March 16, 1937. A. ROREN 2,074,074

COOLING AND DISPENSING APPARATUS

Filed July 23, 1935 2 Sheets-Sheet 1

FIG. 1.

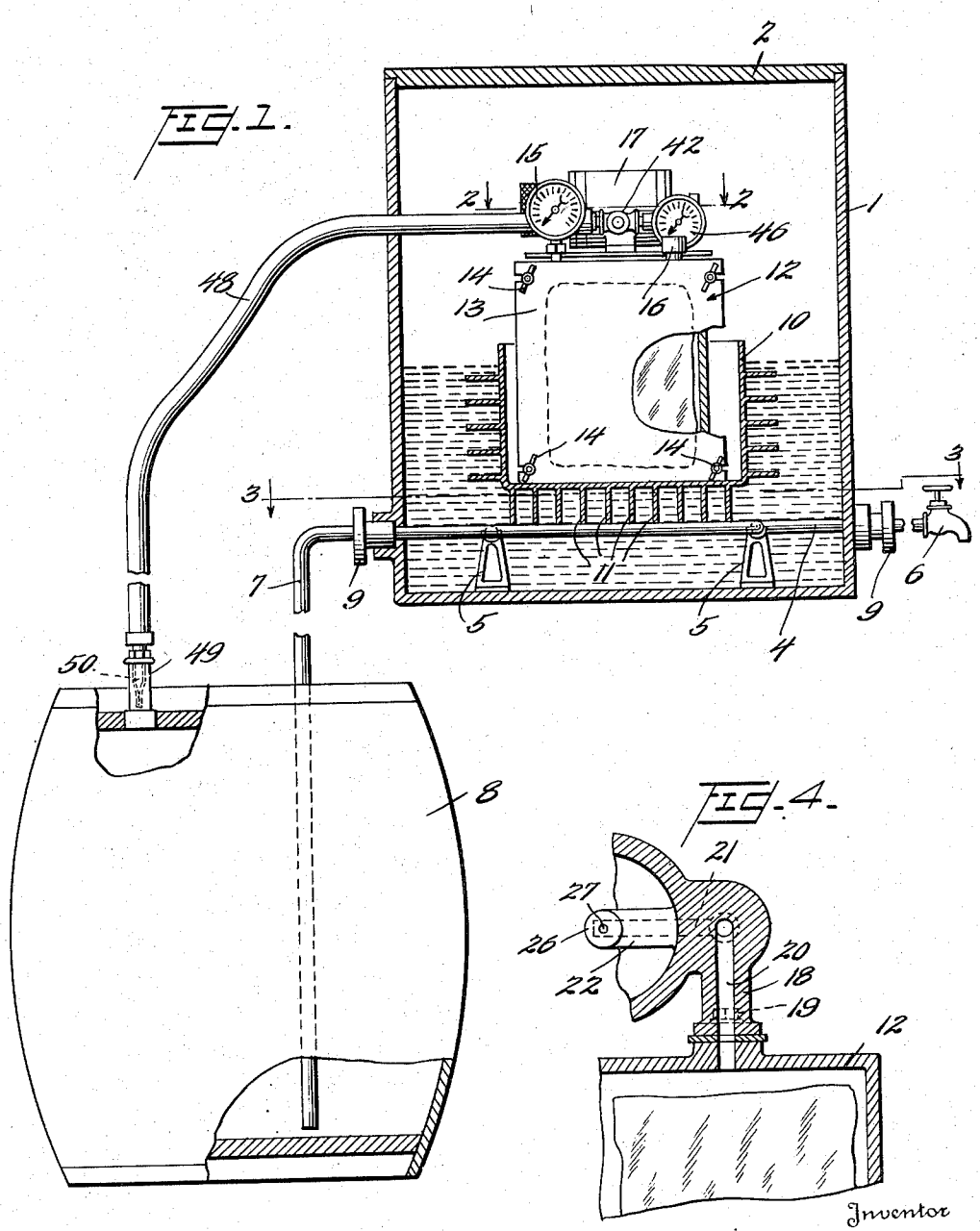


FIG. 4.

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Filed July 23, 1935 2 Sheets-Sheet 2

FIG. 2.

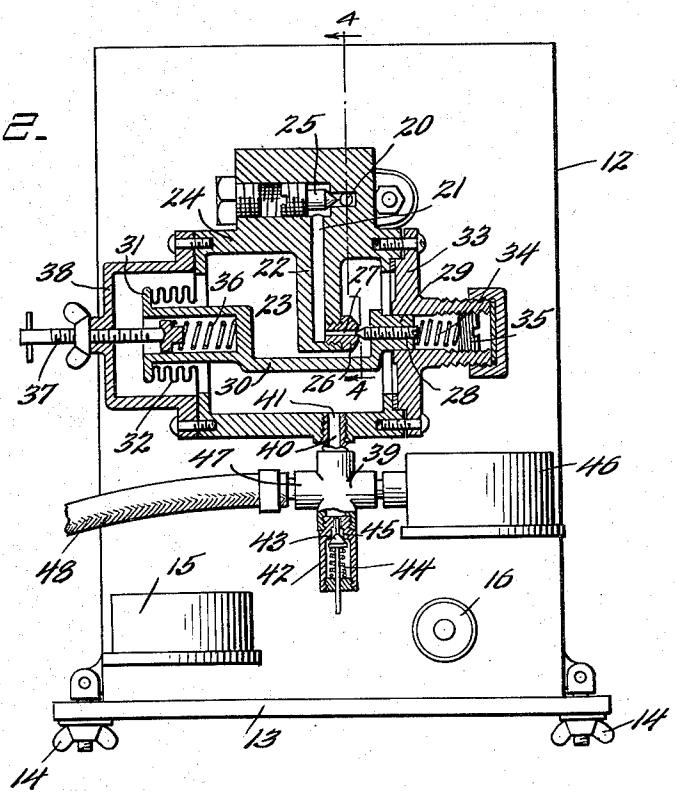
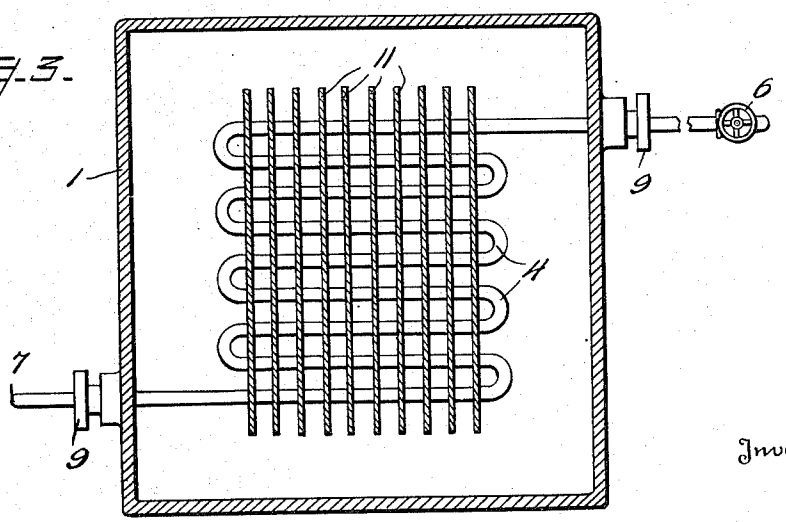


FIG. 3.



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2,074,074

COOLING AND DISPENSING APPARATUS

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Application July 23, 1935, Serial No. 32,797

3 Claims. (Cl. 225—40)

This invention relates to a liquid cooling and dispensing apparatus.

An object of the invention is to provide an apparatus for cooling and dispensing a liquid which utilizes the cold liberated by the evaporation of a solid refrigerant such as solid carbon dioxide for cooling of the liquid to be dispensed and the gas generated by the evaporation of the solid refrigerant for placing said liquid under the desired head pressure for dispensing purposes.

Another object of the invention is to provide an apparatus for cooling and dispensing a liquid which is simple, compact, and easy to operate.

A further object of the invention is to provide an apparatus for cooling and dispensing a liquid in which the cold liberated by the evaporation of a solid refrigerant is utilized to effect the cooling of the cooling liquid surrounding the dispensing conduit containing the liquid to be dispensed.

Other objects and advantages will become apparent from the following description.

An embodiment of the invention is illustrated by way of example in the accompanying drawings, wherein

Figure 1 is a side elevation view, with parts in section and parts broken away, showing the cooling and dispensing apparatus of the present invention.

Figure 2 is a plan view, partly in section, taken on the line 2—2 of Figure 1, showing the structure of the carbon dioxide unit.

Figure 3 is a plan view, taken on the line 3—3 of Figure 1 showing the structure of the dispensing coil.

Figure 4 is a section taken on the line 4—4 of Figure 2.

Referring to the drawings, the numeral 1 designates a receptacle or chamber having a removable cover 2. Disposed within the chamber 1 is a dispensing coil 4 of the type shown in Figure 3, which coil is fixedly supported therein by means of supports 5. To one end of the coil 4 is attached a dispensing faucet 6. The other free end of the coil 4 is attached to the pipe 7 leading into the keg 8 containing the liquid to be dispensed, for example beer, by means of the coupling 9. As will be obvious from Figure 1, the chamber or receptacle 1 is partially filled with a cooling liquid like water.

Disposed within the chamber 1 and resting upon the coil 4 is a tray 10 which is provided with fins 11 which protrude exteriorly from the walls of the tray. The fins of the bottom wall of the tray contact with and rest upon the coil 4. The fins and also the tray are preferably made of a material having high conductivity, as for example copper. As shown in Figure 1, the fins are integral with the walls of the tray.

Mounted within the tray 10 is a box or receptacle 12 which is of such size and dimensions as to receive a piece of a solid refrigerant like solid carbon dioxide of the standard size. This box or receptacle is made of metal and is so constructed that it will withstand the pressure of the gaseous carbon dioxide generated by the evaporation of the solid carbon dioxide. The receptacle is closed pressure tight by any suitable means such as a cover 13 clamped on tight by clamps 14.

The receptacle 12 is provided with a suitable pressure gauge 15 for registering the pressure within the receptacle. The receptacle is also provided with a safety valve 16 of the conventional membrane type which, when a given excessive pressure exists therein, the membrane will blow out and thus permit the escape of the gas.

On the top of the receptacle 12 is mounted a valve housing 17 having a leg 18 which is secured to the receptacle by means of screws 19. The leg 18 has a vertical inlet passage 20 which communicates with a horizontal passage 21 in the boss 22 that extends into a chamber 23 of the reducing valve body 24 of the valve housing 17. The inlet passage 20 is closed at the top by an adjustable valve 25, the valve passage in turn being closed by an outside cap. The inner end of the horizontal passage 21 has screwed into it an apertured valve seat nipple 26, the aperture 27 of which is closed by a needle valve 28 adjustably supported in a boss 29. The latter forms the one end of a floating yoke 30 within the valve chamber 23. The other end of said yoke forms a flange 31 and between the flange and the valve body 24 there is mounted a bellows diaphragm 32.

The yoke 30 is held in position by the boss 29 which slides in the valve cover 33 and a spring 34 tends to force the yoke in one direction to cause the needle valve 28 to close the aperture 27. The tension of the spring is regulated by a screw 35. The other end of the yoke is held in position by the diaphragm 32 and a spring 36 which bears against the yoke 30 and is adjustably held by a screw 37 in the dome cap 38 which closes the other end of the valve housing 17.

It is thus apparent that carbon dioxide gas liberated by the evaporation of the solid carbon dioxide in the receptacle 12 passes upwardly through the passage 20 and then into the valve

chamber 23 through the passage 21. The flow of gas is controlled first by the valve 25 and secondly by the operation of the needle valve 28. The reduction in pressure may be controlled to a very fine point by adjusting the two opposed springs 34 and 35 in combination with the diaphragm 31. An incoming excess of pressure acts against the diaphragm 31 to close the needle valve 28.

Into the valve housing 17 there is screwed a cross connection 39 which has four openings or passages. One branch 40 communicates with the outlet 41 of the chamber 23 of the reducing valve body 24. To another, directly opposite, there is attached a bleeder valve 42 which comprises a needle valve 43 seated under pressure of a spring 44 to close the opening 45 in the valve. A third branch connects with a gauge 46 and the fourth branch 47 is in communication with a flexible hose 48. The other end of the hose 48 has secured thereto a standard coupling 49, as shown in Figure 1 which forms the male member of a standard valve for connection with the complemental female member which is fixedly mounted in the keg 8. The coupling contains a check valve 50 of conventional construction which permits the gas to go only into the keg 8. As the coupling 49 is of the conventional construction, no further description is deemed necessary.

In operation of the cooling and dispensing apparatus of the present invention, a block of solid carbon dioxide is placed within the receptacle 12, and the receptacle then closed pressure tight by means of the cover 13 and clamps 14. The receptacle 12 which includes the carbon dioxide treating unit is then mounted within the tray 10 within the chamber 1, and flexible hose 48 attached to the keg 8 by means of the coupling 49. The valve 25 is adjusted to regulate the pressure within the receptacle 12, and the reducing valve elements are next set to reduce the pressure to the desired degree.

The absorption of heat by the solid carbon dioxide contained within the receptacle 12 causes the evaporation of the solid carbon dioxide and the consequent generation of carbon dioxide gas. The evaporation of the solid carbon dioxide causes a thin film of frozen moisture to form upon the exterior walls of the receptacle 12, which film cools the tray 10. The cold of the tray is transferred by means of the fins 11 to the surrounding cooling liquid to cool the liquid and thereby cool the dispensing conduit 4 containing the liquid to be dispensed.

The generation of carbon dioxide gas by the evaporation of the solid carbon dioxide causes an increase of pressure within the interior of the receptacle 12, the pressure being recorded on the gauge 15. The carbon dioxide gas thus generated passes from the receptacle 12 into the reducing valve housing 17 wherein it is reduced to the desired predetermined pressure and thence at such reduced pressure into the keg 8 containing the liquid to be dispensed by means of the flexible tube 48. The introduction of the carbon dioxide gas under the predetermined reduced pressure into the keg 8 places the liquid contained therein under a head pressure sufficient for discharge of the liquid present in the dispensing conduit 4 upon the opening of the faucet 6.

Although the tray 10 is shown as being mounted within the receptacle 1 so that the fins 11 thereof are in contact and rest upon the coil 4, it is to be understood that the tray 10 and box 12 together with its accessories may be disposed within the receptacle in such manner that the fins are suitably spaced from the coil 4.

It will be understood that the cooling and dispensing apparatus may be constructed and arranged as best suited to meet the requirements of use and that, except as pointed out in the accompanying claims, the invention is not restricted to the particular construction and arrangement shown and described herein.

Having fully described the invention, what I claim as new and desire to secure by Letters Patent is:

1. Apparatus for cooling and dispensing liquid comprising a source of supply of the liquid to be dispensed, a chamber having a space therein for containing a cooling liquid, a dispensing conduit leading from said source of supply and extending through said space at a point adjacent the bottom thereof, a tray located in said space and having fins of a material of high conductivity protruding from the exterior thereof, a closed receptacle for solid carbon dioxide mounted within said tray, and means in communication with said receptacle for conveying the gaseous carbon dioxide liberated by the evaporation of solid carbon dioxide under a predetermined pressure to said source of supply, whereby the cold generated by the evaporation of the solid carbon dioxide may be transferred from the walls of said receptacle through the fins of said tray to the cooling liquid surrounding said tray and the portion of the dispensing conduit within said space to cool the liquid contained therein and the gaseous carbon dioxide liberated by the evaporation of the solid carbon dioxide may be introduced into the source of liquid supply to place it under head pressure sufficient for discharge of the liquid contained in the dispensing conduit through a dispensing faucet.

2. Apparatus for cooling and dispensing liquid comprising a source of supply of the liquid to be dispensed, a chamber adapted to contain a cooling liquid, a dispensing conduit leading from said source of supply and extending through said chamber at a point adjacent the bottom thereof, a tray, fins of high conductivity material on the exterior of said tray and integral therewith, said fins of the bottom wall of said tray being in contact with and resting upon the portion of said conduit within said chamber, a closed receptacle for solid carbon dioxide mounted within said tray, the wall structure of said tray being in heat transfer relation with the wall structure of said receptacle, and means in communication with said receptacle for conveying the gaseous carbon dioxide liberated by the evaporation of solid carbon dioxide under a predetermined reduced pressure to said source of supply, whereby the cold generated by the evaporation of the solid carbon dioxide may be transferred from the walls of said receptacle through the fins of said tray to the cooling liquid surrounding said tray and the portion of the dispensing conduit within said chamber to cool the liquid contained therein and the gaseous carbon dioxide liberated by the evaporation of the solid carbon dioxide may be introduced into the source of liquid supply to place it under head pressure sufficient for discharge of the liquid contained in the dispensing conduit through a dispensing faucet.

3. Apparatus for cooling and dispensing liquid comprising a source of supply of the liquid to be dispensed, a chamber adapted to contain a cool-

ing liquid, a dispensing conduit leading from said source of supply and extending through said chamber at a point adjacent the bottom thereof, a tray, fins of high conductivity material on the exterior of said tray and integral therewith, said fins of the bottom wall of said tray being in contact with and resting upon the portion of said conduit within said chamber, a closed receptacle for solid carbon dioxide mounted within said tray, the wall structure of said tray being in heat transfer relation with the wall structure of said receptacle and terminating at a point substantially below the top wall of said receptacle, and means in communication with said receptacle for conveying the gaseous carbon dioxide liberated by the evaporation of solid carbon dixoide under a predetermined reduced pressure to said source of supply, whereby the cold generated by the evaporation of the solid carbon dioxide may be transferred from the walls of said receptacle through the fins of said tray to the cooling liquid surrounding said tray and the portion of the dispensing conduit within said chamber to cool the liquid contained therein and the gaseous carbon dioxide liberated by the evaporation of the solid carbon dioxide may be introduced into the source of liquid supply to place it under head pressure sufficient for discharge of the liquid contained in the dispensing conduit through a dispensing faucet.

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