Dec. 26, 1933. R. H. BREWER 1,940,741

APPARATUS FOR COOLING LIQUIDS

Filed May 18, 1931 2 Sheets-Sheet 1

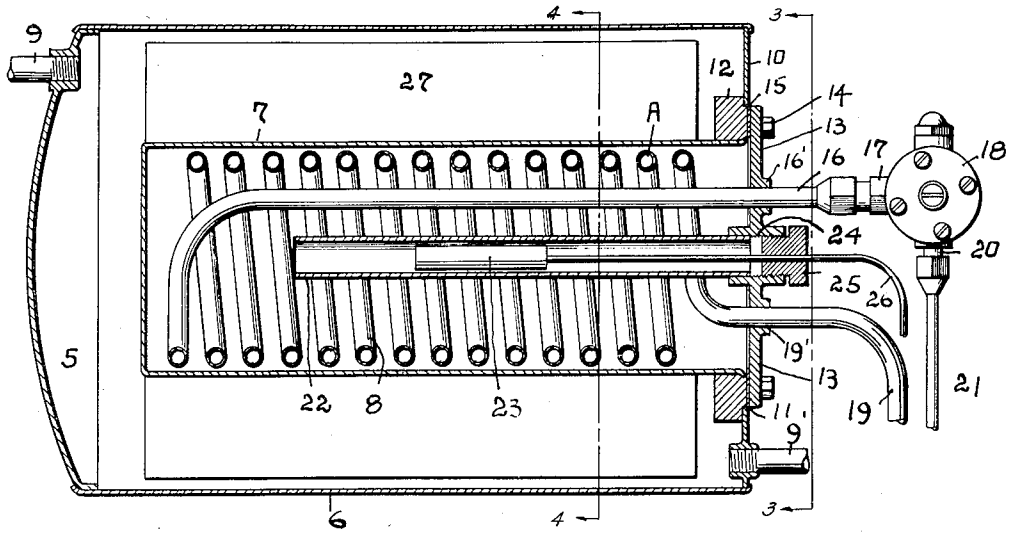


Fig. 1.

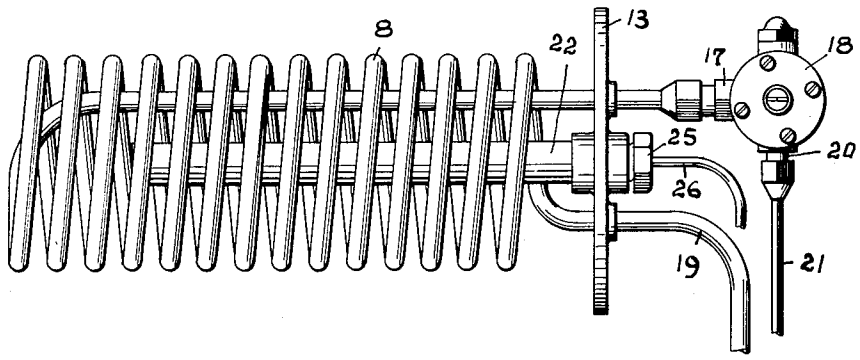


Fig. 2.

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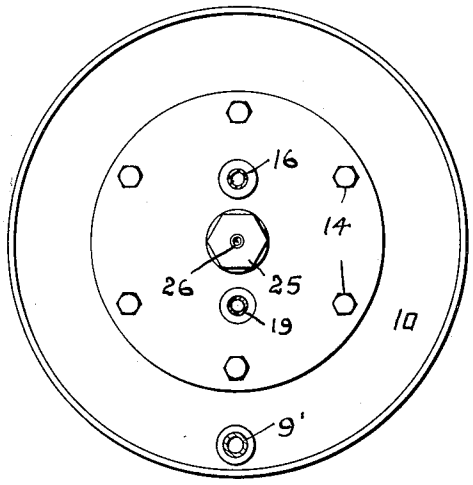


Fig. 3.

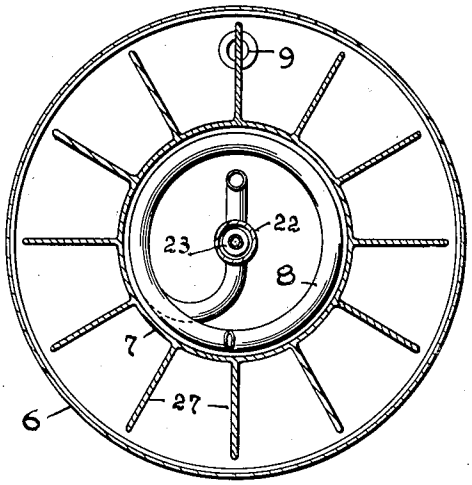


Fig. 4.

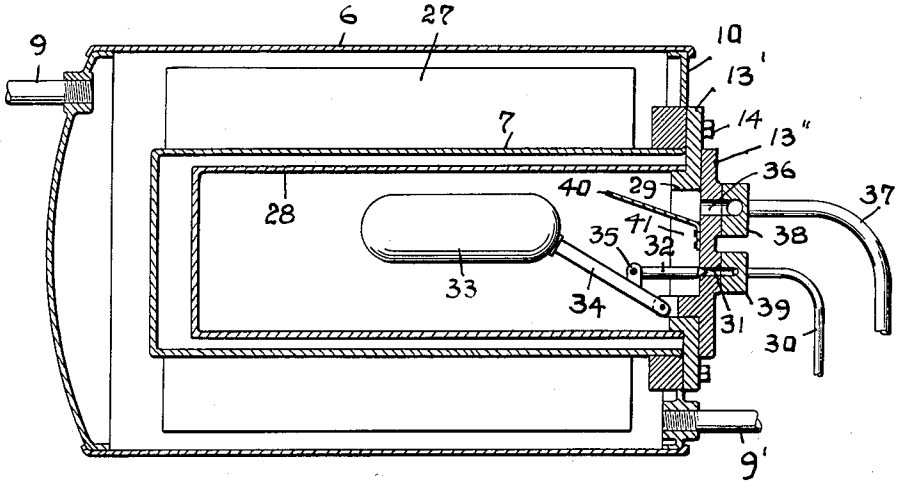


Fig. 5.

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UNITED STATES PATENT OFFICE

1,940,741

APPARATUS FOR COOLING LIQUIDS

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Application May 18, 1931. Serial No. 538,117

3 Claims. (Cl. 62—141)

My invention relates to apparatus for cooling liquids, particularly water delivered under pressure to and from a drinking fountain, as where the latter is connected to the public water system. The demands made on such apparatus are very heavy at times, and in order to insure an adequate supply of cool water it is necessary to employ chemical refrigerants which would have a deleterious effect upon patrons should there be any contact between the supply of water and the refrigerant. The general object of the present invention is to provide a cooling unit which is so separated from the water to be cooled that all danger of the refrigerant coming in contact with the drinking water, due to a break in the cooling unit, or other causes, will be obviated. A further object of my invention is to mount the cooling unit on the removable head of the cooling tank so that the unit may be readily installed and is readily removed intact.

Other and more detailed objects of the invention will be apparent as the specification is read in connection with the accompanying drawings, in which Fig. 1 shows a longitudinal section through the assembled cooling unit; Fig. 2 a cooling coil disconnected from its tank; Figs. 3 and 4 are cross sections on lines 3—3 and 4—4, respectively, of Fig. 1; and Fig. 5 shows a modified form of cooling unit embodying my invention.

Referring more particularly to the drawings the numeral 5 denotes generally a cooling apparatus adapted for installation in a drinking fountain or the like, not shown. The apparatus comprises an outer water tank or cylinder 6 connected with a source of water supply and an inner cylinder or shell 7 which contains the cooling coil 8. Water to be cooled is delivered, to tank 6, through pipe 9 direct from the water main, not shown, and is dispensed from pipe 9'. The front end wall 10 of tank 6 is formed with a large central opening 11 of slightly greater diameter than that of the cylinder or shell 7, and the latter is positioned axially of the opening 11 with its open end projecting into the said opening and flush with outer face of end wall 10. A heavy steel ring 12 which surrounds the open end of shell 7 and is welded thereto, is also welded to the end wall 10, thus connecting these parts together. A head 13 seats against the outer face of ring 12 and is secured thereto by bolts 14, the ring being suitably bored for this purpose. A gasket 15 is preferably employed to insure a sealing fit between the ring and head.

The shell 7 houses the cooling coil 8 one end 16 of which extends through opening 16' in the head 13 and connects with the outlet 17 of an expansion valve 18 and the other end 19 passes through an opening 19' and connects with the inlet side of a compressor, not shown, and thence communicates with the inlet 20 of the expansion valve through pipe 21. A well or tube 22 for housing a thermostatic element 23, is supported at one end in the inner end of a hollow boss 24 formed centrally of the head 13 and is preferably secured by welding. The outer end of boss 24 is internally threaded to receive an externally screw-threaded plug 25, through which a tube 26 leading from the element 23 extends and connects with a thermostat, not shown. The appliances just described may be of any known type or kind adapted to supply the cooling coil 8 with a liquid refrigerant, and preferably I use mechanism whereby refrigerating operations are controlled automatically, either by the pressure or temperature pressure produced in the system.

The shell 7 is filled or partially filled with brine, and metal fins 27 soldered to and radiating from the shell facilitate the heat transfer between the brine in the shell and the water in the outer chamber or tank 6.

Assembly of the refrigerating unit disclosed in Fig. 2 can be accomplished readily by sleeving the pipes 16—19 and 26 through the head 13 and connecting the expansion valve 18 to pipe 16. This assembly thus becomes a unit which can be inserted in or withdrawn from the shell 7 without the necessity of disconnecting any of the parts. Should a leak occur in the coil 8 or other part of the cooling unit within the shell 7, the water in the surrounding chamber or tank 6 will not be contaminated.

The modified form of invention disclosed in Fig. 5 is very similar to the preferred form just described, but differs in the employment of a "boiler" in lieu of the coil unit disclosed in the preferred embodiment. Thus, a shell or cylinder 28 commonly called a boiler is welded to an internal flange 29 formed on a head member 13', and extends within the cylinder shell 7 in spaced relation thereto, the space between the two shells being filled or partially filled with brine solution. Thus, the boiler 28 becomes an integral part of the head 13' and can be readily removed for repairs or where it becomes desirable to insert a refrigerating coil unit such as disclosed in Figs. 1 and 2. An auxiliary head member 13'' welded to the head 13' closes the opening 41 therein.

Liquid refrigerant is forced under pressure by a compressor, not shown, through pipe 30 to inlet opening 31 in the auxiliary head 13'' in communi-

cation with the interior of the boiler. The inlet opening 31 is controlled by a needle valve 32 actuated by a float 33 pivotally connected to the head 13'' by means of a lever 34 which in turn connects with the needle valve by means of a short arm 35. As the refrigerant boils or becomes gassified by the exchange of heat between the brine and the drinking water, it escapes in gaseous form through outlet opening 36 in auxiliary head 13'' and thence back to the compressor through outlet pipe 37. Coupling members 38 and 39 for connecting the respective pipes 37 and 30 to the auxiliary head are preferably welded to the latter. A baffle member 40 prevents the refrigerant from boiling over or escaping in liquid form.

It will be obvious that the tank 6 and cylinder 7 could be made of rectangular shape and that in such construction the ring 12 and cover member would also be rectangularly shaped.

What I claim, is:

1. In a cooling device, a tank having an opening at one end, a cylinder situated within said tank, means secured to the tank and to the cylinder for supporting the latter, a cover member for closing said opening, a cooling unit carried by said cover and situated within said cylinder and means for detachably connecting the cover member to said supporting means.

2. In a cooling device, a tank having an opening in one end wall, a cylinder within said tank in spaced relation thereto, means connecting said end wall and said cylinder together and forming a support for the cylinder, and a cover for said opening detachably connected to said means, and a cooling unit carried by said cover and situated within said cylinder.

3. In a cooling device, a tank having a substantially circular opening in one end wall thereof, a cylinder open at one end positioned within said tank, said cylinder being of less diameter than the diameter of said opening, and having its open end axially aligned therewith, a ring member connecting said end wall and the open end of said cylinder tightly together and forming a support for the cylinder, a cover member for the opening, a cooling unit carried by said cover and situated within said cylinder, and means for detachably connecting the cover member to said ring.

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