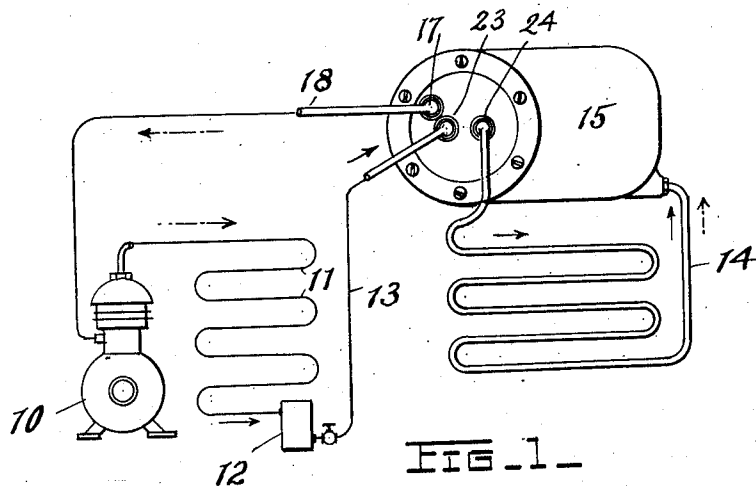
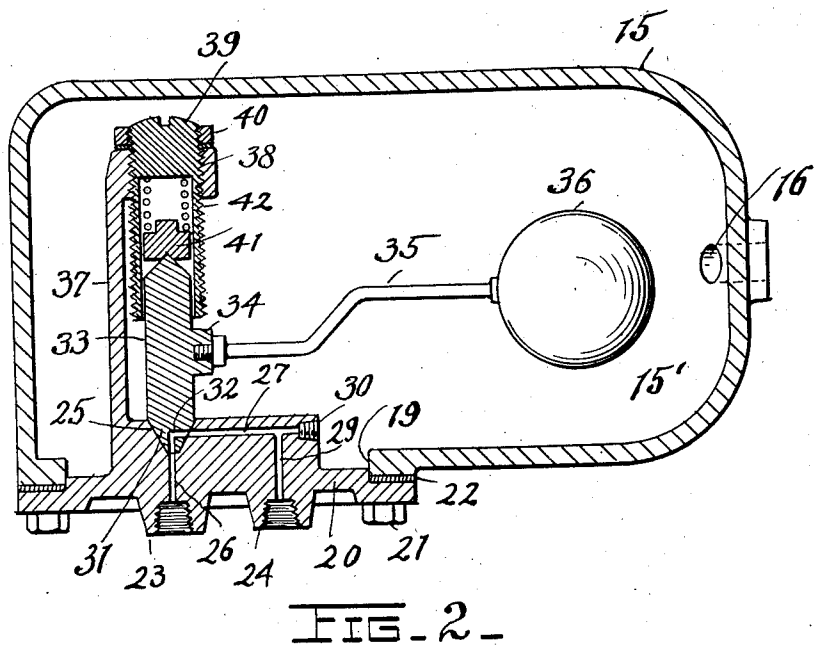


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O. C. OLSEN
REFRIGERATING APPARATUS

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REFRIGERATING APPARATUS

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This invention relates to improvements in refrigerating apparatus, more particularly float control mechanisms.

In the so-called "flooded system" the refrigerating unit consists of a header or boiler with a series of loops connected thereto, one end below and the other above the normal liquid level in the boiler, and with a float located in the header controlling a valve for admitting liquid refrigerant thereto. The cost of this type of apparatus is relatively high, the amount of refrigerant required for its operation is large, and its construction involves a considerable number of joints, that is, between the loops and the boiler or header, which joints are subject to possible leakage.

One of the objects of my invention is the provision of a valve for the intake line of the refrigerating unit or evaporating coil, which valve shall be controlled by a float located in a float chamber in the return line from the refrigerating unit to the compressor, these two lines being out of communication with each other.

Another object is the provision of a float control valve which shall render it possible to employ a relatively small amount of refrigerant in the system of which the valve is a part, and shall make it feasible to employ a single continuous coil for the refrigerating unit instead of a series of independent loops.

Other objects and features of novelty will appear as I proceed with the description of that embodiment of the invention which, for the purposes of the present application, I have illustrated in the accompanying drawing, in which—

Fig. 1 is a diagrammatic illustration of a refrigerating system in which my invention may be incorporated;

Fig. 2 is a horizontal sectional view of a float chamber embodying the invention.

In the drawings, a compressor or pump of conventional form is illustrated at 10 for delivering compressed gaseous refrigerant to a condenser coil 11, from the opposite end of which liquid refrigerant finds its way into a liquid container 12. The pressure above the liquid in the container 12 forces liquid upwardly through pipe 13 on its way to one end

of a refrigerating unit 14 which consists preferably of a single continuous coil, as shown, or a plurality of coils connected in series. From the opposite end of this unit liquid and gaseous refrigerant is discharged into a casing 15, containing the float chamber 15', preferably through an opening 16 at the bottom of the chamber. From a point 17 above the maximum liquid level in the chamber a return pipe 18 conveys the low pressure gaseous refrigerant back to the compressor 10. Now, referring particularly to Figs. 2 and 3, in which the float control mechanism is illustrated more or less in detail, it will be noted that the casing 15 is provided in one side with an opening 19, which is normally closed by a cover plate 20, fastened to the casing by means of bolts 21, with a packing ring 22 interposed. This cover plate is considerably thickened near the center and is there provided with a pair of spaced threaded bosses 23 and 24 which are intended for the reception of threaded connectors upon the upper end of pipe 13 and upon the intake end of refrigerating unit 14, respectively.

On the rear side of the cover plate 20, directly opposite the boss 23, is a conical valve seat 25, the point of which is connected with boss 23 by a passage 26 of small bore. At one side of the valve seat 25 there is a laterally extending passage 27, also of small bore, which is connected with the boss 24 by a further passage 29. 30 is a threaded plug which may be employed to close the end of passage 27 after the drilling operation has been performed.

A rotary conical valve 31 is ground to fit snugly in the seat 25 and has an angular passage 32, one portion of which registers at all times with the passage 26 and the other portion of which registers at times with the passage 27, depending upon the angular position of the valve. The valve 31 has a shank 33 of substantial size extending into the interior of the chamber 15' where it has a threaded boss 34 for the reception of a float arm 35 carrying on its free extremity a hollow metal float 36.

As an integral part of the cover plate 20 there is formed a rearwardly extending arm 100

37 which is enlarged at its extremity and there provided with a threaded opening 38 arranged in axial alignment with the valve 31 and its seat 25. A plug 39 is threaded into the opening 38 and may be held in adjusted position therein by means of a lock nut 40. The plug 39 is hollow for a considerable portion of its length, as shown, receiving the shank 33 and a member 41 in which the tapered end 33' of the shank 33 has a pivotal bearing, a coil spring 42 being interposed between the member 41 and the solid portion of the plug 39.

It will be observed that all the movable parts of the control apparatus are carried by the removable cover plate 20. They may, therefore, be assembled on the bench as a unit and the proper adjustment of the plug 39 may then be made to seat the valve with such pressure as will prevent leakage and yet not interfere with its operation by the float. By turning the assembly sidewise the float may be inserted into the chamber 15' first and then by moving the assembly inward and turning it at the same time the arm 37 and parts carried thereby may be guided into place. On account of the fact that the passage 26 is quite small, about one-sixteenth of an inch in diameter, the pressure of liquid therein tending to unseat the valve is not very great and may be overcome by a relatively light pressure in spring 42. Furthermore, such leakage as may occur, if any, can do no particular harm since it will be discharged into the chamber 15' which is a part of the system.

In operation the angular passage 32 in the valve 31 remains open, permitting liquid refrigerant to flow into the refrigerating unit 14 and thence into the float chamber 15, until the liquid in that chamber reaches a predetermined level, at which time the float 36 will have rotated the valve in an anti-clockwise direction far enough to break communication between angular passage 32 and passage 27, whereupon the flow of refrigerant to the coil 14 and chamber 15 will be interrupted for a time, that is, until evaporation has again lowered the liquid level in the float chamber. For convenience in following the operation, I have indicated the passage of gaseous refrigerant by broken line arrows in Fig. 1 and of liquid refrigerant by full line arrows.

Having thus described my invention, what I claim is:

1. Control mechanism for refrigerating systems, comprising a chamber adapted to be connected into the discharge line of the refrigerating unit, said chamber having in one wall thereof a valve seat opening into the interior of the chamber, a rotary valve for said seat having a shank projecting into the chamber, said wall having a passage therein intercepting said valve seat and

adapted to be connected into the intake line of the refrigerating unit, and means within the chamber for holding the valve to its seat and for operating the valve.

2. Control mechanism for refrigerating systems, comprising a chamber adapted to be connected into the discharge line of the refrigerating unit, said chamber having in one wall thereof a conical valve seat opening into the interior of the chamber, a conical valve for said seat having a shank projecting into the chamber, said wall having a passage therein leading to the point of said conical seat and away from one side of said seat, said passage being adapted to be connected into the intake line of the refrigerating unit, said valve having an angular passage therein adapted to register with the passage aforesaid, and means within the chamber for causing said passages to register when the liquid in the chamber falls below a predetermined level.

3. Control mechanism for refrigerating systems, comprising a chamber adapted to be connected into the discharge line of the refrigerating unit, said chamber having in one wall thereof a valve seat opening into the interior of the chamber, a valve for said seat having a shank projecting into the chamber, said wall having a passage therein intercepting said valve seat and adapted to be connected into the intake line of the refrigerating unit, means for rotatably mounting the free end of said valve shank and for holding said valve to its seat, and means within the chamber for causing said valve to open said passage when the liquid in the chamber falls below a predetermined level.

4. Control mechanism for refrigerating systems, comprising a float chamber adapted to be connected into the discharge line of the refrigerating unit, said chamber having a removable wall portion on the inner side of which is formed a valve seat, a valve for said seat having a shank projecting into the chamber, said wall having a passage therein intercepting said valve seat and adapted to be connected into the intake line of the refrigerating unit, a bearing for the inner end of said shank carried by said removable wall, and a float attached to said shank.

5. Control mechanisms for refrigerating systems, comprising a chamber having a removable wall portion on the inner side of which is formed a valve seat, a valve for said seat having a shank projecting into the chamber, said wall having a rearwardly projecting arm carrying a bearing for rotatably supporting the free end of said shank and carrying adjustable means for regulating the pressure of the valve upon the seat.

In testimony whereof, I hereunto affix my signature.