July 31, 1956 H. G. HOLMES 2,757,046

ROTARY GARDEN SPRINKLER

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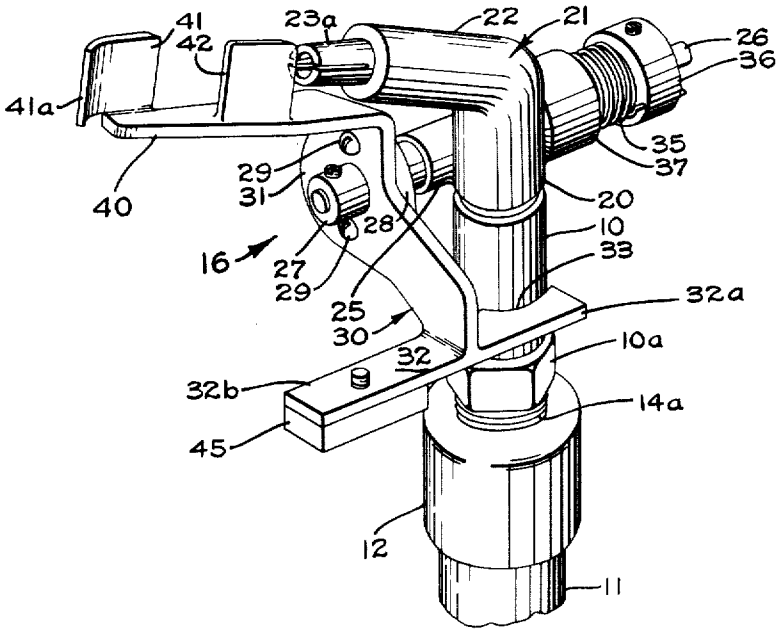


FIG_1

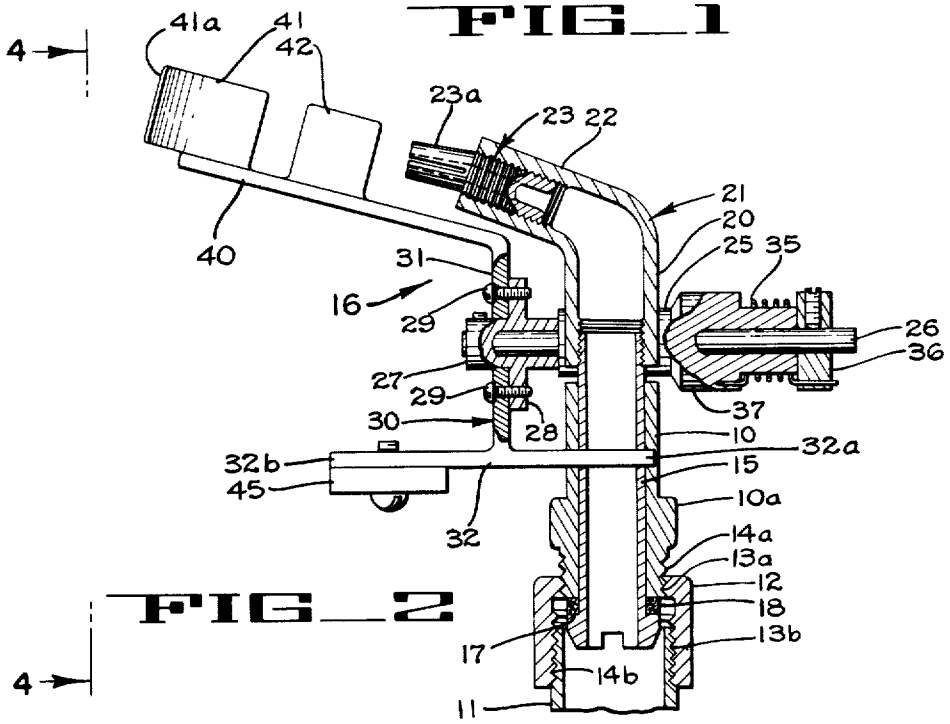


FIG_2

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FIG_3

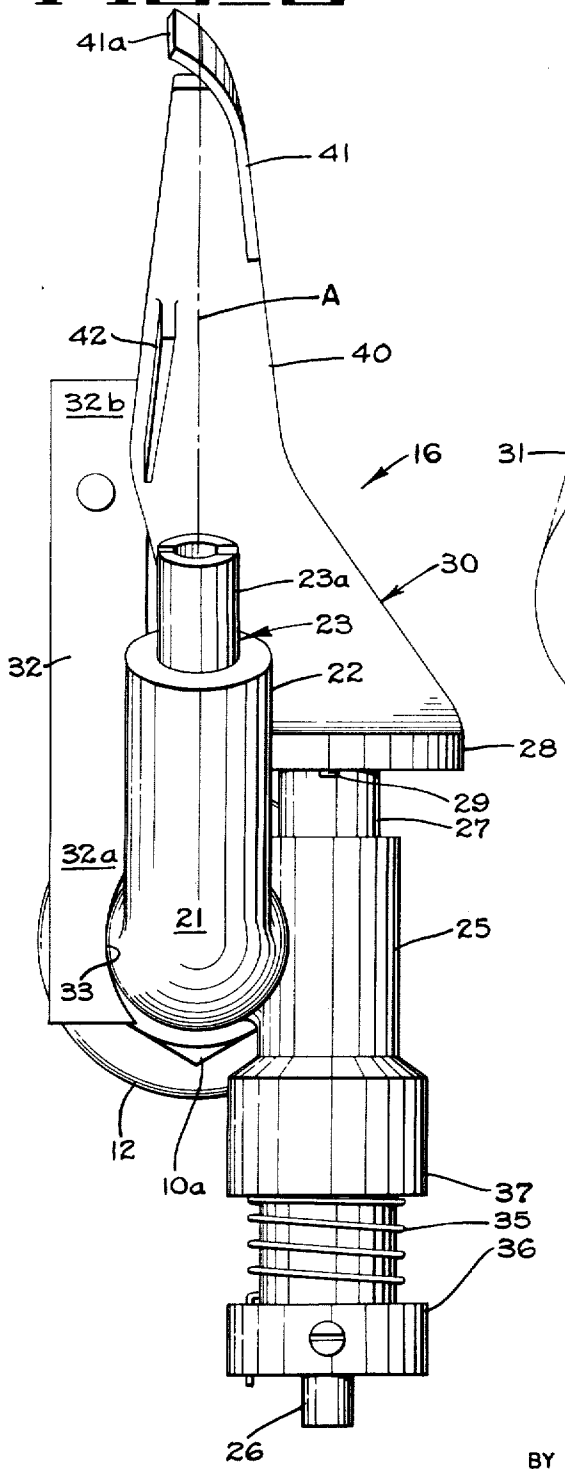
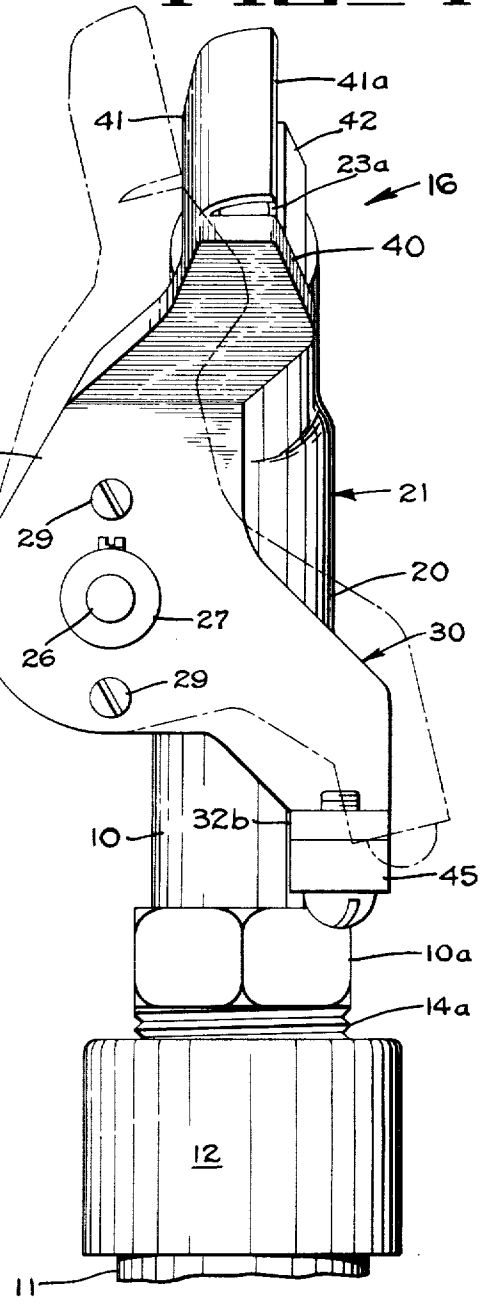



FIG_4

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2,757,046

# ROTARY GARDEN SPRINKLER

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5 Claims. (Cl. 299—69)

The present invention relates to self-propelling rotary garden sprinklers of the type wherein the force of the water jet ejected from the sprinkler nozzle is employed to impart to said nozzle a stepwise rotary movement about a vertical axis.

It is an object of the present invention to provide a rotary garden sprinkler, of the type referred to, that is simple in construction and dependable in operation.

Another object is to provide a garden sprinkler, of the type referred to, whose rotary movement occurs uniformly in one direction.

Still another object is to so arrange a sprinkler, of the type referred to, as to avoid any backlash in the rotary movement of its nozzle.

An additional object of the invention is to so arrange a sprinkler, of the type referred to, that continuity of its rotary advance is assured, and any tendency of its relatively rotatable components to bind is effectively counteracted.

Still another object is to provide a garden sprinkler, of the type referred to, which spreads practically all the ejected water in a substantially horizontal direction with a minimum of upward deflection, such as might wet the foliage of bushes or trees.

These and other objects of the present invention will be apparent from the following description of the accompanying drawings which illustrate a preferred embodiment thereof and wherein:

Fig. 1 is a perspective of a garden sprinkler embodying my invention.

Fig. 2 is a vertical section through the sprinkler and the water supply conduit upon which it is mounted.

Fig. 3 is an enlarged plan view of the sprinkler.

Fig. 4 is an enlarged elevation of the sprinkler viewed from a point in front of its spray nozzle orifice, i. e. in the direction of arrows 4—4 in Fig. 2.

Having first reference to Figs. 1 and 2, the sprinkler of my invention comprises a stationary base portion in the form of a tubular socket **10**. During practical use of the sprinkler, said socket **10** is firmly secured to the end of a water supply line which is represented by the vertical pipe **11**. For this purpose a centrally apertured cap **12** may be provided with internal threads **13***a* and **13***b* in its neck and body portion, respectively, which may be engaged with external threads **14***a* and **14***b* provided in the lower end of the socket **10** and the upper end of the pipe **11**, respectively, and the socket **10** may possess an outer collar in the form of a hexnut **10***a* to facilitate tightening of the socket **10** within the cap **12**. Rotatably received within the socket **10** is the tubular stem **15** of the rotary sprinkler head **16**. Said stem **15** is free to slide vertically within the socket **10** but its bottom end is radially extended below the lower end of the socket to form an outwardly directed annular shoulder **17** by means of which the stem **15** is retained within the socket **10**. To establish a desired degree of frictional resistance to the rotation of the stem **15** within the socket **10**, a suitable gasket **18** is interposed between the lower end of the socket **10** and the annular shoulder **17**. During operation of the sprinkler,



said gasket is held under compression between the socket **10** and the shoulder **17** by the force exerted by the upwardly flowing water current upon the extended bottom end of the stem **15**. Securely screwed upon the projecting upper end of the tubular stem **15** is the vertical shank **20** of an elbow pipe or conduit **21**. The other shank **22** of said elbow pipe extends in a radial direction with a slightly upward inclination, and within the open end of said radially extending shank is screwed the jet nozzle **23**. Said nozzle may be of conventional design forming a slotted tubular nipple **23***a* that projects beyond the upper outwardly directed shank of the elbow pipe as shown in both Figs. 1 and 2.

To rotate the sprinkler head **16** within the base **10** during practical performance of the device, a horizontally positioned tubular socket **25** is firmly secured to, or may form an integral part of the vertical shank **20** of the elbow pipe **21**, and rotatably received within said socket is a horizontal shaft **26**. The position of said socket **25** on, and relative to, the elbow pipe **21** is preferably such that said horizontal shaft **26** extends in a vertical plane that is parallel to the vertical plane determined by the two shanks of the elbow tube **21** which latter plane contains the axis of the water jet ejected from the nozzle **23** during operation of the sprinkler. Firmly secured to the forwardly projecting end of the horizontal shaft **26**, i. e., the end pointing in the same direction as the jet nozzle **23**, is a hub **27** which forms a circular disc **28** to which is bolted a rocker **30** as indicated by the screw bolts **29** in Figs. 1 and 2. The rocker **30** comprises an intermediate portion in the form of a plate **31** that lies substantially within a vertical plane extending at right angles to the center axis of the horizontal shaft **26**. Said plate **31** extends downwardly to a level below the upper end of the stationary sprinkler base **10**, and its lower end carries a crossbar **32** which may be an integral part of said plate as shown, and which extends substantially parallel to the horizontal shaft **26** but on the opposite side of the sprinkler head **16** and its socket **10**. The inner arm **32***a* of the crossbar **32** has a concave edge **33** adjacent the tubular socket **10**, and means are provided to yieldably hold the rocker **30** in a position wherein the crossbar **32** bears with said concave edge against the stationary socket **10**. For this purpose, a torsion spring **35** is coiled around the rearwardly projecting portion of the horizontal shaft **26**, with one of its ends attached to a collar **36** that is firmly secured to said shaft, and its opposite end anchored in an abutment **37** that is formed on the tubular socket **25**. Said spring **35** is arranged to urge the shaft **26** in a clockwise direction, as viewed in Figs. 1 and 4 until the crossbar **32** strikes against the stationary sprinkler base **10**, as best illustrated in Fig. 1. The outer arm **32***b* of the crossbar **32** is loaded with a weight **45** for reasons that will presently appear.

At its upper end, the plate **31** is bent in radial direction to form a narrow upwardly inclined shelf **40** of radially converging contour. When the rocker **30** is in its extreme clockwise position as shown in Fig. 1, the shelf is situated a limited distance below the radial shank of the elbow pipe **21** and the center axis of the sprinkler jet ejected from the nozzle **23**, and may extend in a plane of about the same inclination as said center axis. At its far end, the shelf **40** carries a vertically positioned lateral vane **41** located on the same side of the sprinkler jet axis as the horizontal shaft **26** in such a manner as to slant in radial direction toward said sprinkler jet axis which is indicated by a dash-dot line A in Fig. 3. In fact, the remote edge **41***a* of said vane (viewed from the vertical center axis of the sprinkler) is preferably curved inwardly to intersect the path of the sprinkler jet as best shown in Fig. 3. At an intermediate point the shelf **40** carries a second vertically positioned vane **42** which is located

on the same side with respect to the sprinkler jet axis as the stopbar **32**, whenever the rocker is in the extreme clockwise position illustrated in Fig. 1. As best shown in Fig. 3, the plane of said vane **42** is slightly inclined relative to the sprinkler jet such that the remote edge thereof lies closest to the center line A of said jet.

When the supply of water is turned off, the rocker **30** assumes the position illustrated in Fig. 1 under the urgency of the torsion spring **35** and the weight **45** corresponding to the position shown in full lines in Fig. 4. As soon as the water is turned on, however, the jet of water ejected from the nozzle **23** rushes past the intermediate vane **42**, impinges upon the inwardly slanting side wall and the inwardly turned end of the remote vane **41** and is deflected to the left as viewed in Fig. 3 while imparting an oppositely directed moment to said vane **41** and the shelf **40** upon which said vane **41** is mounted. To this moment the described device may respond in a two-fold manner: (1) The total sprinkler head **16** may turn within the stationary socket **10** in a clockwise direction as viewed in Fig. 3, and (2) the rocker **30** may swing in a counterclockwise direction as viewed in Fig. 4 about the center axis of its horizontal shaft **26** to the position illustrated in broken lines in said Fig. 4, which position is dependent upon the weight **45** and the strength of the torsion spring **35** (which oppose the described counterclockwise motion) in relation to the friction established by the gasket **18** between the rotatable stem **15** of the sprinkler head **16** and the stationary sprinkler base **10** (which opposes rotary movement of the former within the latter). By making spring **35** of appropriate strength as compared with the friction between the stem **15** and the base **10**, matters may be arranged in such a manner that the water jet imparts a slight but significant rotary movement in clockwise direction to the total sprinkler head (as viewed in Fig. 3) while counerclockwise rotation of the shelf **40** about the center axis of the shaft **26** (as viewed in Figs. 1 and 4) is restricted to a shallow arc. As the shelf **40** turns in the described manner to withdraw the vane **41** from the impact of the water jet, the torsion spring **35** is tensioned and acts in concert with the weight **45** to restore the rocker **30** to its initial clockwise position; and as the shelf **40** returns to its original position directly below the water jet, the intermediately positioned vane **42**, which is of an inclination opposite to vane **41**, enters the water jet prior to vane **41**, and shields the curved end of said vane momentarily from the full impact of the water jet so that the return movement of the rocker **30** under the force of weight **45** and the urgency of the spring **35** may be completed without interference. In addition, the force of the water jet upon the inclined inner surface of the intermediate vane **42** imparts an added return moment to the rocker **30**, as it returns to its clockwise position, and as a result thereof, the return movement of the rocker is completed with a sudden thrust before the water jet may again fully impinge upon the remote vane **41** and start another cycle in the operation of the sprinkler.

Due to the fact that the stopbar **32** at the lower end of the plate **31** is arranged to come against a stationary component of the sprinkler, namely, its stationary base **10**, the return movement of the rocker **30** is unable to impart a reverse rotational increment to the sprinkler head **16**. Thus, the sprinkler nozzle advances exclusively in clockwise direction as viewed in Fig. 3 without any backlash so that there will be no excessively wettened sectors in the area serviced by the sprinkler of my invention. In fact, by loading the forwardly extending arm **32***b* of the stopbar **32** with the weight **45**, the return stroke of the rocker **30** imparts an additional rotative increment of clockwise direction to the sprinkler head, because as the rear end **32***a* of the stopbar **32** comes to an abrupt halt against the stationary sprinkler socket **10**, the momentum of its forward end **32***b* and of the weight **45** secured thereto tends to swing the entire sprinkler head further in clockwise direction about the vertical center axis of the device. The impact of the loaded stopbar **32** against the stationary base **10** has the added advantage of jarring said base continuously to such an extent that the relatively rotatable elements **10** and **15** are loosened and the rotary stem **15** of the sprinkler head **16** may readily follow the rotary impulses imparted to it by the sprinkler jet. Thus, the device will dependably remain in rotative condition during practical use thereof. Moreover, owing to the fact that the shelf **40** is arranged to turn about a horizontal axis adjacent to the sprinkler jet axis and substantially parallel to a vertical plane containing said sprinkler jet axis, with its rotative movement limited to a shallow arc, there is practically no upward deflection of the water dispensed by the sprinkler, such as may wet the foliage of trees above the serviced meadows or fields.



While I have explained by invention with the aid of an exemplary embodiment thereof, it will be understood that I do not wish to be limited to the specific constructional details shown and described which may be departed from without departing from the spirit and scope of my invention. Thus, the rocker **30** may be arranged to turn about an axis that is not only parallel to the vertical plane determined by the center axis of the water jet but lies actually within said vertical plane.

I claim:

1. A self-propelling rotary sprinkler including a stationary socket; a sprinkler head rotatably mounted in and projecting above said socket, said sprinkler head having a nozzle adapted to form a radially directed water jet; and means for turning said sprinkler head comprising a rocker supported from said sprinkler head for rotation about an axis substantially parallel to the vertical plane containing the center axis of said water jet, a radially extending shelf provided on the upper end of said rocker, a stop member in the form of a bar extending substantially parallel to the defined vertical plane provided at the lower end of said rocker at sufficiently low a level to bear against said stationary socket, said stopbar having a radially projecting outer end, spring means yieldably urging said rocker into a rotary position wherein the inner end of said bar engages said stationary socket, a vertical vane provided at the remote end of said shelf at the side opposite to said stopbar with respect to the defined vertical plane, said vane being inclined relatively to the said jet axis and having its remote edge bent inwardly to intersect said jet axis when the rocker is in the rotary position determined by said stopbar, and a weight attached to said rocker and spaced radially from the axis of rotation of said sprinkler head to impart a turning moment to said head through said rocker as said stopbar strikes said stationary socket.

2. A self-propelling rotary sprinkler including a stationary socket; a sprinkler head rotatably mounted in said socket, said sprinkler head having a nozzle adapted to form a radially directed water jet, and means for turning said sprinkler head comprising a rocker supported from said sprinkler head for rotation about an axis substantially horizontal and parallel to the vertical plane containing the center axis of said water jet, a stop member in the form of a bar extending parallel to the defined vertical plane provided at the lower end of said rocker and adapted to bear with one of its ends against said stationary socket, a vertical vane supported from the upper end of said rocker at a point remote from the orifice of said nozzle in such relation to said stopbar with respect to the defined vertical plane as to converge from the opposite side in radial direction toward said jet axis when said rocker is in the rotary position determined by engagement of said stopbar with said socket, and a weight provided at the other end of said stopbar and spaced from the axis of rotation of said sprinkler head to apply a turning moment to said head through said rocker causing a rotation of said head.

3. A self-propelled rotary sprinkler comprising a stationary support, a conduit rotatably mounted on said support, a nozzle on said conduit, a lever disposed at one side of said conduit, a shaft pivotally mounted on said conduit, means mounting said lever on said shaft for pivotal movement relative to said conduit and for conjoint rotation with said shaft and said conduit about the axis of said conduit, a stop disposed on said lever and projecting away from the plane of pivoting of said lever and into abutting contact with said stationary support, a vane mounted on said lever adjacent one end thereof and positioned in the path of the stream of water issuing from said nozzle, said lever being pivotally movable in one direction upon impact of the stream on said vane, transmitting a component of the force of the impart through said mounting means and through said shaft as a turning moment against said conduit to rotate the same, a spring operatively connected between said conduit and said lever to resist the pivoting of said lever in said one direction and to return said stop to the position abutting said stationary support, and a weight on said lever on the opposite side of the pivot axis from said vane and spaced from the axis of rotation of said nozzle to impart a turning moment to said conduit through said mounting means when said stop impacts against said stationary support.

4. A self-propelled rotary sprinkler comprising a stationary socket, a conduit rotatably mounted in said socket, a nozzle on said conduit, a lever disposed at one side of said conduit, a shaft pivotally mounted on said conduit, means mounting said lever for pivotal movement relative to said conduit and for conjoint rotation with said shaft and said conduit about the axis of said conduit, a vane carried by said lever and disposed in the path of a stream of water issuing from said nozzle, said lever being pivotally movable in one direction upon impact of the stream of water on said vane transmitting a portion of the force of said impact to said conduit through said mounting means and said shaft to rotate the conduit in one rotary direction, a weight on said lever movable in a path spaced from the axis of rotation of said conduit to an elevated position as said lever is rocked in said one direction, means operatively connected between said lever



and said conduit for rocking said lever in an opposite direction when said weight reaches said elevated position, and stop means carried by said lever and projecting away from the plane of rotation of said lever into a parallel plane through said socket and into a position to contact said socket upon pivoting movement of said lever in said opposite direction, said weight being arranged to apply a turning moment to said conduit through said lever, said mounting means and said shaft upon impact of said stop with said socket to further rotate said conduit in the said one rotary direction.

5. A rotary sprinkler comprising a fixed support member, a conduit terminating in a nozzle mounted on said support member for rotation about a vertical axis, said nozzle being arranged to discharge a radially directed fluid jet, a shaft rotatably journaled on said conduit in a plane parallel to and offset laterally from a first vertical plane passing through said vertical axis and through said jet, said shaft extending to opposite sides of a second vertical plane passing through said vertical axis and normal to said shaft, a rocker keyed on said shaft on one side of said second vertical plane, a vane disposed on said rocker in the path of said jet, said rocker being pivotally movable in one direction upon impact of said jet on said vane, a stopbar on said rocker and having a weight associated therewith, and a spring supported on said conduit on the opposite side of said second vertical plane, said spring being operatively connected between said conduit and said shaft to resist pivotal movement of said rocker by said jet and to urge said stopbar into striking contact with said support member.

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