July 25, 1933. H. R. MUNZ 1,919,243

ROTARY SPRINKLER

Filed May 26, 1930

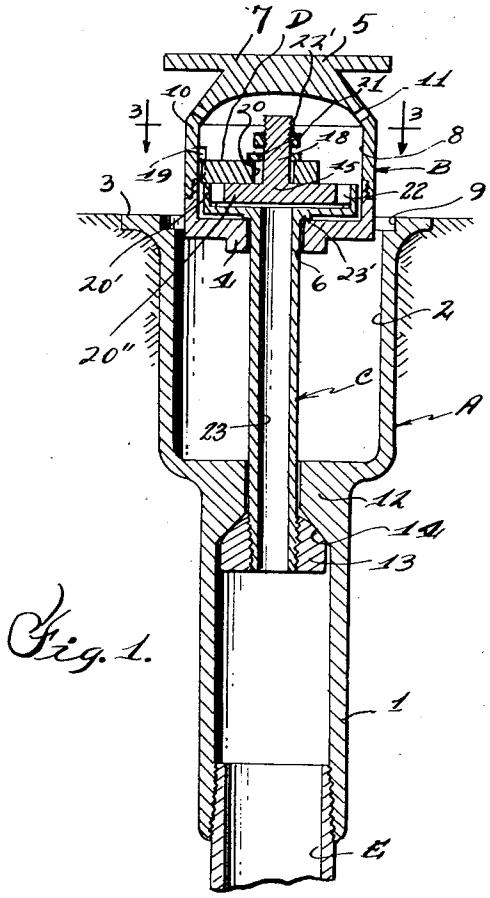


Fig. 1.

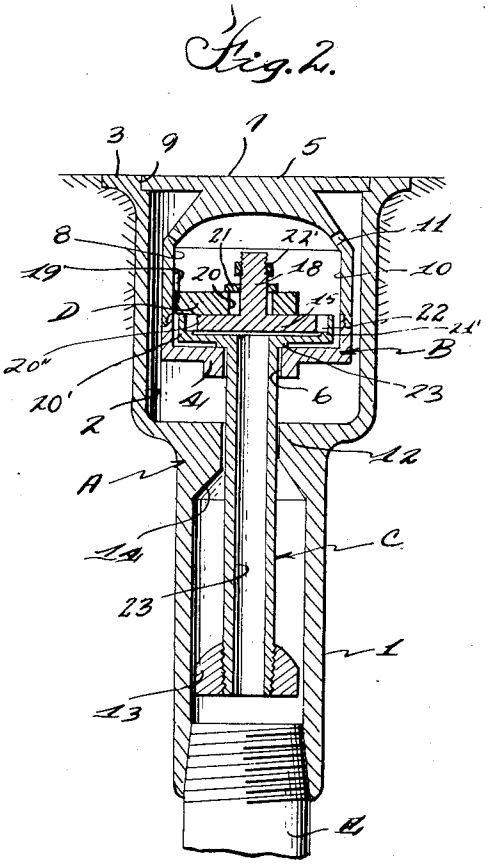


Fig. 2.

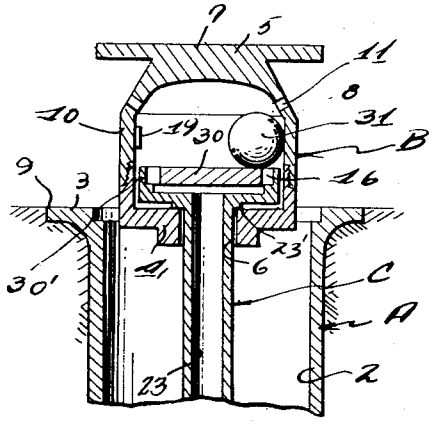


Fig. 4.

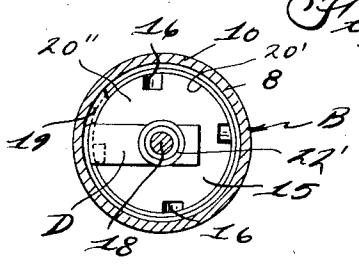


Fig. 3.

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ROTARY SPRINKLER

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This invention relates generally to sprinklers for lawns and the like and refers more particularly to those applicable to underground piping systems.

One of the essential objects of the invention is to provide an efficient sprinkler in which a rotatable nozzle is moved step by step about its axis by contact therewith of a loosely mounted rotatable member.

Another object is to provide a sprinkler of the type just described wherein the rotatable member just mentioned is rotated by the action of whirling water within the nozzle.

Another object is to provide a sprinkler in which frictional contact between the part rotatable with the nozzle and another part of the sprinkler is maintained by the water while the sprinkler is in operation to retard the movements of the nozzle about its axis.

Another object is to provide a simple and compact rotary or revolving sprinkler having a radial discharge adapted to cover the greatest possible area with a minimum amount of water.

Another object is to provide an efficient sprinkler in which all of the operating parts are within the sprinkler itself so that they are kept clean and lubricated by the water and protected from dirt when they are installed in the ground as permanent fixtures.

With the above and other objects in view the invention consists of certain novel features of construction, combinations and arrangements of parts that will be hereinafter more fully described and particularly pointed out in the appended claims.

In the accompanying drawing:

Figure 1 is a vertical sectional view through a sprinkler embodying my invention and showing the parts in operative sprinkling position;

Figure 2 is a view similar to Figure 1 but showing the parts in inactive position;

Figure 3 is a sectional view taken on the line 3—3 of Figure 1;

Figure 4 is a fragmentary vertical sectional view through a slightly modified construction.

Referring now to the drawing, A is the casing; B is the rotatable body or nozzle; C is the stem for the body; and D is the rotating member of a sprinkler embodying my invention. As shown, the casing A has a tubular portion 1 threaded upon the upper end of a water supply pipe E in the ground and has an upwardly opening cup-shaped portion 2 provided at its upper end with a lateral flange 3 that is substantially flush with the upper face of the ground. The body or nozzle B is supported axially on the stem C and is movable longitudinally of the cup-shaped portion 2 of the casing. Preferably the body B is substantially cylindrical in shape and has a base 4 and a cover 5. As shown, the base 4 has an axial opening 6, while the cover 5 has a flat top portion 7 and a downwardly and outwardly flaring wall portion 8. The opening 6 receives the stem C; the top portion 7 is adapted to seat in an annular recess 9 in the flange 3 of the casing and cooperates with the latter to enclose the other parts when the body is in lowered position; and the wall portion 8 constitutes a connection between the top portion 7 and the cylindrical walls 10 of the body and is provided with holes or openings 11 that incline upwardly relative to the axis of the body. The stem C is tubular in form and extends through the bases 12 and 4 respectively of the cup-shaped portion 2 of the casing and of the body B. Preferably the stem C is provided at its lower end with a nut 13 that is engageable with the lower face 14 of the base, and is provided at its upper end with a cup-shaped portion 20′. Pressed within this cup-shaped portion 20′ is the base 20″ of a member 15. As shown, an annular shoulder 21′ is provided at the bottom of the cup-shaped portion 20′ to space the base 20″ thereabove so that water from the passage 23 in the stem may flow laterally to upwardly inclined slots 22 in the base 20″ at the edges thereof. The rotatable member D is loosely mounted upon the stem 18 of the member 15 and is engageable with an inwardly extending lug or projection 19 upon the cylindrical walls of the body. In this connection it will be noted that the lug 19 is rounded and the opening 20 in the member receiving the stem 18 is of such a size that sufficient clearance will be provided to allow

the member D to ride over the lug 19 after contacting therewith. Preferably a washer 21 is sleeved upon the stem above the rotating member, and a nut 22′ threadedly engages the stem 18 above the washer.

In use the body B, stem C and nut 13 as a unit are movable vertically within the casing A. When the water supply to the pipe E is turned off the body B, stem C and nut are in lowered position (see Figure 2), and the top portion 7 seats within the annular groove 9. However, when the water supply to the pipe E is turned on the water will rise in the tubular part of the casing 1 against the lower face of the nut 13 and will cause the said nut, stem C and body B to rise until the nut engages the lower face 14 of the base 12 (Figure 1) whereupon water rising in the passage 23 will flow through the inclined passages 22 and will be discharged in a whirling stream into the body B. In this connection it will be noted that the inclined passages 22 are larger than the discharge openings 11; hence the body B will be filled with water under pressure and this body of whirling water rotates the member D about the stem 18 and causes the outer end of the member D to contact with the lug 19 on the inner walls of the body at each revolution and to advance the body about its axis. In this instance the impact of the member D against the lug 19 is sufficient to give a slight movement to the body B at each revolution of the member D, about three hundred impacts being required to rotate the body B one revolution. As the member D rotates the whirling water will be discharged through the openings 11 and will be thrown laterally from the body over a large area. In fact the construction and arrangement of the body B and stem C is such that the entire velocity of the water is utilized for carrying the stream from the body. Thus a minimum of water will cover the greatest possible area. This is particularly desirable where the water supply is small and where ordinary underground sprinklers cannot be used efficiently or without greatly diminishing the water supply for other domestic purposes. In this connection the body B may or may not be hydraulically balanced. However, in the present instance it is preferably not balanced. As shown, the upward force of water within the body B will be greater than the downward force when the sprinkler is in operation, and this will cause the body B to be thrown by the water upwardly against the shoulder 23′ of the stem C so that friction between the shoulder 23′ and the base 4 of the body will slow up or retard the movement of the body about its axis. Consequently the water discharged from the opening 11 in the body will reach a wide radius.

The sprinkler illustrated in the accompanying drawing and described above is primarily adapted for use in connection with underground piping systems; however, it may be adapted to a garden installation by the elimination of the casing A and by an arrangement to affix the stem C directly to the vertical piping, or it may be provided with spike or sled supports for portable use with a hose as the source of water supply.

In Figure 4 I have illustrated a slight modification in which the member 30 in the cup-shaped portion 30′ is flat, and a ball 31 on the member 30 is used instead of the rotatable member D to engage the lug 19. With this construction the ball is rotated by the whirling water within the body B, and each time the ball rotates it strikes against the lug 19 thereby producing the same effect as the engagement of the rotatable member D with said lug.

What I claim as my invention is:

1. In a sprinkler, a casing, an axially movable stem within the casing, a nozzle mounted on the stem for rotation relative thereto, and fluid actuated means rotatably mounted upon the stem and engageable once each revolution thereof with said nozzle to actuate the same.

2. In a sprinkler, a casing, an axially movable stem associated with the casing, a nozzle mounted on the stem and capable of rotary movement relative to said stem, means associated with the stem for discharging a whirling body of water into the nozzle, and means actuable by said whirling body of water for intermittently engaging and actuating said nozzle.

3. In a sprinkler, a casing, a nozzle rotatably and axially movable with respect to said casing, means operable by the water pressure for axially moving said nozzle, means for discharging water into said rotatably and axially movable nozzle in a direction to exert a torque about the axis of said nozzle, means for projecting water radially of said nozzle, means within said nozzle rotatable by the torque exerted by said discharging water and means on said nozzle for intermittently receiving an impact from said last mentioned means whereby said nozzle is rotated.

4. In a sprinkler, a casing, a nozzle rotatably and axially movable with respect to said casing, means operable by the water pressure for axially moving said nozzle, means for discharging water into said rotatably and axially movable nozzle in a direction to exert a torque about the axis of said nozzle, means for projecting water radially of said nozzle, a member within said nozzle head rotatable independently thereof by the internal action of the water within said nozzle and an abutment carried by said nozzle in the path of said last mentioned rotatable member adapted to intermittently receive an impact therefrom.

5. In a sprinkler, a casing, a hollow stem slidable within said casing, a nozzle rotatable on said stem, a head carried by said stem

within said nozzle provided with inclined ports communicating with said hollow stem, a member rotatably mounted in said nozzle adapted to be rotated by the water from said inclined ports and an impact member on said nozzle in the path of said rotatable means.

6. In a sprinkler, a base, a nozzle rotatably and axially movable with respect to said base, means operable by water pressure for axially moving said nozzle, means for discharging water into said rotatably and axially movable nozzle in a direction to exert a torque about the axis of said nozzle, an arm rotatably mounted within said nozzle and adapted to be turned by the internal action of the water within said nozzle, said arm being mounted to permit the same to continually contact with the inner wall of said nozzle during the rotation thereof and means for projecting water radially of said nozzle.

7. In a sprinkler, a base, a nozzle rotatable on said base, means for discharging water into said rotatable nozzle in a direction to exert a torque about the axis of said nozzle, an arm rotatably mounted within said nozzle and adapted to be turned by the internal action of the water within said nozzle, said arm being mounted to permit the same to continually contact with the inner wall of said nozzle during the rotation thereof and means for projecting water radially of said nozzle.

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