

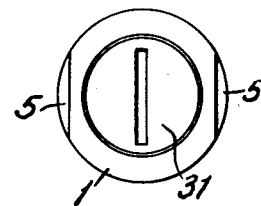
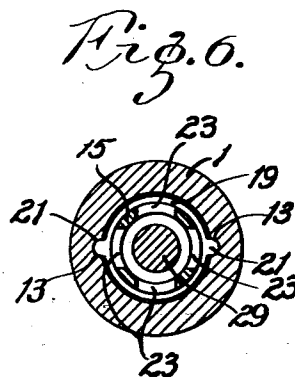
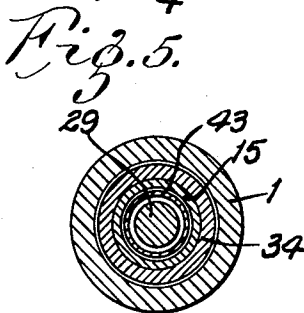
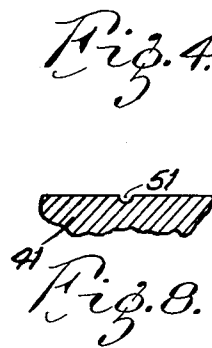
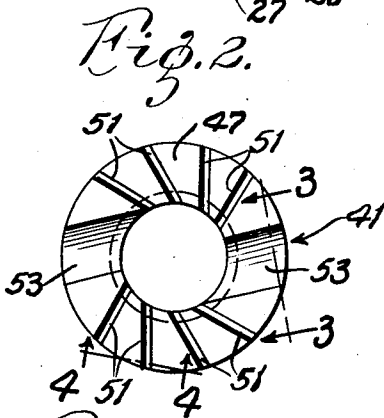
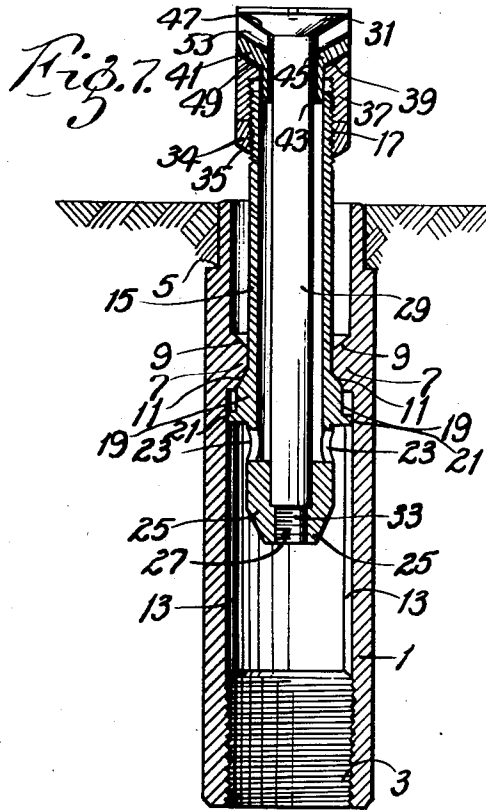
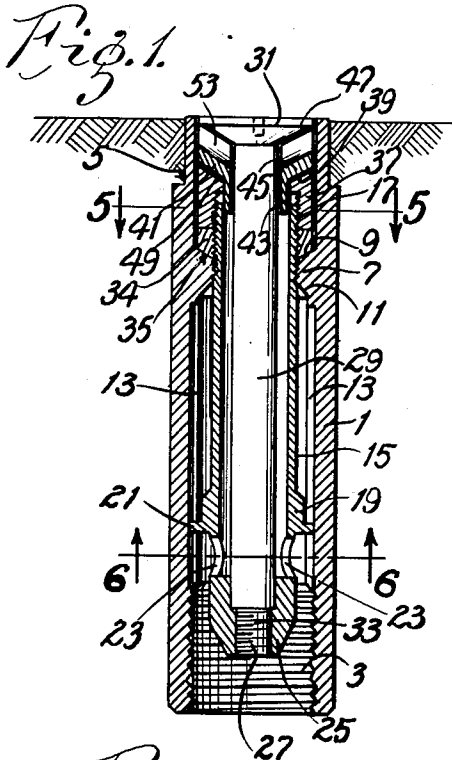
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LAWN SPRINKLER

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UNITED STATES PATENT OFFICE

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LAWN SPRINKLER

Application filed November 18, 1929. Serial No. 407,971.

This invention relates to sprinklers, and with regard to certain more specific features, to rotary sprinklers.

Among the several objects of the invention may be noted the provision of a rotary sprinkler, preferably for lawns, which is adapted to be permanently installed in a position substantially flush with the ground and which is substantially invisible when not in operation; a sprinkler of the class described which operates to throw water in a fine spray or the like over an extended area with a minimum pressure and supply of water; a sprinkler which is subject to a minimum of wear when in operation by reason of the provision of a water bearing for moving parts; a sprinkler of the type described which includes a minimum number of parts and which is reliable and certain in operation and which can be easily fabricated and installed for service. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, features of construction, and arrangements of parts which will be exemplified in the structure hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, in which is illustrated one of various possible embodiments of the invention,

Fig. 1 is a longitudinal sectional view of the sprinkler in a retracted position;

Fig. 2 is an enlarged plan view of a rotary sleeve;

Fig. 3 is a vertical section taken on line 3—3 of Fig. 2;

Fig. 4 is a vertical section taken on line 4—4 of Fig. 2;

Fig. 5 is a cross section taken substantially on line 5—5 of Fig. 1;

Fig. 6 is a cross section taken substantially on line 6—6 of Fig. 1;

Fig. 7 is a longitudinal section similar to Fig. 1 showing the sprinkler in its extended or operating position; and,

Fig. 8 is a top plan view of the sprinkler.

Similar reference characters indicate cor-

responding parts throughout the several views of the drawings.

Referring now more particularly to Fig. 1, there is illustrated at numeral 1 a cylindrical casing or fitting which has a pipe tapped portion 3 at the lower end thereof adapted to receive a threaded delivery pipe (not shown). At the upper end of the casing 1 are provided a pair of flats 5 (see also Fig. 8) which adapt said casing for installation with a suitable wrench. Near the top of the inside of casing 1 is provided an inwardly extending annular collar or stop 7, which has upper and lower beveled seats 9 and 11 respectively. Extending from the top of the threaded portion 3 to the collar 7 diametrically opposite each other are a pair of grooves 13 (see Fig. 6).

At numeral 15 is indicated a tube of diameter sufficient to slip readily through the inwardly extending collar 7. The tube 15 has a threaded portion 17 at the top thereof, and an integrally formed collar 19 extending outwardly therefrom near the bottom thereof. The collar 19 is of a diameter sufficient to slidably fit in the interior of the casing 1. Diametrically opposite each other on said collar 19 is provided a pair of ears 21 adapted to slidably fit in the grooves 13 in the casing 1 (see Fig. 6). The top portion of the collar 19 is beveled to seat on the under beveled portion 11 of the collar 7. Beneath the collar 19 are four spaced openings 23. The bottom of the tube 15 is closed as indicated at numeral 25, except for a threaded recess 27.

Centrally positioned in the tube 15 is a stem 29 having a slotted head 31, conical in form. The lower portion of said stem 29 comprises a shouldered and threaded portion 33 adapted to screw into the threaded hole 27 in the tube 15, the shoulder of the portion 33 seating to predetermine the position of said head 31. The head 31 is small enough to slide loosely into the casing 1 as is shown in Fig. 1.

A threaded collar or jam nut 34 is provided on the upper threaded portion 17 of the tube 15. The under side 35 of the nut 34 is beveled to match and seat on the upper beveled edge 9 of the inwardly extending

collar 7 located on the casing 1. A second threaded collar or sleeve 37 is positioned on the tube 15 above the nut 34, and is locked in position on said tube 15 by said nut 34.

5 An inwardly extending rim 39 at the top of said collar 37 has a diameter substantially equal to the interior diameter of the tube 15, so that said rim 39 forms a continuation of said tube 15. The entire upper portion of
10 the rim 39 is sloped inwardly and downwardly, thereby forming a conical socket adapted to receive a rotating sleeve 41 which is substantially the same form as the head 31 of the stem 29.

15 The rotating sleeve 41 comprises a cylindrical portion 43 which spacedly and rotatably surrounds the stem 29 and has a rotatable bearing support in the tube 15 and in the rim 39. This sleeve 41 has an outwardly and upwardly flaring collar 45. The collar 45 has parallel but conical upper and
20 lower faces 47 and 49 respectively, the upper face 47 being adapted to fit to the conical head 31 of the stem 29, and the lower face 49

25 being adapted to fit the conical socket of the collar 37. The upper face 47 is provided with a number of small grooves 51 and a pair of diametrically opposite larger grooves or ports 53. The approximate relative sizes of
30 the grooves 51 and ports 53 are illustrated in Figs. 2, 3 and 4. It will be seen by reference to Fig. 2 that the grooves 51 and ports 53 are angularly disposed with relation to radii of the upper face 47 of the sleeve 41,

35 that is, they are askew.
The sprinkler is assembled in the following manner:
The tube 15 is first inserted into the casing 1 through the lower threaded portion 3
40 thereof, thus placing the threaded portion 17 of said tube 15 at the top of said casing 1. The ears 21 engage the grooves 13 to prevent rotation of the tube 15 in the casing 1. The jam nut 33 is next screwed to the top
45 threaded portion 17 of the tube 15. Next the threaded sleeve 37 is screwed into position on the tube 15 above the nut 34. The rotating sleeve 41 is then placed on the stem 29, with the upper face 47 of said sleeve 41
50 against the conical head 31 of the stem 29. The stem 29 is next placed in the tube 15, and screwed tightly into the threaded bottom hole 27 of said tube, thereby effecting a rigid assembly between said tube 15 and said stem
55 29. The threaded sleeve 37 is now adjusted until the rotating sleeve 41 is free to rotate on the stem 29, the clearance being such that a water bearing may be effected between surfaces when they are in relative motion. The
60 sleeve 37 is then locked in position by means of the nut 34. It will be seen by reference to Figs. 1 and 5 that the top assembly on the tube 15, including the head 31 of the stem 29, the rotating sleeve 41, the threaded sleeve
65 37 and the nut 34, fit snugly into the casing

1 when the sprinkler is in the retracted position (Fig. 1).

The operation of the sprinkler is as follows:

The casing 1 is preferably screwed to a water feed pipe (not shown). If it is desired
70 to permanently install the sprinkler so that it is not noticeable when not in operation, the casing may be sunk into the earth to a flush position as illustrated in Figs. 1 and 7. It is to be understood, however, that the
75 sprinkler may be mounted above ground or in any other suitable position. In its normal position, gravity causes the tube 15 to fall to a retracted position in the casing 1 where the head 31 of the stem 29 is flush with the top of said casing and the nut 34 seats on the bevel seat 9 of the collar 7 (see Fig. 1).
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When water under pressure is admitted to the casing 1, the pressure of said water acting upon the closed lower end 25 of the tube 15
85 forces said tube 15, and the assembly thereon, upwardly until the collar 19 seats on the lower beveled edge 11 of the collar 7, thereby positioning the head 31 considerably above the top of the casing 1, and the surface of the earth. Thus the parts 1 and 15 are sealed
90 against exit of water.

The water passes from the casing 1 through the holes or openings 23 into the annular space between the tube 15 and the stem 29,
95 and thence between the cylindrical portion 43 of the rotating sleeve 41 and said stem 29, until it is deflected outwardly by the head 31 through the grooves 51 and ports 53 of the rotating sleeve 41. The reaction of the
100 water in the skewed grooves 51 and ports 53 causes the sleeve 41 to rotate, and the water is thrown from the sprinkler in the form of a mist. The rotation of the sleeve 41 aids in the mist formation, and also permits a more complete covering of the area surrounding the sprinkler than would be possible if said sleeve 41 did not rotate.
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The water flowing between the sleeve 41 and the stem 29, and between the sleeve 41 and the head 31, forms a water bearing for the moving parts, thereby reducing wear on such parts to a minimum. This water is also
110 ejected and breaks up both itself and the streams flowing from the grooves and ports 51 and 53 respectively, thus aiding in forming the mist.
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The small size of the grooves 51 and ports 53 enhances the distance effect for a given
120 water pressure. The ports 53 serve primarily to deliver the greater quantity of water from the sprinkler, while the smaller grooves 51 maintain the water bearing hereinbefore mentioned, and also serve to distribute the
125 water to an area close to the sprinkler, which, under certain circumstances, might be under the trajectory of the main flow issuing from the ports 53. The sleeve 41 may thus be described as a distributor.
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It is possible with this type of sprinkler to effect permanent installations on places such as golf putting greens and tees where it is undesirable to have any permanent ob-
 5 struction standing on the ground, because of the telescoping action of the casing 1 and the tube 15. Further, the spray engendered by this type of sprinkler, whereby the sprinkling is effected by means of a fine mist, will
 10 not tend to wash away earth, grass and the like, where a stream of water would. The fine mist settling on the area to be sprinkled is as harmless as a natural rain.

When sprinkling has been achieved, the
 15 turning off of the water in the supply pipe removes the pressure in the casing 1, and the tube 15 and appended parts falls to the retracted position (Fig. 1).

In view of the above, it will be seen that
 20 the several objects of the invention are achieved and other advantageous results attained.

As many changes could be made in carrying out the above constructions without departing from the scope of the invention, it is
 25 intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. The sprinkler which comprises telescoping cylindrical members, a stem rigidly
 30 mounted in the inner cylindrical member, said stem having a conical head, a rotatable sleeve on said stem constructed and arranged to receive said conical head, means on the top of
 35 said inner cylindrical member for supporting said rotatable sleeve, flanges on said cylindrical members whereby the inner member is permitted to move in the outer member
 40 through a predetermined distance only.

2. The sprinkler which comprises telescoping cylindrical members, a stem rigidly
 45 mounted in the inner cylindrical member, said stem having a conical head, a rotatable sleeve on said stem constructed and arranged to receive said conical head, means on the top of
 50 said inner cylindrical member for supporting said rotatable sleeve at a predetermined position, flanges on said cylindrical members whereby the inner member is permitted to move in the outer member through a prede-
 55 termined distance only.

3. The sprinkler which comprises telescoping cylindrical members, a stem rigidly
 60 mounted in the inner cylindrical member, said stem having a conical head, a rotatable sleeve on said stem adapted to receive said conical head, means on the top of said inner cylindrical
 65 member for supporting said rotatable sleeve, flanges on said cylindrical members whereby the inner member is permitted to move in the outer member through a prede-
 70 termined distance only, said rotatable sleeve

having skewed grooves and ports on the upper surface thereof.

4. The sprinkler which comprises a pair of telescoping cylindrical members, means on
 70 said members whereby the inner member is permitted to move through a predetermined range in the outer member, said range being determined by an extended position and a re-
 75 tracted position where said inner member is substantially encased in said outer member, means for admitting water under pressure to said outer member, whereby said inner mem-
 80 ber is forced into said extended position, and means associated with said inner member for throwing a rotating spray from the top there-
 85 of, said last-named means comprising a stem supported rigidly in said inner cylindrical member, a rotatable sleeve spacedly surrounding said stem, and supporting means on the
 90 top of said inner cylindrical member for said rotatable sleeve.

5. The sprinkler which comprises a cylindrical casing, a tube adapted to fit into said
 95 casing, means for limiting the movement of said tube in said casing, a stem rigidly mounted in said tube, said stem having a conical head above said tube, a supporting sleeve mounted
 100 on the top of said tube, and a rotatable sleeve spacedly surrounding said stem and supported by said supporting sleeve.

6. The sprinkler which comprises a cylindrical casing, a tube adapted to fit into said
 105 casing, means for limiting the movement of said tube in said casing, a stem rigidly mounted in said tube, said stem having a conical head above said tube, a supporting sleeve mounted on the top of said tube, means for locking said supporting sleeve in a predeter-
 110 mined position on said tube, and a rotatable sleeve spacedly surrounding said stem and supported by said supporting sleeve.

7. The sprinkler which comprises a cylindrical casing, a tube adapted to fit into said
 115 casing, means for limiting the movement of said tube in said casing, a stem rigidly mounted in said tube, said stem having a conical head above said tube, a supporting sleeve mounted on the top of said tube, and a rotatable sleeve spacedly surrounding said stem and supported by said supporting sleeve, said
 120 rotatable sleeve having an extending flange adapted to substantially fit to said conical head on said stem.

8. The sprinkler which comprises a cylindrical casing, a tube adapted to fit into said
 125 casing, means for limiting the movement of said tube in said casing, a stem rigidly mounted in said tube, said stem having a conical head above said tube, a supporting sleeve mounted on the top of said tube, a rotatable sleeve spacedly surrounding said stem and supported by said supporting sleeve, said ro-
 130 tatable sleeve having an extending flange adapted to substantially fit to said conical head on said stem, and grooves and ports on

the upper surface of said extending flange, said grooves and ports being angularly disposed with relation to the radii of said rotating sleeve.

- 8 9. The sprinkler which comprises a cylindrical casing, a tube adapted to fit into said casing, said tube having a closed lower end, means for limiting the movement of said tube in said casing, a stem rigidly mounted in said
10 tube, said stem having a conical head above said tube, a supporting sleeve mounted on the top of said tube, and a rotatable sleeve spacedly surrounding said stem and supported by said supporting sleeve, said tube being
15 adapted to project upwardly under pressure of water in said casing, and ports in said tube whereby water is forced from said casing through said tube and rotatably sprayed by said rotating sleeve.
- 20 10. The sprinkler which comprises a cylindrical casing, a tube shaped to fit into said casing, means for limiting the movement of said tube in said casing, a stem rigidly mounted in said tube, said stem having a conical
25 head above said tube, a supporting sleeve mounted on the top of said tube, a rotatable sleeve spacedly surrounding said stem and supported by said supporting sleeve, said rotatable sleeve having an extending flange
30 adapted to substantially fit to said conical head on said stem, and grooves and ports on the upper surface of said extending flange, said grooves and ports being angularly disposed with relation to the radii of said rotating
35 sleeve, said tube being adapted to project upwardly under pressure of water in said casing and ports in said tube whereby water is forced from said casing through said tube and rotatably sprayed through said grooves and
40 said ports in said rotating sleeve.
- 45 11. The sprinkler which comprises a cylindrical casing, a tube adapted to fit into said casing, means for limiting the movement of said tube in said casing, a stem rigidly mounted in said tube, said stem having a conical
50 head above said tube, a supporting sleeve mounted on the top of said tube, a rotatable sleeve spacedly surrounding said stem and supported by said supporting sleeve, said rotatable sleeve having an extending flange
55 adapted to substantially fit to said conical head on said stem, and grooves and ports on the upper surface of said extending flange, said grooves and ports being angularly disposed with relation to the radii of said rotating
60 sleeve, said tube being adapted to project upwardly under pressure of water in said casing, and ports in said tube whereby water is forced from said casing through said tube and rotatably sprayed through said
65 grooves and said ports in said rotating sleeve, said grooves and said ports in said rotating sleeve simultaneously causing the formation of a water bearing for said rotating sleeve.
12. A sprinkler, comprising a tubular por-

tion adapted to transmit liquid, a spaced stem therein having a head, a distributor member spaced from said stem rotatable in the tubular member, said distributor having passages for liquid therein, and grooves for effecting
70 a water bearing for the distributor.

13. A sprinkler comprising a tubular member, a spaced stem therein having a conical head, said tubular member having a conical
75 portion spaced away from the conical head, a distributor spaced from the stem and rotatable in the tubular member, a flange forming a portion of said distributor, and rotatably fitting the space between said head and the upper portion of the tubular member, said
80 flange having liquid transmitting passages arranged in angular position relative to the radii of said flange.

14. A sprinkler comprising a tubular member, an adjustable conical portion thereon, a
85 spaced stem therein having a conical head, a distributor rotatable in the tubular member, said distributor being spaced from the stem and a flange on the distributor located between said conical portion and said conical
90 head.

In testimony whereof, I have signed my name to this specification this 11th day of November, 1929.

HAROLD K. RADER. 95

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