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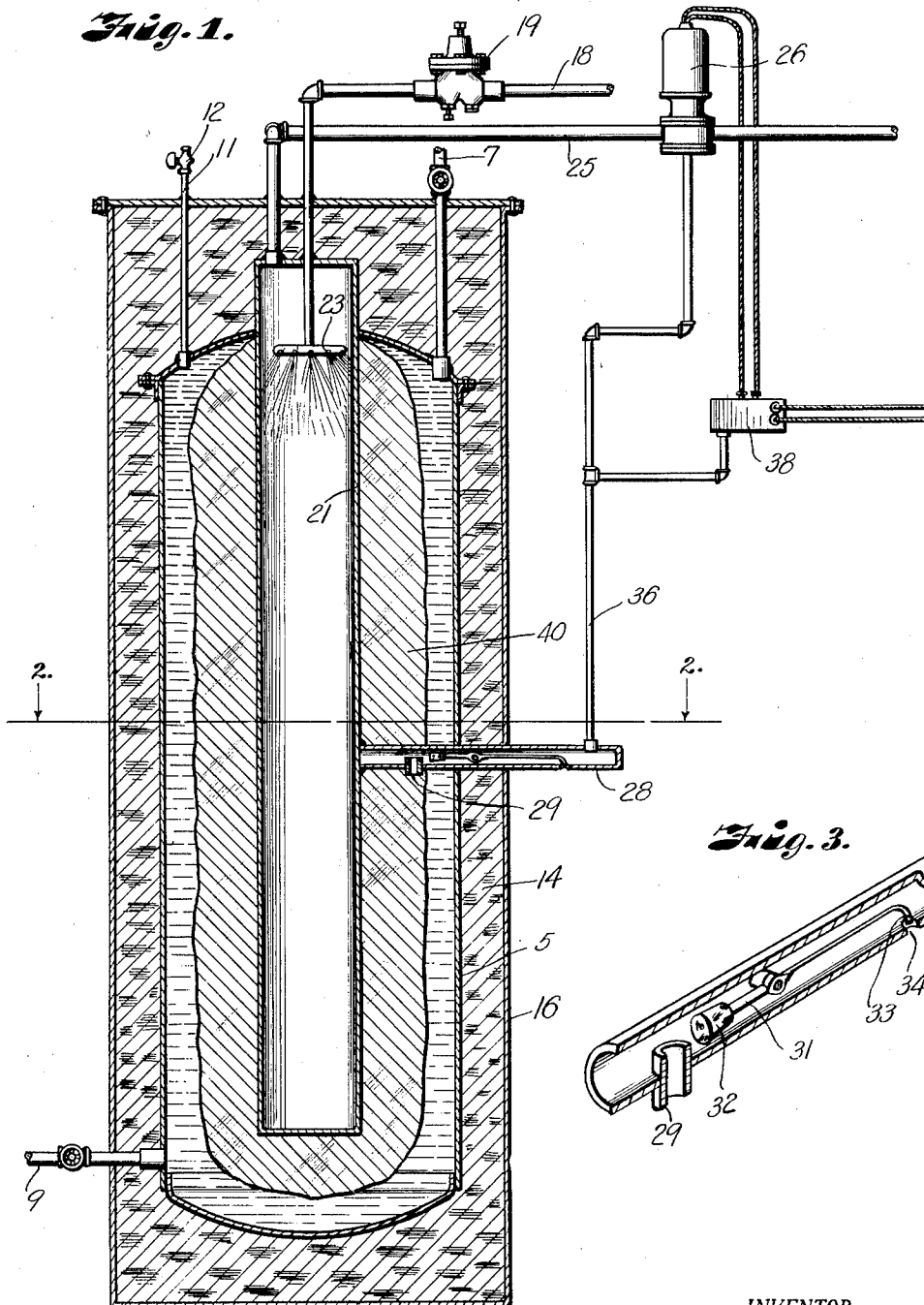
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1,937,698

WATER COOLING SYSTEM

Filed Dec. 29, 1930

2 Sheets-Sheet 1



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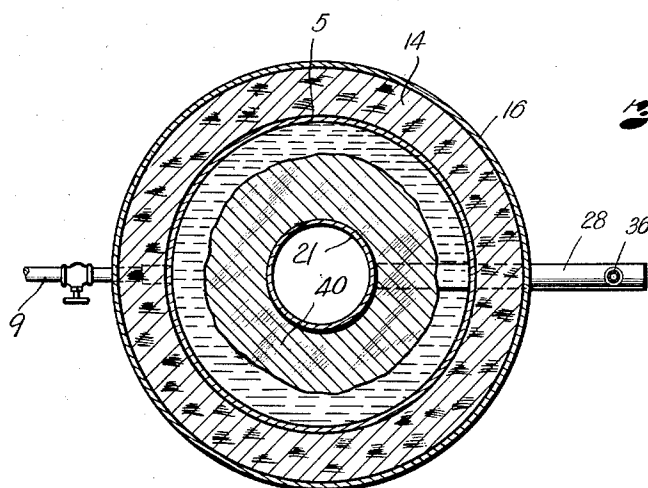


Fig. 2.

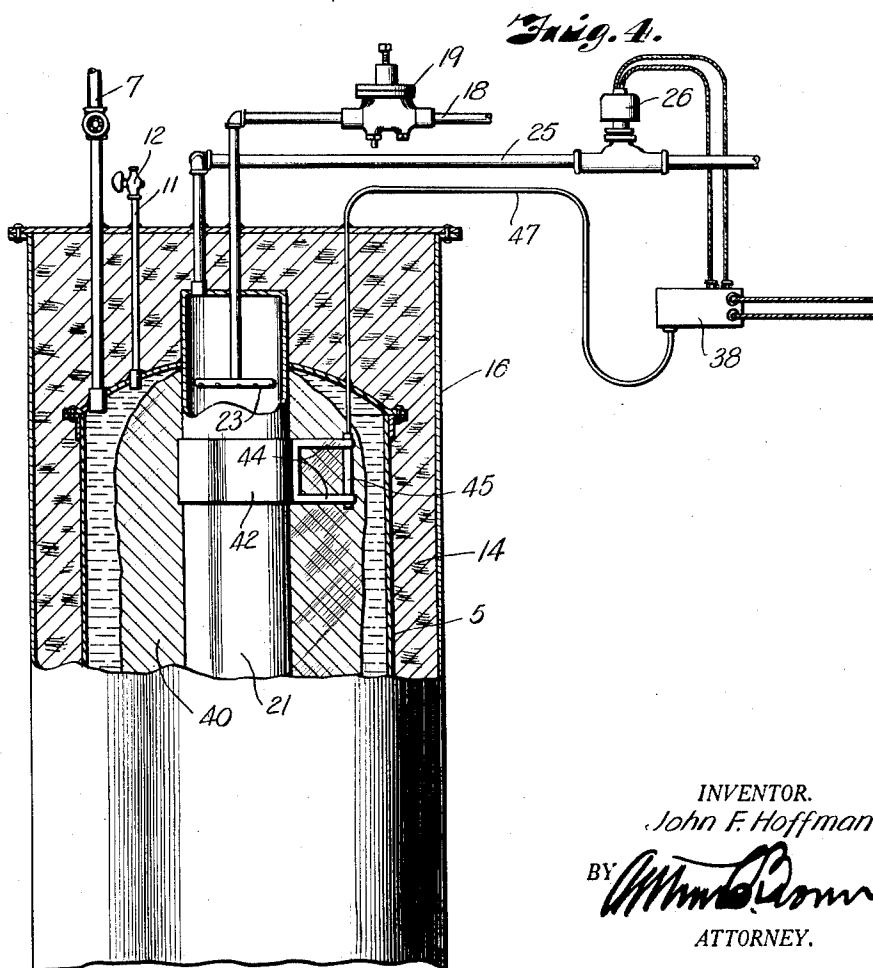


Fig. 4.

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UNITED STATES PATENT OFFICE

1,937,698

WATER COOLING SYSTEM

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Application December 29, 1930
Serial No. 505,348

2 Claims. (Cl. 62—2)

This invention relates to water coolers, and particularly a water cooler of the storage tank type. It is an object of this invention to produce a water cooler adapted to accommodate peak loads with a minimum size of refrigerating plant.

More particularly, the invention consists in the provision of a tank in which there are means of forming a limited amount of ice to cool water during times when the demand for water is at a maximum, and to build up a reserve supply of ice during the time when the demand for water is at a minimum.

These and other objects of the invention are accomplished by means of the following apparatus, in which:—

Fig. 1 is a vertical sectional view of the device.

Fig. 2 is a cross section on the line 2—2 of Fig. 1.

Fig. 3 is a detail view of the regulating tubing shown in Fig. 1.

Fig. 4 is a modification of the invention showing a variation in the regulating means.

In the drawings, in which like numerals indicate like parts throughout the several views, 5 is a water tank having an inlet 7 at the upper end and an outlet 9 at the lower end. A vent 11 controlled by the cock 12 is located at the top of the tank to permit the escape of gas accumulated in the top of the tank to the atmosphere. The tank 5 is packed in any heat insulating material 14 which is enclosed by a jacket 16.

The inlet 18 for the refrigerant leads through an expansion valve 19 and the head of the expansion chamber 21 to a refrigerant distributor 23. A return pipe or suction line 25 for the refrigerant is tapped into the head of the expansion chamber 21 and passes through a suction line control valve 26.

Attached to the side of the expansion tank 21 and passing through the water tank 5 and the jacket 16 is a regulating tube 28. The tube 28 has a port provided with a nipple 29 between the expansion chamber 21 and the tank 5. The details of the regulating tube are shown most clearly in Fig. 3. Pivotaly mounted in the tube 28 is a rod 31 having a cork float 32 secured at one end, and the opposite end of the rod is provided with a pointed portion 33 adapted to fit in the hole 34 for cleaning purposes.

Referring to Fig. 1, the tube 28 is in communication with the pipe 36 which leads in turn to the suction line control valve 26 and to a syphon operated switch 38. The suction valve 26 and the switch 38 maintain an operative position as long as there is pressure in the line 36.

Fig. 4 illustrates a slightly modified form of the invention showing a variation in the operating means for the switch 38 and the valve 26. In that figure, a metal band 42 surrounds the expansion chamber 21 and is attached thereto by any suitable means. The band has a pair of arms 44 projecting therefrom and holding at the outer end a tube 45 containing a volatile fluid subject to change of volume with changes of temperature. A tubing 47 leads to the syphon operated switch 38 which controls both the operation of the compressor and the suction line valve 26.

When sufficient ice has formed over the expansion chamber 21 to carry the peak load, the fluid in the tube 45 will contract to a sufficient extent to operate the switch 38, shut off the compressor and close the suction line valve 26. In other respects Figs. 1 and 4 are substantially alike.

In operation, the tank is filled by opening the valve controlling the inlet pipe 7 and admitting water into the tank 5. Any air in the tank can be vented through the cock 12. The pressure of the water will pass up through the nipple 29 and the pipes 36 to close the switch 38 and open the valve 26, the switch 38 starting the compressor and admitting refrigerant through the line 18.

The refrigerant distributor 23 allows the refrigerant to expand in the chamber 21, cooling it and the water surrounding it. When the temperature of the water drops to the freezing point, ice will begin to form on the outside of the expansion chamber 21. The crust of ice thereon will increase as the time for the maximum load to occur approaches. The ice will continue to form until it has covered the nipple 29 and shut off the supply of pressure to the switch 38 and the valve 26. The port 34 allows the escape of pressure and the throwing of the valve and switch so as to cut out the compressor and stop the freezing action.

It will thus be seen that the proper positioning of the port 29 in the form shown in Fig. 1, and the positioning of the tube 45 in the form shown in Fig. 4 governs to a large extent the amount of ice on hand at the peak loads.

In the form of apparatus shown in Fig. 1, the fluctuations in pressure, due to the water acting on the cork 32, cause vibration of the rod 31 which tends to keep the hole 34 open to atmosphere so that when the nipple 29 is surrounded by ice the port 34 will be open to allow the relief of pressure from the pipe 36.

What is claimed as new and desired to secure by Letters Patent is:

1. In a water cooler, a storage tank, an expansion chamber located centrally therein, a refrigerant supply line including an expansion valve connected to a refrigerant distributor in said expansion chamber, a refrigerant return line including a control valve connected to said expansion chamber, a metallic band surrounding said expansion chamber and having parallel arms running therefrom, a tube connected to said arms at their outer ends, a tubing joining said tube with a pressure-actuated switch, and means within said tube and tubing to actuate said switch to operate said control valve.

2. In a water cooler, a storage tank, an expansion chamber located centrally therein, a refrigerant supply line communicating with the expansion chamber, an expansion valve in the supply line, a refrigerant return line connected with the expansion chamber, a control valve in the return line, a metallic band surrounding said expansion chamber and having parallel arms extending therefrom, a tube connected to said arms, a tubing joining said tube with a pressure operated switch, and means within said tube and tubing to actuate said switch to operate said control valve.

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