

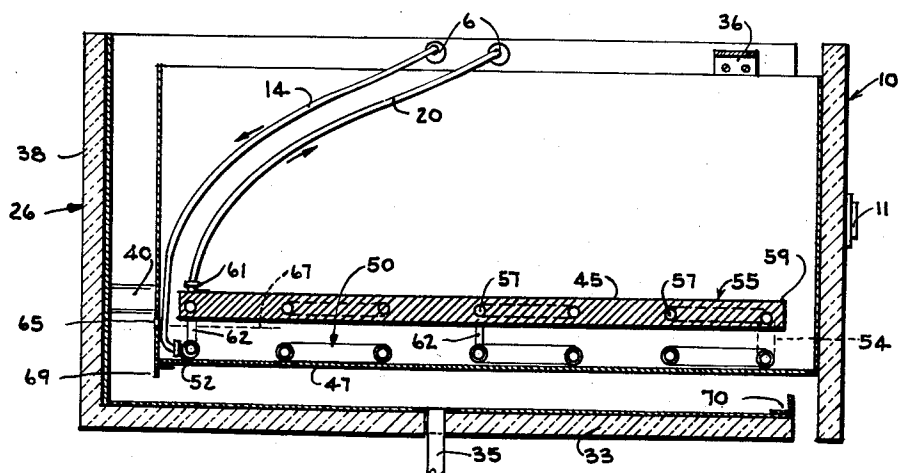
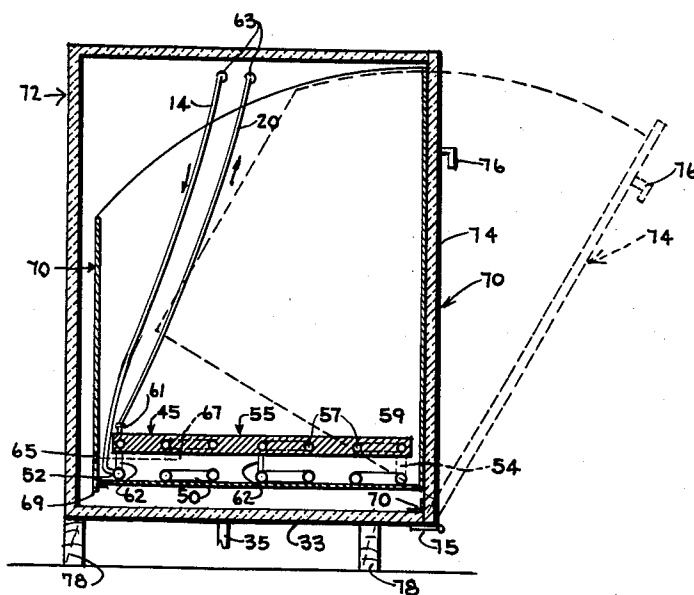
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E. A. GOULD, JR
CABINET COOLING MEANS

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INVENTOR.
EDWARD A GOULD JR.

BY

John H. Widdowson
ATTORNEY

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CABINET COOLING MEANS

Edward A. Gould, Jr., Wichita, Kans.

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This invention relates to heat exchange means. In a more specific aspect this invention relates to heat exchange means for cooling fluids, especially pre-mixed soft drinks. In still a more specific aspect this invention relates to a cabinet cooler having drawers therein each structurally designed and equipped to hold cracked ice to cool in a heat exchange assembly pre-mixed soft drinks passed therethrough.

It is known to mix soft drinks in relatively large bottles and dispense same through a faucet into a cup or glass, instead of mixing the soft drink syrup with carbonated water at the fountain. The premixed carbonated soft drink must be cooled to pleasant drinking temperature, and to as close to 32° to 36° F. as possible to reduce foaming of the soft drink to a minimum. It has been known in the prior art to pass the pre-mixed soft drink from the bottle through a cooling coil in contact with ice and ice water. The known cooling means to accomplish this are inefficient, giving poor heat transfer and are inconvenient to use being bulky and space wasting. I have invented new drawer-type cabinet cooling means which utilizes in cooperative combination therewith a very efficient heat exchange assembly. The new drawer-type cooling means of my invention is very versatile, allowing for handling a desired number of different pre-mixed soft drinks, and it is structurally designed to take up a minimum of floor space.

The new means of my invention for cooling fluids has a drawer which can be mounted in a cabinet, preferably either a slideably mounted drawer or a bin-type drawer which is tiltably mounted. A heat exchange assembly is mountable in the drawer, preferably an assembly having a lower pre-cool cooling coil and in series therewith an upper cooling plate having a cooling passageway therethrough. The plate is spaced from the cooling coil, and in operation the coil is preferably immersed in water resulting from melting ice, the level of such water being below the cooling plate and maintained so by run-off apertures in the drawer. Inlet and outlet conduits for the heat exchange assembly are provided to deliver the fluid for cooling and to receive the resulting cooled fluid. The drawer receives and holds cracked ice in contact with the heat exchange assembly during cooling operation, preferably on the top of the cooling plate. In preferred specific embodiments of my new cooling cabinet means, I provide a plurality of separate drawer and cabinet housing units which can be arranged in vertical stacked relation, and a single cabinet housing can hold a plurality of drawer units, each handling a different soft drink.

It is an object of my invention to provide new heat exchange means.

It is another object of my invention to provide new means for cooling fluids, especially pre-mixed soft drinks.

Still another object of my invention is to provide new cooling means for pre-mixed soft drinks utilizing a drawer cabinet, each drawer cooling unit handling a different soft drink.

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Another object of my invention is to provide a drawer cabinet cooling unit for more efficiently and economically handling a plurality of pre-mixed soft drinks to be faucet dispensed into cups or glasses at such as baseball games, football games, basketball games, fairs, circuses, and the like.

Other objects and advantages of my invention will be apparent to those skilled in the art upon reading this disclosure.

Drawings accompany and are a part of this disclosure. The drawings depict preferred specific embodiments of the new cooling means of my invention, and it is to be understood that such is not to unduly limit the scope of my invention. In the drawings,

Fig. 1 is a perspective and diagrammatic view of a preferred specific embodiment of the new cooling means of my invention in relation to means for holding pre-mixed soft drink and means to dispense cooled soft drink.

Fig. 2 is an exploded perspective view of another preferred specific embodiment of my invention wherein the drawer units and cabinet are sectionalized.

Fig. 3 is a longitudinal, cross-sectional, elevation view through the cabinet housing, drawer, and heat exchange assembly of the cooler shown in Fig. 2.

Fig. 4 is a longitudinal, cross-sectional, elevation view through the cabinet housing, drawer, and heat exchange assembly of a preferred specific embodiment of my invention using a bin-type drawer tiltably mounted.

Fig. 5 is an enlarged perspective view of preferred latch means for a preferred specific embodiment of my invention.

Following is a discussion and description of the new cooling means for fluids of my invention made with reference to the drawings whereon the same reference numerals are used to indicate the same parts or structure. The discussion and description is of preferred specific embodiments of the new cooling means for fluids of my invention, and it is to be understood that such is not to unduly limit the scope of my invention.

In Fig. 1 cabinet 6 has an outer housing 8 and individually opening drawers 10, handles 11 being used to open the drawers. The cabinet preferably has a recessed base 12 to provide a toe space. Inlet lines 14 for different pre-mixed soft drinks pass into drawers 10 through holes in the side of the cabinet from holding bottles 16, only one of which is shown. Line 18 can lead to another bottle 16 in series with the one shown or it can be a pressuring line for forcing soft drink from bottle 16 shown, if desired. Lines 20 are return or outlet lines from cabinet 6 for the cooled soft drink, they passing the cooled drink to dispenser 22 having faucets 24 through which the drink is run into the serving cup or glass (not shown). The cabinet 6 shown has three drawer units to cool and serve three soft drinks, or the same soft drink from more than one faucet. Any number of drawer units can be used, as desired, and positioned in vertical relation. I have found it desirable to use a metal or wood housing 8 which is insulated against heat passage, and non-corrosive metal drawer units with the fronts of wood and insulated against heat passage.

In Figs. 2 and 3 is depicted a preferred embodiment of my cooling means wherein cabinet 6 is made with the housing therefor in sections, a lower section 26 and an upper section 28, and with a top 30 therefor. More than the two sections shown can be used or one section only can be used, if desired, each one holding a drawer 10 and cooling a soft drink. The cabinet housing 26 and 28 and top 30 are desirably insulated, as is the front panel of drawer 10. The sections are desirably removably connected together by fastening means 31 which can be any suitable latching means, for example, the trunk type latch shown. Bottom section 26 has a bottom 33 therein

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with a drain 35. Top section 28 has a channel groove along the bottom of the sides thereof into which the top edge of the sides of section 26 fit when mounted. Transverse frame and support members 36 hold the sides together in the front, and back panel 38 holds the sides together at the rear. Drawer slides 40 are fastened to the sides of the sections to receive corresponding slides 42 on the drawer, and to slidably mount the drawers 10.

The drawer 10 holds the heat exchange assembly 45 which preferably rests on the bottom 47 thereof. Heat exchange assembly 45 has a lower cooling coil 50 having a plurality of passes through which soft drinks to be cooled pass in series from inlet 52 to outlet 54. Cooling coil 50 is connected in series to cooling plate 55 which has a passageway 57 therethrough making a plurality of passes back and forth in series within plate 55 from the inlet at end 59 to the outlet 61. Coil 50 and plate 55 are preferably made of non-corrosive metal having a high heat transfer coefficient. Plate 55 is spaced from coil 50, this being very important to efficient operation of the cooler, and spacers or hangers 62 are attached thereto in any suitable manner such as by welding. Inlet line 14 enters through one of the holes 63 in the housing section and is connected to coil 50 inlet 52, and delivery line 20 for cooled soft drink is connected to plate outlet 61, and then passes out through the housing section through the other hole 63. Thus, the pre-mixed soft drink from bottle 16 passes first through coil 50 and then through passageway 57 in plate 55 and out outlet 61. This is the preferred direction of passage, with coil 50 which is immersed in ice water during operation giving a pre-cool.

Drawers 10 have apertures 65 in the back thereof to maintain a constant liquid level at line 67 during operation. Water overflows from holes 65 and down the back of the drawer and off drip 69 which runs along the back of the drawer. This water is removed by drain 35, and is prevented from running out of the cabinet by stop 70 along the front edge of the bottom of the lower section. In this preferred embodiment of my new drawer cooling unit, the placement and size of apertures 65 is very important. They are positioned and sized so that the water level is above coil 50, and is below plate 55 so that water does not cover plate 55. In operation cracked ice is placed in drawers 10 on top of plate 55. As the ice melts water runs over and off the plate into the liquid tight lower portion of the drawer. The water collects until it reaches the level of line 67 over coil 50, and then runs out apertures 65. The flowing water on plate 55 and the agitation of the water falling from the plate and overflowing through holes 65 results in no build up of a low heat transfer coefficient film on plate 55 or coil 50, and results in a cooling unit of high efficiency.

In Fig. 4 is shown another preferred embodiment of my cabinet cooler having a bin-type drawer 70 tiltably mounted in a cabinet 72 by hinge 75. Front 74 has a handle 76 thereon to open the cabinet to remove the heat exchange assembly from the bottom, if desired, or to add cracked ice for cooling. The cabinet preferably rests on supports 78. The cooling operation is the same as that described hereinbefore for the cooler of Figs. 2 and 3. And, the bin-type structure can be made sectionalized as in the case of the cooler of Figs. 2 and 3, or several drawers 70 can be mounted in one cabinet as shown in Fig. 1.

As will be evident to those skilled in the art, various modifications of this invention can be made, or followed in the light of this disclosure and discussion, without departing from the spirit or scope of the disclosure or from the scope of the claims.

I claim:

1. Cabinet cooling means, comprising, in combination, a cabinet having an insulated outer housing with a drain in the lower portion thereof, a plurality of vertically spaced drawers mounted in said housing to open individ-

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ually, said drawers being liquid tight in the lower portion, each of said drawers having a heat exchange assembly removably mounted therein in the lower portion and resting on the bottom of said drawer, said heat exchange assembly having a lower metal coil with a plurality of passes lying in a substantially horizontal plane and a solid metal plate having a conduit therethrough making a plurality of passes through said plate, said plate positioned above said cooling coil, spaced therefrom and lying in a substantially horizontal plane, said cooling coil and plate conduit connected in series, an inlet conduit for fluid to be cooled passing through said cabinet housing and connected to the inlet of said cooling coil, and an outlet conduit for cooled fluid connected to the outlet of said plate conduit and passing out through said cabinet housing, each of said drawers having an aperture therethrough at a point therein between the plane of the upper surface of said cooling coil and the plane of the lower surface of said plate when said cooling coil assembly is resting on the bottom of the drawer and the drawer is within said cabinet housing so that a liquid level can be maintained in said drawer above said cooling coil with said liquid level below said plate, and said drawer adapted to receive and hold ice on said plate to cool a fluid passed into said cabinet through said inlet conduit, next through said cooling coil, next through said conduit in said plate and then out through said outlet conduit.

2. The cooling means of claim 1 wherein said cabinet housing is made in sections stackable in vertical relation with each section mounting one of said drawers, means mounted on said cabinet sections adapted to detachably connect same together, and a top member having means adapted to detachably connect same to the top of the uppermost section.

3. The cooling means of claim 2 wherein said drawers are slidably mounted in said sections.

4. The cooling means of claim 1 wherein said drawers are slidably mounted in said housing.

5. The cooling means of claim 1 wherein said drawers are bin-type tiltably mounted in said housing.

6. Cabinet cooling means, comprising, in combination, a cabinet housing, a plurality of vertically spaced drawers mountable in said housing, a heat exchange assembly for each of said drawers mountable in the lower portion of said drawers, said heat exchange assemblies having a lower cooling coil having a plurality of passes and an upper cooling plate having a conduit therethrough making a plurality of passes, said cooling coil and cooling plate being connected together in fluid flow relation therethrough and said cooling plate being spaced from said cooling coil, inlet conduit means connectable to said heat exchange assembly adaptable to deliver fluid to be cooled thereto, outlet conduit means connectable to said heat exchange assembly adaptable to receive cooled fluid therefrom, aperture means in each of said drawers positioned and adapted to maintain a substantially constant liquid level in said drawers during cooling operation with the liquid covering said cooling coil and said level of said liquid below said cooling plate, and said drawers adapted to receive ice on the upper surface of said cooling plate with said heat exchange assembly mounted therein.

7. The cabinet cooling means of claim 6 wherein said drawers are slidably mounted in said cabinet housing.

8. The cabinet cooling means of claim 7 wherein said cabinet housing and drawers therefor are in sections stackable vertically, and said sections have means thereon to removably connect said sections together.

9. The cabinet cooling means of claim 6 wherein said drawers are of bin-type tiltably mounted in said cabinet housing.

10. Means for cooling fluids, comprising, in combination, a drawer unit mountable in a cabinet, a heat exchange assembly removably mountable in the lower portion of

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said drawer to rest on the bottom thereof, said heat exchange assembly having a lower heat exchange coil with a plurality of passes and an upper plate having a conduit therethrough making a plurality of passes, said coil and conduit of said plate joined in series fluid flow relation and spaced from each other, conduit means to introduce fluid to be cooled into the inlet of said coil, conduit means to receive cooled fluid from the outlet of said plate, and said drawer having aperture means therethrough to maintain in use a liquid level covering said coil and below said plate, and said drawer adapted to receive and hold ice on top of said plate with said heat exchange assembly mounted in said drawer.

11. Means for cooling fluids, comprising, in combination, a drawer mountable in a cabinet, a heat exchange assembly mountable in said drawer, said heat exchange assembly having a lower cooling coil and an upper cooling plate having a fluid conduit therethrough, said coil and plate being connected together in fluid flow relation and spaced from each other, conduit means connectable to introduce fluid to be cooled into the inlet of said heat exchange assembly, conduit means connectable to receive cooled fluid from said heat exchange assembly, aperture means in said drawer adapted to maintain in operation a liquid level above said cooling coil and below said plate, and said drawer adapted to receive ice on the top of said plate with said heat exchange assembly mounted in said drawer.

12. Cabinet cooling means, comprising, in combination, a cabinet housing, a drawer mountable in said housing, rail means mounted on said drawer and track means mounted on said cabinet to receive and mount said drawer, a heat exchange assembly mountable in said drawer, said heat exchange assembly comprising a cooling plate having a flat upper surface and positioned in the bottom of said drawer when mounted therein and having a passageway formed therein with a plurality of passes therethrough and having an inlet and an outlet, inlet conduit means to deliver fluid to said inlet of said passageway of said heat exchange assembly, outlet conduit means to receive fluid from said outlet of said passageway of said heat exchange assembly, and said drawer constructed to receive ice in contact with the flat top surface of said cooling plate when same is mounted in said drawer, and said cabinet, drawer and heat exchange assembly having drain means constructed, mounted and positioned with the outlet thereof below the bottom of said cooling plate to pass from in contact with all portions of said cooling plate water resulting from melting of said ice.

13. Means for cooling fluids, comprising, in combination, a drawer, rail means mounted on said drawer and constructed and positioned to mount said drawer in a horizontal position below a horizontal structure member, a heat exchange assembly mountable in said drawer, said heat exchange assembly comprising a cooling plate having a flat upper surface and positioned in the bottom of said

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drawer when mounted therein and having a passageway formed therein with a plurality of passes therethrough and having an inlet and an outlet, inlet conduit means to deliver fluid to said inlet of said passageway of said heat exchange assembly, outlet conduit means to receive fluid from said outlet of said passageway of said assembly, and said drawer constructed to receive ice in contact with the flat top surface of said cooling plate, and said drawer and heat exchange assembly having drain means constructed, mounted and positioned with the outlet thereof below the bottom of said cooling plate to pass from in contact with all portions of said cooling plate water resulting from melting said ice.

14. Means for cooling fluids, comprising, in combination, a drawer, rail means mounted on said drawer and constructed and positioned to mount said drawer in a horizontal position below a horizontal structural member, heat exchange means mountable in the bottom of said drawer, said heat exchange means having a plate-type cooling element having a flat upper surface portion to support ice in direct contact therewith and having a passageway formed therethrough with an inlet and an outlet to receive and deliver said fluid, and said drawer and heat exchange means having means to contain said ice therein in direct contact with said flat upper surface portion of said heat exchange means and having drain means constructed, mounted and positioned with an outlet to pass water resulting from melting said ice from in contact with said upper surface portion of said heat exchange means and out of contact with all portions of said heat exchange means.

15. Means for cooling fluids, comprising, a structure having ice containing means and heat exchange means and constructed to be mounted in the manner of a drawer, rail means constructed, mountable and operable with said structure to mount same in a horizontal position below a horizontal structural member, said heat exchange means having a plate-type cooling element having a flat upper surface portion to support ice in direct contact therewith and having a passageway for fluid therein and having an inlet and an outlet to receive and deliver said fluid, said ice containing means having side members to retain said ice on said flat upper surface of said heat exchange means, and said ice containing means and heat exchange means being positionable and having drain means constructed, mounted and positioned with an outlet to pass water resulting from melting said ice from in contact with said flat upper surface portion of said heat exchange means and out of contact with all portions of said plate-type element of said heat exchange means.

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