This invention relates to the art of dispensing liquids and more particularly to the dispensing of carbonated beverages such as beer and soft drinks, for example.

It is an object of this invention to provide an improved valve of the type which is operative to mix and dispense the syrup and carbonated water components of soft drinks in a uniform manner and with a minimum loss of carbonation. In the interest of conserving space, and especially since the development of compact and effective carbonating apparatus, it has been found desirable, in many soda fountain and tavern dispensing installations, to utilize the syrup concentrate of the various types of soft drinks along with a significant portion of carbonated water, rather than the relatively bulky form of the premixed drinks. Heretofore, however, it has been a problem of considerable magnitude to provide a properly mixed drink and yet avoid undue loss of carbonation. As may be understood, the two conditions work directly against each other, since a certain degree of turbulence, necessary to obtain a uniform mix of the components, causes considerable loss of carbonation at the low dispensing pressure. We have therefore provided a valve of such design as to mitigate the counteraacting effects of the mixing and decarbonation.

It is another object of this invention to provide an improved valve of this type wherein are combined several independently operated syrup dispensing valves which operate cooperatively with a single valve for the control of carbonated water to automatically dispense a properly mixed beverage upon actuation of any of the independently operated syrup valves.

It is yet another object of the invention to provide a valve having the characteristics enumerated above which is so designed that it requires little more space than that required by a similar valve having provisions for dispensing but a single flavor.

A further object of our invention is the provision of an improved valve of the character described which is of such inherent versatility that minor adaptations will render it capable of dispensing uncarbonated beverages, such as fruit ades or uncarbonated water for example, along with various carbonated beverages from other of its several outlets. It is also an object of the invention to provide a high pressure soda dispensing valve which is operated independently of the syrup valves but by an operator which is utilized for one of said syrup valves.

A still further object of our invention is the inclusion in one valve of an element which is operative to provide a surge trap for carbonated water emitted at relatively high velocity from a restricted pressure reducing passage. Our novel element further provides a somewhat restricted cup by means of which the carbonated water is forced to flow through the surge trap as it is issued from the valve, thus insuring uniform mixing of the components and further insuring that the syrup valves will be thoroughly washed by the water after closing of the valves.

The above and other objects and advantages of the invention will become apparent upon full consideration of the following detailed specification and the accompanying drawings wherein there is disclosed a certain preferred embodiment of the invention.

In the drawings, Figure 1 is a front view, in axial section, of a dispensing and mixing valve constructed in accordance with the principles of our invention.

Figure 2 is a vertical section of our valve taken along line II—II of Figure 1;

Figure 3 is a horizontal section taken along line III—III of Figure 2; and

Figure 4 is a horizontal section taken along line IV—IV of Figure 2.

Referring now to the drawings, and in particular to Figures 1 and 2 thereof, the reference numeral 10 designates a generally cylindrical block which forms the main body or body portion of our valve. Rigidly secured to the body 10 by welding or other suitable means, not shown, is a tubular support 11 which extends outwardly of the body 10 in normal relation to the axis thereof. The support 11 is normally provided with means, not shown, by which it may be secured to a dispensing panel or cooling tank as may be understood. The embodiment shown we have provided three vertical bores 12, 13 and 14 which are spaced as shown in Figure 3. The bores 12—14 are enlarged at their upper and lower end portions and are centrally retained as shown in Figures 1 and 2. Slidably retained in each of the said bores 12—14 are plunger members 15 each of which is bored and tapped at its lower end to receive a cap screw 16. A resilient washer 17 is carried in a recess provided therein in each of the said cap screws 16. The washers 17 extend outwardly of the plunger 15 and are adapted to act upwardly to provide a liquid seal as will become apparent.

In accordance with the principles of the invention, the syrup dispensing valves of our apparatus, which comprise the bores 12—14 and the plungers 15, must discharge the syrup at a point considerably below the lower end of the body member 10. To accomplish this we provide tubular extensions 18 which are adapted to be rigidly retained in the lower enlarged portions of the bores 12—14 and which depend downwardly in spaced concentric relation to the plungers 15. The lower ends of the tubular extensions 18 are adapted to recess the resilient washers 17 to thus, in cooperation therewith, form a liquid-tight seal. In order to provide a normally closed valve we utilize compressible coil springs 19 which are positioned over the plungers 15 and act upon the enlarged ends 20 thereof to yieldably urge the said plungers upwardly. Also acting upon the springs 19, at their lower ends, are metal washers 21 and resilient O ring washers 22 which prevent the upward passage of syrup into the upper end portions of the bores 12—14. As may be observed from Figure 3 the syrup is supplied to the lower enlarged portions of the bores 12—14 by means of horizontal bores 23, 24 and 25 respectively which are connected by conduits 23', 24' and 25' respectively. The said conduits 23'—25' communicate in the conventional manner with pressurized sources of syrup solutions, not shown.

Inasmuch as the relatively short length of the reduced central portion of the bores 12—14 is insufficient to provide proper guidance for the plungers 15, we have devised insertable guide pieces 26 which are secured to the bottom of the plungers 15 by means of the cap screws 16 and which have a plurality of circumferentially spaced upwardly extending legs. The upwardly extending legs of the guide pieces 26 are so dimensioned to slidably retain the plungers 15 in spaced concentric relation to the tubular extensions 18 and yet provide for the relatively unrestricted flow of syrup from the valves.

To open the normally closed syrup valves it is of course necessary to force the plungers downwardly against the action of the springs 19. To this end we provide operating levers 27, 28, 29 of each of which is adapted to actuate a separate plunger 15. As shown, the levers 27—29 are pivotally mounted on a rod 30 which is secured at each end by lugs 31 fastened to and extending upwardly from the body 10 in diametrically opposed relation. The levers 27 and 29 each have cam surfaces such as is shown at the lower portion of the lever 28. The cam surfaces of the levers 27 and 29 overlie the plungers 15 which are retained in bores 12 and 13 respectively and, as may be observed, drawing the upper ends of the said levers 27 and 29 forwardly will cause the above mentioned plungers to be forced downwardly to thus separate the washers 17 from their seats—the tubular extensions 18. It is, of course, understood that the levers 27 and 29 may be operated
independently of each other and of the center lever 28, and that each of the plungers 15 is thus operated independently of the others.

For reasons which will become apparent upon further consideration of this specification the plungers 15 which are retained in the bore 14 is positioned substantially out of line with respect to the axis of the rod 30 which serves as a pivotal mounting for the operation levers 27-29. Due to the aforesaid position of the rod 30, the bore 14 of the center lever 28 cannot act directly upon the plunger retained in the bore 14. To overcome this we have provided a short bar 32 which is operative to move vertically when incorporated with the said levers 27-29 at least partially overlies the cup member 33 so that upon actuation of any of the said levers 27-29 carbo

ated water as well as the particular choice of syrup will be caused to flow. Experimental determinations have shown the proper size of valve opening to be used to obtain the proper mixture of the components and this, of course, must be strictly adhered to if a drink of the correct proportions is to be obtained.

Secured to the lower end of the body 10 so as to form a fluid-tight seal therewith is a liquid trap 48, the function of which is to prevent the escape of the carbonated water issuing from a plurality of radial apertures 46 provided in the tubular insert 35. As will be understood the carbonated water emerging from the said aperture 46 and 36 will be moving at a relatively high velocity and will be at substantially atmospheric pressures—conditions which are very conducive to the loss of carbonation. By the provision of an enlarged liquid trap at the exit of the restricted passage we provide means of reducing the velocity of the stream and of preventing excessive loss of carbonation by causing the stream to come to rest in the liquid trap.

Depending integrally from liquid trap 45 are conical drip cups 47 which are positioned about each of the syrup valves as shown, with the lower or outlet ends of the tubular extension 18. As will be noted, the conical drip cups 47 provide the only outlet for carbonated water issuing from the radial apertures 46 of the tubular insert 35 so that the water will be discharged as it falls to the cup 47. When actuated, the conical drip cups 47 provide a relatively restricted passage for the carbonated water which is then discharged at a comparatively low velocity.

To further the washing action we provide that the valve controlling the flow of carbonated water be opened slightly before, and remain open for a short time after, the syrup valve. This is easily accomplished by providing for a certain degree of lost motion between the operating levers and their respective syrup valves, while having substantially none between the said levers and the water valve.
and which carries at its lower end a discharge tube 50. As should be apparent, opening of the valve by downward movement 43 will allow the discharge of relatively high pressure carbonated water through the tube 50. To accomplish downward movement of the rod 43 we provide a foot 51 at the lower and rearward point of the pivot rod 30. The foot 51 is adapted to overlie the upwardly extending portion of the rod 43 so that downward movement of the lever 28 will cause downward movement and consequent opening of the valve. It will be noted that the spring 40 acts at a considerable distance from the pivotal center of the operating lever 28 and is therefore effective, upon release of the lever to return it to its normal position and close the valve.

It should be noted that while the restoring force applied to the rod 43 is operative to return the lever 28 to the normal or upright position, the restoring forces of various syrup valves and the centrally located water valve act directly through the center of the pivot rod 30 and therefore have no tendency of return of the levers 27-29 to the normal from the forward position. This provision has been made purposely since this type of operation has been found to be most satisfactory in most instances. To further insure that the levers 27-29 do not restore themselves or otherwise required.

To provide an upright reference position for each of the levers which they may be returned when closing the valves, each of the levers 27 and 29 has been provided with a foot similar to the foot 51 of the lever 28. The upper surface 53 of the body 10 then serves as a positive stop for the return of levers 27 and 29. The head 25 is stopped upon its foot 51 by touching the upper end of the rod 43, although sufficient additional pressure will permit further movement of this lever to open the high pressure water valve, as explained. To enclose the principal parts of the dispensing valve for the sake of outward appearance we provide a discharge funnel 54 which has a single central outlet for the discharge of liquid from the various valves. A cap 55 encloses the assembly and houses the levers 27-29. Suitable slots are, of course, provided in the cap 55 to permit movement of the various levers.

From the foregoing disclosure it should be apparent that we have provided apparatus for the dispensing of carbonated beverages and the like embodying several novel features and means of operation which render it desirable from the standpoint of manufacture as well as that of use. We have in the embodiment hereinafter described incorporated several individual valves into a compact and practical structure, the construction of which necessitates only elementary machining operations.

In our valve we have incorporated numerous features deemed desirable by consumers of such devices. Further, our novel liquid trap element with its integral drip cups insures proper delivery of the carbonated water with a minimum loss of carbonation. Into the drip cups themselves we have incorporated features which insure proper and uniform mixing of the constituents by causing the major portion of the carbonated water to pass around the valve from which syrup flavoring is being infused. By this means substantially limiting the amount of liquid in the closed valves. We have also, by means of the afore-mentioned drip cups, provided a unit which is self-cleaning in operation. The relatively restricted passage between the closed syrup valves causes the retention of a small amount of the carbonated water after the closing of the valves. The thus retained water passes slowly out of the cup, and in doing so dissolves and leaches away any syrup which may have been contained at the valve opening. The self washing action is furthered by providing that the water valve open before and close after the syrup valves. It should be understood that by incorporating the last mentioned features we substantially eliminate undesirable cross contamination of the various flavors and insure a "pure" drink. A further advantage of our valve is its versatility. As mentioned previously, minor adaptations may be made in the structure to permit the dispensation of plain water or other carbonated beverages such as fruit ales, for example. This may be accomplished by closing the carbonated water valve or by closing the carbonated water valve and opening the actuating cam surface of one or both of the extreme operating levers 27 and 28 so that it will not bear on the inverted cup member 33. Thus conduits 24 and/or 23 may be connected realizing the desired source of plain water or other beverage to permit the same to be dispensed free of carbonation.

The incorporation of the short bar 32 as a means of actuating a remotely positioned syrup valve provides a novel principle of operation by virtue of which our valve may be constructed in such a compact and self contained manner. As may be understood, this principle may be utilized in producing a similar valve having four, five, or more syrup flavors as may be desired in some cases. It should be understood, however, that the embodiment of our invention herein shown and specifically described is illustrative only as many changes may be made in the specific structure without departing from the spirit of the invention. Reference should therefore be had to the appended claims in determining the scope of the invention.

We claim:

1. In a valve assembly for mixing and dispensing carbonated beverages the combination of a body member having a centrally disposed outlet for low pressure carbonated water and a plurality of syrup outlets positioned in spaced relation mutually divergent from the Preston carbonated water outlet, a cup-like member secured to the lower end of said body member in fluid tight relation therewith and having therein an enlarged chamber for the entrapment of carbonated water issuing from said carbonated water valve, conical drip cups, one for each of said syrup outlets, depending integrally from said cup-like member and said syrup outlets in closely spaced concentric relation, said drip cups providing the openings from said chamber for the discharge of carbonated water, the arrangement being such that a relatively restricted area of said cap 55 is formed between said drip cups and said syrup outlets whereby said syrup outlets are washed during each operation of the valve.

2. In a valve assembly for mixing and dispensing carbonated beverages the combination of a body member having a vertical bore therethrough with an enlargement in its lower end portion providing an internal shoulder, a sleeve having a tapered inner surface partially received in said enlarged portion of said bore, said sleeve having a plurality of circumferentially spaced openings in its side wall said sleeve an internally threaded below said openings, a tapered plug screw threaded received in said sleeve, a centrally disposed axis, a plurality of said plug, a valve having a sealing member vertically movable in said bore and adapted to be brought into and out of engagement with said shoulder and having an upwardly extending operating stem, a valve retainer engaging said stem, a rod operable by and mounted on said stem and partially engaged in said recess in said plug, and means mounted on the upper end portion of said body member to move said stem downwardly.

3. Apparatus according to claim 2 further including means at the bottom end of said body member to provide a liquid trap to receive the liquid passing between the upper portions of said sleeve and plug and outwardly through said circumferentially spaced openings, and said body member having an inlet port communicating with the upper end port of said bore.

4. In an assembly for mixing and dispensing carbonated beverages the combination of a body member having a plurality of valves for controlling the flow of dispensing syrup; an operating lever for each of said valves pivotally mounted on said body member and operative upon said upward movement to cause said valves to open, each of said operating levers having a cam surface of its pivotal center adapted to limit the rearward motion of said levers; a valve for controlling the flow of low velocity carbonated water, said last-mentioned valve being operable by each and a second operating lever; and a valve for controlling the flow of high velocity carbonated water, said last mentioned valve comprising an operating stem adapted for vertical opening and closing movement in a bore in said body member, said operating stem adapted to underlie the foot of one of said operating levers and to be moved downwardly thereby, yieldable means opera-
tive to urge said valve upwardly into the closed position, the arrangement being such that the rearward movement of said last-mentioned operating lever is normally limited by contact of its foot with the upper end of said operating stem, but such that sufficient force to overcome the abutting means is required to cause continued rearward movement of the said lever to open said last-mentioned valve.

5. In a valve assembly for mixing and dispensing carbonated beverages the combination of a body member having a plurality of inlet ports and a valve for each of said ports, each of said valves having an operating member positioned in the body member and movable vertically therein, means at the lower end of said body member to collect and discharge liquid issuing from any and all of said valves, a plurality of operating levers pivotally mounted on the upper end of said body member and having common driving engagement with one of said operating members and individual driving engagement with the other of said operating members, a valve for the discharge of carbonated water at high velocity, said valve comprising an operating stem adapted to move vertically in a bore in said body member, said bore being enlarged at its lower end portion to provide an internal shoulder, a sealing member carried at the lower end of said operating stem and operable to move into and out of contact with said internal shoulder to control the flow of said bore, a spring retained by said member and adapted to act upwardly upon said sealing member to normally maintain the same in contact with said internal shoulder; and means to control the operation of said last-mentioned valve comprising one of said operating levers, said one of said levers having a foot positioned outwardly of its pivotal center and adapted to overlie the upper end of said operating stem, the arrangement being such that movement of the said foot will cause said foot, and consequently said operating stem, to move downwardly against the action of said spring.

6. In a valve assembly for dispensing a beverage the combination of a body member having first and second valves for controlling the flow of said beverage through said assembly, said body member having an inlet passages connecting said first and second valves with a source of said beverage, an operating lever for said first valve pivotally mounted on said body member and operative upon forward pivotal movement of said first valve to open said bore, said abutment means positioned outwardly of its pivotal center to engage said second valve, means to yieldably urge said second valve into a closed position whereby said second valve and said abutment means is normal limit the rearward pivotal movement of said lever, said abutment means being further operative to move said second valve into an open position upon continued rearward pivotal movement of said lever, bile outlets for each of said valves, and flow restricting means positioned between said valve and outlet means. 14. Apparatus according to claim 13 further characterized by said second plug being comprised of a tube extending from said bore through said outlet means and said second plug being operable to move said second valve outwardly from said pivotal center to engage said first valve.

7. Apparatus according to claim 6 further characterized by beverage entrapping means secured to said body member for receiving beverage flowing from said restricting means, said beverage entrapping means comprising said last-mentioned outlet.

8. Apparatus according to claim 6 further characterized by said body member having beverage outlet passages therein leading from each of said valves to an end of said outlet means, one of said outlet passages including said flow restricting means, beverage entrapping means secured to said body member at said end in communication with said one of said outlet passages, and a jet tube communicating with the other of said outlet passages and passing through said beverage entrapping means, said tube comprising the outlet for the other of said valves, said entrapping means comprising the outlet for said one of said valves.

9. In a valve assembly for dispensing beverages the combination of a body member having first and second valves for controlling the flow of beverages through said assembly, said body member having inlet and outlet passages communicating with each of said valves, an operating lever for said first valve pivotally mounted on said body member and operative upon forward pivotal movement to cause said first valve to open, said lever having abutment means positioned outwardly of its pivotal center to engage said second valve, means to yieldably urge said second valve into a closed position whereby said second valve and said abutment means is normally limit the rearward pivotal movement of said lever, said abutment means being further operative to move said second valve into an open position upon continued rearward pivotal movement of said lever.

10. In a valve assembly for mixing and dispensing a plurality of beverages the combination of a body member having a plurality of spaced syrup valves in said body member, said syrup valves having outlet openings spaced outwardly of one end of said body member, valve means in said body member for controlling the flow of a base liquid to be dispensed with said flavoring syrups, outlet passage means for said valve means including flow restricting means and an outlet opening adjacent said one end of said body member, and a cup-shaped member secured to said one end of said body member in communication with said outlet opening whereby to form a liquid entrapping chamber, a two-piece base having said outlet opening, said cup-shaped member having a plurality of outlet openings therein each adjacent an outlet opening of a syrup valve and arranged substantially concentrically therewith whereby to form a partially restricted annular outlet for base liquid about the outlet opening of each of said syrup valves.

11. Apparatus according to claim 10 further characterized by the outlet opening of each of said syrup valves being provided with a member comprising integrally depending conical drip cups.

12. Apparatus according to claim 10 further characterized by said syrup valves being normally closed and comprising depending tuyeres operatively movably in line with said syrup valves and operating stems movably longitudinally in said tubular members and having enlarged head portions for engaging the annular end surfaces of said tubular members to control the flow of liquid therethrough, said enlarged head portions being normally positioned substantially within said openings whereby to partially restrict the same and being movably outwardly of said openings to simultaneously open said syrup valves and enlarge said openings, the arrangement being such that when one of said syrup valves is opened the flow of base liquid is greater through the opening about said valve than through the opening about any of the other of said syrup valves.

13. In a valve assembly for mixing and dispensing carbonated beverages the combination of a body member having a vertical bore therethrough, a valve plunger slidably in said bore, said bore including a tapered outwardly diverging lower portion, a valve plug disposed in said lower portion below said plunger, a spring acting on said plunger and said tapered plug to urge said plunger in an upward direction, lever means on said body member to urge said plunger in a downward direction, said means being carried by said plunger and arranged to be closed upon upward movement thereof, water inlet passage means including said valve means leading into the tapered portion of said bore, and water outlet means, said tapered bore and plug constituting a restricted passage for water positioned between said valve and outlet means.

14. Apparatus according to claim 13 further characterized by said tapered plug being comprised of a tube extending from said bore therethrough and said water outlet means comprising passage means leading from said restricted passage toward said plurality of syrup valves and means providing separate water outlet openings for each of said syrup valves.

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