Aug. 13, 1940. G. G. GILPIN 2,211,618

REFRIGERATOR CAR WALL

Filed July 9, 1938 2 Sheets-Sheet 1

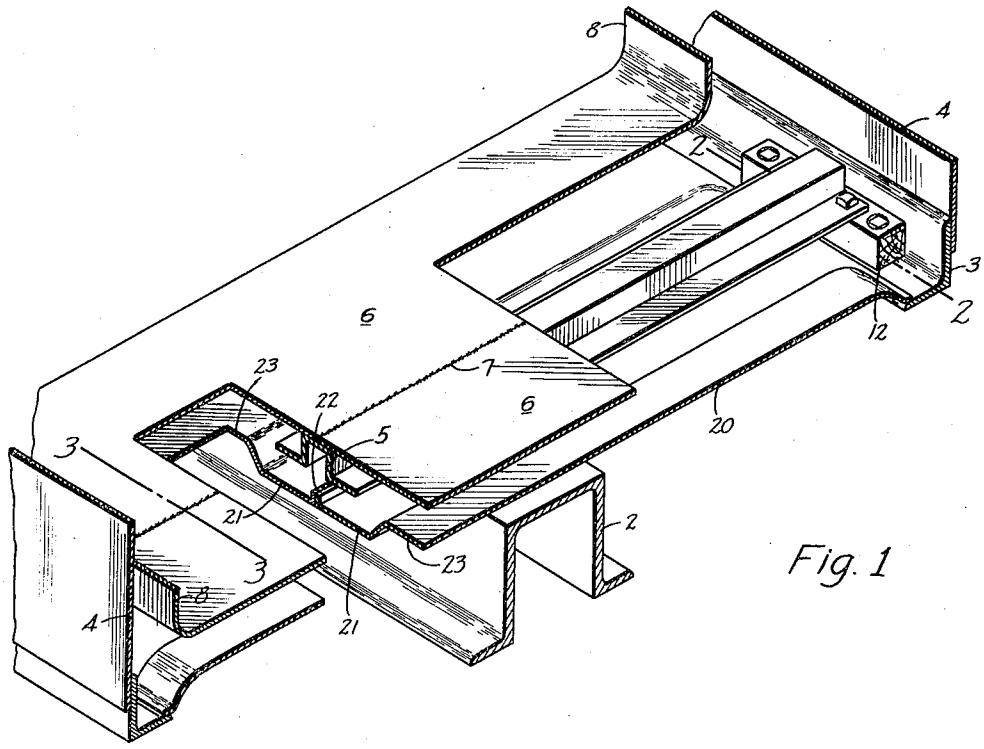



Fig. 1

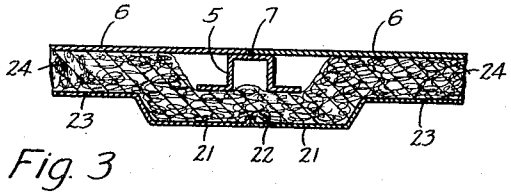



Fig. 3

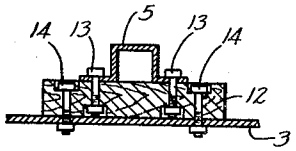



Fig. 2

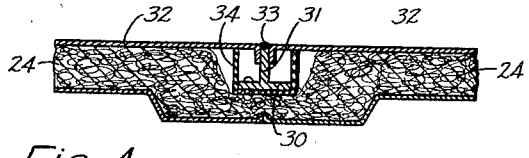



Fig. 4

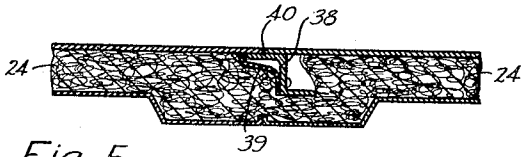



Fig. 5

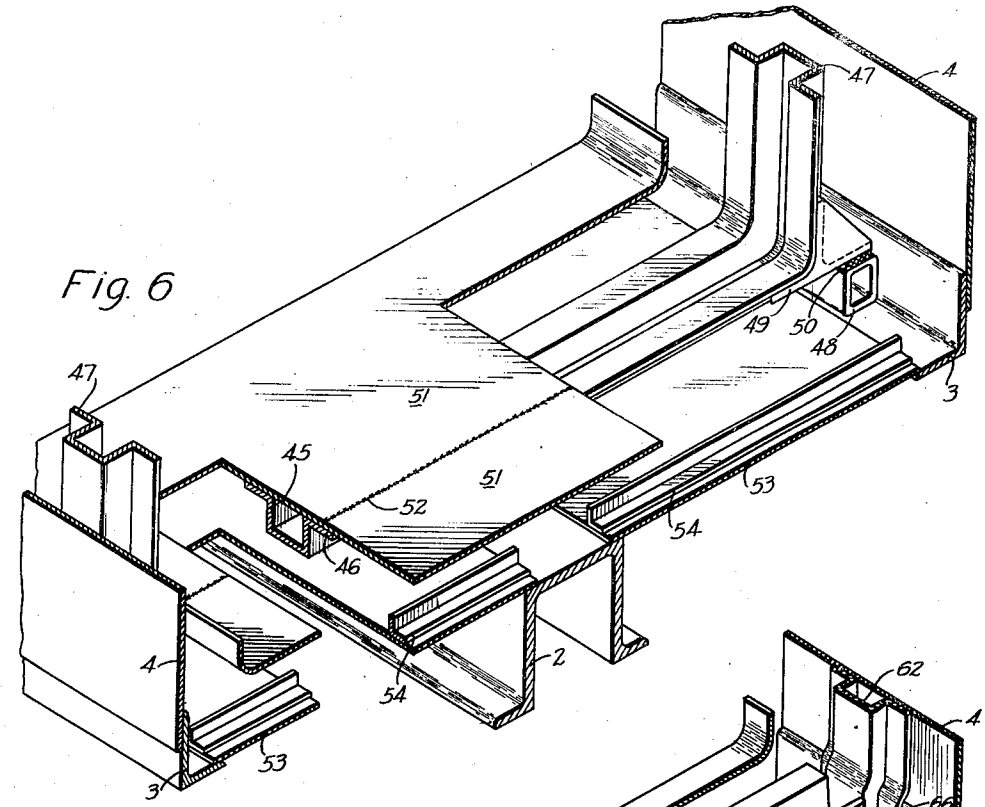
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Fig. 6



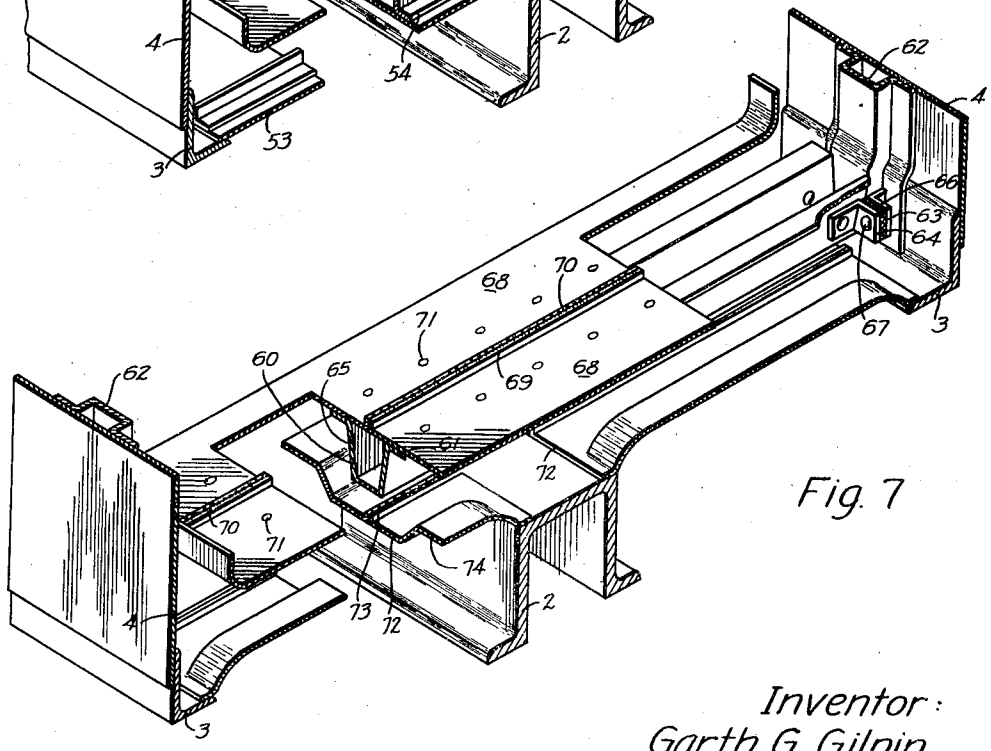




Fig. 7

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Patented Aug. 13, 1940 2,211,618

# UNITED STATES PATENT OFFICE

2,211,618

## REFRIGERATOR CAR WALL

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Application July 9, 1938, Serial No. 218,465

13 Claims. (Cl. 105—422)

This invention relates to insulated walls for refrigerator cars which are used to transport perishable commodities. Walls of such cars must be well insulated to prevent or retard transfer of heat therethrough and must be watertight to prevent moisture reaching the insulation and impairing the insulating efficiency thereof.

It is an object of this invention to provide a strong, waterproof, insulated floor for a refrigerator car. The floor must have sufficient strength to support the weight of the lading. It must be well insulated to retard the flow of heat into the car when the car is being refrigerated and retard the flow of heat out of the car when it is being heated. Insulation usually used in refrigerator cars is of a type whose insulating efficiency is greatly reduced when it is moist. Water is frequently present inside a refrigerator car due to moisture from the lading, from melted refrigerant or from cleaning. It is, therefore, a further object of the invention to use welded steel plates as a top surface of the floor to prevent entrance of moisture into the insulation. It is another object to prevent entrance of moisture from outside the car by providing lower members welded together to form a watertight seal.

Another object of the invention is to provide a completely insulated floor. This is accomplished by extending one insulation blanket from side sill to side sill and longitudinally of the car any distance desired, preferably between end sills. This is an improvement over a construction in which the insulation blanket extends only between stringers.

Another object of the invention is to provide panels or corrugations in the lower floor sheet to prevent vibration during service movements of the car. This lower sheet may be made of thin sheet since it supports only the insulation blanket and being thin it is subject to vibrations if some means is not provided to prevent the vibrations.

It is a further object of the invention to provide upwardly projecting panels in the lower sheet between the stringers or beams which support the upper sheet and the load. This arrangement causes the insulation blanket to assume a wave-like form and tends to prevent it from shifting during movements of the car.

A further object of the invention is to provide downwardly projecting panels in the lower sheet below the load supporting beams or stringers. This arrangement increases the thickness of the insulation blanket where it would otherwise be thinnest and tends to provide the ideal condition, a blanket of constant thickness.

It is another object of the invention to provide means to prevent corrosion of the underframe of the car. In spite of all efforts at prevention, insulation occasionally becomes moist due to leakage or condensation within the wall. Metallic parts in contact with the insulation are then subject to corrosion. The lower metallic sheet is provided to protect the underframe from the corrosive effects of moist insulation.

The insulation usually used in refrigerator cars is inflammable. It is a further object of this invention to provide means for protecting the insulation from heat and sparks which occur during welding.

In the drawings:

Fig. 1 is a perspective view having parts broken away and the insulation removed.

Figs. 2 and 3 are sections on lines 2—2 and 3—3 respectively of Fig. 1.

Figs. 4, 5, 6 and 7 show modified constructions.

Fig. 1 is a fragmentary perspective view of a refrigerator car showing center sill 2 and side walls comprising side sills 3 and sheathing 4. The beams 5 which support the loading resting on the floor are of inverted channel shape having outwardly projecting flanges. Upper floor sheets 6 extend between the sides of the car and are joined at their transverse edges by continuous seam welds 7 which also preferably form the means for securing the sheets 6 to the beams 5. The upturned flanges 8 of the sheets 6 are provided to overlap the side lining (not shown) and form a watertight seal.

The beam 5 is shown supported on the side sills 3 by the wooden pieces 12, as shown in Fig. 2. The bolts 13 secure the beam 5 to the wooden pieces 12 and the bolts 14 secure the pieces 12 to the sills 3. The wooden pieces 12, therefore, insulate the beam and also the upper sheets 6 from the sills 3 and the outside temperature.

The lower member 20 comprises a plurality of sheets 21 having upturned flanges at their adjacent edges and joined by continuous seam welds 22, preferably below the beams 5. The sheets 21 rest upon the side sills 3 and are provided with upwardly projecting panels 23 between the beams 5. As shown in Fig. 3, insulation 24 is positioned between the upper sheets 6 and the lower member 20. The insulation 6 has been omitted from the perspective view in Fig. 1 so that the construction could be shown more clearly.

The panel 23 in the lower sheet 21 causes the

insulation 24 to assume a wave-like form having upper portions between the beams 5 and lower portions below the beams 5. This tends to hold the insulation in place and helps to prevent its creeping during movements of the car. Positioning the lowest parts of the sheets 21 immediately below the beams 5 tends to provide insulation of uniform thickness throughout the floor area of the car.

In the modification shown in Fig. 4 the beam is a T-shaped member 30 having an upwardly projecting web 31 to which the upper sheets 32 are secured by a continuous seam weld 33. A protecting piece 34 is provided to protect the insulation 24 from the heat and sparks which accompany welding.

Fig. 5 shows a Z-bar 38 used as the beam and a protecting piece 39 to protect the insulation 24 from the heat and sparks which occur during the formation of the continuous seam weld 40.

In the construction shown in Fig. 6 the beams 45 are channel shaped with outwardly projecting flanges 46 and have formed integral with them vertical frame members 47 of the side wall structure. The beams 45 are supported upon the side sill 3 by the tubular member 48 and the brackets 49 which are secured to the beams 45. Insulating members 50 made of fibre or other insulating material capable of supporting a load are provided between the members 48 and the brackets 49 to insulate the beams 45 and hence the floor sheets 51 from the sills 3 and from the outside temperature. The upper sheets 51 are joined at their adjoining edges by continuous seam welds 52, said welds also functioning to secure the sheets 51 to the flanges 46 of the beams 45. The lower member comprises center sill 2, side sills 3 and the metallic sheets 53 extending between said sills and secured thereto. The purpose of the lower member is to support the insulation and also to protect it from moisture. Stiffeners 54 are shown secured to the lower sheets 53.

Fig. 7 shows another modified construction. The beams 60 are of channel shape with outwardly projecting reflanges 61. The center sill 2, side sills 3, side sheathing 4 and side wall vertical frame members or posts 62 are also shown. Brackets 63 are secured by riveting or welding to the posts 62 and engaging brackets 64 are secured in a similar manner to the flanges 65 of the beams 60. Insulating pieces 66 are inserted between the brackets 63—64 and rivets 67 are provided through the brackets 63—64 and the insulating pieces 66. The beams 60 are, therefore, supported by and insulated from the side wall structure of the car.

The upper sheets 68 are provided with upturned flanges 69 at their engaging edges, and joined together by a continuous seam weld 70 at the flanges 69. The sheets 68 are secured to the reflanges 61 of the beams 60 by rivets 71. These rivets 71 must be of a type, such as Huck rivets, which can be inserted and driven entirely from above the sheets 68. The lower floor member comprises the center sill 2, side sills 3 and the sheets 72. The sheets 72 have upturned flanges at their adjoining edges and are joined together by continuous seam welds 73 on the tops of said flanges. The welds 73 are preferably below the beams 60. The sheets 72 are preferably provided with upwardly projecting panels or corrugations 74 between the beams 60, said panels functioning to strengthen the sheet, to reduce the vibrations thereof, to hold the insulation in place and to provide an insulation blanket of more uniform thickness.

The main advantage of the floor constructions herein disclosed is that there are no obstructions to prevent the floor insulation blanket from extending continuously from side sill to side sill and from end sill to end sill. The insulation commonly used in refrigerator cars includes kapok contained in a large sack to form a blanket, various types of hair insulation and spun glass. These are all provided in blankets and may be obtained in such sizes that one blanket covers the entire floor area of the car. This provides a very well insulated floor and I claim as my invention a construction which makes the use of a single continuous insulation blanket practical.

The accompanying drawings show my invention applied to a floor construction. It is to be understood, however, that my invention should not be limited to a floor but may be used for any wall of a refrigerator car, such as roof, side walls, end walls or door.

Insulated car walls are shown by Charles D. Bonsall in co-pending application Serial No. 218,450, filed July 9, 1938, and in my co-pending application Serial No. 218,464, filed July 9, 1938.

The accompanying drawings illustrate the preferred form of the invention, though it is to be understood that the invention is not limited to the exact details of construction shown and described, as it is obvious that various modifications thereof, within the scope of the claims, will occur to persons skilled in the art.

I claim:

1. In a refrigerator car having spaced apart walls, a plate-like member extending between and secured to said walls, an insulation above said plate-like member, a plurality of beams above said insulation and extending substantially between said walls, insulating means supporting only the end portions of said beams from said walls in spaced relation to said plate-like member, and a sheet secured to said beams on the opposite sides thereof from said insulation, whereby said insulation may extend continuously between the side walls and lengthwise of the car.

2. A wall for a refrigerator car comprising spaced apart frame members, a plate-like member extending between and secured to said frame members, an insulation adjacent said plate-like member, a plurality of beams adjacent said insulation and extending substantially between said frame members, wooden pieces supporting only the end portions of said beams from said frame members in spaced relation to said plate-like member, and a sheet secured to said beams on the opposite sides thereof from said insulation, whereby said insulation may extend continuously between the side walls and lengthwise of the car.

3. In a refrigerator car having spaced apart side sills and a center sill in combination with lower floor sheets extending between the center sill and side sills, each of said lower floor sheets being formed with a corrugation extending effectively between the center sill and a side sill, a plurality of beams, insulating means supporting said beams upon said sills in spaced relation above said lower sheets, an insulation between the lower floor sheets and said beams, and an upper floor sheet secured to the beams whereby said insulation may extend continuously between the side sills and lengthwise of the car.

4. In a refrigerator car having spaced apart

walls, a lower floor member extending between and secured to said walls, said lower floor member being provided with stiffening means extending effectively between said walls, a plurality of beams extending substantially between said walls, insulating means supporting only the end portions of said beams from said car walls in spaced relation above said lower member, an insulation between the lower floor member and said beams, and an upper floor sheet secured to the beams whereby said insulation may extend continuously between the side sills and lengthwise of the car.

5. In a refrigerator car having spaced apart side sills, lower floor sheets extending between and secured to said side sills, each of said lower floor sheets being formed with a corrugation extending effectively between said sills, a plurality of beams, insulating means supporting said beams upon said sills in spaced relation above said lower sheets, an insulation between the lower floor sheets and said beams, and an upper floor sheet secured to the beams whereby said insulation may extend continuously between the side sills and lengthwise of the car.

6. A wall for a refrigerator car comprising spaced apart frame members, wall sheets extending between and secured to said frame members, each of said wall sheets being provided with inwardly projecting stiffening means extending effectively between said frame members, a plurality of beams extending substantially between said frame members, insulating means supporting only the end portions of said beams from said frame members in spaced relation to said wall sheets, an insulation between said wall sheets and said beams, and a sheet secured to said beams whereby said insulation may extend continuously between said frame members and lengthwise of said wall.

7. A structure as defined in claim 4 wherein said stiffening means comprise downwardly projecting panels formed in said lower floor member below said beams to provide increased insulation therebelow.

8. A structure as defined in claim 1 wherein said beams are formed integral with vertical frame members of said walls.

9. A structure as defined in claim 4 wherein said stiffening means comprise panels projecting upwardly between said beams to hold said insulation in place.

10. A wall for a refrigerator car comprising spaced apart frame members, a wall member extending between and secured to said frame members, a plurality of beams extending substantially between said frame members, insulating means supporting only the end portions of said beams from said frame members in spaced relation to said wall member, an insulation between said wall member and said beams, and a sheet secured to said beams whereby said insulation may extend continuously between said frame members and lengthwise of said wall.

11. In a refrigerator car having spaced apart side sills, the combination of lower floor sheets extending between and being secured to said side sills, a plurality of beams above said lower floor sheet extending substantially between said side sills, means to secure the end portions of said beams to said sills, insulation above said lower sheets, upper floor sheets above said beams, and means to secure said upper sheets to said beams, said lower sheets having downwardly projecting panels formed therein below said beams so that insulation may extend below said beams.

12. In a refrigerator car having spaced apart side sills and a center sill, the combination of lower floor sheets extending between and being secured to said side sills and said center sill, a plurality of beams above said lower floor sheet extending substantially between said side sills, means to secure the end portions of said beams to said sills, insulation above said lower sheets, upper floor sheets above said beams, and means to secure said upper sheets to said beams, said lower sheets having downwardly projecting panels formed therein below said beams so that insulation may extend below said beams.

13. In a refrigerator car having spaced apart walls, the combination of lower floor sheets extending between and secured to said walls, a plurality of beams in spaced relation above said lower floor sheets extending substantially between said walls, means to secure the end portions of said beams to said walls, upper floor sheets above said beams, means to secure said upper sheets to said beams, and insulation between said beams and said lower floor sheets.

GARTH G. GILPIN.