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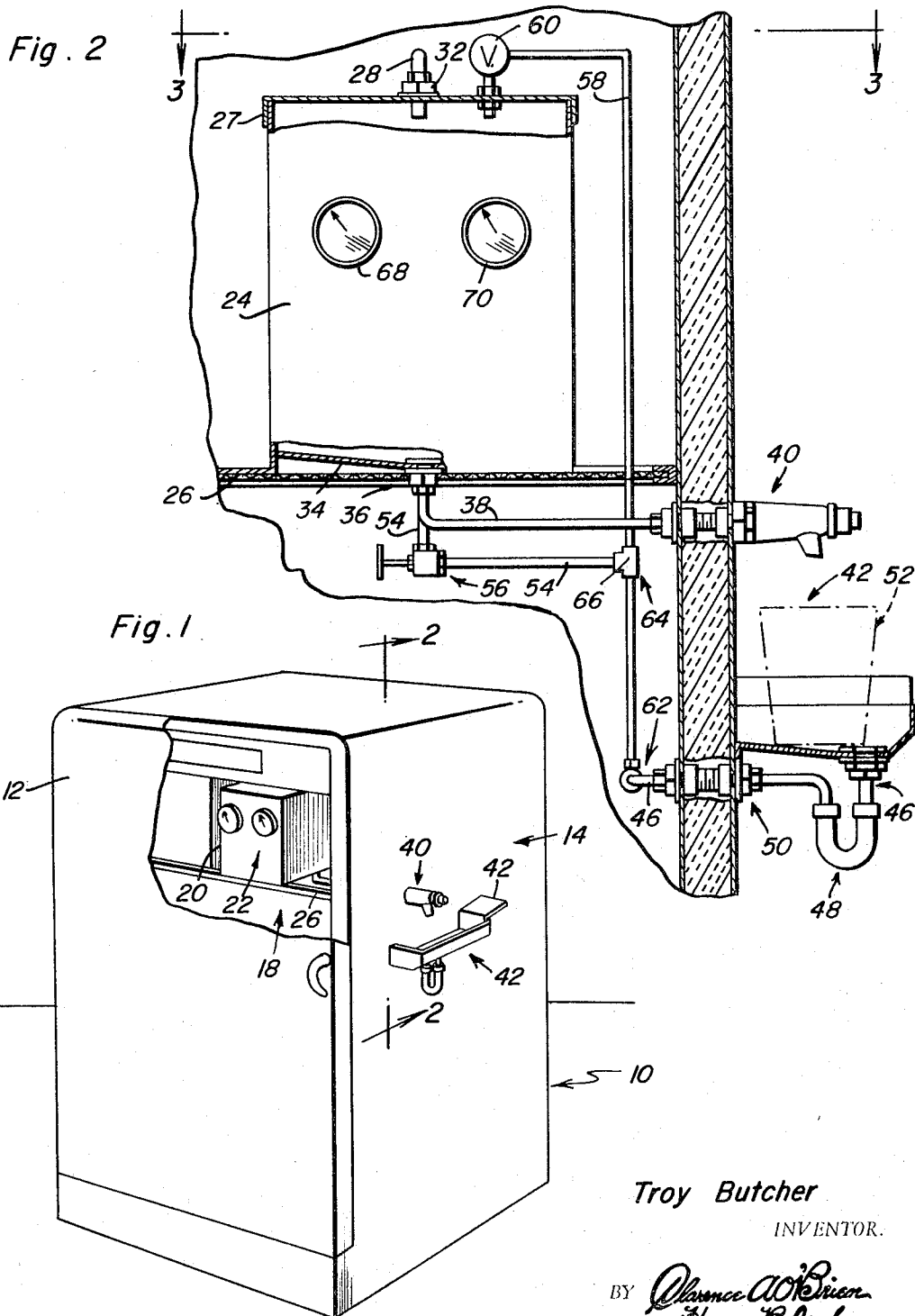
T. BUTCHER

3,299,663

REFRIGERATOR MOUNTED COLD WATER SYSTEM

Filed June 14, 1965

2 Sheets-Sheet 1



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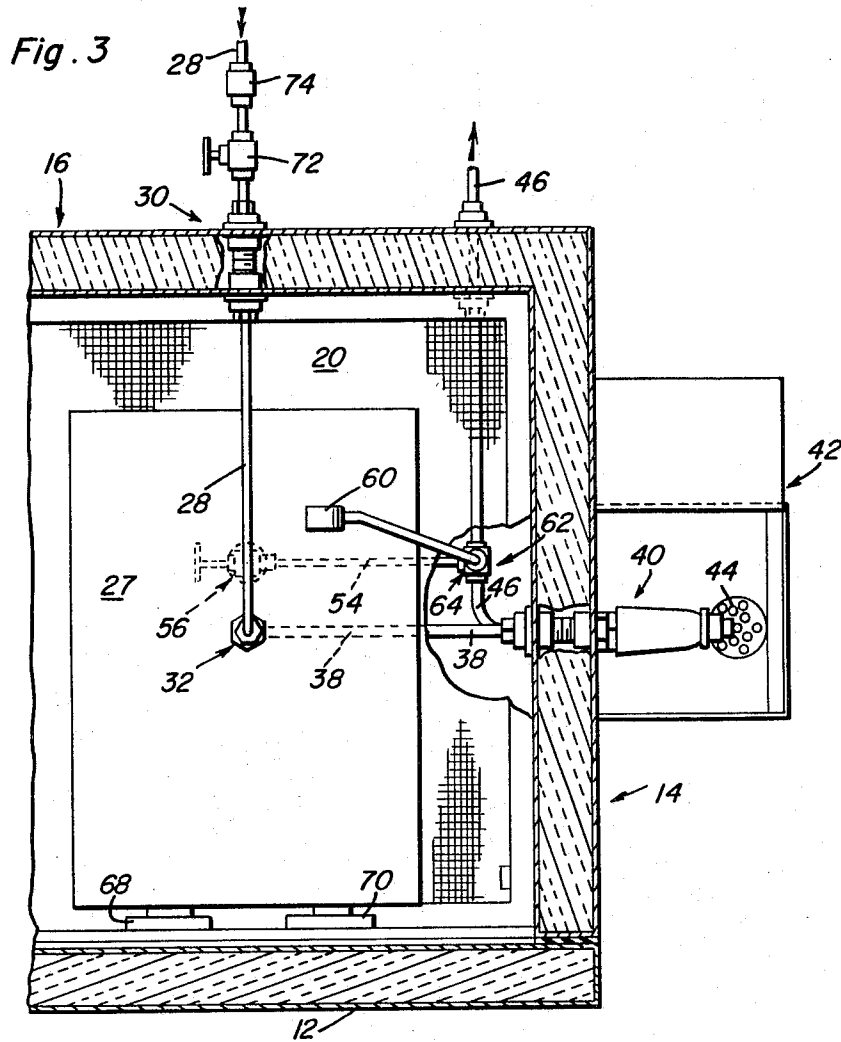
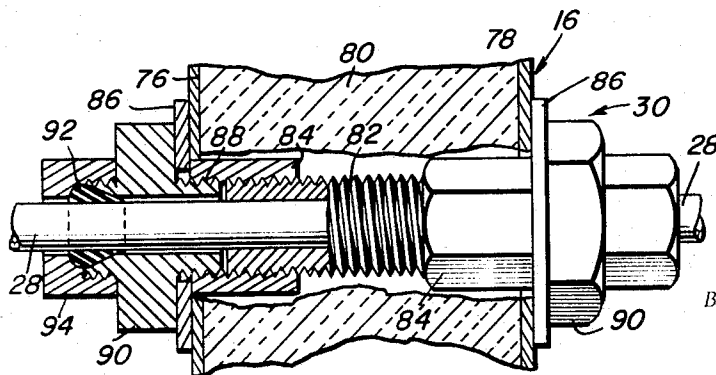


Fig. 4



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3,299,663 REFRIGERATOR MOUNTED COLD WATER SYSTEM

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This invention relates to a cold water system and more specifically to a storage container for cold water which is mounted in the cooled compartment of a refrigerator in order to be cooled thereby.

It is well known that cold water is generally not available in the home unless water is kept in the refrigerator in containers or ice cubes are used to cool tap water. These methods of cooling water are generally unsatisfactory in that they necessitate continually opening the refrigerator door for access to the refrigerator. Further, it takes a relatively long time to cool water in this fashion as well as being generally bothersome.

It is therefore an object of this invention to provide a cold water reservoir for installation in existing refrigerators which may be constructed from readily available materials and when installed is virtually maintenance free and may be operated without any added expense in the operation of the refrigerator.

Another object of the present invention is to provide a cold water system including a reservoir mounted within a refrigerator and a discharge line extending to the refrigerator wall and including a sink and water spigot mounted on the exterior of the refrigerator.

It is a further object of the present invention to provide a refrigerator mounted cold water reservoir supply system including means for regulating and controlling the pressure and temperature of the cold water fed therefrom.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a perspective view of a refrigerator having the door partially broken away to reveal the cold water supply tank of the present invention mounted therein;

FIGURE 2 is an enlarged partial vertical cross-sectional view taken substantially on the plane of the line 2—2 of FIGURE 1;

FIGURE 3 is a horizontal cross-sectional view taken substantially on the plane of the line 3—3 of FIGURE 2; and

FIGURE 4 is an enlarged cross-sectional view illustrating one wall sealed joint between the conduits used in the present cold water supply system and the refrigerator wall.

Referring now more particularly to the drawings, reference numeral 10 refers to a conventional refrigerator having the usual front door 12 and walls 14 and 16. The refrigerator 10 has a cooling chamber 18 therein including a cube freezer compartment 20 which is normally maintained at a lower temperature than the rest of the chamber. The refrigerator 10 is provided with the usual cooler unit, insulated walls and the like. Designated generally at 22 is the water cooler unit comprising the present invention.

The water cooler unit 22 comprises a fluid container or tank 24 which is fixedly positioned closely adjacent to the compartment 20 on the shelf 26. In order to preserve

the said regulated pressure of the cold water supplied by this container it is sealed at its joints and pipe connections against leakage of the water. Its walls preferably are of a material which is generally rust resistant and readily permits the transfer of heat energy through the walls, such as a light gauge stainless steel or a light gauge galvanized sheet metal. The container 24 is supplied with water through conduit 28 which is connected to the conventional house water supply which normally supplies water under pressure. The conduit 28 extends through the wall 16 of the refrigerator at 30 and is maintained in a sealed condition in a manner to be described hereinafter. The conduit 28 extends over the top 27 of the container 24 and extends through a hole in the top 27 in order to supply water thereto. The conduit 28 is connected to the top 27 by conventional, sealed fastening means 32.

The bottom 34 of the container 24 contains an opening and plug connector 36 therein to which is sealingly attached the outlet conduit 38 through which cold water is fed to a faucet 40. The conduit 38 extends through the wall 14 of the refrigerator and is mounted therethrough in sealed relationship therewith similarly to the sealed joint 30 to be described hereinafter. The faucet 40 is a conventional spigot having a push button operated valve. Mounted on the outside of wall 14 is a sink 42 which is positioned below the spigot 40. The sink 42 is mounted on wall 14 by conventional fastening means and includes a drain opening 44 therein, under which opening is mounted a drain conduit 46 including a conventional trap 48 therein for preventing backflow as is well known to those skilled in the art. The drain conduit 46 extends through the wall 14 at 50 in a sealed manner similar to sealed opening 30 and extends parallel to wall 14 and outwardly of the refrigerator through wall 16 to provide drainage for the sink 42. A conventional water glass 52 is shown in a preferred position in sink 42 for filling from spigot 40.

The container 24 has a drain opening (not shown) in bottom 34 and a drain conduit 54 leading therefrom in order to provide drainage for the container 24 so that the container can be cleaned, or replaced, or the like. The drain conduit 54 has a conventional shut-off valve and handle arrangement 56 positioned therein, the conduit 54 continuing from the valve 56 parallel to the bottom of container 24 and emptying into sink drain conduit 46.

The container 24 is provided with a second opening (not shown) in the top 27 through which is inserted an air escape conduit 58 having an air release valve 60 positioned therein adjacent this opening. The air release valve is of a variety well known to those skilled in the art and permits the passage of air while preventing the passage of water therethrough. This valve is positioned in conduit 58 in order to prevent a build up of air within the container 24 when it is initially filled with water, as the water level rises therein. It thus allows trapped air within the container to escape so that the entire capacity of the container may be utilized for water storage. The air escape line 58 extends downwardly alongside the container 24 and joins sink drain conduit 46 at 62. The drainage conduit 54 joins the air release conduit 58 at 64 by means of a conventional T-joint 66, thereby allowing the water which drains from container 24 also to escape through the sink drain conduit 46. The air release line 58 is joined to the sink drain conduit 46 so that any water which may accidentally escape through air release valve 60 will be conveyed outwardly of the refrigerator thereby eliminating any possibility of water escaping from the valve 60 into the refrigerator itself.

The container 24 has mounted on its front face a pressure-indicating gauge 68, and a temperature-indicating gauge 70. The pressure-indicating gauge is in com-

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munication with the interior of the container 24 and in a manner well known to those skilled in the art will indicate the pressure of the water within the container 24 at all times. The temperature gauge 70 is also in communication with the interior of the tank 24 and will indicate the approximately average temperature of the cooled water. This average temperature of the water within the container 24 is generally dependent upon the ambient temperature of the refrigerator, and may be controlled by regulating this ambient temperature by means of the standard type of refrigerator control. Normally, with occasional venting of the tank-trapped air, the usual operating temperature for the refrigerator will enable the water in tank 24 to be cold enough for everyday use. But if very cold water is desired—or the amount of water taken from the spigot is considerably above the average—the temperature of the refrigerator may be lowered. This temperature of the ambient air in the refrigerator may be roughly calculated from the reading on the gauge 70. Since this gauge generally indicates the temperature of the water in the tank its reading of course is always lower than the temperature of the ambient air.

The water-intake conduit 28 has positioned therein, exteriorly of the refrigerator, a conventional shut-off valve 72, with a control handle, and an adjustable pressure reducing valve 74 for reducing the relatively high pressure of the water in conduit 28, determined by the pressure of the said conventional house-water supply. The pressure of the water in tank 24 may be observed from gauge 68, and then regulated by adjusting the pressure-reducing valve 74 until the desired, reduced operating pressure for container 24 is reached. It is anticipated that the normal operating pressure of the water in the container will be approximately 5 pounds per square inch, and the average, operating temperature of the water contained in the tank will be approximately 40 to 50 degrees, Fahrenheit.

Since the inlet to container 24 is at its top and the outlet to faucet 40 is at the bottom of the container, the coldest water in the tank will be supplied thru line 38 when the faucet valve is opened, as the colder, heavier water has settled to the bottom of the container. This colder water, which mainly has emanated from the area of the tank near the wall that is closely adjacent to the ice-freezing compartment, has accumulated, in the normal operation of the cooler, in a layer on the bottom that is sufficiently deep to supply several glasses of water that is a little colder than the average tank-water temperature indicated by gauge 70.

Referring now specifically to FIGURE 4, it will be seen that the wall 16 of the refrigerator is composed of an outer shell or wall 76 and an inner shell or wall 78 with insulating material 80 positioned therebetween. It is very desirable to provide a sealed joint between the various conduits extending through the walls of the refrigerator in order to prevent the transfer of heat energy through the openings created thereby. Thus, the sealed joint illustrated in FIGURE 4 is contemplated by this invention. This joint includes a standard threaded pipe member 82 which extends through walls 76 and 78 and which carries the conduit 28 therein. Threaded on the member 82 inside the wall are conventional nuts 84 which are provided to adjust the fit between different size walls. The nut members 84 when adjusted will provide shoulders flush with the outer surface of walls 76 and 78 against which walls conventional washers 86 will be seated. The washers 86 are mounted over the openings in the walls on the inwardly extending portions 88 of male pipe compression fitting members 90 which are threaded into the nuts 84 and tightly against the washers 86. The other ends of compression members 90 have tapered openings therein for receiving the grommets 92 which are composed of rubber-like material, which grommets tightly encompass the conduit 28 and when the

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compression nut 94 is tightly screwed down on the outer threaded end of the compression members 90 the grommets 92 provide a seal between the conduit 28 and the compression members 90. Thus, it will be observed that the openings in the walls 76 and 78 are sealed by the above described arrangement, thereby insuring against any heat transfer through these openings. Further, it will be appreciated that the assembly above described will insure that the conduit 28 will be tightly maintained in the wall 16 when the compression nut 94 is screwed tightly against the grommets 92; however, prior to this time, the conduit 28 can be freely slidable through the wall.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. In combination with a refrigerator having insulated walls, a cooling chamber and means for cooling the air in said chamber below the temperature of the air outside the refrigerator:

a sealed, fluid-tight water tank having walls of thin material which readily permits the transfer of heat thru the walls, said tank constructed and arranged to hold more than a quart of water under a selected, substantially constant pressure above that of the atmosphere;

means for supporting said tank from said insulating walls in a location closely adjacent to said cooling means;

a gauge for indicating the pressure of the water in the tank;

water-supplying means flow-connected with said tank and connectible with a source of high-pressure water, for withdrawing water under high pressure from said source and supplying pressurized water to the tank; an adjustable pressure regulating device, for controllably reducing the pressure of said high-pressure water to a selected, substantially constant pressure that is considerably greater than that of the atmosphere and is indicated by said gauge;

faucet means for supplying cooled water from said tank; and

water-conducting means for connecting said tank and faucet means.

2. A water-cooling system comprising:

a refrigerator, having insulated walls, providing a refrigerated space for the storage and cooling of materials;

said refrigerator containing a closed, fluid-tight, water-cooling tank having a volume of over a quart, fixed to portions of said walls, storing water under a selected, substantially constant pressure and supplying cooled water, said tank having walls of thickness and material which readily permit transfer of heat from the interior to the exterior of the tank and defining a water-cooling space having a minimum dimension across it of a plurality of inches;

water-conducting means, comprising a conduit extending thru one of said insulated walls, for flow-connecting said tank to a source of water under high pressure, said water-conducting means further comprising an adjustable pressure regulator, for controllably reducing said high pressure to a selected lower pressure that is well above that of the atmosphere;

means, connected with a lower part of said tank, for conducting cooled water to a point where it is dispensed;

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faucet means connected to said last-named means;
and
air-venting means connected with the top part of said
tank, venting air that is trapped under pressure in
said top part.

3. A device as set forth in claim 2, in which said
selected lower pressure is in the neighborhood of five
pounds per square inch.

4. A device as set forth in claim 2 which further
comprises sealing means between said conduit and walls,

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said sealing means comprising a flexible, compressible
element around said conduit.

References Cited by the Examiner

UNITED STATES PATENTS

2,341,872	2/1944	Kasold	62—339	X
2,478,220	8/1949	Alexander	62—339	
3,031,860	5/1962	Middleton	62—339	X

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