

Sept. 22, 1953

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2,652,787

HATCH CONSTRUCTION FOR RAILWAY CARS

Filed March 17, 1950

3 Sheets-Sheet 1

Fig. 1.

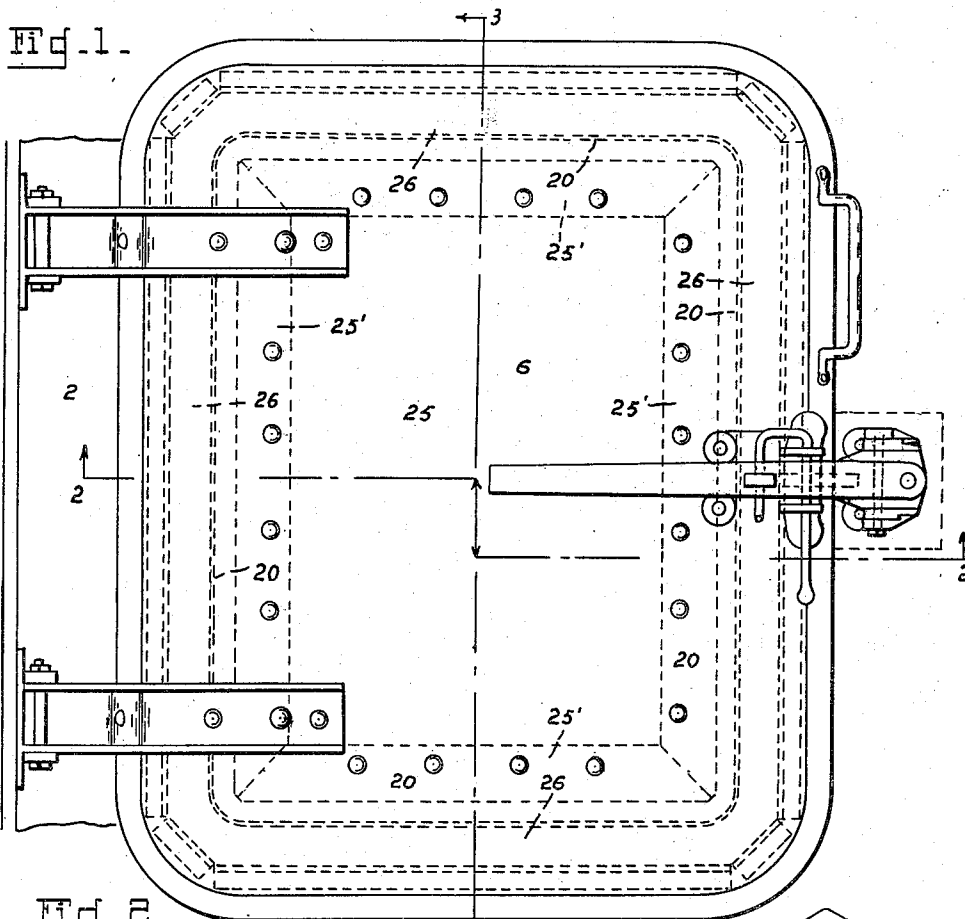
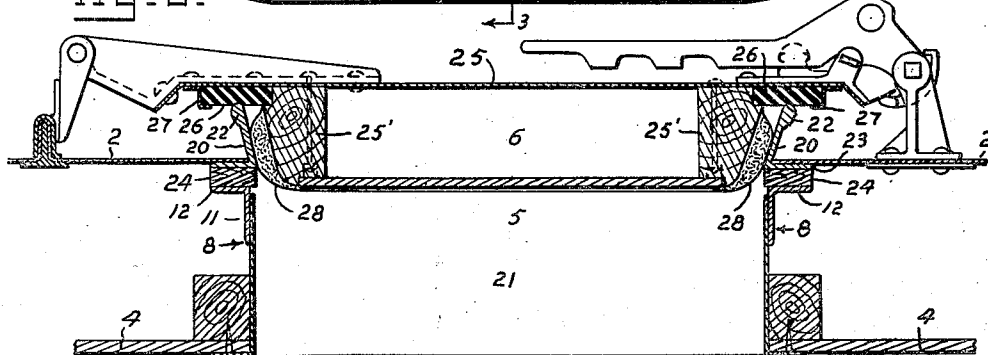


Fig. 2.



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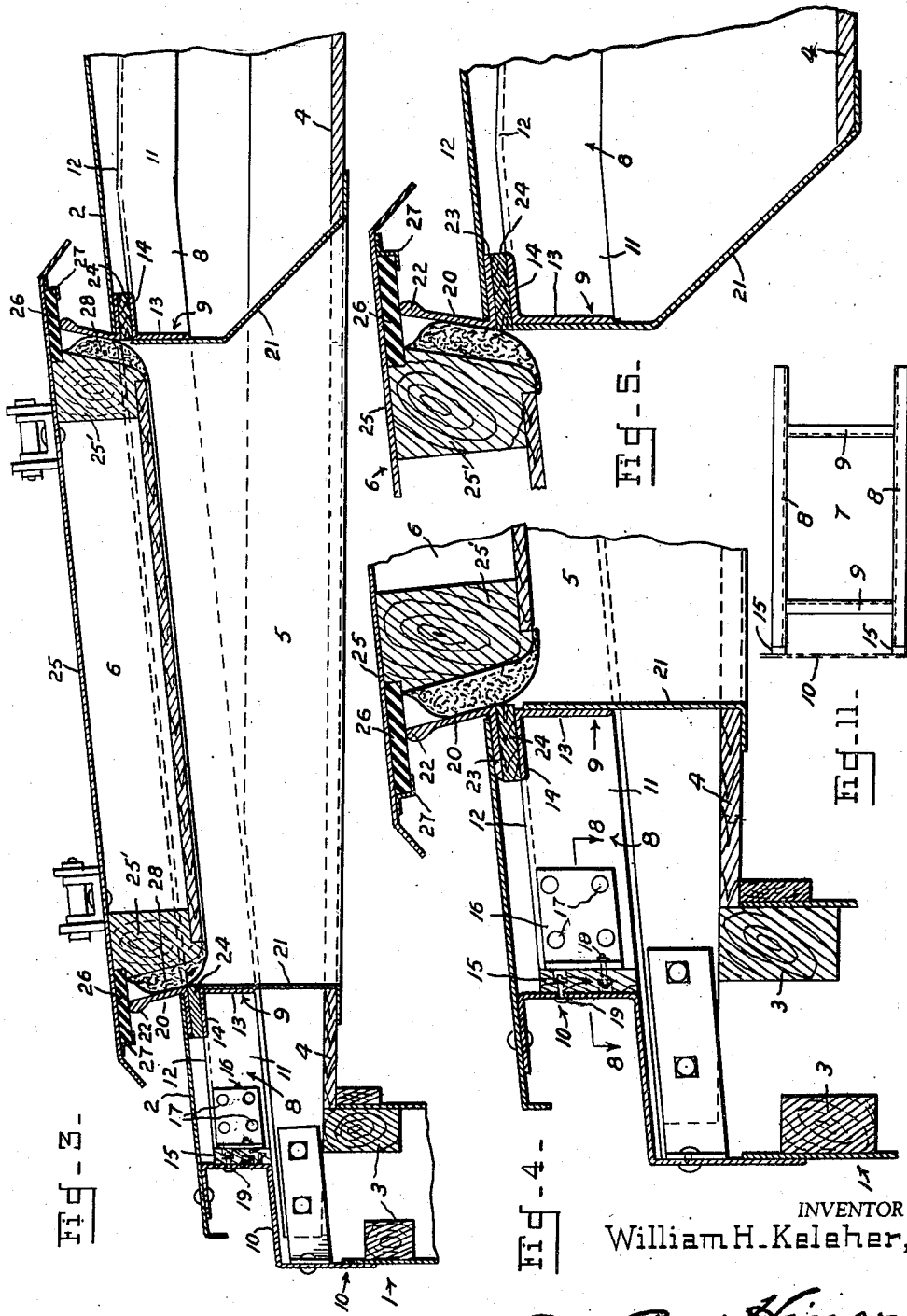
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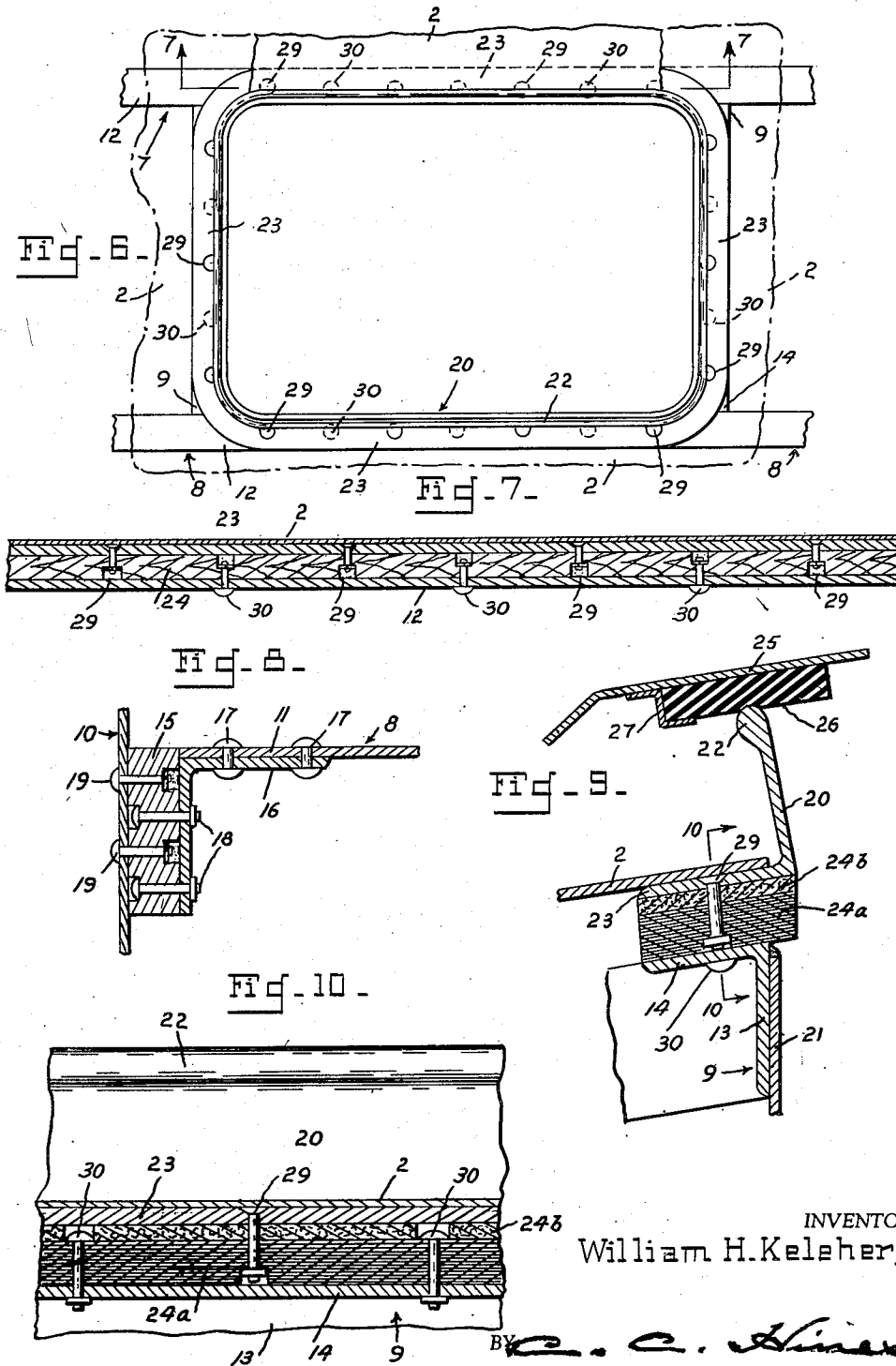
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HATCH CONSTRUCTION FOR RAILWAY CARS

Filed March 17, 1950

3 Sheets-Sheet 3



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## UNITED STATES PATENT OFFICE

2,652,787

## HATCH CONSTRUCTION FOR RAILWAY CARS

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Application March 17, 1950, Serial No. 150,240

17 Claims. (Cl. 105—377)

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This invention relates to improvements in hatch constructions for railway cars, and particularly to a hatch construction for insulated refrigerator cars having roof hatchways or openings for the introduction of ice into ice bunkers arranged within the car.

For many years refrigerator car roofs were essentially of wood construction, with wood or canvas as the exposed waterproofing surface. Wood hatch coamings and wood hatch plugs and covers were the order of that day. With improvements in box cars the flexible steel roof, and finally the solid steel roof, were carried over to and became standard to refrigerator cars. The use of steel roofs with hatch openings led to the design of steel hatch coamings and steel hatch covers, and, in some cases, combined plugs and covers of all steel construction. This latter type of construction had distinct advantages over the old wooden construction in that it presented a more pleasing appearance, was of considerably longer life than the wood and involved less maintenance problems, was less vulnerable to injury from the large cakes of ice striking the coaming on their way through the hatch openings, and was more satisfactory than its wood predecessor in that it provided a tight roof and hatch opening barrier against water leaks. Water leaks around the hatch opening result in water passage into the insulation above the car ceiling, which results in deterioration of the insulation and reduction of its insulation value, with attendant heat transfer and consumption of more ice in the warm season and more fuel in the heating season. Water passage into the ceiling of the car also results in damage claims where the water can find its way through the ceiling and damage cartons of canned goods, bottled goods and other commodities requiring dry conditions. The one disadvantage of the steel construction over the wood construction which it displaced, is that it conducts heat much faster than wood, which is practically an insulating material, resulting in refrigerating losses when the bunkers are used as refrigerating chambers to cool the air in the car and in heat losses when the bunkers are used as heating chambers to heat the air in the car.

The object of the present invention is to provide a novel construction of hatchway and closure which retains the advantages of the steel construction of roof, coaming, and skirt lining the lower part of the hatch opening, while at the same time giving the insulating advantages of a wood construction against heat exchange losses through any parts of the hatchway.

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In the accompanying drawings illustrating the invention,

Fig. 1 is a plan view of a portion of a metal car roof provided with my improved hatchway construction.

Fig. 2 is a vertical section through the same taken in a direction longitudinally of the car on line 2—2 of Fig. 1.

Fig. 3 is a similar section taken in a direction transversely of the car on line 3—3 of Fig. 1.

Figs. 4 and 5 are views similar to Fig. 3, on an enlarged scale, of portions of the parts located at opposite sides of the hatchway.

Fig. 6 is a top plan view of the ladder carline and a portion of the coaming and showing the insulating gasket applied thereto.

Fig. 7 is an enlarged detail section on line 7—7 of Fig. 6.

Fig. 8 is a sectional plan view showing the joint connection between one of the ladder carline bars and a side plate.

Fig. 9 is a sectional view showing the use of a modified form of insulating means between the carline frame and coaming.

Fig. 10 is a section on line 10—10 of Fig. 9.

Fig. 11 is a plan view showing the ladder carline frame.

Referring now more particularly to the drawings, 1 represents a portion of one of the car side walls, 2 a portion of the roof hatch sheet, 3 parts of the wall framing, and 4 a portion of the ceiling of an insulated refrigerator car having a hatchway 5, and a closure 6 therefor, constructed in accordance with my invention.

The hatchway structure includes in its assembly a ladder carline framing 7 formed of pairs of angle metal bars or members 8 and 9, respectively, rigidly connected together. The carline members 8 extend below the roof from side to side of the car between the ZU eaves sections 10 of the side plates and have vertical portions 11 depending at the ends of the hatch opening and upper horizontal flange portions 12 arranged below and in spaced relation to the edges of the roof sheet at the ends of the hatch opening. The carline members 9 extend below the roof sheet at the sides of the hatch opening and have vertical portions 13 depending in line with the edges of the roof sheets at the sides thereof and upper horizontal flange portions 14 arranged in spaced relation to the roof sheets at such points. Where the ends of the carline members 8 are attached to the plates 10, each end of a carline member 8 is spaced from the plate 10 by an insulation block 15 and is secured thereto by an angle bracket 16 and sets of rivets or bolts 17, 18 and 19. As

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shown, one part of the angle bracket is fastened by the bolts or rivets 17 to the portion 11 of the carline member 8, while the other part of said bracket is fastened to the block 15 by the bolts or rivets 18 and the block in turn is independently fastened to the plate 10 by the bolts or rivets 19. The arrangement of the sets of bolts 18 and 19, which may be disposed in staggered order, as shown, is such that each bolt is countersunk at one end in the block 15 so that bolts 18 are free from connection with the plate 10 and bolts 19 are free from connection with the carline member and bracket. Thus the carline member is indirectly fastened to the plate 10 so as to be thermally insulated therefrom, the joint connections between each carline member 8 and the metal side plates forming temperature breaks preventing heat transfer between the metal plates and carline frame and through the latter to the interior of the car.

The hatchway structure also includes in its construction the upper portion or angle metal coaming 20 extending above the roof about the hatch opening, and the lower depending sheet metal skirt or lining 21. The coaming 20, as shown, extends upwardly and outwardly at an angle of from 85° to 90° to the vertical plane of the hatchway to form a downwardly converging entrance thereto, and terminates at its upper free end in a bulbous enlargement 22, and is provided at its lower end with a flange 23 which extends under and is riveted, welded or otherwise rigidly fastened to the roof sheet. The skirt or lining 21 may be of any suitable form and extends downwardly between the carline framing and the car ceiling, being welded to the vertical portions 11 and 13 of the carline members and suitably fastened to the ceiling.

In order to prevent any heat-transfer action between the roof and coaming and the interior of the car in the region of the hatchway, or between the upper part of the hatchway and the lower or lining part thereof, a gasket 24 of rubber or other suitable insulating material is arranged and firmly secured between the base flange of the coaming and the flanges 12 and 14 of the carline members, thus providing a sealing connection and a heat-break or frost-break to prevent water leaks and temperature losses through air leakage at this important point. By this means and by the use of a proper closure to cover and seal the hatchway a construction is provided which in a simple manner allows use of a sturdy, long-life hatchway structure of steel which has an insulating value equal to that of wood through the provision of an effective heat conduction interruption between external and internal steel parts.

The hatchway closure employed may be of any suitable construction, but as shown herein comprises a hinged metal cover 25 carrying a suitable form of insulating plug including a wooden plug member 25' externally tapered to correspond substantially to the interior downward taper of the coaming. The plug is rabbeted at its upper edge to receive the inner edge of an insulated sealing gasket 26 secured at its outer edge to the cover by a retaining member 27. This gasket, which may be made of rubber or other suitable material, is arranged so as to be compressed, when the cover is closed, into sealing engagement with the bulbous edge 22 of the coaming, whereby an insulated air and water tight connection between the hatchway and coaming is provided. In order to add to the sealing security of this connection the tapered peripheral surface of the plug may be

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provided with a compressible sealing means 28 which will be jammed or forced with a wedging fit into the coaming and against the inclined inner surface thereof when the cover is closed. Any suitable type of combined ventilating arm and hatch plug pressure applying means, and means for securing the cover in closed position, may be employed.

In assembling the parts of the hatch structure, the roof hatch sheet proper, provided with a suitable opening, is placed over the hatch coaming, which projects through it, and the hatch sheet is then riveted to the side and end plates and welded around the entire periphery of the previously applied coaming. The hatch sheet is self-supporting, inasmuch as it is riveted to the side and end plates. The coaming is individually supported by the roof hatch sheet to which it is welded and by the ladder carline and frost-breaking insulating ring or gasket. For the purpose of attachment of the ring to the ladder carline and the ring to the coaming, sets of bolts, rivets, or screws 29, 30 are used to connect the coaming to the ring or gasket and to independently connect the ring or gasket to the ladder carline, as shown particularly in Figures 6 and 7, in which sets of fastenings are staggered with relation to each other and are each countersunk at one end in the gasket so as to avoid direct connection between the coaming and carline and any heat-exchange between these parts. The hatchway lining or skirt is preferably made in one piece and applied from the interior of the car to the vertical portions or legs of the carline members, to which the lining may be either welded or secured by blind-riveting or self-tapping screws. This lining not only forms a complete flashing but also a satisfactory armor against the rough usage it gets due to abrasion and impacts of chunk and cake ice and against the sharp points of the pike poles used in icing the cars. The described hatch structure not only permits of ready and quick assembly of its parts, but of quick repairs or replacement of damaged parts when required.

Figs. 9 and 10 show a modified construction in which, in place of the rubber gasket 24, layers of plywood 24<sup>a</sup> and asbestos 24<sup>b</sup> are used between and secured to the coaming and carline in the same manner as the rubber gasket to provide a heat insulating break connection therebetween.

From the foregoing description, taken in connection with the drawings the construction of my improved hatchway will be readily understood by those versed in the art without a further and extended description. In summing up, the advantages of this construction may be stated as follows: (1) the heat transfer from interior to exterior or vice versa is definitely interrupted, (2) the general over-all construction of the hatch coaming, ladder carline and steel skirt is completely maintained for armoring, longevity and maintenance services, (3) the use of a prefabricated unitary steel skirt does away with hazardous flanging of light gage flashings and the use of heavy wooden hatch carlines and blocks heretofore employed to nail the light gage flashings thereto, and provides a skirt of much greater inherent strength and durability, (4) the use of a structural angle coaming affords greater convenience in application and a saving of cost over the pressed metal coamings customarily used, (5) the construction of the hatchway parts allows quicker and more convenient inspection of the parts and their repairs or replacement as occasion

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requires, and (6) removal of the easily removable skirt, not only allows a skirt in use to be readily repaired or replaced but also allows ready inspection of the insulation in the area of the bunker ceiling and adjacent to the hatch opening.

While the construction disclosed herein is preferred it is to be understood that I do not limit my invention thereto, but reserve the right to make such changes in the form, construction and arrangement of parts as fairly fall within the spirit and scope of the appended claims.

Having thus described my invention, I claim:

1. In a hatchway construction for cars, a roof sheet having a hatchway opening, carlines attached to the car side plates and arranged beneath the edges of the opening, and a hatchway lining including a coaming disposed above and supported by the carlines and a skirt formed independently of the coaming and supported by the carlines.

2. In a hatchway construction for cars, a roof sheet having a hatchway opening, carlines attached to the car side plates and arranged beneath the edges of the opening, a hatchway lining comprising a coaming disposed above and supported by the carlines and a skirt formed separate from the coaming and supported by the carlines, means interposed between and insulatively connecting the coaming with the carlines, and means interposed between and insulatively connecting the carlines with the car side plates.

3. In a hatch construction for cars having a roof sheet and a ceiling, each formed with a hatch opening, a metal coaming extending upward through the opening in the roof sheet and having a base flange bounding the opening, a metal framing supported by the car and supporting the coaming, said framing being arranged below and secured to said flange of the coaming, and a unitary metal skirt extending through the opening in the ceiling and secured at its upper end to the framing.

4. In a hatch construction for cars having a roof and a ceiling formed with hatch openings, a metal coaming extending upward through the opening in the roof and having a base portion extending beneath and secured to the roof sheet at the edges of said opening, a metal framing supported by the car and bounding the hatchway below the base portion of the coaming, and a unitary metal skirt extending upward through the opening in the ceiling and secured at its upper end to said framing.

5. In a hatch construction for cars having a metal roof provided with a hatch opening, a metal coaming extending through said opening and having a base portion secured to the underside of the roof sheet, a metal framing supported by the car and arranged beneath the base portion of the coaming, a skirt secured at its upper end to the framing, and a heat insulating barrier supported by the framing and interposed between and thermally insulating the coaming and framing from each other.

6. In a hatchway construction for cars, a car body having a metal roof sheet provided with a hatch opening, a metal coaming having a part underlying and secured to the sheet roof about the hatch opening, a ladder carline supported by the body and including members connected with each other and extending beneath said part of the coaming about the hatchway, insulating material independently fastened to said part of the coaming and to the carline by fastening members insulated thereby from the coaming, ladder

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carline and each other, and a metal skirt depending from the carline and connected thereto.

7. In a hatchway construction for cars, a car body having a metal roof sheet provided with a hatch opening, a metal coaming having a part underlying and secured to the sheet roof about the hatch opening, a ladder carline supported by the body and including members connected with each other and extending beneath said part of the coaming about the hatchway, insulating material interposed between said underlying part of the coaming and the carline, and a metal skirt secured to and depending from the carline.

8. In a hatchway construction for cars, a car body having a metal roof sheet provided with a hatch opening, a metal coaming having a part underlying and secured to the sheet roof about the hatch opening, a ladder carline supported by the body and including longitudinal and transverse angle metal bars bounding the opening and each having an upper horizontal flange and a vertical leg depending therefrom, insulating material interposed between the roof sheet and the horizontal flanges of the bars, and a metal skirt secured to and depending from the legs of the bars.

9. In a hatchway construction for cars, a car body having a metal roof sheet provided with a hatchway opening, a metal coaming projecting upwardly through the opening and having a base flange extending under and secured to the sheet about the margins of the opening, a metal frame supported by the body in the hatchway space and having upper flange portions disposed beneath the coaming, a metal skirt secured to and depending from the metal frame, and insulation between the flanges of the coaming and the frame thermally insulating the sheet and coaming from the frame and skirt.

10. In a hatchway construction for cars, a car body having a metal roof sheet provided with a hatchway opening, a metal coaming projecting upwardly and outwardly at an angle through the opening and having a base flange extending under and secured to the roof sheet, a metal frame supported by the body and bounding the opening beneath the coaming, a metal skirt secured to and depending from the metal frame, and insulation between the flange of the coaming and the frame thermally insulating the sheet and coaming from the frame and skirt.

11. In a hatchway construction for cars, a car body having a metal roof sheet provided with a hatchway opening, a metal coaming projecting upwardly and outwardly at an angle through the opening and having a base flange extending under and secured to the sheet, a metal frame supported by the body and comprising bars having depending legs bounding the opening and having flange portions disposed beneath the flange of the coaming, a metal skirt secured to and depending from the legs of the metal frame, and insulation between the flanges of the coaming and the frame thermally insulating the sheet and coaming from the frame and skirt.

12. A hatchway construction for cars comprising a metal lining including a coaming and a skirt forming the upper and lower parts of the lining, a metal frame structure arranged beneath the coaming, and a barrier of insulating material interposed between and supporting the coaming from the frame structure and thermally insulating said parts from each other.

13. A hatchway construction for cars including a metal roof sheet having a hatch opening, a

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metal coaming having a part extending beneath and secured to the roof sheet, a metal frame structure arranged beneath the coaming, a metal skirt supported below the coaming by said frame structure, and a barrier of insulating material supported by the frame structure and supporting the coaming therefrom and thermally insulating the coaming from the skirt and framing.

14. In a hatchway construction for cars, a car body having a metal roof sheet provided with a hatch opening, a metal coaming having a part underlying and secured to the sheet roof about the hatch opening, a ladder carline including longitudinal and transverse frame bars bounding the opening and connected to each other, fastening connections between each end of each transverse frame bar and the adjacent side of the car, each of said fastening connections comprising an insulating block disposed between the car side and the adjacent end of the transverse frame bar and fastening elements independently connecting the block with the car sides and adjacent end of the transverse frame bar, and a metal skirt secured to and depending from the carline frame bars.

15. In a hatchway construction for cars, a car body having a metal roof sheet provided with a hatch opening, a metal coaming secured to and projecting upwardly from said sheet at the margin of the opening, a metal flange supported by the body and bounding the opening beneath the coaming and adjacent portion of the roof sheet, a metal skirt separate from the coaming and secured to and depending from the metal frame, and insulation supported by the frame and interposed between and supporting the coaming from the frame and thermally insulating the sheet and coaming from the frame and skirt.

16. In a hatchway construction for cars, a car body having a metal roof sheet provided with a hatch opening, a metal coaming secured to said

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sheet and projecting upwardly through the opening and having a base portion bounding the edge of the opening, a metal carline frame including a pair of longitudinal frame bars and a pair of cross frame bars connected with each other and bounding the opening beneath the base of the coaming and supporting said coaming insulated fastening means connecting the edges of one of the pairs of frame bars to the body, a metal skirt formed separately from the coaming and secured at its upper end to and depending from the metal frame, and insulation between the coaming and the frame thermally insulating the sheet and coaming from the frame and skirt.

17. In a hatchway construction for cars, a car body having a metal roof sheet provided with a hatchway opening, a metal coaming projecting upwardly and outwardly at an angle through the opening and having a base flange extending under and secured to the roof sheet, a metal frame bounding the opening and comprising longitudinal bars and transverse bars connected therewith, said bars having flange portions disposed beneath the flange of the coaming and supporting said coaming, insulated connections between the ends of the transverse bars and with the body, a unitary metal skirt piece formed separate from the coaming and secured to and depending from the metal frame, and insulation between the flange of the coaming and the frame thermally insulating the sheet and coaming from the frame and skirt.

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