

April 6, 1954

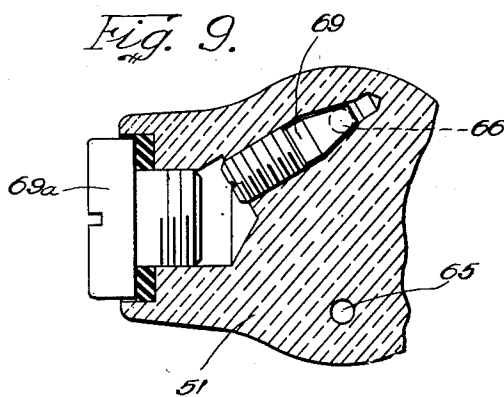
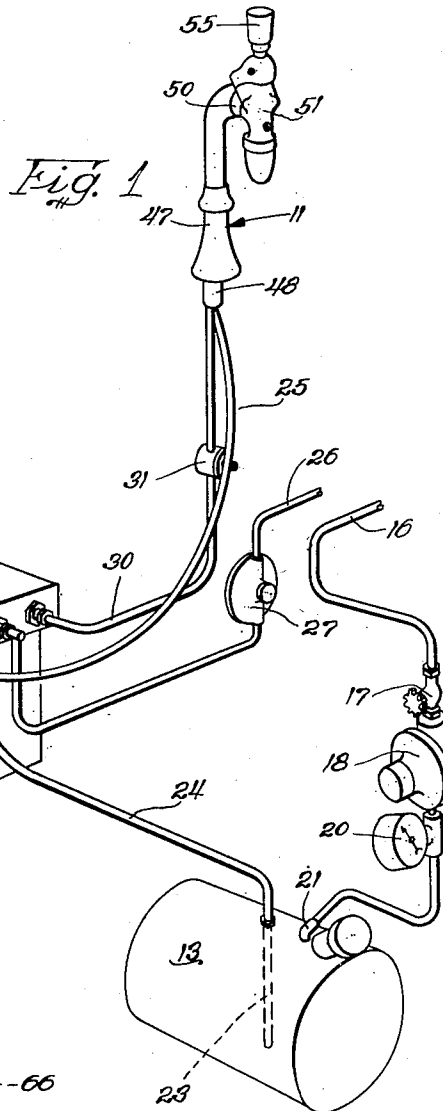
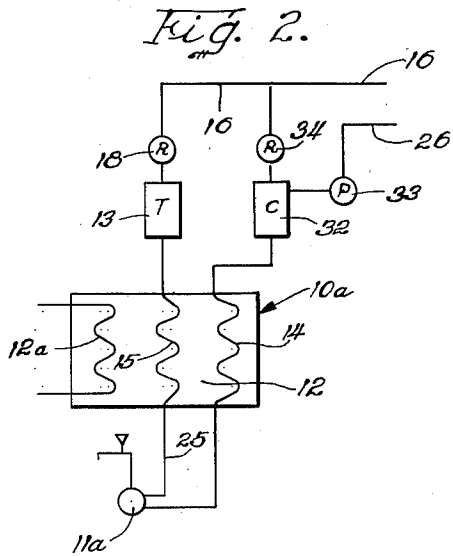
E. V. RUPP ET AL

2,674,263

BEVERAGE DISPENSER HAVING A MIXING CONTROL VALVE

Filed Aug. 5, 1948

2 Sheets-Sheet 1



Inventors:
 Earl V. Rupp
 Charles E. Adams
 Savin L. Sundstrom.

By *Walter D. Harbaugh* att'y

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2 Sheets-Sheet 2

Fig. 3.

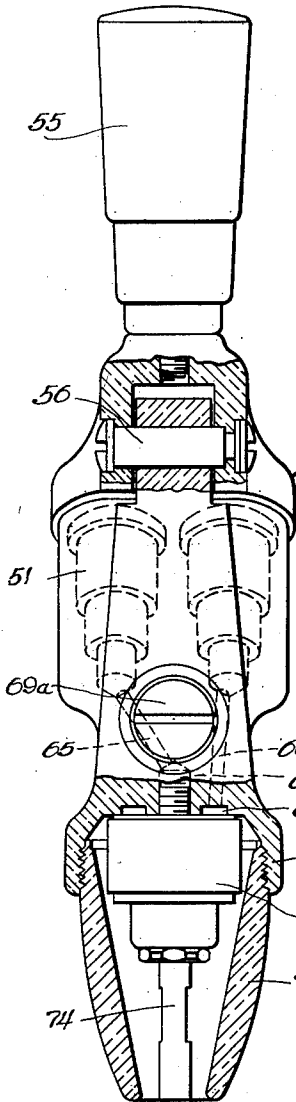


Fig. 4.

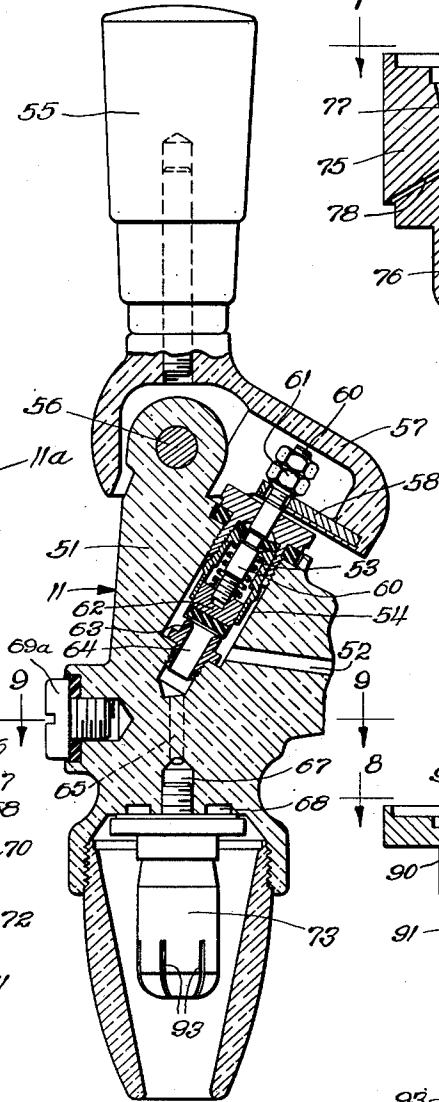


Fig. 5.

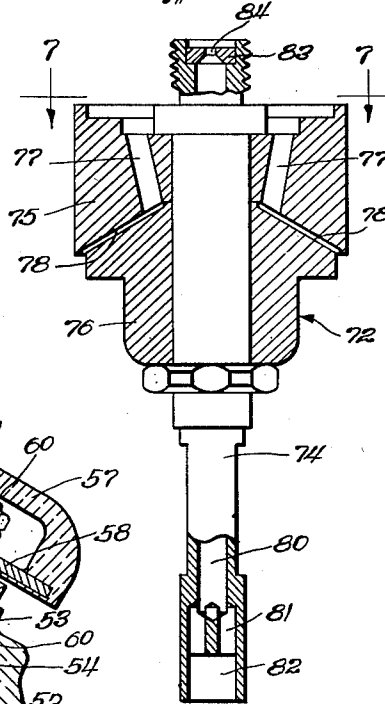


Fig. 6.

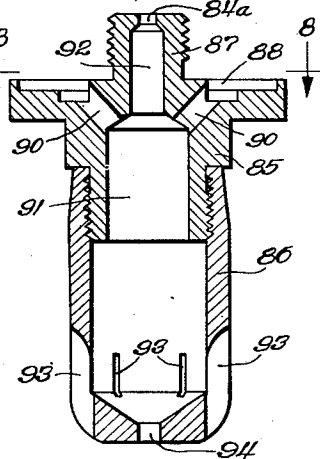


Fig. 8.

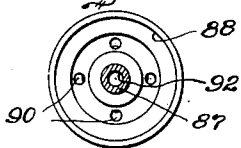
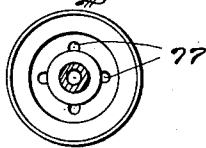


Fig. 7.



Inventors:
Earl V. Rupp
Charles E. Adams
Savin E. Sundstrom

By *Watson Harbaugh*
Att'y

UNITED STATES PATENT OFFICE

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BEVERAGE DISPENSER HAVING A MIXING
CONTROL VALVE

Earl V. Rupp, Charles E. Adams, and Savin L.
Sundstrom, Chicago, Ill., assignors to The Bas-
tian-Blessing Company, Chicago, Ill., a corpo-
ration of Illinois

Application August 5, 1948, Serial No. 42,564

13 Claims. (Cl. 137—604)

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This invention relates generally to beverage dispensing apparatus and more particularly to an improved dispenser for soft drinks made from flavored syrup and carbonated or sweet water.

When soft drinks are dispensed from soda fountains, it is customary to provide a plurality of receptacles for flavored syrup, each receptacle being provided with a pump which delivers a predetermined volume of syrup into the beverage glass each time the handle is moved through one stroke, and one or more separate spigots or draft arms for sweet or carbonated water. To mix the drink the attendant pumps a predetermined amount of syrup into the bottom of the glass and then fills the glass from one of the draft arms with sweet or carbonated water depending on which type of beverage is desired.

The making of drinks in this fashion is a time consuming operation in that the attendant usually has to walk from the syrup receptacles to the draft arm station performing a separate operation at each station. The operation is further prolonged by the fact that the beverage must usually be stirred in order to insure complete mixing of the syrup and the water. The stirring is also disadvantageous in that carbon dioxide gas is lost thereby from the solution.

In view of these facts many attempts have been made to provide a satisfactory dispensing apparatus which would dispense drinks from a single draft arm or faucet, mixing of the syrup and water occurring as the beverage was drawn. None of these devices heretofore has been wholly satisfactory in that either too much time was required to dispense the drink or a drink having low carbonation or being inadequately mixed was produced.

In order to insure that a sparkling, highly carbonated, cold drink will result it is necessary to precool the syrup from which the drink is made. This is necessary because the amount of syrup in the drink is usually about $\frac{1}{6}$ of the drink by volume, and the beverage is substantially warmed when the syrup is introduced. This warming results in a loss of carbon dioxide gas which is additive to the loss obtained by the dilution thereof. Furthermore, drinks which are to be mixed without ice must be served very cool, for they are unpalatable if too warm, and warm up rather quickly.

When dispensers are provided with cooling coils or other means for cooling the syrup, difficulty has heretofore been incurred in dispensing the same amount of syrup each time a drink is dispensed. This difficulty arises because of

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the fact that the temperature of the syrup varies over a rather wide range depending upon the rate at which drinks are being dispensed and the load on the refrigerating system. When the syrup is warm, its viscosity is relatively low compared with the high viscosities encountered at temperatures close to 35° F. which is the preferred syrup temperature. This difference in the viscosity greatly affects the rate at which the syrup will flow through the conduits leading to the draft arm, the rate of flow being a function of the viscosity.

Consequently, the only devices used heretofore which have proved at all satisfactory from the standpoint of mixing uniform drinks are those which employ some sort of a measuring receptacle which is filled each time a drink is dispensed and which empties automatically into the drink when the draft arm handle is thrown to draw water. Such devices, however, are unsatisfactory in that by necessity they are slow acting, two cycles instead of one being required, and also in that once a device is built for a certain syrup and size of drink it may not be readily adapted to discharge a drink of a different size or a drink from a different syrup.

The fact that such devices are not able to dispense drinks of different sizes is particularly disadvantageous, for most soda fountains customarily sell two sizes of soft drinks.

Other dispensers having thermal valves, responsive to the syrup temperature, which were intended to compensate for changes in viscosity have been constructed, but they have not proved satisfactory chiefly because of the complexity of the valve required.

One object of this invention, therefore, is to provide a drink dispenser which may be used to dispense drinks having a uniform composition regardless of the size of the drink and the temperature of the syrup.

Another object is to provide a drink dispenser having a syrup cooling coil which will dispense drinks having a uniform composition regardless of the temperature of the syrup.

Another object is to provide a drink dispenser which may be adapted to dispense drinks made from either sweet water or carbonated water.

Another object is to provide a drink dispenser in which the pressure of carbon dioxide gas supplied to the carbonator is employed to force the syrup from syrup container up to the draft arm.

A further object is to provide a novel method and means for regulating the rate of syrup flow through the draft arm which produces a uniform

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flow regardless of the temperature and viscosity of the syrup.

A further object is to employ a flow restricting orifice in the syrup conduit near or at the draft arm station to regulate the rate of flow of syrup through the draft arm, the syrup being supplied under constant pressure conditions and the conduit to the draft arm being relatively large in diameter.

Other objects and advantages of this invention will be apparent to those familiar with the art on reading the following specification in conjunction with the drawings and the appended claims.

In the drawings:

Fig. 1 is a perspective view showing the manner in which the various elements of the dispenser are connected;

Fig. 2 is a schematic flow diagram of a dispenser adapted to dispense carbonated beverages.

Fig. 3 is a front view partially in section showing a draft arm adapted to dispense carbonated beverages;

Fig. 4 is a side view, partially in section, of a draft arm adapted to dispense noncarbonated beverages;

Fig. 5 is an enlarged vertical section of the distributor assembly of the draft arm of Fig. 3;

Fig. 6 is an enlarged vertical section of the distributor assembly of the draft arm of Fig. 4;

Fig. 7 is a horizontal section taken on line 7—7 of Fig. 5; and

Fig. 8 is a horizontal section taken on line 8—8 of Fig. 6.

Fig. 9 is a horizontal section taken on line 9—9 of Fig. 4.

The dispensing apparatus 10 of this invention is schematically illustrated in Figs. 1 and 2, like elements bearing like numbers. Fig. 1 is a perspective view showing the various elements of a system for dispensing noncarbonated beverages, the enclosing cabinet or fountain not being shown. Fig. 2 is a schematic diagram showing connections between the individual elements when carbonated beverages are dispensed. It will be noted that a conventional carbonator is connected to the water inlet line in the system of Fig. 2.

The dispensing systems 10 and 10a may be readily adapted to be installed in a conventional soda fountain or may be housed in a separate cabinet or fountain. When the latter arrangement is used, the various elements may be arranged within the cabinet substantially in the position shown or their arrangement may be varied in order to fit them more compactly into the space available.

When the dispensing system 10 is to be installed in a soda fountain, the draft arm 11 is preferably mounted on top of the soda fountain (not shown) and cooler 12 is mounted within the fountain, the remaining elements being mounted either in the fountain, if space is available, or in the basement below the fountain.

The dispensing system 10 comprises draft arm 11, a cooler 12, a syrup receptacle 13, and conduits, pumps and regulators for conveying carbon dioxide and water to the various elements. Within the cooler 12, which is filled with some fluid such as glycol, are placed a refrigerant coil 12a, Fig. 2, supplied with refrigerant by a conventional refrigeration system (not shown), a water cooling coil 14, and a syrup cooling coil 15. When a dispenser which dispenses more

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than one beverage is desired, additional water and syrup coils may be employed in the cooler 12.

The syrup tank 13 is usually located below the draft arm 11 and pressure of carbon dioxide gas is used to force syrup from this tank to the draft arm. Carbon dioxide gas from a storage bottle (not shown) is supplied to a conduit 16 through a shut-off valve 17 and a pressure regulator 18. The downstream side of the regulator 18 is connected through a pressure gauge 20 to a fitting 21 opening into the top of the tank 13. A water inlet line 26 is connected to the cooling coil 14 through a pressure regulator 27 which maintains the proper water pressure at the draft arm 11, and adjustment can be made here as well as at the regulator 18 for maintaining the proper proportion of syrup and water.

The carbonated beverage dispensing system 10a shown in Fig. 2 is substantially the same as the tap or sweet water system except that a conventional carbonator 32 and pump 33 are provided in the water inlet line 26 in place of the water pressure regulator 27 in order to supply carbonated water to the cooler 12 instead of sweet water.

When the dispensing system 10a is to be installed in a separate cabinet, it is preferred to employ a carbonator similar to that described in the patent to Alexander F. McMahon for Carbonator Control, No. 2,521,472 issued September 5, 1950, reference to which is hereby made. The pump 33 may be any motor driven pump capable of delivering water at a pressure in excess of the carbonating pressure which is regulated by a conventional pressure regulator 34.

When the system 10a is to be installed in a soda fountain, the preferred arrangement is to connect the conduit 26 directly to the carbonator supplying the fountain. The carbonated water cooling coil in the fountain may be employed instead of the coil 14 if its capacity is great enough, and the syrup tank 13 may be installed in a refrigerated space eliminating the necessity for the cooler 12. The sweet water dispensing system 10 may also be installed in a fountain in a similar manner, the cooler 12 being eliminated, if desired.

From the foregoing, it will be seen that various systems or arrangements for supplying cool syrup and carbonated or sweet water to the draft arm 11 may be used so long as the liquids are supplied under constant pressure conditions. The main idea of this invention is to accurately control the rate of flow of syrup through the system regardless of its viscosity which, as stated previously, is a function of its temperature. To accomplish this, a flow restricting orifice is provided near the downstream end of the syrup conduit. This orifice is preferably located within the draft arm 11 although it has been found that satisfactory performance will result if the orifice is placed in the conduit 25 leading to the draft arm at a point within five feet of the draft arm 11.

The detailed construction of the draft arm 11 is shown in Figs. 3 to 9. Figs. 4, 6, 8 and 9 illustrate a draft arm 11 adapted to mix and dispense drinks of sweet water and syrup, while Figs. 3, 5, 7 and 9 illustrate a draft arm 11a adapted to dispense carbonated drinks. The two draft arms 11 and 11a are identical in construction except that the distributors 72 and 73 are different in form.

A pair of identical normally closed valve as-

semblies 53 are received in cavities 54 drilled into the head 51. One of the valve assemblies 53 controls the flow of syrup and the other controls the flow of water. The valves 53 are actuated by a handle 55 supported on a pivot 56 at the upper end of the head 51. A projecting portion 57 on the handle 55 carries a member 57 which fits about the stems 60 of the valves 53. A pair of nuts 61 on the valve stems 60 provides an adjustment which controls the off position of the valves 53. Thus, when the handle 55 is moved to the left as viewed in Fig. 4, the valves 53 are moved upwardly and the valve members 62 are lifted away from the valve seats 63 threadably received in the bottoms of the cavities 54. This permits liquid to flow from each of the passages 52 through the respective valve port 64 and into the passages 65 and 66. The springs 59 serve to hold the valves closed unless the handle 55 is moved.

The passage 65 extends to the top of a threaded opening 67 in the bottom of the head 51 and the passage 66 extends to an annular recess 68 which surrounds this opening. A threaded skirt 70 on the lower end of the head 51 supports a frusto-conical collector 71.

As shown in Fig. 9, and adjustable valve 69 is provided in the passage 66 for varying the rate of water flow through the draft arm 11. This valve is accessible through a threaded plug 69a on the front of the head 51.

As was previously described, the two draft arms 11 and 11a are identical; however, the distributors 72 and 73 used for carbonated water and sweet water drinks respectively are different from each other. The distributor 72 is shown in Fig. 5 and comprises a stem 74, a collar 75 and a spray guide 76. Except for the stem 74, the various elements of the distributor 72 are substantially the same as those described and claimed in the patent to Lewis E. Mendonca, for Method and Apparatus for Dispensing Carbonated Beverages, No. 2,657,592 issued November 3, 1953, reference to which is hereby made. As disclosed in this application, the collar 75 is provided with a plurality of passages 77 which connect the annular recess 68 in the bottom of the head 51 with a diverging passage 78 which is formed between the collar 75 and the spray guide 76. The passages 77 and 78 serve to conduct carbonated water from the passage 66 to the space within the collector 71, a film of carbonated water flowing out of the passage 78 and down the wall of the collector 71 as explained in the above referred to application.

The stem 74 serves a dual function of supporting the collar and spray guide and of conducting the syrup to the mouth of the collector 71 where it is mixed with the carbonated water stream. A longitudinal passage 80 extends through the stem 74 from the upper end thereof to a point near the bottom. In order to break up the flowing stream of syrup and to provide better mixing, a plurality of smaller passages 81 radially disposed about the axis of the stem 74 connect the lower end of the passage 80 with a larger diameter axial passage 82 in the bottom of the stem 74. The passages 81 function to break up the stream flowing through the passage 80 into a plurality of smaller streams which effect more efficient mixing as the syrup stream and carbonated water stream pass from the draft arm 11a into the glass.

The upper end of the passage 80 is larger in diameter and receives a removable plate 83 having a small restricting orifice 84 therethrough.

The size of the orifice 84 is such that it is substantially smaller than any other portion of the systems of conduits and passages leading from the syrup tank 13 to the passage 80 in the stem 74. The size of the orifice 84 is determined by the amount of temperature variation for a given syrup. To vary the amount of syrup in the drinks, carbon dioxide pressure may be varied by adjusting the regulator 16.

It is preferred to make the plate 83 removable for cleaning. The size of orifice and the carbon dioxide pressure for any given syrup is best determined by trial and error methods similar to the tests described herein. If the temperature variation is large, the orifice would necessarily be smaller, and if the variation is small, the orifice can be larger.

The orifice 84 functions as follows: The pressure of the carbonated water supplied to the draft arm 11a is maintained constant by the action of the pressure regulator 40 in the carbon dioxide supply line 20. Similarly, the pressure of the syrup in the tank 13 is maintained constant by the regulator 18 which controls the pressure at which carbon dioxide is supplied to the syrup tank 13. Thus, the only variable which may affect the rate of flow of the syrup or carbonated water through the draft arm is the temperature of the syrup and its viscosity which is a function of temperature. Since all of the conduits leading from the tank 16 to the draft arm 11a are relatively large in diameter with respect to the orifice 84 which governs the rate of flow of syrup, the pressure upstream of the orifice is substantially constant regardless of the viscosity of the syrup whose rate of flow through the conduits is quite low. The change in frictional resistance and consequent change in flow produced by change in viscosity is reduced to a minimum by the reduced surface area of the orifice. Normally, the larger surface area of the conduits when the temperature of the syrup is raised or lowered produces an extensive variation in the amount of syrup discharged in a unit of time. Using a restriction having small surface area, such as an orifice, practically eliminates the effect of temperature change on the discharge rate. The rate of flow of carbonated water is substantially constant, for it is dependent on the carbonator pressure which is also substantially constant.

Because the syrup and carbonated water rates of flow are constant, the composition of drinks dispensed is uniform regardless of the size of the drink. Were the restricting orifice 84 not employed, this would not be the case, for the rate of flow through the draft arm would be greatly affected by changes in viscosity which controls the rate of flow through a pipe or conduit but which has little or no effect on the rate of flow through a sharp edged orifice.

The distributor assembly 73 employed in the draft arm 11 which dispenses beverages made from sweet water is best shown in Fig. 6. This assembly comprises a mixer 85 and a spray nozzle 86. The upper end of the mixer 85 is machined so as to be similar to the upper end of the distributor 72, a threaded projection 87 being provided which screws into the opening 67 in the head 51. An annular recess 68 in the top of the mixer 85 connects with the recess 68 in the bottom of the head 51. These two recesses, together with a plurality of passages 90, serve to conduct sweet water from the passage 66 into a cavity 91

opening from the lower end of the mixer 85. An axial passage 92 extends from the top of the cavity 91 upwardly through the projection 87, an orifice 84a being provided in the upper end of this passage. The orifice 84a in the embodiment illustrated is integral with the mixer 85, but in many instances it has proved desirable to employ a removable orifice plate similar to that shown in Fig. 5.

The hollow spray nozzle 86 is threadably attached to the lower end of the mixer 85. This member is provided with a plurality of radial slots 93 which extend through the lower portion thereof. An opening 94 in the bottom of the spray nozzle permits drainage and forms an additional outlet passage.

The distributor 73 operates as follows: The refrigerated syrup is supplied to the draft arm 11 from the tank 13 at a constant pressure which is governed by the regulator 18. Refrigerated sweet water is supplied to the draft arm 11 at a pressure maintained constant by the regulator 27. When the handle 55 is thrown to the open position, both of the valves 53 are open, permitting syrup and water to flow into the passages 65 and 66 respectively. The water passes through the annular recess 68 and the passages 90 into the chamber 91. Simultaneously, syrup, its variation in viscosity being regulated by the orifice 84a, and its rate of flow by the regulator 27, passes through the axial passage 92 and into the chamber 91. The streams of water emerging from the passages 90 intersect the lower velocity stream emerging from the passage 92 and initiate mixing. This mixing continues as the fluids flow downwardly to the bottom of the chamber 91 and is substantially completed by the time the mixed fluids pass out of the distributor through the openings 93 and the hole 94. The beverage emerging from the openings 93 strikes the walls of the collector 71 and is formed into a column at the bottom of the collector 71 which column falls into the glass. It will be noted that the distributors 72 and 73 function differently. In the case of the latter, mixing of the syrup and sweet water takes place largely within the distributor itself, whereas, in the former, mixing is delayed until the time the syrup and the carbonated water pass out of the bottom of the collector 71, to preserve carbonation as much as possible.

In a test made on the apparatus of this invention employing a distributor similar to that illustrated in Fig. 6 and having a orifice of .070 inch diameter, an orange flavored syrup was mixed with sweet water to form an orange drink. The temperature of the syrup supplied to the draft arm 11 was varied from 37° F. to 60° F. Glasses of the beverage were drawn at intervals during the test and the sugar content or Brix was measured. At 37° F. this value was 11.0 and at 60° F. the value was 11.2. Thus, the sugar content was substantially constant, varying less than 2%, as the temperature changed 23° F.

The test was then repeated using an orifice plate having a diameter of .042 inch, the pressure of gas on the syrup being adjusted to produce drinks having a Brix in the neighborhood of 11.0. During this test the temperature was varied from 37° F. to 60° F. and the Brix was found to be constant at a value of 11.2. A third test using an orifice having an opening of .093 inch was made, the Brix found to vary plus or minus one unit.

In the absence of an orifice the change in Brix

or sugar content has been found to be several units. This is far in excess of the tolerance of plus or minus one unit which has been found to be satisfactory from a taste standpoint.

From the foregoing, the effect of the orifice will be seen. A smaller opening substantially eliminates variations in the sugar content of the drink produced by changes in viscosity due to changes in temperature of the syrup, whereas, a larger sized orifice reduces the amount of variation in the sugar content produced by changes in viscosity due to changes in temperature of the syrup.

As the orifice approaches the size of the conduits leading to it, the viscosity effect is encountered in the conduit causing excessive variations in the Brix.

Similar tests were made on the draft arm 11a using various sized orifices and temperatures ranging from 31° F. to 70° F. The optimum orifice size for the cola syrup being used was found to be .059 inch, the Brix varying in that case from 11.4 to 11.7. The reason that the smaller size orifice is required for the soft drink dispenser is because of the greater control required due to the viscosity change in the temperature range encountered.

Further tests were made in which the location of the orifice was changed to various points within the conduit leading from the tank to the draft arm. These tests indicated conclusively that the orifice must be located in the head of the draft arm or in the conduit connected to the arm and within a certain distance from the arm. To exceed this distance renders the orifice ineffective and the wide change in flow rate is caused by the large conduct area controlling the rate of flow to this area beyond the orifice as the viscosity changes. The farther back in the conduit it is placed, the greater the variation in sugar content of the drink with respect to temperature is experienced.

From the foregoing it will be seen that a novel and superior drink dispensing apparatus has been provided which may be readily adapted to dispense any size of carbonated or noncarbonated drink, the sugar content or strength of the beverage mixed remaining uniform regardless of the rate at which drinks are dispensed and the syrup temperature.

Various changes and modifications such as will present themselves to those familiar with the art may be made without departing from the spirit of this invention whose scope is defined by the following claims.

What is claimed is:

1. A draft arm comprising a body, a passage for water containing carbon dioxide, a second passage for syrup, a pair of valve means for controlling the flow of water and syrup through said passages, a stem depending from said body, a downwardly converging collector surrounding said stem and supported by said body, a collar supported on said stem adjacent said body and having a plurality of passages therethrough connecting the first mentioned passage with the bottom of said collar, a spray guide surrounding said stem below said collar and spaced therefrom, a frusto-conical surface on the upper part of said spray guide, a complementary surface on the lower part of the collar said two surfaces forming a diverging flow area, an axial passage for syrup through said stem, said passage being in communication with the syrup passage in said body, and a flow restricting orifice in said axial passage.

2. A draft arm comprising a body, a passage for water containing carbon dioxide in said body, a second passage for syrup, valve means for controlling the flow of water through said passage, a stem threadably supported by said body, a downwardly converging collector surrounding said stem and supported by said body, a collar supported on said stem adjacent said body and having an annular recess on the top thereof in communication with said first mentioned passage, a plurality of passages through said collar connecting the annular recess with the bottom of said collar, a spray guide surrounding said stem below said collar and spaced therefrom, a frusto-conical surface on the upper part of said spray guide, a complementary diverging surface on the lower part of the collar said two surfaces forming a frusto-conical passage, an axial passage for syrup through said stem, said passage being in communication with the syrup passage in said body, and a restricting orifice disposed in one of the passages for syrup.

3. A draft arm comprising a body, a passage for water containing carbon dioxide in said body, a second passage for syrup, a pair of valve means for controlling the flow of water and syrup through said passages, a stem threadably supported by said body, a downwardly converging collector surrounding said stem and supported by said body, a collar supported on said stem adjacent said body and having an annular recess on the top thereof in communication with said first mentioned passage, a plurality of passages through said collar connecting the annular recess with the bottom of said collar, a spray guide surrounding said stem below said collar and spaced therefrom, a frusto-conical surface on the upper part of said spray guide, a complementary diverging surface on the lower part of the collar said two surfaces forming a frusto-conical passage, an axial passage for syrup through said stem, said last mentioned passage extending from the syrup passage in said body to the bottom of said stem.

4. A mixing distributor for use in a draft arm comprising an elongated body having a chamber in the center thereof, a conduit for syrup opening into the upper end of said chamber, means defining a flow restricting orifice in said conduit, said body having a plurality of passages for water disposed about said conduit and also opening into said chamber, said passages being inclined with respect to said conduit so that water flowing therefrom intersects in the upper end of the chamber the stream of syrup flowing from said conduit, and an outlet passage at the bottom of said body.

5. A mixing distributor for use in a draft arm comprising an elongated body having a central chamber and an axial passage for syrup opening into the upper end of said chamber, said body also having a plurality of passages for water disposed about said axial passage and opening into said chamber, said passages being inclined with respect to said axial passage so that water flowing therefrom intersects in the upper end of the chamber the stream of syrup flowing from said axial passage, said body further having a plurality of slots through the wall thereof providing outlets from said chamber.

6. A mixing distributor for use in a draft arm comprising a body, means defining a mixing chamber at the lower end of said body, a conduit for syrup having a vertical rectilinear portion opening straight downwardly into the upper end

of said chamber and having a flow restricting orifice at the top thereof, said body having a plurality of passages for water disposed about said conduit and also opening into said chamber, the passages being inclined with respect to said conduit so that water flowing from said passages intersects the stream of syrup flowing from said conduit, said means defining a chamber having an outlet for the mixed syrup and water at the bottom thereof.

7. A mixing distributor for use in a draft arm comprising a body having a mixing chamber and a plurality of water passages therein, said passages opening into said chamber, said plurality of passages being disposed about said conduit, and said body also having a plurality of slots through the wall and an opening through the bottom providing outlets for mixed water and syrup from said chamber.

8. In a draft arm the combination including a passageway for syrup, a second passageway for water, a valve closing in the direction of flow in each of said passageways, means for simultaneously actuating the valves, a flow restricting orifice at the beginning of a rectilinear terminal end portion of the syrup passageway, an adjustable flow restricting means in the water passageway for controlling the flow of water therethrough when the valve in the water passageway is opened to vary the proportions of water and syrup being discharged, and a mixing chamber into which both of said passageways open.

9. In a draft arm the combination including a passageway for syrup, a second passageway for water, a valve closing in the direction of flow in each of said passageways, a single handle for simultaneously opening the valves, resilient means for closing said valves when the handle is released, a flow restricting orifice in the syrup passageway constituting the last flow restraint upon syrup flow through the syrup passageway for maintaining a constant rate of syrup flow regardless of viscosity changes, an adjustable flow restricting means in the water passageway for controlling the flow of water therethrough when the valve in the water passageway is opened to determine the proportions of water and syrup being discharged, and a mixing chamber into which both of said passageways open.

10. In a beverage dispenser having a source of syrup under constant pressure and refrigerated to a temperature within the range of 31° to 60° F. and a source of water under a predetermined pressure, the combination of a conduit connected to said source of syrup including a valve and a flow-restricting element having a sharp-edged orifice substantially smaller in cross-sectional area than said conduit for maintaining a constant flow rate of syrup therethrough regardless of the temperature of the syrup, the conduit downstream of said orifice being substantially larger than said orifice and free of any turns and obstructions, a second conduit connected to the source of water and including a second valve adapted to be actuated with said first valve and an adjustable flow restricting means for varying the effective flow area of said second conduit downstream of said second valve.

11. In a beverage dispenser having a source of syrup under constant pressure refrigerated to a temperature below 60° F. and a source of water under a predetermined pressure, the combination of a discharge conduit connected to said source of syrup and including a valve and

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a flow-restricting element comprising a sharp-edged orifice having an opening substantially smaller in cross-sectional area than the remainder of said conduit, said orifice constituting the sole restriction to free flow in said conduit downstream of said valve whereby syrup is supplied to said orifice at a constant pressure regardless of its viscosity when said valve is open, a second conduit connected to said source of water and including a second valve operable with the first valve and a restriction controlling the flow of water to vary the proportions of water and syrup being discharged, said conduits terminating in close proximity to each other, means for mixing the discharge from said conduits including a chamber having a plurality of outlets, and means for opening said valves simultaneously.

12. In a beverage dispenser the combination including a vertical passageway for syrup, a plurality of passageways for water disposed to discharge along converging lines around the syrup passageway, a pair of valves for controlling the flow of water and syrup through said passageways, means for simultaneously actuating said valves, a flow restricting orifice in the syrup passageway, and means defining a mixing chamber below the openings of said passageways and including an opening below said vertical passageway and a plurality of radial slots

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in the sidewalls of the chamber near the bottom thereof to provide outlets from said mixing chamber.

13. A mixing device for use in a beverage dispenser comprising an elongated body having a mixing chamber therein, passageways for water opening near the top of the chamber for discharging water into the chamber along converging lines of flow, a passageway for syrup opening into the upper end of said chamber for discharging syrup into the lines of water flow at their convergence, a flow restricting orifice in said syrup passageway, a plurality of slots through the sidewall of said body at the bottom of said chamber, said body having an opening at the lowermost limit of the bottom of said chamber, said slots and opening draining all liquid present in said chamber.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,169,666	Mayer	Jan. 25, 1916
1,268,232	Furman	June 4, 1918
1,429,574	England	Sept. 19, 1922
1,603,082	Jacobs	Oct. 12, 1926
2,391,003	Bowman	Dec. 18, 1945
2,401,914	Di Pietro	June 11, 1946