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C. E. JACKSON
SELF-CLEANING NOZZLE

3,474,968

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FIG. 1.

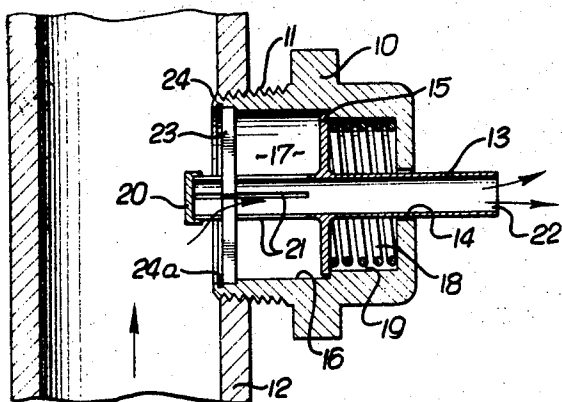


FIG. 4.

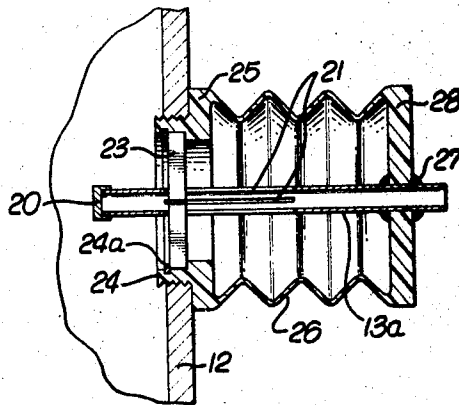


FIG. 2.

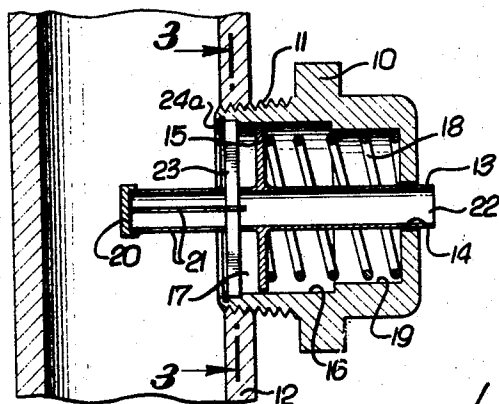


FIG. 5.

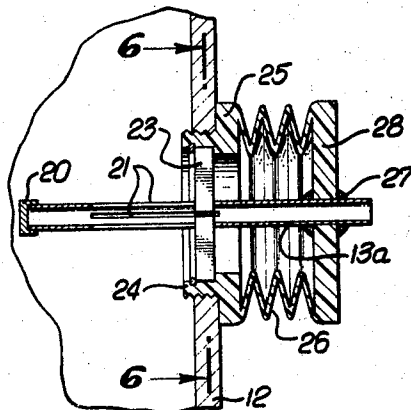


FIG. 6.

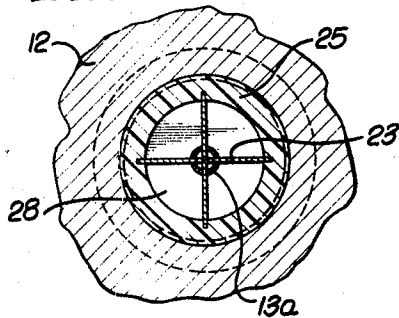
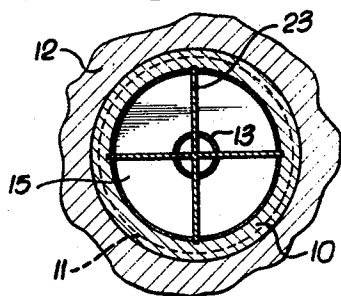


FIG. 3.



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SELF-CLEANING NOZZLE

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11 Claims

ABSTRACT OF THE DISCLOSURE

The invention provides a self-cleaning spray nozzle assembly comprising the combination of a body having an inlet end and containing a nozzle tube axially movable in response to fluid pressure changes. Fluid is required to enter the nozzle through one or more longitudinal slots therein, the individual slot width being less than the minimum fluid passing internal dimension of the tube so that the slot effect is to screen any otherwise nozzle clogging particles.

The nozzle is rendered self-cleaning by the provision of means carried by the body and entering the slot or slots so that the tube displacement results in removal of temporarily retained slot clogging particles.

BACKGROUND OF THE INVENTION

This invention relates to improvements in self-cleaning spray nozzles useable in any of various pressure spray systems in which nozzle clogging by foreign particles may present problems. Illustrative of such nozzles are those used for lawn sprinkling, dishwashers and industrial spray washers.

Generally contemplated is the combination of a body adapted to receive fluid under pressure, and a nozzle tube within the body and axially reciprocable in response to fluid pressure variations. Fluid delivery to the nozzle is effected by longitudinally slotting the wall of the tube, the slot dimension being such as to block or screen from entry to the tube potential clogging foreign matter carried by the fluid.

The capacity of the nozzle tube for axial movement is utilized to free the slot or slots from lodged particles, by providing suitable slot entering means carried by the body and serving to displace such particles as they are engaged during the tube movement.

An effective arrangement permissive of adequate flow through the nozzle is the use of diametrically opposed slots extended at least throughout the range of the nozzle reciprocation, and stationary clearing means extending transversely of the tube through the slots.

The various features of the invention as well as the details of illustrative embodiments will be more fully understood from the following description of the accompanying drawing, in which:

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a view showing one form of the invention in axial cross section with the spray nozzle projected; FIG. 2 is a similar view in which the nozzle tube is retracted; FIG. 3 is a cross section on line 3—3 of FIG. 2; FIGS. 4 and 5 are views similar respectively to FIGS. 1 and 2, showing a variational form of the invention; and FIG. 6 is a cross section on line 6—6 of FIG. 5.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In reference first to FIGS. 1 to 3, the nozzle assembly is shown to comprise a hollow body 10 threaded at 11 for reception within a pipe 12 which in the broad aspects

of the invention is to be regarded as any form of conduit for a liquid to be sprayed.

The body 10 contains an axially reciprocable spray nozzle in the form of a tube 13 projecting through the body opening 14 and having integral piston 15 received within the body bore 16, the piston being responsive to fluid pressure in the chamber 17 to project the nozzle as in FIG. 1 against the resistance of spring 18 contained within bore 19.

Inwardly the closed end 20 of the nozzle tube is projectable into the conduit 12 and beyond the closed end the tube has longitudinal parallel slots 21, typically four in number, through which fluid passes from within the conduit and chamber 17 into the nozzle for projection in a spray pattern from its discharge end 22. As will be understood, the nozzle tube or its tip may be given any of various shape characteristics to achieve desired spray patterns. The tube 13 is intersected by crossed members 23 in the nature of a spider which pass through the slots 21 with sufficient clearance therein to allow pressure responsive reciprocation of the nozzle, the members 23 stationarily terminating at 24 within the body inlet end and being suitably retained therein as by lock ring 24a.

In response to fluid pressure from the conduit and within chamber 17 the piston-equipped tube is projected against the resistance of spring 18 to the limiting position of FIG. 1 for operation of the device under normal spray conditions. Upon interruption or reduction of the fluid pressure, spring 18 retracts the tube as to the position of FIG. 2 limited by engagement of the cross pieces 23 with the ends of slots 21. The latter are sufficient in number, length and width to pass the proper flow required for spraying from the tube. However, the slots otherwise are sized to be sufficiently narrow to interrupt and in effect screen from entry to the tube foreign materials that might tend to clog or so accumulate in the tube as to interfere with the desired spray. Such materials may tend temporarily to become lodged in the slots 21 but are displaced therefrom upon reciprocations of the tube by clean-out engagement with the spider pieces 23, thus assuring continued proper spray projection.

The form of the invention shown in FIGS. 4 to 6 (wherein parts corresponding to those in FIGS. 1 to 3 are given corresponding reference numerals) precludes any leakage about the nozzle tube from a body opening and differs in that here the body 25 has the form of resilient bellows 26 which is self collapsible when relieved of internal fluid pressure, as in the condition of FIG. 5. The nozzle tube 13a passes through and is fixed and sealed at 27 to the head 28 of the bellows so that in response to operative spray fluid pressure the bellows expands to the FIG. 4 condition limited by the engagement of the spider 23 with the ends of slots 21. As before, relief and increase of fluid pressures reciprocates the nozzle tube, enabling the spider to clear out the slots from any materials lodged therein.

I claim:

1. A self-cleaning nozzle assembly comprising:

- (a) a hollow body having an inlet end adapted to receive fluid from a conduit,
- (b) an axially reciprocable nozzle tube contained within the body,
- (c) means whereby the nozzle tube is responsive to increasing and decreasing inlet fluid pressures respectively to move between projected and retracted positions,
- (d) said tube being longitudinally slotted to pass fluid from within the body into the tube, and
- (e) means carried by the body and extending into the tube slot to effect removal of clogging material upon axial displacement of the tube.

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2. A nozzle assembly according to claim 1, in which said means (c) comprises a piston carried by the tube causing the tube to project out through an opening in the body in response to increasing fluid pressure, and means reversely biasing the tube.

3. A nozzle assembly according to claim 1, in which said means (c) comprises a bellows portion of said body to which the tube is attached and which is expansible and contractable to project and retract the tube.

4. A nozzle assembly according to claim 1, in which said inlet end of the body is threaded for connection with a conduit.

5. A nozzle assembly according to claim 1, in which said means (e) is positioned within the inlet end of the body.

6. A nozzle assembly according to claim 1, in which said tube is reciprocable out of the inlet end of the body.

7. A nozzle assembly according to claim 1, in which said tube has a plurality of circularly spaced slots (d) and said means (e) is received within said slots.

8. A nozzle assembly according to claim 7, in which said means (e) comprises cross members intersecting within the tube and stationarily positioned within the body.

9. A nozzle assembly according to claim 1, in which

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the slot width in the tube is less than the minimum internal fluid passing diameter of the tube.

10. A nozzle assembly according to claim 1, in which the tube has a plurality of circularly spaced parallel slots (d) the width of each being less than the minimum internal fluid passing diameter of the tube, and said means (e) is received within said slots.

11. A nozzle assembly according to claim 9, in which said means (c) comprises a piston carried by the tube causing the tube to project in response to increasing fluid pressure, and means reversely biasing the tube.

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U.S. Cl. X.R.

239—123