Dec. 15, 1942. J. H. BENSON 2,304,876

REFRIGERATOR EVAPORATOR

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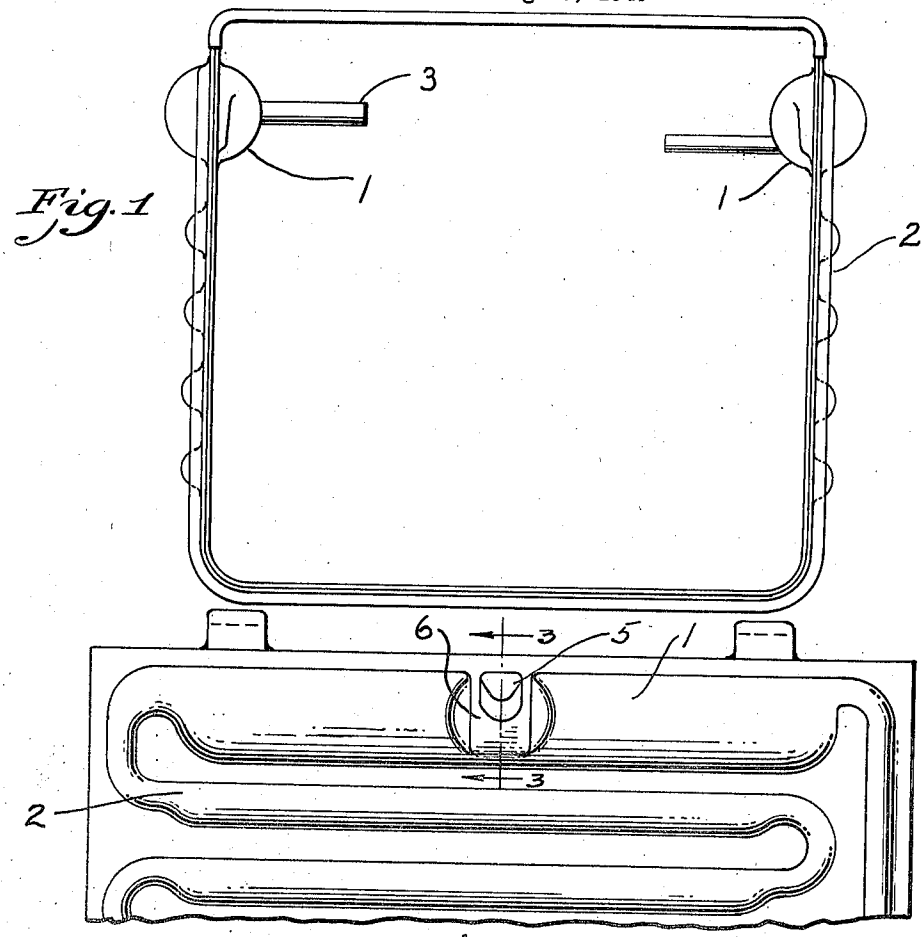


Fig. 1

Fig. 2

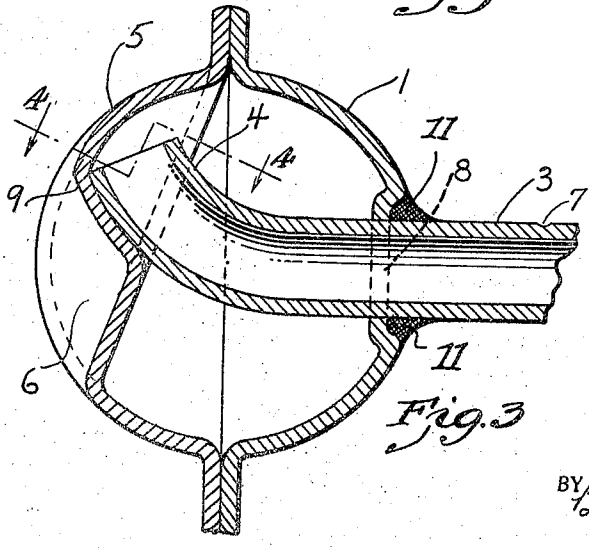


Fig. 3

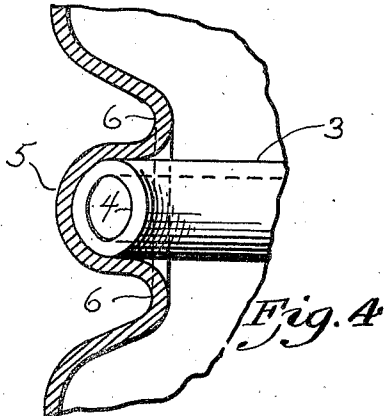


Fig. 4

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REFRIGERATOR EVAPORATOR

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11 Claims. (Cl. 62—126)

My invention relates to improvements in evaporators for refrigerating systems of the type containing liquid refrigerant in the evaporator.

For the purposes of this description systems containing substantial amounts of liquid refrigerant in the evaporator will be referred to as flooded systems.

Flooded type evaporators have liquid and gas headers or disengaging spaces with a suction tube located therein for the removal of oil and gaseous refrigerant. This suction tube is connected to the compressor unit of the refrigerating system, all as is known in the art. These flooded evaporators have had various arrangements to provide for entrance of one end of the suction tube in the header of the evaporator. In some systems now in use the suction tube merely projects into the interior of the header. In welding and in handling the protruding portion of the suction tube movement of the end of the tube confined within the header results. Such movement seriously affects the performance and operation of the system in which the evaporator is installed. A constant internal volume of liquid refrigerant in the evaporator is essential for successful operation of the system. This is particularly true in hermetic systems using high side floats or capillary tubes. Lowering the elevation of the end of the suction tube in the header causes the system to act like one with an overcharge of refrigerant and causes frost back while raising the open end of the tube causes the system to act like one short of refrigerant, and oil accumulates in the header. It is thus essential that the installed location of the suction tube be undisturbed.

It is an object of my invention to provide a simple means for supporting the header end of the suction tube.

A further object of my invention is to provide means so that in manufacture an external visual inspection of the extending tube portion will indicate the proper location of the tube end inside of the sealed header.

A further object of my invention is to prevent movement of the suction tube which would change the effective level of the refrigerant even during the operation of welding the tube in place, and during subsequent handling such as using the extended tube portion to support the evaporator during a porcelain enameling operation.

A further object of my invention is to provide a baffle which shields the open end of the suction tube within the header and thus prevents a surging liquid refrigerant from entering the suction tube and causing frost back.

A further object of my invention is to incorporate said baffle in my tube locating means without the use of extra parts.

In the drawing:

Fig. 1 is a front elevation of a sheet metal evaporator embodying the present invention.

Fig. 2 is a fragmentary side view of the same evaporator showing the embossing in the outlet header.

Fig. 3 is a section taken on the line 3—3 of Fig. 2 and showing the location of the suction tube in the header.

Fig. 4 is a section taken on the line 4—4 of Fig. 3.

In the illustrated embodiment of the invention, the evaporator is shown as consisting of headers 1 formed by the complementary embossing in sheets which are known in the art as the inner and outer shells respectively, wherein the outer shell is formed with embossed conduits 2 which connect the headers 1.

The configuration of the exterior shell or wall of these headers constitutes one element of my invention. This may best be seen in Figs. 2, 3 and 4 and constitutes an emboss 5 in the header shell. This emboss is formed by a U-shaped indentation 6 best seen in Fig. 2. The contour of emboss 5 is substantially similar to a nose.

The end of suction tube 3 which is to be inserted in the header is bent upward as shown in Fig. 3. This upwardly bent portion 4 of the suction tube is adapted to be received in the interior of emboss 5 as shown in Figs. 3 and 4. The tube is confined therein and its movement is prevented.

A punch mark 7 or other marking may be placed on the exterior portion of tube 3 to indicate when the turned up end of the tube is in a vertical plane.

It is apparent that when tube 3 is inserted through hole 8 in header 1 with the punch mark 7 on the top side, the upwardly bent portion of the tube may be fitted in the pocket of emboss 5 to give a definite location for the end of the tube as at 9. A sharp change in the rate of curvature will form a definite location 9.

The upward bent end of the suction tube confined in the pocket is shielded by the side walls of emboss 5. This construction forms a deflector or baffle and prevents liquid refrigerant from surging or splashing into the open end of the tube. No additional parts are necessary for this baffle and where the header is stamped from

sheet metal this configuration may be stamped at the same time as the header.

Tube 3 is then fastened in place in header 1 preferably by welding or soldering as at 11. The tube must be held in position during welding so that bent end 4 is in contact with position 9.

Bending the extended end of tube 3 and even distortion of a portion of header 1 will not materially affect the proper location of the suction tube in the header as determined by point 9.

I claim:

1. In a sheet metal evaporator of the flooded type the combination of a header, a suction tube penetrating one side of said header and an embossing in the opposite side of the header supporting the end of said suction tube.

2. In a flooded evaporator the combination of a header, a protuberance having a base and side walls in the wall of the header, a suction tube entering said header and having an upwardly bent portion within the header fitting within the base and side walls of said protuberance.

3. In a flooded evaporator the combination of a header, a suction tube entering said header and an irregularity formed in the wall of said header, said irregularity supporting said tube and forming a baffle for the open end of said tube.

4. In a flooded evaporator the combination of a header, a suction tube entering said header and having the penetrating end bent upwardly, a U-shaped indentation in the wall of said header supporting said tube, said identification protecting the open end of said tube from the entrance of liquid refrigerant.

5. In a flooded evaporator the combination of a header, a suction tube entering said header and having its penetrating end bent upwardly, a pocket formed in the wall of said header, said pocket receiving and supporting said suction tube, the walls of said pocket forming a baffle on either side of the suction tube to prevent liquid refrigerant from being splashed into the open tube.

6. In a flooded evaporator the combination of a header, a suction tube entering said header and having an upwardly bent end positioned within said header, a pocket in the wall of said header supporting the upwardly bent end of the suction tube and a visible marking on the exterior surface of the protruding part of the suction tube indicating the position of the upwardly bent end of the tube within the header.

7. In a sheet metal evaporator of the flooded type, the combination of a header, a substantially horizontal suction tube penetrating one side of said header and a ledge on the interior of the opposite side of the header supporting the free end of said tube.

8. In a flooded evaporator, the combination of a header formed from stamped metal, a suction tube penetrating one side of said header and a support for said tube stamped on the opposite side of said header.

9. In a flooded evaporator, the combination of a header, a suction tube penetrating one side of said header, said suction tube having an upturned portion within the header and a support on the opposite side of said header engaging said upturned portion and securing the tube against lateral movement.

10. In a flooded evaporator, the combination of a header, a suction tube penetrating one side of said header, an embossed portion in the opposite side of said header supporting the entrant portion of said tube and leaving the end of said tube unobstructed.

11. In a flooded evaporator, the combination of a header, a suction tube penetrating a first side of said header, an embossed portion in the opposite side of said header supporting the penetrating portion of said tube and leaving the end of said tube unobstructed and means fastening said tube to said first side of said header.

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