

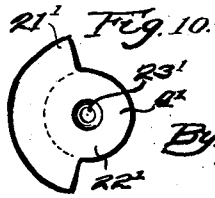
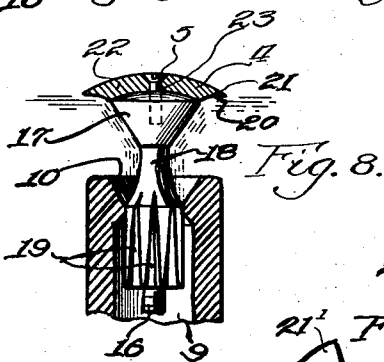
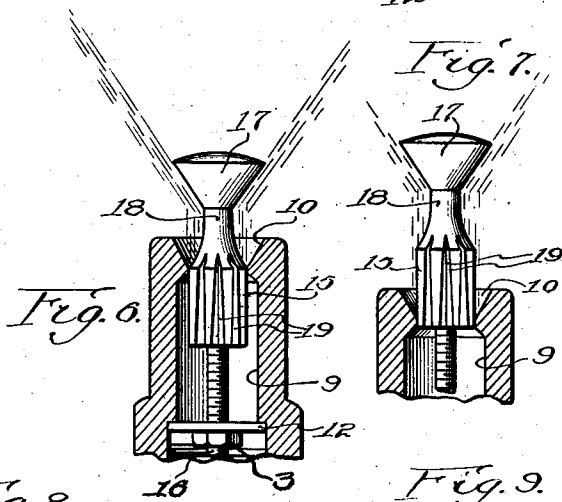
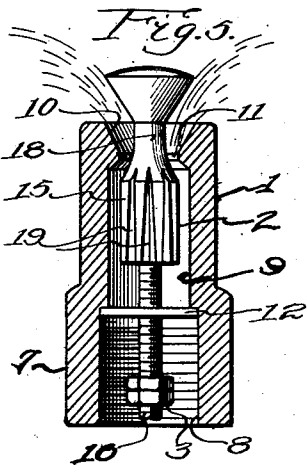
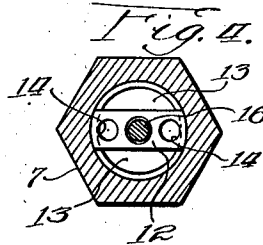
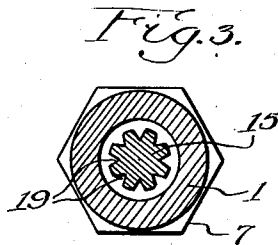
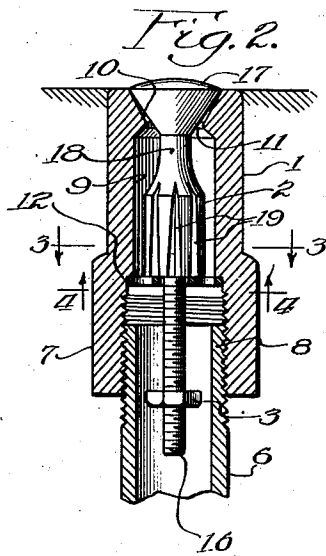
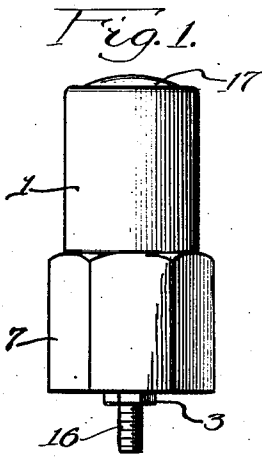
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LAWN SPRINKLER NOZZLE

Filed Sept. 24, 1927



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# UNITED STATES PATENT OFFICE

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## LAWN-SPRINKLER NOZZLE

Application filed September 24, 1927. Serial No. 221,733.

This invention relates to lawn sprinkler nozzles, and the main objects are to provide a nozzle for this purpose adapted for ready setting from time to time to produce sprays differing in volume and character and also differing in height of discharge point relative to the surface of the ground; to provide such a nozzle adapted for momentary large initial flow of water for flushing purposes and which shall be automatically operable for quickly assuming a predetermined effective position, when the water is turned on, according to the adjustment setting and kind of spray desired; and to provide a spray deflecting attachment of interchangeable character adapted for applying to a nozzle such as herein referred to for modifying the character of and limiting the upward movement of the spray or augmenting its lateral deflection.

An illustrative embodiment of this invention is shown by the accompanying drawings, in which:—

Figure 1 is a side elevation of the nozzle in its closed position.

Fig. 2 is mainly a longitudinal axial section through the nozzle, positioned as in Fig. 1, the central core being in side elevation.

Fig. 3 is a horizontal section on the line 3—3 of Fig. 2.

Fig. 4 is a horizontal section on the line 4—4 of Fig. 2, viewed as indicated by the arrows.

Fig. 5 is a sectional view taken as in Fig. 2 but with the valve raised to its initial intermediate or flushing position.

Fig. 6 is similar to Fig. 5 except that the central core is raised to its normal small-stream position and the lower part of the nozzle is broken away.

Fig. 7 is mainly similar to Fig. 6 except that the core is raised to its uppermost position for throwing a large stream, only the top part of the nozzle being shown.

Fig. 8 is similar to Fig. 6 with the addition of a spray deflecting cap which augments lateral deflection and throws the spray horizontally.

Fig. 9 is similar to the top part of Fig. 2 except that the core is raised very slightly for

discharging a fine, thin spray, with the whole nozzle top substantially flush with the ground.

Fig. 10 shows a modified form of deflector cap.

Fig. 11 shows in axial section a cap the deflecting face of which is of modified form.

In the construction shown in the drawings, the nozzle is of simple construction and comprises only two relatively movable main parts, namely the shell 1 and the core 2, besides an adjusting nut 3. Whenever it is desired to restrict or preclude upward projection of the spray, and augment its lateral deflection, a curved cap 4 is attachable rigidly to the top of the core, as by means of a screw 5. However, even then the only movement occurring in the valve under the operation conditions of opening and closing, when adjustment has been made, is that of the substantially unitary core part represented by numerals 2, 3, 4 and 5.

This nozzle is intended mainly for use in a lawn sprinkling system where a plurality of nozzles are connected to a common source of water supply which may be controlled by a remotely positioned hand valve, not here shown. In this instance the source of supply is indicated by pipe 6 on Fig. 2. In order to facilitate ready connection of the nozzle to this pipe, it is formed of nut shape, as for instance hexagonal, as shown at 7, and the interior is threaded, as at 8. The main body of the shell 1 is provided with a cylindrical chamber 9 and the upper end is provided with an outwardly flared conical crater or discharge part 10 communicating with said chamber by a comparatively narrow central opening extending through the restricted neck part as shown at 11. It matters not as to which end of shell is hexagonal.

In order to assure coaxial alinement of the lower end of core 2 in the shell 1 a guide part 12 is set in place permanently at the inner end of the threaded portion 8. Water passages 13 extend past this guide at its sides and through perforations 14 therethrough. The upward movement of the core 2 by pressure of the water is limited by the nut 3 coming to rest against the lower side of said part

12 according to the adjustment of said nut.

Referring now to structural details of the core 2, this member includes a central, relatively thick longitudinal and symmetrically fluted cylindrical body part 15, projecting from the lower end of which is the threaded adjusting stem 16 for the nut 3. At the upper end of the core is a spray expanding conical tip 17 formed and adapted to close the nozzle part 10 when the water is turned off, permitting the core 2 to drop by gravity. This part 17 is connected to the fluted part 15 by means of a thin neck part 18 adapted to permit a large flow of water for flushing the nozzle when the core is raised initially to an intermediate position.

The fluting grooves 19 on the part 15 are flared deep and wide toward the lower end and are comparatively narrow and shallow at the upper end whereby adjustment of the rate of flow may be effected according to the elevation of the core 2 as determined by the setting of nut 3.

Referring to the spray deflector attachment or cap 4, it is to be noted that the lower face 20 of the projecting rim part 21 is curved so as to be tangent to the face of cone 17 at its inner edge and substantially horizontal at its outer edge, so that as the spray leaves the nozzle it will be projected substantially horizontally and thence pulled downwardly by gravity, approximately according to the shape of an umbrella. The central body part 22 is axially perforated at 23 to accommodate the screw 5. The lower side of part 22 is curved to fit the top.

In case it is desired to restrict only a part of the spray or a limited sector thereof, the deflector cap may be formed accordingly, as in Fig. 10. Here the cap 4' includes a central body part 22' as in cap 4, but the deflector part is represented merely by a sector 21' which may well be about sixty degrees in extent, depending on the range of protection desired. As the caps are interchangeable a variety of different designs of caps may be kept on hand for use to meet specific needs from time to time.

In order to set the core nut-lock 3, the water being turned off from the spraying system, the attendant uses any common socket wrench (not shown) of suitable size to fit the nut part 7, and removes the nozzle as a whole from the pipe 6, and then either with his fingers or with a small wrench adjusts and sets the stop nut or nuts 3. He then replaces the nozzle on the pipe 6, as will be understood, whereupon the water may be turned on again.

Summarizing the character of this improved nozzle there are three main features which are especially notable, namely (1) the initial self cleaning automatic flush of the nozzle incident to the narrow neck 18 of the core, (2) the adjustable setting for

limiting the effective projection or height of the core whereby accommodation may be had for (a) large volume of water and high point of initial spread of spray, as desirable for relatively tall grass, (b) smaller volume and lower point of initial spread, as desirable for shorter grass or for newly seeded lawns, and (c) very small volume with fine thin spray and a substantially ground flush point of initial spread, as may be desired at times, and (3) the interchangeable downwardly restricting spray deflector attachment or cap 4 or 4' for protecting nearby upstanding objects from being sprayed upon.

Furthermore, this improved nozzle is aptly adapted for simplicity of design; it comprises but few parts, all of which are inexpensive and easy to make, and which lend themselves to ready assemblage in the finished product; the parts are all adapted for manufacture from rigid, non-rusting material, are substantially free from wear, and as a result there is practically no expense for replacement; and any desired setting may be had at any time by an unskilled attendant and without the use of any special tool.

Although but one specific embodiment of the main features of this invention has been herein shown and described, together with several forms of deflector caps it will be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of this invention as defined by the following claims.

I claim:

1. A nozzle comprising a shell in combination with a relatively movable core, said parts being formed relative to each other for control of the transmitted fluid according to the position of said core, and also for limiting the movements of said core, said shell having a passageway therethrough to transmit the fluid and to house said core, the latter having a narrow neck, and said shell having the inner face of its wall formed to restrict said passageway at that part which lies opposite the core neck when the valve is closed or nearly closed, said core having a head on its outer end to close the valve when the core is moved inwardly and said core having a longitudinally fluted part on the other side of its neck to fit slidably and snugly in the restricted part of said passageway and accommodate a normal operating flow of fluid in numerous small streams when the core is moved to its outward position, whereby free passage is allowed initially for a large momentary flushing current whenever operation of the nozzle is desired and formation of spray is facilitated when the valve is fully opened.

2. A nozzle comprising a shell in combination with a core having a limited range of movement therein, said parts being formed relative to each other for control of the transmitted fluid according to the position of said

core, said shell having a passageway there-  
through to receive, transmit and discharge  
the fluid and to house said core, the latter  
having a narrow neck, and said shell being  
formed interiorly to restrict said passageway  
at that part which lies opposite the core neck  
when the core is at or near its valve closing  
position, said core having a head on its outer  
end to close the discharge end of said pas-  
sageway when the core is moved inwardly  
and said core having a longitudinally aper-  
tured relatively thick body part on the other  
side of its neck to fit slidably and snugly in  
the restricted part of said passageway and  
accommodate a normal limited flow of fluid  
in numerous small stream units when the core  
is moved to its outward position, whereby  
free passage is allowed for a large momentary  
flushing discharge whenever operation of the  
nozzle is initiated and efficient spraying is  
assured in operation.

3. A self-closing nozzle comprising a tubular  
shell in combination with a longitudinally  
movable core therein operable by liquid pres-  
sure to open the nozzle, which members have  
mutually related control parts one of which is  
manually adjustable to determine the range  
of movement of said core and the degree of  
opening of said nozzle according to the kind  
of spray desired, said shell having a restrict-  
ed orifice at its discharge end, and said core  
having a thick body part disposed substan-  
tially all within the chamber of said shell  
when the nozzle is closed, and a relatively  
thin axially projecting neck part disposed  
in or extending beyond said orifice accord-  
ingly as the nozzle is closed or opened respec-  
tively, said neck part having a head to close  
said orifice when said core is retracted, said  
body part being formed to slide outward  
more or less into said orifice according to the  
setting of said adjustable part and said body  
part also being formed to provide a longitu-  
dinal passageway of different capacities  
therethrough according to the position of  
said core.

4. A self-closing spray nozzle comprising  
a tubular shell in combination with a longi-  
tudinally movable core disposed axially  
therein and operable by liquid pressure to  
open the nozzle, which members have mutu-  
ally related control parts one of which is  
manually adjustable to determine the range  
of movement of said core and the degree of  
opening of said nozzle according to the  
amount or kind of spray desired, said shell  
having a restricted orifice at its discharge  
end, and said core having a thick and sub-  
stantially cylindrical body part disposed  
within the chamber of said shell when the  
nozzle is closed, and a relatively thin end-  
wise projecting neck part disposed in or ex-  
tending beyond said orifice accordingly as  
the nozzle is closed or opened respectively,  
said neck part having a head to close said

orifice when said core is retracted, said body  
part being formed to slide outward more or  
less into said orifice according to the setting  
of said adjustable part and said body part  
also being fluted to permit the passage of  
liquid, the fluting grooves being flared in  
one direction to provide for different capaci-  
ties through said body part according to  
the position of said core when the nozzle is  
in use.

5. A nozzle comprising a shell having a  
discharge orifice in combination with a core  
having a part disposed axially within said  
orifice and provided with a head having a  
downward conoidal face to cause deflection  
of the liquid escaping between said shell and  
core, and means attachable to said head to  
more or less augment deflection of the liquid,  
said means including a central body part  
curved to fit against the top of said head  
which is convex and a rim segment project-  
ing laterally beyond said head, the lower  
face of said segment being more downwardly  
divergent from the vertical than the lower  
face of said head, whereby the upward pro-  
jection of the liquid may be more or less  
limited and confined in any desired lateral  
direction.

6. In an adjustable spray nozzle a longi-  
tudinally movable axial core formed as to  
cross section area at successive points so as to  
operate freely and automatically in service  
to pass first a flushing current, as the water  
is turned on and then a lesser current which  
is variable according to the extent of further  
movement of said core as predetermined by  
adjustable setting, and means to limit such  
movement including threaded adjusting  
means.

7. In a spray nozzle having a tubular shell  
with a restricted outlet, a longitudinally  
movable axially disposed core adapted to  
regulate the spray and having adjustable  
means to effect a setting thereof according to  
the kind of spray desired, said core having  
a head on one end to close said outlet when  
the core is in one position, a longitudinally  
apertured body part formed to pass a limited  
amount of water in small independent  
streams when the core is in its operative  
spraying position, and a restricted neck part  
between said head and body parts to momen-  
tarily pass a relatively large volume of water  
initially as the nozzle goes into service.

8. A self-closing nozzle comprising a tu-  
bular shell in combination with a longitu-  
dinally movable core therein operable by  
liquid pressure to open the nozzle, which  
members have mutually related control parts  
one of which is manually adjustable to de-  
termine the range of movement of said core  
and the degree of opening of said nozzle ac-  
cording to the kind of spray desired, said shell  
having a restricted orifice at its discharge end,  
and said core having an elongated body part

fitting loosely in said orifice and a head disposed outside of said orifice and adapted to seat against said shell to close said orifice under the urge of gravity when the pressure is withheld, said nozzle being disposed uprightly with said head uppermost.

Signed at Chicago this 21st day of September, 1927.

AXEL R. LE MOON.

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