Nov. 7, 1933. G. MUFFLY 1,934,371

MECHANICALLY REFRIGERATED WATER COOLER

Filed Feb. 6, 1930

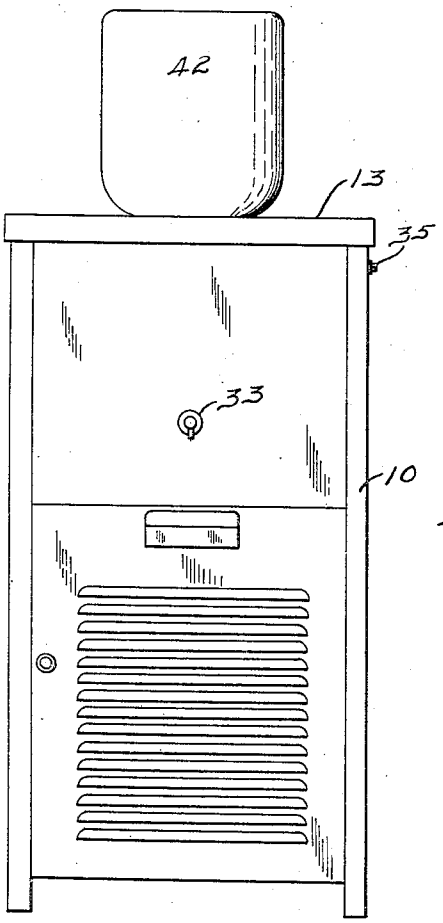


Fig. 1.

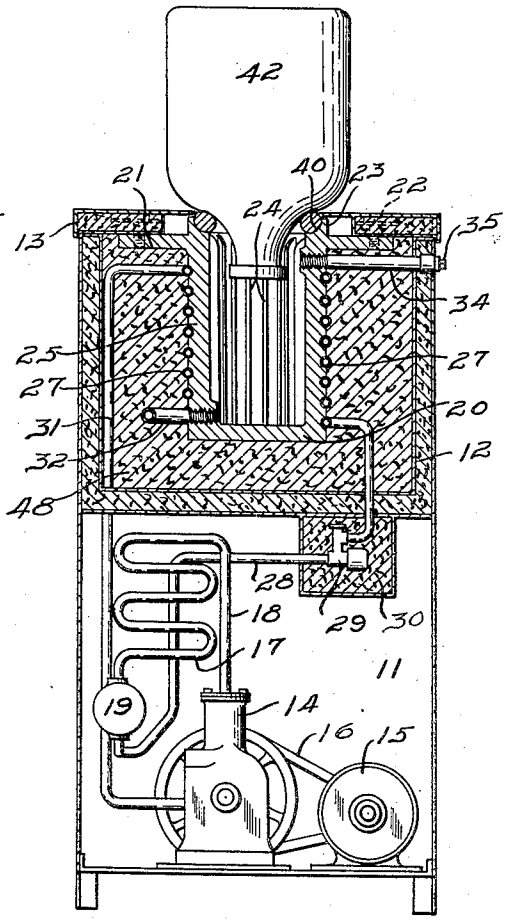


Fig. 2.

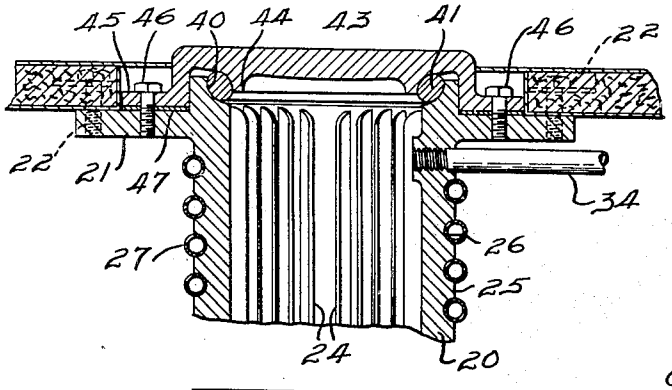


Fig. 3.

INVENTOR
Glenn Muffly.
BY
Harness, Dickey, Pierce & Mann
ATTORNEYS.

Patented Nov. 7, 1933 1,934,371

UNITED STATES PATENT OFFICE

1,934,371

MECHANICALLY REFRIGERATED WATER COOLER

Glenn Muffly, Detroit, Mich., assignor to Copeland Products, Inc., Detroit, Mich., a corporation of Michigan

Application February 6, 1930. Serial No. 426,209

11 Claims. (Cl. 62—141)

This invention relates to water coolers and particularly to that type thereof provided with mechanical refrigeration, the principal object being the provision of a new and novel construction that is simple in design, efficient in operation and economical to operate.

Another object is the provision of a water cooler of the type described so formed as to enable it to employ as a source of water either a bottle or the pressure mains of municipal water supply systems.

Another object is to provide a water cooler of the type described having a water container of novel formation.

Another object is to provide, in a water cooler of the type described, an inner water container having a top opening adapted to receive a gasket, the gasket serving as a bottle support when a bottle is employed as the source of water, and the gasket adapted to cooperate with a cover for sealing the top opening of the water container when it is desired to employ a supply of water under pressure from a water system instead of a bottle.

Another object is to provide, in a device of the type described, a water container having interior and exterior heat interchange ribs extending in directions transversely disposed relative to each other.

Another object is to provide a water container for a mechanically cooled water cooler in which the container is provided with external helically arranged ribs between which the cooling element of the refrigerating system is located.

A further object is to provide a cap of novel construction for closing the open end of a water container.

Other objects will be apparent in the following specification, reference being had to the accompanying drawing, in which:

Fig. 1 is a front elevation of a mechanically refrigerated water cooler.

Fig. 2 is a vertical sectional view taken centrally through the water cooler shown in Fig. 1 in a plane parallel to the front face thereof.

Fig. 3 is a fragmentary enlarged sectional view taken centrally through the upper end of the water container shown in Fig. 2, and in which the top of the container is shown as being closed by a cap which is provided when it is desired to use water under pressure from a municipal or other water system instead of from a bottle.

Referring to the drawing, I show a cabinet indicated generally as at 10. As indicated in Fig. 2, the cabinet 10 is interiorly formed to provide a lower chamber 11 and upper chamber 12. The top of the cabinet is provided with a removable cover or top 13. The walls of the chamber 12, as well as the cover 13, are formed to include insulating material in order to prevent a material amount of heat transfer therethrough.

In the bottom chamber 11 may be positioned any conventional type of refrigerating mechanism, such as that illustrated, comprising a compressor 14 driven from an electric motor 15 through the belt 16, a condenser 17 connected to the discharge side of the compressor 14 by means of the duct 18, and the receiver 19 connected to the discharge side of the condenser 17.

Within the chamber 12 is located a water container 20 having a full-diameter opening at its top and provided adjacent its top with a radially extending annular flange 21; and this may be secured to the under side of the cover 13 by means of bolts 22 or other suitable means, in case the container is to be dependently supported, as shown. The cover 13 is provided with a central aperture 23 through which the upper end of the illustrated cylindrical container projects into substantially flush relationship with respect to the upper surface of the cover 13. The inner surface of the container 20 is shown as provided with a plurality of vertically disposed radially inwardly projecting ribs 24. The outside of the container 20 is preferably provided with outwardly extending ribs 25, which in reality are formed as a single rib arranged in a helix from the bottom of the container 20 to a point slightly below the flange 21. The ribs 25 are preferably so formed that a section taken perpendicularly to their length discloses a semi-circular groove 26 between them, as best shown in Fig. 3. Within the helical groove 26 is wound the cooling or expansion element 27 which is preferably formed from metallic tubing and which accordingly is of helical formation. The bottom end of the cooling element is connected to the receiver 19 by means of a line of tubing such as 28, an expansion or other control valve 29 preferably being inserted in the tubing 28 exterior to the chamber 12 as shown in Fig. 2, and preferably independently insulated as at 30. The upper or discharge end of the expansion element 27 is connected by the tubing 31 with the intake side of the compressor 13 as shown.

The bottom end of the container 20 is shown as connected by a tube such as 32 with a discharge valve such as 33 (see Fig. 1) located on an exterior face of the cabinet 10. Adjacent the top of the container 20 a threaded pipe such as 34

is shown as threaded into an opening in the side wall of the same and extending out into substantially flush relationship with the side of the cabinet 10, where it may be closed by means such as a removable plug such as 35 when a bottle is employed as a source of water supply.

The top of the container 20 is formed to provide an annular shoulder 40 of arcuate shape in section and extending from the inner face of the container 20 outwardly and upwardly therefrom. On this shoulder 40 is received an annular gasket member 41 which is preferably circular in cross section. When a bottle such as 42 is employed as the source of water, the neck of the bottle is inserted downwardly into the container 20 with the flared portion at the base of the neck thereof resting against the gasket 41 which acts to seal the bottle to the container.

When it is desired to employ water under pressure from city or other mains the bottle 42 is removed and means such as a cap 43, shown in Fig. 3, is employed for sealing the upper end of the container 20, and the plug 35 in the pipe 34 is removed and a connection made at this point with the city water supply. The cap 43 as indicated in Fig. 3 is of somewhat inverted cup shape so as to fit over that portion of the container 20 projecting above the upper face of the flange 21. The cap 43 is shown as internally provided with an integral annular rib or shoulder 44 formed somewhat to the shape of that portion of the bottle 42 which engages the gasket 41 when the bottle is employed. The cap 43 is shown as further provided with an integral outwardly extending annular flange portion or external shoulder 45, through which bolts such as 46 are adapted to extend into threaded engagement with the flange 21 on the container 20. An annular gasket such as 47 is preferably provided between the flange 45 and the flange 21 so that when the bolts 46 are drawn up, not only will the gasket 41 be compressed, but the gasket 47 will also be compressed, thereby providing a double seal against leakage of water from the container 20 when water under pressure from city mains is employed.

It is preferable, in order to obtain maximum efficiency in the operation of the water cooler, that the space between the walls of the chamber 12 and the exterior of the container 20 be filled with an insulating material such as 48, thereby reducing the heat transfer losses from the evaporator 27 to a minimum.

From the above it will be apparent that I have provided a water cooler which is equally adaptable for a water supply from a bottle or from the mains of the city water supply system. It will also be apparent that this is accomplished in a very economical manner inasmuch as the same gasket may be employed for sealing either a bottle to the container or a cap to the container, and that where such cap is necessary when water under pressure is employed a double seal is provided for preventing possible leakage of the water from the container. It will also be apparent that by forming the helical groove in the container 20 and winding the coils of the evaporator 27 into the groove a maximum amount of the surface of the evaporator 27 is in direct metallic contact with the container 20 which insures a maximum rate of heat transfer between the evaporator 27 and the water in the container, and this insures a high rate of cooling for the device. By forming the interior rib 24 transversely to the direction of the rib 25, I am enabled to further increase the rate of heat transfer, inasmuch as it tends to equalize the transfer of heat better between the top and bottom limits of the water container. By keeping the expansion valve 29 exterior to the chamber 12 it is made relatively easily accessible and is accessible without disturbing any of the parts within the chamber 12, and by insulating it separately from the chamber 12, I am further enabled to cut down the heat interchange losses which would otherwise occur due to the expansion of the refrigerant within the expansion valve.

These and other formal changes may be made in the specific embodiment of the invention described without departing from the spirit or substance of the broad invention, the scope of which is commensurate with the appended claims.

What I claim is:

1. In a mechanically refrigerated water cooler, a metallic container open at its top and externally embraced by a cooling element, said container having a circularly arranged integral shoulder at its open end, a gasket received on said shoulder and adapted to seal the open end of said container by co-operation with either a bottle received in said end or by a cap closing said end, and a cap provided with means for its retention in engagement with said gasket in the absence of said bottle.

2. In a mechanically refrigerated water cooler, a water container embraced by a cooling element and provided with a pair of openings for introducing water into said container from either of two sources, said openings being respectively a full-diameter top opening and an opening which extends through a side wall of said container, one of said openings being provided with an internal annular gasket carrying shoulder, and a cap closing the opening to one of said sources.

3. In a mechanically refrigerated water cooler, a water container embraced by a cooling element, a pair of openings in said container for introducing water into said container from either of two sources, one of said openings being a full-diameter top opening provided with an internal annular gasket carrying shoulder, and a cap adapted to close the opening to one of said sources and to be sealed against leakage by a gasket compressed between it and said shoulder.

4. In a mechanically refrigerated water cooler, a water container and an associated cooling element, said water container being open at one end, an annular shoulder formed on said container internally thereof, an annular shoulder formed on said container externally thereof, a cap closing said open end, and a gasket associated with each of said shoulders and compressed against said container by said cap, said gasket being positioned suitably to engagement by a bottle, upon the removal of said cap.

5. In a mechanically refrigerated water cooler, a water container having a full-diameter opening in its top, a refrigerating element operatively associated with said container, said container having an annular internal shoulder at its open end and an annular external shoulder, a cap closing said open end and arranged to compress a gasket between it and said external shoulder, said internal shoulder forming a seat for receiving said gasket favorably to the support of a bottle when said cap is removed.

6. In a mechanically refrigerated water cooler, a container arranged to receive water from either of two supply sources, a refrigerating element co-

operatively associated with said container, one of said sources comprising a bottle, a full-diameter top opening being provided directly in said container for receiving said bottle, an annular shoulder about said opening, a gasket received on said shoulder for sealing said shoulder when said bottle is received thereon, and a cap having a surface corresponding with a portion of the surface of said bottle, to be secured to said container and compress said gasket to seal said opening when the other of said sources is being employed.

7. A water cooler comprising a cover, a one-piece heat exchanging container having an inlet opening at its upper end and there provided with both an integral flange element for the dependent support of said container by said cover, said container having an integral shoulder element adjacent said opening and having a ring disposed thereon for the support of a bottle thereabove, said container also being provided with an alternative inlet opening, a closure for said inlet opening for employment alternately with said bottle, and a closure for said alternative opening for employment when said bottle is employed.

8. A water cooler comprising a cover, a one-piece heat exchanging container having an inlet opening at its upper end and there provided with both an integral flange element for the dependent support of said container from said cover, and an integral shoulder element for the support of a bottle thereabove, a compressible ring upon said shoulder element and a closure for engagement with said ring when said bottle is not employed.

9. A water cooler comprising a cover, a one-piece heat exchanging container having an inlet opening at its upper end and there provided with both an integral flange element for the dependent support of the container from said cover and an integral shoulder element for the support of a bottle thereabove, a compressible ring for said shoulder and a cap-shaped closure for said inlet opening to be secured to said flange when said bottle is not in position upon said shoulder.

10. A water cooler comprising a cover, a one-piece heat exchanging container having an inlet opening at its upper end and provided with both an integral flange element for the dependent support of said container from said cover and an integral shoulder element in the plane of said cover for the support of a bottle thereabove, a flexible ring disposed upon said shoulder, and a closure for employment alternately with said bottle and comprising a cap-shaped part for engagement with said ring and for attachment to said flange.

11. A water cooler comprising a one-piece cylindrical container provided at its top with a full diameter inlet opening surrounded by an integral ring receiving shoulder and a flange, a cover for said water cooler for engagement with said flange for supporting said container, an alternative inlet opening below said flange, a flexible ring for said shoulder surrounding said inlet opening, a cap for engagement with said ring, and means for securing said cap rigidly against said flange.

GLENN MUFFLY.