Nov. 6, 1956 D. L. SPENDER 2,769,665

OSCILLATING SPRINKLER

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Fig. 1

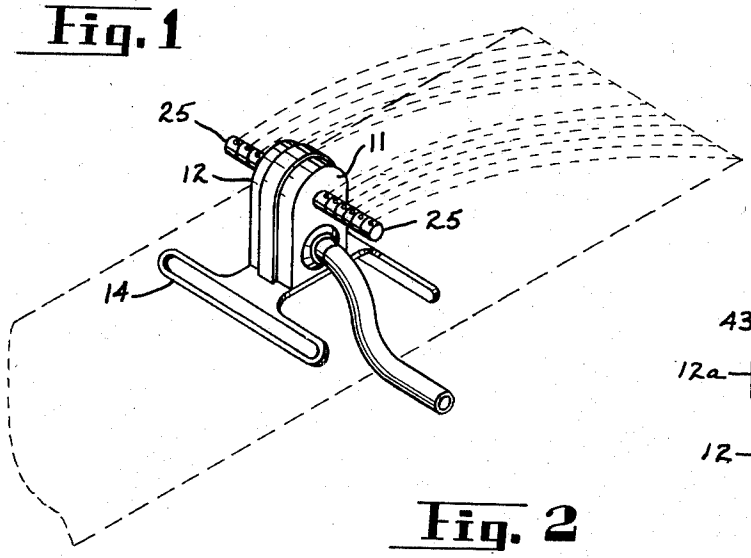

Fig. 6

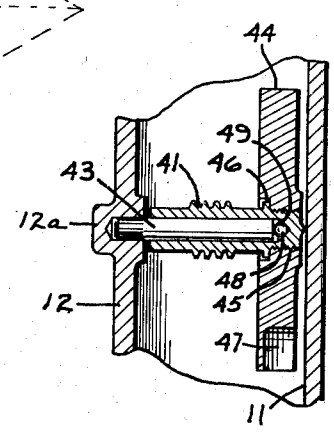

Fig. 2

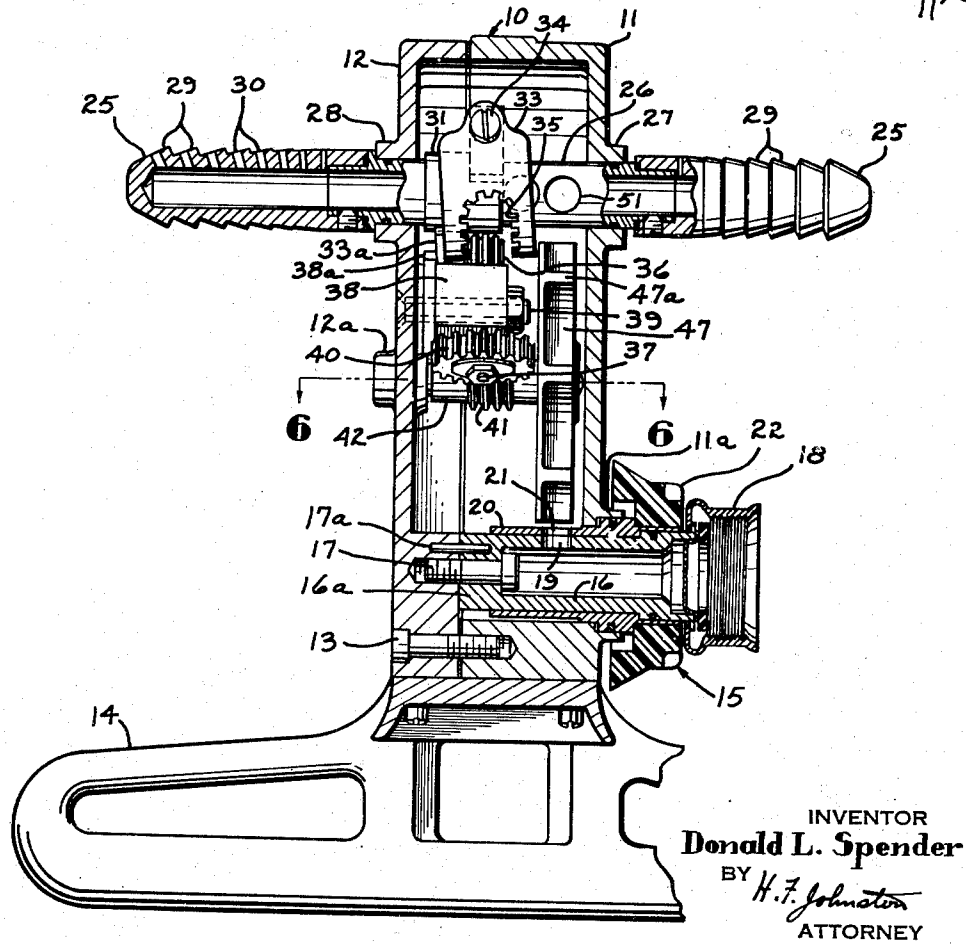

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Fig. 3

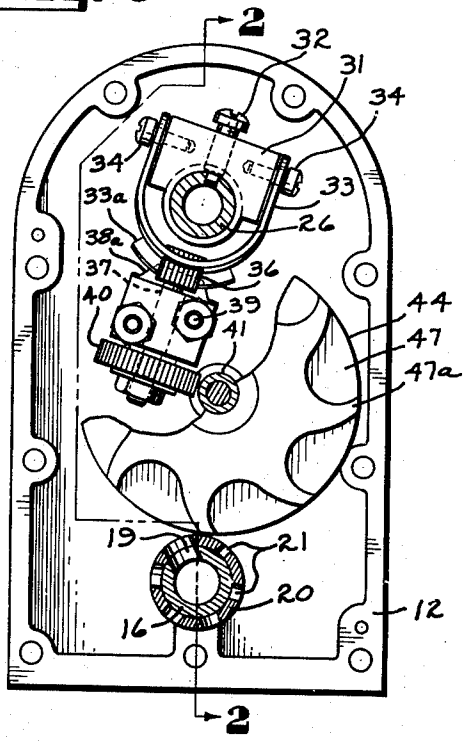


Fig. 5

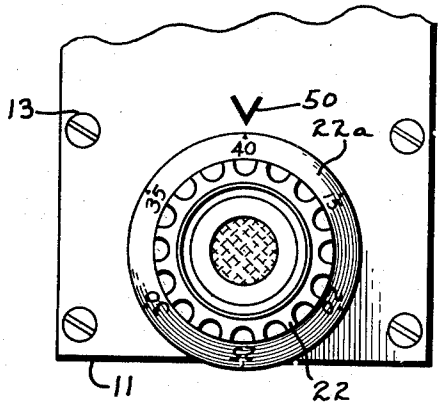
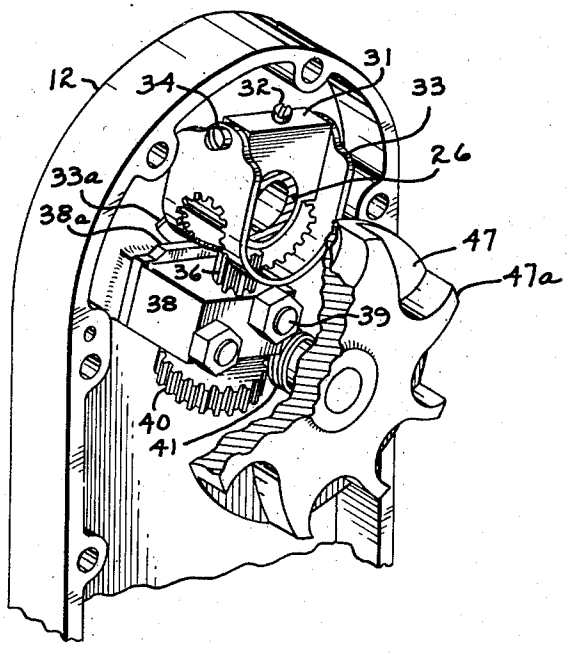


Fig. 4



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2,769,665

OSCILLATING SPRINKLER

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3 Claims. (Cl. 299—67)

This invention relates to sprinklers for watering lawns, gardens or the like, and especially to sprinklers of the type where the water discharging members or nozzles are oscillated about a horizontal axis as distinguished from that class where the arms or nozzles are spun about a vertical axis.

Heretofore, sprinklers of this general character have been of the oscillatory type in which the discharging nozzles are operated by a crank connecting with a rotating member resulting in a harmonic oscillatory motion which would always produce a progressively decreasing and slowly increasing motion at the opposite ends of the oscillatory stroke and resulting in a greater volume of water at the end of the sprinkled area than at the middle.

This unwanted condition is overcome by my invention that has for one of its objects the operation of a horizontal discharge nozzle in an oscillatory manner about its longitudinal axis so that the rate of movement of the nozzle is uniform throughout each swing of the oscillation.

Another object is to provide a simple, efficient and easily operated control device for varying the volume of water flowing through the sprinkler without appreciably varying the speed of oscillation of the nozzles to vary the area being sprinkled.

With these and other objects in view, the invention consists in the novel construction, arrangement and formation of parts, as will be hereinafter more fully understood by reference to the following description when considered in connection with the accompanying drawings, in which,

Fig. 1 is a perspective view of the sprinkler as it appears in operation.

Fig. 2 is a vertical sectional view through the sprinkler on an enlarged scale, the view taken along the line 2—2 of Fig. 3.

Fig. 3 is a right end view of the sprinkler, with the right half of the casing removed to show the interior construction with portions broken away.

Fig. 4 is a perspective view of the interior mechanism shown in association with the left portion of the casing.

Fig. 5 is an end view of the volume control unit, and

Fig. 6 is a sectional view through the impeller wheel and support spindle taken along the line 6—6 of Fig. 2.

Referring now to the drawings in which like reference numerals denote like parts throughout the several views, the numeral 10 refers generally to a hollow casing formed of two companion parts, a right section 11 and a left section 12, the parts being secured together to form the casing as by screws 13. The casing 10 is supported on a pedestal or stand 14 which is preferably of the sled type to permit the sprinkler to be drawn over the area to be sprinkled. Water is directed into the casing through a volume-control unit 15. This unit 15 consists of a hollow valve body 16 closed at its inner end 16*a*, the latter being secured to the inner wall of the left casing 12 as by a screw 17 and held against turning by a dowel pin 17*a*. The outer end of the body 16 has a swivel nut 18

secured thereto in the usual manner and by means of which the sprinkler may be attached to a hose line. The valve body 16 is provided with a discharge port 19 that is directed upwardly into the casing 10. A valve sleeve 20 surrounds the valve body 16 and is rotatably mounted in an embossed part 11*a* of the right casing 11. The sleeve 20 incidentally also serves as a support for that portion of the valve body 16 passing through the casing 10. The valve sleeve 20 is formed with a series of graduated openings 21 arranged circumferentially thereabout and adapted to be brought into alignment with the discharge port 19 of the valve body 16. An operating valve knob 22 is secured to the outer end of the valve sleeve 20 for rotating said sleeve in selectively registering any one of the graduated openings 21 with the discharge port 19 for controlling the size of the stream to be directed into the casing 10 and against an impeller wheel 44.

For the purpose of covering a square or rectangular area a pair of discharge nozzles 25 is mounted on a hollow shaft 26, one at each end, to oscillate about a horizontal axis. The shaft 26 is rotatable in bearing bosses 27 and 28 in the casing halves 11 and 12 respectively. Any suitable packing may be used between the shaft and bearings to prevent leakage. Each nozzle 25 is cut with a series of conical surfaces 29 progressively increasing in angular arrangement from their inner end outwardly, and a series of angular discharge ports 30 are provided preferably in a straight row, one to each of the conical surfaces 29.

The means for imparting an oscillatory motion to the discharge nozzles with a uniform rate of speed will now be described. A yoke supporting block 31 is secured to the shaft 26 within the casing 10 as by screw 32 in definite relationship to the line of discharge ports 30 in said nozzles 25. A U-shaped rack yoke 33 is pivotally mounted on the yoke block 31 as by pivot screws 34. The circular portion of the yoke, which is substantially concentric with the shaft 26, is slotted out, and around the edges of the slot is a series of teeth forming a continuous interior rack 35. A pinion gear 36 is fixed to one end of a gear shaft 37 mounted in a bearing block 38 attached to the inside of the left casing wall 12 by a pair of bolts 39. The gear 36 is smaller than the width of the slot in the yoke 33 and is held in constant engagement with the rack 35 by a sector lip 33*a* integral with one edge of the yoke 33, which lip 33*a* cooperates by a sliding contact with a guide flange 38*a* extending upwardly from the bearing block 38.

From Fig. 4 it will be apparent from my invention that as the rack yoke 33 is moving in one direction the lip 33*a* will glide along one side of the guide flange 38*a* until the yoke reaches the end of its stroke, whereupon the gear 36 rolling around the arcuate end of the rack 35 will hinge the yoke 33 about its pivot screws 34 and shifting the lip 33*a* so that it glides along the opposite side of guide flange 38*a*. This arrangement assures that the pinion gear 36 will always remain in mesh with internal yoke rack 35.

Worm wheel 40 is secured to the opposite end of the gear shaft 37 and is adapted to mesh with a worm pinion 41 formed as an integral part of an impeller wheel hub 42 rotatably mounted on a support shaft 43. The shaft 43 is horizontally supported within the hollow of the casing 10 by having a drive fit into an embossed part 12*a* of left casing section 12.

The above described mechanism is driven by the impeller wheel 44. This impeller wheel is threadedly engaged to the threaded end 45 of the hub 42 up to a shoulder flange 46 on said hub 42. The impeller wheel 44 is provided with a series of peripheral and laterally opening pockets 47 separated by vanes 47*a* in alignment with the jet issuing from the admission valve port 19, the

open sides being toward the adjacent wall of right casing 11. By reason of the particular lead of the worm pinion 41 and its engagement with the worm wheel 40 a left hand thrust, as viewed in Fig. 5, is imparted to the hub 42, and to reduce end thrust friction a ball bearing 48 is interposed between the pocket-like base 49 of said hub 42 and the adjacent end of said support shaft 43.

In order to predetermine the size of the area to be sprinkled, the operating knob 22 is provided with a circumferential beveled flange 22*a* having indicia printed thereon such as 15, 20, 25 etc. representing the size of the area in feet to be sprinkled, and these index numbers may be turned to line up with an index arrow 50 stamped in the adjacent wall of right casing 11.

Operation

When it is desired to operate the sprinkler it will first be connected to a supply hose by the swivel nut 18. Next, the size of the area to be sprinkled will be judged and a requisite setting made with the control knob 22 in accordance with the size of the area to be covered. When the water is turned on it will first fill the chamber in the valve body 16 and pass out through the discharge port 19 and one of the selected graduated openings 21 in valve sleeve 20 and impinge against the pockets 47 in impeller wheel 44 causing the latter to rotate. Rotation of the impeller wheel 44 will turn the hub 42 bearing the worm pinion 41 and cause the worm wheel 40, gear shaft 37, and pinion gear 36, to rotate. Rotation of the pinion gear 36 will cause the U-shaped rack yoke 33 to move about the axis of the spindle nozzles and consequently oscillate the hollow hub 26 and supported nozzles 25 between predetermined limits as determined by the length of the rack 35 in yoke 33.

The water that is impinged against the impeller wheel 44 will fill the casing 10 and then pass into the hollow hub 26 through one or more openings 51 and outwardly through the several discharge ports 30 in nozzles 25.

As a result of this invention there is provided an oscillating sprinkler having uniform motion so that there will be no long dwell period or retarded motion at the end of each oscillating stroke such as was the fault with former

oscillating sprinklers operated through a pitman and crank arrangement. This will preclude the deposit of an excessive amount of water at the extreme end of the area sprinkled and a lesser amount at the intermediate area.

While there is shown only a single embodiment of my invention, it is to be understood that the invention is not to be limited thereto but may comprehend other constructions included within the scope and sphere of the appended claims.

I claim:

1. A sprinkler comprising a hollow casing, a hollow shaft journaled in and extending through opposite walls of said casing, said shaft having an opening leading to the interior of the casing, a discharge nozzle on one end of said shaft, an impeller wheel within the casing, means directing a stream of water against the impeller wheel to rotate the same, a gear rack member attached to said shaft within said casing and transversely of the axis of said nozzle, and a gear train connecting said impeller wheel to said rack member including a gear meshing with the rack, said rack member being of such shape that upon rotation of said impeller wheel an oscillating movement of uniform rate throughout is imparted to said nozzle.

2. A sprinkler as defined in claim 1 wherein the gear rack member is a U-shaped yoke having a continuous interior rack and is pivotally mounted on said shaft.

3. A sprinkler as defined in claim 2 wherein the U-shaped yoke is mounted substantially concentric with the hollow shaft.

References Cited in the file of this patent

UNITED STATES PATENTS

1,099,874	Dorward	June 9, 1914
1,284,251	Dahl	Nov. 12, 1918
1,534,979	McGee	Apr. 21, 1925
1,677,228	Coles	July 17, 1928
1,765,939	Roach	June 24, 1930
2,187,549	Thompson	Jan. 16, 1940
2,497,139	Rumbaugh	Feb. 14, 1950

FOREIGN PATENTS

434,156	Great Britain	Aug. 27, 1935