W. J. WHITE.

WATER MOTOR.

APPLICATION FILED SEPT. 19, 1908.

924,300.

Patented June 8, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

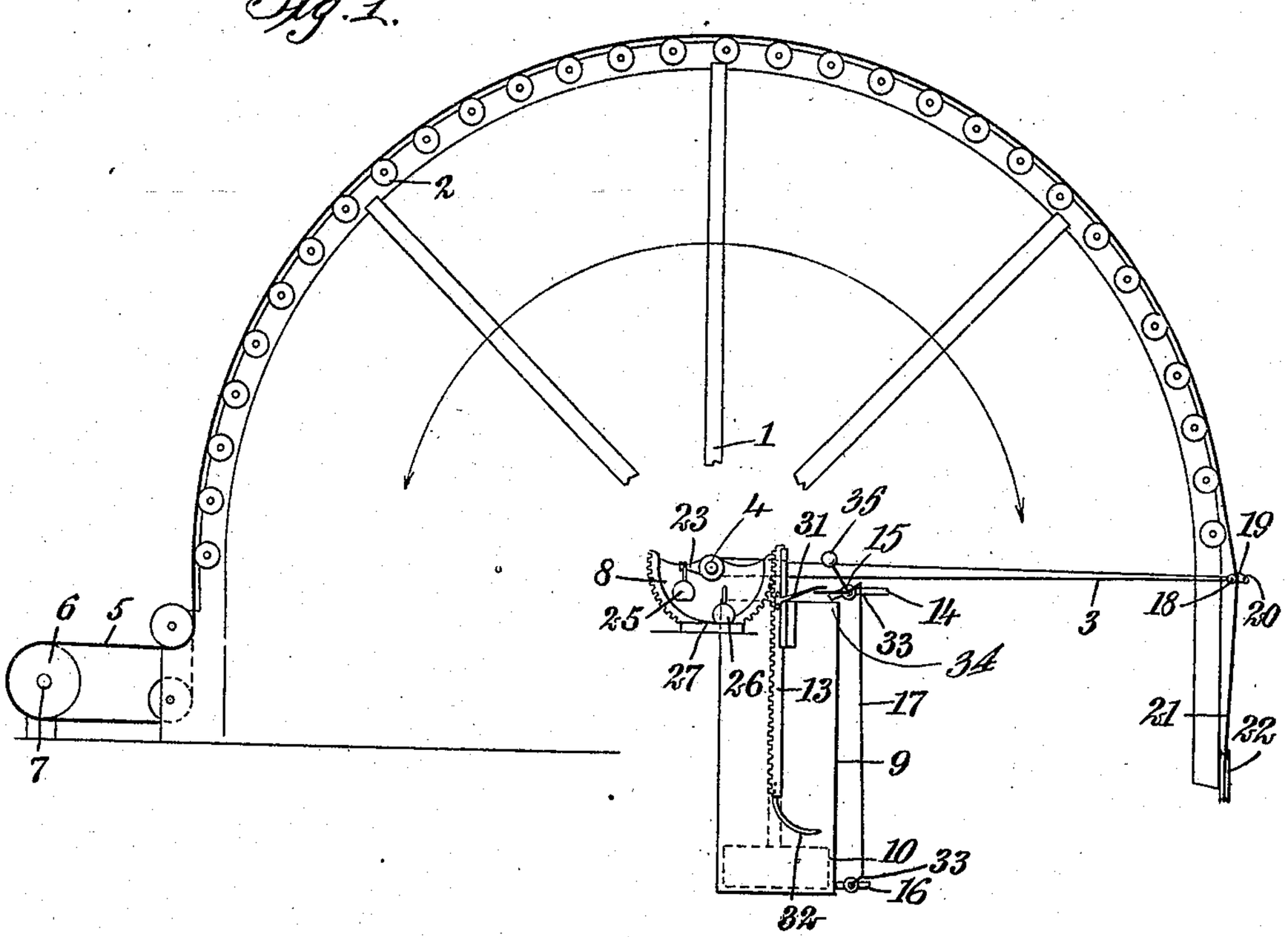


Fig. 2.

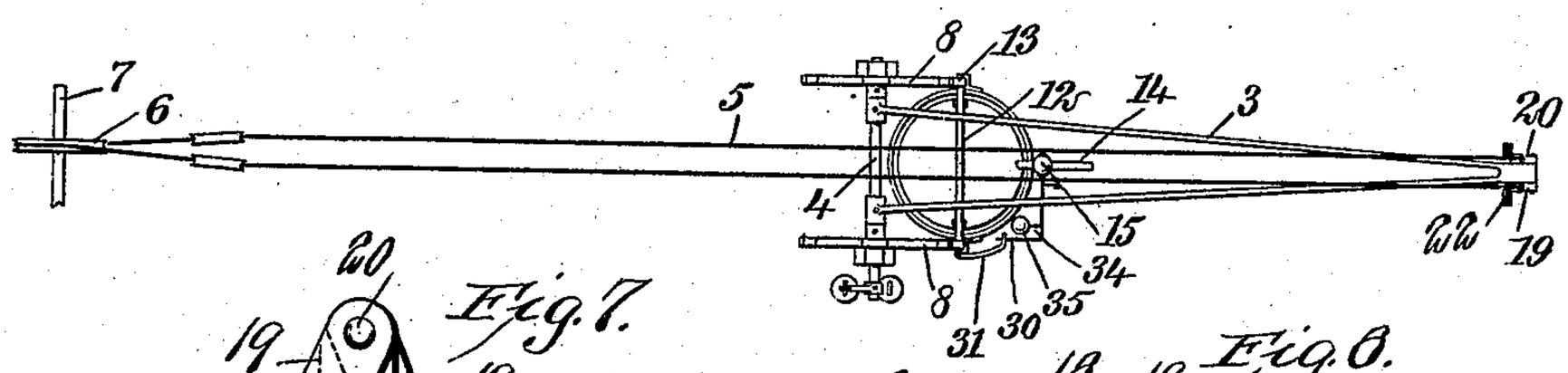


Fig. 7.

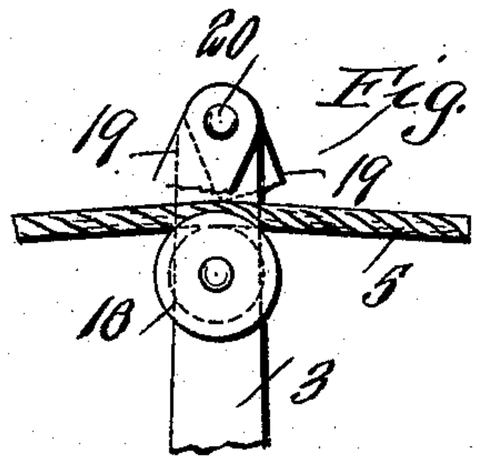
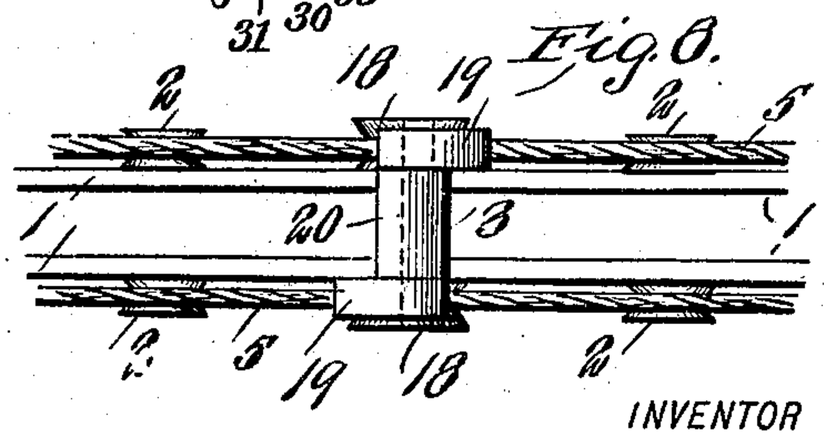


Fig. 8.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 3.

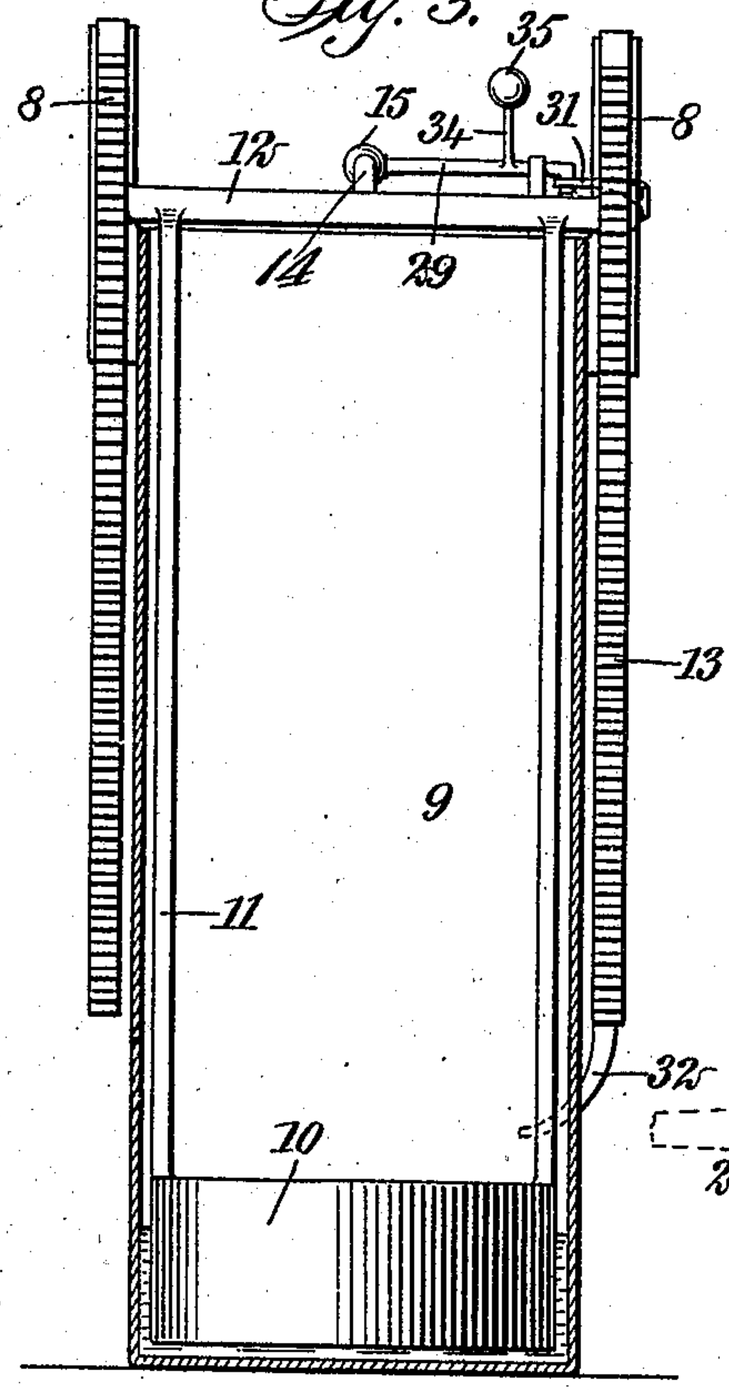


Fig. 5.

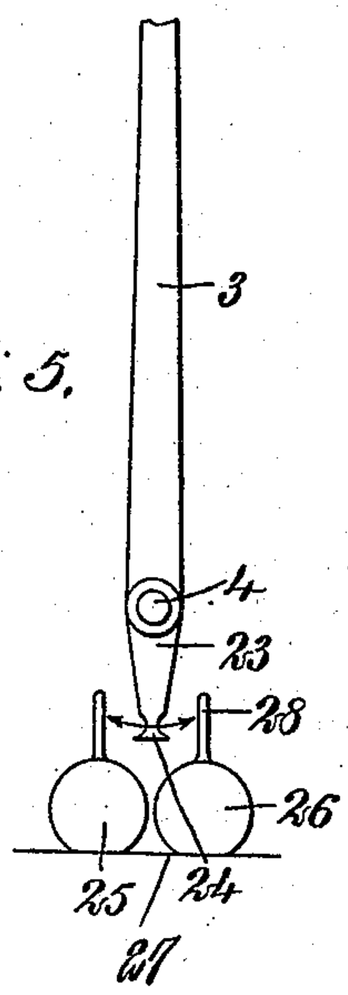


Fig. 6.

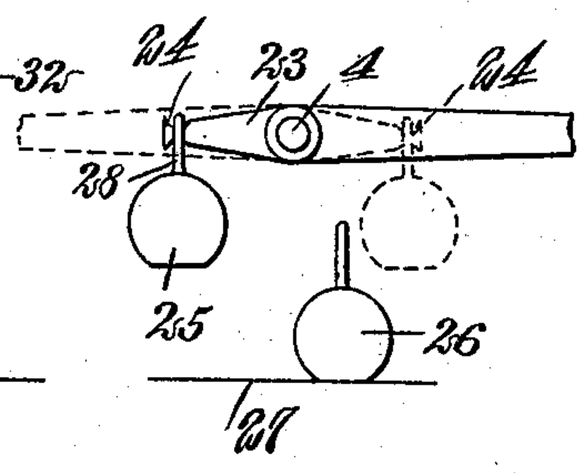
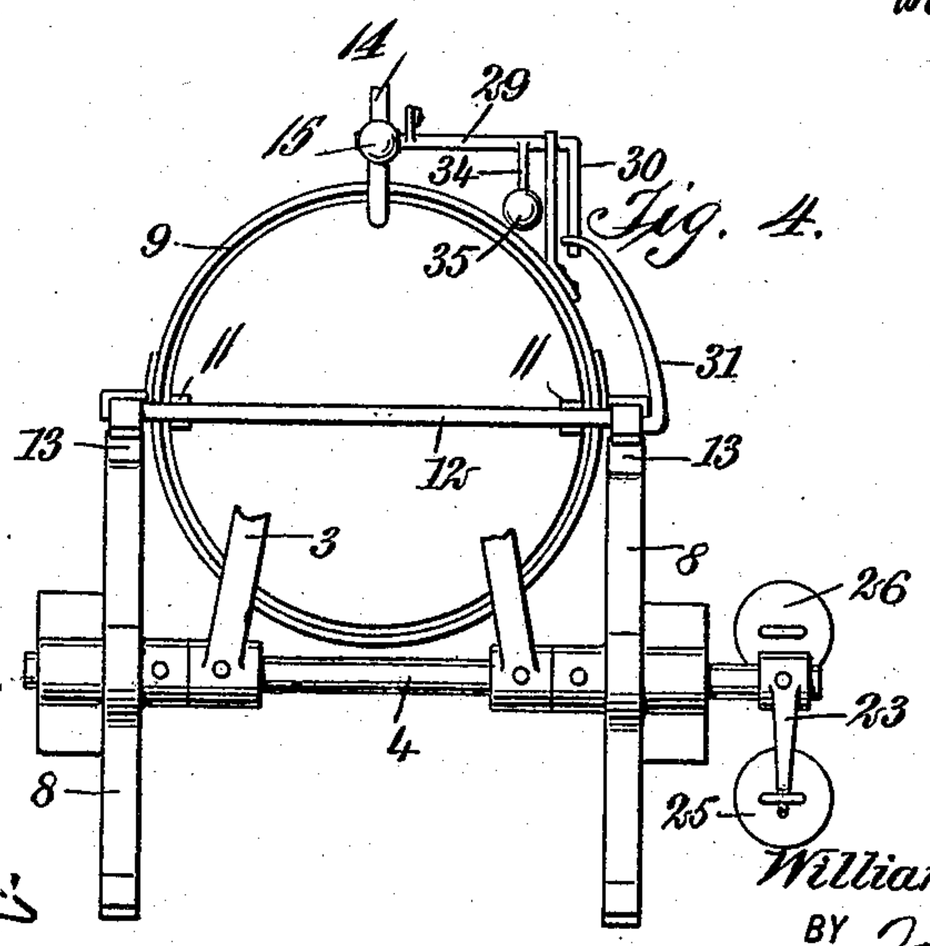


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM JOHN WHITE, OF OYSTER BAY, NEW YORK.

WATER-MOTOR.

No. 924,300. Specification of Letters Patent. Patented June 8, 1909.

Application filed September 19, 1908. Serial No. 453,831.

To all whom it may concern:

Be it known that I, WILLIAM JOHN WHITE, a citizen of the United States, and a resident of Oyster Bay, (Center Island,) in the county of Nassau and State of New York, have invented a new and Improved Water-Motor, of which the following is a full, clear, and exact description.

This invention relates to water motors, and particularly to that type of motor in which power is derived from the motion of a float which rises and falls with the change of water level.

In its general construction the invention comprises a sweep which moves to and fro with its end in the vicinity of an endless cable. Mechanism is provided on the sweep to advance the cable with either direction of movement of the sweep.

An object of the invention is to provide a construction in which the lever arm of the float operating upon the sweep will be constant so that the velocity of the sweep will be substantially uniform.

A further object of the invention is to provide means for counterweighting the sweep when in a horizontal or in an inclined position, and which will relieve the sweep of the counterweight when the sweep is in a substantially vertical position.

The invention consists in the construction and combination of parts to be more fully described hereinafter and particularly set forth in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation showing diagrammatically a motor constructed according to my invention; Fig. 2 is a plan of parts of the motor shown in Fig. 1, and illustrating the cable arrangement; Fig. 3 is a vertical section through a vessel carrying the float, and illustrating details of the construction; Fig. 4 is a plan looking down on the vessel and the float which rises and falls within it, this view also illustrates the contiguous mechanism through which the motion of the float is transmitted; Fig. 5 is a side elevation illustrating diagrammatically the means for counterweighting the sweep, and for enabling it to become relieved from the counterweight when in its vertical position; Fig. 6 is a view similar to Fig. 5, but illustrating the manner in which the sweep picks up the counterweights as it swings to and fro. Fig. 7 is a side elevation upon an enlarged scale further illustrating the grip carried at the end of the sweep for moving the cable; and Fig. 8 is a plan or edge view of a short portion of the frame, and further illustrating the grip at the end of the sweep.

Referring more particularly to the parts, 1 represents a frame of any suitable construction, which is of substantially semi-circular form in outline. In this frame two oppositely disposed rows of guide sheaves 2 are arranged, and between these rows of sheaves, the end of a sweep 3 moves to and fro about a shaft or pivot 4. On the sheaves 2 an endless cable 5 is guided, the lower run of the cable being passed in a loop around a wheel 6 driving a shaft 7, from which the power is taken. On the shaft 4, rigid segments 8 are provided, which are of semi-circular form, as shown, and between these segments, a cylindrical tank 9 is arranged. In this tank there is mounted a float 10 which is adapted to rise and fall with the changing of the water level in the tank.

As illustrated most clearly in Fig. 3, the float is provided at each side with upwardly extending side arms 11, and these arms are connected at their upper ends by a cross head 12. The cross head projects over at the sides of the tank and carries vertically disposed racks 13. These racks mesh with the segments or gear wheels 8, as indicated in Fig. 1. An inlet pipe 14 is provided near the upper edge of the tank, and this pipe is provided with a valve 15 for admitting water to the tank. An outlet valve 16 is provided at the lower end of the tank. These valves are connected by a link 17 so one will be opened when the other is closed.

The sweep 3 is provided on its sides at its outer end with small rollers 18, over which the endless cable 5 passes, as shown. Adjacent to these rollers 18, cable grips 19 are provided; these are pivoted at 20 and incline in opposite directions, as illustrated in Fig. 8. They lie against the cables opposite to the rollers 18 and are arranged so that the grip at the right of the sweep will hold the cable against its corresponding roller with one direction of movement of the sweep, and the other grip holds the cable in the opposite direction of movement. As shown in Fig. 1 the upward movement of the sweep will operate upon the one side of the cable to advance the same. The run of the cable re-

mote from the wheel 6, is formed into a loop 21 which passes around a guide pulley 22, as indicated.

In order to counterweight the sweep when it is in an inclined or horizontal position, the shaft 4 is extended at the right, as indicated in Fig. 4, and is provided with a rigid arm 23. This arm is formed near its extremities into a double hook 24. Near the path of movement of this arm 23, I provide two counterweights 25 and 26. These counterweights may rest upon a shelf or plate 27, as indicated in Fig. 1. The upper sides of the counterweights are provided with eyes 28 which project into the path of the double hooks 24. From this arrangement when the sweep moves in one direction it picks up one of the counterweights and when it moves in the other direction it picks up the other counterweight, as illustrated in Fig. 6. In this way, while one of the weights coöperates as a counterweight for the sweep, the other rests idly on the shelf or plate 27.

In the operation of the motor, water is admitted by the valve 15 to the vessel or tank 9. As the float 10 rises therein the racks 13 rotate the segments 8 and the shaft 4. In this way the sweep 3 will be swung toward the left. In this movement the clutch at the end of the sweep will engage one side of the cable and advance the same continuously as the sweep moves. After the tank is full, the valve 15 will be shut, and the valve 16 opened. The float 10 will then descend by gravity, and move the sweep in an opposite direction. The clutch on the end of the sweep will grip the other side of the cable and advance the cable continuously in the same direction. From this arrangement it will be seen that the shaft 7 will be rotated continuously in one direction, and this shaft may be used to drive a dynamo-electric machine, or to do any other useful work.

Attention is called to the fact that for a given amount of movement of the float, either in rising or in descending, the same amount of rotation will be given to the shaft 4. In other words, the ratio of movement between the sweep and the float is constant for all positions of the float and sweep.

The operation of the motor is rendered automatic by providing the rotating stem 29 of the valve 15 with a trip lever 30 which projects inwardly toward one of the racks 13; near its upper end this rack is provided with a rigid trip arm 31 which is adapted to move the trip lever downward as the float reaches the lower limit of its movement; a similar rigid trip arm 32 is provided on the rack near the lower end thereof, and this arm strikes the trip lever near the upper limit of movement of the float.

The valves have parallel arms 33 that are connected by the link 17. In addition to this the stem 29 is provided with a counterweight arm 34 and counterweight 35. This counterweight moves to and fro above the valve and tends to hold the valves in one extreme position or the other. As represented in Fig. 1, the arm 31 has just struck the trip lever; this has moved the valve 15 into its open position and the valve 16 into its closed position. When the arm 32 strikes the lever it reverses the conditions of the valves, the valve 16 will be opened and the valve 15 closed. The water then flows out of the valve 16 and the float descends by gravity.

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

1. In a water motor, in combination, an endless cable, means for guiding said cable, a sweep adapted to engage said cable for advancing the same, a float adapted to rise and fall with the changing water level, a segment adapted to drive said sweep, and a rack rigid with said float and meshing with said segment.

2. In a water motor, in combination, an endless cable, means for guiding the same, a shaft, a sweep carried thereby, a clutch carried by said sweep and adapted to engage said cable for advancing the same, segments rigid with said shaft, a float adapted to rise and fall with the water level, and racks rigid with said float and meshing with said segments.

3. In a water motor, in combination, an endless cable, means for guiding the same, a tank, a shaft near said tank, a sweep carried by said shaft, a clutch carried by said sweep adapted to grip said cable, segments rigid with said shaft, a cross head carried by said float, and racks carried by said cross head meshing with said segments.

4. In a water motor, in combination, an endless cable, means for guiding the same, a tank, a shaft near said tank, a sweep carried by said shaft, a clutch carried by said sweep adapted to grip said cable, segments rigid with said shaft, a cross head carried by said float, racks carried by said cross head meshing with said segments, a valve adapted to admit water to said tank, and a valve for draining the water from said tank.

5. In a motor of the class described, in combination, an endless cable, a sweep adapted to swing to and fro, a clutch carried by said sweep adapted to engage said cable, an arm moving with said sweep, and counterweights projecting into the path of said arm and adapted to be moved alternately thereby as said sweep swings.

6. In a motor of the class described, in combination, an endless cable, means for guiding the same, a sweep mounted to swing to and fro, a clutch carried by said sweep for engaging said cable, an arm rigid with said sweep and having a double hook formed thereon, and a pair of counterweights having

eyes projecting into the path of said hook and adapted to be raised by said arm alternately as said sweep swings.

7. In a water motor, in combination, an endless cable, means for guiding the same, a sweep mounted to swing adjacent to said cable, means for advancing said cable by said sweep, a segment rotating with said sweep, a tank, a float in said tank, a rack rigid with said float and engaging said segment to move said sweep, an inlet valve for said tank, an outlet valve for said tank, and means for actuating said valves by said rack.

8. In a water motor, in combination, an endless cable, a sweep mounted to swing adjacent thereto, means carried by said sweep for gripping said cable, a segment rigid with said sweep, a tank, a float rising and falling in said tank, a rack rigid with said float and meshing with said segment, an inlet valve for said tank, an outlet valve for said tank, trip arms rigid with said rack, a trip lever carried by one of said valves and projecting into the path of said arms, and means connecting said valves for operating the same in unison.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM JOHN WHITE.

Witnesses:

HELEN S. WHITE,

T. C. GRAHAM.