G. E. DAHL & F. F. BRODIE.

LAWN SPRINKLER.

APPLICATION FILED OCT. 1, 1917.

1,284,251.

Patented Nov. 12, 1918.

2 SHEETS—SHEET 1.

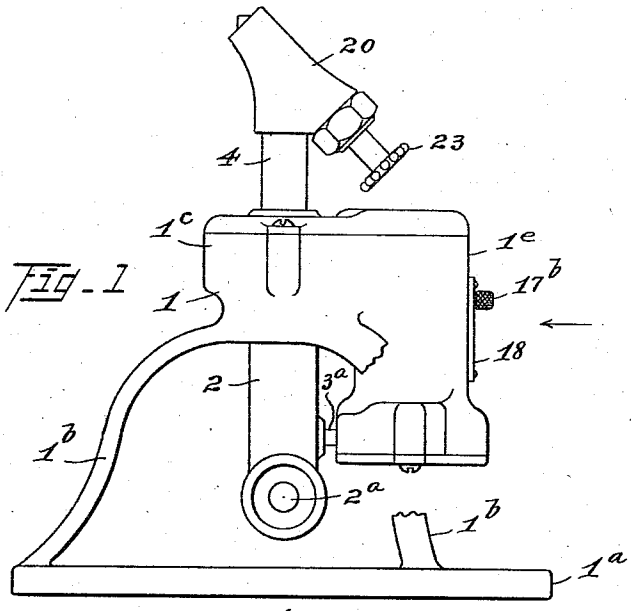


Fig. 1

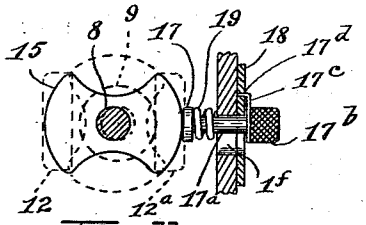


Fig. 11

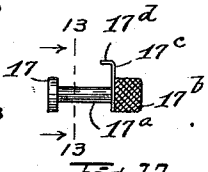


Fig. 12

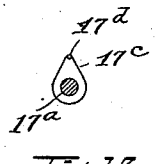


Fig. 13

Fig. 2

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2 SHEETS—SHEET 2.

Fig. 3

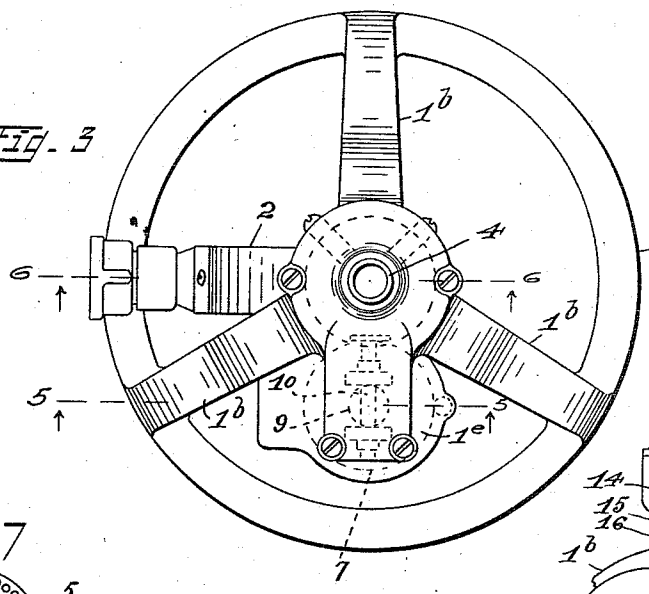


Fig. 5

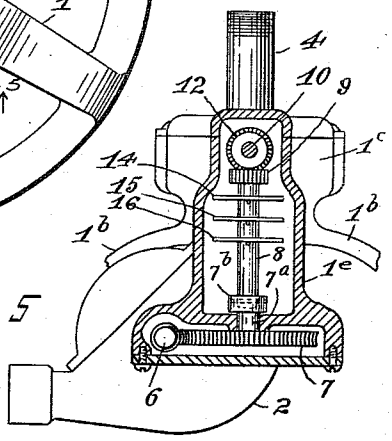


Fig. 7

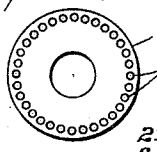


Fig. 4

Fig. 6

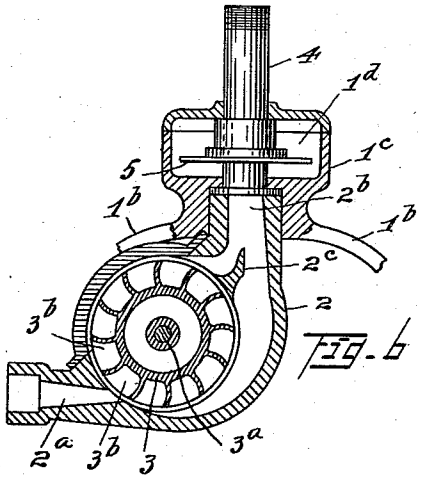


Fig. 8

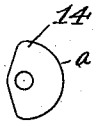
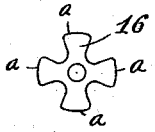


Fig. 9



Fig. 10



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UNITED STATES PATENT OFFICE.

GEORGE E. DAHL AND FRANK F. BRODIE, OF CLEVELAND, OHIO.

LAWN-SPRINKLER.

1,284,251. Specification of Letters Patent. Patented Nov. 12, 1918.

Application filed October 1, 1917. Serial No. 194,195.

To all whom it may concern:

Be it known that I, GEORGE E. DAHL and FRANK F. BRODIE, citizens of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Lawn-Sprinklers, of which the following is a specification.

This invention relates in general to machines for sprinkling lawns, and it has particular reference to a type of machine for this purpose, wherein the sprinkling nozzle is automatically oscillated thereby throwing the water over a more or less extended area.

The primary object of the present invention is the provision of a machine for the purpose set forth, wherein the oscillation of the sprinkling nozzle is brought about by the action of the water in its passage through the machine. A further object of the invention is to provide a construction that admits of ready adjustment of certain of the coacting elements whereby the arc of oscillation is automatically controlled.

It is often desired to place a sprinkler in juxtaposition to the side of a building and to sprinkle over an extended area without throwing the water on the building. Or to place the machine in an angle of the building with the same object in view. The improved sprinkler can be adjusted to fulfil the above desires, as it is adapted for oscillation in a complete circle or may be made to oscillate over any arc of the circle.

Another object of the invention is the provision of a durable, economical and convenient machine that is highly efficient in the performance of its intended functions for the purpose set forth.

With these objects in view the invention consists in the construction, combination and arrangement of the parts as hereinafter described and pointed out definitely in the claims, reference being had to the accompanying drawings which are made a part of this specification, and in which similar characters of reference are employed to designate similar parts.

In the said drawings Figure 1 is an elevation of the improved sprinkler with two of the supporting members broken.

Fig. 2 is an elevation taken at right angles to that shown in Fig. 1, and in direction of arrow.

Fig. 3 is a top plan view with the nozzle removed.

Fig. 4 is a section taken on line 4—4 Fig. 2.

Fig. 5 is a section taken on line 5—5 Fig. 3.

Fig. 6 is a section taken on line 6—6 Fig. 3.

Fig. 7 is a plan view of a gear employed.

Figs. 8, 9, and 10 illustrate cams used.

Fig. 11 is an enlarged fragmentary section illustrating the shifting device.

Fig. 12 is a view of the shifting member detached, and Fig. 13 is a section on line 13—13 of Fig. 12.

Referring now to the drawings, the present embodiment of the improved sprinkler provides a body or cast metal housing 1 having a base 1^a, supporting members 1^b, and a head 1^c. Attached to the body member 1 and depending from the head 1^c is a casing 2 having an inlet 2^a and an outlet 2^b. This casing provides a housing for the motor 3 and also a passage for the water from the supply source to the sprinkling nozzle. Mounted in the head 1^c and in open communication with the outlet 2^b, is a stand-pipe 4. The head 1^c is provided with a chamber 1^d through which the stand-pipe 4 extends to its connection with the outlet 2^b, and attached to the stand-pipe within the chamber 1^d is a gear wheel 5, which is adapted to oscillate the stand-pipe 4, as will presently be explained. An extension 1^e of the head provides a housing for the mechanism which forms the operative connection from the motor 3 to the oscillating gear 5.

The motor shaft 3^a to which the motor wheel 3 is rigidly attached, is provided with a worm 6, which is in mesh with a worm wheel 7. The worm wheel 7 is firmly attached to a stub shaft 7^a journaled in the extension 1^e, and the said shaft is provided with a socket 7^b. A vertical shaft 8 is flexibly connected with the stub shaft 7^a, the lower end of the shaft 8 entering the socket 7^b and connected therewith by a pin which penetrates the shaft and the walls of the socket. This construction provides a driving connection between the shafts 7^a and 8, and also allows a rocking movement to the shaft 8, which has a spur gear 9 attached to its upper terminal.

A horizontally arranged shaft 10 carries a toothed wheel 11, and two opposing face gears 12 and 12^a. The teeth of the wheel 11 are adapted to mesh with the holes 5^a in the gear 5, and the gear 9 is located between

the opposing toothed faces of the members 12 and 12ª, and adapted to mesh with either of said members as provided by certain adjusting means which will now be described.

The shaft 8 is under the tension of a spring 13 which holds the gear 9 in mesh with the gear member 12ª if the action of said spring is not opposed by some counter force. Cams 14, 15 and 16 carried by the shaft 8 provide means for counter acting the function of the spring 13. These cams are operative through their peripheries engaging and bearing on an adjustable buttress member 17. By reference to Figs. 8, 9 and 10 it will be noted that the working periphery *a* of the several cams is divided into arcs of a different number of degrees. The cams oppose the function of the spring 13 only when their peripheral arcs or working surfaces are bearing on the member 17, thereby forcing the gear 19 into mesh with the gear 12. With the member 17 adjusted to engage the cam 14, the gear 9 will be in mesh with the gear 12 during one-half revolution of the shaft 8, and during the other half revolution the cam is free from the member 17 and the spring 13 carries the gear 9 into mesh with gear 12ª, thereby reversing the direction of revolution of the shaft 10.

Oscillation of the stand-pipe 4 is brought about through the co-action of the gear 5 in mesh with the toothed wheel 11 carried by the shaft 10, on which the gears 12 and 12ª are fixed. Therefore when the member 17 is adjusted as above mentioned, the member 4 will be caused to oscillate 180° in one direction and then 180° in the opposite direction. When the member 17 is adjusted to engage cam 15 a 90° oscillation is imparted to the sprinkler, and when engaging cam 16 a 45° movement is the result. If the member 17 is in a position free from engagement with the cams the spring 13 retains the gear 9 in mesh with the gear 12ª and a continuous revolution of the sprinkler is brought about.

In the embodiment as illustrated, the buttress member 17 is provided with a shank 17ª, a handle 17ᵇ and a locking member 17ᶜ, best shown in Figs. 11, 12 and 13. The shank 17ª passes through a slot 1ᶠ in the member 1ᵉ and through a slotted adjustment plate 18 provided with notches 18ª adapted to receive the shank 17ª and register the member 17 in the planes of the several cams. Mounted on the shank 17ª and bearing on member 17 and on the inner wall of member 1ᵉ, is a spiral spring 19 of stronger power than the spring 13. A locking member 17ᶜ is provided with a tongue 17ᵈ which is adapted to enter any one of the apertures 18ᵇ and hold the adjustment member in the desired position relative to the cams. In adjusting the device, the member 17 is pulled out by means of the handle 17ᵇ until the tongue 17ᵈ is freed from the aperture in the plate 18, the shank 17ª is moved into the desired notch in said plate, and when released the action of spring 19 will return the member to its seat with the tongue 17ᵈ in the corresponding aperture in the plate 18. In Fig. 11 the cam 15 is shown with one of the working faces in contact with the member 17, which throws the gear 9 into mesh with gear 12. The dotted lines show the cam released and the gear 9 under action of spring 13, brought into mesh with gear 12ª.

In operation the water under pressure from the supply source, enters the inlet 2ª, revolves the motor 3 through the medium of the pockets 3ᵇ, and is discharged through the outlet 2ᵇ, stand-pipe 4 and nozzle 20. A baffle 2ᶜ relieves the back pressure on the motor, and said motor operates the oscillating mechanism by the co-action of the operative elements combined and arranged as above described.

The nozzle 20 which is attached to the pipe 4 at an angle, as shown, is provided with a chamber 20ª having a contracted mouth 20ᵇ, and an adjustable spraying device is provided. The said spraying device comprises a stem 21 which is threaded in the body of the nozzle, as shown at 21ª, and extends through a suitable stuffing box 22, being operated by a hand-wheel 23. The outer end of the stem 21 is provided with a head 21ᵇ and an angular groove 21ᶜ. The spray is formed by the water passing through the choked opening 20ᵇ and impinging on the head 21ᵇ when the stem 21 is in the position shown in Fig. 4. When the stem is threaded back into the chamber 20ª the nozzle will throw a direct stream.

While the embodiment of the invention as illustrated and described provides for oscillation over four specified areas, it will readily be understood that the machine may be modified to provide oscillation over any desired arc by the embodiment of cams on the shaft 8, of different contours, as the arc of oscillation is regulated by the cams. Other modifications in the details of construction may be made without departing from the nature of the invention.

What we claim and desire to secure by Letters Patent is:

1. In a lawn sprinkler the combination of a water motor confined in a chamber adapted to be connected with the water supply; an exhaust member connected with said chamber; reversible gear mechanism for oscillating said exhaust member; opposing gears provided as elements of said reversible mechanism; a shaft driven by the motor; a driving gear on said shaft adapted to mesh with either of the opposing gears; and means for

automatically shifting said driving gear from mesh with one to the other of the opposing gears.

2. In a lawn sprinkler the combination of a water motor confined in a chamber adapted to be connected with the water supply; an exhaust member connected with said chamber; reversible gear mechanism for oscillating said exhaust member; opposing gears provided as elements of said reversible mechanism; a shaft driven by the water motor; a driving gear carried by said shaft and adapted to mesh with either of the opposing gears; means for automatically shifting said driving gear from mesh with one to the other of the opposing gears; and means for adjusting the timing of said shifting means.

3. In a lawn sprinkler the combination of a water motor operative in a chamber adapted to be connected with the water supply; a rotatable exhaust member connected with said chamber; reversible mechanism for oscillating said exhaust member; opposing gears provided as elements of said reversible mechanism; a flexible shaft driven through gears by the water motor; a driving gear carried by said flexible shaft and adapted to mesh with either of the opposing gears; cam mechanism on the flexible shaft for shifting said driving gear from mesh with one to the other of the opposing gears.

4. In a lawn sprinkler the combination of a water motor confined in a chamber adapted to connection with the water supply; an exhaust member connected with said chamber, the motor being operated by the pressure of the water from the supply through the chamber to the exhaust; reversible operative mechanism for oscillating the exhaust member, said mechanism comprising a gear attached to the exhaust member, a driven shaft carrying a gear in mesh with the gear on the exhaust member, opposing gears fixed on said driven shaft, a flexible shaft driven by the water motor through interposed gears, a driving gear on the flexible shaft adapted to mesh with either of the opposing gears, and means for shifting said driving gear from one to the other of the opposing gears.

5. In a lawn sprinkler the combination of a water motor operative in a chamber adapted to connection with a water supply; an exhaust member connected with said chamber, the motor being operated by the pressure of the water through the chamber to the exhaust; reversible mechanism for oscillating the exhaust member; opposing gears provided as elements of said reversible mechanism; a flexible shaft gear-driven by the motor; a driving gear carried by said flexible shaft and adapted to mesh with either of the opposing gears; a series of cams fixed on the flexible shaft, having an opposing spring connection, for shifting the driving gear from mesh with one to the other of the opposing gears; and an adjustable bearing member for said cams.

6. In a lawn sprinkler the combination of a water motor operative in a chamber adapted to connection with a water supply; a rotatable exhaust member connected with said chamber; a sprinkling nozzle attached to the exhaust member; reversible operative mechanism for oscillating the exhaust member, said mechanism comprising a gear attached to the exhaust member, a driven shaft carrying a gear in mesh with the gear on the exhaust member, opposing gears fixed on said shaft, a flexible shaft carrying a driving gear adapted to mesh with either of the opposing gears, a worm wheel on said driven shaft, a motor-driven worm in mesh with said worm wheel, a series of cams of different contours fixed on the flexible shaft, having opposing spring connection, for shifting the driving gear from mesh with one to the other of the opposing gears, and an adjustable bearing member for said cams whereby the arc of oscillation of the exhaust member is governed.

In testimony whereof we affix our signatures.

GEORGE E. DAHL.
FRANK F. BRODIE.