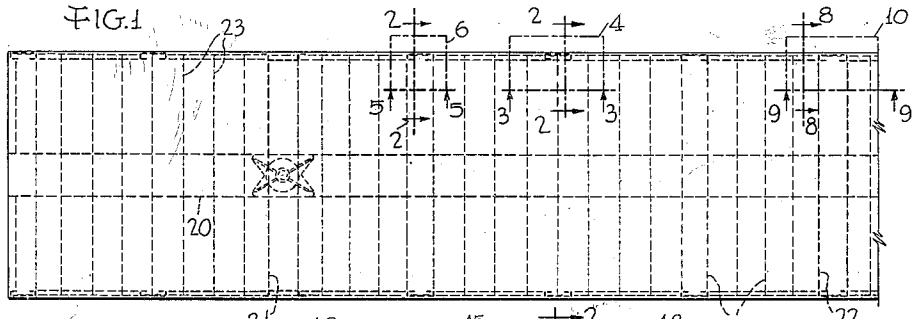
April 18, 1950 W. B. DEAN 2,504,657

BODY FOR VEHICLES, ESPECIALLY RAILWAY CARS

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FIG. 1



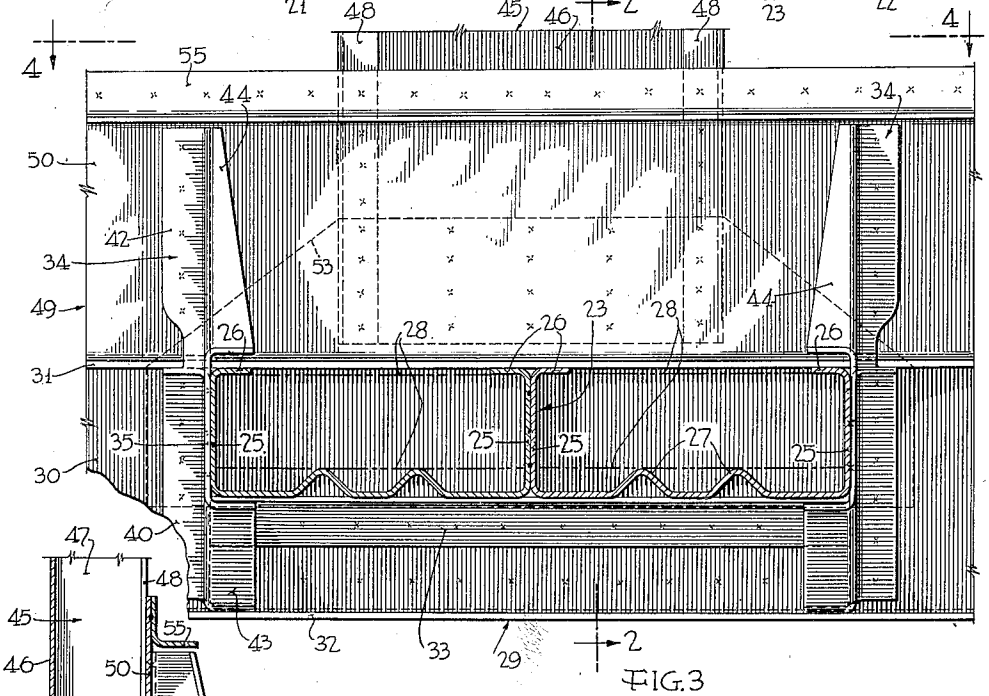


FIG. 3

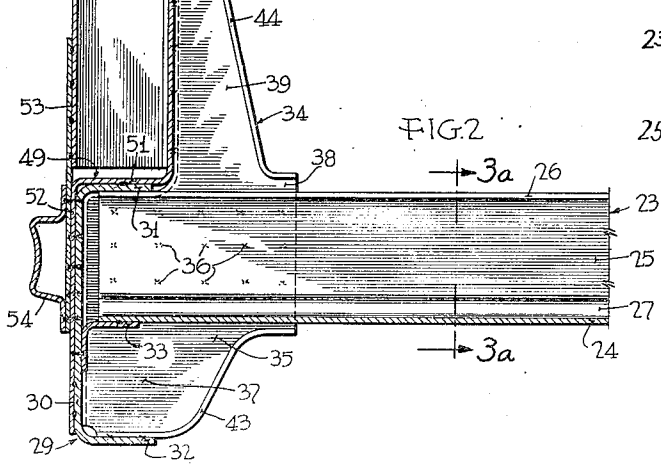


FIG. 2

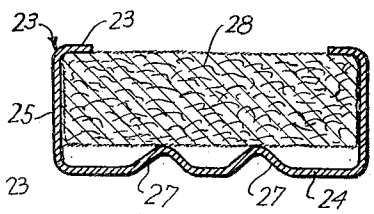


FIG. 3a

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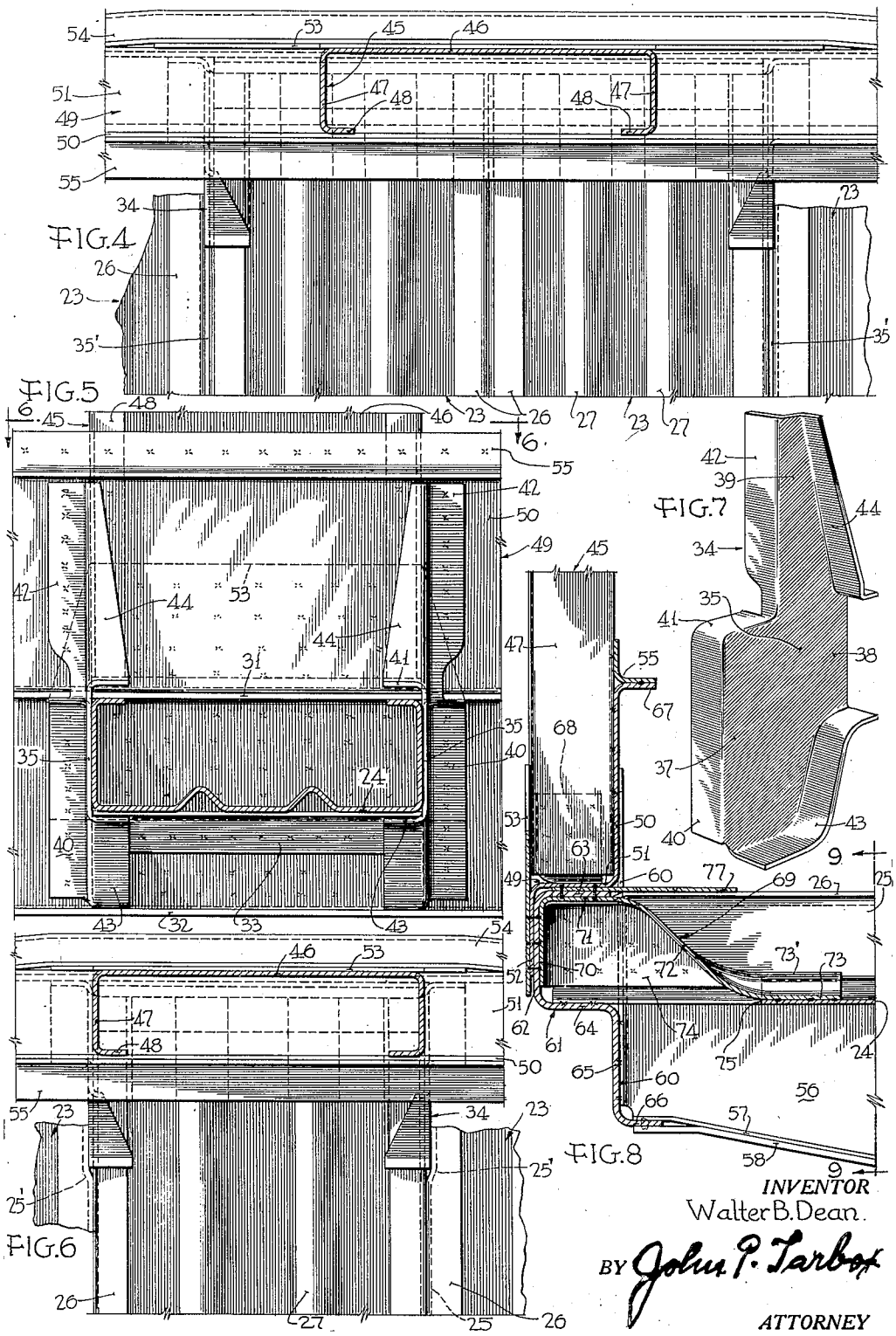
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BODY FOR VEHICLES, ESPECIALLY RAILWAY CARS

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BODY FOR VEHICLES, ESPECIALLY RAILWAY CARS

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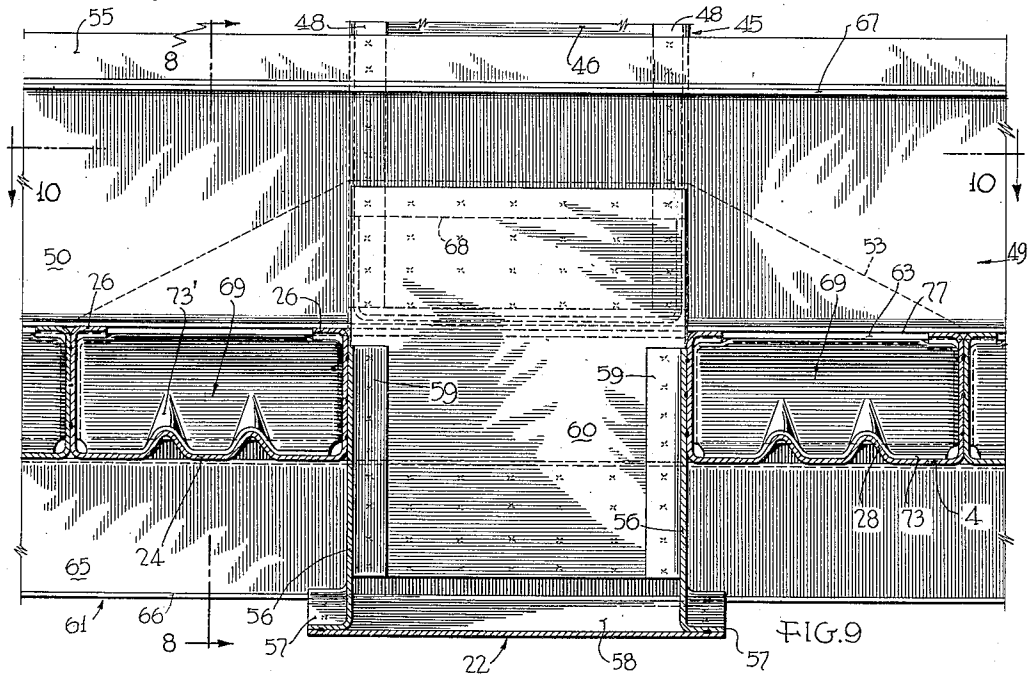


FIG.9

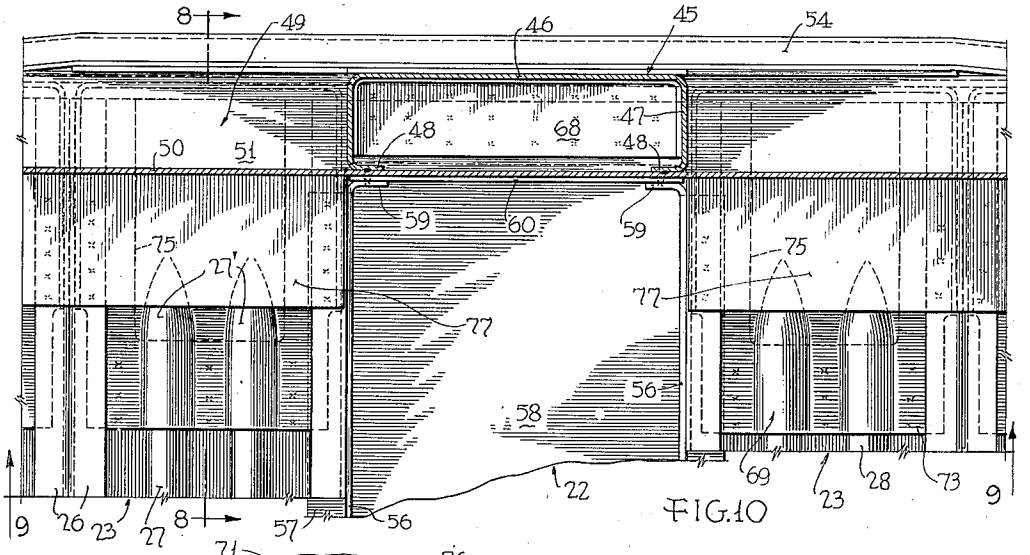


FIG.10

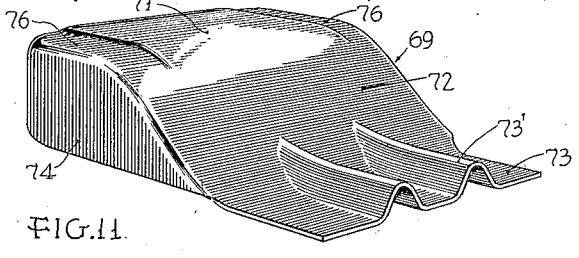


FIG.11

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UNITED STATES PATENT OFFICE

2,504,657

BODY FOR VEHICLES, ESPECIALLY RAILWAY CARS

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Application March 2, 1945, Serial No. 580,646

11 Claims. (Cl. 105—397)

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The invention relates to vehicle bodies, such as railway car bodies, and more particularly to the joint between the body underframe unit and the side wall units.

Among the objects of the invention is a construction the component parts of which are easy to manufacture, which is light in weight, which results in a strong connection between side walls and underframe, and in which the final assembly between underframe unit and side wall units may be easily and speedily made mostly by means of spot welds.

Among the features of the invention is a vehicle construction having an underframe unit provided along its longitudinal margins with side sills or rails presenting each an inwardly and downwardly facing angle in cross-section, and having side wall units provided along their lower margins below vertical posts with an angle- or Z-section sill or rail adapted to be nested over the respective angle-section rail of the underframe so that the overlapping walls of both rails may be secured together. Other features of the invention consist in means, such as plates or brackets, secured to upright transverse webs of the underframe and secured also to the lower portion of the side wall units in the interior of the body.

The hereinbefore outlined and other objects, advantages and features of the invention as well as the details thereof will be more easily understood from the embodiments illustrated in the attached drawings and described in the following.

In the drawings:

Figure 1 is a diagrammatic plan view of one end of a railway car body showing the location of one of the bolster beams, of a needle beam and of the center sill;

Figure 2 is a fragmentary section on a larger scale through the connection between the underframe unit and the side wall taken in one of the regions of the car indicated by lines 2—2 of Figures 1 and 3;

Figure 3 is a fragmentary section and side elevation of the underframe and side wall connection viewed in the directions of the arrows on section line 3—3 of Figure 1;

Figure 3a is a local section along line 3a—3a of Figure 2, showing one floor element and insulation material therein;

Figure 4 is a fragmentary plan view partly in section taken along line 4—4 of Figure 3 and showing on a larger scale the region enclosed by the dot-and-dash line 4 in Figure 1;

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Figures 5 and 6 are views similar to those of Figures 3 and 4, Figure 5 being a section along line 5—5 of Figure 1 at a location of the car where there is a different relative position between the transverse floor members and one of the side wall posts than in Figures 2 to 4, and Figure 6 being a section along line 6—6 of Figure 5 and a plan view of the region surrounded by the dot-and-dash line 6 of Figure 1 on a larger scale;

Figure 7 is a perspective view of one of the brackets shown in Figures 2 to 6 for reinforcing the connection between the underframe and side wall;

Figure 8 is a fragmentary section through the connection between side wall and underframe according to another embodiment of the invention, the section being taken at a location of the body indicated by line 8—8 of Figure 1 and along line 8—8 of Figures 9 and 10;

Figure 9 is a fragmentary elevational section taken along and viewed in the direction of the arrows on line 9—9 of Figures 1, 8 and 10;

Figure 10 is a fragmentary plan view partly in section along line 10—10 of Figure 9 and showing on a larger scale the region of the body surrounded by the dot-and-dash line 10 in Figure 1; and

Figure 11 is a perspective view of one of the reinforcing members at the connection between underframe and side wall as shown in Figures 8, 9 and 10.

The general construction of the body of all illustrated embodiments has in common an underframe comprising a longitudinal center sill 20 with which are connected bolster beams 21, needle beams 22 and other not illustrated cross members.

Arranged on top of and connected with the center sill 20 is a shear panel in the form of transverse floor pans 23. The floor pans are upwardly facing channels or angles having a bottom wall or arm 24, side walls or webs 25 and flanges 26 along the upper margins of the side walls. The floor pans 23 abut each other with their side walls 25 and the adjoining side walls are connected with each other, such as by spot welding. This results in a shear panel which, owing to the upwardly directed side walls webs or arms 25 and the flanges 26, has great rigidity and constitutes a continuous cross beam extending over the entire width and over the entire or at least over a large part of the length of the car.

Ribs or webs 27 extending in the longitudinal direction of the pans and provided in the bottom walls 24 thereof contribute to the stiffness and

serve additionally for the support of insulation 28 diagrammatically indicated by dot-and-dash lines in Figures 3 and 9 and in cross-section in Figure 3a.

In the embodiments shown in Figures 2 to 7, an inwardly facing channel-section sill 29 has its vertical bottom wall 30 arranged outside the end of floor pans 23 and its upper horizontal side wall 31 arranged on top of the flanges 26 of the floor pans 23. The horizontal lower side wall 32 of the sill 29 is arranged at a distance below the bottom wall 24 of the floor pans. Of course, there is a sill 29 on each side of the body. Angle-section strips 33 have one of their arms secured, such as by welding, to the inside of wall 30 whereas the other arm supports and is secured to the bottom walls 24 of the floor pans.

Brackets 34 with their generally web-shaped main portion 35 are inserted between and connected, such as by spot welding, to the ends of the adjacent floor pan side walls 25. The weld spots are diagrammatically indicated by asterisks at 36. The portion 35 has an outwardly projecting portion 37 which fits between the walls 31, 32 of the sill 29, an inwardly directed extension 38 of a height slightly greater than the height of the floor pan side walls 25, and an upwardly directed extension 39. The outer margins of the extensions 37 and 39 as well as the upper margins of the latter are provided with continuous flanges 40, 41 and 42. Oppositely directed flanges 43, 44 are provided respectively along the lower and inner margin, respectively, of the extensions 37, 38.

The bracket 34 is secured by its flanges 40, 41 and the outer portion of its flange 43 to the walls 30, 31, 32 of the side sill 29. The flanges 43, 44 leave between their inner ends a free space for the passage of the respective floor pan and serve for reinforcing and stiffening the bracket. The remaining flange 42 is connected with the side wall unit, as will be described later on.

The side wall unit comprises, in the embodiments of Figures 2 to 7, vertical posts 45 in the form of inwardly facing channels having a bottom wall 46, side walls 47 and marginal flanges 48. The lower ends of the vertical posts are interconnected by a Z-section sill or rail 49 having a vertical inner arm 50 attached to the inside of the flanges 48 of the posts, a web 51 arranged beneath the posts, and an outer arm 52 extended downwardly in about the plane of the bottom wall 46 of the post. Gusset plates 53 overlap the outside of and are connected to the bottom wall 46 of the post and the downwardly extending arm 52 of the sill 49. Note that the plate 53 is longer than the width of the post in the arrangement shown in Figures 3 and 4; the purpose of this will become apparent later on.

A skid or rub rail 54 is welded to the outside of the plates 53 and to the arm 52 of the sill 49. Spacer strips (not shown) may be inserted between the skid rail 54 and the arm 52 so as to compensate for the thickness of the plates 53 rather than offsetting the rail 54 as shown in Figures 4 and 6. The sill 49 is supplemented by an angle-section strip 55 welded by one of its arms to the arm 50 of the sill along the upper margin thereof whereas the other arm extends inwardly.

After the underframe and the side wall have been assembled in including the parts along their margins as hereinbefore described, the two units are connected with each other by nesting the underframe sill 29 in the angle formed by the web 51 and the arm 52 of the side wall sill 49 and by welding the overlapping walls together. The flanges 42 of the brackets 34 overlap the inside of the upper arm 50 of the side wall sill 49 and are welded thereto in the course of the final assembly operation.

Where two of the floor pans 24 meet in the region of a post 45, as shown in Figures 3 and 4, one bracket 34 each is arranged on either side of the post and the gusset plate 53 extends in both directions to and preferably somewhat beyond the locations of the two brackets.

If, as illustrated in Figures 5 and 6, a floor pan and a post register, brackets 34 are arranged on both sides of such floor pan so that the flanges 42 of the brackets are connected to arm 50 of the side wall sill 49 adjacent the flanges 48 of the post.

In the case of Figures 3 and 4 as well as in the case of Figures 5 and 6, the brackets 34 strongly reinforce the connection between underframe and side wall and assist in the transmission of the stresses from and into the posts of the side walls. Furthermore, the brackets 34 act as reinforcing webs between the side walls 31, 32 of the underframe sills 29.

The number of brackets of the disclosed type to be arranged in one body is more or less optional and depends upon the conditions to be met and the stresses which are expected. One bracket may be arranged between each two floor pans but mostly it will suffice to arrange brackets in the region of the side wall posts in the manner illustrated in Figures 2 to 6.

It will be noted that for the sake of clarity in Figures 3 and 5, the floor pans 23 between two brackets 34 are only shown. However, Figures 4 and 6 show fragmentary views of adjoining floor pans. In Figure 4, spacer strips 35' between adjoining walls 25 of the floor pans compensate for the thickness of the webs 35 of the brackets 34. In Figure 6, the side walls 25 of certain floor pans are for the same purpose offset at 25'. Similarly, accommodations (not shown) have to be made at the ends of the respective floor pans for the flange 41 of the brackets 34.

Obviously, the embodiment or embodiments of the invention as shown in Figures 2 to 7 are not restricted to the specific form of the gusset plates, the floor pans, the side rails and to the specific arrangement thereof as illustrated and described, but are susceptible to modifications.

In the embodiment illustrated in Figures 8 to 11, the same type floor pans are employed and the construction of the side wall is substantially the same so that these parts do not need to be described in detail once again and so that the same reference numerals are employed for corresponding details. Any differences will be outlined as the description goes along.

Figures 8 to 10 show the connection between side wall and underframe at and near the region of one of the underframe needle beams or cross bearers 22 which registers with one of the side wall posts 45.

The needle beam 22 comprises longitudinally spaced vertical webs or walls 56 provided along their lower margins with oppositely directed flanges 57 which are interconnected by a bottom plate 58 so that an upwardly facing deep trough is formed, the depth of which increases toward the longitudinal center of the car. The outer end margins of the webs 56 are provided with flanges 59 connected to a plate 60 forming part of the final assembly means between underframe and side wall.

The underframe side sill 61 comprises an in-

wardly facing channel section having a vertically arranged bottom wall 62, an upper side wall 63 and a lower side wall 64, the latter being continued by downwardly and inwardly extending webs or flanges 65, 66. The channel-section portion 62, 63, 64 is of such width as to telescopingly receive and embrace the outer ends of the floor pans 23. The ends of pans 23 may, for this purpose, be slightly reduced in height, such as by joggling of the flanges 26, as appears clearly from Figures 8 and 9. The aforesaid plate 60 and the flanges 59 of the needle beam are secured to the web 65 of the side sill 61. The bottom wall 58 and the flanges 57 of the side walls of the needle beam overlap with their outer ends the flange 66 of the side sill and are connected thereto, such as by spot welding.

The specific features described in the preceding two paragraphs do not constitute part of the instant invention but of the invention claimed in the simultaneously filed application, Serial No. 580,647, "Body construction especially for rail cars" of R. J. Theriault.

The upper arm 50 of the side wall sill 49 is provided with an inwardly extending flange 67 to which one arm of the angle-section strip 55 is welded whereas the other arm of the latter is secured directly to the flanges 48 of the side wall posts 45. The connection between the post 45 and web 51 of the side sill 49 is strengthened by a member 68 of U-shape in horizontal and L-shape in vertical section. The U section is secured with its arms to the side walls 47 and with its middle portion to the bottom wall 46 of the post 45 whereas the lower arm of the L-section is secured to the web 51 of the side sill 49.

The connection between the ends of the floor pans 23 and the underframe side sill 61 and thereby the connection between the underframe and side wall is reinforced by members 69 telescoped into and connected with the ends of the floor pans. The members 69, one of which is separately shown in Figure 11, have a web which in transverse vertical section (Figure 8) has approximately the form of a lying T with an outer vertically arranged portion or arm 70 adjoined by a horizontal portion 71, which latter is continued by an inclined portion 72, and ending in a substantially horizontal portion 73. The side margins of the portions 70, 71 and 72 have their lateral margins interconnected by transversely extending vertical web portions 74.

The members 69 are slid into the ends of the floor pans 23 which have their bottom walls 24 at the ends cut out as indicated by lines 75. The portion 73 of the member 69 is provided with beads 73' corresponding to and fitting over the beads or ridges 27 of the floor pans. The side margins of the web portion 71 are downwardly offset at 76 so that they underlie the flanges 26 of the respective floor pan 23 whereas the middle portion is at the same level as the flanges. The web portions 70, 71 and the flanges 26 rest against and are welded respectively to the inside of the arms 62, 63 of the side sill 61 whereas the arms or webs 74 and the inner end of the web portion 73 overlap and are welded to the side walls 25 and the bottom wall 24, respectively, of the floor pan.

In the illustrated embodiment, one of said reinforcing pieces 69 is provided for each floor pan on the sides of the needle beam and post location. A gusset plate 53 extends continuously across the post 45 and across the ends of both the floor pans 23 provided with the members 69. Here again, the brackets 69 connected with the

side walls of the floor pans greatly contribute to the strength of the connection between underframe and side wall, especially in the region of a post.

The connection between side wall and underframe is in Figures 8 to 10 substantially the same as described for the first embodiment except that in the second embodiment plate 60 of the underframe is welded to the arm 50 of the side wall sill 49.

An additional reinforcement may be provided by a horizontal plate 77 which overlies and is secured to the flanges 26 of the floor pans and extends close to the outer wall 62 of the side sill. This plate 77, which after final assembly lies between the arms 63 and 51 of the sills 61 and 49, may be a continuous web extending over a considerable part or the entire length of the car. On the other hand, the plate or plates 77 may be used for local reinforcement in the region of the posts and may extend only over floor pans adjacent the post, which floor pans are provided with the reinforcing members 69. The plate 77 is cut out at the location of the needle beam so as to make room for the passage of the plate 60.

Also in connection with this embodiment, it should be noted that any desired number of members 69 may be provided. That is, such members may be arranged at the location of great stress, they may be distributed over the entire length of the body, or they may even be provided in each one of the floor pans. Still further, the second embodiment of reinforcing members may be used in connection with different floor constructions as outlined in connection with the first embodiment, or the two types of reinforcements may be used in one and the same body.

All the floor pans and also the needle beams may house insulating material. Floor boards, seat supporting rails etcetera (not shown) are supported by the flanges 26 of the floor pans. The entire disclosed structure consists of sheet metal, preferably cold-rolled high-tensile stainless steel. The connection between the component parts is preferably made throughout by electric spot welding as indicated by asterisks or by dots at the interfaces.

The attached claims are intended to cover the specifically described embodiments as well as all such modifications and adaptations falling within the spirit of the invention.

What is claimed is:

1. In a vehicle body such as a railway car body, an underframe unit and a side wall unit each comprising frame members extending transversely to the longitudinal extent of the unit, the transverse frame members of said underframe unit being provided along their ends on each side of the body with a side sill having an upper inwardly extending arm overlying and secured to the upper side and a downwardly extending outer arm overlying the outer ends of the transverse underframe members, said side wall unit comprising an angle-section side sill having a horizontal arm underlying the lower ends of said transverse frame members of the side wall unit and an outer downwardly depending arm, said sill of the side wall unit nesting with its said arms over the said arms of the underframe sill and being secured thereto.

2. In a body for vehicles such as railway cars, an underframe unit and a side wall unit joined together along their meeting edges, said underframe unit having transversely extending members with a generally horizontal wall and a gen-

erally vertical web, a sill of angle-section facing inwardly and downwardly having one of its arms arranged on top of and the other downwardly extending arm arranged at the end of said transverse members, said side wall unit having a Z-section sill and upright posts with longitudinally extending webs or flanges along their inner margins, said sill having its web arranged beneath the posts, one upwardly directed arm arranged on the inside of said inner webs or flanges of the posts and connected thereto and the other arm extended downwardly and arranged in the region of the outer face of the posts, said web and downwardly extending arm of the side wall unit being nested over and secured to the arms of the side sill of the underframe unit in final assembly so that the ends of the posts are arranged over the ends of the transverse members of the underframe unit.

3. Understructure for vehicle bodies comprising transverse floor members having horizontal walls and transversely extending vertical webs, an angle-section side sill having an upper inwardly extending arm secured on top of the transverse members and an outer downwardly extending arm arranged on the outside of the ends of and extending downwardly beyond the transverse members, a reinforcing bracket attached to the outer ends of one of said webs, having a portion nesting in the angle formed by the arms of said sill and being secured to the flanges thereof, said portion extending likewise downwardly beyond the transverse members, said bracket having furthermore an upwardly directed extension for interbracing the outer end of the underframe and the lower margin of a body side wall.

4. In a vehicle body, a floor pan comprising a horizontal shear panel and longitudinally spaced transversely extending vertical webs thereon, a reinforcing member at the outer longitudinal margin of the floor pan, said member having U-shape in longitudinal vertical section, being connected by the arms of the U in overlapping relation to two consecutive ones of said webs, and having its bottom wall spaced from said shear panel so that the shear panel and said bottom wall offer together two vertically spaced surfaces for the attachment of means adapted for reinforcing the connection of the floor pan with a body side wall.

5. In a body according to claim 4, said member having a vertical wall or flange at its outer end adapted for the connection to a vertical wall of a side sill.

6. In a body according to claim 4, the bottom wall of said member having its inner portion offset in vertical direction and brought into overlapping relation to said shear web panel to which it is secured.

7. In a vehicle floor, a panel of sheet material such as sheet metal provided with upwardly projecting reinforcing webs, a plurality of beads formed between consecutive webs as integral one-piece portions of the panel, said beads being spaced from each other and from said webs and projecting upwardly from the panel thereby presenting supports for insulation material arranged between said reinforcing webs.

8. In a vehicle underframe, a floor comprising upwardly facing channels having their side walls

connected to each other, upwardly projecting beads formed in the bottom walls of the channels and extending at a distance from each other and from said side walls in the longitudinal direction of the channels, insulating material supported by said beads at a distance from the bottom walls of the channels in the space between the side walls thereof.

9. In a body underframe for vehicles such as railway cars; a floor panel extending over the width of the frame and over a major portion of its length; longitudinally spaced transversely extending, generally upright webs reinforcing said floor panel; a section side sill having an upright wall and a horizontal arm extending inwardly from the upper margin of said upright wall; said wall and arm fitting over the ends of said panel and webs and said wall extending downwardly beyond them; and a bracket extending vertically across and upwardly and downwardly beyond said panel and webs, said bracket being secured to the downwardly projecting portion of said side sill wall, and the upwardly projecting portion of the bracket being adapted for securement to an adjoining body side wall.

10. In a body underframe for vehicles such as railway cars; a floor panel extending over the width of the frame and over a major portion of its length; longitudinally spaced, transversely extending, generally upright webs reinforcing said floor panel; a section side sill having an upright wall and a horizontal arm extending inwardly from the upper margin of said upright wall; said wall and arm fitting over the ends of said panel and webs; and a bracket extending upwardly beyond said panel and webs and being secured to some of said webs, the upwardly projecting portion of the bracket being adapted for securement to an adjoining body side wall.

11. In a body for vehicles, such as railway cars, an underframe and a side wall; said underframe comprising a floor panel extending over the width of the frame and over a major portion of its length, longitudinally spaced, transversely extending, generally vertical webs reinforcing said floor panel, and a section side sill having an upright web and a horizontal arm extending inwardly from the upper margin of said upright web, said last named web and arm fitting over the ends of said panel and its webs, and said side sill web extending downwardly beyond them; said side wall being located on top of said arm; and a bracket extending vertically across and upwardly and downwardly beyond said panel and its webs, said bracket being secured to the downwardly projecting portion of said side sill web, and the upwardly projecting portion of the bracket being secured to the inner surface of said side wall.

WALTER B. DEAN.

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