(No Model.)

# T. L. MURPHY.

## CONVERTIBLE SPRAY AND JET NOZZLE.

No. 555,062. Patented Feb. 18, 1896.

Fig. 2.

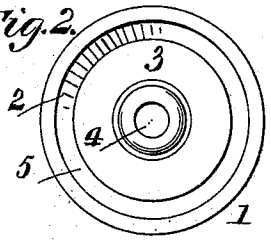



Fig. 3.

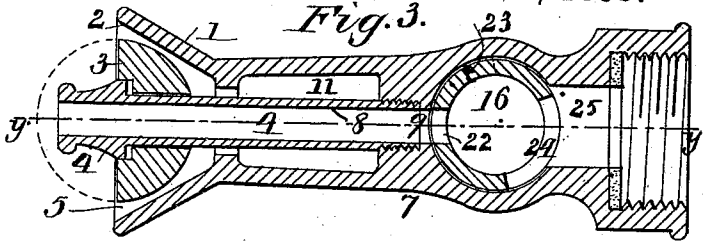



Fig. 1.

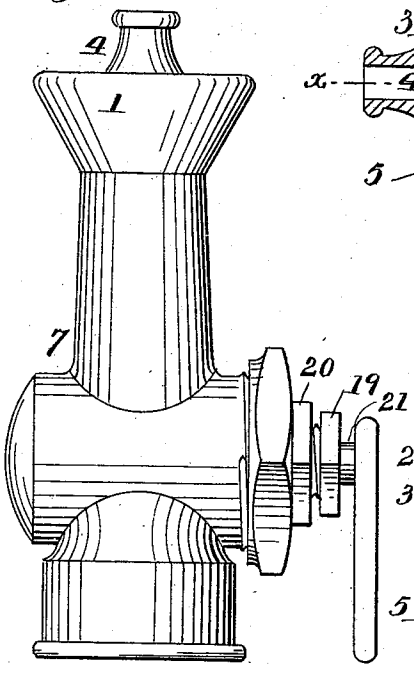



Fig. 4.

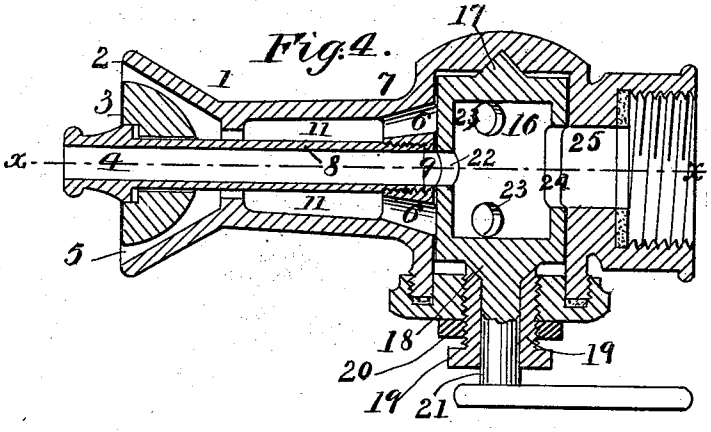



Fig. 5.

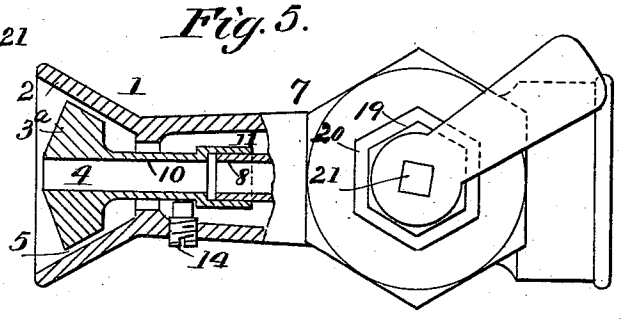



Fig. 7.

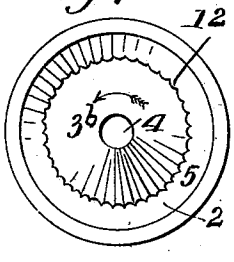



Fig. 8.

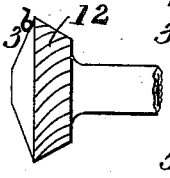
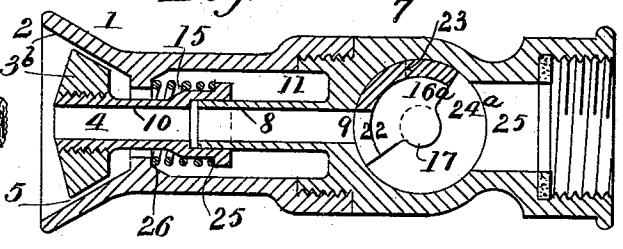



Fig. 6.

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# UNITED STATES PATENT OFFICE.

THOMAS L. MURPHY, OF NEW YORK, N. Y., ASSIGNOR TO THE COLUMBIAN HOSE NOZZLE COMPANY, OF DES MOINES, IOWA.

## CONVERTIBLE SPRAY AND JET NOZZLE.

SPECIFICATION forming part of Letters Patent No. 555,062, dated February 18, 1896.

Application filed May 25, 1895. Serial No. 550,596. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS L. MURPHY, a citizen of the United States, and a resident of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Convertible Spray and Jet Nozzles, of which the following is a specification.

My invention relates to nozzles for general purposes, the same being applicable to all sizes from lawn-sprinklers to fire-hose; and said invention relates to improvements in the nozzle and also in the cock or valve for controlling the nozzle, and such cock or valve is also applicable to other purposes.

The objects of my invention are to render the nozzle instantaneously convertible for spray or jet, and to render the cock or valve easy to shift under high pressure.

My invention consists in a nozzle having concentrically-arranged jet and self-regulating spray orifices and valvular means for directing the stream through either said orifice at will, and also in an improved valve, and also in certain other features of improvement hereinafter described and claimed.

Referring to the accompanying drawings, in which similar numerals of reference indicate corresponding parts, Figure 1 is a side elevation of my improved nozzle; Fig. 2, a front end view; Fig. 3, a longitudinal section taken on the line $x\ x$ of Fig. 4; Fig. 4, a longitudinal section taken on the line $y\ y$ of Fig. 3; Fig. 5, a side elevation, partly in section, showing a modification of the spraying device; Fig. 6, a longitudinal section showing a further modification of the spraying device; Fig. 7, a front end view of Fig. 6, and Fig. 8 a detail side view of the spraying device in Fig. 6.

The spraying-nozzle 1 has a bell-shaped mouth 2 and a core 3, through which core the jet-nozzle 4 extends, and the annular spray-orifice 5, formed between the bell-shaped mouth 2 and the core 3, connects through the chamber 11 with valve-controlled ports 6 in the body 7, and the central jet-orifice 4 connects with a tube 8, terminating in a valve-controlled port 9, and said tube 8 is supported by the body 7.

The core 3 may be hemispherical, as shown in Figs. 3 and 4, or it may be spherical, as indicated by the dotted line in Fig. 3, or it may be cone-shaped, as at $3^a$ $3^b$ in Figs. 5, 6, and 8, or of any other suitable form. Such core may be rigidly attached to the tube 8, if desired; but in order to render the spray self-regulating to best advantage I prefer to attach the said core 3 loosely upon the tube 8, as shown in Figs. 3 and 4, or the core may carry with it a portion 10 of the tube 8, which is loosely connected with the tube 8, telescoping the same, as at $3^a$ and $3^b$ in Figs. 5 and 6. The force of the stream will then draw the core back toward and within the bell-shaped mouth 2 when the water is ejected through the ports 6, the core being self-retained, in the manner well known in ball-nozzles.

The core $3^b$ may be provided with spiral grooves 12, as in Figs. 7 and 8, causing a rapid rotary motion of said core when the spray is discharged, thereby more effectively throwing the same.

The screw 14 in Fig. 5 serves to retain the core 3 when the central jet is turned on.

The spring 15 in Fig. 6, compressed between the shoulder 25 of the tube 10 and the shoulder 26 of the nozzle 1, is designed to press the core toward the bell-shaped mouth 2 when the pressure of the water is insufficient to perform this function—say, under twenty pounds per square inch. Such spring is useful more particularly for lawn-sprinklers where the pressure is moderate, and the nozzle part 1 in Fig. 6 may be unscrewed from the body 7 and the central tube 4 plugged and the said nozzle 1 attached directly to the hose-fitting—that is to say, the spring 15 is a feature of my invention adapted for use upon nozzles designed exclusively for spraying.

The valve consists of a rotary plug 16, having a very slight bearing-contact with its bore in the body 7. In fact a one-thousandth part of an inch clearance may be given in cases where slight leakage is unobjectionable, and the thrust of the water-pressure, which often amounts to one hundred and twenty pounds per square inch or over, is wholly received by the antifriction cone-bearings 17 and 18, Fig. 4. The slight wear is taken up when necessary by tightening the movable cone-bearing or sleeve-nut 19, secured by a jam-nut 20, which sleeve surrounds the plug-stem 21.

The valve 16 is preferably hollow in the present instance, and the ports 6 6 and the

port 9 coincide with different cross-sections of the cylindrical body of the valve, and said ports are in line in the length of the cylinder. The opening 22 in the plug coincides with the port 9 in the position shown, the ports 6 6 being shut off, while at a different position of the plug the openings 23 23 will coincide with the ports 6 6, the port 9 being shut off, and at an intermediate position of said plug all the ports 6 6 and 9 will be shut off. The opening 24 in the plug is in permanent communication with the inlet 25 of the body 7 or hose connection.

The formation of the plug $16^a$ is slightly modified in Fig. 6, the opening $24^a$ being enlarged, the construction in other respects remaining the same as in Fig. 4, but constituting a segmental rocking valve.

When the valve 16 or $16^a$ is at the position illustrated, the jet-nozzle 4 has an unobstructed straightway delivery from hose to mouth, which is an important feature in the valvular construction.

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

1. A nozzle having a bell-shaped mouth and a movable core in the mouth, forming an annular pressure-controlled spraying-orifice between said mouth and core, and an independent jet-orifice extending through the core.

2. A nozzle having a bell-shaped mouth and a movable core in the mouth, forming an annular pressure-controlled spraying-orifice between said mouth and core, and a jet-orifice extending through the core, and valvular means for directing the stream independently through said spraying-orifice or through said jet-orifice.

3. In a nozzle, the combination of a suitable body, a bell-shaped mouth on said body, a movable core in the mouth forming an annular pressure-controlled spraying-orifice between said mouth and core, a longitudinal passage in the body communicating with said annular spraying-orifice, a central jet-orifice opening through the said core and having an independent longitudinal passage through the said body, an opening in said body adapted for connection to a suitable source of supply, and a valve adapted to connect said source of supply opening with either of said independent longitudinal passages, or to cut off both.

4. The combination of a tubular outer spraying-nozzle having a bell-shaped mouth, a tubular inner jet-nozzle concentric with said outer nozzle, and a spraying-core in said mouth movably supported by said inner nozzle substantially as described.

5. In combination, a nozzle having a bell-shaped mouth, a movable core forming in the mouth an annular pressure-controlled spraying-orifice, an independent jet-orifice extending through the core, and a spring adapted to press the core inward toward the said mouth for the purpose described.

6. A rotary plug-valve having a stem and opposed cone-bearings of less diameter than the valve, one of which bearings consists of a tapering bearing-shoulder around the stem, and a longitudinally-adjustable bearing-sleeve having a correspondingly-tapered bearing-surface surrounding the stem.

7. A rotary plug-valve having a stem, a conic bearing-shoulder around the stem, a sleeve-nut surrounding the stem and having a correspondingly-conic bearing-face serving both as a centering device and a packing-gland, and an opposed cone-bearing suitably located in the axis of the plug.

Signed at New York city, in the county of New York and State of New York, this 22d day of May, A. D. 1895.

THOMAS L. MURPHY.

Witnesses:
H. F. PARKER,
K. M. TUCKER.