May 29, 1945. W. M. GREENE 2,377,296

WATER AND LIKE COOLER

Filed Sept. 10, 1943 2 Sheets-Sheet 1

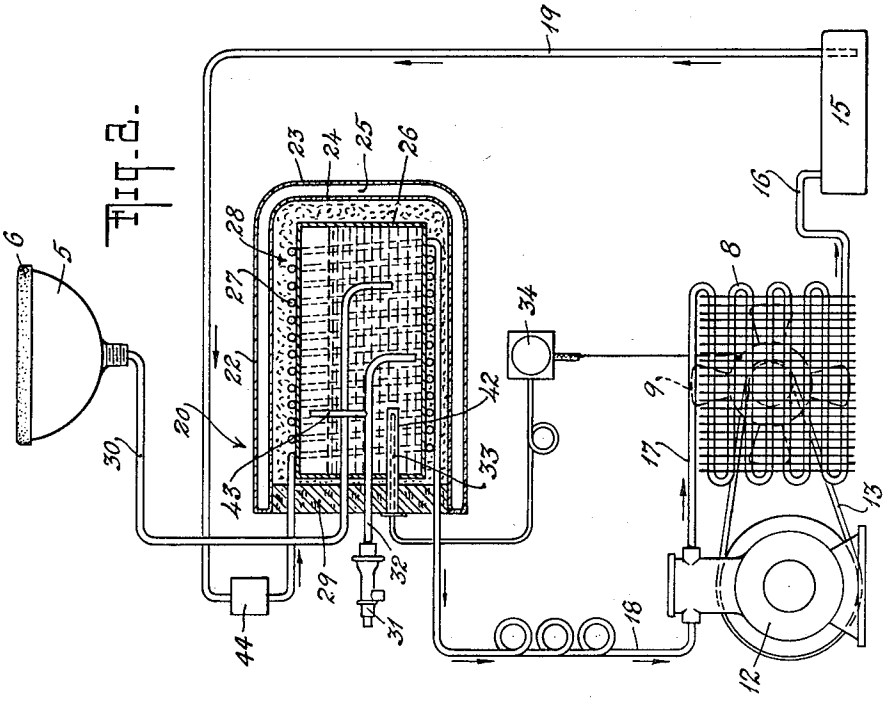


Fig. 2.

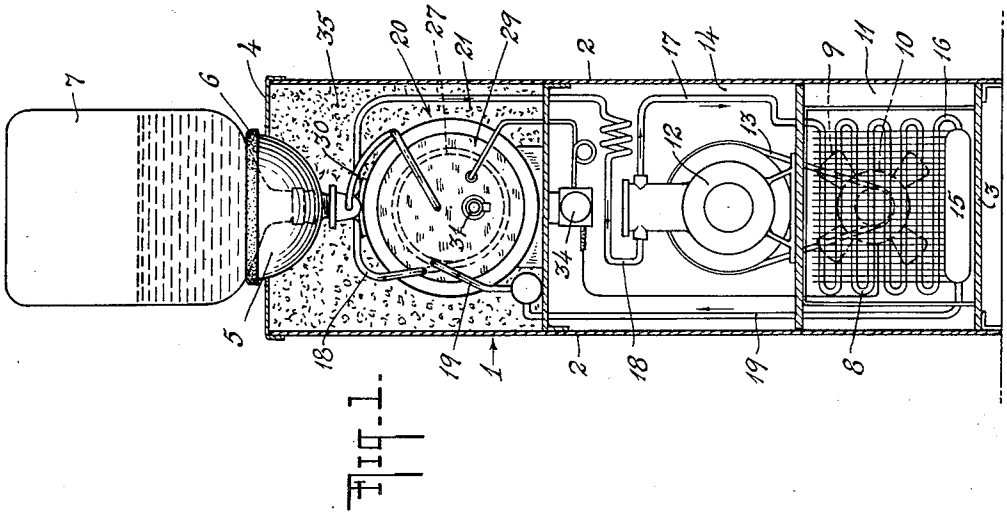


Fig. 1.

WITNESS
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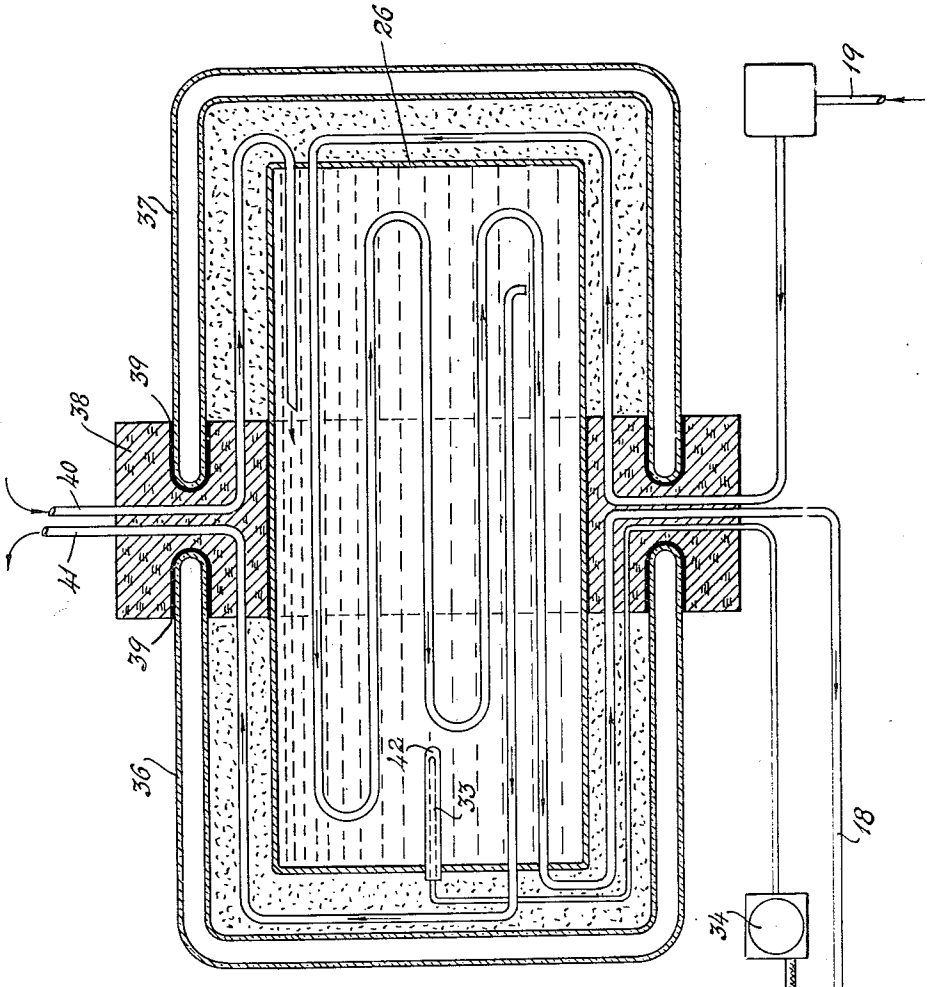


FIG. 3.

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WATER AND LIKE COOLER

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Application September 10, 1943, Serial No. 501,779

4 Claims. (Cl. 62—141)

This invention relates to coolers for water and the like.

The object of the invention is to supply water-dispensing units with cooling systems wherein the cooling portions of the devices are securely sealed against the admission of foreign matter and in which the power consumed is reduced to a minimum, especially during periods in which water is not withdrawn from the coolers, thus, for instance, during night-time, when no demand for cool water exists.

In the drawings, Fig. 1 is a front sectional view of a water cooler arranged to provide water; Fig. 2 is a diagrammatic showing of the apparatus contained in the cooler of Fig. 1 viewed from the right side of Fig. 1; Fig. 3 is a diagrammatic showing of a modification of an installation in which connection is made to a water service line.

The cabinet 1 is provided with side walls 2—2, bottom wall 3, top cover plate 4, and a face plate (not shown). The top plate 4 is provided with an enlarged opening through which projects a stainless steel bowl 5 provided with the usual rubber cushion ring 6 and supporting the bottle of water 7 in reversed position.

The cabinet carries a water-cooling system, comprises the condenser 8, fan 9 and motor 10, located in the bottom compartment 11 of the cabinet, and a compressor 12 driven by the belt 13 from the motor 10, which compressor is located in the compartment 14 immediately above the compartment 11. A suitable liquid receiver 15 is connected by the tubing 16 with the condenser 8 and the condenser is connected by suitable tubing 17 with one side of the compressor 12; tubing 18 connects the other side of the compressor with one side of the low side of the cooling system and the tubing 19 connects the other side of the low side of the cooling system with the liquid receiver 15. A cooling unit 20 is located in the compartment 21 immediately above the compartment 14. The cooling unit 20 comprises a unitary, self-contained member in which all of the parts can be assembled as a single, unitary, sealed structure transportable and installable as such and utilized over long periods of time without disturbing the relation of the several parts. The unitary, sealed structure, by reason of its construction, requires a minimum operation of the moving parts of the cooling system for the production of cooled water of a temperature between 44 and 50° F., which enables the apparatus to function over long periods of time without excessive wear, and the reduction of servicing, which is a very important factor in connection with operating water coolers in factories, plants and offices.

The unitary, sealed structure comprises a chamber 22 made of glass or other suitable insulative material, provided with walls 23, 24 and a vacuum space 25. A receptacle 26 made of ceramic material or stainless steel, for holding water or other liquid, is positioned entirely within the chamber 22 and is preferably of the sealed type in order that the liquid contained therein cannot escape therefrom. The refrigerating tubing 27 connected with the tubing 18 and 19, is located either within the receptacle 26 or coiled on the outside thereof, as illustrated in Fig. 2. An expansion valve 44 is interposed between the liquid receiver and the tubing 27. A suitable insulating material 28, such as glass wool, is packed between the inner wall 24 and the wall of the receptacle 26. The chamber 22 is closed and sealed at its open end by a suitable block of material 29 such as cork. The bowl 5 communicates through the tubing 30 with the interior of the chamber 22 and the tube deposits liquid from the bowl 5 and the bottle 6 within the receptacle 26. The faucet 31 communicates through the section of tubing 32 with the interior of the receptacle 26. A thermostat bulb 33 connected with the electric switch 34 controls the operation of the motor 10.

It is preferred to mount the bulb 33 in a metallic well 42 which well is mounted in an aperture in the receptacle 26 and secured therein by soldering or otherwise. The metallic well member 42 is preferably mounted in the sealing material 29 (which, as illustrated, constitutes a disc of cork firmly fitting in place and preferably cemented therein to form a tight seal), with its free end extending within the receptacle 26. The sections of tubing 30, 32 pass through suitable perforations in the sealing material 29.

The source of water supply is located above the unitary, sealed structure and by reason of its hydrostatic pressure keeps the receptacle 26 filled excepting for such air as may be trapped in the upper portion of the receptacle. The water supply tubing 30, the water outlet tubing 32 and the coils of the tubing 27 all pass through and are supported by the closure 29. The insulating material 35 may be packed around the unit in the compartment 21.

The structure thus defined and the relation of the parts reduces heat leakage into the system to a high degree. In fact it has been found that with a six degree temperature differential setting of the thermostat to maintain the liquid in

the receptacle at a temperature of approximately 44°, there is a saving of approximately 50% of the operating time of the motor. In the periods, particularly at night when no demands for cool water exist, the motor has been observed to be inoperative for periods of from four to eight hours, whereas in the usual cooling system the motor under like conditions is usually operative in periods of less than two hours each. The construction of the unitary, sealed structure and the increased efficiency of the high side operations of the device, increase the capacity of the system for delivering cooled water.

In the construction shown it is only necessary to remove the B. t. u.'s from the water, contained immediately in the water receptacle, due to the perfect insulation of the water receptacle by the surrounding thermos vacuum container and the sealing of the unit against the admission of heat to the interior thereof. This invention is a vast improvement over the present conventional method of packing the low side unit in a bed of rock or glass-wool, ground cork or other suitable insulating material through which heat absorbed from the air through the side walls of the cooler passes into the water cooler tank and refrigerating tubing thereby greatly increasing the heat load to be eliminated by the high side of the refrigeration system.

A modification of the invention is shown in Fig. 3, incorporating the advantages of this invention and intended for connection with the service line of a water-main. In this modification the chamber **20** comprises two vacuum sections **36**, **37**, the open ends of which face, and are united by an annular cork insulating ring or the like **38**, which is provided on both its faces with annular recesses **39** into which the ends of the vacuum members **36**, **37** fit and wherein they are cemented to form a sealed union. The tubing **19** is connected with the liquid receiver **15** and the tubing **18** is connected to one side of the compressor **12**. The service line for the admission of water is connected to the tubing **40**, whereby water is admitted to the water receptacle **26** and the tubing **41** is connected to the faucet **31**. The pressure in the service line is sufficient to keep the water receptacle **26** substantially full at all times.

In order to insure constant flow of water from the faucet **31**, an air bleeder **43**, in the form of a section of tubing is connected to the tubing **32** located within the receptacle **26** and extends to the upper portions of the receptacle. When the faucet **31** is opened water as well as air will be drawn from the level above the water in the receptacle **26**.

I claim:

1. In a water or other beverage cooler, a cooling unit comprising a pair of chambers, each chamber having spaced side and bottom walls and a substantial vacuum in the space between said walls, the open ends of said chambers facing toward each other, a connecting member embracing the open ends of said chambers and connecting and sealing the same, a receptacle within said chambers, refrigerating means within said unit and in proximity to said receptacle, means to admit water or other beverage into said receptacle and means to withdraw water or other beverage from said receptacle.

2. In a water or other beverage cooler, a refrigerating system of the type including a compressor and condenser, a source of water or beverage supply, a unitary sealed cooling unit comprising, a water or beverage receptacle located within said unit, refrigerating coils positioned, with respect to said water or beverage receptacle, in heat exchange relation, a double walled vacuum chamber having an open end, the ends of the walls thereof being permanently sealed together, said vacuum chamber being spaced from said coils, insulating material between walls of said receptacle and the inner walls of said vacuum chamber, said insulating material overlying said coils, a closure member spanning and closing said open end of the vacuum chamber, tubing connecting said water or beverage supply source with the interior of said receptacle, tubing connecting said refrigerating coils with the compressor and condenser, a discharge faucet, tubing connecting said discharge faucet with the interior of said receptacle, the connecting tubing from said source of supply, said coils and said discharge faucet all passing through the body of said closure member.

3. In a water or other beverage cooler a refrigerating system of the type including a compressor and condenser, a source of water or beverage supply, a unitary sealed cooling unit comprising, a water or beverage receptacle located within said unit, a double walled vacuum chamber having an open end, the ends of the walls of said vacuum chamber being permanently sealed together and positioned in spaced relation about the water or beverage receptacle, refrigerating coils positioned, with respect to the interior of said receptacle, in heat exchange relation, insulating material between the inner wall of said vacuum chamber and walls of said water receptacle and over said refrigerating coils, a closure member spanning and sealing said open end, tubing connecting said water or beverage supply source with the interior of said receptacle, tubing connecting said refrigerating coils with the compressor and condenser, a discharge faucet, tubing connecting said discharge faucet with the interior of said receptacle, the connecting tubing from said source of supply, said coils and said discharge faucet all passing through the body of said closure member.

4. In a water or other beverage cooler, a refrigerating system of the type including a compressor and condenser, a source of water or beverage supply, a unitary sealed cooling unit comprising, a water or beverage receptacle, vacuum means surrounding said receptacle throughout the major portions thereof in spaced relation to said receptacle, said vacuum means comprising spaced permanently sealed double walls, a closure member overlying said receptacle and spanning and closing the space which said vacuum means do not surround, insulating packing in the space between the inner walls of said vacuum means and walls of said receptacle, refrigerating coils positioned with respect to said receptacle to cool the water or beverage contained therein, tubing connecting said water or beverage supply source with the interior of said receptacle, tubing connecting said refrigerating coils with the compressor and condenser, a discharge faucet, tubing connecting said discharge faucet with the interior of said receptacle, the connecting tubings for the said coils and said discharge faucet all passing through the body of said closure member.

WILLIAM M. GREENE.