July 25, 1933. E. G. MUNZ 1,919,244

ROTARY SPRAYING DEVICE

Filed May 26, 1930

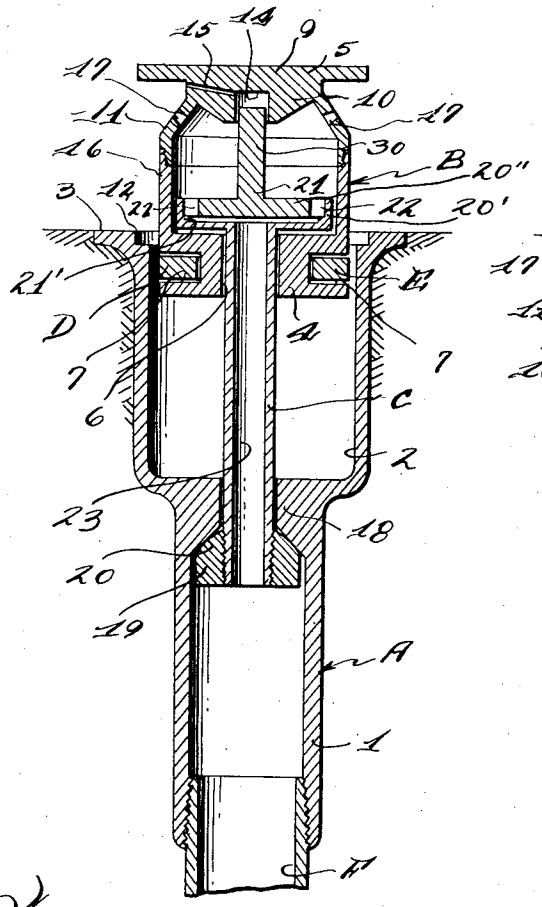


Fig. 1.

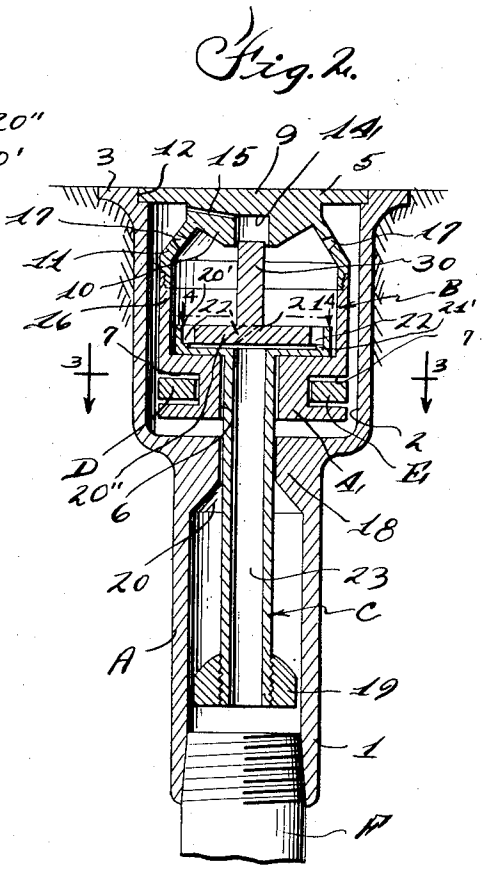


Fig. 2.

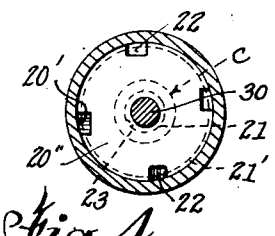


Fig. 4.

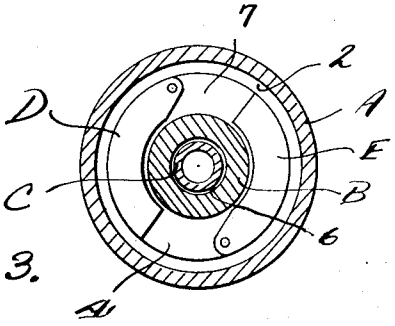


Fig. 3.

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Patented July 25, 1933 1,919,244

UNITED STATES PATENT OFFICE

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ROTARY SPRAYING DEVICE

Application filed May 26, 1930. Serial No. 455,868.

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 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.

Another object is to provide a sprinkler of the type described in which the rotating body or nozzle of the sprinkler is hydraulically balanced and is rotated by the friction of whirling liquid under pressure within the same.

Another object is to provide a sprinkler in which the rotating body or nozzle is provided with brakes that govern the speed of rotation thereof.

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 showing the parts in inactive position.

Figure 3 is a cross section on the line 3—3 of Figure 2.

Figure 4 is a cross section on the line 4—4 of Figure 2.

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 and E respectively are brakes for the rotatable body B 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 F 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 surface 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 and is provided upon diametrically opposite sides of said opening with laterally opening slots 7 and 8 respectively. The cover 5 preferably has a flat top portion 9, a central depending portion 10, and a downwardly and outwardly inclined annular wall portion 11. The top 9 is adapted to seat in an annular recess 12 in the flange 3 of the casing and cooperate with the latter to enclose the other parts when the body is in lowered position; the depending portion 10 has an axial socket 14 and a radial passage 15; and the wall portion 11 constitutes the connection between the depending portion 10 and the cylindrical walls 16 of the body and is provided with holes or openings 17 that incline upwardly relative to the axis of the rotating body. The stem C is tubular in form and extends through the bases 18 and 4 respectively of the cup-shaped portion 2 of the casing and of the body B. Preferably the stem is provided at its lower end with a nut 19 that is engageable with the lower face 20 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 an inverted T-shaped member 21. As shown, an annular shoulder 21′ is provided at the bottom of the cup-shaped portion 20′ to space the base 20″ of the T member 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 brakes D and E comprise segments pivoted at one end within an annular groove 7 so that their other ends may swing laterally outwardly to frictionally engage the inner walls of the cup-shaped portion 2 of the casing.

In use the body B, stem C and nut 19 as a unit are movable vertically within the cas-

ing. When the water supply to the pipe F is turned off, the body B, stem C and nut 19 are in lowered position within the casing (see Figure 2), and the top 9 seats within the annular groove 12. However, when the water supply to the pipe F is turned on the water will rise in the tubular part of the casing 1 against the lower face of the nut 19 and will cause the nut 19, stem C and body B to rise until the nut 19 engages the lower face 20 of the cup-shaped base (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 17, hence the body B will be filled with water under pressure and this body of whirling water rotates the body B merely by friction. If desired the interior of the body B may be provided with blades or fins (not shown), but this is not necessary for satisfactory operation. As the body rotates the whirling water will be discharged through the openings 17 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 the present instance the body B must be free to move with very little friction. This has been accomplished by hydraulic balancing, so that the body practically floats when in operation. As shown, the axial socket 14 receives and constitutes a bearing for the stem 30 of the T-shaped member 21, and the passage 15 at the upper end of the socket is open to the atmosphere and constitutes a vent. Hence any leakage passing the bearing 14 is immediately discharged to the atmosphere so that no pressure builds up above the stem 30. Therefore, there is no upward pressure against the body on the area of the bearing. This overcomes the lack of downward pressure on the body due to the bearing 6 through the base 4 of the body through which the stem C extends. Consequently the body B is hydraulically balanced, but in order to make it float its weight must be overcome. This is accomplished by making the bearing 14 smaller than the stem C so that upward pressure on the body B is equal to the downward pressure plus the weight of the body, whereupon the body will float on the stem C.

It is desirable that the entire device be as small in diameter as possible and because of the small diameter the speed would be great. However, it is also desirable to reduce the speed as far as possible in order that the water discharging from the opening 17 in the body will reach a wide radius. In this particular construction the speed of the body B is reduced by the segments D and E which as the body rotates are thrown outwardly by centrifugal force against the walls of the cup-shaped portion 2 and serve as brakes. The faster the body rotates the greater is the pressure of the segments D and E against the cup-shaped portion 2; hence the braking force is greater. In this connection it will be apparent that the desired braking effect may be obtained by weights of different configuration or by other means.

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.

What I claim as my invention is:

1. In a sprinkler, a casing attachable to a water supply means, a stem movable longitudinally of the casing and having an inverted substantially T-shaped head portion, and a rotatable body having a bearing in the base thereof receiving the stem and having a bearing in the top thereof receiving the stem of the T head portion, said top also having a radial passage constituting a vent for the last mentioned bearing, whereby any leakage past the said last mentioned bearing is immedately discharged to the atmosphere so that no pressure builds up above the stem of the T head, and said last mentioned bearing being smaller than the bearing in the base for the stem so that upward pressure on the body is equal to the downward pressure plus the weight of the body.

2. In a sprinkler, a casing, a rotatable nozzle projectable from within said casing, means for rotating said nozzle and a centrifugal brake operatively engaging said casing and said nozzle when the latter is rotating in projected position for limiting the speed of rotation.

3. In a sprinkler, a casing, a nozzle rotatable in said casing, means for discharging water into said rotatable nozzle in a direction to exert a torque about the axis of said nozzle, means for discharging the water from said nozzle radially thereof and means for relieving the hydraulic pressure on a portion of the upper surface of said nozzle whereby the upward pressure on said nozzle is just sufficiently greater than the downward pressure thereon to maintain a hydraulic balance permitting the free rotation of said nozzle

and a centrifugal brake for limiting the speed of rotation of said nozzle.

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 radially discharging the water from said nozzle and means for relieving the hydraulic pressure on a portion of the upper surface of said nozzle whereby the upward pressure on said nozzle is just sufficiently greater than the downward pressure thereon to maintain a hydraulic balance permitting the free rotation of said nozzle and a centrifugal brake for limiting the speed of rotation of said nozzle.

5. In a sprinkler, a liquid supply conduit, a nozzle head rotatable and axially movable relative to said supply conduit, means for rotating said head, means for maintaining said nozzle head in substantial hydraulic balance at the normal operating pressure of said liquid supply conduit, thereby obtaining low initial resistance to rotation and means for retarding rotation of said nozzle head after rotation has started.

6. In a sprinkler, a liquid supply conduit, a nozzle head rotatable relative to said supply conduit, means operable by the internal action of the water within said nozzle head for rotating said head, means for maintaining said nozzle head in substantial hydraulic balance at the normal operating pressure of said liquid supply conduit, thereby obtaining low initial resistance to rotation and means for retarding rotation after rotary movement has started.

7. In a sprinkler, a rotatably and axially movable nozzle head, a liquid supply conduit extending within said nozzle head and adapted to discharge liquid thereinto in a manner to cause rotation of the head by the internal action of the liquid.

8. In a sprinkler, a rotatably and axially movable nozzle head, a liquid supply conduit extending within said nozzle head and means associated with said liquid supply conduit and within said head for discharging liquid in a direction to cause said head to be rotated by internal action of the liquid.

9. In a sprinkler, a fixed body, a head supported on said body for rotation and axial movement with respect thereto, and means within said head for discharging liquid in a direction to exert a torque within said head whereby a rotary motion is obtained within said head capable of rotating said head, and means for discharging the liquid from said head in a direction to project a maximum distance therefrom.

10. In a sprinkler, a rotatably and axially movable nozzle head, a liquid supply conduit extending within said nozzle head and adapted to discharge liquid thereinto in a direction to cause a rotation within said nozzle head by internal action, and means cooperating with said nozzle head to produce a rotation of said head at a substantially slower speed than said internal rotation.

11. In a sprinkler, a rotatable nozzle head, a liquid supply conduit extending within said nozzle head, means for maintaining said head in substantial hydraulic balance at the normal operating pressure of said liquid supply conduit, and means associated with said supply conduit and within said nozzle head for discharging the liquid from said supply conduit into said nozzle head in a direction to cause said head to be rotated by internal action of the liquid.

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