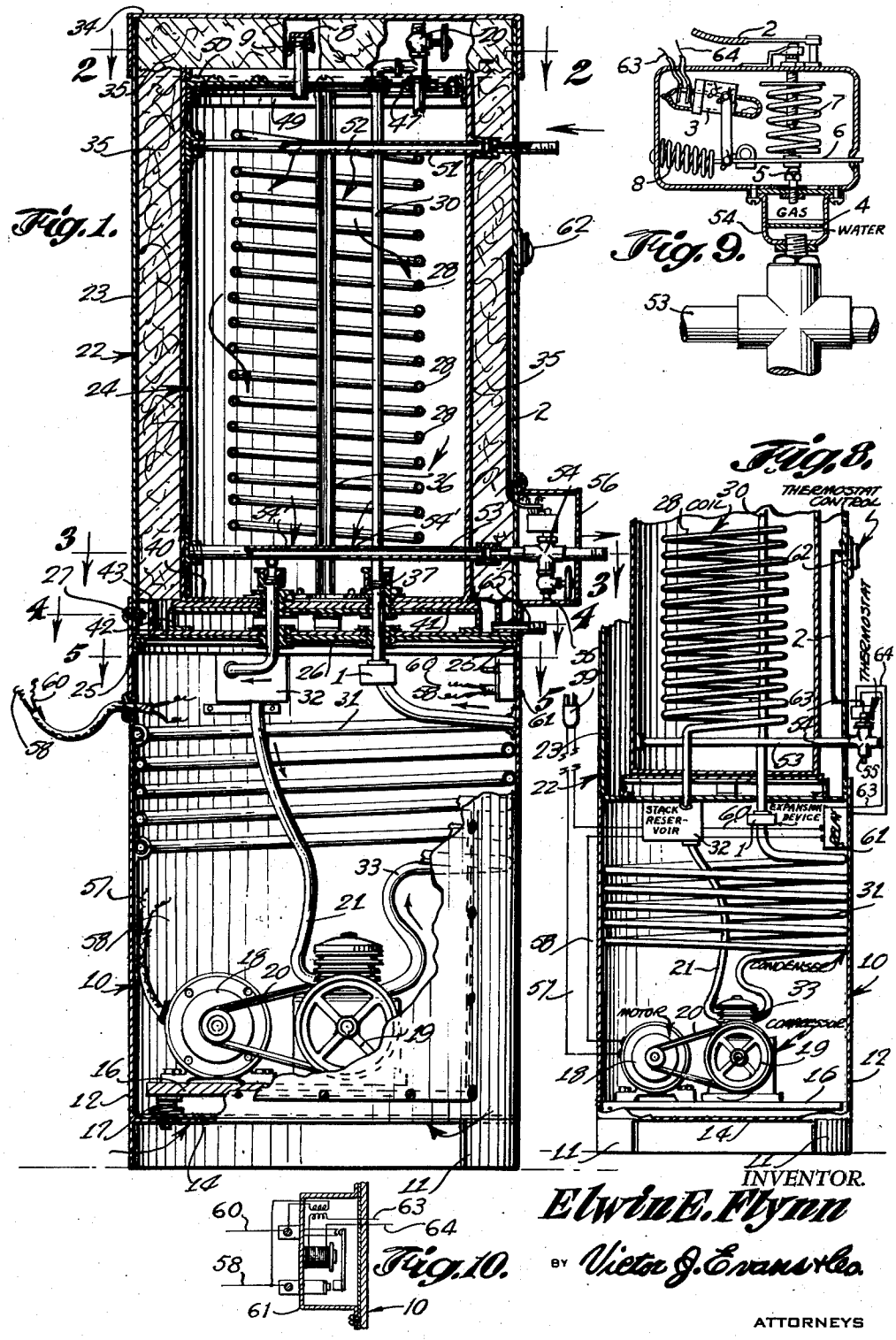
May 21, 1957 E. E. FLYNN 2,792,690

WATER COOLER

Filed Nov. 4, 1954 2 Sheets-Sheet 1



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Fig. 4.

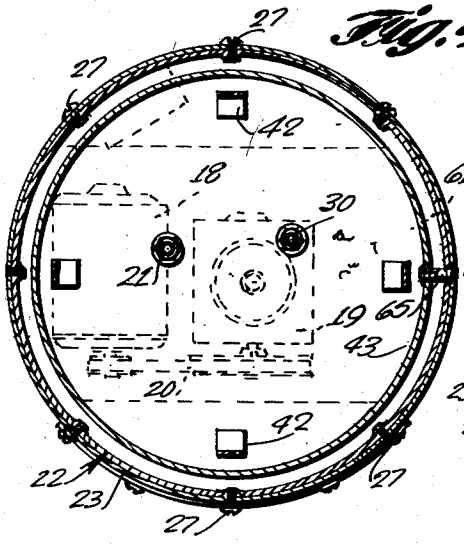


Fig. 2.

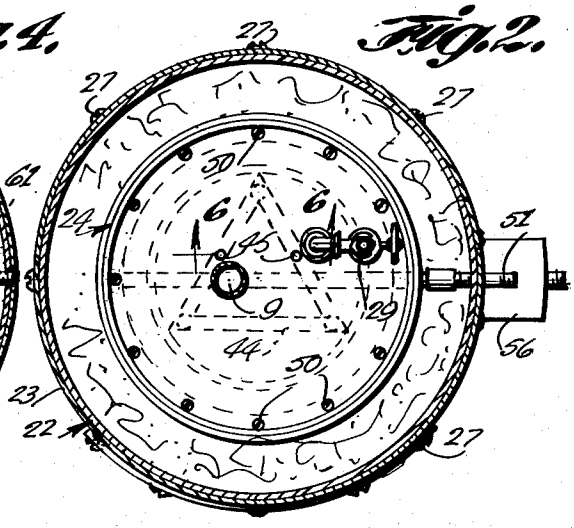


Fig. 5.

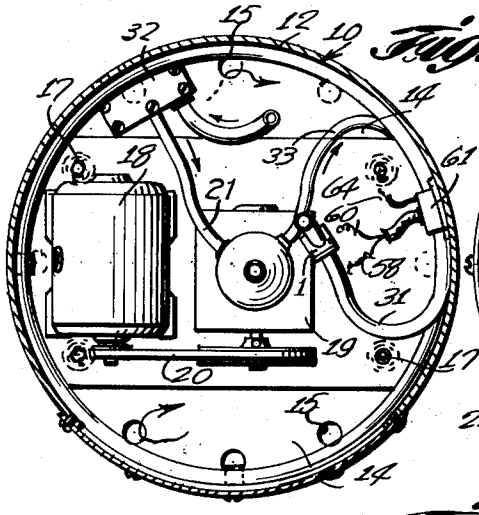


Fig. 3.

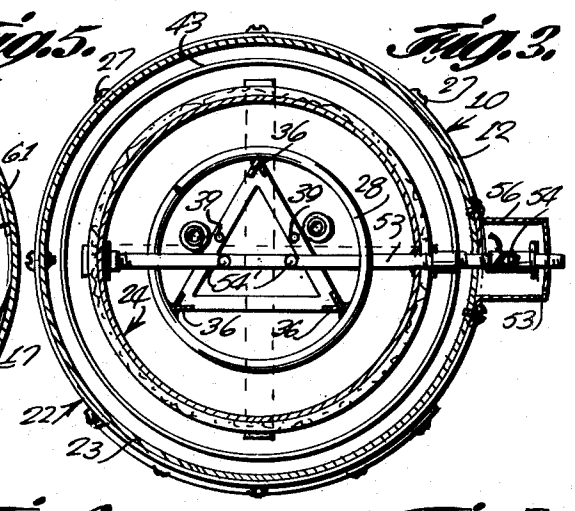


Fig. 6.

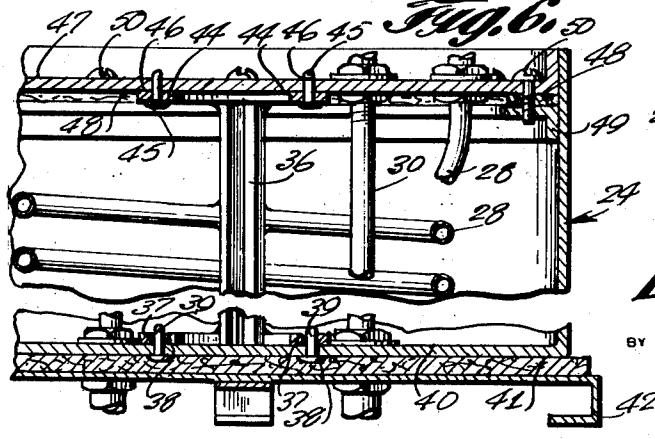
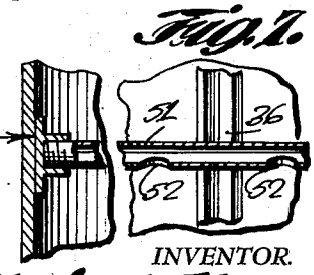


Fig. 7.



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2,792,690

WATER COOLER

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Application November 4, 1954, Serial No. 466,886

3 Claims. (Cl. 62—4)

This invention relates to a refrigerator, and more particularly to a refrigerator for cooling water.

The object of the invention is to provide a water cooler which includes a refrigeration unit or system that will effectively cool water to a predetermined degree or temperature so that a ready supply of cold water will be available for drinking purposes or for use in air conditioning systems.

Another object of the invention is to provide a water cooler which includes a housing having a refrigeration system therein, there being a tank or casing mounted above the housing through which water circulates whereby the water is cooled so that this water can be supplied to an air conditioner such as that shown and described in my co-pending application, or else the cooled water can be used for drinking purposes.

A further object of the invention is to provide a water cooler which is extremely simple and inexpensive to manufacture.

Other objects and advantages will be apparent during the course of the following description.

In the accompanying drawings, forming a part of this application, and in which like numerals are used to designate like parts throughout the same:

Figure 1 is a side elevational view of the water cooler, constructed according to the present invention, and with parts broken away and in section.

Figure 2 is a sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a sectional view taken on the line 3—3 of Figure 1.

Figure 4 is a sectional view taken on the line 4—4 of Figure 1.

Figure 5 is a sectional view taken on the line 5—5 of Figure 1.

Figure 6 is a sectional view taken on the line 6—6 of Figure 2.

Figure 7 is a fragmentary elevational view with parts broken away and in section showing certain constructional details of the apparatus.

Figure 8 is a side elevational view, with parts broken away and in section of the water cooler, and showing schematically the refrigerating system and the electrical controls.

Figure 9 is an enlarged elevational view of the thermostat, with parts broken away and in section.

Figure 10 is a sectional view taken through the relay.

Referring in detail to the drawings, the numeral 10 designates a hollow housing which may be supported on a leg structure 11, Figure 1, and the housing 10 may include an annular side wall 12 and a horizontally disposed bottom wall 14. The bottom wall 14 may be provided with a plurality of apertures 15, Figure 5, whereby air can pass through the apertures 15 to cool a compressor 19 arranged within the housing 10.

Arranged in spaced parallel relation above the bottom wall 14 is a horizontally disposed platform 16 which may be supported on the bottom wall by means of spring members 17. A motor 18 is mounted on the platform 16, and the motor 18 is adapted to be connected to a suitable source of electrical energy. The motor 18 serves to operate the compressor 19 through an endless belt 20, and a conduit 21 extends upwardly from the compressor to a stack reservoir 32.

Supported above the housing 10 is a hollow casing 22 which includes an annular side member 23, and arranged in concentric relation within the casing 22 is an annular shell 24. An annular bracket 25 is secured to the upper end of the housing 10, and the bottom wall 26 of the casing 22 abuts the upper surface of the bracket 25. Suitable securing elements such as bolt and nut assemblies 27 interconnect the housing 10 and casing 22 together, so that by removing the bolt and nut assemblies 27, the casing 22 can be removed from the top of the housing.

Positioned within the shell 24 is a coil 28 which is connected to the conduit 21, and a bleed valve 29 is arranged in communication with the upper end of the coil 28. The valve 29 may be opened in order to bleed air or gases from the refrigerating system. A pipe or line 30 leads from the bleed valve 29 down through the shell 24, and the lower end of the line 30 is arranged in communication with the upper end of a coil 31 which is positioned in the housing 10, the numeral 1 indicating a conventional expansion device. A conduit section 33 connects the compressor 19 to the coil 31.

Detachably mounted on the upper end of the casing 22 is a cover or lid 34 which can be removed as desired, and insulation 35 may be interposed between the shell and the casing and insulation may also be positioned below the cover 34 as shown in Figure 1.

A means is provided for maintaining the convolutions of the coil 28 in their proper position, and this means comprises a plurality of vertically disposed braces 36, Figure 3, and these braces are connected at their upper and lower ends with triangular shaped body members. Thus, the lower ends of the braces 36 are secured to a triangular shaped body member 37, and the body member 37 may be provided with apertures 38 through which pins 39 extend. The pins 39 also extend through the bottom wall 40 of the shell 24, and the pins 39 maintain the body member 37 in its proper position. A support member 42 has an insulated mat or pad 41 thereon, and the bottom wall 40 rests on the mat 41. The support member 42 may be positioned within a condensate receiving tray 43, and the tray 43 may collect or receive any moisture that is formed in insulation 35 of the assembly.

A triangular shaped body member 44 is secured to the upper ends of the braces 36, Figure 6, and the body member 44 has pins 45 projecting therethrough, the pins 45 also extending through openings 46 in a top member 47 which extends across the upper portion of the shell 24. The pins 45 help to maintain the braces and body members in their proper position within the shell. An annular gasket 48 which may be made of cork or the like is positioned below the member 47, and an annular bracket 49 is secured to the upper portion of the shell 24 below the member 47, there being securing elements such as bolts or screws 50 extending through the member 47 and into engagement with the bracket 49.

Extending into the shell 24 is an upper pipe 51 which is provided with a plurality of openings 52 in its lower end. The pipe 51 is adapted to be connected to any suitable supply of water which is to be cooled, and the pipe 51 supplies water to the interior of the shell 24. Extending into the shell through the casing and positioned below the upper pipe 51 is a lower pipe 53, and the pipe 53 is provided with a plurality of openings 54' in its upper surface whereby the water which has been cooled will enter the openings 54' and pass out through the pipe 53 to any suitable locality as for example this

cooled water may be used for drinking purposes or it may be conveyed to the air conditioner shown and described in my co-pending application whereby the air passing through this air conditioner will be cooled. A thermostat 54 is arranged in the pipe or line 53, and a drain valve 55 communicates with the pipe 53 and the drain valve 55 is normally kept closed except when water is to be drained from the shell. A box or housing 56 surrounds the thermostat 54 and valve 55 and the box 56 may be detachably connected to the casing 22.

The schematic wiring diagram for the apparatus is shown in Figure 8. Wires 57 and 58 extend from the motor 18, and the wire 57 may be connected to a plug 59 which is adapted to be arranged in engagement with any suitable source of electrical energy. A wire 60 leads from the plug 59 to a relay 61, and the wire 58 is also connected to the relay 61. A manually operable control for the thermostat 54 is indicated by the numeral 62, and the control 62 is arranged exteriorly of the casing 22. Thus, the control 62 can be adjusted so that water delivered through the pipe 53 will be at any desired temperature. A wire 63 leads from the relay 61 to the thermostat 54, and a wire 64 also leads from the thermostat 54 to the relay 61, the control 62 being of conventional construction. A conduit 65 leads from the drainage tray 43 to any suitable location.

From the foregoing it is apparent that there has been provided a water cooler which can be used for many purposes. Thus, the water cooler can be used for supplying cold water through the pipe 53 which can be used for drinking purposes or else the pipe 53 can be connected to the pipe 27 of the air conditioner of my co-pending application, and when the present invention is being used with the air conditioner of my co-pending application, the pipe 51 can be connected to the pipe 43 of my co-pending application. Thus, there will be a continuous circulation of water. In use when the temperature of the water passing out through the pipe 53 exceeds a predetermined degree which is determined by the setting of the thermostat control 62, then the thermostat 54 will energize the motor 18 to thereby operate the compressor 19. This will cause the refrigerating system to operate whereby refrigerant will be pumped through the conduit 33, then up through the coil 31, then through the expansion device 1, then through the pipe 30 and down through the coil 28, and since the coil 28 is surrounded by water which enters the shell 24 through the openings 52 in the pipe 51, then this water will be cooled. The cooled water will enter the pipe 53 through the openings 54' and this water will pass out through the pipe 53 as previously described. Meanwhile the refrigerant will return by first entering the reservoir 32 and then passing through conduit 21 back to compressor 19. When the temperature of the water passing out through the pipe 53 decreases sufficiently, the thermostat will cut off the motor 18. Suitable insulation is provided where necessary and the cooler can be readily disassembled when access is to be gained to the various parts. The water inlet and outlet pipes are parallel and the outside of the housing and casing can be provided with attractive decorations. The water is directly contacted and cooled by the coil 28 and the temperature of the water is automatically regulated by means of the thermostat 54. The inlet and outlet pipes for the water extend through the side of the casing and there is a minimum amount of resistance to the water being circulated. The water circulates naturally around the cooling coil 28 so that the apparatus can be operated with economy and efficiency. The water can flow from a source of supply and after it has been cooled it can pass out through the pipe 53 and the water does not necessarily have to return to the apparatus. However, if the water is used in the air conditioner of my co-pending application, then the same water can be recirculated and returned for cooling. Lock nuts or bushings can be provided wherever necessary for engagement with the tubing which may be made of copper or other suitable material. The compressor 19 may be of conventional construction and the cooling coil 28 is secured to the vertical braces 36 whereby the cooling coil convolutions are maintained in their proper position. The cap 34 may also have suitable decorations thereon. My co-pending application is identified by Serial No. 436,105, and was filed on June 11, 1954, now Patent No. 2,709,898. A pipe 9 having a removable cap 8 thereon extends upwardly from the top of the shell 24 whereby by removing the cap 8, air can be bled from the interior of the apparatus.

In use, the refrigerant flows from the compressor 19 up through the conduit 33 and then to the coil 31, then through the expansion device 1, then up through the conduit 30 and then down through the coil 28. Then, refrigerant passes through the stack reservoir 32, then through the conduit 21 back to the compressor 19. The thermostat 54 is of conventional construction, and attention is invited to page 5428 of Audel's Handbook X, which forms part of "Audel's New Electric Library." The adjustment of the thermostat may be effected by means of a flexible cable 2 which extends between the control 62 and thermostat 54. The electric circuit is opened and closed by the tilting of the mercoid switch 3, which causes the mercury to flow from one end to the other, making or breaking contact with the terminals. The power element 4, consists of a metal bellows containing a gas which quickly expands with a slight rise in temperature. When the temperature increases, the power element exerts an upward push on the stem 5, forcing up the lever 6, which rocks the mercoid switch to the left closing the circuit. A decrease in temperature causes the power element to contract as the large adjusting spring 7 throws the switch back opening the circuit. The spring 8, gives the required snap action to the switch as it is necessary for the proper operation of the control. The relay 61 shown in Figure 10 is for actuating the motor 18, and the relay is also of conventional construction. The stack reservoir 32 is an accumulator which permits the liquid to vaporize. Condensate, which collects in the tray 43 may come from the outside of the device.

I claim:

1. In a water cooling apparatus, a hollow housing including an annular side wall and a horizontally disposed bottom wall provided with a plurality of spaced apertures for the passage therethrough of air, a spring pressed platform supported above said bottom wall, a door detachably connected to said side wall for gaining access to the interior of said housing, a compressor supported on said platform, a motor adapted to be connected to a source of electrical energy for operating said compressor, a conduit extending upwardly from said compressor, an annular bracket secured within said housing adjacent the upper end thereof, a hollow casing including an annular side wall of less diameter than the side wall of said housing, securing elements detachably connecting said casing to said housing, said casing including a horizontally disposed bottom member abutting said bracket, a cylindrical shell arranged in concentric relation within said casing, insulation interposed between said shell and casing, a cover detachably mounted on said casing, a refrigerant coil arranged in said shell and connected to said conduit, a line connected to said coil, a coil positioned in said housing and connected to said line through the medium of an expansion device, and said coil being connecetd to said compressor, a pipe extending into the upper end of said shell and casing and adapted to be connected to a source of supply of water, there being a plurality of openings in the bottom of said pipe for the egress therethrough of water, a second pipe extending into the lower end of said shell and casing and provided with openings in its upper end for the ingress therethrough of water, a thermostat arranged in engagement

with said last named pipe, and a condensate receiving tray positioned below said shell.

2. The structure as defined in claim 1, and further including valves for bleeding air from said coil.

3. In a water cooling apparatus, a hollow housing including a side wall and a bottom wall provided with a plurality of spaced apertures for the passage therethrough of air, a platform supported above said bottom wall, a compressor supported on said platform, a motor adapted to be connected to a source of electrical energy for operating said compressor, a conduit extending upwardly from said compressor, a bracket secured within said housing adjacent the upper end thereof, a hollow casing including a side wall of less diameter than the side wall of said housing, securing elements detachably connecting said casing to said housing, said casing including a bottom member abutting said bracket, a shell arranged in concentric relation within said casing, a refrigerant coil arranged in said shell and connected to said conduit, a

line connected to said coil, a coil positioned in said housing and connected to said line through the medium of an expansion device, and said coil being connected to said compressor, a pipe extending into said shell and casing and adapted to be connected to a source of supply of water, there being a plurality of openings in the bottom of said pipe for the egress therethrough of water, a second pipe extending into the lower end of said shell and casing and provided with openings in its upper end for the ingress therethrough of water, a thermostat arranged in engagement with said last named pipe, and a condensate receiving tray positioned below said shell.

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