May 15, 1928. 1,669,736

C. D. BONSALL

REFRIGERATOR CAR

Filed March 10. 1927 2 Sheets-Sheet 1

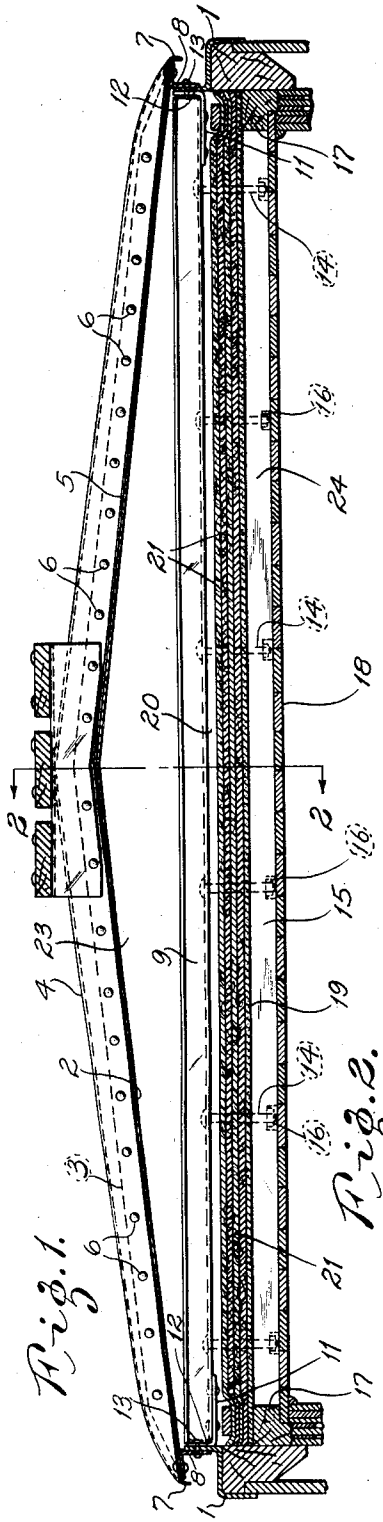


Fig. 1.

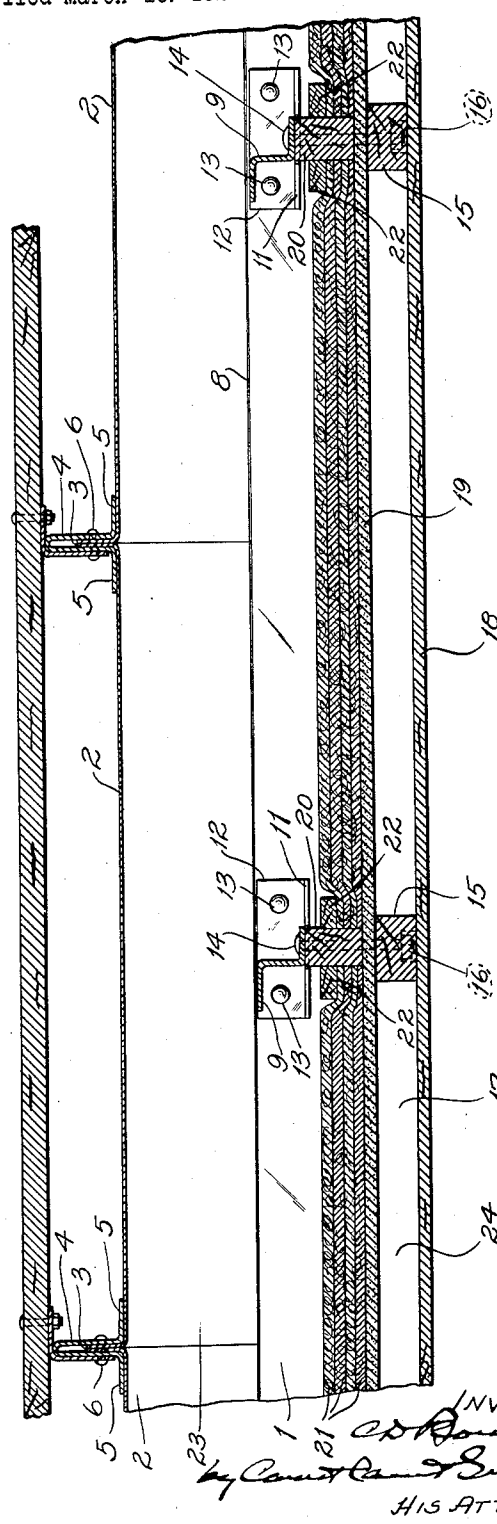


Fig. 2.

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Fig. 3.

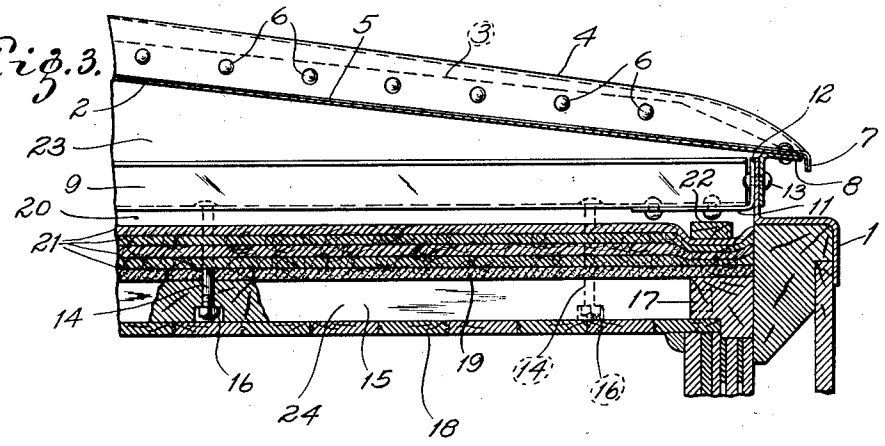


Fig. 4.

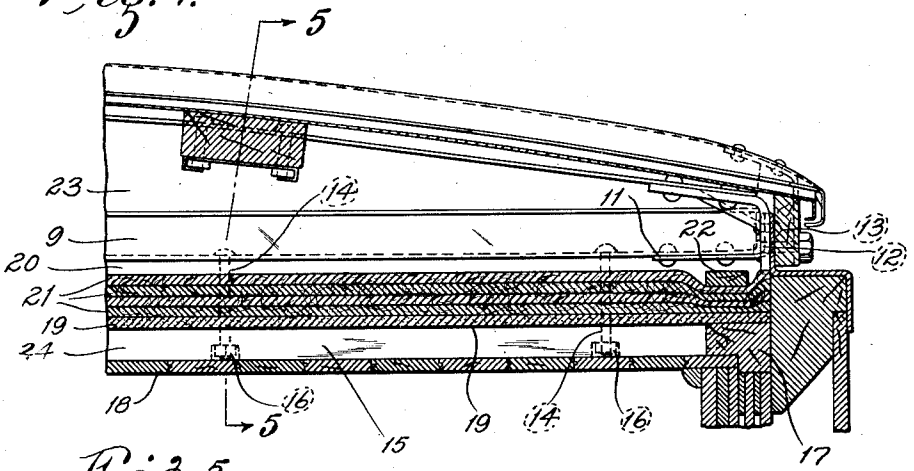
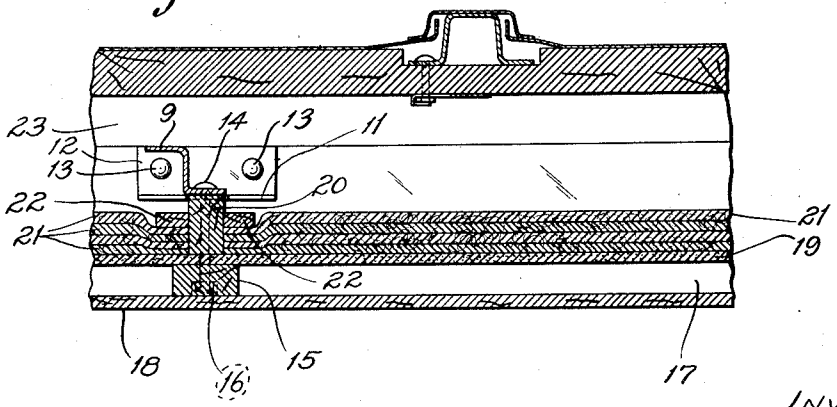


Fig. 5.



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UNITED STATES PATENT OFFICE.

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REFRIGERATOR CAR.

Application filed March 10, 1927. Serial No. 174,391.

This invention relates to refrigerator cars.

Heretofore it has generally been considered impracticable to use an all-metal roof for refrigerator cars and especially for cars with steel body frames. On the other hand, the practical merits of an all-metal roof, especially for cars with metal body frames, are so important that it is highly desirable to be able to use such all-metal roofs for refrigerator cars: and it is the principal object of the present invention to devise means for achieving such desideratum. The invention consists principally in the combinations and arrangements of parts hereinafter described.

In the accompanying drawing wherein like reference numerals refer to like parts wherever they occur,

Fig. 1 is a vertical cross sectional view of the upper portion of a refrigerator car embodying my invention,

Fig. 2 is a vertical cross section, showing part of the upper portion of the car on an enlarged scale,

Fig. 3 is a longitudinal sectional view of part of the upper portion of the car,

Fig. 4 is a view similar to Fig. 1 showing a different type of single course roof; and

Fig. 5 is a longitudinal sectional view on the line 5—5 in Fig. 4.

In the construction illustrated in the accompanying drawing, the side plates 1 are metal members in the form of Z-bars arranged with the web horizontal and the inner flange extending upwardly and the outer flange extending downwardly. The roof construction illustrated in Figs. 1 to 3 comprises metal sheets 2 that extend across the car and have upstanding flanges 3 along their side margins which flanges abut flatwise and are enclosed in a channel-shaped seam cover 4 that has lateral flanges 5 that cover the marginal portions of the sheets. The sheets and seam cover are rigidly secured together by rivets 6 that extend horizontally through the seam cover and the sheet flanges. In the construction shown, each eaves end 7 of the roof sheets is bent downwardly and the adjacent end portion of the sheet is riveted to the horizontal leg of an angle plate 8 whose vertical leg is riveted flatwise against the outer face of the upstanding flange of the side plate. In addition to the obvious merits of this roof in service, it has the great advantage that it may be assembled very economically in the shop and applied to the car frame as a completed unit.

According to the present invention, metal sub-carlines 9 extend from side plate to side plate. In the construction illustrated, these sub-carlines are of regular section, preferably in the form of Z-bars arranged with the bottom leg or flanges horizontal. The sub-carlines 9 are preferably provided with suitable end fittings or brackets 11 that are riveted or otherwise rigidly secured to the underside of their bottom flanges and have a vertically disposed portion 12 that fits flatwise against the inner face of the side plate and is riveted between them by horizontal rivets 13, which also serve to secure the eaves angles 8 to said side plate. Preferably the sub-carlines are offset with relation to the vertical planes of the roof seams so as to be located about midway between such seams.

Carriage bolts or other suitable hangers 14 extend through openings provided therefor in the bottom horizontal flanges of the sub-carlines and through openings provided therefor in wooden nailing strips 15 that have recesses in their lower sides to receive nuts 16 that are screw-threaded on to said bolts and thus serve to support said nailing strips at a suitable distance below said sub-carlines.

As indicated in the drawing, the nailing strips are preferably tenoned into or otherwise suitably supported at their ends by the longitudinal members 17 that constitute the tops of the side frames of the insulation construction at the sides of the car. A ceiling 18, preferably of tongue-and-groove boards, is nailed or otherwise suitably secured to the under side of said nailing strips.

Supported on top of the nailing strips is a layer 19 or relatively rigid insulating material, such for instance as the material known in the trade as "celotex", which extends in a continuous layer from end to end of the car. On this relatively rigid layer of insulating material are a series of wooden filler strips 20 that are located above the respective nailing strips and are provided with vertical holes to accommodate the hanger bolts. Preferably the tops of the filler strips abut against the under side of the sub-

carlines, when the supporting nuts 16 are drawn tight on the hanger bolt. The space between the lower layer of insulating material and the bottom of the sub-carlines is thus divided by the filler strip into a number of panels. These panels are filled with insulating material 21, such, for instance as material of the kind known in the trade as "dry zero." Such material usually comes in the form of sheets, and the width of the panel is preferably equal to the width of the commercial sheet. The desired width of panel is readily obtained by making the filler blocks of such width that the distance between them will equal the width of said commercial material. The upper layers of insulating material are held in place by means of wooden strips 22 that are pressed down on the edges of such material and nailed in this position to the sides of the filler blocks.

It is noted that the insulation divides the space between the wooden ceiling 18 and the roof proper 2 into two large air chambers 23 and 24, and particularly that no metal whatsoever is exposed in the lower of said chambers. It is further noted that, with the exception of the hanger bolts and nuts, all of the metal parts are wholly above the insulation; and that the portions of the hanger bolts and nuts below the sub-carline are wholly enclosed within and effectively insulated by the wooden nailing strips and the wooden ceiling boards, so that there is no metal in the roof or ceiling construction whose surface is exposed in the interior of the car. It is noted that the construction hereinbefore described embodies in a refrigerator car the advantages of an all-steel car roof and particularly of an all-steel car roof applied to an all-steel body construction. It is also noted that the sub-carlines function as framing members, and particularly function after the manner of ties and struts and thus relieve the roof proper of part of its duty in resisting stresses and thereby make it permissible to make such roof lighter.

The present invention does not deal with the insulating of the sides of the car and accordingly the same is not described herein.

In the construction hereinbefore described, the roof proper is of the type commonly referred to as solid or riveted up. In the construction illustrated in Figs. 1 and 3 my invention is illustrated in connection with a single course roof of the kind commonly known as solid or riveted up roof. In the construction illustrated in Figs. 4 and 5, the invention is shown as applied to a well known roof of the flexible type.

What I claim is:

1. A refrigerator car comprising side plates having upstanding flanges, eaves angles secured to the upstanding flanges of said side plates, a single course roof supported by and secured to said eaves angles, sub-carlines extending from side plate to side plate and supported thereby, and insulation suspended from said sub-carlines.

2. A refrigerator car comprising side plates having upstanding flanges, eaves angles secured to the upstanding flanges of said side plates, a single course metal roof supported by and secured to said eaves angles, sub-carlines extending from side plate to side plate, and horizontal rivets rigidly securing together said sub-carlines, the upstanding flanges of said side plates and said eaves angles.

3. A refrigerator car comprising side plates a single course roof comprising a series of metal roof sheets spanning the car from side plate to side plate and connected along their adjacent margins by weatherproofing seams, sub-carlines extending from side plate to side plate and supported thereby independently of said roof, and insulation supported mainly by said sub-carlines, said sub-carlines being above the insulation.

4. A refrigerator car comprising side plates a single course roof comprising a series of pitched or arched metal roof sheets spanning the car from side plate to side plate and connected along their adjacent margins by rigid upstanding seams, sub-carlines extending from side plate to side plate and supported thereby independently of said roof, and insulation supported mainly by said sub-carlines, said sub-carlines being above the insulation.

5. A refrigerator car comprising side plates a single course roof comprising a series of roof sheets spanning the car from side plate to side plate and connected along their adjacent margins by rigid upstanding seams constituting carlines, and sub-carlines extending from side plate to side plate and supported thereby independently of said roof, said sub-carlines being located intermediate said roof seams.

6. A refrigerator car comprising side plates, carlines and purlins, pitched or arched metal roof sheet spanning the car from side plate to side plate between carlines, weatherproofing means connecting adjacent sheets, sub-carlines extending from side plate to side plate and supported thereby independently of said roof, and insulation supported mainly by said sub-carlines, said sub-carlines being above the insulation.

7. A refrigerator car comprising side plates, carlines and purlins, roof sheets spanning the car from side plate to side plate between carlines and weatherproofing means connecting adjacent sheets, sub-carlines extending from side plate to side plate and supported thereby independently of said roof, and insulation below and mainly supported by said sub-carlines, said sub-carlines being located intermediate said roof carlines.

3. A refrigerator car comprising side

plates, carlines and purlins, roof sheets spanning the car from side plate to side plate between carlines and weatherproofing means connecting adjacent sheets, and sub-carlines extending from side plate to side plate and supported thereby independently of said roof, said sub-carlines being located intermediate said roof carlines, and insulation supported by said sub-carlines.

9. A refrigerator car comprising side plates, a single course roof spanning the car from side plate to side plate, sub-carlines extending from side plate to side plate and spaced below said roof, and an insulated construction suspended from said sub-carlines.

10. A refrigerator car comprising side plates, a single course metal roof, sub-carlines extending from side plate to side plate and supported thereby, an insulated construction suspended from said sub-carlines.

11. A refrigerator car comprising side plates, an all-metal roof, sub-carlines extending from side plate to side plate, an insulated construction suspended from said sub-carlines said insulating construction comprising nailing strips suspended from said sub-carlines, sheathing secured to the under side of said nailing strips, a layer of insulating material supported on top of said nailing strips and below said sub-carlines.

12. A refrigerator car comprising side plates, an all-metal roof, sub-carlines extending from side plate to side plate an insulated construction suspended from said sub-carlines, said insulating construction comprising hangers depending from said sub-carlines, nailing strips supported by said hangers, a wooden ceiling secured to the under side of said nailing strips, a layer of insulating material extending continuously across the tops of said nailing strips, filler strips interposed between said continuous layer of flexible material and the under sides of said sub-carlines, insulating material in the panels formed by said filler strips.

13. A refrigerator car comprising side plates, an all-metal roof, sub-carlines extending from side plate to side plate, an insulated construction suspended from said sub-carlines and cleats secured to the sides of said filler strips and binding the edges of the insulating material in said panels.

Signed at St. Louis, Missouri, this 5th day of March, 1927.

CHARLES DAVID BONSALL.