O. JACOBSEN.

SPRAY NOZZLE.

APPLICATION FILED APR. 9, 1921.

1,431,526. Patented Oct. 10, 1922.

FIG. 1.

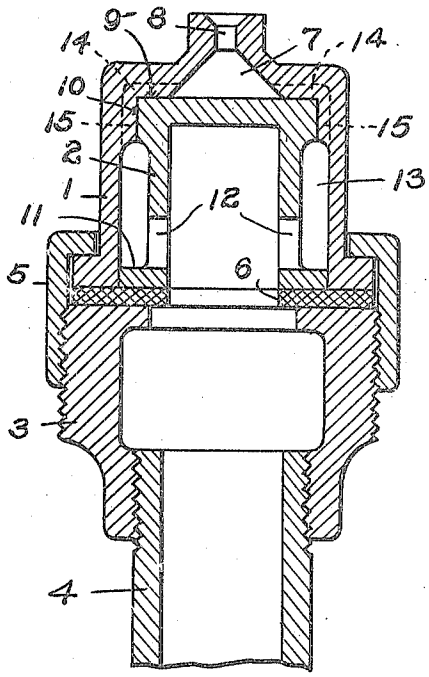
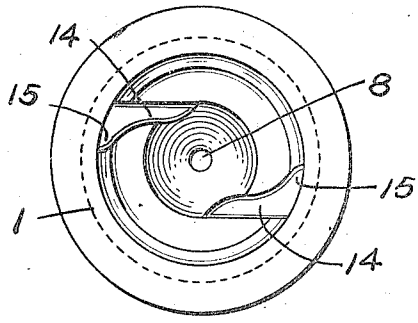


FIG. 2.



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by

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UNITED STATES PATENT OFFICE.

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SPRAY NOZZLE.

Application filed April 9, 1921. Serial No. 460,004.

To all whom it may concern:

Be it known that I, OYSTEIN JACOBSEN, a citizen of the United States, and a resident of Dayton, in the county of Montgomery and State of Ohio, have made a new and useful Invention in Spray Nozzles, of which the following is a specification.

The invention relates to spray nozzles. It is designed particularly for use in those relations in which the nozzle or at least the forward end thereof is exposed to fumes of a corrosive nature, but the construction is useful in other relations and when made from metal other than acid resisting compositions. The invention has for its primary objects the provision of an improved and simplified construction designed to give the well known conical spray, (1) wherein the casing and thimble may be made of very hard acid resisting materials requiring a minimum amount of machine work; (2) wherein a fixed and definite relation between the outlet passage in the casing and the passage or passages which give the liquid to be sprayed its whirling motion is secured, thus insuring a conical spray of uniform and symmetrical configuration; (3) wherein the gasket for making a tight joint between the nozzle casing and its supporting fixture is also utilized to hold the thimble against movement in the casing; and (4) wherein the nozzle parts may be very easily assembled and disassembled for the purpose of replacement or repair. Certain embodiments of the invention are illustrated in the accompanying drawings wherein:

Figure 1 is a partial side elevation and partial section through the preferred embodiment of the invention. And Fig. 2 is an end view looking into the casing with the thimble removed therefrom.

Referring to the construction of Figs. 1 and 2, 1 is the casing of the nozzle; 2 is the thimble; 3 is a fixture or connection mounted upon the end of the supply pipe 4, and 5 is a coupling by means of which the casing 1 is clamped to the end of the fixture.

The casing 1 and thimble 2 are preferably composed of an acid resisting compound such as the material known in the art as "duriron", such material containing a large percentage of silicion and being exceedingly hard and relatively difficult to machine. The coupling 5 and fixture 3 may be made of ordinary cast iron or any other suitable material while the pipe 4 is of ordinary or other suitable material such as wrought iron. In order to secure a tight joint between the casing 1 and fixture 3, the gasket 6 is employed, such gasket being of rubber, metal or fiber and being tightly clamped between the opposing ends of the casing and fixture. This gasket also performs the additional function of holding the thimble 2 in position with its inner end in tight engagement with the discharge end of the casing.

The discharge end of the casing is provided with the conical chamber 7 and with a discharge opening 8 preferably of the form shown. The opposing surfaces of the casing and thimble at 9 and 10 are ground or smoothed so that a relatively tight fit is secured. The thimble is provided with a collar portion 11 at its inner end adapted to engage the inner surface of the casing 1 and is also provided with a pair of openings 12 to permit a flow of fluid from the interior of the thimble to the chamber 13 formed between the two collars on the thimble.

In order to provide for the flow of fluid from the chamber 13 to the chamber 7 a pair of angularly disposed passages or grooves 14 are provided in the surface of the inner face of the end of the casing. These grooves communicate at their outer ends with a pair of grooves 15 also formed upon the inner surface of the side walls of the casing 1. This arrangement permits the flow of fluid through the two sets of passages to the chamber 7, and by reason of the angular disposition of the grooves 14, the liquid entering the chamber 7 is given a whirling movement around the axis of the casing. This liquid is discharged through the outlet opening 8 of the casing and because of its rotary movement and because of the shape of the chamber 7 the discharged liquid assumes the form of a hollow cone, thus giving a finely divided spray.

Those portions of the cap and casing which require smooth surfaces may be readily ground, which is desirable, because of the hardness of the material used, while the grooves 14 and 15 formed upon the in-

terior walls of the casing 1 are secured by coring out in the casting operation so that no machining is required at these points. It is not necessary that the thimble should have a close fit in the casing although it is desirable that the annular surfaces at 9 should have a good fit in order to insure that substantially all the liquid shall pass through the grooves 14 and 15 and thus secure a maximum whirling effect, such as could not be secured if the joint at 9 were loose so that a part of the liquid could pass to the chamber 7 through a space other than the grooves 14. It is a comparatively easy matter however to secure a tight joint at this point by grinding the opposing surfaces and the pressure between the surfaces secured by reason of the engagement of the gasket 6 with the inner end of the thimble. The use of the hard material in the cap is particularly desirable in a device of this kind since the wear at the outlet 8 is ordinarily relatively great due to the friction of the liquid.

It is also extremely desirable that the grooves 14 and 15 should be made in the cap 1, rather than in the thimble as this insures that the passages will be symmetrical with respect to the opening 8 and with respect to the axis of the casing. This would not be the case if the grooves were in the surfaces of the thimble as in this case the grooves would be thrown slightly off center with respect to the axis of the casing and with respect to the discharge casing if the thimble had any lost motion in the casing and to avoid this considerable expense and care would be necessary in order to machine the parts accurately to fit.

What I claim is:

1. In combination in a spray nozzle, a fixture, a casing clamped to the fixture and having its outlet end provided with a central outlet passage and with the inner face of said end provided with an angularly disposed groove for giving the liquid passing therethrough a movement around the axis of the casing, and a thimble in the casing with its outer end closed and in opposition to the inner face of the end of the casing, the said thimble having its wall perforated, and a passageway being provided between the opposing side walls of the casing and thimble leading to the outer end of said groove.

2. In combination in a spray nozzle, a fixture, a casing clamped to the fixture and having its outlet end provided with a central outlet passage and with the inner face of said end provided with a plurality of angularly disposed grooves for giving the liquid passing therethrough a movement around the axis of the casing, and a thimble in the casing with its outer end closed and in opposition to the inner face of the end of the casing, the said thimble having its wall perforated, and a passageway being provided between the opposing side walls of the casing and thimble leading to the outer ends of said grooves.

3. In combination in a spray nozzle, a fixture, a casing clamped to the fixture and having its outlet end provided with a central outlet passage and with the inner face of said end provided with an angularly disposed groove for giving the liquid passing therethrough a movement around the axis of the casing and a thimble in the casing with its outer end closed and in opposition to the inner face of the end of the casing and fitting loosely in the casing to provide a passageway longitudinally of the casing from the perforation in the wall of the thimble to the outer end of said groove.

4. In combination in a spray nozzle, a fixture, a casing clamped to the fixture and having its outlet end provided with a central outlet passage and with the inner face of said end provided with an angularly disposed groove for giving the liquid passing therethrough a movement around the axis of the casing, and a thimble in the casing with its outer end closed and in close engagement with the inner face of the end of the casing, the said thimble having its inner wall perforated and a passageway being provided between the opposing side walls of the casing and thimble leading to the outer end of said groove.

5. In combination in a spray nozzle, a fixture, a casing clamped to the fixture and having its outlet end provided with a central outlet passage and with the inner face of said end provided with an angularly disposed groove for giving the liquid passing therethrough a movement around the axis of the casing, the inner side face of the casing also provided with a groove leading to the outer end of the first groove, and a thimble in the casing with its outer end closed and in opposition to the inner face of the end of the casing, the said thimble having its wall perforated, and a passageway being provided between the opposing side walls of the casing and the thimble leading to the inlet end of the second groove.

6. In combination in a spray nozzle, a fixture, a casing clamped to the fixture and having its outlet end provided with a central outlet passage and with the inner face of said end provided with an angularly disposed groove for giving the liquid passing therethrough a movement around the axis of the casing, the inner side face of the casing also being provided with a groove leading to the outer end of the first groove, and a thimble in the casing with its outer end closed and in opposition to the inner face of the end of the casing, the said thimble having its wall perforated, and a passageway being provided between the opposing

side walls of the casing and the thimble leading to the inlet end of the second groove, the said thimble having a machine fit at its end with the inner end and side surfaces of the casing carrying the grooves in order to substantially restrict the passage of the liquid to said grooves.

In testimony whereof, I have hereunto subscribed my name this 5th day of April, 1921.

O. JACOBSEN.

Witnesses:
W. E. PRATT,
J. DWIGHT.