Patented Apr. 11, 1944 2,346,469

UNITED STATES PATENT OFFICE

2,346,469

REFRIGERATING SYSTEM

Franklyn Y. Carter, Detroit, Mich., assignor to Detroit Lubricator Company, Detroit, Mich., a corporation of Michigan

Application March 27, 1942, Serial No. 436,408

3 Claims. (Cl. 62—141)

This invention relates to new and useful improvements in refrigerating systems and, more particularly, to a system including an evaporator for refrigerating a water cooler.

In the refrigerating of water coolers which are positioned in a space or in an ambient medium having a temperature lower than the temperature of the water cooling evaporator, it is necessary, when using a thermostatic expansion valve of the gas-charged type, to provide means to maintain control of the expansion valve in accordance with the temperature of the evaporator outlet. Unless some such means is provided, the limited volatile liquid charge in the power element bulb or feeler member will condense into the power element or tubing connected to the bulb so that the expansion valve will be rendered ineffective.

It is, accordingly, one object of this invention to provide means for maintaining the expansion valve in control of the admission of refrigerant to the evaporator.

The invention consists in the novel cooperative relation of parts to be more fully described hereinafter and the novelty of which will be particularly pointed out and distinctly claimed.

In the accompanying drawing to be taken as a part of this specification there is fully and clearly illustrated a preferred embodiment of the invention, in which drawing:

Figure 1 is a top plan view of a water cooler having the invention applied thereto, and

Fig. 2 is a view of the water cooler partly in section and shown as operatively connected in a refrigerating system and positioned in a refrigerated space.

Referring to the drawing by characters of reference, 1 designates a room or chamber, such as a butcher box, wherein the interior space 2 is to be maintained substantially at a water freezing temperature, say 32° to 32° F. Positioned within the space 2 there is a water cooler 3 which may be of the drum type containing a copper coil evaporator 4 having an inlet 5 and an outlet 6. A thermostatic expansion valve 7 which may be of any of the well known forms now on the market and which is of the gas-charged type controls the supply of refrigerant to the evaporator inlet 5. The valve 7 is fed from a refrigerant liquid line or conduit 8 which is connected to the outlet of a compressor-condenser unit 9. From the evaporator outlet 6 a suction line or outlet conduit 10 connects to the inlet of the unit 9 so that a refrigerant circulatory system is established. In the suction conduit 10 there is a back pressure limiting valve 11 which is set to maintain the evaporator temperature at a temperature above 32° F. and preferably in the neighborhood of 38° to 40° F. The interior of the cooler 3 is supplied with water from the usual service main by a water inlet pipe 12 which has a portion of its length, as at 13, wrapped around and in intimate heat exchange relation with the expansible hollow power element 14 of the valve 7. The supply pipe 12 discharges into the interior of the cooler 3 adjacent its bottom or lower end, as at 15. The power element 14 is controlled by a hollow temperature responsive bulb element 16 which extends into the evaporator adjacent its outlet to the conduit 10 so that it is in intimate heat exchange relation with the refrigerant leaving the evaporator. The bulb element 16 contains a limited quantity of volatile liquid which could condense over into the tubing 17 which connects the element 16 to the power element 14 or could condense over into the power element 14, thereby leaving the bulb element 16 evacuated of any controlling charge. The water supply line 12 extends closely adjacent to the evaporator outlet so that the volatile liquid pressure transmitting tube 17 may have heat exchange contact therewith substantially at its point of leaving the evaporator outlet, as at 18. The tube 17 is wrapped around the pipe 12 or otherwise secured in intimate heat exchange relation therewith substantially to the point of connection of the tube 17 to the power element 14. The tube 17 and the power element 14 will thus be warmed by the inflowing water in the supply pipe 12. The cooler 3 is provided with a water discharge pipe 19 which may be provided with a faucet 20 and, if desired may lead outside of the room 1.

The operation of the system is as follows. When the faucet 20 is opened to draw water from the cooler 3, the volatile liquid may have condensed into the tube 17 or power element 14 so that the valve 7 will be held in closed position. However, as soon as water is drawn from the cooler 3, warm incoming water will flow through the pipe 12, thereby raising the temperature of the tube 17 and the power element 14 so that volatile liquid which may have condensed in the tube 17 and element 14 will now be vaporized. In normal operation, the water in the cooler 3 which is at a temperature below that of the warm incoming water in pipe 12 will cause at least a part of the volatile liquid vaporized in tube 17 to condense at the control point, namely in the bulb element 16. If now the temperature at the outlet of the evaporator is above the desired tem-

April 11, 1944. H. H. CARY ET AL 2,346,470

METHOD OF MAKING GLASS ELECTRODES

Filed Aug. 2, 1940

Fig. 1.

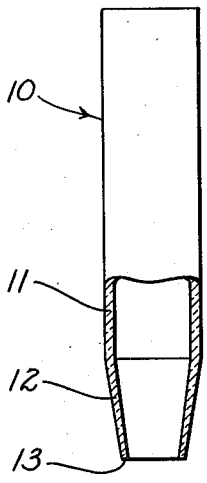


Fig. 2.

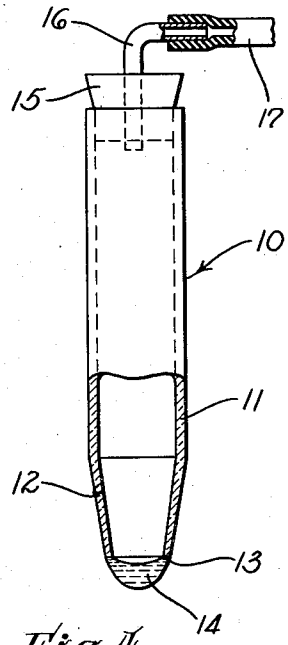


Fig. 3.

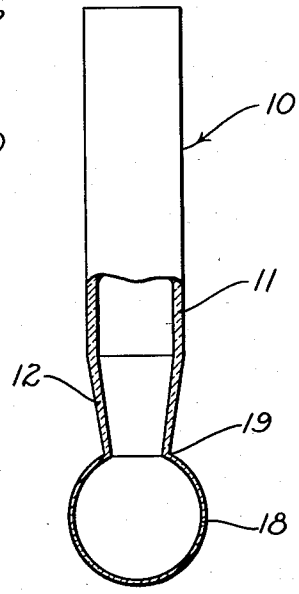
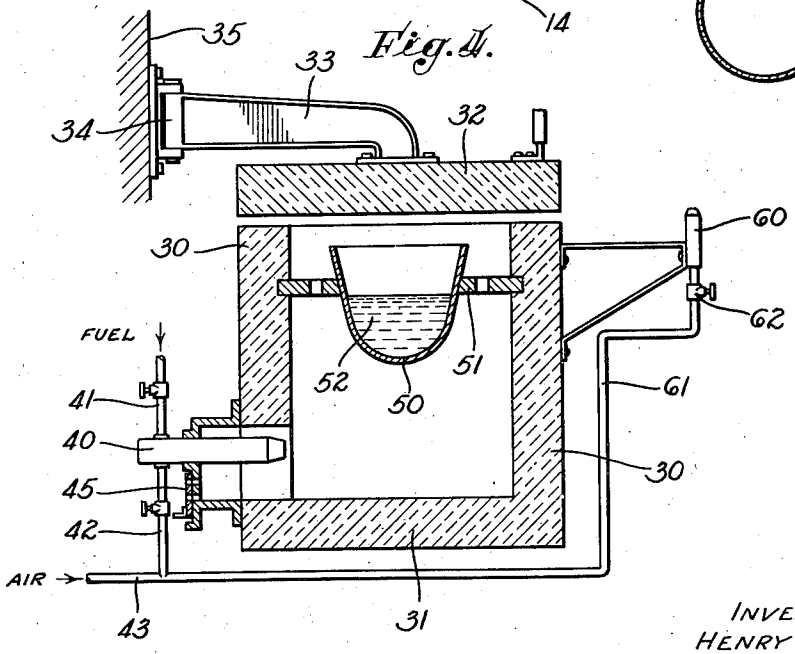


Fig. 4.



INVENTORS
HENRY H. CARY
WARREN P. BAXTER
BY
HARRIS, KIECH, FOSTER & HARRIS
Clarence F. Kiech
FOR THE FIRM
ATTORNEYS.