

Jan. 27, 1942.

E. F. DICKIESON, JR

2,270,934

CONTROL FOR REFRIGERATING DEVICES

Filed Oct. 13, 1939

Fig. 1.

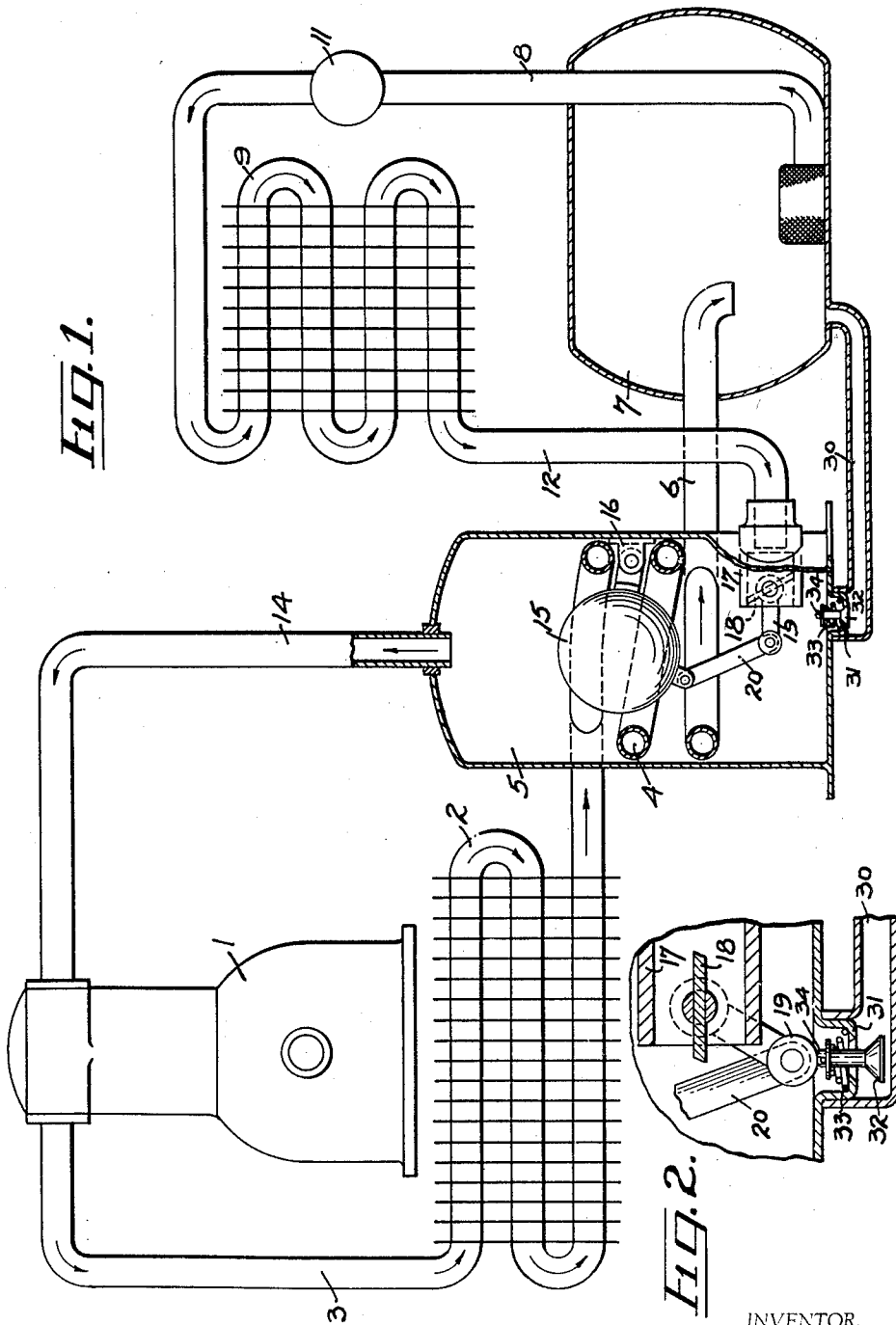


Fig. 2.

BY

INVENTOR.
Edward F. Dickieson, Jr.

George J. Baldwin
ATTORNEY.

UNITED STATES PATENT OFFICE

2,270,934

CONTROL FOR REFRIGERATING DEVICES

Edward F. Dickieson, Jr., Detroit, Mich.

Application October 13, 1939, Serial No. 299,250

4 Claims. (Cl. 62—8)

This invention relates to improvements in controls for refrigerating devices. It is an object of the invention to provide a control for refrigerating devices for regulating the amount of refrigerant passing through an evaporating coil so that though different and varying amounts flow therethrough the temperature thereof in the coil remains constant.

Another object of the invention is to provide a control for refrigerating devices through which the refrigerant, in both liquid and vaporized form, passes on its way back to the compressor, and which automatically closes as the volume of the refrigerant in liquid form passing therethrough increases, thereby reducing the back pressure on the compressor without affecting the temperature in the evaporating coil of the refrigerant, the pressure of which is maintained constant by other means.

A further object of the invention is to provide a control for refrigerating devices including a coil therein through which the refrigerant passes on its way from the condensing coil to the receiver wherein some of the refrigerant is stored under pressure.

Yet another object of the invention is to provide a control for refrigerating devices including means for maintaining a minimum of the refrigerant therein at all times through which other refrigerant passing from the evaporating coil to the compressor must flow, thereby insuring that all vaporized refrigerant reaching the compressor arrives in saturated form.

Having thus briefly stated some of the major objects and advantages of the invention I will now proceed to describe a preferred embodiment thereof with the aid of the accompanying drawing, in which:

Figure 1 illustrates a diagrammatic view of a refrigerating system including my control which is shown in section.

Figure 2 is an enlarged detail.

Referring to the drawing, 1 designates a conventional compressor from which a refrigerant is discharged into a condensing coil 2 through a pipe 3. After passing through the coil 2 the refrigerant flows into and through a coil 4 in a trap 5, and from the former through a tubular connection 6 into a receiver 7 wherein the refrigerant is stored under pressure. 8 denotes an outlet pipe from the receiver which terminates in an evaporating coil 9; in this outlet pipe, intermediately of its length, an adjustable, automatic expansion valve 11 of known design is provided which may be set to regulate the flow

of refrigerant therethrough at any desired pressure less than that in the receiver 7. The refrigerant after passing through the evaporating coil 9 flows through a pipe 12 into the trap 5.

A float 15 is pivotally mounted upon a suitable bracket 16 provided within the trap 5 intermediately of its height. Mounted on one extremity of the pipe 12 and terminating within the said trap is an enlarged annular seat 17, preferably concentric with, and forming that end of the said pipe. Pivotally mounted in the annular seat 17 about an axis transversely disposed thereto is a valve 18 from which an arm 19 extends. The outer extremity of this arm is pivoted to one end of a link 20 the opposite extremity of which is pivotally secured to the float 15.

Consequently as the amount of refrigerant in liquid form passing through the evaporating coil 9 and pipe 12, and collecting in the trap 5, raises the float 15, the latter turns the valve 18, and gradually closes the seat 17 until the said valve assumes the completely closed position shown in Figure 1. However before so doing the flow of refrigerant in liquid form from the evaporating coil 9 is progressively reduced by the gradual closing of the valve as the float is raised. It will also be noted that the passage of refrigerant in vaporized form from the coil 9 and pipe 12 into the trap 5 does not raise the float 15 as it passes through the liquid refrigerant and to the pipe 14 which terminates at its opposite extremity in the compressor 1. The back pressure upon the compressor is thus limited, and at the same time the temperature of the refrigerant in the evaporating coil 9 is not affected as that temperature is dependent upon the pressure of the refrigerant therein which is controlled and maintained by the setting of the automatic expansion valve 11.

If the evaporating coil 9 is in a relatively cool location a relatively large amount of the refrigerant will pass therethrough as a liquid, so that the trap 5 will soon be filled sufficiently for the valve 18 to become at least partly closed by movement of the float 15, thereby reducing the flow into the trap. On the other hand if the evaporating coil is exposed to a relatively warm temperature the refrigerant will boil in the evaporating coil and only vapor will pass into the trap 5, which as already stated will not raise the float. But in either case a constant temperature is maintained in the evaporating coil by the expansion valve 11 as the latter maintains the refrigerant in the coil under constant pressure.

It is found more efficient to maintain sufficient

refrigerant in liquid form in the trap 5 at all times to cover the pipe 12 and the valve seat 17, because if the refrigerant becomes superheated in the evaporating coil 9 a saturated condition is then restored to it by contact with the liquid refrigerant as the vapor passes upwardly there-through in the trap. In the present instance this is accomplished in the following manner: From the bottom of the receiver 7 a pipe 30 extends which terminates in a valve seat 31 opening into the bottom of the trap 5. 32 denotes a valve which is normally retained against the seat 31 by a spring 33, however when the float 15 drops below a predetermined minimum level the arm 19 contacts the spindle 34 of the valve 32 and forces the latter downwardly off its seat so that liquid refrigerant flows into the trap 5 from the receiver 7. When this liquid refrigerant thus introduced into the trap reaches the predetermined minimum level the float 15 is again at such a height that the arm 19 is raised clear of the spindle 34 and the valve 32 is again pressed against its seat 31 by the spring 33.

While in the foregoing the preferred embodiment of the invention has been described and shown, it is understood that the construction is susceptible to such alterations and modifications as fall within the scope of the appended claims.

What I claim is:

1. An arrangement of the character described comprising a receiver adapted to contain a refrigerant, an evaporating coil connected thereto, valve means interposed between said receiver and said coil adapted to maintain the refrigerant in the coil at constant pressure, a trap, means connecting the evaporating coil with the trap, automatic means including a float for checking the flow of the refrigerant in the trap as the liquid refrigerant approaches a predetermined height therein, a connection from the receiver to the trap, a valve therein, means normally holding said valve closed, and means coacting with the float adapted to open the valve and admit the refrigerant from the receiver into the trap when the float is lowered.

2. In an arrangement of the character described the combination of a receiver adapted to

contain a refrigerant, an evaporating coil connected thereto, valve means interposed between the receiver and the coil adapted to maintain the refrigerant at a uniform pressure in the latter, a trap, means connecting the coil with the trap, automatic means for decreasing the flow of the refrigerant from the coil into the trap as the amount of liquid refrigerant therein increases, and automatic means for maintaining a minimum amount of liquid refrigerant in the trap at all times.

3. An arrangement of the character described comprising a compressor adapted to compress a refrigerant, a condensing coil connected thereto, a receiver connected to said coil, a trap, an evaporating coil connected to the receiver and to the trap, valve means interposed between the receiver and the evaporating coil adapted to maintain the refrigerant at uniform pressure in the latter, automatic means in the trap for decreasing the flow of the refrigerant thereinto as the amount of liquid refrigerant in the trap increases, means connecting the trap with the compressor, and means for maintaining the level of the liquid refrigerant in the trap at all times above the inlet thereinto from the evaporating coil to insure that vaporized refrigerant from the latter must pass through said liquid.

4. An arrangement of the character described comprising a compressor adapted to compress a refrigerant, a condensing coil connected thereto, a receiver connected to the coil, a trap, an evaporating coil connected to the receiver and to the trap, valve means interposed between the receiver and the evaporating coil adapted to maintain the refrigerant at uniform pressure in the latter, automatic means in the trap for decreasing the flow of the refrigerant thereinto as the amount of liquid refrigerant in the trap increases, means connecting the trap with the compressor, and a coil in the trap interposed in the connection from the condensing coil to the receiver whereby the refrigerant passing therethrough to the receiver is adapted to be cooled by evaporating the liquid in the trap.

EDWARD F. DICKIESON, JR.