April 17, 1962 J. J. ROSENKRANZ 3,030,030

ROTATING REACTION SPRINKLER AND METHOD OF ASSEMBLING THE SAME

Filed Aug. 27, 1959

FIG. 1

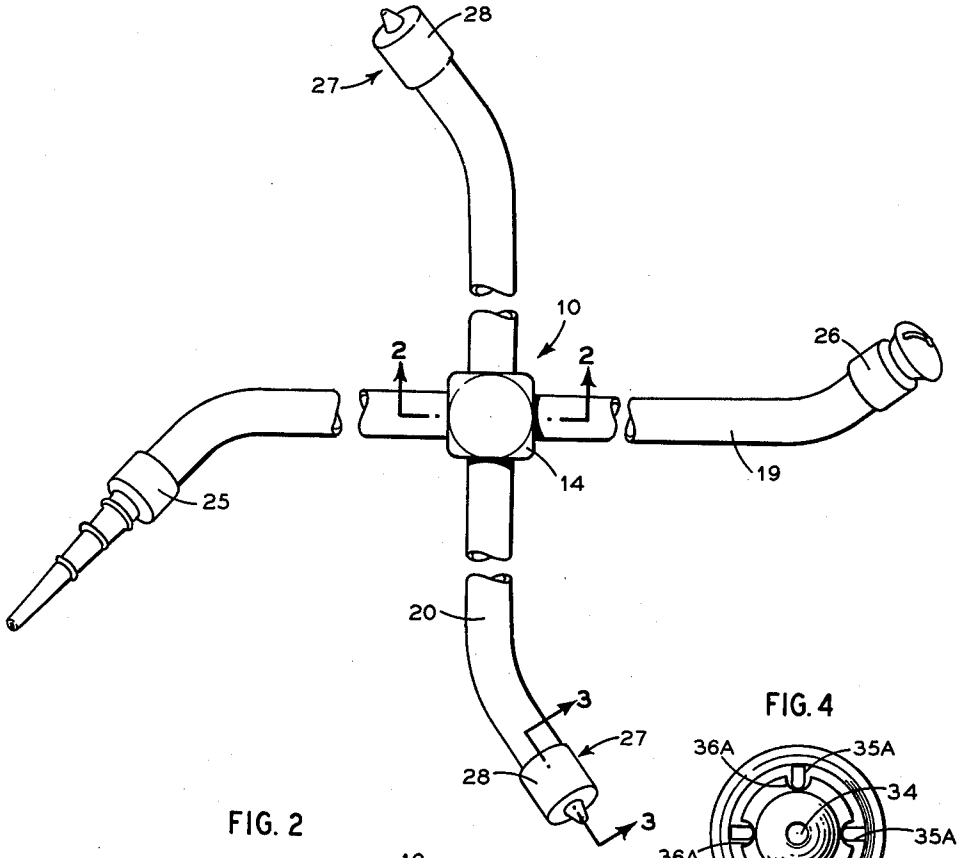


FIG. 2

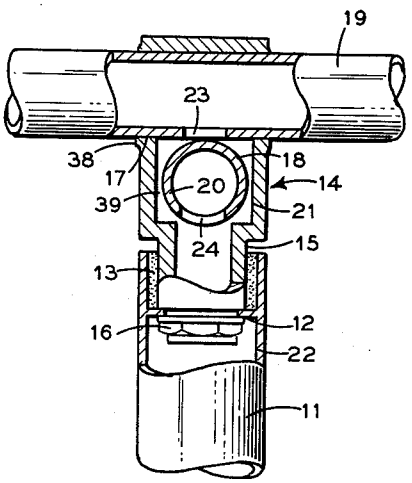
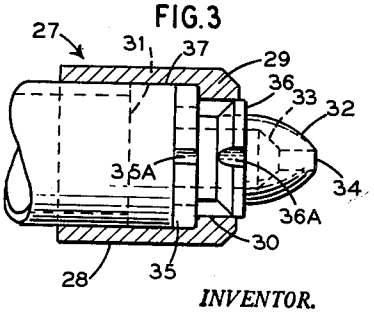


FIG. 4

FIG. 3



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ROTATING REACTION SPRINKLER AND METHOD OF ASSEMBLING THE SAME

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This invention relates in general to lawn and garden type sprinklers, and more specifically to an improved rotating reaction type sprinkler and nozzle therefor, and a method for assembling the same.

An object of this invention is to provide a novel rotating reaction sprinkler which is economical to manufacture, very simple in construction, and positive in operation.

Another object is to provide for a novel self cleaning nozzle means for use on such sprinkler.

Still another object is to provide an improved and novel method for assembling the reaction sprinkler as herein set forth.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, its operating advantages and specific objects attained by its use, reference should be had to the accompanying drawings and descriptive matter in which is illustrated and described a preferred embodiment of the invention.

In the drawings:

FIG. 1 is a plan view of a rotating reaction type sprinkler in accordance with this invention.

FIG. 2 is a section view taken along line 2—2 of FIG. 1.

FIG. 3 is a section view taken along line 3—3 of FIG. 1.

FIG. 4 is a front end view of FIG. 3.

Referring to the drawing, the improved rotating, reaction type sprinkler 10 of this invention comprises a water supply conduit 11 extending upwardly from a suitable base or support (not shown) to which a hose or the like is connected for supplying water to the sprinkler. Adjacent the upper end, the conduit 11 is provided with a flange or shoulder 12 upon which is seated a packing and bearing ring 13. Rotatably connected to the supply conduit 11 is the hub 14 of the sprinkler. The hub 14 is formed of a tubular member closed at the upper end and has a reduced circular portion 15 which is adapted to fit the bearing ring 13. A nut 16 threaded to the reduced portion 15 which extends beyond the shoulder 12 secures the hub 14 in position. As an alternate construction, not shown, the inner end of the hub may be provided with an annular groove into which is positioned a spring washer for retaining the hub to the conduit for rotatary movement relative thereto.

At vertically spaced intervals the hub 14 is provided with at least two holes 17 and 18 which extend transversely therethrough. In the illustrated embodiment the axes of the holes 17 and 18 are disposed at right angles relative to each other. Extended through each of the holes 17 and 18 is a cross arm 19 and 20, respectively. Each cross arm 19 and 20 is extended through its respective hole 17 and 18 so that substantially equal portions thereof extend outwardly on either side of the hub. The upper cross arm 19, as shown, is spaced above the lower cross arm 20. Also it is to be noted that the diameter of the lower cross arm 20 is smaller than the bore 21 of the hub, and that the bore 21 is in open communication with the bore 22 of the supply conduit 11.

Each cross arm 19 and 20 is provided with a fluid inlet

23 and 24 disposed in axial alignment with bores 21 and 22.

Connected to the outer ends of the respective cross arms 19, 20 is a nozzle. As shown different nozzle types may be connected to the cross arms, if desired, so as to attain various types of sprays. Nozzles 25 and 26 are conventional but nozzles 27 connected to the ends of cross arm 20 constitute novel self cleaning ones.

Referring to FIGS. 3 and 4, these nozzles each include a collar 28 which is frictionally fitted to the ends of cross arm 20. The outer end of the collar is provided with an inturned annular flange 29 to define a bore or opening 30. In accordance with this invention, the flange 29 is spaced beyond the ends 31 of cross arm 20. Retained within the collar 28 is a nozzle plug 32 which is arranged to slide between protracted and retracted position; the limits of travel being between the end 31 of the cross arm 20 and the inturned flange 29. A bore 33 extends longitudinally of the plug 32 through which water is free to flow and discharges therefrom through the orifice 34 in the tip of the plug.

The plug 32 is provided with a pair of spaced, radially extending flanges 35, 36. The rear flange 35 is sized to fit the bore 37 of the collar 28 to form a bearing. The other flange 36 is sized to fit the bore 30 of the collar and forms a bearing surface. Thus the plug 32 is maintained in axial alignment relative to the collar and free to slide between the limits defined by the end of the conduit 31 and inturned flange 29. Circumferentially spaced in each of the flanges 35, 36 are a plurality of openings 35A and 36A, respectively. Thus an alternate passageway is provided for the water to flow thereby.

In operation, the force of the water pressure causes the plug 32 to slide between its limits. Thus the impact of the plug against its stops under the action of the water pressure will tend to dislodge any sediment which would otherwise tend to plug the openings in the plug. In this manner the nozzle is rendered self cleaning.

In accordance with this invention the method of assembling the sprinkler head described is to drill or otherwise form at least a pair of vertically spaced holes 17, 18 transversely of the hub 14. In the illustrated form the holes 17, 18 are preferably displaced at right angles to each other. Then an imperforate tubular cross arm 19 is inserted through the upper hole 17 first, and extended therethrough so that substantially equal portions thereof project beyond the hub 14. With the cross arm 19 in position, it is secured in place as by crimping as indicated at 38. Either the cross arm 19 or the hub 14 adjacent the hole 17 may be crimped to secure one to the other . With the cross arm 19 secured in position the fluid inlet 23 is drilled in substantially axial alignment with the bore 21 of the hub.

When this is formed the second imperforate cross arm 20 is inserted through the other opening 18 until equal portions thereof project outwardly of the hub 14. In this position the cross arm 20 is secured or fixed in place by crimping, as hereinabove described. Then the fluid inlet 24 is formed by drilling or the like in the bottom of cross arm 20. If desired, but not shown, the upper end of the cross arm may be provided with an opening to permit the water to reach the fluid inlet 23 of the upper arm 19. This construction would be feasible when no by-pass is provided, such as is indicated at 39 around the lower cross arm 20 as is shown in FIG. 2.

As shown in FIG. 1, the opposite ends of the cross arms 19, 20 are then bent in opposite directions an equal amount. Preferably the opposed ends are bent laterally and upwardly. Then nozzles are connected to each upwardly inclined end. With this arrangement the nozzle plug 32 being free to slide within collar 28, will automatically assume a retracted position due to gravity when

the water pressure is not acting thereon. When water is permitted to flow to nozzle 27 the action of water pressure on the plug 32 advances it to protracted position. If desired the self cleansing action of the nozzle as herein described can be enhanced by manually retaining the nozzle plug 32 in retracted position, for an interval of time sufficient to permit the water flowing therethrough to wash out any sediment or dirt which may accumulate in the nozzle 27. In normal operation the water is discharged from nozzle 27 as a conically shaped spray. Thus the arrangement is such that the reaction of the water discharging therefrom effects rotation of said cross arms. The sprinkler head is then rotatably connected to the supply conduit 11.

From the foregoing it will be noted that the method by which the sprinkler is assembled can be rapidly performed with a minimum of operations and with a minimum of component parts. As a result, such sprinklers can be turned out in quantity as well as quality, the savings in the cost of manufacturing being passed on to the consumer.

While in accordance with the provisions of the statutes there is illustrated and described herein the best form and mode of operation of the invention now known to the inventor, those skilled in the art will understand that changes may be made in the form of the apparatus disclosed without departing from the spirit of the invention covered by the claims, and that certain features of the invention may sometimes be used to adjacentage without a corresponding use of other features.

What is claimed is:

1. An improved lawn and garden sprinkler comprising a water supply conduit, a head closed at one end rotatably connected to said conduit, said head having a bore extending along the longitudinal axis thereof and in communication with said supply conduit, a pair of vertically spaced, angularly disposed cross arms, each of said cross arms extending transversely through said head, said cross arms having a smaller diameter than that of the head so that water is free to circulate around said cross arms disposed within said head, each of said spaced cross arms having a fluid inlet in axial alignment with the longitudinal axis of said head and in communication with said bore whereby water is supplied from said conduit to each of said arms, and a nozzle means connected to the ends of said cross arm, said nozzle means being arranged so that the reaction of the water discharging therefrom effects rotation of said cross arms.

2. An improved lawn and garden sprinkler comprising a water supply conduit, a head rotatably connected to said supply conduit, said head being closed at one end and having a bore extending along a longitudinal axis thereof communicating with said supply conduit, a pair of vertically spaced cross arms extending transversely through said head, said cross arms being disposed at substantially right angles with respect to one another, each of said cross arms having substantially equal portions extending on either side of said hub, means forming a fluid inlet in each of said cross arms, the fluid inlet of each arm being in alignment with the longitudinal axis of said hub and in communication with the bore thereof whereby water is supplied from said conduit to each of said cross arms, a nozzle means connected to said cross arms whereby the reaction of the water discharging therefrom effects rotation of said hub, said nozzle means including a collar connected to either end of a cross arm, said collar having an inturned flange on one end thereof, said flange being spaced from the end of said cross arm, an orifice plug disposed within said collar, the plug being free to slide between retracted and protracted position, said plug having an axial bore extending therethrough and forms a discharge orifice in one end thereof, a pair of spaced, outwardly extending, radial flanges connected to said plug to form a bearing for said sliding plug, each of said radial flanges having circumferentially spaced openings therein to permit the passage of water thereby, one of said radial flanges being sized to form a stop for limiting the movement of said plug between the ends of said cross arm and said collar inturned flange.

3. An improved self cleaning nozzle comprising a collar having an inturned peripheral flange to define a discharge opening, said collar being adapted to be connected to the end of a conduit supplying water to said nozzle so that the flange of said collar is spaced from the end of the supply conduit, a plug loosely and slidably retained in said collar, said plug being slidable between retracted and protracted relationship with respect to said opening, said plug having a bore extending along the longitudinal axis thereof to form a discharge orifice in the end thereof and a pair of spaced, circular outwardly extending radial flanges for spacing said plug within said collar, each of said flanges having circumferentially spaced radial slots to permit the passage of water thereby, one of the radial flanges of said plug being sized to form a stop for limiting the movement of said plug between the end of the conduit and said collar inturned flange, and the other of said pair of flanges sized to bear against the surface of said discharge opening to maintain the aligment of said plug.

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