June 4, 1929. W. H. KLEIN 1,716,175

SPRAYHEAD AND METHOD OF SPRAYING

Filed May 6, 1924

Fig. 1.

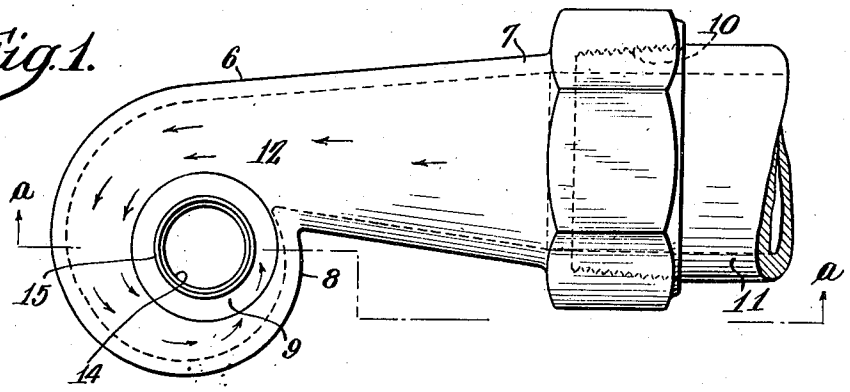



Fig. 2.

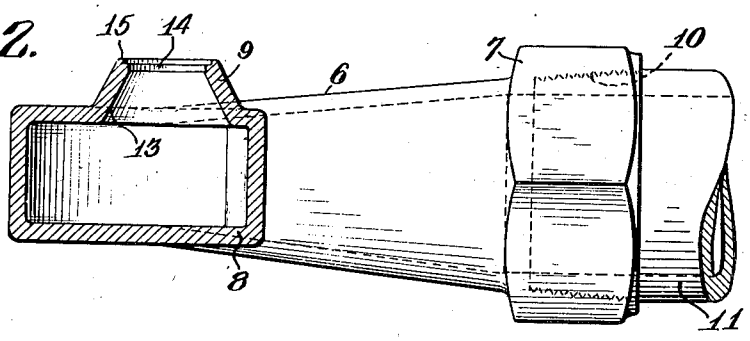



Fig. 3.

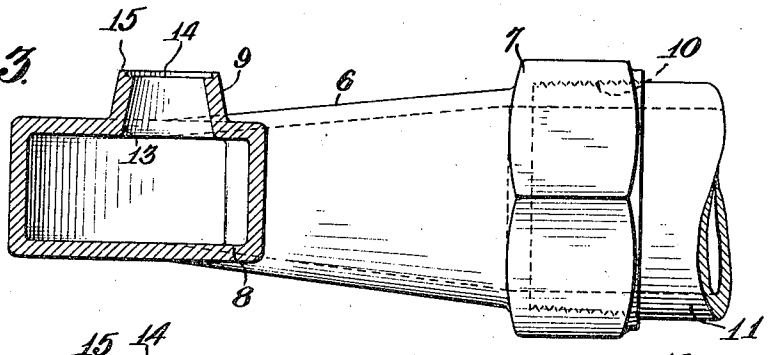
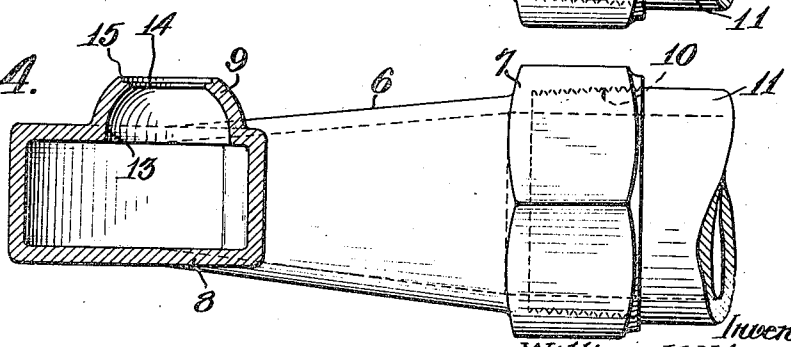



Fig. 4.




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# UNITED STATES PATENT OFFICE.

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## SPRAY HEAD AND METHOD OF SPRAYING.

Application filed May 6, 1924. Serial No. 711,327.

My invention relates to sprayheads and more particularly to outlet nozzles from sprayheads.

A purpose of my invention is to provide an involute sprayhead having lateral discharge with an outwardly converging discharge nozzle.

A further purpose is to have the converging nozzle of circular section which may be, longitudinally, either conical or bell form.

Further purposes will appear in the specification and in the claims.

I have preferred to illustrate my invention by two forms only, selecting forms that are practical, efficient, reliable and inexpensive, and which at the same time well illustrate the principles involved.

Figure 1 is a top plan view of an involute spray head supplied with my invention.

Figures 2, 3 and 4 are sectional elevations taken upon the line *a—a* of Figure 1 and illustrating slightly different forms, of any one of which Figure 1 may be considered as a plan view.

In the drawings similar numerals indicate like parts in all figures.

Describing in illustration and not in limitation and referring to the drawings:—

The present invention relates more particularly to the form of discharge nozzle for spray heads of the general type disclosed and claimed in my application for rigid spray head, filed June 9, 1922, Serial No. 567,001.

The sprayhead 6 comprises intake 7, main compartment 8 and tubular discharge nozzle 9.

The intake, enlarged and internally threaded at its inlet 10 to connect to water supply pipe 11, preferably has its initial circular section gradually modified to a rectangular section at the point 12 where the water discharges into compartment 8. Desirably the sectional area along the intake throat progressively reduces toward the discharge end, providing thus gradual increase of water velocity through the intake and the rectangular section of the inlet at the edge of the compartment 8 gives an interiorly-flat stream there.

The contour of the body in section perpendicular to the axis of the discharge nozzle is preferably that of a flat spiral or involute beneath and about inlet end 13 of the discharge nozzle. The outlet is much smaller in cross section than the supply and preferably smaller than the discharge end of the throat, to provide progressive reduction in cross section from the inlet to the discharge nozzle. The spiral or involute walls unite opposite walls of the intake, departing or "offsetting" from opposite vertical walls of the rectangular intake gradually (tangentially) at one lateral wall and abruptly at the opposite lateral wall.

The inlet of the discharge nozzle is offset both horizontally and vertically from the intake and is relatively near to the abruptly offsetting side of the body, at or near the inner end of the involute curve defined by the water.

The lines of flow are indicated roughly by the arrows of Figure 1.

I have found it advantageous to make the tubular discharge nozzle converge toward its outlet and to make the outlet of much smaller cross section than the inlet. The reduction of the size of the outlet greatly improves the quality of the spray, breaking the water up into very much finer particles. The convergence may be of various contours to secure part of the benefit of my invention. It is desirably conical as illustrated in Figures 2 and 3 but much more desirably inwardly concaved, of which one bell form is shown in Figure 4. Obviously, too, the degree of convergence may be modified to suit different plant conditions, as different available heads, illustrated in Figures 2 and 3 which are the same except for difference in convergence of the discharge nozzle.

The discharge edge 14 of the nozzle 9 is protected from injury by the raised flange 15.

It will be noted that the inner end of the involute and therefore the outlet into the discharge nozzle is located in that region of low fluid energy which always exists after an abrupt offset from lines of flow. Such a region, except for harmful eddy currents, is usually a dead space, and transition into it from the main stream is accompanied by a sudden drop in kinetic energy without corresponding gain in static energy, a condition bringing a whirl of eddy currents with corresponding loss in the available energy of the main stream.

In locating the outlet into the discharge nozzle in this region of low fluid energy and

in guiding the main stream to rotary motion about it, I utilize the energy of this whirl and am thus enabled to secure the high efficiency which my nozzle develops in practice.

In view of my invention and disclosure, variations and modifications will doubtless occur to others skilled in the art to meet individual whim or particular need and I claim all such in so far as they fall within the reasonable spirit and scope of my invention.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a spray head, an intake, a body at one end thereof having an interior involute peripheral wall tangentially merging with one wall of the inlet and sharply offsetting at the opposite inlet wall, and a laterally-directed converging outlet passage having a minimum section of much smaller section than the intake, leading off from a point at the interior of the involute and having its axis offset from the inlet.

2. In a spray head, an inlet, a body at one end thereof having an interior involute peripheral wall tangentially merging with one wall of the inlet and sharply offsetting at the opposite inlet wall, and an outlet laterally directed converging bell passage of much smaller minimum section than the intake leading off from a point at the interior of the involute and having its axis offset from the inlet.

3. In a spray head, an inlet, a body at one end of the inlet having an interior involute peripheral wall tangentially merging with one wall of the inlet and sharply offsetting at the opposite inlet wall, a laterally directed, converging outlet passage of much smaller minimum section than the intake leading off from a point at the interior of the involute and having its axis offset from the inlet, and a raised guard around the discharge rim of the passage.

4. In a spray head, an inlet initially circular and flattened adjacent the body, a body at one end of the inlet having an interior involute peripheral wall tangentially merging with one wall of the inlet and sharply offsetting at the opposite inlet wall and a laterally directed converging outlet passage leading off from the interior of the involute, of much smaller minimum section than the inlet and having its axis offset from the inlet.

5. The method of spraying water received from a cylindrical supply pipe which consists in flattening the stream of water, and subsequently giving the water circumferentially converging spiral movement and a higher velocity and finally a converging rotary movement lateral to the spiral movement.

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