

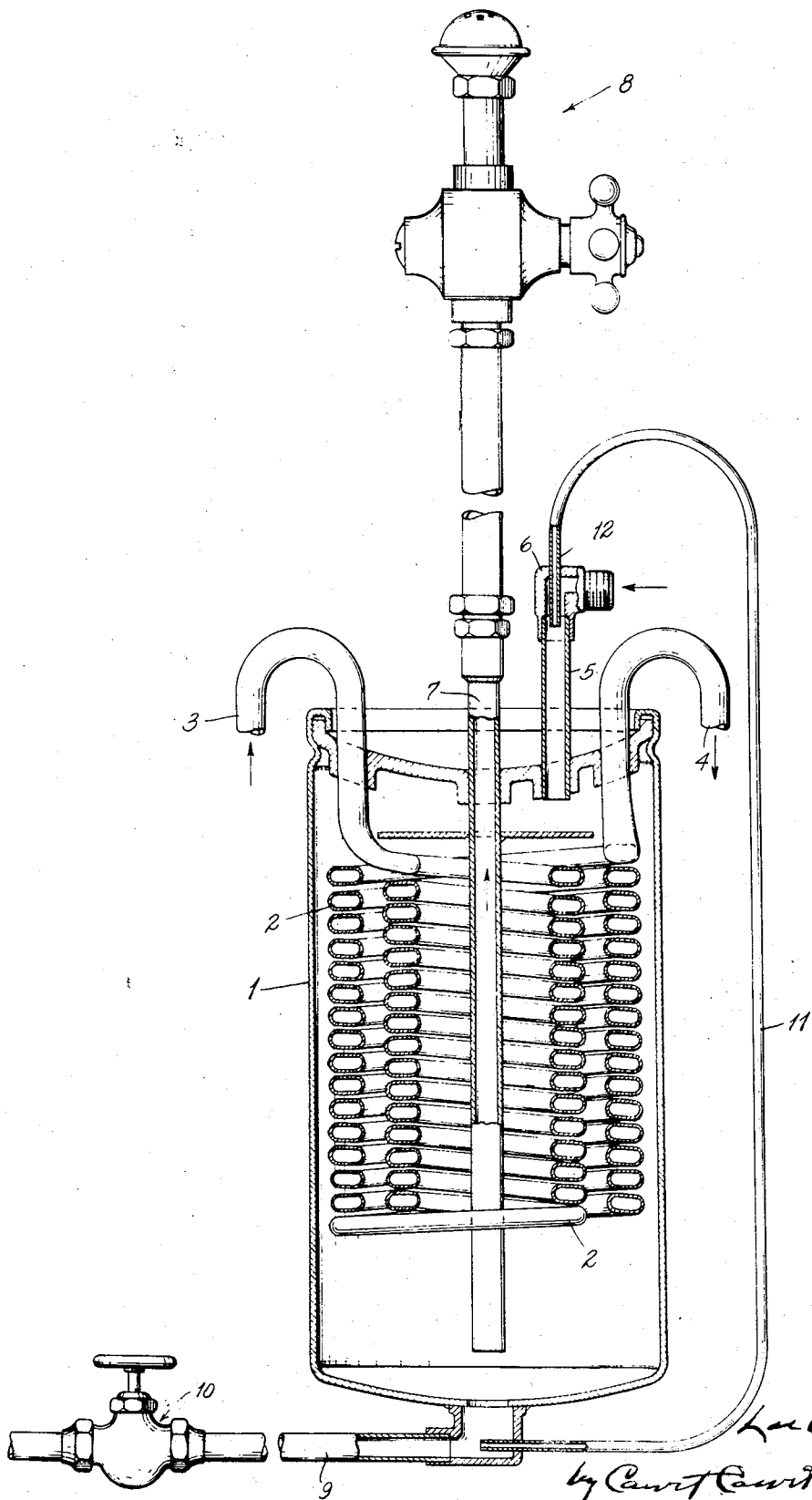
Jan. 30, 1940.

L. C. LOVE

2,188,574

REFRIGERATED LIQUID DISPENSER

Filed July 19, 1939



INVENTOR:

L. C. Love

by Carv Carv Carv

HIS ATTORNEYS.

UNITED STATES PATENT OFFICE

2,188,574

REFRIGERATED LIQUID DISPENSER

Lee C. Love, Columbus, Ohio, assignor to The
Ebco Manufacturing Company, Columbus,
Ohio, a corporation of Ohio

Application July 19, 1939, Serial No. 285,259

6 Claims. (Cl. 62—141)

This invention relates to refrigerated liquid dispensers, particularly mechanically refrigerated drinking water dispensers wherein the water is continuously supplied to a storage tank and is cooled therein by a compressor-condenser-expander circuit that is thermostatically controlled according to the temperature of the water in said tank and is dispensed therefrom through a valved outlet. A practical objection to this type of water dispenser is that excessive freezing of the water in the storage tank due to improper functioning of the refrigerating system may burst the tank and the resulting leakage of water may cause serious property damage. The object of the present invention is to provide a simple, efficient and economical means which will prevent the storage tank from bursting when the water freezes therein. The invention consists in an arrangement which will bring about a return flow of water from the storage tank to the water supply conduit therefor due to the increased pressure produced on the water in said tank by the formation of ice therein.

The accompanying drawing, which forms part of this specification and wherein like symbols refer to like parts wherever they occur, is a vertical central longitudinal section through a mechanically refrigerated liquid dispenser embodying my invention.

In the accompanying drawing my invention is shown embodied in a mechanically refrigerated drinking water dispenser comprising a closed storage container or tank 1 for accommodating the water to be cooled and a cooling coil 2 enclosed in said tank and constituting the expansion element of the well-known compressor-condenser-expander refrigerating circuit (not shown) whose operation is automatically controlled according to the temperature of the water in said tank. The expansion coil 2 is shown in the form of a double coil having refrigerant inlet and outlet pipes or conduits 3 and 4, respectively, that pass through the closed upper end of said tank and communicate with the upper ends of the inner and outer coils. The dispenser also includes an inlet pipe 5 that opens into the upper end of the storage tank through the top thereof and has a fitting 6 thereof for connection with a city water supply line (not shown) so as to furnish a continuous supply of water to said tank under pressure. The tank is also provided with a central outlet conduit or pipe 7 that extends upwardly from a point adjacent to the bottom of the tank, passes through the top of said tank and has a bubbler or other dispensing valve 8 thread-

ed thereon. The storage tank has a suitable drain or remote outlet conduit or pipe 9 that leads from the bottom thereof and is provided with a normally closed cut-off valve 10. In accordance with common practice the storage tank is usually enclosed in a suitable heat-insulated casing (not shown). The mechanically refrigerated liquid dispenser thus far described is well-known and it is considered unnecessary to illustrate it in detail.

With the above type of refrigerated liquid dispenser, when the water freezes in the storage tank 1 due to improper operation of the refrigerating system, the ice starts to form on the refrigerating coil 2, usually about three or four turns from the top of said coil and finally forms a baffle or partition in said tank that cuts off communication between the inlet pipe 5 above such ice and the water therebelow thereby preventing such water from being forced upwardly through the outlet pipe 7 by the pressure of the supply water. The ice formation or baffle then works upwardly and downwardly in the tank until it reaches the bottom thereof at which time the expansive force thereof will cause the tank to burst; and the resulting leakage of water is liable to cause considerable property damage unless the continuous water supply to the damaged tank is promptly cut off.

The present invention provides means for preventing the storage tank of the above mechanically refrigerated water dispenser from bursting when the water freezes in said tank. As shown in the drawing, said means comprises a by-pass conduit or pipe 11 which leads from the valved drain pipe 9 at the bottom of the storage tank and thence extends upwardly alongside of said tank clear thereof to a point thereabove where it terminates in a downwardly curved upper end portion 12 that opens into the city water inlet or supply pipe 5 for said tank above and exteriorly thereof. By this arrangement, when the water freezes in the tank in the manner above described and forms an ice baffle that cuts off communication between the upper and lower portions of the tank, the ice formation, as it moves downwardly towards the bottom of the tank creates a pressure on the water below said ice formation greater than the pressure of the water in the supply pipe and thus forces the water in the lower portion of said tank through the by-pass pipe 11 back into said water supply pipe. When the ice formation finally reaches the bottom of the tank it will have forced back into the supply pipe a quantity of water sufficient to relieve the pressure

in the tank and to prevent the same from bursting. Thus, the hereinbefore described arrangement permits freezing of the water in the tank without bursting thereof and without damage due to leaking water. As shown in the drawing, the by-pass tube is spaced from the tank a distance sufficient to prevent freezing of the water in said tube.

Obviously, various arrangements may be provided for relieving the pressure in the storage tank without departing from the invention. Therefore, I do not wish to be limited to the precise arrangement shown and described.

What I claim is:

1. A refrigerated liquid dispenser comprising a closed container for accommodating a liquid to be cooled and dispensed, a refrigerating element in said container, a liquid supply conduit opening into said container adjacent to one end thereof, a valved outlet conduit leading from said container, and a pressure relief conduit leading from the other end of said container to said supply conduit for establishing permanent communication therebetween.
2. A refrigerated liquid dispenser comprising a storage container for a liquid to be cooled and dispensed, a refrigerating coil in said container, a supply conduit opening into the upper portion of said container, a valved outlet conduit leading from said container, and a pressure relief conduit leading from the lower end of said container to said inlet conduit.
3. A refrigerated liquid dispenser comprising a storage container for a liquid to be cooled and dispensed, a refrigerating coil in said container, a conduit opening into said container adjacent to one end thereof for supplying liquid to said container under pressure, a valved outlet conduit leading from said container, and a conduit leading from the other end of said container to said supply conduit and adapted to return a portion of the liquid in said container to said supply

conduit when the pressure of the liquid in said container exceeds the pressure of the liquid in said supply conduit.

4. A refrigerated liquid dispenser comprising a storage container for a liquid to be cooled and dispensed, a refrigerating coil in said container, a supply conduit opening into one end of said container, a valved outlet conduit leading from said container, and a conduit leading from the other end of said container to said inlet conduit outside of said container and adapted to return a portion of the liquid in said container to said supply conduit when the pressure of an ice formation in said container on the liquid therein exceeds the pressure of the liquid in said supply conduit.

5. A refrigerated liquid dispenser comprising a storage container for a liquid to be cooled and dispensed, a refrigerating element in said container, a conduit opening into said container for supplying liquid thereto, an outlet conduit leading from said container, and a relief conduit leading from said container and adapted under excess pressure in said container due to ice formation therein to permit escape of liquid therefrom.

6. A refrigerated drinking water dispenser comprising a storage container for the water to be cooled and dispensed, a conduit opening into the upper end of said container for supplying water thereto under pressure, a valved outlet conduit leading from the lower portion of said container through the top thereof, a valved drain conduit leading from the bottom of said container, a refrigerating coil located in said container, and a conduit located outside and clear of said container and leading from said drain conduit to said supply conduit and adapted to by-pass water from said container to said supply conduit when the pressure of the water in said container due to ice formation therein exceeds that of the water in said supply conduit.

LEE C. LOVE.