Dec. 25, 1928. 1,696,385

W. H. COLES

IRRIGATING DEVICE

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Fig. 1.

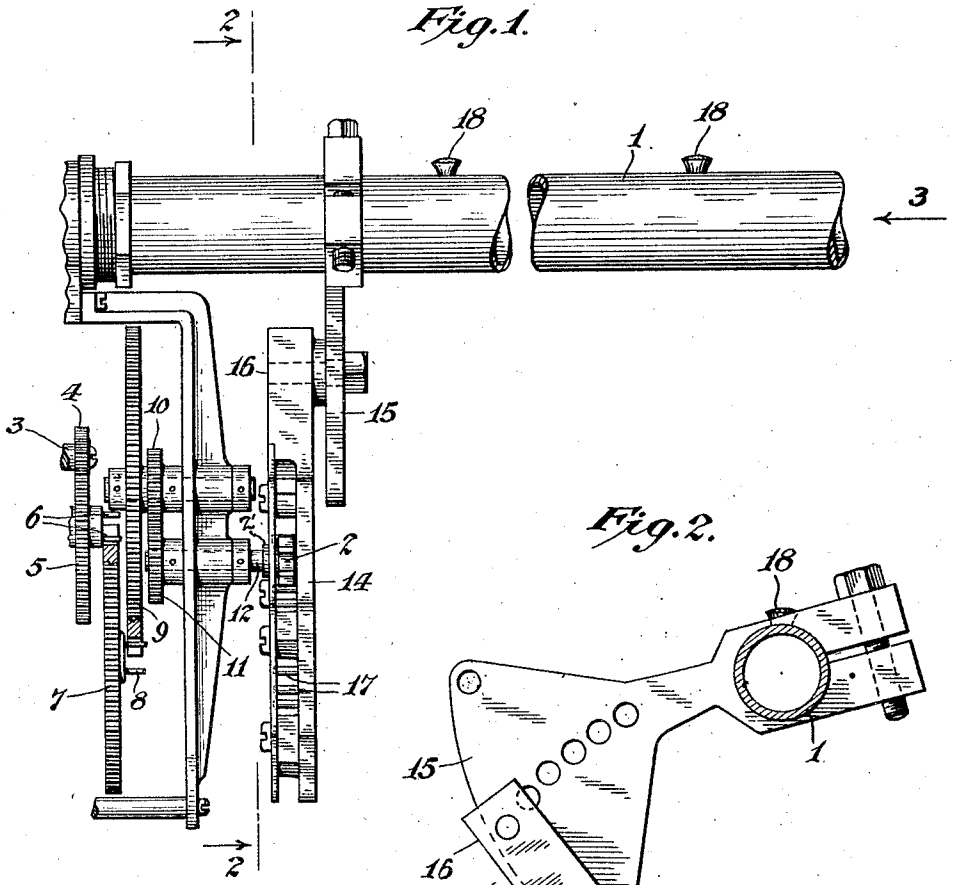
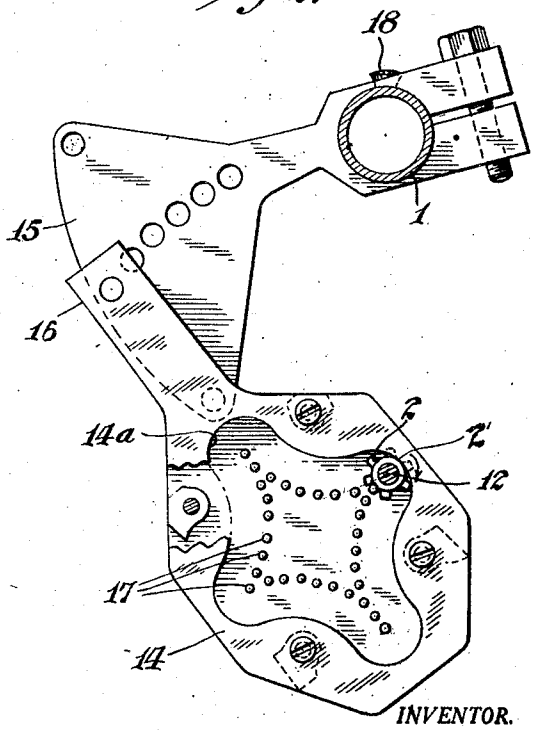


Fig. 2.



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IRRIGATING DEVICE

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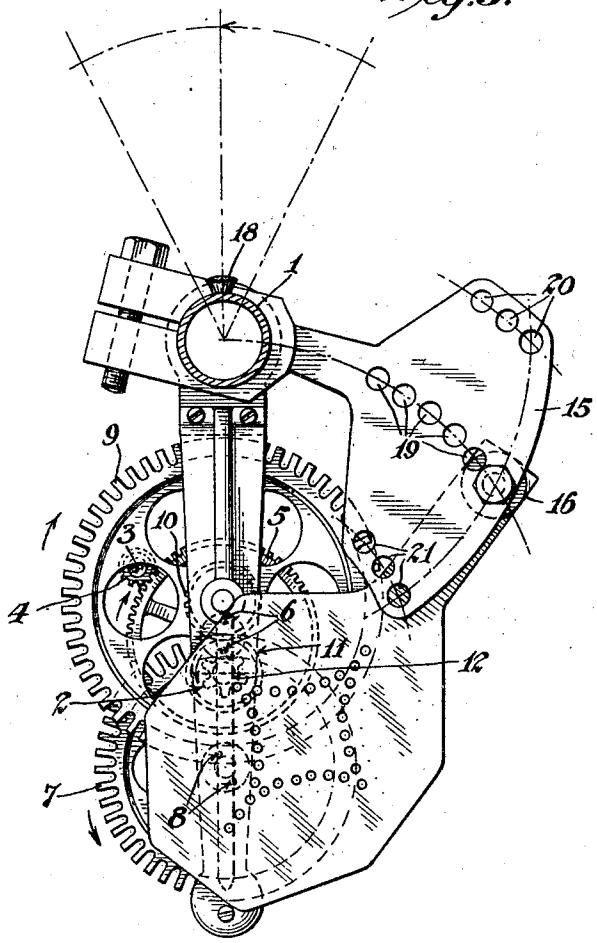
Fig. 3.



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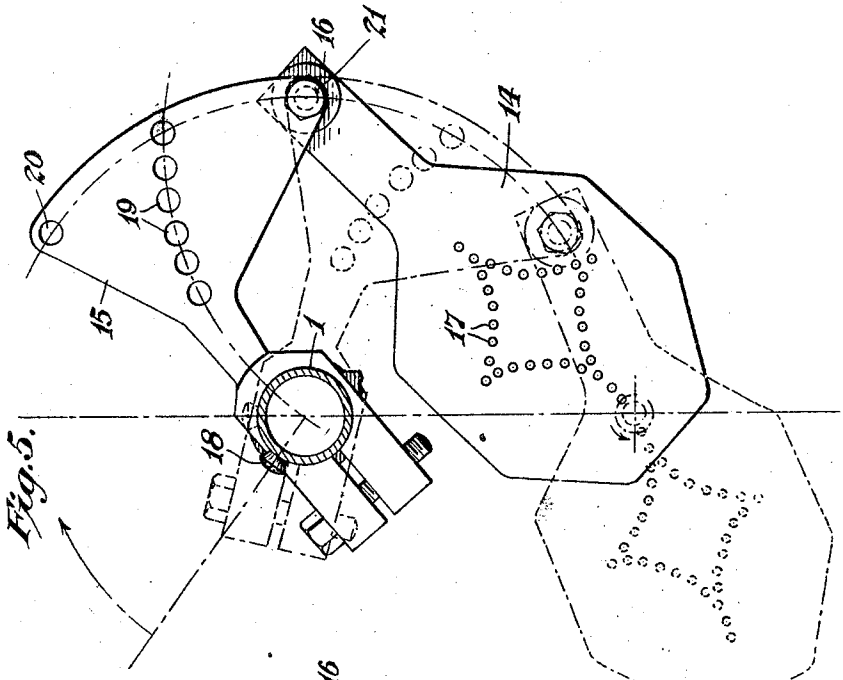

Fig. 5.

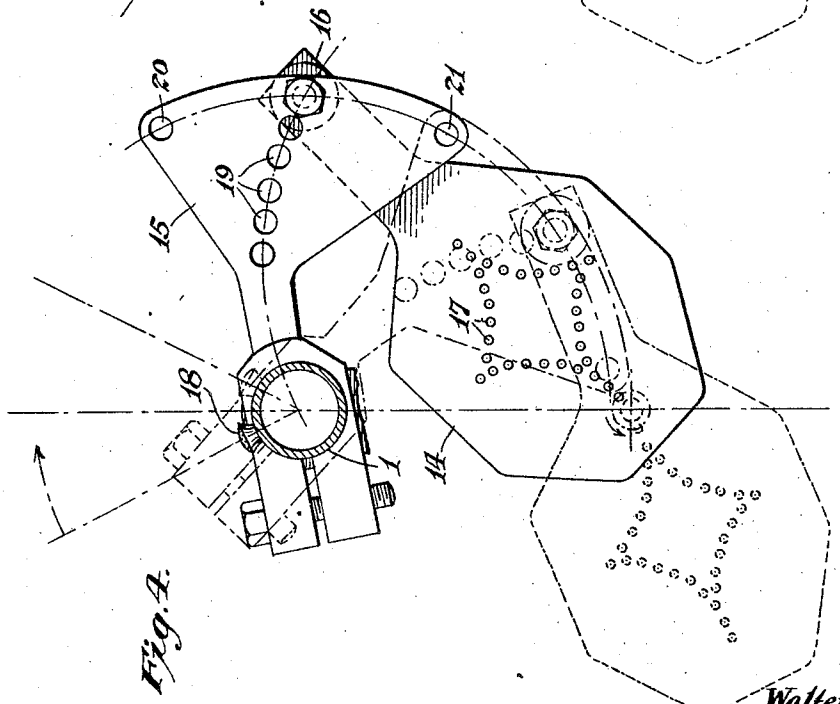

Fig. 4.

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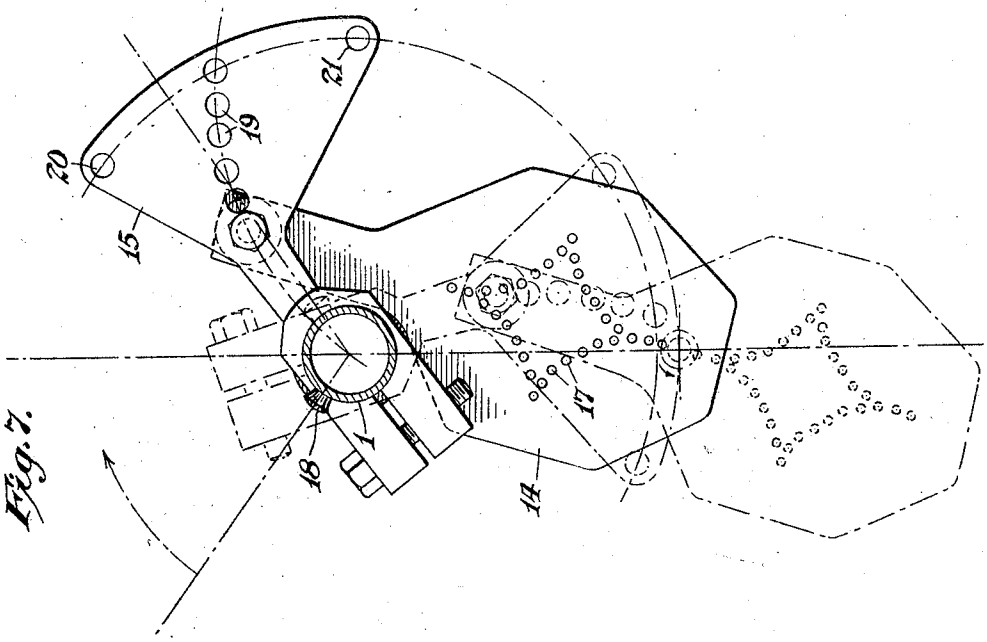

Fig. 7.

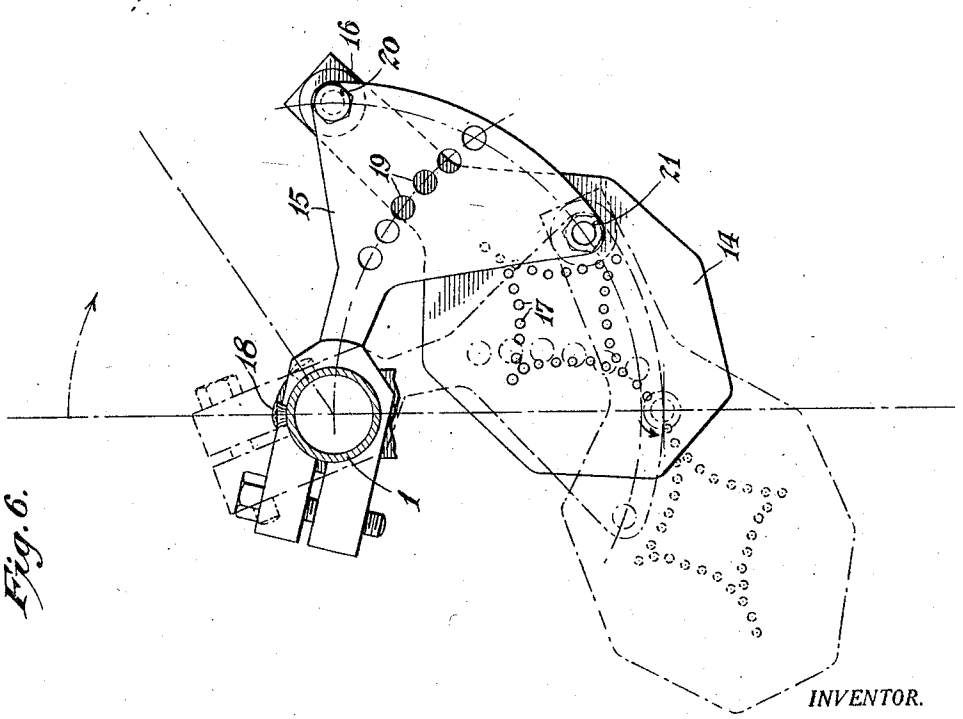

Fig. 6.

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UNITED STATES PATENT OFFICE.

WALTER H. COLES, OF TROY, OHIO, ASSIGNOR TO THE SKINNER IRRIGATION COMPANY, OF TROY, OHIO, A CORPORATION OF OHIO.

IRRIGATING DEVICE.

Application filed June 4, 1926. Serial No. 113,656.

This invention relates to irrigating devices particularly of the type known as overhead irrigating systems, and has for its main object and feature the production of simple and inexpensive means for oscillating a sprinkler pipe, such means being at the same time not only flexible so that adjustments can be readily made to vary the character of the oscillation and the amplitude of the stroke of oscillation but also positive in their action so that the oscillation may take place uninterruptedly and at such varying speed that the distribution of water over a given surface is substantially uniform.

In the accompanying drawings the invention is disclosed in a concrete and preferred form in which

Fig. 1 is a front elevation of a portion of an irrigating device embodying one form of the invention.

Fig. 2 is a vertical sectional view substantially on the plane of line 2—2 of Fig. 1.

Fig. 3 is a view in side elevation of the parts shown in Fig. 1, looking in the direction of arrow 3 of Fig. 1 with the sprinkler pipe in section and with the parts so adjusted that the pipe oscillates an equal distance on both sides of the vertical and with the smallest amplitude of stroke possible in the construction shown.

Fig. 4 is a view similar to Fig. 3, but more diagrammatic in form, with the parts in the same adjusted position and showing the extremes of the strokes in opposite direction.

Fig. 5 is a view similar to Fig. 4 but with the parts so adjusted that the oscillation takes place entirely at the left hand side of the vertical.

Fig. 6 is a view similar to Figs. 4 and 5 but with the parts so adjusted that the oscillation takes place entirely at the right hand side of the vertical.

Fig. 7 is a view similar to Fig. 4 with the parts so adjusted that the pipe oscillates an equal distance on both sides of the vertical and with the greatest amplitude of stroke in the construction shown.

1 indicates an oscillatory sprinkler pipe suitably mounted in any convenient way and 2 is a rotatable driving element here taking the form of a pinion or gear. Any suitable means may be employed to actuate the driving element but preferably 3 indicates the shaft of a water motor, said shaft driving pinion 2 through a suitable train of reducing gears here indicated by pinion 4, gear 5, pin wheel 6, gear 7, pin wheel 8, gear 9, pinions 10 and 11, the latter, 11, being mounted on shaft 12, carrying gear 2.

The problem is to oscillate the sprinkler pipe 1 from gear 2 and to do this in a positive, simple and adjustable manner. To this end suitable driving connections are utilized including a variable-speed cam-gear or a variable speed member 14 and this cam-gear is here shown connected to an arm 15 attached to the sprinkler pipe. The connection between gear 14 and arm 15 is eccentric or it may be said that bolt 16 is a crank carried by the floating member and to which arm 14 is connected. The cam gear is polygonal-sided and takes substantially the form of a lozenge as indicated at 17 having concave faces; and surrounding the gear is a cam surface 14, complementary to that of the arrangement of teeth 17, with which cam surface the bushing 2′ of gear 2 engages. The rotation of driving gear 2 therefore causes member 14 to travel about it in an irregular orbit. It is a well known fact that a movement of nozzle 18 equal to one degree from the vertical will cause the water to traverse the ground more quickly than a similar movement of the nozzle when pointing at an angle of say forty-five degrees with respect to the vertical. It is for this reason that the variable-speed gear is utilized and the arrangement is therefore such that when the nozzle is at the vertical it travels much more slowly than when at a considerable angle with respect to the vertical. The operation then is that gear 2 meshes with teeth 17 of cam gear 14 and oscillates the sprinkler pipe at a varying speed, the slowest speed occurring when the nozzles are at the vertical and gradually increasing as the nozzles are pointed away from the vertical.

In ordinary circumstances the parts will be so adjusted that the pipe will oscillate an equal distance at both sides of the vertical so as to spray the ground equally on both sides of the pipe, and the parts are shown so adjusted in Figs. 3 and 4. The amplitude of the stroke across center may in practice be anywhere from fifty-five degrees to one-hundred-ten degrees. To vary the amplitude of the stroke from the fifty-five degree stroke shown in Figs. 3 and 4 arm 15 may conveniently have a series of bolt holes 19 that are

arranged in an arc of a circle the center of which is the center of gear 2 when occupying the position shown in Fig. 3, that is, with the nozzle in vertical position, and it will be understood that by placing bolt 16 in the position indicated in Fig. 7 the amplitude of the stroke is doubled or increased to one-hundred-ten degrees.

In some circumstances it is desirable to have the oscillation of the sprinkler pipe take place entirely at one side of the vertical. To adjust the parts to this position there are provided two other holes 20 and 21 in arm 15. These two holes and the outermost hole 19 are arranged, with respect to each other, in an arc of a circle the center of which is the center of oscillation of the sprinkler pipe as indicated in Fig. 3, and it will be understood that, when bolt 16 is placed in hole 21 (Fig. 5), the oscillation will be entirely at the left hand side of the vertical, and that, when bolt 16 is placed in hole 20 (Fig. 6), the oscillation will be entirely at the right hand side of the vertical. Of course, there may be a series of holes 20 and another series of holes 21 as shown to thereby vary the amplitude of the stroke at either side of the vertical.

I claim:

1. An irrigating device including: an oscillatory sprinkler pipe, a rotatable driving element, and driving connections from the driving element to the pipe including an arm attached to the pipe and a member connected to the arm, and adjustable with respect thereto both in an arc of a circle the center of which is the center of oscillation of the pipe and also in an arc of a circle the center of which is the center of rotation of the rotatable driving element to thereby oscillate the pipe an equal distance at both sides of the vertical or to oscillate it at one side of the vertical and, in either case, with different amplitudes of strokes at will.

2. An irrigating device including: an oscillatory sprinkler pipe, a rotatable driving gear, a polygonal-sided gear meshing with and traveling about, the driving gear, and connections from the polygonal-sided gear to the pipe, to thereby oscillate the latter.

3. An irrigating device including: an oscillatory sprinkler pipe, a rotatable driving gear, a substantially lozenge-shaped gear having concave faces meshing with, and traveling about, the driving gear, and connections from the lozenge-shaped gear to the pipe, to thereby oscillate the latter.

4. An irrigating device including: an oscillatory sprinkler pipe, a rotatable driving gear, a polygonal-sided gear meshing with, and traveling about, the driving gear, and an arm attached to the pipe and eccentrically connected to the polygonal-sided gear to oscillate the pipe.

5. An irrigating device including: an oscillatory sprinkler pipe, a rotatable driving gear, a substantially lozenge-shaped gear having concave faces meshing with, and traveling about, the driving gear, and an arm attached to the pipe and eccentrically connected to the lozenge-shaped gear to oscillate the pipe.

6. An irrigating device including: an oscillatory sprinkler pipe, a rotatable driving gear, and driving connections from the driving gear to the pipe, to thereby oscillate the latter, including a variable-speed cam gear meshing with the driving gear and traveling about the same.

7. An irrigating device including: an oscillatory sprinkler pipe, a concentrically rotatable driving gear, and driving connections from the driving gear to the pipe, to thereby oscillate the latter, including a variable-speed cam gear meshing with the driving gear and traveling in an irregular orbit about the same.

8. An irrigating device including: an oscillatory sprinkler pipe, a rotatable driving gear having a bushing and driving connections from the driving gear to the pipe, to thereby oscillate the latter, including a variable-speed cam gear supported by the bushing of, meshing with and traveling about, the driving gear.

9. An irrigating device including: an oscillatory sprinkler pipe, a concentrically rotatable driving gear having a bushing, and driving connections from the driving gear to the pipe, to thereby oscillate the latter, including a variable-speed cam gear supported by the bushing of, meshing with and traveling in an irregular orbit about, the driving gear.

Signed at Troy, in the county of Miami and State of Ohio, this 29th day of May, 1926.

WALTER H. COLES.