Nov. 19, 1957 J. ZIELINSKI 2,813,754

PRESSURE NOZZLES

Filed June 27, 1955

FIG. 1

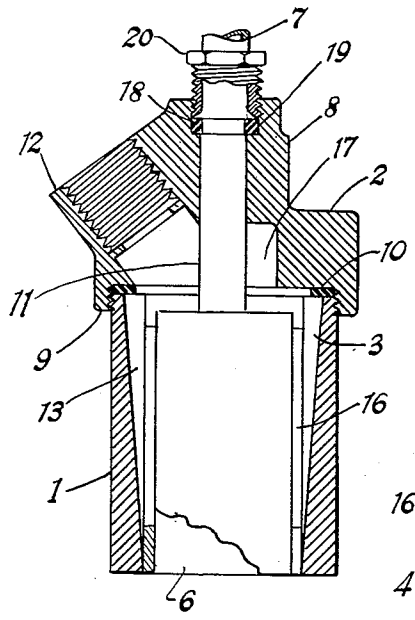


FIG. 2

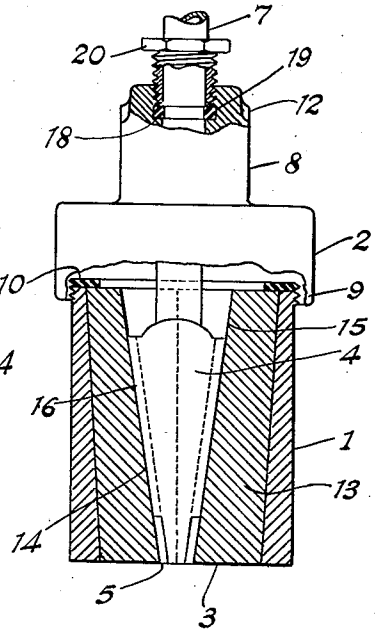


FIG. 3

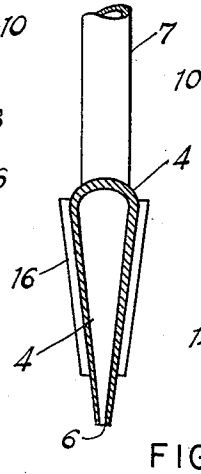


FIG. 5

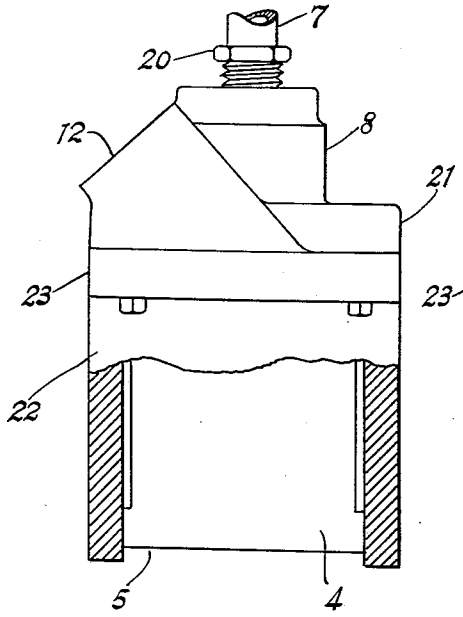


FIG. 6

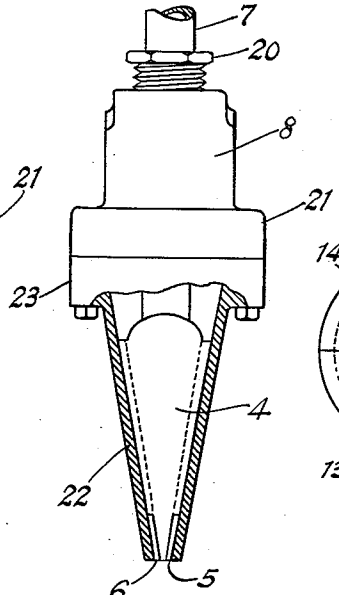
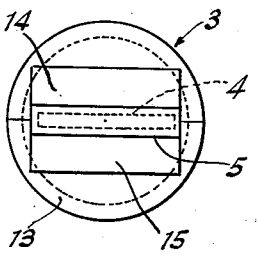


FIG. 4



INVENTOR

Joseph Zielinski

BY

William F. Nickel

ATTORNEY

United States Patent Office

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PRESSURE NOZZLES

Joseph Zielinski, Brooklyn, N. Y.

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6 Claims. (Cl. 299—140)

This invention is an improvement in nozzles and casings therefor, especially casings and nozzles from which more than one fluid can be forcibly delivered in the form of flat transversely extended jets for cleaning, scouring and other purposes.

The chief object of my invention is to provide a casing having means for supporting an inner nozzle and an outer nozzle enveloping the inner nozzle, with parts for connecting each nozzle to a separate supply of fluid medium, one or both of which may be under pressure, both nozzles being constructed to emit a wide thin sheet of spray and to direct the fluid along a surface to be treated instead of squarely against it, in volume and velocity sufficient to remove deposits and coatings of every kind from surfaces that have become foul with use.

Another object is to construct such nozzles so that the operation thereof can be regulated at will, preferably by the adjustment of one of the nozzles in the enveloping casing.

The nature and advantages of my improvement are clearly described hereinafter, and the novel characteristics are defined in the claims. On the drawings preferred embodiments of the device are illustrated, but variations of structure in minor respects may be adopted without deviation from the general design in which the invention resides.

On said drawings:

Figure 1 is a longitudinal or axial section of a casing with nozzles therein according to this invention.

Figure 2 is a similar section taken on a plane at right angles to the plane of section of Figure 1.

Figure 3 is a side view, partly in section of the inner spout or nozzle.

Figure 4 is a top view of the outer nozzle.

Figure 5 is a front elevation of a different form of the unit, and

Figure 6 is a side elevation thereof.

The casing comprises a section in the shape of a round sleeve 1 and a cap or head 2 secured to one end of the sleeve. A wedge-shaped nozzle 3 in the sleeve envelopes another nozzle 4, and the outer member or nozzle 3 has an outlet or discharge port 5 at the opposite end of the sleeve 1 at its thin end. The inner nozzle or spout 4 has a discharge port 6. Both discharge ports are elongated crosswise of the nozzles and narrow, and the discharge end of the nozzle 4 lies adjacent the port 5 in the nozzle 3. The nozzle or spout 4 is affixed to the end of a supply pipe 7 that extends through the cap 2 and projects from a boss 8 at the end of the cap remote from the sleeve 1. The cap or head 2 has a rim 9 surrounding a shoulder bearing a gasket 10 and the sleeve 1 is screwed into the rim and abuts the gasket 10. In the head is a chamber 11 adjacent the junction of the nozzle 4 and supply pipe 7, and the cap 2 has an inclined hollow boss 12 having a bore leading to the chamber 11 at one side of the boss 8, with internal threads to couple thereto a pipe to supply fluid to the nozzle 3.

The nozzle or spout 4 has flat sides joined by portions 12 that converge or taper from the juction with the pipe 7 to the port 6. The nozzle 4 is thickest and its interior largest at the junction of the nozzle 3 and pipe 7, which is connected to the nozzle 3 at the middle of the latter. The outer nozzle 3 is made of two semi-round halves 13, the outer faces of which conform to the interior surface of the tubular sleeve 1. The opposite or inner faces of said halves are flat and in contact with each other, and each half has on its inner face a recess 14. The inner ends or backs 15 of these recesses are flat and converge towards the port 5; and the nozzle 4 has ribs 16 at each end making the same angle with each other as the inner ends 15 of the matching recesses 14 in the nozzle 3. When the discharge end of the nozzle 4 is adjusted towards or into the port 5, the ribs 16 make contact with the surfaces 15 in the nozzle 3. The ribs 16 extend from the closed end of the nozzle or spout 4 towards the port 6 therein but terminate short of the discharge end of the nozzle 4.

The inside of the sleeve 1 is not cylindrical but conical and contracts from the gasket 10 to the opposite or outer end of the sleeve 1. The rounded sides of the two parts 13 of the nozzle 4 are also conical and contract in the same direction; and when they are snugly seated in the sleeve they extend from the outer end of the sleeve into the gasket 10. The outer end of the sleeeve 1 may have an inside retaining flange to engage the parts 13 of the nozzle 3, if desired.

The nozzle 4, however, is a little shorter than the nozzle 3 and when the discharge ends of the two nozzles are flush with each other the inner end of the nozzle 4 is separated by a small space from the gasket 10. Hence the nozzle 4 can be adjusted towards or from the adjacent edge 17 of the chamber 11.

To facilitate adjustment of the spout or member 4, the pipe 7 is slidably mounted in the head 2, and the outer end of the boss 8 has a counterbore with a shoulder 18 having a gasket 19 thereon surrounding the pipe 7. The counterbore is threaded and receives a nut 20 surrounding the pipe 7. The inner end of the nut may be concave to press on the gasket and make it grip the pipe 7 and hold it with the nozzle 4 in adjusted position. By loosening the nut the pipe 7 and nozzle can be moved and readjusted.

Compressed air can be delivered through the nozzle 3 to flow out through the space in the nozzle 3 around the thin end of the nozzle 4 and and a detergent medium can be supplied through the pipe 7 and nozzle 4. Compressed air and water or steam and water can also be forced through the nozzles, and either nozzle can be made to discharge any of the fluids mentioned. A most thorough scouring or cleaning action can be obtained. The combined discharge spreads out in a thin sheet, directed along the surface being treated.

In Figures 5 and 6 the casing is made with a cap 21 secured to a section 22, by means of bolts engaging flanges 23 on the head and section 22. The latter has converging sides with a long transverse narrow discharge opening like the opening 5 above mentioned to form the outer nozzle 3, and inside the section 22 is the nozzle 4 of the same shape as before, with discharge opening like the opening 6. When the ribs 16 on the nozzle 4 make contact with the inside of the nozzle 3, the openings 5 and 6 are flush, and the nozzle 3 can be retracted and adjusted as before by loosening the nut 20 and moving the nozzle 4 and pipe 7. The nozzle 3 is supplied with fluid entering through the boss 12 and the operation is the same as before.

My invention is therefore quite simple but well designed to serve all the uses for which it is intended.

In practice the device can be utilized with a fluid medium under pressure supplied to the outer nozzle **3** only, while a cooperating substance is discharged from the nozzle **4**, being drawn therefrom by the suction or force of the fluid delivered by the nozzle **3**. It is especially effective for scouring when compressed air or steam enters the nozzle **3** while sand is fed into the pipe **7** and is drawn out at the nozzle **6**. Similarly a detergent or a chemical medium can be fed to the inner nozzle **4** and drawn out by the pressure fluid emitted by the nozzle **3**.

Having described my invention what I believe to be new is:

1. The combination of a nozzle having a narrow, transversely elongated outlet, another nozzle having a narrow transversely elongated outlet within the first-named nozzle, a casing in which said nozzles are adjustably mounted with said outlets in proximity to each other, said first-named nozzle having inner surfaces converging towards the outlet of said first-named nozzle, the other nozzle being wedge-shaped and seated between said surfaces, said casing having means for separately connecting said nozzles to sources of fluid to be discharged by each of said nozzles.

2. The combination of a nozzle having a narrow transversely elongated outlet and flat inside surfaces converging towards said outlet, another nozzle having a narrow transversely elongated outlet within the first nozzle, a casing in which said nozzles are adjustably mounted with said nozzles in proximity to each other, said first-named nozzle having inner surfaces converging towards the outlet of said first-named nozzle, the other nozzle being wedge-shaped and seated between said surfaces, said casing having means for separately connecting each nozzle to sources of fluid to be discharged from said outlets, said other nozzle having projecting ribs to engage said inside surfaces.

3. The combination of a nozzle having a narrow transversely elongated outlet and flat inside surfaces converging towards said outlet, another nozzle having a narrow transversely elongated outlet within the first nozzle, a casing in which said nozzles are adjustably mounted with said nozzles in proximity to each other, said first-named nozzle having inner surfaces converging towards the outlet of said first-named nozzle, the other nozzle being wedge-shaped and seated between said surfaces, said casing having means for separately connecting each nozzle to sources of fluid to be discharged from said outlets, said other nozzle having projecting ribs to engage said inside surfaces, said ribs being disposed along the longitudinal side edges of said other nozzle and projecting from both faces thereof.

4. The combination of a nozzle having a narrow transversely elongated outlet, another nozzle having a narrow transversely elongated outlet within the first-named nozzle, a casing in which said nozzles are mounted with said outlets in proximity to each other,

said first-named nozzle having inner surfaces converging towards the outlet of said first-named nozzle, the other nozzle being wedge-shaped and seated between said surfaces, said casing having means for connecting the first-named nozzle to a fluid medium to be discharged from the first-named nozzle, and a pipe connected to said other nozzle, and projecting from said casing to supply a fluid to the other nozzle, said casing having means for engaging said pipe to hold the other nozzle and pipe in adjusted position.

5. The combination of a nozzle having a narrow transversely elongated outlet, another nozzle having a narrow transversely elongated outlet within the first-named nozzle, a casing in which said nozzles are mounted with said outlets in proximity to each other, said first-named nozzle having inner surfaces converging towards the outlet of said first-named nozzle, the other nozzle being wedge-shaped and seated between said surfaces, said casing having means for connecting the first-named nozzle to a fluid medium to be discharged from the first-named nozzle, and a pipe connected to said other nozzle, and projecting from said casing to supply a fluid to the other nozzle, said casing having means for engaging said pipe to hold the other nozzle and pipe in adjusted position, the first-named nozzle having flat inside surfaces converging towards said first-named outlet, said other nozzle having ribs projecting from both faces thereof to maintain the other nozzle spaced from said inclined surfaces.

6. The combination of a nozzle having a narrow transversely elongated outlet, another nozzle having a narrow transversely elongated outlet within the first-named nozzle, a casing in which said nozzles are mounted with said outlets in proximity to each other, said first-named nozzle having inner surfaces converging towards the outlet of said first-named nozzle, the other nozzle being wedge-shaped and seated between said surfaces, said casing having means for connecting the first-named nozzle to a fluid medium to be discharged from the first-named nozzle, and a pipe connected to said other nozzle, and projecting from said casing to supply a fluid to the other nozzle, said casing having means for engaging said pipe to hold the other nozzle and pipe in adjusted position, the first-named nozzle having flat inside surfaces converging towards said first-named outlet, said other nozzle having ribs projecting from both faces thereof to maintain the other nozzle spaced from said inclined surfaces.

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