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INTERMITTENT ROTATION SPRINKLER

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Fig. 1

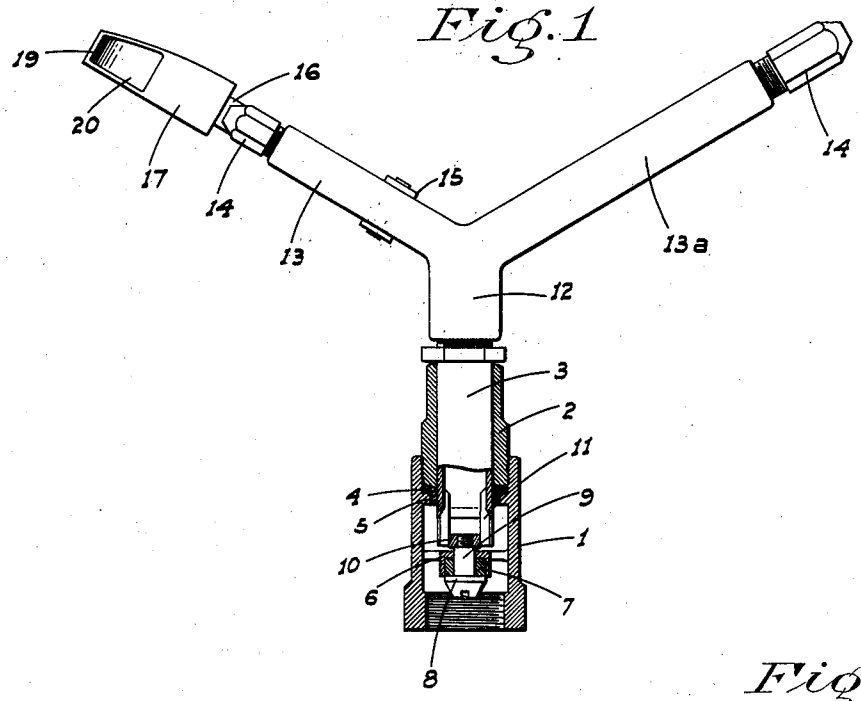
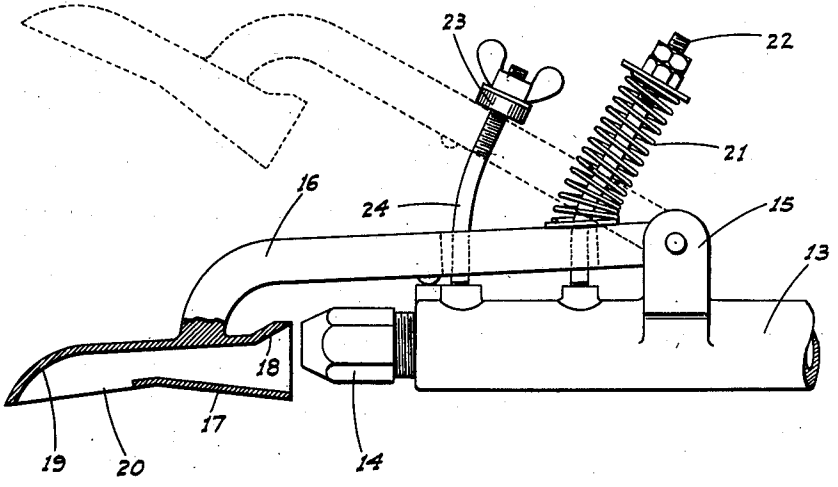


Fig. 2



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INTERMITTENT ROTATION SPRINKLER

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5 Claims. (Cl. 299—69)

This invention relates to rotary water sprinklers of the type adapted to be mounted in upstanding relation to the ground and including opposed radially disposed nozzles through which the water is discharged.

The principal object of my invention is to provide a rotation controlling device, actuated by water discharged from one nozzle, which will cause the sprinkler to be given intermittent rotative impulses, and which at the same time and in the same direction exerts an intermittent tapping or jarring action on the rotating member of the sprinkler preventing possible sticking of the sprinkler spindle in its bearing.

A further object of the invention is to provide a device for the purpose which may be readily adjusted to alter the speed of rotation of the sprinkler as operating conditions may require.

Another object is to provide a simplified and improved form of bearing for the rotating spindle of the sprinkler, so that the likelihood of sand or the like getting against the bearing surface is avoided. An efficient form of combination annular and thrust bearing unit is also provided, which is easily replaced if worn but whose wear will not affect the efficient operation of the sprinkler or the functioning of the sand sealing feature.

A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawing similar characters of reference indicate corresponding parts in the several views:

Figure 1 is a side elevation of the sprinkler with the bearing structure in section.

Figure 2 is a top plan of the rotation controlling unit of the sprinkler partly in section.

Referring now more particularly to the characters of reference on the drawing, 1 denotes a tubular base or supporting member tapped at its lower end for connection with a vertical water supply pipe.

Removably screwed into the member 1 from the top is a bearing sleeve 2 in which a tubular sprinkler head spindle 3 is turnable. A compressible leather sand sealing washer or ring 4 engages the spindle adjacent its lower end and below the sleeve and is removably held in place, in a compressive and spindle engaging relation, between the lower end of the sleeve and an internal flange 5 in the member 1.

Formed in the member 1 below the spindle is a central boss 6 in which an annular end thrust bearing ring 7 of special wear resisting metal is removably mounted. The ring 7 at the bottom is engaged by a ring or washer 8 of similar metal disposed under the head of a bearing pin 9 and removable therefrom. This pin turnably projects through the ring 7 and is removably screwed into a boss 10 disposed below but connected integral with the spindle by arms 11 so as not to interfere with the free flow of water into the spindle from below.

By means of this construction it will be seen that the sleeve is journaled along spaced areas, giving excellent support against any tendency to bind, while the upward thrust is taken by the special thrust rings 7 and 8. The pins 9 and the rings being removable, they can be easily replaced if undue wear occurs. The sealing ring 4 can also be replaced by removing the sleeve 2, and since it engages only the circumferential surface of the spindle, slight vertical play of the spindle does not effect the sealing action.

The spindle at its upper end is connected to the base of the sprinkler head 12, from which diametrally opposed and relatively short and long nozzle arms 13 and 13*a* respectively project upwardly at an acute angle to the horizon, the arms and nozzle tips 14 providing jet openings at their upper ends, adapted to throw water in straight radial directions.

Projecting laterally from the arm 13 near the base 12 are vertically spaced lugs 15 between which is pivoted the adjacent end of an arm 16. This arm extends alongside the nozzle 13 to a termination beyond the tip 14, and is there connected to a water deflecting passage member 17 which extends lengthwise of the nozzle arm. The interior of the member 17 is preferably rectangular in cross section and is open to the tip 14. At the end of said member nearest the tip and on the side nearest the arm 16, the corresponding vertical wall of the passage slopes into the path of water issuing from the jet opening as shown at 18. At its outer end said vertical wall of the passage curves as at 19 to the opposite side of the member, from which the water discharges through a side opening 20 disposed in a vertical plane and facing away from the arm 16.

By reason of this construction it will be seen that water issuing under pressure from the jet opening of the nozzle strikes the deflecting surface 18 and causes the arm 16 to swing away from the nozzle arm. This movement is yieldably resisted by an adjustable tension spring 21 mounted on a rod 22 which projects through the arm 16 from a rigid connection with the nozzle arm 13. A definite stop for the movement of the arm 16 is provided by a bumper 23, preferably of noise deadening material, which is adjustably mounted on another rod 24 also projecting through the arm 16 from the nozzle arm 13.

In operation water striking the deflecting member 17 from the nozzle tip causes said mem-

ber to be thrown suddenly out of the path of the water. The arm 16 is of course likewise moved and strikes the bumper 23 with an impact sufficient to impart rotation to the sprinkler head, accompanied by a slight jar in the same direction which prevents any tendency of the sprinkler spindle to bind. A certain amount of rotative impulse is also imparted to the sprinkler by the reaction of the water issuing from the side discharge opening 20 and by the initial movement of the arm against the spring resistance.

Once the water has thrown the arm out against the bumper, where it is clear of the path of the water, the spring immediately returns said arm to its original position adjacent the nozzle arm, where the deflector is again acted on by the water and again thrown out. The arm and deflector thus continually oscillate through the length of the stroke governed by the position of the bumper, as long as water is issuing under pressure from the nozzle, and thus the sprinkler is being given constantly recurring rotative impulses, each one of course rotating the sprinkler through a very small arc.

The actual speed of rotation of the sprinkler depends of course on the number of rotative impulses given the arm 16 by the water and this is determined by the adjustment of the bumper 23 along the rod 24. This is because the shorter the swing or stroke of the arm, the quicker will be its return, and hence the arm will be oscillated a greater number of times in a given period and vice versa. The intensity of the jarring action of the arm against the bumper may be controlled by adjusting the tension of the spring, since it will be evident that if the spring is quite slack the arm will fly out and hit the bumper with greater force than if the spring offers considerable resistance. This adjustment of the spring also enables the movement of the arm to be properly controlled according to the pressure of the water which of course may vary at different times or in different installations.

It may be here stated that the mounting of the spindle as described is such as to provide a smaller bearing resistance than the reactionary drive effect obtained by water striking the deflector.

Thus while the main rotative impulse is obtained by the deflector arm striking the bumper, a certain amount of rotative action is imparted to the sprinkler by the movement of said arm before it strikes the bumper, if the spring has sufficient tension.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

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

1. A constant direction rotary sprinkler comprising a sprinkler head mounted for rotation and having a nozzle member projecting therefrom and provided with a jet opening, an arm mounted on said member for oscillatory movement in a plane substantially at right angles to the axis of rotation of the sprinkler, a water deflecting element rigid with said arm and normally positioned in the path of water issuing from said opening and arranged with respect to the direction of water flow to be moved in said plane and away from the nozzle member by the force of the water, whereby said arm will also be swung away from the member, a bumper fixed with the member in position to be engaged by the arm after it has swung out a predetermined distance, and means to return the arm to its normal position.

2. A device as in claim 1 with means to adjust the position of the bumper whereby to alter the throw of the arm.

3. A rotary sprinkler comprising a sprinkler head mounted for rotation and having a nozzle member projecting therefrom and provided with a jet opening, an arm mounted on said member for oscillatory movement in a plane substantially at right angles to the axis of rotation of the sprinkler, a water deflecting element rigid with said arm and normally positioned in the path of water issuing from said opening and arranged with respect to the direction of water flow to be moved away from the nozzle member by the force of the water, whereby said arm will also be swung away from the member, a bumper fixed with the member in position to be engaged by the arm after it has swung out a predetermined distance, a spring to return the arm to its normal position, and means to alter the effectiveness of the spring.

4. A rotary sprinkler comprising a sprinkler head mounted for rotation and having a nozzle member projecting therefrom and provided with a jet opening, an arm mounted for oscillatory movement on said member, means provided with the arm whereby water issuing from the jet opening under pressure will swing the arm away from the member, means to return the arm to its normal position whereby the arm will constantly oscillate as long as a jet of water under pressure emerges from the opening and means between the arm and member to impart a rotative impulse to the member with each oscillation thereof, and means to vary the number of oscillations of the arm in a given period and without altering the pressure of the water.

5. A rotary sprinkler comprising a sprinkler head mounted for rotation and having a nozzle member projecting therefrom and provided with a jet opening, an arm mounted for oscillatory movement on said member, means provided with the arm whereby water issuing from the jet opening under pressure will swing the arm away from the member, means to return the arm to its normal position whereby the arm will constantly oscillate as long as a jet of water emerges from the opening, means between the arm and member to impart a rotative impulse to the member with each outward movement of the arm, and means to alter the length of the outward stroke of the arm.

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