L. MORRELL.

SPRINKLER FOR IRRIGATING SYSTEMS.

APPLICATION FILED DEC. 4, 1914.

1,156,612. Patented Oct. 12, 1915.

2 SHEETS—SHEET 1.

Fig. 3.

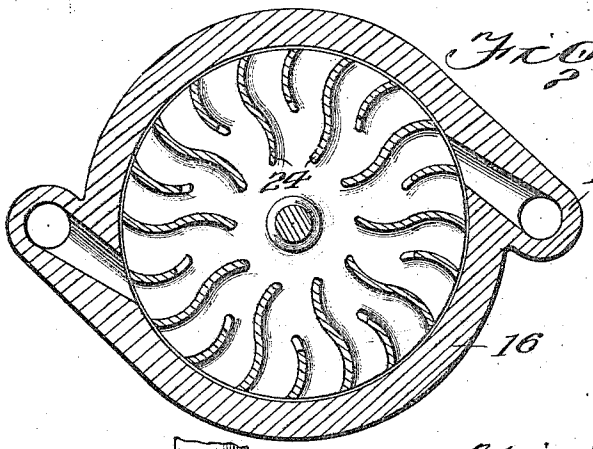


Fig. 1.

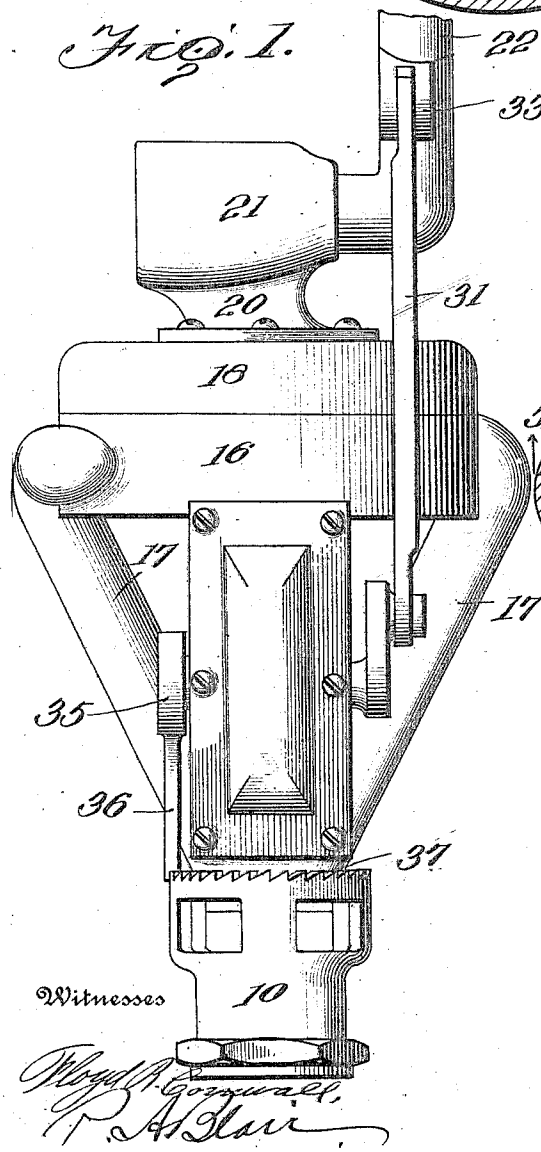
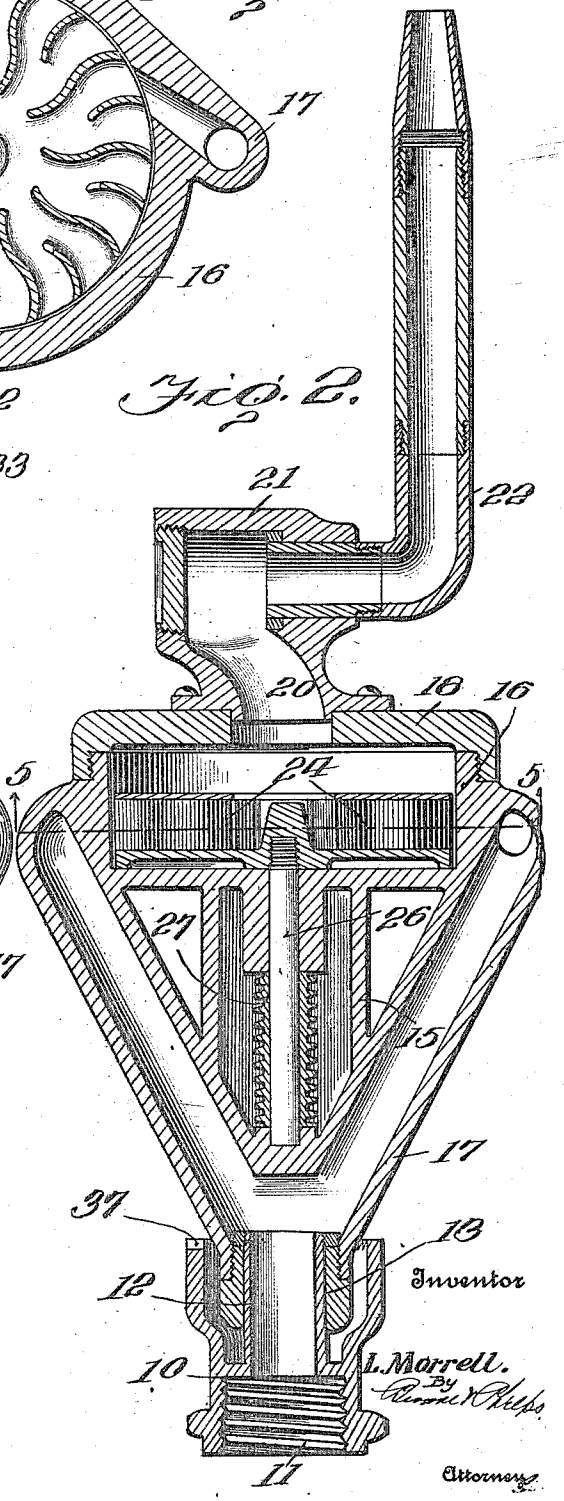


Fig. 2.



Witnesses

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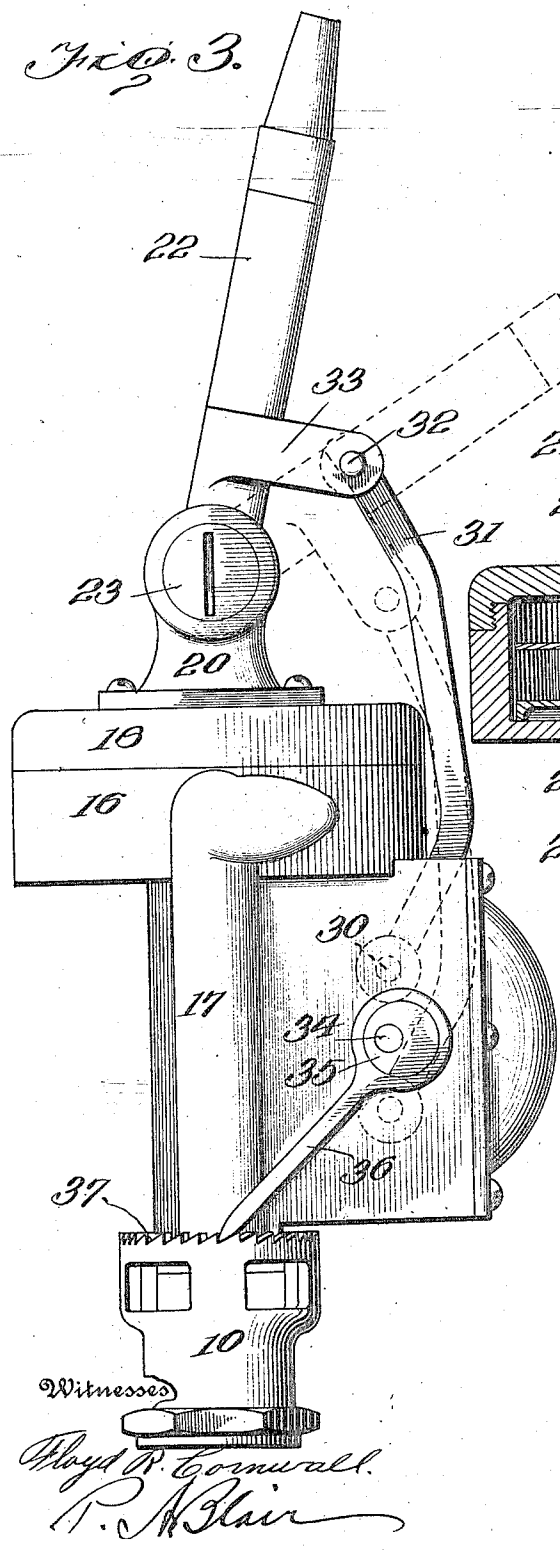
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2 SHEETS—SHEET 2.

Fig. 3.

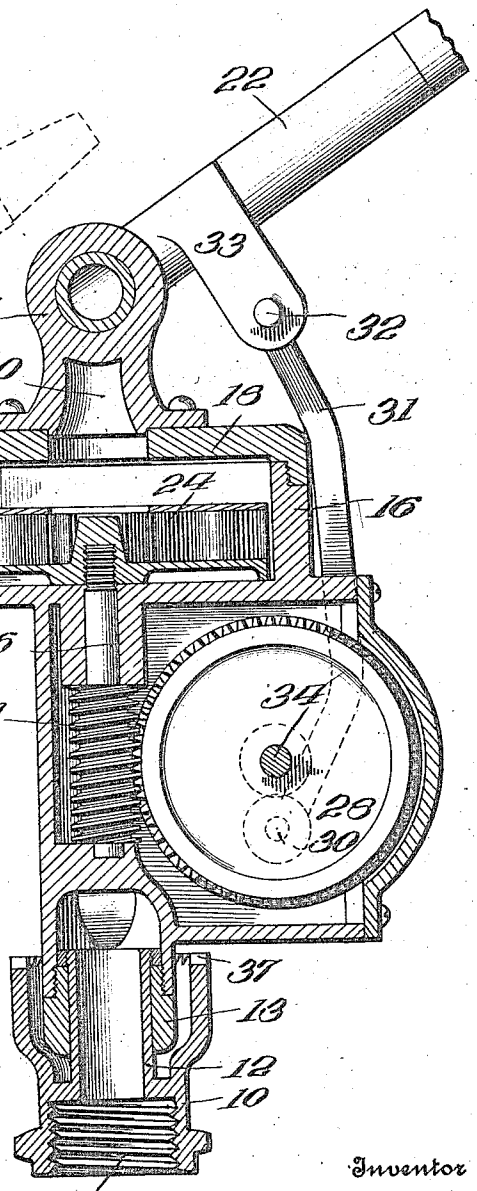


Witnesses

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Fig. 4.



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SPRINKLER FOR IRRIGATING SYSTEMS.

1,156,612. Specification of Letters Patent. Patented Oct. 12, 1915.

Application filed December 4, 1914. Serial No. 875,472.

To all whom it may concern:

Be it known that I, LON MORRELL, a citizen of the United States, residing at Jacksonville, in the county of Duval and State of Florida, have invented certain new and useful Improvements in Sprinklers for Irrigating Systems, of which the following is a specification.

This invention relates to sprinklers and in its more intense aspect to sprinklers particularly adapted for use in irrigating systems, although it may be used for other purposes if so desired.

One of the objects of the present invention is to provide a simple and practical sprinkler of the above character adapted to efficiently and uniformly sprinkle or irrigate a predetermined surrounding area.

Another object is to provide a device of the above character having few parts which will be cheap to manufacture and install.

A further object is to provide a durable sprinkler of the first above mentioned character which will be positive in its operation and economic in use, the parts being so arranged and designed as to eliminate a waste of water when in operation.

Other objects will be in part obvious from the annexed drawings and in part indicated in connection therewith by the following analysis of this invention.

This invention accordingly consists in the features of construction, combination of parts, and in the unique relations of the members and in the relative proportioning and disposition thereof; all as more completely outlined herein.

To enable others skilled in the art fully to comprehend the underlying features thereof that they may embody the same by the numerous modifications in structure and relation contemplated by this invention, drawings depicting a preferred form have been annexed as a part of this disclosure, and in such drawings, like characters of reference denote corresponding parts throughout all the views, of which:—

Figure 1 is a side elevation of a single complete device; Fig. 2 is a central vertical sectional view of the device shown in Fig. 1; Fig. 3 is a view similar to Fig. 1 taken at right angles therto; Fig. 4 is a view similar to Fig. 2 taken at right angles thereto; Fig. 5 is a sectional view taken on the line 5—5 of Fig. 2.

In order that the present invention may be more clearly understood, it is to be noted that the above mentioned drawings disclose only one of a plurality of devices of a similar construction adapted to be regularly disposed about an area to be irrigated in such a manner that each device will uniformly irrigate a circle substantially tangential to five or six circles irrigated by similar devices thereabout. While it may have been attempted to employ rotary sprinklers of various types heretofore in irrigating relatively large areas, there may have arisen the objection that the individual areas irrigated by each device were not uniformly irrigated. Either a ring about the device was irrigated to an unnecessarily large extent, while the area inclosed thereby was hardly touched, or if the intermediate area was irrigated by oscillating the sprinkling nozzle during its rotation, the center was irrigated to a wasteful degree due in part to the loss of water used for operating the device.

The present invention is designed to overcome the above objections, among others, by uniformly irrigating a predetermined area completely about the centrally disposed device and to positively utilize all of the water reaching the device, first, for positively revolving a sprinkling nozzle and, second for irrigating the land after performing its driving function.

With this preliminary sketch of the present invention in mind, attention is now directed to Figs. 1 and 2 of the drawings wherein is disclosed one of the devices in question. This device comprises a coupling member 10 provided with a threaded end 11 for engagement with the upper part of a stand pipe (not shown) forming a permanent portion of the irrigating system. This coupling has a central inlet tube 12 upon which is swiveled a collar 13 having a connection with branch pipes 17 of a casting 15 provided at its upper part with an open topped circular chamber 16. A ring is adapted to hold the casing in place upon the coupling and also prevent leakage.

The chamber 16 is provided with a cover 18 threadely connected therewith and provided with a central aperture 20 at which point is secured a fixed portion of the sprinkling head 21. This head has oppositely and horizontally disposed openings, in one of which is secured a rigid elbow

nozzle 22, and the opposite one a plug 23 adapted to permit access to the interior thereof as for packing the connection. This nozzle 22 is so mounted as to turn about the horizontal axes of the openings in the head 21.

Within the chamber 16 is positioned a turbine 24, in order to obtain maximum efficiency, adapted to rotate in a horizontal plane under the action of oppositely directed substantially tangential impinging jets from the diverging pipes 17, as shown more clearly in Fig. 5. A rotation of this turbine 24 will rotate a central shaft 26 connected therewith and upon which is mounted a worm gear 27. This worm gear co-acts with an inclosed pinion 28, as shown more clearly in Fig. 4. Eccentrically mounted upon this pinion 28 at the point 30 is connected one end of an intervening link 31, the opposite end of which is pivotally connected at 32 with a lug 33 upon the oscillating nozzle 22. It will thus be seen that as the gear or pinion 28 is rotated, the link 31 will be alternately raised and lowered to swing the nozzle through the arc indicated by the dotted lines in Fig. 3 whereby a stream of water at uniform pressure issuing from this nozzle will have a maximum range when in substantially the dotted line position to reach the outer circumference of the circle to be irrigated, while in the elevated position, the stream will be directed almost straight upwardly to fall in a manner similar to rain relatively close to the irrigating device, the intermediate area being similarly irrigated as the nozzle oscillates from one extreme to the other.

In order to positively rotate the device and irrigate the complete circle the stud shaft 34 upon which the gear 28 is mounted projects to one side and is provided with an eccentric 35 upon which is mounted a pawl 36. The lower end of this pawl co-acts with ratchet teeth 37 formed on the upper part of the coupling 10, thus at every revolution of the gear, the pawl will be raised and depressed to progressively advance the sprinkler a predetermined amount. The teeth of the ratchet divide the circle into a corresponding number of sectors, each of which is irrigated from the center to the outer edge of the circumference by a complete oscillation of the irrigating nozzle.

It is thus seen that the present device is designed to uniformly and completely irrigate a relatively large area depending, of course, to some extent upon the head of water used. The entire amount of water passes completely through the device, first to rotate and operate the same, and second, to perform its irrigating functions, thereby positively eliminating any waste that might occur by diverging a portion of the stream to operate the device as it escapes.

The device in question is simple and practical in its construction and is designed to accomplish, among others, all of the objects and advantages above set forth.

Without further analysis, the foregoing will so fully reveal the gist of this invention that others can by applying current knowledge readily adapt it for various applications without omitting certain features that, from the standpoint of the prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention, and therefore such adaptations should and are intended to be comprehended within the meaning and range of equivalency of the following claims.

What I claim is:

1. In a device of the character described, in combination, a circular chamber having substantially tangential water inlets, and a central outlet, an oscillating nozzle connected with said outlet, a turbine within said chamber, and means connected with said turbine for positively rotating said casing in a step by step manner and oscillating said nozzle at each step.

2. In a device of the character described, in combination, a circular casing having an inlet and a central outlet through which water is adapted to pass, a turbine within said chamber adapted to be rotated by the incoming water prior to its passing out through said outlet, a nozzle supported by said casing connected with said outlet and adapted to oscillate about a horizontal axis, a gear for said chamber and mechanical connections between said turbine and gear for continuously turning the latter, means between said gear and nozzle for continuously oscillating the nozzle, and means associated with said gear for intermittently rotating said casing step by step.

3. In a device of the character described, in combination, a circular casing having an inlet and a central outlet through which water is adapted to pass, a turbine within said chamber adapted to be rotated by the incoming water prior to its passing out through said outlet, a nozzle connected with said outlet and adapted to oscillate about a horizontal axis, a gear for said chamber, mechanical connections between said turbine and gear for continuously turning the latter, means between said gear and nozzle for continuously oscillating the nozzle, a fixed ratchet surface and an eccentrically mounted pawl associated with said gear wheel adapted to coact with said ratchet and positively and intermittently rotate said casing about a vertical axis.

4. In a device of the character described, in combination a coupling having a ratchet associated therewith, a casing mounted on said coupling, said casing inclosing a circular chamber connected with said coupling by

diverging pipes having substantially tangential entrances to the chamber, a nozzle mounted on said casing communicating with the interior thereof adapted to oscillate about a horizontal axis, a turbine within said casing, a worm adapted to be actuated by said turbine, a gear meshing with said worm, and means actuated by said gear for oscillating said nozzle and to coact with said ratchet thereby completely rotating said casing.

5. In a device of the character described, in combination, a coupling having a ratchet associated therewith, a casing mounted on said coupling, said casing inclosing a circular chamber connected with said coupling by diverging pipes entering said chamber, a nozzle mounted on said casing and communicating with the interior thereof adapted to oscillate about a horizontal axis, a turbine within said casing, a worm adapted to be actuated by said turbine, a gear meshing with said worm, and means between said gear and nozzle and between said gear and ratchet for continuously oscillating said nozzle and progressively rotating said casing.

6. In a device of the character described, in combination, a coupling, a ratchet associated therewith, a casing mounted on said coupling, said casing inclosing a circular chamber connected with said coupling by diverging pipes having substantially tangential entrances to said chamber, a nozzle mounted on said chamber and communicating with the interior thereof adapted to oscillate about a horizontal axis, a turbine within said casing, a worm adapted to be actuated by said turbine, a gear meshing with said worm, an intervening link eccentrically connecting said gear with said nozzle, and an eccentrically mounted pawl associated with said gear and coacting with said ratchet whereby said nozzle is continuously oscillated during the intermittent rotation of said casing.

7. In a device of the character described, in combination, a coupling, a ratchet associated therewith, a casing having a chamber mounted on said coupling, and connected therewith by diverging pipes having substantially tangential entrances to said chamber, a nozzle communicating with the interior of said chamber adapted to oscillate about a horizontal axis, a turbine within said casing, a worm adapted to be actuated by said turbine, a gear meshing with said worm, an intervening link eccentrically connecting said gear with said nozzle, and an eccentrically mounted pawl associated with said gear and co-acting with said ratchet whereby said nozzle is oscillated back and forth at each progressive step in the rotation of said casing.

In testimony whereof I affix my signature in presence of two witnesses.

LON MORRELL.

Witnesses:
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ALEX. TAYLOR.