Jan. 3, 1939. L. C. WILKOFF ET AL 2,142,431

HATCH PLUG

Filed Jan. 7, 1937

Fig. 1.

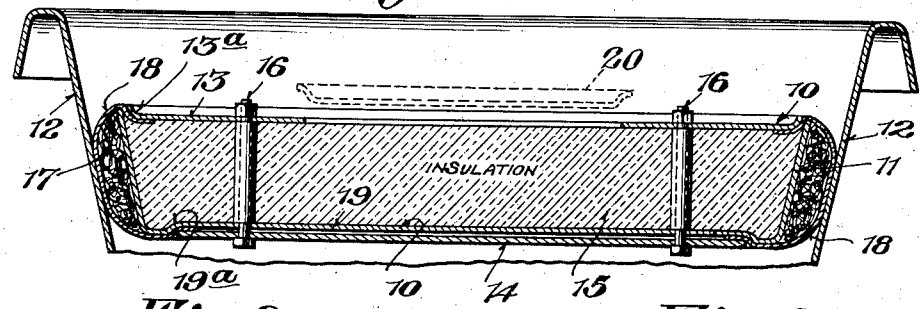


Fig. 2.

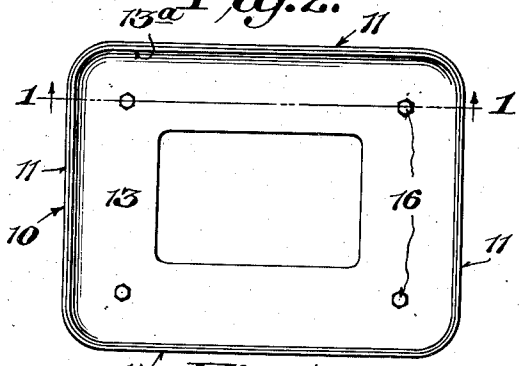


Fig. 6.

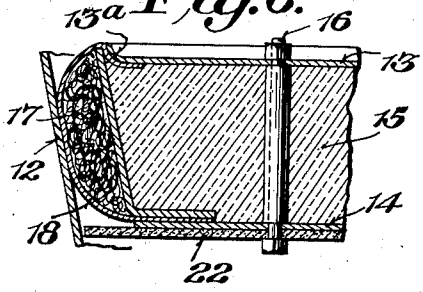


Fig. 3.

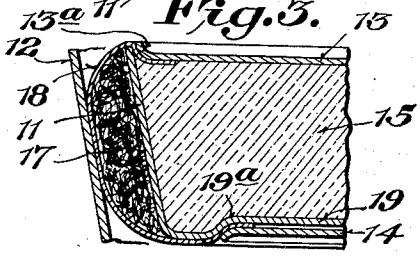


Fig. 7.

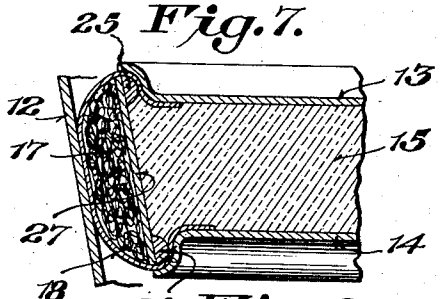


Fig. 4.

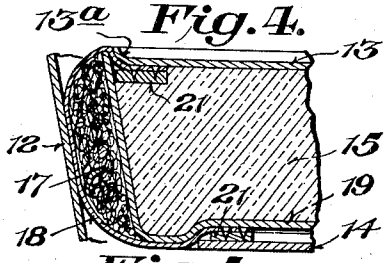


Fig. 8.

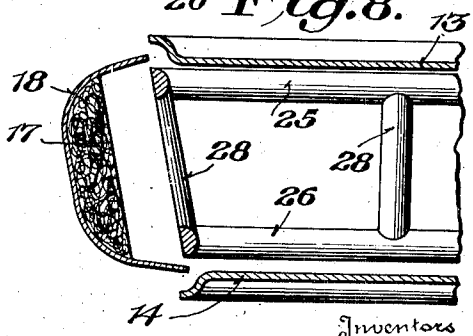
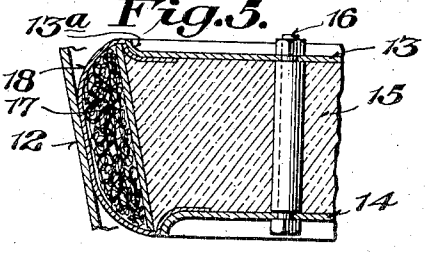


Fig. 5.



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HATCH PLUG

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18 Claims. (Cl. 105—377)

The present invention relates to hatch plugs for use in refrigerator car roofs and aims generally to improve the construction of such plugs.

Heretofore hatch plugs have been made of wood having spaced upper and lower plankings between which is placed a quantity of insulation. A packing strip is usually tacked to the outer edge of the frame to provide a tight seal with the walls of the hatch frame.

The upkeep and repair of hatch plugs is an expensive item of refrigerator car maintenance. When the plugs are in closed position, they are subject to the moisture of the icing compartment and become badly swollen, and then must be opened for a considerable time to be thoroughly dried. The result is excessive warpage, bad fit and in many instances inadequate seal.

According to our invention, we provide an improved construction of hatch plugs designed to overcome the objections of the wood plugs and to provide a plug that will not be subject to expansion and shrinkage due to changes in humidity conditions and which will maintain a constant size and shape with relation to the hatch openings.

These and other important aims and objects of the invention will be apparent from the following description, wherein considered with the accompanying drawing illustrating certain preferred embodiments of the invention.

Fig. 1 is a sectional view of a portion of a hatch frame and improved hatch plug constructed in accordance with one embodiment of the invention;

Fig. 2 is a plan view of the plugs shown in Fig. 1;

Fig. 3 is an enlarged detail sectional view of the plug shown in Fig. 1;

Fig. 4 is an enlarged detail sectional view of a modified form of plug; and

Figs. 5, 6, 7 and 8 are similar sectional views of further modified embodiments of the invention.

According to the invention the plug comprises a frame 10 of light weight material preferably non-hygroscopic such as sheet metal, of substantial depth, said frame having sloping side walls 11 and generally conforming in shape to the opening in the hatch frame 12. The frames may be closed by upper and lower plates 13 and 14 respectively, having clamping engagement with the frame. The interior of the frame may be filled with some suitable insulating material 15, as for example fibrous rock wool, glass and the like. Suitable fastening means as for example, bolts 16, may be used to hold the frame 10 and plates 13 and 14 in assembled relation and to maintain the clamping engagement between the plates and the frame.

A tight seal is maintained between the plug frame 10 and the hatch frame 12 by means of a packing strip 17, surrounding the side walls of the frames which may advantageously comprise a packing of compressible material, for example, hair, confined within a flexible fabric covering 18, as for example a canvas or like covering. The edges of the covering 18 are of sufficient width as to extend between the bottom of the frame 10 and clamping plate 14 so as to be clamped therebetween, and the opposite edge of the covering 18 extends over the upper edge of the frame and is clamped between the frame and the clamping plate 13. In this manner the packing strip 17 may be quickly and readily replaced when worn or damaged, and because it is secured in place by continuous line clamping contact between the frame 10 and plates 13 and 14, the connection is much stronger to resist pull during closing and opening of the hatch plug, than previous constructions wherein the covering is merely tacked to a wood frame.

Alternately, the edges of the packing strip covering may be tacked to nailing strips 21, as in Fig. 4, to facilitate assembly of the packing strip to the frame and maintaining it in place prior to tightening the clamping plates into clamping position.

As shown in Figs. 1 and 3, the frame 10 may be constructed as a pan having a continuous bottom 19 and preferably the bottom is recessed as at 19a to house the bottom plate 14. In such form of invention the pan may be filled with insulation introduced from the top and may be effected by simply removing the upper clamping plate 13. If desired the upper plate 13 may be formed with an opening and a separate closure 20 (shown in dotted lines) so that the insulating filling may be introduced into the frame without necessitating breaking the clamping connection with the packing strip covering 18.

Preferably the peripheral edge of the upper plate 13 is outwardly turned or curved as at 13a to provide a clamping cam surface for engagement with the edge portion of the frame 10. The plate 13 may advantageously be made of a size to be pressed within and fitted to the frame so as to provide a continuous clamping engagement with the frame for securing the edge portion of the packing strip covering 18.

The bottom of the frame need not be solid

but may be open as illustrated in Figures 5, 6, 7 and 8, in which case the clamping plate 14 serves as a closure to confine the insulating material 15. This permits of a decrease in weight of the plug which is desirable.

When the bottom of the frame is open, as in Figures 5, 7 and 8, both of the clamping plates 13 and 14 may be dished or otherwise formed with curved peripheries for a press-fit engagement with the edge portions of the frame.

If desired, a separate insulating strip may be provided for the bottom of the plug as shown in Fig. 6. This strip 22 may be of a board of suitable fibrous insulating material and may be held in place against the bottom of the plug by the bolts 16 and the insulating strip 22, if desired, may extend beyond the side walls of the frame into contact with the hub frame.

As stated above, it is highly desirable that the weight of the hatch plug be reduced as much as possible, and in this respect our invention is of material advantage over the prior heavier wood plugs.

In Figures 7 and 8 we have illustrated further modified embodiments of the invention permitting an extremely light weight yet rigid plug. In Figure 7 the frame may be of skeleton form composed of upper and lower portions 25—26 formed of bars having rounded inner surfaces and the frame portions 25—26 may be held in spaced relationship by a light weight sheet metal 27 of sufficient gauge to normally space the bars and confine the insulating material 15 within the frame. Alternately as in Figure 8, the sheet metal covering 27 may be dispensed with and the frame portions 25—26 may be held in spaced relationship by struts 28. In the forms illustrated in Figures 6 and 7, the clamping plates 13 and 14 may be formed with curved peripheral edges for a press-fit engagement with the rounded surfaces of the skeleton frame.

Advantages of the invention reside in the simplicity of construction, the lightness of weight and the ease with which the component parts of the plug may be assembled and replaced. Because of the lightness in weight, the plug may be deeper than heretofore to accommodate a greater thickness of insulation. The use of the metal frame 10 in the plug, permits of proper sealing in hatch frames having well rounded corners as shown in Fig. 2 and also insures of a uniform relationship in size and shape between the plug and frame. By clamping the edges of the packing strip covering by a continuous line clamping pressure, a more secure connection between the packing strip and plug frame is provided, and the packing strip may be more readily replaced when worn.

Numerous other advantages of the invention will be apparent to those skilled in the art.

I claim:

1. A hatch plug comprising a frame conforming to the shape of a hatch opening, clamping plates cooperating with the frame to form therewith an insulating chamber, and a packing strip surrounding the side wall of said frame, said strip having flexible edge portions clamped between said clamping plates and frame.

2. A hatch plug for refrigerator cars and the like comprising a metal frame conforming generally to the shape of a hatch opening, plates cooperating with the top and bottom of said frame, said frame and at least one of said plates forming a closed insulating chamber, and a packing strip surrounding the side walls of said frame and held in place by portions thereof clamped between said frame and plates.

3. A hatch plug for refrigerator cars and the like comprising a metal frame conforming generally to the shape of a hatch opening, a packing strip surrounding the side walls of said frame, said packing strip having flexible edge portions extending over the edge portions of the frame, and a pluralty of clamping plates cooperating with said frame for clamping the flexible edge portions of the packing strip to the frame.

4. A hatch frame for refrigerator cars and the like comprising a metal frame conforming generally to the shape of a hatch opening, said frame being open at the opposite ends thereof, a closure plate for each of the respective open ends of the frame, a packing strip having flexible edge portions extending between the frame and closure plates, and means for holding the parts in assembled relation.

5. A hatch frame for refrigerator cars and the like, comprising a metal frame conforming generally to the shape of a hatch opening, said frame being open at the opposite ends thereof, a closure plate for each of the respective open ends of the frame, a packing strip having flexible edge portions extending between the frame and closure plates, and means for drawing said plates toward each other to clamp the flexible edge portions of the packing strip between said plates and frame.

6. A hatch frame for refrigerator cars and the like, comprising a metal frame conforming generally to the shape of a hatch opening, said frame being open at the opposite ends thereof, a closure plate for each of the respective open ends of the frame, said plates being formed with an outwardly curved peripheral edge adapted to be pressed within and fitted to said frame, a packing strip having flexible edge portions extending between the frame and closure plates, and means for drawing said plates toward each other to clamp the flexible edge portion of the packing strip between said plates and frame.

7. A hatch frame for refrigerator cars and the like comprising a metal frame conforming generally to the shape of a hatch opening, said frame being open at the opposite ends thereof, a closure plate for each of the respective open ends of the frame, at least one of said plates being formed with an outwardly curved peripheral edge adapted to be pressed within and fitted to said frame, a packing strip having flexible edge portions extending between the frame and closure plates, and means for drawing said plates toward each other to clamp the flexible edge portion of the packing strip between said plates and frame.

8. A hatch plug for refrigerator cars and the like comprising a metal frame having tapering side walls and a bottom, a compressible packing strip around the side walls of said frame, means cooperating with the bottom of the frame for clamping one edge portion of the packing strip thereto, and a removable closure plate for the upper portion of said frame, said plate having its periphery formed to cooperate with and fit the upper portion of the frame and to clamp an edge portion of the packing strip thereto.

9. A hatch plug for refrigerator cars and the like comprising a metal frame having tapering side walls and a bottom, a compressible packing strip around the side walls of said frame, means cooperating with the bottom of the frame for clamping one edge portion of the packing strip thereto, and a removable closure plate for the

upper portion of said frame, said plate being formed with an outwardly bent periphery adapted to be pressed within and fitted to the frame for clamping an edge portion of the packing strip thereto.

10. A hatch plug for refrigerator cars and the like comprising a flexible metal frame of light weight construction, closure means for said frame and forming therewith a closed insulating space of substantial depth, a compressible packing strip surrounding the side walls of said frame, and means for securing the packing strip in place between the closure means and the frame.

11. A hatch plug for refrigerator cars and the like comprising a frame of non-hygroscopic material, said frame conforming generally to the shape of a hatch opening, closure means for the ends of the frame forming a closed insulating chamber, and a compressible packing strip extending along the outer side walls thereof and clamped between the frame and closure means.

12. A hatch plug comprising a frame, an insulating chamber within said frame, a packing strip of compressible material surrounding the side walls of the frame, said strip having flexible edge portions extending around the respective edges of the frame, and a single clamping member for each of the edge portions of said strip, whereby said packing strip may be clamped between the frame and clamping member and quickly replaced upon removal of said clamping members.

13. A hatch plug comprising a frame, an insulating chamber within said frame, a packing strip of compressible material surrounding the side walls of the frame, said strip having flexible edge portions extending around the respective edges of the frame, and means for clamping the flexible edge portions of said packing strip to the frame by means of continuous clamping contact throughout each respective edge portion.

14. A hatch plug for refrigerator cars comprising a sheet metal pan having substantially vertical side walls and an integral bottom and conforming generally to the shape of a hatch opening, an insulating filling within said pan, a closure plate for the open end of said pan, a packing strip surrounding the outer side walls of said pan, and means for securing said packing strip to the pan.

15. A hatch plug for refrigerator cars comprising a sheet metal pan conforming generally to the shape of a hatch opening, an insulating filling within said pan, a packing strip surrounding the outer side walls of said pan, and means for securing said packing strip to the pan, said means including a flexible edge portion on the packing strip extending over the edge of the pan and between the pan and closure plate whereby the edge of the strip is clamped by continuous line contact between the pan and plate.

16. A hatch plug for refrigerator cars comprising a metal frame having spaced parallel clamping edges, a pair of clamping plates adapted for clamping engagement with the frame, and a compressible packing strip surrounding the sides of the frame and formed with flexible edge portions clamped between the clamping plates and frames.

17. A hatch plug for refrigerator cars comprising a metal frame composed of spaced upper and lower portions having rounded clamping edges, means for maintaining said upper and lower portions in spaced relationship, a pair of clamping plates adapted for clamping engagement with the rounded edges of the frame portions, and a packing strip including a flexible covering secured around the outer walls of the frame, the edge portions of the flexible covering being clamped in place between the clamping plates and the cooperating edge portions of the frame.

18. A hatch plug for refrigerator cars comprising a metal frame composed of spaced upper and lower portions having rounded clamping edges, means for maintaining said upper and lower portions in spaced relationship, a pair of clamping plates adapted for clamping engagement with the rounded edges of the frame portions, a filling of insulating material between said plates, and a packing strip including a flexible covering secured around the outer walls of the frame, the edge portions of the flexible covering being clamped in place between the clamping plates and the cooperating edge portions of the frame.

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