May 22, 1951 J. S. SWANN 2,554,427

DROP BOTTOM GONDOLA CAR DOOR

Filed Nov. 25, 1946 2 Sheets-Sheet 1

Fig. 1

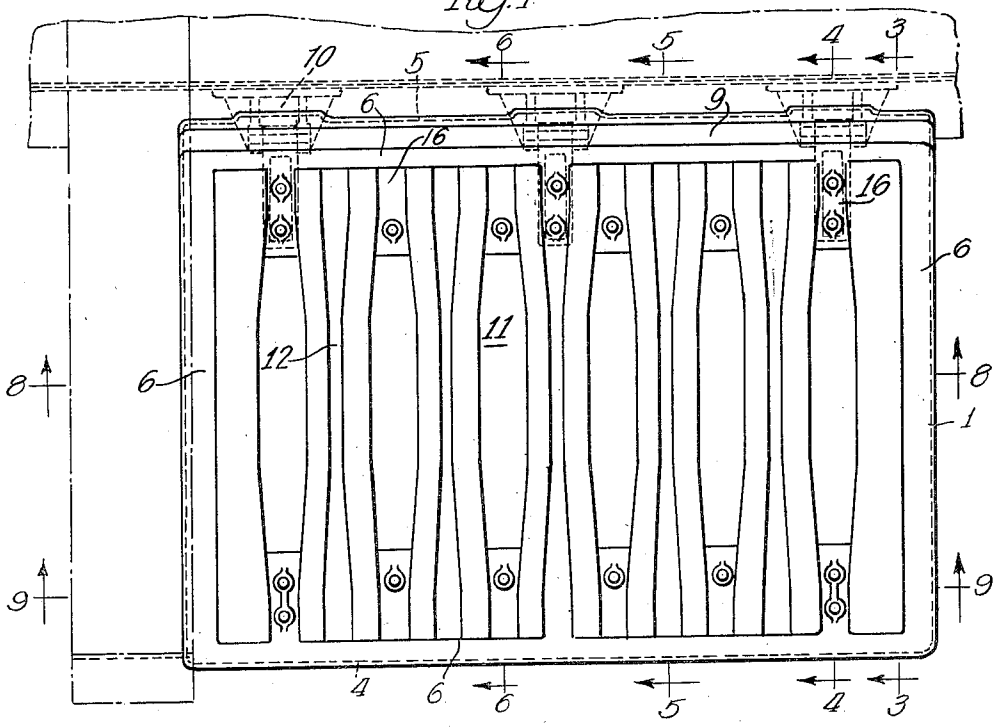


Fig. 7

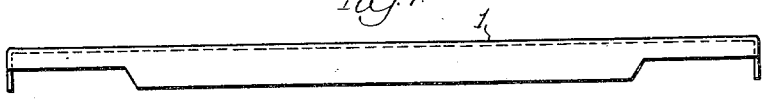


Fig. 8

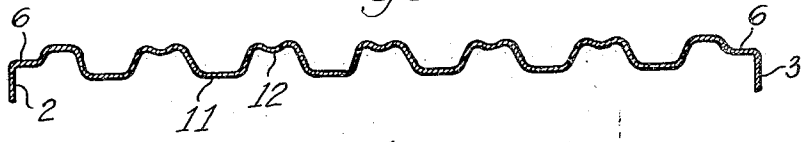
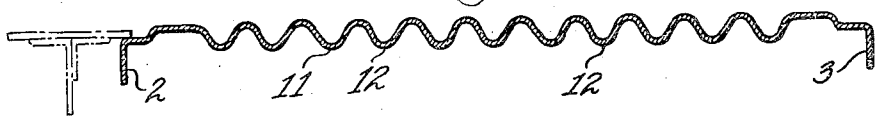


Fig. 9



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DROP BOTTOM GONDOLA CAR DOOR

Filed Nov. 25, 1946 2 Sheets-Sheet 2

Fig. 2

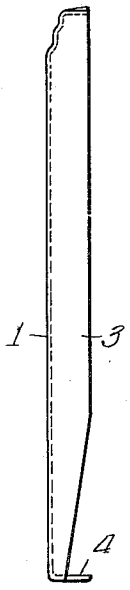


Fig. 3

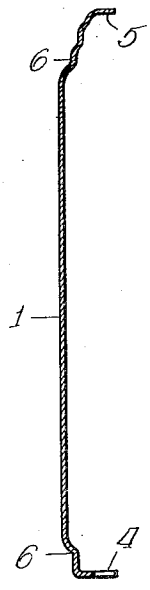
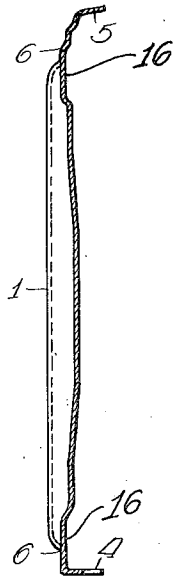


Fig. 4



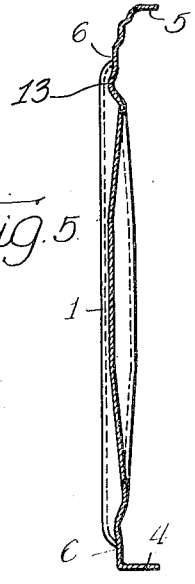


Fig. 5

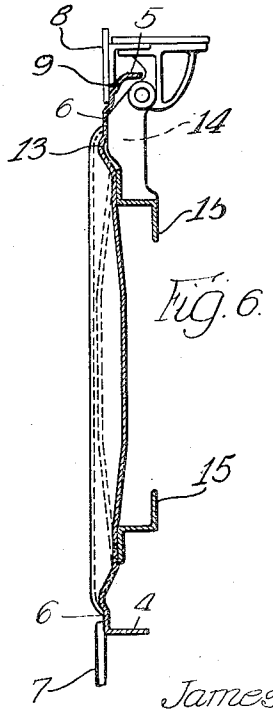


Fig. 6

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DROP-BOTTOM GONDOLA CAR DOOR

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Application November 25, 1946, Serial No. 712,089

5 Claims. (Cl. 105—280)

1

This invention relates to railway freight cars, and more particularly to gondola cars wherein the floor comprises a series of doors on each side of the center sills of the car.

An object of the invention is to form such doors of metallic plate, or other suitable material, in such manner that the material of the plate will be disposed so as to provide a door having great strength to sustain the load in the car.

Another object is to form a door from a single piece of material so as to provide a marginal portion about the periphery of the door in substantially a single plane, with corrugations in said door extending between opposite portions of said marginal portion and merging into said plane adjacent said opposite portions, said corrugations projecting on opopsite sides of the plane of said marginal portion.

A further object of the invention is to form the corrugations in pairs, each pair being alike and consisting of a major corrugation and a minor corrugation, said minor corrugations always occurring within the bounding planes of the major corrugations, and the corrugations of each pair being proportioned so as to provide a door having great resilience and strength to retain an equally distributed load.

In the drawings:

Figure 1 is a front elevation of a general purpose gondola car embodying the invention.

Figure 2 is an end elevation of the door of Figure 1.

Figures 3, 4, 5 and 6 are transverse sections, respectively, on lines 3—3; 4—4; 5—5 and 6—6 of Figure 1.

Figure 7 is a side elevation of Figure 1.

Figures 8 and 9 are longitudinal sections, respectively, on lines 8—8 and 9—9 of Figure 1.

The door comprising the invention is formed from a single plate of material, preferably by hot pressing between reciprocating dies, and, when formed, is of generally rectangular pan shape, providing a body portion 1 having flanges 2, 3, 4 and 5 at the sides and ends of the plate, which flanges all extend in the same direction from the plane of the plate and together form a continuous flange entirely about the periphery of the door. Adjacent the flanges, entirely about the plate, and in what shall be called the original plane of the plate (which also is substantially the neutral axis plane of the plate) is a narrow marginal area 6, which forms a surface when the door is closed to engage the ends and one side of the door frame, indicated in dotted lines at 7, Figure 6. Since the part 8 of the car structure forming the other side of the frame of the door opening is offset slightly from the plane of the parts 7 forming the remainder of said frame,

2

that side of the body portion adapted to engage said part 8 when the door is closed is accordingly offset, as at 9, so as to underlappingly engage said part 8 of the frame. Thus there is a continuous flat area in one plane across one side and both ends, and a slightly offset flat area across the other side which cooperate with the car parts 7 and 9 to close the door opening.

The hinge structure for hingedly attaching the door to a railway car is shown generally at 10 and may be any of several well known types suitable for such connection, and forms no part of the invention.

The body portion 1 of the door is provided with a plurality of like pairs of corrugations, each pair of which comprises a major corrugation 11 and a minor corrugation 12. The middle portion of each major corrugation is comparatively wide and deep, decreasing in width and depth from said middle portion toward the end portions thereof. Said major corrugations extend substantially from side to side of the sheet and terminate within the body portion adjacent the inner edges of said marginal area 6.

The middle portion of each minor corrugation is narrow and shallow and from said middle portion increase in width and depth toward its ends, never, however, equaling the depth or width of a major corrugation. The minor corrugations, therefore, always occur within the bounding planes of the major corrugations (see Figures 5 and 6), although, as will be apparent from Figure 9, adjacent the ends of the corrugations the major corrugations have decreased, and the minor corrugations have increased, both in depth and width, so that said minor corrugations are almost as deep as the major corrugations. The minor corrugations also terminate within the body portion adjacent the marginal area 6.

The end portions of the valleys of the minor corrugations 12 are humped, as at 13 (Figures 5 and 6), to provide additional strength at that area of the corrugations and also to take up the extra material at that area so that areas 6 and 9 can be pressed flat with no wrinkles therein as would occur were the material not taken up in the hump portions 13. As a consequence of this formation, the ridges of the minor corrugations terminate short of the ridges of the major corrugations, and, therefore, are shorter than the major corrugations.

The end portions of the major corrugations adjacent area 6 are formed in the same plane as areas 6 (see Figures 1 and 4) to provide flat surfaces 16 of sufficient length for application of the hinge straps 14 to the major corrugations adjacent the ends of the plate, and for application of the stiffening Z-bars 15.

Also one end of the central transverse minor corrugation is likewise formed in the same plane as the area 6 adjacent thereto, for the purpose of providing a flat area for application of a hinge to the central part of the door.

Any form of device for holding the door closed against the door frame to retain the load may be employed.

Thus the Z-bar stiffening members 15 extend across and are secured to the end portions of the major corrugations and any loads imposed upon said major corrugations are carried thereby to said stiffening members and also to the flanges about the periphery of the door. This also applies to the centermost of the minor corrugations. The minor corrugations pass over and rest upon, but are not shown as secured to the stiffening members. However, any loads imposed upon said minor corrugations would be carried thereby to said stiffening members. The loads carried to the upper stiffening members are transmitted to the hinges and thereby to the car, whereas the loads carried to the lower stiffening members are transmitted thereby to whatever means is employed to hold the door closed against the lading.

The accompanying drawings illustrate the preferred form of the invention, though it is to be understood that the invention is not limited to the exact details of construction shown and described, as it is obvious that various modifications thereof, within the scope of the claims, will occur to persons skilled in the art.

I claim:

1. A hingeable door adapted to form part of a lading retaining means of a railway car having a door frame providing an opening, said door comprising a metallic plate formed with a flat portion extending about the margin of said plate adapted to engage said frame when in closed position to close said opening, said plate also formed with a plurality of spaced major corrugations extending substantially between opposite parts of said marginal portion, and a plurality of alternate spaced minor corrugations of less depth than said major corrugations, thereby providing stiffening portions between the end portions of adjacent corrugations and between the ends of the minor corrugations and said marginal portion, the end portions of certain major corrugations merging into and occurring in the same plane as said flat marginal portion to provide a narrow elongated area for the attachment thereto of hinge means.

2. A hingeable door adapted to form part of a lading retaining means of a railway car having a door frame providing an opening, said door comprising a metallic plate formed with a flat portion extending about the margin of said plate in substantially a single plane and adapted to engage said frame when in closed position to close said opening, said plate also formed with a plurality of spaced major corrugations extending substantially between opposite parts of said marginal portion and projecting on opposite sides of said plane, and a plurality of alternate spaced minor corrugations positioned between the bounding planes of the major corrugations and of less depth than said major corrugations, thereby providing stiffening portions between the end portions of adjacent corrugations and between the ends of the minor corrugations and said marginal portion, the end portions of certain major corrugations merging into and occurring in the same plane as said flat marginal portion to provide a narrow elongated area for the attachment thereto of hinge means.

3. A hingeable door adapted to form part of a lading retaining means of a railway car having a door frame providing an opening, said door comprising a metallic plate formed with a flat portion extending about the margin of said plate in substantially a single plane and adapted to engage said frame when in closed position to close said opening, said plate also formed with a plurality of spaced major corrugations extending substantially between opposite parts of said marginal portion and projecting on opposite sides of said plane, and a plurality of alternate spaced minor corrugations positioned between the bounding planes of the major corrugations and of less length and depth than said major corrugations, thereby providing stiffening portions between the end portions of adjacent corrugations and between the ends of the minor corrugations and said marginal portion, the end portions of certain major corrugations merging into and occurring in the same plane as said flat marginal portion to provide a narrow elongated area for the attachment thereto of hinge means.

4. A hingeable door adapted to form part of a lading retaining means of a railway car, said door comprising a plate formed with a flat portion extending about the margin of said plate in substantially the neutral axis plane of said plate, a flange formed at the outer edge of said flat portion substantially normal to said neutral axis plane, spaced major corrugations extending substantially between opposite parts of said flat portion and projecting on opposite sides of said plane, and spaced minor corrugations alternating with said major corrugations and positioned between the bounding planes of said major corrugations, the end portions of certain major corrugations adjacent one side of said plate occurring in the same plane as said flat portion to provide an elongated area for attachment thereto of hinge means.

5. A hingeable door adapted to form part of a lading retaining means of a railway car, said door comprising a plate formed with a flat portion extending about the margin of said plate, a flange formed at the outer edge of said flat portion substantially normal to said portion, spaced major corrugations formed in said plate extending substantially between opposite parts of said flat portion, and spaced minor corrugations formed in said plate alternating with said major corrugations and positioned between the bounding planes of said major corrugations, the end portions of certain of said major corrugations being flattened and occurring in the same plane as the adjacent flat marginal portion to provide an elongated area for attachment thereto of hinge means.

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