My invention relates to plugs for hatch constructions, especially hatch constructions of the kind wherein the hatch cover seats on the wide upper portion of the hatch frame and the hatch plug seats within the narrow lower portion of said frame and said portions are connected by an intermediate ledge portion, such as shown for instance in Gilpin Patent No. 2,072,328, dated March 2, 1937. The principal objects of the present invention are to combine the functions of the plug and the cover in a single construction which will be light, simple and efficient, which will be easy to maintain in repair, which can be used for ventilating the ice bunker with which it is used and which will provide a compressible gasket between the plug and the frame and a relatively stiff gasket between the cover and the coaming of said frame for limiting the downward travel of the plug and thus preventing the compressible gasket from being crushed excessively.

The invention consists in the parts and combination of parts hereinafter described and claimed.

In the accompanying drawings wherein like reference numbers refer to like parts wherever they occur,

Fig. 1 is a plan view of the end of a refrigerating car roof embodying my invention.

Fig. 2 is a vertical sectional view of one of my hatchway constructions, said section being taken crosswise of the car on the line 2--2 of Fig. 1.

Fig. 3 is a similar vertical sectional view taken longitudinally of the car on the line 3--3 of Fig. 1.

Fig. 4 is an enlarged vertical section of a portion of the hatch construction shown in Fig. 3.

Fig. 5 is a similar enlarged section corresponding to Fig. 2.

Figs. 6 and 7 are vertical sectional views crosswise of the car and longitudinally of the car respectively illustrating a modified form of hatch plug construction.

Fig. 8 is an enlarged section corresponding to Fig. 7.

Fig. 9 is a detailed plan view of the bottom member; and

Fig. 10 is an enlarged vertical longitudinal section of a portion of another hatch construction of modified form.

The hatch frame illustrated in Figs. 1 to 5 and more particularly described in Gilpin Patent No. 2,072,328, dated March 2, 1937, has a lower part 1 whose sides converge downwardly and an upper part 2 whose sides converge upwardly to an inwardly turned coaming 3 whose inside diameter is larger than the inside diameter of the downwardly and inwardly inclined ledge or shoulder portion 4 that connects the upper and lower portions together. This hatch frame has important advantages which are retained and utilized in the present construction. As shown in the drawings, the hatch frame is mounted in an opening provided therefor in a metal refrigerator car roof 6 with its shoulder or ledge portion 4 seated on frame members 5 that cross said opening below said roof. The metal roof is flanged upwardly, as at C, around the hatch opening therein and this flange surrounds and is welded along its upper edge to the wide upper portion 2 of the hatch frame.

The hatch plug illustrated in Figs. 1 to 5 comprises a hollow sheet metal body 7 which is filled with suitable insulating material 8. The metal body of said hatch plug comprises two main members, namely a bottom member 6 and a top member 7. The bottom member 6 is a paneled sheet of metal with its marginal portions pressed up into outwardly diverging side walls with outwardly turned marginal flanges 8 at the top thereof.

The top member 7 comprises a metal sheet which extends beyond the flanges 8 of the bottom member 6 and has downturned marginal flanges 8.

A gasket 10 (of fiber, cork or the like) is interposed between the marginal flanges 8 of the pan-shaped bottom member 6 and the overlapping top member 7; and filler strips 11, preferably of wood, are mounted beneath said marginal flanges of said bottom member and the downturned flanges 8 of said top member. These filler strips 11 are held in place by bolts 12 that extend through them and through the marginal flanges 8 of the bottom member 6 and the gaskets 10 thereon and the overlapping cover 7, all these parts being clamped together by nuts 13 on the threaded upper ends of said bolts, and the heads of said bolts lying in sockets 14 provided therefor in the lower faces of said filler strips.

The cover 7 is preferably stiffened by means of channel-shaped metal members 15 welded to the lower face thereof and which serve to compress the insulation 8. Fastened to the top of the cover 7 near said reinforcing channels are metal straps 16 which are hinged or pivotally connected, as at 17, to hinge members 18 provided therefor on the roof of the car.

The lower edge or corner portions of the bottom member 6 of the plug are pressed inwardly to form concave seats 19; and in these seats or grooves are mounted gaskets or strips 20 of semi-soft rubber or the like. Preferably the rubber embeds and is vulcanized around the heads of bolts 21 and the projecting portions of the bolts extend through the gasket seats 18 into the inside of the pan-shaped metal bottom member 6 of the hatch plug and are held by nuts 22 threaded thereon.

By the arrangement described, the functions of a hatch plug and a hatch cover are combined in a single construction, the pan-shaped bottom member 6 of said construction constituting the plug for the hatch frame and the top member 7 constituting the cover for the hatch frame.
constituting the cover for said frame. In practice, the plug is of such size and shape that the rubber gasket or gaskets 20 thereof will fit against the inner margin of the shoulder or ledge 4 of the hatch frame as the time that the wooden filler strips 11 of the plug contact with the coaming of said hatch frame. The wooden filler blocks 11 constitute relatively rigid gaskets that limit the downward movement of the hatch plug. On the other hand, the gaskets 20 are relatively compressible and will make a good waterproof engagement with the hatch frame but cannot become wedged in the tapered lower portion thereof tight enough to interfere with proper operation. The relatively solid bearing surfaces between the filler strips 11 of the cover member 7 and the coaming 3 of the hatch frame provide a fixed relation between the cover and coaming in the closed position of the plug and thus permit the use of hinges and locking devices of simple and economical construction.

There are occasions when it is desirable to ventilate the bunks of the car. For this purpose, the bottom member 6 of my plug has, as shown in Figs. 6 to 9, inclusive, downwardly extending corrugations or a continuous corrugation or rib extending along the margins of three sides, leading uncorrugated that side which is further from the hinges 18. The corrugation 23 along the margin next to the hinge end is relatively shallow and the corrugations 24 along the other two sides of the bottom member 6 gradually increase in depth from the corrugation 23 to their ends where they are relatively quite deep. When this plug is propped or otherwise held in partially opened position, as shown in Fig. 7, it constitutes, in effect, a flue that is open at the deep end of the parallel corrugations 24 which form the sides thereof while the corrugation 23 at the hinge end serves as a deflector to deflect the incoming air downwardly into the bunkter.

The construction hereinafter described admits of considerable variation without departing from my invention. Thus, Fig. 10 illustrates a modification particularly adapted for use with a hatch frame having a coaming in the form of an exterior rim 32 that is preferably flanged downwardly, as at 3b, along its outer edge. In this modification, the insulated bottom member 6a of the plug is made of wood, instead of metal; and the metal top member 7a extends laterally beyond the side edges of said bottom member and seats directly on the outstanding rim 32 of the hatch frame and has a downturned marginal flange 6a that overhangs the depending flange 3b of said rim or coaming. The wooden bottom member 6a has a relatively narrow lower portion, which is located inside of the narrow lower part 1 of the hatch frame and is tapered to conform to the downwardly converging sides of said part, and a relatively wide upper portion that is located inside the wide upper part 2 of said hatch frame and overhangs the ledge thereof and is beveled on its underside to conform to the slope of said ledge or shoulder. The wooden bottom member 6a has a compressible sealing gasket or padding 20a, which is secured to the tapered surface of the narrow lower portion of said bottom member and seats against the downwardly converging sides of the lower part 1 of the hatch frame. A similar compressible gasket or padding 20b is secured to the beveled underside of the wide upper portion of the bottom member 6a and seats on the sloping ledge or shoulder portion 4 of the hatch frame. Thus, the compressible gaskets 20a and 20b form a double seal between the bottom member 6a and the hatch frame, and the metal top member 7a rests on the rim of said frame and constitutes a cover therefor and also prevents said gaskets from being crushed excessively by the weight of the plug.

What I claim is:

1. A hatch plug for a refrigerator car roof, said plug having a metal body of inverted pyramidal shape and a metal top extending laterally beyond said body, a separate gasket interposed between said body and said top, a relatively rigid non-metallic gasket secured to the underside of said laterally extending portion of said metal top and a compressible pad secured to the sides of said metal body.

2. A hatch plug for a refrigerator car roof, said plug having a metal body having downwardly converging sides and a metal top extending laterally beyond said body, a separate gasket interposed between said body and said top, a relatively rigid non-metallic gasket secured to the underside of said laterally extending portion of said metal top, means for securing together said body, top and gasket, and a compressible pad secured to said sides of said metal body.

3. A hatch plug for a refrigerator car roof, said plug having a metal body of inverted pyramidal shape and an upper portion extending laterally beyond said body and having its underside inclined inwardly and downwardly toward said body, a sealing pad secured to the sides of said body, and a sealing pad secured to the inclined lower side of said laterally extending upper portion.

4. A hatch plug for a refrigerator car roof, said plug having a metal body of inverted pyramidal shape and an upper portion extending laterally beyond said body and having its underside inclined inwardly and downwardly toward said body, a top extending laterally beyond said upper portion, and said sealing pads to the sides of said body and the inclined underside of said laterally extending upper portion.

5. A hatch plug having a metal body of inverted pyramidal shape and an upper portion extending laterally beyond said body and having its underside inclined inwardly and downwardly toward said body, a top extending laterally beyond said upper portion, and said sealing pads to the sides of said body and the inclined underside of said laterally extending upper portion.

6. A hatch plug having a metal body of inverted pyramidal shape, a non-metallic upper portion extending laterally beyond said body, and having its underside inclined inwardly and downwardly toward said body and a metal top extending laterally beyond said non-metallic upper portion, and sealing gaskets secured to the sides of said body and the inclined underside of said laterally extending upper portion.

7. A hatch plug comprising a metal pan-shaped bottom member with an outwardly extending marginal flange, a metal top member secured to said pan-shaped flange, insulation material in the space between the top and bottom members, a relatively stiff gasket detachably secured underneath said marginal flange, and a compressible pad secured to the lower corner portion of said pan-shaped bottom member.

8. A hatch plug comprising a metal pan-shaped bottom member with an outwardly extending marginal flange, a metal top member secured to said marginal flange, a gasket interposed between said flange and said top, insulating material in the space between the top and bottom members, a relatively stiff gasket detachably secured un-
derneath said marginal flange, means for clamping together said marginal flange, said top member and said gaskets, and a compressible pad secured to said pan-shaped bottom member around the lower corner thereof.

9. A hatch plug comprising a metal pan-shaped bottom member with an outwardly extending marginal flange, a metal top member secured to said marginal flanges, compressible insulating material in the space between said top and bottom members, a relatively stiff gasket detachably secured underneath said marginal flange, said top member having a longitudinal groove in the lower exterior corner thereof, and a compressible gasket in said groove.

10. A hatch plug comprising a metal pan-shaped bottom member, a detachable metal cover therefor, insulating material in the space between the top and bottom members, a relatively stiff gasket detachably secured underneath said marginal flange, said top member having a longitudinal groove in the exterior lower corner thereof, and a compressible gasket in said groove, bolts embedded in said gasket and extending inside said bottom member, and nuts on the inner ends of said bolts and bearing against the inner surface of said bottom member.

11. A hatch plug comprising a body with hinge elements along one margin, a depending rib along said margin and spaced depending ribs extending from said first mentioned depending ribs towards the margin of said body remote from said hinge elements.

12. A hatch plug comprising a substantially rectangular body with depending ribs along three margins thereof, the ribs along two opposite margins of said body gradually increasing in depth from the rib along the third margin thereof to the fourth margin thereof.

13. A hatch plug comprising a metal rectangular pan-shaped bottom member with an outwardly extending marginal flange, a metal top member secured to said marginal flange, insulating material in the space between the top and bottom members, a relatively stiff gasket detachably secured underneath said marginal flange, and compressible gaskets secured at the lower corners of said pan-shaped bottom member, said bottom member having depending ribs pressed therein along the three margins thereof, the ribs along two opposite margins of said bottom member gradually increasing in depth from the rib along the third margin thereof to the fourth ribless margin thereof.

14. In a refrigerator car having a hatch opening in the roof thereof, the combination with a metal hatch frame of the type wherein the upper and lower portions are connected by an inclined offsetting portion whose inner margin is of smaller diameter than the clear top opening of the hatch frame, a plug having a body adapted to enter said top opening and a top adapted to seat on the top of said frame, the upper portion of said body overhanging said offsetting portion of said hatch frame, a sealing pad secured to the overhanging upper portion of said body in position to bear against said offsetting portion of said hatch frame, and a sealing pad secured to said body below said first mentioned pad in position to bear against said lower portion of said hatch frame.

15. In a refrigerator car having a hatch opening in the roof thereof, the combination with a metal hatch frame having upper and lower portions connected by a shoulder or ledge portion, a plug whose body portion is adapted to enter said frame through the upper end thereof and whose upper portion overlaps and is relatively rigidly sustained by the top of said frame, said plug having a compressible sealing pad in position to bear against said hatch frame in the region where said ledge or shoulder portion of said frame joins said lower portion thereof.

16. In combination with a metal hatch frame having upper and lower portions connected by a downwardly and inclined shoulder or ledge portion, a plug having a body of inverted pyramidal shape hinged along one margin so as to enter said frame through the upper end thereof, and a sealing gasket carried by said plug and adapted to bear against said frame, said body having a depending rib along the hinged margin thereof and depending ribs along two opposite margins thereof extending from the rib along the hinged margin of said body to the free ribless margin thereof.

17. In a refrigerator car having a roof having a hatch thereon, a plug adapted to close said hatch and arranged for upward swinging movement about a horizontal axis and adjustable means for holding said plug in raised position, said plug having downwardly extending ribs along its hinged and adjacent margins which ribs serve to direct air downwardly through said hatch when the plug is in a raised position.

18. In a refrigerator car, the combination with an upwardly opening metal hatch frame which has an inwardly extending horizontal ledge below the top thereof, of a hatch plug which has a metal body of inverted pyramidal shape adapted to enter said opening and a metal top extending laterally beyond said body and overlapping the top margin of the hatch frame, a relatively stiff gasket separate from said body and secured underneath said laterally extending upper portion of said metal top in position to bear on the top of said hatch frame, and a compressible gasket secured to the sides of said metal body in position to bear against said ledge when the first mentioned gasket bears on top of said hatch frame.

VICTOR E. WEST.