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H. E. NORTON

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SPRAY NOZZLE

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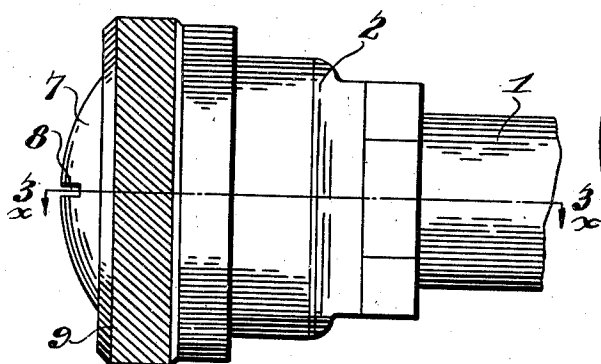


Fig. 1

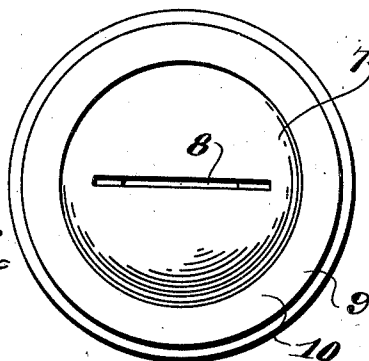


Fig. 2

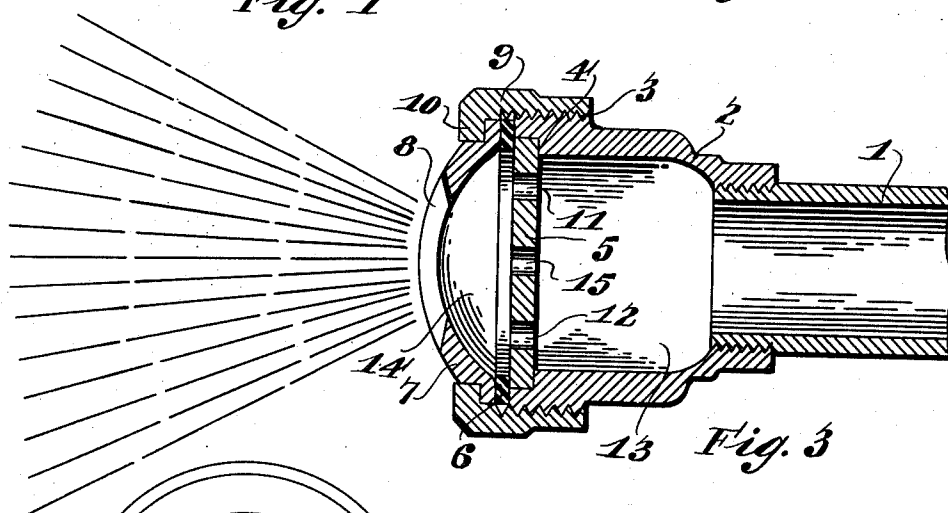


Fig. 3

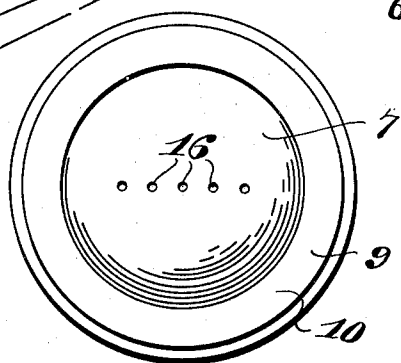


Fig. 5

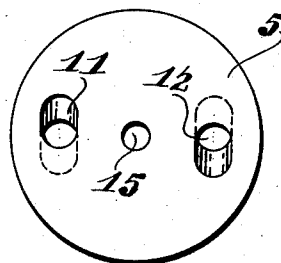


Fig. 4

INVENTOR
Herbert E. Norton
BY
Frank Kiipfer
ATTORNEY

UNITED STATES PATENT OFFICE

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SPRAY NOZZLE

Herbert E. Norton, Brockport, N. Y.

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8 Claims. (Cl. 299—120)

The object of this invention is to produce a spray nozzle that will convert liquid into a very fine spray or mist.

Another object of the invention is to produce a spray nozzle that will produce a very fine spray distributed over a considerable angle in a comparatively thin layer.

Another object of the invention is to provide a spray nozzle that will produce a very fine spray from liquid forced through it under high pressure.

Another object of the invention is to produce a spray nozzle that will produce a fine spray, by forcing the liquid through a narrow slot in a curved plate at the end of the nozzle, under high pressure.

Another object of the invention is to combine in the nozzle a curved plate having a narrow slot therein at the end of the nozzle, with a baffle plate inside of the nozzle having openings therein that give to the liquid a tangential or swirling motion before it reaches the exit opening.

These and other objects of the invention will be illustrated in the drawing, described in the specification, and pointed out in the claims at the end thereof.

In the drawing:

Figure 1 is a side elevation of the spray nozzle.

Figure 2 is an end elevation of the spray nozzle, looking at it from the left of Figure 1.

Figure 3 shows a cross section of the nozzle, the section being taken on the line 3x—3x of Figure 1.

Figure 4 is an elevation of the baffle plate shown in Figure 3.

Figure 5 is a front elevation of a modified form of the spray nozzle.

In the drawing like reference numerals indicate like parts.

In the drawing reference numeral 1 indicates a tube, on which is mounted a housing or hub 2. This housing is threaded on the outside as indicated at 3 and on the end is provided with a seat 4, on which rests the twirling or baffle plate 5. On this baffle plate rests a washer or gasket 6. On top of this rests a concave disc 7 having a long, narrow slot 8 therein. The parts are held together by a cap 9, which is threaded on to the housing and has an annular shoulder 10 thereon, which engages the rim or seat provided therefor in the concave disc 7.

The twirling plate 5 is stationary and has two holes 11 and 12 cut tangentially near the periphery thereof. This plate divides the end of the spray nozzle into two chambers 13 and 14. The twirling plate 5 causes the liquid as it flows from

the rear chamber 13 into the forward chamber 14 to take on a swirling motion. The twirling plate is also provided with a central opening 15 through which some of the liquid goes direct. The tangential openings 11 and 12 form a whirlpool in the forward chamber 14, and the central opening 15 sends a jet into the forward chamber that tends to break up the whirlpool. These openings cause the liquid to reach the slot 8 with cross currents that interfere with or prevent the liquid from being projected through the slot in a solid mass, and instead, cause it to be spread out and broken up into an extremely fine spray or mist within a short distance of the nozzle, and which, under high pressure of from 200 to 500 pounds, is projected from the nozzle to an ample distance for effective spraying of fruit trees.

The mist emerges from the nozzle in a fan-shaped stream that tapers anywhere from 45 to 60 degrees, and it is spread over an area to correspond, in a sheet that is comparatively thin. The spray or mist is practically free from drops or particles of any considerable size.

In the commercial samples which applicant has already made, the outside diameter of the concave plate 7 is about one and five-sixteenths inches, and the curvature of the concave is made with a radius of about .8125 inch, and the slot is cut with a mill having a width of about a thirty-second of an inch. The tangential holes 11 and 12 are drilled with a bevel of about sixty degrees, and the central hole 15 is drilled substantially perpendicular to the plate.

The plate 5 may be formed with as many as six tangential holes, similar to the holes 11 and 12, or with any intermediate number.

In Figure 5 I have shown a modification of the plate 7, in which the plate 7 with the slot 8 is replaced by a similar concave plate with a series of five small holes 16, 16 therein.

I claim:

1. A spray nozzle, comprising a tube, a hub on the end thereof, a flat stationary twirling plate in the end of said hub having slanting twirling openings therein through which liquid can pass, a concave plate attached to the end of the hub and forming a shallow substantially spherical segmental chamber between it and the twirling plate, a long narrow slot extending diametrically across and through the concave plate.

2. A spray nozzle, comprising a tube, a hub on the end thereof, a flat stationary twirling plate closing the end of said hub, a concave plate attached to the end of the hub and forming a

shallow substantially spherical segmental chamber between it and the twirling plate, said twirling plate having tangential openings therein through which liquid can go, said tangential openings arranged to cause the liquid to whirl in the segmental chamber, said concave plate having a long slot extending diametrically across and through it.

3. A spray nozzle, comprising a tube, a hub on the end thereof, a flat twirling plate closing the end of said hub, a concave plate attached to the end of the hub and forming a forward segmental chamber between it and the twirling plate, said twirling plate having tangential openings therein through which liquid can go, said tangential openings causing the liquid to whirl in the forward chamber, said concave plate having a long slot extending diametrically across it, said twirling plate having a central opening therein through which a jet of liquid passes straight forward into the liquid that has passed through the tangential openings.

4. A spray nozzle, comprising a tube, a hub on the end thereof, a twirling plate at the end of said hub forming a chamber in the hub between the plate and the tube, said plate having slanting twirling openings therein through which liquid can pass, a concave plate attached to the end of the hub and forming a substantially spherical shallow chamber between it and the twirling plate, a long narrow slot extending diametrically across and through the concave plate.

5. A spray nozzle, comprising a tube, a hub on the end thereof, a flat stationary twirling plate closing the end of said hub having a slotted orifice, a concave plate attached to the end of the hub and forming a shallow substantially spherical segmental chamber between it and the twirling plate, said twirling plate having two tangential openings therein near the margin thereof spaced about 180 degrees apart through which the liquid passes in directions adapted to set up a whirling motion in the forward chamber around the central axis of the plate, a central opening passing axially through said twirling plate between the tangential openings, through which central opening liquid passes directly toward the center of the concave plate, the liquid that passes through said tangential and axial

openings setting up cross currents in the forward chamber.

6. A spray nozzle comprising a tube, a hub on the end thereof, a stationary twirling plate in the end of said hub having slanting twirling openings therein through which liquid can pass, a concave plate attached to the end of the hub and forming a shallow substantially spherical segmental chamber between it and the twirling plate in which the liquid is adapted to whirl, said concave plate having a long narrow slot extending diametrically across it and through which the liquid passes under pressure, the area of the openings in the twirling plate being several times the area of the opening of the long narrow slot.

7. A spray nozzle, comprising a tube, a hub on the end thereof, a stationary twirling plate in the end of said hub having slanting twirling openings therein through which liquid can pass, a concave plate attached to the end of the hub and forming a substantially spherical shallow chamber between it and the twirling plate, and discharge opening means through said concave plate arranged along a substantial portion of a diametral line of said concave plate to produce a flat spray mist the cross-sectional area of said discharge opening means being less than the area of the twirling openings.

8. A spray nozzle comprising a hub, said hub having a shoulder and seat formed in one end thereof and having a male thread on the outside thereof, a twirling plate resting in said seat and closing the end of the sleeve, a washer resting on the end of the hub and the edge of the twirling plate, a shallow substantially spherical segmental plate having its edge resting on said washer, a sleeve having an inwardly turned flange on one end engaging over the outer edge of said segmental plate and having a female thread at the other end engaging the male thread on the hub and clamping the parts together, slanting twirling openings through said twirling plate and discharge opening means through said segmental plate arranged along a substantial portion of a single great circle of said segmental plate, to produce a flat spray mist, the cross-sectional area of said discharge opening means being less than the area of the twirling openings.

HERBERT E. NORTON.