July 5, 1960 H. BODMER 2,943,799

VALVE AND NOZZLE FOR A WASHING UNIT

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Fig. 1

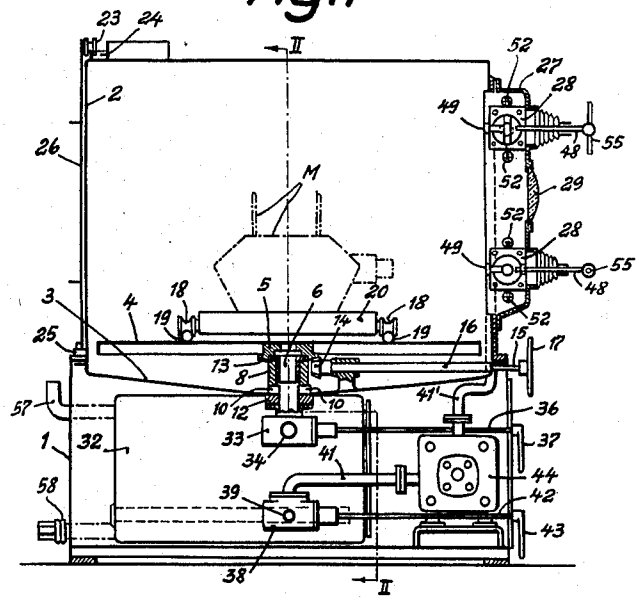
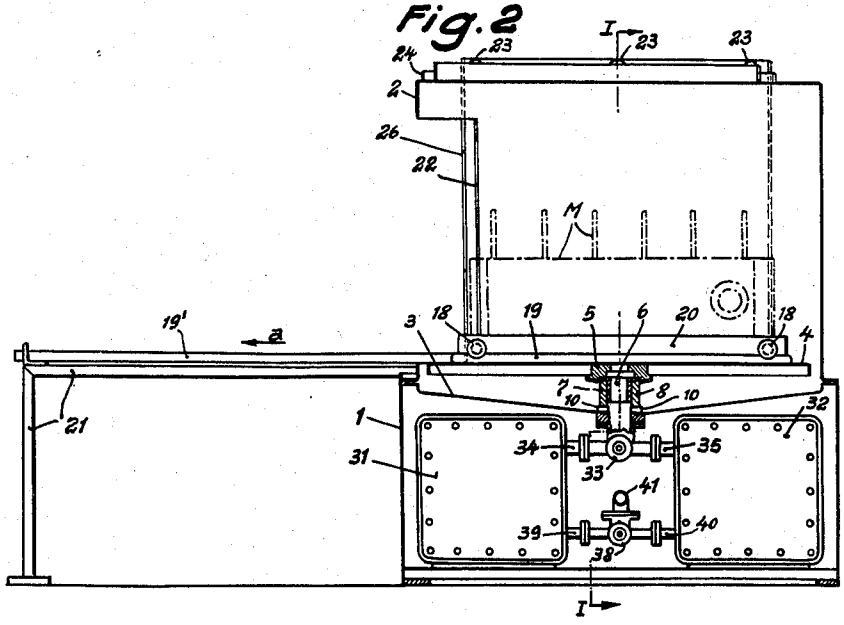


Fig. 2



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Fig.3

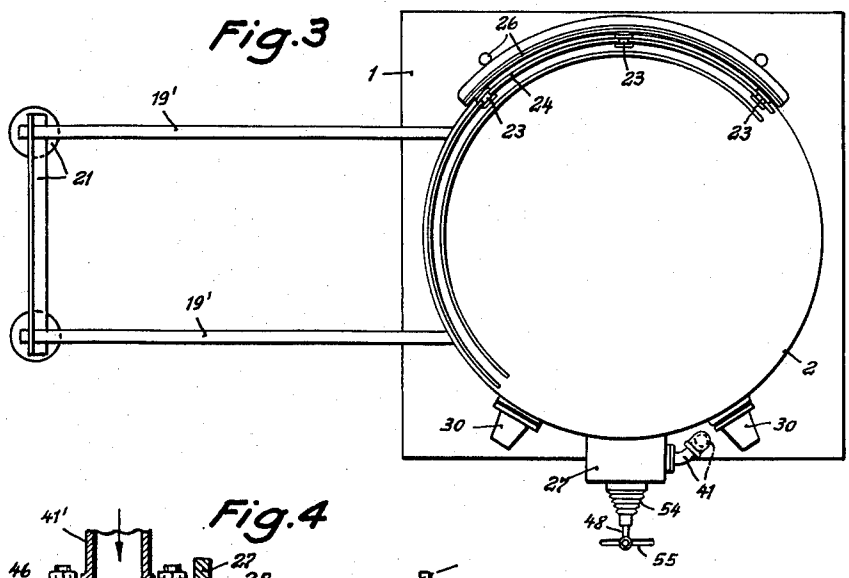


Fig.4

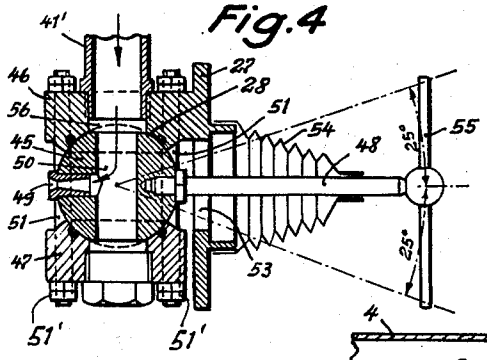


Fig.5

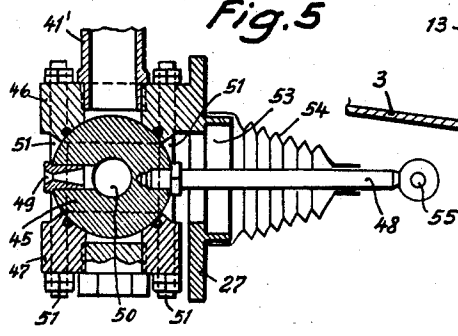
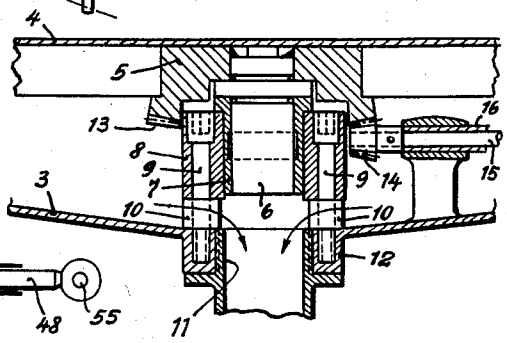


Fig.6



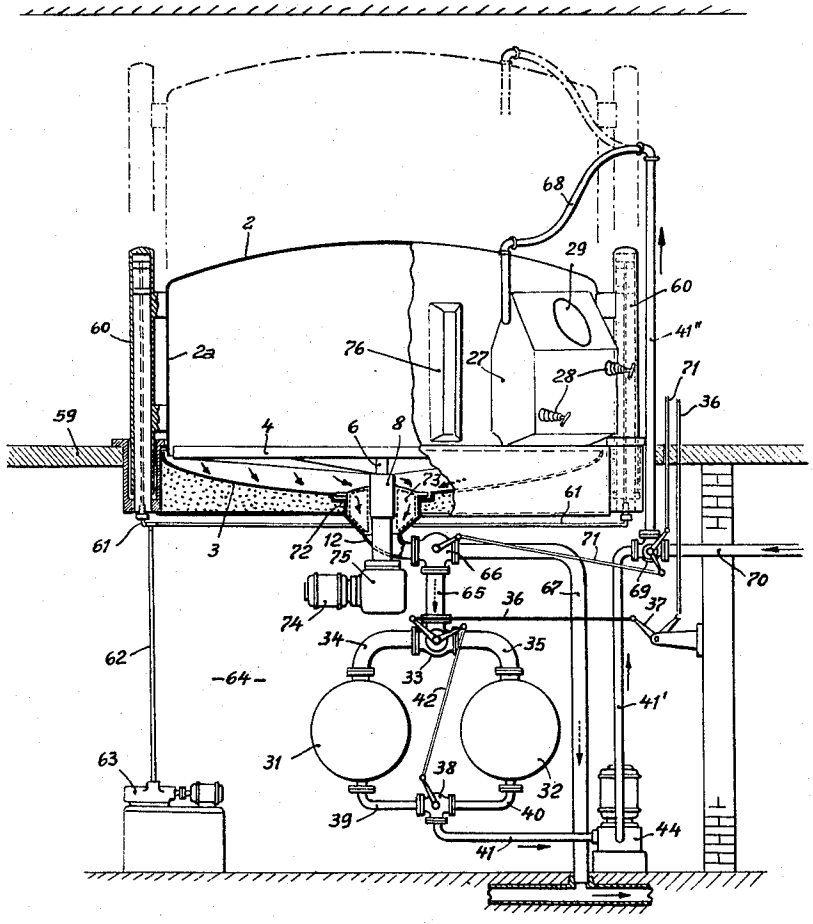
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Fig. 7



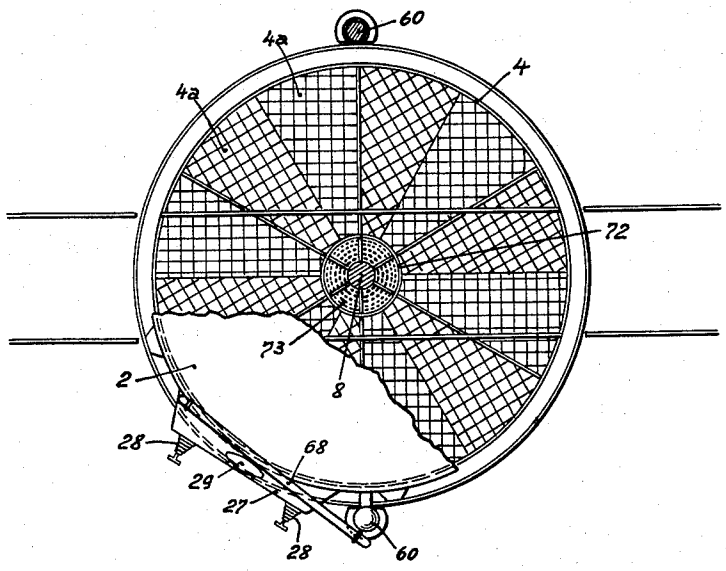
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Fig. 8



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VALVE AND NOZZLE FOR A WASHING UNIT

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Filed Mar. 11, 1957, Ser. No. 645,135

Claims priority, application Switzerland Mar. 15, 1956

1 Claim. (Cl. 239—569)

This invention relates to a washing unit, in particular for motors, machines and parts thereof.

The washing unit according to the invention is characterized in that it comprises a hood having a rotary table therein operable from outside, and that the hood fitted with an inspection window has mounted thereon sprayers which are swivelable to all sides so as to allow to sweep not only a certain place, but to cover entire zones of the object being washed, further in that the hood has allocated to it a heatable tank for the washing liquid and another tank for the rinsing liquid, which tanks are both connectible on the one hand to the outlet trough of the hood via a three-way cock, and on the other hand to the sprayers via a second three-way cock and a delivery pump.

Preferably, the hood may be provided with a lifting device adapted to raise it from the rotary table for the purpose of introducing and removing the object to be washed, the top of the rotary table being level with the floor.

Advantageously, also the delivery piping leading from the pump to the spray nozzles via a three-way cock may be selectively connectable to a main water line, whereby, between the outlet branch and the three-way cock of the return pipes leading to the washing and rinsing tanks, there is arranged a further three-way cock through which the outlet branch is selectively connectable to the return pipes or to a drain pipe leading to the open, the plugs of these additional three-way cocks being interconnected so that upon connection of the delivery pipe with the main, the outlet branch or the rotary table communicates with the drain piping leading to the open, whereas, upon connection of the delivery pipe with the pump, the outlet branch communicates with the return pipes.

This design permits of removing coarse dirt, especially dirt soluble in water, without affecting the washing liquid primarily intended for loosening finer and oleiferous dirt, which liquid would be unnecessarily contaminated by the coarse soluble dirt in the material being washed.

Further, a filter may be advantageously incorporated in the closed circuit of the washing liquid. This has the advantage that, during operation of the washing machine, the washing liquid will be cleaned so as to allow fresh and clean washing liquid to be constantly supplied to the material being washed, which is of great importance, especially in the case of washing machines used for cleaning linen, etc.

Further features of the invention will appear from the following description and claims, taken in conjunction with the accompanying drawing, which shows two forms of embodiment incorporating the invention.

In said annexed drawing:

Fig. 1 is a side elevation of the machine of the first example of embodiment, partly in vertical section on the line I—I of Fig. 2;

Fig. 2 is an elevation partly in section on the line II—II of Fig. 1;

Fig. 3 is a top plan view of Fig. 2;

Fig. 4 shows an axial section through the nozzle in open position;

Fig. 5 shows an axial section through the nozzle in closed position;

Fig. 6 shows the mounting of the rotary table on the central drain hub of the trough.

Fig. 7 shows an elevation of the washing unit of the second example of embodiment, with certain parts in vertical section, and

Fig. 8 is a top view of the washing unit with hood partly broken away.

The washing unit shown in Figs. 1–6 comprises a box 1 which is square in plan view and has arranged thereover a hood 2 with a trough bounding the space between box and hood. The hood 2 has a cylindrical jacket adjacent the edge of the trough. Numeral 4 designates a circular rotary table arranged within the hood and rotatably mounted—in a bearing 8 with a bushing 7—at a distance over the trough 3 by means of a central vertical rotary axle 6 attached to the underside of the table in the hub 5 thereof. By interposition of spacer bushings 10, the bearing 8 is fixed by screws 9 to the orifice-hub 12 of the trough 3 having the outlet 11 for the washing liquid. The hub 5 of the rotary table 4 is provided on the underside with a bevel ring gear 13 engaging a bevel pinion 14. The latter is seated on the inner end of a driving spindle 15 rotatably supported within a tubular bearing 16 which is fast on the trough, protrudes through the box wall and carries a handwheel 17 in front of the front wall of the box, with which handwheel the table 4 can be turned in either direction of rotation, as desired. The hood includes the washing space for the motor to be washed. The latter rests on a carriage 20 traveling by means of rollers 18 on rails 19 of the table 4. Connectible to said rails 19 of the rotary table 4 are lengthwise slidably supported outlet rails 19'. To enable the carriage 20 with the motor M to move in and out, the hood 2 has an aperture 22 which is closable by a sliding door 26 (Fig. 1) movably suspended above by means of rollers 23 on a rail 24 and guided below by rollers 25 on the hood wall. In order to be able to shut the door 26, the rails 19' must be moved outwards according to the arrow *a* (Fig. 2) into their interrupted position. After opening the door, the rails 19' can be joined to the rails 19 by moving them in a direction opposed to the arrow *a*, whereupon the carriage 20 may be moved in and out.

Two or more sprayers 28 located at different heights in a recess 27 of the front wall of the hood serve for washing the motor M, the direction of spray being adjustable onto any desired place of the object to be washed. 29 denotes an inspection window which is arranged between the two sprayers in the front wall of the recess and permits the object to be observed as it is washed. At both sides of the recess light fittings 30 are built into the front wall of the hood so that the object being washed may be illuminated from two different sides. Arranged within the box 1, on both sides, are two tanks 31 and 32 respectively, each containing, say, 400 litres. The tank 31 serves for receiving the washing liquid, say, trisodium phosphate, and the tank 32 for receiving a rinsing liquid, say, water or a much diluted lye. Both liquids are heatable by electric heating elements built into the tanks and are kept at the required temperature by incorporated thermostats which control the electric circuit of the heating elements.

Mounted on the outlet branch 12 of the trough 3 is a three-way cock 33, one return pipe 34 of which is connected to the tank 31, and the other pipe 35 to the tank 32. The three-way cock 33 can be operated by means of a handlever 37 through a spindle 36 protruding out of

the front wall of the box 1. In one end position of said lever 37 the outlet 11 of the trough 3 communicates with the tank 31, and in the other position with the tank 32. A second three-way cock 38 arranged beneath the three-way cock 33 is connected on the one hand to the two tanks 31, 32 via two flow branches 39, 40, and on the other hand to the flow pipe 41. The cock 38 can be manipulated by means of a spindle 42 with handlever 43, which protrudes through the front wall of the box 1 so that in one end position of said lever, the flow pipe communicates with the tank 31, and in the other end position with the tank 32. The washing or rinsing liquid is supplied to the sprayers 28 through a flow pipe 41, a pump 44 and a delivery pipe 41' under a pressure of, say, 6 atmosphere gauge at an output of, say, 300 l./min.

The sprayers are both of identical design. They have each a ball-shaped plug 45 supported rotatable to all sides between two sealing flanges 46, 47 designed as spherical sockets. Each plug is associated with a service handle (through a valve stem) and a spray nozzle 49 coaxial thereto, which communicates with the plug hole 50. The sealing flange 46 is fast on the wall of the recess 27 and carries four guide rods 51, on which the movable sealing flange 47 is slidable lengthwise and is kept by screw-nuts 51' against the action of compression springs 52 (Fig. 1) in sealing position on the plug 45 and together with this on the sealing flange 46. The valve stem 48 of the service handle passes through sealing bellows 54 fixed to the opening 53 in the recess wall 27 and is turnable to all sides from the middle position at an angle of 25°, i.e. through an arc of 50°. By turning the valve stem 48 through 90° by means of the operating handle 55, the plug can be moved from its open position into the closed position, or vice versa. The stationarily mounted sealing flanges 46 have the delivery or pressure pipe 41' connected thereto. In the open position of the plug, in which the T-handles 55 lie horizontal, the plug-holes 50 communicates with the connection bores 56 of the delivery pipe 41' in any position of swivelling of the service handles 55 or nozzles 49. 57 denotes a branch for filling the tank with fresh lye. The used lye can be drained off through an outlet branch 58 fitted with closing nipple.

After filling the tanks with washing and rinsing liquids, the heating may be switched-on. Upon reaching the required operating temperature readable on a thermometer and adjustable on a thermostat, the unit is ready for service. The motor or machine parts to be washed are lifted onto the carriage 20 already on the stand which, along with said object, is then moved into the washing space. Upon retraction of the rails 19' the hood door is closed. Now the lamps 30 are switched-on and the washing may begin. To this effect the lever 37 is set to the tank 31 so as to allow the washing lye collected in the trough 3 to return into the wash-lye tank 31 via three-way cock 33. Accordingly, also the lever 43 is set to the wash-lye tank 31, so that the pump will draw the liquid therefrom to deliver it to the sprayers 28. If, for instance, one first works with the lower sprayer, its operating handle 55 has to be turned from the vertical into the horizontal position, thus causing this sprayer to act. By turning the operating handle the jet of lye may be directed to any desired place of the object being washed, and this may be checked through the inspection window 28. During the washing, the rotary table 4 may be swivelled in either direction of rotation as desired, so that the object can be sprayed from all sides. Should certain places not be attainable with the lower sprayer, this is cut out by turning the lower operating handle (T-handle) through 90°, and by turning the upper T-handle into the horizontal position. Thus the upper sprayer is set into action and the work proceeds with this sprayer. After finishing washing with the lye, both handles 37 and 43 are changed over to the tank 32 containing the rinsing liquid, to rinse the object by means of the two sprayers. When also rinsing is finished, upon closing the sprayers, the hood cover 26 is opened, and by turning the handwheel 17 the rotary table 4 can be set so that the rails thereof become re-aligned to the rails of the stand 21. Now the rails 19' are joined to the rails 19, and the carriage 20 with the washed object can be moved out again. Other objects may subsequently be washed in the same way.

The service levers 37 and 43 are preferably coupled to each other, so that when the delivery pump 44 is connected to the tank 31 via three-way cock 38, this tank at the same time is in connection with the drain trough 3, while the latter is connected to the tank 32, if the connection of the delivery pump with the tank 32 is established via three-way cock 38.

In the second example of embodiment according to Figs. 7 and 8, numeral 3 designates a trough which is located in the floor 59 and covered by a hood 2, which trough opens at its lowest point into a drain branch 12. The hood 2 has a jacket 2*a* adjoining the edge of the trough 3. 4 designates a circular rotary table arranged within the hood and which is rotatably supported in a stationary bearing 8, at a distance above the trough 3 by means of a central vertical rotary axle 6 mounted on the underside of the table. Removably placed into the rotary table are circular sector-shaped gratings 4*a* (Fig. 8) through which the dirt sprayed off with the washing or rinsing liquid can flow away freely. The space defined by the hood 2 and the rotary table 4 serves as washing space for the material brought on the table. To enable the washed object or material to be removed in and out, the hood 2 is provided with hydraulic pressure cylinders 60 which are connected to a pump aggregate 63 through pipes 61 and 62. By means of the pump aggregate the pressure cylinders 60 can be set under pressure, whereby the hood 2 can be lifted off the rotary table and brought into the position as indicated in dotted lines in Fig. 7, in which the table lies for conveyance in and out of the material to be washed. Sprayers 28 mounted at different heights in a recess 27 of the hood jacket serve for washing the material placed on the table, the direction of the spray being adjustable to any desired point of the material being washed. 29 designates an inspection window, allowing the material to be observed as it is washed, and 76 denotes one of, say, two lamps, by means of which the material may be illuminated during the washing operation.

Accommodated within a space 64 in the floor below the trough 3, there are two tanks 31 and 32, the tank 31 serving for taking a washing liquid, and the tank 32 for taking a rinsing liquid. From the tanks 31, 32 two return pipes 34, 35 lead to a three-way cock 33 which communicates with the drain branch 12 of the trough 3 via a duct 65 and another three-way cock 66. Through the three-way cock 66 the outlet branch 12 is connectible, on the one hand to the duct 65 leading to the return pipes 34, 35, and on the other hand to the drain pipe 67 leading to the open. The three-way cock 33 can be actuated by a linkage 36, 37. In one end position of the three-way cock 33, the outlet branch 12 is connected to the tank 31, and in the other position to the tank 32. A further three-way cock 38 is connected via two flow branches 39, 40, on the one hand to the two tanks 31, 32, and on the other hand to the flow pipe 41. The cock 38 is connected to the cock 33 through a linkage 42 so that upon connection of the outlet branch with the tank 31, the latter is connected to the pump 44 through the flow pipe 41.

The washing or rinsing fluid can be delivered to the sprayers 28 through the pressure piping 41', 41'' and a further flexible pipe 68.

69 designates a further three-way cock fitted in the pressure or delivery pipe 41', by means of which the delivery pipe 41'' may be connected to the main 70 instead of to the delivery pipe 41' leading to the pump 44.

Thereby the three-way cock **69** is connected to the three-way cock **66** through a linkage **71** so that upon connection of the outlet branch **12** with the three-way cock **33** leading to the return pipes **34**, **35**, the delivery pipe **41''** is connected to the delivery pipe **41'** via three-way cock **69**, whereas upon connection of the outlet branch **12** with the drain pipe **67** leading to the open, the delivery pipe **41''** is connected to the main **70** via cock **69**. In this case the sprayer nozzles **28** will be fed with main or tap water which can be discharged to the open or into the drains via drain pipe **67**.

To prevent compact dirt, sprayed off screws and the like, reaching the cocks, a filter is built into a shaft **72** adjoining the outlet of the trough **2**. This filter is constituted by several circular sector-shaped filter baskets **73** which are removable from the shaft **72** for cleaning. By these filters not only coarse impurities sprayed off screws and the like will be retained, but moreover the washing and rinsing fluids will be continuously cleaned during operation.

Numeral **74** designates an electric motor which is operatively connected to the shaft **6** of the rotary table through a gearing **75**.

Instead of having the tanks **31**, **32** and pump **44** arranged under floor level, it is understood that they may also be located above the floor **59** at a suitable place at the side of the hood.

Alternatively, instead of the three-way cock **69** for the main **70** being arranged after the pump **44**, it could be arranged in the pipe **41** before the pump **44**.

What I claim is:

A spray nozzle arrangement, comprising in combination, a valve housing having an inlet opening, an outlet aperture at one side, and an access aperture at the other side of said inlet opening and opposite to said outlet aperture, said housing including a pair of complementary swivel bearing portions having their meeting faces disposed in a plane transversal of the planes of said apertures, and having said inlet opening provided in one of said bearing portions; connecting means for detachably fastening said bearing portions to each other; a supporting bracket portion extending from one of said swivel bearing portions in a plane adjacent to and substantially parallel to the plane of said access aperture and having an opening substantially registering with said access aperture; a valve body fitting into said valve housing and having a passage therethrough with an inlet end and a spray discharge end, said valve body arranged swivelably in said valve housing between a closing position in which said inlet opening of said valve housing and said inlet end of said passage in said valve body are out of communication with each other and a plurality of open positions corresponding to respective swivel positions in each of which positions said spray end of said passage in said valve body is located within the area of the outlet aperture of said valve housing; sealing means effectively sealing the space between said valve housing and said valve body around said inlet opening in said valve housing and said inlet end of said passage in said valve body in any swivel position thereof relative to the valve housing; an actuating member extending from said valve body through said access aperture in the valve housing and through said registering opening in said bracket portion operable to position said valve member in any desired swivel position as well as to control communication between said passage in the valve member and said opening and said inlet opening in the housing; and a bellows surrounding said actuating member and operatively connecting the same with the edge portion of said registering opening.

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