March 12, 1929. J. K. NORTHROP 1,705,305

SPRINKLER

Filed Nov. 19, 1925

FIG. 1.

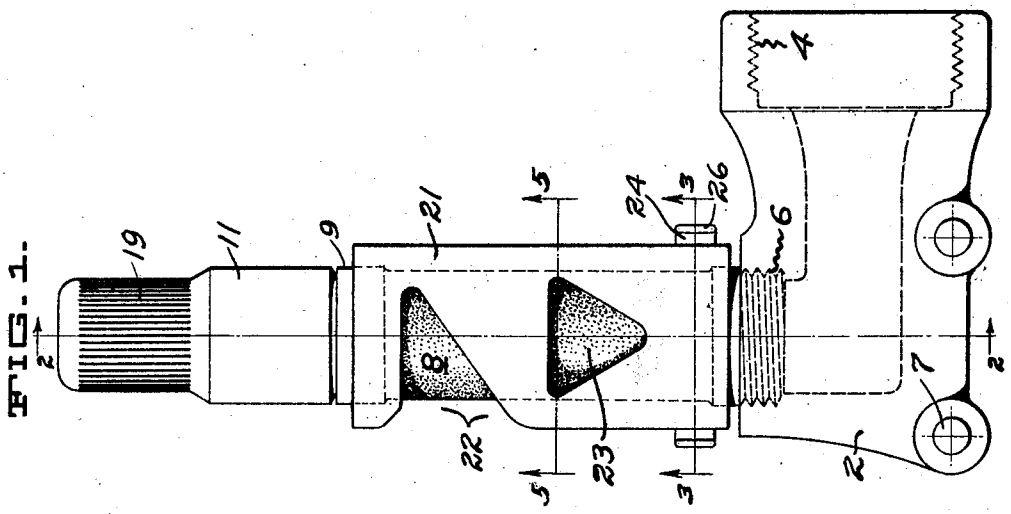


FIG. 4.

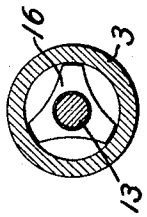


FIG. 5.

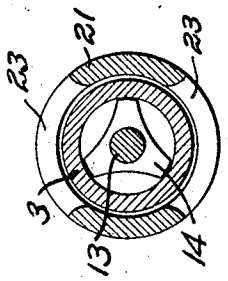


FIG. 2.

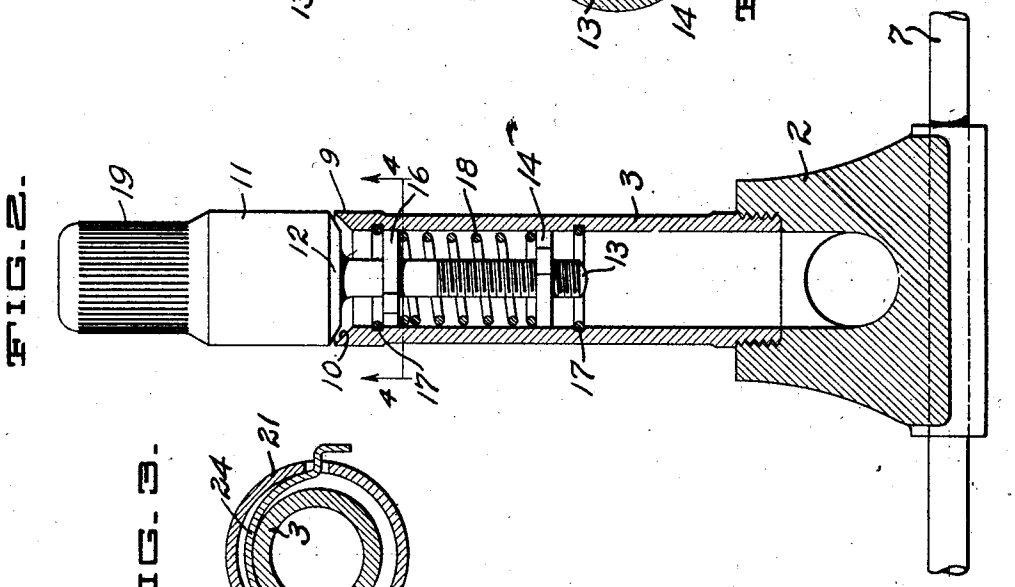


FIG. 3.

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UNITED STATES PATENT OFFICE.

JOHN K. NORTHROP, OF WEST LOS ANGELES, CALIFORNIA.

SPRINKLER.

Application filed November 19, 1925. Serial No. 69,975.

My invention relates to water sprinklers used for irrigational purposes and particularly relates to portable sprinklers of the fountain type usually left to stand in the center of the plot to be irrigated and normally supplied with water through a flexible hose.

Most of the sprinklers now in use are devised to discharge water over a circular area. This arrangement is satisfactory for use where there are no walks, driveways, houses or other obstructions bordering the plot to be irrigated, but along the borders of such obstructions their use frequently results either in waste of water and inconvenience of wet walks, or the neglect of certain areas adjacent the bordering obstructions.

The principal object of my invention is to provide a sprinkler adapted to discharge water over a circular area or which may be readily adjusted to selectively distribute water over any of a number of different sizes and shapes of areas so that it may be used to irrigate any desired plot of ground economically and without waste of water.

Another object of my invention is to provide a sprinkler of the above mentioned character which may be adjusted without shutting off the water supply.

The invention possesses other objects and features of advantage some of which, with the foregoing, will be set forth in the following description of the preferred form of my invention which is illustrated in the drawings accompanying and forming part of the specification. It is to be understood that I do not limit myself to the showing made by the said drawings and description, as I may adopt variations of the preferred form within the scope of my invention as set forth in the claims.

Referring to the drawings:

Figure 1 is a side elevation of my sprinkler.

Figure 2 is a vertical sectional view thru a portion of the sprinkler, the plane of section being indicated by the line 2—2 of Figure 1.

Figures 3, 4 and 5 are horizontal sectional views, the planes of section being respectively indicated by the lines 3—3 and 5—5 of Figure 1, and the line 4—4 of Figure 2.

In terms of broad inclusion my invention comprises a main hollow body from which the water is discharged through an annular passage between the body and an adjustable spring loaded valve head. Surrounding the body is an adjustable sleeve having openings therein adapted to register in different degrees with the annular discharge passage, so that a portion or different portions of such passage is blocked off, the water then discharging from the unblocked portions The sleeve openings are such that the sprinkler may be adjusted to throw a single jet of water, or a number of jets in any desired direction; or a fan shaped spray or sprays of varying degree of spread may be thrown. By suitable adjustment, specific areas in the lawn or garden may be reached by my sprinkler without flooding all adjacent areas. Means are provided for fixing the position of the adjusted parts.

In more detailed terms my sprinkler comprises a base 2 of any suitable form and preferably a casting, adapted when in use to rest firmly on the ground and support in a substantially vertical position a tubular body 3. The base is provided with a threaded opening 4 for connection with a water supply line (not shown) and a threaded opening 6 for engagement with the body 3. A wire extension 7 is cast into the base for engagement with the ground to provide added stability and assist in maintaining this sprinkler in an upright position. The body 3 consists of a section of tubing the lower end of which is threaded into the base. The outer surface 8 of the body is preferably slightly roughened by cutting with a lathe tool, or knurling, except for a short portion 9 near the top which is turned true and smooth. The upper end of the body is beveled to form a valve seat 10 adapted to co-act with a spring loaded head 11 in forming a pressure controlled water outlet.

The head 11 is disposed above the water outlet and is cylindrical in shape and of the same diameter as the portion 9 of the body 3. The lower outer edge 12 of the head is beveled to form a valve for engagement with the valve seat 10. For clearness the head is shown slightly raised from the valve seat, in the position assumed when water is flowing. Preferably formed integral with and depending from the underside of the cylindrical head is a stem 13 by which the head is mounted on the body 3. The stem extends into the upper end of the hollow body and is threaded at its lower end into a spider nut 14 so shaped as to permit the flow of water

therepast. Within the body and on the upper unthreaded portion of the stem is a washer 16 similar in shape to the nut 14 and free to slide upon the stem 13. Above the washer and below the nut are snap rings 17 which engage in grooves on the inside of the body, and prevent the disengagement and loss of the nut and washer. Interposed between the nut and the washer, that is, between the head 11 and the body 3 is a coiled loading spring 18 which bears upwardly against the washer 16 and downwardly against the nut 14. The compression of the spring holds the washer 16 tightly against the snap ring 17, and the friction between these parts, and similarly between washer and spring, and spring and nut, prevents relative rotation so that the nut does not turn when the stem is screwed therein. The upper end 19 of the head 11 is preferably knurled to form a convenient finger grip whereby the head may be turned and the stem adjusted to vary the tension of the loading spring 18.

As the stem 13 is screwed into the nut 14, the nut rises upon the stem and compresses the spring, holding the head resiliently against the body. If the head be turned to the right or screwed in, as far as it will go, the spring is finally compressed until the coils bear on each other, and the head is held rigidly against the body, so that no water can pass. Rotation of the head does not change its axial relation to the body, but merely changes the tension on the spring. The threads on the stem are relatively coarse, and a few turns of the head produce large differences in the spring tension.

Surrounding the body 3, and free to slide vertically thereon, is a cylindrical sleeve 21 in which variously shaped openings are provided. In the preferred construction shown, three triangular openings are provided, one opening 22, centrally located, with its widest part extending about two thirds of the way around the sleeve, and two openings 23, located lower down on the sleeve, directly opposite each other, and each extending about one-quarter of the way around the sleeve. The sleeve is reamed smooth and true on the inside, and is a close fit around the upper portion 9 of the body, and the lower portion of the head 11. The sleeve is maintained in the desired position by a flat, semi-circular spring 24, which normally bears inwardly against the roughened portion 8 of the body 3, as shown in Figure 3. Its frictional bearing is released by pressing inwardly on the projecting ends 26, so that the central portion bows outwardly, away from the body. When the ends are so pressed, the sleeve may be readily placed in any desired position, and on release of the spring will remain so placed until again moved.

The operation of my sprinkling device is as follows:

Water under pressure is furnished through a hose or by other suitable means connected into the threaded opening 4 of the base. This pressure forces the head upwardly against the tension of the spring 18, and away from the body, so that the water normally is discharged in a circular jet from the annular orifice between the head and the body. As the head is constantly held downward under spring tension, the discharged water is always under pressure, so that the jet is a finely divided spray or film which breaks into a spray regardless of the amount of water passing through the orifice. It is possible therefore by regulating this amount of water to irrigate evenly an area of from three to over thirty feet in diameter under normal conditions of pressure. The spring tension may be readily regulated to suit conditions by turning the head a few revolutions to right or left. In general a high spring tension is more satisfactory with high pressures, and a low tension with low pressures. As the head is retained only by spring tension, any sand or other particles in the water pass through the orifice without causing the obstruction generally experienced where water is delivered through rigidly fixed holes or slots. In case of large obstructions to the jet, the head may be completely unscrewed, and the mechanism flushed with water, or the obstruction otherwise removed.

When it is desired to irrigate other than circular areas, the sleeve 21 is raised until the desired opening is opposite the jet orifice, and the flow of water is confined to a circular arc conforming to the portion of the annular orifice uncovered by the sleeve. With the upper part of the opening 22 opposite the jet, a spray covering about 240° is delivered. As the sleeve is raised the arc of the spray is decreased until finally a single narrow jet is obtained. Under these conditions the device may be used as a hand nozzle as well as a portable sprinkler. If desired, when moving from place to place, water may be completely cut off by turning the head to the right until the spring is compressed sufficiently to seat the head rigidly on the body.

For irrigating borders, and oblong plots of ground, the sleeve is raised still further until the openings 23 come opposite the orifice. In this position a spray is delivered in two opposite directions, the width of the spray being governed by the relative height of the sleeve. Openings in the sleeve may be of any suitable shape or location, but I prefer an arrangement similar to that shown, as it makes possible the irrigation of areas widely differing in shape and extent, by the use of a simple mechanism.

It may be seen from the above descrip-

tion that it is possible to cover almost any desired areas, including semi-circular sprays for use along walks or houses, 90° sprays for use in corners, and narrow or wide sprays in opposite directions. Any one of these is almost instantly available. The approximate location of the spray is readily pre-determined by noting the arc of the orifice uncovered by the openings in the sleeve. Minor adjustment for exact location may be made while the sprinkler is in operation in all cases except that of a full circular spray, as no water is discharged on the side shielded by the sleeve.

I claim:

1. In a sprinkler, the combination of a tubular body having means arranged to form an annular and laterally discharging water inlet and a water outlet, and an axially and rotatably adjustable sleeve provided with a triangular shaped opening adapted to co-act with said outlet for selectively controlling the volume and direction of the flow of water therethrough.

2. In a sprinkler the combination of a tubular body having means arranged to form an annular and laterally discharging water inlet and a water outlet, and an axially and rotatably adjustable sleeve provided with a plurality of oppositely disposed triangular shaped openings adapted to co-act with said outlet for selectively controlling the volume and direction of the flow of water therethrough.

3. In a sprinkler, the combination of a tubular body having a water inlet and means arranged to form an annular and laterally discharging water outlet, and a sleeve mounted on said body for axial and rotary movement, said sleeve being provided with an opening the width of which varies along the sleeve adapted to co-act with said water outlet by movement of the sleeve on the body to vary the arc and the direction of water sprinkled.

4. In a sprinkler, the combination of a tubular body having a water inlet and means arranged to form an annular and laterally discharging water outlet, an adjustable sleeve formed to co-act with said outlet for selectively directing the flow of water therethrough, and a valve head resiliently mounted in said tubular body for regulating the area of the water outlet.

5. In a sprinkler, the combination of a tubular body having a water inlet and means arranged to form an annular and laterally discharging water outlet, an axially and rotatably adjustable sleeve formed to co-act with said outlet for selectively controlling the volume and direction of the flow of water therethrough, and resilient clamping means for maintaining said sleeve in adjusted position.

6. In a sprinkler, the combination of a tubular body having a water inlet and a water outlet and a roughened exterior, an adjustable sleeve slidably mounted over said body and provided with openings adapted to co-act with said water outlet for selectively directing the flow of water therethrough, and a spring carried by said sleeve adapted to resiliently engage the roughened exterior of said body so as to maintain the sleeve in adjusted position.

In testimony whereof, I have hereunto set my hand.

JOHN K. NORTHROP.