A. W. LISSAUER.

NOZZLE.

APPLICATION FILED JAN. 27, 1915.

1,216,146. Patented Feb. 13, 1917.

Fig. 1.

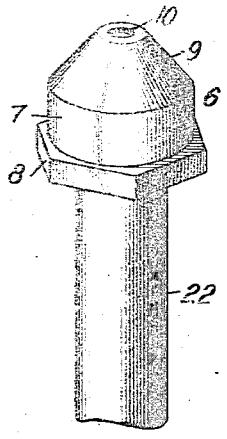


Fig. 2.

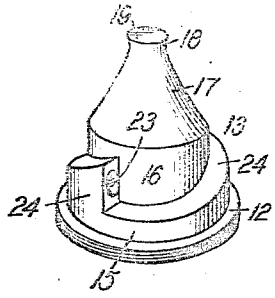


Fig. 3.

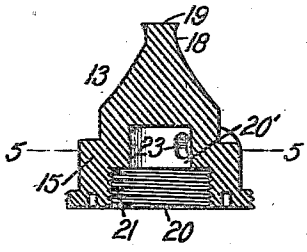


Fig. 4.

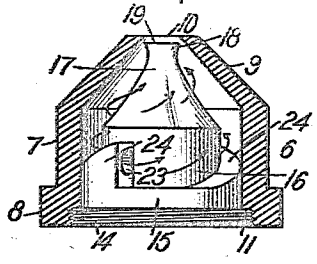
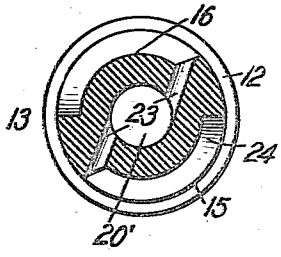


Fig. 5.



WITNESSES

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NOZZLE.

1,216,146. Specification of Letters Patent. Patented Feb. 13, 1917.

Application filed January 27, 1916. Serial No. 74,681.

To all whom it may concern:

Be it known that I, ADOLPH W. LISSAUER, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Nozzle, of which the following is a full, clear, and exact description.

My invention relates to nozzles for generating a spray of liquid which is finely divided, whereby the nozzle is particularly adapted for humidifying air. The object of the invention is to provide a simple and inexpensive nozzle which will offer least resistance to flow therethrough, which will not clog, and with which a maximum amount of liquid can be delivered in a finely divided state with a minimum of initial pressure.

With the above and other objects in view, the nature of which will more fully appear as the description proceeds, the invention consists in the novel construction, combination and arrangement of parts as herein fully described, illustrated and claimed. In the accompanying drawings, forming part of the application, similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a perspective elevation of the nozzle as mounted on a conduit;

Fig. 2 is a perspective view of the distributer of the nozzle;

Fig. 3 is a vertical section of the distributer;

Fig. 4 is a vertical section through the housing of the nozzle, the distributer being in elevation; and

Fig. 5 is a horizontal cross section of the distributer on lines 5 5, Fig. 3.

Referring to the drawings, the housing 6 of the nozzle is formed of a tubular portion 7 having at one end a polygonal base 8 to be engaged by a wrench. The other end of the tubular portion 7 is provided with a tapering dome 9 terminating in a sharp-edged opening 10. The tubular portion 7 at the base is provided with a shoulder 11 against which a threaded base collar 12 of a distributer 13 abuts when said distributer is screwed into a coöperating thread 14 provided in the housing.

The base collar 12 of the distributer is surmounted by a cylindrical portion 15 fitting snugly into the tubular portion 7 of the housing. The cylindrical portion 15 is dominated by a reduced cylindrical portion 16 which has a tapering portion 17 at the top properly spaced from the tapering dome 9 by the engagement of the base collar 12 of the distributer with the shoulder 11 of the housing, the base angle of the tapering portion 17 being greater than the base angle of the tapering dome 9, consequently the distance between the two tapers decreases as the outlet of the nozzle is approached. The tapering portion 17 terminates in a flare 18, the dominating surface 19 of which flare is at right angles to the axis of the distributer, the surface 19 being spaced from the opening 10 coaxial therewith and having a diameter substantially equal to that of the opening 10.

The distributer 13 has an axial bore 20 open at the base collar and thereat provided with a thread 21 extending through a certain length of the bore to receive the threaded end of a pipe 22 which is to supply the liquid to be sprayed. The portion 20′ of the bore 20 above the thread has a capacity such that the static pressure of the liquid is kept substantially constant. From this portion 20′ two diametrically opposite passages 23 convey the liquid to the housing 6. These two passages are in a plane at right angles to the axis of the nozzle. Each of said passages is carried through the high end of an adjacent inclined plane 24, each of said planes being formed on the cylindrical portion 15 and partly encircling the cylindrical portion 16 and preferably forming an integral part therewith. The passages 23 are so formed in the distributer that they direct the liquid against the inner surface of the tubular portion 7 at as small an angle as possible, the object being to secure the conversion from static to velocity pressure with the least frictional loss.

The liquid delivered through the passages 23 is given a rotary movement by the inner surface of the tubular portion 7. The two inclined planes 24 will impart to the revolving liquid a motion toward the outlet 10. The two inclined planes inclosed between the cylindrical portion 16 and the inner surface of the housing 6 form a double spiral the length of which is sufficient to impart proper advancing rotation to the liquid delivered through the passages 23. The rotation of the liquid will continue as it advances to the orifice 10 of the nozzle. As the liquid approaches the flare 18 its velocity increases, due to the reduction of area caused by the

tapering dome 9 and the tapering portion 17. At the maximum velocity the direction of flow is changed by the flare and the liquid is caused to pass between the two sharp edges, one formed by the surface 19 and the other by the sharp edge of the orifice 10. This change in direction at maximum velocity between the two sharp edges breaks up the liquid into fine particles which continue to whirl after leaving the nozzle. The peripheral area between the surface 19 and the opening 10 is less than the sum of the cross sectional areas of jet openings or passages 23, and the sum of the cross sectional areas of the passages 23 is less than the area of the inlet pipe 22.

From the above description it will be seen that the liquid supplied by the tube 22 to the interior of the distributer 13 is sub-divded into two jets by the passages 23 which are directed into the space formed by the housing and distributer. The jet striking the inner surface of the housing at as small an angle as possible, and aided by the inclined planes, produces a rapid advancing rotation of the liquid without eddy currents, the speed of rotation gradually increasing as the liquid approaches the orifice 10, due to the decreasing area allotted. The inclined planes are made as short as possible to eliminate friction and the tendency to clog. The effect of the flare on the tapering portion of the distributer is such that a partial interference to the advancing rotation is attained, the result being a dense spray of liquid leaving the orifice and spreading over a maximum area.

While I have described the principle of operation, together with the device which I now consider to be the best embodiment thereof, I desire to have it understood that the device shown is merely illustrative and that such changes may be made as are within the scope of the appended claims.

I claim:

1. A spray nozzle comprising a housing formed of a tubular portion surmounted by a tapering dome terminating in an axial orifice, and a distributer detachably secured to the tubular portion and forming therewith an annular space, said distributer having a pair of diametrically opposite inclined planes extending from the distributer to the housing and located within the annular space, said distributer having an axial inlet and diametrically opposite passages establishing communication between the inlet and the annular space, said passages being in a plane at right angles to the axis of the distributer and entering the annular space below the high end of the inclined planes, said distributer having a tapering portion spaced from the tapering dome.

2. A spray nozzle comprising a housing formed of a tubular portion surmounted by a tapering dome terminating in an axial orifice, and a distributer detachably secured to the tubular portion and forming therewith an annular space, said distributer having a tapering portion coöperating with the tapering dome, said tapering portion terminating in a flare spaced from the orifice and coaxial therewith, said distributer having an axially located inlet and passages for directing the flow from the axis to the walls of the housing in a plane at right angles to the axis of the distributer, said distributer having means in the annular space for giving to the flow a spiral direction toward the tapering portion and dome.

3. A spray nozzle comprising a housing having a tapering dome terminating in a sharp-edged orifice, and a distributer in the housing having a tapering portion spaced from the tapering dome of the housing, said tapering portion terminating in a flare having a flat surface spaced from the tapering orifice and of substantially the same diameter as the orifice, said housing and distributer having means for forming a spiral flow of liquid toward said tapering portion and dome.

4. A spray nozzle comprising a housing having a tubular portion surmounted by a tapering dome terminating in a sharp-edged orifice, and a distributer detachably secured to the tubular portion of the housing and forming therewith an annular space, said distributer having a tapered portion spaced from the tapered dome so that the distance between the two tapers decreases toward the orifice, said tapering portion terminating with a flare having a flat surface spaced from the orifice of the dome coaxial therewith and of substantially the same diameter, said nozzle having an axial inlet and passages for directing the flow from the inlet to the annular space, said housing and distributer having means within the annular space adapted to coöperate with the passages to give to the flow of liquid a spiral movement toward the orifice in the dome.

5. A spray nozzle comprising a housing formed of a tubular portion surmounted by a tapering dome terminating in an axial, sharp-edged orifice, and a distributer detachably secured to the tubular portion and forming therewith an annular space, said distributer having a tapering portion spaced from the taper of the dome so that the distance between the tapers decreases as the orifice is approached, said tapering portion of the distributer terminating with a flare having a flat surface spaced from the sharp-edged orifice of the housing and of substantially the same diameter as said orifice, said distributer having a pair of diametrically opposite inclined planes extending across the annular space, said distributer having an axial inlet and diametrically opposite

passages establishing communication between the inlet and annular space, said passages being in a plane at right angles to the axis of the distributer and entering the annular space below the high end of the inclined planes and at as small an angle as possible with the surface of the tubular portion of the housing.

6. A spray nozzle comprising a housing having an outlet and a distributer secured in the housing and forming therewith an annular space which is in communication with the outlet opening, said distributer having a pair of diametrically-opposite inclined planes extending from the distributer to the housing across the annular space, said distributer having an inlet and passages establishing communication between the inlet and the annular space, said passages entering the annular space below the high end of the inclined planes.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ADOLPH W. LISSAUER.

Witnesses:

EDWIN HORURTZ,

FREDERICK L. GUGGENHEIMER.