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Description

The present invention relates to fluid dispensers for example to high pressure dispensers for introducing a fluid, such as soap, from a reservoir into a main stream of fluid passing through the dispenser.

Dispensers are known which introduce and dispense in a main stream of high pressure fluid a second fluid, such as soap or detergent, or other chemicals mixed in a liquid solution.

US Patent Specification No. 4 369 921 discloses a liquid dispenser having a housing supporting and chemical content jar and a rotary control valve. The rotary control valve is located in a main through passage in the housing. The valve is selectively positionable in three positions. In a first position it allows the free flow of liquid through the main passage. In this position chemical in the chemical jar is drawn by venturi action into the liquid flowing through the passageway. In a second position it blocks all liquid flowing through the through passage and in the third position is also blocks liquid flowing through the passage but also diverts the liquid to the chemical content jar so as to disolve or dilute any chemical freshly introduced into jar.

Thus all liquid dispensed by the dispenser contains a proportion of the chemical in the chemical content jar and a control is provided for varying the proportion of chemical to the liquid flowing through the valve.

It is an object of the invention to provide an improved fluid dispenser.

Soap dispensers are commonly used for introducing soap into a stream of water which is dispensed by a nozzle or is used to drive a water wheel in a rotary scrub brush.

Existing soap dispensers of this type suffer from a number of disadvantages including relatively high costs of manufacture, difficulty of cleaning the parts and a relatively large number of parts.

To reduce the cost of manufacturing, attempts have been made to make the dispensers of all, or virtually all, plastic moulded parts. By way of example, US Patents 3,447,753 and 3,770,205 provide for the injection moulding of four separate parts and the assembly of ten parts.

With the ever-increasing costs for manufacture and labour, providing fewer parts in the ultimate assembly will have a direct effect on the cost of production for the product. Such efficiency enables the manufacturer to provide the product at a lower price. By way of contrast, the devices in the above patents involve a housing, a ball valve rotatable in the housing and a main passage through the housing and the ball valve. An auxiliary passage extends from an upstream portion of the main passage through the housing, to a secondary fluid reservoir at the bottom of the housing, then through the housing, back to a downstream portion of the main passage. A disc held on the end of the ball valve by a fragile plastic clip, closes and opens the openings to the reservoir in the auxiliary passage. O-rings, two in all, are required; one placed around each of the openings so that the valve member can close off the auxiliary passage. Also, due to the fragileness of the clip, repeated or improper use of the clip may break it. Additionally, two O-rings are required; one above and one below the main passage, for sealing between the top ball valve and the housing in which it rotates.

According to the present invention there is provided a fluid dispenser for a source of high-pressure fluid and a further fluid, said dispenser comprising:

a housing having a first side and a second side the second side comprising means for coupling to a container forming a fluid reservoir for a said further fluid; a valve cavity formed through the housing from the first side to the second side; a cylindrical valve rotatably mounted in the valve cavity; a main passage formed through the housing and the valve substantially transverse to the valve cavity; means for coupling an upstream portion of the main passage to a high-pressure fluid source; an exposed control knob located at the first side of the housing and connected to the cylindrical valve for holding the valve in position with respect to the housing at the first side and for rotating the cylindrical valve; an "O"-ring for forming a fluid seal between the housing and the cylindrical valve towards the housing first side with respect to the main passage; an auxiliary passage extending from an upstream position in the main flow passage to the reservoir and back to a downstream position in the main passage with respect to the upstream position characterised by a valve member rigid with the cylindrical valve; and in that cylindrical valve is insertable into the valve cavity from the second side of the housing, with the valve member extending outwardly from the cylindrical valve to a position adjacent and facing the second side of the housing for holding the valve in position with respect to the second side of the housing and so that a first rotational position of the control knob causes the valve to block the flow of the high-presure fluid through a the main passage, a second rotational position of the control knob causes the valve to provide a main flow of high-pressure fluid through the main passage and a secondary flow of high-pressure fluid from the main passage to the reservoir and back to the main passage along the auxiliary passage to thereby dispense the further fluid into the high-pressure fluid in the main passage, and a third rotational position of the control knob

causes the cylindrical valve to provide a flow of high-pressure fluid through the main passage of the housing while blocking any flow of the fluid through the auxiliary passage.

Significantly, the present invention allows the grooves within the reservoir to be closed off without the need for gaskets or O-rings as discussed in US Patents 3,447,753 and 3,770,205. To this end, grooves are placed down the valve cavity between the cylindrical valve and housing to allow the openings to the reservoir to be positioned at the minimum radial distance from the centre of rotation of the cylindrical valve and closely adjacent the outer edge of the valve cavity. As a result, the force required on the cylindrical valve to ensure a good, tight seal between the bottom side of the housing and the valve member is minimised. Thus, the closing of the auxiliary passage may be accomplished by the valve member sliding against the bottom surface of the housing itself, without the need for O-rings. This construction also minimises the structural strength needed and therefore the amount of material needed for the valve member. Additionally, structural strength is enhanced by moulding the cylindrical valve and valve member as an integral plastic part without the need for clips.

Broadly, the fluid dispenser has a housing having a top side and a bottom side. The bottom side is for a coupling to a container forming a fluid reservoir. A valve cavity extends through the housing from top to bottom sides. The cylindrical valve is insertable into the valve cavity from the bottom side. A valve member is formed integrally as a unit with the cylindrical valve and extends outwardly beyond the valve cavity into closely spaced opposed relation with the housing bottom side. A main passage extends through the housing and cylindrical valve substantially transverse to the valve cavity. Means is provided for coupling the upstream portion of the main passage to a high pressure fluid source. An exposed control knob is connected to the cylindrical valve at the top side of the housing for manually rotating the cylindrical valve and for securing the cylindrical valve, relative to the housing, so that the substantially opposed relation between the housing bottom side and valve member is maintained. A groove is provided around the cylindrical valve in the valve cavity. An O-ring is provided in the groove forming a fluid seal between the housing and cylindrical valve toward the housing top side from the main passage. An auxiliary passageway extends from the upstream main flow passage, through the reservoir, to the downstream flow passage. The first, second and third rotational positions discussed above block the flow of high pressure fluid through the main passage, passes the high pressure fluid through the cylindrical valve and in addition shunts a secondary flow of high pressure fluid through the auxiliary passage including the reservoir and passes the high pressure fluid through the main passage while blocking the secondary flow of fluid through the auxiliary passage block by the valve member.

Preferably, the auxiliary passageway comprises an upstream passage extending through the housing in a direction transverse to the main passageway, through a passage in the valve member into the soap reservoir; and a downstream passage extending from the soap reservoir through another passage in the valve member, through a passage in the housing, transverse to and ending in the downstream main passageway downstream of the valve cavity.

The alternate embodiment with the addition of O-rings around the upstream and downstream passages through the main housing has the advantage of requiring less exacting tolerances for valve and housing construction. Additionally, because the auxiliary passageway is less complicated, manufacture of the ball valve is easier.

In various embodiments to be described, the number of parts can be minimised and performance improved over the prior devices. For example, the total number of parts can be reduced to only three injection moulded parts and a total assembly of eight parts as compared with four and ten, respectively, in the above prior art devices.

Lastly, placing an O-ring in a groove around the cylindrical valve above the main passage, allows the O-ring to rotate with the O-ring reducing the frictional forces between the knob and O-ring which otherwise occur if the O-ring did not rotate with the knob. Also, placing an O-ring around the main passage at the upstream side of the cylindrical valve, between the housing and cylindrical valve, reduce pressure build-up in the reservoir when the valve is turned off.

A soap dispenser embodying the present invention will now be described, by way of example, with reference to the accompanying diagrammatic drawings in which:

Fig. 1 is a side elevation view, partially in section, of a soap dispenser and embodies the present invention;

Fig. 2 is a top plan view of the control knob, illustrating the control knob at the "soap" position, and showing the indicia for the "rinse" and the "off" positions;

Fig. 3 is a sectional view taken along line 3-3 of Fig. 1, showing the cylindrical valve in the "soap" position;

Fig. 4 is a left side elevation view of the soap dispenser, partially in section, taken along line 4-4 of Fig. 3;

Fig. 5 is a bottom elevation view of the soap

dispenser, showing the cylindrical valve in the "soap" position;

Fig. 6 is a schematic view of the soap dispenser similar to Fig. 3, except, the cylindrical valve is shown in the "rinse" position;

Fig. 7 is a schematic view of the soap dispenser similar to Fig. 5, except, the cylindrical valve is shown in the "rinse" position;

Fig. 8 is a schematic view of the soap dispenser similar to Fig. 3, except the cylindrical valve is shown in the "off position";

Fig. 9 is a schematic view of the soap dispenser similar to Fig. 5, except the cylindrical valve is shown in the "off" position;

Fig. 10 is a sectional side elevation view of the soap dispenser similar to Fig. 1 showing an alternative embodiment of the auxiliary passageway; and

Fig. 11 is a bottom elevation view of the soap dispenser of Fig. 10, similar to Fig. 5.

Referring more particularly to the drawings, soap dispenser 10 has a handle in the form of a conduit 12 connectable to the discharge end of a standard hose (e.g. garden hose), which provides a high pressure flow of water or fluid through the soap dispenser. A male threaded connector (not shown) on the hose is connected to an internal threaded connector 14 at the left end of conduit 12. The right end 16 of the conduit 12 is slipped into and locked by detentes on the intake end 28 of housing 18, which is detachably connected to a reservoir 20.

Conduit 12 leads to the intake end of a main passageway 22 which extends through the housing 18 and a cylindrical valve 24, located in the valve cavity 26 portion of the housing. The passageway 22 will not extend through the housing and cylindrical valve 24 unless the cylindrical valve 24 is properly positioned. Although the conduit 12 may be glued or moulded into the intake tube 28, detente loading reduces assembly time and cost of manufacture. An O-ring 31, made of rubber or like material, is positioned at the end portion 16 of the conduit 12, and ensures against leakage of water between the intake tube 28 and the conduit 12. The discharge end 30 of the main passageway 23 is sized to snugly receive the extension of an intake tube (not shown) of a water wheel driven, rotary scrub brush. In the preferred embodiment, the discharge end 30 has external threads 33 for threading into internal threads of a connector (not shown).

The housing has a ring-shaped flange 32 at its underside, for connection to a co ntainer 20, which together form a reservoir for a fluid or other material to be dispensed. The container 20 will be connected in such a manner as to ensure easy disconnection, as for refilling in the "off" position, and a leakproof fit when connected to the flange 32. In the preferred embodiment, the container has external threads 38 to receive internal threads 39 on the flange 32, at the bottom side of the housing 18. The container 20 is moulded to receive and hold an O-ring 19 of rubber or like material, and ensures against leakage of water between the container and flange 32 when the container 20 is fastened to the flange 32.

A control knob 40 enables an operator of the soap dispenser 10 to directly effect the positioning of the cylindrical valve and thus control the main passageway 52, through the cylindrical valve (Fig. 1), and an auxiliary passageway 65 (Fig. 4). The control knob 40 is a circular disc-member which has conveniently placed on the top side markings which indicate "off", "soap" and "rinse" positions, as illustrated in Fig. 2. The control knob 40 is mounted in any conventional manner to the top side of the cylindrical valve 24. Preferably, a standard screw 42 is used to secure the control knob 40 to the top end of the cylindrical valve. Splines 51, on the bottom side of the control knob, fit into a spline hole 53, in the top side of the cylindrical valve 24 to ensure that the cylindrical valve 24 is mechanically positioned with respect to the control knob 40. Referring to Fig. 4, the control knob 40 is preferably large in diameter and extends past the edge of the housing 18, in order for the operator to get better leverage and grip for positioning the control knob 40 and cylindrical valve. In addition, a detente is provided in the upper part of the housing, below the control knob, to provide a slight resistance in the "off" position, for a mechanical indication of the "off" position.

Referring to Fig. 1 from left to right, high pressure fluid, such as water, flows through the main passageway 22, which extends through the upstream portion of the housing 18, to an orifice 46 leading into the valve cavity 26. This cavity is cylindrical in shape, and contains the cylindrical valve 24. O-ring 50, preferably made of rubber or like material, seals tightly against and conforms to the outer side of the cylinrical valve in the valve cavity. The O-ring 50 helps to seal off intake water from the valve cavity 26 and the main passageway 22, when the cylindrical valve 24 is in the "off" position.

The main passageway 22 extends diametrically through a central portion 52 of the cylindrical valve 24, so that the main passageway 22 allows flow therethrough when the control knob 40 is in either the "rinse" position (Figs. 1, 3) or the "soap" position (Figs. 6, 7).

In Fig. 1, when the control knob 40 is in the "soap" position, an upstream portion 54 of the main passageway 52, through the cylindrical valve, has a large diameter; for example, of 3/8 inch, and a downstream portion 56, for example, of 1/4 inch.

Accordingly, in Fig. 6, when the control knob is rotated 180° to the "rinse" position, the upstream portion 54 and downstream portion 56 are reserved.

Referring to Figs. 1 and 4, the cylindrical valve 24 has a smooth, cylindrical, wall surface 43, which is about the same size as, but slightly smaller than, the cylindrical-shaped valve cavity 26 and freely rotates within cylindrical valve cavity 26. A substantially watertight seal is formed between the O-ring 50 and the surface of the cylindrical shaped valve. The cylindrical valve 24 has two orifices 64 and 66 at the ends of two passageways 58 and 60 that extend from the upstream and downstream portions 54 and 56, respectively, of the main passageway 52 through the cylindrical valve 24.

As seen in Figs. 4 and 5, a disc-shaped valve member 63 extends from the cylindrical valve outwardly beyond the valve cavity 26 abutting with the flat side 41 of the housing. The valve member together with the cylindrical portion 49 of the cylindrical valve 24 are integrally moulded together as a unit, so that, when the control knob 40 is rotated, the valve member 63 rotates as well. Provided through the valve member 63 are two ports 74 and 76 which control passage of fluid through the auxiliary passageway 65 extending from the main passageway 52 (Fig. 3). The auxiliary passage 65 includes grooves 68 and 67 extending longitudinally along the wall surface 43 of the valve cavity 26, radial grooves 72 and 70 on the bottom side 41 of the housing and upstream and downstream passages 58 and 60. Rotation of the valve member 63 and the control knob 40 are limited by a circular stop wall 80 protruding from the bottom side of the housing 41. The circular stop wall 80 circumferentially surrounds the valve member 63 for, preferably, 90°. In addition, the valve member 63 is provided with an abutment 81 extending diametrically beyond the stop wall 80, and circumferentially around the valve member for, preferably, 90°. Together, the abutment and stop wall limit rotation of the valve member and cylindrical valve to only 180° rotations from the "soap" and "rinse" positions.

In the "soap" position (Figs. 3, 4 and 6), the two ports 74 and 76 register with two reservoir grooves 70 and 72, respectively, of the auxiliary passageway 65 at the bottom of the housing 41. The top side of valve member 63 is forced up against the bottom side 41 of the housing 41 by a spring in the form of a wavy washer 61 located between the bottom surface of the control knob 40 and the top side of the housing 26. By forcing the valve member 63 tightly against the bottom side of the housing 41, leakage of fluid from the main valve passageway 52 through auxiliary passageway 65 is minimised when in the "rinse" or "off" positions.

When the control knob 40 is in the "soap" position, valve orifices 64 and 66 align with upstream housing groove 68 and a downstream housing groove 67, respectively (Fig. 4). These grooves are located between the valve cavity 26 and the cylindrical valve. Preferably, the grooves are moulded entirely within the wall surface 48 of the valve cavity 26. Each groove extends down to separate openings or reservoir grooves 70 and 72, respectively, in the surface of the bottom side 41 of the housing 18 (Fig. 5). When the control knob is in the "soap" position, the upstream and downstream portions of main passageway 52 through the cylindrical valve 24 are remotely connected to the reservoir 20 by the auxiliary passageway 65.

Significantly, the present invention allows the opening or reservoir grooves 70 and 72 into the reservoir 20 to be closed off without the need for gaskets or O-rings to be attached to the grooves. To accomplish this, grooves 68 and 67 are placed down the surface of the valve cavity to allow the grooves 70 and 72 to the reservoir 20 to be positioned at the minimum radial distance from the centre of rotation of the cylindrical valve and closely adjacent the outer edge of the valve cavity. As a result, the force required on the cylindrical valve to ensure a good, tight seal between the bottom of the housing 41 and the valve member 63 can be minimised.

In addition, O-ring 47 is positioned in a groove in the cylindrical valve between the top end of the cylindrical valve and the knob 40. As a result, pressure in the main passage will tend to lift the knob and cylindrical valve and enhance the seal between the upper surface of disc 63 and the bottom surface 41. In this way, the seal between the openings or grooves 70 and 72 are enhanced. The positionng of the O-ring 47 between the knob and cylindrical valve has a significant advantage over placing the O-ring in a groove at the top side of the housing. Here, the control knob 40 would have difficulty sliding against the O-ring when the O-ring is under pressure. In order to avoid this problem, in the preferred embodiment, the O-ring is placed in a groove at the top side of the cylindrical valve so that the control knob, the cylindrical valve and the O-ring rotate together, even under pressure.

Referring to Figs. 6 and 7, when the control knob 40 is rotated to the "rinse" position, the auxiliary passageway 65 is closed, since the reservoir grooves 70 and 72 are preferably sealed by valve member 63 and ports 74 and 76 no longer register with them. Thus, the flow of water passes through the main passageway 52 unaffected by the contents of the reservoir 20. Although only one of the two reservoir grooves 70 and 72 need be

blocked in order to stop the dispensing of fluid from the reservoir, preferably, both grooves are blocked by one valve member 63 to avoid any leakage of fluid from the reservoir.

When the control knob is turned to the "soap" position, the high pressure in the upstream portion 54 of the cylindrical valve 52 and low pressure at the downstream portion 56 are effective to shunt a stream of water through the auxiliary passageway 65. The diverted water leaves the main passageway 22 at an upstream high pressure location and re-enters the main passageway 23 at a downstream low pressure location. To this end, the diverted fluid flows in the auxiliary passage 65 through passage 58, port 64, housing groove 68, reservoir groove 72 and through port 76 to the reservoir 20 in the auxiliary passage 65 through port 74, reservoir groove 70, housing groove 67, port 66, passageway 60 and into the downstream portion 56 of the cylindrical valve 24.

The soap dispenser may be used with or without soap. If depletion of the reservoir occurs, the reservoir can be refilled with soap by turning the control knob 40 to the "off" position, disconnecting the reservoir from the housing, refilling it with soap, and reconnecting it back into the housing.

Although the above description of the invention relates to the use of a soap dispenser, the invention is also expected to be useful with other materials such as waxes detergents or insecticides and the like.

Preferably, the housing, including its cavity, passages, grooves, control knob detentes assembly, detentes and the cylindrical valve, including its valve member, passages, ports, splines and O-ring grooves, control knob including its spline, and container are all individually injection moulded as a unit to form individual, easily assembled, plastic parts, as described. Assembly is achieved by placing O-rings 50 and 47 in their respective grooves in the housing and cylindrical valve 24, by inserting the cylindrical valve 24 with O-ring 47 through the valve cavity from the bottom side 41, until the valve member surface 63 abuts the bottom side 41, by placing the wavy spring washer 61 around the cylindrical valve 24 on the top of the housing 18, by inserting the control knob 40 on the top end of the cylindrical valve 74, and wavy spring washer 61, by theading the screws through the control knob 40 into the upper end of the cylindrical valve 24, and by connecting the container 20 with O-ring 19 into the bottom side of the housing 18.

Figs. 10 and 11 depict an alternative embodiment of the invention. Identical reference numerals indicate identical elements disclosed in Figs. 1-9. New reference numerals are used to indicate additional components. Referring to Figs. 10 and 11 this embodiment invention also has a cylindricl valve 24' insertable from the bottom side into the valve cavity 26 for mounting and rotation in the valve cavity. The cylindrical valve has a valve member of disc 63' extending outwardly beyond the valve cavity into closely spaced opposed relation with the housing bottom side at 110. The exposed control knob 40 is again connected to the cylindrical valve at the top side of the housing for manually rotating the cylindrical valve and for securing a cylindrical valve, in and relative to the housing, so that the substantially opposed relation between the housing bottom side and the valve member is maintained.

The auxiliary passageway extends from an upstream position in the main flow passage, through the reservoir, to the main flow passage at a position which is downstream from the upstream position. As discussed above, the first rotational position of the central knob causes the cylindrical valve to block the flow of fluid through the main passageway of the housing, a second rotation position of the control knob and cylindrical valve provides communication of the fluid through the main passage of both the housing and the cylindrical valve, and communication of fluid through the auxiliary passageway and reservoir between the upstream and downstream positions, and a third rotation position of the control knob and cylindrical valve provide fluid communication through the main passageway of both the housing and the cylindrical valve and an obstruction by the valve member of the flow fluid through the auxiliary passageway. The auxiliary passageway includes an upstream passage 95 which extends from the main passage to a position between the bottom side of the housing and the valve member, downstream passage 74 which is alignable with passage 95 and passes through the valve member 63', downstream passage 96 which passes from the main passage to a position between the housing bottom side and valve member 63' and a downstream passage 76, alignable with passage 96 through valve member 63'. We noted that the upstream passages 95 and 74 extend from the upstream side of the main passage to the reservoir whereas the downstream passages 96 and 76 extend from a position in the main passage which is downstream with respect to passages 95 and 74.

In the "soap" position (Figs. 10 and 11), the two passages 74 and 76 in the valve member 63 register with the two passages 95 and 96, respectively, thereby forming the auxiliary passageway. Two O-rings 97 and 98, respectively, are positioned in grooves in the bottom side of the housing 41, around passages 95 and 96. A substantially watertight seal is formed between the O-rings 97 and 98 and the disc-shaped valve member 63', thereby minimising the leakage of fluid from the

main valve passageway 52 through the auxiliary passageway when the cylindrical valve 24 is in the "rinse" and "off" positions.

Additionally, the bottom side of the housing 41 may be equipped with a groove, essentially concentric about the valve cavity 26, with an O-ring 100 placed in the groove to provide additional seal between the cylindrical valve 24' and the bottom side of the housing 41.

When the control knob 40 is rotated to the "rinse" position, the auxiliary passageway is closed, since passages 95 and 96 are sealed by the valve member 63'. Thus, the flow of water passes through the main passageway 52 only, unaffected by the contents of reservoir 20.

Claims

1. A fluid dispenser (10) for a source of high-pressure fluid and a further fluid, said dispenser comprising:

a housing (18) having a first side and a second side (41), the second side (41) comprising means (32) for coupling to a container (20) forming a fluid reservoir for a said further fluid; a valve cavity (26) formed through the housing (18) from the first side to the second side; a cylindrical valve (24) rotatably mounted in the valve cavity (26); a main passage (22,52) formed through the housing (18) and the valve (24) substantially transverse to the valve cavity; means (12) for coupling an upstream portion of the main passage (22,52) to a high-pressure fluid source; an exposed control knob (40) located at the first side of the housing and connected to the cylindrical valve for holding the valve in position with respect to the housing at the first side and for rotating the cylindrical valve; an "O"-ring (47) for forming a fluid seal between the housing and the cylindrical valve towards the housing first side with respect to the main passage; an auxiliary passage (65) extending from an upstream position in the main flow passage (22,52) to the reservoir (20) and back to a downstream position in the main passage (22,52) with respect to the upstream position characterised by a valve member (63 or 63') rigid with the cylindrical valve (24); and in that cylindrical valve (24) is insertable into the valve cavity (26) from the second side of the housing (18), with the valve member (63,63') extending outwardly from the cylindrical valve (24) to a position adjacent and facing the second side of the housing (18) for holding the valve (24) in position with respect to the second side of the housing (18) and so that a first rotational position of the control knob (40) causes the valve (24) to block the flow of the high-presure fluid through a the main passage (22,52), a second rotational position of the control knob (40) causes the valve (24) to provide a main flow of high-pressure fluid through the main passage (22,52) and a secondary flow of high-pressure fluid from the main passage (22,52) to the reservoir (20) and back to the main passage (22,52) along the auxiliary passage (65) to thereby dispense the further fluid into the high-pressure fluid in the main passage, and a third rotational position of the control knob (40) causes the cylindrical valve (24) to provide a flow of high-pressure fluid through the main passage (22,52) of the housing while blocking any flow of the fluid through the auxiliary passage (65).

2. A fluid dispenser according to Claim 1, characterised in that the passage (65) has a first upstream passage and a downstream passage extending from the main flow passage (22,52) to the valve member (63,63') at locations between the valve member (63,63') and the second side of the housing (18) and has a second upstream passage and a second downstream passage in the valve member (63,63') alignable with, respectively, the first upstream passage and the first downstream passage.

3. A fluid, dispenser according to Claim 1 or to Claim 2 characterised by an O-ring (50) between the housing (18) and cylindrical valve (24), around the main passageway (22,52) on the upstream side of the cylindrical valve (24).

4. A fluid dispenser according to any one of Claims 1 to 3, characterised in that the valve member (63,63') is disk shaped.

5. A fluid dispenser according to any preceding claim, characterised by a further groove in the second side of the housing (18) around the valve cavity (26) and by an O-ring (100) disposed in the further groove to form a fluid seal between the second side of the housing (18) and the valve member (63,63').

6. A fluid dispenser according to Claim 1, characterised by separate upstream and downstream housing grooves (68,67) in the valve cavity, each of the grooves extending to a different position on the second side of housing (18); an upstream valve passage (58) extending from the upstream position of the main passage (22,52) through the cylindrical valve (24) to the upstream housing groove; a downstream valve passage (60) extending from the downstream position in the main passage through the cylin-

drical valve to the downstream housing groove; the second rotational position of the control knob (40) providing communication of fluid through the main passage (22,52) of the housing (18) and the communication of fluid through the upstream valve passage (58) and the upstream groove, through the reservoir (20) and through the downstream groove and the downstream valve passage (60) and back to the main passageway (22,52); and the third rotational position of the control knob (40) providing fluid communication through the main passage (22,52) of the housing (18) while positioning the valve member to obstruct the opening of at least one of the grooves to the reservoir (20).

7. A fluid dispenser according to Claim 1, characterised in that the auxiliary passage (65) extends from an upstream position in the main flow passage (22,52) through an upstream passage (95) formed in the housing (18) then through an upstream passage (74) formed in the valve member (63'), and into the reservoir (20), and through a downstream passage (76), formed in the valve member (63,63'), then through a downstream passage (96) formed in the housing (18) and to an upstream position in the main flow passage (22,52), the upstream and downstream passages (74,76) in the valve member (63') being aligned with the upstream and downstream passages (95,96) in the housing (18) when the control knob (40) is in the second position.

8. A fluid dispenser according to Claim 1, characterised in that the auxiliary passage (65) extends from an upstream position in the main flow passage, through the cylindrical valve (24), between the cylindrical valve (24) and housing (18) to the reservoir (20), then from the reservoir (20) between the cylindrical valve (24) and housing (18), and through the cylindrical valve (24) back to the downstream position of the main passage (22,52).

9. A fluid dispenser according to Claim 1, characterised in that the auxiliary passage (65) comprises a groove between the housing (18) and cylindrical valve (24).

10. A fluid dispenser according to Claim 1, characterised in that the auxiliary passage comprises first and second spaced apart grooves extending to the reservoir (20), the first and second spaced apart grooves being formed between the housing (18) and cylindrical valve (24).

Revendications

1. Distributeur-doseur de liquides (10) pour une source de liquide sous haute pression et un autre liquide ce distributeur-doseur comprenant: un carter (18) qui presente un premier côté et un second côté (41), le second côté (41) comprenant des moyens (32) d'accouplement à un récipient (20) constituant un réservoir de liquide pour ledit autre liquide; une cavité de valve (26) formée à travers ledit carter (18) entre le premier côté et le second côté; une valve cylindrique (24) montée à rotation dans la cavité de valve (20); un passage principal (22, 52) forme à travers le carer (18) et la valve (24) dans une direction sensiblement perpendiculaire à la cavité de valve; des moyens (12) d'accouplement d'une partie amont du passage principal (22, 52) à une source de liquide sous haute pression: un bouton de commande (40) expose à la vue, situé du premier côté du carter et raccordé à la valve cylindrique en vue de maintenir la valve en place par rapport au carter du premier côté de celui-ci et de faire tourner la valve cylindrique; une bague torique (47) pour former un joint étanche aux liquides entre le carter et la valve cylindrique vers le premier côté du carter par rapport au passage principal; un passage auxiliaire (65) qui s'étend depuis une position amont dans le passage d'écoulement principal (22, 52) jusqu' au réservoir (20) et, en retour, vers une position aval dans le passage principal (22, 52) par rapport à ladite position amont; caractérisé par un élément de valve (63 ou 63') solidaire de la valve cylindrique (24); et en ce que la valve cylindrique (24) peut être insérée dans la cavité de valve (26) par le second côté du carter (18), l'élément de valve (63, 63') s'étendant vers l'extérieur à partir de la valve cylindrique (24) jusqu'à une position située au voisinage et en face du second côté du carter (18) pour maintenir la soupape (24) en place par rapport au second côté du carter (18) et de telle sorte qu'une première position de rotation du bouton de commande (40) a pour effet que la valve (24) bloque l'écoulement du liquide sous haute pression à travers le passage principal (22, 52), qu'une deuxième position de rotation du bouton de commande (40) a pour effet que la valve (24) établit un écoulement principal de liquide sous haute pression à travers le passage principal (22, 52) et un écoulement secondaire de liquide sous haute pression depuis le passage principal (22, 52) vers le reservoir (20) et, en retour, vers le passage principal (22, 52) le long du passage auxiliaire (65) pour incorporer ainsi l'autre liqui-

de au liquide sous haute pression dans le passage principal, et qu'une troisième position de rotation du bouton de commande (40) a pour effet que la valve cylindrique (24) établit un écoulement de liquide sous haute pression à travers le passage principal (22, 52) du carter et, en même temps, bloque tout écoulement du liquide à travers le passage auxiliaire (65).

2. Distributeur-doseur de liquides selon la revendication 1, caractérisé en ce que le passage (65) comprend un premier passage amont et un passage aval s'étendant depuis le passage principal (22, 52) jusqu'à l'élément de valve (63, 63') dans des positions situées entre l'élément de valve (63, 63') et le second côté du carter (18), ainsi qu'un second passage amont et un second passage aval dans l'élément de valve (63, 63'), pouvant être alignés respectivement avec le premier passage amont et le premier passage aval.

3. Distributeur-doseur de liquides selon la revendication 1 ou 2, caractérisé par une bague torique (50) entre le carter (18) et la valve cylindrique (24), autour du passage principal (22, 52) du côté amont de la valve cylindrique (24).

4. Distributeur-doseur de liquides selon l'une quelconque des revendications 1 à 3, caractérisé en ce que l'élément de valve (63, 63') a la forme d'un disque.

5. Distributeur-doseur de liquides selon l'une quelconque des revendications 1 à 4, caractérisé par une gorge supplémentaire dans le second côté du carter (18) autour de la cavité de valve (26), et par une bague torique (100) placée dans la gorge supplémentaire pour former un joint étanche aux liquides entre le second côté du carter (18) et l'élément de valve (63, 63').

6. Distributeur-doseur de liquides selon la revendication 1, caractérisé par des rainures distinctes amont et aval (68, 67) formees dans la cavité de valve du carter, chacune de ces rainures s'étendant jusqu'à une position différente sur le second côté du carter (18); un passage de valve amant (58) s'étendant depuis la position amant du passage principal, à travers la valve cylindrique (24), jusqu'à la rainure amont du carter; un passage de valve aval (60) s'étendant depuis la position aval dans le passage principal, à travers la valve cylindrique, jusqu'à la rainure aval du carter; la deuxième position de rotation du bouton de commande (40) établissant une communication pour le liquide à travers le passage principal (22, 52) du carter (18) et une communication pour le liquide à travers le passage de valve amont (58) et la rainure amont, à travers le réservoir (20) et à travers la rainure aval et le passage de valve aval (60) et, en retour, vers le passage principal (22, 52); et la troisième position de rotation du bouton de commande (40) établissant une communication pour le liquide à travers le passage principal (22, 52) du carter (18), tout en plaçant l'élément de valve de sorte qu'il obture l'ouverture de l'une au moins des rainures dans le réservoir (20).

7. Distributeur-doseur de liquides selon la revendication 1, caractérisé en ce que le passage auxiliaire (65) s'étend depuis une position amont dans le passage principal (22, 52), à travers un passage amont (95) formé dans le carter (18), puis à travers un passage amont (74) formé dans l'élément de valve (63'), jusque dans le réservoir (20), et à travers un passage aval (76) formé dans dans l'élément de valve (63, 63'), puis à travers un passage aval (96) formé dans le carter (18) et jusqu'à une position amont dans le passage principal (22, 52), les passages amont et aval (74, 76) dans l'élément de valve (63') étant alignés avec les passages amont et aval (95, 96) dans le carter (18) lorsque le bouton de commande (40) est dans la deuxième position.

8. Distributeur-doseur de liquides selon la revendication 1, caractérisé en ce que le passage auxiliaire (65) s'étend depuis une position amont dans le passage principal, à travers la valve cylindrique (24), entre la valve cylindrique (24) et le carter (18) jusqu'au réservoir (20), puis depuis le réservoir (20), entre la valve cylindrique (24) et le carter (18) et à travers la valve cylindrique (24) en retour vers la position aval du passage principal (22, 52).

9. Distributeur-doseur de liquides selon la revendication 1, caractérisé en ce que le passage auxiliaire (65) comprend une rainure entre le carter (18) et la valve cylindrique (24).

10. Distributeur-doseur de liquides selon la revendication 1, caractérisé en ce que le passage auxiliaire comprend des première et seconde rainures espacées s'étendant jusqu'au réservoir (20), les première et seconde rainures espacées étant formées entre le carter (18) et la valve cylindrique (24).

Patentansprüche

1. Fluidausgeber (10) für eine Quelle eines unter hohem Druck stehenden Fluids und ein weiteres Fluid, wobei der Ausgeber aufweist:

   ein Gehäuse (18) mit einer ersten Seite und einer zweiten Seite (41), wobei die zweite Seite (41) ein Mittel (32) zum Anschließen eines Behälters (20) besitzt, der ein Fluidreservoir für das genannte zweite Fluid bildet; eine durch das Gehäuse (18) von der ersten Seite zu der zweiten Seite geformte Ventilkammer (26); ein in der Ventilkammer (26) drehbar eingesetztes zylindrisches Ventil (24); einen im wesentlichen quer zu der Ventilkammer durch das Gehäuse (18) und das Ventil (24) geformten Hauptdurchlaß (22, 52); ein Mittel (12) zum Anschließen eines stromauf gelegenen Abschnittes des Hauptdurchlasses (22, 52) an eine unter hohem Druck stehende Fluidquelle, einen an der ersten Seite des Gehäuses freiliegenden Schaltknopf (40), der mit dem zylindrischen Ventil verbunden ist, um das Ventil bezüglich des Gehäuses an der ersten Seite in Lage zu halten und um das zylindrische Ventil zu verdrehen; einen O-Ring (47), um eine Fluiddichtung zwischen dem Gehäuse und dem zylindrischen Ventil in Richtung der ersten Gehäuseseite bezüglich des Hauptdurchlasses zu bilden; und einen Hilfsdurchlaß (65), der sich von einer stromauf gelegenen Stelle in dem Hauptdurchlaß (22, 52) des Flusses zu dem Reservoir (20) und zurück zu einer bezüglich der stromauf gelegenen Stelle stromabwärts liegenden Stelle in dem Hauptdurchlaß (22, 52) erstreckt, gekennzeichnet durch ein mit dem zylindrischen Ventil (24) starres Ventilglied (63 oder 63') und dadurch, daß das zylindrische Ventil (24) von der zweiten Seite des Gehäuses (18) in die Ventilkammer (26) einsetzbar ist, wobei sich das Ventilglied (63, 63') von dem zylindrischen Ventil (24) nach außen zu einer der zweiten Seite des Gehäuses (18) benachbarten und dieser gegenüberliegenden Stelle erstreckt, um das Ventil (24) bezüglich der zweiten Seite des Gehäuses (18) in Lage zu halten, sodaß eine erste Verdrehlage des Schaltknopfes (40) dazu führt, daß das Ventil (24) den Fluß des unter hohem Druck stehenden Fluids durch den Hauptdurchlaß (22, 52) unterbricht, eine zweite Verdrehlage des Schaltknopfes (40) dazu führt, daß das Ventil (24) einen Hauptfluß von unter hohem Druck stehenden Fluid durch den Hauptdurchlaß (22, 52) und einen Sekundärfluß von unter hohem Druck stehenden Fluid längs des Hilfsdurchlasses (65) von dem Hauptdurchlaß (22, 52) zu dem Reservoir (20) und zurück zu dem Hauptdurchlaß (22, 52) ermöglicht, um hiedurch das zweite Fluid in das unter hohem Druck stehende Fluid in dem Hauptdurchlaß auszugeben und eine dritte Verdrehlage des Schaltknopfes (40) dazu führt, daß das zylindrische Ventil (24) einen Fluß von unter hohem Druck stehenden Fluid durch durch den Hauptdurchlaß (22, 52) des Gehäuses ermöglicht, während es jeglichen Fluß des Fluids durch den Hilfsdurchlaß (65) unterbricht.

2. Fluidausgeber nach Anspruch 1, dadurch gekennzeichnet, daß der Durchlaß (65) einen ersten stromauf gelegenen Durchlaß und einen ersten stromab gelegenen Durchlaß besitzt, welche Durchlässe sich von dem Hauptdurchlaß (22, 52) zu dem Ventilglied (63, 63') an Stellen zwischen dem Ventilglied (63, 63') und der zweiten Seite des Gehäuses (18) erstrekken und daß er in dem Ventilglied (63, 63') einen zweiten stromauf gelegenen Durchlaß und einen zweiten stromab gelegenen Durchlaß besitzt, welche Durchlässe mit dem ersten stromauf gelegenen Durchlaß bzw. mit dem ersten stromab gelegenen Durchlaß ausrichtbar sind.

3. Fluidausgeber nach Anspruch 1 oder 2, gekennzeichnet durch einen O-Ring (50) zwischen dem Gehäuse (18) und dem zylindrischen Ventil (24), der an der stromauf gelegenen Seite des zylindrischen Ventils (24) um den Hauptdurchlaß (22, 52) verläuft.

4. Fluidausgeber nach irgendeinem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß das Ventilglied (63, 63') scheibenförmig ist.

5. Fluidausgeber nach irgendeinem der vorgehenden Ansprüche, gekennzeichnet durch eine zusätzliche Rille in der zweiten Seite des Gehäuses (18) um die Ventilkammer (26) herum, und durch einen O-Ring (100), der in der zusätzlichen Rille angeordnet ist, um zwischen der zweiten Seite des Gehäuses (18) und dem Ventilglied (63, 63') eine Fluiddichtung zu bilden.

6. Fluidausgeber nach Anspruch 1, gekennzeichnet durch: getrennte, stromauf und stromab gelegene Gehäuserillen (68, 67) in der Ventilkammer, wobei sich jede der Rillen zu einer verschiedenen Stelle an der zweiten Seite des Gehäuses (18) erstreckt; einen stromauf gelegenen Ventildurchlaß (58), der sich von der stromauf gelegenen Stelle des Hauptdurchlasses (22, 52) durch das zylindrische Ventil (24)

zu der stromauf gelegenen Gehäuserille erstreckt; einen stromab gelegenen Ventildurchlaß (60), der sich von der stromab gelegenen Stelle des Hauptdurchlasses durch das zylindrische Ventil zu der stromab gelegenen Gehäuserille erstreckt; wobei die zweite Verdrehlage des Schaltknopfes (40) ein Kommunizieren von Fluid durch den Hauptdurchlaß (22, 52) des Gehäuses (18) ermöglicht, sowie das Kommunizieren von Fluid durch den stromauf gelegenen Ventildurchlaß (58) und die stromauf gelegene Rille, durch das Reservoir (20) und durch die stromab gelegene Rille und den stromab gelegenen Ventildurchlaß (60) und zurück zu dem Hauptdurchlaß (22, 52); und wobei die dritte Verdrehstellung des Schaltknopfes (40) eine Fluidkommunikation durch den Hauptdurchlaß (22, 52) des Gehäuses (18) ermöglicht, während sie das Ventilglied in eine Lage zum Verschließen der Öffnung zumindest einer der Rillen zu dem Reservoir (20) hin bringt.

7. Fluidausgeber nach Anspruch 1, dadurch gekennzeichnet, daß sich der Hilfsdurchlaß (65) von einer stromauf gelegenen Stelle in dem Hauptdurchlaß (22, 52) des Flusses durch einen in dem Gehäuse (18) ausgebildeten, stromauf gelegenen Durchlaß (95) erstreckt, dann durch einen in dem Ventilglied (63') ausgebildeten, stromauf gelegenen Durchlaß (74), und in das Reservoir (20) und durch einen in dem Ventilglied (63, 63') ausgebildeten, stromab gelegenen Durchlaß (76), sodann durch einen in dem Gehäuse (18) ausgebildeten, stromab gelegenen Durchlaß (96) und zu einer stromauf gelegenen Stelle in dem Hauptdurchlaß (22, 52) des Flusses, wobei die stromauf und stromab gelegenen Durchlässe (74, 76) in dem Ventilglied (63') mit den stromauf und stromab gelegenen Durchlässen (95, 96) in dem Gehäuse (18) ausgerichtet sind, wenn sich der Schaltknopf (40) in der zweiten Lage befindet.

8. Fluidausgeber nach Anspruch 1, dadurch gekennzeichnet, daß sich der Hilfsdurchlaß (65) von einer stromauf gelegenen Stelle in dem Hauptdurchlaß des Flusses durch das zylindrische Ventil (24), zwischen dem zylindrischen Ventil (24) und dem Gehäuse (18), zu dem Reservoir (20) erstreckt, sodann von dem Gehäuse (20) zwischen dem zylindrischen Ventil (24) und dem Gehäuse (18), und durch das zylindrische Ventil (24) zurück zu der stromab gelegenen Stelle des Hauptdurchlasses (22, 52).

9. Fluidausgeber nach Anspruch 1, dadurch gekennzeichnet, daß der Hilfsdurchlaß (65) eine Rille zwischen dem Gehäuse (18) und dem zylindrischen Ventil (24) aufweist.

10. Fluidausgeber nach Anspruch 1, dadurch gekennzeichnet, daß der Hilfsdurchlaß voneinander beabstandete Rillen, eine erste und eine zweite, aufweist, die sich zu dem Reservoir (20) erstrecken, wobei die erste und die zweite der beabstandeten Rillen zwischen dem Gehäuse (18) und dem zylindrischen Ventil (24) ausgebildet sind.

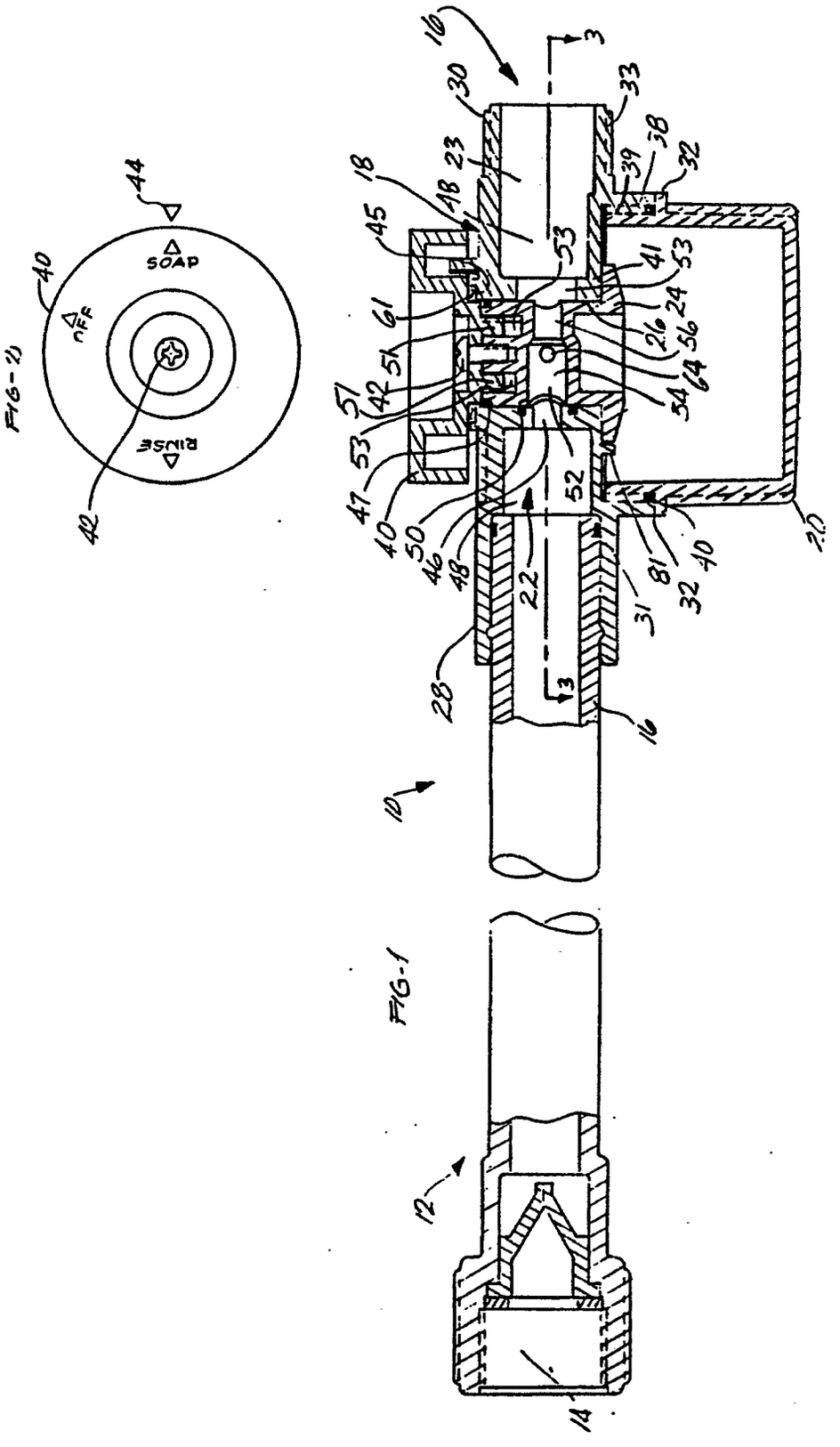
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FIG-2
FIG-1

FIG-3

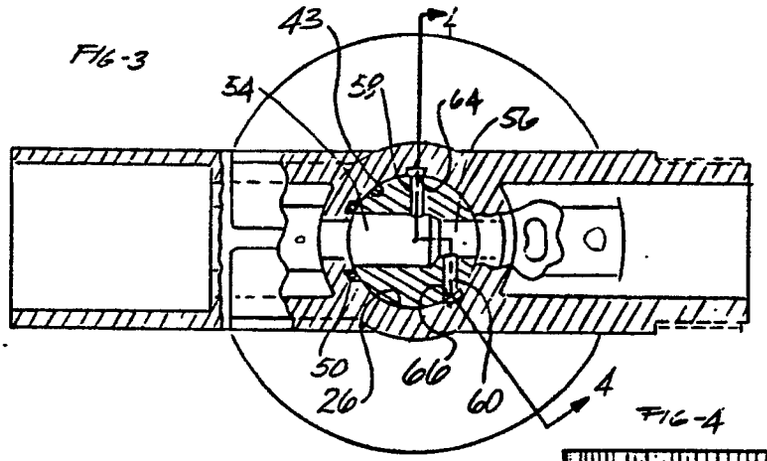

FIG-4

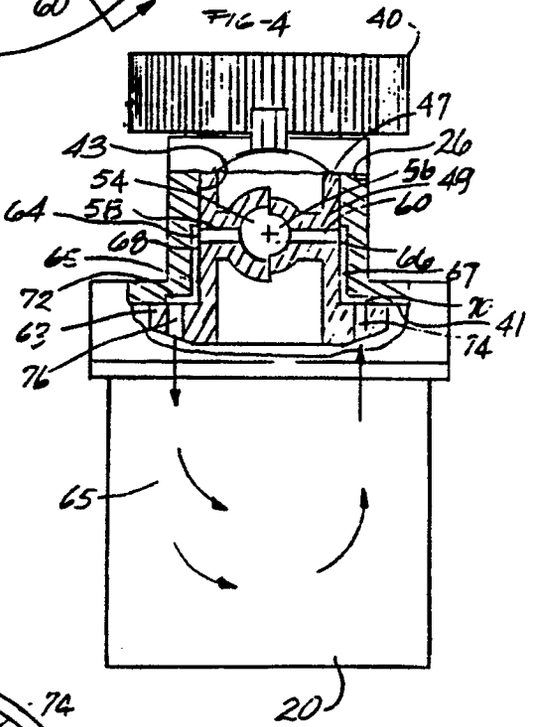

FIG-5

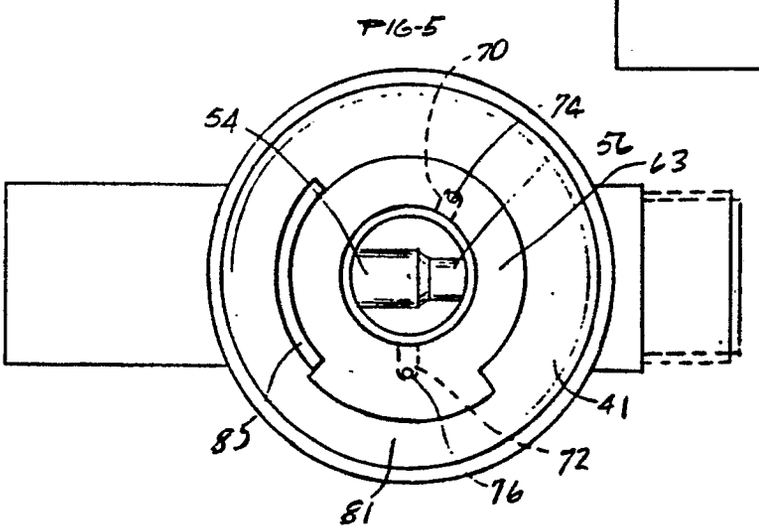

FIG-6

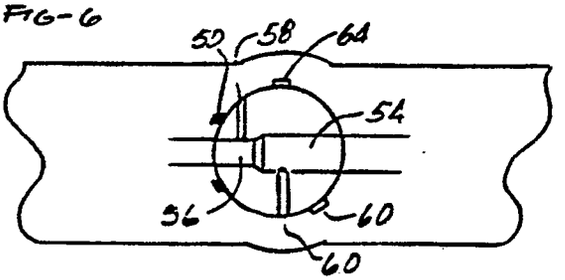

FIG-7

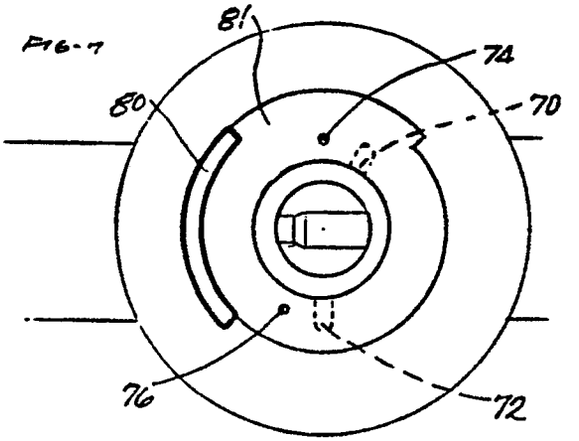

FIG-8

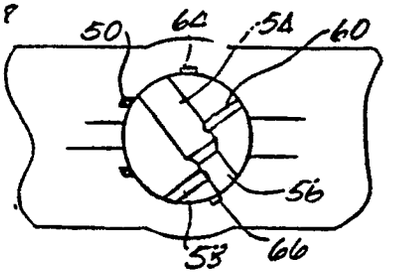

FIG-9

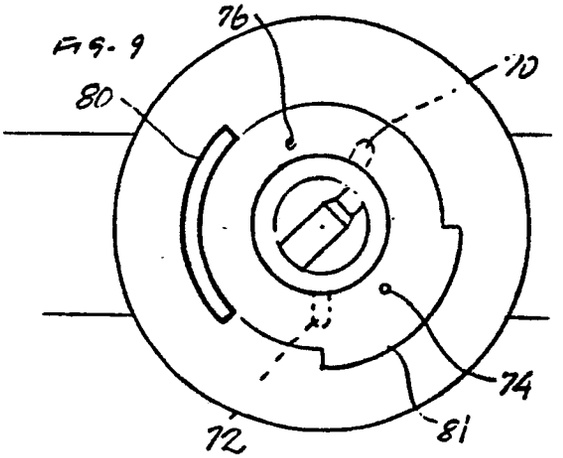

FIG-10

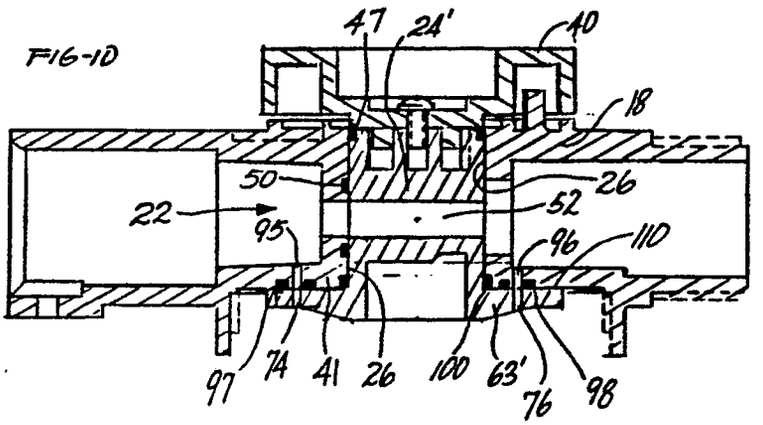

FIG-11