No. 866,949. PATENTED SEPT. 24, 1907.

S. E. MERRICK.

WATER ELEVATOR.

APPLICATION FILED SEPT. 1, 1906.

Fig. I.

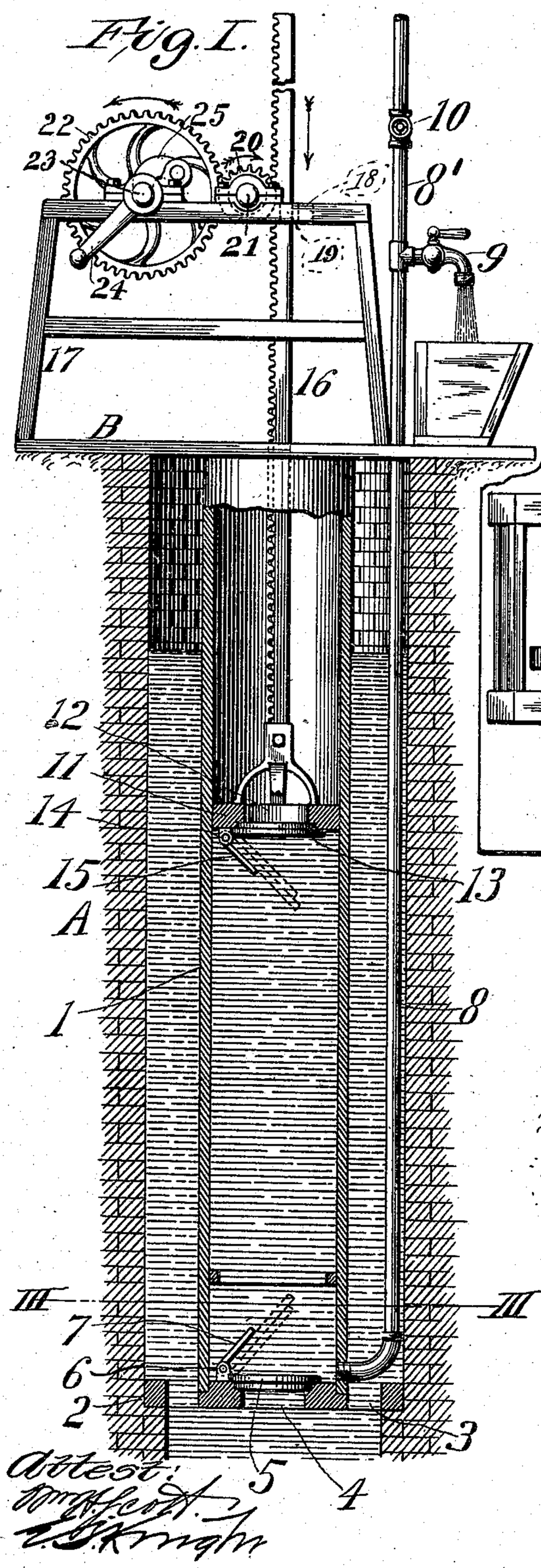


Fig. II.

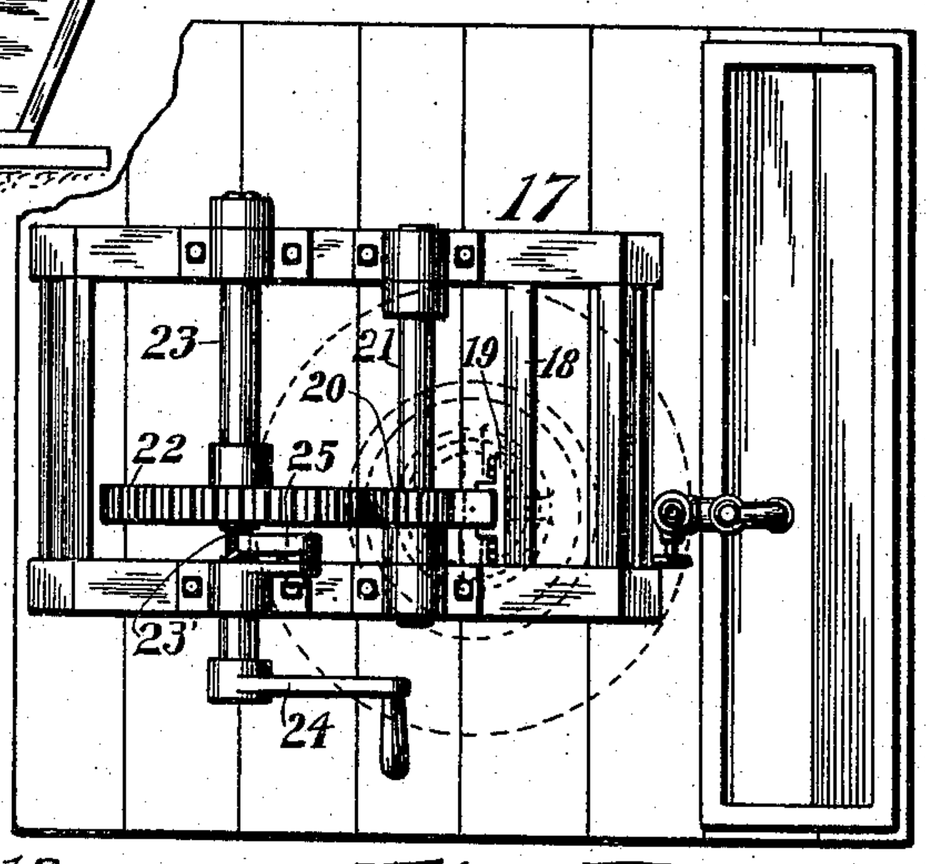
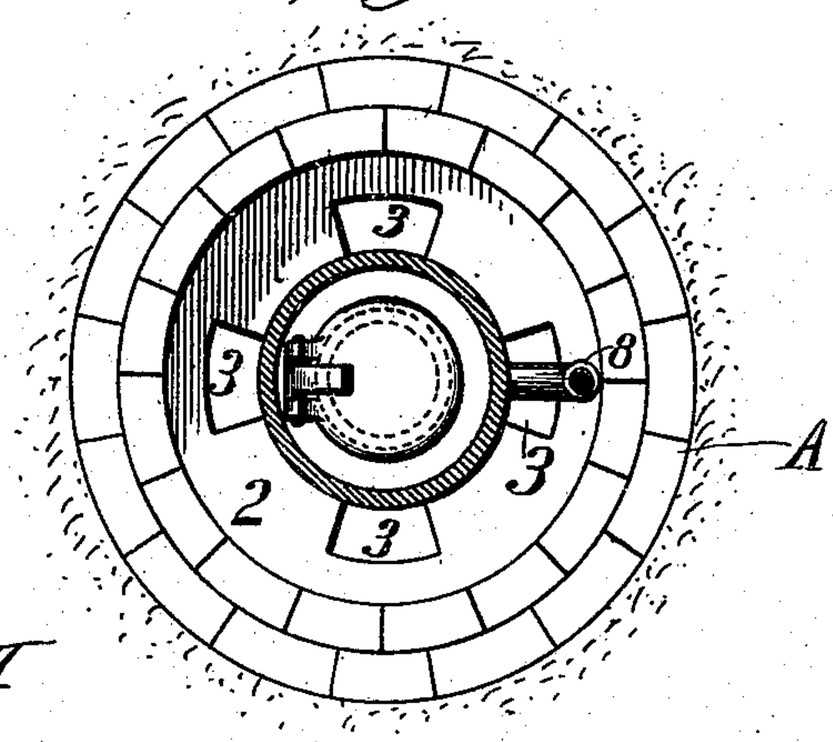


Fig. III.



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WATER-ELEVATOR.

No. 866,949. Specification of Letters Patent. Patented Sept. 24, 1907.

Application filed September 1, 1906. Serial No. 332,926.

To all whom it may concern:

Be it known that I, STEPHEN E. MERRICK, a citizen of the United States of America, residing in the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Water-Elevators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming part of this specification.

My invention relates to a device for exerting pressure upon the water in a well for the purpose of forcing the water from the well through a suitable pipe to the surface of the ground or to any desired elevation.

Figure I is a view partly in elevation and partly in vertical section of my water elevator. Fig. II is a top or plan view of the elevator. Fig. III is a top or plan view of a well with the surmounting platform omitted and the water receiving cylinder and discharge pipe shown in cross section taken on line III—III, Fig. I.

A designates a well having an inbuilt part providing an annular ledge and B is a platform surmounting the well.

1 designates a water receiving cylinder that is vertically positioned in the well A and spaced from the wall thereof so as to provide an annular water reservoir. The lower end of this receiving cylinder which extends into the water in the well is mounted upon a cylinder supporting circular base 2 that has an annular channel or groove in which the lower end of the cylinder is fitted and the base is provided with a series of segmental openings or water passageways 3 through which the water may circulate in either an upward or downward direction. This circular base 2 is seated upon the annular ledge formed by the inbuilt part of the well. The receiving cylinder supporting base is also provided with a central orifice 4 through which the water may enter the receiving cylinder.

5 is an upwardly opening and downwardly closing check valve pivoted to the cylinder supporting base at 6 and adapted to open in an upward direction within said receiving cylinder as indicated by dotted lines Fig. I. The upward movement of this valve is governed by an upwardly inclined stop arm 7 which serves to prevent the movement of the check valve in opening to a position past the dead center or the pivotal point of the valve. Located at a suitable distance above the check valve so as to be clear thereof is a plunger seat upon which the plunger can be supported so as not to come into contact with the check valve when the receiving cylinder is becoming exhausted or the elevator is not being used.

8 designates a discharge pipe leading from the lower end of the water receiving cylinder and extending upwardly through the annular water reservoir to the exterior of the well. This discharge pipe may be provided with a faucet 9 through which the water may be discharged into a trough at the well, and it may be also provided with an extension 8′ by which the water may be conducted to any desired point before being discharged. The pipe extension 8′ is preferably provided with a valve 10.

11 designates a plunger that is adapted to operate in the water receiving cylinder 1 to exert a pressure upon the water therein for the purpose of causing water to be forced through the discharge pipe 8. The plunger is provided with a central orifice 12 that is controlled by an upwardly closing and a downwardly opening check valve 13 which is pivoted to the lower side of the plunger at 14 so as to open downwardly, the degree of downward movement of the check valve being limited by a downwardly inclined stop arm 15 carried by the plunger.

16 is a rack bar attached by a spider frame to the plunger 11 and extending to the exterior of the well.

17 is a frame mounted upon the well platform and provided with a cross bar 18 to which is secured a guide bracket 19 in which the plunger rack bar operates.

20 is a pinion arranged in mesh with the teeth of the rack bar 16 and rotatably supported by a driven shaft 21 journaled in suitable bearing boxes mounted on the frame 17.

22 is a pinion driving gear wheel meshing with the pinion 20 and fixed to a driving shaft 23 that is journaled in suitable bearing boxes mounted on the frame 17. The driving shaft 23 is equipped with a crank handle 24 or any other suitable means whereby said driving shaft may be rotated.

In the practical use of my water elevator, the operation is as follows: The plunger 11 is first elevated by operating the driving shaft 23 and the gear wheel 22 thereon, whereby the pinion 20 geared to said gear wheel is rotated and caused to act with lifting effect upon the rack bar 16. As the rack bar is lifted it carries with it the plunger and the water in the well enters into the receiving cylinder 1 through the inlet orifice 4. The parts are then released and the plunger, with its rack bar, descends by gravity with the result of exerting a pressure against the water in the receiving cylinder 1, as a consequence of which the water is forced from said receiving cylinder into the discharge pipe 8 and held under pressure and may be withdrawn from said pipe at any point to which the pipe leads. It is to be understood that the plunger and the parts associated therewith which descend by gravity to force the water from the receiving cylinder 1 must be of sufficient weight to produce the necessary pressure against the water for the delivery thereof through the discharge pipe. It is obvious that when the plunger is descending to force the water from the receiving cylinder, the check valves 5 and 13 controlling the inlet orifice 4 and the plunger orifice 12 respectively are closed automatically, thereby preventing the water from being forced from the receiving cylinder

through the inlet orifice or through the plunger orifice into the upper end of the receiving cylinder.

For the purpose of providing for the disengagement of the pinion driving gear wheel 22 from the pinion 21 when the elevator is not in use, I so mount the driving shaft 23 that carries said gear wheel that it may be shifted longitudinally in its bearing boxes and form an annular groove 23′ in said driving shaft that is adapted to receive a dog 25. When this dog is seated in the groove in the driving shaft as just mentioned, it serves to hold the driving shaft from longitudinal movement and maintain the gear wheel in mesh with the pinion 20, but when the dog is withdrawn from said groove the driving shaft is readily shifted to throw the gear wheel out of mesh with said pinion.

I claim:—

1. The combination of a well having an inbuilt part providing a ledge, a water receiving cylinder located within and spaced from the wall of the well so as to provide a reservoir, a base formed with a series of passageways surrounding the receiving cylinder, with an annular groove in which the lower end of the receiving cylinder is fitted, and with a central inlet orifice surrounded by the receiving cylinder, a check valve for controlling the central inlet orifice and pivoted to the base at one side of its central inlet orifice, and adapted to open upwardly and to close downwardly, a discharge pipe leading from the lower end of the receiving cylinder, a gravitating plunger adapted to operate in the receiving cylinder, and formed with a central inlet orifice, and a check valve for controlling the central inlet orifice of the plunger and pivoted to the bottom of the plunger at one side of its central inlet orifice and adapted to close upwardly and to open downwardly.

2. The combination of a well having an inbuilt part providing an annular ledge, a water receiving cylinder located in and spaced from the wall of the well so as to provide an annular water reservoir, an annular base formed with an annular series of passageways surrounding the receiving cylinder, and with a central inlet orifice surrounded by the receiving cylinder, a check valve for controlling the central inlet orifice pivoted to the base at one side of its central inlet orifice and adapted to open upwardly and to close downwardly, a discharge pipe leading from the lower end of the receiving cylinder, a gravitating plunger, adapted to operate in the receiving cylinder, and formed with a central inlet orifice, and a check valve for controlling the central inlet orifice of the plunger pivoted to the bottom of the plunger at one side of its central inlet orifice and adapted to close upwardly and to open downwardly.

3. The combination of a water receiving cylinder, a base formed with a series of passageways surrounding the receiving cylinder, and with a central inlet orifice surrounded by the receiving cylinder, a check valve for controlling the central inlet orifice and pivoted to the base at one side of its central inlet orifice, and adapted to open upwardly and to close downwardly, a discharge pipe leading from the lower end of the receiving cylinder, a gravitating plunger adapted to operate in the receiving cylinder and formed with a central inlet orifice, a check valve for controlling the central inlet orifice of the plunger and pivoted to the bottom of the plunger at one side of its central inlet orifice and adapted to close upwardly and to open downwardly, and a seat for the plunger located within the receiving cylinder near the lower end of the latter for supporting the plunger out of contact with the base valve.

STEPHEN E. MERRICK.

In presence of—
E. S. KNIGHT,
H. G. COOK.