United States Patent

[11] 3,584,472

[72] Inventor **Carl E. Sholtes**
Columbus, Ohio

[21] Appl. No. **828,264**
[22] Filed **May 27, 1969**
[45] Patented **June 15, 1971**

[73] Assignee **Westinghouse Electric Corporation**
Pittsburgh, Pa.

[54] **BOTTLED-WATER COOLER**
8 Claims, 2 Drawing Figs.

[52] U.S. Cl. **62/394,** 62/399
[51] **Int. Cl.** **B67d 5/62**
[50] **Field of Search** 62/390, 394, 395, 397, 399

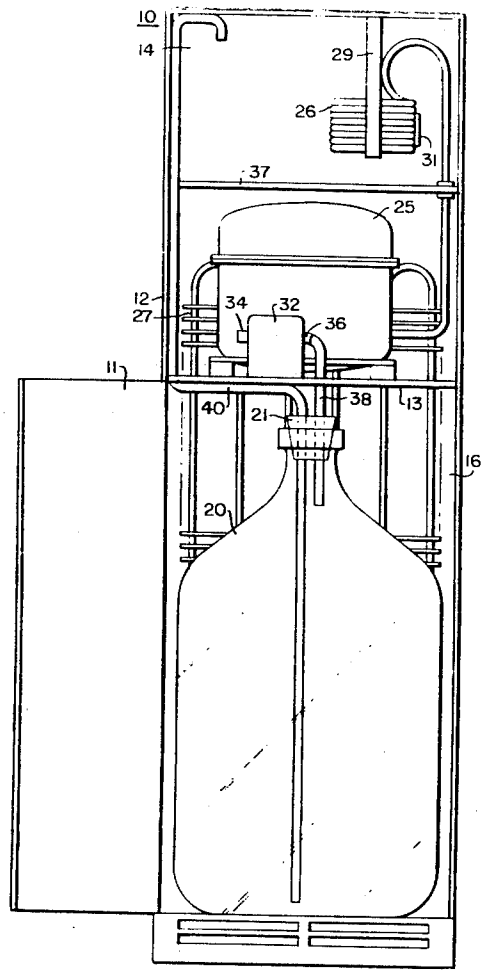
[56] **References Cited**

UNITED STATES PATENTS

3,088,289	5/1963	Alex	62/397 X
3,179,292	4/1965	Terry	62/390 X
3,367,133	2/1968	Dreis	62/390
3,495,612	2/1970	Moreland	62/394 X

Primary Examiner—Meyer Perlin
Attorneys—F. H. Henson and E. C. Arenz

ABSTRACT: A bottled-water cooler enclosed in a cabinet containing a replaceable water container in a lower compartment, a refrigerator unit and an electrically actuated air pump in an upper compartment. The pump pressurizes the air in the container to force the water therein to an elevated reservoir in the upper compartment. The reservoir is separated into two tanks by a partition wall having an aperture therein providing fluid communication between the tanks. The air pump is actuated by a float in one tank sensing the level of water therein, the water from the container being initially delivered to this tank. Refrigeration coils are disposed within the other tank to cool the water therein to a predetermined temperature. Each tank is equipped with a gravity flow valve faucet for dispensing the water therein under the influence of the head of water developed in the tanks and at their respective temperatures.



PATENTED JUN 15 1971

3,584,472

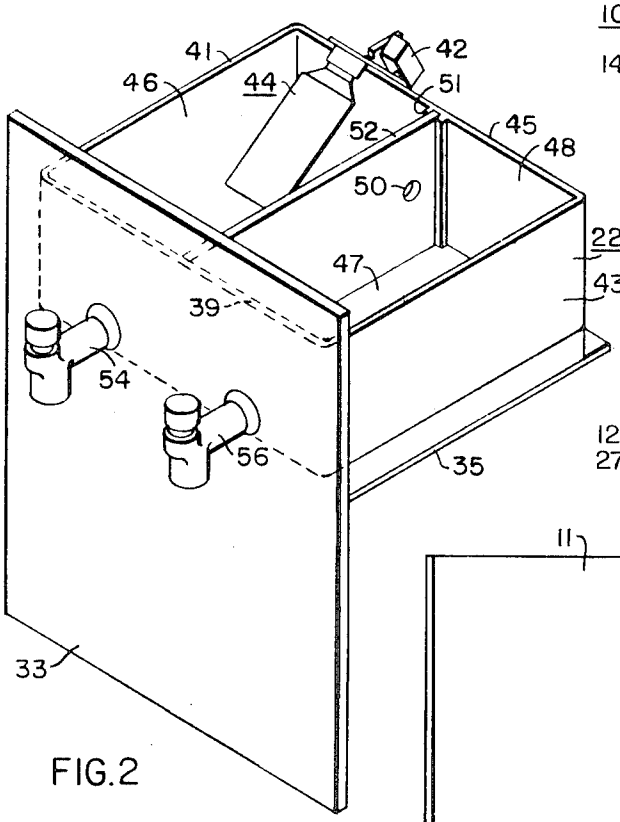


FIG. 2

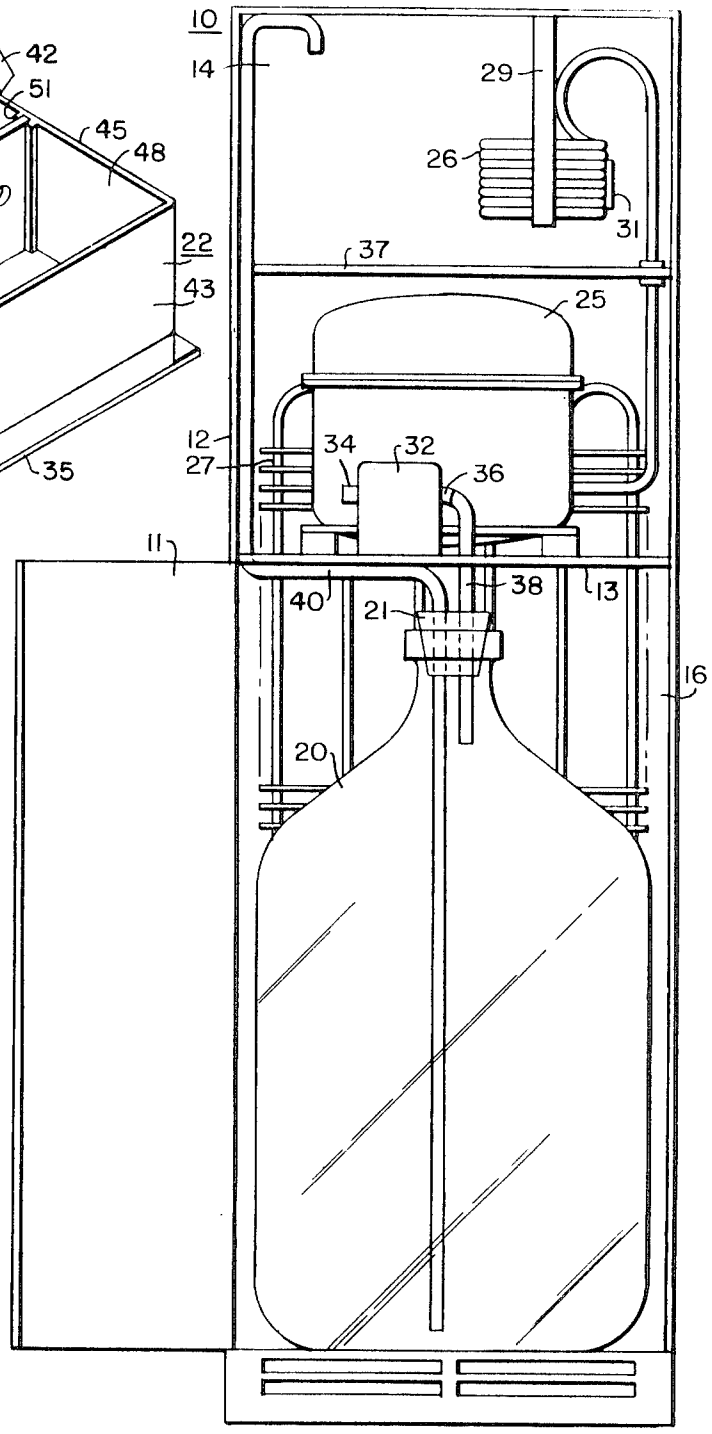


FIG. 1

WITNESSES

Fred Williams

Richard S. Sheldon

INVENTOR

Carl E. Sholtes

BY Edward C. Arenz

ATTORNEY

BOTTLED-WATER COOLER

BACKGROUND OF THE INVENTION

This invention relates to a bottled-water cooler having a cabinet containing refrigerating means and valve means for dispensing refrigerated water from a replaceable water container. More specifically this invention relates to a water cooler of the above type where the replaceable container is positioned within the cabinet and hidden thereby.

Generally, bottled-water coolers are characterized by a cabinet supporting an inverted bottle of water on its top which empties into an interior refrigerated tank and is dispensed therefrom through some faucet means. Ordinarily, the cabinet contains an electrical refrigeration mechanism including a compressor, evaporator and condenser, as is well known in the art, for automatically maintaining the water in the tank at the desired temperature.

Recent advances in the field have included the use of a second tank in which the refrigeration effects are minimized so as to provide a source of unrefrigerated water. The water in this second tank can then be used for cooking purposes such as coffee, tea, hot chocolate, soup, etc., without requiring heating of previously refrigerated water. Such a bottled-water cooler is disclosed in U.S. Pat. No. 3,367,133.

Another recent advance in the field has been the provision of a water cooler wherein the replaceable water container was positioned interiorly of the cabinet and in a lower compartment, thereby eliminating the difficulties inherent in replacing an empty container with a heavy and unwieldy full container and improving the overall outward appearance of the cabinet. A cooler such as this is disclosed in U.S. Pat. No. 3,333,438.

Although both types of coolers discussed above presented certain advances, each had definite disadvantages limiting their usefulness, i.e., replacing the inverted full glass bottle on top of a cooler took some dexterity and strength and did not lend itself to be readily used in a household environment, in addition to being generally unattractive, whereas the cooler having a hidden container would require a second water circuit, similar to the one provided, to adapt it to provide water at different temperatures.

An object of the present invention is to provide a water cooler of the type having a hidden replaceable container in the cabinet and capable of dispensing water at a faster rate than the pumping rate for replacing the water, thereby permitting the use of a relatively low cost pump.

Another object of the invention is to provide a container of the above type having separate tanks for dispensing water at different temperatures.

A still further object of the present invention is to provide an inexpensive and compact water cooler having a generally attractive appearance and which can be used in the standard cabinets now in use.

SUMMARY OF THE INVENTION

The present invention is embodied in a cabinet of dimensions similar to those now used and which is generally divided into a top compartment and a bottom compartment. A glass bottle containing water is placed in the lower compartment and has a stopper in its neck so that the bottle is able to be slightly pressurized. A low cost electrically actuated air pump such as is used in home aquariums is connected to the bottle by a conduit through the stopper. Another conduit is placed through the stopper, into the water in the container, the other end being disposed in an elevated reservoir in the upper compartment. The reservoir is divided into two tanks by a wall partition having a generally centrally located aperture An electrically actuated refrigeration system is also enclosed in the cabinet with the evaporator coils disposed within one of the tanks, and a float connected to a switch controlling the pump is located in the other tank. Each tank has a gravity flow valve faucet in the lower portion for dispensing the water.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevational view of the water cooler with the upper panel and tanks removed; and

FIG. 2 is a perspective view of the upper panel and tanks.

DETAILED DESCRIPTION OF THE INVENTION

The water cooler **10** of the present invention is embodied in a generally rectangular cabinet **12** of a well-known construction having a horizontal shelf **13** attached interiorly to the walls of the cabinet **12** and generally dividing the cabinet **12** into an upper compartment **14** and a lower compartment **16**. A door **11** coextensive with the lower compartment **16** is hingedly attached along one side of the front of the cabinet **12** providing access to the lower compartment **16** of the cabinet. A water supply container **20**, is situated in the lower compartment. Container **20** is generally a glass bottle having a relatively small neck and opening at the top thereof, and, in the present invention, has a stopper **21** in the opening permitting the bottle to be pressurized interiorly.

Two flexible plastic tubes **38** and **40** extend into the bottle **20** through longitudinal bores in the stopper **21**. Tube **38** is a compressed air tube leading from the pressure air outlet of a low pressure electrically actuated pump **32** which is supported in the upper compartment **14** on shelf **13**. Air tube **38** extends just into the interior of the bottle **20**. The remaining tube **40** provides a water conduit and extends from adjacent the bottom surface of the interior of bottle **20** through the stopper **21** to the upper compartment **14**, terminating a short distance from the uppermost interior surface of compartment **14** as shown in FIG. **1**. Both tubes **38** and **40** are provided with extra length in the lower compartment **16** so that bottle **20** can be removed therefrom for purposes of replacement without disturbing the tubes as held in the stopper **21** or in the upper compartment **14**.

Pump **32** is relatively inexpensive electrically actuated low pressure air pump such as a vibrating diaphragm or reciprocatory piston type used in home aquariums for pumping air into the water. Pump **32** has an ambient air inlet **34** and a pressure air outlet **36** on which compressed air tube **38** is coupled.

A conventional electrically actuated refrigeration unit such as shown in U.S. Pat. No. 3,333,438, for example, is also generally situated within the upper compartment **14** and comprises a hermetically sealed motor and compressor unit **25** positioned on shelf **13**, condenser **27** disposed in a vertically extending plane at the rear of the cabinet **14** and connected to the compressor unit **25**, and evaporator coils **26** connected to the condenser **27** by way of a capillary tube which meters the flow of the refrigerant therein and reduces its pressure to provide cooling in the evaporator coils **26**. The evaporator coils **26** are secured depending from the upper interior surface of compartment **14** supported by a U-shaped strap member **29** as is shown in FIG. **1**. The refrigeration means has a temperature sensing thermostat **31** disposed adjacent the coils **26** for controlling the refrigeration unit as is well known in the art.

The upper compartment **14** has a front panel **33** generally coextensive with the front of the compartment. A horizontally extending support member **35** is secured to the rear face of panel **33**, generally in the upper portion thereof. Support member **35** projects rearwardly a sufficient distance to rest on a cross member **37**, extending across the rear opening of the upper compartment **14**, when panel **33** is assembled in cabinet **12**. A water reservoir **22** of any suitable material such as stainless steel plastic, or porcelainized metal, is held resting on member **35** and comprises a front wall **39**, sidewalls **41** and **43**, rear wall **45** and bottom **47**. Front wall **39** abuts the rear face of panel **33** and has threaded apertures in the lower portion concentric with apertures through panel **33**. Water outlet means comprising gravity flow valves **54** and **56** such as Fast Flow Valve No. 1 Long, manufactured by the Reid Valve Co. of Monrovia, California, for example, are threadably secured in the reservoir **22** through panel **33** and wall **39**, so that the

interior of reservoir 22 is in fluid communication with the exterior of the cooler through the valves.

Reservoir 22 is partitioned into two separate tanks by a common wall 52 parallel to sidewalls 41 and 43 and extending between front wall 39 and rear wall 45 dividing reservoir 22 into a first tank 46 and a second tank 48 of generally equal capacities.

Wall 52 is supported in position by insertion into channels 51 formed in the front and rear wall of reservoir RESERVOIR 22. A substantially centrally located hole 50 in wall 52 provides a restricted flow passage between the first and second tanks.

A float means 44 attached to the rear wall 45 of the first tank 46, is disposed within tank 46 and operates a switch means 42 within predetermined limits as is well known in the art. Switch means 42 in turn controls pump 32 so that pump 32 is, in effect, responsive to the float means 44.

When the front panel 33 carrying the reservoir 22 is assembled in the cabinet 12, he depending refrigeration coils 26 will be disposed in the second tank 48, directly cooling the water therein.

On startup of the unit, the float 44 is at its lowermost limit in which position the switch 42 to pump 32 is closed and pump 32 is actuated delivering compressed air through tube 38 to the container 20. The pressure in the container 20 is raised to a point sufficient to raise the water to the reservoir through conduit 40 where it is delivered to the first tank 46 containing the float 44. The water continues to rise in this tank until it reaches the height of the hole 50 whereupon it flows into the second tank 48 until it also reaches that level and thereafter the water in the two tanks continues to rise equally until the float reaches an upper predetermined position opening the switch 42, stopping the pump and thereby stopping the delivery of the water to the tanks.

The thermostat 31 upon sensing the relatively warm water in tank 48 starts the refrigeration unit so as to cool the water in tank 48 through the coils 26 to a predetermined temperature, providing refrigerated water in that tank. Water in either tank can then be used and drawn at a rate depending only upon the valve opening of the gravity flow valves 54, 56, and the height of the water above the valve. When the water level in the reservoir is lowered to a predetermined point, the float 44 will again close the pump switch 42 thereby initiating water feed from the container 20. It is evident that with this arrangement the capacity of the pump to deliver water to the reservoir does not effect the rate of flow when it is dispensed through the valves.

Because of the hole 50 in the common partition wall 52, it is apparent that one tank cannot be thermally insulated from the other, and the temperature in both tanks will tend to be lower than the temperature of the water as delivered from the container 20. However the water in tank 48, having the evaporator coils disposed therein will be lower than in tank 46 solely because of its proximity to the coils, therefore providing relatively cold water in tank 48 and only cool water in tank 46. The cool water in tank 46 provides water for use in cooking and also a prechilled source for the refrigeration water in tank 48, thereby increasing the capacity of the unit to deliver cold water.

I claim:

1. A water cooler having a cabinet generally divided into an upper compartment and a lower compartment and enclosing a refrigerated water supply means comprising:

a replaceable water supply container in said lower compartment;

a water reservoir in said upper compartment, said reservoir partitioned into a first tank and a second tank being in fluid communication and heat transfer relationship with each other;

refrigeration means including cooling coil associated with said second tank, for cooling the water in said second tank to a predetermined low temperature and through said heat transfer relationship cooling the water in said first tank to a somewhat higher temperature than said low temperature of said second tank;

means for raising water in said container to said reservoir;

water outlet means communicating with the lower part of said first and second tanks for dispensing water therefrom whereby water is generally stored at separate reduced temperatures to increase the capacity of the cooler to provide cool water.

2. A water cooler according to claim 1 wherein: said water supply container comprises a pressure bottle; and

said means for raising water in said container comprises;

a low pressure electrically actuated air pump having an ambient deliver inlet and a pressure air outlet in communication with said pressure bottle to delivery compressed air thereto; and

water conduit means disposed in said bottle and in communication with said reservoir to convey water from said bottle to said reservoir.

3. A water cooler according to claim 2 including:

switch means associated with said low pressure air pump for controlling electrical actuation of said pump;

float sensing means disposed in said first tank and attached to said switch means for sensing the level of water in said reservoir and thereby controlling said switch means to actuate the pump in accordance with a predetermined position of said float means.

4. A water cooler according to claim 3 wherein:

said first and second tanks are in fluid communication through a restricted flow passage connecting them; and,

said cooling coils of said refrigeration means are disposed in said second tank.

5. A water cooler according to claim 4 wherein:

said first tank and said second tank have a common partition wall; and

said restricted flow passage comprises a hole through said wall.

6. A water cooler according to claim 5 wherein said water outlet means comprises gravity flow valves, at least one of said valves associated with each of said tanks, said valves being in fluid communication with the lower part of said tanks.

7. A water cooler according to claim 1 wherein said water outlet means comprises a gravity flow valve.

8. A water cooler having a cabinet generally divided into an upper compartment and a lower compartment and enclosing a refrigerated water supply means, comprising:

a replaceable pressure container in said lower compartment and having a supply of water therein;

a water reservoir in said upper compartment, said reservoir having a generally centrally located wall partitioning said reservoir into a first tank and a second tank; said tanks being in fluid communication with each other through a hole in said wall, said partition also providing a heat transfer relationship between said tanks;

refrigeration means having cooling coils, said coils disposed in said second tank for cooling water therein to a predetermined low temperature and through said heat transfer relationship cooling the water in said first tank to a somewhat higher temperature than said low temperature of said second tank;

means for raising water in said bottle to said reservoir; and,

water outlet means in the lower part of said first and second tanks for dispensing water therefrom,

whereby water is provided at generally separate reduced temperatures.