

Aug. 28, 1951

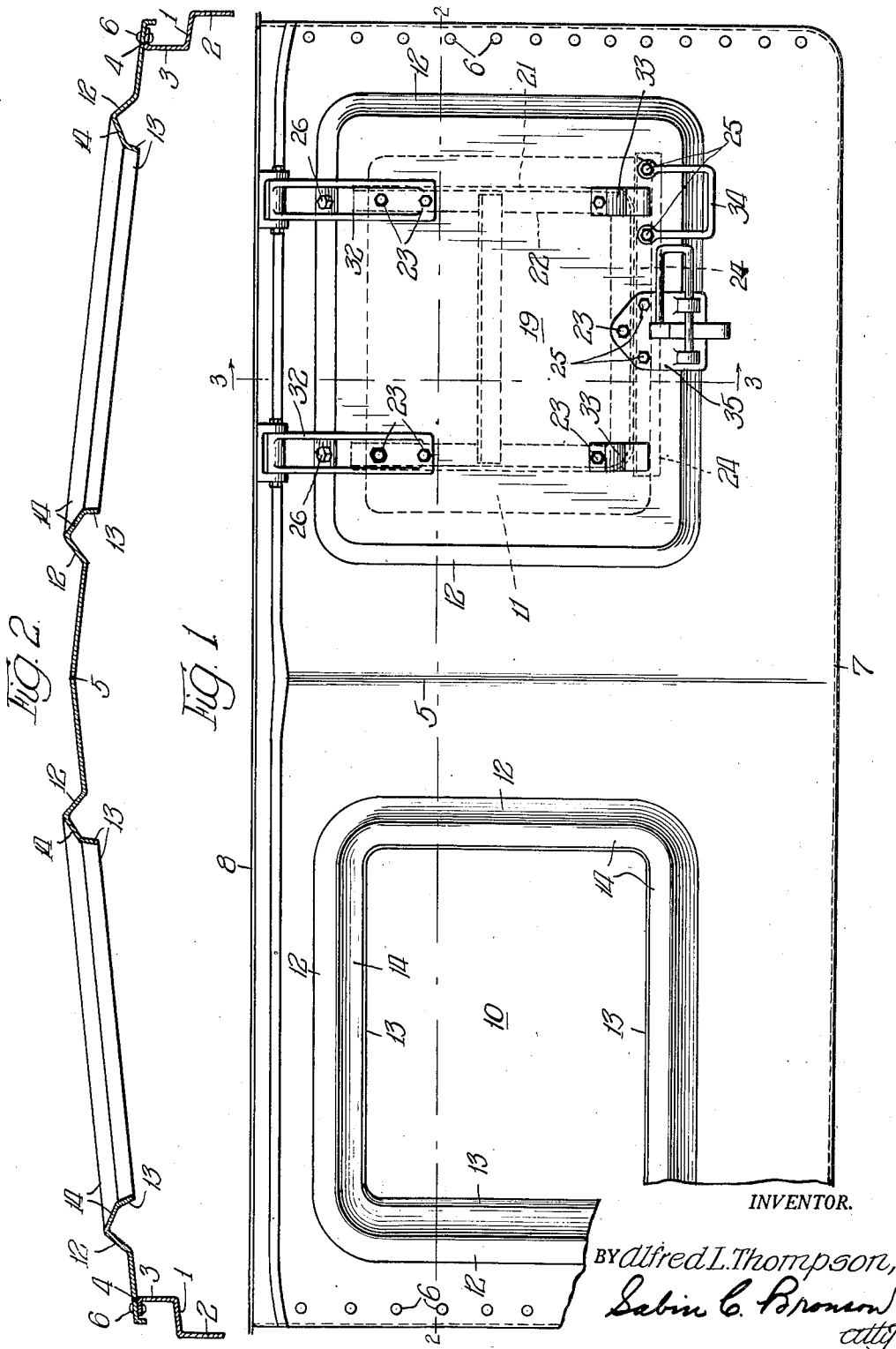
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INTEGRAL ROOF SHEET AND HATCH FRAME

Filed Oct. 26, 1949

2 Sheets-Sheet 1



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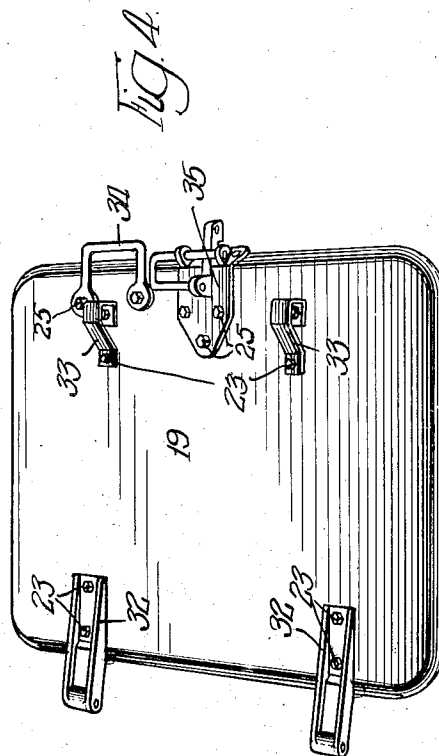
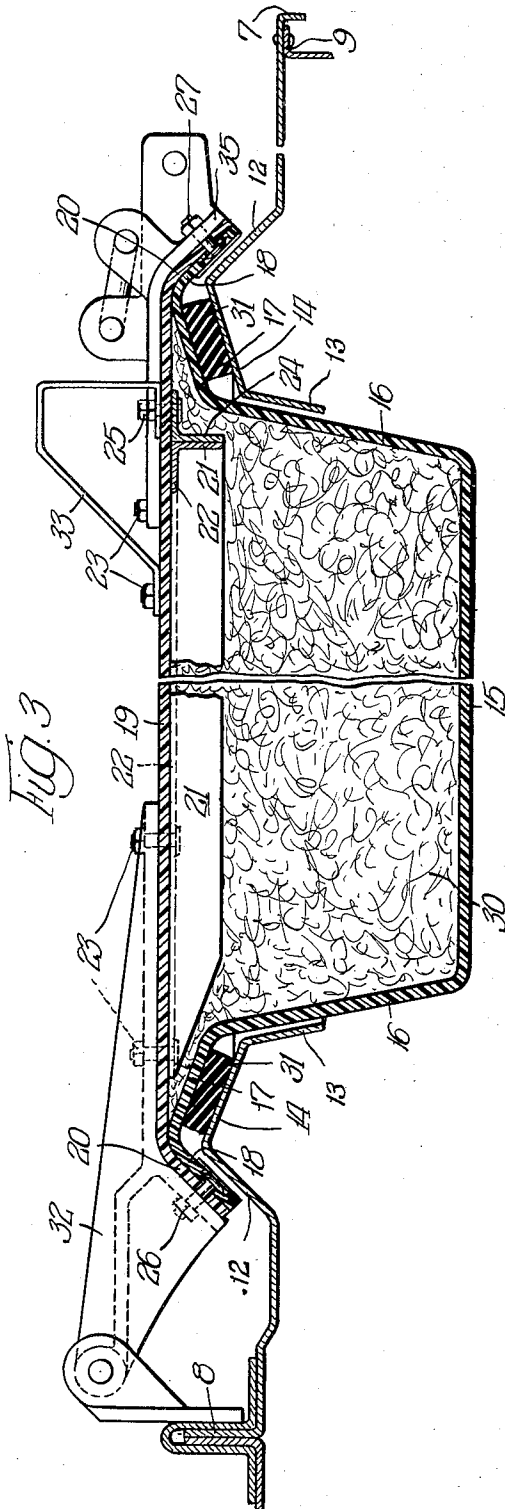
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2 Sheets-Sheet 2



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INTEGRAL ROOF SHEET AND HATCH FRAME

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5 Claims. (Cl. 105—377)

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This invention relates to railway refrigerator cars, and more particularly to overhead bunker cars wherein a plurality of refrigerant containers are supported in spaced relation immediately below the roof of the car.

Heretofore metal car roofs for refrigerator cars have been made wherein the roof sheets span from side plate to side plate of the car and had their adjacent side margins flanged up and covered with a seam cap to form a seam construction that served the purpose of an outside carline. In this type of roof it was old to cut a hatch opening in the roof sheet and mount a hatch frame in said opening; but for this purpose it was necessary to support the hatch frame by supplemental inside carlines, sometimes called ladder carlines, that extended from side plate to side plate and by purlins extending between the carlines on opposite sides of the hatch frame under the roof sheet.

The invention is also applicable to provide a roof for a hopper car by the use of which hopper cars may then carry cement, lime or other material which it is necessary to keep dry during transit.

In the manufacture of railway freight cars it is desirable and economical to have as few parts as possible so as to simplify and expedite the assembly of such parts into a complete car. It is likewise expensive and slow to make numerous and sundry parts, especially when they must be made in various types of manufacturing plants, such as foundries and steel fabricators, and then all such parts shipped to the car manufacturer for assembly into the cars being built.

The ordinary hatch plugs for use with such roof sheets are usually composed of inner and outer spaced pan shaped metal portions with insulation therebetween and weigh, for an average sized hatch opening, approximately one hundred and thirty-five pounds. This is considerable weight for one man to handle when lifting the hatch plugs as when the ice tanks are to be loaded, and, consequently, it is desired that these plugs be made as light as possible. A hatch plug made in accordance with my hereinafter described hatch plug is roughly one hundred pounds lighter than the standard hatch plug now available and saves an appreciable amount in the total weight of the finished car.

My invention has for its object the formation of a roof sheet and hatch frames as an integral unit pressed from a single sheet of material and to so form said unit that it has sufficient inherent strength to support itself in the roof structure

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without the necessity of inside ladder carlines, doing away with said carlines entirely, saving the weight thereof, and the large cost of assembling ladder carlines, and hatch frames into the car roof structure, and to provide a lightweight, economical hatch plug therefor.

Referring now to the accompanying drawing forming part of this application wherein like reference characters indicate like parts:

Fig. 1 is a plan view of the improved roof sheet having the hatch frames integrally formed therein and with a lightweight plug applied to one of said hatch frames.

Fig. 2 is a section on line 2—2, Fig. 1, omitting the hatch plugs and side plates.

Fig. 3 is an enlarged section on line 3—3, Fig. 1.

Fig. 4 is a perspective view of one of the plugs.

The invention is shown as embodied in a car having metal side plates of substantially Z-shaped cross section, which extend from end to end of the car and have a portion 1 disposed substantially horizontally to rest upon and be secured to the tops of longitudinally spaced vertical side posts (not shown) of the car. From the outer edges of said portion 1 depends a flange 2 which overlaps the upper outer edge of said posts, and at the inner edge of said portion 1 an upstanding flange 3 is provided, it having a laterally turned refflange 4 extending in the plane of the roof of the car.

The invention has to do with those sheets of a railway car roof wherein hatch frames are located, and consequently these particular sheets of a railway car roof only will be described.

These hatch frame roof sheets span the car from side plate to side plate, and conform to the general shape of the car roof having a ridge portion 5 transversely thereof conforming to the ridge of the roof, and the roof sheet slopes downwardly on opposite sides of said ridge portion 5 to the side plates, and the ends thereof rest upon and are secured to the lateral flange 4 of said side plate by a row of rivets 6. The side of the hatch sheet adjacent the end of the car is formed with a downturned flange 7 which is adapted to overlap and be secured to the upper margin 9 of the end wall and be secured thereto, as is common, and the other side of said sheet is formed with an upstanding flange 8 adapted to abut a similar flange of an adjacent sheet and be covered with a seam cap, securing said flanges and caps together, all as is common in the art.

For years manufacturers of roof sheets have attempted to integrally form hatch frames therein but have been unable to do so because the

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manufacturing problems were too difficult to overcome and, furthermore, the sheet steel available would not permit drawing to the extent necessary. Applicant has overcome these difficulties and is now manufacturing roof sheets with integrally formed hatch frames therein. The sheets are placed in a press, between reciprocating dies, squeezed therebetween, thus forming the hatch frames continuously about the margins of openings 10 and 11, which openings may be blanked from the sheet substantially simultaneously with the formation of the hatch frames, or subsequently, depending upon the type of reciprocating dies used. The hatch frames thus pressed in the roof sheet are in the form of an upstanding boss having downwardly and outwardly sloping outside walls 12 and downwardly and inwardly sloping inside walls 13 spaced from the outside walls, said inside and outside walls being connected by a shoulder or web 14 which slopes outwardly and upwardly and forms a seat for the hereinafter described cover or plug for said hatch opening. The embossment forming the hatch frame is pressed almost in its entirety to one side of the general plane of the roof sheet and when said sheet is applied to the car is upstanding from said roof. The lower margin of the inner wall 13 projects below the general plane of the roof; otherwise, the entire hatch frame is above the general plane of the roof. In cross section said embossment is substantially a downwardly facing channel, extending continuously about the hatch opening, and each hatch frame is approximately midway between the ridge and eaves portion of the sheet. From experience in the pressing of the herein described roof sheet and hatch frame unit it has been found that, with present practices at least, the depth of the hatch frame cannot be more than approximately three inches, because the material would tear if a deeper draw were made. This is apparently a critical dimension limit with present equipment and practice. In combination with the side flanges the pressing of these embossments integrally within the roof sheet itself provides a very strong roof sheet, which when joined with adjacent sheets and to the car side plates, is amply strong to support itself within the entire car roof structure, requiring no carlines or purlins whatever to support the same, but the function of said carlines and purlins is retained inherently in the sheet itself. The saving in weight per car of the purlins and carlines heretofore considered absolutely necessary is very considerable.

The hatch plug shown for use with said hatch frames comprises a pan shaped bottom member 15 having rounded corners and outwardly diverging side walls 16 with outturned marginal flanges 17 which terminate into downturned reflanges 18. The top member of the plug comprises a sheet having a flat body portion 19 spanning across the bottom member between the outer edges of flanges 17, and the outer flanged margin 20 of said portion 19 is turned down over and rests flatly against reflange 18 and is bonded thereto. These two members are formed of plastic material which is durable and is not affected by salt, acid, alkali, soot, cinders, or atmospheric temperatures. A metallic stiffening angle 21 is provided on the under surface of the body portion 19 of the top member, said angle 21 being of U or horseshoe-shape and one flange 22 thereof being disposed flatwise against the inner surface of the top member 19. Spaced registering holes are provided through said flange

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and the adjacent body portion 19, through which extend bolts 23, the heads of said bolts being welded to said flange with the shank of said bolt projecting through the body portion for application of fixtures thereto. A straight reinforcing angle 24 is also provided across the base of said angle 21 with one flange thereof disposed flatwise against the inner surface of said body portion and is provided with bolts 25 extending through said angle 24 and the body 19 of said top member, similar to bolts 23. Extending through flanges 18 and 20 on opposite sides of the plug are also provided bolts 26 and 27 also for application of fixtures for securing the plug to the hatch frame and adjacent car roof. The space between the bottom 15 and top 19 members of the plug is filled with a suitable insulating material, indicated at 30, and a gasket 31 is bonded to the under side of flange 17 to seat upon flange 14 of the hatch frame.

Ordinary hatch plug hinges 32 are secured along one side of the plug to hingedly secure the plug to the roof, as shown, and along the opposite sides are secured the stops 33, handle 34 and lock 35, all of which are common in such structures.

The bottom and top members of this hatch plug are formed of plastic material and the insulation is also of plastic material and the weight of such a plug is approximately one hundred pounds less than the ordinary plug constructed of steel.

I claim:

1. A roof sheet for a railway car roof consisting of a single sheet of material having a hatch opening formed therein and an upstanding boss formed therein integral therewith about the margins of said opening forming a hatch frame for said opening, said boss provided with downwardly and outwardly sloping outside walls and downwardly and inwardly sloping inside walls, said inside and outside walls being connected by an outwardly and upwardly sloping shoulder forming a seat for a cover for said opening, the depth of said boss being approximately three inches.

2. A roof sheet for a railway car roof consisting of a single sheet of material having a hatch opening formed therein and an upstanding boss formed therein integral therewith about the margins of said opening forming a hatch frame for said opening, said boss provided with downwardly and outwardly sloping outside walls and downwardly and inwardly sloping inside walls, said inside and outside walls being connected by an outwardly and upwardly sloping shoulder forming a seat for a cover for said opening, said boss projecting both above and below the general plane of the sheet, the distance between the top of said shoulder and bottom of said inside walls being approximately three inches.

3. In a railway car, a roof sheet for the roof of said car, said roof sheet having a hatch opening cut therefrom, a hatch frame pressed therein integral therewith and extending continuously about the margins of said opening, said hatch frame having downwardly diverging outside walls, downwardly converging inside walls, and an inclined shoulder connecting said walls, the depth of said boss being approximately three inches.

4. A roof sheet for a railway car formed from a flat metallic sheet having flanges formed at the side margins thereof extending substantially normal thereto for attachment to adjacent sheet flanges or end plates, a hatch opening in said sheet and an upstanding embossment about said

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opening integrally formed therewith, constructed, shaped and arranged so as to provide inherently within said sheet sufficient strength to support itself in the roof structure, said embossment comprising upwardly converging outer walls, upwardly diverging inner walls spaced from said outer walls, the upper edges of said inner and outer walls being connected by a shoulder forming a seat for a hatch plug for said hatch opening, the depth of said embossment being approximately three inches.

5. A roof sheet for a railway car roof comprising a single sheet of material having a hatch opening formed therein and an upstanding boss formed by a single pressing integrally within said sheet about the margins of said opening, said boss projecting partly above and partly below

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the general plane of said roof sheet, the depth of said boss being approximately three inches.
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