Oct. 21, 1947. C. R. KEEP 2,429,267

SPRAY NOZZLE

Filed July 7, 1944

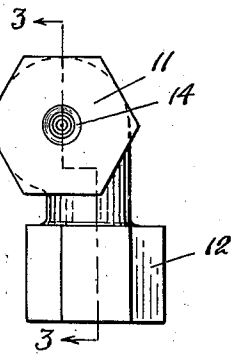


Fig. 1.

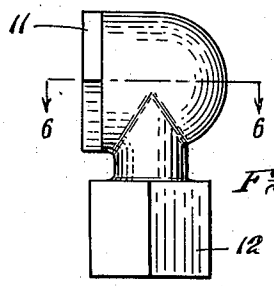


Fig. 2.

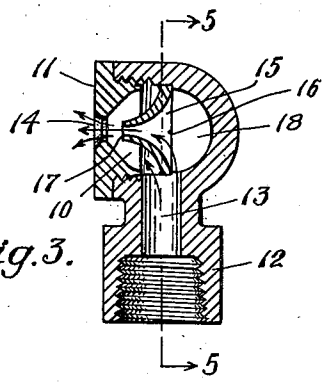


Fig. 3.

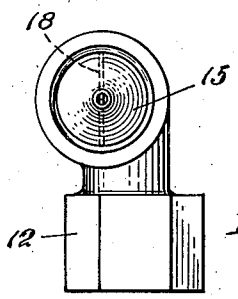


Fig. 4.

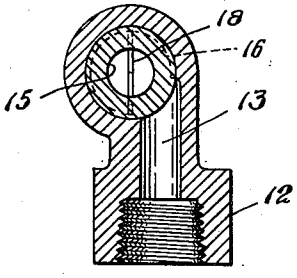


Fig. 5.

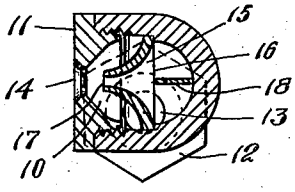


Fig. 6.

INVENTOR.
Charles R. Keep.
BY Robert J. Palmer

Attorney.

Patented Oct. 21, 1947

2,429,267

UNITED STATES PATENT OFFICE

2,429,267

SPRAY NOZZLE

Charles R. Keep, Norwood, Mass., assignor, by mesne assignments, to Westinghouse Electric Corporation, a corporation of Pennsylvania

Application July 7, 1944, Serial No. 543,907

4 Claims. (Cl. 299—114)

1

This invention relates to spray nozzles and relates more particularly to spray nozzles of the type disclosed in my Patent No. 2,257,691, which are adapted to produce large volumes of spray over wide angles and under low pressures.

The nozzle of my said patent produces a wide angle of spray filled with relatively coarse droplets as is desired for the spraying of evaporator tubes and the wetting of filters in air washers. The nozzle of this invention provides results superior to those of the patent and has the additional advantages that it may be manufactured and serviced at less expense, and in addition may be made of plastic as well as of metal.

Objects of the invention are to provide a spray nozzle which will provide large spray angles filled with relatively coarse droplets, which may be manufactured and serviced at less expense than prior nozzles.

The invention will now be described with reference to the drawing, of which:

Fig. 1 is a front elevation of a spray nozzle embodying this invention;

Fig. 2 is a side elevation of the nozzle of Fig. 1;

Fig. 3 is a sectional view along the lines 3—3 of Fig. 1;

Fig. 4 is a view similar to Fig. 1 but with the end cap removed;

Fig. 5 is a sectional view along the lines 5—5 of Fig. 3, and

Fig. 6 is a sectional view along the lines 6—6 of Fig. 2.

The nozzle has a hollow, tapered, whirl chamber 10, the outer portion of which is formed by the inner wall of the removable plug or cap 11, the inner portion of which is threaded and is screwed into the nozzle around the chamber 10. The base 12 of the nozzle is internally threaded for connection to a liquid supply pipe or header and the cylindrical passage 13 extends from the interior of the base and connects substantially tangentially with the whirl chamber 10 at the center thereof.

The plug 11 has the outlet 14 connecting with the whirl chamber 10 and diverging outwardly therefrom for spraying the liquid received from the nozzle through a relatively wide angle.

The inner nozzle 15 converges towards the outlet 14 and has inner and outer walls formed as surfaces of revolution. The outer end 16 of the nozzle 15 extends in a vertical plane across the outlet of the passage 13 and divides the liquid passing therefrom into the whirl chamber 10 into two streams, one of which after spinning around the curved inner wall of the plug 11

2

passes directly from the outlet 14, and the other of which passes into the nozzle 15 and is projected from its outlet 17, centrally into the outlet 14 in the plug 11.

The plate 18 may be attached to the inner nozzle 15 so as to extend across the inlet to same so as to take the spin out of the liquid entering the inner nozzle. It preferably should have curved edges complemental to and contacting the curved walls of the whirl chamber to the rear with respect to liquid flow, of the nozzle 15.

The liquid passing from the nozzle 15 has its velocity increased due to the converging walls with the apparent result that upon being projected into the whirling liquid passing directly from the outlet 14, it provides a spray more completely filled with coarse spray droplets.

As disclosed in said patent, the outlet 17 of the nozzle 15 should have a diameter less than that of the outlet 14 and should be spaced therefrom a distance not less than the outer diameter of the outlet 17.

The inner wall of the nozzle may be recessed as illustrated by Figs. 3 and 6, to receive the outer edge of the base of the nozzle 15 which may be attached thereto when the plug 11 is removed, as by soldering or brazing if the nozzle is of metal, or by cementing if the nozzle is of plastic material.

In operation, the nozzle 15 projects a cone shaped spray of relatively coarse droplets into the center of the wider angled cone of spray resulting from the liquid leaving the whirl chamber 10 and passing directly from the outlet 14, the overall result of the two sprays being a wide angle cone completely filled with coarse droplets.

In operation, the liquid leaving the whirl chamber 10 and passing directly therefrom through the outlet 14 provides a wide angle cone of spray which without the use of the inner nozzle 15 would not be filled with coarse spray droplets as is desired. The nozzle 15 projects a high velocity jet into the water passing through the outlet 14 and reacts with it providing a wide angled cone completely filled with relatively large spray droplets.

While one embodiment of the invention has been described for the purpose of illustration, it should be understood that the invention is not limited to the exact disclosure, since modifications thereof may be suggested by those skilled in the art, without departure from the essence of the invention.

What is claimed is:

1. A spray nozzle having an inner whirl cham-

ber with a wall converged at the opposite ends thereof, said wall having an outwardly diverging outlet formed therein, said nozzle having a liquid supply passage with a wall connecting substantially tangentially with a wall of said chamber whereby the liquid entering said chamber is given a spin, and means forming an inner nozzle in said whirl chamber, said means being positioned to extend crosswise of the whirl chamber and to form a partition across said passage for dividing the flow therefrom into two streams, one into said diverging nozzle and the other into said inner nozzle, said inner nozzle having an outlet aligned axially with said outlet and spaced therefrom.

2. A spray nozzle having an inner whirl chamber with a wall converged at the opposite ends thereof, said wall having an outwardly diverging outlet formed therein, said nozzle having a liquid supply passage with a wall connecting substantially tangentially with a wall of said chamber whereby the liquid entering said chamber is given a spin, and means forming an inner nozzle in said whirl chamber and extending crosswise same, and forming a partition across said passage for dividing the flow therefrom into two streams, one into said diverging nozzle and the other into said inner nozzle, said inner nozzle having walls converging towards said diverging outlet and having an outlet aligned axially with said first mentioned outlet and spaced therefrom.

3. A spray nozzle having an inner whirl chamber with a wall converged at the opposite ends thereof, said wall having an outwardly diverging outlet formed therein, said nozzle having a liquid supply passage with a wall connecting substantially tangentially with a wall of said chamber whereby the liquid entering said chamber is given a spin, and means forming an inner nozzle in said whirl chamber and extending crosswise same, and forming a partition across said passage for

dividing the flow therefrom into two streams, one into said diverging outlet and the other into said inner nozzle, said inner nozzle having an outlet aligned axially with said first mentioned outlet and spaced therefrom, said converging wall being removable for insertion of said inner nozzle.

4. A spray nozzle having an inner whirl chamber with a wall converged at the opposite ends thereof, said wall having an outwardly diverging outlet formed therein, said nozzle having a liquid supply passage with a wall connecting substantially tangentially with a wall of said chamber whereby the liquid entering said chamber is given a spin, and means forming an inner nozzle in said whirl chamber and extending crosswise same, and forming a partition across said passage for dividing the flow therefrom into two streams, one into said diverging outlet and the other into said inner nozzle, said inner nozzle having walls converging towards said outlet and having an outlet aligned axially with said first mentioned outlet and spaced therefrom, said converging wall being removable for insertion of said inner nozzle.

CHARLES R. KEEP.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,390,048	Lange	Sept. 6, 1921
2,247,897	Wahlin	July 1, 1941
2,161,016	Carr	June 6, 1939
1,029,909	Brown	June 18, 1912
580,151	Barnard	Apr. 6, 1897
1,430,832	Murphy	Oct. 3, 1922
1,186,241	Standish	June 6, 1916
1,163,591	Eneas	Dec. 7, 1915
2,257,691	Keep	Sept. 30, 1941