Nov. 25, 1952 I. JEPSON 2,619,382

SPRINKLER

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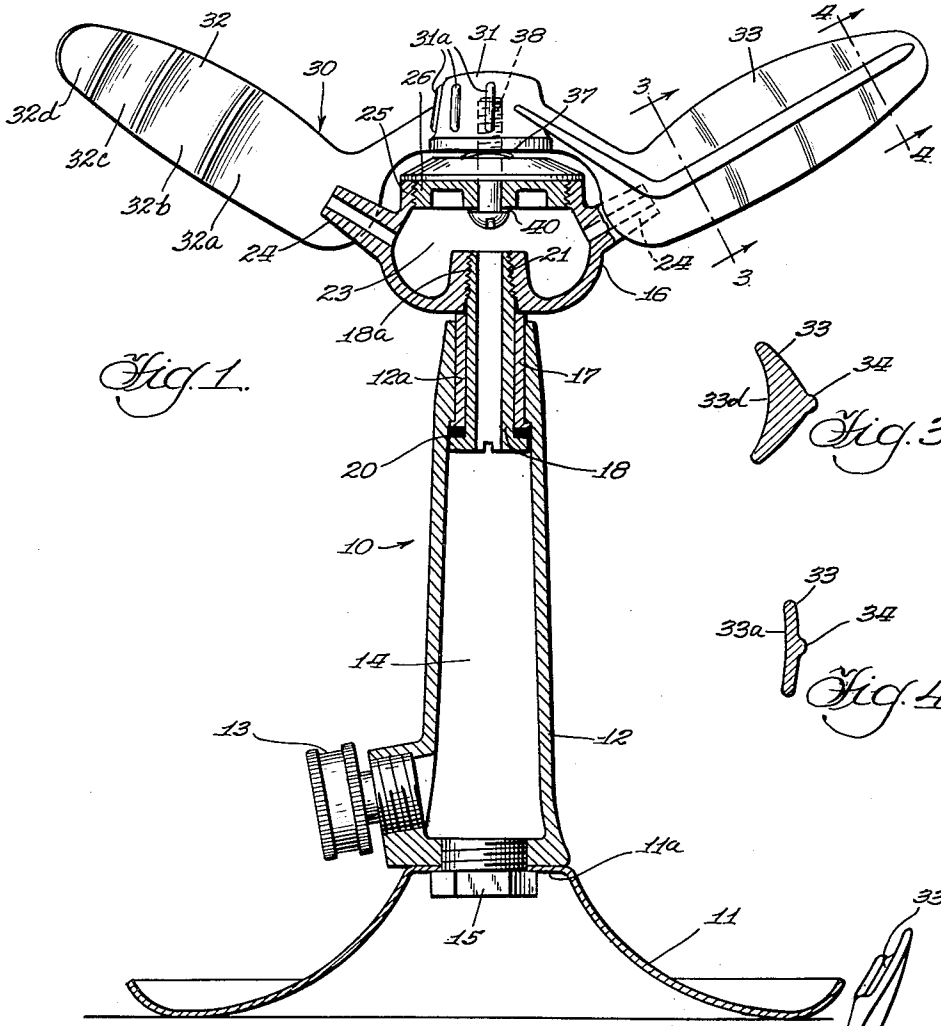



Fig. 1.




Fig. 3.




Fig. 4.

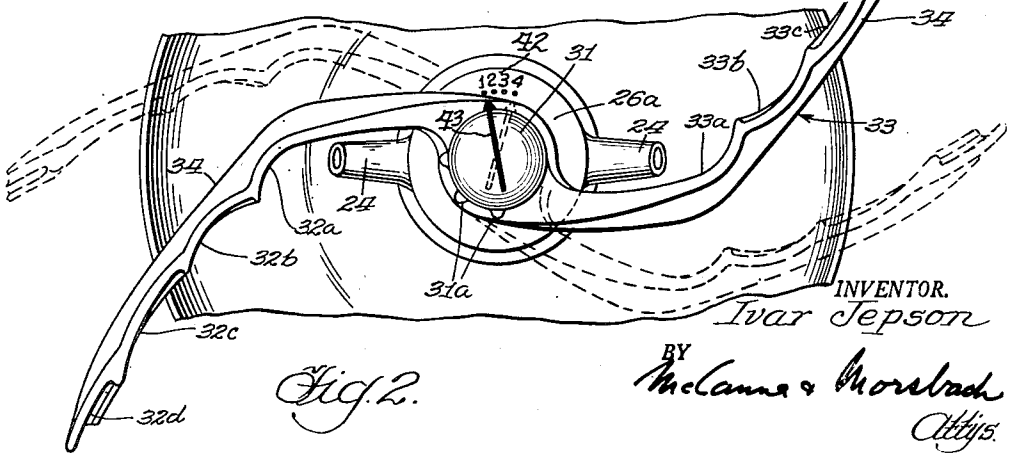



Fig. 2.

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## SPRINKLER

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4 Claims. (Cl. 299—69)

1

This invention relates to sprinklers particularly adapted for watering lawns, gardens, golf courses and the like. Specifically, the present invention is in the nature of an improvement on Butler Patent No. 1,901,225, assigned to the same assignee as the present application.

Rotary reaction type sprinklers have been extensively employed for sprinkling lawns and the like and such prior type of sprinklers have in the main comprised a plurality of discharge nozzles or jet delivery devices arranged in spaced relation on a rotary head, usually in substantially balanced relation at the opposite sides of the axis about which the nozzles revolve. In the majority of these sprinklers no adjustment of the area covered by the sprinkler was possible and any control in this direction was had solely by controlling the amount of water supplied to the sprinkler which was unsatisfactory even at best. In United States Letters Patent No. 2,335,281—Jepson—there is disclosed and claimed a sprinkler in which by the adjustment of a single dial the area covered by the sprinkler is readily controllable in a simple and expeditious manner. This type of sprinkler has come into great favor in recent years, and the present invention is in some respects closely allied thereto.

Although the sprinkler disclosed in the above-mentioned Jepson patent has found great favor, the construction thereof is fairly expensive by virtue of the adjustable nozzles required and it cannot compete from the standpoint of selling price with the more or less unsatisfactory rotary reaction type sprinklers referred to above. It would be desirable, therefore, to provide a sprinkler having at least some of the advantageous features of the above-mentioned Jepson patent and which can be manufactured and sold at a lower cost and which sprinkler will still permit the adjustment of the area sprinkled by a single dial control.

Accordingly, it is an object of the present invention to provide a novel sprinkler arrangement whereby the area sprinkled upon operation of the sprinkler may be adjusted by a single control device.

It is another object of the present invention to provide a new and improved sprinkler of the type having one or more fixed nozzles for projecting a jet or stream of water against a vane to cause rotation of the nozzle about an axis together with means for adjusting the vane relative to the nozzle in a selective manner to control the magnitude of the area sprinkled by the sprinkler.

A further object of the present invention comprises the provision of a rotary reaction type sprinkler having adjustable means for controlling the distribution of water over a wide range varying from an area of a relatively few square feet to an area many times that.

2

Still another object of the present invention is to provide a sprinkler of relatively few parts which is easy to manufacture and which will give years of foolproof and satisfactory service.

Further objects and advantages of the present invention will become apparent as the following description proceeds, and the features of novelty which characterize the invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

For a better understanding of the present invention reference may be had to the accompanying drawing, in which:

Fig. 1 is a vertical section through a lawn sprinkler embodying the present invention;

Fig. 2 is a top plan view of the lawn sprinkler shown in Fig. 1, assuming Fig. 1 shows the complete construction;

Fig. 3 is a sectional view taken on line 3—3 of Fig. 1; and

Fig. 4 is a sectional view taken on line 4—4 of Fig. 1.

Although the present invention has been illustrated in the drawing specifically as embodied in a sprinkler especially designed for sprinkling lawns, it should be understood that the present invention is capable of application to other sprinkler arrangements. As illustrated the sprinkler embodiment is capable of distributing water in a uniform manner over a circular area having a diameter of the order of fifty feet for the maximum setting thereof and an area having a diameter of the order of five feet for the minimum setting thereof. It will be understood that these suggested areas of distribution are by way of example only, although a fifty foot diameter is practical for a maximum setting since the majority of lawns are not much wider than this. Furthermore if the sprinkler were designed to cover circular areas much greater than fifty feet in diameter, the amount of water supplied thereto through the conventional garden hose would be insufficient and also the uniformity of distribution would likely be impaired. Similarly it is seldom desirable to cover areas smaller than about five feet in diameter.

Referring now to the drawing there is illustrated a sprinkler generally designated at 10, which comprises a suitable base 11 adapted to rest upon the ground and of sufficient area so as to give firm support to the remainder of the sprinkler 10. The base 11 is preferably formed of a sheet metal stamping or the like and comprises a raised central portion forming a flat surface 11a having a suitable opening therein for receiving a fastening means for supporting a hollow upright 12 thereon. As illustrated, the upright 12 may comprise a suitable casting equipped with a conventional hose coupling means 13 by means of which water under pres-

sure may be supplied to the chamber 14 of the hollow support or upright 12. A suitable plug 15 having an enlarged head is threadedly engaged with an opening at the lower end of the upright 12 so as to clamp the base 11 to the upright 12. It will be apparent that this plug 15 in addition to serving as an assembly means for the base 11 and the upright 12, also provides a clean out plug whereby any sediment or the like which may accumulate in the hollow chamber 14 defined within the upright 12 may be removed.

For the purpose of rotatably supporting a suitable nozzle carrying head 16 from the upper end of the support 12, this upper end of the support 12 is provided with a bore 12*a* for receiving therein a bearing sleeve or bushing 17, preferably formed of bronze or the like which bearing sleeve may be press fitted into the bore 12*a*. Rotatable about the vertical axis of the bearing sleeve 17 is a hollow bearing stud 18 journalled in the bushing 17, which stud has an enlarged lower end which under the pressure of water supplied to the chamber 14 seats against a combined packing and thrust washer 20. The nozzle head 16 is provided at its underside with a threaded opening 21 for receiving the threaded end 18a of the hollow bearing stud 18. Normally the head 16 rests on the protruding end of the bushing or bearing sleeve 17, but when water under pressure is supplied to the sprinkler 10 this pressure lifts the stud 18 and the nozzle head 16 thereby substantially reducing the friction when rotation of the sprinkler occurs.

As illustrated, the nozzle head 16 comprises a casting defining a chamber 23 therein of somewhat annular configuration and having somewhat laterally extending integrally formed nozzle members 24 arranged in diametrically opposed relationship. As illustrated, the head 16 is provided with a threaded opening 25 at the upper end thereof for receiving a suitable cover 26, the purpose of which will become apparent from the following description.

With the arrangement described thus far it will be apparent that when water under pressure is supplied as by connecting a suitable hose to the coupling 13, this water will be discharged through the nozzles 24. Although the head 16 is rotatable, without additional means to be described hereinafter, no rotation thereof will occur.

For the purpose of providing a rotational torque to the head 16 in response to the flow of water from the nozzles 24, there is provided a vane assembly generally designated at 30 comprising a central member 31, adapted to be coaxially disposed with respect to the vertical axis of the upright 12, and a pair of vanes 32 and 33. As illustrated, the central member 31 and the vanes 32 and 33 are integral and may comprise a suitable casting. The vanes 32 and 33 are each identical and are displaced from each other by 180 degrees with respect to the central member 31.

As illustrated, each of the vanes comprises a central strengthening rib portion 34, to lend rigidity thereto, and a plurality of separate delineated vane surfaces which for the vane 32 are designated as 32*a*, 32*b*, 32*c* and 32*d*, respectively. The corresponding delineated surfaces for the vanes 33 are designated as 33*a*, 33*b*, 33*c* and 33*d*. As is best shown in Fig. 2 of the drawing, each of the vanes is a somewhat curved member with each of the surface portions marked with subscripts *a*, *b*, *c* and *d* capable of selectively having impinged thereon a jet of water from the adjacent nozzle.

In accordance with the present invention the central member 31 of the vane assembly 30 is supported from the cover 26 of the nozzle head 16 in a manner to permit limited relative movement between the nozzle head 16 and the vane assembly 30. To this end a tension screw 38 extending through a suitable opening in the cover 26 is threadedly engaged with a suitable opening defined in the central member 31. Preferably a tension washer 37 is interposed between the cover 26 and the central member 31. Also to prevent leakage through the opening 26 through which the cover extends a suitable gasket or washer 40 is preferably provided.

The vane assembly 30 is capable of being moved relative to the nozzle head 16 between the extreme positions shown in Fig. 2 of the drawing where the solid line position represents the arrangement of the vanes when the sprinkler is employed to sprinkle a minimum area and the dotted line position indicates the selective adjustment when the sprinkler is employed for sprinkling a maximum area. In the solid line position in Fig. 2 the jet of water from the nozzles 24 impinges on the surfaces 32*a* and 33*a* so as to produce a turbine effect and wherein substantially all of the water impinges on the vane surface, whereby a high proportion of the kinetic energy of the water jets is converted to a reaction torque causing high speed rotation of the nozzle head 16 and consequently also of the vane assembly 30, with the result that the effective velocity of the water with respect to the ground is relatively low and the liquid will be distributed over a relatively small area. When the vane assembly 30 is in the dotted line position shown in Fig. 2 of the drawing, the water jets from the nozzles 24 will impinge on the surfaces 32*d* and 33*d*, and by virtue of the angular disposition of these vane surfaces marked with the subscript "*d*," a much smaller portion of the kinetic energy of the water jets will be converted to a reaction torque causing rotation of the nozzle head 16 with the result that the sprinkler head will rotate at a much lower speed and the water will be distributed over a much larger area. The intermediate vane surfaces 32*b* — 33*b* and 32*c*—33*c* will be effective, when positioned to have impinged thereon jets from the nozzles 24, to distribute the water over intermediate areas with the nozzle head 16 rotating at intermediate speeds.

Preferably the central member 31 is provided with suitable protuberances 31*a* so that it may readily be grasped manually by the fingers of the operator for producing relative movement between the vane assembly and the nozzle head 16. Also suitable indicia, as is clearly shown in Fig. 2 and designated by the reference numeral 42, may be provided on the inclined surface 26*a* of the cover 26 so as to cooperate with a suitable pointer or indicator 43 defined on the central member 31 to provide an indication to the operator of the sprinkler setting with reference to the area over which the water will be distributed. It will be understood that the scale might be calibrated to designate directly the area which the sprinkler will effectively cover, as for example, the diameter of a circle defining the area to be covered by the sprinkler. The tension screw 38 will be adjusted so that the vane assembly 30 will remain in any one of its preselected positions relative to the nozzle head 16.

From the above description it will be apparent that the sprinkler 10 may be readily assembled by first attaching the vane assembly 30 to the cover 26 and then attaching the cover 26 to the nozzle head 16. The bearing stud 18 can then be inserted into the upper end of the upright 12 so as to threadedly engage the head 16 whereupon the base 11 may be assembled to the upright 12 by means of the screw 15.

When water under pressure is supplied to the sprinkler 10 in the conventional manner, the jets of water from the nozzles 24 impinging on the vanes 32 and 33 cause rotation of the nozzle head 16, and the speed of such rotation and the area over which water is uniformly distributed will be selectively dependent on the setting of the vane assembly 30 relative to the head 16. Furthermore, the area to be sprinkled may readily be controlled by the adjustment of a single dial in a very simple and satisfactory manner.

While there has been shown and described a particular embodiment of the present invention, it is not desired that the invention be limited to the construction shown and described, for it will, of course, be obvious to those skilled in the art, that changes and modifications may be made without departing from the invention, and it is therefore aimed in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of this invention.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. In a sprinkler, a head rotatable about a vertical axis, a pair of diametrically opposed water jet discharging nozzles extending laterally from said head, a pair of vanes, means for mounting said vanes for rotation with said head so that at least a portion of the water jet from said nozzles impinges on an associated one of said vanes to cause rotation of said head, said vanes being mounted to permit limited relative movement with respect to said nozzles thereby selectively to control the effectiveness of the water jets impinging on said vanes, and manually actuable selective means comprising a single rotatable dial member for selecting the relative positions of said vanes and nozzles to control the magnitude of the area over which water is distributed by said sprinkler, the axis of rotation of said dial member being coincident with said vertical axis.

2. In a sprinkler, a head rotatable about a vertical axis, a water jet discharging nozzle extending laterally from said head, a vane having a plurality of delineated surface areas selectively adapted to have a water jet from said nozzle impinged thereagainst and each of different configuration with reference to the angular position relative to said nozzle of each particular area when selectively positioned to have a water jet from said nozzle impinge thereagainst, means for mounting said vane for rotation with said head so that at least a portion of the water jet from said nozzle impinges on one of the surface areas of said vane to cause rotation of said head, said vane being mounted to permit limited relative movement between said vane and said nozzle thereby selectively to render a different one of said surface areas effective to have water from said jet impinge thereon, and manually actuable means for selecting the relative position of said vane and nozzle to control the magnitude of the area over which water is distributed by said sprinkler.

3. In a sprinkler, a head rotatable about a vertical axis, a water jet discharging nozzle extending laterally from said head, a curved vane having a plurality of adjacent surface areas of different configuration with reference to the relative angular position of each of said surface areas and said nozzle when selectively positioned to have a water jet from said nozzle impinge thereagainst, each of said adjacent surface areas being selectively adapted to have a water jet from said nozzle impinged thereagainst, means for mounting said vane for rotation with said head so that at least a portion of the water jet from said nozzle impinges on one of said surface areas of said vane to cause rotation of said head, said vane being mounted to permit limited relative movement between said vane and said nozzle thereby selectively to render a different one of said surface areas effective to have water from said jet impinge thereon, and a dial mounted on said head and connected to said vane for selecting the relative position of said vane and nozzle to control the magnitude of the area over which water is distributed by said sprinkler.

4. A sprinkler having a water supply head rotatable about a vertical axis, a water jet discharging nozzle element extending from said head and rotatable therewith, a vane element having a plurality of adjacent surface areas of different curvature each selectively adapted to have a water jet from said nozzle impinged thereagainst, said surface areas when selectively disposed to have a water jet from said nozzle impinge thereagainst each providing a different angle relative to said nozzle, means for mounting said vane element on said head for rotation therewith but permitting limited relative movement of said elements, said vane and nozzle elements being disposed so that in different relative positions thereof at least some water from the water jet strikes different ones of said surface areas of said vane element to produce rotation of said head about said vertical axis, a dial member on said head coaxial with said axis and having associated therewith circumferentially spaced indicia indicating different settings representative of the effectiveness of different ones of said surface areas and also different areas of delivery of said sprinkler, an indicator member cooperating with said dial member, one of said members being manually adjustable about said axis to a pre-selectable setting relative to said other member representative of one of said areas, and means for operatively connecting said one of said members with one of said elements to produce relative movement between said elements in response to relative movement between said members.

IVAR JEPSON.




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