No. 697,595. Patented Apr. 15, 1902.

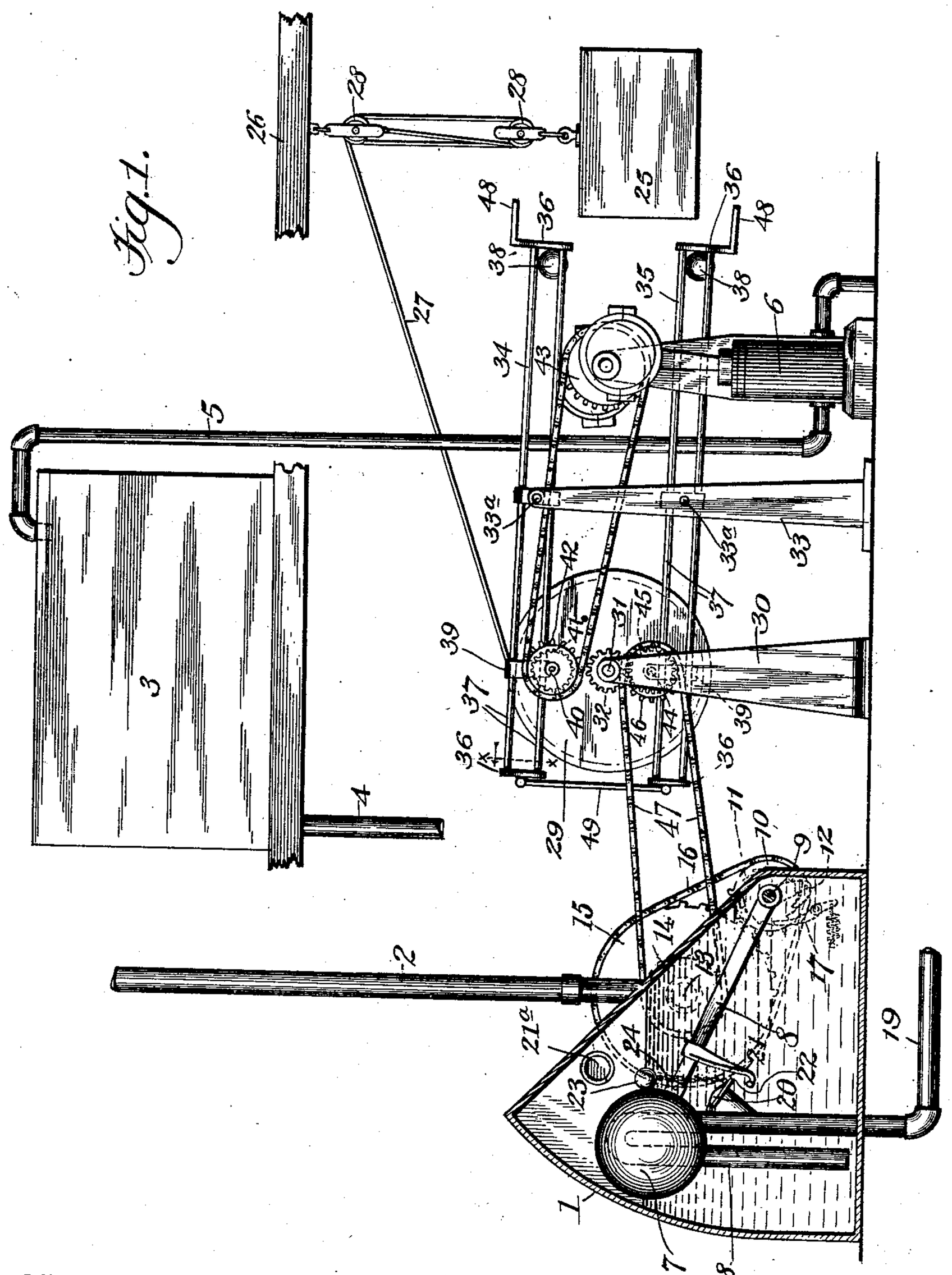
A. B. ANDERSON.

AUTOMATIC PUMPING MECHANISM.

(Application filed Aug. 25, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.



Witnesses:
A. D. Appleman Jr.
J. M. Hoctor.

Inventor
A. B. Anderson,
By his Attorney
L. R. Littell,

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Fig. 4.

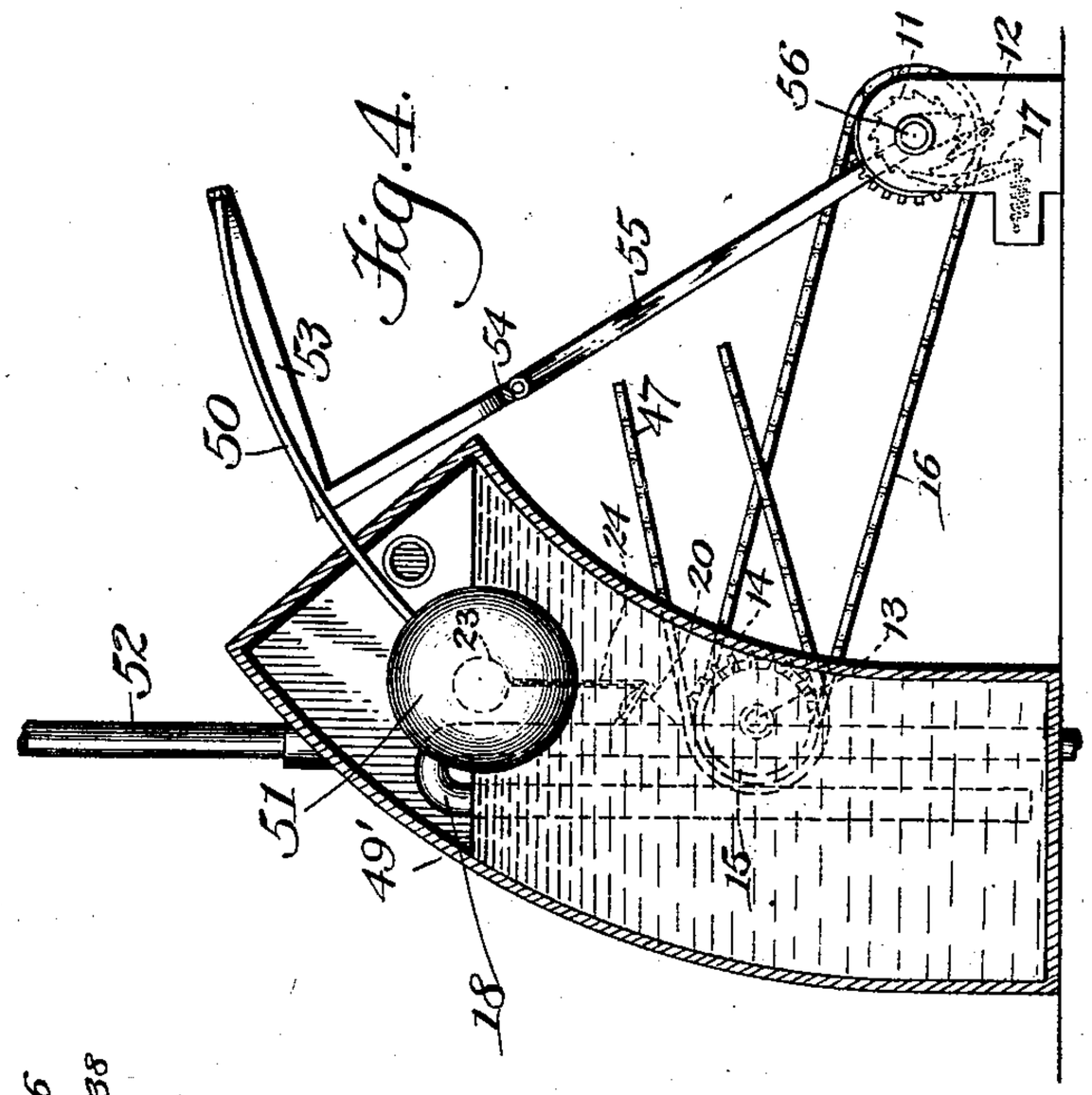


Fig. 2.

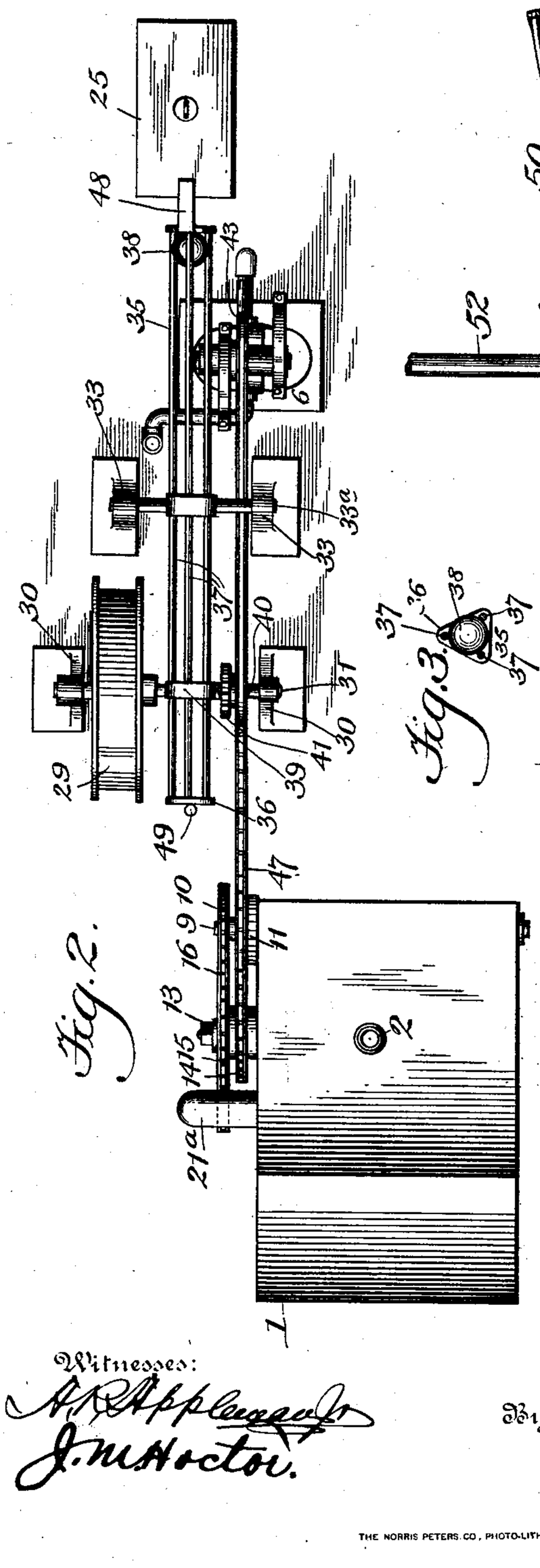
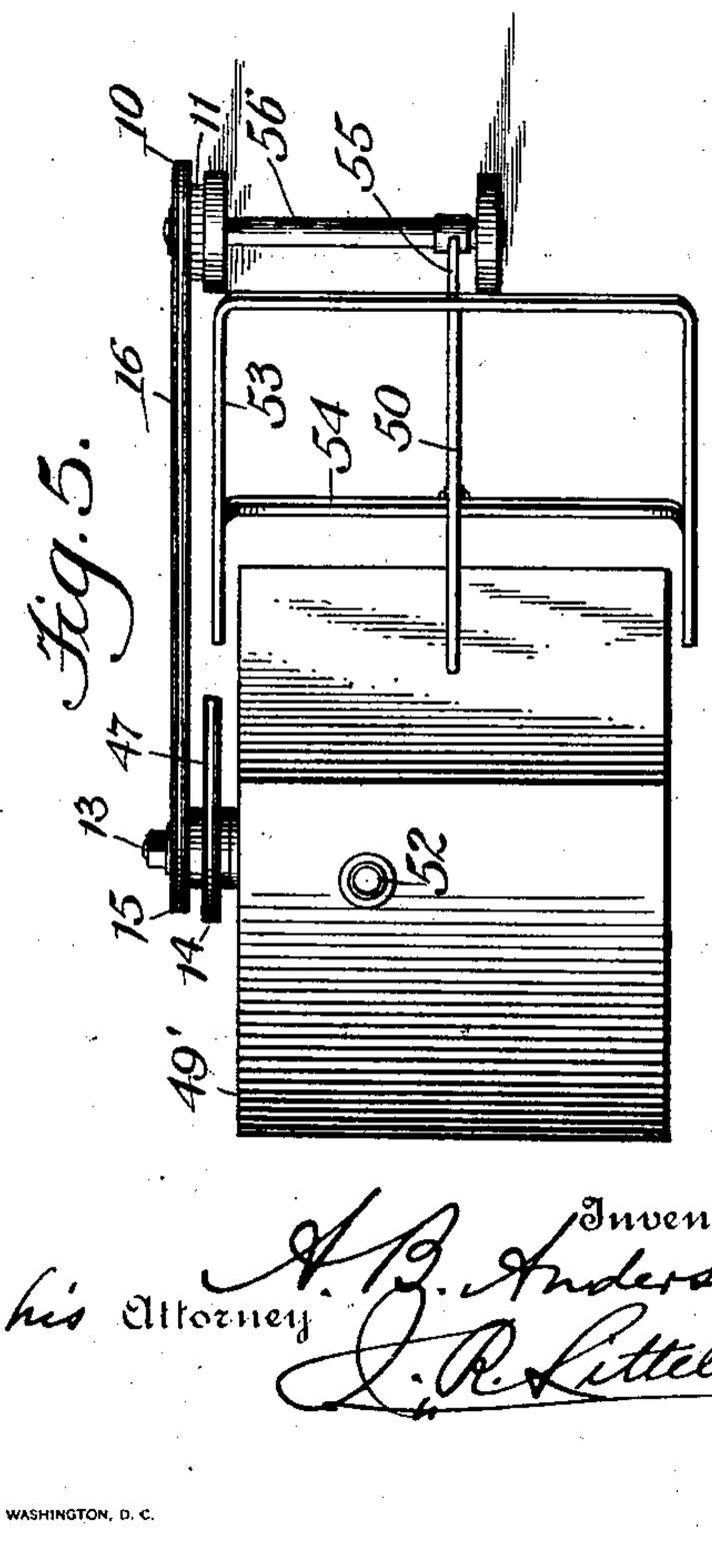


Fig. 3.

Fig. 5.



Witnesses:
A. R. Applewald Jr.
J. M. Hoctor.

Inventor
A. B. Anderson,
By his Attorney
L. R. Littell

UNITED STATES PATENT OFFICE.

ALFRED B. ANDERSON, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF AND MAX I. SCHLESINGER, OF NEW YORK, N. Y.

AUTOMATIC PUMPING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 697,595, dated April 15, 1902.

Application filed August 25, 1900. Serial No. 27,984. (No model.)

To all whom it may concern:

Be it known that I, ALFRED B. ANDERSON, a citizen of the United States, residing at New York, in the county and State of New York, have invented certain new and useful Improvements in Automatic Pumping Mechanisms, of which the following is a specification.

This invention relates to automatic pumping mechanisms or apparatus; and it has for its object to provide a pumping apparatus particularly designed for maintaining the supply-water in buildings by the employment of the buoyant action of the waste water which runs from the basins, tubs, &c., throughout the building.

My improved apparatus is installed in the basement or lower apartments of a building and operates to maintain a fresh supply of water in a storage tank or reservoir upon the roof or in the upper apartments of the building.

In the drawings, Figure 1 is a side elevation, partially in section, of the automatic pumping apparatus constructed according to my invention. Fig. 2 is a plan view thereof. Fig. 3 is a transverse section of a detail of the construction, taken on the line *x x* in Fig. 1 and looking in the direction of the arrow. Fig. 4 is a side elevation, partly in section, illustrating a modification of a portion of the construction shown in Figs. 1 and 2. Fig. 5 is a plan view of said modification.

In the drawings corresponding reference characters denote corresponding parts in the several views.

Referring to the drawings and to Figs. 1, 2, and 3 thereof, 1 designates a casing or tank, with which communicates pipe 2, leading from the water-fixtures of a building in connection with which the casing 1 is installed, whereby the waste water or sewage from the basins, tubs, and other fixtures in the building will discharge into the casing 1. Preferably the casing 1 is installed in the basement or lower compartments of the building; but it may be mounted exteriorly thereof, if desired.

3 designates a fresh-water-supply tank or reservoir, which is preferably installed upon the roof or in the upper compartments of the building and which is provided with a standpipe or discharge-pipe 4, which supplies water to the several basins and other fixtures of the building. The reservoir 3 is supplied by means of a feed-pipe 5 through the automatic action of the pumping apparatus hereinafter described and which embrace a pump proper, 6, of any adapted type.

In order to employ the lifting potential of the waste water which collects and rises in the casing 1, I provide a ball-float 7, carried within the casing by an arm 8, pivotally supported by a shaft 9, passing through the casing at one side thereof, the arm 8 being arranged for vertical play and the casing 1 being preferably approximately sector-shaped to accommodate the arm 8 in its play. Exteriorly of the casing 1 the shaft 9 carries a loose sprocket-wheel 10, provided upon one face with a ratchet 11, and the shaft 9 carries at its end a pawl 12, arranged to operate the sprocket 10 in one direction by means of the ratchet at such times as the water in the casing 1 is raising the ball-float 7. A stub-shaft 13 is secured to the side of the casing 1, adjacent the shaft 9, and carries two revoluble sprocket-wheels 14 and 15, of which the latter is geared in connection with the sprocket 10 by means of a chain 16. A suitably-supported spring-pawl 17 serves to prevent counter revolution of the ratchet 11 and sprocket 10 during the downward movement of the arm 8 within the casing 1.

To cause the discharge of the water from the casing 1, I provide a siphon-tube 18, which leads at one end into the lower part of the casing and at the other end communicates with the sewer connection or drain-pipe, as shown at 19. The siphon-tube 18 is provided with a controlling-valve 20, which operates to close or open a port at one side thereof and within the casing 1, and the arm 8 carries a projection 21, which is arranged to engage a projection 22, formed upon the valve 20, and operate the latter upon the upward movement of the arm 8. As a further means for operating the valve 20 I provide a float 23, which is connected with the valve by a chain 24 and which when the water within the casing has reached a predetermined level raises the valve and causes the initiation of the siphon

action in the tube 18 to empty the casing 1. The casing 1 is also provided with an overflow-vent 21ª.

As a means for storing the energy or working potential of the buoyant action of the water rising in the casing 1 I provide a weight 25, which is suspended from any convenient structure, such as a ceiling-beam 26, by means of a cable or rope 27 and pulley-blocks 28, about which the same is operatively passed. One end of the cable or rope 27 is secured to the uppermost pulley device 28, and the other end is fixed to a drum 29, carried by a shaft 31, revolubly carried by standards 30. The shaft 31 is provided with a fixed pinion 32. The standards 30 are arranged in convenient proximity to the pump 6.

Intermediate of the pump 6 and standards 30 I arrange a pair of standards 33, between which are centrally and pivotally swung, as at 33ª, a primary and secondary gear-carriage, respectively, 34 and 35, each of which consists, as clearly shown in Figs. 1 and 3, of triangular end pieces 36 and longitudinal body rods or bars 37, secured at their ends to the end pieces 36 at the corners of the latter. The gear-carriages 34 and 35 thus constructed constitute frames or cages for counterbalance-balls 38, which roll freely between the body-rods 37 when the carriages are tilted, as hereinafter described. Each of carriages 34 and 35 is provided adjacent the end nearest the drum 29 with a bracket 39. The carriages 34 and 35 are arranged in the same vertical plane, as shown in the drawings, and the bracket 39 of the uppermost carriages 34 carries a short shaft 40, to which is fixed a gear 41, arranged to mesh with the pinion 32 upon the shaft 31. The shaft 40 also carries a fixed sprocket-wheel 42, which is geared in connection with a sprocket-wheel 43, the rotation of which serves to operate the pump 6. The bracket 39 of the lowermost carriage 35 carries a short shaft 44, to which is fixed a gear 45, arranged to mesh with the pinion 32. The shaft 44 also carries a fixed sprocket-wheel 46, which is geared in connection with the sprocket-wheel 14 by means of a sprocket-chain 47, the sprocket-wheel 14 being upon the shaft 13, which is turned by the chain 16 and sprockets 10 and 15.

The gear-carriages 34 and 35 are provided each at one end and in proximity to the path of vertical travel of the weight 25 with a projection-piece 48, arranged to be engaged, respectively, at predetermined phases of the upward-and-downward movement of the weight 25 to swing or tilt the carriages 34 and 35 and engage or disengage the gears 41 and 45 from the pinion 32. The carriages 34 and 35 are connected at an end of each by a link-rod or brace 49, whereby said carriages are operatively connected in a fixed relative position.

The operation of my improved automatic pumping apparatus will be readily understood from the foregoing description, taken in connection with the following statement: The waste water, entering the casing 1 through the pipe 2 from the basins, sinks, and other fixtures in the building in connection with which the pumping apparatus is installed, will rise in the casing 1 and carry upwardly the float 7, which swings upwardly the arm 8 and turns the sprocket 10 by means of the ratchet 11 and pawl 12. The sprocket 10 turns the sprocket 15, and the sprocket 15 turns the sprocket 46 and gear 45, which latter, with the parts in the position shown in Fig. 1 of the drawings, is in mesh with the pinion 32, causing the same to rotate the drum 41 and wind the cable 27 thereon to elevate the weight 25. The carriages 34 and 35 are maintained in the position shown in Fig. 1 of the drawings by the counterbalance-balls 38, which are adapted to move freely in the cages formed by the body-rods 37 of the carriages. When the float 7 has risen to such a height in the casing 1 that the projection 21 has raised the valve 20 to cause a discharge of the water in said casing through the siphon 18, the arm 8 and float-ball 7 move downwardly, and the pawl 12, carried by said arm, passes inoperatively over the ratchet 11, which, together with the sprocket 10, is sustained against reverse movement by the spring-pawl 17. After the completion of sufficient chargings and dischargings of the casing 1 and consequent vertical oscillation of the arm 8, as above described, to raise the weight 25 to a predetermined height the latter engages the projection-piece 48 of the carriage 34 and tips said last-named carriage, as well as the carriage 35, to disengage the gear 45 from the pinion 32 and cause the engagement of the gear 41 with the pinion 32, which engagement is maintained by the counterbalance-balls 38, which have then taken position at the other end of the carriages. With the parts in the last-mentioned position the drum 29 is freed to turn under action of the weight 25 and cable 27 and by means of the pinions 32 turns the gear 41 and sprocket 42, which in turn operate the sprocket 43 to operate the pump 6 and raise a fresh supply of water through the pipe 5 to the reservoir or tank 3. When the weight 25 has fallen sufficiently to engage with the lowermost projection 48, the carriages are again tilted until they assume the position shown in Fig. 1 of the drawings.

It will be understood from the above description that the work accomplished by the successive charges of waste water as the same rise in the casing 1 is conserved by the weight 25, which is raised by the float 7, arm 8, drum 29, and intermediate parts. It is further evident that the rising weight 25 automatically disconnects from the weight-lifting mechanism and connects with the pump-operating mechanism, thereby effecting the operation of the latter.

In Figs. 4 and 5 I have shown a modified form of the float mechanism hereinabove de-

scribed as embodied in the casing 1. Referring to said Figs. 4 and 5, 49′ designates a casing which is curved or segmental in form and through the upper end of which projects a float-rod 50, which carries the float 51, which is raised in the casing 49 by the waste water, which enters the same through the drain-pipe 52. A siphon-tube 18 is employed in connection with the casing 49′ and is constructed and operates the same as that hereinbefore described, with the exception that the sole means for operating the valve 20 consists of the float 23 and connection 24. Secured to the free end of the float-rod 50, exteriorly of the casing, is a yoke 53, the ends of which are connected by a cross-head 54, with which is rigidly connected the free end of an arm 55, pivoted to a shaft 56 and provided with a pawl 12, ratchet 11, and sprocket 10, which latter parts are arranged and operate the same as the corresponding parts shown in Fig. 1.

The operation of the modified construction last described is manifest from the foregoing description. The arm 55 is necessarily oscillated by the rise and fall of the float 51 in the casing 49′ and by means of the sprocket 10 causes the rotation of the drum 29, being in practice connected therewith in the same manner as the corresponding parts in Fig. 1.

I do not desire to limit myself to the specific details of construction shown and described, but reserve the right to vary the same in adapting the apparatus to varying conditions of use without departing from the scope of my invention and the terms of the following claims.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. An improved automatic pumping apparatus, comprising a movably-suspended weight, a casing provided with an inlet and an outlet, a float within the casing, means for intermittently discharging the contents of the casing, a pump proper, power-transmission devices between the float and the weight, power-transmission devices between the weight and the pump proper, and means operated by the weight in its movement for throwing said power-transmission devices into and out of operation.

2. An improved automatic pumping apparatus, comprising a casing provided with an inlet and outlet, a float within the casing, means for intermittently discharging the contents of the casing, a pump proper, storage means for storing the energy supplied by the movement of the float within the casing, power-transmission devices between said float and said storage means, and power-transmission devices between said storage means and said pump proper, said storage means embodying devices for throwing said power-transmission devices into and out of operation.

3. An improved automatic pumping apparatus, comprising a casing provided with an inlet and an outlet, a float within the casing, means for intermittently discharging the contents of the casing, said means being operated by said float, a pump proper, storage means for storing the energy supplied by the movement of the float within the casing, power-transmission devices between said float and said storage means, and power-transmission devices between said storage means and said pump proper, said storage means embodying devices for throwing said power-transmission devices into and out of operation.

4. In an automatic pumping apparatus, a pump proper, a casing provided with an inlet and an outlet, a float within the casing, means for intermittently discharging the contents of the casing, a movably-suspended weight, power-transmission devices between the float and the weight, and power-transmission devices between the weight and the pump proper, said power-transmission devices embodying each an adjustable member actuated by the weight in its movement.

5. In an automatic pumping apparatus, a pump proper, a casing provided with an inlet and an outlet, a float within the casing, means for intermittently discharging the contents of the casing, a movably-suspended weight, power-transmission devices between the weight and the float, and power-transmission devices arranged between the weight and the pump proper and embodying an adjustable member actuated by the weight in its movement.

6. In an automatic pumping apparatus, a pump proper, a casing provided with an inlet and an outlet, a float within the casing, means for intermittently discharging the contents of the casing, a movably-suspended weight, a rotary drum, a cable or rope connected with said weight and adapted to be wound upon said drum, power-transmission devices between said float and said drum, power-transmission devices between said drum and said pump proper, and devices operated by said weight in its movement for throwing said power-transmission devices into and out of operation.

7. In an automatic pumping apparatus, a pump proper, a casing provided with an inlet and an outlet, a float within the casing, means for intermittently discharging the contents of the casing, storage means for storing the energy supplied by the movement of the float within the casing, a rotary drum operatively connected with said storage means, adjustable power-transmission devices between said float and said drum, adjustable power-transmission devices between said drum and said pump proper, and means for operating said power-transmission devices, said power-transmission devices embodying each a tiltable gear-carriage provided with a shifting counterbalance member.

8. In a pumping apparatus of the class described, a driven mechanism, a movably-suspended weight, a drum with which the weight is connected in suspended position, means for

operating the drum to raise the weight, and power-transmission devices between the drum and the driven mechanism whereby the weight in its downward movement operates the latter, said power-transmission devices embodying a movable gear-carriage provided with a gear mechanism adapted for operative connection with the drum and with the driven mechanism, said gear-carriage being operated in its movement by the moving weight and embodying a counterbalance device, substantially as and for the purpose set forth.

In testimony whereof I have signed my name in the presence of the subscribing witnesses.

ALFRED B. ANDERSON.

Witnesses:
J. R. LITTELL,
JOHN M. HOCTOR.