Feb. 26, 1924. 1,485,143

L. K. MOBLEY

OUTLET NOZZLE FOR ATOMIZING AND SPRAYING LIQUID ANTISEPTICS UNDER PRESSURE

Filed April 17, 1920

Fig. 1.

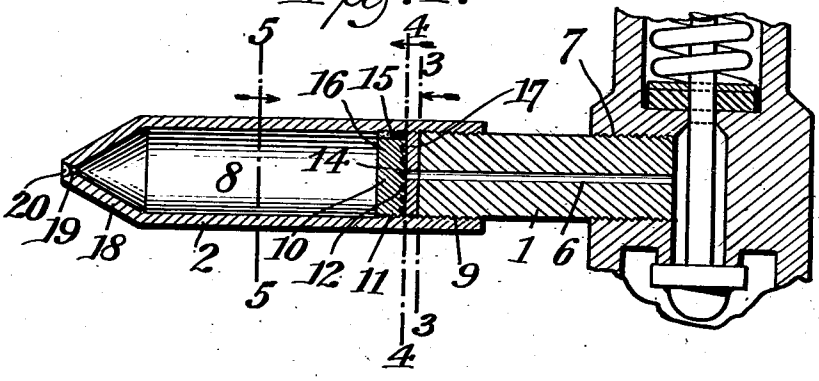


Fig. 2.

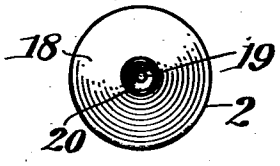


Fig. 3.

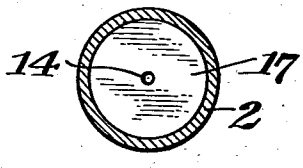


Fig. 4.

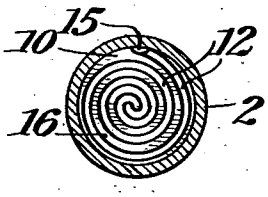
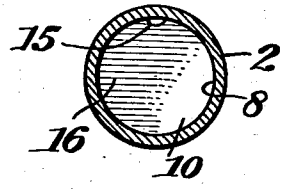


Fig. 5.



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UNITED STATES PATENT OFFICE.

LEWIS KEMPTON MOBLEY, OF NEW YORK, N. Y.

OUTLET NOZZLE FOR ATOMIZING AND SPRAYING LIQUID ANTISEPTICS UNDER PRESSURE.

Application filed April 17, 1920. Serial No. 374,669.

To all whom it may concern:

Be it known that I, LEWIS KEMPTON MOBLEY, a citizen of the United States, and resident of New York, in the county and State of New York, have invented certain new and useful Improvements in Outlet Nozzles for Atomizing and Spraying Liquid Antiseptics Under Pressure, of which the following is a specification.

This invention relates to outlet nozzles for atomizing and spraying liquids under pressure, and it has for its object to provide a simple and improved nozzle of this class which will be particularly adapted to high pressures and will possess advantages in point of positive and effective operation and general efficiency.

My present improved nozzle is particularly adapted to the conditions of operation and use as set forth in my co-pending applications for patent, Serial No. 311,947 for an improved method of applying liquid antiseptics, and Serial No. 313,371 for an improved means for applying liquid antiseptics, in which a liquid antiseptic is combined with carbonic acid gas in sufficient volume to carbonate the antiseptic to the desired degree of pressure in a normally hermetically-sealed container, from which a volume of the carbonated antiseptic solution is discharged by valve control through an outlet tube and simultaneously with said discharge converted at the point of ejection into the outer air under action of the carbonic acid gas into an antiseptic carbonated spray. While the improved nozzle as comprised in my present application for patent is particularly adapted for effective service and facility of operation and general efficiency under the conditions as just set forth to convert a jet of carbonated liquid antiseptic under high pressure into a whirling atomized spray, it will be understood that the improved nozzle is not restricted to this condition of use and that it may be employed in all conditions and circumstances under which it is desired to convert a liquid discharged under pressure into a whirling spray at the point of ejection.

In the drawings—

Figure 1 is a longitudinal sectional view of the improved nozzle device.

Fig. 2 is a detail face view, on an enlarged scale, of the ejection end of the nozzle.

Fig. 3 is a detail cross-section, on an enlarged scale, taken on the line 3—3, Fig. 1.

Fig. 4 is a detail cross-section, on an enlarged scale, taken on the line 4—4, Fig. 1.

Fig. 5 is a detail cross-section, on an enlarged scale, taken on the line 5—5, Fig. 1.

Corresponding parts in all the figures are denoted by the same reference characters.

Referring to the drawings, the body of the nozzle device is tubular and is preferably constructed in two sections, 1 and 2, respectively constituting an inlet member and an outlet or discharge member. The inlet member 1 consists of a tube of desired length, having a longitudinal bore, 6, of relatively small or narrow diameter, and adapted to be secured in fixed connection to the outlet portion of a supply member or container from which the liquid under pressure is discharged into said tube, for which purpose the terminal connection end of the member 1 is preferably externally threaded, as at 7, for engagement with a threaded orifice in the supply member of container. The discharge member 2 of the nozzle consists of a tube of desired length, having a longitudinal bore, 8, of relatively large or increased diameter, and extending from the inlet member 1, the connection therewith being preferably by means of a threaded connection, as at 9, between the rear end of the member 2 and the front end of the member 1, the construction being such that the end of the member 1 is received within the end of the bore of the member 2, whereby the tubular sections of the nozzle are separably connected and carried one upon the other. The bore of the outlet section 2 constitutes a terminal tube chamber which, as before stated, is of an enlarged or increased diameter with relation to the diameter of the bore of the inlet section 1, and which is extended longitudinally to afford a desired degree of length in said terminal tube chamber and provides a cylindrical interior wall throughout the length thereof.

The tubular nozzle carries interiorly means for retarding the jet of liquid passing under pressure from the bore of the inlet section 1 and for deflecting the jet and imparting to it a spiral whirling motion as it passes into and through the enlarged terminal tube chamber of the discharge section 2. Said conversion and deflecting and retarding means comprises a block-partition, 10, which is fixed within the tubular body of

the nozzle immediately in front of the bore of the inlet section 1, said block-partition being of large or increased diameter with relation to said bore. In the preferred construction, said block-partition is mounted within the bore chamber 8 of the outlet section 2 at the rear end thereof and corresponds in diameter thereto, and is in fixed position against the end of the inlet section 1 which extends within said bore. I have herein shown one means of mounting the block-partition in its fixed position, in which the circumference of the block is provided with external threads, as at 11, engaging with the terminal inner portion of the threads 9 within the bore 8 of the section 2 by which the sections 1 and 2 are secured together, but it will be understood that the block-partition may be mounted and secured in its fixed position within the tubular body of the nozzle in any suitable or adapted manner.

The block-partition 10 has an internal spiral channel, 12, extending from a small inlet orifice, 14, at the center of the inlet face of the block member, to a small outlet orifice, 15, adjacent the periphery of the outlet face of the block member, said channel thus forming a gradually widening spiral from the centered inlet orifice 14 to the peripherally-located outlet orifice 15. The outlet terminal end portion of said spiral channel, which forms the orifice or port 15, extends to the terminal orifice in a direction following the course of the spiral, as indicated in Fig. 4. The spiral channel is also preferably so provided or formed that the longitudinal extent of the gradually widening spiral is located in the same plane transversely of the body of the nozzle.

In the practical construction of the block-partition, to produce the conditions as above noted, the block body preferably consists of a main disc, 16, in the face of which is formed the spiral channel 12 and through which the outlet orifice 15 extends from the terminal end of said channel, and a supplementary face plate or disc, 17, covering the channelled face of said body disc 16 and having a central orifice intersecting the initial terminal end of the spiral channel 12 and constituting the inlet orifice 14, said main body disc 16 and face disc 17 being permanently secured together by welding or in any other suitable manner. In the preferred relative construction, the diameter of the inlet orifice 14 in the face disc 17 preferably corresponds to the diameter of the small bore 6 of the inlet member 1 of the body of the nozzle, with which it registers.

At the terminal discharge end of the outlet section 2 of the body of the nozzle, the internal wall of the longitudinally-extended cylindrical tube chamber which is constituted by the bore 8 is preferably contracted in conical form, as at 18, leading to a small terminal outlet orifice, 19, in the end wall of the section 2, through which orifice the spirally-rotating jet will pass in a fine whirling atomized spray under pressure, and the outer end of said orifice 19 is preferably flared or cup-shaped, as at 20, to enhance the spread of the spray.

The operation and advantages of the improved construction of nozzle as comprised in my invention will be readily understood. The pressure jet entering from the relatively-small or narrow bore of the inlet section 1 to the inlet orifice 14 of the block-partition 10 is retarded within the block body by the spiral channel thereof and is deflected and converted by the gradually widening spiral into a spirally-rotating jet of high speed under pressure, which passes from the outlet orifice 15 adjacent the periphery of the conversion block into the chamber 8 formed by the bore of the discharge section 2, in which it passes forwardly at high speed, in a spiral whirling motion guided by the cylindrical interior wall of said chamber 8, throughout the length thereof and to the conically-contracted end and point of final ejection at the terminal outlet orifice 19, from which it passes to the outer air in a fine whirling atomized spray.

The efficiency of the retarding and conversion action of the improved nozzle, to to impart to the jet spiral whirling motion under which it is finally ejected in a fine whirling atomized spray, is enhanced by the gradually widening form of the spiral channel and its location with its longitudinal extent in the same plane transversely of the nozzle, and by the relative size or diameter of the respective bores and the spiral channel, in which the terminal tube chamber 8 is of enlarged or increased diameter with relation to the inlet bore 6 of the section 1 and the spiral channel 12, to afford a spread to the spiral whirling jet which issues from the conversion block under pressure, and by the extension of said terminal tube chamber 8 longitudinally to afford a continued-length guidance to the spiral whirling action of the jet within said chamber before it is finally ejected therefrom as a fine whirling spray.

It will be understood that the various parts are magnified in the accompanying drawings, for purpose of illustration, and that in practical construction for usual conditions of service and use the parts are of small or minute size, especially the bore 6 and the spiral channel 12, and that the length of the spiral channel and the length of the terminal discharge chamber 8 may be varied according to desired conditions of service and use.

I do not desire to be understood as limiting myself to the detail features of construc-

tion and arrangement as herein illustrated and described, as it is manifest that modifications and variations therein may be resorted to in the adaptation of the construction to varying conditions of use, without departing from the spirit and scope of my invention and improvements. I therefore reserve the right to all such variations and modifications as properly fall within the scope of my invention and the terms of the following claims.

Having thus described my invention, I claim and desire to secure by Letters Patent:

1. An outlet nozzle for atomizing and spraying liquids under pressure, comprising a discharge tube having an inlet bore and a terminal cylindrical chamber extending to an outlet orifice, and a converting block forming a partition interposed intermediately of said terminal chamber and said inlet bore and having an internal spiral channel of relatively-narrow diameter extending from an orifice intersecting said inlet bore to an orifice entering said terminal cylindrical chamber and having its longitudinal extent in the same plane transversely of the nozzle and operative to retard the pressure jet and convert it into a spirally-rotating jet which moves under pressure in a spiral whirling motion forwardly and in the terminal tube chamber to the point of ejection at the outlet orifice thereof in a fine whirling atomized spray.

2. An outlet nozzle for spraying liquids under pressure, comprising a tubular body having interposed in its bore intermediately of its inlet and outlet ends a gradually widening spiral channel having its longitudinal extent in the same plane transversely of the bore and forming part of the longitudinal extent of said bore.

3. An outlet nozzle for spraying liquids under pressure, comprising a tubular body having a longitudinal bore, a converting block-partition interposed in said bore between the inlet and outlet ends thereof and having a spiral channel forming part of the longitudinal extent of said bore, said converting block-partition consisting of a body disc having said spiral channel formed in its face and extending therethrough at the terminal end of the channel, and closure means covering the channelled face of the body disc and having a central orifice intersecting the initial terminal end of the spiral channel.

4. A discharge tube for retarding and deflecting the passage of a jet of liquid under pressure, comprising a cylindrical bore-chamber extending to an outlet orifice, and having interposed in said bore-chamber a converting block forming a partition and consisting of a main body disc in the face of which is formed a spiral channel of relatively-narrow diameter extending from the center or axis of the body disc to a point adjacent the periphery thereof and from thence through the body disc at the discharge terminal end of the channel and a supplementary face plate or disc secured over and covering the channelled face of the body disc and having a central orifice intersecting the initial terminal end of the spiral channel.

5. An outlet nozzle for spraying liquids under pressure, comprising a tubular body having a longitudinal bore, a converting block interposed in said bore between the inlet and outlet ends thereof and having a spiral channel forming part of the longitudinal extent of said bore, said channel being formed by a groove in one face of the converting block and extending from an inlet terminal end intersecting the inlet portion of the bore to an outlet terminal end passing through the block and leading to the outlet portion of the bore, and closure means covering the channelled face of the block and opening to the inlet terminal end of the channel-groove.

In testimony whereof I have signed the foregoing specifications.

LEWIS KEMPTON MOBLEY.