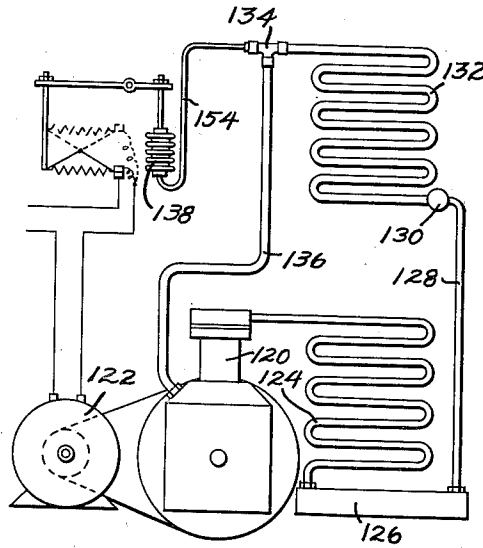
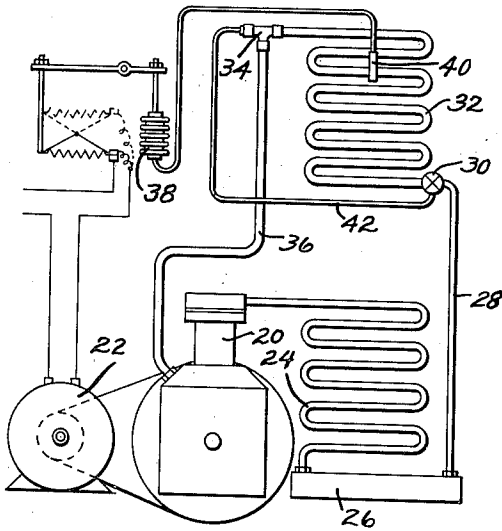
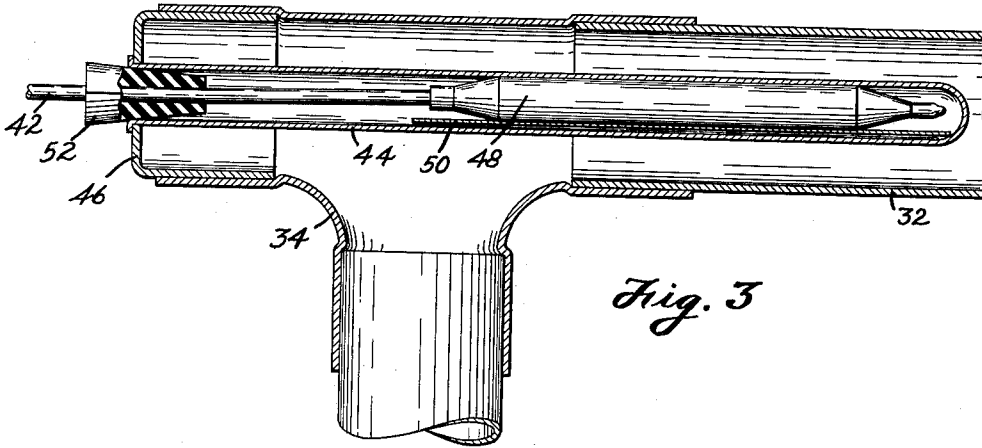


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REFRIGERATING APPARATUS
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REFRIGERATING APPARATUS

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3 Claims. (Cl. 62—3)

This invention relates to refrigerating apparatus and more particularly to control means.

Heretofore where control means employing a thermostat bulb has been used, the thermostat bulb has ordinarily been clamped to the outside of the evaporator or to the outside of the return conduit, adjacent the outlet of the evaporator. Such a form of connection does not provide a very rapid heat transfer between the contents of the evaporator or the contents of the return conduit and consequently with such an arrangement the control is not very sensitive.

It has also been proposed to place the thermostat bulb directly in the return conduit but such a scheme eliminates one of the chief advantages of the thermostat bulb type of control system, namely, that the control may be removed from the system without opening the refrigerant circuit.

It is an object of my invention to provide an improved means which will provide much more rapid heat transfer between the contents of the return conduit or evaporating means and the thermostat bulb, without making it necessary to open up the refrigerant system to remove the thermostat bulb from the system.

It is another object of my invention to provide a form of well provided in the refrigerating system at the particular point where it is desired to take the temperature.

It is still another object of my invention to provide an improved well construction for thermostat bulbs and thermometers in the refrigerating system and other types of systems requiring different forms of temperature measurement.

It is a further object of my invention to provide means for improving the heat transfer between the wall of the well and the thermostat bulb.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawing, wherein a preferred form of the present invention is clearly shown.

In the drawing:

Fig. 1 is a diagrammatic representation of a refrigerating system embodying my invention;

Fig. 2 is a diagrammatic representation of another form of refrigerating system embodying my invention; and

Fig. 3 is an enlarged sectional view of the well and fitting used in Figs. 1 and 2.

Briefly, I have shown two refrigerating systems of the direct expansion type provided with T-

shaped fittings at the outlet of the evaporating means. Each of these T-shaped fittings has one of the aligned legs connected to the outlet of the evaporating means, while the other aligned leg is closed by a cap containing a copper well extending through the aligned legs of the fitting into the outlet of the evaporating means. These wells each contain a thermostat bulb held pressed against the side wall of the well by a thin spring brass strip which is slightly longer than the thermostat bulb. The well is closed by a split rubber stopper which encircles the small tube connected to the thermostat bulb and fits within the mouth of the well.

Referring now to the drawing and more particularly to Fig. 1, there is shown a refrigerant liquefying means including a compressor 20 driven by an electric motor 22 for compressing refrigerant and forwarding the compressed refrigerant to a condenser 24 where the compressed refrigerant is liquefied and drains into the receiver 26. From the receiver 26 liquid refrigerant is forwarded to the supply conduit 28 to a thermostatic automatic expansion valve 30 which controls the flow of liquid refrigerant into the evaporating means 32. The outlet of the evaporating means 32 is provided with a T-shaped fitting 34 having one of its aligned legs connected to the outlet of the evaporating means and having another of the legs connected to the return conduit 36 which connects to the inlet of the compressor. The operation of the compressor 20 and its driving motor 22 is controlled by a snap acting switch means 38 controlled by thermostat bulb 40 located adjacent or in contact with the evaporating means 32 for controlling the operation of the liquefying means in accordance with the temperature of the evaporating means 32.

The expansion valve 30 has a diaphragm means responsive to the pressure of the refrigerant within the evaporating means 32 and also has a thermostatic portion connected by a tube 42 to a thermostat bulb. Heretofore such a thermostat bulb has ordinarily been clamped by some form of clamping means to the outlet of the evaporating means. Such a clamping arrangement did not provide good heat transfer between the gases in the outlet and the thermostat bulb and for that reason this arrangement was not very sensitive.

In order to improve the sensitivity of the control of refrigerant flowing into the evaporating means 30 I have provided an assembly which includes relatively long thermostat well 44 and a cap member 46 provided with the aperture receiving the flanged mouth of the well. This

flanged mouth of the well is silver soldered to the portion of the cap member immediately surrounding the mouth of the well. The cap member 46 is preferably made of heavy copper while the well 44 is made of thinner copper. Each of these pieces may be made from seamless copper tubing and soldered together by the use of silver solder. The closed end of the well 44 may be made by spinning and silver soldering in order to seal the inner end of the well 44. This assembly of the cap and the well is inserted in one of the aligned legs of the fitting 34, as shown in Fig. 3, and sweat-soldered in place.

The well not only extends through the fitting but also extends a considerable distance into the outlet of the evaporating means 32. The thermostat bulb 48 is connected to the end of the tube 42 and is inserted into the well after a thin flat strip 50 of phosphor bronze has been previously inserted into the well. This thin flat strip 50 of spring bronze holds the bulb 48 tightly against one portion of the wall of the well 44. The mouth of the well 44 is closed by a pierced split rubber stopper 52 which receives the tube 44 and is inserted into the mouth of the well. Preferably the well contains only air or some other gaseous fluid, so that the specific heat of the well and the thermostat bulb is kept as low as possible. However, if it is desired to make this arrangement less sensitive or if it is desired to secure better heat transfer the well may be filled with some suitable heat transfer liquid which may have either a low or a high specific heat, as desired.

The well may be made any length desired in order to position the bulb properly. The bulb may be moved longitudinally within the well to adjust the position of the bulb to the exact point desired in order to obtain the best control. Preferably the assembly of the cap member and well is sweat-soldered to the T fitting when the T fitting is soldered into the refrigerant circuit.

In Fig. 2 there is shown a very similar refrigerating system including a compressor 120 driven by an electric motor 122, a condenser 124 and a receiver 126. Supply and return conduits 128 and 136 connect the liquefying means with the evaporating means 132. An automatic expansion valve 130 or a restrictor is used to control the flow of liquid refrigerant into the evaporating means 132. A T-shaped fitting 134 connects the outlet of the evaporating means with the return conduit 132. A snap acting switch means 138 is provided for controlling the operation of the compressor motor 122, and the operating bellows of this snap acting switch means is connected by a small tube 154 to a thermostat bulb located within a well in the T-shaped fitting 134 in like manner as the well and bulb are embodied in the T-shaped fitting as shown in Fig. 3.

This T-shaped fitting provided with a well or

thermostat bulb may be used in connection with new refrigerating equipment or it may be incorporated into old refrigerating equipment merely by sweating the two legs or arms of the T-shaped fitting to the outlet of the evaporating means and to the return conduit.

While the form of embodiment of the invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. Refrigerating apparatus including liquefying means and evaporating means, conduit means connecting the liquefying means and the evaporating means, said conduit means including a multi-legged portion provided with a well in one of the legs, said well being provided with a metal wall and being fastened to and sealed to the wall of one of the leg portions for closing said one leg portion, a control means for controlling said apparatus, said control means including a thermostat bulb located within said well and in heat exchange relationship through the wall of the well with the fluid flowing through the conduit means, and yielding means within the well for holding said bulb tightly against one of the side walls of the well.

2. Refrigerating apparatus including liquefying means and evaporating means, conduit means connecting the liquefying means and the evaporating means, said conduit means including a plural legged fitting having one leg connected to the outlet of the evaporating means and another leg, said fitting having a third leg substantially in alignment with one of the other legs, a cap member and a well having its mouth fastened to an aperture in the cap member for closing said third leg, said cap member being fastened and sealed into the mouth of said third leg, said well extending into the fitting from the cap member.

3. Refrigerating apparatus including liquefying means and evaporating means, conduit means connecting the liquefying means and the evaporating means, said conduit means including a plural legged fitting having one leg connected to the outlet of the evaporating means and another leg, said fitting having another leg substantially in alignment with one of the other legs, said another leg being closed by means including a well extending into the leg with which it is in alignment, and means including a thermostat bulb in said well for controlling the circulation of refrigerant through the evaporating means, said well extending all the way through and beyond the fitting, to cause the end of the well to project into the path of the flow of refrigerant through said one and said first mentioned another leg.

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