April 27, 1965 P. TALMEY 3,180,286

RAILWAY REFRIGERATOR CARS

Original Filed March 14, 1960 5 Sheets-Sheet 1

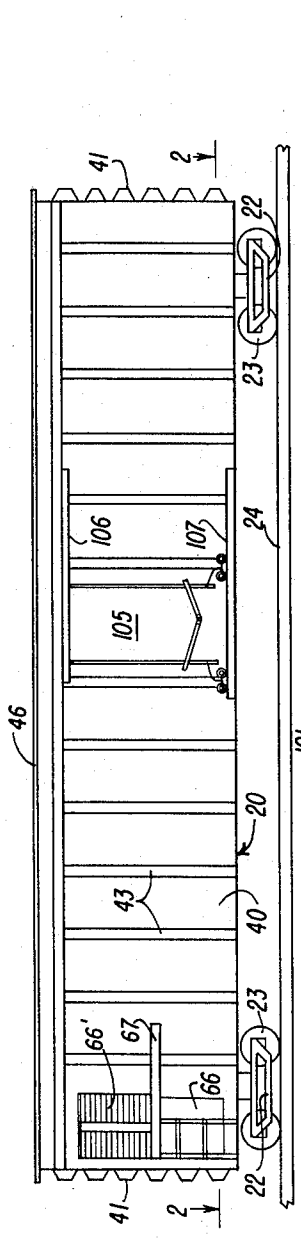

FIG. 1

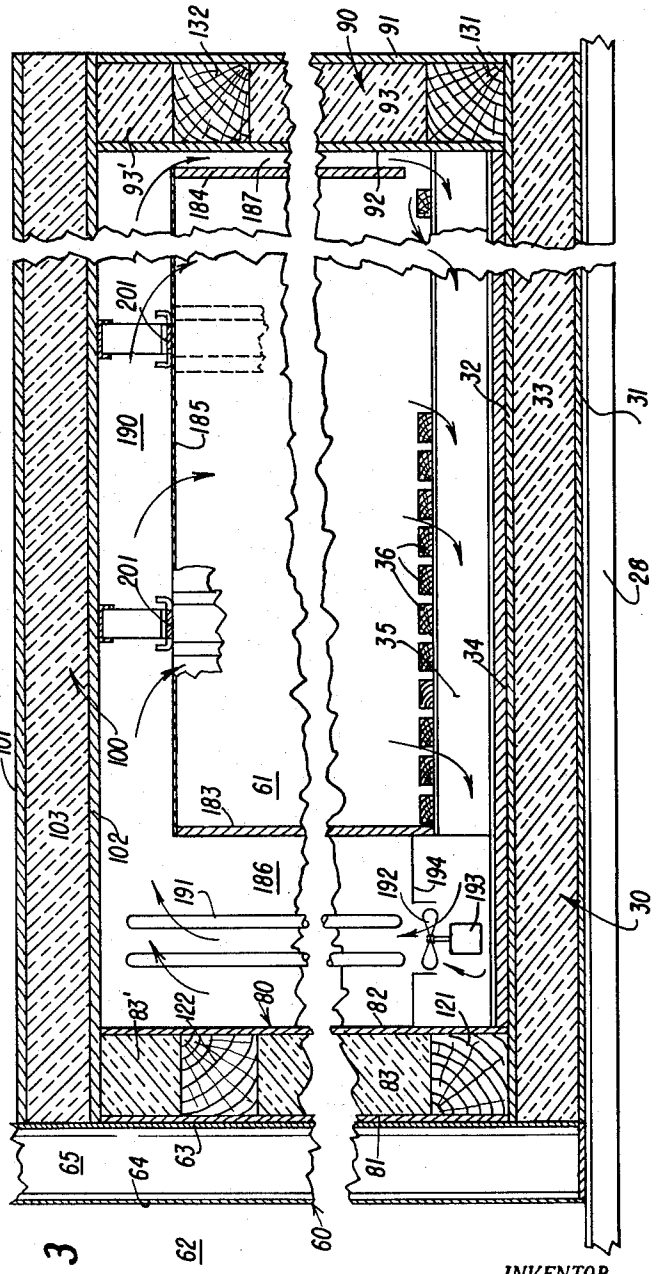

FIG. 3

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RAILWAY REFRIGERATOR CARS

Original Filed March 14, 1960 5 Sheets-Sheet 2

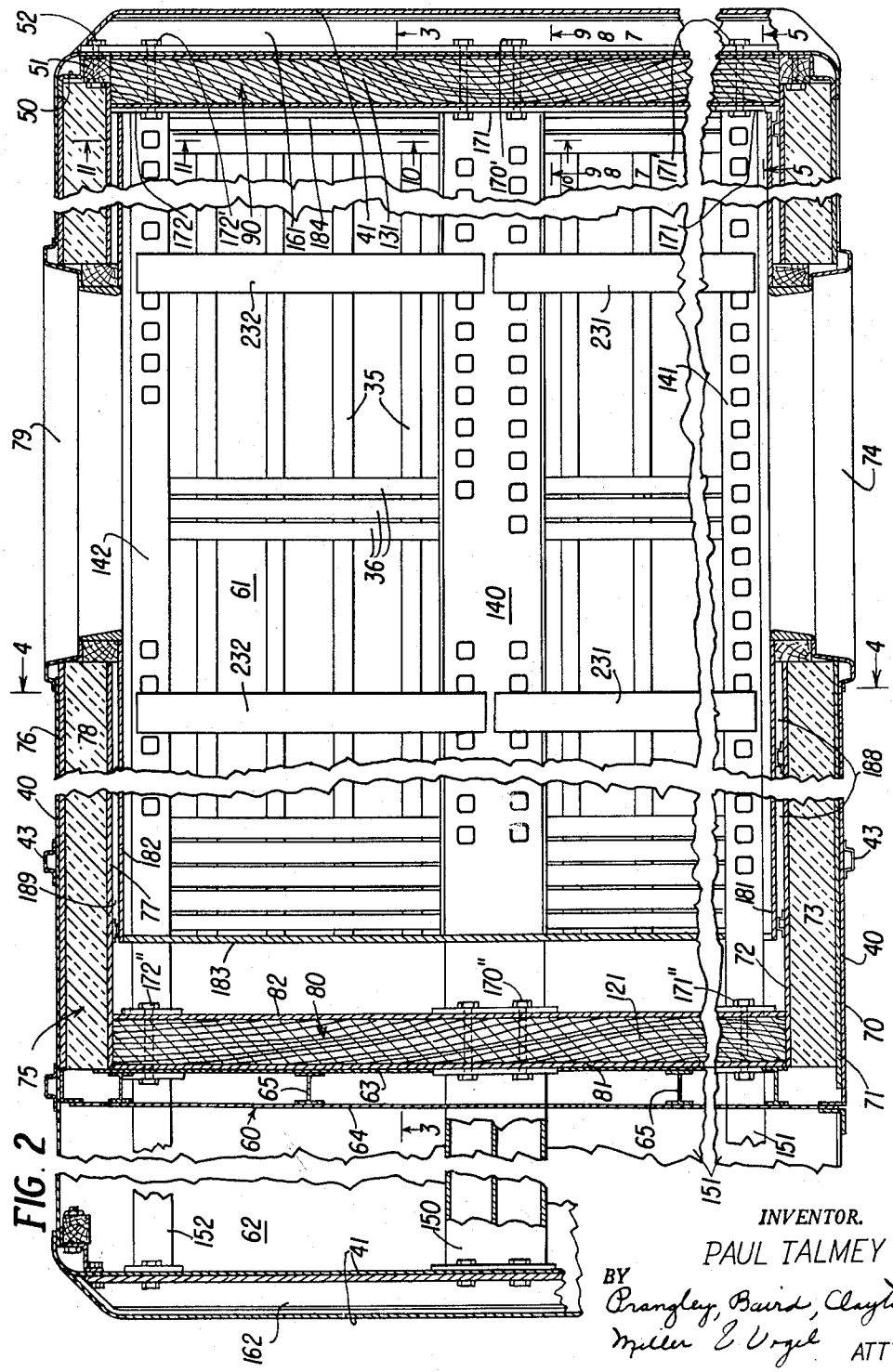

FIG. 2

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RAILWAY REFRIGERATOR CARS

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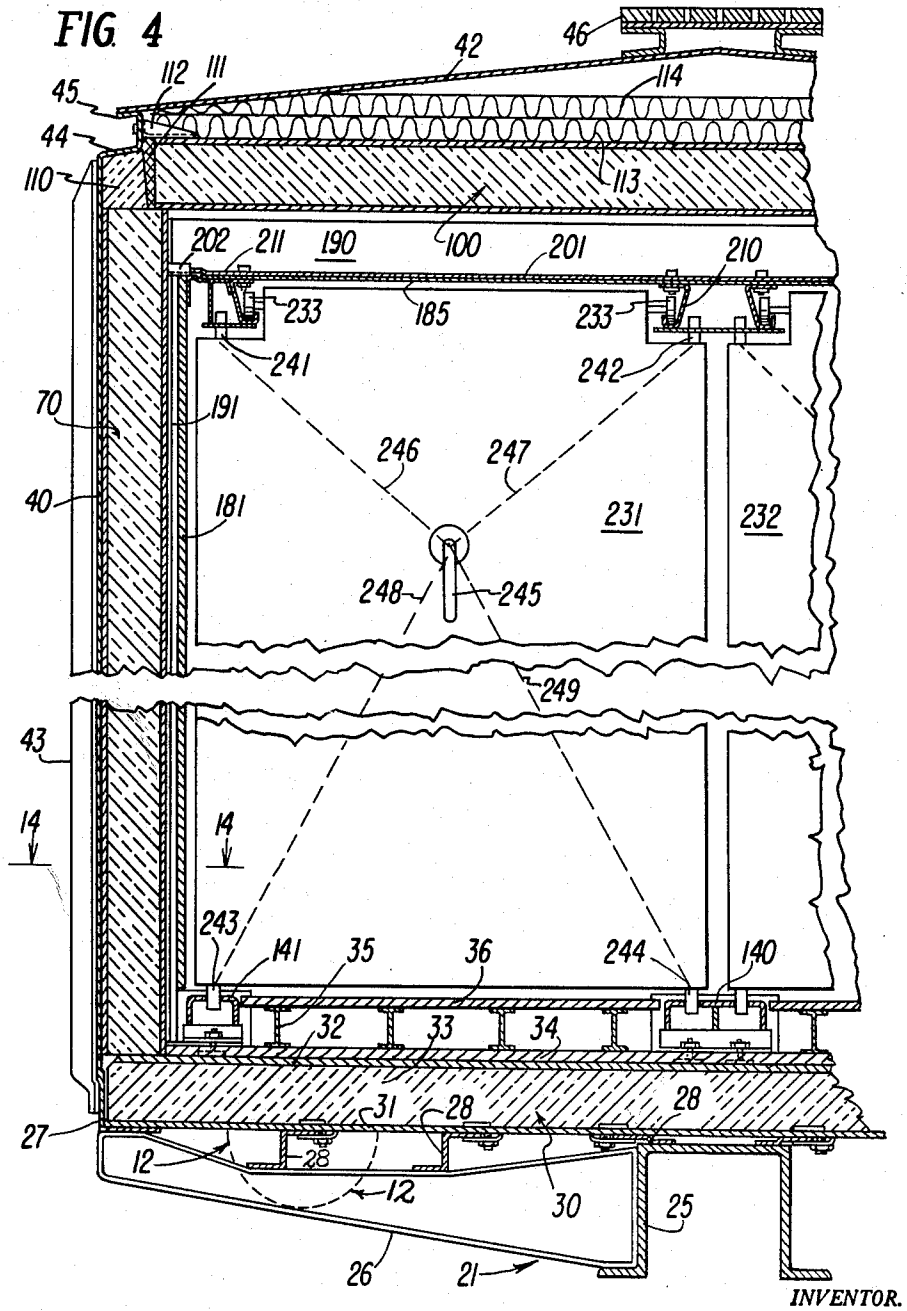
FIG. 4



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RAILWAY REFRIGERATOR CARS

Original Filed March 14, 1960 5 Sheets-Sheet 4

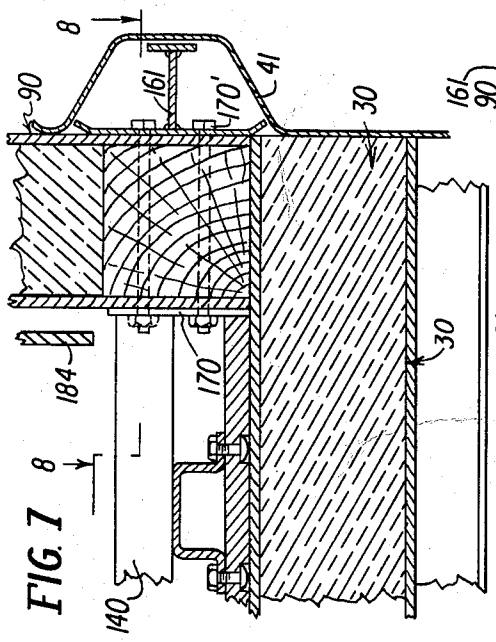

FIG. 7

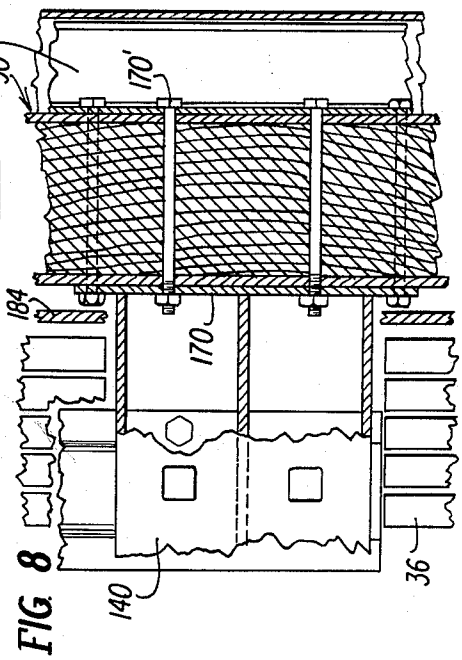

FIG. 8

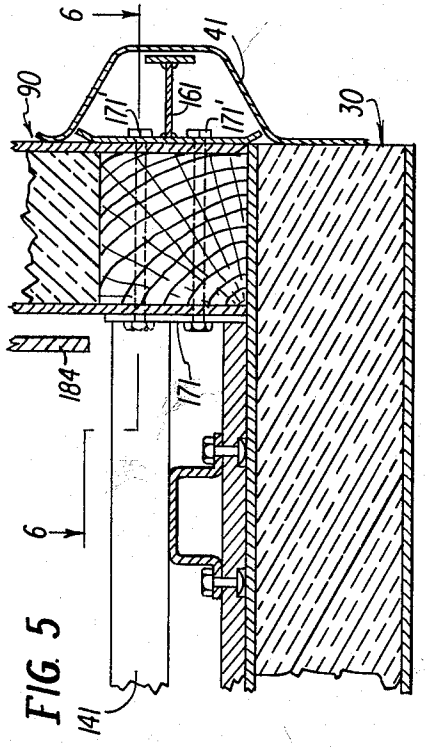

FIG. 5

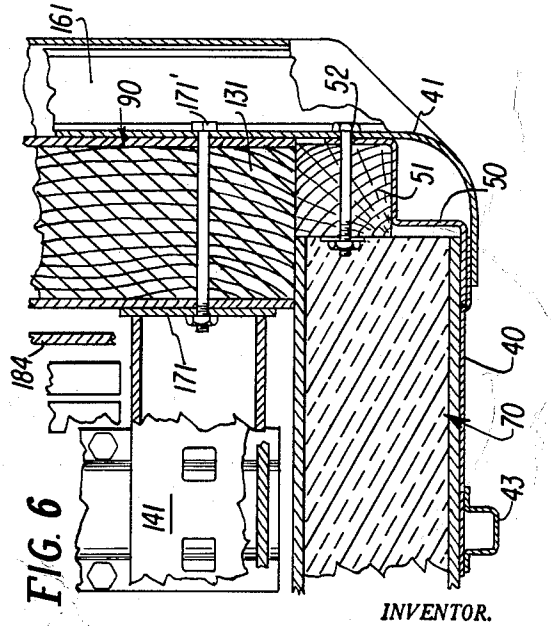

FIG. 6

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RAILWAY REFRIGERATOR CARS

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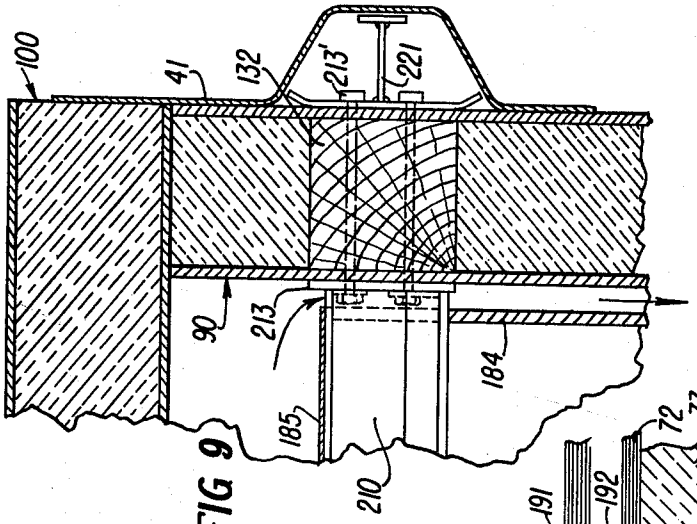

FIG 9

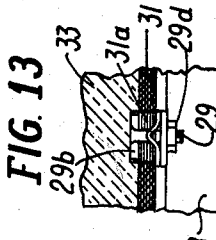

FIG. 13

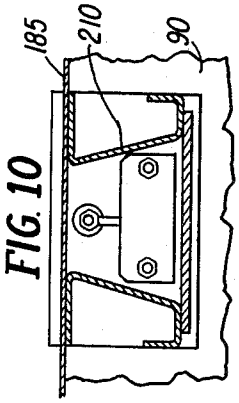

FIG. 10

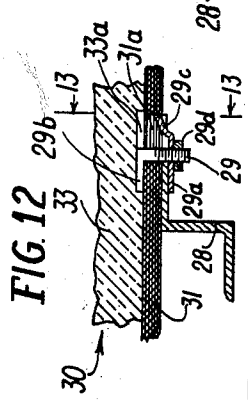

FIG. 12

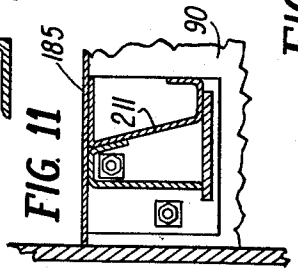

FIG. 11

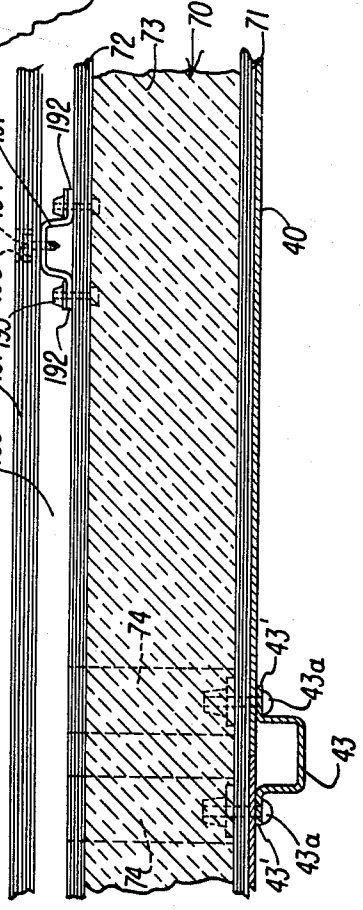

FIG. 14

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United States Patent Office 3,180,286 Patented Apr. 27, 1965

3,180,286

RAILWAY REFRIGERATOR CARS

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Original application Mar. 14, 1960, Ser. No. 14,788, now Patent No. 3,062,156, dated Nov. 6, 1962. Divided and this application Nov. 22, 1961, Ser. No. 154,248

11 Claims. (Cl. 105—404)

The present invention relates to heat-insulated railway cars, and more particularly to railway refrigerator cars. This application is a division of the copending application of Paul Talmey, Serial No. 14,788, filed March 14, 1960, now Patent No. 3,062,156.

It is a general object of the present invention to provide a railway car body that comprises a rigid substantially box-like shell, a substantially box-like heat-insulating liner housed in the shell and defining a lading chamber therein, wherein the liner is formed of a plurality of individual prefabricated panels, and improved constructional arrangements for securing the individual panels of the liner in place to the cooperating elements of the shell, so as to produce a strong uniform construction.

Another object of the invention is to provide a railway car body of the character noted that further includes an improved arrangement of a plurality of sheets disposed in the lading chamber and cooperating with certain of the panels of the liner to define a plurality of flues for circulating cold air through the lading chamber.

A further object of the invention is to provide a railway car body of the type noted that comprises an improved arrangement of the individual heat-insulating panels that are incorporated in the sides and in the ceiling of the liner, together with additional heat-insulating structure arranged in the upper corners at the junctions between the top edges of the side panels and the side edges of the ceiling panel, so as to minimize heat-leakage into the lading chamber adjacent to the junctions between the side walls and the roof of the shell.

A further object of the invention is to provide a railway car body of the type noted that includes an improved structural arrangement for securing in place the ceiling panel with respect to the adjacent side panels and end panels of the liner and involving an improved disposition of brackets carried by the side walls of the shell.

A further object of the invention is to provide a railway car body of the type noted that incorporates an improved structural arrangement for securing in place the side panels of the liner and the side walls of the shell, and a plurality of outside posts that are provided for the purpose of reinforcing the side walls of the shell.

A further object of the invention is to provide a railway refrigerator car body that comprises a rigid substantially box-like shell, a substantially box-like heat-insulating liner housed in the shell and defining both a lading chamber therein and a machinery compartment between one end wall of the shell and the adjacent end wall of the liner, and an improved disposition of flue sheets disposed within the lading chamber and cooperating with the boundary walls of the liner to provide an improved flue arrangement for the circulation of cold air throughout the lading chamber for the purpose of effecting refrigeration of the lading contained therein.

Further features of the invention pertain to the particular arrangement of the elements of the heat-insulated railway car body, whereby the above-outlined and additional operating features thereof are attained.

The invention, both as to its organization and method of operation, together with further objects and advantages thereof, will best be understood by reference to the following specification, taken in connection with the accompanying drawings, in which:

FIGURE 1 is a side elevational view of a railway refrigerator car embodying the present invention;

FIG. 2 is an enlarged fragmentary horizontal sectional view of the refrigerator car, taken along the line 2—2 in FIG. 1;

FIG. 3 is an enlarged fragmentary longitudinal sectional view of the refrigerator car, taken along the line 3—3 in FIG. 2;

FIG. 4 is an enlarged fragmentary lateral sectional view of the refrigerator car, taken along the line 4—4 in FIG. 2;

FIG. 5 is a greatly enlarged fragmentary longitudinal sectional view of the lower right-hand corner of the refrigerator car, taken along the line 5—5 in FIG. 2;

FIG. 6 is a greatly enlarged fragmentary horizontal sectional view of the lower right-hand corner of the refrigerator car, taken along the line 6—6 in FIG. 5;

FIG. 7 is a greatly enlarged fragmentary longitudinal sectional view of the lower central portion of the right-hand end of the refrigerator car, taken along the line 7—7 in FIG. 2;

FIG. 8 is a greatly enlarged fragmentary horizontal sectional view of the lower central portion of the right-hand end of the refrigerator car, taken along the line 8—8 in FIG. 7;

FIG. 9 is a greatly enlarged fragmentary longitudinal sectional view of the upper central portion of the right-hand end of the refrigerator car, taken along the line 9—9 in FIG. 2;

FIG. 10 is a greatly enlarged fragmentary lateral sectional view of the upper central portion of the right-hand end of the refrigerator car, taken along the line 10—10 in FIG. 2;

FIG. 11 is a greatly enlarged fragmentary lateral sectional view of the upper left-hand corner of the refrigerator car, taken along the line 11—11 in FIG. 2;

FIG. 12 is a greatly enlarged lateral sectional view and development of the detail of the connection of the stringer and the floor panel, as indicated by the broken line 12—12 in FIG. 4;

FIG. 13 is a greatly enlarged longitudinal sectional view of the detail mentioned, taken along the line 13—13 in FIG. 12; and

FIG. 14 is a greatly enlarged horizontal sectional view of the side wall of the refrigerator car, taken along the line 14—14 in FIG. 4.

Referring now to FIGS. 1 to 4, inclusive, of the drawings, the railway refrigerator car 20 there illustrated, and embodying the features of the present invention, essentially comprises a rigid longitudinally extending underframe 21 that is carried by a pair of longitudinally spaced-apart trucks 22 provided with flanged wheels 23 cooperating with the track rails of an associated railway track, indicated at 24. As best shown in FIG. 4, the underframe 21 comprises a longitudinally extending center sill 25 carrying a plurality of laterally extending and longitudinally spaced-apart side trusses 26 that, in turn, carry a pair of longitudinally extending and laterally spaced-apart side sills 27, as well as a pair of laterally extending and longitudinally spaced-apart end sills, not shown, and also a number of longitudinally extending and laterally spaced-apart stringers 28. The underframe 21 is of skeleton construction and directly carries upon the top thereof a substantially horizontally disposed floor panel 30.

More particularly, the floor panel 30 is of composite construction, including a plurality of cooperating sections suitably secured together; and each of the sections of the floor panel 30 essentially comprises an outer ply-

wood sheet 31, an inner plywood sheet 32 and an intervening or intermediate slab 33 of heat-insulating material. Preferably, the slab 33 essentially comprises a block of foamed polystyrene having a high compressive strength; and the plywood sheets 31 and 32 are suitably cemented to the opposite surfaces of the slab 33 by intervening layers of water-impervious cement, not shown. Accordingly, the individual sections of the floor panel 30 may be prefabricated and then assembled and secured together to define the composite floor panel 30 carried upon the top of the underframe 21.

As best shown in FIGS. 12 and 13, the floor panel 30 may be secured to each of the stringers 28 by a series of longitudinally spaced-apart bolts 29 and cooperating clips 29*a*. In the arrangement, an opening 31*a* is formed only through the outer plywood sheet 31 of the floor panel 30 and communicating with an aligned cavity 33*a* provided in the adjacent outer surface of the polystyrene slab 33. Also the bolt 29 is provided with a threaded shank and an annular offset head 29*b*, so that the head 29*b* may be inserted through the opening 31*a* provided in the outer plywood sheet 31 and into the cavity 33*a* formed in the polystyrene slab 33; whereupon the shank of the bolt 29 is rotated so as to cause the head 29*b* thereof to rotate in the cavity 33*a* and to overlap the adjacent portion of the outer plywood sheet 31 disposed immediately above the upper flange of the stringer 28. Also, the clip 29*a* is provided with an upwardly offset tongue 29*c* that is arranged in the opening 31*a*, when the central hole provided in the clip 29*a* is arranged on the threaded shank of the bolt 29; which tongue 29*c* disposed in the opening 31*a* prevents rotation of the clip 29*a*, after the cooperating nut 29*d* is threaded upon the shank of the bolt 29. Accordingly, in the final assembly, the upper flange of the stringer 28 and the adjacent portion of the outer plywood sheet 31 are securely clamped between the head 29*b* of the bolt 29 and the clip 29*a* that is secured in place upon the shank of the bolt 29 by the associated cooperating nut 29*d*. This arrangement is very advantageous as it effects positive securing of the floor panel 30 to the stringers 28, without the provision of bolts through the floor panel 30, thereby to minimize the transfer of heat from the exterior through the floor panel 30.

The construction and arrangement of the fastening device, including the bolt 29 and the clip 29*a*, and the particular cooperation thereof with the floor panel 30, are disclosed and claimed in the copending application of Arthur E. Nyberg, Serial No. 66,865, filed November 2, 1960.

The upper surface of the inner plywood sheet 32 of the floor panel 30 carries a main floor 34 suitably secured thereto and formed of wood; and a plurality of longitudinally extending and laterally spaced-apart stringers 35, in the form of I-beams, are carried by the main floor 34 and suitably secured thereto. In turn, the upper flanges of the I-beams 35 carry a plurality of laterally extending and longitudinally spaced-apart boards 36 formed of wood and suitably secured thereto; which boards 36 define a work-floor or lading-supporting floor upon the floor panel 30.

Further, the refrigerator car 20 comprises a body of substantially box-like form that includes a pair of longitudinally extending and laterally spaced-apart side walls 40, a pair of laterally extending and longitudinally spaced-apart end walls 41 and a roof 42, all formed of sheet steel. In the arrangement, the lower end of each of the side walls 40 is suitably secured, as by welding, to the adjacent outer surface of the side sill 27; and each of the side walls 40 is reinforced by a plurality of upstanding and longitudinally spaced-apart outside posts 43 suitably secured thereto, as by welding. Similarly, the lower end of each of the end walls 41 is suitably secured, as by welding, to the adjacent outer surface of the end sill, not shown; and each of the end walls 41 is reinforced by deep laterally extending and vertically spaced-apart corrugations formed therein. The upper end of each of the side walls 40 is provided with a substantially Z-shaped construction 44 terminating in an outwardly directed eave flange 45 that is suitably secured, as by welding, to the adjacent eave of the roof sheet 42, as best shown in FIG. 4. Also, the upper ends of the two end walls 41 are brought to suitable junctions with the ends of the roof sheet 42 and suitably secured thereto in a manner, not shown, as by welding. Further, the central portion of the roof 42 carries a longitudinally extending catwalk 46 of any suitable construction and for the usual purpose.

As best shown in FIGS. 2 and 6, each of the four corners of the car body is reinforced by an arrangement including an upstanding post 50 formed of steel and a cooperating upstanding post 51 formed of wood. Specifically, the post 50 has a substantially W-shape in lateral section and bridges together the adjacent portions of the side wall 40 and the end wall 41, the end wall 41 wrapping around the post 50 and overlapping the adjacent end of the side wall 40. Also, the post 50 embraces two sides of the post 51 to provide a strong unitary construction. The post 51, one wing of the post 50 and the adjacent portion of the end wall 41 are rigidly secured together by a series of vertically spaced-apart bolts 52 extending through aligned openings therein; which bolts 52 may be formed of stainless steel in order to minimize the heat flow therethrough. As illustrated, the end of the side wall 40 is arranged between the overlapping end of the end wall 41 and the other wing of the post 50; which assembly may be rigidly retained in place, as by welding.

An upstanding laterally extending partition 60 is arranged within the car body adjacent to the left-hand end thereof, so as to subdivide the interior of the car body in a lading compartment 61 disposed on the right-hand side of the partition 60 and a machinery compartment 62 disposed on the left-hand side of the partition 60, as shown in FIG. 2. In the arrangement, the lading compartment 61 is substantially larger than the machinery compartment 62; and the partition 60 is of composite construction including inner and outer steel sheets 63 and 64, secured together in spaced-apart relation by a plurality of upstanding I-beams 65 arranged in laterally spaced-apart relation. As indicated in FIG. 1, the opposite lower sides of the machinery compartment 62 are accessible from the exterior through cooperating doorways respectively provided in the side walls 40; which doorways are normally closed by sliding doors 66 that are respectively supported by suitable guideways 67 carried by the side walls 40 of the car body. In passing, it is mentioned that refrigerating machinery, not shown, is removably supported in the machinery compartment 62; which refrigerating machinery may be removed from the machinery compartment 62 through the doorways provided in the side walls 40, when the doors 66 occupy their open positions. Also, the side walls 40 respectively carry ventilated panels 66′ communicating with the opposite upper portions of the machinery compartment 62 in order to accommodate ventilation of the refrigerating machinery disposed therein.

Further, the car body houses a heat-insulating liner that includes, in addition to the previously described floor panel 30, two side panels 70 and 75, and two end panels 80 and 90, and also a ceiling panel 100. The side panel 70 is arranged adjacent the lower side wall 40, as shown in FIG. 2, and comprises a plurality of sections suitably secured together; the side panel 70 being of composite construction essentially the same as that of the floor panel 30, preivously described; whereby the side panel 70 includes the outer plywood sheet 71, the inner plywood sheet 72 and the intermediate slab 73 of foamed polystyrene. The side panel 75 is arranged adjacent to the upper side wall 40, as shown in FIG. 2, and comprises a plurality of sections suitably secured together; the side panel 75 being of composite construction essentially the same as that of the floor panel 30 previously described; whereby the side panel 75 includes the outer plywood sheet 76, the inner plywood sheet 77

and the intermediate slab 78 of foamed polystyrene. The end panel 80 is arranged adjacent to the partition 60, as shown in FIG. 3, and comprises a plurality of sections suitably secured together; the end panel 80 being of composite construction essentially the same as that of the floor panel 30 previously described; whereby the end panel 80 includes the outer plywood sheet 81, the inner plywood sheet 82 and the intermediate slab 83 of foamed polystyrene. The end panel 90 is arranged adjacent to the right-hand end wall 41, as shown in FIG. 3, and comprises a plurality of sections suitably secured together; the end panel 90 being of composite construction essentially the same as that of the floor panel 30 previously described; whereby the end panel 90 includes the outer plywood sheet 91, the inner plywood sheet 92 and the intermediate slab 93 of foamed polystyrene. The ceiling panel 100 is arranged below the roof 42, as shown in FIGS. 3 and 4, and comprises a plurality of sections suitably secured together; the ceiling panel 100 being of composite construction essentially the same as that of the floor panel 30, previously described; whereby the ceiling panel 100 includes the outer plywood sheet 101, the inner plywood sheet 102 and the intermediate slab 103 of foamed polystyrene.

Referring now more particularly to FIGS. 2, 3 and 4, it will be appreciated that the composite heat-insulating liner that is housed in the car body comprises the six individual heat-insulating panels 30, 70, 75, 80, 90 and 100 that constitute the boundary wall structure of the lading compartment 61. In the arrangement, the lower ends of the side panels 70 and 75 are supported directly upon the adjacent marginal sides of the floor panel 30, the lower ends of the end panels 80 and 90 are supported directly upon the adjacent marginal ends of the floor panel 30, the opposite sides of the ceiling panel 100 respectively partially overlap the respective upper ends of the side panels 70 and 75 (as shown in FIG. 4), and the opposite ends of the ceiling panel 100 respectively fully overlap the respective upper ends of the end panels 80 and 90 (as shown in FIG. 3). Also a doorway is provided through the side panel 70 and the adjacent side wall 40; which doorway is suitably framed, as indicated at 74 in FIG. 2; likewise a doorway is provided through the side panel 75 and the adjacent side wall 40; which doorway is suitably framed, as indicated at 79 in FIG. 2. The doorways 74 and 79 are provided with cooperating heat-insulating doors, in the usual manner; the door 105 cooperating with the doorway 74 being indicated at FIG. 1 as supported upon cooperating upper and lower guides 106 and 107.

The side panels 70 and 71 are securely fastened to the respective side walls 40 of the car body; and as best illustrated in FIG. 14, the side panel 70 may be secured to the adjacent side wall 40 of the car body at each of the upstanding outside posts 43 utilizing a number of "Huck" bolts, or other blind fasteners 43*a*. In the arrangement, the outside post 43 is substantially U-shaped in lateral cross-section including a pair of outwardly directed flanges 43' that are directly secured in place with respect to the side wall 40 by the fasteners 43*a*; which fasteners 43*a* also secure in place the outside sheet 71 of the adjacent side panel 70. Specifically, two cylindrical cores 74 may be cut from the composite construction of the side panel 70 in alignment with the two fasteners 43*a* and removed from the side panel 70 prior to the setting of the fasteners 43*a* firmly in position, so that the fasteners 73*a* secure in place the outside post 43, the side walls 40 of the car body and the outside plywood sheet 71 of the adjacent side panel 70. After setting of the fasteners 43*a*, the cores 74 may be again coated with a suitable glue or cement and then reinserted into the holes provided through the styrofoam slab 73 and through the inner plywood sheet 72, thereby again to provide unbroken heat-insulation through the side panel 70 between the plywood sheets 71 and 72, so as to minimize heat flow from the exterior through the side panel 70 into the lading compartment 61.

As previously noted, the opposite sides of the ceiling panel 100 only partially overlap the upper ends of the respective side panels 70 and 75, thereby providing voids between the side walls 40 and the opposite sides of the ceiling panel 100 adjacent to the junctions of the side walls 40 and the opposite sides of the roof sheet 42. As illustrated in FIG. 4, these voids are filled with insulating material; and specifically, the void mentioned defined adjacent to the junction of the side of the ceiling panel 100 and the upper end of the side panel 70 is filled by a longitudinally extending preformed block 110 of foamed polystyrene and a mass 111 of foamed-in-place polyurethane. In producing the assembly, as shown in FIG. 4, the ceiling panel 100 is secured in place by a series of longitudinally spaced-apart brackets 112 carried by the upper portion of the Z-shaped construction 44 provided at the upper end of the adjacent side wall 40; which brackets 112 project inwardly over the ceiling panel 100 and clamp the same securely in place. The preformed block 110 is arranged as a filler block upon the upper end of the side panel 70; and the space between the filler block 110 and the adjacent side of the ceiling panel 100 is filled with the mass 111 of foamed polyurethane. More particularly, the polyurethane material mentioned may be foamed in place as the last step in producing the assembly, and after the filler block 110 is positioned upon the upper end of the side panel 70 and after the brackets 112 have been secured in place to position the ceiling panel 100. Furthermore, two layers 113 and 114 of fibrous insulating material, such as glass fibers, are arranged upon the top of the ceiling panel 100 and in the space between the ceiling panel 100 and the roof sheet 42, thereby substantially to fill this void and further to insulate the lading compartment 61 against the entry of heat thereinto through the roof sheet 42.

Again reverting to the construction of the end panels 80 and 90 and referring to FIGS. 2 and 3, it is pointed out that these panels incorporate additional structure that is not necessary in the construction of the side panels 70 and 75. Specifically, lower and upper beams 121 and 122 are respectively incorporated in the lower and the upper ends of the end panel 80, which beams 121 and 122 may be formed of oak or other strong wood. The lower beam 121 is positioned between the outer and inner plywood sheets 81 and 82 and below the slab 83 of foamed polystyrene and located immediately in contact with the adjacent upper surface of the floor panel 30; likewise, the upper beam 122 is positioned between the outer and inner plywood sheets 81 and 82 and above the slab 83 of foamed polystyrene and located somewhat below the adjacent lower surface of the ceiling panel 100. In the arrangement, the space between the plywood sheets 81 and 82 disposed above the upper beam 122 and below the adjacent lower surface of the ceiling panel 100 is filled with another slab of foamed polystyrene 83', thereby completing the assembly of the end panel 80. The construction of the end panel 90 is identical to that of the end panel 80; whereby the end panel 90 comprises the lower and upper beams 131 and 132, as well as the slabs 93 and 93' of foamed polystyrene, all arranged between the outer and inner plywood sheets 91 and 92. In passing, it is mentioned that the lower beams 121 and 131 respectively incorporated in the end panels 80 and 90 are disposed in a common horizontal plane positioned immediately above the floor panel 30. Similarly, the upper beams 122 and 132 respectively incorporated in the end panels 80 and 90 are disposed in a common horizontal plane positioned somewhat below the ceiling panel 100.

As best shown in FIGS. 2 and 4, a longitudinally extending lower center securing sill 140 is arranged within the lading compartment 61 and directly secured to the main floor 34 and extending between the end panels 80 and 90. Also, two longitudinally extending and later-

ally spaced-apart lower side securing sills 141 and 142 are arranged within the lading compartment 61 and directly secured to the main floor 34 and extending between the end panels 80 and 90. In the arrangement, the lower center securing sill 140 is disposed substantially centrally of the main floor 34, while the lower side securing sills 141 and 142 are disposed respectively adjacent to the opposite sides of the main floor 34 and respectively adjacent to the side panels 70 and 75. Moreover, the upper surfaces of the lower securing sills 140, 141 and 142 are disposed substantially in the plane of the lading floor 36 so as to define a generally unbroken work floor within the lading compartment 61. As illustrated in FIG. 2, a lower center stub sill 150 is arranged upon the floor of the machinery compartment 62 in alignment with the center securing sill 140 and extending between the end panel 80 and the adjacent left-hand end wall 41 of the car body. Similarly, two lower side stub sills 151 and 152 are arranged upon the floor of the machinery compartment 62 respectively in alignment with the lower side securing sills 141 and 142 and extending between the end panel 80 and the adjacent left-hand end wall 41 of the car body.

As best shown in FIGS. 2, 5, 6, 7 and 8, a laterally extending lower keeper beam 161 fabricated of steel is arranged adjacent to the exterior surface of the end panel 90 and located in one of the deep corrugations formed in the lower portion of the adjacent right-hand end wall 41 of the car body; which lower keeper beam 161 is disposed in alignment with the lower beam 131 incorporated in the end panel 90. More particularly, the lower keeper beam 161 is positioned between the end panel 90 and the adjacent end wall 41 and is rigidly fastened to the adjacent right-hand ends of the securing sills 140, 141 and 142. Specifically, the central portion of the lower keeper beam 161 is secured to a flange 170 carried on the right-hand end of the lower center securing sill 140 by a series of bolts 170'; one end portion of the lower keeper beam 161 is secured to a flange 171 carried on the right-hand end of the lower side securing sill 141 by a series of bolts 171'; and the other end of the lower keeper beam 161 is secured to a flange 172 carried on the right-hand end of the lower side securing sill 142 by a series of bolts 172'. In the arrangement, the bolts 170', 171' and 172' are preferably formed of stainless steel in order to minimize the conduction of heat from the lower keeper beam 161 into the lading chamber 61. The opposite ends of the lower keeper beam 161 are rigidly anchored to the corner posts 50 and 51 at the right-hand end of the car body by the previously mentioned bolts 52. As illustrated in FIG. 2, a lower keeper beam 162 is provided at the left-hand end of the car body inwardly of the adjacent end wall 41 and rigidly secured to the adjacent left-hand ends of the lower stub sills 150, 151 and 152; and the opposite ends of the lower keeper beam 162 are rigidly anchored to the adjacent corner post structures 50 and 51 at the left-hand end of the car body. The left-hand ends of the securing sills 140, 141 and 142 are rigidly secured to the right-hand ends of the adjacent stub sills 150, 151 and 152 by associated bolts 170'', 171'' and 172'', which last-mentioned bolts are also preferably formed of stainless steel to prevent the transfer of heat therethrough from the machinery compartment 62 into the lading compartment 61.

In view of the foregoing description, it will be understood that the lower keeper beam 161 is rigidly secured to the two adjacent corner constructions at the right-hand end of the car body; and likewise, the lower keeper beam 162 is rigidly secured to the two adjacent corner constructions at the left-hand end of the car body. The right-hand ends of the lower securing sills 140, 141 and 142 are rigidly secured to the lower keeper beam 161 through the lower beam 141 incorporated in the adjacent end panel 90; the left-hand ends of the lower securing sills 140, 141 and 142 are rigidly secured to the right-hand ends of the lower stub sills 150, 151 and 152 through the lower beam 121 incorporated in the adjacent end panel 80; and the left-hand ends of the lower stub sills 150, 151 and 152 are rigidly secured to the adjacent lower keeper beam 162. Thus, it will be understood that any longitudinal shocks applied to the lower securing sills 140, 141 and 142 will be transmitted to the lower keeper beam 161 through the lower beam 131 incorporated in the adjacent end panel 90, without damage thereto; and likewise, the longitudinal shocks applied to the lower securing sills 140, 141 and 142 will be transmitted to the lower stub sills 150, 151 and 152 through the lower beam 121 incorporated in the adjacent end panel 89, without damage thereto. Of course, the longitudinal shocks applied to the lower stub sills 150, 151 and 152 are transmitted directly to the adjacent lower keeper beam 162. Thus the longitudinal shocks applied to the lower securing sills 140, 141 and 142 are transmitted through the end panels 80 and 90, without damage thereto, to the lower keeper beams 161 and 162 and thence to the four corner post constructions provided in the car body.

As best shown in FIGS. 2, 3 and 4, a flue arrangement is provided about the boundary of the lading compartment 61 by a plurality of flue sheets, including a pair of side flue sheets 181 and 182, a pair of end flue sheets 183 and 184 and a ceiling flue sheet 185. More particularly, the end flue sheet 183 is arranged in upstanding position and spaced inwardly with respect to the adjacent end panel 80 so as to define an upstanding evaporator chamber 186 therebetween, the lower end of the end flue sheet 183 being supported upon the adjacent left-hand ends of the I-beams 35 carrying the lading floor 36; the end flue sheet 184 is arranged in upstanding position and spaced inwardly with respect to the adjacent end panel so as to define on upstanding flue 187 therebetween; the side flue sheet 181 is arranged in upstanding position and spaced inwardly with respect to the adjacent side panel 70 so as to define a flue 188 therebetween; and the side flue sheet 182 is arranged in upstanding position and spaced inwardly with respect to the adjacent side panel 75 so as to define a flue 189 therebetween. The ceiling flue sheet 185 is arranged in a horizontal position and spaced below the adjacent ceiling panel 100 so as to define a flue 190 therebetween. The upper portion of the evaporator chamber 186 communicates with the adjacent ends of the flues 188, 189 and 190; and the lower portion of the evaporator chamber 186 communicates with the adjacent ends of the flues 188 and 189 and also with the space disposed between the main floor 34 and the lading floor 36. The sides of the flue 190 communicate with the respective upper portions of the flues 188 and 189; the right-hand end of the flue 190 communicates with the top of the flue 187; and the right-hand ends of the flues 188 and 189 communicate with the respective sides of the flues 187. Finally, the lower end of the flue 187 communicates with the lading compartment 61 and also with the space between the main floor 34 and the lading floor 36.

An upstanding refrigerant evaporator 191 is arranged in the evaporator chamber 186; and disposed below the refrigerant evaporator 191 is a circulating fan 192 that is driven by an associated electric motor 193, the fan 192 being arranged in suitable baffle structure, indicated at 194, arranged in the lower portion of the evaporator chamber 186. Accordingly, it will be understood that operation of the electric motor 193 effects operation of the fan 192 and the consequent circulation of a stream of air upwardly through the evaporator chamber 186 and fundamentally into the flue 190. From the flue 190, the air circulates into the tops of the flues 188 and 189 and 187; from the bottoms of the flues 188 and 189, the air circulates downwardly into the space between the main floor 34 and the lading floor 36; and from the bottom of the flue 187, the air circulates into the lading compartment 61 and thence through the lading floor 36 into the

space disposed between the main floor 34 and the lading floor 36. Finally, the air from the space disposed between the main floor 34 and the lading floor 36 is withdrawn by the fan 92 back into the bottom of the evaporator chamber 186 for recirculation. As previously noted, the principal refrigerating machinery is arranged in the machinery compartment 62 and includes the usual compressor and condenser, as well as the driving motor for the compressor; none of which machinery has been shown in the interest of simplicity. Of course, the refrigerating machine also includes the refrigerant evaporator 191 wherein liquified refrigerant is expanded effecting cooling thereof and the consequent cooling of the air that is circulated by the fan 192 over and through the refrigerant evaporator 191. Accordingly, the circulated air is cooled by the refrigerant evaporator 191 and effects corresponding cooling of the lading compartment 61, and of course, the lading arranged therein.

Preferably the side flue sheets 181, 182, 183 and 184 are formed of plywood; and as illustrated in FIG. 14, the side flue sheet 181 is secured in place inwardly by the adjacent panel 70 by a series of upstanding longitudinally spaced-apart posts 191 arranged between the side flue sheet 181 and the adjacent inner plywood sheet 72 of the side panel 70. As illustrated, the post 191 is generally channel-shaped and defines the space between the sheet 72 and 181; thereby defining the side flue 188. In the arrangement, the post 191 is provided with a pair of oppositely directed flanges 192 that may be securely fastened to the adjacent inner plywood sheet 72 by "Huck" bolts 193, or other suitable blind fasteners, the blind fasteners 193 extending only through the adjacent inner plywood sheet 72. The central portion of the posts 191 may be suitably secured to the side flue sheet 181 by a series of screws 194 arranged in corresponding recesses 195 provided in the inner surface of the side flue sheet 181, the shank of each screw 194 extending through an associated hole provided in the side flue sheet 181 and being received in a threaded hole provided in the central portion of the post 191.

Preferably the ceiling flue sheet 185 consists essentially of a sheet of aluminum and is secured in place by an arrangement including a series of laterally extending and longitudinally spaced-apart rafters 201 arranged thereabove and suitably secured thereto, as shown in FIGS. 3 and 4. More particularly, the rafters 201 are positioned above the ceiling flue sheet 185 and exteriorly of the lading compartment 61 and extend laterally through the flue 190, the opposite ends of each of the rafters 201 being received by a pair of fixtures 202 carried by the upper ends of a pair of the posts 191. Accordingly, it will be understood that the series of laterally extending and longitudinally spaced-apart rafters 201 are supported by the longitudinally spaced-apart series of pairs of upstanding posts 191; and in turn, the ceiling flue sheet 185 is suitably secured to the lower surfaces of the rafters 201.

As best shown in FIGS. 4, 9, 10 and 11, there is arranged within the top of the lading compartment 61 and below the ceiling flue sheet 185, a longitudinally extending upper center securing sill 210 and two longitudinally extending upper side securing sills 211 and 212; which upper securing sills 210, 211 and 212 are respectively disposed directly above the corresponding lower securing sills 140, 141 and 142; and which upper securing sills 210, 211 and 212 are respectively arranged in the upper plane of the beams 122 and 132 respectively incorporated in the end panels 80 and 90.

As best shown in FIGS. 9, 10 and 11, a laterally extending upper keeper beam 221 fabricated of steel is arranged adjacent to the exterior surface of the end panel 90 and located in one of the deep corrugations formed in the upper portion of the adjacent right-hand end wall 41 of the car body; which upper keeper beam 221 is disposed in alignment with the upper beam 132 incorporated in the end panel 90. More specifically, the upper keeper beam 221 is positioned between the end panel 90 and the adjacent end wall 41 and is rigidly fastened to the adjacent right-hand ends of the securing sills 210, 211 and 212. Specifically, the central portion of the upper keeper beam 221 is secured to a flange 213 carried on the right-hand end of the upper center securing sill 210 by a series of bolts 213' that are preferably made of stainless steel, as previously explained. In the arrangement, the upper keeper beam 221 corresponds to the lower keeper beam 161 previously described in detail; whereby it will be understood that the right-hand ends of the upper side securing sills 211 and 212 are likewise rigidly secured thereto; and moreover, the opposite ends of the upper keeper beam 221 are rigidly secured to the corner constructions of the right-hand end of the car body in a manner similar to that of the lower keeper beam 161.

Furthermore, it will be understood that an upper keeper beam 222, not shown, is also provided at the left-hand end of the car body and disposed directly above the lower keeper beam 162, just as the upper keeper beam 221 is arranged at the right-hand end of the car body and disposed above the lower keeper beam 161. This upper keeper beam 222, not shown, arranged at the left-hand end of the car body is rigidly secured to the upper portions of the corner constructions at the left-hand end of the car body and is further secured to the left-hand ends of the upper stub sills, not shown, provided in the machinery compartment 62; and the right-hand ends of the upper stub sills, not shown, are rigidly secured to the left-hand ends of the upper securing sills 210, 211 and 212 through the adjacent end panel 80. In other words, the arrangement of the upper securing sills 210, 211 and 212 with respect to the end panels 80 and 90 and with respect to the two upper keeper beams 221 and 222 is altogether commensurate with that of the arrangement of the lower securing sills 140, 141 and 142 described in detail heretofore.

Accordingly, it will be understood that longitudinal shocks applied to the upper securing sills 210, 211 and 212 are transmitted to the upper keeper beams 221 and 222 and thence to the corner construction at the opposite ends of the car body, without damage to the end panels 80 and 90, by virtue of the incorporation of the upper beams 122 and 132 in the respective end panels 80 and 90.

A series of partitions or load dividers 231 are arranged in the lower half of the lading compartment 61 and a series of partitions or load dividers 232 are arranged in the upper half of the lading compartment 61, both as viewed in FIG. 2. The load dividers 231 extend laterally from and adjacent to the side flue sheet 181 toward the center of the lading compartment 61 and are mounted for longitudinal rolling movements upon the upper securing rails 210 and 211, while the load dividers 232 extend laterally from the adjacent side flue sheet 182 toward the center of the lading compartment 61 and are mounted for longitudinal rolling movements upon the upper securing rails 210 and 212. Preferably, each of the load dividers 231 and 232 is of the construction available commercially as "Equipco" load divider and essentially comprises an upstanding hollow panel provided with rollers 233 carried adjacent to the upper corners thereof and arranged in rolling engagements with corresponding longitudinally extending trackways respectively provided by the upper securing sills 210 and 211 or 210 and 212. Also each of the panels or load dividers 231 carries two locks 241 and 242 at the upper corners thereof and two locks 243 and 244 at the lower corners thereof, as well as an operating handle 245 associated with mechanisms, indicated by the broken lines 246, 247, 248 and 249, and interconnecting the respective locks 241, 242, 243 and 244. As illustrated in FIG. 4, the handle 245 occupies its locked position so that the mechanisms 246, 247, 248 and 249 are operated to move the locks 241, 242, 243 and 244 outwardly into their locked positions with respect to the sills 211, 210, 141 and 140, respectively. Specifically, each

of the sills **211**, **210**, **141** and **140** is provided with a longitudinally spaced-apart series of holes therein that are adapted to cooperate with the corresponding one of the locks **241**, **242**, **243** and **244**. Accordingly, as viewed in FIG. 4, the locks **241**, etc., occupy their locked positions with respect to the sills **211**, etc.; whereby the longitudinally adjusted position of the load divider **231** is securely established.

In view of the above description of the construction and arrangement of the load divider **231**, it will be understood that when the handle **245** is operated into its unlocked position, the locks **241**, etc., are withdrawn from the holes provided in the sills **211**, etc.; whereby the load divider **231** may be rolled longitudinally upon the rollers **244** in engagement with the trackways provided by the upper securing sills **211** and **210**. Specifically, the load divider **231** may be rolled longitudinally along the upper securing sills **210** and **211** into a desired longitudinal location within the lading compartment **61**; whereupon the handle **245** may be operated into its locked position; whereby the load divider **231** in its longitudinally adjusted position is securely locked to the four securing sills **140**, **141**, **210** and **211**, as previously explained.

In view of the foregoing description of the construction and arrangement of the load divider **231**, it will be understood that the series of load dividers **231** and the series of load dividers **232** may be independently adjusted individually within the lading compartment **61** for the purpose of sectionalizing or subdividing the lading arranged in the lading compartment **61** into corresponding sections in order to prevent the transmission of shocks between the different sections of the lading and in order securely to maintain the sections of the lading in their respectively supported positions within the lading compartment **61**. Also, it will be understood that when the load dividers **231** and **232** are properly adjusted and secured in place with respect to the securing sills **140**, **141**, **142**, **210**, **211** and **212**, all of the longitudinal shocks are transmitted directly from the sections of the lading to the various load dividers **231** and **232**, and thence via the securing sills **140**, **141**, **142**, **210**, **211** and **212** to the keeper beams **161**, **162**, **221** and **222**, and thence to the four corner constructions of the car body, without damage to the heat-insulating end panels **80** and **90**, by virtue of the incorporation of the solid beams **121** and **122** in the end panel **80** and the incorporation of the solid beams **131** and **132** in the end panel **90**, as previously explained.

The construction and arrangement of the railway car body, with particular reference to the arrangement of the load dividers and to the construction of the end panels of the liner to direct longitudinal shocks into the corner posts of the body, without damage to the end panels, is disclosed and claimed in the previously mentioned Talmey application.

In view of the foregoing, it is apparent that there has been provided a railway car body comprising a rigid substantially box-like shell, a substantially box-like heat-insulating liner housed in the shell and defining a lading chamber therein, wherein the liner is formed of a plurality of individual prefabricated panels that are sectionalized, so as to obtain a substantially uniform construction and arrangement of the heat-insulating panels thereof, so as to achieve maximum economies in production and fabrication of the heat-insulating panels, as well as minimum labor in the installation of the pre-fabricated heat-insulating panels in the car body.

While there has been described what is at present considered to be the preferred embodiment of the invention, it will be understood that various modifications may be made therein, and it is intended to cover in the appended claims all such modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. A railway car body comprising an upstanding substantially box-like shell of strong rigid structure, said shell including a pair of longitudinally extending and laterally spaced-apart upstanding side walls each formed of a metal sheet and a roof formed of a metal sheet, an upstanding substantially box-like heat-insulating liner of strong rigid structure arranged within said shell and reinforcing said shell and defining therein a lading chamber, said liner including a pair of longitudinally extending and laterally spaced-apart upstanding side panels respectively supported with the outer surfaces thereof in direct contact with the inner surfaces of the respectively adjacent ones of said side walls and a ceiling panel disposed adjacent to and below said roof, each of said panels named being of strong rigid structure and of composite sandwich construction including inner and outer plywood sheets and an intermediate slab of synthetic organic resin of cellular structure and with the inner and outer surfaces of said slab securely adhered to the respectively adjacent surfaces of said inner and outer plywood sheets, said ceiling panel being supported by said side panels by respective engagements of the opposite marginal sides of said ceiling panel with the upper ends of said side panels, the opposite marginal sides of said ceiling panel only partially overlapping the respective upper ends of said side panels, whereby two longitudinally extending voids are respectively defined adjacent to and below the respective junctions of said roof with said side walls, two longitudinally extending blocks of heat-insulating material respectively arranged in said voids and respectively partially filling the same,, each of said blocks being formed of synthetic organic resin of cellular structure, two masses of molded heat-insulating material respectively arranged in said voids and respectively cooperating with said blocks substantially completely to fill said voids, each of said masses being formed of synthetic organic resin of cellular structure, and a layer of fibrous heat-insulating material arranged in the space between said roof and said ceiling panel.

2. The railway car body set forth in claim 1, wherein each of said blocks is formed essentially of polystyrene, and each of said masses is formed essentially of polyurethane.

3. A railway car body comprising an upstanding substantially box-like shell of strong rigid structure, said shell including a pair of laterally extending and longitudinally spaced-apart upstanding end walls each formed of a metal sheet and a pair of longitudinally extending and laterally spaced-apart upstanding side walls each formed of a metal sheet and a generally horizontally disposed roof formed of a metal sheet, an upstanding substantially box-like heat-insulating liner of strong rigid structure arranged within said shell and reinforcing said shell and defining therein a lading chamber, said liner including a generally horizontally disposed floor panel supported adjacent to the bottom of said shell and a pair of laterally extending and longitudinally spaced-apart upstanding end panels respectively supported by the opposite ends of said floor panel and a pair of longitudinally extending and laterally spaced-apart upstanding side panels respectively supported by the opposite sides of said floor panel and a generally horizontally disposed ceiling panel supported jointly by said end panels and by said side panels, said side panels being respectively supported with the outer surfaces thereof in direct contact with the inner surfaces of the respectively adjacent one of said side walls, each of said panels named being of strong rigid structure and of composite sandwich construction including inner and outer plywood sheets and an intermediate slab of synthetic organic resin of cellular structure and with the inner and outer surfaces of said slab securely adhered to the respectively adjacent surfaces of said inner and outer plywood sheets, the marginal end portions of said ceiling panel overlapping the adjacent upper ends of said end panels and the marginal side portions of said ceiling panel overlapping the adjacent upper ends of said side panels, a first row of longitudinally spaced-apart brackets carried by one of said side walls and projecting laterally inwardly over the adjacent marginal side portion of said ceiling panel in

order to clamp the same in its supported position, and a second row of longitudinally spaced-apart brackets carried by the other of said side walls and projecting laterally inwardly over the adjacent marginal side portion of said ceiling panel in order to clamp the same in its supported position.

4. The railway car body set forth in claim 3, wherein said roof is spaced somewhat above said ceiling panel, and further comprising a generally horizontally disposed layer of heat-insulating material arranged in the space between said roof and said ceiling panel and supported by said ceiling panel.

5. A railway car body comprising an upstanding substantially box-like shell of strong rigid structure, said shell including a pair of longitudinally extending and laterally spaced-apart upstanding side walls each formed of a metal sheet, an upstanding substantially box-like heat-insulating liner of strong rigid structure arranged within said shell and reinforcing said shell and defining therein a lading compartment, said liner including a pair of longitudinally extending and laterally spaced-apart upstanding side panels respectively supported with the outer surfaces thereof in direct contact with the inner surfaces of the respectively adjacent ones of said side walls, each of said side panels being of strong rigid structure and of composite sandwich construction including inner and outer plywood sheets and an intermediate slab of synthetic organic resin of cellular structure and with the inner and outer surfaces of said slab securely adhered to the respectively adjacent surfaces of said inner and outer plywood sheets, a first row of longitudinally spaced-apart upstanding outside stiff metal posts carried by the outside surface of one of said side walls for reinforcing the same, a second row of longitudinally spaced-apart upstanding outside stiff metal posts carried by the outer surface of the other of said side walls for reinforcing the same, each of said side panels being arranged in abutting relation with respect to the inside surface of the adjacent one of said side walls, and a plurality of metal fasteners for securing in place each of said outside posts and the adjacent one of said side walls and the adjacent one of said side panels; each of said fasteners including a shank extending through aligned openings provided in one of said posts and in the adjacent one of said side walls and in the outer plywood sheet of the adjacent one of said side panels and carrying an outside fastening element engaging said one post and an inside fastening element arranged in an associated cavity provided in the intermediate slab of said one side panel and engaging the inner surface of the outside plywood sheet of said one side panel.

6. A railway car body comprising an upstanding substantially box-like shell of strong rigid structure, said shell including a pair of longitudinally extending and laterally spaced-apart upstanding side walls each formed of a metal sheet, an upstanding substantially box-like heat-insulating liner of strong rigid structure arranged within said shell and reinforcing said shell and defining therein a lading compartment, said liner including a pair of longitudinally extending and laterally spaced-apart upstanding side panels respectively supported with the outer surfaces thereof in direct contact with the inner surfaces of the respectively adjacent ones of said side walls, each of said side panels being of strong rigid structure and of composite sandwich construction including inner and outer plywood sheets and an intermediate slab of synthetic organic resin of cellular structure and with the inner and outer surfaces of said slab securely adhered to the respectively adjacent surfaces of said inner and outer plywood sheets, a pair of longitudinally extending and laterally spaced-apart upstanding side sheets each formed of plywood respectively disposed adjacent to and inwardly of said side panels, a first row of longitudinally spaced-apart upstanding metal spacers arranged between the inside surface of the inner plywood sheet of one of said side panels and the outside surface of one of said side sheets, a second row of longitudinally spaced-apart upstanding metal spacers arranged between the inside surface of the inner plywood sheet of the other of said side panels and the outside surface of the other of said side sheets, a plurality of first metal fasteners for securing in place each of said spacers and the adjacent one of said side panels, a plurality of second metal fasteners for securing in place each of said spacers and the adjacent one of said side sheets, a first row of longitudinally spaced-apart upstanding outside stiff metal posts carried by the outside surface of one of said side walls for reinforcing the same, a second row of longitudinally spaced-apart upstanding outside stiff metal posts carried by the outer surface of the other of said side walls for reinforcing the same, each of said side panels being arranged in abutting relation with respect to the inside surface of the adjacent one of said side walls, and a plurality of third metal fasteners for securing in place each of said outside posts and the adjacent one of said side walls and the adjacent one of said side panels, each of said first fasteners including a shank extending through aligned openings provided in one of said spacers and in the inner plywood sheet of the adjacent one of said side panels and carrying an inside fastening element engaging said one spacer and an outer fastening element arranged in an associated cavity provided in the intermediate slab of said one side panel and engaging the outer surface of the inner plywood sheet of said one side panel.

7. A railway refrigerator car body comprising an upstanding substantially box-like shell of strong rigid structure, said shell including a roof formed of a metal sheet and a pair of laterally extending and longitudinally spaced-apart upstanding end walls each formed of a metal sheet and a pair of longitudinally extending and laterally spaced-apart upstanding side walls each formed of a metal sheet, an upstanding substantially box-like heat-insulating liner of strong rigid structure arranged within said shell and reinforcing said shell and defining therein a lading compartment, said liner including a floor panel supported adjacent to the bottom of said shell and a ceiling panel supported adjacent to and below said roof and a laterally extending upstanding first end panel supported inwardly of a first of said end walls and cooperating therewith to define a machinery compartment therebetween and a laterally extending upstanding second end panel supported adjacent to and inwardly of a second of said end walls and a pair of longitudinally extending and laterally spaced-apart upstanding side panels respectively supported with the outer surfaces thereof in direct contact with the inner surfaces of the respectively adjacent ones of said side walls, each of said panels named being of strong rigid structure and of composite sandwich construction including inner and outer plywood sheets and an intermediate slab of synthetic organic resin of cellular structure and with the inner and outer surfaces of said slab securely adhered to the respectively adjacent surfaces of said inner and outer plywood sheets, a floor platform formed of wood supported adjacent to and above said floor panel and cooperating therewith to define a floor flue therebetween, a ceiling sheet formed of wood supported adjacent to and below said ceiling panel and cooperating therewith to define a ceiling flue therebetween, a laterally extending upstanding first end sheet formed of wood supported inwardly of said first end panel and cooperating therewith to define an evaporator compartment therebetween, a laterally extending upstanding second end sheet formed of wood supported adjacent to and inwardly of said second end panel and cooperating therewith to define an end flue therebetween, and a pair of longitudinally extending and laterally spaced-apart upstanding side sheets each formed of wood respectively supported adjacent to and inwardly of said side panels and respectively cooperating therewith to define a pair of side flues therebetween, said floor flue commonly communicating with the lower end of said evaporator compartment and with the lower end of said end flue and with the lower ends of said side flues, said ceiling flue commonly communicating with the upper end

of said evaporator compartment and with the upper end of said end flue and with the upper ends of said side flues, said floor platform and said ceiling sheet and said end sheets and said side sheets mutually cooperating to define a lading chamber therewithin.

8. The railway refrigerator car body set forth in claim 7, wherein said floor platform is of open-work construction accommodating free circulation of air between said floor flue and said lading chamber.

9. The railway refrigerator car body set forth in claim 7, and further comprising means for circulating air from said floor flue upward through said evaporator compartment and then into said ceiling flue and thence via said end flue and said side flues back to said floor flue.

10. A railway refrigerator car body comprising an upstanding substantially box-like shell of strong rigid structure, said shell including a roof formed of a metal sheet and a pair of longitudinally extending and laterally spaced-apart upstanding side walls each formed of a metal sheet, an upstanding substantially box-like heat-insulating liner of strong rigid structure arranged within said shell and reinforcing said shell and defining therein a lading compartment, said liner including a ceiling panel supported adjacent to and below said roof and a pair of longitudinally extending and laterally spaced-apart upstanding side panels respectively supported with the outer surfaces thereof in direct contact with the inner surfaces of the respectively adjacent ones of said side walls, each of said panels named being of strong rigid structure and of composite sandwich construction including inner and outer plywood sheets and an intermediate slab of synthetic organic resin of cellular structure and with the inner and outer surfaces of said slab securely adhered to the respectively adjacent surfaces of said inner and outer plywood sheets, a pair of longitudinally extending and laterally spaced-apart upstanding side sheets each formed of wood respectively supported adjacent to and inwardly of said side panels and respectively cooperating therewith to define a pair of side flues therebetween, a first row of longitudinally spaced-apart upstanding metal spacer posts arranged between the inside surface of the inner plywood sheet of one of said side panels and the outside surface of one of said side sheets, a second row of longitudinally spaced-apart upstanding metal spacer posts arranged between the inside surface of the inner plywood sheet of the other of said side panels and the outside surface of the other of said side sheets, a row of longitudinally spaced-apart metal rafters respectively extending laterally between and supported by the upper ends of said rows of spacer posts, and a ceiling sheet formed of metal secured to and supported by said rafters and disposed adjacent to and below said ceiling panel and cooperating therewith to define a ceiling flue therebetween, the upper ends of said side flues respectively communicating with the opposite sides of said ceiling flue.

11. The railway refrigerator car body set forth in claim 10, and further comprising a first longitudinally spaced-apart row of metal fixtures respectively carried by the upper ends of the spacer posts in said first row and respectively receiving and locating the adjacent first ends of said rafters, and a second longitudinally spaced-apart row of metal fixtures respectively carried by the upper ends of the spacer posts in said second row and respectively receiving and locating the adjacent second ends of said rafters.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,180,286 April 27, 1965

Paul Talmey

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 14, line 58, for "wood" read -- metal --.

Signed and sealed this 28th day of September 1965.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents