(No Model.)

J. F. MAIN.

LAWN SPRINKLER.

No. 575,966. Patented Jan. 26, 1897.

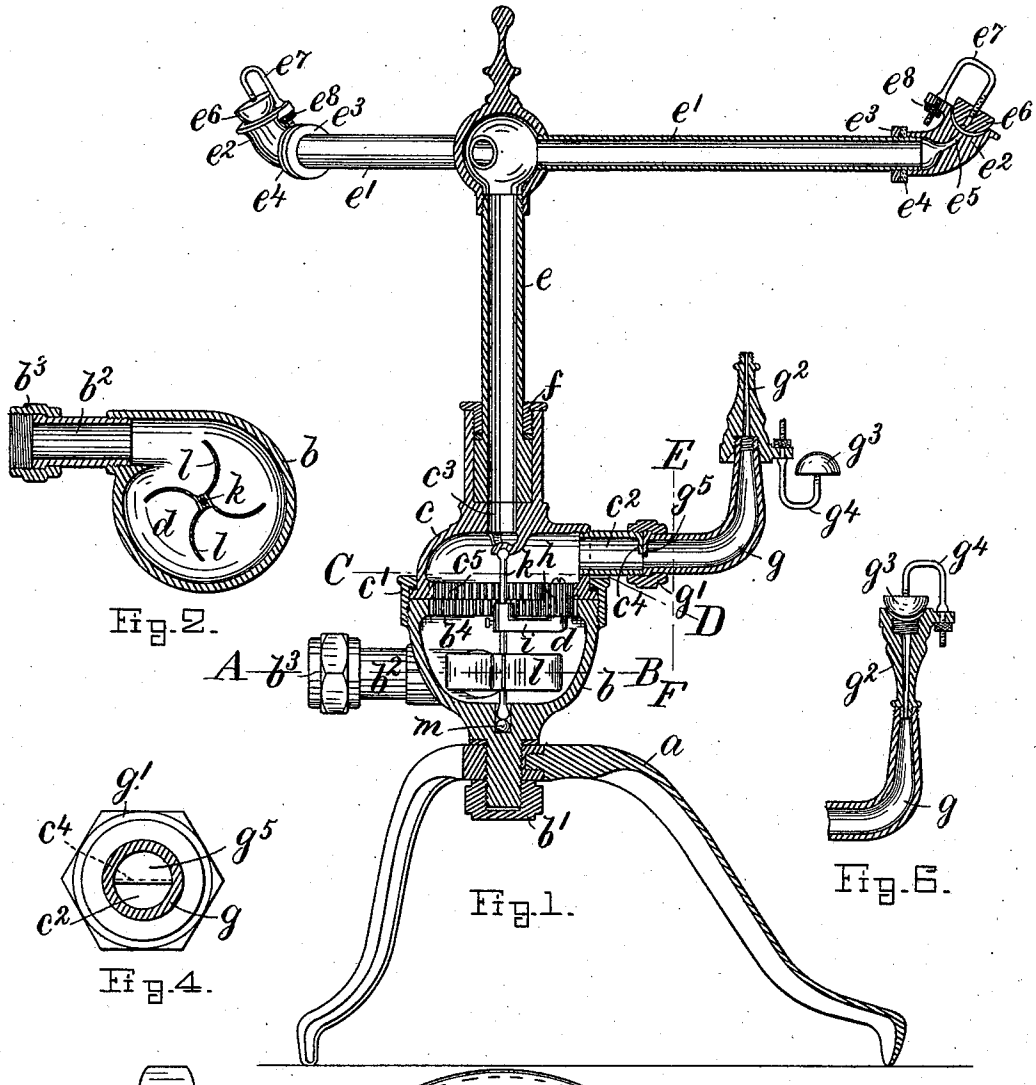


Fig. 1.

Fig. 2.

Fig. 4.

Fig. 6.

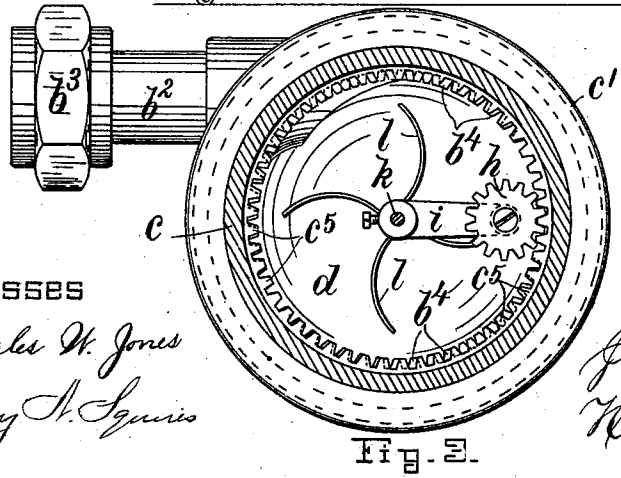


Fig. 3.



Fig. 5.

Witnesses

Charles W. Jones

Harry N. Squires

Inventor

Jacob F. Main

by Henry Chadbourn

his Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JACOB F. MAIN, OF BOSTON, MASSACHUSETTS.

LAWN-SPRINKLER.

SPECIFICATION forming part of Letters Patent No. 575,966, dated January 26, 1897.

Application filed September 18, 1895. Serial No. 562,836. (No model.)

To all whom it may concern:

Be it known that I, JACOB F. MAIN, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Lawn-Sprinklers, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention relates to improvements in lawn-sprinklers of that class in which the direction of the spray or flow of water from the nozzle or nozzles of the sprinkler is automatically and constantly changed by the action of the water as it flows through the sprinkler.

My invention consists in the novel construction, arrangement, and combination of parts, as will be fully described hereinafter and set forth in the claims.

Referring to the accompanying drawings, which form an essential part of this specification, and whereon the improved sprinkler has been shown in its preferred form, Figure 1 represents a central vertical section of the sprinkler complete. Fig. 2 represents an enlarged horizontal section through the inlet to the sprinkler on the line A B in Fig. 1. Fig. 3 represents an enlarged horizontal section on the line C D in Fig. 1, showing the means employed to cause the rotatable casing to slowly rotate upon the stationary casing. Fig. 4 represents a detail cross-section on the line E F in Fig. 1, showing the means employed to shut off any one of the outlets from the rotating part of the casing of the water-chamber. Fig. 5 represents a detail section of the discharge-nozzle of one of the radiating arms when arranged to discharge a solid stream of water. Fig. 6 represents a detail section of the nozzle used on the outlet from the rotatable casing, showing the same when arranged to discharge the water in the form of spray.

The same characters represent the same parts on the different parts of the drawings.

The standard *a* for the support of the working parts of the sprinkler is preferably made in the form of a tripod having each leg provided with a pointed projection, which tends to hold the sprinkler steady in its position on a lawn; but other forms of standards may be used, if so desired.

To the upper part of the supporting-standard is attached the cup-shaped casing *b*, which is provided with a screw-threaded shank and is screwed through a threaded perforation in the standard, being provided on its under side with a check-nut *b'*, or the casing *b* may be attached to the standard in any other suitable manner. A garden-hose is attachable to the inlet b^2 of this casing in any suitable and well-known manner, but preferably by a coupling b^3, as shown on the drawings, and supplies water under pressure to the chamber contained within said casing. The upper edge of the casing *b* is screw-threaded, and a second inverted-cup-shaped casing *c* is loosely and rotatably attached to the screw-threaded upper edge of the casing *b* by means of the screw-threaded ring *c'* in a manner substantially as shown on the drawings and which will be readily understood by reference thereto without further description. The casing *c* is provided with one or more side outlets c^2 (one of such outlets only having been shown) and a top outlet c^3. It will be seen that the cup-shaped casings *b* and *c* form an internal chamber *d*, through which all of the water passes in its passage through the sprinkler.

To the top outlet c^3 of the casing *c* is loosely and rotatably secured the vertical stand-pipe *e*, and the connection between the casing *c* and said stand-pipe forms a bearing on which the stand-pipe rotates, it being made water-tight by means of the packing and gland *f*. To the upper end of the stand-pipe *e* are secured the radiating arms *e' e'*, which radiate in a horizontal direction and are provided on their outer ends with the nozzles e^2 e^2, the particular construction of which will be described hereinafter. The nozzles e^2 are set at such angles that the discharge of the water under pressure from said nozzles will cause the arms to rotate and the stand-pipe to turn continually in the bearing on the casing *c* in a manner similar to many of the lawn-sprinklers now in common use.

The nozzles e^2 are attached to the arms *e'* in such a manner that the angle at which the water is discharged from said nozzles may be varied at will by turning the nozzles upon the arms to the desired position. To accomplish this result, I provide the outer ends of the arms *e'* with screw-threads, and upon said threads are screwed the nozzles e^2. A check-nut e^3 is also screwed upon each of the arms *e'* inside of the nozzle, and a washer e^4, of rub-

ber or other elastic and friction-producing material, is placed upon the arm e' between the nozzle and the check-nut. Thus it will be seen that the nozzle is turned upon the arm until it is in the desired position. The check-nut is then turned upon the arm until it has forced the rubber washer against the end of the nozzle with sufficient force to produce sufficient friction to hold the nozzle in its place and also to prevent any liability of leakage through the joint between the arm and the nozzle.

The nature of the washer allows of the turning of the nozzle to produce any slight change in the direction of the discharge of the water from the nozzle without adjustment of the check-nut.

The nozzles e^2 are preferably made bell-shaped and provided at or near their center with one or more small perforations e^5, through which the water is normally discharged in one or more small but solid streams. If it is desired to change the character of the discharge of water from the nozzles e^2 from a solid stream to a more or less divided spray or a sheet of water, I provide the nozzle with a plug e^6, adapted to be placed within the bell-shaped mouth of the nozzle and adjustably held there by means of a yoke e^7, upon which the plug e^6 is screwed in order to adjust the spray. The other end of the yoke e^7 is adjusted within a perforation in the body of the nozzle and held when adjusted by means of the check-nut e^8. The under side of the plug is made to substantially conform to the bell shape of the nozzle. When the plug is not to be used to produce a spray from the nozzles, it is removed therefrom by swinging it to one side, as shown in Fig. 5. It will be seen that when it is desired to produce a very fine spray from the nozzle e^2 its plug e^6 will be adjusted very close to the bell-shaped cavity in the nozzle, leaving a very small space between the plug and nozzle, and that the character of the spray will be varied by the adjustment of the plug upon the yoke toward or from the cavity in the nozzle. It will also be seen that the use of this peculiarly-constructed nozzle is not confined to this sprinkler alone, as it may be applied to many of the common sprinklers now in use, and in fact could be applied to the common garden-hose nozzle, if so desired.

On the drawings only one side outlet has been shown from the casing c; but it will be readily understood that several of such outlets might be used, if so desired. To this side outlet is secured an elbow g by means of the coupling g' in such a manner that the angle at which said elbow is attached to the outlet may be changed, so as to discharge the water in various directions. To this elbow is secured the nozzle g^2, which nozzle, when in the position shown in Fig. 1, will discharge a solid stream of water. This nozzle g^2 is so constructed that it can be reversed, the opposite end of the nozzle being attached to the elbow, as shown in Fig. 6. When in that position, the plug g^3, which is adjustable upon the yoke g^4, may be adjusted within the bell-shaped end of the nozzle and cause a spray of water to be discharged from this nozzle in a manner similar to that described in relation to the nozzles e^2.

It is sometimes desirable to prevent the discharge of water from the side outlet c^2 in the casing c, and for this purpose said outlet is provided with the partition c^4, which covers a little more than one-half of the cross-sectional area of said outlet. The elbow g is also provided with the partition g^5, which also covers a little more than one-half of the cross-sectional area of said elbow and will entirely close the outlet c^2 when the elbow is turned one-half a revolution and the nozzle thereon is pointing downward. This arrangement completely shuts off the outlet c^2 and prevents the liability of a solid stream of water being forced directly downward against the lawn while the nozzle is in an inverted position, which would tend to wash away the lawn. By means of the coupling g' the elbow is held firmly in its adjusted position and against the outlet c^2.

It will be understood that the casing c might be made to rotate upon the casing b by the discharge of the water from the nozzle g^2, and especially if several side outlets with nozzles were used in connection with the casing c in a manner similar to that of the action of the arms e'; but in order to provide positive means whereby the casing c may be slowly rotated the casings b and c are provided, respectively, with the internal gears b^4 and c^5, both of which mesh into a pinion h, mounted on a crank-arm i, firmly secured to a vertical shaft k within the chamber d. This vertical shaft has bearings at its ends within the casings b and c, and is caused to rotate in its bearings by means of a fan or wheel, firmly secured to the shaft and acted upon by means of the flow of water through the chamber d from the inlet b^2. The number of teeth in the gear b^4 differ from those in the gear c^5, and as both gears mesh into the same pinion and also as the casing b is held stationary upon the standard a it will be seen that when the shaft k is rotated, carrying with it the crank-arm and the pinion n, a slow rotary motion will be imparted to the casing c upon the casing b by means of the differential gears b^4 and c^5. This slow rotation of the casing c will cause the water discharged from the nozzle g^2 to be discharged in a circle around the sprinkler as a center. The size of the circle covered by the water from the nozzle g^2 may be increased or diminished according to the angle of inclination of the elbow g, as will readily be seen.

In order to get the best effect of the flow of water upon the wheel l, the inlet b^2 does not enter the casing b upon a radius, but rather upon a line parallel to a tangent of the circular casing, so that the water from the inlet will strike at one side of the center of the

wheel. To prevent any unnecessary friction upon the shaft k, the lower end of said shaft is preferably stepped upon a ball m, free to rotate within the bearing for said shaft.

It will be obvious that the outlet c^3 from the casing c, its connected stand-pipe e, and radiating arms e' might be dispensed with and the remaining parts of the sprinkler, as herein described, be used with good results, if so desired, especially if a plurality of nozzles g^2 were connected to the rotating casing c and preferably having each of said nozzles varying from the others as to the character of the discharge of water therefrom.

Having thus fully described the nature, construction, and operation of my invention, what I wish to secure by Letters Patent and claim is—

1. In a lawn-sprinkler, a standard or support, a stationary casing thereon, an inlet in said casing to communicate with a supply of water, a rotatable casing attached to the stationary casing, a discharge-nozzle from the rotatable casing, and internal differential gears one on each of said casings, a pinion meshing into said gears, a fan or wheel located within the flow of water through the sprinkler turned thereby, and connected mechanism between the fan and pinion, whereby the rotatable casing is slowly rotated upon the stationary casing for the purpose set forth.

2. In a lawn-sprinkler, a standard or support, a stationary casing thereon, an inlet in said casing to communicate with a supply of water, a rotatable casing attached to the stationary casing, a discharge-outlet from said rotatable casing, internal gears upon each casing the number of teeth in each gear differing from that in the other, a pinion meshing into both gears and mechanism substantially as described to cause said pinion to rotate bodily around the surface of said gears whereby the rotatable casing is caused to slowly rotate upon the stationary casing for the purpose set forth.

3. In a lawn-sprinkler, a standard or support, a stationary casing attached thereto, an inlet in said casing to communicate with a supply of water, a rotatable casing attached to the stationary casing, discharge-outlet from said rotatable casing, internal gears upon each of said casings the number of teeth in each gear differing from that in the other, a pinion meshing into both gears, a crank-arm carrying said pinion, a shaft upon which the crank-arm is firmly mounted, a fan or wheel upon the shaft located within the flow of water through the sprinkler and acted upon thereby, for the purpose set forth.

4. In a lawn-sprinkler, a standard or support, two casings mounted thereon one stationary and the other rotatable upon the stationary casing, an inlet to the stationary casing, an outlet to the rotatable casing, and internal mechanism operated by the flow of water through the sprinkler whereby the rotatable casing is slowly rotated, combined with a stand-pipe and radiating arms having nozzles thereon which are rapidly rotated by the force of the discharge of water from said arms, for the purpose set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 9th day of September, A. D. 1895.

JACOB F. MAIN.

Witnesses:
HENRY CHADBOURN,
HARRY N. SQUIRES.