July 23, 1929. W. J. WARNER 1,721,758

LAWN SPRINKLER

Filed July 30, 1928

FIG. 1.

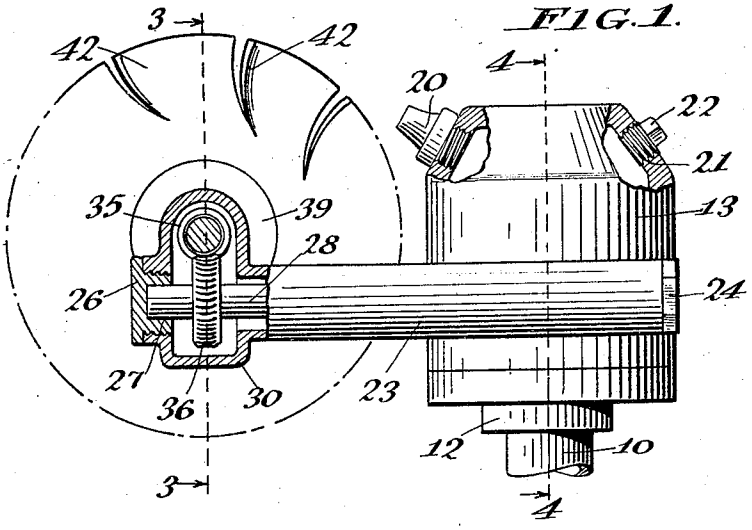


FIG. 2.

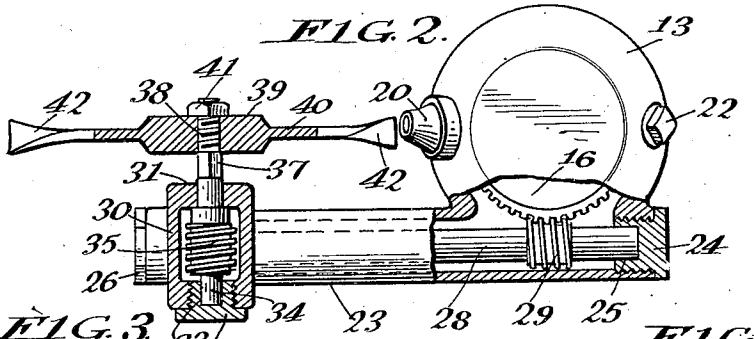


FIG. 3.

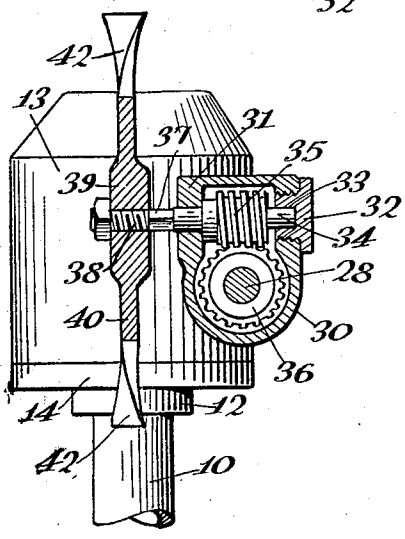
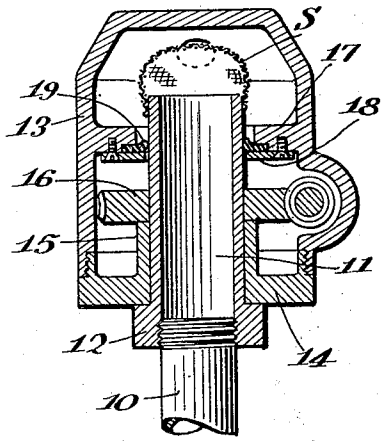


FIG. 4.



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Patented July 23, 1929. 1,721,758

UNITED STATES PATENT OFFICE.

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LAWN SPRINKLER.

Application filed July 30, 1928. Serial No. 296,110.

My invention relates to a lawn sprinkler of the type wherein a head carrying a jet nozzle is mounted to rotate on a vertical axis, the power for producing the rotary movement being produced as a result of the impact of a portion of the jet of water that issues from the head against a rotary member having blades or vanes, and the principal objects of my invention are to generally improve upon and simplify the construction of the existing forms of rotary lawn sprinklers and to provide a sprinkler of the character referred to that is inexpensive of manufacture, capable of being readily assembled or taken apart, and which is not liable to easily get out of order.

Further objects of my invention are to provide simple and efficient means to prevent leakage of water from the sprinkler head while the same is in service, further to provide means for straining all of the water that is delivered to the rotary head of the sprinkler, and further to provide a construction wherein the pressure of the water passing through the rotary head is utilized for packing the joints between said head and the member upon which it rotates, thereby tending to minimize and prevent leakage of water through said joints.

With the foregoing and other objects in view, my invention consists in certain novel features of construction and arrangement of parts that will hereinafter be more fully described and claimed and illustrated in the accompanying drawings, in which:

Fig. 1 is an elevational view of a lawn sprinkler constructed in accordance with my invention, parts thereof being broken away and in section.

Fig. 2 is a top plan view of the rotary sprinkler head with portions thereof in horizontal section.

Fig. 3 is a cross section taken on the line 3—3 of Fig. 1.

Fig. 4 is a vertical cross section taken on the line 4—4 of Fig. 1.

Referring by numerals to the accompanying drawings which illustrate a practical embodiment of my invention, 10 designates a vertically disposed pipe that is connected to and leads upwardly from the underground supply pipe of a water distribution system, and screw seated on the upper end of said pipe 10 is a short vertically disposed tube 11 provided at its lower end with an outwardly projecting flange 12.

Tube 11 provides a vertically disposed bearing on which the head of my improved sprinkling device rotates, and said head comprises a short vertically disposed hollow cylindrical body 13, the lower end of which is closed by a removable cap or plate 14, and the latter being provided with a centrally arranged aperture for the reception of the tube 11.

Formed integral with the plate 14 around the central opening therein is an upwardly projecting collar 15 that surrounds the lower portion of the tube 11, and when properly assembled the underside of the plate 14 adjacent to the aperture therein rests on the upper face or flange 12.

Fixed on the intermediate portion of tube 11, preferably by a drive fit, is a worm wheel 16, the under face of which bears on the upper edge of collar 15.

Formed integral with the upper portion of the housing 13 is an inwardly projecting flange 17, the inner edge of which is spaced a short distance apart from the periphery of the tube 11, and arranged on the underside of said flange 17 and retained in position thereon by a ring plate 18 that is secured to said flange is a packing ring 19 of flexible material such as leather, rubber or composition, and the inner edge of this packing ring bears directly against the periphery of tube 11. The inner edge of this ring 19 is subjected to the pressure of the water within the chamber in housing 13 above the flange 17 and as the inner edge of said ring is pressed against the tube 11 by the water pressure a leak-proof joint is provided between the flange 17 and the chamber below said flange, and which last mentioned chamber is occupied by the worm wheel 16 and the worm that cooperates therewith.

The upper end of tube 11 terminates in a plane a short distance above the upper surface of flange 17, and the annular space surrounding the upwardly projecting portion of

said tube and immediately above the flange constitutes a settling chamber for small particles of sand, dirt or other foreign matter that may enter the rotary housing through the supply tube and to prevent the larger particles of foreign matter from entering this settling chamber a substantially spherical strainer S of reticulated material, preferably wire screen, is fitted over the upper end of tube 11, as illustrated in Fig. 4.

Seated in a threaded aperture in the upper portion of the housing 13 is a short jet nozzle 20 that occupies an inclined position of approximately thirty or forty degrees relative to a horizontal plane, and formed in the upper portion of the housing, preferably at a point opposite the jet nozzle 20, is a threaded aperture 21, for the accommodation of a secondary jet nozzle which may be used under certain conditions, or if such secondary nozzle is not used this aperture is closed by a screw plug 22.

Formed integral with or fixed to the lower portion of the housing 13 and preferably parallel with the plane occupied by the jet nozzle 20 and threaded opening 21, is a horizontally disposed tubular member 23, and the inner end thereof, or that end that is immediately adjacent to the housing 13 is closed by a screw plug 24 in which is formed a bearing 25.

The outer end of the tubular member 23 is closed by a screw plug 26 in which is formed a bearing 27 and journaled in said last mentioned bearing and in the bearing 25 in plug 24 are the ends of a shaft 28 that carries a worm 29, and which latter engages the teeth of worm wheel 16.

Formed integral with the outer end portion of tubular member 23 is a short horizontally disposed housing 30, one end of which is closed by an integral wall 31 and the other end closed by a screw plug 32 in which is formed a bearing 33. Journaled in bearing 33 and in a bearing that is formed in an integral wall 31 is a short shaft 34, and mounted thereon within the housing 30 is a worm 35 that engages the teeth of a worm wheel 36, which latter is secured to shaft 28 within the lower portion of housing 30.

That portion of the shaft 34 that projects beyond the housing 30 is provided with a short non-circular portion 37 and with an outer threaded portion 38, which latter receives the hub 39 of a metal disk 40, and said hub being locked on the shaft by a nut 41.

The outer edge of the disk 40 is slotted and portions between the slots are pressed outwardly to form curved or inclined blades or vanes 42, and the disk or wall 40 is arranged so that these vanes or blades travel in a circular path that passes through the lower portion of the jet of water that issues from nozzle 20.

When my improved sprinkler head is in operation water under pressure passes upwardly through pipe 10 and tube 11 into the settling chamber within the upper portion of the housing 13, and after passing through the strainer S the water discharges upwardly and outwardly through jet nozzle 20. A portion of the jet of water issuing from the nozzle strikes against the vanes 42 that are formed on the edge of disk 40, thereby imparting rotary motion to said disk and through worm 35 and worm wheel 36 this rotary motion is transmitted to shaft 28.

Inasmuch as shaft 28 carries worm 29 and the latter engages with the stationary worm wheel 16 the engagement of the worm 29 with the stationary worm wheel will cause said worm to slowly travel about the worm wheel 16 with the result that the housing 13 and parts carried thereby will slowly revolve on a vertical axis that is coincident with the axes of pipe 10 and tube 11.

That portion of the jet of water that issues from nozzle 20 that passes over the vanes 42 will travel to a considerable distance away from the rotary head, thereby sprinkling water over the ground throughout a considerable area adjacent to the head and that portion of the water that engages the vanes will be deflected so as to cover the ground between the supply pipe and that portion of the ground that is covered by the upper portion of the jet or that portion that does not impinge the vanes 42.

Thus it will be seen that I have provided a rotary head sprinkler that is relatively simple in construction, inexpensive of manufacture, capable of being readily assembled or taken apart, and which is very effective in performing the functions for which it is intended.

Inasmuch as the packing member 19 is, during the operation of the sprinkler, under the influence of the pressure of the water passing through the rotary head, a leaf-proof joint is produced between the flange 17 in the upper portion of the housing and the chamber in the lower portion thereof, and this desirable non-leaking result is enhanced by the provision of the collar 15 which fits snugly upon the tube 11 between the worm wheel 16 and the flange 12 on the lower end of tube 11.

Larger particles of foreign substance are prevented from passing through the rotary sprinkler head by the strainer S and smaller particles that may pass through this screen will accumulate in the settling chamber immediately above the flange 17.

The non-circular portion 37 is provided on the shaft 34 in order that said shaft may be readily engaged by a suitable tool such as a wrench or pair of pliers when the bladed wheel 40 is being removed from or supplied to said shaft.

It will be readily understood that minor changes in the size, form and construction of the various parts of my improved lawn

sprinkler may be made and substituted for those herein shown and described without departing from the spirit of my invention, the scope of which is set forth in the appended claims.

I claim as my invention:

1. In a rotary lawn sprinkler, a vertically disposed tube adapted to be connected to a source of water supply, a housing mounted for rotary movement upon said tube, a flange on the lower end of said tube, a worm wheel fixed on the intermediate portion of said tube, a collar on the lower portion of said housing, which collar bears on said flange and worm wheel, a flange projecting inwardly from the upper portion of the housing, a packing ring of flexible material arranged on the underside of said flange, the inner edge of which packing ring bears against the vertically disposed tube, a ring secured to the underside of said flange for retaining the packing ring thereon, the upper end of which tube terminates in a plane above said flange so as to provide a settling chamber in the upper portion of the housing, a strainer secured on the upper end of said vertically disposed tube within said settling chamber, a jet nozzle seated in the upper portion of said housing, a tubular housing projecting horizontally from the lower portion of the first mentioned housing, a bladed wheel journaled for rotation on the outer portion of said tubular member, the blades of which wheel are in the path of travel of the jet of water issuing from said nozzle, and driving connections between said wheel and the worm wheel that is fixed on said vertically disposed tube.

2. In a rotary lawn sprinkler, a vertically disposed tube adapted to be connected to a water supply pipe, a housing mounted for rotary movement on said tube, a jet nozzle projecting from the upper portion of said housing, means carried by said housing and actuated by the force of the jet of water issuing from said nozzle for causing said housing to rotate upon said tube, a flange projecting inwardly from the upper portion of said housing, the inner edge of which flange is spaced apart from the upper portion of the tube, a packing ring of flexible material arranged on the underside of said flange and bearing against the outer surface of said tube to provide a leak-proof joint between the chamber above said flange and chamber below said flange, and a ring plate secured to the underside of said flange for retaining said packing ring in position thereupon.

3. In a rotary lawn sprinkler, a vertically disposed tube adapted to be connected to a water supply pipe, a housing mounted for rotary movement on said tube, a jet nozzle projecting from the upper portion of said housing, means carried by said housing and actuated by the force of the jet of water issuing from said nozzle for causing said housing to rotate upon said tube, a flange projecting inwardly from the upper portion of said housing, the inner edge of which flange is spaced apart from the upper portion of the tube, a packing ring of flexible material secured to the underside of said flange and bearing against the outer surface of said tube to provide a leak-proof joint between the chamber above said flange and the chamber below said flange, a ring plate secured to the underside of said flange and overlying the outer edge of said packing ring, and the upper portion of which tube projects a substantial distance above the said flange so as to provide above the latter a settling chamber that surrounds the upwardly projecting end of said tube.

4. In a rotary lawn sprinkler, a vertically disposed tube adapted to be connected to a water supply pipe, a housing mounted for rotary movement on said tube, a jet nozzle projecting from the upper portion of said housing, means carried by said housing and actuated by the force of the jet of water issuing from said nozzle for causing said housing to rotate upon said tube, a flange projecting inwardly from the upper portion of said housing, the inner edge of which flange is spaced apart from the upper portion of the tube, a packing ring of flexible material secured to the underside of said flange and bearing against the outer surface of said tube to provide a leak-proof joint between the chamber above said flange and the chamber below said flange, the upper portion of which tube projects a substantial distance above the said flange, a ring plate secured to the underside of said flange and overlying the outer edge of said packing ring so as to provide above the latter a settling chamber that surrounds the upwardly projecting end of said tube, and a strainer secured on the upper end of said tube within said settling chamber.

In testimony whereof I affix my signature.

WALTER J. WARNER.