glass retainer 28 and the above-described projecting edge 26 are pressingly held through a seal rubber 30 interposed on the inner surface of the projecting edge 26.

In addition to the seal rubber 30, an adjusting shim 31 is interposed between the circumferential end face of the window glass 29 and the inner circumferential wall 25 of the window opening portion 24 confronting the end face of the window glass 29.

A tongue portion 28a extending inwardly of the vehicle body 20 is formed integrally with the glass retainer 28 over the entire circumference of the glass retainer. The tongue portion 28a is in contact with an inner decorative member 32 provided in the vehicle body 20.

Fig. 6 shows an example of a structure of the groove 27 for the corner member 23. As described before, a large strain is liable to be applied to the corner portion of the window structure. Therefore, according to the invention, a reinforcing member 33 is welded at position 34 to define the groove 27 by the reinforcing member 33 and the corner member 23.

As described above, according to the window structure of the invention, in the assembling works, the window glass 29 is inserted directly into the window opening portion 24 of the vehicle body 20 from the inside, and simultaneously therewith, a one side surface of the window glass 29 is brought into pressing contact with the projecting edge 26 through the seal rubber 30. Under such a condition, the glass retainer 28 is pressed to the other side surface of the window glass so that the window glass 29 is pressingly held between the glass retainer 28 and the projecting edge 26, thus completing the assembling works of the window structure. According to the present invention, the projecting edge 26 serving as a retainer for the window glass and the groove 27 serving as a pressing retainer are formed integrally with the upper and lower frame members 21, the right and left side pillar members 22 and the corner members 23 which constitute the window opening portion 24 of the vehicle body 20. Therefore, the projecting edge 26 and the groove 27 reinforce the window opening portion 24 constituted by the above-described members, thus providing a window structure having rigidity and mechanical strength which sufficiently withstand the various loads transmitted from the vehicle body. In addition, the present invention offers advantages of considerably simplifying the window assembly and structure.

Claims

1. A window structure provided on the framework of a vehicle, in which framework there are respective corner members (23) at the junctions of upper and lower framework members

Fig. 4 is an enlarged view of a corner portion shown in Fig. 1;

Fig. 5 is a cross-sectional view taken along the line V-V of Fig. 4;

Fig. 6 is a partially fragmentary perspective view of the corner portion shown in Fig. 1;

Fig. 7 is an outside view of a window structure according to the prior art;

Fig. 8 is a cross-sectional view taken along the line VIII-VIII of Fig. 7;

Fig. 9 is an enlarged view of a corner portion shown in Fig. 7;

Fig. 10 is a cross-sectional view taken along the line X-X of Fig. 9;

Fig. 11 is an enlarged view similar to Fig. 9;

Fig. 12 is a cross-sectional view taken along the line XII-XII of Fig. 11;

Fig. 13 is an enlarged view similar to Fig. 11; and

Fig. 14 is a cross-sectional view taken along the line XIV-XIV of Fig. 13;

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention will now be described with reference to the accompanying drawings.

In figs. 1 to 5, a vehicle body generally designated reference numeral 20 includes a window opening portion 24 composed of upper and lower frame members 21, right and left side pillar members 22 and corner members 23 which are integrally formed with the vehicle body 20.

Along one side peripheral edge, that is, a peripheral edge confronting the outside, of the above-described window opening portion 24, there is formed a projecting edge 26 normal to an inner circumferential wall 25 of the window opening portion 24.

The above-described projecting edge 26 is constructed by integrally formed which are lateral edge forming pieces 21a integrally formed with the upper and lower frame members 21, longitudinal edge forming pieces 22a integrally formed with the right and left side pillar members 22 and corner edge forming pieces 23a integrally formed with the corner members 23.

A groove 27 having a trapezoidal cross-section is formed over the window opening portion 24 inside of the inner circumferential wall 25. A glass retainer 28 made of elastic material is fitted in the groove 27. Both surfaces of a window glass 29 fitted in the window opening portion 24 between the glass retainer 28 and the above-described projecting edge 26 are pressingly held through a seal rubber 30 interposed on the inner surface of the projecting edge 26.

In addition to the seal rubber 30, an adjusting shim 31 is interposed between the circumferential end face of the window glass 29 and the inner circumferential wall 25 of the window opening portion 24 confronting the end face of the window glass 29.

A tongue portion 28a extending inwardly of the vehicle body 20 is formed integrally with the glass retainer 28 over the entire circumference of the glass retainer. The tongue portion 28a is in contact with an inner decorative member 32 provided in the vehicle body 20.

Fig. 6 shows an example of a structure of the groove 27 for the corner member 23. As described before, a large strain is liable to be applied to the corner portion of the window structure. Therefore, according to the invention, a reinforcing member 33 is welded at position 34 to define the groove 27 by the reinforcing member 33 and the corner member 23.

As described above, according to the window structure of the invention, in the assembling works, the window glass 29 is inserted directly into the window opening portion 24 of the vehicle body 20 from the inside, and simultaneously therewith, a one side surface of the window glass 29 is brought into pressing contact with the projecting edge 26 through the seal rubber 30. Under such a condition, the glass retainer 28 is pressed to the other side surface of the window glass so that the window glass 29 is pressingly held between the glass retainer 28 and the projecting edge 26, thus completing the assembling works of the window structure. According to the present invention, the projecting edge 26 serving as a retainer for the window glass and the groove 27 serving as a pressing retainer are formed integrally with the upper and lower frame members 21, the right and left side pillar members 22 and the corner members 23 which constitute the window opening portion 24 of the vehicle body 20. Therefore, the projecting edge 26 and the groove 27 reinforce the window opening portion 24 constituted by the above-described members, thus providing a window structure having rigidity and mechanical strength which sufficiently withstand the various loads transmitted from the vehicle body. In addition, the present invention offers advantages of considerably simplifying the window assembly and structure.

Claims

1. A window structure provided on the framework of a vehicle, in which framework there are respective corner members (23) at the junctions of upper and lower framework members



(21) with left and right framework members (22), characterized in that the window structure comprises a window opening (24) defined by:

the upper and lower framework members (21), the left and right framework members (22) and respective corner members (23), at the junctions of the upper and lower framework members (21) with the left and right framework members (22), each being formed with an inner wall (25) bounding the window opening (24),

a projecting edge (26) integrally formed on the upper and lower framework members (21), on the left and right framework members (22), and on the corner members (23) along one side edge of the inner wall (25),

a groove (27) formed along the opposite side edge of the inner wall (25),

and a pane retainer (28) located in the groove (27), the pane (29) being held at its circumference between the projecting edge (26) and the pane retainer (28).

2. A window structure as claimed in claim 1, wherein the pane retainer (28) includes a member (28) made of resilient material.

3. A window structure as claimed in claim 1 or claim 2, wherein the groove (27) has a trapezoidal cross-section.

4. A window structure as claimed in any preceding claim, wherein the groove (27) is further defined by a reinforcing member (33) at least at each of the corner members (23), the reinforcing member (33) being welded to each of the corner members (23).

5. A window structure as claimed in any preceding claim, wherein an adjusting shim (31) is interposed between seal means (30) and the inner wall (25).

Revendications

1. Structure de fenêtre formée sur le châssis d'un véhicule. châssis dans lequel il est prévu des pièces d'angle (23) respectives aux jonctions entre des pièces de cadre supérieure et inférieure (21) et des pièces de cadre gauche et droite (22), caractérisée en ce qu'elle comprend une baie de fenêtre (24) définie par;

les pièces de cadre supérieure et inférieure (21), les pièces de cadre gauche et droite (22) et les pièces d'angle (23) respectives aux jonctions entre les pièces de cadre supérieure et inférieure (21) et les pièces de cadre gau-

che et droite (22), pièces dans lesquelles est formée une paroi interne (25) qui limite la baie de fenêtre (24),

un rebord saillant (26) formé d'un seul tenant sur les pièces de cadre supérieure et inférieure (21), sur les pièces de cadre gauche et droite (22) et sur les pièces d'angle (23) le long d'un bord latéral de la paroi interne (25),

une gorge (27) formée le long du bord latéral opposé de la paroi interne (25),

et un élément de maintien de glace (28) disposé dans la gorge (27), la glace (29) étant maintenue à sa périphérie entre le rebord saillant (26) et l'élément de maintien de glace (28).

2. Structure de fenêtre selon la revendication 1, dans laquelle l'élément de maintien de glace (28) comprend une pièce (28) faite de matière élastique.

3. Structure de fenêtre selon la revendication 1 ou 2, dans laquelle la gorge (27) a une section trapézoïdale.

4. Structure de fenêtre selon l'une quelconque des revendications 1 à 3, dans laquelle la gorge (27) est en outre définie par une pièce de renfort (33) au moins au niveau de chacune des pièces d'angle (23), la pièce de renfort (33) étant fixée par soudage à chacune des pièces d'angle (23).

5. Structure de fenêtre selon l'une quelconque des revendications 1 à 4, dans laquelle une cale d'ajustement (31) est interposée entre des moyens d'étanchéité (30) et la paroi interne (25).

Ansprüche

1. Fensterscheibe, die im Rahmen eines Fahrzeugs angebracht ist, wobei im Rahmen Eckelemente (23) an den Verbindungen von oberen und unteren Rahmenelementen (21) mit linken und rechten Rahmenelementen (22) vorgesehen sind, dadurch gekennzeichnet, daß die Fensterscheibe eine Fensteröffnung (24) umfaßt, die definiert ist durch:

das obere und untere Rahmenelement (21), das linke und rechte Rahmenelement (22) und die Eckelemente (23) an den Verbindungen des oberen und unteren Rahmenelements (21) mit den linken und rechten Rahmenelementen (22), wobei jedes mit einer an die Fensteröffnung (24) angrenzenden Innenwand (25) gebildet ist,



eine vorspringende Kante (26), die am oberen und unteren Rahmenelement (21), am linken und rechten Rahmenelement (22) und an den ECKelementen (23) entlang einer Seitenkante der Innenwand (25) integral angeformt ist, 5

eine entlang der entgegengesetzten Seitenkante der Innenwand (25) gebildeten Nut (27), 10

und einen in der Nut (27) angeordneten Scheibenhalter (28), wobei die Scheibe (29) an ihrem Umfang zwischen der vorspringenden Kante (26) und dem Scheibenhalter (28) gehalten wird. 15

2. Fensterscheibe nach Anspruch 1, wobei der Scheibenhalter (28) ein aus elastischem Werkstoff bestehendes Element (28) umfaßt. 20
3. Fensterscheibe nach Anspruch 1 oder 2, wobei die Nut (27) trapezförmigen Querschnitt aufweist. 25
4. Fensterscheibe nach einem der vorhergehenden Ansprüche, wobei die Nut (27) weiterhin durch ein Verstärkungselement (33) zumindest bei jedem der ECKelemente (23) definiert ist, wobei das Verstärkungselement (33) an jedes der ECKelemente (23) angeschweißt ist. 30
5. Fensterscheibe nach einem der vorhergehenden Ansprüche, wobei ein einstellbares Distanzstück (31) zwischen einer Dichtungseinrichtung und der Innenwand (25) zwischengelegt ist. 35



40

45

50

55

5