(No Model.)

D. T. ELLIS.

SPRAY NOZZLE.

No. 386,870. Patented July 31, 1888.

Fig. 1.

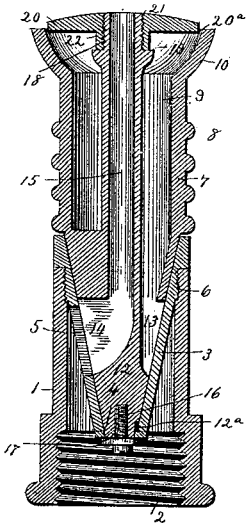


Fig. 4.

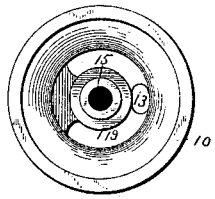


Fig. 2.

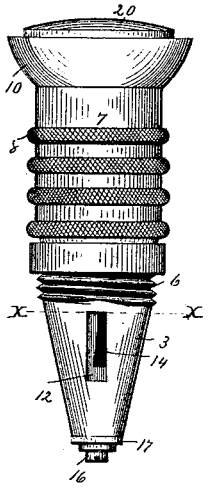


Fig. 5.

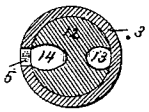


Fig. 6.

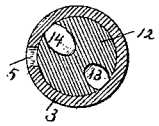
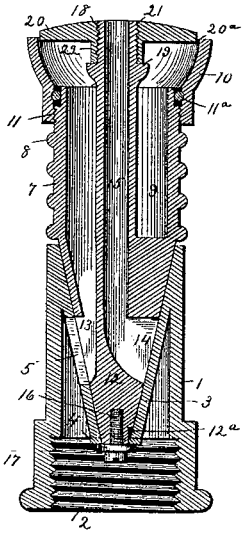


Fig. 3.



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UNITED STATES PATENT OFFICE.

DAVID T. ELLIS, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR OF ONE-HALF TO THE BELKNAP MANUFACTURING COMPANY, OF SAME PLACE.

SPRAY-NOZZLE.

SPECIFICATION forming part of Letters Patent No. 386,870, dated July 31, 1888.

Application filed December 3, 1887. Serial No. 256,895. (No model.)

To all whom it may concern:

Be it known that I, DAVID T. ELLIS, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Spray-Nozzles; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to the class of hose-nozzles usually designated as "cut-off spray-nozzles"—that is, nozzles in which a slight rotary movement of one of the parts will cause the nozzle to throw a straight stream or a spray or will cut off the flow entirely; and it has for its object to simplify the construction and to greatly improve the operation in use.

With these ends in view I have devised the novel construction of which the following description, in connection with the accompanying drawings, is a specification.

It is a novel and highly important feature of my present invention that in addition to the ordinary straight stream, central spray, and cut-off, which I produce by an entirely novel construction and arrangement of parts, I am also enabled to produce a very fine circular ribbon-spray, which is especially valuable when it is desired to sprinkle delicate plants, upon which it is necessary that the water should fall lightly, and which, moreover, will throw a greater volume of water than it is possible to throw with even the full central stream.

In the drawings, Figure 1 is a central section of the nozzle complete, the parts being in position to throw a full stream; Fig. 2, an elevation of the nozzle with the base detached, the parts being in position to produce the central spray; Fig. 3, a central section of the nozzle complete, illustrating certain changes in the details of construction, the parts being in position to produce the circular ribbon-spray; Fig. 4, an end view of the nozzle with the cap-plate removed, the position of the parts corresponding with Fig. 1; Fig. 5, a cross-section on the line *x x* in Fig. 2, showing the relative position of the openings through the inner and outer cones in producing the full stream; and Fig. 6 is a similar section, the position of the parts being such that the flow is entirely cut off.

Similar numbers denote the same parts in all the figures.

1 denotes the base, which is provided at its lower end with a screw-thread, 2, adapted to be engaged by a corresponding thread upon the coupling-piece at the end of the hose. (Not shown.)

3 denotes the outer cone depending within the base, the inner side of which is ground, for a purpose presently to be explained, and which is provided with an opening, 4, at its lower end and an opening, 5, upon one side, the purpose of which will presently be explained. In Fig. 1 I have shown this cone as made separate from the base and attached thereto by screw-threads on both parts, as at 6; and in Fig. 3 I have shown the outer cone and the base as made integral. Either form may be used, at the convenience of the manufacturer.

7 denotes the barrel, which is provided upon its outer side with knurls 8, for convenience in rotating it. Within the barrel is a chamber, 9. I preferably enlarge the outer end of this chamber, so as to increase the diameter of the circular ribbon-spray by an outwardly-curved flange, 10, which may be made integral with the barrel, as in Fig. 1, or which may be attached thereto by screw-threads, as at 11 in Fig. 3. The latter construction renders the flange adjustable should it be desired to change the quality of the ribbon-spray or to regulate the quantity of water thrown. When the flange is made adjustable, I place a packing-ring, 11^a, between said flange and the barrel, to prevent leakage or dripping of water back of the flange. (See Fig. 3.) At the lower end of the barrel is an inner cone, 12, which is formed integral therewith and is ground upon its outer side, so that when the inner and outer cones are in operative position a ground joint is formed between them, thus rendering the nozzle perfectly water-tight without the use of packing.

13 denotes an opening through one side of the inner cone on the same transverse plane as opening 5 through the outer cone, which leads into chamber 9; and 14, an opening upon the opposite side, in the same transverse plane, leading into a tube, 15, preferably made integral with the barrel and inner cone, which extends up through chamber 9 to the end of

the nozzle. It should be noted (see Figs. 5 and 6) that the outer edge of opening 14 corresponds in width with opening 5 in the outer cone, with which it registers, but that said opening 14 curves outward on both sides and has at about its central portion a much greater width than at its outer edge. The purpose of this construction will presently be fully explained. The lower end of the inner cone is solid and extends down into opening 4. The parts are secured together by a screw, 16, which passes through a washer, 17, resting upon the base of the outer cone and engages the inner cone. The parts are thus held firmly together; but the inner cone is left free to rotate within the outer cone when it is desired to change the quality of the stream. The lower end of the inner cone is preferably made angular, as indicated at 12^a, and the interior of the washer made to correspond therewith, so as to prevent the latter from turning. The outer end of the tube is provided with a screw-thread, 18, and a stop, 19.

20 denotes the cap-plate, which nearly closes the outer end of the chamber, a narrow circular opening, 20^a, being left between the cap-plate and flange, through which the water passes in forming the ribbon-spray. An opening, 21, is provided at the center of the cap-plate, which is internally screw-threaded to engage thread 18 upon the tube, a hub, 22, being preferably formed on the inner side of the cap-plate to engage stop 19, as clearly shown in Figs. 1 and 3.

In Figs. 1 and 3 the circular opening between the cap-plate and flange is exaggerated for clearness. In practice the cap-plate acts as a stop to limit the outward movement of the adjustable flange, the upper knurl acting as a stop to limit its inward movement. The operation may be clearly understood from the drawings.

Suppose that it is desired to produce a straight stream. The barrel is rotated until opening 14 in the inner cone, which leads into the tube, is brought to register with opening 5 through the side of the outer cone. This allows the water to pass freely from the base out through the tube, which of course produces a straight stream. The position of the several parts in producing this result is clearly shown in Figs. 1 and 5. To produce a central spray it is simply necessary to turn the barrel and inner cone sufficiently so that the outer cone partially covers opening 14, as clearly shown in Fig. 2. This partially cuts off the flow, thereby increasing the pressure, and forces the water to pass through the openings at an angle and to pass partially around opening 14, the interior of which is enlarged, as already explained, before it can pass into tube 5, so that the stream is given a spiral movement in said tube, which breaks the stream and causes it to pass out therefrom in the form of spray. The amount of water thrown and the fineness of the spray are perfectly controlled by turning the barrel slightly in either direction. When it is desired to produce a very fine spray, or, on the other hand, to throw in the form of spray a greater volume of water than is possible through the tube, either result may be accomplished by giving the barrel a partial turn to the position shown in Fig. 3. This cuts off the flow into the tube, but permits an unobstructed flow from the base, through openings 5 and 13, into the chamber in the barrel, and thence out in the form of a circular ribbon-spray between the flange and cap-plate. As already explained, the flange may be made adjustable, if preferred, as a means for regulating the fineness of the spray and the amount of water thrown. A perfect cut-off is effected by turning the barrel so that neither of the openings 13 or 14 in the inner cone will register with opening 5 through the outer cone—as shown, for example, in Fig. 6.

It will, of course, be understood that the details of construction may be greatly varied without departing from the principles of my invention.

I claim—

1. A hose-nozzle consisting of a base, a cone, 3, depending within it, having an opening, 5, a barrel having a chamber, 9, a tube leading through said chamber, a cone at its lower end closely fitting cone 3, openings in said cone adapted to register with opening 5, and leading to said chamber and said tube, and a cap-plate engaging said tube, which closes said chamber with the exception of a narrow circular opening surrounding said cap-plate.

2. The base and outer cone having opening 5, in combination with the barrel having chamber 9, central tube, 15, cone 12, engaging within the outer cone and provided with openings 13 and 14, the latter being widened at its central portion for the purpose set forth, and a cap-plate nearly closing the outer end of said chamber, whereby partial rotation of the barrel will permit water either to pass out through the chamber, producing a circular ribbon-spray through the tube, producing a full stream or a central spray, or will effect a perfect cut-off.

In testimony whereof I affix my signature in presence of two witnesses.

DAVID T. ELLIS.

Witnesses:
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B. E. LEE.