

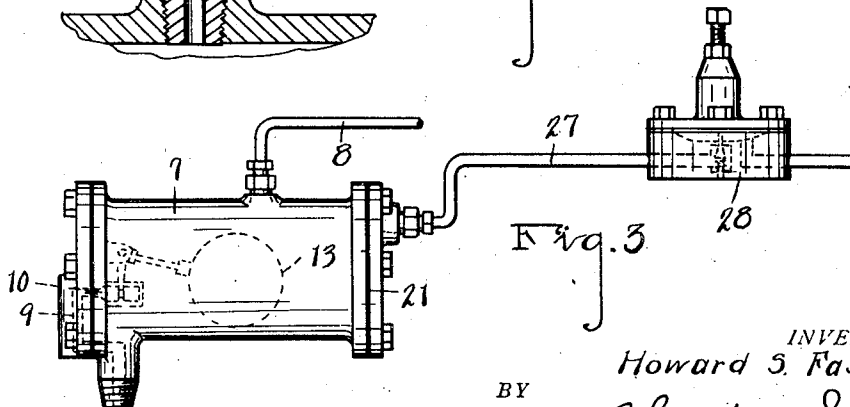
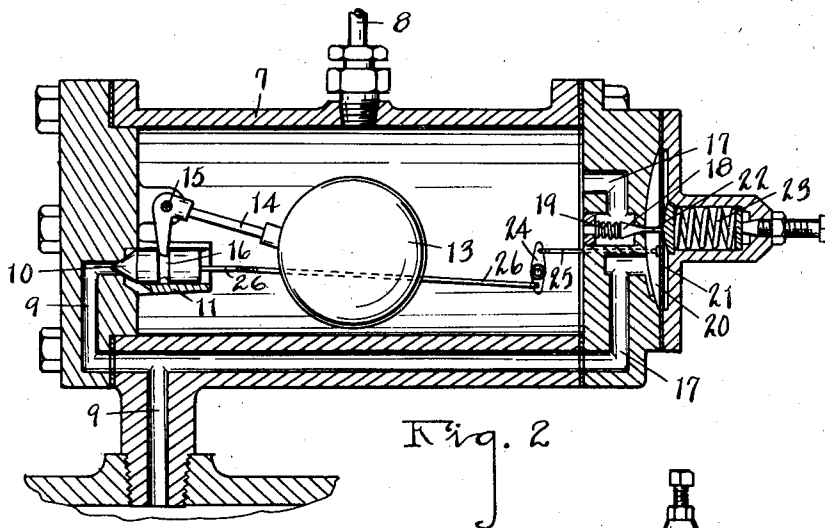
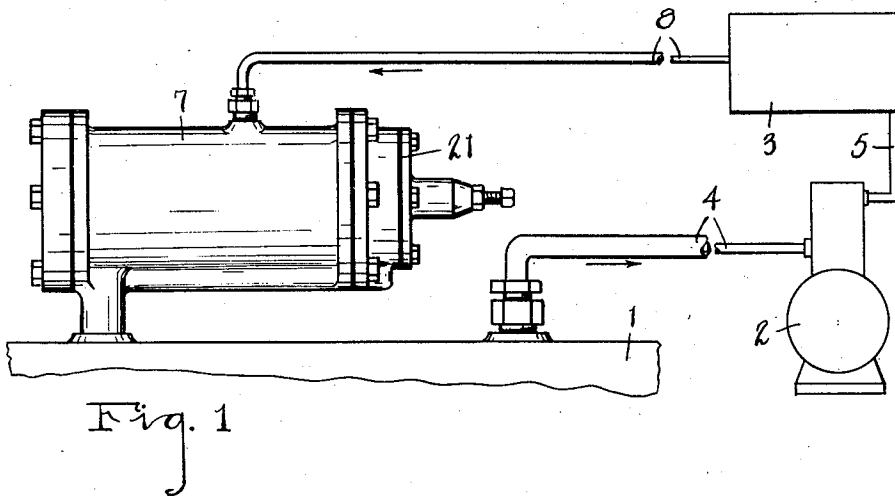
April 16, 1929.

H. S. FASSETT

1,709,468

CIRCULATING APPARATUS

Filed Jan. 29, 1927



INVENTOR
Howard S. Fassett
BY
Chapman & Earl
ATTORNEYS

UNITED STATES PATENT OFFICE.

HOWARD S. FASSETT, OF CHICAGO, ILLINOIS, ASSIGNOR TO FRANK B. LAY, OF CHICAGO, ILLINOIS.

CIRCULATING APPARATUS.

Application filed January 29, 1927. Serial No. 104,646.

The main objects of this invention are:

First, to provide in a circulating system such as that of a mechanical refrigerator in which the return fluid is controlled by a float valve means for preventing the "hanging up" or sticking of the valve.

Second, to provide in a circulating system provided with a float controlled valve means whereby the system is automatically opened in the event of the float controlled valve becoming inoperative.

Objects pertaining to details and economies of my invention will definitely appear from the detailed description to follow. The invention is clearly defined and pointed out in the claims.

A structure embodying the features of my invention is clearly illustrated in the accompanying drawing, in which:

Fig. 1 is a diagrammatic view of a refrigerating apparatus embodying the features of my invention, the parts being shown mainly in conventional form.

Fig. 2 is a detail view mainly in vertical section of the float valve chamber showing the relation of the float controlled valve and the by-pass valve and passage.

Fig. 3 is a detail side elevation of a modified form or embodiment of my invention.

Referring to the drawing, 1 represents the radiator or expansion element of a refrigerating system, 2 the pump and 3 the condenser. These parts are shown conventionally. The intake of the pump is connected to the radiator or expansion element 1 as by the pipe 4. The discharge of the pump is connected to the condenser by the pipe 5 while the condenser is connected to a float valve chamber 7 by the pipe 8 which opens into the top of the float valve chamber. This float valve chamber has a delivery passage 9 connected to the expansion element. This passage 9 is controlled by the delivery valve 10 supported in a cage 11 and controlled by the float 13, the bell crank arm 14 of which is pivoted at 15 to engage the stem 16 of the valve 10.

In normal operation, when the condensed circulating fluid reaches a predetermined level within the float chamber, the float opens the discharge valve permitting the fluid to flow into the radiator. It is, however, quite

a frequent occurrence in refrigerating systems, for instance, that owing to lubricating oil or excessive pressure accumulating in the float chamber the float will not operate to open the valve, thereby interrupting the circulation in the system so that it is necessary to get access to the float chamber in order to release the valve. This ordinarily entails the removal of the refrigerant from the system and disassembling a portion of the apparatus. I have provided means for overcoming or preventing this condition.

This I accomplish by means of a by-pass 17 which in the embodiment illustrated in Fig. 2 is formed in the walls of the float chamber and opens to the float chamber above the level of the valve 10 and to the discharge passage 9. This by-pass 17 is controlled by a valve 18 seating outwardly and held normally to its seat by the coiled spring 19. The by-pass has a diaphragm chamber 20 therein or forming a part thereof, the diaphragm 21 being extended across this chamber and operatively associated with the stem 22 of the valve 18. A spring 23 is provided to assist in the opening of the valve. The spring 19 and the pressure within the float chamber, however, are sufficient to normally hold the valve 18 closed.

When the discharge valve 10 becomes inoperative or does not open, owing to an accumulation of lubricant or excessive pressure within the float housing, the suction of the pump, with which the by-pass is connected, acting through the diaphragm will open the valve 18 and thereby the liquid or gases, preventing the opening of the valve 13, are drawn off allowing the float to rise in the event it is held down by excessive pressure, or causing such agitations of the fluid within the float chamber as will move the float and effectively loosen the valve.

In the preferred embodiment shown in Fig. 2 the diaphragm 21 is connected to the valve 10 to positively open the same, the connection consisting of a lever 24 connected to the diaphragm by a link 25 and to the valve by a link 26.

In the modification shown in Fig. 3 the by-pass passage 27 is in the form of a pipe in which the diaphragm controlled valve is located, this valve being indicated generally

by the numeral 28. This is not detailed, however, as the same valve mechanism as is shown in Fig. 2 may be satisfactorily employed. In this modification there is no connection for the diaphragm to the valve such as is shown in Fig. 2.

I have illustrated and described my improvements in an embodiment which I have found very practical and I have shown the same as embodied in refrigerating machines. My improvements are, however, adapted to other circulating systems such as heating systems and the like involving the return of a condensate.

I have not illustrated such other embodiments as I contemplate as I believe the disclosure made will enable those skilled in the art to which my invention relates to embody or adapt the same as may be desired.

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

1. In an apparatus of the class described, the combination of a radiator, a pump, a condenser, a float valve chamber, a connection for said condenser to said float valve chamber opening to the top thereof, a discharge connection from said float valve chamber to said radiator, a valve controlling said discharge connection and provided with a float in said chamber, a by-pass connection for said float valve chamber to said radiator opening to said float valve chamber above the said discharge valve, said by-pass having a diaphragm chamber therein, a spring seated inwardly opening by-pass valve for said by-pass passage, and a diaphragm in said diaphragm chamber operatively associated with said by-pass valve, said chamber being open to the by-pass at the rear of the by-pass valve.

2. In an apparatus of the class described, the combination of an expansion element, a pump and a condenser having suitable circulation connections, a float valve chamber in the connection between the condenser and the expansion element, a float control valve for such connection, and a by-pass connection for said valve chamber to said expansion element provided with a normally seated suction actuated control valve, said by-pass opening to said float chamber above the normal liquid level thereof.

3. In an apparatus of the class described, the combination of an expansion element, a pump and a condenser having suitable circulation connections, a float valve chamber in the connection between the condenser and the expansion element, a float control valve for such connection, and a by-pass connection for said valve chamber to said expansion element provided with a normally seated suction actuated control valve above the level of said discharge valve.

4. In an apparatus of the class described,

the combination of a circulating system including a pump and a condenser operatively associated with said pump, a float chamber operatively associated with the discharge of said condenser and the intake of the pump, a discharge valve for said float chamber operatively associated with the intake of the pump and provided with a control float within said float chamber, and a by-pass for said float chamber provided with a suction actuated operating means, said by-pass opening to said float chamber above the level of its discharge valve.

5. In an apparatus of the class described, the combination of a circulating system including a pump and a condenser operatively associated with said pump, a float chamber operatively associated with the discharge of said condenser and the intake of the pump, a discharge valve for said float chamber operatively associated with the intake of the pump and provided with a control float within said float chamber, and a by-pass for said float chamber provided with a suction actuated operating means.

6. In a circulating system, the combination of a float chamber provided with a discharge valve, a control float for said discharge valve, a by-pass around said discharge valve, a normally seated control valve for said by-pass, and an actuating diaphragm for said by-pass valve provided with a chamber opening to the by-pass at the rear of the by-pass valve.

7. In a circulating system, the combination of a float chamber provided with a discharge valve, a control float for said discharge valve, a by-pass around said discharge valve, and a normally seated suction actuated control valve for said by-pass subject to the circulation system.

8. In a circulating system, the combination of a float chamber provided with a discharge valve, a control float for said discharge valve, a by-pass around said discharge valve, a normally seated control valve for said by-pass, and means for automatically opening said by-pass valve upon the failure of said float to operate.

9. In a circulating system, the combination of a float chamber provided with a discharge valve, a control float for said discharge valve, a by-pass around said discharge valve, a normally seated control valve for said by-pass, an actuating diaphragm for said by-pass valve subject to the circulating system, and operating connections for said diaphragm to said discharge valve.

10. In a circulating system, the combination of a float chamber provided with a discharge valve, a control float for said discharge valve, a by-pass around said discharge valve open to the circulating system, a normally seated suction actuated control valve for said by-pass valve subject to the circulating system, and operating connections from said suction

actuated valve actuating means to said discharge valve.

11. In a circulating system, the combination of a float chamber provided with a discharge valve, a control float for said discharge valve, a by-pass around said discharge valve connected to the suction system, a suction actu-

ated member in said by-pass, and operating connections from said suction actuated member to said discharge valve.

In witness whereof I have hereunto set my hand.

HOWARD S. FASSETT.