Jan. 2, 1962 M. H. CHUDNOW 3,015,420

DOUBLE STROKE VARIABLE CONTROL FLUID DISPENSING VALVE

Filed July 25, 1960 3 Sheets-Sheet 1

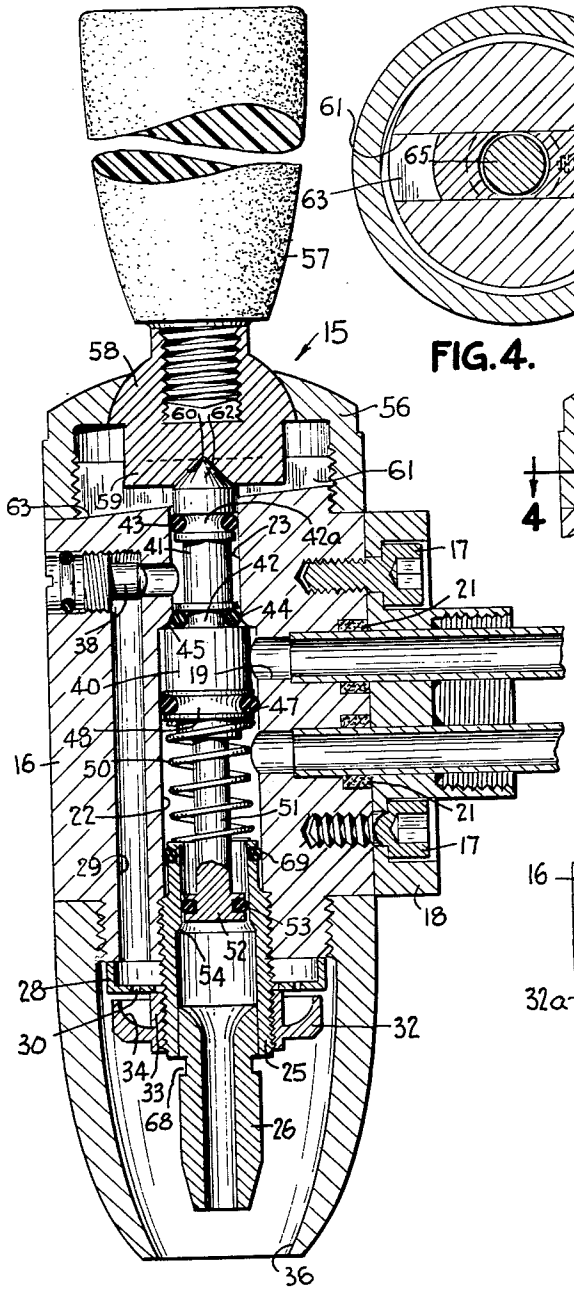

FIG. 1.

FIG. 4.

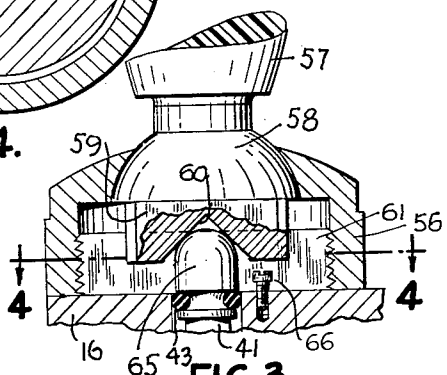

FIG. 3.

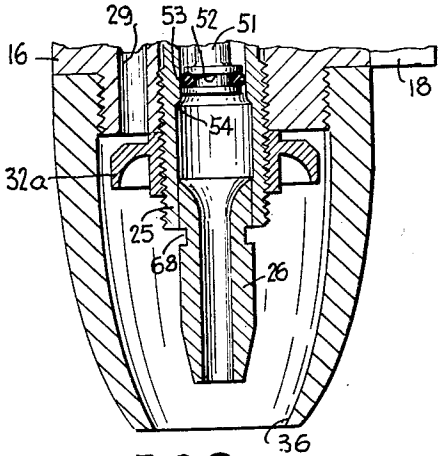

FIG. 2.

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DOUBLE STROKE VARIABLE CONTROL FLUID DISPENSING VALVE

Filed July 25, 1960 3 Sheets-Sheet 2

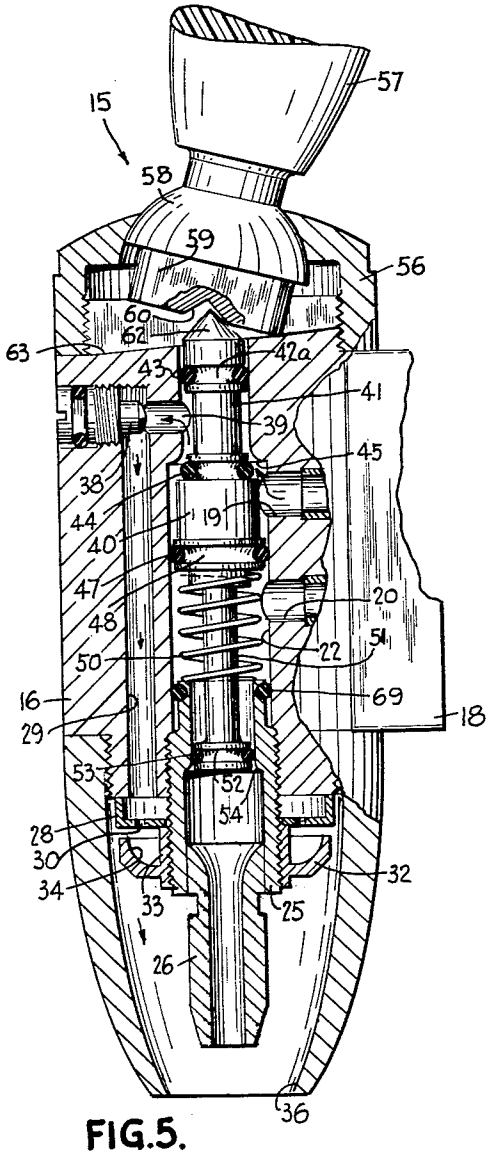

FIG.5.

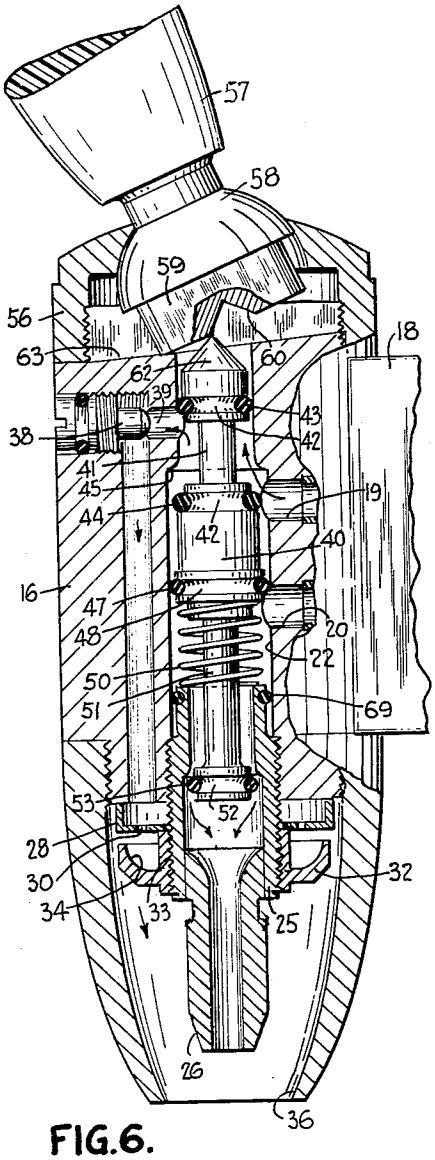

FIG.6.

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DOUBLE STROKE VARIABLE CONTROL FLUID DISPENSING VALVE

Filed July 25, 1960 3 Sheets-Sheet 3

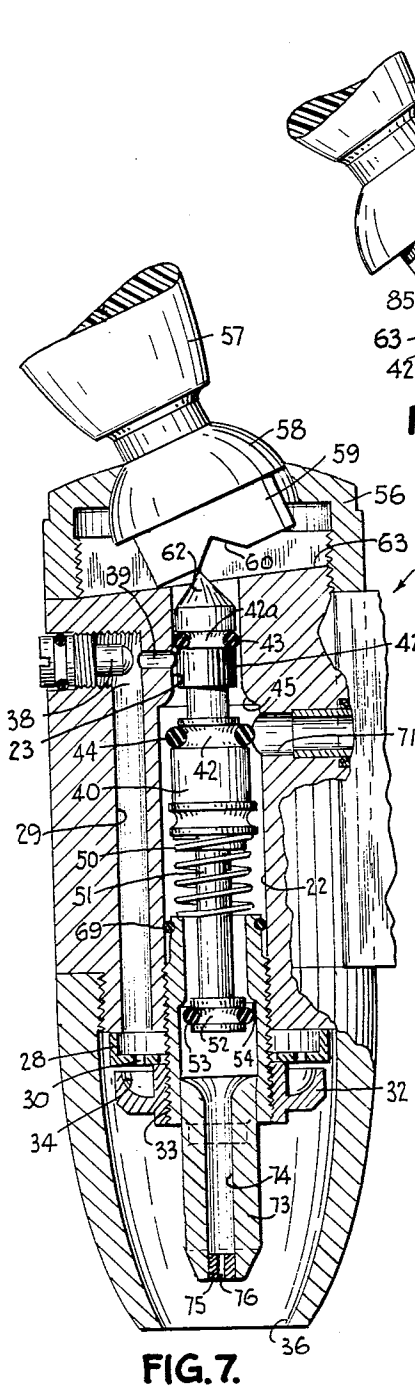

FIG. 7.

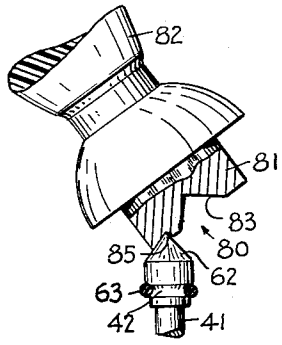

FIG. 8.

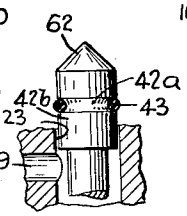

FIG. 7a

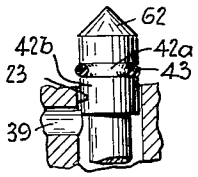

FIG. 7b

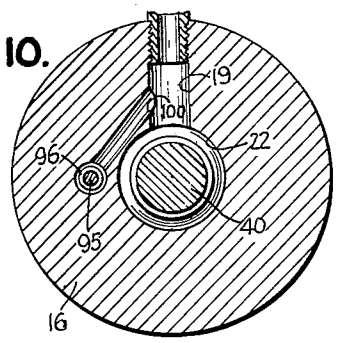

FIG. 10.

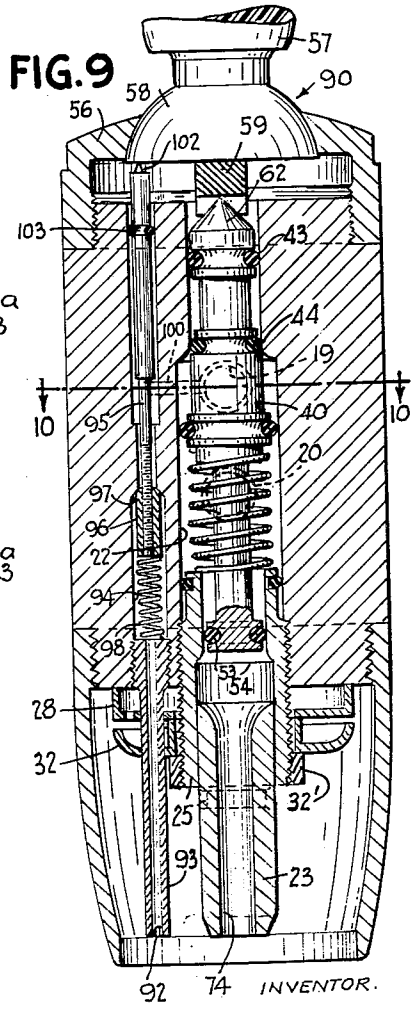

FIG. 9

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3,015,420

Patented Jan. 2, 1962

3,015,420

DOUBLE STROKE VARIABLE CONTROL FLUID DISPENSING VALVE

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Filed July 25, 1960, Ser. No. 45,210
12 Claims. (Cl. 222—144.5)

This invention relates to valves and, more particularly, to a manually operated dispensing type control valve.

Of the many known dispensing valves in use today, none can be used for dispensing a carbonated and non-carbonated mixed drink, nor can they be used for dispensing plain soda or water drink, without drastic revision in their construction.

It is an object of the present invention to provide a manually operated control valve especially adapted for use in the dispensing of water, or carbonated water, with or without flavoring syrup, and the like, which can be readily used with all types of water distribution systems, and which is extremely compact in construction.

Another object of the present invention is to provide a fluid control valve having an operating handle that is movable into a plurality of operating positions to produce a variety of different types of fluid flow outwardly through a nozzle portion thereof.

A more specific object of the present invention is to provide a compact combination mixing and dispensing valve which will provide for the dispensing of the plain water or carbonated water and the dispensing of flavoring syrup and such water at the same time through the nozzle, thus making it possible to dispense mixed drinks directly from the control assembly.

A further object of the present invention is to provide a mixing and dispensing valve of the type above described whereby carbonated water alone or non-carbonated beverage may be selected and separately dispensed from the device, without allowing for the dispensing of the syrup therefrom.

Another object of the present invention is to provide a main water valve which will direct carbonated or non-carbonated water and syrup to the discharge nozzle through completely separate ducts.

A further object of the present invention is to provide a mixing and dispensing valve of the type described having an auxiliary jet spray nozzle apart from the carbonated water and syrup discharge ducts which will provide a high velocity jet spray through the nozzle in response to a predetermined alternate movement of the operating handle of the device, completely independently of the dispensing of carbonated water and syrup through the remaining valve structure.

A more specific object of the present invention is to provide a novel operating connection between the operating handle and the plunger of the valve which will provide for determined control thereof in response to selected movements of the operating handle relative to the main body member of the assembly.

All of the foregoing and still further objects and advantages of this invention will become apparent from a study of the following specification, taken in connection with the accompanying drawing, wherein:

FIG. 1 is a longitudinal cross-sectional view of a combined mixing and dispensing valve assembly made in accordance with one form of the present invention with all of the parts in a normally closed position.

FIG. 2 is a fragmentary longitudinal cross-sectional view of certain parts of the assembly shown in FIG. 1 in a slightly altered position.

FIG. 3 is a fragmentary longitudinal cross-sectional view of certain other parts of the assembly shown in

FIG. 1, illustrating a slightly modified form of operating elements.

FIG. 4 is a transverse cross-sectional view taken along line 4—4 of FIG. 3.

FIG. 5 is a view similar to FIG. 1, showing the valve parts in one selected position that provides for the dispensing of carbonated water through the nozzle, while preventing outward flow of syrup therefrom.

FIG. 6 is a view similar to FIG. 1, showing the parts in another alternate position that allows for the dispensing of both carbonated water and syrup outwardly through the discharge nozzle.

FIG. 7 is a view similar to FIG. 1, of a modified form of construction that provides for the dispensing only of carbonated water, with the parts shown in an adjusted position for dispensing a jet stream.

FIG. 7*a* is a view similar to FIG. 7, with the parts in an initially closed position.

FIG. 7*b* is a view similar to FIG. 7, with the parts in a partly open position for providing ordinary flow, without a jet stream, through the nozzle.

FIG. 8 is a fragmentary side elevational view, with parts broken away, of an indent holding means for releasably securing the parts of the valve structure in a selected dispensing position.

FIG. 9 is a longitudinal cross-sectional view of the basic valve structure shown in FIG. 1, but further including a jet spray nozzle device for providing a jet spray mixing spray independently of the dispensing of the syrup and carbonated water from the valve assembly.

FIG. 10 is a transverse cross-sectional view taken along line 10—10 of FIG. 9.

Referring now to the drawing, and more particularly to FIGS. 1, 5 and 6, a fluid control valve assembly **15** made in accordance with one form of the present invention is shown to include a substantially cylindrical main body member **16** which may be mounted upon the supporting fixture **18**, such as by machine screws **17**. The fixture **18** includes water and syrup conduits that are inserted into water and syrup inlets **19**, **20**, respectively of the main body member **16** through sealing gaskets **21**.

Both the water and syrup inlets **19**, **20**, communicate with a central longitudinal chamber **22** of the main body member **16**, which chamber is of reduced size at one end **23**. A syrup injector or outlet control tube **25** is threadedly mounted within the opposite end of the chamber **22** and has a press fit extension **26** depending therefrom.

A spray washer or restrictor **28**, in the form of an upwardly opening shallow tray with openings **30** in the base thereof, is mounted upon the control tube **25** directly beneath the outlet from a longitudinal duct **29** which extends in spaced apart parallel relationship with the main chamber **22**, at least partially along the length of the main body member. A baffle **32** threadedly carried upon the control tube **25**, directly beneath the spray washer **28**, has a central hub **33** that acts as a spacer against the spray washer **28**, and which further includes a concavity **34** into which carbonated water enters through the openings **30** in the bottom of the spray washer **28**, and from which such carbonated water overflows and is discharged outwardly through the nozzle **36** of the assembly at reduced pressure and without agitating the syrup in the vessel. A screw threaded needle valve **38** carried by the main body member **16** may be adjusted relative to a port **39** communicating between the duct **29** and the reduced end **23** of the chamber **22**, to control the flow of carbonated water from the chamber to the discharge duct **29**. However, flow of carbonated water from the carbonated water inlet **19** to the port **39** is controlled by first means comprising a water O-ring **44** mounted upon a collar **42** on the upper end **41** of a valve plunger **40**.

This O-ring 44 cooperates with a seat 45 formed between the main chamber 22 and the reduced end 23, to allow flow between such ring 44 and seat 45 from the water inlet 19 to the port 39, in response to longitudinal movement of the plunger 40 in a direction toward the control tube 25. A terminal O-ring 43 mounted upon another collar 42*a* adjacent to the outermost end of the plunger, provides a pressure seal between the plunger and the main body member 16 so as to prevent outward flow of carbonated water through the adjacent end of the chamber bore 23.

The main portion of the plunger 40 is also provided with a collar 48 upon which a divider O-ring 47 is mounted, such divider ring 47 being movable along that length of the chamber 22 lying between the water inlet and the syrup inlet 20, thus providing a constant separator that prevents the mixing of the water and syrup within the chamber 22. A compression coil spring 50 encircling the lower end 51 of the plunger is seated at opposite ends upon the facing sides of the collar 48 and the control tube 25, so as normally to maintain the plunger 40 in the position shown in FIG. 1, in which position second means or a seal in the form of a syrup O-ring 53 mounted upon a collar 52 at the outermost extremity of the lower end 51 of the plunger prevents flow of syrup outwardly through the constricted inner end of the control tube 25. However, in response to extended movement of the plunger, the syrup O-ring 53 is moved inwardly beyond the shoulder 54 formed between the control tube 25 and the constricted end thereof so that syrup from the interior of the chamber 22 is allowed to pass outwardly through the space between the shoulder 54 and syrup O-ring 53 and into the extension 26, from which it is discharged outwardly through the nozzle 36. FIGURE 6 illustrates the position of the parts which will allow for the dispensing of both the carbonated water and the syrup through the provided control ports.

A cap 56 threadedly mounted upon the uppermost end of the main body member 16, pivotally supports a handle 57 through a ball rocker joint 58. A tongue 59 depending from the handle 57 is received within a diametrical slot 61 in the upper end of the main body member 16, which slot 61 in each of the embodiments of the present invention except that shown in FIG. 3, includes an inclined bottom surface 63, for purposes hereinafter more fully described. The adjacent end of the reduced portion 41 of the plunger 40 may be in the form of a substantially conical head 62, the apex of which is received within a V-slot 60 extending transversely across the tongue 59.

With reference now specifically to FIGS. 1, 5 and 6, it will be noted that movement of the handle 57 in one rearward direction from the position shown in FIG. 1 to the position shown in FIG. 5, will allow the tongue 59 to rock until the end thereof abuts the upper inclined surface 63, thus allowing for partial depression of the plunger 40 sufficient to open the passageway between the water O-ring 44 and valve seat 45, but not allowing for movement of the plunger 40 sufficiently to open the passageway between the syrup O-ring 53 and its shoulder 54. As a result, only carbonated water will be dispensed outwardly through the nozzle 36 during such rearward movement of the handle 57. However, when the handle 57 is moved in the opposite forward direction, the lower end of the inclined surface 63 will allow for greater angular movement of the handle 57, thus causing the plunger 40 to be depressed downwardly to a greater extent, which is sufficient to open the passageways past both the syrup O-ring 53 and the water O-ring 44, thus providing for the simultaneous dispensing of carbonated water and syrup through the nozzle 36, as is clearly shown in FIG. 6.

This valve can also be used for non-carbonated drinks by removing the spray washer or restrictor 28 or by enlarging the openings 30 and inverting the baffle 32*a*, as shown in FIG. 2, in which case it is also necessary to increase flow through the discharge duct 29 by adjusting the needle valve screw 38.

In FIGS. 3 and 4 of the drawing, the inclined surface of the slot 61 is replaced by an adjustable set screw 66 which serves to limit the rearward movement of the handle 57 to a greater extent than the forward movement thereof, in much the same manner as the inclined surface 63 of the other embodiments of the present invention. FIG. 3 also illustrates the use of a substantially spherical head 65 at the uppermost end of the reduced portion of the plunger 41, in place of the conical head illustrated in the other embodiments of the present invention. Other than for the use of such set screw 66 and the shape of the head 65, the manner of operation is the same as hereinbefore described.

In all embodiments of the present invention, a gasket O-ring 69 mounted upon the innermost end of the control tube 25, serves to prevent the flow of fluid between the chamber wall and the control tube wall. A key 68 is formed in the extension member 26 to facilitate threaded axial adjustment of the control tube 25 relative to the main body member 16, after temporary threaded removal of the nozzle member 36 from the lower end of the main body member 16, to adjust syrup flow by varying the distance between the O-ring 53 and shoulder 54.

It should be noted that while the length of stroke of handle 57 is limited in both directions except in the single instance described relative to FIG. 3, nevertheless the flow of syrup can be varied by axially adjusting the position of control tube 25 relative to O-ring 53.

The valve can also be converted into a plain soda and jet stream dispenser, as seen in the modification shown in FIG. 7 of the drawing, which illustrates a slightly modified form of control valve in which the mode of operation is similar to that hereinbefore described except that the valve is provided with a single fluid inlet 71, such as for water or carbonated water, but which allows for the dispensing of such fluid through either the duct 29 and the associated baffle 32, or directly through the control tube 25. In this modification, the collar 42*b* is extended, the O-ring 47 is omitted and the control tube 25 is provided with an injector extension 73 in place of the extension 26, which injector includes a longitudinal bore 74 having a bushing 75 inserted in its outer end. This bushing 75 has a constricted opening 76, so that carbonated water admitted to the control tube 25 is forced outwardly through the opening 76 in a fine high velocity spray.

The movement of the plunger 40 in FIG. 7 is substantially identical to that hereinbefore described. In response to rearward movement of the handle 57, the plunger 40 is depressed from its normal position shown in FIG. 7*a* only far enough to open the passageway between the inlet 71 and the valve seat 45, as shown in FIG. 7*b*, thus allowing the fluid from the fluid inlet 71 to be dispensed outwardly through the needle valve port 39 and the duct 29, spray washer 28, baffle 32, and nozzle 36. However, in response to opposite forward movement of the handle 57, the plunger 40 is depressed further, to the position shown in FIG. 7, and sufficiently to open the passageway between the lower O-ring 53 and its associated shoulder 54 in the control tube 25, as well as the space between the water O-ring 44 and its seat 45. When the ports are in the position shown in FIG. 7, the close fit between the plunger head 42*b* and the bore 23 closes off the port 39 and prevents flow through the discharge duct 29, thus creating the jet spray through the bushing 75.

In FIG. 8 of the drawing, an indent arrangement 80 is shown which may be used with the operating handle of any of the embodiments of the present invention. This operating handle 82 is provided with a depending tongue 81 of the type hereinbefore described, which tongue 81 is further provided with a transversely extending V-

shaped groove 83. However, the tongue 81 is provided with an indent 85 adjacent to one of the ends of the V-shaped groove 83, which indent 85 is adapted to receive the apex of the conical head 62 of the plunger 40 in an extreme pivoted position of the handle 82, thus serving to retain the valve parts in the open position against the action of the compression coil spring 50, until the handle 82 is manually moved to its normally centered position.

With reference now to FIGS. 9 and 10 of the drawing, a slightly modified arrangement 90 is shown wherein the valve mechanism is identical to that hereinbefore described in connection with FIGS. 1, 5, and 6. This arrangement 90, however, is further provided with an auxiliary feature which includes a jet nozzle 92 formed in the discharge end of a duct 93 mounted within a longitudinal bore 94 of the main body member 16 in spaced apart parallel relationship with the discharge duct 29 and chamber 22. A rod 95 slidably supported within the bore 94 has a valve member 96 that cooperates with a downwardly facing seat 97 formed in the bore 94. A compression coil spring 98 acting between the duct piece 93 and the lower end of the rod 95, yieldably maintains the valve member 96 in closed engagement with the seat 97. However, the uppermost end of the rod 95 extends through the uppermost end of the main body member 16 and is provided with a detent 102 that is directly beneath the downwardly facing side of the ball rocker 58 of the handle 57. A by-pass duct 100 communicating at opposite ends with the inlet 19 and the bore 94, thus provides for the direct supply of water or carbonated water to the bore 94 at all times. A gasket 103 mounted upon the uppermost end of the rod 95 provides a sealing engagement between the rod and the bore 94 to prevent the escape of fluid into the cap 56.

The longitudinal axis of the bore 94 lies in a plane with the longitudinal axis of the chamber 22 that extends normal to the central plane of the tongue 59. Thus, the reciprocating rocking movement of the handle 57 and tongue 59 provided by the slot 61 in the main body member 16, will not cause movement of the rod 95. However, there is sufficient side play between the tongue 59 and slot 61 to allow for limited lateral movement of the handle 57, which lateral movement will cause longitudinal movement of the rod 95 through the abutment of the facing surface of the ball rocker 58 and detent 102 at the end of the rod 95. Such longitudinal movement of the rod 95 is sufficient to open the passageway between the valve member 96 and its associated seat 97 to allow for the flow of water or carbonated water outwardly through the jet nozzle 92 of the duct piece 93, completely independently of the dispensing of any other material through any of the other provided outlets of the assembly. This jet spray is especially useful for mixing drinks, as is well known to those skilled in the art. As a result, the valve assembly 90 provides for three distinct dispensing features including the jet spray duct piece 93, the discharge duct 29, and the control tube 25.

It will also be noted that the baffle 32 and spray washer 28 in FIG. 9 are slidably received upon the control tube 25 and retained there by a lock nut 32'. This facilitates the assembly of these parts which include the depending duct that is eccentrically received through the baffle 32 and spray washer 28.

It is to be noted that in all embodiments of the present invention, a fluid control valve assembly is provided in which movement of the operating handle 57 controls the actual discharge of fluid through the dispensing nozzle 36, such control being maintained by the longitudinal movements of valve pieces completely contained within the confines of the main body member 16. The entire unit is extremely compact, readily mounted on any desired supporting structure, and especially easy to clean and service whenever required.

While this invention has been described with particular reference to the construction shown in the drawing, it is to be understood that such is not to be construed as imparting limitations upon the invention, which is best defined by the claims appended hereto.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A fluid mixing faucet comprising in combination, a main body member having a central chamber, a fluid inlet communicating with the interior of said chamber, one end of said main body member having a nozzle, a control handle supported for movement upon the opposite end of said main body member, a duct through said main body member communicating at opposite ends with said chamber and said nozzle, the point of communication of said duct with said chamber being spaced longitudinally of said chamber from said fluid inlet, a plunger slidably supported within said chamber having first means movable longitudinally between a normally closed flow blocking position between said fluid inlet and said duct and an open longitudinally disposed position, spring means yieldably resisting movement of said plunger out of said normal position, and said handle in response to manually directed pivotal movement in at least one direction urging said plunger toward said open position against the action of said spring means, an injector carried by said main body member at one end in communication with said chamber and an opposite end in communication with said nozzle, said plunger having second means blocking flow through said injector in said open and closed positions of said plunger, and said handle including detent means for actuating said plunger from said closed position to an extended position beyond said open position to provide flow through said injector from said chamber.

2. A fluid mixing faucet as set forth in claim 1, wherein said detent means comprises a tongue depending from said handle, said main body member having a groove rockingly receiving said tongue, said groove having a bottom surface facing said tongue, abutment means upon said bottom surface limiting pivotal movement of said tongue in one direction more than in an opposite direction, whereby movement of said handle in said one direction effects movement of said plunger to an open position, and movement of said handle in an opposite direction effects movement of said plunger to said extended position.

3. A fluid mixing faucet as set forth in claim 2, wherein said bottom surface is inclined to a plane extending normal to the longitudinal axis of said plunger having one end axially displaced further from said nozzle than the other end, and said plunger having one end extending through said bottom surface into pressure abutment with said tongue, whereby rocking movement of said tongue in said groove in one direction of said handle toward said one end of said inclined surface effects longitudinal movement of said plunger out of said normal position to said open position, and rocking movement of said tongue in said groove in an opposite direction of movement of said handle toward said other end of said inclined surface effects movement of said plunger to said extended position.

4. A fluid mixing faucet as set forth in claim 2, wherein said bottom surface extends normal to the longitudinal axis of said plunger, and said abutment means comprises a set screw carried within said groove at said one end of said bottom surface limiting rocking movement of said handle in one direction more than in an opposite direction.

5. A fluid mixing faucet as set forth in claim 2, wherein said tongue includes a central indent, and one end of said plunger extending through said bottom surface of said groove includes a bearing portion at least partially received within said central indent of said tongue, whereby rocking movement of said tongue within said groove effects longitudinal movement of said plunger relative to said main body member.

6. A fluid mixing faucet as set forth in claim 1, further

comprising a second fluid inlet communicating with the interior of said chamber longitudinally spaced from said first fluid inlet in a direction away from said inlet and toward said injector, said plunger including a divider ring continuously interposed between said first and second inlets preventing mixing of fluids from said inlets within said chamber, said second means of said plunger controlling flow of fluid from said second inlet to said injector, said first means being movable from a normally closed position to an open position in response to pivotal movement of said handle in either direction out of a normally centered position upon said main body member, and said second means being movable to an open position with said first means in response to pivotal movement of said handle in a direction opposite to said one direction out of said normally centered position.

7. A fluid mixing faucet as set forth in claim 6, wherein said injector comprises a tubular sleeve having an outwardly enlarged portion defining an inwardly facing shoulder, said second means including a ring sealingly carried by said plunger within said sleeve and movable outwardly away from said shoulder in response to pivotal movement of said handle in said opposite direction to provide communication between said chamber and said injector.

8. A fluid mixing faucet as set forth in claim 7, further comprising a jet spray tube depending from said main body member within said nozzle, a bore extending through said main body member having one end in communication with said first fluid inlet and an opposite end in communication with said spray tube, a normally closed plunger valve slidably supported within said bore and having a stem projecting outwardly at one end toward said handle, said handle being carried for movement

upon said main body member for limited rocking movement normal to the general plane of said tongue and having an abutment surface overlying said stem of said plunger valve to actuate said plunger valve toward an open position in response to said limited rocking movement of said handle normal to the plane of said tongue.

9. A fluid mixing faucet as set forth in claim 1 further comprising a needle valve carried by said main body member adjustably controlling flow of fluid from said chamber to said duct.

10. A fluid mixing faucet as set forth in claim 1 further comprising indent means acting between said handle and said plunger releasably securing said plunger in a displaced position against the action of said spring means.

11. A fluid mixing faucet as set forth in claim 1, further comprising a spray washer supported upon said main body member in the path of fluid flow from said duct to said nozzle, and a baffle interposed between said spray washer and said nozzle.

12. A fluid mixing faucet as set forth in claim 7, wherein said syrup injector control tube is axially adjustable in said main body member relative to said second means whereby to vary the quantity of syrup to be dispensed upon movement of said plunger to said extended position.

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