

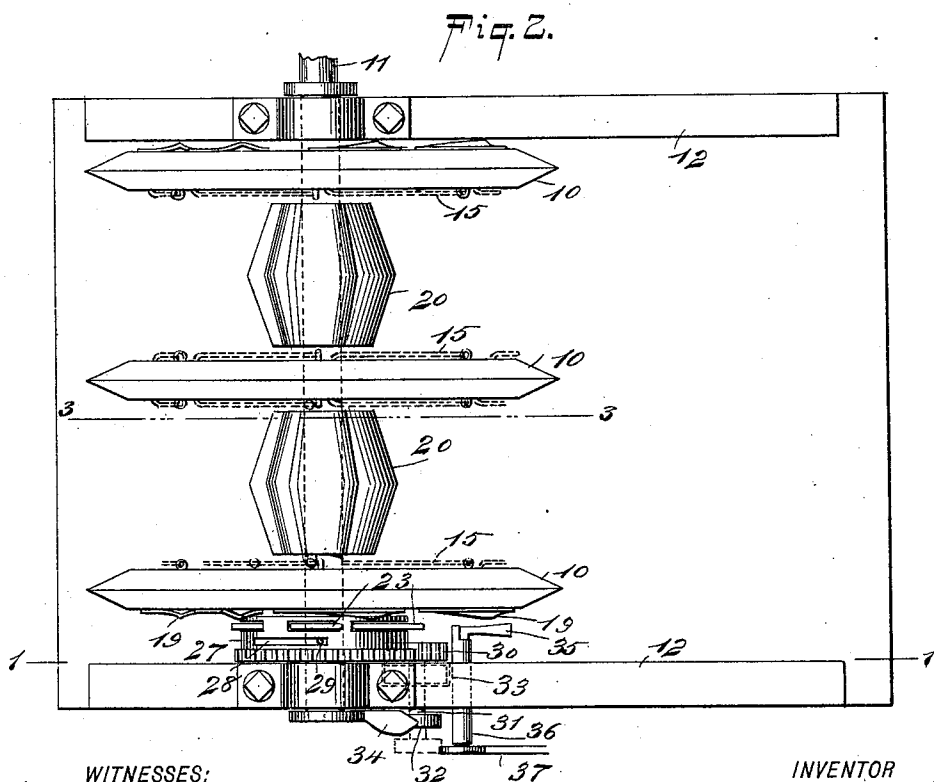
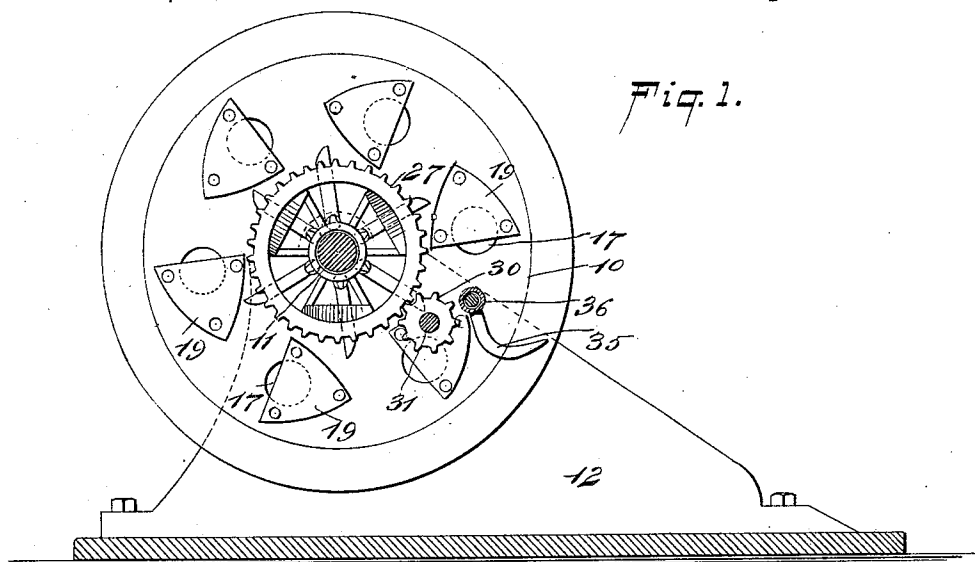
(No Model.)

2 Sheets—Sheet 1.

B. F. RATHBUN.
WATER MOTOR.

No. 536,654.

Patented Apr. 2, 1895.



WITNESSES:

William Gaebel.
W. O. Hutchinson

INVENTOR

B. F. Rathbun
BY *Munn & Co.*
ATTORNEYS.

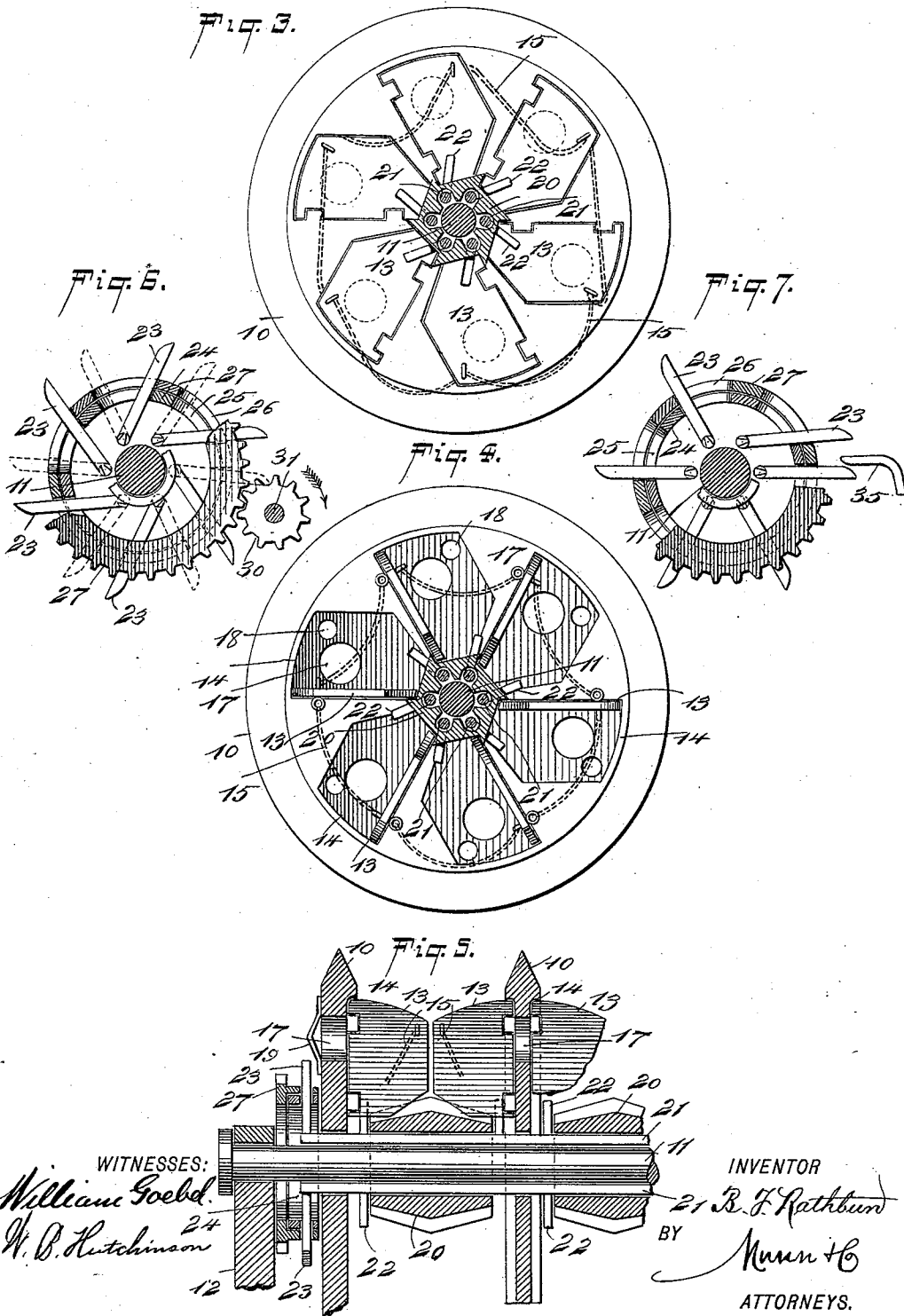
(No Model.)

2 Sheets—Sheet 2.

B. F. RATHBUN.
WATER MOTOR.

No. 536,654.

Patented Apr. 2, 1895.



UNITED STATES PATENT OFFICE.

BENJAMIN F. RATHBUN, OF CHICAGO, ILLINOIS.

WATER-MOTOR.

SPECIFICATION forming part of Letters Patent No. 536,654, dated April 2, 1895.

Application filed April 12, 1894. Serial No. 507,262. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN F. RATHBUN, of Chicago, in the county of Cook and State of Illinois, have invented a new and Improved Water-Motor, of which the following is a full, clear, and exact description.

My invention relates to improvements in water motors and particularly to such as are adapted to be placed in a stream and run by the force of the current.

The object of my invention is to produce a motor of this kind, which may be run when either partially or entirely submerged, which is adapted to provide a great deal of power in proportion to the speed of the current, and which has a very simple and easily actuated mechanism for throwing it into and out of gear.

To these ends my invention consists of certain features of construction and combinations of parts, which will be hereinafter described and claimed.

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

Figure 1 is a sectional elevation on the line 1—1 of Fig. 2, of the machine embodying my invention. Fig. 2 is a plan view of the motor. Fig. 3 is a cross section on the line 3—3 of Fig. 2 and with the gates or abutments closed. Fig. 4 is a similar section, but with the gates or abutments thrown open to the current. Fig. 5 is a broken detail longitudinal section through the central portion of the motor. Fig. 6 is a broken detail sectional view of the mechanism for locking and releasing the gates, the crank arms of the locking device being shown in position to hold the gates locked; and Fig. 7 is a similar section, but with the crank arms in position to hold the gates open, one of the arms, however, being shown as moved to throw the motor out of gear.

My invention comprises a series of wheels 10 which preferably have beveled edges to enable them to pass easily through the current of a stream, and these wheels are secured to a common shaft 11 which is journaled in a suitable frame 12. The shaft may be provided with any desired number of these wheels, according to the width of the stream and the amount of power which it is desired

to utilize. The wheels are provided on their sides with outwardly-swinging gates 13, which are adapted to close into recesses 14 in the sides of the wheel when the motor is not in gear, and the end wheels have the gates on their inner sides only, so that they will not interfere with the frame and other parts of the machine, while the middle wheels have gates on both sides.

The gates on one side of a wheel are connected together by chains 15, so that when one gate swings out to the current it will have a tendency to pull the next one open and thus they act on each other so as to enable the motor to be thrown easily into gear. The wheels are pierced opposite the gates by holes 17 and 18, this arrangement preventing excessive suction and also permitting the current to enter and assist in turning the wheel.

The holes 17 on the end wheels have their outer sides partially covered by deflectors 19, which serve to throw the current through the holes so as to help force open the gates 13. When the gates swing open their inner edges strike against the teeth of the ratchet wheels 20 which are secured to the shaft 11 and which thus serve as abutments to brace the gates. Arranged parallel with the shaft 11 and circumferentially around it are rods 21 which have arms 22 adapted to turn opposite the gates 13 and hold the gates closed, but the arms may be also turned back of the gate hinges so as to permit the gates to swing outward at right angles to the wheels, as shown best in Fig. 5. In this figure the gates are shown swung out at the top as they would appear in a tide or two way current, but in an ordinary stream the gates on the lower half of the motor would open while those on the upper half would close.

The rods 21 have at one end crank arms 23 which project radially outward through the slots 25 and 26, of the concentric wheels 24 and 27, the latter being arranged outside the former and having teeth thereon to engage a pinion, as described presently. These wheels 24 and 27 are movable in relation to each other, their movement being limited by a pin 29 which is secured to the inner wheel and projects through a slot 28 in the outer one, as shown in Fig. 2.

The teeth of the wheel 27 are adapted to en-

gage a pinion 30 which is carried by a shaft 31, journaled in the frame 12, parallel with the main shaft 11 and slidably mounted in the said frame. The shaft 31 has a collar 32 at its outer end, see Fig. 2, and the shaft may be pulled endwise so that the pinion 30 may enter the recess 33, as shown by dotted lines in Fig. 2, and be out of engagement with the wheel 27. The pinion 30 may be held out of engagement with the wheel 27 by a latch 34 which is pivoted on the frame 12 and is adapted to drop behind the collar 32.

The rods 21 and arms 22 are held normally so as to lock the gates 13, but by pushing the pinion 30 into engagement with the wheel 27 and then turning the collar 32 and pinion 30, the wheel 27 may be turned so that it strikes the crank arms 23 and oscillates them and the arms 22, so as to move the latter from in front of the gates 13 and permit these gates to swing into the current.

The machine is thrown out of gear by means of a pawl or arm 35, which is adapted to engage the arms 23 and which has its shank journaled in a bearing 36 in the frame 12, while a handle 37 is secured to the outer end of the shank to enable the shank to be turned at will.

When the machine is revolving the arms 23 are of course revolved with the shaft 11, and if the machine is to be stopped, the operator turns the handle 37 so as to bring the arm or pawl 35 into successive engagement with the crank arms 23, as illustrated in Fig. 7, and thus the rods 21 are turned so as to force the arms 22 against the gates so as to close and lock them.

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

1. A water motor comprising a shaft, a plurality of wheels carried by the shaft and having recesses in their adjacent faces, a ratchet abutment on the shaft between each pair of wheels, a series of outwardly swinging gates hinged at one edge on lines radial to the wheels to fold into the respective recesses and the opposed gates on the adjacent faces of two wheels swinging open toward each other at their free edges and abutting at their inner ends against said ratchet abutments, and a series of rock shafts extending longitudinally of the main shaft and each having a series

of arms 22 projecting outwardly into engagement with the respective gates at their hinged edges, whereby rocking any shaft all of the gates lying in the plane of that shaft will be moved away from their respective abutments and closed and locked in that position or by the opposite movement of said shaft will be permitted to swing outwardly, substantially as described.

2. In a water motor, the wheel 10 having circularly arranged recesses 14 in one face, openings 17 extending from said recesses through the opposite side of the wheel and there provided with deflectors 19 to throw the water through said openings into the recesses to force the gates open, and a series of gates hinged in said recesses to swing outwardly substantially as described.

3. In a water motor, the combination, with the shaft, the wheels thereon, the swinging gates and the locking rods having arms to engage the gates, of the concentric pulleys having slots therein, the crank arms secured to the rods and projecting through the pulley slots, and a gear mechanism for turning the outer wheel and moving the crank arms, substantially as described.

4. In a water motor, the combination, with the shaft, the wheels, the swinging gates on the wheels, and the oscillating rods having arms to engage the gates, of the concentric slotted wheels on the shaft, the crank arms secured to the rods and extending through the slots of the wheels, and the revoluble pinion held to move into and out of engagement with the outer slotted wheel, substantially as described.

5. In a water motor, the combination with the shaft, the wheels thereon, the swinging gates on the wheels, and the oscillating locking rods on the shaft provided with arms to engage the gates and having crank arms, concentric wheels having slots through which said arms project, of the tilting lever having an arm to engage the crank arms, and the gear mechanism for turning the outer concentric wheel, and moving the crank arms, substantially as described.

BENJAMIN F. RATHBUN.

Witnesses:

ELIZABETH L. RATHBUN,
B. VAN BUREN.