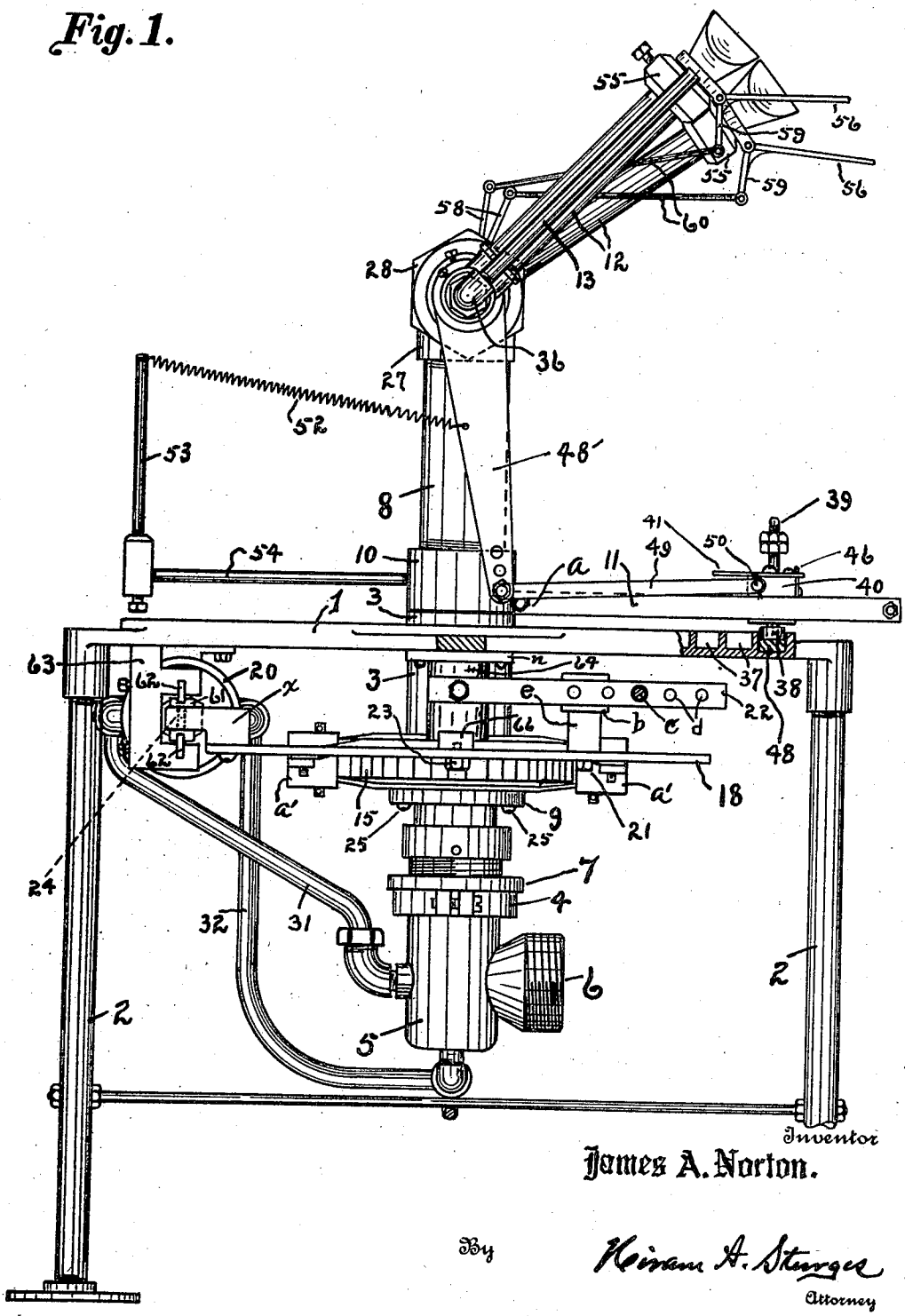
May 8, 1923. 1,454,332

J. A. NORTON

IRRIGATING APPARATUS

Filed Nov. 3, 1921 6 Sheets-Sheet 1

Fig. 1.



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Attorney

May 8, 1923.

1,454,332

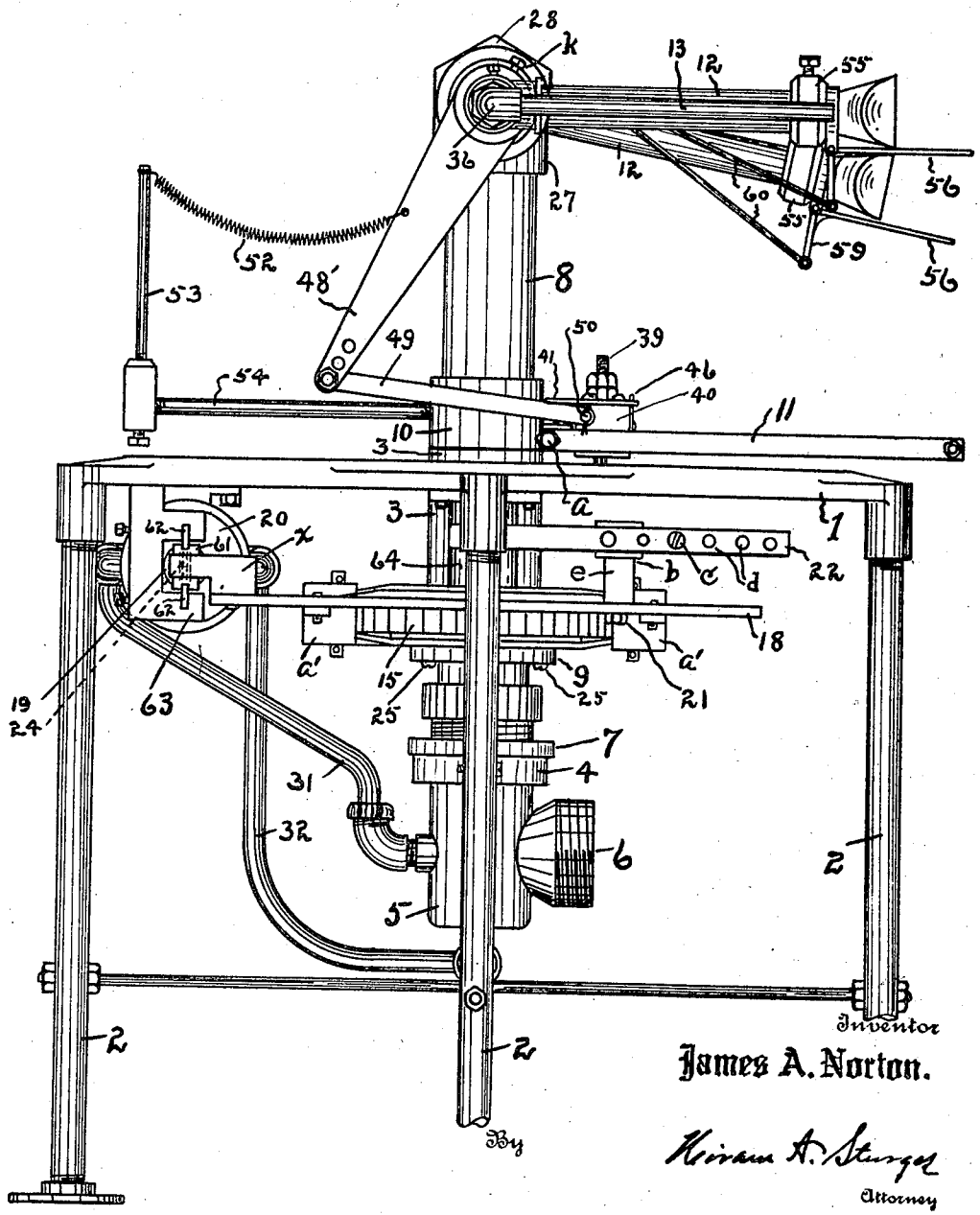
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Filed Nov. 3, 1921

6 Sheets-Sheet 2

Fig 2.



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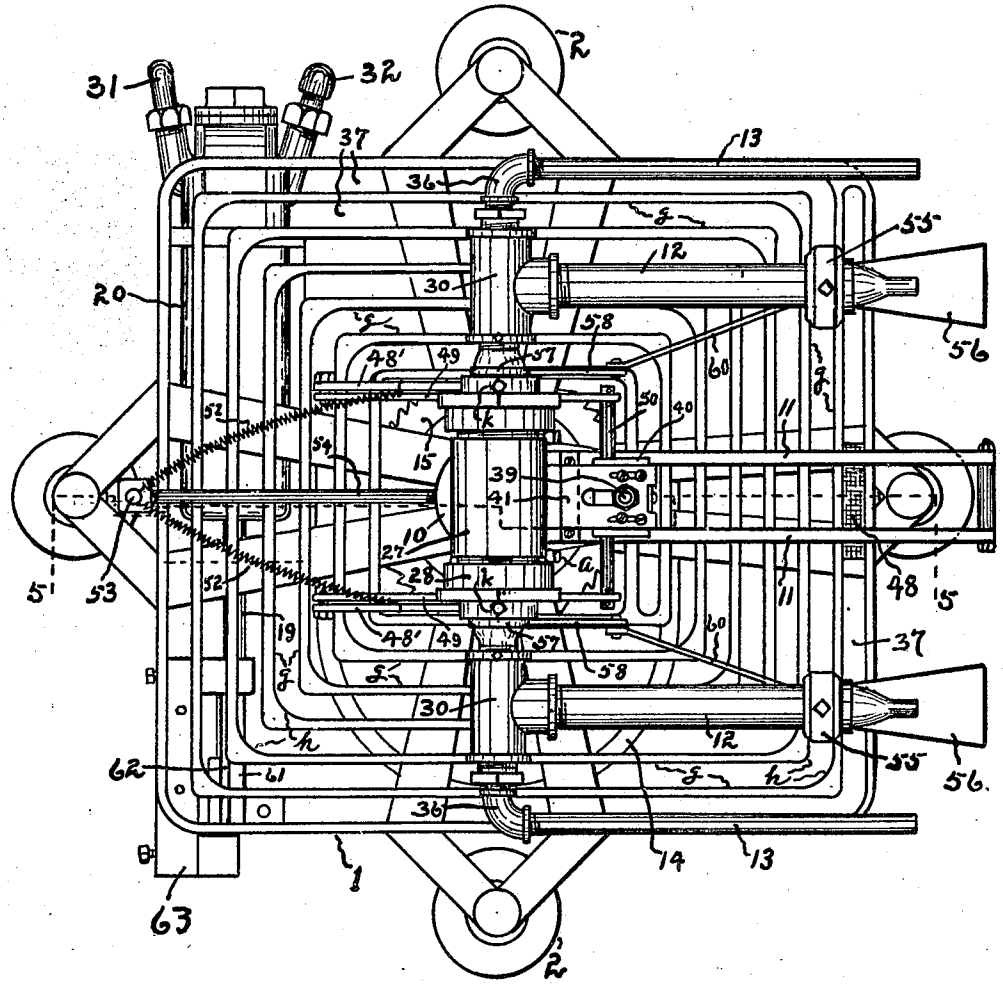
May 8, 1923. 1,454,332

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IRRIGATING APPARATUS

Filed Nov. 3, 1921 6 Sheets-Sheet 3

Fig. 3.



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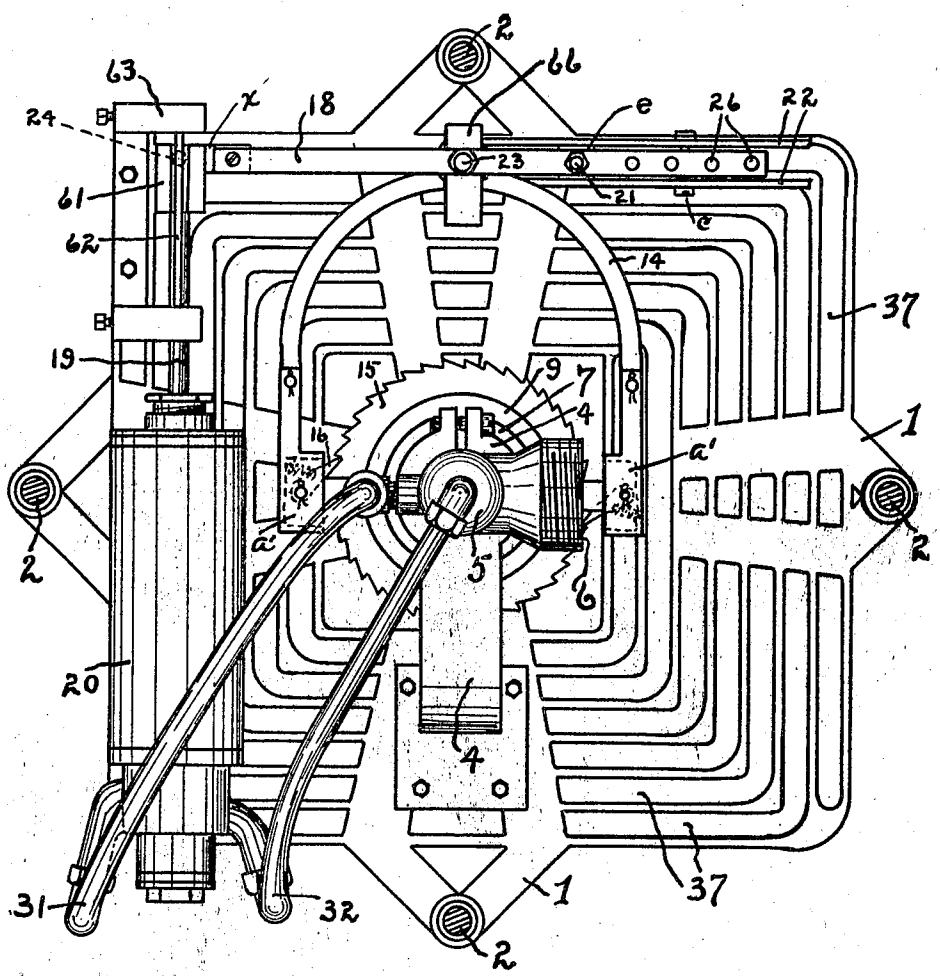
May 8, 1923. 1,454,332

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IRRIGATING APPARATUS

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Fig. 4.



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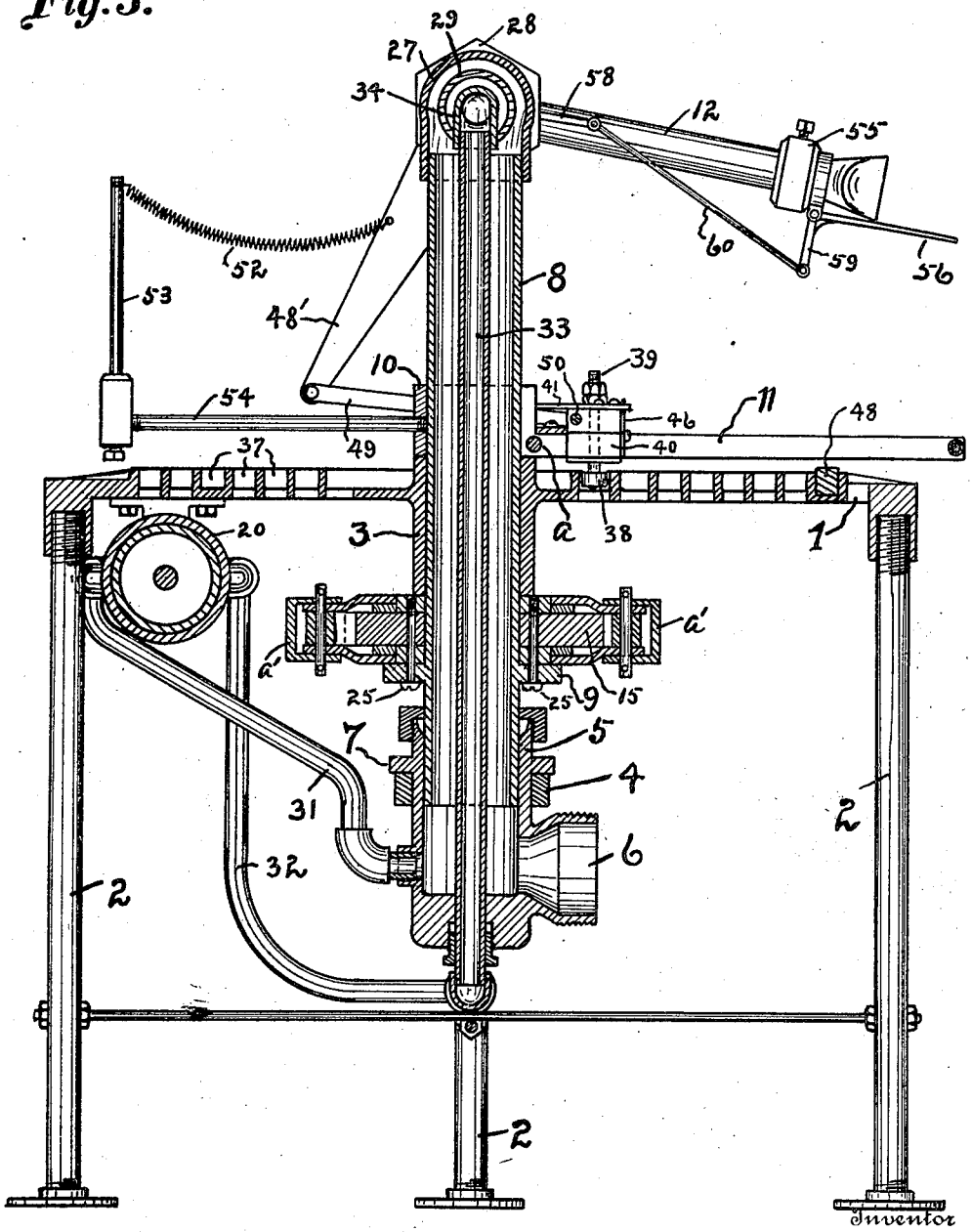
May 8, 1923. 1,454,332

J. A. NORTON

IRRIGATING APPARATUS

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Fig. 5.



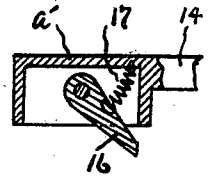


Fig. 6.

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IRRIGATING APPARATUS

Filed Nov. 3, 1921 6 Sheets-Sheet 6

Fig. 7.

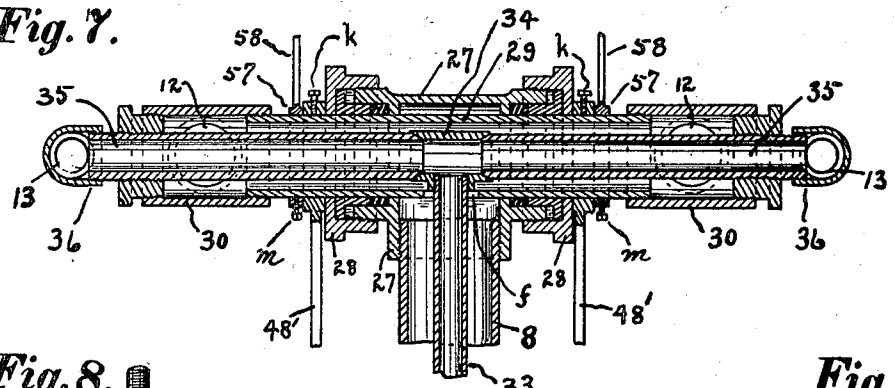


Fig. 8.

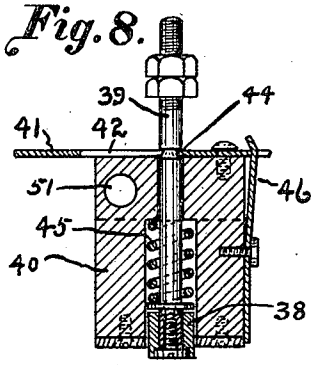


Fig. 9.

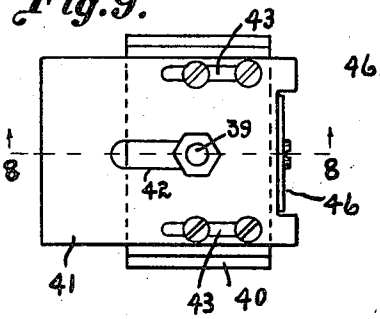


Fig. 10.

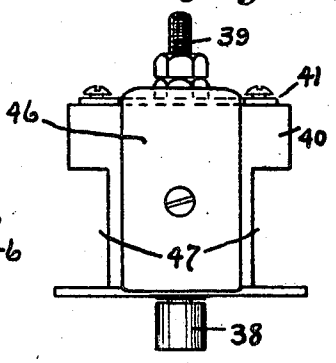


Fig. 14.

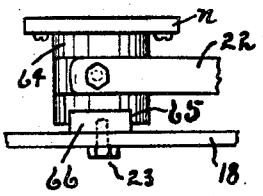
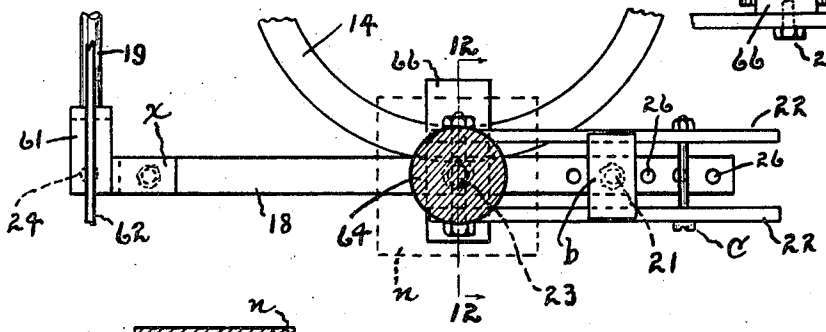


Fig. 11.



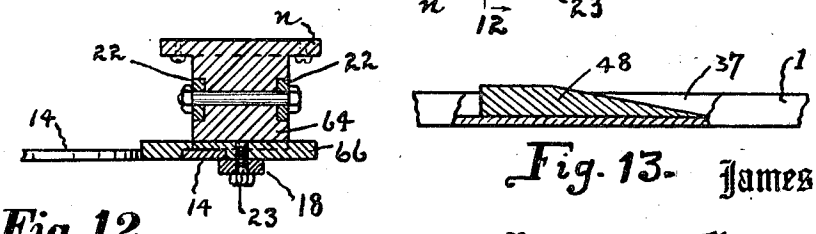


Fig. 12.

Fig. 13.

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Patented May 8, 1923. 1,454,332

UNITED STATES PATENT OFFICE.

JAMES A. NORTON, OF ODEBOLT, IOWA.

IRRIGATING APPARATUS.

Application filed November 3, 1921. Serial No. 512,478.

To all whom it may concern:

Be it known that I, JAMES A. NORTON, a citizen of the United States, residing at Odebolt, in the county of Sac and State of Iowa, have invented certain new and useful Improvements in an Irrigating Apparatus, of which the following is a specification.

This invention has for its object to provide an apparatus which may be disposed at the middle of a rectangular area and will operate to irrigate said area uniformly or practically so by directing water under pressure thereto.

The novel and useful features of the invention are fully described herein and pointed out in the appended claims, and illustrated in the accompanying drawings, wherein,—

Fig. 1 is a view of the apparatus in side elevation, the nozzles being swung upwardly, and a part of the frame broken away. Fig. 2 is a similar view to that shown in Fig. 1, showing the relative position of parts when the nozzles have been swung to their lower position. Fig. 3 is a top plan view of the apparatus. Fig. 4 is a bottom plan view of the same, the legs being in transverse section. Fig. 5 is a sectional view on line 5—5 of Fig. 3. Fig. 6 is a sectional detail showing one of the pawls for a yoke. Fig. 7 is a view of the nozzle-holder in longitudinal section. Figs. 8, 9 and 10 are details relating to a shifting-block. Fig. 8 is a sectional view on line 8—8 of Fig. 9. Fig. 9 is a plan view of the shifting-block. Fig. 10 is an end view of the shifting-block. Fig. 11 is a plan view of a rock-lever and parts connected therewith. Fig. 12 is a sectional view on line 12—12 of Fig. 11. Fig. 13 is a detail relating to the platform. Fig. 14 is a side view of a block showing the pivotal mounting of the yoke and rock-lever.

Referring now to the drawing for a more particular description, a frame is shown consisting of a platform 1 provided with legs 2, and also provided at its middle with a sleeve 3 which extends beyond its upper and lower sides. Numeral 4 indicates a hanger or L-shaped bracket which, as best shown in Fig. 4, is secured to and extends below the platform for supporting a stationary cylindrical container 5 having an intake port 6 for water under pressure, the support of said member 5 being its boss 7 which is disposed upon a part of the L-shaped bracket.

Mounted to permit rotation in the sleeve 3 and container 5 is a conducting pipe 8 which extends considerably above the platform, said pipe being provided, between its ends, with a boss 9.

Numeral 10 indicates a sleeve provided with a guide or pair of parallel, horizontal arms 11, this sleeve being keyed to the pipe 8 by means of a bolt *a*, the bearings for said sleeve being upon the upper end of the sleeve 3. The guide 11 extends outwardly somewhat beyond the edge of the platform.

Means are provided to cause a revoluble movement, in one direction, of the pipe 8, the pair of nozzles 12 and pair of secondary nozzles 13 swinging circularly therewith, for discharging water to the rectangular area.

Means for adjustments are also provided to control the revoluble speed of the pipe 8, so that the volume of water discharged may be greater or less, as may be desired, at each complete rotation of said pipe.

Also means are shown for moving the nozzles upwardly and downwardly for the purpose of discharging water to greater or lesser distances from the apparatus, and means are provided for swinging the nozzles upwardly to their greatest elevation while the nozzles discharge water to parts most remote from the apparatus, these remote parts being at the "corners" of the rectangular area.

The revoluble movement, in one direction, for the pipe 8 is accomplished by means of the longitudinal reciprocation of a yoke 14 which causes rotation of a ratchet-wheel 15, the arms of the yoke at opposed sides of the wheel 15 being provided with casings *a'* in which pawls 16 are mounted and are pressed against the teeth of the ratchet-wheel by means of springs 17, said pawls operating, in alternation, to cause a part rotation of said wheel, reciprocation of the yoke being caused by a rock-lever 18 actuated by the piston 19 of a pump 20 of well known type, said rock-lever swinging from its pivot 21 mounted in the block *b* of an adjusting-frame 22 which is secured to the lower side of the platform, the pivotal mounting of said lever with the yoke being indicated at 23, and its pivotal connection with the piston 19 being indicated at 24, in a block *x* provided for said rock-lever.

The adjusting-frame 22 consists of a pair of arms provided with the block *b*, said arms being maintained parallel by means of a screw *c* adapted to engage in apertures *d* of

said arms, a spacing-block *e* being supported by said arms and adapted to receive the pivot 21. The ratchet-wheel 15 is secured, by means of bolts 25, to the boss 9 of the pipe 8 (Fig. 5) and therefore the pipe 8 will be rotated by the longitudinal reciprocation of the yoke.

The rock-lever is provided at longitudinal intervals, near its distal end, with apertures 26, and it will be seen that if the pivot 21 engages in an aperture 26 further from the pivotal mounting 23 of the yoke, the distance to which the yoke will be moved will be increased, the result being that the revoluble movement of the ratchet-wheel and pipe 8 will be increased, this often being desirable to permit a lesser quantity of water to be discharged during a single rotation of said pipe; and it will be understood that a greater quantity of water will be discharged during a single rotation of the pipe 8 if the pivot 21 engages in an aperture 26 of the rock lever nearer to the pivot 23 of the yoke.

The distal end of the piston 19 is provided with a head 61 adapted to slide in a pair of guides 62, these guides being supported by a bracket 63 which is secured to the lower side of the platform, the head 61 having a pivotal connection with the block *x* of the rock-lever 18. The pivotal connection 23 of the rock-lever with the yoke 14 is best shown in Figs. 11, 12 and 14. A block 64 is provided with a flange *n* which is secured to the lower side of the platform, said block providing mountings for the arms of the adjusting-frame 22 and having a slot 65 for receiving a slide-plate 66 with which the rock-lever is connected by the pivot 23 and with which the yoke is connected, the operation being that reciprocation of the piston and resulting movements of the rock-lever will cause reciprocation of the slide-plate 65 and yoke.

A nozzle-holder is provided, best shown in Fig. 7, consisting, in part, of a T-pipe coupling 27 which is threaded upon the upper end of the pipe 8, and revolubly mounted therein and journalled in packing-nuts 28 is a conduit 29 having a slot *f* formed therein to provide an intake communicating with pipe 8, and upon the ends of the conduit 29 are mounted T-pipe couplings 30 which provide mountings for the nozzles 12.

The intake-pipe 31 for the pump is in communication with the intake 6 for water under pressure. The discharge pipe for the pump is indicated at 32 and it communicates with a conducting pipe 33 which traverses the pipe 8, the upper end of said pipe 33, within the pipe 28, being provided with a T-pipe coupling 34, and mounted to permit rotation in the opposed ends of member 34 are comparatively short conducting pipes 35, elbows 36 being mounted on the ends of pipes 35 in which the nozzles 13 are mounted.

The means for causing swinging movements, upwardly and downwardly, of the nozzles consist, in part, of a trackway which is approximately rectangular in plan, this trackway being a groove 37 formed in the platform and extending many times about the tube 8, commencing near the middle of said platform and terminating near its outer edge, the walls *g* of the groove, at one side, being parallel with the walls *g* at the opposite side of the platform, and having curved parts *h* adjacent to the corners of the platform to permit a roller 38 to move in the groove without undue resistance.

As best shown in Fig. 8, the roller 38 is mounted on the lower end of a plunger 39 carried by a shifting-block 40, the latter being provided on its top with a plate 41 having a slot 42 adapted to receive the plunger and having slots 43 formed therein.

The plunger is provided with an annular groove 44 adapted to catch upon the plate 41 when the plunger is elevated against the force of a spring 45; and at 46 is indicated a spring which is provided for the shifting-block, said spring operating to press the plate 41 into the groove 44.

The shifting-block is adapted to have sliding movements on its guide or parallel arms 11, and its sides are provided with recesses 47 in which said arms engage. Numeral 48 indicates a block of wedge-shape which is disposed below the guide 11 in a groove 37 near the edge of the platform, and the plunger slides upwardly on this block against the force of the spring 45 during the movement of the roller in the groove 37, the result being that the roller is elevated somewhat above the platform, and by operation of the spring 46 the plate 41 will enter the annular groove 44 of the plunger to maintain the plunger and roller in said elevated position.

Numerals 48′ indicate projections or arms which are secured to the pipe 29 by means of set-screws *k*, and at 49 are indicated links which pivotally connect the arms 48′ with a pin 50 which is mounted in an aperture 51 (Fig. 8) of the shifting-block 40, and it will be understood that during the movement of the roller 38 in the groove 37 the block 40 will slide outwardly, the arms 48′ and links 49 causing a part rotation of the conduit 29, the nozzles then having an upward swinging movement which will continue until the plunger engages the wedge-shaped block 48 above mentioned.

Numerals 52 indicate springs which are adapted to aid in causing a sliding movement of the block 40 on the arms 11 toward the middle of the platform, said springs being secured at their inner ends to the arms 48′, their outer ends being secured to a strut

53 carried by a horizontal bar 54, the latter being mounted in the sleeve 10.

The nozzles 12 are provided with collars 55 operating as weights, which may be adjusted longitudinally thereon, and which aid in causing a downward swinging movement of the nozzles and a sliding movement of the block 40 toward the middle of the platform.

Since all parts of the apparatus above the platform move with the pipe 8 during the revoluble movements of the latter, the roller 38 will move in the groove 37, commencing near the middle of the platform and continuing until the plunger slides upwardly on the platform 48, the roller then being elevated above the platform, at which time the block 40 will quickly slide toward the middle of the platform by operation of the springs 52 and weights 55, the plate 41 being driven against the sleeve 10 with sufficient force to cause it to have a sliding movement against the force of the spring 46 and to be disengaged from the annular groove 44 of the plunger, the result being that the plunger will slide downwardly in the block 40 to permit the roller to again engage in the groove 37.

The nozzles, therefore, will be inclined downwardly when the roller is disposed in that part of the groove 37 near the middle of the platform and will gradually swing upwardly and will attain their highest position when the roller is disposed in a part of the groove near the edge of the platform. It will be understood that the nozzles move circularly in one direction only; also that the upward or downward swing movements of the nozzles will not be uniform during each cycle of movement, but will be greater when the roller engages the curved walls *h* of said groove near the corners of the platform, and their elevation will be less when the roller engages the walls *g* in parts of said groove midway between the corners of the platform.

It will thus be seen that the rectangular areas may be irrigated to great advantage, the shifting of the block 40, permitting water to be discharged to the middle and outermost parts, in alternation.

I claim as my invention:

1. In an irrigating apparatus, an upright, revoluble pipe provided with a nozzle, a stationary platform traversed by the pipe and having a groove surrounding and disposed at varying distances from said pipe, a guide movable with and extending outwardly from the pipe, a shifting-block engaging the guide and having a roller normally engaging in the groove of the platform, mechanism connected with the nozzle and shifting-block to cause the roller to move in said groove for moving the shifting-block outwardly from the pipe and for causing upward and downward swinging movements of the nozzle simultaneous with the revoluble movements of said pipe, and means on the platform for disengaging the roller from the groove to permit a sliding movement of the shifting-block toward said pipe and to permit a downward swinging movement of said nozzle.

2. In an irrigating apparatus, an upright, revoluble pipe provided with nozzles, a stationary platform traversed by the pipe and having an angular groove surrounding said pipe, mechanism connected with the nozzles and including a roller normally engaging in said groove, said mechanism being movable circularly by the revoluble movements of the pipe for causing swinging movements of the nozzle, and means for disengaging the roller from the groove to permit the nozzles to move downwardly in a circle's arc.

3. In an irrigating apparatus, a platform provided with a sleeve and having a groove surrounding and disposed at varying distances from the sleeve, an upright, rotatable conducting-pipe for water under pressure journalled in the sleeve and having a nozzle disposed transverse to its axis of rotation, a second sleeve, said second sleeve being keyed to the conducting-pipe and bearing upon the first named sleeve and provided with a guide, a shifting-block engaging the guide and having a roller normally engaging said groove, mechanism pivotally connecting the shifting-block with the nozzle for causing the roller to move in said groove to cause upward and downward swinging movements of the nozzle simultaneously with its horizontal swinging movements, and means on the platform to cause disengagement of the roller from the groove to permit a downward swinging movement of said nozzle.

4. In an irrigating apparatus, a platform provided with a sleeve and also provided with a groove surrounding and having rectilinear parts at opposite sides of the sleeve, a conducting-pipe having bearings in said sleeve, a revoluble mounted conduit in communication with said pipe, said conduit having projections and being provided with nozzles, a second sleeve, said second sleeve being secured to the conducting-pipe and bearing on the first named sleeve and provided with a rectilinear guide, a shifting block engaging the guide and having a roller normally engaging in said groove, mechanism pivotally connecting the shifting-block with the projections of the conduit, said conducting-pipe being revoluble for moving the roller in said groove to simultaneously cause the nozzles to swing horizontally and vertically, and means on the platform adapted to be engaged by the roller for disengaging said roller from the groove to permit a downward swinging movement of the nozzles.

5. In an irrigating apparatus, a revoluble conducting-pipe provided with nozzles, a platform traversed by and having a groove surrounding said pipe, a shifting-block having a roller normally engaging in the groove, mechanism connecting the nozzles with the shifting-block to cause simultaneous, swinging movements, in two directions, of the nozzles by a revoluble movement of the conducting pipe, and means to disengage the roller from the groove to permit the nozzles to have a downward swinging movement.

6. In combination with an irrigating apparatus having a revoluble pipe provided with nozzles and having a stationary platform traversed by the pipe and provided with a groove extending around the pipe to form numerous communicating passageways approximately rectangular in plan from near the pipe outwardly of the platform, said apparatus being provided with mechanism including a roller normally engaging in the groove operating to cause upward and downward swinging movements of the nozzles while the roller moves in the groove outwardly of the platform, of means to release the roller from the groove to permit the nozzles to swing downwardly, and means for moving the roller in a straight line to dispose it in that part of the groove near said pipe.

7. In an irrigating apparatus, a revoluble conducting-pipe provided with nozzles, a platform traversed by and having a groove surrounding the pipe, a rectilinear guide movable with the pipe, a shifting-block engaging the guide and having a roller normally engaging in the groove, mechanism pivotally connecting the block and said nozzles to cause a movement of the roller in the groove for swinging the nozzles upwardly, means for disengaging the roller from the groove, and means to coincidently cause the shifting-block to move on said guide and the nozzles to swing downwardly after the roller has been disengaged from the groove.

8. In an irrigating apparatus, a revoluble conducting-pipe, a revolubly mounted conduit having projections and provided with nozzles, said conduit being in communication and movable with the conducting-pipe, a platform traversed by and having a groove surrounding the conducting-pipe, a guide movable with the conducting-pipe, a shifting-block engaging the guide and having a roller normally engaging in the groove, a second conducting-pipe within the first named conducting-pipe, said second pipe having branches provided with nozzles and disposed in said conduit, mechanism pivotally connecting the block and the projections of the conduit to cause a movement of the roller in the groove for moving the nozzles of said conduit and the nozzles of said branches in a circle's arc, and means for disengaging the roller from the groove to permit the shifting-block to move on said guide and to permit downward swinging movements of the nozzles of the conduit and the nozzles of said branches.

9. In an irrigating apparatus, a revoluble conducting-pipe provided with nozzles, a platform traversed by and having a groove surrounding said pipe, a shifting-block having a contact member normally engaging in said groove, mechanism connecting the nozzles with the shifting-block to cause simultaneous horizontal and vertical swinging movements of the nozzles by the revoluble movement of the conducting-pipe, means to disengage the contact-member of the shifting-block from the groove to permit the nozzles to have a downward swinging movement, means to increase the degree of the revoluble movement of the conducting-pipe, and means to decrease the revoluble speed of said pipe.

In testimony whereof, I have affixed my signature in presence of two witnesses.

JAMES A. NORTON.

Witnesses:

HIRAM A. STURGES,

E. E. NORRIS.