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J. ZIELINSKI

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SPRAYER NOZZLE

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*Fig. 1.*

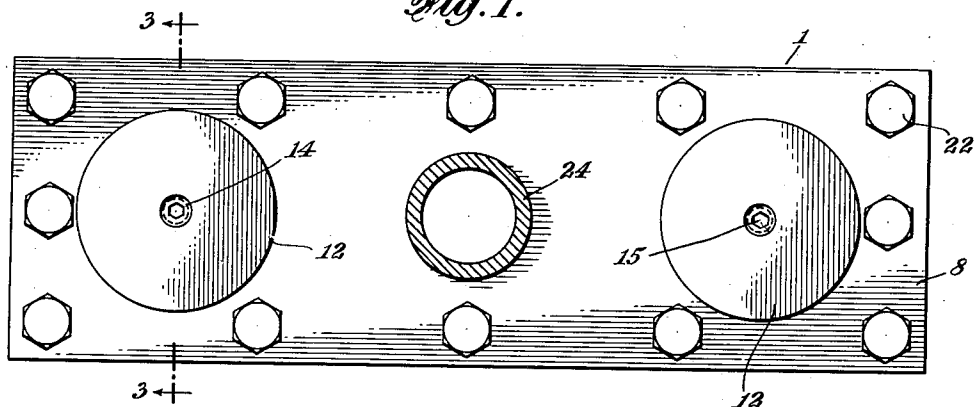


*Fig. 2.*

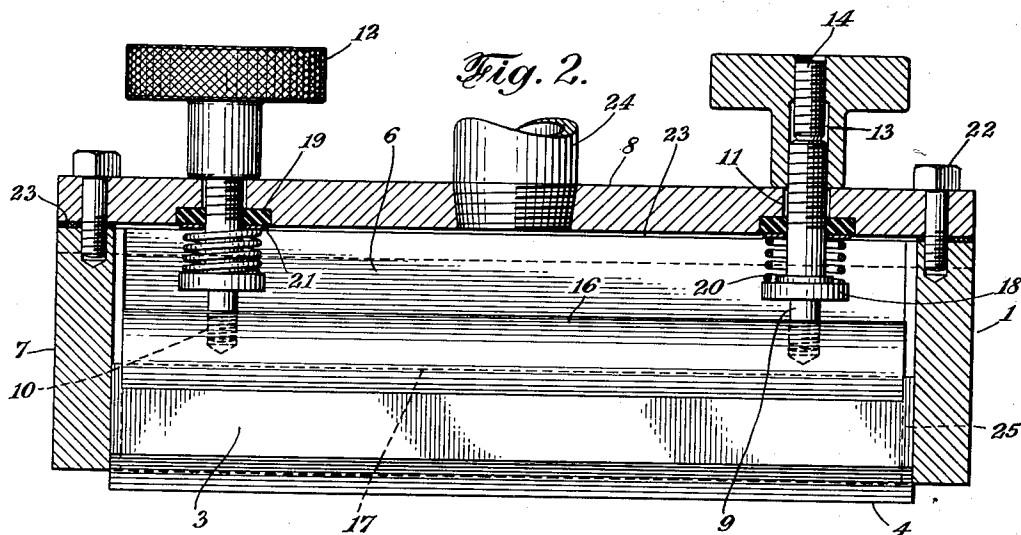
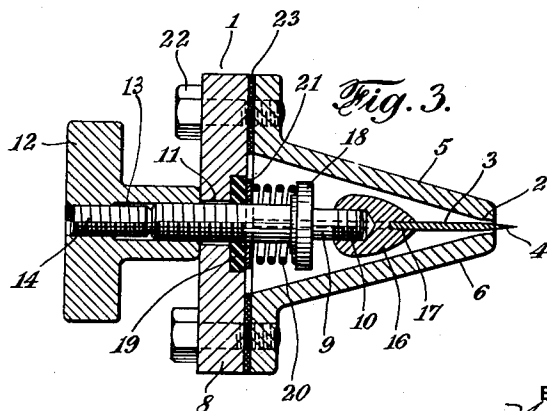


*Fig. 3.*



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## UNITED STATES PATENT OFFICE

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## SPRAYER NOZZLE

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4 Claims. (Cl. 299-136)

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This invention is an improvement in spray nozzles, especially nozzles from which a fluid under pressure can be forcibly discharged in the form of a jet to serve a required purpose.

An important object of this invention is to provide a nozzle which is elongated in shape and designed to eject a spray of fluid in the form of a thin sheet, the flow being coplanar with reference to the length of the sheet, and uniform in volume per unit of time and velocity throughout the extent thereof. The nozzle is adapted to emit either liquid or gas and is constructed to serve a variety of purposes in the most efficient and practical manner.

On the drawings,

Figure 1 is a rear view of the casing or body of the nozzle;

Figure 2 is a transverse horizontal section thereof; and

Figure 3 is a transverse vertical section on line 3-3 in Figure 1.

The nozzle comprises a body or casing 1 which has an elongated outlet opening 2. This opening is relatively narrow and it is controlled by a valve element or spray plate 3 which has on the side adjacent said opening a tapered edge 4. The casing has a top 5 and a bottom 6 which converge toward the opening 2 and it is closed by ends 7 and rear 8. The top, bottom and ends may be in one piece, but the member 8 is detachable.

The valve 3 is movable transversely of its length to control the discharge of fluid through the outlet 2. For this purpose it is adjustably supported by means comprising rods 9, which are mounted in the back plate 8 of the casing.

These rods have threads 10 on their inner ends. They project at the rear 8 through openings 11 therein, and on their outer ends are heads 12. The outer ends also have threads and are inserted into threaded bores 13 in the heads 12. Screw plugs 14 in these openings hold the knobs or heads 12 and rods 9 in rigid relation, so that by means of the heads the rods can be rotated. The plugs 14 have polygonal recesses 15 to receive a tool to operate the plugs into and out of position.

The spray plate 3 is attached to a bar 16, substantially pear-shaped in cross section, with its thinner edge presented to the discharge outlet 2. This bar has a slot 17 which receives the edge of the plate 3, and the latter is secured to the bar in any suitable way. The upper and lower sides of the bar 16 being curved, the spaces between the bar and the inner faces of the top 5

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and bottom 6 are of such shape as to afford an approximately Venturi-shape in cross section, and give a smooth flow of the fluid through them. Each rod 9 has a collar or flange 18 inside the casing in front of the rear wall 8, and said wall is counter-bored on its inner face at the openings 11 to receive packing rings 19. Coiled compression springs 20 encircle the rods 9, seating against the collars 18 and washers 21 over the packing rings 19. Thus, while the knobs or heads 12 can be turned to rotate the rods and adjust the valve 3, leakage through the openings 11 is always prevented.

The rear member 8 is affixed to the casing 1 by screws 22, and packing 23 is interposed between it and the top 5, lower part 6 and ends 7. Fluid under pressure is forced into the casing 1 through one or more supply pipes 24. This casing can be of any desired length and the fluid issues from the outlet 2 in the form of a long continuous sheet and in greater or less volume according to the position of the valve 3. Preferably several inlets 24 for a longer sprayer are used. The sides or ends 7 are fashioned to have grooves 25 on their inner faces to serve as guideways for the ends of the spray plate 3, projecting a little beyond the ends of the bar 16. The adjusting movement of the element 3 is thus facilitated.

The sprayer above described is well designed to give a continuous sheet of spray of constant cross section and volume at all points along the length of the opening 2. The fluid may be gas or liquid, as already indicated, and the pressure of the fluid at the discharge opening may be varied over a wide range by adjusting the valve plate to be close to or relatively remote from the opening 2. The nozzle or sprayer can be employed for the separation of materials, as in de-scaling, debarking and washing; for cooling and for extinguishing fires, or to emit a thin sheet of liquid for dyeing.

The structure of the casing and valve plate is such that the fluid entering the body is uniformly distributed inside the casing, and is forced to pass by on both sides of the bar 16. This bar is of such shape as to prevent turbulence and gives the fluid a smooth flow up to the exit thereof at the outlet 2. The valve has such shape with respect to the inside surfaces of the outlet 2 as to give to all the fluid in contact with it, the same direction. The fluid thus is given a constant pressure and the out-going jet is uniform and even along the full length of the plate.

With the bar 16 having the cross section above stated, the spaces between the bar and the

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upper and lower walls of the casing cause the fluid to have a very smooth flow above and below the valve plate. The two currents converge and unite at a predetermined distance from the end of the plate in the opening 2. This distance is regulated by the concavity and slope of the tapered edge 4 of the valve 3, and the effect of a small vacuum created over and under the valve by the rapid passage of the fluid past the valve plate 3. The slight difference in pressure flattens out the spray entirely as it leaves the casing; and affords the long continuous sheet desired.

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

1. A nozzle comprising a hollow body having a relatively narrow opening, a valve element having a tapered edge of substantially the same length as said opening, a bar in said body to which the valve is affixed, said body having inside surfaces converging towards said opening, said bar being substantially parallel to said opening, and having rounded sides presented to said surfaces and tapering toward said element, means comprising a rod attached to the bar and extending to the outside of the body, a collar on said rod within the body, an elastic member encircling the rod between said collar and one of the inside surfaces of the body, and the rod having a threaded portion outside of the body, a knob on said portion and a screw plug in said knob engaging said rod.

2. The nozzle according to claim 1 in which the ends of the body have grooves in line with the ends of said opening, and the valve element projects beyond the ends of the bar into said grooves.

3. A nozzle comprising a hollow body having a converging top and bottom, ends secured thereto, and a rear member attached to the top and

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bottom and ends, the top and bottom converging and being separated along one edge to present a narrow elongated opening, a valve element having a tapered edge in said opening of substantially the same length as said opening, a bar to which the valve element is affixed, said bar having rounded sides presented to the converging top and bottom and converging towards said valve element, means comprising a rod rotatably attached to the bar and projecting through the rear member to the outside of the body, a collar on said rod in the body, a spring between the collar and the rear member, the outer end of said rod being threaded, a knob screwed upon said threaded end and a screw plug in the knob for releasably securing the knob to the rod.

4. The nozzle according to claim 3 in which the ends of the body have guide grooves in line with the edge of said opening and the valve element projects beyond the ends of the bar into said guide grooves.

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#### REFERENCES CITED

The following references are of record in the file of this patent:

#### UNITED STATES PATENTS

| Number    | Name       | Date           |
|-----------|------------|----------------|
| 384,524   | Heberer    | June 12, 1888  |
| 807,025   | Henry, Jr. | Dec. 12, 1905  |
| 910,178   | Cosmovici  | Jan. 19, 1909  |
| 1,085,313 | Wickel     | Jan. 27, 1914  |
| 1,297,135 | Fricker    | Mar. 11, 1919  |
| 1,545,670 | Linke      | July 14, 1925  |
| 1,561,809 | Valerius   | Nov. 17, 1925  |
| 1,663,263 | Sharp      | Mar. 20, 1928  |
| 2,130,629 | Clayton    | Sept. 20, 1938 |
| 2,321,792 | Bowie      | June 15, 1943  |