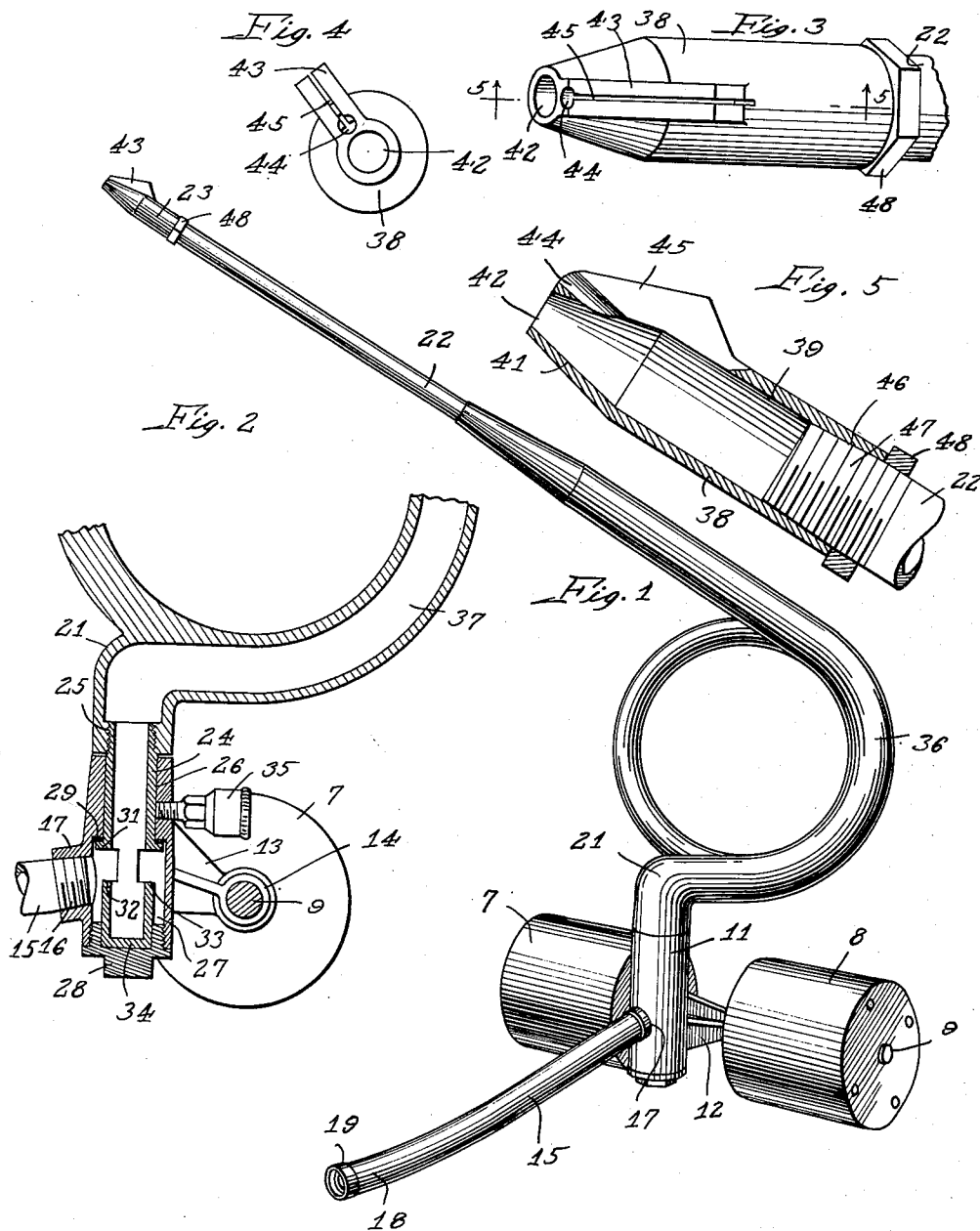


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WIDE RANGE SPRINKLER
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WIDE RANGE SPRINKLER

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This invention relates to sprinklers and has particular reference to sprinklers adapted for use on parks, golf courses, and the like, where even distribution of large quantities of water over a wide range is required.

While wide range sprinklers are known, all of those with which I am acquainted are relatively complicated in construction and embody complicated devices in attempting to obtain uniform distribution of the water from the sprinkler outward to the edge of the area covered by the sprinkler. The sprinklers are comparatively expensive to manufacture and are prone to be unreliable in service since reliability of a device of this character is predicated upon continuous good performance in the absence of an attendant. Many of these sprinklers have numerous bearing surfaces and the parts are not so arranged and balanced as to give prolonged and uninterrupted service, trouble frequently developing because of uneven wear in the bearings.

I have aimed to provide a wide range sprinkler of greater simplicity and reliability than those heretofore known.

Another object of the invention is the provision of a wide range sprinkler having a single nozzle tip and means for balancing the moving parts.

Another object of the invention is the provision of a wide range sprinkler having improved bearing construction.

A still further object of the invention is the provision of an improved nozzle tip for wide range sprinklers.

Another aim of the invention is to provide a one-piece nozzle tip having orifices arranged to provide substantially uniform wide range delivery.

Other objects of the invention will become apparent to those skilled in the art from the following description and the accompanying drawing, in which—

Figure 1 is a side perspective view of a sprinkler embodying my invention;

Fig. 2 is a vertical section through the body and a portion of the delivery tube showing the bearing construction;

Fig. 3 is a perspective view of my improved nozzle tip;

Fig. 4 is an end view of the nozzle tip, and

Fig. 5 is a section on the line 5—5 of Fig. 3.

The sprinkler consists of a pair of wheels between which is supported a body offset from the vertical plane of the wheels and supported on its opposite side on a hose connection pipe which

serves to brace the body and to conduct water. A delivery tube is supported on the body for rotation and carries a nozzle arranged to travel on a circle of which the pivotal support is the center, the weight of the delivery tube being disposed so as to balance the delivery tube about the axis of its bearing.

Referring first to Figure 1, the numerals 7 and 8 designate generally a pair of wheels, in this instance being a pair of rollers connected together by means of a shaft 9, the rollers being journaled on the shaft. A cylindrical body 11 carries spaced brackets 12 and 13 on one side, the brackets having sleeves 14 for receiving the shaft 9 to support the body thereon. The brackets may be fixedly secured to the shaft in any well known manner, as, for example, by set screws, keys, or by a press fit, as shown in the drawing. A hose connection pipe 15 is secured to the body 11 on the side opposite from the brackets 12 and 13 in any suitable manner, as, for example, by threading the end 16 of the pipe into a threaded boss 17 on the body. The hose connection pipe is curved downwardly, as shown in Figure 1, so that contact of the outer end 18 thereof with the ground serves to support the body 11 free from the ground. The end 18 of the pipe is provided with a suitable fitting 19 for the connection thereto of a conventional hose. Supported on the top of the body 11 is a delivery tube 21, the outer end 22 thereof extending radially outward from the point of support and carrying a nozzle tip, designated generally by the numeral 23, at its terminus.

Enclosed bearing means is provided for pivotally supporting the delivery tube on the body. This consists of a tubular bearing member 24 threaded into the lower end of the delivery pipe, as shown at 25, and extending into the body 11, as shown in Fig. 2. The body 11 is provided with a bore 26 forming a bearing and a bore 27 forming a chamber, the lower end of the chamber 27 being closed by a threaded plug 28. The bearing member 24 is receivable in the bores 26 and 27 and has bearing support in the bore 26. The bearing member is provided with an annular flange 31 so positioned as to bear against the shoulder 29 at the junction between the bores 26 and 27. A replaceable washer to seal the bearing and take the wear is shown interposed between the flange 31 and shoulder 29. The bearing member 24 is also provided with transverse slots 32 and 33 within the bore 27 for the passage of water from the pipe 15 and bore 27 to the interior of the tubular bearing member 24 through

which it passes into the delivery tube 21. The lower end of the bearing member 24 has lateral support in the plug 28 and preferably, though not necessarily, has a solid bottom 34 also having end thrust bearing support against the plug 28. A grease cup 35 of conventional character serves to provide lubricant to the bearing portion 26.

In the form shown in the drawing, the delivery tube 21 is provided with an arcuate bend adjacent to the body 11, as shown at 36, and has a channel 37 arranged to receive the water from the bearing member 24 and conduct the same to the nozzle tip 23. The purpose of this bend in the delivery tube is to balance the delivery tube about its bearing in the body 11, and while this particular manner is shown in the drawing, the weight of the nozzle tip 23 and the overhanging end 22 of the delivery tube may be counterbalanced in any convenient manner.

Referring now to Figs. 3 to 5, inclusive, wherein the nozzle tip is shown in further detail, the numeral 38 designates the body of the tip which is preferably formed as a single piece. The tip has a bore 39 of substantially uniform diameter terminating at one end in a conical bore 41 which in turn terminates in a relatively large orifice 42 substantially coaxial with the bore 39. The body 39 also carries on its tip portion a longitudinal rib 43 directed upwardly from the end of the tube 21 and rearwardly with respect to the direction of rotation of the tube at an acute angle to the vertical plane thereof, as indicated in Fig. 4. A forwardly directed orifice 44 adjacent to the orifice 42 and of substantially smaller diameter than the orifice 42 and at an acute angle to the axis of the bore 39 and orifice 42. Joining the orifice 44 and extending rearwardly lengthwise of the rib 43 is a radial slot 45, the slot in this instance extending slightly beyond the rear end 40 of the rib, as best shown in Figs. 3 and 5. The bore 39 is threaded at 46 for the reception of the threaded end 47 of the delivery tube 21. A lock nut 48 is carried on the threaded end 47 and is adapted to be screwed against the nozzle tip to secure the same against rotation with respect to the delivery tube.

In use, the hose connection pipe 15 is connected to a suitable source of water supply through the coupling 19. Water passes through the pipe 15 and into the bore 27 of the body. From the bore 27, water passes through the slots 32 and 33 into the interior of the tubular bearing member 24 and thence through the channel 37 into the bore 39 of the nozzle tip. At the nozzle tip, the greater proportion of the water exits through the orifice 42. This being a relatively large stream of water under high pressure, the stream will be carried far out from the nozzle before it begins to break into a spray. It will be seen that the angle of the portion 22 of the delivery tube will, to a certain extent, regulate the distance to which this stream of water will be projected. This stream will break as it approaches the end of its path, and upon rotation of the delivery tube about the body 11, will cover a circular band relatively far out from the sprinkler. Simultaneously, a stream of water will pass out of the orifice 44. However, this stream of water will be of considerably smaller size than that emerging from the orifice 42 and consequently the stream will break at an earlier point in its travel. The size of the orifice 44 is so arranged that the outer edge of the band covered thereby will substantially coincide with the inner edge of the band covered by the water from

the orifice 42. Water will also emerge from the radial slot 45 in a fan-shaped spray-like delivery and will cover the area outwardly and inwardly from the nozzle 23, between the inner edge of the band covered by the orifice 44 and the sprinkler. The relative sizes of the orifices 42 and 44 and the radial slot 45 are so arranged that they cover bands of successively smaller radius and distribute substantially equal amounts of water per unit area in each band. A further function of the radial port 44 and the radial slot 45 is to apply a rotative force to the delivery tube. It will be seen that the water being discharged from these ports along one side of the nozzle tip tends to bring about rotation of the delivery tube through the unequal forces incident thereon through this arrangement. It will be noted also that the rate of rotation of the delivery tube about its bearing may be regulated by varying the rotative position of the nozzle tip on the delivery tube and that the closer the rib 43 approaches a transverse position at right angles with respect to the vertical plane of the tube 21, the greater will be the rate of rotation of the delivery tube.

Attention is directed to the fact that the body 11 is supported to one side of the vertical plane through the axis of the wheels and that the hose connection pipe 15 is connected to the body on the opposite side so that the body is supported between the wheels and the pipe. The pipe 15 may conveniently be used as a handle or as a skid for rolling the sprinkler from place to place.

It is evident from Fig. 2 that I have also provided a reinforcement preferably formed integral with the tube 21 and completing a circle with the arcuate bend 36 of said tube, as disclosed in Fig. 1. This reinforcement is in substantially balanced relation to the vertical axis of rotation of the tube 21, as should be evident in Fig. 1.

Attention is also directed to the improved bearing construction whereby a very simple and yet very sturdy bearing is provided at very small cost.

Another feature of the invention is the fact that a single nozzle tip is employed offset from the vertical axis of the bearing and that means are provided for counterbalancing the unequal distribution of weight resulting from this offset position. I have also provided a one-piece nozzle tip so arranged as to uniformly distribute the flow of water throughout the entire range of the sprinkler without the use of any type of moving distribution elements. Because of the arrangement of the nozzle tip and the provision of a single nozzle instead of a plurality of nozzle tips, a maximum range is obtained from the sprinkler since the water pressure is not dissipated by the provision of a plurality of nozzle tips. Attention is directed to the simplicity of construction which entirely eliminates the necessity for close personal supervision of the sprinkler while in operation and also to the improved wide range and uniform distribution of water.

While I have thus described and illustrated a specific embodiment of my invention, I am aware that numerous alterations and changes may be made therein without departing from the spirit of the invention or the scope of the appended claims, in which—

I claim:

1. In a rotary sprinkler, a nozzle tip having an axial bore and an axial orifice communicating with the end thereof, a supplementary orifice in spaced relation to the axial orifice and diverging

from the bore at an acute angle, said supplementary orifice being small in diameter in relation to the axial orifice, and a slit orifice of small width in relation to the supplementary orifice and extending from the latter along one side of the nozzle tip away from the axial orifice.

2. In a rotary sprinkler, a nozzle having a tapered tip portion, provided with an axial main orifice, a longitudinal rib projecting from said tapered portion away from said main orifice of the sprinkler, a secondary orifice in the side of the tapered tip extending through said rib and of smaller diameter in relation to the main orifice and diverging from the bore at an acute angle, and a longitudinal slot in said rib of small width in relation to the secondary orifice and extending from the latter away from the main orifice a certain distance sufficient to produce a fan-shaped spray.

3. In a wide range rotary sprinkler, a nozzle having an axial bore and an axial main orifice communicating with one end thereof of relatively large diameter for wide range sprinkling, a secondary orifice of smaller diameter disposed in diverging relation to the main orifice and at an acute angle with respect thereto for intermediate range sprinkling, and a narrow slot of narrower width than the secondary orifice extending along the side of the nozzle from the secondary orifice in a direction away from the main orifice for close range sprinkling.

4. A wide range sprinkler comprising spaced coaxial wheels, a hollow upstanding body supported therebetween offset laterally from the vertical plane of the wheels, a hose connection pipe entering the body on the side thereof opposite said wheels arranged to form a third support for the body, and a delivery tube communicating with the hose connection pipe through said body and having a lower portion pivoted in said body on an axis at right angles to the plane of support of said sprinkler and an upper portion in a vertical plane extending from the lower portion first to one side of the axis of rotation and upwardly and across the axis and terminating at a remote

point on the other side of the axis, the portions of said upper portion on opposite sides of the axis substantially counterbalancing each other when said axis is vertical.

5. A wide range sprinkler comprising spaced coaxial wheels, a hollow upstanding body carried between the wheels, supported thereon, and offset laterally from the vertical plane of the wheels, a hose connection pipe entering the body on the side thereof opposite said wheels arranged to form a third support for the body, and a delivery tube communicating with the hose connection pipe through said body and pivoted on the body on an axis at right angles to the plane of support of the sprinkler, comprising a delivery end extending upwardly from the axis of support, bent through an arc ranging between 180° and 270° on one side of said axis, and extending outwardly on the opposite side of the axis, the outwardly extending end and the arcuate portion normally substantially counterbalancing each other to balance the delivery tube when the axis thereof is vertical.

6. A wide range sprinkler comprising spaced coaxial wheels, a hollow body carried on and between the wheels and offset laterally from the vertical plane of the wheels, a hose connection pipe entering the body on the side thereof opposite said wheels arranged to form a third support for the body, a single delivery tube communicating with the hose connection pipe through said body and pivoted on the body on an axis at right angles to the plane of support of said sprinkler and having a delivery end terminating on the arc of a circle of substantially greater radius than the body, and a nozzle tip on the delivery end of said tube having an axial orifice and at least one supplementary orifice in spaced relation to and of smaller diameter than the axial orifice and spaced therefrom both laterally and longitudinally of the nozzle tip, said tip being rotatable axially on said delivery end to determine the rate of rotation of said delivery tube.

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