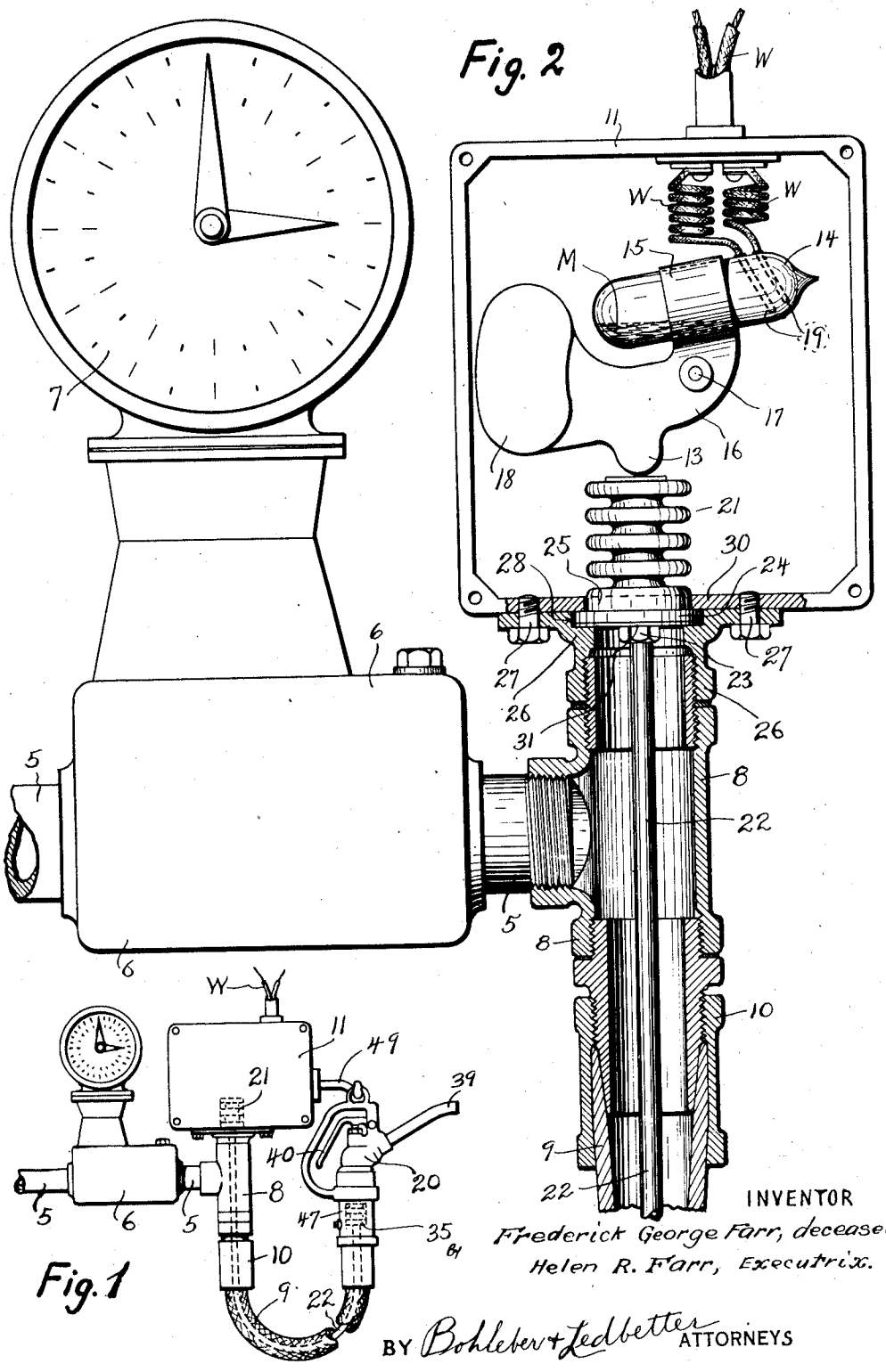
Oct. 13, 1931. F. G. FARR 1,827,355

NOZZLE CONTROLLED SWITCH

Filed March 30, 1929 2 Sheets-Sheet 1



INVENTOR

Frederick George Farr, deceased.

Helen R. Farr, Executrix.

BY Bohlebert + Ledbetter ATTORNEYS

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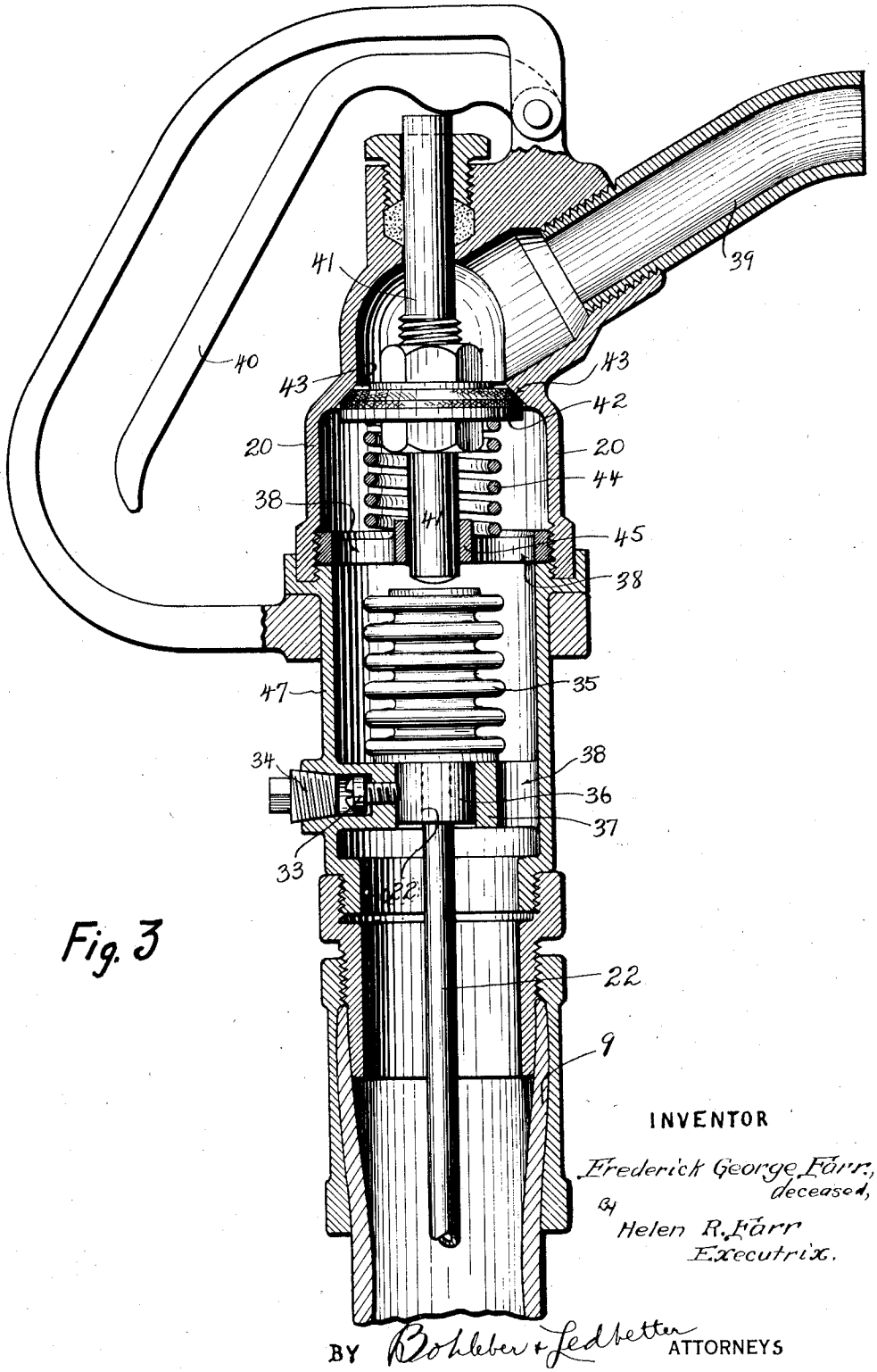


Fig. 3

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UNITED STATES PATENT OFFICE

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NOZZLE-CONTROLLED SWITCH

Application filed March 30, 1929. Serial No. 351,348.

This invention relates to liquid dispensing systems and apparatus and more particularly to a nozzle-controlled switch for use in connection therewith and by which is produced a novel dispensing gasoline hose line.

The principle of this invention is illustrated by reference to gasoline dispensing apparatus as one concrete embodiment but its uses are varied and appertain to many industries and to liquid handling systems because there is provided a coordinated valve and switch control both of which are actuated by one and the same handle, making for a variety of uses.

An object of the invention is to improve in general on liquid handling and hose equipment used in combination with gasoline dispensing pumps and the invention provides a conduit such as a flexible hose to convey gasoline from the pump to the fuel tank of motor vehicles and the like; and by adoption of my new dispensing hose the service man or operator selling gasoline places the hose nozzle in the tank to be filled and controls the flow from said nozzle end by a single handle which acts to open the dispensing valve itself as well as initiate operation of a remotely located feed or pumping apparatus, the one handle on the dispensing valve serving both purposes.

Another object is to produce a combination dispensing valve-nozzle and switch apparatus carried in a conduit, the latter usually being a flexible gasoline dispensing service pump hose and means is provided whereby a remotely located switch is closed and opened by operation of the valve handle to start and stop the flow of liquid through the hose, the operator being required to actuate one handle only on the outer end of the hose.

It is a further object to produce a combination nozzle-controlled switch and dispensing hose and valve apparatus wherein a motion-transmitting means consists of a fluid tight sealed hydraulic means operatively interconnected between a switch at one end of the hose and a dispensing-valve nozzle at the other end thereof.

In carrying out the invention, a conduit, such as a flexible gasoline, oil, or other type hose, carries a dispensing-valve nozzle at one end thereof and a switch means proximate the other end thereof and the switch is located remotely from the valve. A motion-transmitting means consisting of an operative connection is made between the dispensing valve and switch whereby the manual operation of the valve is adapted to be transmitted to the switch for the purpose of controlling the flow of liquid through the hose under the will of the operator who may remain at the outer free end of the hose and therefore does not have to leave the motor vehicle or tank he is filling to return to the pump to start the flow of gasoline.

The accompanying drawings show an embodiment of the invention serving to illustrate its principles and it is understood that changes in structure and operation may be resorted to without departing from the spirit of the invention.

Figure 1 shows a reduced scale schematic view of the general assembly including a liquid dispensing hose having one end attached to a meter and liquid feed pipe unit in the usual manner, and having a dispensing-valve nozzle on the outer free end thereof. The dotted-line structure shows the operating means which is interconnected between a switch and dispensing valve at the ends of the hose.

Figure 2 shows a detail view of the stationary meter unit end of the hose and showing a switch box with the cover removed thereby exposing the switch and its operating means adapted to make and break a circuit.

Figure 3 shows a longitudinal sectional view of the dispensing valve carried on the free end of the hose and shows a single handle which actuates two parts to wit, first a valve disk to open the valve and second an operating means which works through a motion-transmitting connection attached to a remotely located switch operating means to start and stop the flow of gasoline through the hose.

The structural assembly of one embodiment of the invention is shown in Figure 1 where a liquid, gasoline or oil feed pipe 5 is broken away but connects with a storage

tank not shown and conveys gasoline from the storage tank through a meter unit 6 having an indicator 7, the pipe 5 discharging gasoline into a pipe header or fitting 8 to which the dispensing conduit 9 is attached. The fitting 8 has a flexible dispensing hose attached thereto in any convenient way as by clamping sleeve 10. A switch box 11 is supported on the upper end of the pipe column 8—10 as by a flange 26. Circuit wires W are led into the switch box and connect with a switch as will be described.

Within the box 11 is mounted any suitable switch and operating means therefor whereby the electrical circuit through the wires W is made and broken under the control of the operator who handles the outer free end of the hose, such control being effected in a new way insuring safety and positiveness in operation. While any suitable type of circuit making and breaking means may be installed in the box or housing 11, there is shown a simple type of mercury switch comprising a sealed glass tube 14 carried by a loop grip 15 formed on a lever arm 16 pivoted at 17 to one wall of the box. The flexible wires W are sealed in the switch tube and terminate in contacts 19 disposed at one end of the tube 14 so as to be in a lowermost position and capable of being immersed in the deepest portion of the mercury M when it runs to the wire contacts after the tube 14 tilts about the pivot 17.

Operating means for the switch 14 comprises the lever 16 and its weight or equivalent 18 carried at one end of the lever arm 16. The weight serves to maintain the mercury tube 14 in tilted-up open-switch position with the mercury M therein at the left end of the tube. The operating means includes a plunger-like means or motion-transmitting connection, as for example, a hermetically sealed expansible bellows device which connects with the motion-transmitting tube means 22 extending from the switch box 11 through the hose 9 and to a dispensing valve nozzle 20 to be described. The expansible and contractible diaphragm or bellows 21 is correlated with the switch to tilt the same about the axis 17 and these members 16 and 21 constitute a simple switch operating means.

The bellows 21 may be constructed of spun corrugated cylindrical tubing to form bellows devices as now on the market, and one brand is known as the sylphon bellows. The bellows is filled with oil, glycerine or other appropriate non-freezing liquids, and it is this liquid which forms a fluid or piston-like column or plunger-like connection which works back and forth through a flexible tube 22 contained within and protected by the hose 9. Any other type of operating or motion-transmitting connection may be used.

The tube 22 and corrugated bellows 21 are connected together at 23 through a base or flange 24, the lower end 25 of the bellows 21 being sealed to the base or flange 24. The tube 22 is connected to the bellows so that the liquid therein flows freely back and forth between these two parts. The flange 24 mounts the bellows 21 within a fitting 26 attached at 27 to the switch box 11. The fitting 26 surmounts the pipe column 8—10 and is made with a recess 28 into which is loosely received the flange 24 so that the assembly of the tube 22, the flange 24 and the bellows 21 may be adjustably rotated in the recess 28 to remove any torsional strain that may result during assembly of the apparatus.

The tube 22 sometimes has a tendency to become twisted and by leaving the cap screws 27 loose in the box and fitting 26 until the full length of hose apparatus is completely assembled and adjusted, or until a new hose 9 is installed between the meter box 6 and dispensing valve 20, it follows that the torsional strain or twisted condition in the tube 22 relieves or frees itself by turning of the flange 24 in the recess 28. The torsion of the strained or twisted tube 22 unwinds itself or the mechanic assembling the apparatus does so by turning the bellows 21.

The flange 24 is confined between the bottom wall 30 of the box 11 and the flange pipe fitting 26. In fact the members 26 and 30 constitute a clamp between which the flange 24 is anchored after the assembly is completed. Thus the flange 24 and cooperating parts, if desired, can be rigidly secured in position by tightening up the screws 27 after the assembly is completed and after the torsion is removed from the long flexible tube 22 to prevent the motion-transmitting connection 22 from snarling up in the hose 9. A gasket 31 is usually placed in the recess 28 between the fitting 26 and the flange 24 so as to form a liquid tight sealed joint at the upper end of the pipe column 8—10 when the cap screws 27 are tightened to complete the assembly of the structure. Hence gasoline cannot leak out or into the switch box.

The switch operating weighted arm 16 may have a boss 13 which rests in engagement with the upper end of the bellows. The weight 18 maintains the boss 13 in engagement with the bellows 21 to collapse or contract the latter so that, normally, the mercury M remains at the left end of the switch tube 14 as viewed in the drawings and hence the circuit W remains broken because the contact points 19 are at the high end of the mercury tube 14. The circuit W remains normally broken as per the position of all parts in all the views. The weight 18 is sufficiently heavy to contract the bellows 21 and normally hold it in that position thereby pushing the fluid from the bellows 21 into the tube 22 and hence toward the other end of the hose 9. Any suitable weight means

18, spring, or other device may be used to urge the switch 14 to open-circuit position.

The outer free end of the hose 9 carries the dispensing valve 20 heretofore mentioned and the motion-transmitting tube or means 22 leading from the switch operating means 16—21 is connected to a valve-actuated bellows 35 similar to the bellows 21 heretofore mentioned. This bellows 35 is fixed or carried on a cylindrical boss 36 which is rotatably and adjustably confined within a bore formed in a spider 37. The boss 36 forms a base for the bellows 35 and the tube 22 projects through the boss 36 and connects with the bellows 35. Should the tube 22 become twisted or strained in assembling the apparatus, the torsion will be automatically removed because the boss 36 will turn in the bore of the spider 37, the bellows 35 turning as well until the tube 22 is entirely free of any torsional strain.

A set screw 33 may be tightened up against the boss 36 to hold the same in rigid position to prevent movement of parts if this is found desirable. A screw plug 34 may also be inserted over the set screw 33 to conceal the latter. Liquid or gasoline passages 38 are made in the spider or partition 37 so that gasoline may flow outwardly from the hose 9 through a dispensing nozzle 39. The valve case 20 carries the dispensing nozzle or spout 39 and to which is pivoted a handle 40 which is adapted to press inwardly on a valve stem 41 carrying a valve disc 42 adapted to open and close a valve passage 43 leading to the nozzle 39.

A spring 44 is confined on the lower end of the stem 41 and has one end thereof seated against the movable valve disc 42 and the other end thereof seated against a stationary spider 45. The two spiders 45 and 37 are perforated at 38 so liquid may readily flow through the valve assembly to the nozzle 39. The spring 44 maintains the valve disc 42 in closed position over the passage 43 and maintains the handle 40 in outwardly spaced relation from the valve body 20 ready for use by an operator who simply presses the handle 40 towards the valve body to open the valve and discharge gasoline therefrom. Likewise the spring 44 maintains clearance between the lower end of the valve stem 41 and bellows 35 so that the latter may fully expand to receive liquid from the other and remote bellows 21 which is collapsed by the weight 18 or other like means.

To the valve housing or body 20 is attached another housing 47 and within which is mounted the bellows 35 forming the terminals of the motion-transmitting tube 22. This bellows housing and other parts are easily demountable and by removing them a new hose 9 may be readily installed. Simply loosen the set screw 33 so that the casing 47 and valve body 20 may be rotated about the bellows 35 which remains stationary as the apparatus is taken apart and replaced, and hence the two connected bellows 21 and 35 and their tube connections are not twisted and strained. The two operating bellows 21 and 35 are both so mounted that they remain stationary at each end of the hose while working with the housing parts and each bellows has clamp means in the screws 33 and 27 which clamp them to the housing after the assembly is completed should such clamping be necessary.

In the use of the apparatus, the operator removes the dispensing valve 20 from the hook 49 and inserts its nozzle 39 in the tank to be filled, whereupon he depresses the handle 40 which reciprocates the valve stem 41 and forces the lower end thereof against the bellows 35 thereby collapsing or compressing the latter. This action forces the liquid column in the tube 22 throughout the length of the tube and causes the same to flow into the switch-operating bellows 21 thereby expanding the latter and lifting upwardly on the weighted arm 18, which in turn tilts the switch tube 14. That action causes the mercury M to flow to the other end of the switch tube, immersing the contact points 19 and closing the circuit W. The circuit W now being closed, starts the operation of a motor, hydraulic, or other type of pumping system, not shown, which forces the liquid to be dispensed, such as gasoline, through the pipe 5 and meter unit 6 into the hose 9 and out through the valve 20.

As long as the operator holds the handle 40 depressed, the valve disc 42 is unseated to open the valve 20 and the switch 14 is closed, thus maintaining a steady flow of gasoline through the hose 9. When the operator releases the handle 40, the spring 44 automatically tilts the switch tube 14 to open position, the weight also serving to force the liquid in the hydraulic motion-transmitting and bellows assembly 21—22 back to the bellows 35 to expand it, thus causing the bellows 35 to follow up in close relation to the lower end of the retracting valve stem 41.

It is seen that the opening of the valve 20 closes the switch 14 and the closing of the valve reversely opens the switch. The apparatus is simple in structure and positive in operation and is of practical convenience because the operator, such as a service station man selling gasoline, may remain at the fuel tank and watch the flow of gasoline thereinto and hence avoid the inconvenience of first inserting the valve dispensing spout 39 and then going back to the pump to start the operation thereof. It is significant that one and the same handle 40 simultaneously actuates the valve 40 and switch 14 in reverse order, closing the switch as the valve is opened.

It is observed that the operating or motion-transmitting connection 22 and the valve and switch operating means 35—41 and 16—21 at the ends thereof are mounted as a unit in the hose apparatus. Furthermore the clamping action derived from the set screw 33 and cap screws 27 is to be omitted in some forms of the apparatus so as to have complete freedom and rotation of the bellows in their seats to allow the tube connection to remain straight and free of strain, since by leaving either one or the other bellows, if not both, free in their seats 28 and 37, it follows that the tube 22 seeks a non-twisted position.

Thus there is provided a novel bearing-anchorage means in the elements 36—37 and 24—28 which holds either or both ends of the motion-transmitting connection 22 in place in the respective ends of the liquid dispensing conduit. It is seen that the screw 33 may be omitted, and the boss 36, which is in the nature of a journal, remains in its bearing 37 to swivel or turn in said bearing to allow the flexible connection 22 in the flexible hose 9 to untwist or free itself from torsional strain due to hard service and usage of the hose 9. This bearing-anchorage means, inherent in 36—37 or 24—28, either or both used singly or together, is a great practical advantage and preserves the life and utility of the flexible motion-transmitting connection 22 in all its forms.

By providing the remote electric switch 14, the pumping of liquid to the dispensing valve 20 is controlled and pressure is not exerted in the hose 9 and against the valve disk 42 and hence fire hazard and danger of leaks are averted. This is true because the rupture of the hose or other accidents thereto, or leaks which come of wear, do not result in spilling gasoline, since the flow of gasoline is stopped at the source by reason of opening the switch 14 to break the circuit W. The hose can only leak or lose that portion of gasoline which it contains within its own length. This hose improvement renders safe the use of a flexible hose, since with the failure of any part the weight 18 always acts in a positive manner to open the circuit and stop the flow of gasoline. Thus the valve disk 42 is merely incidental in stopping the flow. As a matter of fact the closure of the valve disk 42 over the passage 43 merely acts to retain the small quantity of gasoline in the hose 9 until the next dispensing operation.

The two bellows 21 and 35 are examples of reciprocating plunger-like devices for operating the switch and respectively operated by the valve plunger 41. While this concrete embodiment of the invention is illustrated by use of the two reciprocating devices 21 and 35, it is understood that other forms of operating means may be resorted to.

What is claimed is:

1. In liquid dispensing apparatus, a conduit having a manually-operated valve and dispensing nozzle at one end thereof, an electrical switch proximate the other end of the conduit, and motion-transmitting means carried within and concealed and protected by the conduit and operatively connected with the manually-operated valve and with the switch; whereby manual operation of the valve, to directly open and close the nozzle, is transmitted to the switch to reversely close and open it; and bearing-anchorage means for mounting and holding the motion-transmitting means in free operative position in the conduit whereby said motion-transmitting means is relieved of torsional strains.

2. In liquid dispensing apparatus, a flexible hose, a dispensing valve and nozzle carried on one end thereof and a handle to actuate the valve, an electrical switch disposed at the other end of the hose and hence remote from the valve, a motion-transmitting means including a flexible member carried by the flexible hose, a movable device connected with each end of the motion-transmitting flexible member, and said movable devices being operatively related with the switch and valve handle, whereby movement of the handle is transmitted simultaneously to the valve and to the remotely located switch; and bearing means at each end of the flexible motion-transmitting means to operatively mount said ends in adjustable rotary position.

3. In liquid dispensing apparatus, a flexible conduit, a valve and nozzle carried on one end of the conduit, a handle to actuate the valve, a switch disposed remotely from the valve, a flexible motion-transmitting member carried within the flexible conduit, anchorage means at each end of the flexible motion-transmitting member to hold said ends within the center of the conduit whereby the middle section of said member swings loosely within the flexible conduit, operating connections mounted centrally of the conduit and extending from each centrally anchored end of the flexible motion-transmitting member to the valve and handle and to the switch; and swivel bearing means included in the anchorage means to free the central loosely swinging portion of the flexible motion-transmitting member of torsional strain or twisted condition.

4. In liquid dispensing apparatus, a flexible conduit, a valve having an operating handle on one end of the conduit, a switch at the other end of the conduit, a motion-transmitting member carried by the conduit and the ends of the member being disposed concentrically within the ends of the flexible conduit, bearing means cooperating with an end of the motion-transmitting member whereby

the latter may turn in relation to the flexible conduit to remove torsional strain from the member to allow it to swing freely within the conduit, operating means interposed between one end of the member and the valve handle, and operating means interposed between the other end of the member and the switch, whereby movement of the valve is transmitted to the switch.

5. In liquid handling apparatus, a hose, a switch at one end, a nozzle at the other end including a passage, a valve stem and a disk thereon to close the passage and nozzle, a spring to press the valve disk to closed position, and a handle engaging the stem by which the spring is overcome to open the passage; an operating connection being disposed concentrically within the hose and engaging the valve stem at one end thereof and engaging the switch at the other end; and bearing means at each end of the hose in which the operating connection is rotatably confined and by which it may rotate to adjust out such torsional strain as may exist throughout the length thereof.

6. In liquid dispensing means and a nozzle-controlled switch therefor; a conduit line, an electrical circuit and switch, and valve means correlated with the conduit line; said switch and valve means being disposed in spaced relation in connection with the conduit line, operating means for the switch to actuate it to make and break the circuit, motion transmitting member interconnecting the operating means with the valve means, whereby opening the valve means closes the switch and closing the valve means opens the switch; and means mounting the operating means for adjustable movement whereby torsional strain in the motion-transmitting member may free itself to straighten out and avoid any twisting or straining tendency.

7. In liquid dispensing hose equipment, the combination with a flexible hose, a valve and handle at one end and a switch at the other end thereof, a reciprocating device disposed adjacent the valve and the switch and concentrically of the hose, an operating connection made between the two devices and placed within the hose and extending throughout the length thereof, and mounting means comprising a seat in which rests each reciprocating device whereby the said device may adjustably turn to seek a position of rest during assembly of the equipment and during use thereof.

8. In liquid dispensing hose equipment, the combination with a flexible hose, a valve and handle at one end and a switch at the other end thereof, a reciprocating device disposed adjacent the valve and the switch and concentrically of the nose, an operating connection made between the two devices and placed within the hose and extending throughout the length thereof, mounting means comprising a seat in which rests each reciprocating device whereby the said device may adjustably turn to seek a position of rest during assembly of the equipment and during use thereof, and means cooperating with the mounting means of one of the devices to retain the same in its seat against displacement therefrom.

9. In liquid dispensing apparatus, a flexible conduit, a valve having an operating handle on one end of the conduit, a switch at the other end of the conduit, a motion-transmitting member comprising a liquid-filled tube carried by the conduit and the ends of the tube being disposed concentrically within the ends of the flexible conduit, bearing means cooperating with an end of the tube whereby the latter may turn in relation to the flexible conduit to remove torsional strain therefrom and to allow the tube to swing freely within the conduit, operating means interposed between one end of the tube and the valve handle, and operating means interposed between the other end of the tube and the switch, whereby movement of the valve is transmitted to the switch through the liquid-filled tube.

10. In liquid handling apparatus, a hose, a switch at one end, a nozzle at the other end including a passage, a valve stem and a disk thereon to close the passage and nozzle, a spring to press the valve disk to closed position, and a handle engaging the stem by which the spring is overcome to open the passage; a hermetically sealed tube disposed concentrically within the hose, a plunger-like means connected to one end of the tube and engaging the valve and a similar means connected to the other end of the tube to work the switch, and bearing means at each end of the hose in which the tube is rotatably confined and to adjust out such torsional strain as may exist throughout the length thereof.

11. In a nozzle-controlled switch and liquid dispensing means, a hose having a valve at one end and a switch at the other end, tilting means carrying the switch and means to hold the tilting means normally in one position to hold the switch open, a reciprocating device cooperating with the valve and worked thereby, an operating connection established between the tilting means and the reciprocating device, and screw retaining and rotatable support means to hold the reciprocating device in operative position to relieve the operating connection of twisted condition and torsional strain.

12. In a nozzle-controlled switch and liquid dispensing means, a hose having a valve at one end and a switch at the other end thereof, a bellows-operating means at each end of the hose and correlated with the valve and with the switch, and a hydraulic connection between the bellows operating means

whereby the switch and valve work in unison.

13. In a nozzle-controlled switch and liquid dispensing means, a hose having a valve at one end and a switch at the other end thereof, a bellows-operating means connected with each end of the hose and correlated with the valve and switch, a rotatable support on which one of the bellows is mounted, screw means to retain the support in place, and a hydraulic connection between the two bellows-operating means.

In testimony whereof I affix my signature.

HELEN R. FARR,
Executrix of the Estate of Frederick George Farr, Deceased.