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SLOW MOTION ROTARY SPRINKLER

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Fig. 1

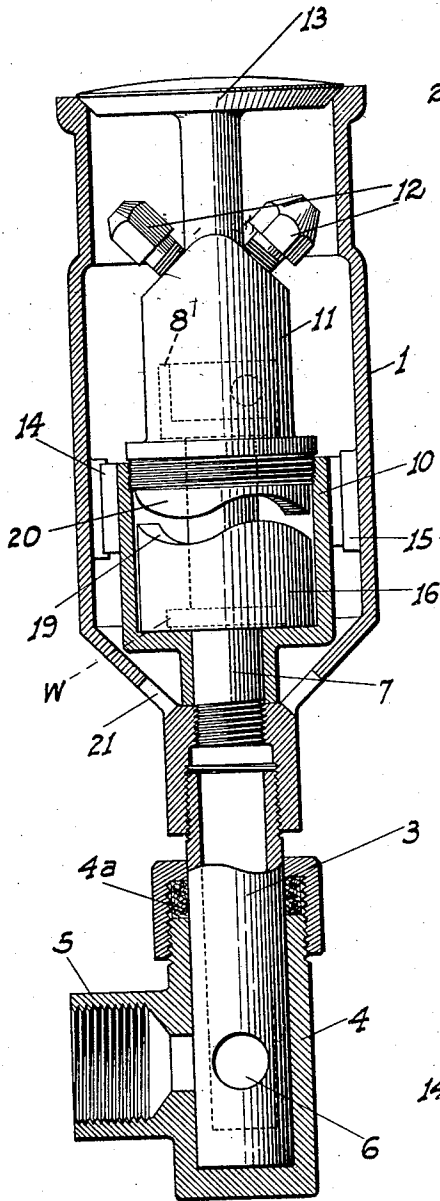


Fig. 2

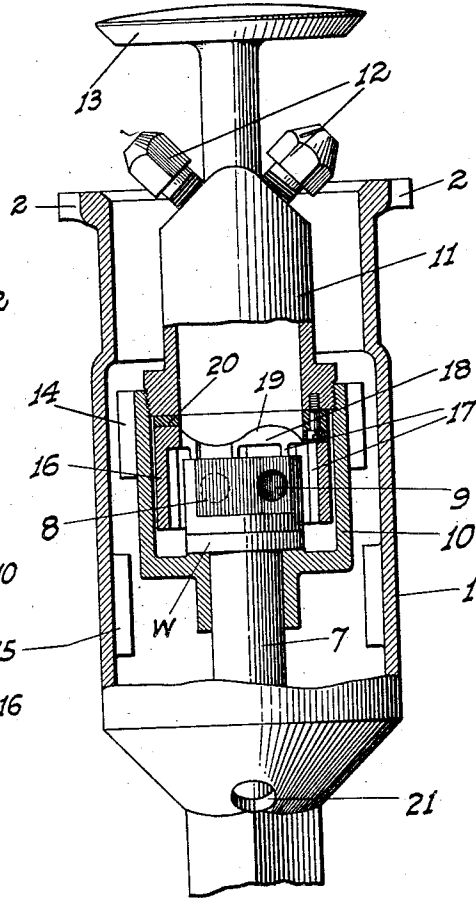
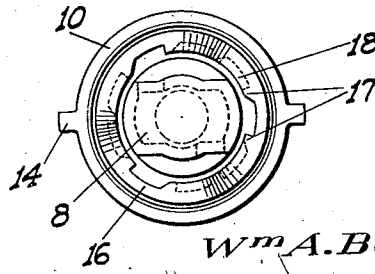


Fig. 3



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SLOW MOTION ROTARY SPRINKLER

Application filed January 21, 1930. Serial No. 422,282.

This invention relates to sprinklers and particularly represents improvements over the type of sprinkler shown in my copending application for patent, Serial No. 352,380, filed April 4, 1929.

In the sprinkler above identified a positive rotation was imparted to the sprinkler head independently of the reactionary rotation had by reason of the opposed nozzles mounted in axially offset relation to each other on the sprinkler head. In the present invention I retain the same positive drive of the head and all the advantages of the previous type but have added means, incorporated with the positive rotation control mechanism, for causing a constant vibration to be imparted to the sprinkler head as it rotates, and the provision of this feature forms the major object of this present invention.

The head therefore is prevented from any tendency to sticking or uneven rotation, regardless of whether the water pressure is high or relatively low.

Another object of the invention is to provide a simple water control valve mechanism mounted in direct connection with the sprinkler and so arranged that upon turning the head-casing one way or the other, the water is shut off entirely or the volume passing through the head may be regulated to suit individual conditions. In this manner water to any one or more of the sprinklers arranged in a battery or series, and connected to a common main, may be regulated as may be desired without interfering with the flow to the other sprinklers in the series.

I have also constructed and arranged the parts of the sprinkler as a whole so that they may be manufactured and assembled or dismounted from each other with greater ease than was previously the case.

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

Fig. 1 is a side elevation partly in section

of my improved sprinkler in its idle position or when the water is turned off.

Fig. 2 is a fragmentary sectional elevation of the sprinkler as in operation.

Fig. 3 is a top plan view of the rotary driving member and the fixed driving nozzle or head associated therewith.

Referring now more particularly to the characters of reference on the drawings, the numeral 1 denotes a cylindrical open topped casing, provided at the top with opposed outwardly projecting lugs 2 or the like, whereby the casing may be readily turned by a suitable wrench for the purpose which will be seen later. Depending from and rigidly secured to the casing is a tubular stem 3, turnably supported in a special pipe fitting member 4 which is in effect an L; having a lateral tapped passage 5 adapted for connection to a nipple or the like projecting laterally from the supply main. The stem 3 and member 4 are closed on the bottom, an adjustable packing gland 4a being provided about the stem at the top of the member 4. The stem 3 has a lateral opening 6 to communicate with the inner end of the passage 5. By reason of this construction, upon turning the casing a certain distance, the flow of water from the main into the stem 3 may be regulated to suit. The wrench engaging lugs are provided on top of the casing, since the latter is sunk in the ground, so as to be flush with the top surface thereof, and could not otherwise be rotated.

Fixed in the bottom of the casing and upstanding therefrom is a rigid pipe 7, forming a spindle, which communicates with the stem 3 and is provided on its upper end with a hollow cross head 8 having tangentially disposed and oppositely facing passages 9 leading to the sides of the head from the interior of the head and spindle. The spindle is considerably shorter than the casing so that the head will be disposed some distance below the top of the same.

Slidable on the spindle and normally resting on or adjacent the bottom of the casing is a cup 10 in the top of which an upstanding and relatively tall hollow cap 11 is removably secured; this cap having opposed nozzles 12 projecting outwardly therefrom at an up-

ward angle. The cup is shorter than the spindle 7 so that the cross head is disposed within the cap when the cup is in its lowermost position, as indicated in Fig. 1. The cap above the nozzle is provided with an enlarged hood 13 which has a snug fit with the top of the casing 1 when the cup is in its lowermost position as shown.

To enable the cap to be secured into the freely turnable cup after the headed spindle has been mounted in place (and which prevents removal of the cup) said cup is provided with laterally projecting lugs 14 to engage similar lugs 15 projecting inwardly from the casing and positioned to engage the cup lugs only when the latter is in its lowermost position or thereabouts.

Slidable and turnable in the cup and disposed in close relation to the spindle and its head is a driving ring 16, provided on the interior with circumferentially spaced vertical ribs 17 and with an inwardly projecting flange 18 at the top. The upper edge surface of the ring is of wavy or undulating contour, forming a cam surface 19. Depending from the bottom of the cap 11 and removably secured thereto but rigid with the sprinkler head unit is another ring 20, of rubber composition or the like, whose lower edge is normally spaced from but is of symmetrical contour to that of the upper edge of the ring 16. The space between the two rings is such that when the driving ring is raised to engage the upper and relatively fixed ring, the ribs 17 are disposed so as to be in the path of the water issuing horizontally from the head opening 9.

In operation when the water in the main is shut off or when the stem 3 is turned so that no water can enter the same the cup 10 is in its lowermost position in the casing and the driving ring is at its lowermost position in the cup. As soon as water under pressure however enters the stem 3 and passes through the outlets 9 and into the enclosure formed by the cup 10 and the cap 11, said cap and cup, being a single unit as far as their movement is concerned, rise, due to the restricted size of the nozzles 12 which causes a back pressure to be set up in said enclosure. The upward movement of the cup is limited by a washer W disposed between the bottom of the cup and the bottom of the head 8, which is provided to then form a water-tight seal between these parts without interfering with their relative rotation, and is preferably of the special type more fully described in my co-pending application for patent, Serial No. 423,385, filed January 25, 1930. This vertical movement of the cup moves the lugs 14 and 15 out of register with each other, so that the casing lugs then offer no interference to the free rotation of the cup.

At the same time the driving ring 16 also rises, due in part to the centrifugal move-

ment imparted thereto by the water jets from the openings 9 playing against the ribs, and also to the overhanging flange 18 against which some of the water bears with an upwardly directed pressure. Said driving ring therefore engages the upper ring 20, and with the continued rotation of the driving ring said ring 20 and the parts connected thereto (the cap 11 and the nozzles 12) are also rotated.

Due to the undulating engaging surfaces of the rings however the frictional force of the engagement, while sufficient to cause the sprinkler head to be rotated, is insufficient to continuously hold the driving ring against the ring 20. In other words the driving force imparted to the ring 16 is greater than the frictional pressure of the rings with each other, and as a result the driving ring as it rotates slips around relative to the upper ring, and owing to the undulating contour of the engaging surfaces, such slipping is accompanied by an alternating upward and downward movement of the driving ring, as it alternately engages and leaves the corresponding undulations of the ring above. This movement of the driving ring therefore imparts a constant tapping movement to the upper ring and of course to the parts connected thereto, and such movements taking place in very rapid succession has the effect of continuously vibrating said upper ring and the sprinkler head. The rotation of the sprinkler head is therefore even at all times and any tendency for the same to stick on the spindle is eliminated by the constant vibration imparted to said head as above described.

Any water which may drop down into the casing about the rotating parts immediately drains out through openings 21 provided at the bottom of the casing.

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 rotary sprinkler including a vertical water passage spindle, a sprinkler head turnably mounted thereon and enclosing the upper end thereof, a ring turnably and slidably mounted in the head and about the spindle, means between the spindle and ring for causing the latter to be raised and rotated by water under pressure issuing from the spindle, and means between the ring and head for causing the latter to be rotated and also vibrated by the rotation of the ring.

2. A rotary sprinkler including a vertical water passage spindle, a sprinkler head turnably and slidably mounted thereon and enclosing the upper end thereof, a ring turnably and slidably mounted in the head and about the spindle, means between the spindle and ring for causing the latter to be raised and rotated by water under pressure issuing from the spindle, the upper edge of the ring being formed with vertically disposed undulations, and a ring fixed with the head above said first named ring, the lower edge of said fixed ring being of undulating form to fit the undulations of the first named ring when the latter is raised whereby when said first named ring is rotated it will intermittently rise and fall and will alternately rotate and impart vibration to the head. 70
3. A rotary sprinkler including a vertical water passage spindle, a sprinkler head turnably and slidably enclosing the upper end thereof, a ring turnably and slidably mounted in the head and about the spindle, means between the spindle and ring for causing the latter to be raised and rotated by water under pressure issuing from the spindle, and a ring fixed with the head to be frictionally engaged by the first named ring when the latter is raised; the contacting faces of the rings being arranged to cause the head to be intermittently rotated and vibrated by the rotation of the first named ring. 75
4. A rotary sprinkler including a water passage spindle, a sprinkler head surrounding and enclosing the upper portion of the spindle and including a cup concentric with the spindle whose bottom is slidable and turnable thereon, nozzle openings opposed tangentially in the upper end of the spindle, a ring slidable and turnable in the cup about the spindle and normally resting on the bottom of the cup whereby it will be raised and lowered with the latter, vertical ribs on the interior of the ring, means limiting the upward movement of the head so that when raised the ring-ribs will be horizontally alined with the nozzle openings so as to be engaged and the ring rotated by water issuing from said openings, a member fixed with the head in overhanging and spaced relation to the ring when the latter is on the bottom of the cup, and means provided with the ring to cause the same to be raised into engagement with the member when the head is raised and the ring is being rotated by the water; the contacting surfaces of the ring and member being arranged so that the head will be intermittently rotated and vibrated by such rotation of the ring. 80
5. A rotary sprinkler including a vertical water passage-spindle having a tangential outlet at its upper end, a hollow sprinkler head turnably mounted on the spindle and enclosing the upper end of the same, a member mounted for rotative and vertical move- 85
6. A rotary sprinkler including a vertical water passage spindle having a discharge outlet at its upper end, a hollow sprinkler head surrounding and enclosing the upper end of the spindle and turnable thereon, a member mounted within the head for free rotative and vertical movement from a normal position and arranged to be thus rotated and moved vertically by the force of the water issuing from the outlet, and means between the member and head to vibratively drive the latter by the rotation and vertical movement of the member. 90
- In testimony whereof I affix my signature.
WILLIAM A. BUCKNER. 95
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