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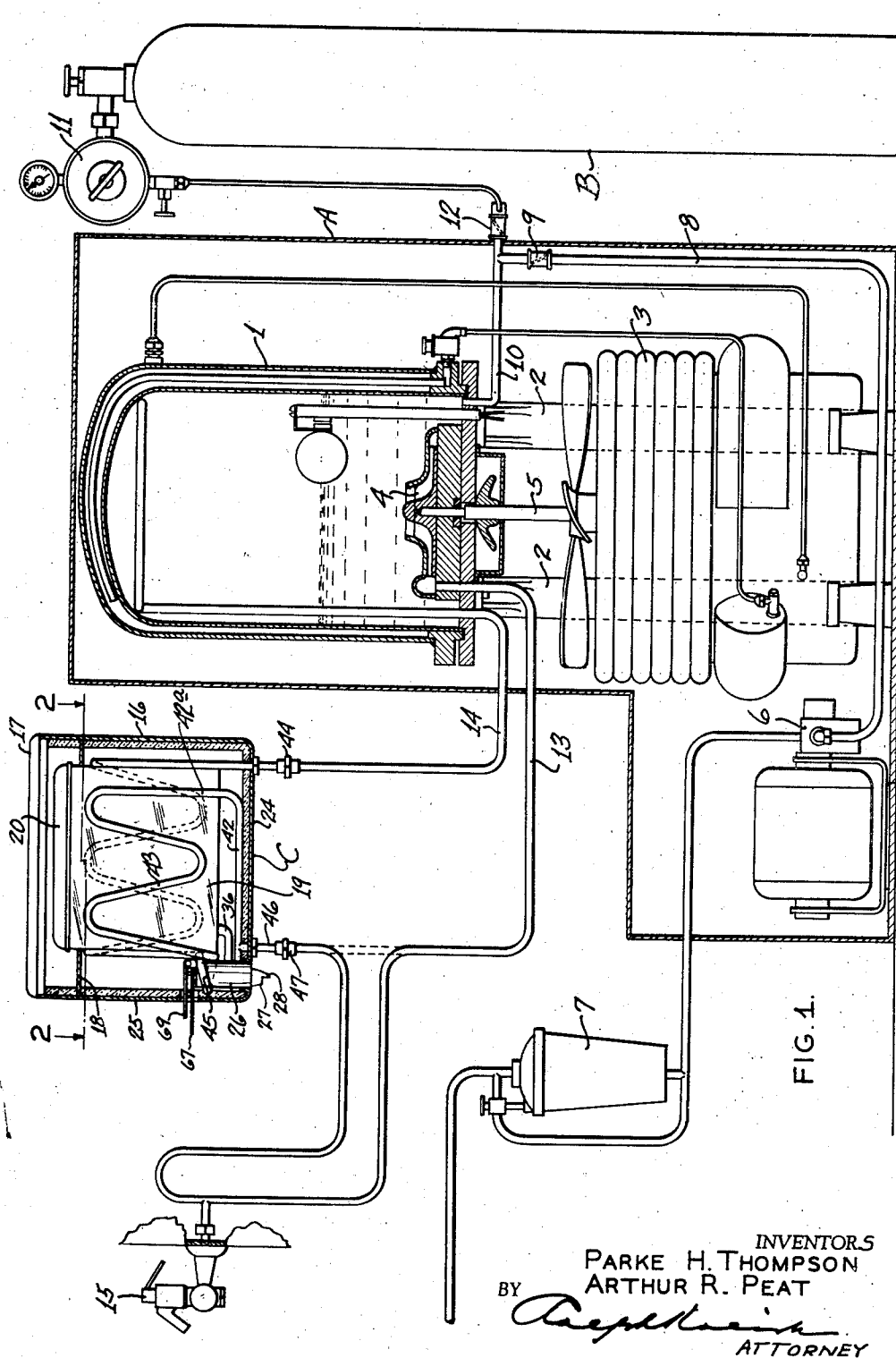
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2,328,110

BEVERAGE DISPENSING APPARATUS

Filed March 14, 1941

2 Sheets-Sheet 1



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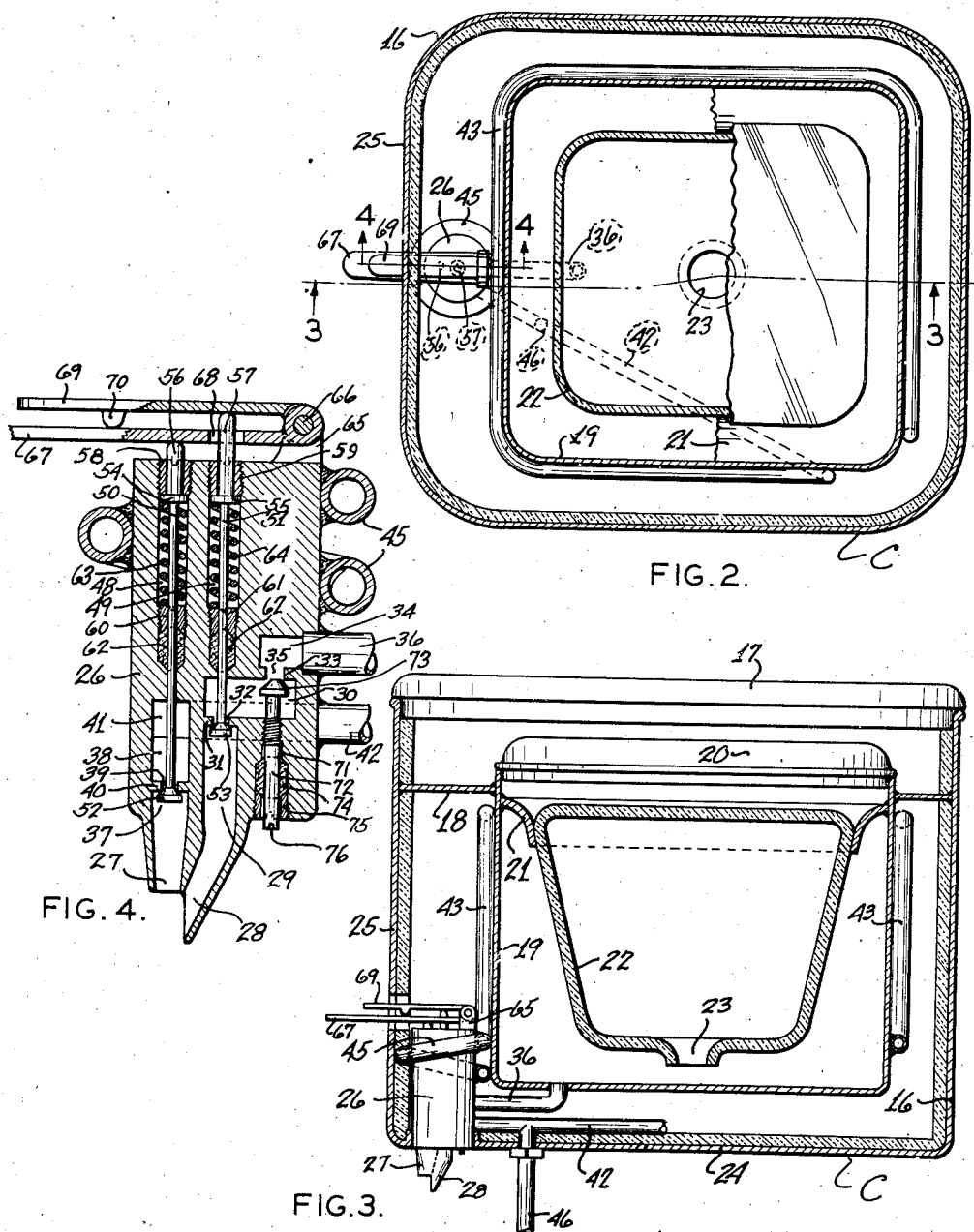
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INVENTORS
 PARKE H. THOMPSON
 ARTHUR R. PEAT
 BY *Arthur R. Peat*
 ATTORNEY

UNITED STATES PATENT OFFICE

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BEVERAGE DISPENSING APPARATUS

Parke H. Thompson, Glendale, and Arthur R. Peat, Webster Groves, Mo., assignors to AMP Corporation, St. Louis, Mo., a corporation of Missouri

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9 Claims. (Cl. 225—21)

This invention relates generally to beverage dispensing apparatus and, more particularly, to a certain new and useful improvement in apparatus especially adapted for mixing and dispensing a syrup-flavored carbonated beverage.

In recent years, retail soft drink dispensing agencies, such as soda-fountains and the like, have found the sales of certain particular drinks sufficiently heavy to justify the installation of special equipment for simultaneously dispensing a measured quantity of syrup and carbonated water directly into the serving glass in a single operation. Ordinarily, this type of equipment employs some form of receptacle provided with a worm and a syrup reservoir, both of which discharge through valve mechanism, the interior of the container being packed with ice for cooling the syrup and the carbonated water.

Existing apparatus of this type, however, is subject to several outstanding disadvantages. By reason of the fact that valves capable of being immersed in melting ice or other liquid cooling medium are prohibitively expensive, it has been necessary to resort to externally mounted valves. External valve structures, however, are usually warm and cause disproportionate mixing of the syrup and carbonated water, in part due to the changes in the viscosity of the syrup resulting from the change in temperature and in part due to the escape of gaseous carbon-dioxide from the carbonated water. Furthermore, due to changes in viscosity and head pressure of the syrup, the quantity of syrup dispensed with each drink varies, making it practically impossible to attain the desired uniformity. We have further found that, with existing types of dispensing apparatus, it is extremely difficult to maintain the carbonated water and syrup at substantially the same temperature for dispensing.

Our invention, hence, has for its primary objects the provision of dispensing apparatus which is extremely economical in cost of construction, as well as in operation and maintenance, which is capable of dispensing carbonated beverages uniformly, accurately preserving any desired ratio between flavoring syrup and carbonated water, which maintains the syrup and carbonated water at substantially precisely the same temperature, which is self-refrigerated and need not be packed periodically with ice or any other refrigerant, which maintains a substantially constant head pressure on the stored syrup, which employs a unique form of internal dispensing valve mechanism maintained at the same tem-

perature as the syrup and carbonated water, and which is highly efficient in the performance of its stated functions.

And with the above and other objects in view, our invention resides in the novel features of form, construction, arrangement, and combination of parts presently described and pointed out in the claims.

In the accompanying drawings (two sheets)—

Figure 1 is a diagrammatic view of an installed carbonated beverage dispensing apparatus constructed in accordance with and embodying our present invention;

Figure 2 is a transverse sectional view of the apparatus or mechanism taken approximately along the line 2—2, Figure 1; and

Figures 3 and 4 are longitudinal sectional views of the mechanism taken approximately along the lines 3—3 and 4—4, respectively, Figure 2.

Referring now in more detail and by reference characters to the drawings, which illustrate a preferred embodiment of our invention, A designates a combination carbonating and refrigerating mechanism adapted for continuously refrigerating and carbonating water and constantly recirculating the refrigerated and carbonated water through the system substantially as described in our co-pending application, Serial No. 355,635, filed September 6, 1940. The refrigerating carbonator A, however, differs from the apparatus of such co-pending application only in employing a carbonating vessel 1, which is mounted by suitable brackets 2 in superposed co-axial alignment with a compressor 3, so that the recirculating pump 4 may be driven from a vertically disposed extension 5 of the main compressor-shaft. In addition, a separate motor-driven injector pump 6 is employed to draw the fresh water into the system from the Buhrstone filter 7, forcing the water through the inlet or supply line 8 and through the check-valve 9 into the intake leg 10 and thence into the carbonating vessel 1.

Provided for co-operation with the refrigerating carbonator A, is a conventional tank or cylinder of carbondioxide B connected through a pressure reducing control valve 11 and check valve 12 to the intake leg 10. Leading from the carbonating vessel 1, is a charged-liquid supply line 13 and a charged-liquid return line 14 for circulating the cold carbonated liquid through one or more dispensing faucets 15 in the formation of a recirculatory system, as shown in Figure 1.

Provided for connection in the recirculatory

system, is a mixed beverage dispenser C comprising a preferably rectangular insulated housing 16 having a tight-fitting cover or lid 17. Supported within the housing 16 by means of a horizontally disposed shelf 18, is a substantially rectangular container shell 19 provided with a tight-fitting removable lid 20, which is accessible from the top of the housing 16 when the cover 17 thereof is removed. Marginally welded or otherwise fixed upon the inner face of the container shell 19 below the plane of the mouth thereof, is a downwardly curved annular flange 21, and removably disposed within and supported by the flange 21, is an inverted flask or bottle 22 of somewhat frusto-pyramidal shape having a centrally positioned downwardly opening mouth 23. It should be noted in this connection that the flask 22 is of such height that, when disposed in inverted position within the container shell 19, the mouth 23 will be spaced upwardly a short distance from the bottom wall of the container shell 19, all as best seen in Figure 3 and for purposes presently fully appearing.

Fixed in and extending through the bottom wall 24 and disposed adjacent the front wall 25 of the housing 16, is a preferably cylindrical valve-body 26, which has a reduced extension projecting below the bottom wall 24 and longitudinally bored to provide discharge nozzles 27 and 28, the latter being partially obliquely continued, as shown, so that its mouth is approximately angularly presented toward and offset downwardly from the mouth of the adjacent nozzle 27.

Interiorly, the valve-body 26 is formed with syrup-discharge and syrup-intake chambers 29, 30, respectively axially separated by a wall 31 having a valve-seat-forming orifice 32, and the former leading into and being practically a continuation of the nozzle 28.

Also formed in the valve-body 26 in upwardly spaced relation to the syrup-intake chamber 30 and separated therefrom by means of a wall 33, is a syrup-intake duct 34 having communication with the syrup-intake chamber 30 by means of a valve-seat-forming orifice 35 in the wall 33. The duct 34 extends across the valve-body 26 and opens upon the side face thereof to receive one end of a stainless steel tube 36, which, in turn, extends through the bottom wall of the syrup container shell 19 for conveying syrup to the syrup-intake chamber 30 of the valve-body 26.

The valve-body 26 is further formed with axially spaced charged-liquid discharge and intake chambers 37, 38, adapted for communication through a valve-seat-forming orifice 39 formed in a transversely disposed separating wall 40, and the former being substantially a part of the nozzle 27. At its upper end, the charged-liquid intake chamber 38 opens into a charged-liquid intake duct 41, which extends transversely across the valve-body 26 to open upon a side face thereof for receiving a charged-liquid inlet pipe 42, which, in turn, extends horizontally over the bottom of the housing 16 and is then bent upwardly, as at 42', against the outwardly presented side face of the container shell 19, to and upon which the pipe 42 is welded in a series of sinuous or somewhat V-shaped bends in the formation of a heat exchange section 43, which eventually extends downwardly through the bottom wall 24 of the housing 16 and communicates through a suitable coupling 44 with the return line 14 of the

recirculatory system. However, in proximity to the valve-body 26, the heat exchange pipe-section 43 is bent outwardly away from the container shell 19, and is then, as at 45, coiled around and welded to and upon the outer face of the valve-body 26, so as to include the valve-body 26 within the heat exchange system of the apparatus.

Similarly, at some suitable point within its length, the charged-liquid supply line 42 is provided with an off-take 46, which extends through the bottom wall 24 and communicates through a suitable coupling 47 with the charged-liquid supply line 13. In this connection, it may be noted that the couplings 44, 47, may be so arranged as to interpose the beverage dispenser C in series with one or more dispensing faucets, spigots, or the like 15 conventionally employing charged-water, or, if desired, may be connected directly to the carbonator A, as shown in dotted lines in Figure 1.

Extending vertically through the upper portion, and opening at their upper end upon the top face, of the valve-body 26, is a pair of spaced parallel bores 48, 49, respectively disposed in axial alignment with the syrup-discharge and charged-liquid-discharge chambers 37, 29, and disposed axially therethrough for longitudinally shiftable movement, are stems 50, 51, which extend, respectively, at their lower end into the discharge chambers 37, 29, to support valve-plugs 52, 53, for seating engagement with the walls 40 and 31 for closing the communicating orifices 39, 32.

At their upper end, the stems 50, 51, are provided with heads 54, 55, and longitudinally extended, as at 56, 57, to slidably fit in thimbles 58, 59, threadedly seated in the upper end of the bores 48, 49, as best seen in Figure 4. Coiled on the stems 50, 51, intermediate the heads 54, 55, and conventional packing nuts 60, 61, threadedly seated in the lower end of the bores 48, 49, for endwise compressive engagement with packing rings 62, are suitable compression springs 63, 64.

Formed preferably integrally upon the upper face of the valve-body 26, is a pair of spaced upstanding ears 65 for supporting a pivot-pin 66, swingably upon which and extending over the valve-body 26, is a charged liquid control handle 67 engageable along its under face with the projecting end of the valve stem extension 56 and suitably provided within its length with a relatively large clearance aperture 68 for freely accommodating the valve stem extension 57.

Independently pivoted upon the pin 66 and extending in spaced relation over the syrup-control handle 67, is a syrup control handle 69 engageable upon its under face with the upper end of the valve stem extension 57 and provided with a depending lug 70, for endwise abutting engagement with the upper face of the syrup control handle 67, all as best seen in Figure 4 and for purposes presently fully appearing.

Opening to and upon the under face of the valve-body 26 and disposed in axial alignment with the orifice 35 of the syrup-intake duct 34, is a bore 71 threaded at its upper end for adjustably receiving a valve stem 72, which extends upwardly through the syrup-intake chamber 30 and is provided with a valve-plug 73 for engagement with the wall 33 for closing the orifice 35. The valve stem 72 extends conventionally through a packing ring 74 and packing nut 75 disposed within the bore 71 and projects a short distance beyond the under face of the valve-body 26, as

shown, the stem 72 at its outer end being preferably provided with a diametral slot 76 for receiving a screw driver or other adjusting tool, not shown.

In use and operation, the carbonator A will continuously generate a large quantity of highly carbonated chilled liquid and recirculate the same through the recirculatory system, substantially as described in our said co-pending application, the chilled charged-liquid continuously recirculating through the heat exchange tubing 43, 45, of the beverage dispensing apparatus and serving as a cooling medium for maintaining the syrup within the container shell 19 and the valve-body 26 at the identical temperature of the charged-liquid or carbonated water in the system.

Meanwhile, the flask 22, having been filled with syrup of the desired flavor, is inverted and set within the syrup-containing shell 19, as shown in Figure 3. The syrup will flow downwardly out of the flask 22 into the lower portion of the container shell 19 and through the tube 36, chamber 34, and orifice 35 into the syrup-intake chamber 30 of the valve 26 until the level of syrup within the container shell 19 rises above the downwardly presented opening of the flask mouth 23. The pressure equalizing air flow into the interior of the flask 22 will thus be cut off and the downward flow of syrup suspended. When a sufficient quantity of syrup has been withdrawn from the container shell 19 to lower the syrup level therein and again permit access of air to the interior of the flask 22, the syrup will again flow out of the flask 22 until the normal liquid level in the container shell 19 is restored. It will thus be evident that the hydrostatic head causing the syrup to flow outwardly through the valve 26 will be substantially constant.

When it is desired to dispense a "drink," the upper handle 69 is pressed downwardly, carrying with it the lower handle 67, thus shifting both valve stems 50, 51, downwardly and unseating both valve plugs 52, 53. Thereupon, the carbonated water will flow outwardly from the discharge chamber 37 into the nozzle 27. Simultaneously syrup will flow from the discharge chamber 29 into the nozzle 28 and be intermixed with the carbonated water as the two fluids are discharged from the respective lower ends of the nozzles 27, 28.

To adjust the rate of flow of syrup, by application of a screw driver or other suitable tool, the valve stem 72 may be conveniently adjusted to shift the valve plug 73 either toward or away from the orifice 35. Accordingly, it will be evident that the rate of syrup flow through the valve-body 26 may thus be regulated and controlled, so that the proper volumetric ratio between syrup and charged-liquid may be maintained as long as both handles 67, 69, are held down by the operator. In this connection, it should be noted that this constantly maintained ratio enables the dispensation of any size drink without additional manipulation. The glass, cup, or other receptacle is merely filled to the desired point and the handles 67, 69, are released to shut off flow of both syrup and charged-liquid, the dispensed beverage, irrespective of the size of the glass or other receptacle, always having the desired syrup concentration.

If it should be desired to dispense only the charged-liquid without any added syrup, the handle 67 may be manually depressed independ-

ently of the handle 69, thus opening only the valve orifice 39 and dispensing pure unflavored carbonated water into the nozzle 27.

By reason of the fact that the flow of cold charged-liquid through the recirculatory system and the heat exchange tubes 43, 45, is continuous, the valve-body 26 and the syrup container shell 19, as well as the charged-liquid and syrup, will be maintained at a predetermined and constant temperature, and, therefore, the syrup and charged-liquid will mix and blend smoothly and readily on discharging through the nozzles 27, 28, so that a uniform, well-mixed beverage-drink will result. Since the recirculating cold charged-water functions also as the refrigerating medium, the employment of extraneous refrigerant, such as ice and the like, is avoided, thus eliminating the inconvenience resulting from the periodic necessity for packing crushed ice into the dispensing apparatus and also eliminating the existence of a temperature differential between the syrup and charged-liquid which results when a substantial portion of the ice has melted and the temperature in different zones of the apparatus varies.

The constancy and uniformity of temperature in the valve-body 26, syrup-container shell 19, and charged-liquid supply lines 42, 43, 45, further eliminate any undue loss of carbonation by way of flash gas as the combined syrup and liquid leaves the dispensing nozzle 28. Even though inaccurate thermostatic control of the refrigerating mechanism or other uncontrolled cause should result in fluctuations in the temperature of the charged-liquid, the temperature of the syrup would correspondingly change, so that the charged-liquid and syrup would be dispensed at a substantially identical temperature. Thus, if the temperature of the charged-liquid rises for a short period of time above the predetermined optimum temperature, such temperature-rise will immediately be communicated to the syrup. Obviously such a rise in temperature will increase the discharge pressure of the carbonated liquid, so that, when the valve is open, the rate of flow thereof is increased. Since, however, the syrup is also warmer, its viscosity will be correspondingly lowered and its rate of flow through the orifice 35 will be correspondingly increased, so that even under such accidental or abnormal conditions, the dispensed beverage-drink will continue to have substantially the desired syrup concentration. Contrariwise, if, under accidental or other abnormal circumstances, the temperature of the charged-liquid should drop for a short period of time, so that the discharge pressure and attendant rate of flow is correspondingly lowered, the temperature of the syrup also is lowered and the viscosity thereof increased, so that the rate of syrup flow is accordingly diminished, thus dispensing a "drink" which will have substantially the desired syrup concentration.

It is to be understood that the word "syrup" or phrase "flavoring syrup" as employed by us in this specification and in the appended claims as designating the liquid or material to be mixed with the circulating liquid is to be broadly interpreted as including any suitable flavoring or additive material that is to be, or may be, mixed with the circulating liquid, and that changes and modifications in the form, construction, arrangement, and combination of the several parts of the beverage dispensing apparatus may be made and substituted for those herein shown and described without departing from the nature and principle of our invention.

Having thus described our invention, what we claim and desire to secure by Letters Patent is:

1. A beverage dispensing system comprising means for carbonating and refrigerating a liquid, dispensing means, and means for continuously recirculating the carbonated liquid between the carbonating-refrigerating means and the dispensing means.

2. A beverage dispensing system comprising means for continuously supplying cold carbonated liquid, dispensing means, and means for continuously recirculating the cold carbonated liquid in heat exchange relationship to the dispensing means for cooling the dispensing means as well as supplying the charged liquid.

3. In a beverage dispensing system, valve means for dispensing a flavoring syrup and carbonated liquid, a reservoir for supplying syrup to the valve means, and a supply line constituting means for continuously supplying and recirculating cold carbonated liquid to the valve means and also bringing the cold liquid in heat exchange relationship with the reservoir for maintaining the system at a substantially constant temperature.

4. In a beverage dispensing system, valve means for dispensing a flavoring syrup and carbonated liquid, a reservoir for supplying syrup to the valve means, and a supply line constituting means for continuously supplying and recirculating cold carbonated liquid to the valve means and also bringing the cold liquid in heat exchange relationship with the valve means and syrup reservoir for maintaining the syrup and carbonated liquid at substantially identical temperatures when dispensed by the valve means.

5. A beverage dispensing system comprising means for carbonating and refrigerating a liquid, a syrup reservoir, dispensing means connected thereto, and means for continuously recirculating the cold carbonated liquid in heat exchange relation with the syrup reservoir in the formation of a recirculatory system, said dispensing means being also connected to said recirculatory system for withdrawing cold carbonated water for dispensing purposes.

6. A beverage dispensing system comprising means for carbonating and refrigerating a liquid, a syrup reservoir, a dispensing means connected thereto, and means for continuously recirculating the cold carbonated liquid in heat exchange relation with the syrup reservoir and the dispensing means in the formation of a recirculatory system, said dispensing means being also connected to said recirculatory system for withdrawing cold carbonated water for dispensing purposes.

7. A beverage dispensing system including a syrup reservoir adapted to maintain a supply of syrup under substantially constant hydrostatic pressure, a dispensing valve connected thereto, and means for continuously circulating cold carbonated liquid in heat exchange relation with the syrup reservoir in the formation of a syrup cooling system, said valve being also connected to said cooling system for withdrawing cold carbonated water for dispensing purposes.

8. A beverage dispensing device comprising means for supplying a refrigerated carbonated liquid, a syrup reservoir, a dispensing valve connected to said syrup reservoir, and a carbonated liquid conducting and recirculating tube having recirculating connection with the carbonated liquid supply means provided with a sinuous heat exchange section disposed in heat exchange relationship with respect to the syrup reservoir and connected with said dispensing valve.

9. A beverage dispensing apparatus comprising a casing, a syrup reservoir in said casing, a dispensing valve having the body thereof within said casing, a connection from said syrup reservoir to said valve, a source of recirculating refrigerated carbonated liquid, and a carbonated liquid conducting pipe connected in looped relationship to the source of supply having a connection to said valve and having portions thereof disposed in sinuous heat exchange relationship to the syrup reservoir and portions coiled around the valve body in heat exchange relationship.

PARKE H. THOMPSON.
ARTHUR R. PEAT.