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F. KLEIN

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SPRAY NOZZLE

Filed July 19, 1940

Fig. 1.

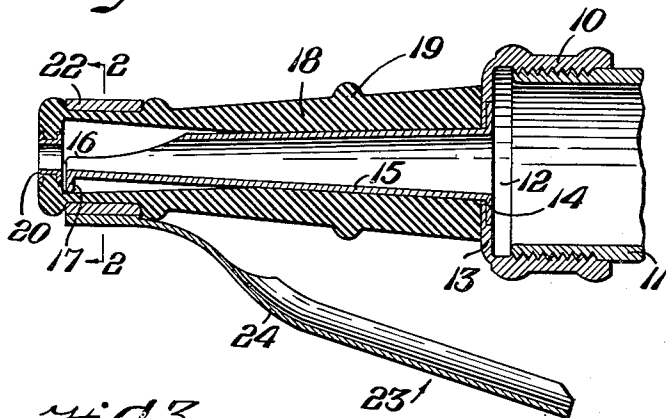


Fig. 2.

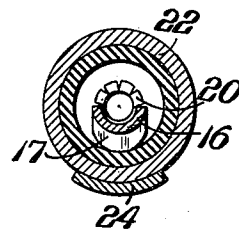


Fig. 3.

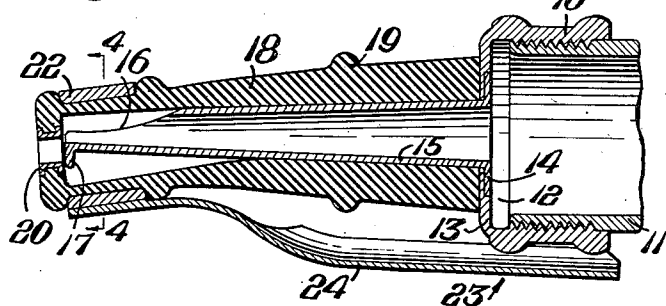


Fig. 4.

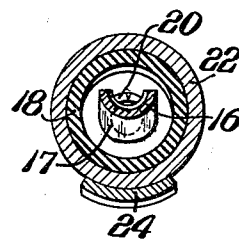


Fig. 5.

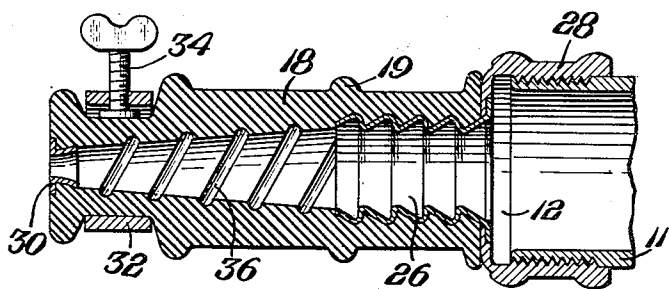


Fig. 6.

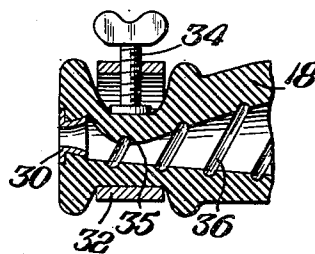


Fig. 8.

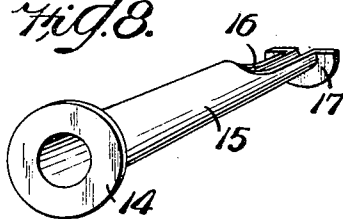
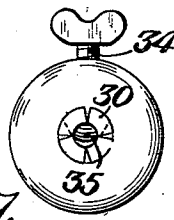


Fig. 7.



INVENTOR
FELIX KLEIN
BY *Louis Necho*
ATTORNEY

UNITED STATES PATENT OFFICE

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SPRAY NOZZLE

Felix Klein, Bayside, Long Island, N. Y., assignor
to Keystone Brass & Rubber Co., Philadelphia,
Pa., a corporation of Pennsylvania

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2 Claims. (Cl. 299—132)

My invention relates to a new and useful spray nozzle and it relates more particularly to a spray nozzle which is provided with means for effecting any desired degree of adjustment and thus controlling the quantity, force, as well as form of the stream of water ejected through the spray nozzle. While my nozzle as here shown and described is applied to the discharge end of a garden hose, it will be seen that the construction, without any variation, is equally useful in connection with other domestic plumbing fixtures such as a kitchen faucet, a shampoo attachment, a bath shower head and the like.

Spray nozzles of this general character have heretofore been made and used and, with particular reference to the type of spray nozzle applied to the discharge end of a garden hose for instance, I have found that all such nozzles are formed of metal such as brass which makes them expensive, and furthermore such nozzles can only be adjusted by the use of both hands, one to hold the end of the garden hose and one to rotate the spray nozzle proper. Also, when the hose is dropped, the brass or other metallic spray nozzle tends to injure delicate plants or break flower pots. It is therefore the object of my invention to produce a spray nozzle which is formed mostly of rubber, which is greatly simplified so as to be produced at greatly reduced expense, and which can be adjusted to any desired degree with the use of one hand.

I am aware that spray nozzles formed of rubber and having means for varying the size of the discharge orifice have heretofore been known, but such spray nozzles are capable of adjustment only in the sense that the volume is increased and the pressure decreased or vice versa, and, if the form of the stream of water discharged is changed at all by the adjustment of the nozzle, this is done only on a limited scale. It is therefore a further object of my invention to produce a spray nozzle in which the discharge orifice proper remains constant, and in which the passage or throat of the nozzle in advance of the discharge orifice is adjusted thus accomplishing a degree or range of adjustment which I found to be otherwise impractical if not impossible.

In the accompanying drawing:

Fig. 1 represents a vertical cross section of a spray nozzle embodying my invention shown in the completely open position.

Fig. 2 represents, on a slightly enlarged scale, a section on line 2—2 of Fig. 1.

Fig. 3 represents a view similar to Fig. 1 showing the nozzle after it has been partly adjusted

Fig. 4 represents a view similar to Fig. 2 taken on line 4—4 of Fig. 3.

Fig. 5 represents a view similar to Fig. 1 showing a slightly modified form of construction.

Fig. 6 represents a fragmentary view of the left hand portion of Fig. 5 showing the nozzle partly adjusted.

Fig. 7 represents a left hand end view of Fig. 6.

Fig. 8 represents a perspective view of the fitting forming part of the construction shown in Figs. 1 to 4.

Referring to the drawing in which like reference characters indicate like parts, 10 designates an internally threaded fitting which is adapted to engage the discharge end 11 of a garden hose or the discharge end of a spigot or other plumbing fixture. Within the fitting 10 is the usual washer 12. The fitting 10 has its outer ends deflected at 13 rotatably to engage the annular flange 14 formed at the rear or inner edge of the pipe 15 which is shown in perspective in Fig. 8. As shown in Fig. 8, the pipe 15 tapers forwardly and is cut away at its outer end as at 16. Also, the outer, cut away end 16 of the pipe 15 is bent outwardly with respect to the longitudinal axis of the pipe 15 to form the annular pendant flange 17. Over the pipe 15 is tightly fitted the rubber nozzle 18 which may or may not have the reinforcing ribs 19. The outer end of the rubber nozzle 18 is provided with an orifice which is fitted with the eyelet 20. 22 designates a collar secured to the end of the nozzle 18, and to the collar 22 is attached the operating arm or lever 23 which is deflected as at 24. It will be noted that the operating lever 23 is secured to the collar 22 at a point corresponding to the center of the flange 17. The operation of this form of construction is as follows:

When it is desired to eject a normal stream of water, the operator holds the end of the garden hose 11 and the pipe 10, or, if the device is attached to a spigot, the spigot is merely turned on. The flow of water will then be the full capacity of the orifices defined by the eyelet 20 and the pressure of course will depend on the pressure of the main. When it is desired to increase the pressure or to vary the form of the stream of water passing through the nozzle, the operating lever 23 is pushed by the thumb or other finger towards the fitting 10 as shown in Fig. 3. Since the internal, tapered pipe 15 is rigid, and since the rubber nozzle 18 is flexible, it would follow that the forward portion of the rubber nozzle is deflected downwardly as viewed in Fig. 3 to the extent that the arm 23

is raised toward the fitting 10. In its normal position the pendant flange 17 is out of registration with the orifice of the eyelet 20 as shown in Fig. 1. When the forward end of the rubber nozzle is deflected with respect to the true horizontal or with respect to the longitudinal axis of the pipe 15, the relative positions of the eyelet 20 and the flange 17 are changed and, as shown in Fig. 3, the flange 17 now partly obstructs the orifice of the eyelet 20. This compels the water flowing through the pipe 15 to pass through the now comparatively restricted orifice of the eyelet 20 and, since the volume and pressure are constant, it follows that the restriction will increase the nozzle pressure and the distance to which the stream can be thrown. Also, by variously moving the discharge end of the nozzle with respect to the flange 17 the form or shape of the stream emanating from the discharge orifice of the nozzle will be varied accordingly. Thus, when a relatively big plant such as a shrub or a tree is being watered the arm 23 is released and the tendency of the rubber of the nozzle to spring back brings the parts back to the position shown in Fig. 1 in which a full stream is directed at a single spot. If, next to such tree or plant, there is a flower bed and a heavy stream would cause damage to the delicate plants, the arm 23 is pressed toward the fitting 10 until the desired degree of adjustment is attained and the desired kind of spray of water is produced. In this way the stream or spray of water emanating from the nozzle is instantaneously adjusted and easily varied as required by merely manipulating the lever 23. Furthermore, the operator can pass from a full stream to a "rainbow" spray instantaneously, whereas with the conventional nozzles of garden hoses which are set to pass through a predetermined series of adjustments beyond the operator's control, the operator will have to pass through the stage of a full stream down through all the other adjustments before the fine spray adjustment is reached. This wastes time and water and also tends to splash the operator. Also, due to the troublesome operation of completely closing the conventional nozzle, the operator usually carries the nozzle fully opened from one end of the lawn or garden to the other end thus not only wasting water but wetting certain portions that it is not desired to wet. In my construction, by merely making the width of the flange 17 equal to the diameter of the opening of the eyelet 20, I am enabled completely to close the discharge orifice of the nozzle while transferring the watering operation from one spot to another.

In Fig. 5 I have shown a different form of construction in which the same rubber nozzle 18 is fitted over the nipple 26 of a conventional garden hose fitting 28, or, instead of being fitted over the nipple 26, it could be equally well fitted over the discharge end of a spigot or other plumbing fixture. The discharge end of the nozzle 18 is again provided with the eyelet 30 and a collar 32 is mounted immediately in advance of the eyelet 30. Threadedly engaging the collar 32 is a pressure thumb screw 34 which, when turned, will deflect the wall of the nozzle as at 35 and thus

restrict the throat of the nozzle in advance of the eyelet 30 as clearly shown in Figs. 6 and 7. The thumb screw 34 is located conveniently to the thumb and forefinger of the operator so that again the adjustment can be effected with only one hand and again it is pointed out that both in the construction of Figs. 1 and 4 the adjustment is effected not in the discharge orifice which is permanently defined by the metallic eyelet 30, but at a point in advance of the discharge orifice whether it be by the action of the lever 23 or the thumb screw 34.

In the construction shown in Fig. 5 I may, if desired, provide the nozzle 18 with an internal, spiral effect which may be in the form of a groove concave with respect to the internal surface or which may be in the form of a rib convex with respect to the internal surface or bore of the nozzle in order to give to the stream of water flowing therethrough a rotary movement prior to its passage through the eyelet 20.

As illustrated in the drawing the flange 17 of the conduit 15 is normally out of registration with the orifice 20 and is adapted to be brought into registration to the desired extent by the manipulation of the lever 23. I want to point out that it is within the scope of my invention to reverse the construction entirely so that the normal position of the lip 17 would be that of completely obstructing the orifice 20 and then the lever 23 can be used to deflect the tip of the rubber nozzle 18 so as to take the orifice 20 out of registration with the flange 17. Also, while I have shown the lever 23 for convenience of operation, it is clear that the nozzle comprising the body 18, the conduit 15, the flange 17 and the orifice 20 could be manipulated by hand, since, by the pressure of the thumb on the tip of the rubber nozzle the same can be deflected to change the position of the orifice 20 with respect to the flange 17 and the longitudinal axis of the conduit 15.

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

1. A spray device of the character stated comprising a flexible nozzle adapted to be connected to a source of water and having a through bore therein, an eyelet disposed at the outer end of said nozzle and constituting a discharge orifice, a closure for said orifice disposed within the bore of said nozzle and normally out of registration with said orifice, and means for flexing said nozzle to bring said closure into partial or complete registration with said orifice.

2. A spray device of the character stated comprising a flexible nozzle adapted to be connected to a source of water and having a through bore therein, a conduit disposed within said bore, a separate eyelet secured in the free end of said nozzle and constituting a discharge orifice therefor, a closure for said orifice carried by said conduit in a position normally out of registration with said orifice, and means for flexing said nozzle to move said orifice into partial or complete registration with said closure.

FELIX KLEIN.