A. ANDREWS.

IRRIGATING PLANT.

APPLICATION FILED AUG. 29, 1914.

1,142,223.

Patented June 8, 1915.

2 SHEETS—SHEET 1.

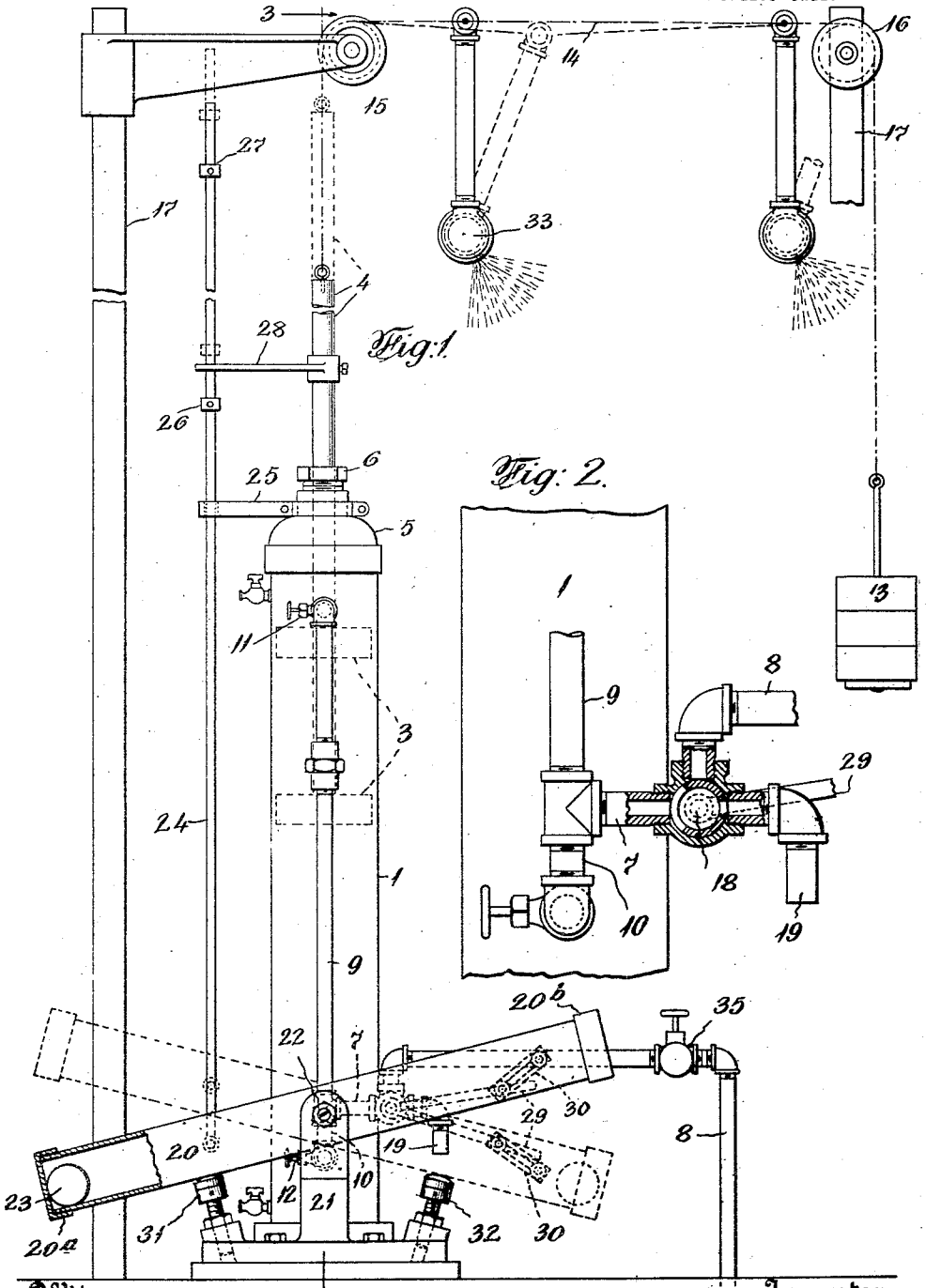


Fig: 1.

Fig: 2.

Witnesses:

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By his Attorney

Arthur Becker

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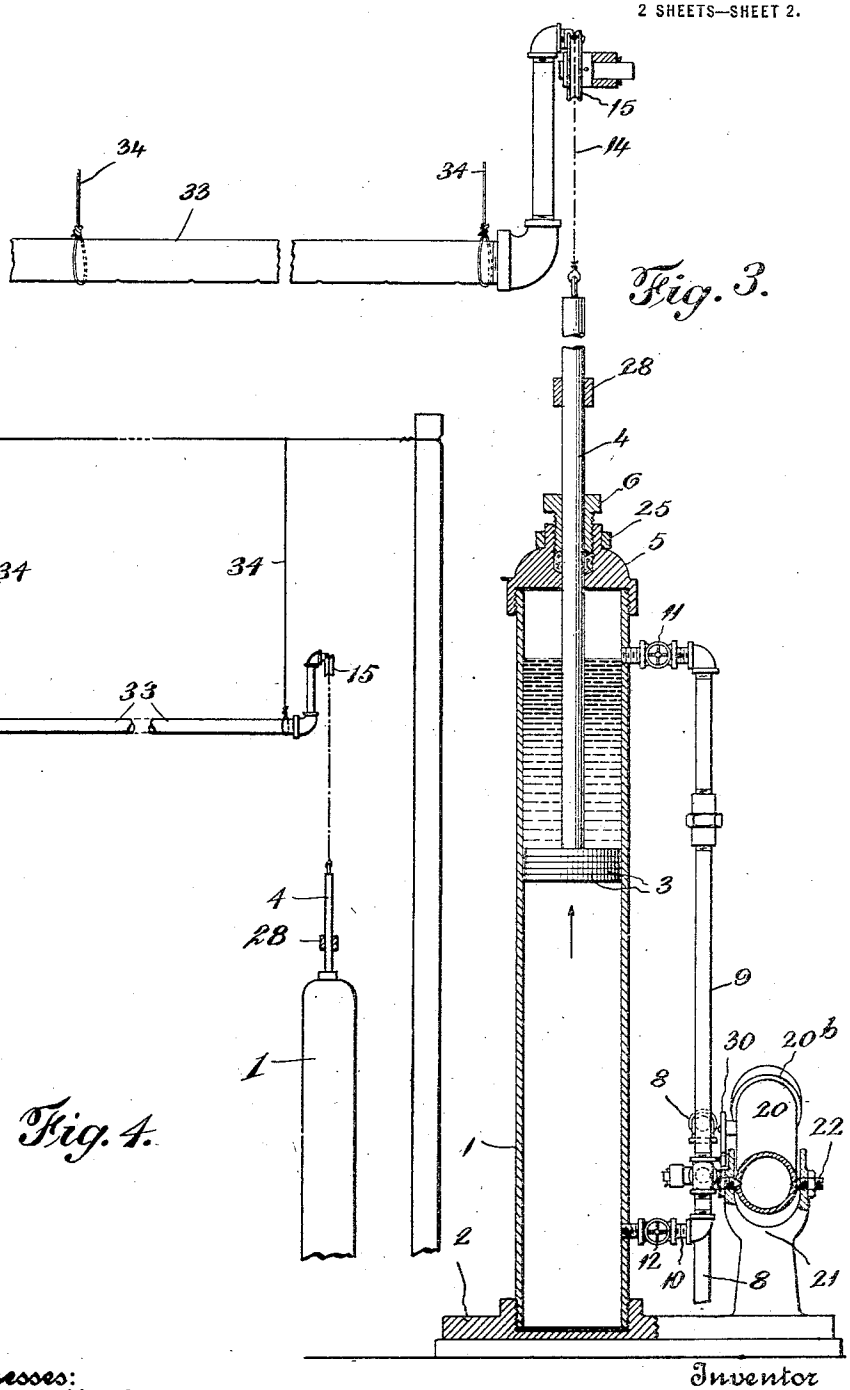


Fig. 3.

Fig. 4.

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UNITED STATES PATENT OFFICE.

AMOS ANDREWS, OF PLAINFIELD, NEW JERSEY.

IRRIGATING PLANT.

1,142,223. Specification of Letters Patent. Patented June 8, 1915.

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To all whom it may concern:

Be it known that I, AMOS ANDREWS, a citizen of the United States, and a resident of Plainfield, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Irrigating Plants, of which the following is a specification.

This invention relates to irrigation systems and particularly to a system utilizing motors of the reciprocating piston type.

The invention contemplates the provision of an irrigating plant comprising a reciprocating motor for moving or oscillating in unison a plurality of spraying members.

The main object of the invention is to provide a system of a simple construction inexpensive to manufacture and which operates with great efficiency at the expense of a small amount of energy.

With these and other objects in view the invention preferably comprises a plurality of horizontal perforated pipes supported by a suitable means permitting the oscillation of the pipes. These pipes receive water from any desired source, and are so connected to a reciprocating water-motor that the movement of the motor piston rotates the pipes. Certain features of the motor cooperate with these elements to produce various advantageous results.

Other features of the invention will appear as the specification proceeds.

The drawings accompanying the specification illustrate the invention in a concrete and preferred form but it is to be understood that the invention is capable of many changes and modifications without departing from the spirit and scope of the invention as is set forth in the appending claims.

In the drawings: Figure 1 is a side elevation of the motor showing the same connected with a plurality of spraying members. Fig. 2 is a fragmental detail view of the three-way valve which controls the flow of fluid pressure to the cylinder and partly shown in section to illustrate the detail construction thereof. Fig. 3 is a vertical sectional view substantially at right angles to Fig. 1 and taken on the line 3—3 of Fig. 1. Fig. 4 is a view similar to Fig. 3, showing more or less diagrammatically the general arrangement of motor, spraying members and supports for the latter.

Similar reference characters denote similar parts throughout the specification and drawings.

1 denotes a cylinder, preferably supported in a vertical position in any desirable manner upon the base 2, although the cylinder is here shown as threaded in the base so that the same may be easily and quickly dismantled for the purpose of cleaning, etc. A piston 3 is adapted to reciprocate in the cylinder and has the piston rod 4 preferably extending through the upper end of the cylinder 1. The cylinder is provided at its upper end with the removable cap 5 having a suitable stuffing means 6 through which the rod 4 extends.

A pipe connection 7 connects the cylinder 1 with a main supply pipe 8 through the branch connections 9 and 10, which latter is so connected to the cylinder to introduce fluid pressure from supply pipe 8 to opposite sides of the piston 3. Preferably in actual use only one of these branch connections 9 and 10 is brought into use during the operation of the motor, since fluid pressure is in the present instance used to effect the stroke of the piston in one direction only. However, by the connections 9 and 10 the direction of movement of the fluid pressure stroke may be changed at will by the manipulation of either of the cut-off valves 11 or 12.

In the preferred embodiment, herein shown, the cut-off valve 12 is normally closed and the valve 11 normally open, and water under pressure from any suitable source is supplied to the cylinder through the pipe 8, pipe 7 and branch pipe 9 to act upon the upper side of the piston 3 to force the same downward. Any suitable pressure resisting means may in the form here disclosed be connected with the piston for forcing the same upwardly in the cylinder 1 and thereby completing one cycle of operation of the motor. However, in the present instance a counterweight 13 is connected with the piston rod 4 through a cable or chain 14 which passes over the pulleys 15 and 16 suitably supported in a plane above the motor by the supports 17. This counterweight 13 operates to effect the return stroke of the piston when the exhaust to the cylinder 1 is open, thus allowing the water pressure, which has been acting upon the piston, to escape therefrom under the tension or stress of the counterweight.

The supply of water under pressure to the

cylinder for operating the piston 3 is automatically governed by the three-way valve 18 which will establish communication between the main supply pipe 8 and the pipe connection 7 and between the pipe connection 7 and the exhaust 19. This three-way valve is operated by a suitable controlling means which in turn is operated by the piston at the finish of each stroke thereof. The controlling means preferably consists in a race 20 intermediately pivoted to swing in a bracket 21 on a horizontal axis 22 and may have mercury, shot, a single ball or any other suitable means 23 movable therein. This race 20 is pivotally connected with the vertical rod 24 supported in the bracket 25. The rod 24 has the collars 26 and 27 adjustable thereon and adapted to be engaged by the arm 28 adjustably secured upon the piston rod 4. As the piston rises and falls the arm 28 engages with the collars and reciprocates the rod 24 upwardly and downwardly with the piston 3.

The race 20 is connected with an operating lever 29 of the three-way valve 18 by the slotted link 30 which is pivotally secured to the race.

Now assuming that the parts above described are in the position shown in Fig. 1, water pressure will enter through pipe 8 and branch connection 9 to the cylinder and will move the piston downwardly. The collar 26 is so adjusted upon the rod 24 that when the piston is about to finsh its downward stroke the arm 28 will engage the collar 26 and move the rod 24 downwardly with the piston, and the rod 24 will in turn swing the race 20 upon its axis from the position shown in dotted lines, Fig. 1, to a position where the end 20^a thereof will be tilted slightly below the horizontal axis of the race. During this movement of the race, the lever connections between the same and the valve 18 will not operate the latter to any extent to cut off the fluid pressure to the cylinder 1, but as soon as the end 20^a of the race is tilted below its horizontal axis the ball 23 will roll from the end 20^b to the end 20^c and thus effect a sudden drop of the end 20^a to the bumper 31, which will rotate the valve 18 quickly and positively to shut off fluid pressure to the cylinder and will open the cylinder to the exhaust 19. Now that the pressure in the cylinder 1 is open to the atmosphere the pressure resisting means 13 will gradually raise the piston and force the water in the cylinder through the branch pipe 9 and out through the exhaust 19, and thereby return the piston to its normal or initial position. Now as the piston is about to finish its upward or return stroke the arm 28 will engage with the collar 27 on the rod 24 and will slowly raise the end 20^a of the race 20 from the position shown in full lines, Fig. 1, to a tilted position slightly above its horizontal axis. When the race has reached this position the ball 23 will roll to the end 20^b and thus cause the race to move quickly and rotate the valve 18 to close the exhaust port and open communication between the fluid pressure supply and the cylinder.

The rapidity at which each stroke of the piston will operate depends upon the rapidity at which the fluid pressure is supplied to and exhausted from the cylinder, which may be controlled, and in the present instance is, by the valve 18. By adjusting the bumpers 31 and 32 and thereby limiting the final or quick movement of the race 20 the position of the valve 18 may be regulated and the rapidity of operation of the piston varied. In the event it is desired to effect a slow movement of one stroke of the piston and a quick movement of the return stroke of the piston, the bumpers 31 and 32 may be independently adjusted for varying the operation of the valve 18. The irrigation is effected through a plurality of horizontal perforated pipes 33 supported by any suitable means 34 which will allow the pipes to rotate upon their axes. These pipes receive water from any desired source and have one end secured to the cable 14 so that upon each stroke of the piston these spraying pipes 33 may be oscillated or swung about their axes, as may be clearly seen from Figs. 1 and 3. A cut-off valve 35 is provided in the main supply pipe 8 for cutting off fluid pressure to the cylinder 2.

What is claimed, is:

1. An irrigating plant comprising: spraying means including a pipe having an offset portion, a reciprocating water motor having a source of supply independent of said spraying means, means for varying at will the speed of said motor, to effect an indeterminate number of speeds within a given range, and connections between said motor and said offset portion whereby, upon the reciprocation of said motor, said pipe is given an oscillating movement at a speed independent of the rate of water supply to the pipe.

2. An irrigating plant comprising: spraying means including a pipe, cables by which said pipe is supported, a reciprocating water motor, means operatively connecting said motor and said pipe whereby the reciprocation of the former effects directly the oscillation of the latter, and means for varying the frequency of oscillation of the spraying means without substantially varying the rate of flow of water discharged by the spraying means.

3. An irrigating plant comprising: a perforated pipe having an offset portion, a motor including a piston, a cable attached at one end to said piston and extending over pulleys, the other end of the cable carrying

weights, the cable connected at intermediate points to said offset portion, and means for supplying water to said motor independently of the water supply to said pipe.

4. An irrigating plant comprising: a series of perforate pipes each provided with an offset portion, means for supporting said pipes to enable them to be rotated about their own axes, a reciprocating water motor including a piston, a cable attached at one end to said piston and extending over pulleys, the other end of the cable carrying weights, the cable connected at intermediate points to said offset portions, and means for supplying water to said motor independently of the water supply to said pipes, whereby the reciprocation of the piston effects an oscillation of the pipes.

5. An irrigating plant comprising: spraying means including a pipe having a bodily movement, a reciprocating water motor including a piston, a cable connected to said piston, means attached to the other end of the cable for maintaining the cable taut, a device in operative connection with said pipe and cable whereby the reciprocation of the piston and cable effects the movement of said pipe, and means for varying the speed of the water motor without substantially varying the rate of flow of the water discharged by the spraying means.

6. An irrigating plant comprising: spraying means including a pipe, reciprocating water motor including a piston, a cable attached to the piston and extending over pulleys, means for maintaining the cable taut, the cable connected at an intermediate point to said pipe, whereby the reciprocation of piston and cable effects the movement of said pipe, and means for varying the speed of the motor in either direction at will independently of the rate of flow of water through the spraying means.

7. An irrigating plant comprising: a pipe mounted for oscillation on its axis, and means for oscillating said pipe comprising a reciprocating motor having variable-speed mechanism, a cable connected at one end to the stem of the motor and passing over pulleys, and secured intermediate its length to said pipe, and weight means connected to the other end of the cable.

8. An irrigating plant comprising: spraying means adapted to have a bodily movement, a water motor having a reciprocating piston, connecting means between the piston and spraying means for effecting a bodily movement of the latter at a speed proportionate to the speed of reciprocation of the piston, means for supplying water to the water motor independently of the spraying means, and means for varying the rate of flow of water to the water motor without substantially varying the rate of flow of water discharged by the spraying means.

9. An irrigating plant comprising: spraying means adapted to oscillate, a water motor having a reciprocating piston, connecting means between the piston and spraying means for oscillating the latter at a speed proportionate to the speed of reciprocation of the piston, means for supplying water to the water motor independently of the spraying means, and means for varying the rate of flow of water to the water motor without substantially varying the rate of flow of water discharged by the spraying means.

10. An irrigating plant comprising: spraying means adapted to have a bodily movement, a water motor having a reciprocating piston, connecting means between the piston and spraying means for effecting a bodily movement of the latter at a speed proportionate to the speed of reciprocation of the piston, and means for varying the speed of the piston without substantially varying the rate of flow of water discharged by the spraying means.

11. An irrigating plant comprising: spraying means adapted to oscillate, a water motor having a reciprocating piston, connecting means between the piston and spraying means for oscillating the latter at a speed proportionate to the speed of reciprocation of the piston, and means for varying the speed of the piston without substantially varying the rate of flow of water discharged by the spraying means.

Signed at Newark in the county of Essex and State of New Jersey this 25th day of Aug. A. D. 1914.

AMOS ANDREWS.

Witnesses:
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