

Jan. 4, 1955

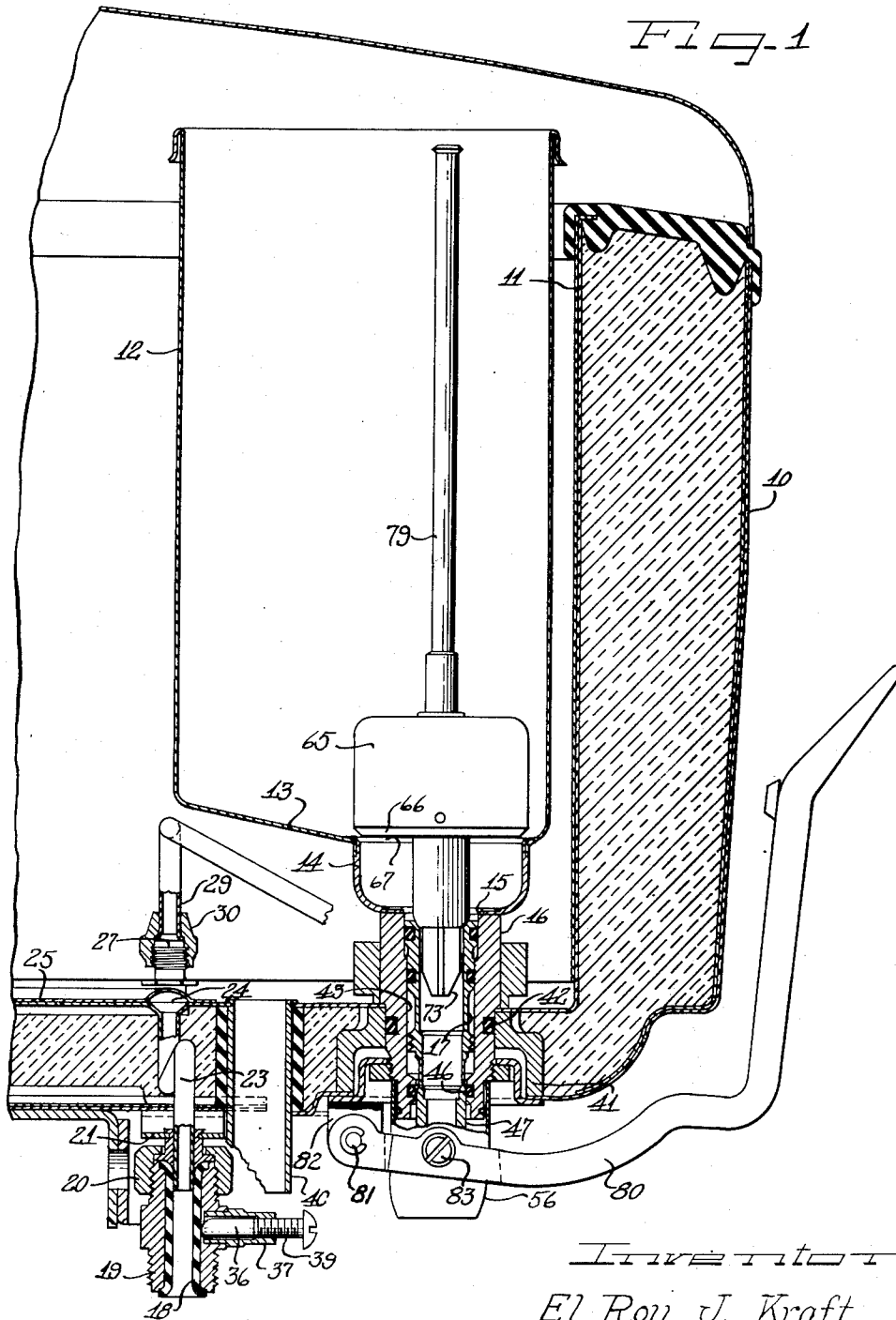
EL ROY J. KRAFT

2,698,701

CONSTANT FLOW BEVERAGE DISPENSER

Filed Nov. 5, 1951

2 Sheets-Sheet 1



Inventor

El Roy J. Kraft

By *Kill, Sherman, Morris, Gross & Simpson* Attys

Jan. 4, 1955

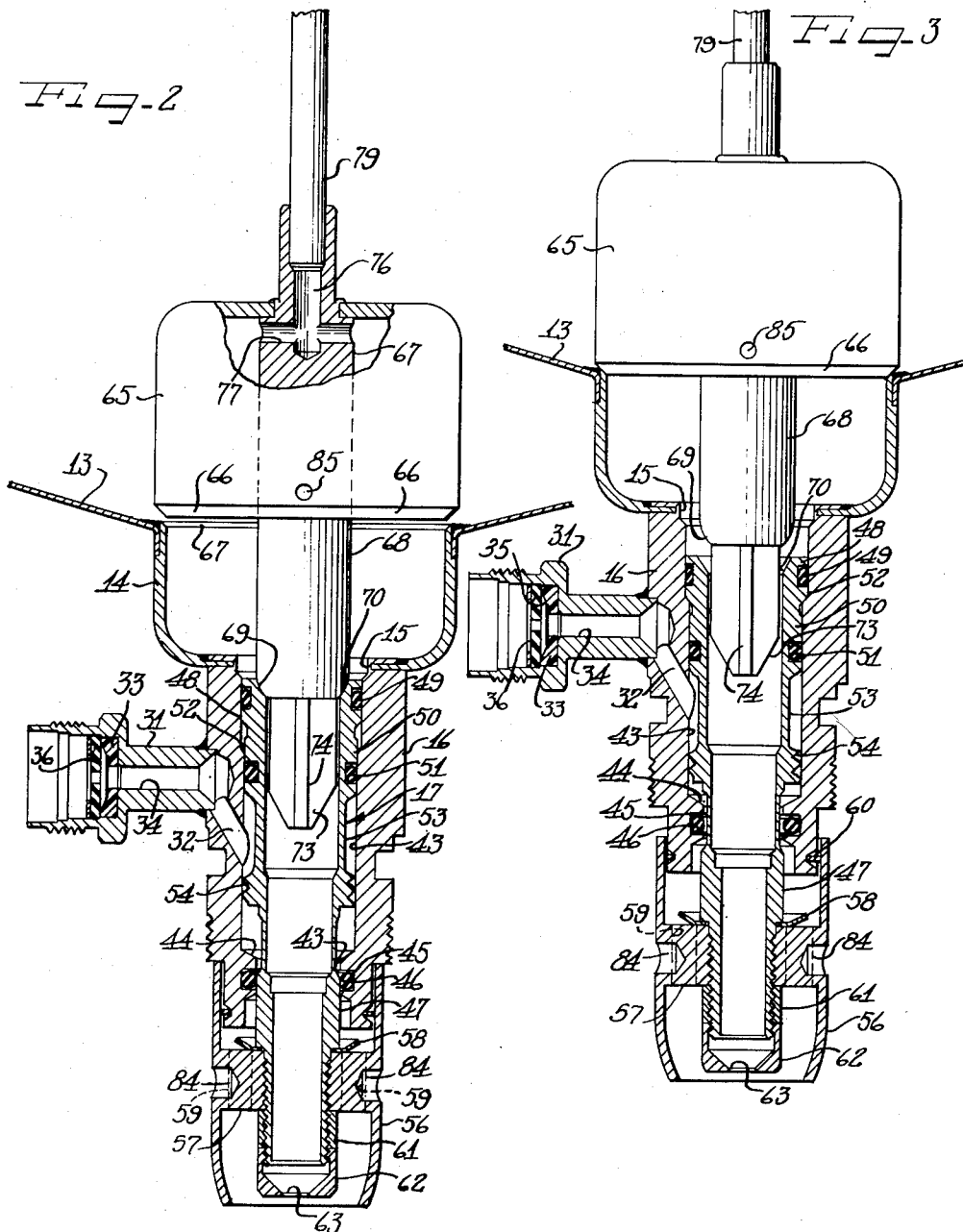
EL ROY J. KRAFT

2,698,701

CONSTANT FLOW BEVERAGE DISPENSER

Filed Nov. 5, 1951

2 Sheets-Sheet 2



Inventor
El Roy J. Kraft

By *Will, Sherman, Morris, Chas. R. Kraft* Attys

1

2,698,701

CONSTANT FLOW BEVERAGE DISPENSER

El Roy J. Kraft, Des Plaines, Ill., assignor to The Dole Valve Company, Chicago, Ill., a corporation of Illinois

Application November 5, 1951, Serial No. 254,864

7 Claims. (Cl. 222—133)

This invention relates to improvements in fluid dispensers and more particularly relates to a constant flow beverage dispenser wherein constant volumes of syrup and carbon dioxide are delivered and mixed for use.

A principal object of my invention is to provide a novel and simplified form of multiple fluid dispenser delivering a constant volume of one fluid for mixture with a proportionate constant volume of another, regardless of variations in head of said one fluid in a tank.

Another object of my invention is to provide a new and improved form of beverage dispenser of a simplified construction arranged to deliver proportionate predetermined constant flow volumes of syrup and carbonated water for mixture, regardless of variations in head of the syrup and pressure of the water.

Still another object of my invention is to provide a simple and efficient measuring device for dispensers, delivering a measured flow of liquid, unaffected by variations in head of the liquid in a tank.

Another and more detailed object of my invention is to provide a new and improved form of measuring device for measuring a quantity of syrup and delivering a uniform volume of syrup, regardless of variations in head of syrup in the syrup tank and bleeding an added quantity of syrup in a measured flow to make up for a proportionate volume of the syrup delivered.

A further and more detailed object of my invention is to provide a simplified form of measuring device for a syrup tank in the form of an inverted measuring cup opening toward the outlet for the tank and vented to the atmosphere, said measuring cup being movable to cover said outlet and supply a measured quantity of syrup to flow therethrough, and having an orifice in the wall thereof to deliver a measured volume of make-up syrup to take care of a proportionate volume of the delivered syrup.

A further and more detailed object of my invention is to provide a beverage dispenser for carbonated beverages including a syrup tank having an outlet leading therefrom and a measuring device opening toward said outlet and seated therein in which carbonated water is supplied for mixture with the syrup through a capillary passage encircling the outlet, and wherein the capillary forms a valve seat for the measuring device and allows the measuring device to move into engagement with the outlet opening in the tank and deliver a measured volume of syrup.

Still another object of my invention is to provide a novel and improved form of constant flow beverage dispenser so arranged that the volume of syrup delivered will be unaffected by variations in viscosity of the syrup.

These and other objects of my invention will appear from time to time as the following specification proceeds and with reference to the accompanying drawings, wherein

Figure 1 is a fragmentary vertical sectional view taken through a beverage dispenser constructed in accordance with my invention, with certain parts thereof broken away;

Figure 2 is an enlarged vertical sectional view taken through the dispensing valve and capillary, with parts of the measuring cup broken away and shown in section in order to illustrate the vent therefrom to the atmosphere; and

Figure 3 is a view somewhat similar to Figure 2, but showing the capillary and delivery valve in an open position, to deliver a mixture of syrup and carbonated water.

2

In the embodiment of my invention illustrated in the drawings I have shown generally a container 10 for the dispensing unit having an ice or refrigerated tank 11 therein, and spaced from the walls thereof and suitably insulated therefrom. Within the ice tank 11 I have shown a syrup tank or can 12, open at its top, above the top of the ice tank and having a sloping bottom 13 leading to an upwardly opening cup 14, secured thereto and depending therefrom. The cup 14 holds a measured quantity of syrup for discharge through a central opening 15 in the bottom of said cup. The central opening 15 is shown as communicating with a capillary housing 16 depending from said cup and leading through the bottom of the ice tank 11 and container 10.

The capillary housing 16 forms a housing for a capillary valve member 17 and a passageway for carbonated water between the interior of the wall thereof and the exterior of said valve member. The capillary member 17 is slidably mounted in the capillary housing 16 for vertical movement with respect thereto, into position to deliver carbonated water along the exterior of said capillary valve member, and syrup through the hollow interior of said capillary valve member for mixture with the carbonated water, as will hereinafter more clearly appear.

Carbonated water may enter the bottom of the container 10 through a flexible tube 18 in a fitting 19. Said tube is shown as being flanged at its ends and engaging opposite ends of said fitting. The fitting 19 is shown as being retained to the bottom of the casing 10 by a nut 20 engaging the flange of a retaining sleeve 21, secured to and depending from the bottom of the casing 10 and having a tube or pipe 23 for the carbonated water leading therefrom and connected with a passageway 24 in a cooling plate 25 extending along the bottom of the ice tank 11. The passageway 24 may be in the form of a labyrinth passageway extending along the entire bottom of said cooling plate to provide a tortuous path for the carbonated water along the cooling plate 25, and has communication with a fitting 27 connected with the receiving end of a tube 29 and retained thereto by a retaining nut 30. The delivery end of the tube 29 is shown as being connected with a fitting 31, shown as being secured to the capillary housing 16 adjacent the upper end thereof, and as communicating with a downwardly inclined passage 32 extending through the wall of said capillary housing into the interior thereof.

The fitting 31 is shown as having a seat 33 therein on the upstream side of a reduced area passageway 34. The seat 33 may be made of nylon to resist any corrosive action of the carbonated water and is shown as having a frusto-conical surface 35 at its upstream side, which forms a seat for a flow control washer 36. The flow control washer 36 operates on principles similar to that shown and described in Patent No. 2,454,929, which issued to Leslie A. Kempton on November 30, 1948, and flexes within the frusto-conical seat 35 upon increases in pressure of the carbonated water, resulting in a reduction in area of the orifice therethrough and a constant delivery volume of the carbonated water, regardless of variations in pressure thereof, as has been shown and described in the aforementioned patent to Leslie A. Kempton, so not herein described further.

The tube 18 in the fitting 19 is shown as being engaged by a generally spherical inner end of an engaging member 36, slidably mounted in a sleeve 37. The sleeve 37 extends at right angles to the tube 18 and within the fitting 19. The engaging member 36 may be secured to a screw 39 threaded in the sleeve 37. Thus, when the semi-spherical inner end of the engaging member 37 is engaged with the tube 18 and one wall thereof is engaged with the other, the flow of carbonated water may be entirely shut off.

A drain 40, which may lead to a suitable container or floor drain or the like, leads from the bottom of the ice tank 11 to take care of the water from the melting ice.

Referring now to the capillary housing 16 and the capillary valve member 17, the housing 16 depends from the bottom of the measuring cup 14 through a collar 41 interposed between the bottom of the ice tank 11 and the bottom wall of the container 10. An O-ring 42, seated in an outwardly opening groove formed in said

capillary housing, abuts the inner periphery of the retaining collar 41 to seal said capillary housing thereto. The inner periphery of the capillary housing is shown as forming a generally cylindrical chamber for the capillary valve member 17 and has an enlarged diameter upper portion forming a continuation of the opening 15, and an intermediate wall portion 43 of a slightly reduced diameter, and with the exterior of the capillary valve member 17 forming a capillary chamber. Said housing also has a reduced diameter lower end portion 44 having an inwardly opening groove 45 therein, within which is fitted a packing member such as an O-ring 46. The O-ring 46 is shown in Figure 2 as engaging an enlarged diameter portion or land 47 at the lower end of the capillary 17, and when in engagement with said land forms a valve to block the discharge of carbonated water from the end of said capillary housing. When the capillary valve member 17 is moved downwardly within the housing 16 to clear the land 47 from the O-ring 46, as shown in Figure 3, carbonated water may be freely discharged past the O-ring 46 for mixture with the syrup at the discharge end of said capillary.

It should here be noted that since the O-ring 46 is mounted in the interior wall of the housing 16, the pressure of the carbonated water will act on said O-ring in a direction to force it within the groove 45 when the valve is opened, and afford a free passage of carbonated water thereby.

The capillary valve member 17 is herein shown as being of a tube-like formation, fitting within the capillary housing 16 and having an enlarged diameter upper end portion 48, having an O-ring 49 seated therein and engaging the inner wall of the capillary housing 16, to seal said wall against the leakage of syrup thereby and against the flow of carbonated water into the syrup tank 12.

Just beneath the upper end portion 48 of the capillary valve member 17 is a reduced diameter portion 50 having an O-ring 51 therein, engaging the reduced diameter wall 43 of the capillary housing 16 and sealing said wall against the passage of fluid thereby. The lower margin of the upper end portion 48 of the capillary member 17 abuts an inverted frustoconical shoulder 52 formed in the capillary housing 16 to limit downward movement of the capillary valve member 17. Immediately below the reduced diameter portion 50 of the capillary valve member 17 is a reduced diameter portion 53, which with the inner wall 43 of the capillary housing 16 forms an annular chamber for the carbonated water.

The reduced diameter portion 53 terminates into an outwardly spaced spiral passage 54, restricting and imparting a relatively high velocity spiral flow to the carbonated water as it passes the open valve formed by the land 47 and O-ring 46.

Carbonated water under pressure in the annular chamber formed between the capillary valve member 17 and the inner wall of the housing 16 will exert pressure against the upper end of the land 47 and against the lower end of the enlarged diameter portion 50 of said capillary valve member, and since the effective area of the enlarged diameter portion of said capillary valve member is greater than the effective area of the shouldered portion of the land 47, the tendency will be for the pressure of the carbonated water to hold the capillary valve member 17 closed.

The lower end of the capillary valve member 17 just beneath the land 47 is shown as being threaded and as having a nozzle 56 threaded thereon on a transverse wall 57 thereof. The nozzle 56 extends upwardly and downwardly from the transverse wall 57 in the form of generally cylindrical walls. An annular baffle 58 of an inverted frusto-conical form abuts the shoulder formed by the lower end of the land 47 and the threaded lower portion of the capillary valve member 17 and is held in engagement therewith by the center transverse wall 57. The transverse wall 57 has a plurality of passages 59, 59 for the carbonated water extending vertically therethrough. The baffle 58 serves to deflect the carbonated water passing through the annular orifice at the end of the housing 16, outwardly toward the wall of the nozzle 56, and quiet the carbonated water so it will pass through the passages 59, 59 for mixture with the syrup in a relatively quiescent state.

The upwardly extending portion of the annular wall of the nozzle 56 is shown as slidably engaging a sealing ring 60, mounted in the capillary housing 16 adjacent

the lower end thereof and extending outwardly therefrom. The upper end portion of the wall of the nozzle 56 also forms a stop, to limit upward movement of the capillary valve member 17. A nut 61 is herein shown as being threaded on the lower end of the capillary valve member 17 and as abutting the bottom of the wall 57 and serving as a lock nut, to lock the nozzle 56 to said capillary valve member.

An orifice member 62 is herein shown as being threaded on the lower end of the capillary valve member 17 and as abutting the bottom of the nut 61, and forming a continuation of the inner passageway through said capillary valve member. The inner wall of the nozzle 62 is shown as being of an inverted frusto-conical form at its lower end, terminating into a knife-edge orifice, indicated by reference character 63. The knife-edge orifice 63 provides an orifice for flow of the syrup from the bottom of the capillary valve member 17, which exerts a minimum of frictional resistance against the flow of the syrup and thus assures a uniform flow of the syrup, regardless of changes in viscosity of the syrup due to temperature changes.

The constant flow measuring device and syrup valve of my invention is herein shown as being in the form of an inverted cup 65, opening toward the cup 14 and in vertical alignment therewith. When the capillary valve member 17 is in position to admit carbonated water to flow through the nozzle 56, an inverted frusto-conical valve surface 66 of the measuring cup will seat against a corresponding seat 67 of the cup 14 and form a valve to block the flow of syrup into the cup 14. An orifice 85 is provided through the wall of said cup, adjacent its bottom to supply a predetermined flow of syrup within said cup, to make up a proportionate amount of the syrup flowing through the outlet 15.

The measuring cup 65 is herein shown as being mounted on a relatively heavy stem 68, which may be in the form of a weight, moving said measuring cup into engagement with the seat 67 by gravity when the capillary valve member 17 is in an open position. The weight or stem 68 terminates into a rounded lower end portion forming a valve 69 adapted to seat in a valve seat 70 formed in the upper end portion of the capillary valve member 17.

A valve stem guide 73 is secured to the bottom of the valve stem 68 and depends therefrom along the inner periphery of the capillary valve member 17. The valve stem guide 73 is shown as having a plurality of fins 74, 74 extending therealong which serve as a guide for the valve and valve stem as it is moved with respect to the capillary valve member 17, and also serve to still any tendency for the syrup to whirl as it passes for discharge through the knife-edge orifice 63. The valve stem guide 73 may be of any suitable tasteless and odorless material, not affected by the syrup. One such material may be a nylon plastic material, which may readily be molded into the desired form.

The valve stem 68 is shouldered adjacent its upper end, and the shouldered portion thereof fits within an open upper end portion of the measuring cup 65 and may be suitably secured thereto. The shouldered portion of the valve stem 68 is shown as extending upwardly from the top of the measuring cup 65 and as having a passageway 76 extending downwardly therealong within the cup 65 and intersected by a cross-drilled passageway 77 opening to the interior of said measuring cup to form a vent for said measuring cup when in a dispensing or measuring position. A vent tube 79 is shown as being mounted in the passageway 76 and as extending upwardly therefrom above the level of the syrup within the syrup tank 12, to provide a region of pressure within the cup 65 at substantially atmospheric pressure and unaffected by the head of syrup within the syrup tank 12.

The capillary valve member 17 may be moved vertically along the capillary valve housing 16 by means of an operating lever 80 pivoted at its inner end on a pivot pin 81, supported between ears 82, 82 depending from the bottom of the container 10. The operating lever 80 may be of a bifurcated form and may extend along opposite sides of the nozzle 56 and may be trunnioned thereto, as by trunnion pins 83, 83, pivotally engaging drilled recesses 84, 84 formed in opposite sides of said nozzle and extending within the transverse wall 57 thereof. From thence the lever 80 may extend outwardly and upwardly along the wall of the container 10 into a convenient location for operation by the hand.

In operation of the dispenser, when pressure is exerted

on the upper end of the lever 80 to depress said lever, the nozzle 56 and capillary valve member 17 will move downwardly along the interior of the capillary housing 16. At the same time, the weighted measuring cup 65 will move downwardly with said capillary valve member until the valve portion 66 thereof engages the seat 67 formed within the inside of the rim of the cup 14. Downward movement of the measuring cup 65 will then stop and a measured volume of syrup will be retained within the cups 14 and 65. The valve 69 will also be unseated from the valve seat 70, allowing syrup within the cups 14 and 65 to flow downwardly through the interior of the capillary valve member 17. The land 47 will also move downwardly out of engagement with the O-ring 46, allowing carbonated liquid to flow through the spiral capillary passage 54 and downwardly in the space between said passage and the land 47 into engagement with the baffle 58. This will deflect the carbonated water toward the wall of the nozzle 56, from whence it will pass downwardly through the passageways 59, 59 and through the bottom of the nozzle 56 in a relatively quiescent state, for mixture with the syrup passing through the knife-edge orifice 63.

As just described, an amount of syrup will be discharged for mixture with carbonated water, equal to the volume of syrup in the cup 14 and the measuring cup 65. This gives a measured volume of syrup for mixture with the carbonated water. The wall of the measuring cup 65, however, has the make-up orifice 85 extending therethrough. This orifice is so calibrated as to supply a measured quantity of syrup into the interior of the measuring cup 65 and the cup 14, sufficient to replace a proportionate amount of the syrup flowing through the interior of the capillary valve member 17 and supply a constant volume flow of syrup sufficient to maintain the uniform mixture of the carbonated water and syrup required for the final drink.

It is, of course, obvious that a number of orifices may be provided in the wall of the measuring cup 65, and that said orifices may be of varying cross-sectional area, dependent upon the volume of said measuring cup and the volume of incoming carbonated water for mixture with the syrup discharged through the interior of the capillary valve member 17, and that the governing factor is to maintain the flow of syrup substantially constant to mix with a proportionate constant volume of carbonated water, so that the end result will be a uniformly mixed drink of the correct proportions.

It may be seen from the foregoing that when the valve 66 comes into engagement with the seat or the rim of the cup 14, a measured quantity of syrup is trapped for discharge through the interior of the capillary valve member 17 and is made up by syrup passing through the orifice 85, and that this measured quantity of syrup flowing for discharge through the knife-edge orifice 63 will be unaffected by variations in head of the syrup within the syrup tank 12.

It may further be seen that with the dispenser of my invention, the valve 17, with the capillary housing 16, forms a capillary passageway for the carbonated water and also forms a valve means therefor, controlling the discharge of the carbonated water from the dispenser for mixture with the syrup, and also forms a valve seat for the syrup valve, controlling engagement of the cup 65 with the rim of the syrup cup 14, to initiate the flow of syrup through the interior of said capillary valve member.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

I claim as my invention:

1. In a constant flow dispenser, a liquid-containing tank, an outlet in the bottom of said tank, a hollow measuring device within said tank in alignment with said outlet and opening toward said outlet, means venting said measuring device to the atmosphere, means movable to engage said measuring device with said outlet to close the same and supply a measured quantity of liquid thereto, and said measuring device having an orifice in a wall thereof admitting a measured flow of liquid thereto upon engagement of said measuring device with said outlet, to make up for liquid flowing through said outlet.

2. A constant flow dispenser comprising a syrup tank, a syrup outlet from the bottom of said tank, a hollow measuring device opening to said outlet and vented to the atmosphere, a valve associated with said measuring device

to block the flow of fluid through said outlet; and means opening said valve and releasing said measuring device to engage said outlet and isolate a measured volume of syrup in said outlet and measuring device; to measure a quantity of syrup for discharge through said outlet, said measuring device having an orifice in the wall thereof to admit a measured flow of syrup thereinto to make up a proportionate volume of the syrup flowing through said outlet.

3. A constant flow dispenser comprising a fluid-containing tank, an outlet from the bottom of said tank, a measuring device including a cup opening to said outlet and having a rim engageable therewith to isolate a measured volume of syrup in said outlet, means venting said cup to the atmosphere, a valve associated with said cup to block the flow of fluid through said outlet when said cup is out of engagement with said outlet, means opening said valve and moving said measuring device into engagement with said outlet to measure a quantity of fluid for discharge through said outlet, and an orifice in the wall of said cup adjacent the lower end thereof accommodating the flow of a measured volume of fluid therethrough to make up for a proportionate amount of the fluid passing through said outlet upon engagement of said rim outlet.

4. In a constant flow dispenser, a liquid supply tank having an outlet in the bottom thereof, a hollow measuring device closed at its top and open at its bottom in axial alignment with said outlet, means venting said measuring device to the atmosphere, means supporting said measuring device above said outlet and releasing said measuring device to engage said outlet and isolate a quantity of liquid for discharge therethrough, means admitting a measured volume of syrup to said measuring device to make up for syrup withdrawn therefrom, and said outlet communicating with an orifice member having a knife-edge orifice to afford a constant flow of liquid regardless of variations in viscosity thereof due to temperature changes.

5. In a constant flow dispenser, a tank containing a viscous liquid and having an outlet in the bottom thereof, a measuring device opening to said outlet and including a downwardly opening cup vented to the atmosphere and having a valve surface at its rim and seating on said outlet to measure a quantity of liquid for discharge through said outlet and having an orifice in the wall thereof to supply a measured quantity of liquid to make up for a proportionate volume of liquid passing through said outlet, and said outlet communicating with a vertically spaced discharge orifice member having a knife-edge orifice to afford a constant flow of liquid regardless of variations in viscosity thereof due to temperature changes.

6. In a constant flow dispenser, a liquid-containing tank having a recessed valve seat defining an outlet through the bottom of said tank, a measuring device opening to said outlet and including a downwardly opening cup vented to the atmosphere and having a valve surface on its rim seating on said seat to measure a quantity of liquid for discharge through said outlet, and also having an orifice in the wall thereof to supply a measured quantity of liquid to make up for a proportionate volume of liquid passing through said outlet, a valve member in said outlet engageable with said measuring device and supporting said measuring device in vertically spaced relation with respect to said outlet when said valve member is in position to block the flow of liquid through said outlet and moving into position to accommodate the flow of liquid through said outlet, and said valve member having a passageway leading therethrough in communication with said outlet and terminating in a knife-edge orifice to afford a constant flow of liquid regardless of variations in viscosity thereof due to temperature changes.

7. A constant flow beverage dispenser comprising a syrup tank, a syrup outlet from the bottom of said tank, a capillary housing communicating with said outlet and depending therefrom, a passageway for carbonated water leading into said capillary housing through a wall thereof and having constant volume flow control means therein for supplying a constant volume of carbonated water for mixing with the syrup regardless of variations in head of the water, a capillary valve member movable within said capillary housing and having a wall portion engageable therewith to control the flow of carbonated liquid therethrough, said capillary valve member having a central passage extending vertically therethrough and the upper end of said passage forming a valve seat, a valve member

engageable with said seat and extending upwardly therefrom, a measuring cup secured to said valve member and opening toward the bottom thereof and having a rim engageable with said outlet, a vent tube venting said measuring cup to atmosphere, an orifice leading through a wall of said cup for supplying a measured quantity of syrup thereto, means for vertically moving said capillary valve member into position for the discharge of carbonated water through the bottom of said capillary housing and for disengaging said seat from said valve and

releasing said cup to engage said opening, and a knife-edge orifice at the discharge end of said passageway through said capillary valve member providing a constant flow of syrup therethrough regardless of variations in viscosity thereof.

References Cited in the file of this patent

UNITED STATES PATENTS

2,454,595

Cramer, Jr. ----- Nov. 23, 1948