

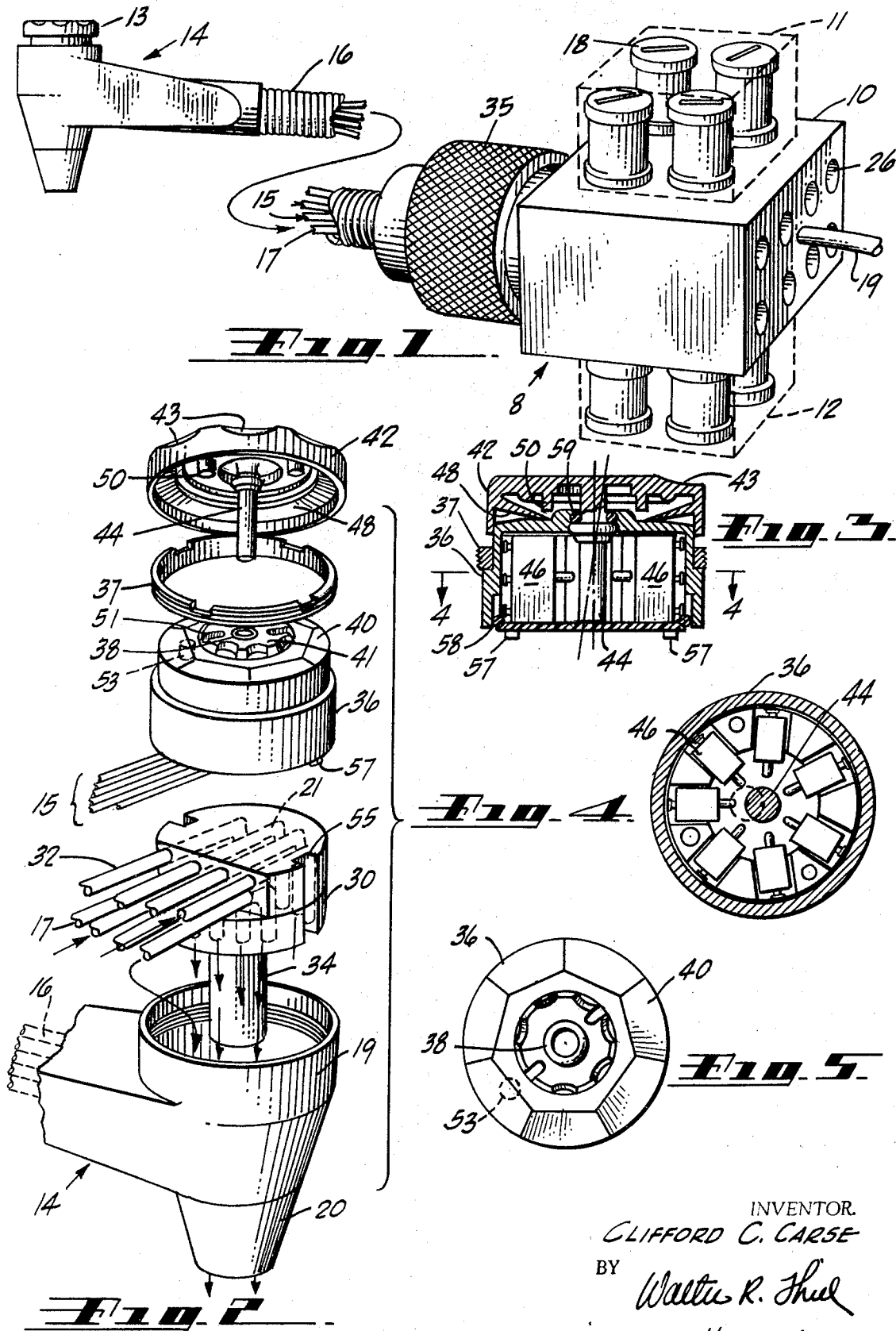
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CONTROL APPARATUS FOR FLUID DISPENSER

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CONTROL APPARATUS FOR FLUID DISPENSER

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6 Claims

ABSTRACT OF THE DISCLOSURE

A multiple fluid dispenser having a dispensing head remotely located from the fluid control valves. The control valves are selectively operated by a plurality of microswitches mounted in a circle within the dispensing head. A circular touch plate mounted on a cammed surface above the microswitches has a shaft extending into an opening central to the microswitches. Pressure along a selected portion of the touch plate rotates the shaft to engage and actuate a respective microswitch which electrically opens an appropriate fluid valve to thereby initiate fluid flow through the dispensing head.

BACKGROUND OF THE INVENTION

This invention relates to a lightweight, multiple fluid dispensing head for use with a multiple fluid dispenser where the fluids to be dispensed are remotely stored from the point of distribution.

Where several beverages are simultaneously marketed, such as at soda fountains or more portable installations, it is considerably more efficient to dispense several beverages from a common dispenser rather than from more conventional individual bottles and cans. Generally, at a typical dispensing installation, an operator commonly dispenses water, soda, ginger ale, tonic and several other liquids almost continuously. During the course of a busy period, a substantial amount of time is lost when each of these liquids is stored in separate bottles and cans and the operator is constantly shuffling containers, opening fresh bottles and cans and disposing of empties. Additionally, where only a portion of the liquid in a container is used over a period of time, the remainder tends to grow stale without the proper sealing and refrigeration of the container, which is a time-consuming and wasteful chore.

Similar problems exist with other types of multiple fluid dispensing operations. As an example, conventional soda fountain installations provide two or three faucets for dispensing water or carbonated soda water from fluid reservoirs located beneath the counter top. Because the faucets are located above the counter in a fixed position, it is necessary to place glasses to be filled in a position underneath the faucet. In cases where several glasses are to be filled at the same time, this results in the need to "shuffle" the glasses underneath the faucet so that each glass will have its turn beneath the fluid stream from the faucet. This tricky maneuver results in substantial spillage, not to mention the amount of broken crockery when glasses are accidentally pushed off the counter. Where this type of installation is designed for more portable application such as where beverages are to be dispensed from a mobile dispensing station, the apparatus needed becomes bulky and awkward to handle.

Recently, various products have been designed and marketed which provide a single dispensing head through which a number of beverages can be selectively served. Several of these new products include a dispensing stand supporting a number of liquid containers which are fixed to a counter top or cart. Normally, these bottles are supported in an inverted position on the standard, and the

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fluid feeds by gravity through a valve means into the single dispensing head. As a result of their design, these devices are extremely cumbersome and unsightly; and because of the limited storage capability of the inverted bottles, substantial time must be spent replacing empties. The capability of the dispensing head still makes it necessary to bring the glass to the source of fluid rather than vice versa.

The solution to the above-mentioned problems is to design a multiple fluid dispenser wherein the dispensing head is flexible and easily portable. Several prior multiple fluid dispensers have been designed with a flexible dispensing head and remotely located fluid reservoirs. In such dispensers, the valves for controlling the flow of fluid from each reservoir to the dispensing head has been located within the body of the dispensing head. Whether the valve action is mechanically or electrically linked to the beverage selector, this always results in a dispensing head which is large, cumbersome and very heavy. Because the dispensing head is directly connected to the fluid reservoirs, many of which are under high pressure, the tubing needed to connect the dispenser to the reservoir is necessarily of a heavy caliber and is relatively inflexible due to the "ballooning" effect of the tube. A dispenser with these disabilities cannot be easily handled and the use of such as dispenser over a long period of time is extremely tiring.

The prior devices have also encountered problems of leakage between the electrical and fluid controls within the dispensing head, which may result in short-circuiting of the electrical system. Additionally, the absence of any audible indication that a fluid valve was actuated made it difficult for the operator to know when a fluid circuit was open, thereby prompting the operator to keep pushing the actuating control, many times each time a beverage was dispensed. This multiple activation caused the switches and valves to wear faster, resulting in higher maintenance of the dispensing head.

I have previously invented a solenoid-actuated multiple fluid valve apparatus, described in my copending application Ser. No. 7,841, filed Feb. 2, 1970, entitled "Multiple Fluid Control Device." This valve mechanism provides an apparatus which can be remotely located from the dispensing head, is inexpensive to manufacture, relatively leak-proof and can provide the selective adjustment and control of the amount of fluid flowing from each reservoir.

It is therefore an object of this invention to provide a dispensing head for a multiple fluid dispenser for selectively controlling the flow of beverages from a plurality of remotely located fluid reservoirs.

Another object of the invention is to provide a dispensing head for a multiple fluid dispenser which allows an operator to rapidly select and dispense one of a number of different fluids.

Another object of this invention is to provide a dispensing head for a multiple fluid dispenser which is lightweight and can be coupled to a valve apparatus by a flexible connector.

Another object of the invention is to provide a dispensing head for a multiple fluid dispenser in which the electrical circuits are effectively sealed off from moisture or leakage of the dispensed fluids.

Another object of the invention is to provide a dispensing head for a multiple fluid dispenser which will give an audible indication of valve actuation.

Another object of the invention is to provide a fluid dispensing head for a multiple fluid beverage dispenser which is lightweight, extremely simple and relatively inexpensive to manufacture.

SUMMARY OF THE INVENTION

In accordance with one aspect of my invention, a dispensing head is provided, having a touch plate mounted over a cammed surface such that pressure applied to the touch plate will actuate one of a number of microswitches located in the dispensing head. Each microswitch controls electric current to a solenoid operated valve device for controlling fluid flow from a selected fluid source.

BRIEF DESCRIPTION OF THE DRAWING

The above and other objects of this invention will particularly be set forth in the claims and will be apparent from the following description, when taken in connection with the accompanying drawings, in which:

FIG. 1 is a perspective view of a multiple fluid dispensing head showing a dispensing head in accordance with one embodiment of my invention connected to a multiple fluid valve apparatus with the connection between the valve apparatus and the dispensing head partially cut away, exposing the fluid and electrical connections therein.

FIG. 2 is an exploded perspective view of the multiple fluid dispensing head constructed in accordance with my invention and having the fluid and electrical connections thereto cut away.

FIG. 3 is a sectional view of the switch control portion of the dispensing head of FIG. 2.

FIG. 4 is a sectional view taken through 4—4 of FIG. 3 used to illustrate the operation of the switch control.

FIG. 5 is a plan view of the cammed surface of the multiple fluid dispensing head.

In the several figures, the same numerals are used to designate the same elements.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 shows a multiple fluid dispensing head 14 connected to an appropriate multiple fluid valve apparatus 8, such as the one described in my aforementioned copending application. The dispensing head 14 and the valve apparatus 8 are connected by a flexible sheathed umbilical cord 16 through which a number of electrical connections 15 and the fluid conduits 17 necessary for the operation of the fluid dispensing system are transferred. The umbilical cord 16 is attached to the valve apparatus 8 by means of a quick connect-disconnect joint 35, such as a plug arrangement, which can be quickly and easily fastened to the valve apparatus 8 with a threaded collar having a knurled surface.

Typically, the valve apparatus 8 would be affixed in proximity to the fluid reservoirs or sources. The source of each of the fluids to be dispensed is connected to one of a series of inlet parts 26 mounted along the end of the valve block 10. Each inlet port 26 is fluidically connected by channels within the block 10 to a respective solenoid-actuated valve 18 mounted along the top and underneath sides of the block 10. For purposes of protection and safety, these valves 18 are normally covered by metal sheaths 11 and 12, shown as dotted lines for purposes of illustration. Each valve is connected through internal channels in block 10 to an appropriately designed joint 35 connecting the fluid conduits 17 in the umbilical cord 16 going to the dispensing head 14. Power is supplied to the electrically operated solenoid valves 18 from an electrical power line 19 which can be connected through a conventional voltage reduction transformer to any standard DC power source.

Referring to the exploded representation of the dispensing head in FIG. 2, the dispensing head 14 comprises a housing 19 supporting a discharge plate 30 which is coupled to the fluid conduits 17 coming from the umbilical cord 16. Fluid channels 21 within the discharge plate 30 connect each of the conduits 17 to a respective output orifice along the bottom portion of the discharge plate.

The discharge plate 30 has a post 34 coupled along the bottom portion thereof and adjacent the fluid output orifices which are circumferentially located around the post 34. The fluid flowing from each of the fluid conduits 17 will flow through the channel 21 in the discharge plate 30, out the orifice, and will flow down along the surface of the post 34 before being discharged through the nozzle 20 of the housing 19. When more than one fluid is being simultaneously discharged from the orifices, the fluids will mix along the post 34 and within the housing 19 prior to discharge through the spout 20. The construction of the nozzle 20, the post 34 and the location of the output orifices also result in an "aeration" of any fluid dispensed. For ease of manufacture and the prevention of leaks, the discharge plate 30 is preferably made out of a plastic block into which the plastic conduits 17 can be easily inserted and the channels 21 machined, thereby providing a relatively leak-proof connection.

The switch control unit 36 is placed immediately above the fluid discharge plate 30. The switch control unit 36 comprises a plurality of microswitches mounted circumferentially in the unit 36 around a central opening 38. The upper surface of unit 36 also contains a plurality of cammed surfaces 40, each cammed surface being aligned directly opposite a microswitch within the unit 36. Centrally located to the cammed surfaces 40 along the top surface of the switch control unit 36 there is a keying disc 41 having a number of slots 51. The discharge plate 30 and the switch control unit 36 are firmly held in position within the dispenser head housing 19 by a threaded ring 37 which threadedly engages the interior portion of the housing 19 and applies a holding force along the flanged side of the switch control unit 36.

The touch plate 42 has a plurality of depressions 43 along the top surface thereof and a center post 44 to fit centrally into the switch control unit 36 through the hole 38. Keying posts 50 are provided along the underneath surface of the touch plate 42 to fit within the appropriate slots 51 in the keying disc 41, thereby aligning the depressions in the top portion of the touch plate 42 directly above the cammed surfaces 40 along the top portion of the switch control unit 36. A disc-like hair spring 48 is mounted along the underneath portion of the touch plate 42 to bias the center post 44 in a vertical position within the switch control unit 36. The hair spring 48 may be an integral part of touch plate 42 or a separate washer-shaped flexible member which is inserted into engagement with the undersurface of the plate 42. The electrical connections 15 are shown running from the microswitches within the switch control unit 36.

A pair of keying slots 55 are provided along the sides of the discharge plate 30 which are designed to mate with appropriate keying posts within the housing 19. The purpose of the keying posts 55 is to prevent movement of the parts within the housing 19. Similarly, posts 57 are provided along the bottom portion of the switch control unit 36 to fit within the top portion of slots 55 in the discharge plate 30. Keying post 53 in the switch control unit 30 serves to maintain proper orientation of the cammed surfaces 40 with the microswitches mounted within unit 30, the importance of which will become apparent from the following discussion.

The construction and operation of the switch control unit 36 can be more particularly described and understood by referring to the drawing and FIGS. 3, 4 and 5. In FIG. 3, the switch control unit 36 is shown having the touch plate 42 mounted thereon. The microswitches 46 are mounted in a circle around the central portion of the switch control unit housing. The microswitches are radially oriented, as seen in FIG. 4, with their on/off buttons facing toward the center post 44 and located such that a slight rotation or "cocking" movement of the post 44 in an appropriate direction will depress one of the on/off microswitch buttons, thereby actuating the respective microswitch. The center post 44 is cocked to one side by

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applying pressure to the touch plate 42 at one of the depressions 43 along the top outer surface thereof.

Two O rings 58 and 59 are provided along the bottom portion of the switch control unit 36 and around the center post 44, respectively. These O rings act as a water-tight seal which prevent any moisture from entering the internal area of the switch control unit 36, thereby possibly damaging the microswitches 36 therein.

As illustrated in FIG. 3, depressing the touch plate 42 will rotate the axis of post 44 through an angle around a pivot point at the top of post 44. This rotation of the post 44 around the pivot results in an approximate lateral movement of the bottom portion of the post 44 from a central position to an offset position shown by the dotted line in FIG. 4. In this offset position, the center post will depress the on/off button for one of the microswitches. Because each of the depressions 43 is aligned directly above one of the cammed surfaces 40 located along the upper surface of the switch control unit 36, shown in FIG. 5, the touch plate 42 can be depressed a sufficient amount to cause the center post 44 to rotate and move laterally, sufficiently to engage one of the microswitches 46. As the touch plate is depressed, the washer-shaped hair spring 48 "snaps" into a tensioned position, thereby providing audible indication that the dispenser has been actuated. When pressure is removed from the touch plate 42, the post 44 will rotate back to a center-oriented neutral position due to the biasing force provided by the hair spring 48. When one of the microswitch buttons is depressed, an electrical connection is thereby made with a respective solenoid in the valve apparatus and fluid will flow through the valve apparatus until the control post 44 is again shifted, disengaging the particular microswitch 46. By properly adapting the electrical circuitry to the valves, actuation of one of the microswitches can be designed to open only one, or a plurality, of fluid valves simultaneously.

The cammed surfaces 40 serve to prevent actuation of more than one microswitch at a time and prevent accidental operation of the dispenser by extraneous pressure on control plate 42. As shown in FIGS. 5 and 6, the cammed surfaces 40 are located in the switch control unit 36 directly opposite each of the microswitches 46. The cammed surfaces are flattened depressions separated by raised ridges and the touch plate 42 is aligned by means of the aforementioned keying posts 50 and slots 51, such that the depressions 43 will be oriented directly above the cammed surfaces 40. The cammed surfaces 40 are designed such that the touch plate 42 and post 44 can only rotate sufficiently to actuate a microswitch when rotation occurs in a plane substantially perpendicular to one of the cammed surfaces 40. Rotation in any other direction will be stopped short of engaging a microswitch by the raised ridges between the cammed surfaces 40 which block sufficient depression of the control plate 42.

It should therefore be apparent that the only time the post 44 will rotate sufficiently to engage one of the microswitches is when pressure is directly applied to a depression 43 in the touch plate 42. Proper alignment of the cammed surfaces 40, microswitches 46 and the control plate 42 insures that only one microswitch will be actuated at a time and accidental operation of the dispenser is prevented.

Because of the aforementioned "fail-safe" design of my device, a great deal of care need not be exercised by the operator when making a beverage selection. If pressure is accidentally misdirected to a portion of the control plate other than the depressions 43, the device will not operate, or at least will not dispense more than one beverage. Additionally, the absence of more conventional buttons for the selection of beverages removes the problem of broken fingernails, especially when the dispenser is used by women.

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When multi-flavored beverages such as soda are to be dispensed, the microswitches would normally be connected such that actuation of any microswitch would actuate at least two valves, one for carbonated or uncarbonated water and another for a particular flavored syrup. The two liquids are mixed within the dispenser head housing 19 after discharge from control plate 30, as previously described. Similarly, any number of fluids can, of course, be mixed prior to dispensing.

What is claimed is:

1. A multiple fluid dispenser comprising:

- (a) a plurality of fluid inputs, each of said inputs associated with a fluid conduit;
- (b) a valve apparatus having a valve means coupled to each of said conduits for controlling the flow of fluid through the conduits;
- (c) a dispensing head adapted to receive said plurality of fluid conduits;
- (d) a flexible umbilical means coupling the fluid conduits from said valve apparatus to said dispensing head;
- (e) control means including a plurality of electrical switches mounted in said dispensing head, each switch being associated with a particular valve means in said valve apparatus and operable to selectively actuate said respective valve means to permit fluid flow to said dispensing head upon predetermined operation;
- (f) fluid selecting means mounted on said dispensing head and having top and bottom surface areas and a switch-activating means connected thereto, so that pressure applied to a predetermined portion of said top surface area will cause said switch-activating means to engage a particular one of said switches to the exclusion of the remaining switches; and
- (g) a plurality of cammed surfaces located adjacent to and adapted to interact with the said bottom surface area so that said switch-activating means will engage one of said switches only when pressure is applied to said top surface area at a predetermined position.

2. The multiple fluid dispenser of claim 1 wherein said switch-activating means includes a cylindrically shaped post mounted on and substantially perpendicular to said top and bottom surface areas.

3. The multiple fluid dispenser of claim 2 wherein said post pivots around a point intermediate the ends of said post when said fluid-selecting means is operated to actuate one of said switches.

4. The multiple fluid dispenser of claim 1 wherein said fluid-selecting means further includes a spring means mounted along the bottom surface area to bias the selector to a neutral position when pressure is no longer applied to said top surface area thereby disengaging any of said switches.

5. The dispenser of claim 4 wherein the control means includes a plurality of O rings positioned to seal the interior of the control means to prevent moisture from contacting the electrical switches.

6. The dispenser of claim 4 wherein the discharge means includes a nozzle adapted to receive the fluid to be discharged and a post extending into the nozzle whereby the simultaneous discharge of more than one fluid into the nozzle results in a mixing of the fluids.

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