Dec. 16, 1941. C. N. STONE 2,266,573

SPRINKLER

Filed Aug. 19, 1939

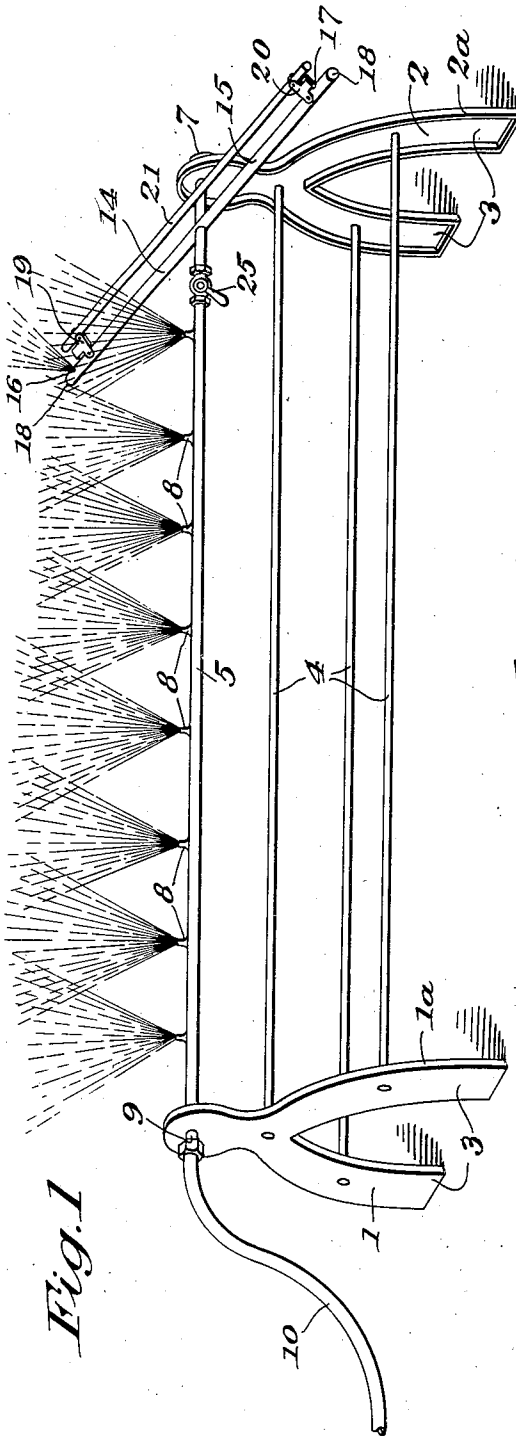


Fig. 1

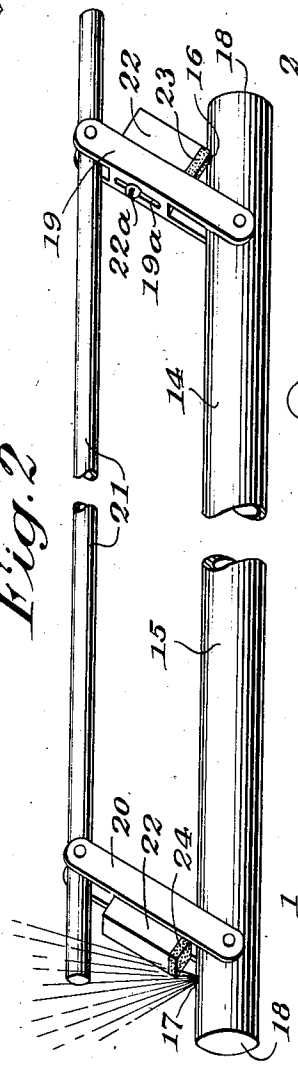


Fig. 2

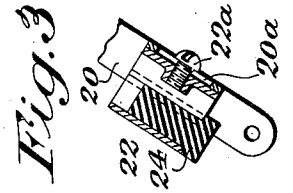


Fig. 3

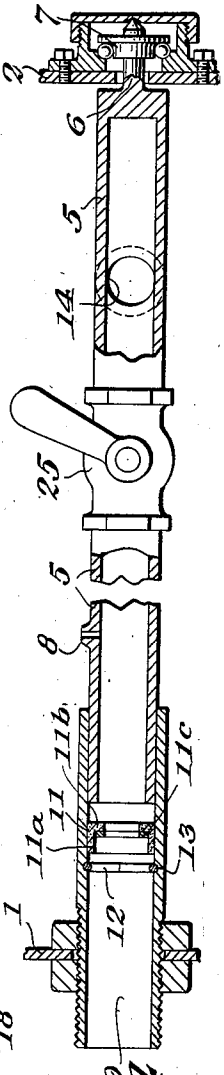


Fig. 4

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SPRINKLER

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6 Claims. (Cl. 299—64)

My present invention relates to a novel oscillating sprinkler or sprayer for conditioning gardens, lawns and the like.

Sprinklers or sprayers have, of course, been widely used to supplement rainfall to maintain gardens, lawns and the like in proper condition. While many such devices have been proposed for these and similar purposes, the types of sprinkler most commonly used consisted of a spray head connected to a source by a suitable conduit, or a rotatable spray head actuated by the reactive force of the discharged water.

Several objections exist to such sprinklers. Among the most serious of these may be noted the difficulty of moving them without first shutting off the flow of water, and the difficulty of properly wetting the surface adjacent walks and the like without likewise wetting the walks.

In accordance with my invention, my novel oscillating sprinkler includes a rotatable spray head of any desired length. The spray head includes at least two oppositely disposed branch conduits having outlet ports so disposed that the reactive force of water delivered through one port is opposed by the reactive force of water delivered through another port. Oscillation of the spray head is controlled by a valve mechanism operable by gravity to open one port when it closes another port so that the reactive force of water delivered through the open port is available to rotate the spray head in one direction. Partial rotation of the spray head results in the actuation of the valve mechanism to close the open port and to open the closed port to cause rotation of the spray head in the other direction.

In spray devices in accordance with my invention, I employ novel means to reduce the friction on the oscillating spray head to a minimum and at the same time maintain the joint between it and the inlet pipe water tight. I also provide for the regulation of the water pressure utilized to cause oscillation of the spray head.

As my novel spray devices are adapted to treat a rectangular patch, they may be approached from either end, and, if desired, the spray heads may be held to stop oscillation during movement of the devices or adjustment of the water pressure.

In the accompanying drawing I have shown, and in the specification described, an embodiment of my invention from which its novel features and advantages will be readily apparent. In the drawing:

Fig. 1 is a view of an embodiment of my invention.

Fig. 2 is an enlarged fragmentary view of the automatic valve control in a position opposite to that shown in Fig. 1.

Fig. 3 is a sectional fragmentary view of a valve, and

Fig. 4 is a sectional view through the spray head.

At 1 and 2 I have indicated the supports for my device which are formed to establish legs 3 and are interconnected by rods 4. If desired, the feet or legs 3 may be provided with wheels or the like, but as shown in the drawing the heads 1 and 2 may be formed to establish rims 1*a* and 2*a* to combine the essential rigidity with a minimum of weight.

The spray head 5 comprises a hollow pipe closed at one end and provided with a spindle 6 for which I provide an anti-friction bearing 7 in the support 2. The bearing 7 may be of any conventional type adapted to take both thrust and radial loads. The head 5 is provided with spray jets 8.

The head 5 is supported at its other end by the water inlet conduit 9 carried by the support 1 and to which the hose 10 is detachably coupled. As shown in Fig. 3, the inlet 9 receives the open end of the spray head 5 and to render the joint water tight I position within the inlet 9 a washer element 11. In practice I use a leather cup-shaped washer that may be considered as including a sleeve portion 11*a*, the inside diameter of which is substantially the same as that of the head 5 and a shoulder portion 11*b*, the inside diameter of which is less than that of the head 5.

The washer element 11 is loosely confined adjacent the open end of the head 5 by any suitable means such as the spring ring 12 lodged in the annular groove 13 in the inlet 9. In Fig. 4, the washer element 11 and the ring 12 are shown, for clarity, spaced from each other and the end of the head 5 a greater distance than in actual practice.

In use, the pressure of the water forces the washer 11 against the open end of the head 5 and tightly against the inlet 9. Because the area of engagement of the portion 11*b* with the open end of the head 5 is less than the area of engagement of the portion 11*a* with the inlet 9, oscillation of the head 5 has no effect on the washer 11.

While the washer 11 may be leather, it may also be of any suitable material having sufficient flexibility to be maintained in sealing relation to the head 5 and the inlet 9 by the pressure of the

delivered fluid. The washer 11 may be reinforced, if desired, as by a metal ring 11c.

The hose 10 may be attached to the spray head 5 in any other manner but the use of my novel liquid tight and nearly frictionless joint is obviously desirable since it is desirable to avoid water leakage and any interference with the free oscillation of the spray head 5.

The spray head 5 carries pipe sections 14 and 15 establishing a T having spaced outlet ports 16 and 17. The ends of the pipes 14 and 15 are closed as at 18 by plugs which may be removed to drain the sprinkler or to permit it to be flushed out.

At 19 and 20 I have shown links pivotally connected to a rod or tube 21 and to the pipes 14 and 15 adjacent the outlet ports 16 and 17, respectively. Each of the links 19 and 20 includes a cage portion 22 for the valve members 23 and 24, respectively, which may be readily removed and replaced when necessary. The cages 22 are adjustably locked in proper position as by set screws 22a through the slots 19a and 20a in the links 19 and 20.

In operation water delivered through the head 5 to the pipes 14 and 15 is discharged through the spray jets 8 and through whichever of the ports 16, 17 is open. While it is theoretically possible that the rod or tube 21 be so balanced that both of the ports 16 and 17 are open, it will be found in practice that this situation never results and therefore only one of the ports 16, 17 will be open and available to start the oscillation of the head 5.

Water discharged through the open port (16 in Fig. 1 and 17 in Fig. 2) has a reactive force effective to swing the pipes 14 and 15 and turn the head 5 on its axis. When the pipes 14 and 15 have swung beyond a horizontal position, the tube or rod 21 is shifted by gravity causing a simultaneous closing of the port 16 and an opening of the port 17 as indicated in Fig. 2. It is a requirement of the rod 21 that it connect the valves for simultaneous movement and have sufficient weight to provide positive valve closing and cooperate with the reactive force of the water in effecting an even oscillation of the sheet of spray established by the jets 8.

It should be noted that the weight of the rod 21 is not the only factor involved in controlling the ports 16 and 17. Because of the leverage established by the links 19 and 20 on the rod 21, these parts may be kept relatively light and still establish a tight closure of the ports that requires considerable pressure to open. This is important as it permits the ports 16 and 17 to be of moderate size as the reactive force necessary to oscillate the head 5 depends to a large extent on the weight of the links 19 and 20 and the rod 21.

In operation it should be noted that as the rod 21 is shifted by gravity to open one port and close the other, the reactive force of the water delivered through the newly opened port opposes the rotative influence of the rod 21 on the spray head 5 and that the water delivered through the other port as it is closed, provides a hydraulic cushion for the valve. Thus, the momentum in one direction is not immediately checked with the closing of a port, but the water discharged through the opened port is effective to gradually check movement in one direction and cause a reverse movement so that harsh or irregular oscillation of the head 5 is avoided. There is no necessity, when my devices are in use, for a mechanical bumper, although one may be employed to cushion the arms when the device is being moved.

Because variations in water pressure may interfere with the most satisfactory operation of my invention by causing too rapid oscillation, and because the water pressure utilized to actuate my sprinkler may be materially less than that of the water in the hose 10, I prefer to employ a valve 25 in the head 5, whereby the effective reactive pressure may be regulated. If desired, the flow of water to the arms 14 and 15 may be prevented, establishing a stationary spray which is sometimes desired.

In accordance with my invention I am therefore able to provide a satisfactory sprinkler which not only effectively sprays a rectangular area with a regularly oscillating curtain of water, but which may be readily moved from one position to another without shutting off the water. While my novel sprinkler may be approached from either end, it may be most conveniently approached from the end established by the support 2, since if desired, either the arm 14 or the arm 15 may be held, preventing oscillation while water is still being discharged through the spray jets 8 so that the sprinkler may be safely moved or the valve 25 adjusted. On release of the retained arm, the oscillation will immediately commence.

What I therefore claim and desire to secure by Letters Patent is:

1. A sprinkler comprising a support, a spray head horizontally mounted in said support for axial rotation, means to cause said head to oscillate, said means comprising a pair of conduits carried by said head, each of said conduits including an outlet port and said conduits being so disposed relative to each other and said head that the reactive force of water delivered through said ports is mutually opposed, and gravity operated valve means to effect the opening of one port simultaneously with the closing of the other port so that said ports are alternately opened, whereby the reactive force of water discharged through said ports effects oscillation of said head.

2. A sprinkler comprising a support, a spray head horizontally mounted in said support for axial rotation, means to cause said head to oscillate, said means including a pair of conduits carried by said head, each of said conduits including an outlet port and said conduits being so disposed relative to each other and said head that the reactive force of water delivered through said ports is mutually opposed, and valve means to open and close said ports so that said ports are alternately opened, whereby the reactive force of water discharged through said ports is controlled to effect oscillation of said head, said valve means including a valve pivotally mounted adjacent each port, and a link interconnecting said valves.

3. A sprinkler comprising a support, a spray head horizontally mounted in said support for axial rotation and means to cause said head to oscillate, said means including a pair of conduits carried by said head, each of said conduits including an outlet port and said conduits being so disposed relative to each other and said head that the reactive force of water delivered through said ports is mutually opposed, and valve means to open and close said ports so that said ports are alternately opened, whereby the reactive force of water discharged through said ports is

controlled to effect oscillation of said head, said valve means including a weighted member, a link pivotally connected to said weighted member and to said conduits adjacent each of said ports, each of said links including a cage and a replaceable valve member in each cage.

4. A sprinkler comprising a support, a spray head horizontally mounted in said support for axial rotation and means to cause said head to oscillate, said means including a pair of conduits carried by said head, each of said conduits including an outlet port and said conduits being so disposed relative to each other and said head that the reactive force of water delivered through said ports is mutually opposed, and valve means to open and close said ports so that said ports are alternately opened, whereby the reactive force of water discharged through said ports is controlled to effect oscillation of said head, said valve means including a weighted member, a link pivotally connected to said weighted member and to said conduits adjacent each of said ports, a valve member for each port, a cage for each valve member, and means adjustably connecting said cages to said links.

5. A sprinkler comprising a support, a spray head horizontally mounted in said support for axial rotation and including a pair of conduits having outlet ports, said conduits being so disposed relative to each other that the reactive force of water delivered through said ports is mutually opposed, a valve for each port and gravity operated means to simultaneously actuate said valves so that when one port is open, the other port is closed, said gravity operated means first retarding partial rotation of said head in one direction effected by the reactive force of water delivered through one port, then closing that port and continuing rotation of said head in that direction until the reactive force of water delivered through the other port is effective to cause partial rotation of said head in the other direction.

6. A sprinkler comprising a spray head, a support, means on said support rotatably supporting said head, said means including a bearing for one end of said head adapted to take thrust and radial loads, a conduit adapted to detachably receive a hose or the like and to receive the other end of said head, means in said conduit to seal the joint between said conduit and said head, said sealing means comprising a cup-shaped washer including a sleeve portion and a shoulder portion, said portions being adapted to be forced into tight engagement with said conduit and the end of said head by the pressure of fluid in said conduit, means to confine said washer in said conduit adjacent the end of said head, and means to oscillate said head, said means including a pair of conduits having outlet ports so disposed relative to each other that the reactive force of water discharged through said ports is mutually opposed and gravity operated valve means to effect the opening of one port simultaneously with the closing of the other port.

CLARENCE N. STONE.