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INSULATED LOAD SUPPORTING STRUCTURAL BEAMS FOR
REFRIGERATED TRAILERS

2,857,196

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2 Sheets-Sheet 1

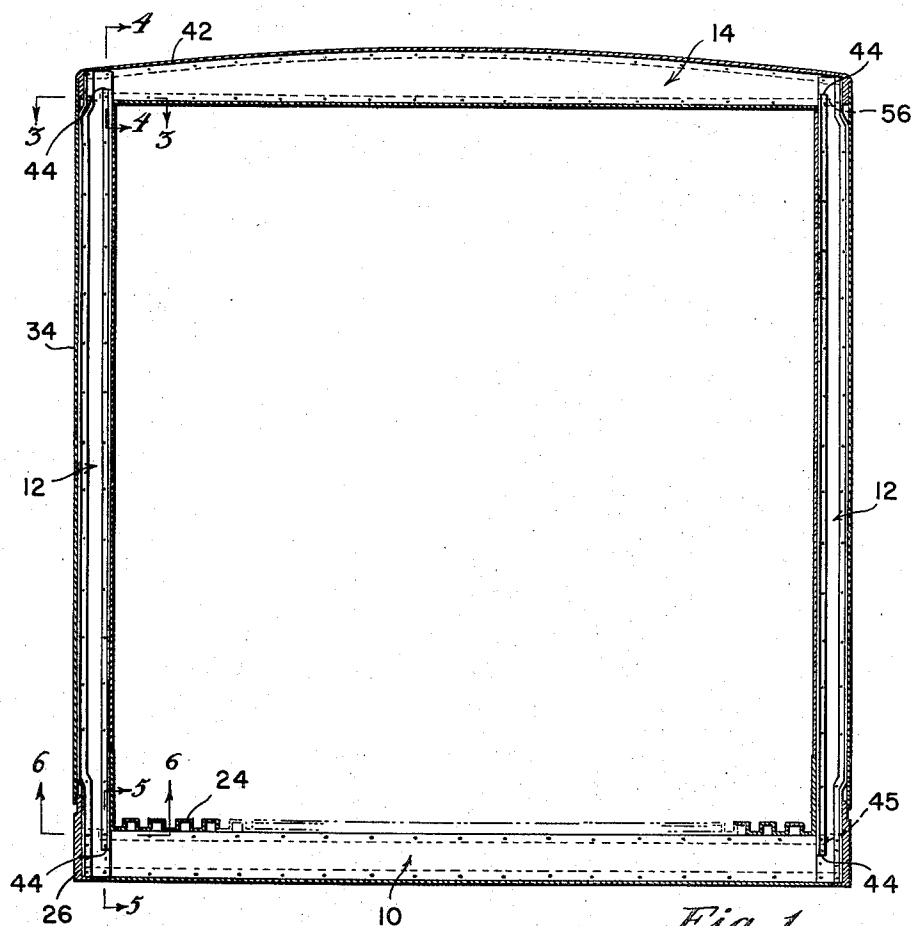


Fig. 1.

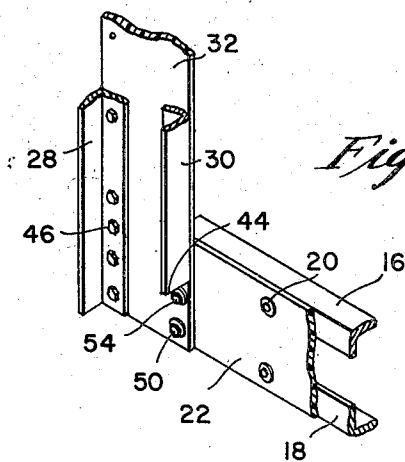


Fig. 2.

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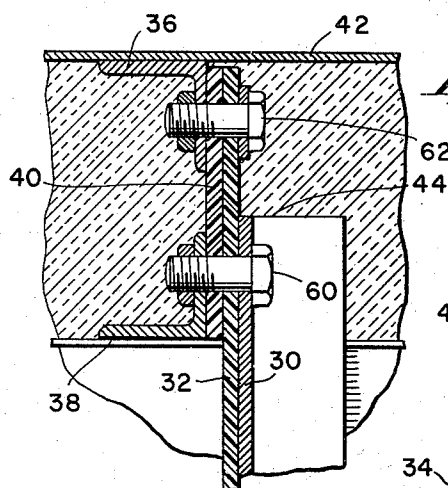


Fig. 4.

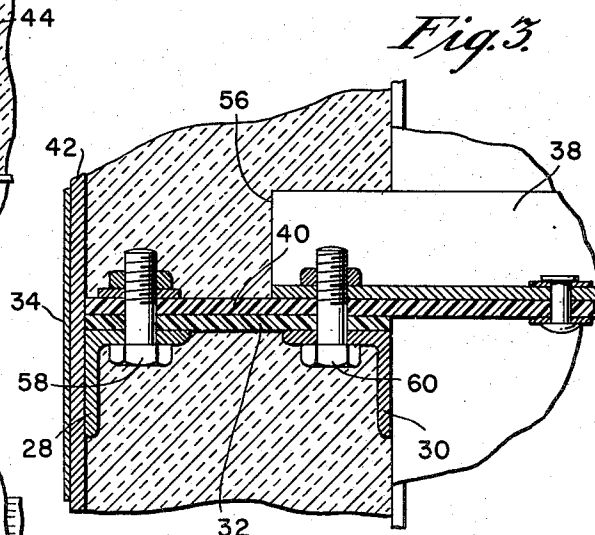


Fig. 3.

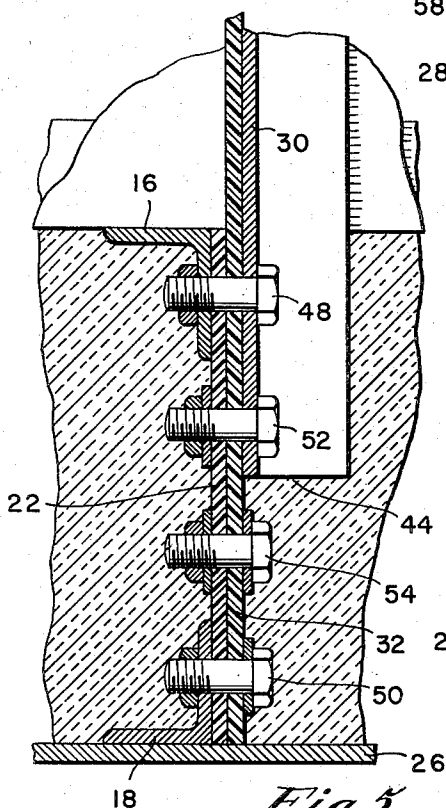


Fig. 5.

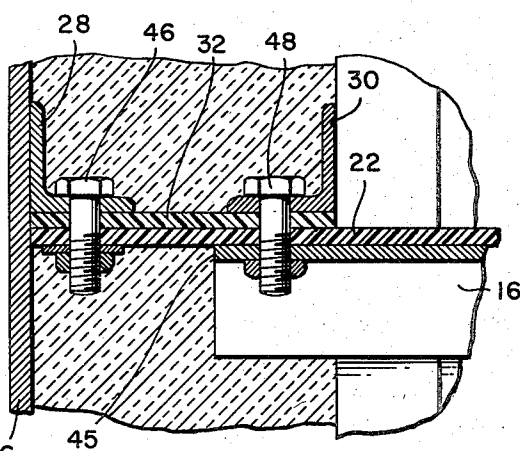


Fig. 6.

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INSULATED LOAD SUPPORTING STRUCTURAL BEAMS FOR REFRIGERATED TRAILERS

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Application May 9, 1955, Serial No. 506,758

7 Claims. (Cl. 296—28)

This invention relates to structural beams for refrigerator vehicle bodies.

The primary object of this invention is to provide a refrigerator vehicle body in which the structural beams, that is the floor-supporting cross-sills, the roof-supporting cross beams and the wall-supporting vertical posts, are each made of metallic sections interconnected by a non-heat conductive structural section. Thus each beam is structurally sound from the point of view of load support and impact-resistance and at the same time performs an important thermo-dynamic function in the refrigerator vehicle body in that the transfer of heat across each beam is considerably minimized because of the intermediate non-heat conductive structural section.

A further object of the invention is to provide a refrigerator vehicle body in which each of the structural beams is comprised of a pair of metallic sections interrupted by a non-heat conductive structural section, the beams being attached to each other in such a manner that there is a complete absence of metal to metal contact and the non-heat conductive sections are continuous around the vertical cross-sectional girth of the vehicle body.

Another object of the invention is to provide structural beams of the character described which are easy and inexpensive to fabricate and easy and inexpensive to assemble in a refrigerator vehicle body, such as a refrigerator trailer body.

These and other objects of the invention will become more apparent as the following description proceeds in conjunction with the accompanying drawings, wherein:

Figure 1 is a vertical sectional view through a refrigerator trailer looking towards the rear thereof;

Figure 2 is a fragmentary enlarged perspective view illustrating the manner in which a pair of structural beams are secured to each other at their ends;

Figure 3 is an enlarged sectional view taken on the line 3—3 of Figure 1;

Figure 4 is an enlarged sectional view taken on the line 4—4 of Figure 1;

Figure 5 is an enlarged sectional view taken on the line 5—5 of Figure 1; and

Figure 6 is an enlarged sectional view taken on the line 6—6 of Figure 1.

Specific reference will now be made to the drawings wherein similar reference characters are used for corresponding elements throughout.

The structural beams of the present invention can be employed in association with a refrigerator vehicle body, preferably a motor vehicle trailer body, and comprises essentially two metallic sections secured to and separated by a non-heat conductive structural section so that the entire beam will perform two functions namely, that of load support or impact-resistance and as a means of minimizing conductivity of heat from one metallic beam section to another. The metallic sections may be made of any suitable metal such as steel, aluminum, etc. and the

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non-heat conductive section may be made of any material which is structurally sound and capable of serving as a load-supporting or impact-resisting member but which is a heat insulating member. The preferred non-heat conductive material is a plastic which is strong, light-weight, moisture and corrosion resistant, preferably fibrous glass molded in a low pressure plastic such as the polyester resins. Examples of such polyester resins are "Paraplex 'P' Series Resins" and "Vibrin" resins.

The three essential structural beams required in a substantially rectangular refrigerator vehicle body are the floor-supporting cross-sills 10 extending transversely of the body, the longitudinally spaced, vertically extending, side wall-supporting posts 12, and the transversely extending roof-supporting cross beams 14. Each of said structural beams is constructed in identical ways in accordance with the principles of the present invention.

Thus, the cross-sills 10 include vertically spaced upper and lower metallic sections 16 and 18 which are preferably L-shaped. Secured by appropriate bolts, nuts and washers 20 to the vertically aligned flanges of the metallic sections 16 and 18 is a sheet 22 of a non-heat conductive material, the sheet being preferably of a height equal to the spacing of the outer flanges of the metallic members 16 and 18. Any suitable floor 24 may be secured upon the upper metallic members 16 and a suitable metallic skin 26 may be suitably secured to the lower flanges of the lower metallic members 18.

In a similar manner, each of the vertical posts on both sides of the trailer body consists of a pair of metallic members 28 and 30, preferably L-shaped, to the vertically aligned flanges of which is secured by appropriate bolts, nuts and washers a non-heat conductive sheet 32 of a width approximating the spacing of the horizontally extending flanges of the metallic members 28 and 30. A conventional metallic outer skin 34 is secured upon the outer faces of the metallic sections 28.

Also in a similar manner, the roof-supporting cross beams 14 each consists of a pair of upper and lower spaced metallic members 36 and 38, preferably L-shaped, to the vertically aligned flanges of which is secured by appropriate bolts, nuts and washers a non-heat conductive material 40 which is of substantially the same height as the spacing between the outer flanges of the metallic members 36 and 38. Appropriately secured to the upper metallic sections 36 is a metallic roof 42.

The non-heat conductive sheets are preferably molded of fibre glass in a polyester resin and each sheet may be of three-sixteenths ($\frac{3}{16}$) to three-eighths ($\frac{3}{8}$) inch thickness. Thus it will be seen that each of the cross-sills 10, the vertical posts 12 and the cross-beams 14 are structural units comprised of two structural metal sections secured to and interrupted by a structural non-heat conductive section.

The ends of the cross-sills 10 are secured to the lower ends of the vertical posts 12 and the ends of the cross beams 14 are secured to the upper ends of the vertical posts 12 in such a manner that there is no metal to metal contact and the non-heat conductive sheets are continuous around the vertical cross-sectional girth of the vehicle body. This is accomplished in the following manner. The inner metallic sections 30 of the vertical posts 12 are shorter than the outer metallic sections 28, as shown at 44. The upper section 16 of the cross-sill 10 is shorter than the lower section 18, as shown at 45. The end of the cross-sill is positioned against the lower end of the vertical post so that the non-heat conductive sheets contact each other. Suitable bolts and nuts 46 are used to secure the outer metallic section 28 to the outer end of the cross-sill 10, the shanks of the bolts extending through the non-heat conductive sheets 22 and 32 which serve to

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prevent metallic contact between the section 28 of the vertical post and the lower sections 16 and 18 of the cross-sill. Additional bolts and nuts 48 are used to secure the inner metallic member 30 to the two non-heat conductive sections 22 and 32 and to the flange of the upper metallic section 16 of the cross-sill. Further bolts and nuts 50 are used to secure the two non-heat conductive sections 22 and 32 to the lower metallic section 18 of the cross-sill. The bolts, nuts and washers 52 secure the inner section 30 of the vertical post to the non-heat conductive sections 22 and 32 adjacent the end 44 of the section 30 and bolts, nuts and washers 54 secure the two non-heat conductive sections 22 and 32 solely to each other below the end 44 of the section 30 of the vertical post, as shown in Figure 5.

In every case where the bolt extends through the non-heat conductive material, a washer is provided to bear against the non-heat conductive material for better gripping action and to prevent frictional wear of the non-heat conductive material at points of attachment.

The connection of the upper end of the vertical posts 12 to the roof-supporting cross beams 14 is essentially the same as the connection hereinabove described between the ends of the cross-sills and the lower ends of the vertical posts.

As in the case of the cross-sills, the lower metallic members 38 of the cross beams 14 are shorter than the upper metallic sections 36, as shown at 56 in Figure 3. At their ends, the vertical post 12 is positioned against the cross beam 14 so that the non-heat conductive sections 32 and 40 contact each other. The upper end of the outer metallic section 28 of the vertical post is secured to the upper metallic section 36 of the cross beam by means of a suitable bolt, nut and washer and is further secured to the non-heat conductive sections 32 and 40 beyond the end 56 of the lower section 38 of the cross beam by means of a suitable bolt, nut and washer 58. The inner metallic section 30 of the vertical post 12 is secured adjacent its end 44 to the lower sections 38 of the cross beam 14 by means of a suitable nut and bolt 60, the shank of said bolt extending through the non-heat conductive sections 32 and 34. The upper metallic section 36 of the cross beam 14 is secured beyond the end 44 of the inner section 30 of the vertical post solely to the two non-heat conductive sections 32 and 40 by means of a suitable bolt, nut and washer 62.

Thus it will be seen that the non-heat conductive sections are continuous along the vertical cross-sectional girth of the vehicle body. And, because the inner metallic sections 30 of the vertical posts are foreshortened, they do not contact the metallic roof 42 and the metallic closure member 26 for the cross-sills. Because the lower metallic members 38 of the cross beams 14 are foreshortened, they do not contact the metallic roofs 42 or the metallic skins 34. Similarly, because the upper metallic sections 16 of the cross beams 10 are foreshortened, they too do not contact the metallic closure members 26 or the metallic skins 34. Thus, there is no metal to metal contact between the outer metallic members of the vehicle body and the inner metallic sections of the structural posts so that heat loss is considerably minimized.

It will be understood that in the completion of the refrigerator vehicle body, appropriate heat insulation material such as fibre glass, rock-wool and the like will be retained between the metallic sections of the structural posts hereinabove described.

While a preferred embodiment of the invention has been shown and described hereinabove, it will be understood that a skilled artisan may make minor variations without departing from the spirit of the invention and the scope of the appended claims.

I claim:

1. A refrigerator vehicle body having floor supporting cross sills, vertical side wall supporting structural posts

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and roof-supporting cross beams, each cross sill being secured at its ends to the lower ends of a pair of said vertical posts and each cross beam being secured at its ends to the upper ends of a pair of vertical posts, each of said cross sills, vertical posts and cross beams including spaced metallic load supporting beam sections and an intermediate load supporting section of non-heat conductive material joining said metallic sections, the intermediate non-heat conductive material of said cross sills, vertical posts and cross beams being in contact with each other at the ends of said sills, posts and beams and extending collectively continuously around the vertical girth of the refrigerator vehicle body metallic sections thereof being free of direct contact with each other.

2. In a refrigerated vehicle body having an outer metallic shell comprising side walls, a roof and a floor undercover, insulated structural load supporting members including floor-supporting cross-sills, vertical side wall supporting posts and roof-supporting cross beams, each of said cross-sills including upper and lower metallic flange members and a section of non-heat conductive load supporting material connecting said members, the lower flange member being secured to said floor undercover and the upper flange member terminating at its ends short of the corresponding ends of said lower flange member, each of said vertical side wall supporting posts including inner and outer metallic flange members and a section of non-heat conductive load supporting material connecting said inner and outer flange members, said inner flange member terminating at its upper and lower ends short of the corresponding ends of said outer flange member with the latter being secured to a side wall of the vehicle body, the lower ends of said vertical posts being secured to the ends of said cross-sills with face to face contact only of said non-heat conductive sections, the outer flange members only of said vertical posts extending to said metallic floor undercover and the lower flange member only of said cross-sill extending to the vehicle side walls, each of said roof-supporting cross beams including upper and lower metallic flange members interconnected by a non-heat conductive load supporting section, the lower cross beam flange member terminating at its ends short of the corresponding ends of the upper cross beam flange members with the latter being secured to the roof, the upper ends of a pair of vertical posts being secured to the ends of said cross beam with face to face contact only of said non-heat conductive sections, the outer flange members only of said vertical posts extending to said roof and the upper flange member only of said cross beam extending to the vehicle side walls so that the non-heat conductive sections are continuous around the vertical girth of the vehicle body and the inner and lower metallic flange members of said cross-sills, cross beams and vertical posts being free of direct contact with the outer metallic shell of the vehicle body.

3. A refrigerator vehicle body having floor supporting cross sills, vertical side wall supporting structural posts and roof supporting cross beams, the ends of said cross sills being connected to the lower ends of said posts and the ends of said cross beams being connected to the upper ends of said posts, each of said cross sills, posts and cross beams comprising spaced load supporting metallic structural members, and an intermediate load supporting section of non-heat conductive material joining said metallic sections, the intermediate non-heat conductive material of said cross sills, posts and cross beams only being in contact with each other at the ends thereof, and the metallic structural members of said sills, posts and beams being free of direct contact with each other.

4. A refrigerator vehicle body having side walls and a floor provided with supporting posts and cross sills respectively, each of said posts including inner and outer load supporting metallic structural members and a load supporting section of non-heat conductive material con-

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necting said structural members, the lower end of said inner structural member terminating short of the corresponding end of said outer structural member, each of said cross sills including upper and lower load supporting metal structural members and a load supporting section of non-heat conductive material connecting said structural members, said upper structural member terminating at its ends short of the corresponding ends of said lower structural member, said cross sills being connected at the ends thereof to said posts with the non-heat conductive material only of said cross sills and posts in contact with each other, and the metallic structural members of said cross sills and posts being free of direct contact with each other.

5. A refrigerator vehicle body having a floor and walls supported thereby, said floor having load supporting cross sills and each of said walls having load supporting posts, a metallic outer skin on said walls and a metallic undercover on said floor, each of said cross sills comprising upper and lower load supporting metallic structural members and a load supporting section of non-heat conductive material connecting said structural members, said lower structural member being secured to said metallic undercover, said upper structural member terminating at its ends short of the corresponding ends of said lower structural member, each of said posts comprising inner and outer load supporting metallic structural members and a load supporting section of non-heat conductive material connecting said structural members, said outer structural member being secured to the metallic outer skin of said wall, the lower end of said inner structural member terminating short of the corresponding end of said outer structural member, the lower ends of said posts being secured to the ends of said cross sills with face-to-face contact only between the non-heat conductive sections thereof, the outer structural members only of said posts extending to said floor undercover and the lower structural members only of said cross sills extending to the metallic outer skin of said walls, the metallic structural members of said cross sills and said posts being free of direct contact with each other.

6. A refrigerator vehicle body including vertical walls and a roof supported thereby, said walls having spaced load supporting posts and said roof having correspondingly spaced cross beams, each of said posts including inner and outer load supporting metallic structural members and a load supporting section of non-heat conductive material connecting said inner and outer structural members, said inner structural member terminating at its upper end short of the corresponding end of said outer structural member, each of said cross beams hav-

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ing upper and lower load supporting metallic structural members interconnected by a load supporting section of non-heat conductive material, the lower cross beam structural member terminating at its ends short of the corresponding ends of said upper cross beam structural member, said posts being connected at the upper ends thereof to the ends of said cross beams with face-to-face contact only between said non-heat conductive sections thereof, and the metallic structural members of said posts and cross beams being free of direct contact with each other.

7. A refrigerator vehicle body having vertical walls and a roof supported thereby, said walls having load supporting posts and a metallic outer skin and said roof having load supporting cross beams, each of said posts including inner and outer load supporting structural members and a load supporting section of non-heat conductive material connecting said structural members, said inner structural member terminating at its upper end short of the corresponding end of said outer structural member, each of said roof supporting cross beams including upper and lower load supporting metallic structural members interconnected by a load supporting section of non-heat conductive material, said lower structural member terminating at its ends short of the corresponding ends of said upper structural member, the outer structural members of said posts being fastened to the metallic outer skin of the body and the upper structural members of said beams being fastened to said roof, the upper ends of said posts being secured to the ends of said cross beams with face-to-face contact only between said non-heat conductive sections thereof, the outer structural members only of said posts extending to said roof and upper structural members only of said cross beams extending to the metallic outer skin of said side walls, the metallic structural members of said cross beams and posts being free of direct contact with each other and the inner and lower structural members of said posts and cross beams being free of direct contact with said skin and said roof.

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