Dec. 10, 1935. L. E. CARTMILL 2,023,406

REFRIGERATOR CAR

Filed Nov. 21, 1931 2 Sheets-Sheet 1

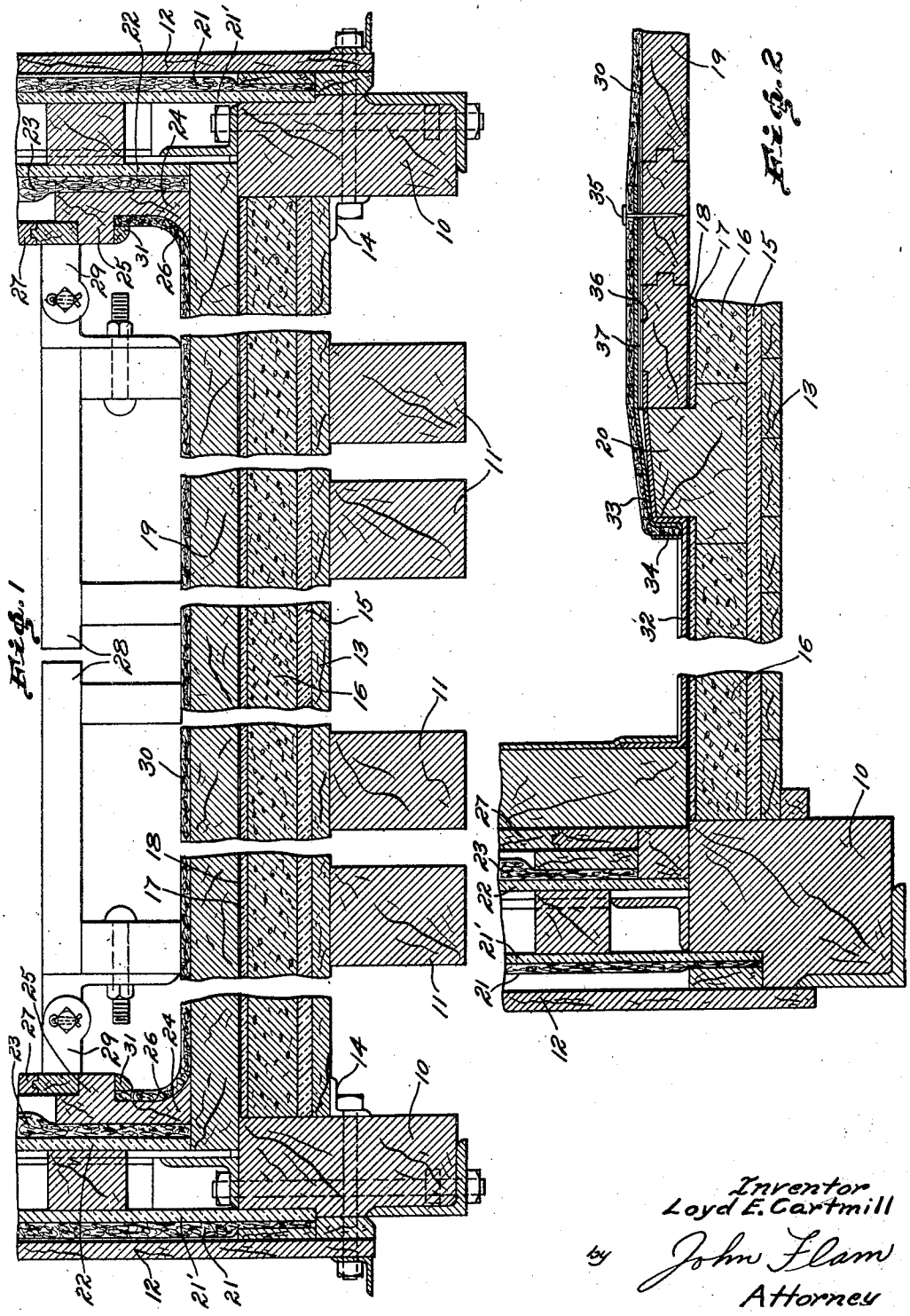


Fig. 1

Fig. 2

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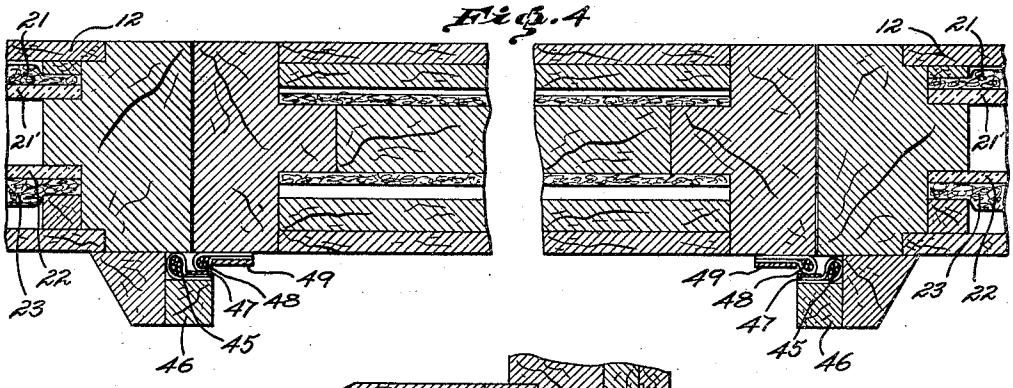
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Dec. 10, 1935. L. E. CARTMILL 2,023,406

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Filed Nov. 21, 1931 2 Sheets-Sheet 2

Fig. 4



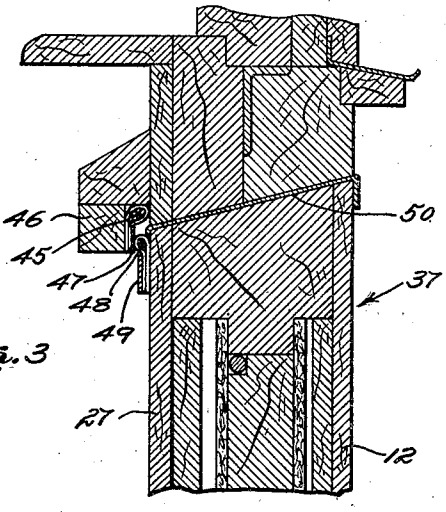
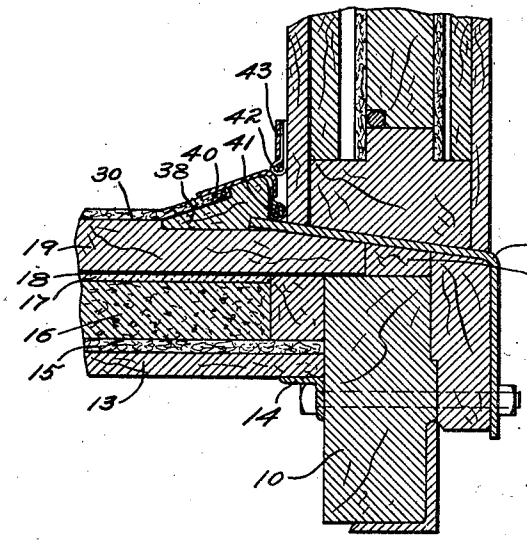


Fig. 3



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UNITED STATES PATENT OFFICE

2,023,406

REFRIGERATOR CAR

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Application November 21, 1931, Serial No. 576,515

10 Claims. (Cl. 105—423)

This invention relates to refrigerator cars, and more particularly to an improvement over my prior Patent No. 1,788,012, issued January 6, 1931.

In my above mentioned patent, I described a means for providing an effective heat insulation for refrigerator cars, and especially for the floor thereof in order to obtain the full benefit of the insulation utilized. Thus the insulation covering layer, such as felted or cellular material, is placed over and secured to the flooring with a continuous and unbroken continuity to prevent loss of refrigeration; for if there be abutting edges of this layer, this layer in stretching or contracting would leave considerable areas unprotected. These unprotected areas permit the loss of refrigeration, and in time become deleteriously affected by the corroding action of the moisture and liquids in the refrigerator car.

Experimentation has proven that even though a continuous insulation covering for the flooring be used, loss of refrigeration will in time take place through crevices or fissures in this covering which are formed by the movement of the bulkhead bearing, for supporting a bulkhead separating the ice compartment from the cargo compartment, and there is a consequent movement of the portion of the flooring adjacent the bearing, which results in a continual buckling of the covering. This movement or "give" of the bulkhead bearing is occasioned by the weight of the ice dropped thereon and by the thrust from the ice load against the bulkhead.

I have found that this objectionable buckling of the insulation floor covering can be very readily overcome by the provision of a novel means permitting relative sliding movement between the floor covering and the bulkhead bearing. It is therefore an object of my invention to provide a novel means for obviating this objectionable feature of the prior art.

It is well recognized in this art, that liquid accumulates on the floor covering due to condensation of the liquid in the circulating refrigerated air, and leakage from cargo containing liquids. Of course, means are provided for draining this accumulated liquid; however, due to the swaying of the car in transit, this liquid is moved against the sides of the car and a portion thereof seeps through the crevices between the loading door and the underlying structure. Obviously, this is harmful as the accumulation of liquid may injure the loading door and may even affect the operation of the door, and in time produces a deleterious corroding effect which necessitates expensive repairs and replacements.

It is therefore a further object of my invention to prevent the objectionable seepage beneath the door, of the liquid accumulated on the floor covering. I readily accomplish this by means of an elevated stop on the flooring adjacent the bottom of the door, and a double seal closure which comes into effect upon closing of the door.

It is a further object of my invention to provide a downwardly inclined threshold or stop plate for shedding any moisture on the threshold away from the door.

It is a further object of my invention to provide a novel double seal closure around the top and sides of the door for preventing the ingress of heat or the egress of refrigerated air through the crevices between the door and the surrounding structure.

My invention possesses many other advantages, and has other objects which may be made more easily apparent from a consideration of one embodiment of my invention. For this purpose I have shown a form in the drawings accompanying and forming part of the present specification. I shall now proceed to describe this form in detail, which illustrates the general principles of my invention; but it is to be understood that this detailed description is not to be taken in a limiting sense, since the scope of my invention is best defined by the appended claims.

Referring to the drawings:

Figure 1 is a fragmentary transverse section of the flooring through a refrigerator car embodying my invention;

Fig. 2 is a fragmentary longitudinal section taken adjacent the ice compartment of the car;

Fig. 3 is a fragmentary vertical section through the door in the side wall of the car; and

Fig. 4 is a fragmentary transverse section thereof.

In the present instance, I show a refrigerator car having most of its substantial framework built in accordance with conventional practice. Thus there are the side sills or beams 10, and the intermediate beams 11. The outer walls of the car can be formed of a layer of wood 12, which may be tongued and grooved. This layer can be supported in any appropriate manner, which is not any part of the present invention.

In order to form the floor of the car, I first of all place a layer of transverse boards 13 at the bottom, supported in any desired manner on the beams or sills 10, 11. For example, the angle irons 14 fastened to sills 10 can be used to sup-

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port the ends of these transverse boards. Over this layer, I place a layer of insulation 15 comprising a single piece of material covering the boards, made from some comparatively rigid cellular material, such as celotex or insulite. I show another layer 16 of insulation, also comprising a single piece of material, made from a comparatively rigid cellular material such as cork. The layer of cork 16 is then covered with a layer 17 of some suitable waterproofing compound, and a single piece of mica surfaced insulating paper 18 can be secured to the waterproofing compound.

Above the layer 18 is the tongue and groove flooring 19, which rests on this layer. Flooring 19 extends substantially across the width of the car and over the sills 10; it also extends longitudinally as far as the bearing rail 20 (Fig. 2) for the bulkhead separating the ice compartment from the cargo compartment. It is to be noted that this rail rests on the celotex layer 15, and interrupts the continuity of the cork layer 16.

The outer walls of the car also have insulation layers. A usual form of this insulation is disclosed. Thus beneath the boards 12 there is a layer of hairinsul 21 and a layer of celotex 21'; then an air space, and then a layer of celotex 22 and hairinsul 23 respectively. At the side corners, I provide a mold 24 having a slightly overhanging edge 25 and a rounded interior corner 26. The inner wall lining 27 can be supported at its bottom on this mold 24. If desired, the conventional cargo racks 28 can be provided, hinged on appropriate hinge leaves or supports 29. These leaves or supports are so supported in the wall structure that no projections are present to injure the cargo when the cargo shifts. Furthermore, the hinge is at a considerable distance above the floor. When the racks 28 are raised on their hinges, they thus present a large clear space for cleaning the floor or for inspection, removal or repairing of the floor covering material.

A continuous layer 30 of waterproof felt paper is laid over the flooring 19. This is carried up over the sides of the molds 24 to protect the corners against moisture. Beading 31 holds the top edge of this layer in place on molds 24. Due to the fact that the inner lining 27 extends beyond the corners, definite advantages are secured. First, sliding of ice or cargo against this layer cannot injure the corners; and second, whatever moisture collects on the car interior will drip down from the lower edge of lining 27, and cannot find its way beneath the floor covering 30.

The waterproof felt layer 30 extends substantially the whole length of the car. As shown most clearly in Fig. 2, it passes over the edge of the drip pan 32 which is disposed at the bottom of the ice compartment. The drip pan 32 overlies the bulkhead rail 20 and is keyed into a groove in the flooring 19 forming a continuation of the upper surface thereof. The layer 30 in fact is preferably carried down over the inner edge of rail 20. The bulkhead (not shown) can be fastened to rail 20 in any desired fashion, well-known in the art. However, I preferably arrange matters in such a way that the covering is capable of an unrestricted relative sliding movement over the bulkhead rail 20, for a purpose to be described.

Should relative sliding movement between the covering 30 and bulkhead rail 20 be prevented, any movement of the latter, due to the weight of the ice dropped thereon and by the thrust of the ice load against the bulkhead, will cause a buckling of the covering and a consequent formation of cracks or creases therein. Obviously, this is objectionable both from the standpoint of ineffective refrigeration, and ultimate rotting of the floor construction due to the corroding action of the liquid seeping through the cracks. Therefore, relative sliding movement between the floor covering 30 and the bulkhead rail 20 is permitted to prevent this buckling, in a manner now to be described.

The ends of the covering 30, as clearly shown in Fig. 2 are gripped by a metal stiffener 33. This stiffener follows the contour of the flooring 19 and rail 20, and underlies the covering except at one end thereof, where it is doubled upon itself as at 34 to overlie the casing. The stiffener 33 extends inwardly towards the center of the car, for only a short distance, and is secured to the flooring 19 as by a nail or other suitable means passing through the covering 30 and the stiffener adjacent its undoubled end. Thus, should the rail 20 be caused to move, it will not carry the covering 30 along with it, as relative sliding movement between the rail 20 and stiffener 33 is permitted. The movement of the rail 20 will have little or no effect upon the flooring 19 not immediately adjacent thereto, and consequently no relative sliding movement between the flooring and covering is necessary at points remote from the rail. Therefore, the central portion of covering 30 can be adhesively secured to the flooring 19 as in my above mentioned patent.

The metal stiffener 33 is effectively insulated from the flooring 19 as by a layer of asphalt cement 36 on the flooring, and an overlying waterproof felt 37 sandwiched between the stiffener and the cement.

Moisture quite frequently accumulates on the floor covering 30 and normally this is removed through the conventional drain in the car; however, in transit the cars sway from side to side and a good deal of this accumulated moisture is moved against the sides. Naturally, some of this moisture will seep through the crevices beneath the door. This obviously is objectionable as the moisture may cause the door and threshold to swell, preventing the opening of the former; and ultimately causes both the door and threshold to rot. I obviate this objection in a manner now to be described.

The door 37, which is of conventional construction comprising wood and multi-layer insulation, is provided with inwardly tapered ends (Fig. 3) which cooperate with the inversely tapered surrounding wall construction to form a substantially air-tight closure. An inclined stop 38, having a substantially right triangular cross-section, is positioned adjacent the downwardly inclined threshold 39 with its short abrupt leg parallel to the door. The floor covering 30 extends onto the inclined face of stop 38 and is protected from any seepage of moisture underneath the covering as by a substantially L-shaped metallic protector 40, the long side of which is coincident with the inclined face of the stop. The short side of protector 40 extends parallel to the abrupt face of the stop 38 and serves as a means for fastening a gasket 41 to this leg. A gasket 42 is secured to the inner face 27 of the door 37 as by a metallic fastening strip 43. The gaskets 41 and 42 coact with the door and protector 40 respectively to form a double seal effect which prevents the escape of liquid swashed onto the stop 38, beneath the door as in the prior art constructions. The gasket 42 is so positioned on the wall 27, that it contacts with the protector 40

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at substantially its topmost portion. In this manner there can be no pocket, for the accumulation of liquid, between the gasket 42 and protector 50.

The downwardly inclined flooring forming the threshold 39 is covered by a metallic threshold plate 44 which serves to shed any moisture thereon away from the door opening. The inner end of this plate extends into a slot in the inclined stop 38.

The double seal effect produced by gaskets 41 and 42, not only prevents the egress of liquid beneath the door of the car, but also serves to prevent the egress of refrigerated air, and the ingress of warm air from the exterior.

This same double seal effect can be formed around the sides and top of the door 37 to prevent the egress or ingress of air between the top and sides of the door and the surrounding wall construction. Thus a gasket, a continuation of gasket 41, is secured to a framework 46, which in turn is properly positioned adjacent the sides and top of the door, as by a metallic fastening strip 47. A gasket 48, a continuation of gasket 42, is secured to the inner face 27 of the door as by a metallic fastening strip 49. Gasket 48 extends around the sides and top of the inner face of the door and is adapted to coact with gasket 45 to form a double seal effect when the door is in closed position as shown in Figs. 3 and 4. A metallic protector strip 50 can be secured to the top inclined face of the door if desired.

I claim:

1. In a refrigerator car flooring structure, a flooring for the car, a bulkhead rail adjacent one end of the floor and assisting to define a cargo and an ice compartment, a floor covering, and a stiffener for one end of the floor covering, said stiffener and floor covering extending over the rail and being capable of a relative sliding movement with respect to the bulkhead rail.

2. In a refrigerator car flooring structure, a flooring for the car, a bulkhead rail adjacent one end of the floor and assisting to define a cargo and an ice compartment, a floor covering for the flooring and bulkhead rail, and a metal stiffener for one end of the flooring, said stiffener extending over the flooring adjacent to the bulkhead rail, and said stiffener and flooring covering extending over the rail and being capable of a relative sliding movement with respect to the bulkhead rail.

3. In a refrigerator car flooring structure, a flooring for the car, a bulkhead rail adjacent one end of the floor and assisting to define a cargo and an ice compartment, a floor covering for the flooring and bulkhead rail, a member extending over the bulkhead rail and the flooring adjacent to said rail for stiffening one end of the floor covering and means adjacent the inner end of said member for securing the covering and said member to the flooring, said covering and said member extending over the rail and being capable of a relative sliding movement with respect to said rail.

4. In a refrigerator car flooring structure, a flooring for the car, a bulkhead rail adjacent one end of the floor and assisting to define a cargo and an ice compartment, a floor covering for the flooring and bulkhead rail, a member extending over the bulkhead rail and the flooring adjacent to said rail for stiffening one end of the floor covering and means adjacent the inner end of said member for securing the covering and said member to the flooring, the outer end of said member being doubled over the end of the covering and extending along the side of said rail into the ice compartment, and said covering and member being capable of a relative sliding movement with respect to said rail.

5. In a refrigerator car having a flooring and a door, a stop at one side of the flooring adjacent the bottom of the door, said stop having an abrupt face adjacent the door, and an upper face inclined from the door toward the car interior, a covering for said floor extending onto the inclined stop, and a protector plate covering the end of the flooring and secured to said inclined stop.

6. In a refrigerator car having a flooring and a door, a stop at one side of the flooring adjacent the bottom of the door, said stop having an abrupt face adjacent the door, and an upper face inclined from the door toward the car interior, a covering for the flooring extending onto the inclined stop, a gasket on the abrupt face of the inclined stop, and a gasket on the door, said gaskets respectively cooperating with the door and the top portion of the elevated stop to form a double seal when the door is in closed position.

7. In a refrigerator car having a flooring and a door, a stop at one side of the flooring adjacent the bottom of the door, said stop having an abrupt face adjacent the door, and an upper face inclined from the door toward the car interior, a covering for said flooring extending onto the inclined stop, a protector plate covering the end of the flooring and extending over the apex of the inclined stop, a gasket on the abrupt face of the inclined stop, and a gasket on the door, said gaskets respectively cooperating with the door and the apex of the protector plate to form a double seal.

8. In a refrigerator car having a flooring and a door, a stop at one side of the flooring adjacent the bottom of the door, said stop having an abrupt face adjacent the door, and an upper face inclined from the door toward the car interior, a covering for said flooring extending onto the inclined stop, a protector plate covering the end of the flooring and extending over the apex of the inclined stop, a gasket on the abrupt face of the inclined stop, a gasket on the door, said gaskets respectively cooperating with the door and the apex of the protector plate to form a double seal, and a downwardly inclined metallic threshold plate extending into the inclined stop.

9. In a refrigerator car having a flooring and a door, a stop at one side of the flooring adjacent the bottom of the door, said stop having an abrupt face adjacent the door, and an upper face inclined from the door toward the car interior, a gasket on the abrupt face of the inclined stop, a gasket on the door, said gaskets respectively cooperating with the door and inclined stop to form a double seal, a frame adjacent to and overlying the top and sides of the door, a gasket on said frame, and a gasket near the edges of the sides and top of the door, said last named gaskets cooperating to form a double seal; said double seals being formed only when the door is in closed position.

10. In a refrigerator car flooring structure, a flooring for the car, a bulkhead rail adjacent one end of the floor and assisting to define a cargo and an ice compartment, and a floor covering for the cargo compartment having a portion extending over the rail, slidably supported thereon and attached only on the cargo side of the rail.

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