

Jan. 15, 1963

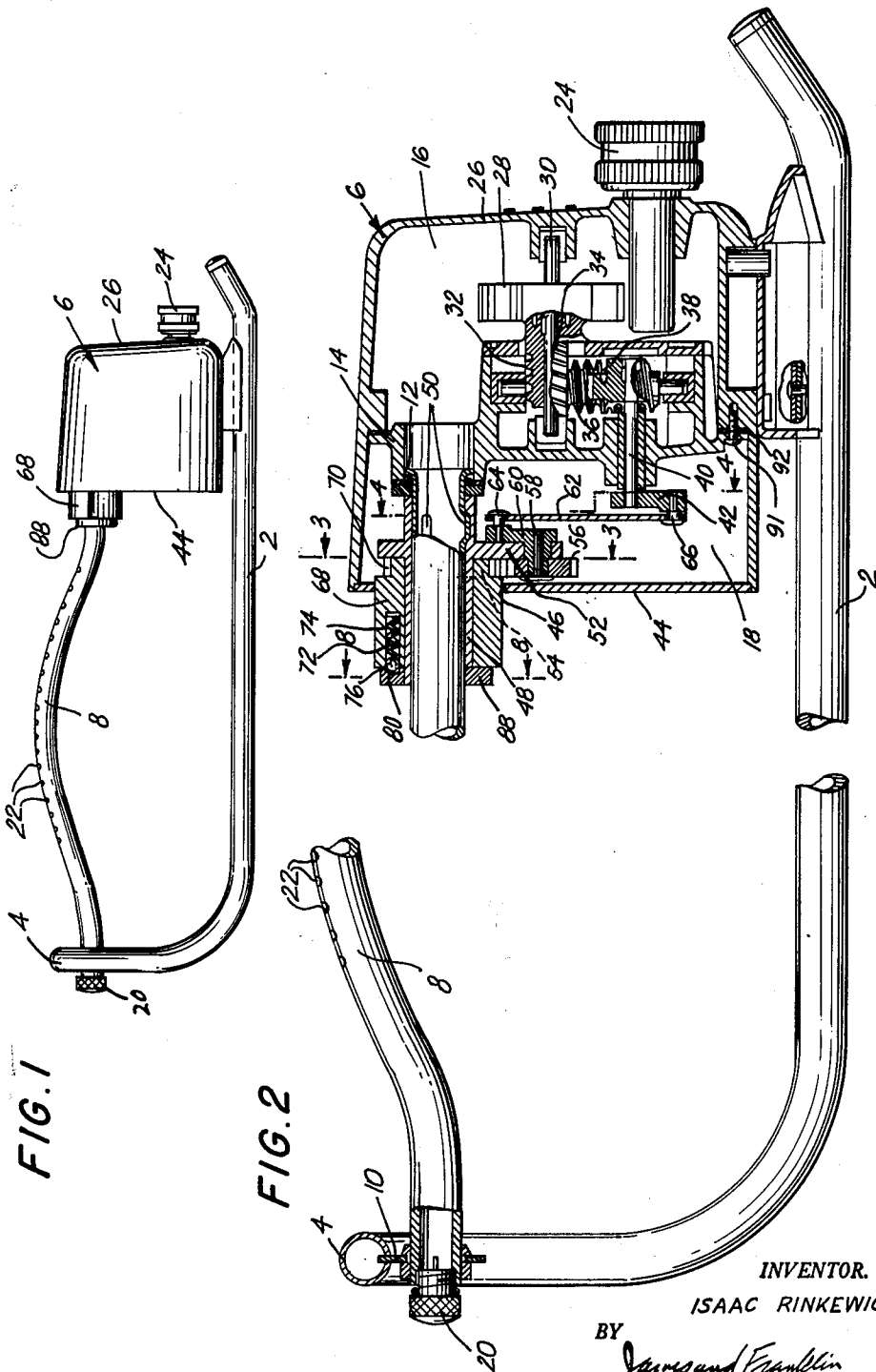
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3,073,532

ADJUSTABLE OSCILLATING LAWN SPRINKLER

Filed Aug. 31, 1960

2 Sheets-Sheet 1



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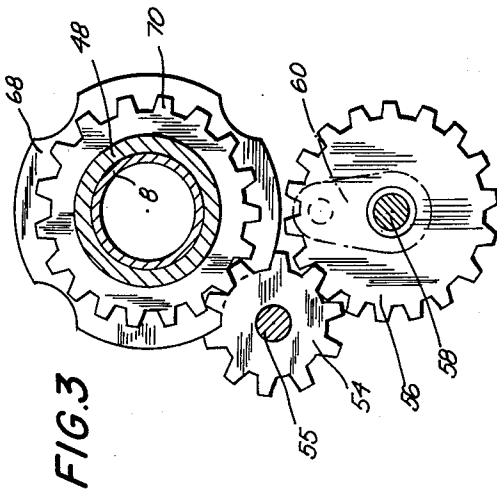
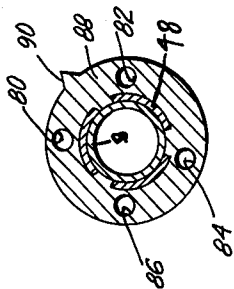
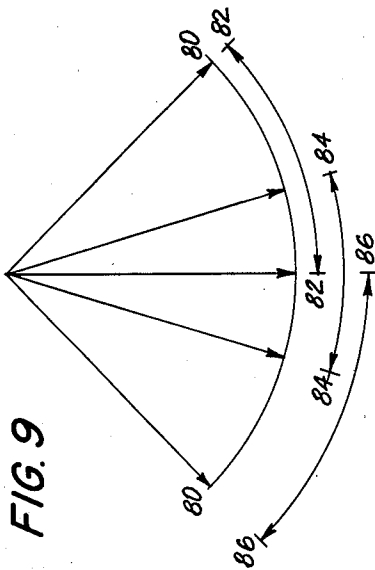


FIG. 7

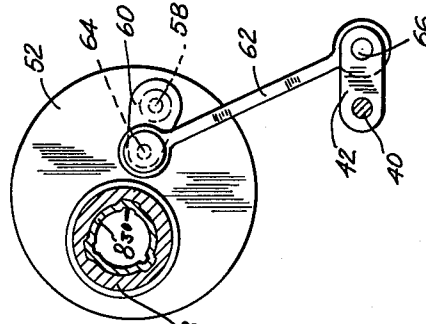


FIG. 6

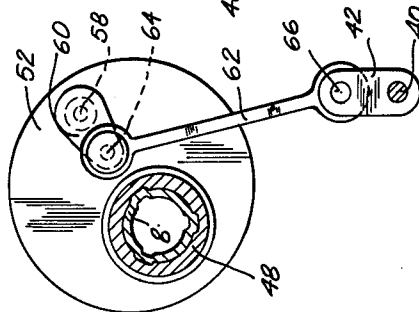


FIG. 5

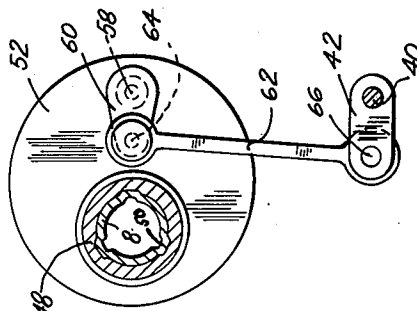
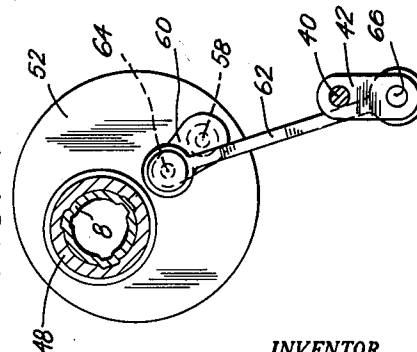


FIG. 4



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ADJUSTABLE OSCILLATING LAWN SPRINKLER
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10 Claims. (Cl. 239-242)

The present invention relates to an oscillating lawn sprinkler in which means are provided for controlling both the angular location and angular extent of the sprinkler unit, thereby to control the area sprinkled thereby.

Oscillating lawn sprinklers comprise a sprinkler unit to which water is fed and from which water is ejected, the unit being driven in oscillation about an axis, thus distributing the sprinkled stream of water over an appreciable area. In most cases, and as here specifically disclosed, the driving means for the sprinkling unit is powered by the water which is fed to the sprinkler unit itself. In the past sprinklers of this type have been provided with means for adjustably controlling the oscillating movement of the sprinkler unit in order to vary the area sprinkled thereby. The adjustment mechanisms involved have comprised linkages interposed between the driving means and the sprinkler unit, the parts of which can be relatively adjustably positioned. These linkages were necessarily exposed in order to permit adjustment thereof, and the adjustment is effected at a point remote from the sprinkler unit itself.

Several disadvantages inhere in that type of arrangement. The linkages must be exposed in order to make them accessible for manual adjustment, but in being exposed they impart to the sprinkler a cluttered and unattractive appearance. Because the linkage is exposed it is subject to damage through mishandling, and it is further subject to deterioration through exposure to the sprinkled water and to dirt. Because the parts of the linkage which are moved to effect the adjustment are remote from the sprinkler unit itself the correlation of linkage adjustment to area sprayed is rather complex in nature and often confusing to the user, and in addition the point of adjustment is often relatively inaccessible. In addition, it has been found that when the particular part that is moved to effect adjustment of the linkage is itself a part of that linkage, the force exerted thereon in carrying out the adjustment often results in damage to the individual links and to the joints between the links.

It is a primary object of the present invention to provide an oscillating lawn sprinkler which is not subject to the above disadvantages. To that end the adjustable linkage is adapted to be completely enclosed within the housing on which the sprinkler unit is mounted and which contains the driving means for the sprinkler unit and the means for conveying water thereto. An adjustment means is mounted on the sprinkler element, preferably in a concentric manner, for movement therewith, that adjustment means extending into the housing and being operatively connected to the adjustable driving linkage. In this way a very convenient dial-type control is provided which is readily accessible for manipulation and which is easily manipulated to produce the desired type of sprinkling action. Since the adjustable linkage is itself contained within the housing, it is protected against damage and deterioration. The sprinkler presents a neat and uncluttered appearance, permitting the application thereto of modern designs, and there are no visible mechanical parts which detract therefrom.

More specifically, the linkage between the sprinkler unit and the driving means includes an arm normally movable with the sprinkler unit but pivotally adjustable

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relative thereto, the arm being connected, at a point remote from the axis about which it is pivotally adjustable, to a linkage connecting it with the driving means. The adjustment means is also mounted on the sprinkler unit, is normally movable therewith as it oscillates, and is adjustably positionable relative thereto. The adjustment means is operatively connected to the aforementioned arm so that as the adjustment means is positioned relative to the sprinkler unit, the arm is correspondingly positioned. Different positions of the arm will vary both the angular extent of oscillation of the sprinkler unit and the angular location of the oscillatory sector relative to the axis about which the sprinkler unit pivots. A detent means is active upon the adjustment means, and through that adjustment means upon the arm, to releasably retain those elements in their adjusted position. Thus the relative position of the adjustment means relative to the sprinkler unit will determine the nature of the oscillatory movement of the unit. Selection of a desired type of oscillation can be facilitated by providing cooperating indicia on the exposed portion of the adjustment means and on the sprinkler unit.

Through the use of the arrangement of the present invention an inexpensive oscillating mechanism is provided which is considerably more sturdy and reliable than the structures of the prior art.

To the accomplishment of the above, and to such other objects as may hereinafter appear, the present invention relates to an oscillating lawn sprinkler having adjustable mechanism for moving the sprinkler unit in oscillation, as defined in the appended claims, and as described in this specification, taken together with the accompanying drawings, in which:

FIG. 1 is a side elevational view of a preferred embodiment of the present invention;

FIG. 2 is a fragmented view of the sprinkler of FIG. 1 on an enlarged scale, certain parts thereof being broken away and cross sectioned;

FIG. 3 is a cross-sectional view taken along the line 3-3 of FIG. 2;

FIGS. 4-7 are progressive views showing the manner in which the sprinkler unit is oscillated by the driving means for one of the operative positions of the adjustable arm carried by the sprinkler unit;

FIG. 8 is a cross-sectional view taken along the line 8-8 of FIG. 2; and

FIG. 9 is a graphical representation of the different types of oscillatory movement of the sprinkler unit for different operative positions of the adjustable arm carried thereby.

As here disclosed the oscillating lawn springler of the present invention comprises a base 2 in the form of tubular skids connected to one another at one end by a raised portion 4 and having a housing 6 mounted thereon at the other end. The sprinkler unit itself is in the form of a tube 8 pivotally mounted at one end in plate 10 carried by the raised portion 4 of the base 2 and pivotally mounted at its other end, at 12, in wall 14 which divides the housing 6 into chambers 16 and 18. The left hand end of the tube 8, as viewed in FIGS. 1 and 2, is closed by plug 20, its right hand end is open to the chamber 16, and it is provided along its length with a plurality of apertures 22 through which water can escape. A fitting 24 extends through the rear wall 26 of the housing 6 into the chamber 16, the fitting 24 being adapted to have a hose attached thereto, water passing through the fitting 24 being directed against the waterwheel 28 rotatively mounted within the chamber 16 on shaft 30. A worm 32 rotates with the waterwheel 28, and is operatively connected, by means of a worm wheel 34 and a second worm 36, with worm wheel 38 mounted on shaft 40. The shaft 40 is journaled in the wall 14, sealingly extends

therethrough into the chamber 18, and there has a crank arm 42 made fast thereon.

The front wall 44 of the housing 6, which defines the left side of the chamber 18, is provided with an aperture 46 through which the tube 8 extends with appreciable clearance. Mounted on the tube 8 where it passes through the front housing wall 44 is a sleeve 48 which is made fast with the tube 8 so as to rotate therewith as by means of the key areas 50. That portion of the sleeve 48 which is received within the chamber 18 carries a plate 52 on which meshing gears 54 and 56 are mounted, the gear 54 being mounted on shaft 55 and the gear 56 being fast on shaft 58 which extends through the plate 52. Arm 60 is fast on the shaft 58 and is located on the opposite face of the plate 52 from the gear 56. A link 62 is pivotally connected to the arm 60 at 64, and is pivotally connected to the crank arm 42 at 66.

Mounted on that portion of the sleeve 48 which passes through the aperture 46 in the housing wall 44 is an adjustment member 68, which may be in the form of a plastic sleeve. It passes fairly snugly through the aperture 46 but is freely rotatable therein. It is provided on that portion thereof within the chamber 18 with gear teeth 70 which mesh with the gear 54. That portion thereof which is exposed outside the housing wall 44 is provided with an axially inwardly extending aperture 72 within which spring 74 and detent ball 76 are housed, the detent ball 76 selectively cooperating with apertures 80, 82, 84 and 86 formed on the facing surface of a ring 88 fixedly secured to the sleeve 48. The ring 88 may be provided with an index pointer 90 adapted to cooperate with indicia appropriately located on the adjustment member 68 and sequentially movable into registration with the index marker 90 as the adjustment member 68 is moved relative to the sleeve 48 and the sprinkler tube 8 from one detented selection position to another.

The wall 14 which subdivides the housing 6 into the chambers 16 and 18 is held in place by a plurality of screws 91 or other appropriate securing means, and packing 92 is interposed between the wall 14 and the outer portion of the housing 6 in order to seal the chambers 16 and 18 from one another and thus prevent the water which flows through the chamber 16 from entering the chamber 18.

When the sprinkler is to be used a hose is connected to the fitting 24, and when water is caused to pass through that hose it enters the housing chamber 16, moves into the pipe 8, and is expelled from the openings 22 therein in the form of a fine stream or spray. The water, in moving from the fitting 24 to the tube 8, is forced over the waterwheel 28, thus driving the crank arm 42 in rotation. The linkage defined by the link 62 and the arm 60 causes the plate 52 to oscillate, the sprinkler tube 8 and the adjustment member 68 oscillating therewith. The oscillation of the tube 8 causes the angular position of the holes 22 to vary about the axis of rotation of the tube 8, thereby directing the stream of water emanating therefrom over a predetermined area of the ground on which the sprinkler rests.

The crank arm 42 driven by the water wheel 28 rotates uniformly, at a speed determined by the rate of flow of water through the hose. It is desired, however, to be able to adjust the oscillatory movement of the tube 8. This is accomplished, according to the present invention, by shifting the position of the arm 60 relative to the plate 52. The arm 60 is connected, by means of shaft 58, gear 56, and gear 54, to the adjustment member 68. As a result shifting of the relative position of the adjustment member 68 with respect to the sprinkler tube 8 will result in a corresponding shift in the position of the arm 60 relative to the sprinkler tube 8, the cooperating selection positions of the adjustment means 68 and the operative positions of the arm 60 being determined by the cooperation between the spring urged detent ball

76 and the apertures 80—86 associated therewith. For example, when the adjustment member 68 is so positioned relative to the sprinkler tube 8 that the detent ball 76 is in the aperture 80, the arm 60 may assume a corresponding operative position here shown as extending from the axis of its shaft 58 toward the axis of rotation of the sprinkler tube 8 (it will be appreciated that this position is selected merely for purposes of illustration). With this position of the arm 60 relative to the tube 8, as the crank arm 42 is rotated clockwise from its position shown in FIG. 4 through its positions shown in FIGS. 5 and 6 to its position shown in FIG. 7, the plate 52, with respect to which the arm 60 is held stationary, will be driven in oscillation, and the sprinkler tube 8 fixed thereto will be correspondingly oscillated. For the particular position of the arm 60 shown in FIGS. 4-7 the plate 52 and tube 8 will be oscillated through an angle of approximately 90 degrees, the tube 8 being so oriented relative to the plate 52 that this oscillation takes place 45 degrees to either side of a vertical plane through the axis of oscillation of the tube 8.

If now that portion of the adjustment member 68 which extends out beyond the front wall 44 of the housing 6 is grasped and rotated relative to the sprinkler tube 8 so that the detent ball 76 moves out of the opening 80 and into the opening 82, the arm 60 will be rotated relative to the plate 52, about the axis of the shaft 58, to a position approximately 90 degrees clockwise from its position shown in FIG. 4. With the arm 60 in that operative position a complete rotation of the crank arm 42 will impart an oscillatory movement to the plate 52 which has an arcuate extent of approximately 45 degrees and which is substantially the same as the left hand half of the arcuate movement of the plate 52 shown in FIGS. 4-7.

If the adjustment member 68 is again rotated relative to the tube 8 so that the detent ball 74 enters the opening 84, the arm 60 will assume a position relative to the plate 52 approximately 180 degrees clockwise from the position shown in FIG. 4. For this position of the arm 60 the plate 52, and hence the sprinkler tube 8, will be oscillated over an arc considerably smaller than that shown in FIGS. 4-7, such as approximately 30 degrees, but substantially centered relative thereto.

If the adjustment member 68 is further rotated relative to the sprinkler tube 8 so that the detent ball 76 enters the apertures 86, the arm 60 will be rotated clockwise for approximately another 90 degrees, now extending to the left from the axis of the shaft 58 as viewed in FIG. 4, and for this position of the arm 60 relative to the plate 52 and the sprinkler tube 8 will be oscillated over an approximately 45-degree arc approximately corresponding to the right hand half of the arc of oscillation disclosed in FIGS. 4-7.

Thus the detent apertures 80, 82, 84 and 86 will correspond respectively to a full oscillation of the tube 8 to either side of a vertical plane passing through the axis of oscillation of the tube 8, an arc extending substantially only to the left of that vertical plane, an arc of restricted extent substantially centered with respect to that vertical plane, and an arc extending substantially only to the right of said vertical plane. These arcs are illustrated diagrammatically in FIG. 9, the numbers at the ends of the arcuate arrows in that figure corresponding to the detent apertures respectively associated therewith.

It will be understood, of course, that once the adjustment member 68 has been moved to any given selective position relative to the sprinkler tube 8 it will thereafter oscillate with the sprinkler tube 8, the detent action on the adjustment member 68 which normally holds it in position relative to the sprinkler tube 8 also causing the arm 60 to remain in its adjusted position relative to the tube-carried plate 52.

The adjustable linkage which permits controlled variation in the oscillation of the sprinkler tube 8 is contained within the housing 6, and therefore is protected from in-

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jury, from the spray which emanates from the sprinkler, and from dirt and the like. The wall 14 within the housing 6, together with the packing 92, insulates it from the water which is fed to the sprinkler tube 8. It therefore will remain in efficient condition, will be secured against mishandling, and will be protected against harm of any kind. The only element which is exposed for manual manipulation, the sleeve member 68, is supported by the tube 8 and by the sleeve 47 so that it can only be manipulated in proper manner, to wit, rotation about the sleeve 48. The particular type of manipulation to which it is susceptible is convenient, and very easily and intelligibly related to the type of oscillating movement desired for the sprinkler tube 8, as by the visual cooperation between the index marker 90 on the ring 88 and the appropriate indicia inscribed on the sleeve and adapted to be brought into registration with the index marker 90 for each of the detent-controlled selection positions of the member 68. The parts are sturdy, need not be manufactured to any high degree of precision, and are readily available. The housing 6 may be designed as desired, the adjustment member 68 may have an appearance cooperating with the design of the housing 6, and the mechanical connections which cause the sprinkler tube 8 to oscillate are hidden from view and therefore will not detract from the overall appearance of the sprinkler.

It will be appreciated that the precise operative positions of the arm 60 relative to the plate 52 in order to produce the types of oscillation above set forth will be determined by the relative locations of the various parts of the linkage and that the arcuate extent and precise rotational positions of the arcs of oscillation will be determined by the relative lengths of the arms 42 and 60 and the link 62, all in accordance with elementary design considerations.

While but a single embodiment of the present invention has been here specifically disclosed, it will be apparent that many variations may be made therein, all within the spirit of the invention as defined in the following claims.

I claim:

1. In a lawn sprinkler comprising a base, a unit pivotally mounted on said base, driving means for said unit, and an operative connection including an adjusting means between said driving means and said unit for causing said unit to pivot in a controllably adjustable manner; the improvement which comprises a housing connected to said base, an element connected to said unit and extending into said housing, said adjusting means mounted concentrically on said element, adjustably rotatable relative thereto and received at least in part in said housing, said driving means being in said housing, said adjusting means being operatively connected to said driving means for varying the pivotal movement of said unit in accordance with the rotative position of said adjusting means relative to said element.

2. The oscillating lawn sprinkler of claim 1, in which said driving means comprises a rotated driving member connected by link means to a part operatively connected to said unit, normally fixed relative thereto, but movable relative thereto between a plurality of operating positions, said operating connection between said adjustment means and said driving means comprising means operatively connected between said adjustment means and said part for selectively locating said part in a desired one of its operating positions.

3. The oscillating lawn sprinkler of claim 2, in which said part is operatively connected to said unit and is rotatable about an axis relative to said unit between its operating positions and is pivotally connected to said link means at a point remote from said axis, said means operatively connecting said adjustment means and said part causing rotation of said part about said axis upon movement of said adjustment means relative to said unit.

4. In a lawn sprinkler comprising a base, a unit pivot-

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ally mounted on said base, driving means for said unit, and an operative connection including an adjusting means between said driving means and said unit for causing said unit to pivot in a controllably adjustable manner; the improvement which comprises a housing connected to said base, an element connected to said unit and extending into said housing, said adjusting means mounted on said element adjustably positionable relative thereto, in part extending beyond and in part received in said housing, said driving means being in said housing, said adjusting means being operatively connected to said driving means for varying the pivotal movement of said unit in accordance with the positioning of said adjusting means relative to said element.

5. The oscillating lawn sprinkler of claim 4, in which said driving means comprises a rotated driving member connected by link means to a part operatively connected to said unit, normally fixed relative thereto, but movable relative thereto between a plurality of operating positions, said operating connection between said adjustment means and said driving means comprising means operatively connected between said adjustment means and said part for selectively locating said part in a desired one of its operating positions.

6. The oscillating lawn sprinkler of claim 5, in which said part is rotatable about an axis relative to said unit between its operating positions and is pivotally connected to said link means at a point remote from said axis, said adjustment member being rotatable relative to said unit, said means operatively connecting said adjustment means and said part causing rotation of said part about said axis upon rotation of said adjustment means relative to said unit.

7. In a lawn sprinkler comprising a base, a unit pivotally mounted on said base, driving means for said unit, and an operative connection including an adjusting means between said driving means and said unit for causing said unit to pivot in a controllably adjustable manner; the improvement which comprises a housing connected to said base, an element connected to said unit for movement therewith and extending into said housing, said adjusting means mounted concentrically on said element, adjustably rotatable relative thereto, and in part extending beyond and in part received in said housing, said driving means being in said housing, said adjusting means being operatively connected to said driving means for varying the pivotal movement of said unit in accordance with the rotative position of said adjusting means relative to said element.

8. The oscillating lawn sprinkler of claim 7, in which said driving means comprises a rotated driving member connected by link means to a part operatively connected to said unit, normally fixed relative thereto, but movable relative thereto between a plurality of operating positions, said operating connection between said adjustment means and said driving means comprising means operatively connected between said adjustment and said part for selectively locating said part in a desired one of its operating positions.

9. The oscillating lawn sprinkler of claim 8, in which said housing has a pair of chambers water-sealed from one another, one of said chambers defining a flow path for water to said unit, said adjustment means, said rotated driving member, said link means, said part operatively connected to said unit, and said means operatively connected between said adjustment means and said part being located in the other of said chambers.

10. The oscillating lawn sprinkler of claim 8, in which said part is rotatable about an axis relative to said unit between its operating positions and is pivotally connected to said link means at a point remote from said axis, said adjustment member being rotatable relative to said unit, said means operatively connecting said adjustment means and said part causing rotation of said part about said

axis upon rotation of said adjustment means relative to said unit.

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