

Sept. 3, 1935.

E. HEITMAN

2,013,516

REFRIGERATING APPARATUS

Filed May 12, 1934

2 Sheets-Sheet 1

Fig. 1.

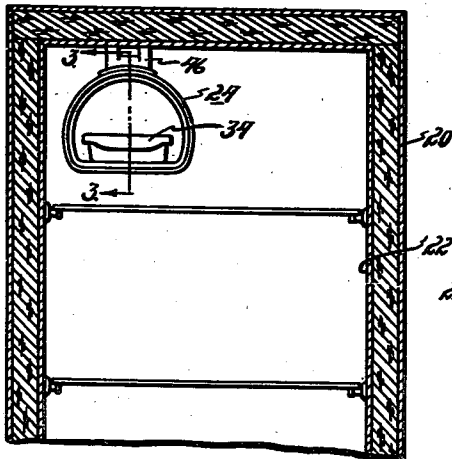


Fig. 2.

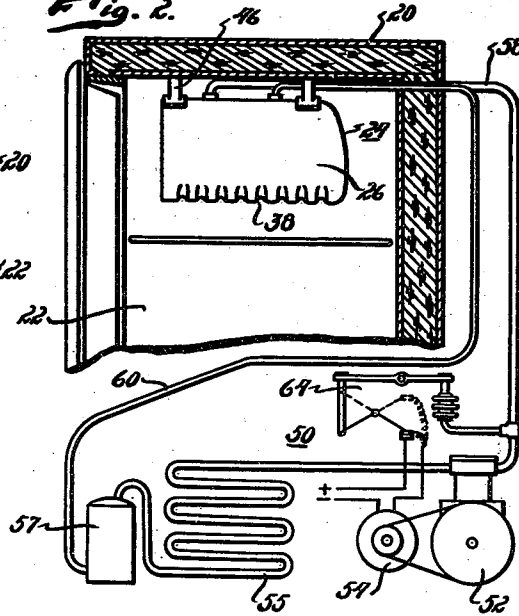


Fig. 3.

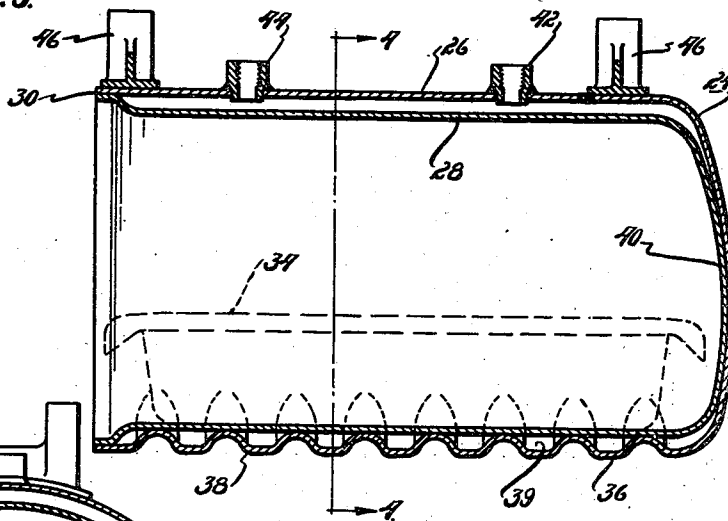
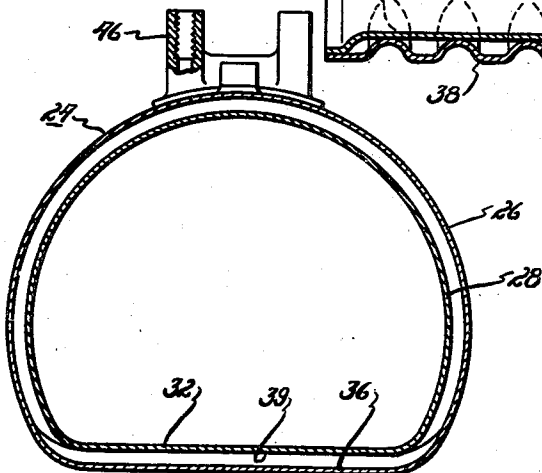


Fig. 4.



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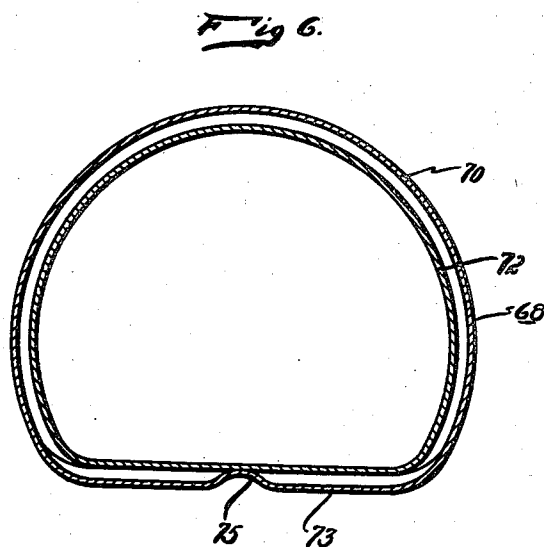
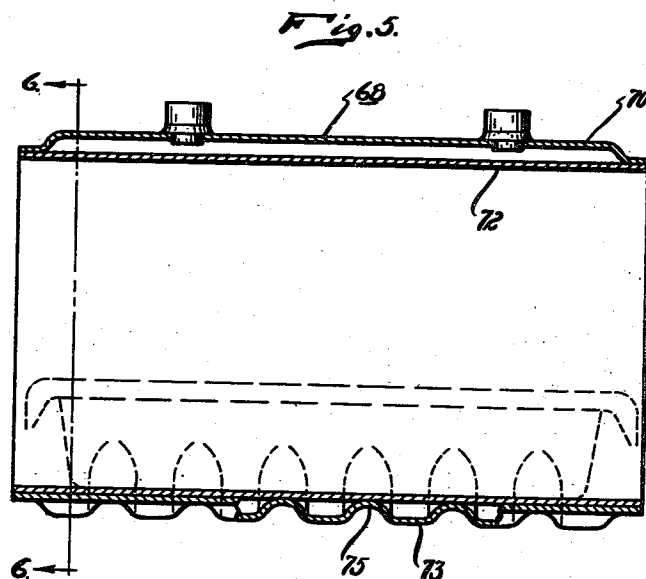
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2 Sheets-Sheet 2



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2,013,516

REFRIGERATING APPARATUS

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Application May 12, 1934, Serial No. 725,305

2 Claims. (Cl. 62-126)

This invention relates to refrigerating apparatus, and more particularly to refrigerant evaporators for use in connection with such apparatus.

One of the objects of my invention is to provide an improved refrigerant evaporator which consists of but two substantially cylindrical or cup shaped sheets of metal which cooperate to provide a reservoir for refrigerant, with the two sheets being so arranged as to provide a flat surface for supporting a flat bottom receptacle in thermal contact with the refrigerant in said reservoir, and to rigidly secure the two sheets of metal together at various points along said flat surface to strengthen the evaporator against pressures existing in the evaporator.

Other objects and advantages will be apparent from the following description, reference being had to the accompanying drawings.

In the drawings:

Fig. 1 is a front view showing my improved refrigerant evaporator in elevation located in a refrigerator cabinet, partly in cross section and partly broken away;

Fig. 2 is a side view of the refrigerating apparatus shown in Fig. 1 and including diagrammatically a refrigerant condensing unit associated with the evaporating unit;

Fig. 3 is an enlarged view in cross section of my evaporator, the view being taken along the line 3-3 of Fig. 1;

Fig. 4 is a view taken along the line 4-4 of Fig. 3;

Fig. 5 is a view in cross section of a modified form of evaporating unit embodying features of my invention; and

Fig. 6 is a view taken along the line 6-6 of Fig. 5.

Referring to the drawings, the numeral 20 designates, in general, a refrigerator cabinet, which may be of the so-called household type. The cabinet includes a food storage compartment 22 in which is disposed a refrigerant evaporator 24.

In order to construct a refrigerant evaporator at low cost and at the same time have all the advantages of fast freezing and proper box cooling, I have constructed the evaporator 24 of two pieces of material in a manner about to be described. The evaporator includes an outer sheet metal cup shaped member 26 and an inner sheet metal cup shaped member 28. The outer sheet metal cup shaped member completely surrounds the inner sheet metal member, with the terminating edges adjacent the front of the

evaporator being welded at 30 to prevent leakage between the two members. As will be noted in Fig. 4 of the drawings, the cup shaped sheet metal members are substantially cylindrical in formation and the inner sheet metal member 28 is provided with a substantially flat bottom portion 32 for supporting a flat bottom ice making receptacle 34. The outer sheet metal member is also provided with a substantially flat bottom portion 36 which cooperates with the flat bottom portion 32 for rigidly securing the two cup shaped members together against pressures existing in the system. Preferably, the flat bottom portion 36 of the cup shaped member 26 is provided with corrugations 38 which serve to space the two flat bottom portions from one another and to provide transverse passages 39 for the flow of refrigerant between the two cup shaped members. As shown in Fig. 3, the inwardly directed portions of the corrugations are in engagement with the flat bottom of the inner cup shaped member. In order to rigidly secure these two bottom portions together, the two flat bottom surfaces are secured together at the points of contact by any suitable tie means, such as by spot welding. By this arrangement the inner and outer cup shaped members are spaced from one another about their outer and inner circumferences, respectively, so as to provide a reservoir for liquid and gaseous refrigerant. It will thus be noted that refrigerant may circulate freely between the two cup shaped members. If desired, the inner cup shaped member may be welded to the outer cup shaped member adjacent the closed ends thereof at 40. It will thus be noted that the two cup shaped members are securely united by welding so as to prevent leakage therebetween and also to strengthen the evaporator so as to prevent bulging by excessive pressures within the reservoir for refrigerant. Preferably, the inner and outer cup shaped members are made of drawn steel. The evaporator is also provided with an inlet connection 42 and an outlet connection 44. Suitable threaded straps 46 may be provided for securing the evaporator to a wall of the compartment 22. Preferably, the straps 46 are welded to the outer cup shaped member 26.

Liquid refrigerant is supplied to and evaporated refrigerant is withdrawn from the evaporator by a refrigerant condensing element 50. The condensing element includes a compressor 52, motor 54, condenser 55 and high side float mechanism 57. Evaporated refrigerant is withdrawn from the evaporator 24 through the outlet connection 44 by the compressor 52 through a vapor

conduit 58. The compressor compresses the gaseous refrigerant and delivers it to the condenser 55 wherein it is liquefied and from which it is delivered to the float mechanism 57. Liquid refrigerant is supplied to the evaporator through inlet connection 42 by means of a liquid conduit 60 under the control of the float mechanism 57.

Preferably, the refrigerating system just described is intermittently operated. In order to control the operation of the compressor, I have provided an automatic switch 64 which is responsive to changes in pressures within the conduit 58 for opening and closing the electric circuit to the motor which drives the compressor.

Referring now to Fig. 5, there is shown a modified form of evaporating unit. In this particular embodiment of the invention, I have provided two cylindrical shaped members, namely; an outer member 70 and an inner member 72. In this instance the back portion of the evaporating element is constructed in all respects the same as the forward end. In this construction the corrugations 73 of the outer cylindrical shaped member 70 do not extend all the way across the bottom of the evaporator but terminate substantially at the central portion of the evaporator along the substantially flat bottom wall thereof where the outer member is depressed inwardly as at 75 throughout the length of the evaporator to provide additional means for strengthening the evaporator. The depressed portion 75 is preferably spot welded to the inner cylindrical shaped member along the flat surface thereof so as to provide additional rigidity to the structure. The evaporating element in all other respects corresponds to the evaporating element 24 shown in Figs. 1 to 4, inclusive.

From the foregoing, it will be apparent that I have provided an improved refrigerant evaporator which consists of only two sheets of metal, each of which are either in the form of a cylinder or cylindrical cup shaped members. By providing the lowermost portion of each of the two members with a substantially flat portion and corrugating the lowermost portion of one of the members, I have provided a device which will provide a flat surface for supporting an ice making receptacle in thermal contact with the refrigerant in the evaporator whereby to facilitate fast freezing, and at the same time this arrangement permits the two members to be spot welded together to rigidly secure one of the cup shaped members within the other so as to prevent bulging by excessive pressures within the evaporator. Thus, it will be noted that I have pro-

vided for the rapid freezing of ice and at the same time the exterior of the evaporator is exposed to the circulating air within the food storage compartment for cooling the circulating air.

Although I have shown an evaporator having provisions for supporting but one ice making receptacle, it is to be understood that any suitable lugs or supporting structure may be positioned above the ice making receptacle within the evaporator for supporting an additional tray, or trays, or, if desired, an ice tray may be positioned in the evaporator to be supported upon the upper surface of the receptacle 34.

Although only a preferred form of the invention has been illustrated, and that form described in detail, it will be apparent to those skilled in the art that various modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

What I claim is:

1. A refrigerant evaporator of the type having an air cooling surface and an ice freezing surface comprising, in combination, an inner cup shaped sheet metal member having a substantially flat surface to provide a support for an ice making receptacle, and an outer cup shaped sheet metal member of substantially cylindrical formation surrounding said inner member and having a substantially flat surface in alignment with the flat surface in the inner member, and said flat surface of the outer member being corrugated to provide a series of passages for refrigerant immediately below said receptacle, the inwardly directed portions of the corrugations being welded to the flat portion of the inner member and the closed ends of said cup-shaped members being welded together.
2. A refrigerant evaporator of the type having an air cooling surface and an ice freezing surface comprising, in combination, an inner cup shaped sheet metal member having a substantially flat surface to provide a support for an ice making receptacle, and an outer cup shaped sheet metal member of substantially cylindrical formation surrounding said inner member and having a substantially flat surface in alignment with the flat surface in the inner member, and said flat surface of the outer member being corrugated to provide a series of passages for refrigerant immediately below said receptacle, the inwardly directed portions of the corrugations being welded to the flat portion of the inner member, the closed ends of said cup-shaped members being welded together, and the terminating edges of said cup shaped members being welded at said edges.

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