

[54] **DOUBLE SPRAY NOZZLE**

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[58] Field of Search.....**239/467, 500, 502, 239/504, 554, 555, 568, 505, 518, 520, 552, 553, 590, 424, 419, 601, 424.5, 423, 422**

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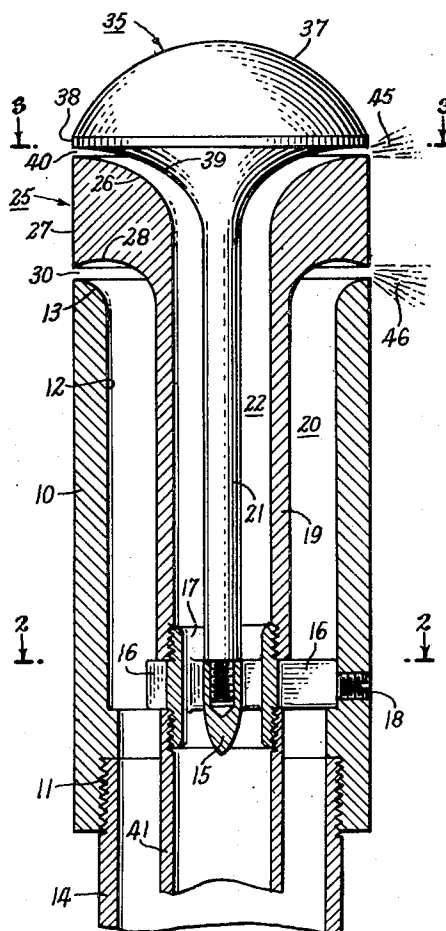
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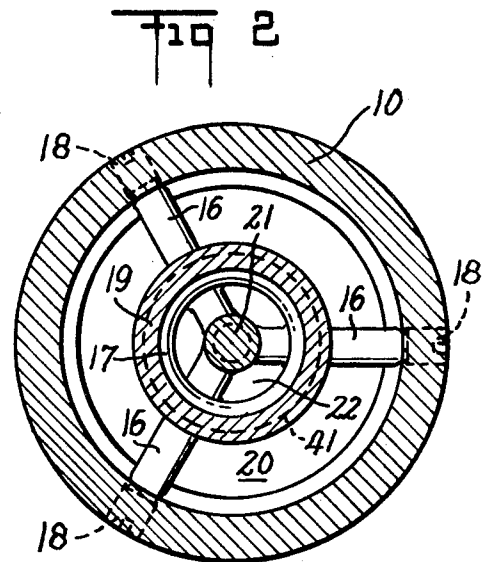
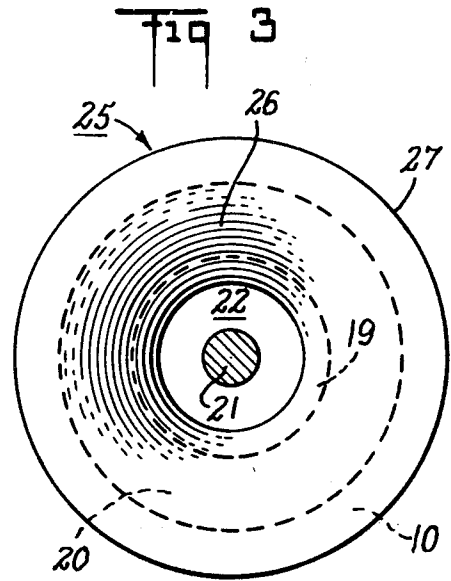
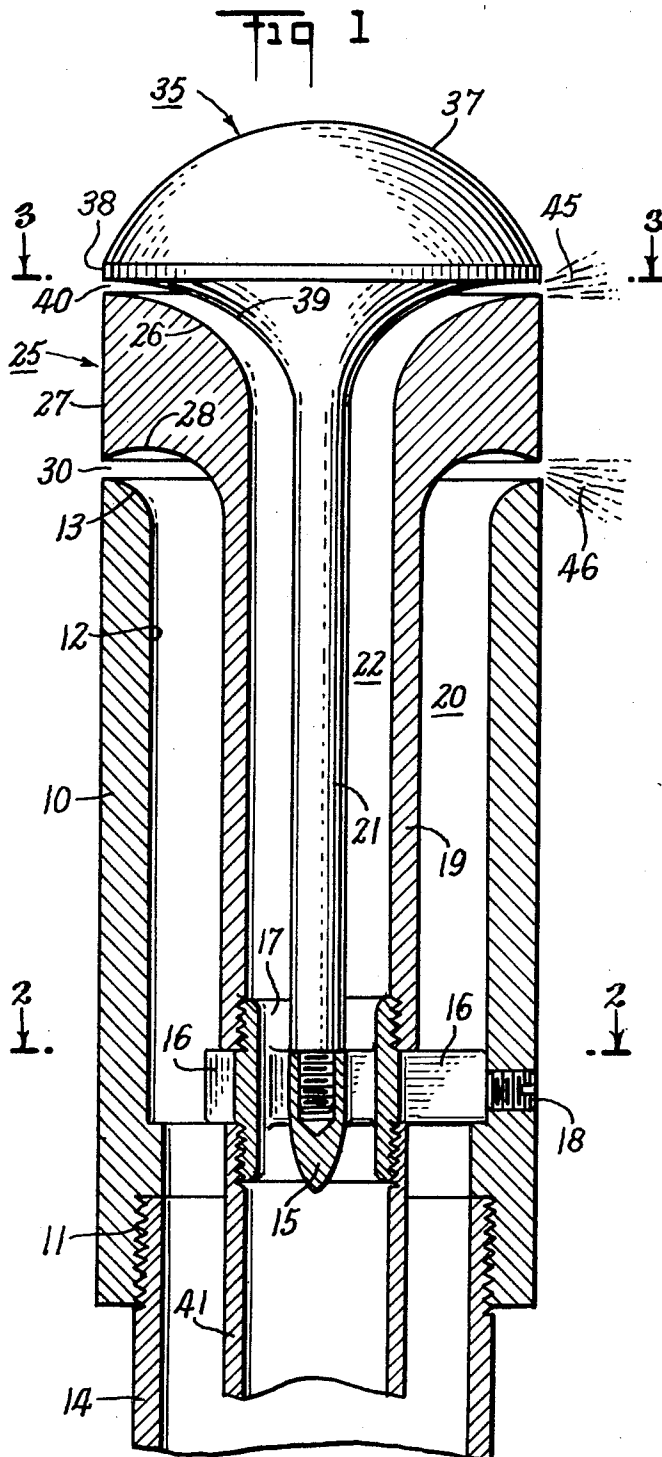
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[57] **ABSTRACT**

A nozzle for producing a pair of axially spaced radial sprays comprising a pair of concentric pipes, each having a deflector disc with its under surface shaped to deflect a cylindrical jet of liquid from an axial to a radial direction and to discharge the same as a radial spray.

4 Claims, 3 Drawing Figures





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DOUBLE SPRAY NOZZLE

This invention relates to spray nozzles and more particularly to a nozzle which is adapted to eject a pair of radial sprays having a common axis.

An object is to provide a nozzle of the above type wherein the two radial sprays may be caused to produce a predetermined angular relationship. They may extend in parallel planes or may diverge or converge according to the requirements.

Another object is to provide a double spray of the above type which extends uniformly around the entire periphery of the nozzle.

Another object is to provide annular orifices of the same size or they may be of different cross-sectional dimensions to allow different relative quantities of water to be emitted in the respective sprays.

A further object is to provide precise positioning of the internal components to provide radial sprays and emitting the sprays at different angles in reference to the axis of the nozzle at different densities and in some cases at different liquid pressures.

A feature of the invention is a double radial spray which is adapted for use in washing gases or washing the inner surfaces of cylinders or other uses wherein a wide radial spray is required.

Other objects and features of the invention will be apparent as the nature of the invention is more fully disclosed.

In one embodiment the spray apparatus includes a pair of concentric pipes which may carry the same or different liquids. A rod is disposed axially within the inner pipe and the pipes and rod are dimensioned to provide a pair of concentric, annular passages for liquid. The rod extends axially beyond the inner pipe and both the rod and the inner pipe carry a deflector disc having its under surface shaped to intercept the liquid in the respective annular passages and to deflect the flow from axial to a radial direction and to discharge the same as a radial spray.

The deflectors may be disposed to eject the liquid spray in parallel planes or in diverging or in converging planes and at various angles to the axis as may be desired.

The nature and scope of the invention will be better understood from the following description, taken in connection with the accompanying drawing in which a specific embodiment has been set forth for purposes of illustration.

In the drawing:

FIG. 1 is an axial section through a nozzle embodying the invention;

FIG. 2 is a section taken on the line 2—2 of FIG. 1 showing the supporting spider for the pipes and rod; and

FIG. 3 is a section taken on the line 3—3 of FIG. 1 showing the spray pattern.

Referring to the drawing more in detail, the apparatus is shown as embodying a housing 10 having an internally threaded bore 11 at its inlet end and a larger bore 12 having flared edges 13 at its outlet end. The housing 10 is shown as attached to a pipe 14 through which the liquid is supplied. Within the bore 12 is a spider 15 having streamlined legs 16 and a ring 17 with externally threaded extensions above and below the legs 16 which is secured in place in the bore 12 by set screws 18. Threaded to the spider ring 17 a pipe 19, concentric

with and spaced from the inner surface of the bore 12 provides an annular channel 20 for the flow of liquid as a hollow cylinder around the outside of the pipe 19.

The spider 15 also carries a rod 21 which is concentric with the pipe 19 and is spaced therefrom to form an annular channel 22 for the flow of liquid in the form of a hollow cylinder along the outer surface of the rod.

A deflector disc 25 is mounted integrally to the pipe 19 at a point beyond the housing 10. This deflector disc 25 has a convex upper surface 26, an annular rim 27, and a channel face 28 in its under surface. This channel face 28 in radial section intercepts the cylinder of liquid from chamber 20 and is smoothly curved to deflect the liquid into a radial direction. The liquid is discharged from the annular orifice 30 defined by the flare 13 of housing 10 and the lower face 28 of deflector 25 as a radial spray.

The rod 21 extends beyond the pipe 19 and beyond the deflector disc 25 and carries a deflector disc 35 which is similar to the deflector disc 25. The deflector disc 35 may be integrally attached to the rod 21 and is formed with a convex upper surface 37 and a rim 38 and with an annular channel face 39 in its under surface. The channel face 39 is shaped and positioned to receive the cylinder of liquid from the chamber 22, to deflect it into a radial path and to cooperate with the upper face 26 of deflector 25 to form annular orifice 40 to discharge the same as a radial spray.

In some instances a second supply pipe 41 may be carried by the spider 15 to communicate with the pipe 19 for supplying a second liquid or a liquid having a different pressure to the inner pipe.

It is obvious that the radial angle or plane of discharge of the liquid spray will depend upon the shape of the corresponding annular channels formed by the faces 13, 28 and 26, 39 so that they may converge or diverge or extend in different parallel planes as desired.

The upper convex surface 26 of the deflector disc 25 may cooperate with the lower channel face 39 of deflector disc 35 to confine and assist in directing the spray 45. The flared end 13 of nozzle housing 10 cooperates with lower channel face 28 of deflector disc 25 to confine and assist in directing the spray 46.

The spray apparatus above described may be used in the wash zone of a gas washing apparatus of the type shown in copending application Ser. No. 155,916, filed June 23, 1971 wherein the gas is passed through the spray zone in the form of an annular stream through which the liquid spray is passed from an axially disposed nozzle. It is also adapted to various other uses as will be apparent to a person skilled in the art.

What is claimed is:

1. A spray nozzle for forming a pair of radial sprays comprising a housing having a bore forming a liquid passage, a concentric pipe in said bore spaced to form therewith an annular liquid passage, a rod concentrically mounted in said pipe and spaced to form therewith a second annular liquid passage, said pipe and rod being mounted in a spider secured in said bore of said housing, a deflector plate carried by said pipe beyond said housing and having in its under surface an annular channel shaped and positioned to intercept the liquid from said first mentioned annular passage and to deflect the same from an axial to a radial direction and to discharge the same as a radial spray extending around the entire periphery of said housing, and a second deflector plate disposed on said rod beyond said first de-

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flector plate and having in its under surface an annular channel shaped and positioned to receive liquid from said second annular passage and to deflect the same from axial to radial direction and to discharge the same as a second radial spray extending entirely around the periphery of said housing.

2. Apparatus as set forth in claim 1 in which the upper surface of said first plate cooperates with said channel in said second plate to confine and direct said

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second mentioned radial spray.

3. Apparatus as set forth in claim 1 in which a second supply pipe is connected to supply liquid to said first mentioned pipe.

4. Apparatus as set forth in claim 1 in which the upper surface of said housing is shaped to cooperate with said first mentioned annular channel to confine and direct said first mentioned radial spray.

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