April 4, 1939. R. H. MONEY 2,152,812.

METHOD OF MAKING FLOAT VALVE AND HEAT INTERCHANGE MECHANISMS

Filed Aug. 11, 1936

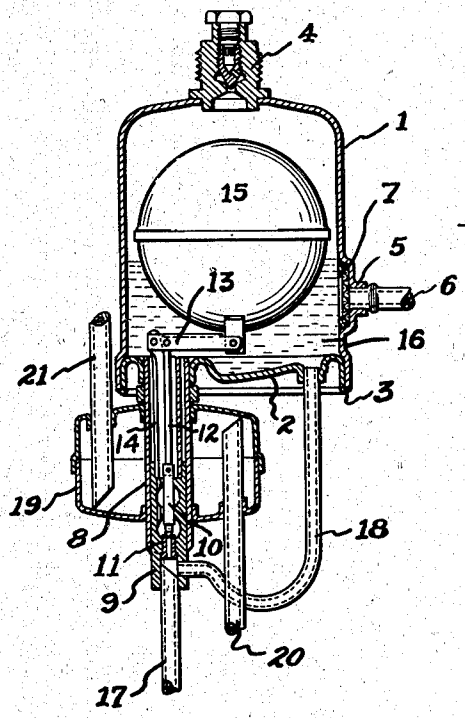


FIG. 1.

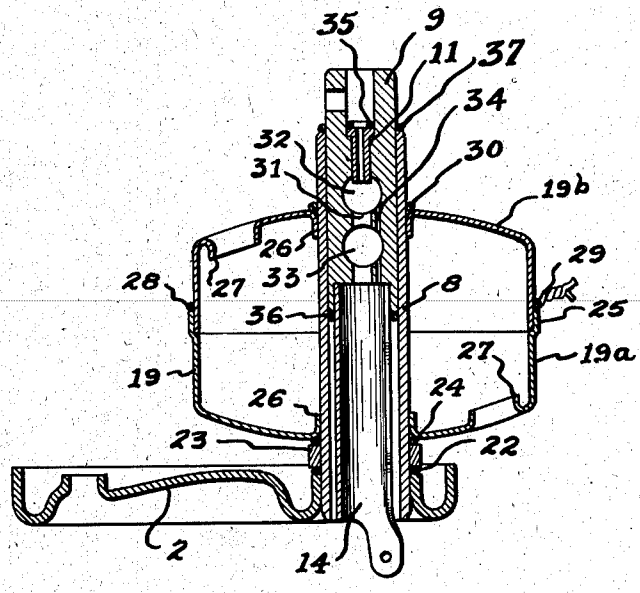


FIG. 2.

INVENTOR.
ROLAND H. MONEY.
BY Allen & Allen
ATTORNEYS.

Patented Apr. 4, 1939

2,152,812

UNITED STATES PATENT OFFICE

2,152,812

METHOD OF MAKING FLOAT VALVE AND HEAT INTERCHANGE MECHANISMS

Roland H. Money, Cincinnati, Ohio, assignor to The Crosley Corporation, a corporation of Ohio

Application August 11, 1936, Serial No. 95,383

2 Claims. (Cl. 113—112)

In the manufacture of domestic refrigerators, such as have compressors, condensers and evaporators, it has been the practice in numerous installations to provide means for feeding the evaporator comprising a high side float valve mechanism. Generally such a mechanism consists of a chamber having a valve controlled outlet, the valve being operated by a float. Thus the admission of refrigerant to the evaporator is dependent upon the accumulation of sufficient liquefied refrigerant in the chamber aforesaid. In addition, with certain kinds of refrigerants it is advisable to pre-cool the liquid as it passes to the evaporator. This is accomplished by effecting heat exchange between gases withdrawn from the evaporator and the incoming liquid, preferably at a point where such heat exchange will be effective to provide considerable pre-cooling. Thus the pre-cooling is desirable at or beyond the float valve mechanism.

The objects of my invention generally are the provision of a structure for the purposes hereinabove described which structure has certain novel features, and further the provision of a novel, convenient and very economical way of providing the structure.

These and the ancillary objects of my invention will be entirely clear to one skilled in the art upon reading the following specifications. For clarity, reference is now made to the drawing wherein:

Figure 1 is a vertical sectional view through the assembled apparatus.

Fig. 2 is a sectional view showing a portion of the apparatus assembled for joining by a brazing operation.

In the assembly view of Fig. 1, I have shown a chamber formed by a cup shaped member 1 and a cap or closure 2, adapted to be welded together as at 3. The cup or dome 1 is provided with a charging fitting 4, not requiring special description, and an entrance fitting 5 from which a tube 6 leads to the condenser of the refrigerated mechanism. A suitable screen or filter 7 at or near the entrance opening may be provided.

The cap 2 has a downwardly projecting sleeve 8 containing a fitting 9 which provides ways for a valve plunger 10. The valve plunger 10 has a seat 11 and is operated by a rod 12 pivoted to a lever 13, intermediate its ends. The lever has a fulcrum or pivotal connection to a member 14 and in turn is pivoted to a float 15, so that as this float rises due to the accumulation of liquefied refrigerant 16 in the dome 1, the valve plunger 10 will be drawn upwardly away from the seat 11.

A suitable tube or conduit 17 leads from the fitting 9 to the evaporator of the refrigerator. A by-pass tube 18 leads from the cap 2, as shown, to the fitting 9; and the end of the tube 17 may be cut off at an angle to provide a connection between the tube 18 and the tube 17 internally of the fitting 9. The purpose of the by-pass tube 18 is realized in the charging of the system of the domestic refrigerator initially. If the workman had to wait for the accumulation of liquefied refrigerant in the dome 1 to charge the refrigerator, a great deal of time would be consumed. With my device, in charging, connection is made through the fitting 4 to a suitable source of refrigerant and the apparatus charged, the refrigerant passing through the by-pass tube 18 to the tube 17 and thence to the evaporator. The charging thus occupies very little time. When it is completed, the source of supply is disconnected from the fitting 4 and this fitting closed. Then the tube 18 is closed in any suitable way. This may easily be accomplished by pinching the walls of the tube 18 together by a tool having powerfully opposed jaws.

To effect heat exchange between the cold gases passing from the evaporator to the compressor and the warm liquefied refrigerant passing from the condenser to the evaporator, I provide a housing indicated generally in Fig. 1 at 19 surrounding the stem 8 and making a tight connection therewith. The housing is made of two cup shaped parts, as will presently be more fully described. Cold gases from the evaporator enter the housing 19 through a tube 20 which is connected with the evaporator; and they leave the housing 19 through a tube 21 which leads to the compressor.

It is an object of my invention to provide a structure such as that hereinabove briefly described, which may be very readily constructed and very readily assembled. In particular it is an object of my invention to provide a way of assembling parts and brazing them together at a single operation. I have shown in Fig. 2 a series of parts arranged for conjoint brazing. The parts will be brazed together in the position shown in the figure, where the cup 2 is utilized to form the base of the assembled device. The sleeve or stem 8 is inserted into the opening in the cup and a ring of copper wire 22 is placed, as shown, above the stem and adjacent the opening in the cup. A spacer member 23 of collar shape is put over the stem 8, the purpose of this being to keep the heat exchange housing

19 from sliding downwardly on the stem during the brazing operation. It will be appreciated that sufficient space between the housing 19 and the edges of the cup 2 must be left to permit the subsequent welding of the edges of the cup 2 to the edges of the dome 1, as at 3 in Fig. 1. Above the collar 23 I prefer to provide another ring of copper wire 24. The cup shaped member 19a forming part of the housing 19 is next placed on the stem, followed by the upper cup shaped portion 19b, the edges of the cups being interengaged as shown at 25. The cups are formed by drawing and preferably have inwardly extending sleeves 26, 27 for engagement respectively with the stem 8 and the tubes 20 and 21. About the meeting edges of the cups a copper ring is provided as shown at 28, which may conveniently be a wire wrapped about the cups and twisted to hold it in place, as at 29.

Where the upper cup 19b engages the stem 8 another ring of copper 30 will be provided.

The sleeve 14 which provides the fulcrum for the lever 13 is inserted in the fitting 9 as shown in Fig. 2. This fitting has a longitudinal orifice 31 to provide a bearing for the valve plunger 10. Transversely there may be provided drilled holes 32 and 33 to relieve the bearing surfaces. A small by-pass 34 is provided to conduct refrigerant past the valve plunger 10 and into the chamber formed by the hole 32. The valve seat member 11 hereinabove described is placed in position as shown, and a ring of copper 35 is put in position above it. Likewise a ring of copper 36 is placed near the juncture of the sleeve 14 in the fitting 9, within the stem 8. The sleeve 14 will serve to maintain the fitting 9 and associated parts in place during the welding or brazing operation, since the upper end of the sleeve may rest on a suitable support. For convenience in handling, the various parts are preferably so made as to have a frictional fit. The sleeve 14 may be split as shown, so as to have resilient engagement with the fitting 9. A ring of copper 37 may be provided above the end of the stem 8 and about the fitting 9.

When these parts have been assembled as shown they may be brazed concurrently and in a single operation. The assembly of Fig. 2 is merely placed in the position shown, in a hydrogen brazing furnace. The various copper members melt and the copper flows in between all meeting parts of the structure. Thus copper derived from the ring 22 brazes the stem 8 to the cup 2 and helps to braze the collar 23 to the stem. Likewise copper derived from the ring 24 brazes the lower cup 19a to the stem. Copper from 30 brazes the upper cup to the stem, while copper from 29 brazes the cups together. The collar 23 prevents the cups from sliding downwardly upon the stem for a purpose which has been described. Copper from 37 brazes the fitting 9 to the stem 8. Some copper from 36 also acts to do this, and in addition brazes the sleeve 14 to the fitting 9. The operations heretofore described can be rapidly carried out and the brazing of the assembly of Fig. 2 accomplished very rapidly and inexpensively. There remains simply the operation of connecting the float and lever mechanism, after which the cup 2 is placed in the end of the dome 1 and welded thereto by a torch. After this the tubing 6, 18, 17, 20 and 21 may be connected as desired.

Modifications may be made in my invention without departing from the spirit of it.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A process of assembling articles of the class described which comprises assembling a stem to a cap, providing a copper ring adjacent the meeting edges thereof, passing a collar over said stem to rest on said cap, locating the elements of a housing about said stem so as to rest upon said collar, providing sources of copper at all the meeting edges of said elements and brazing said elements together in a single operation.

2. A process of assembling articles of the class described which comprises inserting a stem in a cap, providing a collar surrounding said stem, assembling the parts of a housing about said stem and causing said housing to rest upon said collar, assembling a sleeve to a fitting, assembling a valve seat to said fitting, inserting the three last mentioned elements in said sleeve, providing sources of copper at all meeting edges of the elements constituting said assembly, and brazing said assembly together in a single operation.

ROLAND H. MONEY.