No. 632,139. Patented Aug. 29, 1899.

W. A. NORTON.

WAVE MOTOR.

(Application filed Nov. 23, 1898.)

(No Model.) 3 Sheets—Sheet 1.

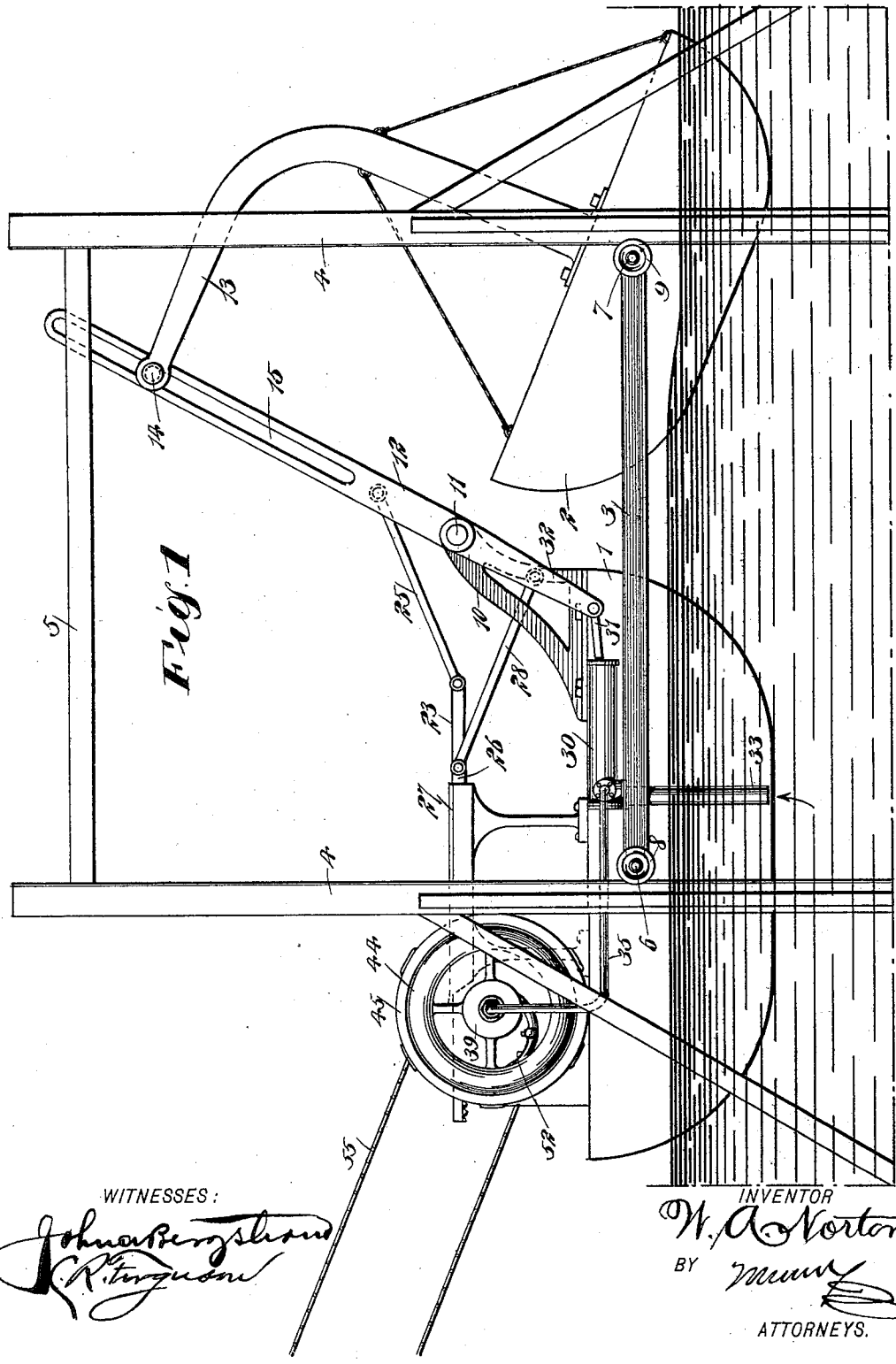


Fig. 1.

WITNESSES:

John A. Bergstrom

C. R. Ferguson

INVENTOR

W. A. Norton

BY Munn & Co.

ATTORNEYS.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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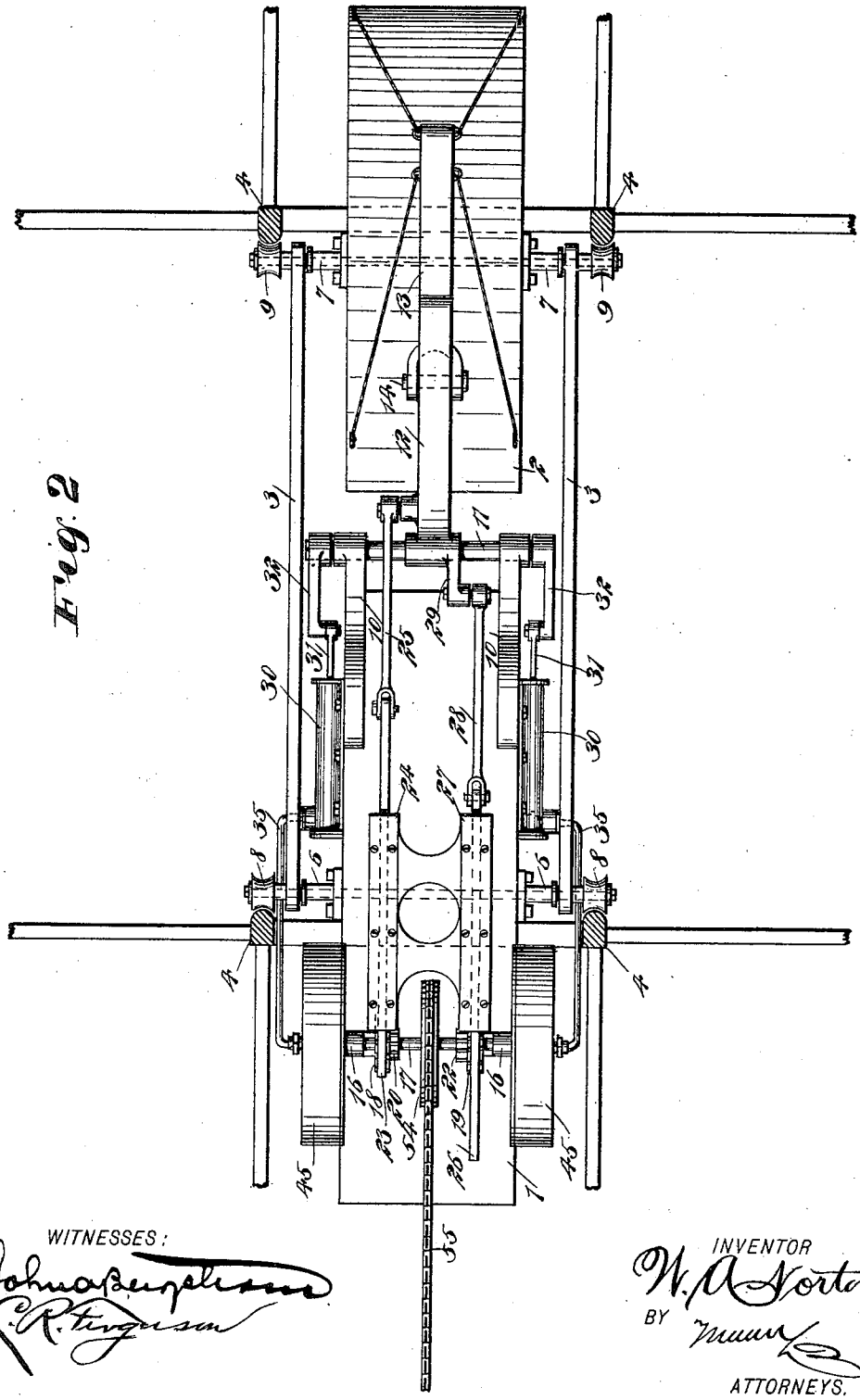
W. A. NORTON.

WAVE MOTOR.

(Application filed Nov. 23, 1898.)

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Fig. 2



WITNESSES:

John A. Engelhardt

C. R. Ferguson

INVENTOR

W. A. Norton

BY Munn & Co.

ATTORNEYS.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 632,139. Patented Aug. 29, 1899.

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Fig. 3

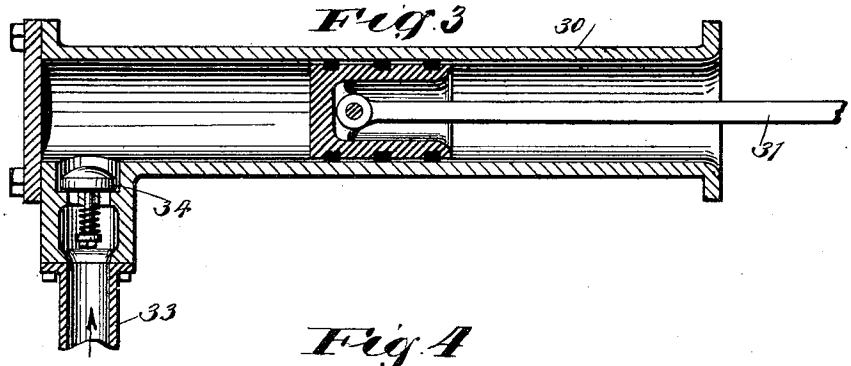


Fig. 4

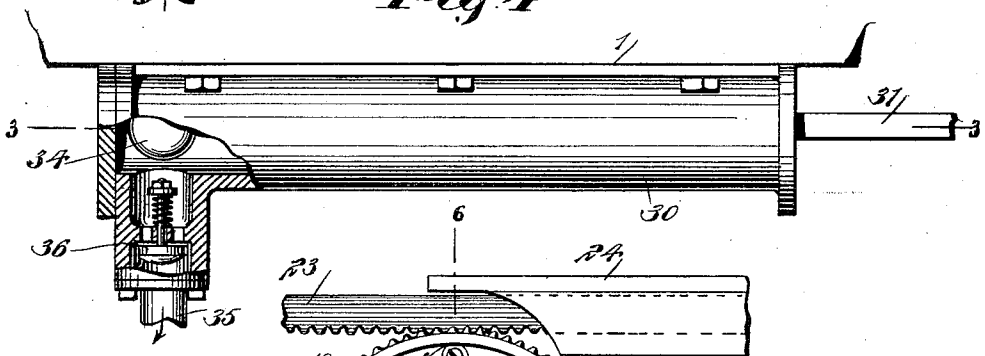


Fig. 5

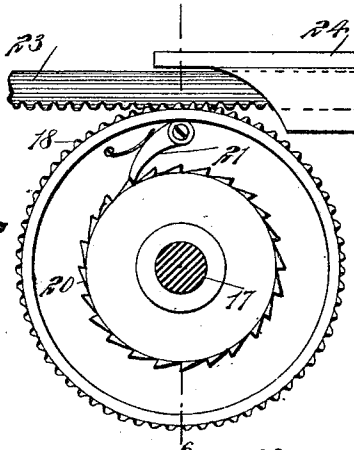
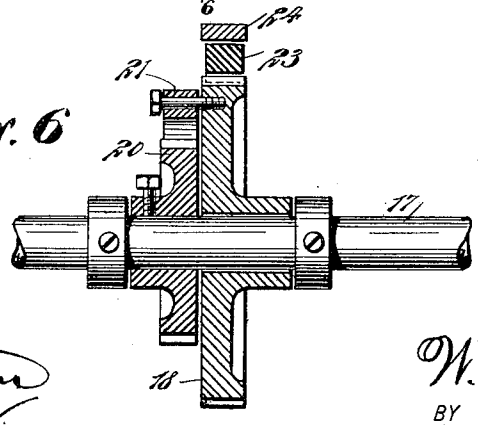


Fig. 6



WITNESSES:

John A. Bergstrom

C. R. Ferguson

INVENTOR

W. A. Norton

BY Munn & Co.

ATTORNEYS.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM A. NORTON, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO EDWARD MERSEREAU, OF SAME PLACE.

WAVE-MOTOR.

SPECIFICATION forming part of Letters Patent No. 632,139, dated August 29, 1899.

Application filed November 23, 1898. Serial No. 697,271. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. NORTON, of the city of New York, (Port Richmond,) borough of Richmond, in the county of Richmond and State of New York, have invented a new and Improved Wave-Motor, of which the following is a full, clear, and exact description.

This invention relates to improvements in motors operated by rising and falling waves of water; and the object is to provide a motor of this character that shall be strong and compactly made, so as to withstand the great strain brought to bear upon it, and having two rocking floats so connected as to act in unison to impart motion to a driving power.

I will describe a wave-motor embodying my invention and then point out the novel features in the appended 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 views.

Figure 1 is a side elevation of a wave-motor embodying my invention. Fig. 2 is a plan view thereof. Fig. 3 is a section on the line 3 3 of Fig. 4 of a force-pump employed. Fig. 4 is a partial plan and partial section at right angles to Fig. 2. Fig. 5 is a detail showing a power mechanism employed. Fig. 6 is a section on the line 6 6 of Fig. 5.

Referring to the drawings, 1 2 designate two floats connected together at the sides by coupling-bars 3. These floats are designed to have a longitudinal rocking motion; but to provide for their vertical movement with the rise and fall of the tides and also to secure or anchor them in the desired position I employ a crib consisting of uprights 4, connected by suitable cross-bars 5. On the trunnions 6 7 of the floats to which the coupling-bars 3 are attached are rollers 8 9, which engage against the uprights 4. These rollers 8 9 are peripherally grooved to engage against the curved surfaces of the uprights.

Extended upward from the float 1, at its end adjacent to the float 2, are brackets 10, in which a rock-shaft 11 has its bearings. Rigidly connected to the rock-shaft 11 is an upwardly-extended arm 12, and extended upward from the float 2 is a curved arm 13, having a forked end embracing the arm 12, and through this forked end a bolt 14 is passed, the said bolt 14 also passing through a longitudinal slot 15, formed in the arm 12. By this construction when the floats are rocked the arm 13 will have a movement longitudinally of the arm 12.

Having bearings in uprights 16 on the float 1 is a power-shaft 17, and loosely mounted on this power-shaft are gear-wheels 18 19. Attached to the shaft 17 at the side of the gear-wheel 18 is a ratchet-wheel 20, engaged by a pawl 21, mounted on the gear-wheel 18, and connected to the shaft 17 at the side of the gear-wheel 19 is a similar ratchet-wheel 22, which is also engaged by a pawl (not shown) connected to the gear 19. A rack 23 engages with the gear-wheel 18 and has movement through a guide 24. This rack 23 has a link connection 25 with the arm 12 at a point above its connection with the rock-shaft 11. A rack 26 engages with the gear 19 and has movement through a guide 27 and has a link connection 28 with an arm 29, extended downward from the shaft 11. Obviously by this arrangement when the arm 12 is rocked by the movement of the floats the racks 23 and 26 will be alternately moved back and forth. On the forward movement of the racks motion will be imparted to the shaft 17 because of the clutch or pawl connection between the gears and the ratchet-wheels. On the backward movement of the racks, however, the gears will be rotated freely without impeding the forward rotation of the driving-shaft.

Secured to each side of the float 1 is a force-pump 30. These force-pumps have their piston-rods 31 connected to cranks 32 on the shaft 11. On the suction operation of the pistons water is drawn through the pipes 33, in which inwardly-opening valves 34 are arranged, and on the reverse motion of the pistons water is forced through pipes 35, which operate water-power wheels to be hereinafter described, and these pipes 35 are provided with outwardly-opening check-valves 36.

The water-wheels 44 have their hubs 39 rigidly attached to the shaft 17, and the wheels rotate in casings 45, mounted on the stand-

ards 16. Water forced in through the pipes 35 is carried to the peripheries of the wheels by valved pipes 52.

In operation the motion of the waves will impart a rocking motion to the two floats, and obviously this rocking motion of the plates will rock the arm 12, and the movement of this arm will operate the racks 23 and 26 above described to impart motion to the driving-shaft 17, and at the same time the pumps 30 will be operated to force water into the water-power wheels. The rack-and-gear motion is designed particularly for the starting of the power, as it is obvious that the water-wheels must be filled with water before they become operative. The shaft-and-gear construction, however, will serve as an auxiliary power when the water-wheels are in operation.

It is designed that the rotary motion of the shaft 17 shall impart motion to the machinery located on shore, and as a means therefor I have shown the shaft 17 as provided with a sprocket-wheel 54, with which a sprocket-chain 55 engages, this sprocket-chain 55 being of course extended to the machinery to be driven.

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

1. A wave-motor comprising two floats, coupling-bars connecting the two floats, a rock-shaft mounted on one float and having operative connection with the other float, a power-shaft, gear-wheels having clutch connection with the power-shaft, racks engaging with the gear-wheels and operated alternately in opposite directions by the rock-shaft, a motor connecting with the power-shaft and means actuated by the rock-shaft for supplying a motive agent to the motor, substantially as specified.

2. A wave-motor, comprising two rocking floats connected together, a rock-shaft carried by one float and having operative connection with the other float, a driving-shaft, a water-wheel connected to said driving-shaft, a pump operated by the rock-shaft for supplying water to the wheel, gear-wheels on said driving-shaft, racks engaging said gear-wheels and connections between the racks and rock-shaft whereby the racks will be alternately moved back and forth, substantially as specified.

3. A wave-motor, comprising two floats mounted to rock and connected together, a rock-shaft carried by one of said floats, an arm extended upward from said rock-shaft, an arm on the other float having sliding connection with the first-named arm, a driving-shaft, water-power wheels connected to said driving-shaft, pumps operated by the rock-shaft, for supplying water-pressure to the wheels, gear-wheels on said driving-shaft, racks engaging the said gear-wheels, and connections between said racks and the rock-shaft, substantially as specified.

4. A wave-motor, comprising two floats connected together and mounted to rock one independently of the other, a rock-shaft carried by one of said floats, an arm extended upward from said rock-shaft, an arm on the other float having sliding connection with the first-named arm, a driving-shaft on the float carrying the rock-shaft, water-power wheels having connection with said driving-shaft, pumps having valve-controlled pipe connections with the water-power wheels, cranks on the rock-shaft and having connection with the pump piston-rods, and rack-and-gear connections between the driving-shaft and the first-named arm, substantially as specified.

WILLIAM A. NORTON.

Witnesses:
JOHN RUTZ, Jr.,
WILLIAM F. LAWSON.