April 1, 1952 M. G. KURTH 2,591,364

MIXING NOZZLE

Filed May 24, 1946 2 SHEETS—SHEET 1

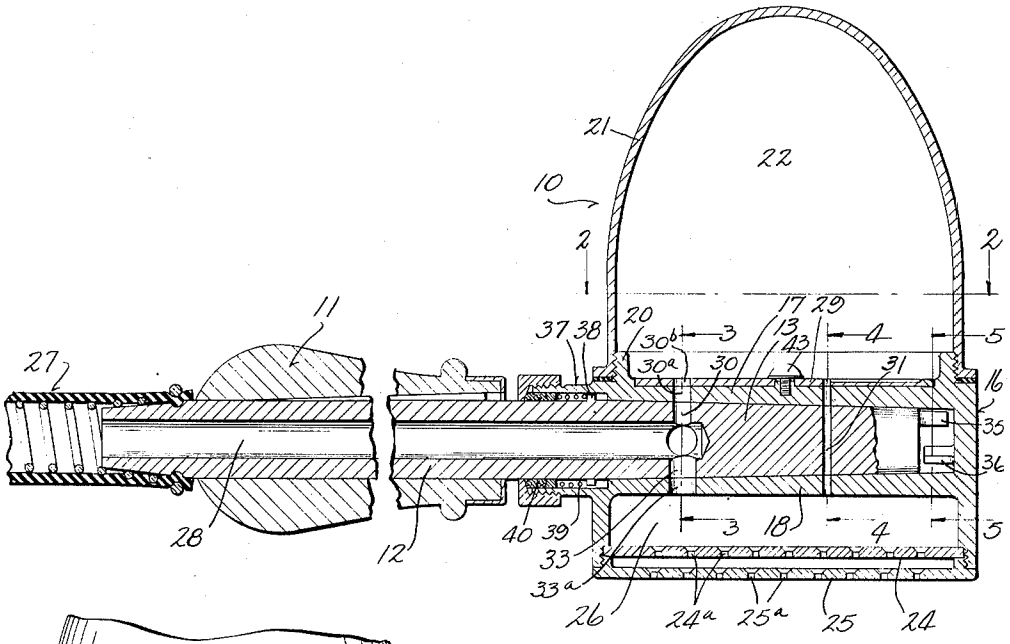


Fig. 1.

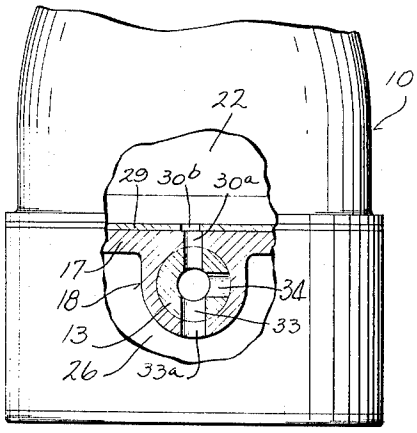


Fig. 3.

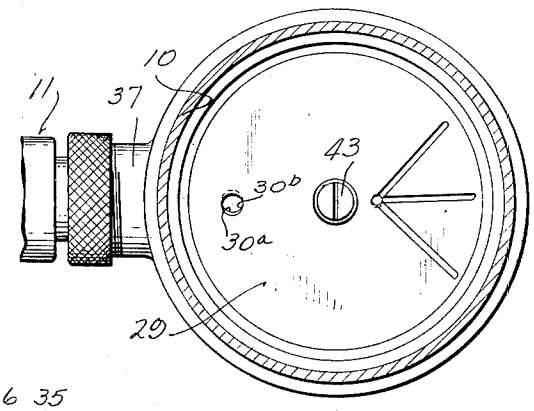


Fig. 2.

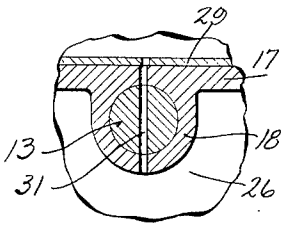


Fig. 4.

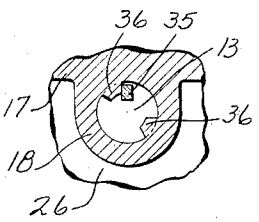


Fig. 5.

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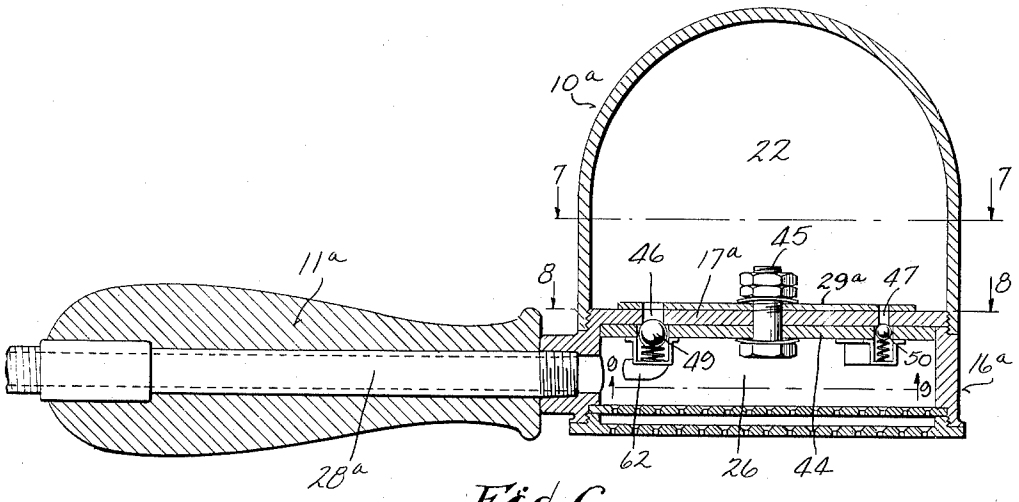


Fig. 6.

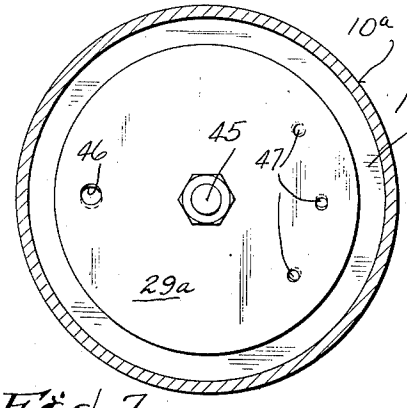


Fig. 7

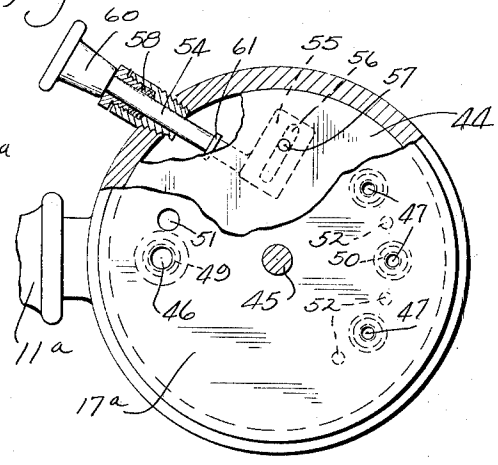


Fig. 8.

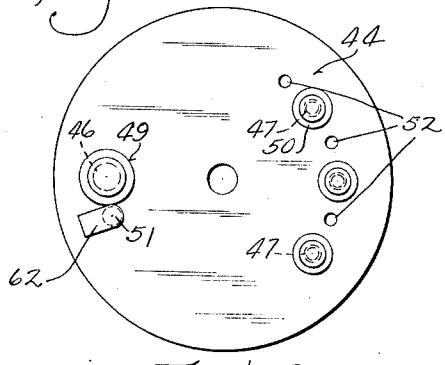


Fig. 9.

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MIXING NOZZLE

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15 Claims. (Cl. 299—84)

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This invention relates generally to nozzles, and more particularly it relates to improvements in nozzles of the type employed in washing dishes or the like.

An important object of the invention resides in the provision of a dish washing nozzle head provided with a storage chamber for soap chips or the like, and having easily accessible, manually controllable means for by-passing a portion of a hot water stream through said chamber when it is desired to produce a soapy water spray.

A further object is to provide an improved spray head wherein an incoming stream of water under pressure is broken up into a relatively large number of fine streams, all of which are at substantially equal pressure.

A still further object is to provide a nozzle head with means for thoroughly mixing soap with a clear water stream to produce a soapy water spray for dish washing.

A further object is to generally improve and simplify the construction, arrangement and operation of dish washing nozzles for one or more of the purposes mentioned, and still other objects will become apparent to those skilled in the art upon examination of the following specification, drawings and claims.

In the drawings:

Figure 1 is a view in longitudinal section of a device having the invention incorporated therein.

Figure 2 is a section taken along line 2—2 of Figure 1.

Figures 3, 4 and 5 are sections taken along lines 3—3, 4—4 and 5—5, Figure 1, respectively.

Figure 6 is a view in longitudinal section, certain parts being omitted, of the device having an alternate embodiment of my invention incorporated therein.

Figure 7 is a view taken along line 7—7, Figure 6, certain parts being omitted.

Figure 8 is a view along lines 8—8, Figure 6.

Figure 9 is a view along line 9—9, Figure 6.

Like parts are identified by the same reference characters throughout the several views.

With reference to the embodiment of the invention as shown in Figure 1, the illustrated device includes a spray head 10, having a handle 11 mounted on a stem 12 on which extends integrally a bearing plug 13 mounted within the spray head and adapted to be manually oscillated in respect thereto for the control of valve ports later described.

The spray head comprises a generally cylindrical casting 16 having an upper wall 17 and an integral bearing portion 18 under wall 17 and in

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which bearing plug 13 seats. Bearing portion 18 is preferably an integral portion of casting 16. Wall 17 is provided with a raised and threaded marginal rim 20 threaded to engage the complementarily threaded cup-like housing 21 to provide a chamber 22 for the storage of soap or soap chips. The lower end of cylinder 16 has a pair of spaced closures 24 and 25, respectively, removably engaged therewith to define a mixing chamber 26 within the cylinder 16, closures 24 and 25 being provided with mutually offset multiple nozzle apertures 24a and 25a, respectively. The apertures are each conically counterbored and the offset of apertures 24a from apertures 25a is such that the projected axes of the former will preferably register with the counterbores of the latter.

The device is adapted for attachment to the hot water faucet of a kitchen sink, whereby to provide a user with means for spraying either soapy or clear water directly onto the dishes being washed. Connection to the hot water faucet is made through a flexible conduit 27 engaging the outer end of stem 12 for the conduction of water under pressure through a center bore 28 in stem 12. The water flowing through center bore 28 is controllable through manual oscillation of bearing plug 13 whereby it may either all be directed into mixing chamber 26 to discharge therefrom through the nozzle apertures of closures 24 and 25 in the form of a clear spray, or in part may be by-passed through soap chamber 22 whereby to provide a soapy solution within mixing chamber 26 for discharge through nozzle apertures 24a and 25a to produce a soapy water spray.

While handle 11 and valve plug 13 are in the position shown in Figures 1, 3 and 4 to produce a soapy spray, part of the stream flowing through handle bore 28 flows through a radial plug port 30 and through aligned ports 30a and 30b in wall 17 and in flow regulator plate 29, later described, to enter soap chamber 22, from which it discharges through a transverse plug passage 31 which is aligned with suitable bearing ports to allow flow of the soapy water into the mixing chamber 26. The rest of the incoming stream flows through an oppositely positioned radial plug port 33 and an aligned bearing port 33a directly into the mixing chamber. When a clear spray is desired, handle 11 and plug 13 are oscillated approximately 90 degrees to close passages 30 and 31, and to align radial plug passage 34 with bearing port 33a to conduct the entire clear water stream into the mixing chamber.

Bearing plug 13 and bearing 18 are preferably

provided with complementary tapers whereby to ensure a snug fit therebetween and to limit the extent to which the plug extends into the bearing. The terminus of plug 13 has an outwardly extending arm 35 positioned for engagement with the pair of arms 36 within the bearing portion of cylinder 16 to limit the extent of oscillation of the plug between the positions above described. Casting 16 is provided with an outwardly extending stuffing box 37 about stem 12. Stem 12 is provided with an annular rib 38 disposed within stuffing box 37 and biased toward bearing 18 by spring 39 maintained under compression between a packing element 40 and rib 38.

The regulating plate 29 is centrally journaled and maintained in contiguous clamped engagement with the upper surface of wall 17 by a screw 43. The plate is provided with ports which may be aligned with the inlet and outlet ports of the soap chamber or may be offset in respect thereto to limit the flow of water through the inlet and outlet ports. Adjustment of plate 29 may easily be effected when housing 21 is removed from casting 16 by loosening screw 43 and retightening the screw after the proper adjustment has been made. This plate is adjusted as desired to regulate relative flow through the soap chamber 22 in accordance with the solubility of the soap used.

The function of the pair of spaced closure plates 24 and 25 each having multiple nozzle apertures with the respective apertures mutually offset is to ensure proper mixture of the soapy water with the clear water before final discharge from the device as a spray during use. Due to the clear water entering the chamber 26 through port 33*a*, and the soapy water entering through passage 31, considerable turbulence is present to initially mix the soapy water with the clear water throughout the chamber. Resulting mixture is discharged under pressure through the nozzle apertures 24*a* in the plate which have countersunk portions within the mixing chamber. The streams discharged from this set of nozzles are directed into the space between plates 24 and 25 to impinge partially against the countersunk portion of offset nozzle apertures 25*a* and partially against the flat, inner wall of plate 25, whereby the streams are individually broken up within the space between the plates with the result that a further mixture of the soap is effected prior to the final discharge of the mixture through nozzle apertures 25*a*. The impingement of streams from apertures 24*a* upon the tapering counterbores of apertures 25*a* improves the quality of spray delivered from the device.

An alternate embodiment of the invention is shown in Figures 6 to 9, inclusive. In common with the device above described, the alternate device includes a spray head 10*a* comprising a generally cylindrical casting 16*a* provided with a handle 11*a* with a longitudinal water passage 28*a* leading into a mixing chamber 26 and manually controllable valve means for by-passing a portion of the incoming stream through to a soap chamber 22. The device differs from the preferred embodiment mainly in the handle mounting and the valve structure for controlling water flow through the soap chamber. A valve control plate 44 is centrally journaled in contiguous clamping engagement with the lower surface of wall 17*a* by means of a clamping bolt 45. Wall 17*a* is provided with an inlet aperture 46 and multiple outlet apertures 47. A spring biased

ball valve 49 is mounted in plate 44 for engagement with port 46 when plate 44 is positioned to prevent soap mixing with the device. Plate 44 is also provided with multiple ball valves 50 positioned for engagement with outlet ports 47 when plate 44 is in a valve closing position.

Plate 44 has an inlet port 51 and outlet ports 52 which are circumferentially spaced from the ball valves and radially positioned for alignment with the inlet and outlet ports 46 and 47, respectively.

A manually operable push rod 54 having an inner offset portion 55 slotted at 56 to receive a pin 57 carried by plate 44 extends through the wall of cylinder 16*a* in slidable engagement therewith as by stuffing box assembly 58. Rod 54 is provided with an outer knob 60 and an inner shoulder 61 to limit the extent of its sliding movement in respect to cylinder 16*a*. When the rod is fully depressed, plate 44 is oscillated about bolt 45 to engage ball valves 49 and 50 with ports 46 and 47, whereby to prevent water flow into or out of soap chamber 22. Withdrawal of rod 54 to the extent limited by collar 61 disengages the ball valves and aligns the valve plate inlet port 51 and outlet ports 52 with inlet port 46 and outlet ports 47 of wall 17*a* respectively, whereby to allow part of the stream entering the mixing chamber through passage 28*a* to be by-passed through the soap chamber. The valve plate inlet port 51 is provided with an elbow-like housing 62 which extends toward inlet port of passage 28*a* when the plate is in this position to promote water flow into the soap chamber. A ported regulating plate 29*a* is provided for the manual adjustment of water flow through the soap chamber as heretofore described. The mixing chamber is provided with spaced closures having aperture nozzles offset to function in the manner set forth in connection with the preferred embodiment.

I claim:

1. A dish washing spray head including a housing having a wall thereof provided with multiple nozzles, a passageway leading into said housing for directing liquid under pressure into the housing, a multiply ported wall within the housing for dividing said spray head into a soap chamber and a mixing chamber, a disc mounted to oscillate in contiguous engagement with said wall, a valve carried by said disc for engagement with one of said ports, a plunger extending through the housing wall and connected to said disc to provide means for the manual oscillation thereof in respect to said ported housing wall whereby the valve carried by the disc may be oscillated from port closing position to port opening position to selectively prevent or permit by-passing of a portion of said incoming stream through the soap chamber.

2. A dish washing spray head including a mixing chamber, means for conducting a stream of liquid under pressure therein, said mixing chamber being provided with a wall portion comprising inner and outer planiform plates in closely spaced parallel relation the outer plate being exposed for free discharge of spray to the atmosphere, each of said plates being provided in substantially coextensive areas with a plurality of spray nozzles to pass liquid therefrom in defined streams, the spray nozzles in one plate being in offset relation to the spray nozzles in the second plate, whereby a diffused spray from the nozzles of the outer plate is created and liquid flowing from the mixing chamber through the nozzles provided in the inner plate is directed in streams

against the outer plate to be further mixed in the space intermediate said plates prior to its discharge through the nozzles of the outer plate.

3. A soap mixing spray head comprising a mixing chamber provided with a nozzle, a soap chamber, ports connecting the chambers, and a handle for the spray head rotatable upon its axis and having a plug valve portion extending axially of the handle into the spray head and rotatable in one of the chambers to open and closed position respecting said ports for the mutual control of said ports upon oscillation of the handle, said handle and plug valve being provided with a liquid passage leading axially of the handle and plug to a point adjacent one of the chamber connecting ports, whereby a user may manipulate the handle to direct the entire liquid stream through the mixing chamber or may cause a portion thereof to be by-passed through the soap chamber.

4. A soap mixing spray head including a casing divided into a soap chamber and a mixing chamber, a wall separating said chambers and provided with inlet and outlet ports for liquid communication therebetween, means for conducting a liquid into the mixing chamber, a plate mounted for movement respecting said wall, said plate having ports selectively registrable with said wall ports in the course of its movement for the control of liquid from the conducting means to the respective chambers, and means associated with said plate and projecting exteriorly of the chambers for the manual control of plate movement.

5. A soap mixing spray head including a casing having a soap chamber and a mixing chamber separated by a wall, said wall provided with a liquid inlet port and a liquid outlet port spaced therefrom, means for conducting liquid under pressure into the mixing chamber, a disk mounted adjacent said wall for oscillation in respect thereto and provided with inlet and outlet ports adapted for registry with the wall ports during one position of the disk to allow liquid flow from the mixing chamber through the soap chamber, and manually controllable means operatively connecting said disk and extending exteriorly of the casing for oscillation of the disk from a port registering position to a position of non-registry of the ports, whereby to selectively permit or prevent liquid flow between the chambers.

6. The device as set forth in claim 5, including spring-biased balls mounted on the disk and circumferentially spaced from the disk ports for seating engagement with the wall ports when the respective ports are out of registry.

7. The device of claim 5, wherein said disk control means include a push rod extending through the casing wall in slidable relation thereto and having a portion within the casing provided with a slot, and a pin carried by the disk and extending into the slot, whereby to permit oscillation of the disk through a predetermined arc upon manual depression and retraction of the push rod.

8. A dish washing spray head comprising the combination with a mixing chamber provided with a liquid inlet and a top partition wall having transfer apertures, said mixing chamber opening downwardly, of a multiple apertured spray member comprising a closure detachably connected with said chamber at the bottom thereof, a soap chamber in detachable threaded

connection with said chamber and extending above said partition wall, one of said apertures constituting a port to lead fresh water from said inlet through said partition wall into said soap chamber, and another of said apertures constituting a port to deliver soapy water from the soap chamber through said wall into said mixing chamber, a single valve means controlling both of said apertures, and a handle for the unitary manipulation of said head.

9. The device of claim 8 in which said valve means comprises a control disk pivoted substantially flat upon said wall and having apertures registrable according to the angular adjustment of said disk with both of the apertures of said wall for regulating flow therethrough.

10. The combination set forth in claim 9 in which said valve means comprises a valve member disposed beneath said wall and provided with operating means extending from outside said head for the control of the disk.

11. A device of the character described comprising the combination with a supply pipe comprising a handle, of a casing having a lower mixing chamber portion mounted on the pipe and having an upper soap chamber portion in separable connection with the mixing chamber portion, said casing having a partition wall fixed to said mixing chamber portion and provided with at least two ports and otherwise partitioning the mixing chamber portion of the casing from the soap chamber portion thereof, one of said ports communicating with said pipe and opening upwardly through said partition wall into the soap chamber portion of the casing and the other of said ports opening downwardly through said partition wall from the soap chamber portion of said casing to the mixing chamber portion thereof, and a single valve member controlling both of said ports and rotatably carried by the partition wall, said wall having seat portions with which said member coacts in controlling said ports, said mixing chamber portion of said casing being provided with an apertured discharge wall opposite said partition wall and being in communication with said pipe to receive fresh water therefrom independently of the soap chamber.

12. The device of claim 11 in which said valve member comprises a plug for which said partition provides a seat socket.

13. The device of claim 11 in which said valve member comprises a plug for which said partition provides a seat socket, the said pipe being connected physically to the plug and rotatable therewith.

14. The device of claim 11 in which said valve member comprises a disk provided axially with a pintle attached to the partition and upon which said disk is rotatable for the control of said ports.

15. The device of claim 11 in which said valve member comprises a disk provided axially with a pintle attached to the partition and upon which said disk is rotatable for the control of said ports, said disk constituting said valve and being rotatable upon said partition at the face thereof for the control of at least one of said ports, and a handle mounted externally of said casing and provided with connections through said casing to one of said disks.

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