

Jan. 31, 1939.

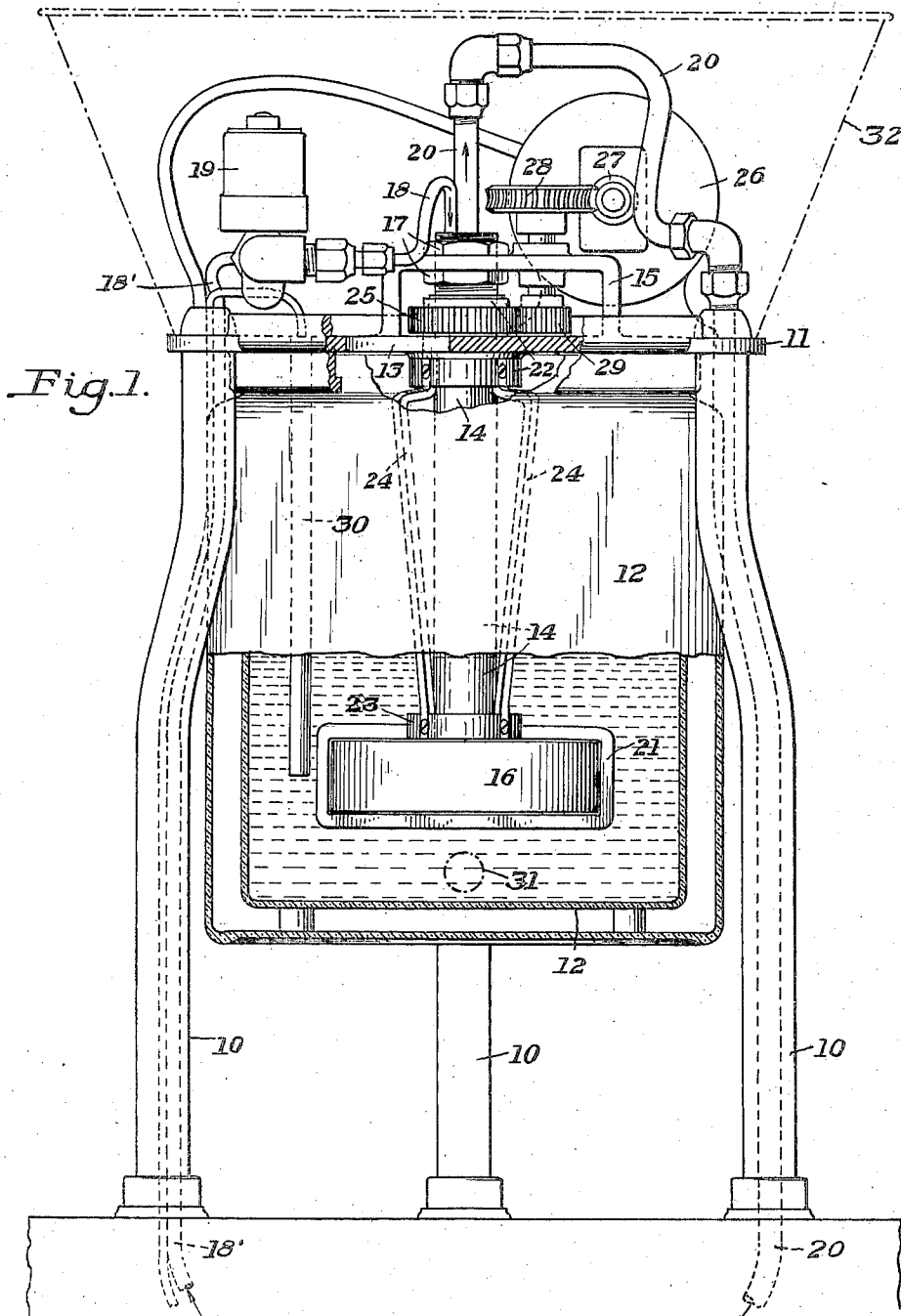
F. L. ARENSBERG

2,145,331

BEVERAGE DISPENSER

Filed May 22, 1936

3 Sheets-Sheet 1



INVENTOR
Francis L. Arensberg
by his atty's
Stebbins, Blankens & Parmelee

Jan. 31, 1939.

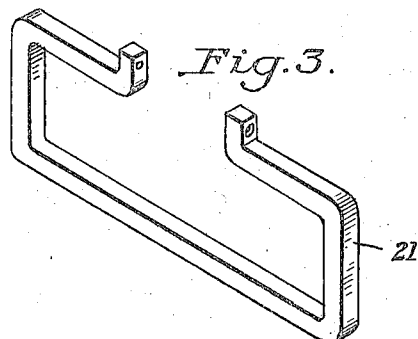
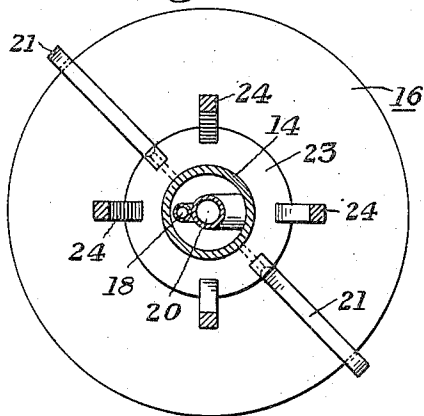
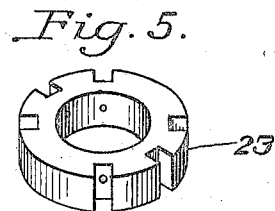
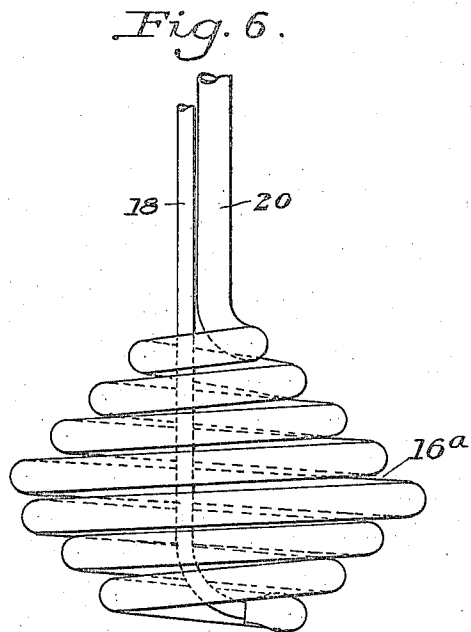
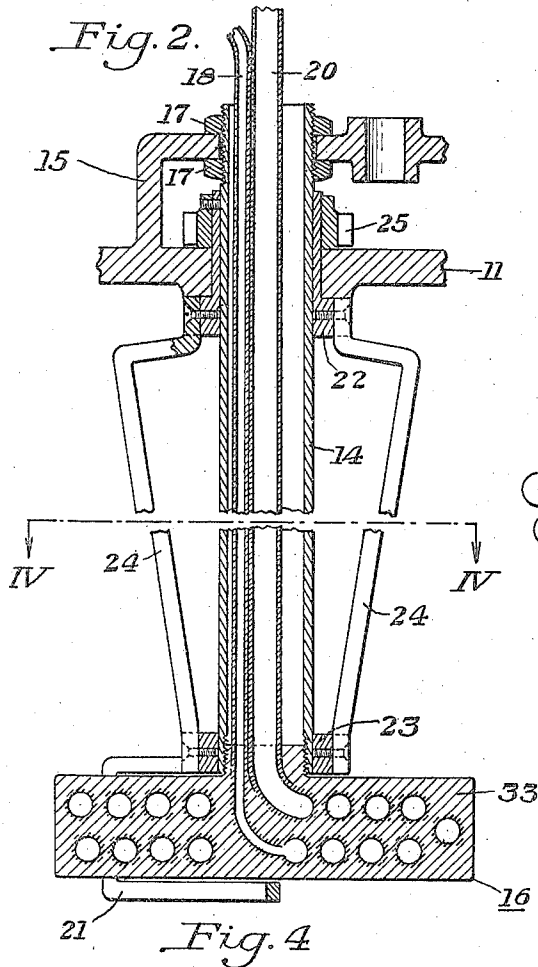
F. L. ARENSBERG

2,145,331

BEVERAGE DISPENSER

Filed May 22, 1936

3 Sheets-Sheet 2



INVENTOR
Francis L. Arensberg
by his attys
Stebbins, Hendon & Parmelee

Jan. 31, 1939.

F. L. ARENSBERG

2,145,331

BEVERAGE DISPENSER

Filed May 22, 1936

3 Sheets-Sheet 3

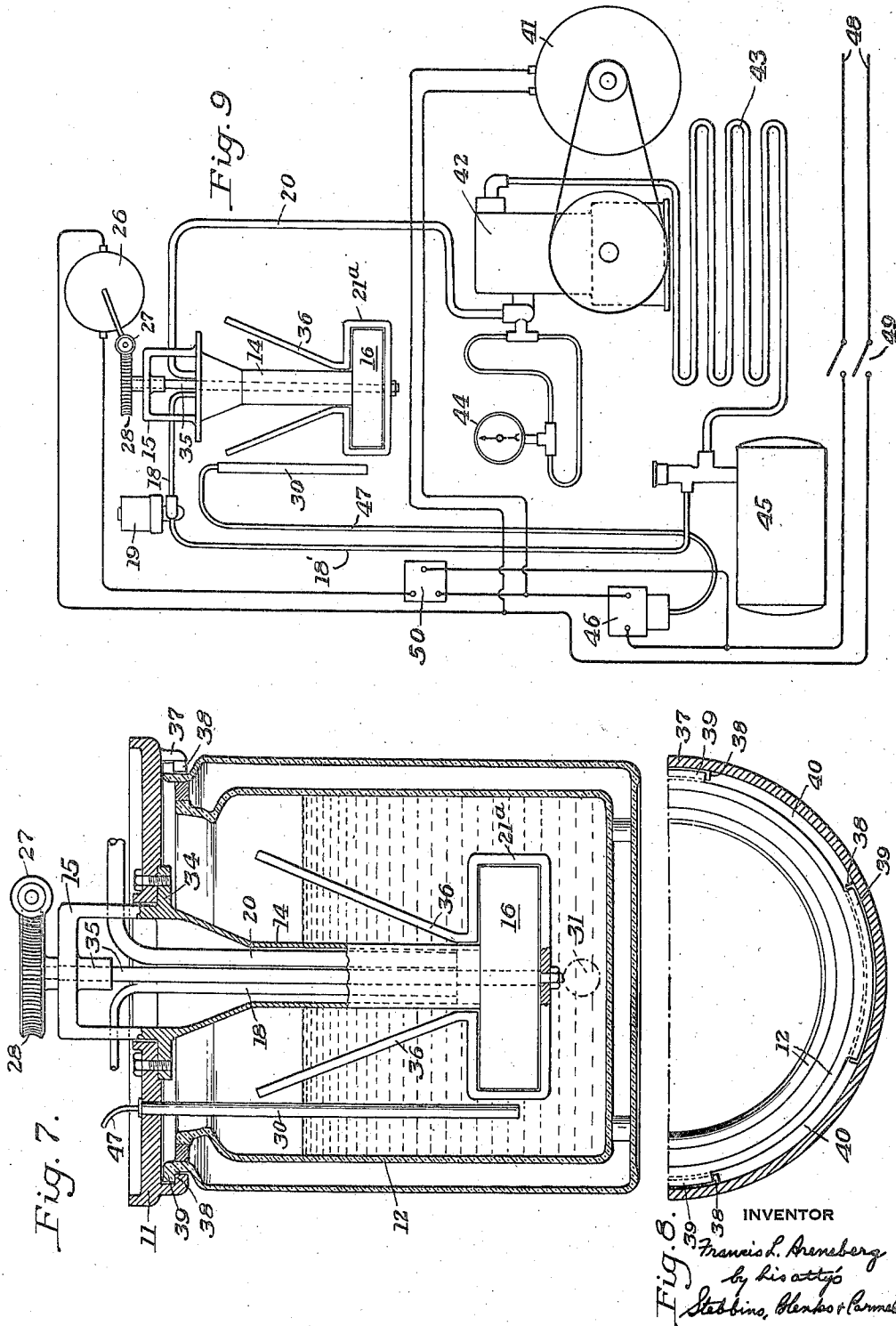


Fig. 8.
 INVENTOR
Francis L. Arensberg
 by his atty's
Stebbins, Henkel & Armelle

UNITED STATES PATENT OFFICE

2,145,331

BEVERAGE DISPENSER

Francis L. Arensberg, Pittsburgh, Pa., assignor
to Reymer & Brothers, Incorporated, Pitts-
burgh, Pa., a corporation of Pennsylvania

Application May 22, 1936, Serial No. 81,255

3 Claims. (Cl. 62-114)

The device is designed for cooling and dispensing fruit juice beverages of the character which are composed of fruit juices, water and other ingredients and which are served in a partially frozen condition. When served, they contain large quantities of small ice crystals and have a consistency much like ordinary soft slush. It is the purpose of this invention to provide a machine which is efficient in operation, safe, and neat in appearance. It is efficient in that it cools the beverage under the direct expansion of a gas of the type normally used in refrigerating apparatus, and eliminates the intermediate cooling brine normally used. It is safe in that an expansion coil with a high safety factor is reinforced by a solid metal casting. It is neat in appearance because the cooling unit is extremely compact. All of these features are of importance because the machine is designed to be used on the counter of a soda fountain. Another advantage of the smallness of the cooling unit lies in the fact that it may be positioned near the bottom of the container so that its entire cooling effect is utilized until practically all of the beverage has been dispensed.

In the drawings:

Fig. 1 is an elevational view partly in section of the entire machine;

Fig. 2 is an elevational view in section and on a larger scale of another embodiment of the cooling unit;

Fig. 3 is an isometric view of the scraper mechanism;

Fig. 4 is a bottom plan view showing the arrangement of the scraper and paddles;

Fig. 5 is an isometric view of a collar on which the paddles are mounted;

Fig. 6 is an elevation view of the cooling coil in the process of construction;

Fig. 7 is a sectional view in elevation of the container showing the means of mounting the container;

Fig. 8 is a horizontal cross section of Figure 7; and

Fig. 9 is a schematic diagram showing the gas and electrical connections.

As shown in Fig. 1, a supporting stand is provided by three curved pipes 10 to the upper portion of which is secured a ring 11. The ring 11 carries the beverage container 12 by means of the usual bayonet joint, not shown in Fig. 1, but to be described later. The container 12 is made of glass and has double walls for the purpose of heat insulation. The ring has an eccentrically positioned opening 13, through which beverage to

be cooled may be poured into the container. Mounted on the member 11 is a bridge 15 from which is suspended a pipe or casing 14. Secured to the lower end of this pipe or casing, preferably by means of a threaded connection, is a refrigerating unit 16, the refrigerating unit being relatively close to the bottom of the inside of the container so that it may be immersed in the fluid to be cooled. The unit is preferably of the particular construction hereinafter more fully described. Two nuts 17 at the upper end of the pipe or casing 14 are shown for holding it in position. Within the refrigerating unit is a circulating passage for a refrigerant. The refrigerant preferably used is a gas which is first compressed into a liquid state and then expanded into a vapor in the refrigerating unit. A pipe 18 supplies the refrigerant in a liquid state from a compressor-condenser unit of any suitable construction, to an expansion valve 19 located adjacent the top of the dispenser. The liquid refrigerant is expanded into a vapor by the expansion valve 19 and then flows through the pipe 18 leading through the casing 14 into the refrigerating unit 16. A second pipe 20 also passing down the inside of the casing 14 to the unit 16 carries spent refrigerant back to the compressor.

When the machine is in operation, refrigerant is passed in a predetermined volume through the unit 16, which is immersed in the fluid to be cooled. Ice crystals are thereby formed on the refrigerating unit 16. As it is the purpose of the machine to supply a large quantity of small crystals and to give the beverage a slush-like consistency, these crystals must be scraped off the unit before they attain large size.

The scraper for removing the ice crystals so formed is preferably of the shape shown in detail in Fig. 3, the scraper 21 being formed of a metal bar of square cross section bent to a yoke shape so as to fit closely about the refrigerating unit 16. The free ends of the yoke-like member 21 are secured to a collar 23 rotatably fitted about the casing 14 above the refrigerating unit. Within the ring-like top member 11 and bearing on the outside of the casing 14 is a sleeve 22. Depending legs 24 serve to connect the collar 23 and its attached scraper 21 with the sleeve, and also provide paddles for agitating the contents of the dispenser. The sleeve is provided with a gear wheel 25, a motor 26 at the top of the unit serving to drive the gear 25 through a worm gear 27, worm wheel 28 and pinion 29, and thereby rotate the scraper. A thermostat 30 supported on member 11 projects down into the dispenser to a

point near the refrigerating unit to maintain the beverage at any predetermined desired temperature. A faucet 31 of the usual plunger type is provided for drawing off the beverage as desired.

5 An enclosing hood or cover, indicated at 32 in chain lines in Fig. 1, may be employed to enclose the top of the dispenser.

Fig. 2 shows a sectional view of the refrigerating unit 16 on a larger scale. This unit is made by coiling a length of metal pipe, preferably aluminum, in increasing and decreasing circles, as shown in Fig. 6. The coil 16a thus formed is then compressed along its axis until the loops are in the position shown in Fig. 2. A body of metal 33, preferably aluminum, is then cast, as by die casting, about the compressed coil 16a to produce the flat cylindrical refrigerating unit 16 as shown. The advantages of this construction are three-fold: first, it increases the strength of the refrigerating unit by reinforcing the coils. This feature is of great importance when it is considered that the machine is designed to be placed on soda fountain counters within a short distance of customers in a store and that the pressures normally employed in cooling systems vary from 100 to 200 pounds per square inch. Second, it provides a smooth surface for the formation of ice crystals and from which the crystals when formed can be readily scraped. Third, it provides a cooling system that is highly efficient because by die casting aluminum around a coil made of aluminum, welding takes place between the casting and the coil so that heat is transferred from the beverage to the expanding gas by means of an all-metal path and therefore highly efficient conductor. It is further to be noted that this unit being compact may be located near the bottom of the container. Its entire cooling effect is, therefore, utilized until practically all of the beverage has been dispensed. Moreover, such a unit can be easily cleaned and is entirely sanitary, being without voids in which fruit particles can lodge.

Fig. 7 shows a modified construction for mounting the refrigerating unit, the scraper and paddles. The pipe or casing 14 is increased in diameter at its upper end, as shown. A flange 34 is made integral with the upper end of the pipe 14 and bolted to the supporting ring 11. A shaft 35 extends down through the bridge 15, the pipe 14 and the refrigerating unit 16. The scraper 21a is fastened at the point where this shaft projects beyond the refrigerating unit. The ends of the scraper are extended upwardly and outwardly at 36 to form paddles. The motor 26 is connected to the shaft 35 through the worm gear 27 and the pinion 28. This mounting of the refrigerating unit, scrapers and paddles is advantageous in that it is more simple to demount for the purpose of repair or cleaning than the arrangement shown in Figure 1.

Figs. 7 and 8 also show in detail the connection between the beverage container 12 and the ring support 11. An annular flange 37 extends down from the ring 11. Inwardly projecting lugs are formed at intervals on the flange 37, as shown in Fig. 8. The outer wall of the glass container is bent outward to form a ledge 39. This ledge is interrupted at intervals to correspond to the spacing of the lugs 38 of the ring support, as shown at 40 in Fig. 7. To apply the container to the dispenser, it is slipped under the dispenser, the legs 10 being bent outwardly to accommodate the insertion and removal of the container. When brought to position under the ring, the

container is raised to the proper level and turned until the ledge portions 39 rest on top of the lugs 38.

Fig. 9 is a diagram of a typical refrigerating and electrical circuit for the unit, but it will be understood that this is for the purpose of illustrating my invention and the invention is not limited to the arrangement shown. Any one of the refrigerants normally used in refrigerating machines may be employed. An electrical motor 41 runs the usual type of gas compressor 42. Compressed refrigerant flows from the compressor through the condenser 43, through the pipe 18' to the expansion valve 19. From the expansion valve 19, the expanded refrigerant flows through pipe 18 into the refrigerating unit 16, where it further expands and cools the beverage. The pipe 20 carries expanded refrigerant in its gaseous state back to the compressor 42. A pressure gauge 44 is connected at the junction of the return pipe 20 and the compressor 42. A small storage tank 45 is connected between the condenser 43 and the expansion valve 19 to provide a container for the refrigerant when the machine is taken apart for cleaning or repair purposes.

The thermostat 39 controls the electrical switch 46 by means of the tube 47. The machine is connected to a source of electrical power by wires 48, which are provided with the usual switch 49. A three-way switch 50 is connected between the switch 49 and the motor 26 and is so arranged that by throwing the switch one way, the motor 26 is connected in the same circuit as the thermostatically controlled switch 46 and the motor 41. When the beverage is cooled to the desired temperature, the thermostat will automatically disconnect both the compressor motor 41 and the stirring and scraping motor 26. By throwing the three-way switch 50 in its second position, the motor 26 may be operated independently of the thermostat and is controlled only by the switch 49.

From the foregoing, it will be seen that my invention provides a beverage dispenser which may be built in compact form and arranged for counter use. The glass receptacle for the beverage promotes the customer's interest in the product. The small compact disk-like refrigerating unit presents a clean appearance, requires but a small amount of the limited space available in the container. The scraper removes crystals before they become too large and solid. The ice crystals, which naturally rise to the top of the beverage, are kept dispersed through it by the paddles so that when a drink is withdrawn through the faucet, an adequate amount of crystals will flow with the liquid. Cleaning is facilitated by the ease of removal of the container, by the smooth surface of the refrigerating unit and by the contour of the paddles and scraper. The refrigerating unit, being of a flat cylindrical or disk-like shape, moreover provides a large liquid contacting surface on the top and bottom of the unit, providing a maximum refrigerating surface in a low depth of beverage.

I have illustrated and described by way of example only two embodiments of my invention, but it will be understood that the invention is not limited thereto, but may be otherwise embodied within the scope of the following claims.

I claim:

1. A machine for cooling and dispensing beverages in a partially frozen condition comprising a container, a refrigerating unit comprising a metal expansion coil embedded in a mass of met-

al of generally round shape and having a smooth surface on which ice crystals may form, and means for scraping the ice crystals from the refrigerating unit.

5 2. A beverage crystallizing and dispensing unit comprising a support, a container removably held in the support, a casing depending from the support into the container, a disk-like refrigerating unit at the lower end of the casing and in the lower part of the container, pipes within the casing 10 protected from contact with liquid in the container by said casing and for circulating refrigerant through the unit, a scraper supported at the exterior of the unit for removing ice crystals therefrom, and means for effecting relative rotary 15 movement between the unit and the scraper, said means comprising a driving mechanism on the support with a sleeve outside the casing, and stirring rods extending from the sleeve to the scraper

for operating the scraper and stirring the contents of the vessel above the unit.

3. A beverage cooling and dispensing device comprising a frame structure having legs and a support member carried thereby, a container removably hung from the support member, a casing member depending from the support into the container, a cylindrical refrigerating unit at the end of the casing, said unit having a height less than its diameter, scraper means about the refrigerating unit connected with stirring means 10 about the casing, and means on the scraper member for effecting relative movement between the scraper and refrigerating unit, said container being so arranged that it may be removed from the supporting member clear of the frame and replaced while the frame remains stationary and other parts of the device remain in position. 15

FRANCIS L. ARENSBERG.