

May 28, 1963

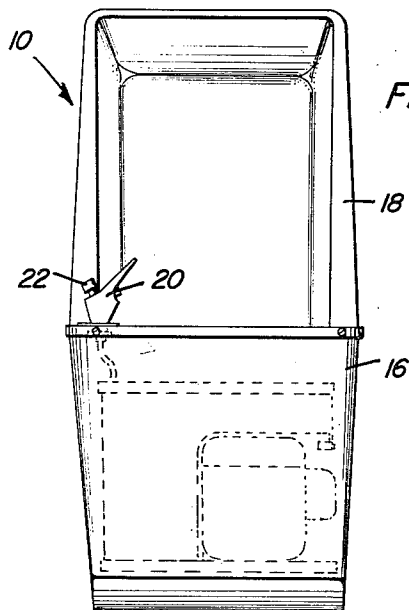
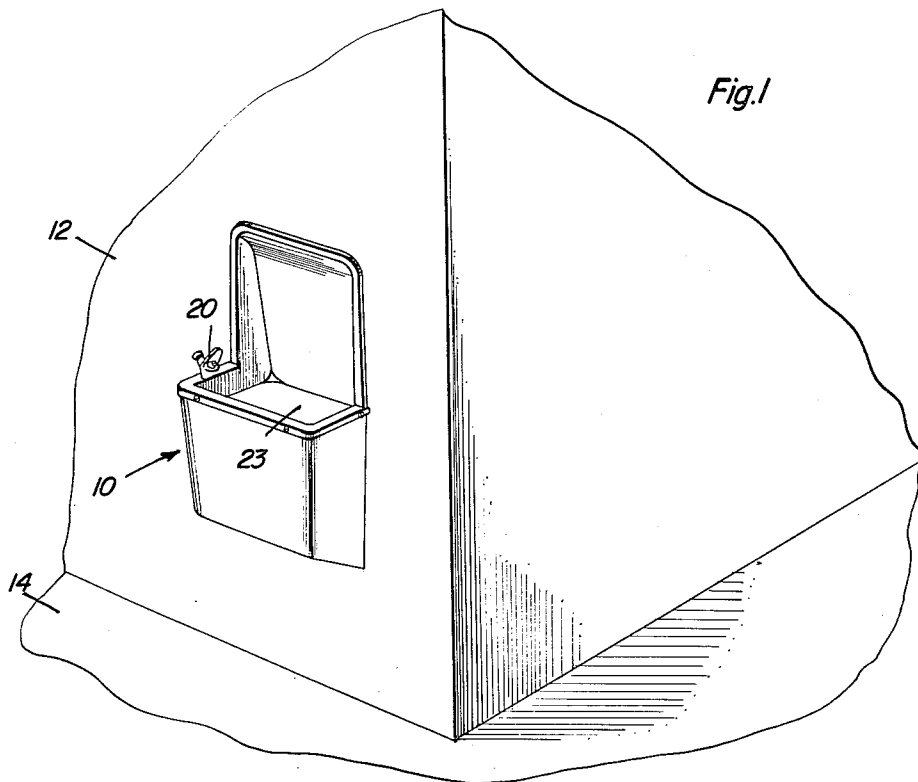
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WALL HUNG WATER COOLER WITH WATER COOLED CONDENSER

Filed Dec. 9, 1960

3 Sheets-Sheet 1



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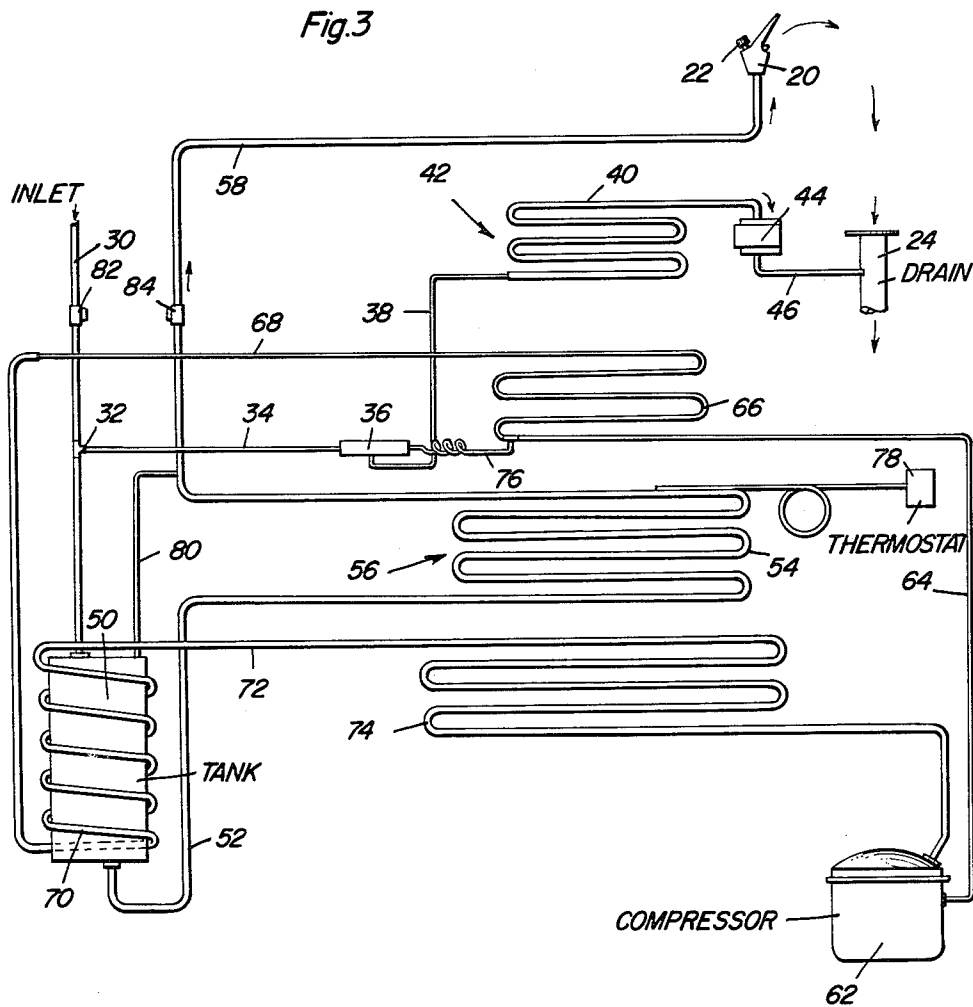
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WALL HUNG WATER COOLER WITH WATER COOLED CONDENSER

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3 Sheets-Sheet 2



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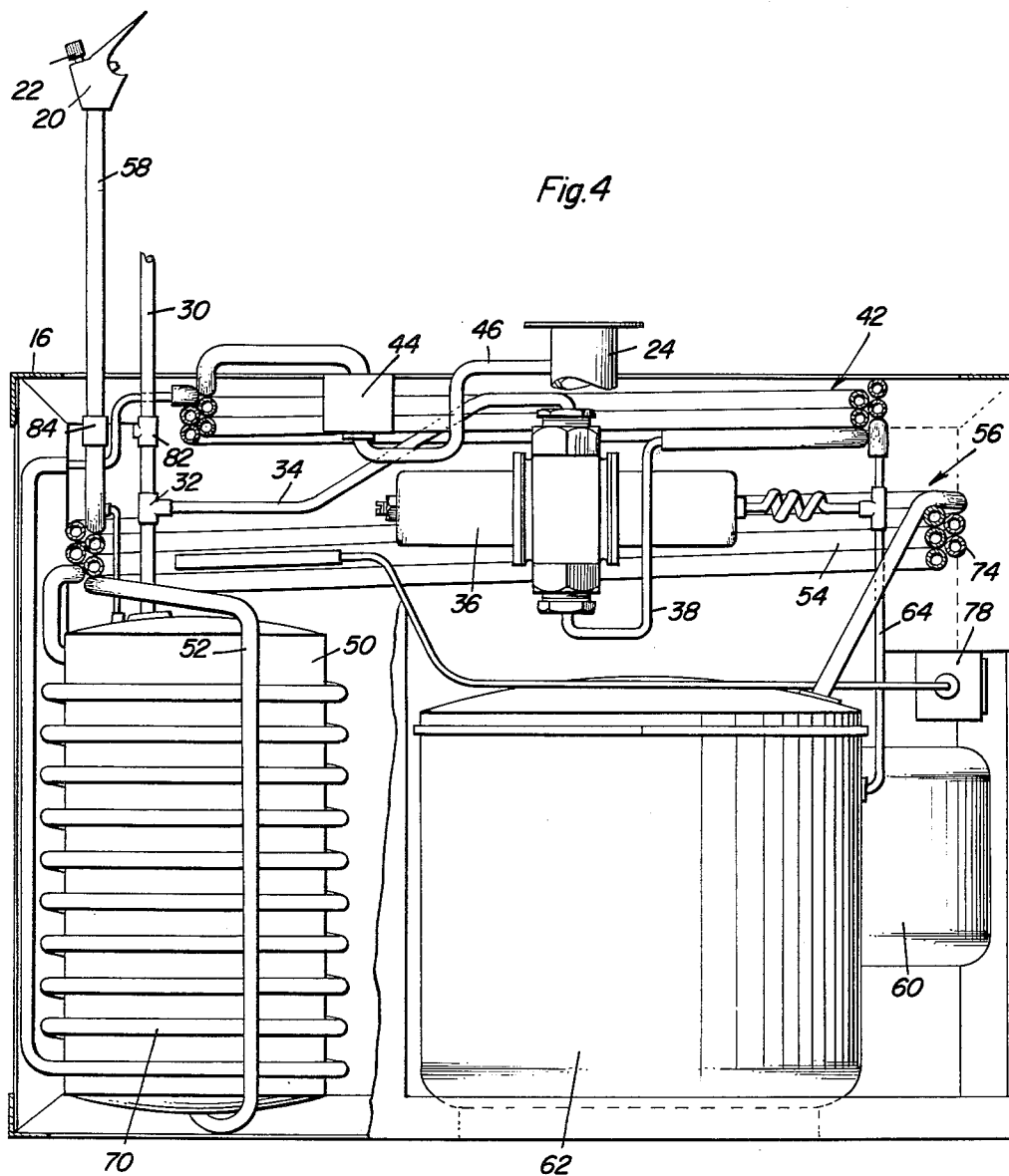
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WALL HUNG WATER COOLER WITH WATER COOLED CONDENSER

Filed Dec. 9, 1960

3 Sheets-Sheet 3



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3,091,100

WALL HUNG WATER COOLER WITH WATER COOLED CONDENSER

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Filed Dec. 9, 1960, Ser. No. 75,017
7 Claims. (Cl. 62—395)

This invention comprises a novel and useful wall hung water cooler with water cooled condenser and more particularly relates to the novel features of structure and operation in water cooling systems of the fountain type and of the character adapted to be hung upon walls in a compact manner.

The present invention relates to common subject matter disclosed in the copending application Serial No. 2,989, filed January 18, 1960, for Water Cooling System, now Patent No. 3,069,872 of December 25, 1962, and constitutes a modification and an improvement thereover.

The primary object of the present invention is to provide an extremely compact, self-contained and improved unitary cooling unit especially adapted for use in wall hung drinking fountains.

A further object of the invention is to provide a water cooler unit in which a water cooled condenser is provided to effect the chilling of the drinking water and wherein a reservoir which supplies water to the water chilling coils of the unit is itself precooled.

Yet another object of the invention is to provide a refrigerated drinking fountain wherein the circulating refrigerant is passed in series through cooling coils for pre-chilling the reservoir of the system and thereafter is passed through the drinking water refrigerating coils.

A further object of the invention is to provide an automatic wall hung type of refrigerated drinking fountain system in which the drinking water is first precooled by being stored in a refrigerated reservoir and thereafter prior to delivery at the discharge spout is refrigerated by passage through refrigerating coils.

An additional object of this invention is to provide a device which can readily be installed in the wall hung type and floor type models of refrigerated drinking fountains disclosed in Patent No. 3,069,872, enabling the use of a lower cost and smaller capacity unit in that construction.

Still another purpose is to provide a device in which the cooling unit may be easily by-passed, thereby enabling continued use of the fountain with an uncooled source of water when the cooling unit requires servicing or repairs.

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 showing a typical wall hung installation of a drinking fountain in accordance with the principles of this invention;

FIGURE 2 is a front elevational view of the drinking fountain installation showing the unitary arrangement of the components thereof in accordance with this invention;

FIGURE 3 is a diagrammatic view showing the flow lines of the circulating refrigerant, the drinking water and the condenser cooling water of the invention; and

FIGURE 4 is a view in vertical section through the unitary refrigerating unit or package of this invention.

In the above identified prior patent, there was set

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forth a number of the conditions necessary for a refrigerated drinking fountain to realize its maximum advantages and benefits. The present invention is likewise directed to these same conditions insofar as they are applicable to a refrigerated drinking fountain of the more compact type required for the installation of the drinking fountain as a water hung refrigerated drinking fountain.

Referring first to FIGURE 1 it will be observed that numeral 10 designates generally a suitable embodiment of a refrigerated drinking fountain which is adapted to be mounted upon or installed in the vertical supporting surface of a wall 12 above a floor 14. Obviously, the drinking fountain 10 of this type may be directly mounted upon or installed in the construction of a wall, or be carried by other vertical supporting members such as columns or other vertical elements of building structures such as in factories or the like.

Referring in particular to FIGURE 2 it will be observed that the refrigerated drinking fountain installation 10 consists of a lower cabinet member or component 16 in which is housed all of the motor compressor or other refrigerating equipment of the unit and which is surmounted by a splash shield, cover or hood 18 together with the drinking fountain nozzle 20. This nozzle includes the usual push button 22 by means of which the supply of refrigerated water to the drinking fountain, whether refrigerated or from an uncooled source, is controlled. The installation further includes a splash or drain pan 23 provided with the usual means, not shown, by means of which waste water from the fountain is removed by a drain conduit 24, see also FIGURES 3 and 4, to the usual waste pipe, not shown.

Referring now especially to the diagrammatic view of FIGURE 3 for an understanding of the flow of the refrigerant, drinking water and cooling water in this installation, it will be observed that the numeral 30 designates a single water inlet line into the device. This water inlet is connected with the usual water supply line of a building construction in which the installation is to be installed, an attachable connection being made between the water main and the water line 30 within the confines of the cabinet 16 in a conventional manner, not shown.

The water supply line 30 within the cabinet is provided with a T-fitting 32 by means of which a portion of the incoming water is delivered to a conduit 34 which has a pressure controlled valve 36 therein. This valve controls the supply of the water from the conduit 34 to the inlet pipe 38 of a water cooling coil 40 forming a part of a water cooled condenser assembly indicated generally by the numeral 42. From the water cooling coil 40 of the condenser the cooling water passes by a non-return anti-siphoning trap 44 and conduit 46 into the previously mentioned draining conduit 24 and thence to the waste pipe.

The remainder of the incoming water from the water inlet line 30 after passing the T-coupling 32 enters the upper end of a chilled water reservoir 50 which operates as a pre-cooler for the drinking water as set forth hereinafter. Water stored in the reservoir 50 emerges from the lower end thereof by a delivery conduit 52 in a pre-chilled condition into the lower end of the water coil 54 of a water refrigerating coil assembly 56, and the refrigerated water then emerges from the upper end of the coil 54 and is delivered by means of a conduit 58 to the previously mentioned spout or nozzle 20 of the fountain.

From the foregoing, the path and flow of the water from the water main through the device both to the water cooled condenser of the refrigerant compressor system and to the precooling reservoir and to the refrigerating

coils and thence to the drinking fountain will be readily apparent.

The water cooling system of this invention employs a generally conventional type of motor compressor unit having a sealed circulating refrigerant therein. Conveniently this unit includes a closely assembled electric motor 60 operating a refrigerant compressor 62 with the usual automatic controls, not shown, being provided therefor. Refrigerant from the compressor 62 is delivered by a refrigerant discharge or outlet conduit 64 to the refrigerant coil 66 of the condenser 42, this coil being in heat exchange relation with the condensing water coil 40, as by being in nested relation therewith as shown in FIGURE 4. From the upper end of the refrigerant coil 66 the refrigerant is delivered by a further conduit 68 to a heat exchange cooling coil 70 which surrounds the reservoir 50 and serves to pre-chill the latter. Thereafter, the refrigerant emerges from the top of the cooling coil 70 by means of a conduit 72 and passes through the refrigerant coil 74 of the water refrigerating unit 56 and from thence returns to the intake side of the compressor.

Thus it will be seen that there is a closed refrigerant system in which the refrigerant is continuously circulated from the compressor through the condenser coil, then through the pre-cooling coil 70 on the reservoir 50 and thereafter to the water refrigerating coil 74, to thus effect in series a preliminary chilling of the reservoir 50 and a final refrigerating of the drinking water in the refrigerating coil 56.

The usual pressure control will be provided for a system of this character, as for example including a connection indicated generally by the numeral 76 which serves to operate the control valve 36 and thus admit more cooling water to the condenser cooling coil 40 in response to pressure increase in the refrigerant coil 66 of the condenser. Similarly, a thermostat 78 is operatively connected to the water refrigerating coil 54 and responds to a temperature rise in the drinking water passing through this coil to again initiate operation of the motor compressor unit through conventional electrical connections, not shown.

In order to prevent the undesirable accumulation of air in the tank 50, a capillary air bleed line 80 is provided establishing communication between the reservoir and the water delivery line 58. Shown at 82 and 84 are couplings in the supply line 30 and in the drinking water delivery conduit 58. This provides a means whereby a by-pass conduit or temporary connecting conduit may be employed to supply water directly to the fountain spout and maintain the latter in use even when the covering system is not functioning.

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. A wall mounted refrigerated drinking fountain comprising

- (a) a cabinet adapted to be mounted upon a wall,
- (b) a refrigerant circulating system in said cabinet,
- (c) including a refrigerant circulating means,
- (d) and a refrigerant condenser including a refrigerant condenser element,
- (e) feed water inlet means and spill water outlet means for said cabinet,
- (f) a feed water precooler comprising a water storage means,

(g) a tube-on-tube water refrigerating means separate from said storage means,

(h) a water drinking spout for said cabinet and a splash shield of substantial height for said spout projecting above said cabinet and adapted for mounting on a wall,

(i) means for delivering water from said inlet means to each of said water storage means, said water refrigerating means and to said drinking spout,

(j) means for serially placing refrigerant in heat exchange relation with said storage means and with said water refrigerating means.

2. In a wall mounted refrigerated drinking fountain including a cabinet and a splash shield of substantial height projecting above said cabinet and adapted to be mounted upon a wall,

(a) a refrigerating system in said cabinet including a refrigerant circulating pump,

(b) and a refrigerant condenser element,

(c) a drinking spout mounted on said cabinet and disposed in front of said splash shield,

(d) means entirely enclosed in said cabinet for refrigerating drinking water and including a tube-on-tube heat exchanger for said refrigerant and drinking water,

(e) means for delivering refrigerated drinking water from said heat exchanger to said spout,

(f) precooling means located remote from said refrigerating means for storing and precooling the water delivered to said refrigerating means,

(g) means for placing refrigerant from said refrigerant pump serially in heat exchange relation with said precooling means and with said heat exchanger.

3. The combination of claim 1 including by-pass fitting means disposed respectively in said feed water inlet means and in said means for delivering water to said drinking spout and operable when placed in communication to connect said feed water inlet means to said drinking spout.

4. The combination of claim 1 wherein said last mentioned means places refrigerant in heat exchange relation first with said water storage means and thereafter with said water refrigerating means.

5. The combination of claim 2 wherein said last mentioned means places refrigerant in heat exchange relation first with said precooling means and thereafter with said heat exchanger.

6. The combination of claim 1 wherein said refrigerant condenser is of the water cooled type, means located in advance of said water storage means for delivering water from said feed water inlet means directly to said condenser and means discharging water from said condenser to said outlet means.

7. The combination of claim 2 including a refrigerant cooling coil disposed in heat exchange relation upon the exterior of said precooling means and forming a part of said refrigerant placing means.

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