

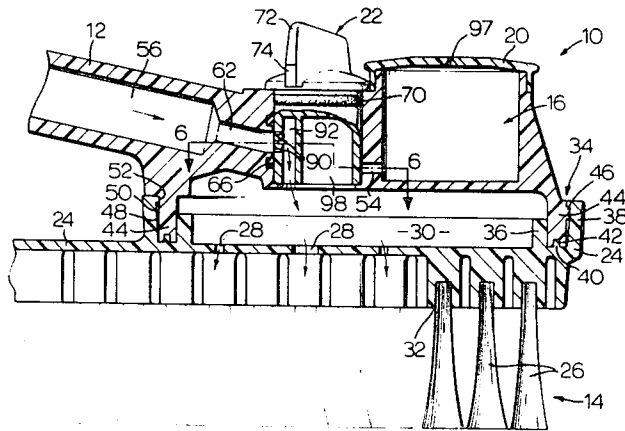
[72] Inventor	Janusz Morawski Toronto, Ontario, Canada	1,818,280 8/1931 Soss.....	401/46
		2,094,161 9/1937 Paddock.....	401/46
[21] Appl. No.	55,046	FOREIGN PATENTS	
[22] Filed	July 15, 1970	875,636 8/1961 Great Britain.....	401/46
[45] Patented	Nov. 9, 1971	<i>Primary Examiner—Lawrence Charles</i>	
[73] Assignee	Trixie Corporation Limited Toronto, Ontario, Canada	<i>Attorney—Douglas S. Johnson</i>	

[54] **FOUNTAIN BRUSH AND VALVE THEREFOR**
7 Claims, 8 Drawing Figs.

[52] U.S. Cl..... **401/46**
 [51] Int. Cl..... **A46b 11/06**
 [50] Field of Search..... 401/45, 46;
 15/24, 29

ABSTRACT: The body of a fountain brush has a chamber with exit holes surrounded by the projecting bristles. The body is connected to a hollow handle through which water is supplied; the body also has a well exterior of the chamber but also connected thereto. A three-way valve controls the flow of liquid not only from the hollow handle into the chamber and through the exit holes but also the supply of liquid detergent contained in the well.

[56] **References Cited**
UNITED STATES PATENTS
 1,262,539 4/1918 Micka 401/46



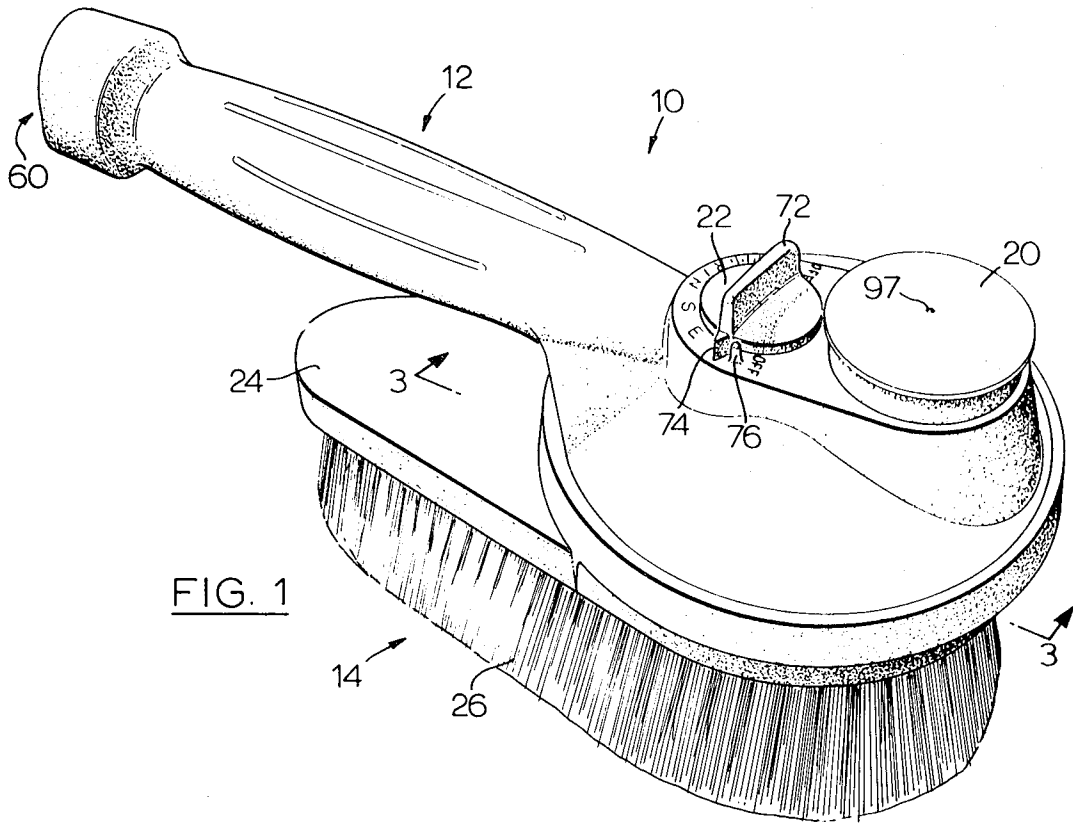


FIG. 1

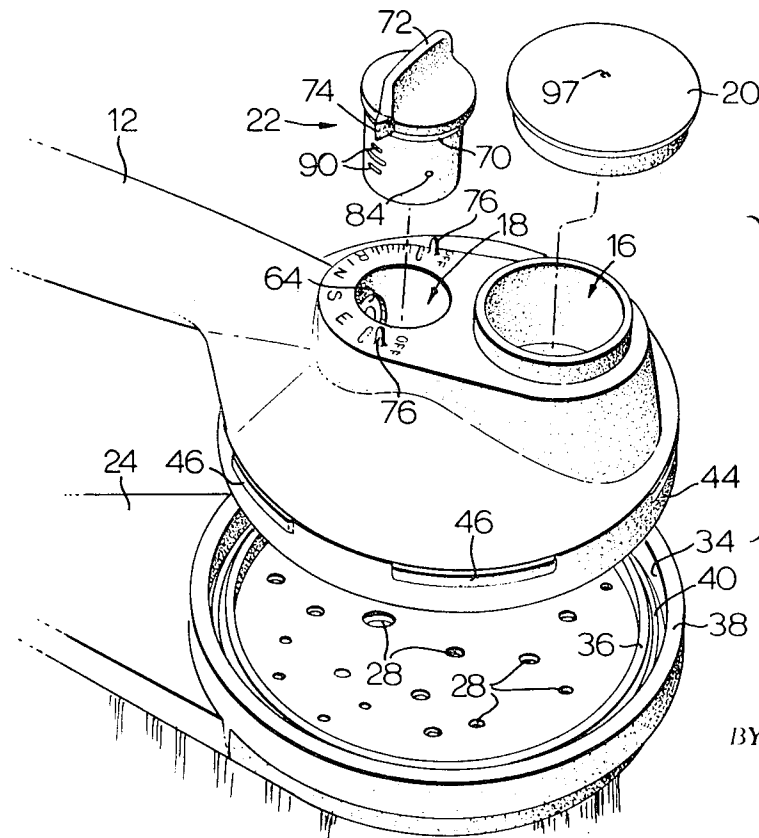


FIG. 2

INVENTOR.
JANUSZ MORAWSKI

BY *Douglas S. Johnson*

Attorney

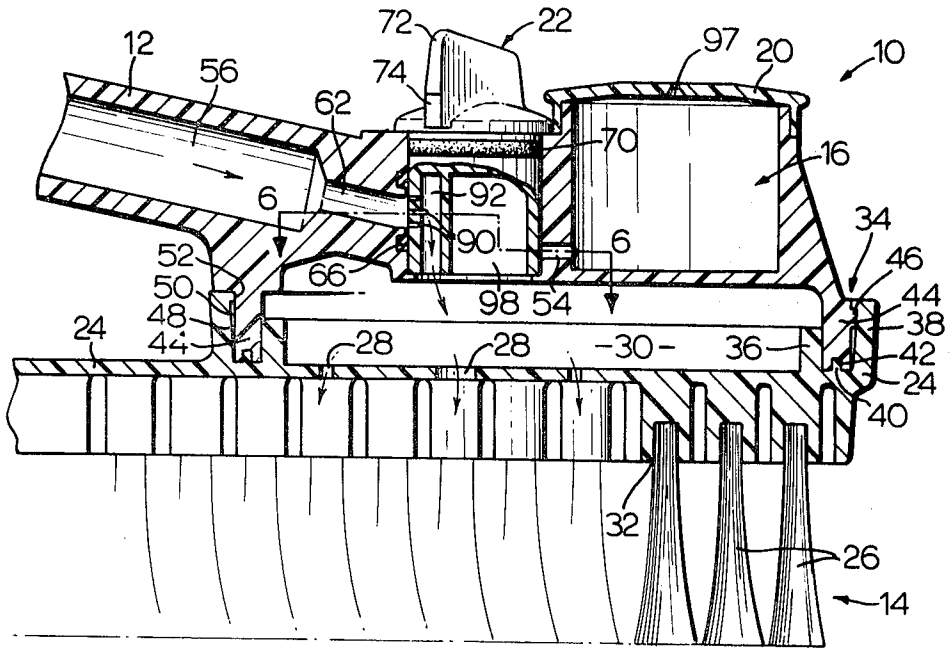


FIG. 3

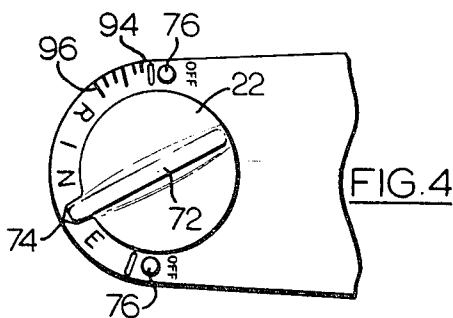


FIG. 4

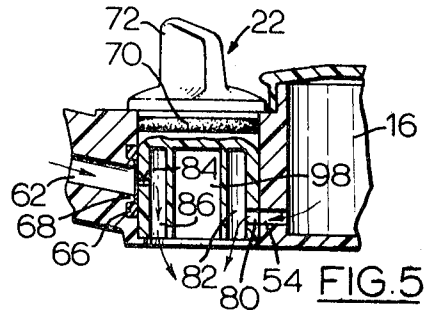


FIG. 5

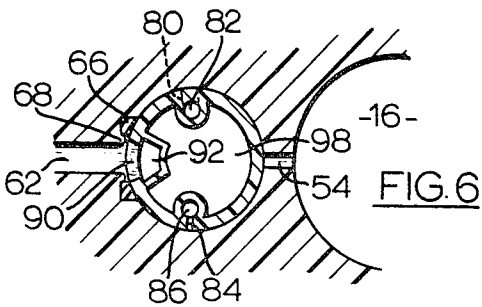


FIG. 6

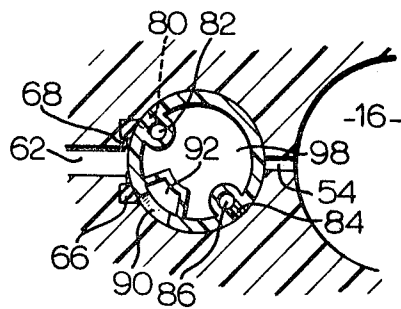


FIG. 8

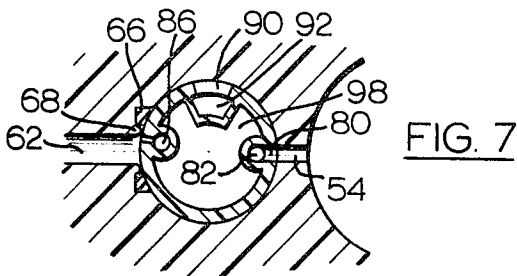


FIG. 7

INVENTOR.
JANUSZ MORAWSKI

BY *Douglas S. Johnson*

Attorney

FOUNTAIN BRUSH AND VALVE THEREFOR FIELD OF THE INVENTION

This invention relates to a fountain brush device, and particularly to a fountain brush and a valve therefor.

The fountain brush device of the present invention contemplates a device whereby water may be flowed past a brush head, and particularly through the brush and along the bristles thereof; and wherein a liquid washing agent such as liquid detergent or soap may be mixed with the water at will, and in varying quantities thereof as required. Thus, the fountain brush device of the present invention is one which is particularly adapted for use in washing and cleaning automobiles and the like, as well as for other washing operations such as windows, siding, furniture, livestock, etc.

An improved valve is provided for the fountain brush device of the present invention whereby varying quantities of the liquid washing agent can be "metered" into the water as it flows through the fountain brush device and out past the bristles of the brush portion thereof. The valve also permits an easy setting whereby clean water may be flowed through the fountain brush without any possibility of the liquid washing agent mixing therewith when unwanted, such as during a rinse operation to rinse away previously placed suds on the surface being washed. Further, the valve contemplated in this invention provides for easy shutoff of the water flow through the fountain brush without damage to any of the components thereof.

The fountain brush device of the present invention is intended to be made from suitable plastic materials so that it may be easily molded and assembled; and so that it is essentially sealed around the interface between the brush portion and the handle portion thereof, thereby assuring that the total water flow through the fountain brush device exits from the brush portion thereof.

The fountain brush device of this invention also provides a device where the mixing of the liquid washing agent such as liquid detergent, with water is effected within the body of the device and not within the valve per se. Thus, the valve contemplated herein is less subject to clogging or encrustation by residue from the water/detergent mixture than it would be if the mixture were effected within the valve body.

SUMMARY OF THE INVENTION

This invention has for its purpose to provide a fountain brush device and valve therefor which may be easily and readily manufactured using standard molding techniques and commercially available plastic materials; so that the fountain brush and valve therefor may be economically produced.

A further object of this invention is to provide an improved valve structure for a fountain brush device, and a structure for the fountain brush so that mixture of the water and liquid washing agent is carried out within the body of the fountain brush and away from the valve body per se.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other objects and features of the invention are more clearly discussed hereafter, in association with the accompanying drawings, in which:

FIG. 1 is a perspective view of a fountain brush device according to this invention;

FIG. 2 is an exploded, perspective view of the major portion of a fountain brush according to this invention;

FIG. 3 is a cross section taken through the fountain brush at line 3—3 in FIG. 1;

FIG. 4 is a plan view of a part of the handle portion, particularly showing the valve in a specific setting;

FIG. 5 is a cross section of the valve and associated parts of the handle portion of the fountain brush device taken in the same manner as FIG. 3, but with the valve shown in a different setting;

FIG. 6 is a sectional view, taken in plan, along the section indicated by the line 6—6 in FIG. 3; and

FIGS. 7 and 8 are similar to FIG. 6 showing the valve in different settings.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The fountain brush 10 comprises two major portions, a handle portion 12 and a brush portion 14. Within the handle portion 12 there is a well 16 and a valve recess 18. Well cover 20 is adapted to be over the well 16, and valve 22 is adapted to fit into valve recess 18, in a manner to be discussed in greater detail hereafter.

The brush portion 14 comprises a base 24 in which bristles 26 are secured. The precise shape of the brush portion 14 and the manner by which bristles are secured in the base 24 are immaterial. It should be noted, however, that a plurality of holes 28 is formed in that portion of the base which cooperates with the handle portion 12 to form a chamber 30 interiorly of the fountain brush in a manner to be discussed hereafter. Liquid communication is therefore provided from the chamber through the holes 28 to the bristles 26. When the chamber 30 is flooded, the fountain brush device of the present invention can be used for any washing or cleansing operation as may be intended by the user. The various holes 28 are, of course, formed in the base 24 of the brush portion 14 in places thereof apart from those places such as at 32 whereat the bristles 26 are secured.

The brush portion 14 is assembled to the handle portion 12 of the fountain brush 10 by means of a flange and recess relationship between the handle and the brush, as herein discussed. There is formed in a portion of the base 24, a groove 34 which is defined by inner and outer walls 36 and 38 respectively, and which is formed substantially above the major plane of the base 24. At the bottom of the groove 34 there is formed an upwardly extending ridge 40 which cooperates with a recess 42 formed in the downwardly extending rim 44 of the handle portion 12 of the fountain brush. For ease of mounting and dismounting, and so that the brush portion 14 of the fountain brush can be placed in any orientation when assembled to the handle portion 12, the downwardly extending lip 44 of the handle portion and the groove 34 in the brush portion are both circular in plan view. Thus, the brush portion 14 may be assembled to the handle portion 12 in any desired orientation.

To assist the assembly and disassembly of the brush portion 14 to the handle portion 12, a series of shoulders or projections 46 is formed around the outer surface 48 of the downwardly extending rim 44. Also, the inside surface of the outer wall 38 formed in the brush portion 14 is made so as to have a slight outward draught, as at 50, and an inwardly extending rim 52 which overlies the shoulders 46 where they are formed. When the brush portion 14 is assembled to the handle portion 12, a chamber 30 is defined interiorly thereof, whose outer periphery is bounded at the inner wall 36 of groove 34 in the brush portion 14 and the upper portions of the downwardly extending rim 44 of the handle portion 12. The seal which is formed between the rim 44 and the groove 34, including the ridge 40 and recess 42 therefor, is essentially watertight.

It has been noted that there is formed in the handle portion 12 of the fountain brush according to this invention, a well 16 intended to be covered by a well cover 20, and a valve recess 18 into which valve 22 is inserted. There are also several passages formed within the handle portion 12, including a passage 54 which extends from the well 16 to the valve recess 18. Passage 54 therefore provides liquid communication from the well 16 to the chamber 30 when the valve itself is correctly positioned, as discussed hereafter. Likewise, a passage 56 is formed through the handle 58 of the handle portion 12, which passage 56 communicates at its outer end, as at 60, with a source of liquid so as to provide liquid communication from that source of liquid to the valve recess 18. In other words, the passage 56 formed in the handle is adapted to be connected at 60 to such as a water hose when the fountain brush is being used in its most usual manner.

It will be noted that the passage 56 is of reduced cross section at its inner end, as indicated at 62. A seat 64 is formed in the wall of the valve recess 18 to surround the exit of the passage 62 into the valve recess, and the seat 64 is adapted to accommodate an O-ring 66 which thereby provides essentially watertight sealing from the passage 62 against the outer surface of the valve 22 when it is properly positioned in the valve recess 18. Thus, no liquid communication is provided from passage 62 to the chamber 30 when the valve is in position in the valve recess 18, except when the valve is properly oriented as discussed hereafter. It should also be noted that the rim 68 which surrounds and defines the exit of passage 62 into the valve recess 18 is slightly set back from the remaining periphery of the valve recess, i.e. the rim has a larger diameter than the recess 18 per se, so that liquid access to the outer surface of the valve 22 is defined within the inner diameter of the O-ring 66, and not by the diameter of the passage 62.

It is noted that the valve 22 is rotatable within the valve recess 18. The valve is sealed within the valve recess by means of an O-ring 70 which is seated in a suitable groove formed near the upper end thereof. Thus, when the valve is properly placed within the valve recess 18, the seal between it and the valve recess is essentially watertight; and this provision is made in the event that liquid may migrate into the area bounded by the outer surface of the valve and the surface of the valve recess, except as otherwise defined by O-ring 66. In any event, when the entire fountain brush is assembled, liquid flow therethrough is determined by the orientation of the valve 22 within the valve recess 18 as discussed below.

There is formed at the top of valve 22 a tab 72 having a pointer 74 at one end thereof. It will also be noted, particularly from FIGS. 1, 2 and 4, that the top face of the handle portion 12 immediately surrounding at least the rear half of the valve recess 18 has formed certain legends and indicia therein; as well as upwardly extending buttons 76 which interfere with the pointer 74 and thereby define the limits to which the valve 22 may be turned in valve recess 18, in either direction. Essentially, the buttons 76 define an arcuate swing or turning of the valve 22 within valve recess 18 of about 180°, but the precise amount by which the valve is permitted to turn within the valve recess is immaterial, as will appear more evident hereafter.

It should be understood that the fountain brush according to this invention provides for a metered - i.e., controlled - flow of liquid washing agent from the well 16 through the valve 22 to chamber 30, and thence outwards past the bristles 26. Of course, in the usual circumstances, the liquid washing agent which is contemplated is liquid detergent or liquid soap. At the same time, it should be understood that the fountain brush of this invention, especially when intended for such use as washing automobiles, is adapted to provide for a flow of clean water therethrough so as to rinse away suds that may previously have been placed on the surface being washed by the same brush. Therefore, the valve 22 must be orientable to positions whereby there is control of the amount of suds being made or, by corollary, of the amount of liquid washing agent being used. The valve must also be orientable to positions at which no suds are formed on cleaning liquid used, and at which no liquid flow is permitted. Thus, the fountain brush of this invention provides for a wash position or orientation of the valve 22, a rinse position or orientation thereof, and off positions. These are specifically discussed hereafter, especially with regard to FIGS. 3 to 8.

The valve 22 is shown in FIG. 1 in an "off" position. That is, no flow passes through the fountain brush from the outer end 60 of the handle portion 12 to the bristles 26, the flow being stopped at the inner end of passage 62 as discussed hereafter.

The valve 22 is shown in the "rinse" or clear water flow orientation by which no flow is permitted from the well 16, in FIGS. 3, 4 and 6. The valve 22 is in a "wash" position, at which flow from well 16 is controlled, in FIGS. 5 and 7; and the valve 22 is in an "off" orientation in FIG. 8.

It will be noted that the inner end of passage 62, i.e., its exit to the valve recess 18, is at a different elevation in the valve

recess than the inner or exit end of passage 54 from well 16. In like manner, it will be noted especially from FIGS. 3 and 5 that a plurality of lengthwise passages is formed within the valve 22, each of which passages is closed at its upper end and open at its lower end so as to permit liquid communication therefrom to the chamber 30. Also, as will be explained hereafter, each of the major lengthwise passages in valve 22 has liquid communication through passages formed in the wall of the valve to the exterior thereof. Thus, there is formed a passage 80 through the wall of the valve 22 in a position such that, when the valve is properly seated and oriented in the valve recess 18, the passage 80 aligns with the passage 54. A vertical or lengthwise passage 82 is formed in the valve body having liquid communication to the passage 80 formed through the wall of the valve body. In like manner, a passage 84 is formed through the wall of the valve body having liquid communication to a second lengthwise passage 86 which is formed in the valve body nearly diametrically opposed to passage 82. The vertical spacing of the passage 84 through the wall of the valve body is different than that of the passage 80 so that, as discussed in greater detail hereafter, there can be no liquid communication through passage 80 to passage 62, or through passage 84 to passage 54.

A plurality of passages 90 is formed, in the specific embodiment illustrated, through the wall of the valve 22 to have liquid communication with a third lengthwise passage 92 formed within the valve body. The remainder of the valve body comprises yet a further lengthwise passage 98 which is closed at its upper end and which has liquid communication to chamber 30 at its lower end, but no liquid communication through the walls of the valve.

When the fountain brush is intended for use in a "wash" operation, the pointer 74 of valve 22 is oriented at any one of the indicia between 94 and 96 which are indicated in FIG. 4. The indicia are intended to indicate minimum to maximum flow of the liquid washing agent such as liquid detergent which is in the well 16. It can be seen that, as the orientation of the valve varies so that the pointer 74 moves from the indicium at 94 to that at 96, varying portions of the passage 80 through the valve wall are opposed to the inner end of the passage 54 from well 16. Thus, differing amounts of liquid washing agent from the well 16 will flow through the passages 54 and 80, and into passage 82, and thence to chamber 30, as the orifice or effective cross-sectional area of the passage 80 changes. At the same time, passage 84 presents itself to the area surrounding the exit from passage 62 as defined within the O-ring 66, so that when the valve is oriented as defined by the pointer 74 at any of indicia 94, 96 or those intermediate thereof, a substantially constant flow of water is permitted from passage 62 through passage 84 into lengthwise passage 86 and thence to the chamber 30. Of course, chamber 30 is substantially flooded, and a mixing action of the liquid washing agent which flowed from the well 16 together with the water from passage 62, is effected in the chamber 30. Because the water is, in fact, flowing through the valve 22 and through the chamber 30, and because the well 16 is normally vented to the ambient by means of hole 97 in valve cover 18, a partial gauge vacuum is effected from ambient to chamber 30 thereby enhancing the flow of liquid washing agent from well 16 to chamber 30. To further increase the rate of flow of liquid washing agent from well 16 to chamber 30 when the water is flowing to the chamber, irrespective of the valve orientation provided only that liquid communication exists between the well 16 and chamber 30, hole 97 may be covered so that a higher gauge vacuum is created between the well 16 and chamber 30.

Form the above description, it can be seen that a "metered" or controlled flow of the liquid washing agent from well 16 into the chamber 30, and thence outwardly from the fountain brush past bristles 26, can be effected. The liquid flow of both the water through passage 62 and the liquid washing agent through passage 54 is as indicated by the arrows in FIG. 5. The cross section of each of passages 80 and 84 through the wall of valve 22 is indicated to be essentially constant, with that of

passage 80 being greater than that of passage 84. However, the precise sizes of the passages and their relationships are immaterial to the present discussion.

When a "rinse" operation, i.e. a clear water flow from the source thereof at 60 through the handle portion 12 to the chamber 30 and thence past the bristles 26 is desired, the valve 22 is oriented so that, in the specific embodiment illustrated, the pointer 74 overlies the letter "S" of the indicia R-I-N-S-E. In any event, the passages 90 are then aligned with the exit end of passage 62 and the area around it as defined within O-ring 66. In this orientation, liquid communication is thereby achieved from passage 62 to passage 92 and thence to chamber 30, as illustrated by the arrows in FIG. 3 and as shown in FIG. 6.

There may be one or a plurality of passages 90 formed through the wall of the valve 22 to provide liquid communication with the lengthwise passage 92 from passage 62. Of course, a greater rate of flow is achieved with a plurality of passages 90. Also, it is noted that the passages 90 are, in this case, slits which are formed in the periphery of the valve in a direction substantially perpendicular to the axis thereof. However, it should be stressed that the precise configuration of the passages 90 is irrelevant, provided only that they are positioned so as to permit liquid communication from passage 62 in the handle portion 12 to chamber 30 and thence past bristles 26.

It should also be noted that, when the valve 22 is in the "rinse" position, and the brush portion 14 is removed from the handle portion 12, the flow of water which exits from vertical passage 92, and which would normally flood the chamber 30, forms a discrete flow which can be used for certain purposes. For example, a flow of water at higher pressure than would be the case when the water flows off bristles 26 of brush portion 14 may be desired to flush crevices of indentations found in an automobile, or otherwise; or to wash suds away from a driveway or other surface after the rinse operation on an automobile which has been washed, etc. It is thus possible to obtain a discrete, high-pressure flow of water without the necessity of having to remove the fountain brush from the hose to which it is attached and replacing it with a nozzle.

An "off" position of the valve 22 in valve recess 18 is effected at any time that neither passage 84 or any of passages 90 provides liquid communication from the chamber 30 through one of the lengthwise passages 86 or 92 to the passage 62, and thence to the source of liquid at 60. However, for convenience, the stop buttons 76 are provided in the upper face of the handle portion 12 of the fountain brush of this invention. When the valve 22 is in an "off" position, a seal is effected between the outer periphery of the valve wall and the O-ring 66, such as is illustrated in FIG. 8. Because of the relative positions of passages 80 and 84, when there is no communication of passage 84 to passage 62 there is no communication of passage 80 to passage 54. So as to provide the metering effect with respect to the flow of liquid washing agent from the well 16, as discussed above, and at the same time to provide the indicia as from 94 to 96, the O-ring 66 is provided around the exit of passage 62 as discussed above and passages 84 and 80 (together with passages 86 and 82 respectively) are formed in the valve so that they are spaced slightly less than 180° apart when measured from the center of the valve past the passages 90.

The materials from which all of the parts of the fountain brush may be produced, with the possible exception of O-rings 66 and 70, may include easily commercially available plastic materials such as nylon, acrylonitrile butadiene styrene, polyvinyl chloride, delrin, polyethylene and others. Standard molding techniques apply in the production of the fountain brush according to this invention.

As noted, the mixing action of the washing liquid and water takes place essentially in chamber 30, away from the valve 22; and the amount of liquid washing agent flowing from well 16 can be altered and controlled.

The embodiments of the invention in which an exclusive property of privilege is claimed are defined as follows:

1. In a fountain brush device, the combination comprising:
 - a handled portion having a well formed therein, a valve recess, and a passage providing liquid communication through said handle portion from a source of liquid to said valve recess;
 - a brush portion having bristles, and being adapted to be retained on said handle portion so as to provide liquid communication from said bristles to said valve recess through a chamber formed by said handle and brush portions and interiorly thereof when they are assembled to each other;
 - there being liquid communication through a passage formed in said handle portion from said well to said valve recess;
 - a substantially cylindrical valve adapted to be retained in said valve recess, said valve having at least three lengthwise passages formed therein, each said lengthwise passage being closed at a first end thereof and having liquid communication from a second end thereof to said chamber;
 - the first of said lengthwise passages being adapted to provide liquid communication, through a first passage formed in the wall of said valve, only with the passage providing liquid communication from said well to said valve recess;
 - the second of said lengthwise passages being adapted to provide liquid communication, through a second passage formed in the wall of said valve, only with said passage providing liquid communication through said handle portion from a source of liquid to said valve recess;
 - the third of said lengthwise passages being adapted to provide liquid communication, through at least a third passage formed in the wall of said valve, with said passage providing liquid communication through said handle portion from a source of liquid to said valve recess;
 - said first, second and third passages formed in the wall of said valve being such that when at least a portion of said first passage has liquid communication with said well, said second passage has liquid communication to said source of liquid; and so that when at least a portion of said at least third passage has liquid communication with said source of liquid, no liquid communication is allowed from said well to said chamber through said valve recess;
 - seal means around said valve between the outer surface thereof and the wall of said valve recess, and further away from the open ends of each of said lengthwise passages than all of said first, second and at least third passages formed through the wall of said valve;
 - and seal means in a seat formed therefor in the wall of said valve recess around the exit of said passage through said handle portion from said source of liquid, and being between said seat and the outer surface of said valve.
2. The combination of claim 1 where the first and second of said lengthwise passages formed in said valve are smaller in cross-sectional area than said third lengthwise passage, and where said second passage formed through the wall of said valve is smaller in cross-sectional area than the first said passage formed therethrough.
3. The combination of claim 2, further comprising a cover for said well having gas communication from said well to the ambient, and being capable of being closed from said gas communication.
4. The combination of claim 3 where said seal means around said valve and said seal means around the exit of said passage through said handle portion to said source of liquid, each comprises an O-ring.
5. The combination of claim 4 where a fourth lengthwise passage is formed in said valve having liquid communication only at the second end thereof to said chamber.
6. The combination of claim 5 wherein said valve has a plurality of passages formed through the wall thereof to provide liquid communication, together with said at least third passage, to said third lengthwise passage.
7. The combination of claim 6 where said brush portion has a groove defined by upstanding walls formed therein and an

upstanding ridge at the bottom of said groove, and where said handle portion has a downturned rim adapted to fit said groove and a recess formed in the bottom face of said rim adapted to accommodate said upstanding ridge.

* * * * *

5

10

15

20

25

30

35

40

45

50

55

60

65

70

75