July 4, 1950 L. L. ANDERSON ET AL 2,513,776

FOUNTAIN BRUSH WITH SOAP CHAMBER

Filed March 1, 1948 2 Sheets-Sheet 1

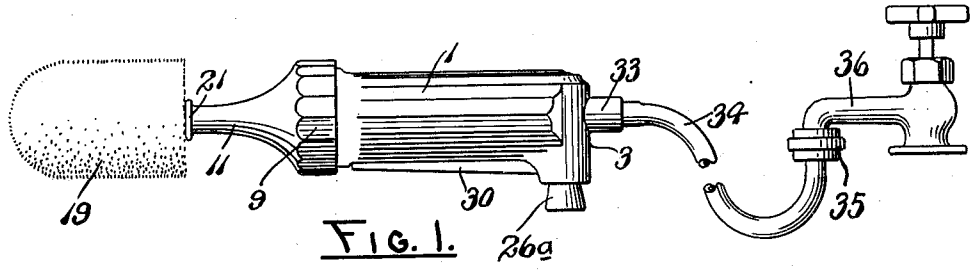


FIG. 1.

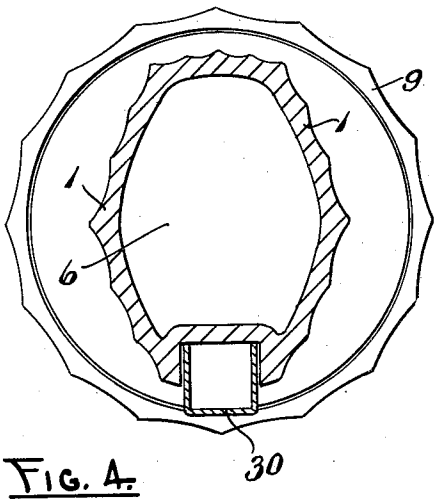


FIG. 4.

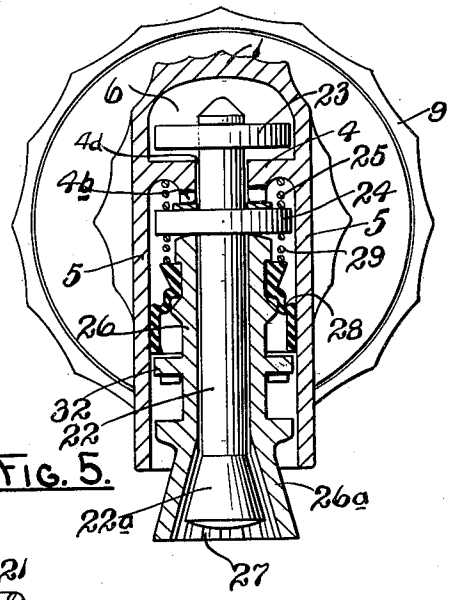


FIG. 5.

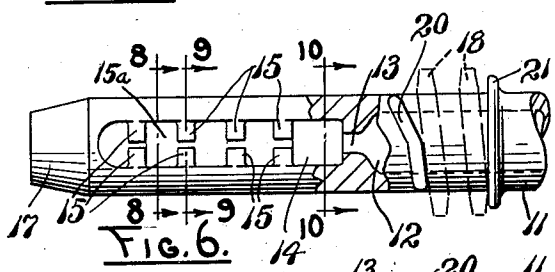


FIG. 6.

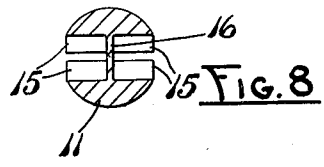


FIG. 8

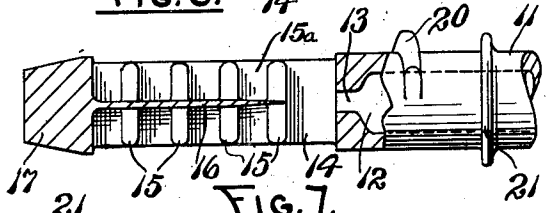


FIG. 7.

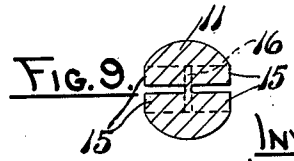


FIG. 9.

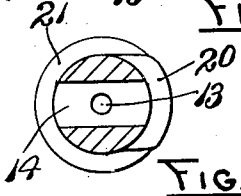


FIG. 10.

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FOUNTAIN BRUSH WITH SOAP CHAMBER

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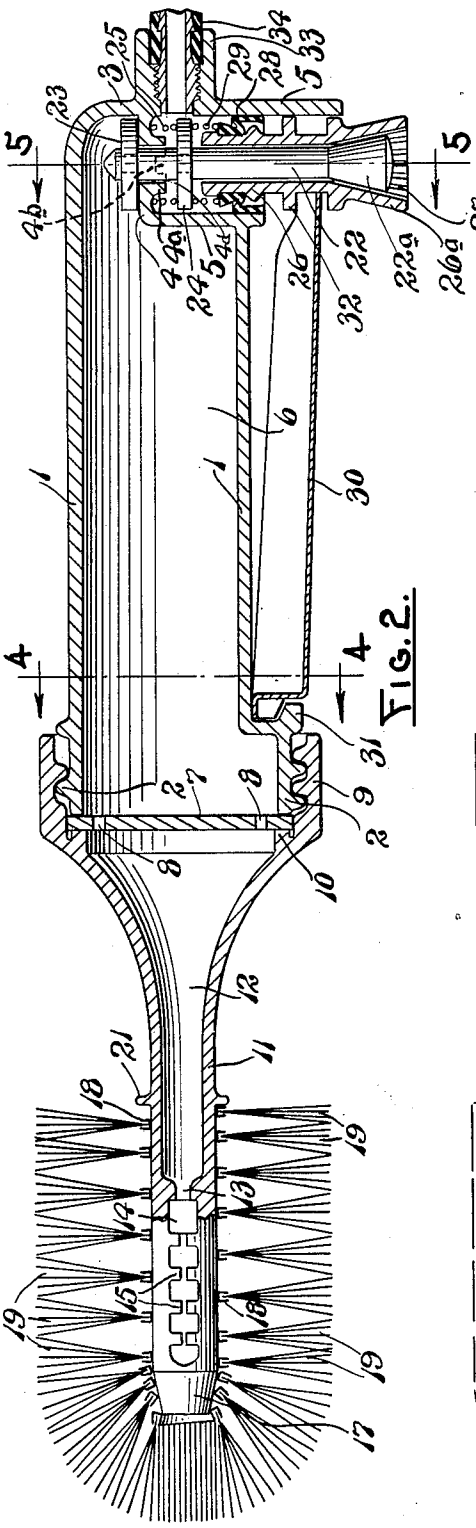


FIG. 2.

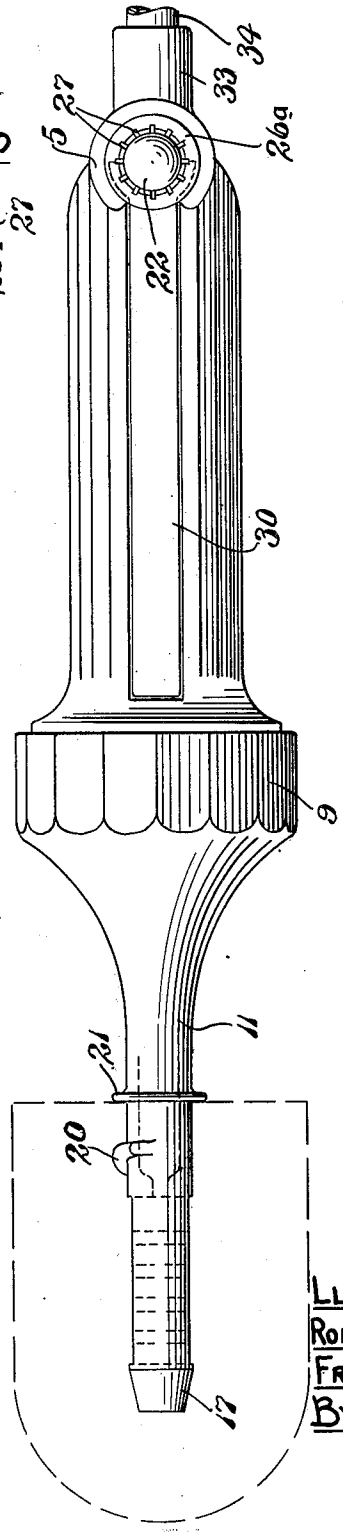


FIG. 3.

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FOUNTAIN BRUSH WITH SOAP CHAMBER

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Application March 1, 1948, Serial No. 12,344

7 Claims. (Cl. 15—129)

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This invention relates to a hand-operated dishwasher and rinser. It is a primary object and purpose of the present invention to provide a simple, novel, practical, very useful and economical dishwasher which is manually operated and with which, by very simple mechanism, the flow of water over or in contact with soap or other cleaning agent, may be directed, when wanted, to a cleaning brush with which the surfaces of dishes are cleaned and thereafter, without changing the position of the hand, clear water directed to the washed dish, by moving it to proper position, for rinsing it. The dishwasher is adapted to be detachably connected to the hot water faucet at a kitchen sink, being readily attached or detached thereto substantially instantly. The water which is used both for washing and rinsing flows from said faucet through a suitable length flexible conduit, being interrupted in its flow to the cleaning brush when rinsing is taking place, and similarly stopped from rinsing flow when washing occurs.

Many novel details of construction and arrangement of parts are utilized in accomplishing the invention and will appear and be understood, and their functions and purposes outlined, in the following description of the invention, taken in connection with the accompanying drawings, in which,

Fig. 1 is a side elevation of the dishwasher as it is used,

Fig. 2 is an enlarged central longitudinal vertical section through the dishwasher construction,

Fig. 3 is an under plan view thereof,

Figs. 4 and 5 are transverse vertical sections, substantially on the planes of lines 4—4 and 5—5, respectively, of Fig. 2, looking in the direction indicated by the arrows,

Fig. 6 is a side elevation, with parts broken away and shown in section intermediate its ends of the nozzle part of the structure, around and upon which the brush is detachably located,

Fig. 7 is a partial central horizontal section and partial plan of the nozzle, and

Figs. 8, 9 and 10 are transverse sections through the nozzle on the planes of lines 8—8, 9—9 and 10—10, respectively, of Fig. 6, looking in the direction indicated.

Like reference characters refer to like parts in the different figures of the drawings.

In the construction illustrated, a somewhat elongated generally tubular container or receptacle is provided having walls 1. At one end the container is enlarged outwardly and is given a circular form in cross section, and has exterior threads, as indicated at 2. At the other

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end an end closure 3 integral with the walls 1 is provided, integral with which is a valve housing and guide having a horizontal top 4 and vertical sides 5. The housing is open at its lower end, the side 5 at the outer side of the chamber being continued in the same plane with the end 3 and extending downwardly below the lower side of the tubular body. The inner vertical wall 5 has an integral connection with the under side wall 1, while the sides between the inner and outer sides, as shown in Fig. 5, may merge with and be a continuation of the chamber vertical side walls 1 of the body. A chamber 6 is enclosed, the enclosure being completed by a transverse plate or disk 7 at the threaded end 2 through which a plurality of passages 8 are made.

The chamber 6 may contain soap or an equivalent suitable washing or cleaning material. The closure plate or disk 7 is releasably held in place by the enlarged interiorly threaded end 9 of an outlet or nozzle member, the plate 7 at its inner side coming against the adjacent end of the tubular body described, and being held thereagainst by an annular ledge 10 on the outlet nozzle engaging against its outer side. The outlet nozzle is a continuation of and integral with the enlarged connecting end portion 9 previously described.

The nozzle or outlet 11, in general axial alinement with the axis of the tubular body, has a continuous central passage 12 therethrough lengthwise thereof from the disk 7, for a portion of its length, the cross sectional area of the passage 12 being reduced generally midway between the ends of the nozzle member, as at 13. A transverse passage 14 through the nozzle outlet member 11, shown as rectangular in cross sectional outline, is in conjunction with the outer end of the reduced outlet 13. Outwardly beyond the passage 14 are a plurality of spaced lugs 15 extending toward each other and having spaced recesses 15a therebetween and joined integrally with a diametrically disposed thin division portion 16. The nozzle at its outer end is of frustro-conical form and is of solid structure having no passage therethrough, as shown at 17. The grooves between the lugs or projections 15 have their bottoms in substantially the same plane with the upper and lower sides of the recess 14 (Fig. 2).

The lugs 15 are not of the same length. Those directly adjacent the passage 14 are separated at their adjacent ends a greater distance than the others, the adjacent ends of the successive pairs of lugs or projections 15 outwardly being progressively brought closer to each other. Thus

when water under pressure forced through the chamber 6, as hereinafter described, through the openings 8 and the passages 12 and 13, is projected with force from the outer end of the passage 13, it strikes the various lugs or projections 15 and is broken up into small particles and mixed with air. The water passing over and having been in contact with the soap or other cleansing agent in the chamber 6, therefore carrying such soap or cleansing material in solution, is intermixed with air and forms a suds or foam which passes outwardly to the brush surrounding the stem or nozzle member 11.

The brush has an axial core in the form of a spiral winding or helix 18, to the coils of which the brush bristles 19 are secured and extend outwardly, the brush being generally of a cylindrical form rounded at its outer end. The outlet stem or nozzle 11 is inserted in said helix. The inner end coil of the helix engages with a rib 20 molded integral with and extending outwardly at one side of the nozzle stem 11, of a shape substantially as shown in Fig. 6. On turning the brush about its longitudinal axis the helical core 18 follows the rib 20 until the end coil comes against an annular ledge or rib 21 around the outer side of the outlet stem 11 located transversely of its axis. A continuation of turning the brush compresses the end coils and a frictional engagement of an amply sufficient degree to hold the brush against movement is obtained. When the brush becomes worn at any side, for example in service, it may be turned back a part of a turn, and such frictional engagement of the end coil of the helix core 18 against the abutment provided by the ledge or rib 21 still remain amply sufficient to insure against accidental or other unwanted looseness of the brush on the outlet stem 11 on which it is mounted.

The top 4 of the valve housing surrounded by the walls 5 has a vertical opening 4*d* through which a vertical rod 22 extends. The diameter of the rod 22 is less than the diameter of the opening 4*d* through which it passes, so that there is an annular clearance around the rod. An integral annular flange 4*a* extends downwardly from the top 4 around the rod 22. The annular flange 4*a*, as indicated in dotted lines in Fig. 2, at one side has an outwardly extending notch 4*b* at each side therein.

At the upper end of the rod 22 and above the top of the valve enclosing housing described, a disk valve 23 is permanently secured. A second like valve 24 is permanently secured to the rod 22 below the top 4. The two valves 23 and 24 are spaced apart a distance greater than the thickness of the top 4 plus the height of the flange 4*a*. A coiled spring 25 of light strength rests at its lower end on the disk valve 24 and at its upper end bears against the under side of the described top 4 (Fig. 5).

A vertical guiding sleeve 26 for the lower portion of the rod 22 has an axial opening for the passage of the rod, which opening is also of greater diameter than the diameter of the rod. At the lower end of the guide sleeve 26 it is flared outwardly in a skirt 26*a* of a frustro-conical form, which at its inner surfaces is grooved with a plurality of spaced generally vertical grooves 27. The lower end of the rod 22 has a head 22*a* of a complementary frustro-conical form, the sides of which are spaced from the inner sides of the guide 26*a* at all parts thereof.

A vertically disposed rubber sleeve 28 has an enlarged diameter at its lower end portion which

is connected with the housing walls 5 at the open lower end of the housing, being securely connected in place in a sealing relation thereto. The upper portion grips and surrounds the upper end portion of the guide sleeve 26, seating in a groove therein. The connecting intermediate portion between the lower and upper portions of the member 28 is of a flexible or accordion-like structure, so that the upper end of the sleeve may move upwardly and downwardly between the two positions shown in Figs. 2 and 5. A coiled spring 29, substantially identical in strength and otherwise with the spring 25, bears at its upper end against the lower side of the disk valve 24 and at its lower end against the upper end of the member 28.

A lever 30, preferably of sheet metal in a channel cross-section, located underneath the lower wall 1 of the first described body, at one end has a rocking connection with the enlarged end portion 2 of said body, being held against disengagement by a lip 31 as shown in Fig. 2. At its other end it is divided and has the two sides of the fork made passing at opposite sides of the guide sleeve 26 and underneath an annular flange 32 extending outwardly from said sleeve immediately below the accordion sleeve 28.

An inlet boss 33 is integral with the end 3 and valve housing sides 5 and has a passage therethrough. A suitable connection of a flexible hose or conduit 34, as shown in Fig. 2, is made for the passage of water into the chamber between the top 4 of the housing and the rubber sleeve member 28. The tube 34 may be of a suitable length and at its free end is provided with a coupling 35 which is designed to be placed over and grip the outlet end of a water faucet 36. The specific structure of this coupling is not disclosed as it is not a part of the present invention. With it a ready and almost instant connection or disconnection with the faucet 36 may be made.

The two equal strength springs 25 and 29, coupled with the weight of the parts and the tendency of the rubber member 28 to occupy the position shown in Fig. 2, locates the parts as shown in Fig. 2, with the valve 24 in middle position between the upper end of the sleeve 26 and the lower edges of the flange 4*a*. In such position the valve 23 is located against the upper side of the top 4 and closes off the annular passage around rod 22. Water coming through the conduit 34 will flow around the rod 22 downwardly through the annular space between it and the sleeve 26, and be directed downwardly and outwardly by the inclined sides of the head 22*a* and leave the skirt 26*a* in divided streams following the grooves 27. On moving the lever 30 upwardly the sleeve 26 is moved upwardly against the springs 25 and 29. The valves 23 and 24 and the rod 22, because of the equal strength of springs 25 and 29, move upwardly one-half of the distance that the sleeve 26 is moved; whereupon the upper end of the sleeve 26 comes to and engages against the under side of the valve 24 at the time said valve 24, or a washer not numbered at its upper side as shown in Fig. 5, engages against the lower end of the annular flange 4*a*. The valve 23 is lifted (Fig. 5) and a passage of water around the rod 22 above the valve 24 takes place into the chamber 6. Such passage continues after the valve 24 has reached its uppermost position, as in Fig. 5, as the notch at 4*b* provides a passage for water at all times when the valve 23 is lifted above its lowermost position against the top 4 (Fig. 2).

In the use of the hand-operated and controlled dishwasher the body surrounding the chamber **6** is gripped by the hand with the fingers of the hand underneath the lever **30**. The brush is brought to a dish which is to be washed and the lever **30** moved upwardly, positioning the valves as in Fig. 5. There is a closing against flow of water downwardly through the sleeve **26**. Water under pressure flows into the chamber **6**, dissolves and carries in solution with it soap or other equivalent soluble washing or cleaning material, passes through the openings at **8**, and is projected with velocity through the small passage at **13**. It strikes the progressively closer together opposed projections or lugs **15**, and is broken up and mixed with air providing a suds which saturates the brush bristles and goes therefrom to the dish surface which is being cleaned. The brush is rubbed against such surface until the dish is cleaned.

After a dish has been thus cleaned or washed, it is brought underneath the skirt at **26***a* and the lever **30** released. The flow of water to and through the chamber **6** is cut off and thereafter so long as the lever **30** is in its down position (Fig. 2), clear water flows through the sleeve **26** around rod **22** and leaves the lower end of the skirt **26***a* in a divergent multiple of small streams caused by the grooves **27**. The dish is thus rinsed of the water and soap which adheres to it, and may be put away for drying. The process is repeated in connection with a succeeding dish.

It is evident that the replacement of a brush when it has worn beyond usefulness, is easily done. The life of a brush is extended as all portions of it may be used before it has to be discarded. The removal by unscrewing from the threaded end **2**, thereby releasing the plate **7**, permits the replacement of soap or other cleaning material when needed. Preferably the walls of the generally tubular body **1** and of the outlet stem or nozzle **11** will be a transparent plastic, and the sleeve **26**, preferably, will be of the same material. But the invention is not limited to any particular material and any material which is available for the purpose may be used.

The novel structure described is practical and useful, economical to make, and is sturdy and durable in use.

The invention is defined in the appended claims and is to be considered comprehensive of all forms of structure coming within their scope.

We claim:

1. In a structure as described, a chambered body, a nozzle connected thereto at one end having a longitudinal passage therethrough and at its outer end portion having laterally positioned openings communicating with the passage, means for controlling the passage of a liquid through said chambered body and nozzle, a brush having a helical core of connected coils, and brush bristles connected to said coils extending outwardly therefrom located over the outer portion of the nozzle, said nozzle extending through said coils, said nozzle between its ends having an annular rib around it against which the inner end coil of the core of the brush is adapted to be brought and having a helical rib extending outwardly therefrom at a distance outwardly of the annular rib, with which said core has a screw engagement to force the innermost coil of the core against said annular rib.

2. In a structure of the class described, an elongated chambered body adapted to have a cleaning material located therein, said body being open at one end, a transverse disk across the open end of the body having a plurality of openings therein, a nozzle having a longitudinal passage detachably connected with said end of the chambered body and engaging said disk to clamp it between the nozzle and the end of the body, said nozzle at its outer end portion having lateral outlet openings, a brush surrounding the outer end portion of the nozzle, a valve housing located within the other end portion of said chambered body, said housing having a top with an opening therethrough, said top being connected to said body and having depending sides, said valve housing being open at its lower end, a valve rod extending upwardly and passing at its upper end portion through the top of said housing, said rod having a lesser cross sectonal area than the opening in the housing top, a flat valve secured to the upper end portion of said rod above said top of said valve housing, a liquid conductor connected with the interior of said valve housing, whereby liquid will pass around the rod on lifting said rod to elevate said flat valve above the top of the housing, and means for closing the open lower end of said housing against passage of liquid downwardly therefrom upon moving said rod and valve in an upward direction.

3. A structure as defined in claim 2, and manually operable means adapted to be operated by a hand grasping said body for moving said rod and valve in an upward direction, and spring means for moving said rod and valve downwardly to closed position on release of the manually operable means.

4. A construction as defined in claim 2, said means closing the lower end of said valve housing comprising, a longitudinally extensible sleeve of resilient material, the lower end of which has a sealed connection with the lower end portions of the vertical walls of the housing, a vertical sleeve through which the rod passes having an axial opening of greater cross sectional area than the like area of the rod, around which the upper end of said resilient sleeve is located and has a tight connection therewith, a disk carried by said rod above the upper end of said last mentioned sleeve, equal strength springs one above and the other below said disk, the lower one bearing against the upper end of the resilient sleeve and the upper one against the lower side of the top of said valve housing, and manually operable means connected with said last mentioned sleeve for moving it in an upward direction.

5. A structure as defined in claim 4, said last mentioned sleeve having a skirt outwardly and downwardly inclined at the lower end portion thereof and said rod at its lower end portion having downwardly and outwardly inclined surfaces generally complementary with the inner surfaces of said skirt, said outwardly inclined surfaces of the lower end portion of the rod engaging against the inner surfaces of the skirt when said last mentioned sleeve is in its lowermost position, there being grooves on the interior of said skirt spaced apart from each other for providing escape for liquid when said lower end portions of the rod and sleeve are thus in engagement.

6. In a structure as described, a body having a chamber therein, means for conducting liquid into said chamber, valve means to control passage of liquid into said chamber, a nozzle having a longitudinal passage communicating with said chamber, a diametrically disposed passage near the terminal end of the nozzle communicating with said longitudinal passage, a longitudinal partition in

said diametrical passage, a plurality of pairs of lugs spaced longitudinally within the diametrical passage on opposite sides of said partition, each pair of lugs being spaced by a slot, said diametrical passage with the spaced lugs and slots forming a plurality of lateral outlet passages, and a brush surrounding said nozzle and the outlet passages therein.

7. A structure as defined in claim 6, said lugs at each side of the partition being spaced by said slots at adjacent ends at progressively lesser distances from each other outwardly toward the outer end of the nozzle.

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