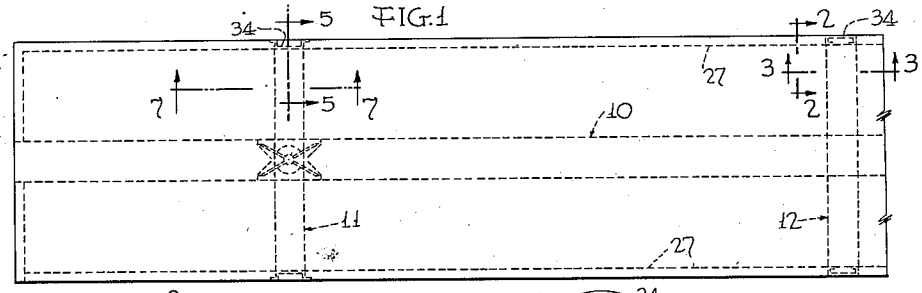
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BODY CONSTUCTION, ESPECIALLY FOR RAILWAY CARS

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FIG. 1



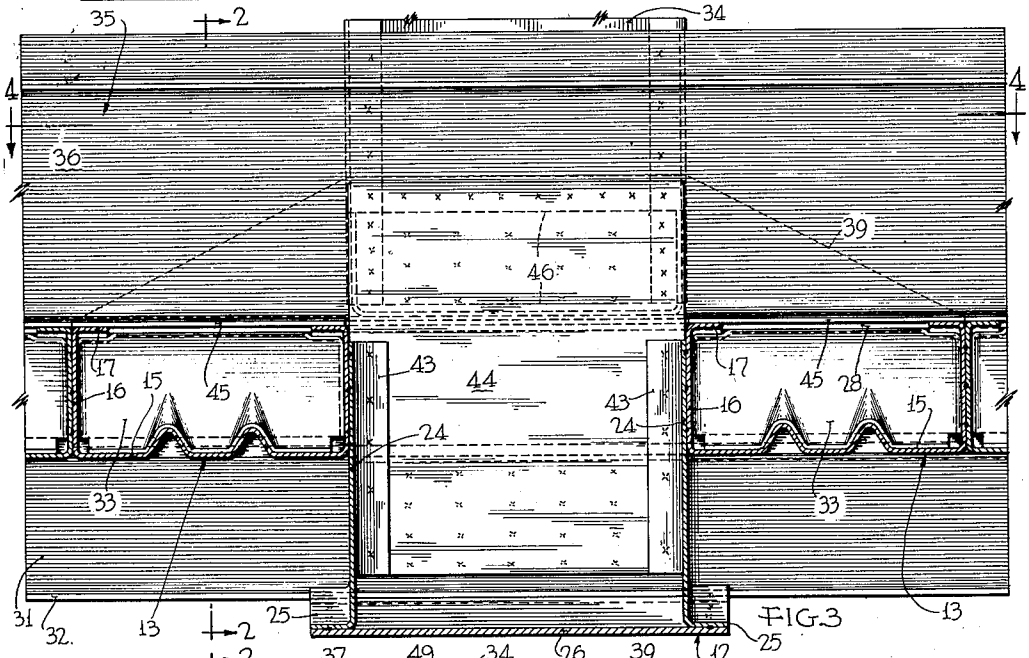


FIG. 3

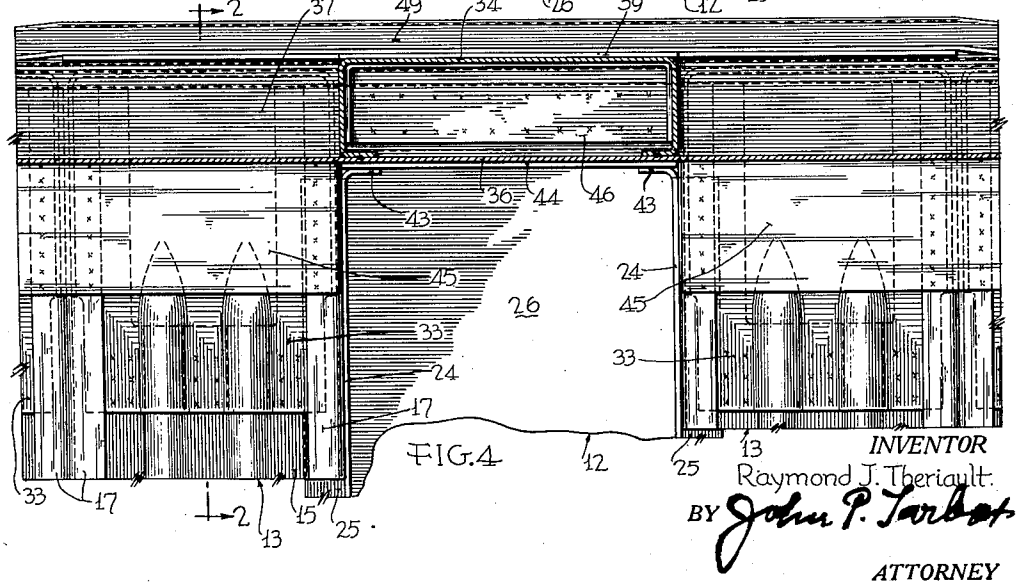


FIG. 4

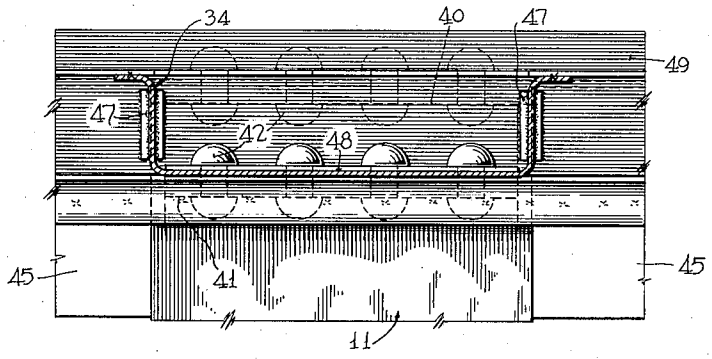
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BODY CONSTUCTION, ESPECIALLY FOR RAILWAY CARS

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FIG. 6



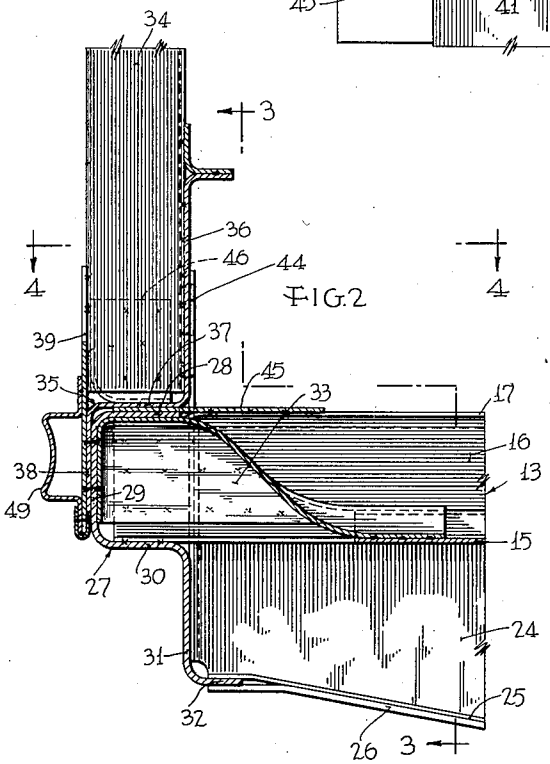


FIG. 2

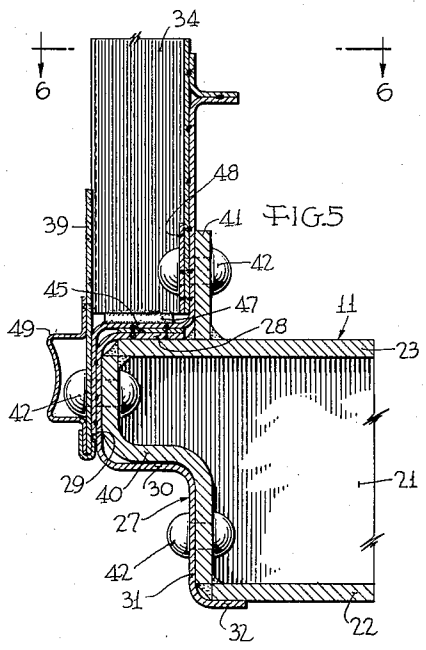


FIG. 5

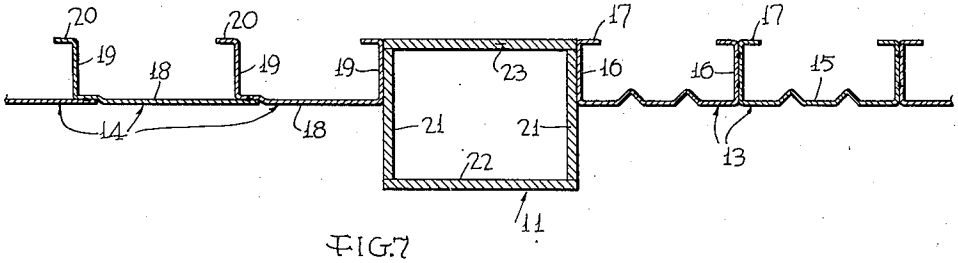


FIG. 7

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UNITED STATES PATENT OFFICE

2,504,658

BODY CONSTRUCTION, ESPECIALLY FOR RAILWAY CARS

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Application March 2, 1945, Serial No. 580,647

9 Claims. (Cl. 105—397)

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The invention refers to the construction of vehicle bodies, such as railway cars, and more specifically the formation of the underframe along its longitudinal side margins as well as to the connection between the underframe and adjoining side walls.

Among the objects of the invention is such a formation of the longitudinal marginal portions of the underframe that the component parts may be easily and cheaply manufactured and assembled, and so that the underframe may be easily and strongly connected to the adjoining side walls.

The aforesaid and other objects and advantages of the invention are outstandingly achieved by a new formation of the longitudinal side rails of the underframe and of their connection with the supporting floor and cross beam structure thereof.

An important feature of the invention consists in a side rail of inwardly facing channel section which is combined with transverse underframe members telescoping with their ends into the U-section and secured to the walls thereof. This U-section side rail is provided along at least one of its margins with a generally vertical web or an angle section which serves for further reinforcement and for the attachment to lower portions of certain cross members.

Certain features of the invention are related to the subject matter of the application of W. B. Dean on Body for vehicles especially for rail cars, filed Serial No. 580,646, simultaneously herewith.

The invention, as well as its details and further objects and advantages thereof, will be more easily understood from the embodiment illustrated in the attached drawing and described hereinafter.

In the drawings:

Fig. 1 is a fragmentary diagrammatic plan view of one end of a vehicle body showing the general location of the center sill and of main cross members of the underframe;

Fig. 2 is a fragmentary section along lines 2—2 of Figures 1, 3 and 4 on a larger scale showing the formation of the underframe and the adjoining side wall at one of the lower side margins of the body in the region of a needle beam;

Fig. 3 is a fragmentary sectional elevation taken along and viewed in the direction of the arrows on lines 3—3 of Figures 1 and 2;

Fig. 4 is a fragmentary plan view partly in section along lines 4—4 of Figures 2 and 3;

Fig. 5 is a section along line 5—5 of Fig. 1 which is similar to Fig. 2 but shows the construction at a bolster beam;

Fig. 6 is a plan view partly in section along line 6—6 of Fig. 5; and

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Fig. 7 is a diagrammatic section along lines 7—7 of Fig. 1.

The underframe comprises a center sill 10, a bolster beam 11 and one or more so-called needle beams or cross bearers 12 between the bolster beams and secured to the center sill.

Shear panels extending over the width of the underframe consist inboard of the bolster beams 11 of channel section pans 13, Figures 3 and 7 and outboard of the bolster beams 11 of angle or Z-section members 14, Fig. 7. The pans 13 have horizontally arranged bottom walls or webs 15 and transversely extending upright side walls or webs 16 provided along their free margins with horizontal flanges 17. The pans are secured together by their adjoining side walls 16 preferably by means of spot welding. The members 14 overlap each other by marginal portions of one of their arms 18 whereas their other transversely extending vertical arms or webs 19 are each provided with a horizontal flange 20. The member 14 adjacent the bolster beam is provided along both margins with upright arms or webs 19 and marginal flanges 20 so that it constitutes a U-section.

The bottom walls or arms 15, 18 of the members 13, 14 constitute together a horizontal main web extending over a major portion of the length of the underframe. This main web is reinforced by the vertical webs and arms 16, 19 which extend transversely to and are spaced in the longitudinal direction of the underframe.

The bolster beam 11 is a box sectional structure having vertical walls 21, a bottom plate 22 and a top plate 23, Figure 7.

The needle beam or cross bearer 12 comprises longitudinally spaced vertical webs or side walls 24 provided with flanges 25 along their lower margins, and a bottom plate 26 connected, such as by welding, to the flanges 25. The floor pans 13 and members 18 are connected respectively by their adjoining walls 16 and 19 to the side walls 21 and 24 of the bolster and transverse beams 11, 12, see Figures 3 and 7.

A side sill 27 arranged along each lower longitudinal margin of the body is connected with the transverse beams 11, 12 and the floor members 13, 14. Each of these sills 27 has an inwardly facing channel section portion with an inwardly directed upper arm 28, a vertically arranged bottom wall 29 and a lower inwardly directed wall 30. The wall 30 is continued by a downwardly directed web or flange 31 and an inwardly directed flange 32. The channel section portion 28, 29, 30 is of such width as to telescopingly fit over the ends of the floor members

13 and 14 allowing the flanges 17 and 20 to be connected to the upper arm 28 of the sill and the bottom walls 15 and lower arms 18 of the floor members to be connected to the lower wall 30 of the sill. See Figure 2.

The sill 27 has great strength on account of its channel and angle section construction and the telescoping fit and connection with the floor members 13, 14. The last-named connection is strong and rigid so as to adapt the sill for the connection with the lower marginal portion of the side wall.

Brackets 33 may be inserted into and secured to the side walls of some or most of the floor pans and secured to the sill 27 so as to further strengthen the marginal portions of the underframe.

The side wall has the lower ends of its posts 34 connected to a side wall sill 35 of Z-section having an inner vertical arm 36 secured to the inside of the posts 34, a horizontal web 37 overlying the lower ends of the posts and an outer depending arm 38 connected by a plate or plates 39 to the outside of the posts. The web 37 and the arm 38 of the side wall sill 35 fit over and are secured to the arm or side wall 28 and the bottom wall 29 of the side sill 27 of the underframe.

The brackets 33 and the connection between the side sills of the underframe and the body side walls constitutes part of the subject matter of the simultaneously filed application for W. B. Dean to which reference was had hereinbefore.

The height of the bolster 11 at its outer end equals about the vertical distance between top arm 28 and the bottom flange 32 of the underframe side sill, and the end of the bolster is provided with an offset or Z-formed end plate 40 so that the bolster end snugly fits into and rests with its top, end and bottom plates 23, 40, 22 against the inner surface of the side sills 27. An upwardly projecting flange or plate 41 welded to the top of the bolster near the latter's end, overlaps and is secured to the arm 36 of the side wall sill. The firm connection between the bolster, the underframe side sill and the side wall is established by three rows of rivets 42 which extend through the end plate 40 and the flange 41 of the bolster beam and through the adjoining walls, plates and arms 29, 38, 39; 31 and 36 of the side sills 27 and 35. See Figure 5.

The needle beams or cross bearers 12 end just inside of the plane defined by the depending web 31 of the underframe side sill. The webs 24 of the needle beam are connected by angle section members or flanges 43 to an end plate 44 which overlaps and is connected to the downwardly directed web 31 of the side sill. The plate 44 projects upwardly above the shear panel 13 and the projecting portion rests against and is secured in final assembly to the inside of arm 36 of the side wall sill, Figures 2 to 4. The flanges 25 and the bottom plate 26 of the cross bearer overlap top and bottom of the flange 32 of the underframe sill and are connected thereto, Figure 2.

A horizontal plate or plates 45 may extend over the entire length of the body or may be restricted to regions of great stress. The plate or plates 45 are secured to the top arm 28 of the underframe sill, the flanges 17, 20 of the floor pans, and the brackets 33. At the location of the bolster and needle beams the inner part of the plate or plates 45 are cut out for the passage of the flange 41 and the plate 44. In final assembly, the plate or plates 45 are secured to the web 37 of the side wall sill and form an additional reinforcement for the underframe and side wall joint.

The connection between the posts 34 and the sill 35 and thereby between side wall and underframe is strengthened by brackets 46, welded spacers 47 and reinforcing plates 48. 49 is a rub rail secured to the outside of the sill 35 and the gussets 39. See Figures 2, 5 and 6.

The illustrated and described structure consists mostly of sheet material such as high-tensile stainless steel. Most of the connections are made by electric spot welding as indicated in the drawing by asterisks or, at the interfaces, by black dots. An exception is the bolster beam which may be fusion, such as arc welded from ordinary or alloy steel other than austenitic stainless steel.

The described and illustrated invention is susceptible to many modifications and adaptations which are covered by the attached claims.

What is claimed is:

1. In a vehicle body, an underframe structure having transverse members and a side sill, said side sill having an inwardly facing channel section portion of such width as to telescopingly fit over the ends of said transverse members and being provided at least along one of the margins of the channel section with an upright web adjoined by an inwardly directed flange so as to form with the side wall along the other margin of the sill a second channel of greater width for the reception of and connection with transverse members of greater height than the aforesaid transverse members.

2. In an underframe for land vehicles, such as railway cars, a shear panel having horizontally arranged portions and transversely extending upright webs, a side sill having an inwardly facing channel section portion provided along its lower horizontal wall with a downwardly projecting flange, the height of said channel section portion being practically equal to the height of said shear panel with its upright webs at the outer ends thereof, the shear panel telescopingly fitting into the channel section portion and being structurally connected at top and bottom with the horizontally arranged side walls of the channel section.

3. In a vehicle underframe, such as for railway cars, a side sill and a transverse beam, said side sill having an inwardly facing channel section and a downwardly extending flange or web along the inner margin of its lower side wall, said transverse beam having an end wall shaped corresponding to and connected with the bottom wall and the lower wall of the channel section portion and to the flange of the sill and fitting against and being secured to at least some of said walls and flange of the sill.

4. In a vehicle underframe, such as for railway cars, a side sill and a transverse beam, said side sill having an inwardly facing channel section and a downwardly extending flange along the inner margin of its lower side wall, said beam having an end wall shaped corresponding to the bottom wall and lower wall of the channel section and to the flange on and resting and being secured to at least some of the same, and a flange or plate secured to the top of the beam which plate is adapted for overlapping securement to the inside of an adjoining vehicle side wall.

5. In a body for vehicles, such as railway cars, a side sill having an inwardly facing channel section portion and a vertically arranged flange or web along at least one of the side walls of the

channel, a transverse beam having longitudinally spaced upright side walls which end at said flange of the side sill, an end plate secured to the side walls of the beam overlapping said flange of the side sill and being secured thereto.

6. In a body for vehicles, such as railway cars, a side sill having an inwardly facing channel section portion and a vertically arranged flange or web along at least one of the side walls of the channel, a transverse beam having longitudinally spaced upright side walls which end at said flange of the side sill, an end plate secured to the side walls of the beam, overlapping said flange of the side sill and being secured thereto, said plate extending upwardly beyond the top of the beam for connection to the inside of an adjoining side wall.

7. In a vehicle body, such as a railway car body, a floor panel reinforced by upright transverse webs which are spaced from each other in the longitudinal direction of the body, a side sill having an angle section portion facing inwardly toward the center of the body and downwardly toward the ground, the arms of the angle section overlapping the end and top margins of said panel and its reinforcing webs, a body side wall arranged on top of and secured to said sill, an extension of the inwardly directed arm of the sill projecting inwardly beyond the vehicle side wall and being secured to the top of said webs, a plate projecting upwardly from said floor panel adjacent the inner surface of the vehicle side wall, said extension having reduced width in the longitudinal region of said plate and being arranged in this region entirely on the outside of said plate.

8. In an underframe structure for vehicles such as railway cars; a shear panel extending substantially over the width and a major part of the length of the underframe, said panel having a horizontal main web and upright reinforcing webs, the latter extending transversely to and being spaced from each other in the longitudinal direction of the structure; a side sill having an inwardly facing channel section and a downwardly directed flange along the inner margin of the lower horizontal wall of the channel; said shear panel with its upright webs telescopingly fitting into the channel section and being connected with the side walls thereof; and a vertical plate extending longitudinally over a minor part of the length of the structure and vertically across the mouth of said channel section through an interruption in said horizontal main web, said plate having its lower portion overlappingly secured to said side sill flange and projecting upwardly beyond the side sill for attachment to the inside of a side wall of the vehicle adjoining the underframe structure.

9. In a body for vehicles, such as railway cars, an underframe side sill having an inwardly facing channel section and a downwardly projecting flange or web along the inner margin of the lower wall of the channel section, a side wall secured to said side sill on top of the latter, a plate extending longitudinally over a small part of the length of the body and vertically across the mouth of said channel section, said plate being overlappingly secured to said flange of the side sill and to the inner surface of said side wall.

RAYMOND J. THERIAULT.

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