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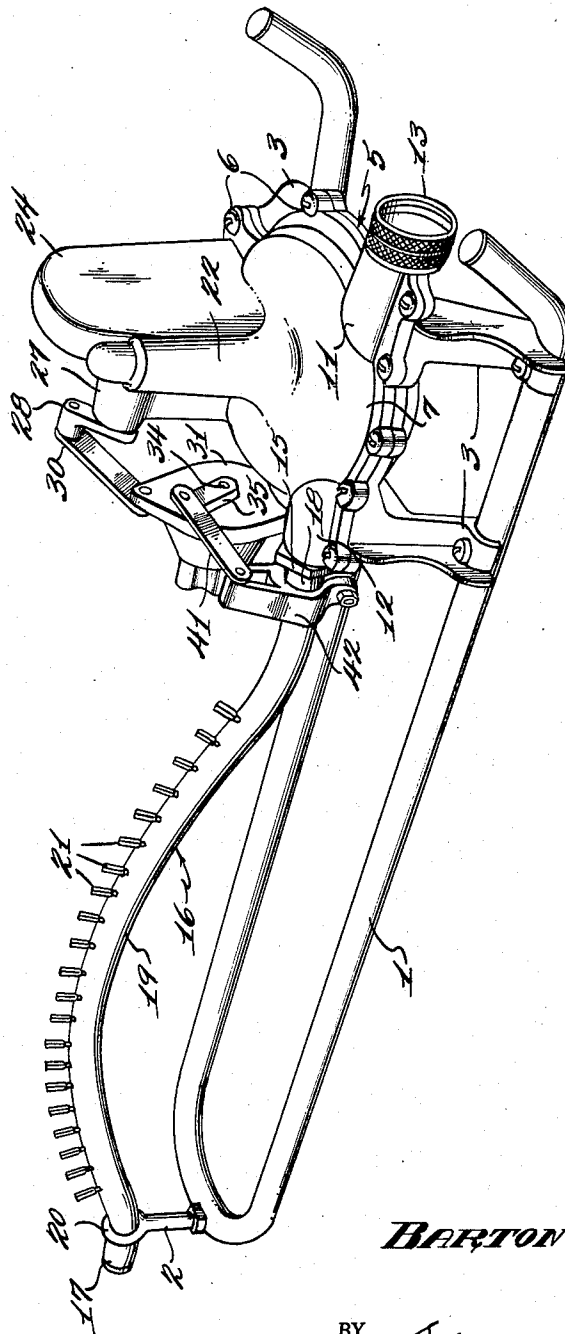
2,945,385

SPRINKLER

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3 Sheets-Sheet 1

Fig. 1.



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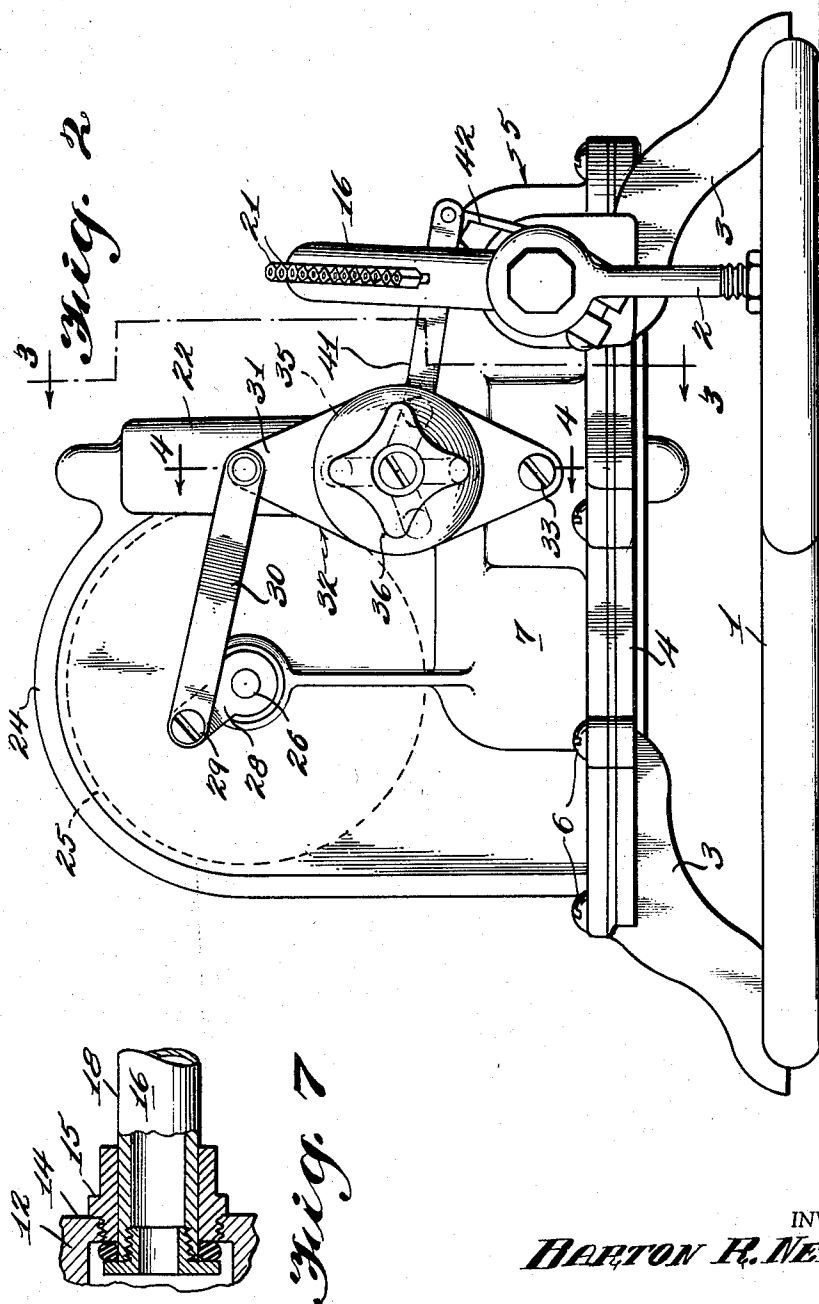
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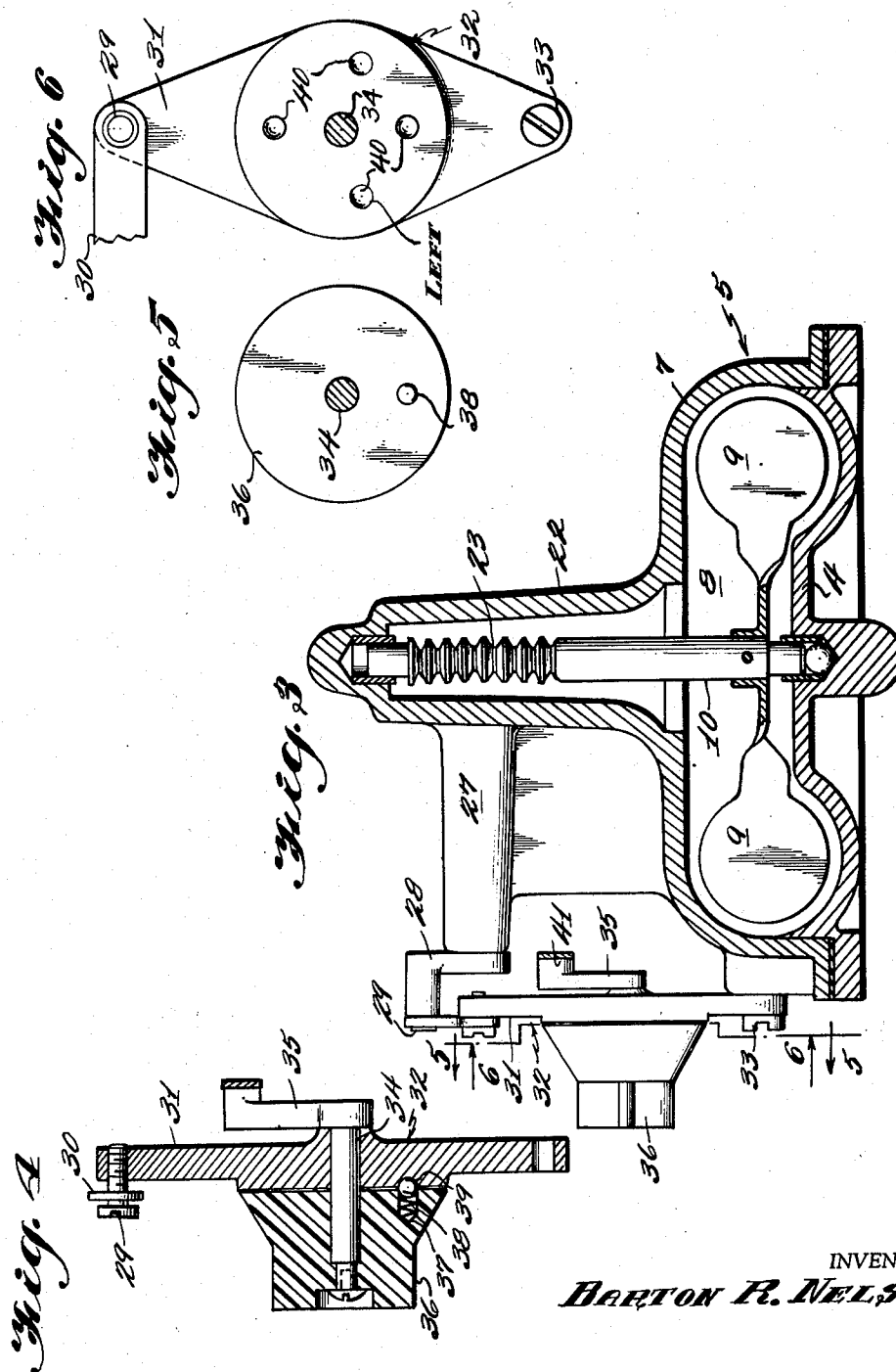
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SPRINKLER

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2 Claims. (Cl. 74—75)

This invention relates to sprinklers and more particularly to wave type sprinklers of the general type disclosed in copending application Serial Number 708,723, filed January 13, 1958, by Walter W. Ballard now Patent No. 8,921,474.

Such sprinklers comprise an elongated, generally horizontally disposed spray pipe mounted for oscillation about a generally longitudinal axis, suitable power means, usually including a water motor connected in series with the spray pipe, being provided to effectuate oscillation of the spray pipe. For versatility of use, it is highly desirable that the sprinkler be so constructed that adjustment can be made to select various ground areas, and various locations thereof with respect to the sprinkler, to be watered by the sprinkler. As disclosed in said copending application of Walter W. Ballard, it is advantageous to be able to adjust the sprinkler to select, for example, a narrow area centered on the sprinkler, a wide area centered on the sprinkler, an area lying to the left of the sprinkler or an area lying to the right of the sprinkler.

In said copending application, such adjustment is made possible by providing an adjustable drive linkage between the oscillatable spray pipe and the rotary drive shaft of the water motor, the adjustment of the drive linkage being accomplished by means of a manually operable adjusting knob mounted on a lever fixed to the spray pipe. The present invention provides adjusting means of this same general type characterized by the fact that the adjusting mechanism is mounted on a stationary portion of the sprinkler removed from and independent of the oscillatable spray pipe. The present invention thus accomplishes the same advantageous results as the device of the aforementioned copending application by providing a novel sprinkler adjusting mechanism differently oriented with respect to the working parts of the sprinkler.

In order that the invention can be understood in detail, reference is had to the accompanying drawings, which form a part of this specification, and wherein:

Fig. 1 is a view in perspective of a wave type sprinkler constructed in accordance with one embodiment of the invention;

Fig. 2 is an end elevational view of the device of Fig. 1, viewing the device from the free end of the spray pipe;

Fig. 3 is a vertical sectional view, with some parts shown in elevation, taken on the line 3—3, Fig. 2;

Fig. 4 is a longitudinal vertical sectional view, on enlarged scale, taken on the line 4—4, Fig. 2;

Fig. 5 is a transverse vertical sectional view taken on the line 5—5, Fig. 3;

Fig. 6 is a transverse vertical sectional view taken on the line 6—6, Fig. 3;

Fig. 7 is a detail sectional view illustrating one manner in which the input end of the spray pipe can be connected in fluid-conducting relationship to the water motor housing, and

Fig. 1 is reduced in scale as compared to Figs. 2 and 3.

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Referring now to the drawings in detail, and first to Figs. 1-3 thereof, it will be seen that the embodiment of the invention here illustrated comprises a base member 1 provided at its forward end with an upright support member 2. At the opposite end of the base member 1, there are secured thereto the legs 3 of the bottom member 4 of a water motor housing 5.

Secured to the member 4 in fluid-tight relation, as by screws 6 and an intermediate gasket, is an upper housing member 7. The members 4 and 7 cooperate to define a generally circular chamber 8, Fig. 3, for the horizontal water wheel 9 of the driving motor, the water wheel 9 being carried by a vertical shaft 10, the ends of which are bearinged in any suitable manner in members 4 and 7, respectively.

The members 4 and 7 are provided with suitable tubular extensions 11 and 12 communicating with chamber 8. The inlet extension 11 is provided with a suitable female coupling element 13 for connection to a garden hose or other suitable supply of water under pressure. The outlet extension 12 terminates in an intumed annular shoulder 14, Fig. 7, which is suitably threaded to receive the plain bearing 15 for the input end of the spray pipe 16. Thus, during operation, water flows through inlet extension 11, into chamber 8, and thence into the input end of the spray pipe 16. It will be noted that the extensions 11 and 12 are aligned so that there is a tendency for the water flow to concentrate along a line displaced from the center of the water wheel, and the water flowing to the spray pipe thus effectively drives the water wheel.

The ends 17 and 18 of the spray pipe 16 constitute straight, coaxially aligned portions, and these are joined by the curved intermediate portion 19 which, as seen in Fig. 1, forms the major portion of the length of the spray pipe. Forward end 17 of the spray pipe is journaled in ring bearing 20 on support 2. Thus, the spray pipe is mounted for oscillation about a longitudinal axis defined by the end portions of the spray pipe. The spray pipe is provided with longitudinally spaced outlet nozzles 21 disposed so that the spray pipe will project a multiplicity of fine, divergent streams of water.

At its center, the top housing member 7 is provided with a vertical tubular extension 22 enclosing the upper portion of shaft 10, which upper portion constitutes a worm 23. The top housing member also includes a second vertical extension 24, having a generally rectangular transverse cross-section and disposed radially with respect to extension 22. The interior of extension 24 communicates with the interior of extension 22 adjacent worm 23 and encloses a worm gear 25 as indicated in dotted lines in Fig. 2, the worm gear 25 meshing with the worm 23. The worm gear 25 is fixed to a drive shaft 26 journaled in the walls of the extension 24 and supported by a forwardly extending boss 27 formed integrally with the front wall of the extension 24.

At its forward end, the drive shaft has rigidly fixed thereto a crank 28. A screw 29, Figs. 2 and 3, is threaded into the end of crank 28 and has a smooth shank extending through a circular hole in one end of a connecting rod 30, so that such end of the connecting rod is pivotally connected to the crank. The other end of the connecting rod 30 is similarly pivoted to the outer end portion 31 of an upright motion transfer lever in the form of a plate 32 pivoted, as by screw 33, on the upper housing member 7.

It will be noted that the plate 32 is disposed at right angles to the axis about which the spray pipe 16 oscillates, and that the plate is located between the spray pipe and the drive shaft 26. As seen in Fig. 4, there extends through a suitable bore in the plate 32 a shaft 34

which extends parallel to the drive shaft 26 and the axis of the spray pipe. To the rear of the plate, the shaft 34 has fixed thereto a lever member 35. Forwardly of the plate, there is fixed to the shaft 34 an adjusting knob 36. Thus, the lever member 35 is pivoted with respect to the plate 32 and the angular relationship between the lever member and the plate can be adjusted by manipulation of the knob 36.

As seen in Figs. 4 and 5, the knob 36 is provided with a bore 37 extending parallel to the shaft 34 and open at the rear face of the knob. Disposed in the bore 37 is a detent ball 38 urged outwardly by a compression spring 39 seated in the bore. On its forward face, the plate 32 is provided with a plurality of recesses 40 spaced in a circle concentric with the shaft 34, the radial distance between the recesses 40 and the axis of the shaft 34 being equal to the distance between the axis of the shaft 34 and the bore 37 in the knob 36. Accordingly, rotary adjustment of the knob 36 causes the detent ball 38 to successively engage the recesses 40, and the combination just described is effective to retain the knob 36, and therefore the lever 35, in any of several angular dispositions manually selected by manipulation of the knob.

At its outer end, the lever member 35 is pivoted to one end of a second connecting rod 41. The other end of the connecting rod 41 is pivoted to the outer end of a lever 42 which is rigidly secured to the spray pipe 16. It will thus be noted that rotary motion of the drive shaft 26 is converted to oscillatory motion of the lever 42 and therefore of the spray pipe, the extent of the oscillation of the spray pipe depending upon the angular relation between the plate 32 and the lever member 35.

As the drive shaft turns, the plate 32 oscillates, about screw 33, through an angle determined by the length of the crank 28, the length of the connecting arm 30, and the distance between the center of screw 33 and the pivotal connection between the connecting rod 30 and the plate 32. Such oscillatory movement is imparted to the spray pipe via the combination of the lever member 35 and the connecting rod 41. The lever member 35, in effect, provides a means for adjusting the pivot point for the connecting rod 41 to any of a plurality of locations spaced in a circle about an axis extending through the plate 32 between screw 33 and the pivotal connection between connecting rod 30 and the plate. Proper selection of such adjustment selects not only the extent of the angle of oscillation of the spray pipe but also the location for such oscillation. Thus, by manipulation of the knob 36, the spray pipe can be caused to oscillate through an angle centered on a vertical line, or on a line directed to the left or right of the pipe.

When the adjustment is as shown in solid lines in Fig. 2, the spray pipe will be oscillated in a manner to direct the spray to the right of the sprinkler, viewing the same as in Fig. 2. If knob 36 is manipulated to engage the ball 38 in the hole 40 labelled "Left" in Fig. 6, the operation will then be such as to cause the spray to be directed to the left of the sprinkler. Adjustment of the knob to engage the ball in one of the two remaining holes 38 will cause the spray to be centered on the sprinkler, either cov-

ering a wide or a narrow ground area, as the case may be.

To facilitate manual adjustment of the sprinkler, the knob 36 can be provided with suitable calibrating indicia, such as the words "Left," "Right," "Full" and "Center," properly positioned to be registered with a mark on the face of the plate 32 when ball 38 is engaged in the corresponding one of the holes 40.

I claim:

1. Linkage mechanism operatively connecting a driven shaft and a member oscillatable about an axis parallel with the axis of said driven shaft and in laterally spaced relation thereto; comprising an elongated motion transfer lever disposed between said driven shaft and said oscillatable member and having one end thereof pivoted on a fixed axis, a crank secured to said driven shaft, a connecting rod having one end thereof pivotally connected to said crank and the other end thereof pivotally connected to the other end of said motion transfer lever, a shaft rotatably supported by said motion transfer lever intermediate the ends thereof in parallel relation to said axis of said driven shaft and the axis of said oscillatable member, a lever member having one end thereof secured to said last named shaft at one side of said motion transfer lever, an adjusting knob secured to said last named shaft at the opposite side of said motion transfer lever, for adjusting said lever member about the axis of said last named shaft, a lever having one end thereof secured to said oscillatable member and a second connecting rod having one end thereof pivotally connected to said lever member and the other end thereof pivotally connected to the opposite end of said oscillatable member engaging lever.

2. Linkage mechanism according to claim 1, wherein said motion transfer lever is provided with a circumferential series of recesses disposed concentrically of the axis of said shaft rotatably supported by said motion transfer lever, said adjusting knob being provided with a bore whose axis is parallel with the axis of said shaft rotatably supported by said motion transfer lever, and spaced therefrom a distance equal to the radius of said circumferential series of recesses, a detent ball movably supported in said bore and adapted for selective seating in said recesses, and means disposed in said bore engaging said detent ball for urging same into said recesses with corresponding rotatable movement of said lever member.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,945,385

July 19, 1960

Barton R. Nelson

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 19, for the patent number "8,921,474" read
-- 2,921,474 --.

Signed and sealed this 31st day of January 1961.

(SEAL)

Attest:

KARL H. AXLINE
Attesting Officer

ROBERT C. WATSON
Commissioner of Patents