March 12, 1957 G. MADLAND 2,784,680

FREIGHT CAR DOORWAY REINFORCEMENT

Filed Aug. 10, 1951

FIG-1

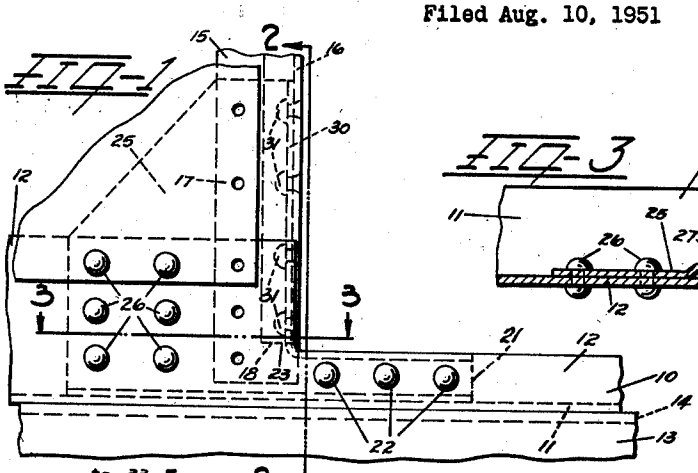


FIG-2

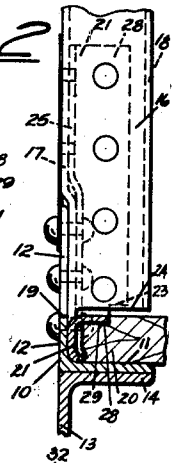


FIG-3



FIG-4

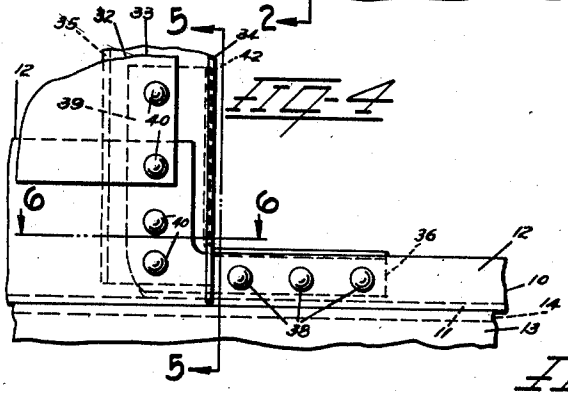


FIG-5

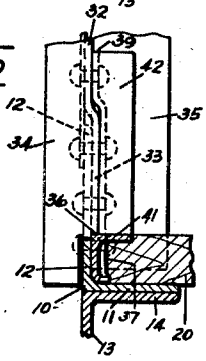


FIG-6

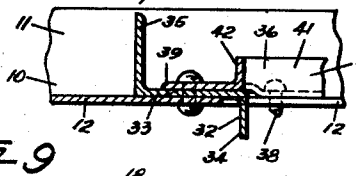


FIG-7

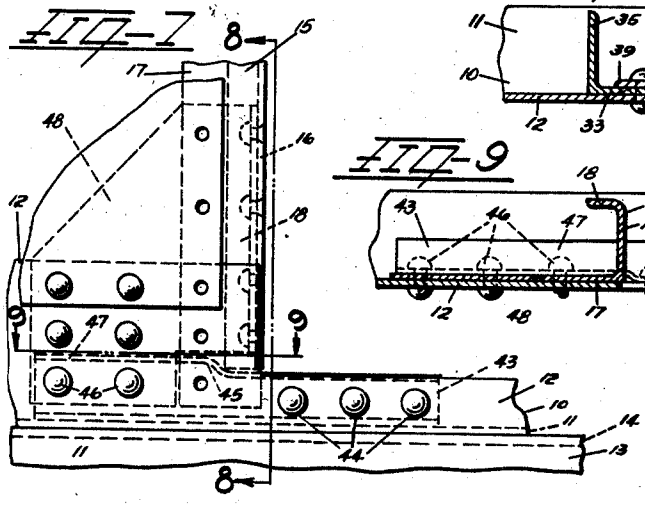


FIG-8

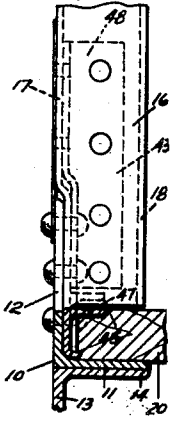


FIG-9



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2,784,680

# FREIGHT CAR DOORWAY REINFORCEMENT

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6 Claims. (Cl. 105—409)

This invention relates to freight car construction and particularly to the construction involving the lower corners of the door openings of box and automobile cars.

It is an object of this invention to provide constructions for railway freight cars which shall obviate tearing of the upstanding flange of the side sills in the door openings of the cars.

A further object is to provide constructions for railway freight cars which shall counteract the effect of the change in the nature of the stress occurring in the side sills of the cars and resulting from the reduction in section of the side sills in the door openings of the cars.

A further object is to provide constructions for railway freight cars which shall afford reinforcements for the side sills of the cars particularly adjacent to the lower corners of the door openings of the cars.

Other objects of the invention will become clear as the description thereof proceeds.

In the drawings forming part of this specification:

Fig. 1 is a fragmentary elevation of the construction of railway freight cars adjacent to a lower corner of a door opening in the cars and embodying the instant invention.

Fig. 2 is a vertical section taken on line 2—2 of Fig. 1.

Fig. 3 is a horizontal section taken on line 3—3 of Fig. 1.

Fig. 4 is a view similar to Fig. 1 showing another embodiment of the invention.

Fig. 5 is a vertical section taken on line 5—5 of Fig. 4.

Fig. 6 is a horizontal section taken on line 6—6 of Fig. 4.

Fig. 7 is a view similar to Fig. 1 showing a further embodiment of the invention.

Fig. 8 is a vertical section taken on line 8—8 of Fig. 7.

Fig. 9 is a horizontal section taken on line 9—9 of Fig. 7.

Referring to the drawings and more particularly to the embodiment of the invention illustrated in Figs. 1, 2 and 3 thereof, the reference numeral 10 designates a customary side sill used in box and automobile freight cars. The side sill 10 is formed of an angle having an inwardly extending horizontally disposed leg 11 and an outer upwardly extending vertically disposed leg 12. The side sill 10 is customarily reinforced by means of an angular member 13 which includes a horizontally disposed flange 14 secured in any desired manner as by means of rivets to the underside of the horizontal leg 11 of the side sill.

Door posts, one of which is designated by the reference numeral 15, are secured as by means of rivets to the upstanding leg 12 of the side sill and serve to define the width of a door opening customarily provided in the side walls of railway freight cars of the type indicated. As is shown more clearly in Figs. 1, 2 and 3 of the drawings, the door post 15 is substantially channel-shaped in section and embodies a transversely extending web 16 contiguous to the door opening and transversely spaced longitudinally extending outer and inner flanges 17 and 18 which are directed away from the door opening. The



door post 15 is extended downwardly so as to overlap the upstanding vertical flange 12 of the side sill, the outer flange 17 of the post being secured to this flange of the side sill as by means of rivets. It will be observed from Figs. 1 and 2 of the drawings that the securement of the door post to the vertical flange of the side sill occurs where this flange is of full height, such height being maintained from each side of the door opening to the end of the car as is well known.

In the door opening, however, the vertical flange 12 of the side sill is cut down in height as indicated at 19 so that it lies substantially in the upper plane of the car floor 20. Because of this reduction in height of the vertical flange of the side sill, the side sill is substantially weakened in the area of the lower corners of the door opening so that tearing of the vertical flange frequently occurs.

In accordance with the instant invention the indicated failure of the side sill is corrected. To this end a reinforcing member 21 is secured to the vertical flange 12 of the side sill below the door opening as by means of rivets 22. The reinforcing member 21 extends under the web 16 of the door post which is coped as indicated at 23 for this purpose. The longitudinally extending flange 18 of the door post is similarly coped as indicated at 24. Beyond the door opening the reinforcing member 21 embodies a gusset portion 25 which as is shown in Figs. 1, 2 and 3 of the drawings is secured as by means of rivets 26 and 27 to the vertical flange 12 of the side sill and the outer longitudinally extending flange 17 of the door post.

As is also shown in these figures of the drawings the reinforcing member 21 is provided with a flange 28 which extends continuously along an edge of the member. Below the door opening the flange 28 is horizontal as indicated at 29. This portion is shown in Figs. 1 and 2 of the drawings extending inwardly and lying substantially in the plane of the upper edge of the vertical flange of the side sill below the door opening. Beyond the door opening the flange 28 is turned upwardly so as to provide a vertical portion 30 which is secured to the web 16 of the door post 15 as by means of rivets 31 and serves to reinforce the door post.

It will be apparent from the foregoing description of the considered embodiment of the invention that a sturdy reinforcement is provided for the side sill and the door post adjacent to the lower corner of a door opening in a railway freight car. Moreover, the construction and the relationship of this reinforcement to the side sill and the door post is such as to present a continuously extending flange in such a position that forces tending to tear the weakened section of the side sill will be resisted by this flange.

In Figs. 4, 5 and 6 the instant invention is shown in its application to a door post which is substantially Z-shaped in section. The door post 32 embodies a longitudinally extending web 33, an outwardly extending flange 34 contiguous to the door opening and an inwardly extending flange 35 spaced from the door opening. A member 36 is used to reinforce the side sill adjacent to the lower corner of the door opening. This member embodies a portion 37 which extends along and is secured to the vertical flange of the side sill below the door opening as by means of rivets 38 and a portion 39 which extends upwardly along the web 33 of the door post and which is secured to the vertical flange of the side sill beyond the door opening and to the web of the door post as by means of rivets 40.

As in the previously described embodiment of the invention the reinforcing member 36 is provided with a continuously extending flange, the portion 41 lying below

the door opening being horizontal and substantially in the plane of the upper edge of the vertical flange of the side sill below the door opening and the portion 42 being vertical. As shown the continuously extending flange of reinforcing member 36 extends inwardly from the side sill and the door post.

In the embodiment of the invention illustrated in Figs. 7, 8 and 9 of the drawings, a reinforcing member 43 for the side sill is utilized. This member is secured to and along the vertical flange of the side sill below the door opening as by means of rivets 44. The reinforcing member 43 is extended under the web 16 of the door post 15 and is offset upwardly as indicated at 45. The reinforcing member 43 extends along and is secured to the vertical flange of the side sill beyond the door opening and to the longitudinally extending flange 17 of the door post as by means of rivets 46. As in the previously described embodiments of the invention the reinforcing member 43 is provided with an inwardly extending flange 47 which extends continuously along the upper edge of the member.

It will be apparent from the foregoing description of the several embodiments of the invention that the side sill is reinforced at the critical point where fracture and failure occur. It will also be clear that while the illustrated embodiments of the invention have been shown in connection with only one of the lower corners of a door opening, it is applicable as well to all of the lower corners of the door openings provided in box and automobile cars. In the last described embodiment of the invention a separate gusset 48 is also used.

It will be apparent that numerous changes and modifications in the details of the invention will be clear to those skilled in the art. It is intended, therefore, that all such modifications and changes be comprehended within this invention, which is to be limited only by the scope of the claims appended hereto.

I claim:

1. In a freight car having a side wall provided with a door opening and an angle side sill extending substantially from end to end of the car, said side sill having a horizontal leg and an upstanding vertical leg, said vertical leg being of full height beyond the door opening, the portion of said vertical leg in the door opening being removed so that the remaining portion thereof terminates substantially in the upper plane of the floor of the car, the combination with said side sill of a door post, said door post overlapping said vertical leg beyond the door opening, means securing said door post directly to said vertical leg, a reinforcing member for said side sill, and means securing said member to said door post and said vertical leg beyond the door opening, said member extending along and being secured to said vertical leg below said door opening, said member having a flange extending continuously along an edge thereof, a portion of said flange being horizontal and substantially in the plane of the upper edge of said vertical leg below the door opening.

2. In a freight car having a side wall provided with a door opening and an angle side sill extending substantially from end to end of the car, said side sill having a horizontal leg and an upstanding vertical leg, said vertical leg being of full height beyond the door opening, the portion of said vertical leg in the door opening being removed so that the remaining portion thereof terminates substantially in the upper plane of the floor of the car, the combination with said side sill of a door post, said door post overlapping said vertical leg beyond the door opening, means securing said door post directly to said vertical leg, a reinforcing member for said side sill, and means securing said member to said door post and said vertical leg beyond the door opening, said member extending along and being secured to said vertical leg below said door opening, said member having a flange extending inwardly and continuously along an edge thereof, a portion of said flange being horizontal and substantially in the plane of the upper edge of said vertical leg below the door opening.



3. In a freight car having a side wall provided with a door opening and an angle side sill extending substantially from end to end of the car, said side sill having a horizontal leg and an upstanding vertical leg, said vertical leg being of full height beyond the door opening, the portion of said vertical leg in the door opening being removed so that the remaining portion thereof terminates substantially in the upper plane of the floor of the car, the combination with said side sill of a door post, said door post having a transversely extending web contiguous to the door opening and inner and outer flanges extending from said web away from the door opening, said outer flange extending downwardly substantially to said horizontal leg of said side sill in overlapping relationship with said vertical leg beyond said door opening and being secured directly to said vertical leg adjacent to said horizontal leg, said web of said post terminating above the upper edge of said vertical leg which lies below the door opening, a reinforcing member for said side sill, said member extending along and being secured to said vertical leg below the door opening, said member having a flange extending continuously along an edge thereof, the portion of said flange of said member lying below the door opening being horizontal and substantially in the plane of the upper edge of said vertical leg below the door opening, said member extending under said web and beyond the door opening, and means securing said member to said door post and said vertical leg beyond the door opening.

4. In a freight car having a side wall provided with a door opening and an angle side sill extending substantially from end to end of the car, said side sill having a horizontal leg and an upstanding vertical leg, said vertical leg being of full height beyond the door opening, the portion of said vertical leg in the door opening being removed so that the remaining portion thereof terminates substantially in the upper plane of the floor of the car, the combination with said side sill of a door post, said door post having a transversely extending web contiguous to the door opening and inner and outer flanges extending from said web away from the door opening, said outer flange extending downwardly substantially to said horizontal leg of said side sill in overlapping relationship with said vertical leg beyond said door opening and being secured directly to said vertical leg adjacent to said horizontal leg, said web of said post terminating above the upper edge of said vertical leg which lies below the door opening, a reinforcing member for said side sill, said member extending along and being secured to said vertical leg below the door opening, said member having a flange extending continuously along an edge thereof, the portion of said flange of said member lying below the door opening being horizontal and substantially in the plane of the upper edge of said vertical leg below the door opening, said member extending under said web and beyond the door opening, said member extending along said vertical leg beyond the door opening and upwardly along said door post, said flange of said member extending upwardly beyond the door opening along said web of said door post, means securing said member to said door post and said vertical leg beyond the door opening, and means securing said flange of said member to said web.

5. In a freight car having a side wall provided with a door opening and an angle side sill extending substantially from end to end of the car, said side sill having a horizontal leg and an upstanding vertical leg, said vertical leg being of full height beyond the door opening, the portion of said vertical leg in the door opening being removed so that the remaining portion thereof terminates

substantially in the upper plane of the floor of the car, the combination with said side sill of a door post, said door post having a transversely extending web contiguous to the door opening and inner and outer flanges extending from said web away from the door opening, said outer flange extending downwardly substantially to said horizontal leg of said side sill in overlapping relationship with said vertical leg beyond said door opening and being secured directly to said vertical leg adjacent to said horizontal leg, said web of said post terminating above the upper edge of said vertical leg which lies below the door opening, a reinforcing member for said side sill, said member extending along and being secured to said vertical leg below the door opening, said member extending under said web and along said vertical leg beyond said door opening, said member having a horizontal flange extending continuously along the upper edge thereof, a portion of said flange being horizontal and substantially in the plane of the upper edge of the vertical leg below the door opening, and means securing said member to said door post and vertical leg beyond the door opening.

6. In a freight car having a side wall provided with a door opening and an angle side sill extending substantially from end to end of the car, said side sill having a horizontal leg and an upstanding vertical leg, said vertical leg being of full height beyond the door opening, the portion of said vertical leg in the door opening being removed so that the remaining portion thereof terminates



substantially in the upper plane of the floor of the car, the combination with said side sill of a door post, said door post having a longitudinally extending web overlapping and secured directly to said vertical leg beyond the door opening, an outwardly extending flange contiguous to the door opening and an inwardly extending flange beyond the door opening, a reinforcing member for said side sill, said member extending along and being secured to said vertical leg below the door opening, said member having a flange extending continuously along an edge thereof, the portion of said flange of said member lying below the door opening being horizontal and substantially in the plane of the upper edge of said vertical leg below the door opening, said member extending along said vertical leg beyond the door opening and upwardly along said door post, said flange of said member extending upwardly contiguous to the door opening, and means securing said member to said web of said door post.

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