

J. M. BUTLER.
WAVE MOTOR.

APPLICATION FILED JUNE 23, 1909.

956,796.

Patented May 3, 1910.

2 SHEETS—SHEET 1.

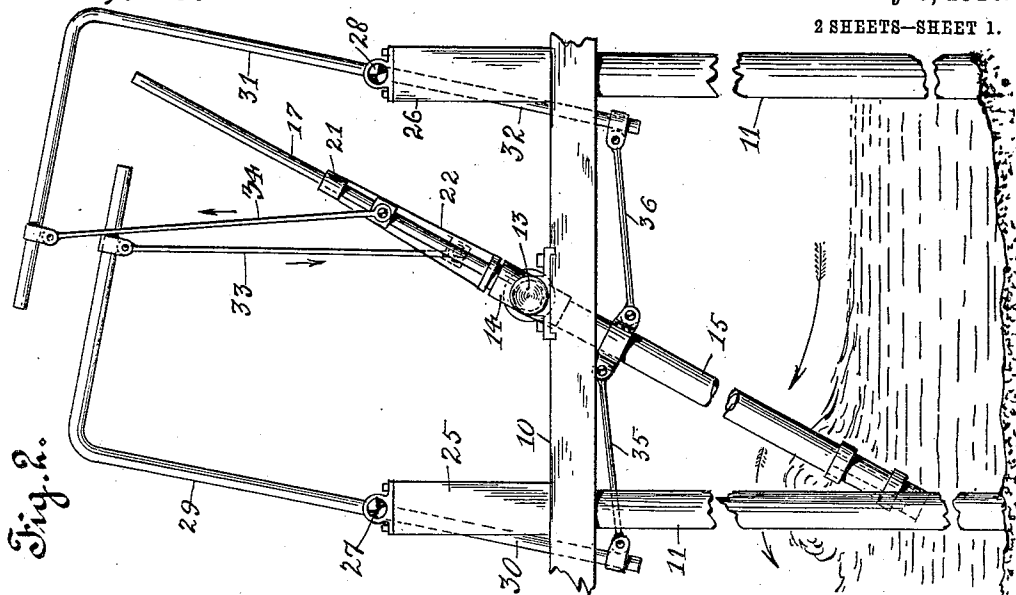


Fig. 2.

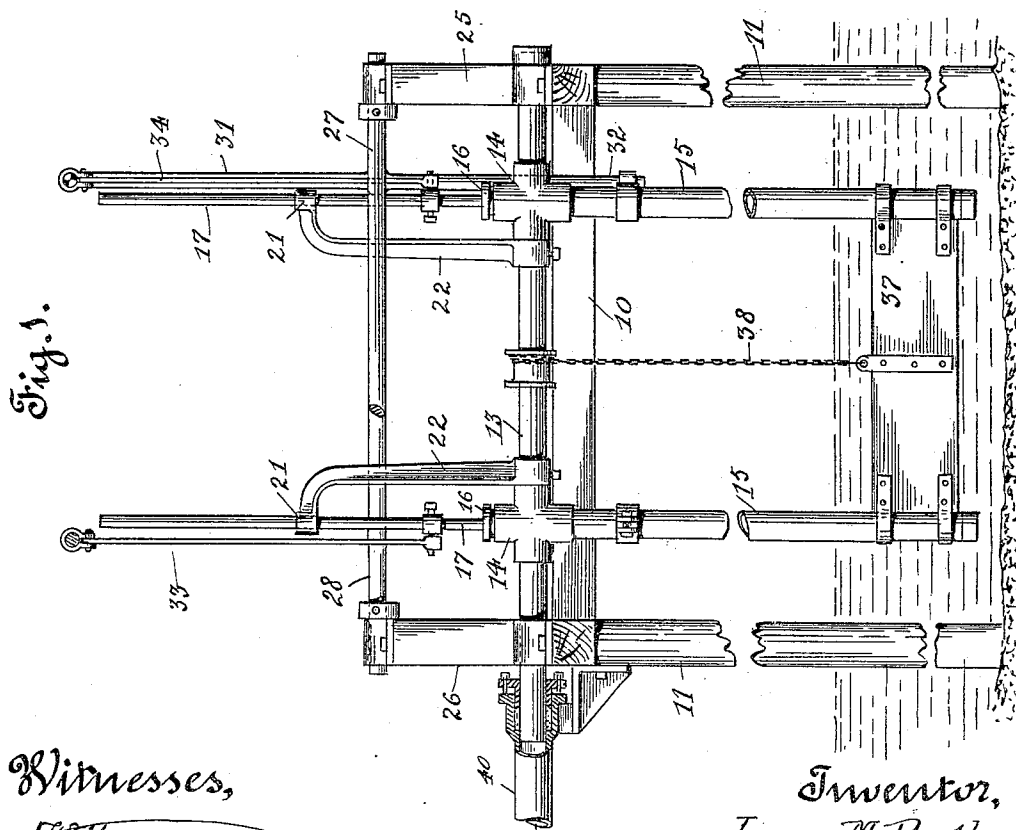


Fig. 1.

Witnesses,
H. Monteverde.
M. A. Palmer.

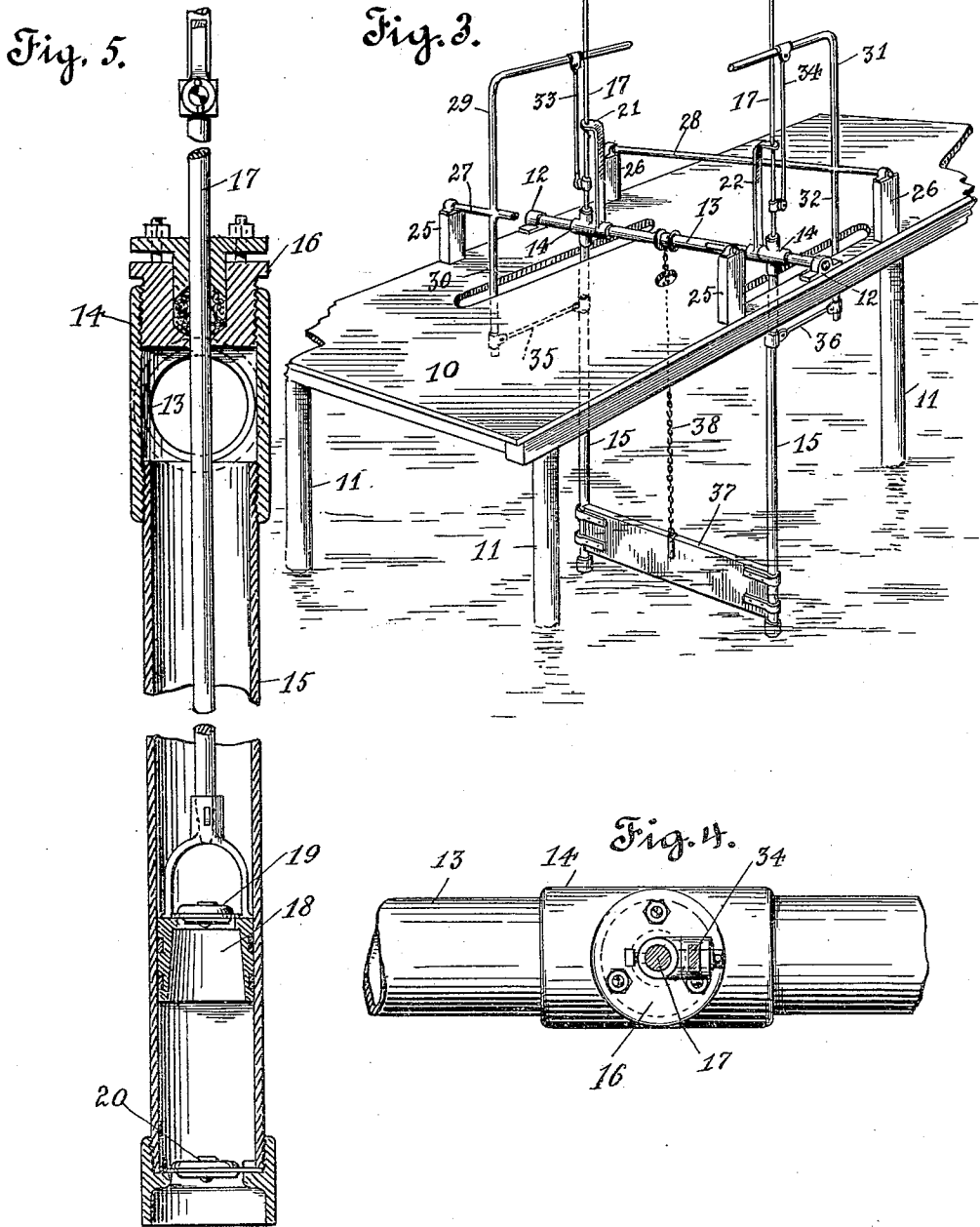
Inventor,
James M. Butler,
By *Hazard Chase,*
Attorneys.

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Witnesses,
H. A. Hart
M. A. Palmer

Inventor,
 James M. Butler,
 BY *Hazard & Thayer*
 Attorneys.

UNITED STATES PATENT OFFICE.

JAMES M. BUTLER, OF LOS ANGELES, CALIFORNIA, ASSIGNOR OF ONE-FOURTH TO
JOSHUA G. DE TURK, OF LOS ANGELES, CALIFORNIA.

WAVE-MOTOR.

956,796.

Specification of Letters Patent.

Patented May 3, 1910.

Application filed June 23, 1909. Serial No. 503,733.

To all whom it may concern:

Be it known that I, JAMES M. BUTLER, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Wave-Motors, of which the following is a specification.

This invention is directed to improvements in those types of wave motors that derive their energy from an oscillating element suspended in the sea from a wharf or superstructure, and which utilize the energy so created to operate a pumping or other mechanism located adjacent thereto, and a main object thereof is to unite the motor element and pumping mechanism into a single element, arranged so that its forward and rearward movement will be fully utilized to force a continuous stream of water therefrom to a source of storage supply.

A further object is to provide a simple and inexpensive mechanism that will successfully withstand the destructive effects of rough seas, winds or tides.

In the accomplishment of the above objects I preferably employ a plurality of oscillating pump cylinders depending from a superstructure into the sea, the plungers of the cylinders being pivotally connected to suitably arranged levers pivotally mounted on the structure, the cylinders also being transversely connected by a motor element or gate to freely oscillate the pump cylinders.

The above objects are accomplished by means of the device described herein and illustrated in the accompanying drawings, in which:—

Figure 1 is a front elevation of my motor mounted on a wharf structure. Fig. 2 is a side elevation of the motor in one of its extreme positions. Fig. 3 is a perspective view of my complete apparatus. Fig. 4 is an enlarged detail plan view of a portion of the hollow shaft to which the pump cylinders are attached. Fig. 5 is an enlarged longitudinal section of one of the pump cylinders.

In a practical embodiment of my invention, 10 designates a wharf or superstructure extending into the sea a sufficient distance to insure a suitable depth of water, carried by piling 11 driven into the bed of the sea. Mounted in bearings 12 secured to the wharf 10 and extending transversely

thereof is a hollow shaft 13, carrying cross fittings 14, the pump cylinders 15 being secured to the lowermost arms of the crosses. The upper arms of these crosses are provided with suitable packing boxes 16 through which operate the plunger rods 17 of the pumps. The lower ends of rods 17 carry pistons 18 provided with check valves 19 of usual construction, and the lower ends of the cylinders are also provided with check valves 20 to supply water to the cylinders below the pistons. The upper ends of rods 17 reciprocate through bearings 21 formed on the upper curved ends of vertically disposed standards 22 rigidly secured to the hollow shaft 13 adjacent the crosses thereon.

Mounted on wharf 10 and disposed at the front and rear of the shaft 13 are bearings 25 and 26, arranged in pairs and disposed transversely of the wharf structure. Journalled in each pair of bearings are rock shafts 27, 28, each carrying rigidly secured thereto upwardly and downwardly extending arms 29, 30, 31, 32, the upper ends of arms 29, 31 being bent at right angles to their lower portions and toward each other, as clearly shown in the various views of the drawings. These upper arms 29, 31 are adapted to operate the plunger rods of the pumps on a movement of the cylinders, being pivotally connected thereto by rods 33 and 34, the lower arms 30, 32 are pivotally connected by rods 35, 36 to the pump cylinders. Both of arms 30, 32 as well as the pump cylinders operate through slots formed in the wharf.

The lower portions of the pump cylinders are connected transversely by a sliding gate 37, against which the force of the waves is directed to oscillate the pump barrels or cylinders, a suitable mechanism, such as chain 38 and winding drum 39, being provided for raising or lowering the gate in case of storms or rough seas.

It will be at once apparent upon an inspection of the various views of the drawings, and especially Fig. 2, that upon a forward oscillation of the pump cylinders the shafts 27, 28 will be rocked, the connecting rods 33, 34, 35 and 36 simultaneously vertically reciprocating the plunger rods of the pumps in an opposite direction, and thereby causing a continuous stream of water to be forced upwardly through one or the other of the cylinders through the shaft 13, and from thence through the pipe line 40 universally

connected thereto, the standards 22 preventing a binding pull on the rods.

By forming the pumping mechanism as a part of the motor device, I am enabled to dispense with a separate expensive pumping mechanism that is always liable to become disordered.

Having described my invention what I claim as new and desire to secure by Letters Patent is:—

1. In a wave motor, the combination of an oscillating pump cylinder and piston therefor, of a motor element secured thereto, a pivotally mounted actuating mechanism connected to the pump cylinder and piston, said mechanism adapted to actuate the piston on a movement of the cylinder.

2. In a wave motor, the combination of a supporting structure, of a pair of pump cylinders suspended therefrom, each being provided with a piston, a plane surface mounted between said cylinders, and a toggle mechanism pivotally mounted on said supporting structure and pivotally secured to the pump cylinders and pistons.

3. In a wave motor, the combination of a pair of oscillating pump cylinders provided with pistons, a motor element slidingly connected to the lower end of said cylinders, a pair of rock shafts journaled in bearings located at the front and rear of said cylinders, each of said rock shafts being provided with a downwardly and upwardly ex-

tending arm rigidly secured thereto, and a connecting rod pivotally secured to each of the arms of said rock shafts, the lower of said rods engaging said pump cylinders and the upper rods engaging the pistons of said cylinders.

4. In a wave motor, the combination of a pair of oscillating pump cylinders and pistons therefor, of a motor element mounted therebetween, and means to actuate the pistons on an oscillation of the cylinders.

5. In a wave motor, the combination of a pair of oscillating pump cylinders and pistons therefor, of a motor element mounted therebetween, and a toggle mechanism adapted to actuate the pistons on an oscillation of the cylinders.

6. In a wave motor, the combination of a supporting structure, of a hollow rock shaft journaled thereon, a pair of pump cylinders connected to and communicating with said shaft and pistons therefor, a motor element mounted between said cylinders, and means to actuate said pistons on an oscillation of said cylinders.

In witness that I claim the foregoing I have hereunto subscribed my name this 15th day of June, 1909.

J. M. BUTLER.

Witnesses:

EDMUND A. STRAUSE,
MYRTLE A. PALMER.