This invention relates generally to valve structures, and more specifically to a dispensing valve for carbonated beverages.

Although the principles of the present invention may be included in various valves, faucets, or other dispensing devices for liquids, a particularly useful application is made in valves or faucets of the type that are employed with carbonated beverages, such as beer and soft drinks. In particular, useful valves of this type are preferably constructed to minimize turbulence so that a beverage may be rapidly dispensed into a vessel without the dispensing or creating of any significant amount of foam. Where the foam is excessive, the operator must wait for it to die down to add the proper amount of liquid, and failing to do so, he creates customer dissatisfaction because of having been served a lesser amount of beverage than one would expect.

On the other hand, a certain amount of foam is desirable and expected. For example, a small "head" on a glass of beer, or foam in an ice cream soda, is considered desirable.

When the level of carbonation decreases in the supply of carbonated beverage, the likelihood of there being an adequate head decreases. Furthermore, as the quality of the basic valve increases and creates less turbulence, the quantity of head or foam decreases.

There are large numbers of dispensing valves of the type described which have been sold, and which would need to be scrapped if they were to be replaced by a dispensing apparatus capable of delivering a high rate of low-foam liquid, and of creating foam. This problem is magnified by the fact that many faucets now in use are tailored and sized to form a part of a larger apparatus such as a soda fountain or other major piece of equipment.

In accordance with the principles of the present invention there is provided a valve assembly which takes the place of the valve assembly of a conventional dispensing device, the valve assembly of the present invention having incorporated therein a second valve assembly so constructed that it may be independently actuated to discharge a high velocity jet of the carbonated beverage or foam thereof, or to create such foam.

Accordingly, it is an object of the present invention to provide an improved liquid dispensing apparatus.

Another object of the present invention is to provide a dispensing faucet having internal configurations which may be separately actuated, one so not to break up the carbonated solution during flow therethrough, and the other so as to deliberately effect break-up thereof.

A still further object of the present invention is to provide an article of commerce which is interchangeable with the valve element of an existing faucet, to thereby convert the faucet into one having two outlets.

A still further object of the present invention is to provide an improved fizzle valve.

Many other advantages, features, and additional objects of the present invention will become manifest to those versed in the art upon making reference to the detailed description and to the accompanying sheet of drawings in which a preferred structural embodiment incorporating the principles of the present invention is shown by way of illustrative example.
grooves, one receiving a rubber O-ring 45 for sealing against the relatively high upstream pressure, one receiving a passage 46 for sealing against a lower pressure during dispensing, and the third groove 47 communicating with an axial bore 48 therein.

The tubular plug 38 is held against the shoulder 37 by a flange nut 49 having a threaded portion engaging with screw threads at the outer end of the stem 22 and having a flange 50 portion acting through a compression seat 50 to so bias the tubular plug 38.

Within the axial bore 48 of the tubular plug 38, there is slidably disposed and supported a second valve stem 51, at the inner end of which there is supported and carried a second annular valve 52, such as of rubber, and at the outer end of which there is secured an actuating knob 53. The knob 53 is secured to the outer end of the stem 51 by a set screw 54. The spring 43 acts against the inner end of the stem 51 to bias and urge the valve 52 against the seat 44. The inner end of the stem 51 has a head 55 of reduced size and which may be undercut to receive therebeneath a reduced diameter turn of the spring 43.

The spring 43 thus acts between the valve assembly 20 and the valve assembly 21 to hold the valve of the valve assembly 21 normally in a closed position.

A further somewhat heavier spring 56 acts between a flange 57 on the stem 22 and on the front side of the body 11 to apply a force to the valve stem 22 which biases the valve 24 in a closing direction. The spring 56 is enclosed or jacketed by a pair of annular telescoping covers 58, 59 which have flange ends respectively disclosed between the spring 56 and the flange 57, and the spring 56 and the body 11.

Referring to FIGURE 3, the stem 22 has a radial opening 60 which communicates the counterbore 36 at the peripheral groove 47 with the exterior, the opening 60 being counterbored and receiving a short length of conduit 61, the lower end 62 of which defines a second outlet of an auxiliary nature smaller than the outlet 18 and disposed remotely therefrom.

When the handle 15 is rocked forwardly as shown in the drawing, pressurized liquid flows past the valve 24, past the seat 19, and out the outlet 18. Whether the valve 24 be open or closed, the knob 53 may also be actuated or pushed inwardly to unseat the valve 52 from the seat 44, thereby enabling fluid to pass through the second passage 28. More particularly, the fluid then flows from the portion 17 in the body 11, through the nut 25, the passage portion 29, the transverse bore 30, and as it flows past the valve 52 and the seat 44 and along a reduced diameter portion of the stem 51 and into the groove 47, to the opening 60 and the outlet 62.

When the main valve 24 is closed, and a force is applied to the knob 53, the spring 43 will yield to enable the second valve 52 to open, while the stronger spring 56 will hold the main valve 24 closed.

While the passage 16 is made as smooth as possible to minimize turbulence, it is to be noted that the passage 28 has a number of sharp corners and edges which tend to create turbulence, and hence foam. By way of example, the transverse bore 30 is so constructed that fluid flowing therethrough must make two sharp turns. By way of further example, there is an internal shoulder 63 in the conduit that defines the auxiliary outlet 62. The foam created in the passage 28 is thus discharged with liquid therethrough the outlet 62, and at a relatively high velocity since the outlet 62 comprises a point of maximum flow restriction. Thus the discharged fluid may impinge other fluid previously dispensed to assist in breaking up the same and creating a foam or fizz.

The valve stems 22 and 51 are so supported that all movement of either or both of them are in the same direction, and each valve opens in response to inward movement thereof.

The assembly shown in FIGURES 2 and 3 comprises an article of manufacture which may initially comprise part of a faucet assembly such as shown in FIGURE 1, and which alternatively may be sold as a replacement device by which faucets such as shown in my U.S. Patent No. 2,899,170 may be modified to incorporate the principles of this invention.

In this construction, the means 61 that defines the auxiliary outlet 62 extends in a downwardly straight direction, and the liquid is discharged therefrom in a downwardly straight direction. Moreover, such means are situated well forward where the operator can readily see what he is doing.

Although various minor modifications might be suggested by those versed in the art, it should be understood that I wish to embody within the scope of the patent warrant hereon all such embodiments as reasonably and properly come within the scope of my contribution to the art.

I claim as my invention:

1. A liquid dispensing apparatus comprising in combination:
   (a) a body having a first fluid passage therethrough in which there is a first seat for communicating with a supply of liquid;
   (b) a first valve disposed in said first fluid passage and supported by said body for free-sliding movement in an axial direction into and out of sealing engagement with said first seat, said first valve having a second fluid passage therethrough in which there is a second seat for communicating with the supply of fluid;
   (c) a second valve disposed in said second fluid passage and supported by said first valve for free-sliding movement in an axial direction into and out of sealing engagement with said second seat;
   (d) a first spring acting between said first body and said first valve and operable to move said first valve toward said first seat; and
   (e) a second spring acting between said valves and operable to move said second valve toward said second seat.

2. A liquid dispensing apparatus comprising in combination:
   (a) a body having a first fluid passage therethrough in which there is a first seat for communicating with a supply of liquid;
   (b) a first valve disposed in said first fluid passage and supported by said body for free-sliding movement in an axial direction into and out of sealing engagement with said first seat, said first valve having a second fluid passage therethrough in which there is a second seat for communicating with the supply of fluid;
   (c) a second valve disposed in said second fluid passage and supported by said first valve for free-sliding movement in an axial direction into and out of sealing engagement with said second seat;
   (d) a first spring acting between said body and said first valve and operable to move said first valve toward said first seat; and
   (e) a second spring acting between said valves and operable to move said second valve toward said second seat.

3. A liquid dispensing apparatus comprising in combination:
   (a) a body having a first fluid passage therethrough in which there is a first seat for communicating with a supply of liquid, said first passage terminating in a main outlet;
   (b) a first valve disposed in said first fluid passage and movable into and out of sealing engagement with said first seat, said first valve having a second fluid passage therethrough in which there is a second seat for communicating with the supply of fluid, said sec-
A liquid dispensing apparatus comprising in combination:

(a) a body having a first fluid passage therethrough of functionally smooth internal construction in which there is a first seat for communicating with a supply of liquid;

(b) a first valve disposed in said first fluid passage and movable into and out of sealing engagement with said first seat, said first valve having a second fluid passage therethrough in which passage there is a second seat for communicating with the supply of fluid, said second fluid passage being defined in part by a sharp corner means by which the direction of flow of all of the liquid flowing through said second passage is sharply turned upstream of said second seat for effecting a turbulence in the liquid; and

(c) a second valve disposed in said second fluid passage and movable into and out of sealing engagement with said second seat.

5. A liquid dispensing apparatus comprising in combination:

(a) a body having a first fluid passage therethrough in which there is a first annular seat directed in an upstream direction for communicating with a supply of liquid;

(b) a first valve assembly including,

(1) a first stem movably supported by said body, and

(2) a first annular valve secured to said first stem and disposed in said first fluid passage, and movable by said first stem in a downstream direction into sealing engagement with said first seat,

(3) means in said stem defining a second fluid passage, the upstream end of said second passage extending through said first annular valve for communicating with the supply of liquid, and said second passage including a cylindrical recess; and

(4) a tubular plug received in said recess and having an upstream end defining a second annular seat directed in an upstream direction and forming a part of said second fluid passage; and

(c) a second valve assembly including,

(1) a second stem extending through and slidably supported by said tubular plug, and

(2) a second valve secured to said second stem and disposed in said cylindrical recess, and movable by said second stem in a downstream direction into sealing engagement with said second seat.

6. A liquid dispensing apparatus comprising in combination:

(a) a body having a first fluid passage therethrough in which there is a first annular seat directed in an upstream direction for communicating with a supply of liquid;

(b) a first valve assembly including,

(1) a first stem movably supported by said body, and

(2) a first annular valve secured to said first stem and disposed in said first fluid passage, and movable by said first stem in a downstream direction into sealing engagement with said first seat,

(3) means in said stem defining a second fluid passage, the upstream end of said second passage extending through said first annular valve for communicating with the supply of liquid, and said second passage including a cylindrical recess; and

(4) a tubular plug received in said recess and having an upstream end defining a second annular seat directed in an upstream direction and forming a part of said second fluid passage; and

(c) a second valve assembly including,

(1) a second stem extending through and slidably supported by said tubular plug, and

(2) a second valve secured to said second stem and disposed in said cylindrical recess, and movable by said second stem in a downstream direction into sealing engagement with said second seat.

References Cited by the Examiner

UNITED STATES PATENTS

144,646 11/1873 Zwieselsch============137—637.2
2,607,559 8/1952 Forsa================251—321
2,619,914 12/1952 Dobkin============137—614.16 X
2,675,822 4/1954 Redlin=============137—600 X
2,879,801 3/1959 Cornelius=========137—637.2 X
2,899,170 8/1959 Cornelius==========251—122

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