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Arzberger et al.

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[54] **THREE PORT VALVE ASSEMBLY HAVING SELECTIVELY ACTUATED VALVES**

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[21] Appl. No.: **68,435**

[52] **U.S. Cl.** **222/129.1,** 222/144.5, 222/506, 137/607, 137/635

[51] **Int. Cl.** **B67d 5/56**

[58] **Field of Search**.....222/129.1, 132, 144.5, 145, 222/506, 518, 545; 137/607, 635

[56] **References Cited**

UNITED STATES PATENTS

2,888,040	5/1959	Terwilliger et al.	222/144.5 X
3,503,541	3/1970	Jacobs et al.	222/129.7

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[57] **ABSTRACT**

A three port valve assembly for dispensing either non-carbonated water, carbonated water, a non-carbonated beverage, a mildly carbonated flavored beverage. An actuating plate controls separate valves in each port (syrup, non-carbonated water and carbonated water) and the connections between the valves in the water ports and the plate can separately readily be disabled to open one valve without the other.

9 Claims, 4 Drawing Figures

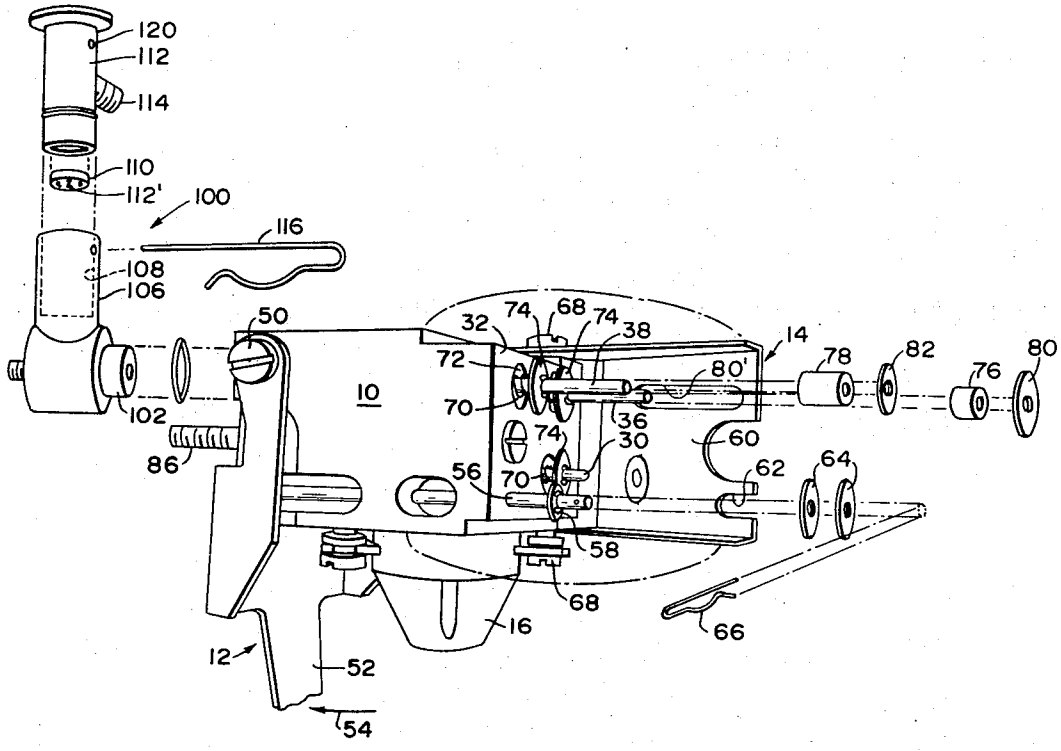
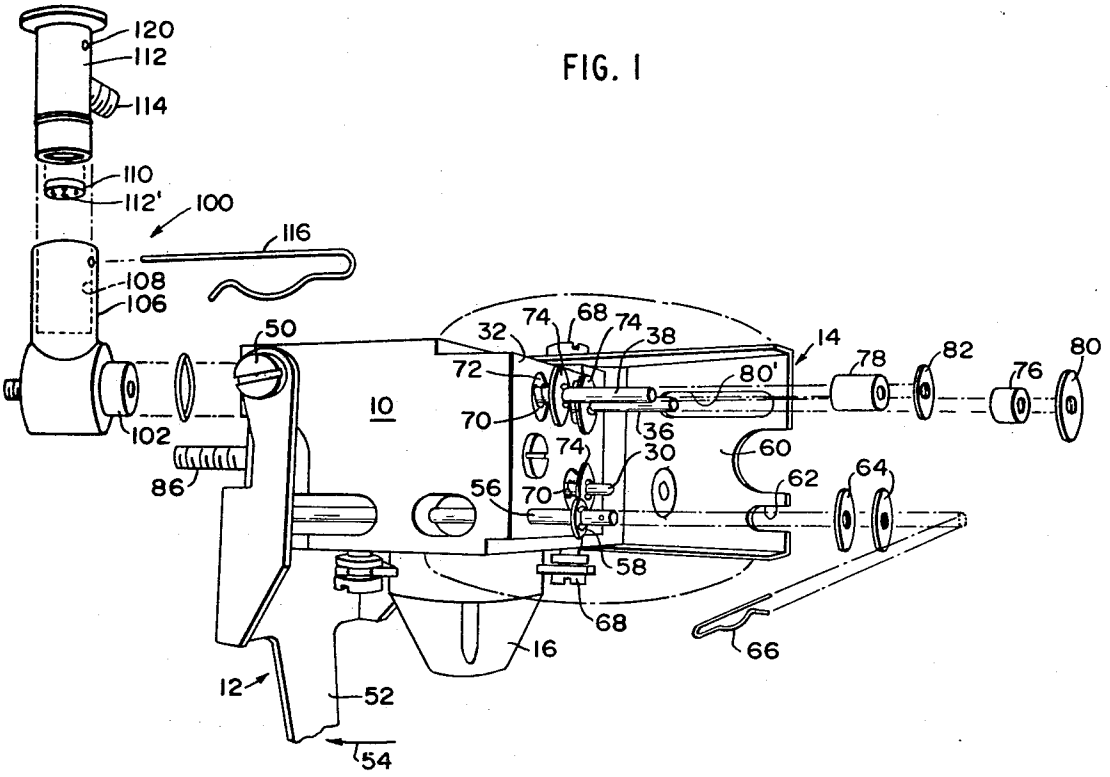


FIG. 1



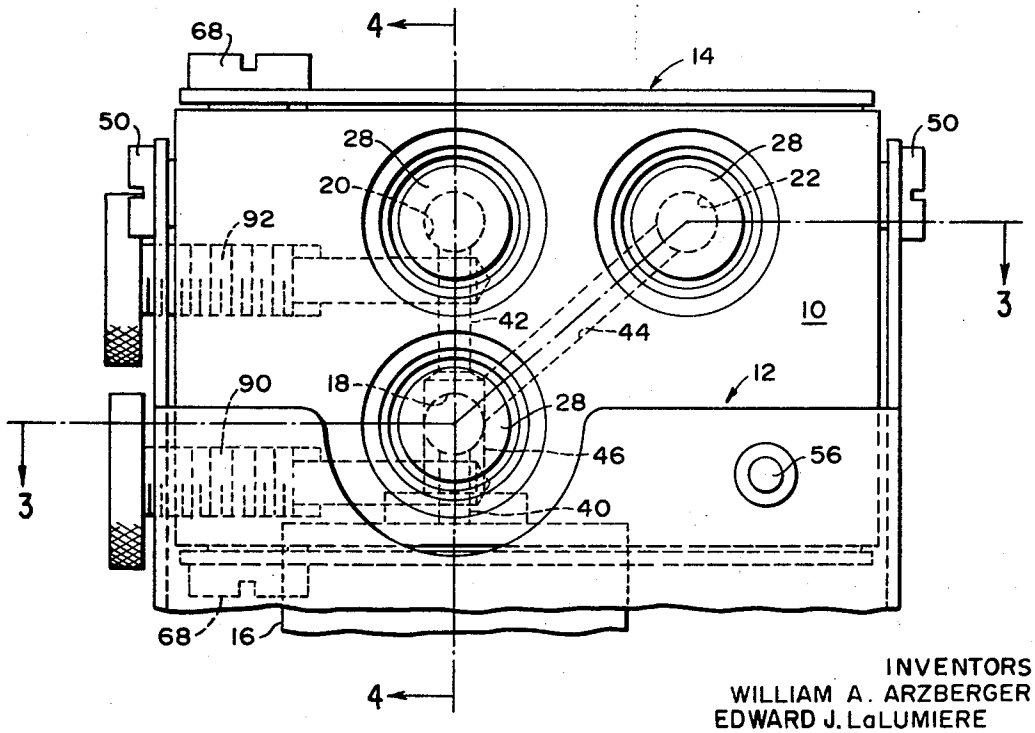


FIG. 2

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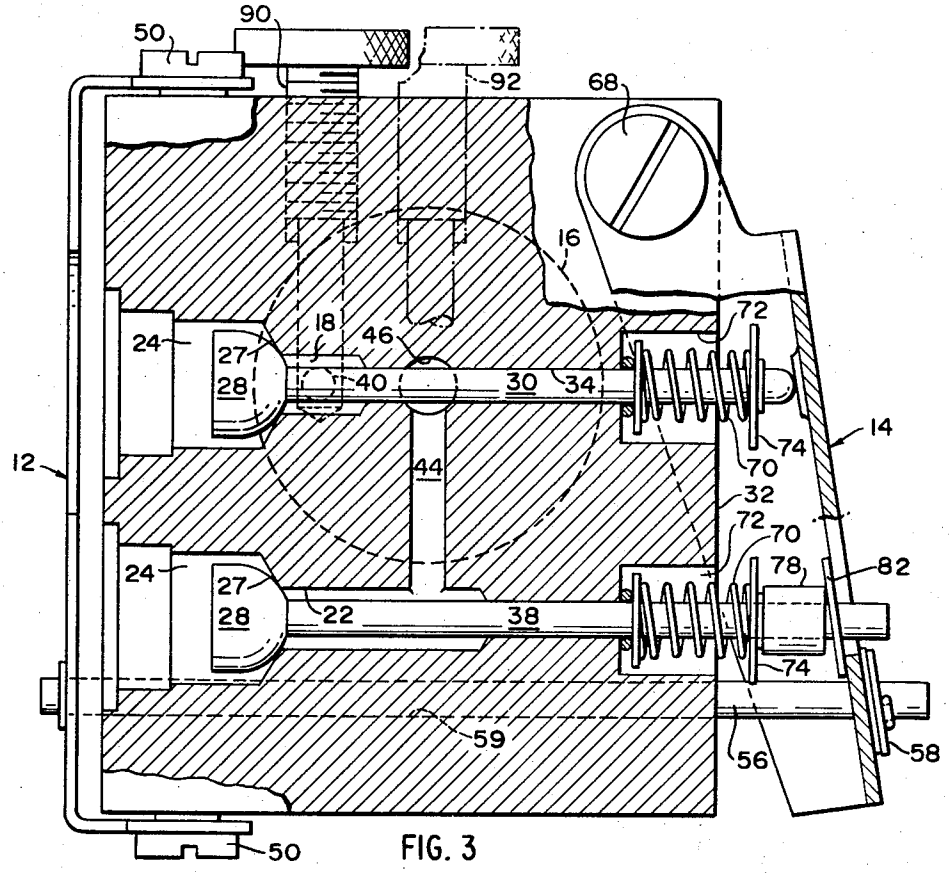

FIG. 3

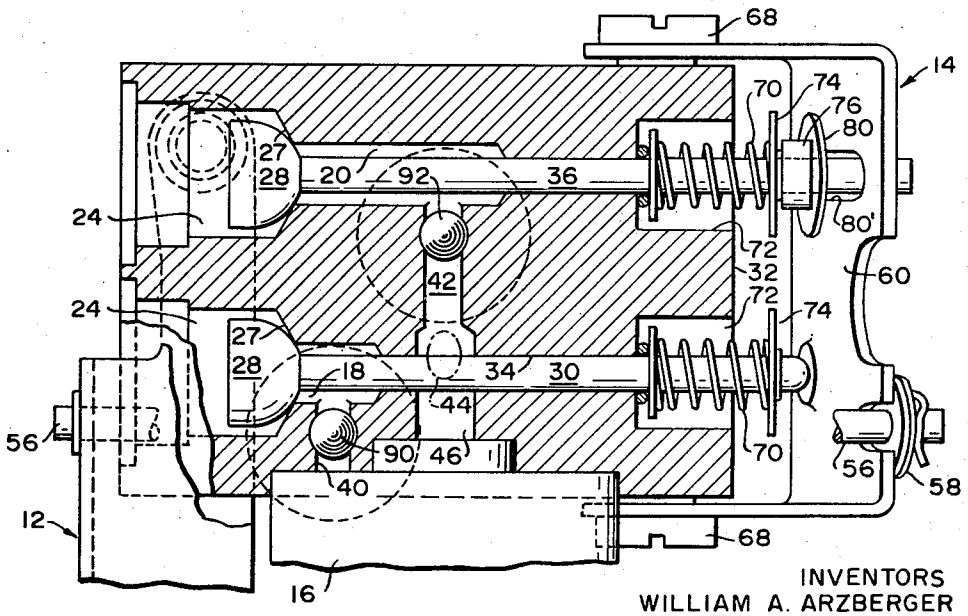

FIG. 4

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THREE PORT VALVE ASSEMBLY HAVING SELECTIVELY ACTUATED VALVES

This invention relates to valve assemblies for beverage dispensers and more particularly comprises a valve assembly for selectively dispensing quantities of carbonated and non-carbonated beverages. The valve assembly has particular application in beverage dispensers such as shown in U.S. Pat. No. 3,503,541 entitled MULTI-BEVERAGE DISPENSER owned by Jet Spray Cooler, Inc. Waltham, Mass.

The multi-beverage dispenser shown in U.S. Pat. No. 3,503,541 is designed to dispense a variety of carbonated beverages and non-carbonated water (hereinafter called "sweet" water). The valve assembly shown contains no means for varying the degree of carbonation of the several beverages, and each of the beverages dispensed from the machine has the same percent of carbonation. However, many people prefer a lesser percentage of carbonation for certain fruit drinks than for other soft drinks such as cola, root beer, etc. In addition many outlets desire to dispense a completely non-carbonated drink.

In accordance with the present invention, the valve assembly is provided with means for readily modifying the assembly to vary the carbon dioxide content of the beverage dispensed from zero to maximum by the assembly. The primary adjustments are made on the front of the assembly so that the change may be made conveniently in a matter of seconds without removing the valve from the machine. When a particular valve assembly is to dispense a carbonated fruit drink, the carbon dioxide content may be reduced, and with a cola drink or root bear for example, the carbon dioxide content may be increased.

In none of the prior art dispensers known to applicants are means provided for readily changing the carbon dioxide content of a soft drink dispensed by a beverage dispenser. In most machines, no means is provided for varying the carbon dioxide content, while in those which provide means for varying the amount, the adjustment is difficult to make, is a time consuming operation, and required substantial dismantling of the various parts.

In accordance with the present invention a valve assembly is provided having a three port body, one for carbonated water, one for sweet water, and one for the flavor syrup. In one setting of the controls on the valve assembly, actuation of the push handle provided as part of the assembly opens only the carbonated water and flavor syrup ports. By making a very quick modification on the machine, actuation of the handle will cause the flavor syrup and sweet water ports to open while the carbonated port remains closed. With a different modification which may be made quickly and conveniently, all three ports are open so as to mix carbonated and sweet water with the syrup, which in turn produces a low or medium carbonated drink.

In the drawing:

FIG. 1 is an exploded view of a single valve assembly constructed in accordance with this invention;

FIG. 2 is a rear view thereof; and

FIGS. 3 and 4 are cross sectional views thereof, taken along lines 3—3 and 4—4 of FIG. 2.

The valve assembly shown in the drawings is one that may be used with a beverage dispenser such as shown in U.S. Pat. No. 3,503,541. Several assemblies may be used each to dispense a single but different beverage. For example, one assembly may be used to dispense a cola drink, another root beer, a third an orange drink, and a fourth a grape drink. In such a multi-beverage dispenser, it is most desirable that at least one valve assembly be adjustable so that it may at various times be utilized to dispense a medium or low carbonated drink, at other times a non-carbonated drink, and at still other times a high carbonated drink. Typically a highly carbonated drink may contain four volumes of carbon dioxide, and a medium carbonated drink may contain 2 ½ to 3 volumes.

The single valve illustrated includes a body **10**, a push handle **12** pivotally supported on the body **10**, an actuating plate **14** also pivotally supported on the body **10** and connected to the handle **12**, and a mixing outlet nozzle **16**. The body **10** includes three separate passages which are described in detail below.

In FIGS. **2–4**, the three separate passages are shown. Passage **18** on the lower left side of the block as viewed in FIG. **2** is designed to be connected to a flavor syrup source, passage **20** above passage **18** on the left side of the block is designed to be connected to a carbonated water source, and passage **22** on the right upper side of the block is designed to be connected to a sweet water source.

Passage **18** has a large inlet chamber **24** which opens through the rear face **26** of the body to receive the appropriate fitting to couple a syrup duct to it. The chamber has a tapered valve seat **27** and cooperating valve **28** to open and close the passage **18**. The valve **28** is carried by a plunger **30** that extends forwardly through the body and out the front face **32** through a bore **34** which forms an extension of the passage **18**.

A similar arrangement is provided in the carbonated water passage **20** and the sweet water passage **22**. Thus, a valve seat and cooperating valve (similarly numbered) are provided in the inlet chamber of each of the passages **20** and **22**, and the valves are carried respectively by plungers **36** and **38** that extend out the front face **32** of the body through the bores which respectively form extensions of the passages **20** and **22**. The passage **18** on the downstream side of valve **28** communicates with a discharge port **40** in turn aligned with the outlet nozzle **16** where the syrup is mixed with carbonated and/or sweet water as selectively dispensed by the valve assembly. The mixing outlet nozzle **16** may typically take the form of the nozzle shown in U.S. Pat. No. 3,503,541. The carbonated water passage **20** on the downstream side of its valve is connected to a discharge port **42** which directs the carbonated water from the passage into the mixing nozzle **16**. A cross duct **44** connected to the sweet water passage **22** downstream of its valve connects the sweet water passage to the port **42**. Thus, the carbonated and sweet water are both discharged into nozzle **16** from the same opening **46** in the body **10**.

It is apparent that each of the passages **18**, **20** and **22** is opened by pushing its particular plunger, **30**, **36**, or **38** rearwardly to move the respective valve off the cooperating seat. Each of the plungers is depressed in this fashion by the actuating plate **14**. The connections between the plate and the respective plungers determines whether the several valves open when the plate **14** is actuated by the push handle **12**.

The push handle 12 is carried by shoulder screws 50 on the body 10, and the lower extension 52 of the handle may be displaced rearwardly by pushing a cup against its front face, as suggested by arrow 54. The handle 12 is secured to plate 14 by means of connecting rod 56 that extends through a bore 58 in the body. The connecting rod 56 is parallel to the several plungers and carries a washer 58 adjacent its outer end which is disposed against the inner face 60 of actuating plate 14. The end of the connecting rod 56 extends through a slot 62 in the plate 14, and washer 64 and pin 66 releasably connect the rod 56 to the plate. The washers 58 and 64 sandwich plate 14 so as to cause the plate to pivot on its shoulder screws 68 upon actuation of the handle 12. The connection between the rod 56 and the plate 14 may be released by pulling the pin 66 and removing the washers 64. When released, the plate 14 may be pivoted to the position shown in FIG. 1 to expose the ends of the several plungers.

Each of the plungers 30, 36 and 38 is urged in a forward direction to seat their respective valves 28 by springs 70 which surround the plungers in counter bores 72 adjacent the front face 32 of the body 10. Each spring bears against the inner end of the counter bore and a washer 74 carried on each plunger immediately forward of the front face 32 of the body. And the springs 70 are overcome when the plate 14 presses against the washers 74, either directly or indirectly, to push the plungers in a rearward direction.

In the embodiment shown, the plate 14 is positioned to contact syrup plunger 30 and unseat its valve 28 when the push handle 12 is actuated, and when the handle is released the spring 70 urges the plunger 30 forwardly in the body 10 to close the passage 18. Spacers 76 and 78 are provided on the stems 36 and 38, respectively so as to connect the inner face 60 of the plate 14 to the stems. Washers 80 and 82 are provided to releasably retain the spacers 76 and 78 on the stems 36 and 38 and offer a surface upon which the plate 14 may bear when moved in a rearward direction.

FIG. 1 suggests the manner in which the valve assembly may be modified to serve its different purposes. Thus, if the valve assembly is to be used to dispense a highly carbonated beverage, the spacer 78 and washer 82 on the sweet water plunger 38 is removed, while the spacer 76 and washer 80 remain on the plunger 36. With this arrangement, movement of the plate 14 under the influence of the handle 12 will not depress plunger 38, for that plunger will extend through slot 80 in the plate and no force will be applied to it. However, the washer 80 and spacer 76 carried on plunger 36 will cause that plunger to be depressed for the plate 14 bears directly against washer 80. Consequently, carbonated water and flavor syrup are discharged into the mixing nozzle 16, while no sweet water is discharged into it. If the valve is to be used to dispense a non-carbonated drink, spacer 78 and washer 82 are placed on plunger 38, while spacer 76 and washer 80 are removed from plunger 36. With this arrangement, it is apparent that the plunger 36 will not be actuated by the plate 14, and when the push handle 12 is depressed only the flavor syrup passage 18 and the sweet water passage 22 will be open.

If the valve assembly is to be used to dispense a drink requiring a lesser percent of carbonation, both spaces 76 and 78 and washers 80 and 82 are utilized, so that both the sweet water passage and the carbonated water passage are opened and a mixture of sweet and carbonated water is mixed with the syrup. Thus the volume of carbon dioxide in a given quantity of liquid is reduced.

The removal or replacement of either or both of the spacers 76 and 78 and their respective washers is facilitated by the connection between the connecting rod 56 and the plate 14. Merely by pulling the pin 66 and removing the washers 64, the plate 14 may be swung to the position shown in FIG. 1 so that the spacers 76 and 78 and washers 80 and 82 may be removed or replaced on their respective plungers. It will also be appreciated that this operation may be carried out without removing the valve assembly from the dispenser on which it is used. In this connection, a mounting screw 86 is carried on the rear face of the body to support the valve assembly on the dispenser.

A pair of fine adjusting screw-type valves 90 and 92 are provided in the ports 40 and 42 and intersect the ports 40 and 42 to control the flow rate in the syrup and carbonated water lines in the assembly body 10. Each screw includes a head 94 which can readily be turned manually by an operator so as to make any fine adjustments necessary to provide the correct flow rate.

In order to promote a constant rate of flow of sweet water with changes in line pressure, a variable orifice flow control is provided in the water line before it enters the body 10. In FIG. 1, this arrangement is shown. A washer housing and coupling assembly 100 connects to the rear face 26 of the body 10 with its horizontal cylindrical portion 102 within the enlarged chamber 104 of the sweet water passage 22. The assembly 100 also includes a vertically extending cylindrical portion 106 having a counter bore 108 that receives the flow control washer 110 in the form of a flexible annulus having an orifice 112' which changes in diameter with changes in pressure head applied to its upstream side. The washer 110 is retained in the bore 108 by the head section 112 of the assembly 100. The lower portion of the head slips into the bore above the annulus. A sweet water nipple 114 connected to the head 112 facilitates the connection of a hose carrying sweet water to the valve assembly.

It is likely that different sizes of flow control washers 110 will be required when the assembly is used on the one hand for dispensing non-carbonated beverages and on the other hand when the assembly is used to dispense low carbonated beverages. To change the flow control washer pin 116 is provided, which extends through opening 118 in the cylindrical portion 106 and the opening 120 in the head 112. When the pin 116 is removed, it is evident that the head 112 may be withdrawn from the bore 108 and the washer 110 may be changed. When the pin 116 is reinserted through the openings 118 and 120 the assembly is retained in the assembled relationship. Because the assembly 100 extends upwardly above the body 10, it too is accessible and there is no need to remove the body 10 from the dispenser to make the flow control washer change. It should be evident that when low carbonation beverages are to be dispensed, the flow control washer 110 will provide a lower rate of flow through the system than is provided when non-carbonated beverage is to be discharged by the valve.

From the foregoing it will be appreciated that with the valve assembly of this invention, a high, low carbonated, or non-carbonated drink may be drawn, and plain sweet water or plain carbonated water may be drawn also. To draw either carbonated or sweet water alone, the end of plungers **36** and **38** extending through slot **80'** on plate **14** may be depressed directly against the action of their springs **70**. Depressing either of those plungers directly will not cause the syrup plunger **36** to be depressed so as to unseat its own valve.

Another advantage of this assembly is that no check valves are required in the sweet and carbonated water passages. Such valves are necessary when the waters are mixed together upstream of a single outlet valve.

It should be evident that modifications may be made of the illustrated embodiment of this invention without departing from its spirit. For example, while in the foregoing description reference is made to the push handle as a means of actuating the valve, the valve could be solenoid actuated without departing from the invention.

We claim:

1. A valve assembly comprising

a body,

three passages in the body, one passage for sweet water, a second for carbonated water, and a third for flavor syrup,

a mixing nozzle connected to the body into which the sweet water, carbonated water and syrup are discharged,

a valve and seat in each passage in the body for controlling the flow through each,

a connecting duct joining the second and third passages on the down stream side of their valve and seat for mixing the sweet water and carbonated water when the valves in the second and third passages are unseated,

valve plungers carrying each of the three valves and extending out of the body,

an actuating plate mounted on the body and positioned to engage and selectively move the plungers for each of the three valves to unseat the valves carried by them,

a handle connected to the plate to facilitate movement of said plate,

and means carried by the plunger of the valve in the sweet water passage for controlling the effect upon the sweet water valve plunger of the movement of the plate.

2. A valve assembly as described in claim **1** further characterized by

means carried by the plunger of the valve in the carbonated water passage for altering the effect upon that valve of the movement of the plate.

3. A valve assembly as described in claim **2** further characterized by

each of said plungers for the sweet water and carbonated water valves extending out the front of the body,

said plate lying in front of the front face of the body and pushing the plungers to unseat the sweet water and carbonated water valves when moved by the handle,

and said means carried by the plungers including spacers for determining the extent of movement of the sweet water and carbonated water valves when the plate is moved through a selected distance.

4. A valve assembly as described in claim **1** further characterized by

means including adjusting valves disposed in the carbonated water passage and syrup passages for altering flow through each of those passages when the first recited valves in those passages are open.

5. A valve assembly as described in claim **4** further characterized by

means carried by the plunger of the valve in the carbonated water passage for altering the effect upon that valve of the movement of the plate.

6. A valve assembly as described in claim **1** further characterized by

a conduit connected to the sweet water passage for joining that passage to a water source,

a flow regulating washer mounted in the conduit,

and means for opening the conduit to change the washer.

7. A valve assembly comprising

a body and three passages in it for three different liquids, a valve and seat in each passage for controlling the flow through each,

plungers connected to each of the three valves and an actuator associated with each of the plungers for moving each of the plungers to unseat each of the three valves,

coupling means removably mounted on two of the plungers and when mounted on said two plungers causing activation of the actuator to move said two plungers and when removed from either plunger causing the plunger from which the coupling means is removed to remain stationary when the actuator is activated,

each of the plungers extending out the front of the body with the body being supported at the rear, a duct in the body joining the two passages having valves connected to said two plungers, whereby those two passages have a common outlet from the body,

and said coupling means being spacers mounted on the ends of the plungers and lying in front of the body in a readily accessible location whereby the spacers may be removed and remounted on the plungers without dismounting the body.

8. A valve assembly as described in claim **7** further characterized by

said actuator being a plate mounted on the front of body and covering the spacers,

and a push handle connected to said plate for moving the plate to depress the plungers.

9. A valve assembly as described in claim **8** further characterized by

a connecting rod joining the push handle and plate and mounted in the body,

said plate being pivotally mounted on the front of said body,

and means for disconnecting the rod and plate enabling the plate to be pivoted away from the body to make the spacers accessible.

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