

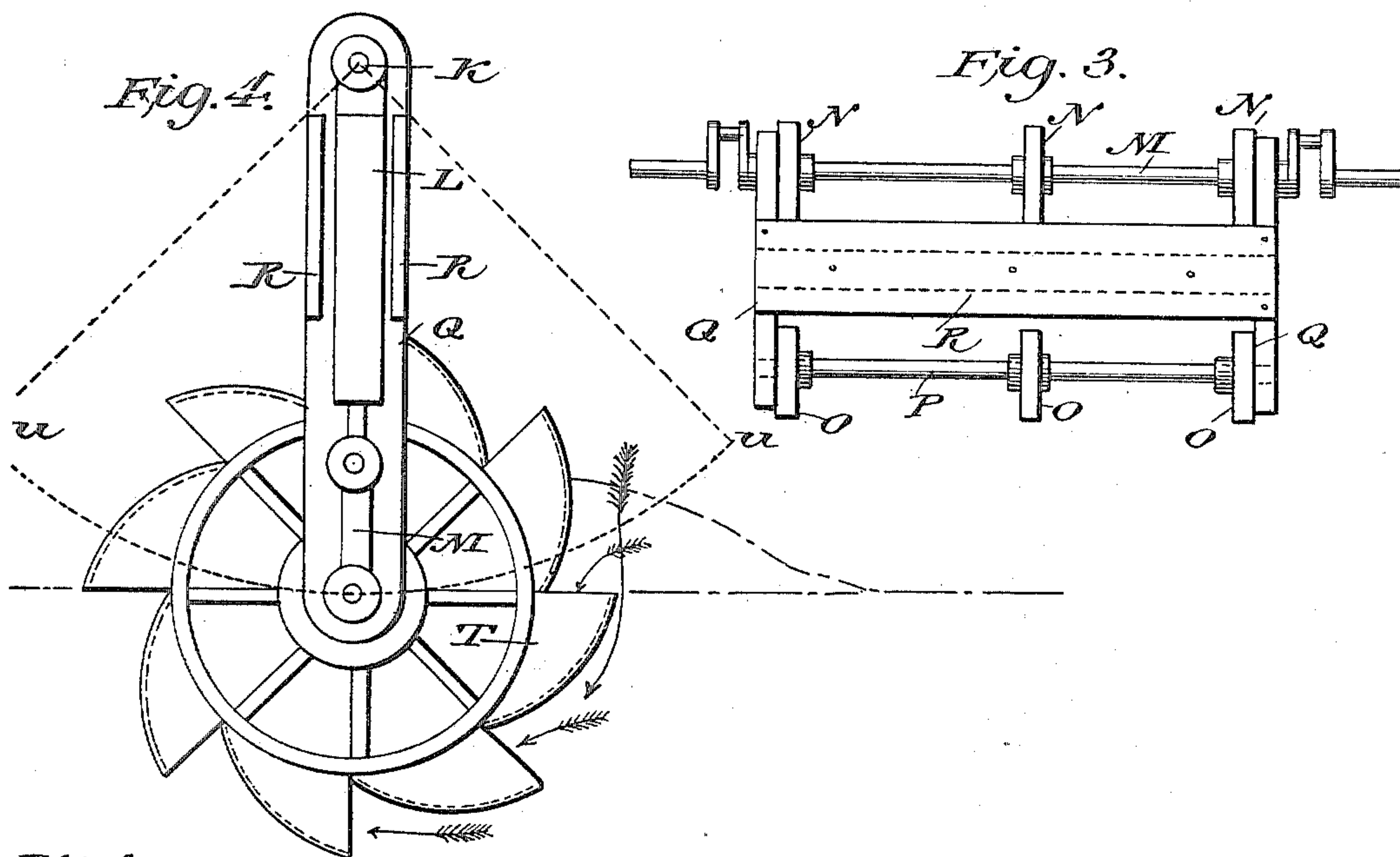
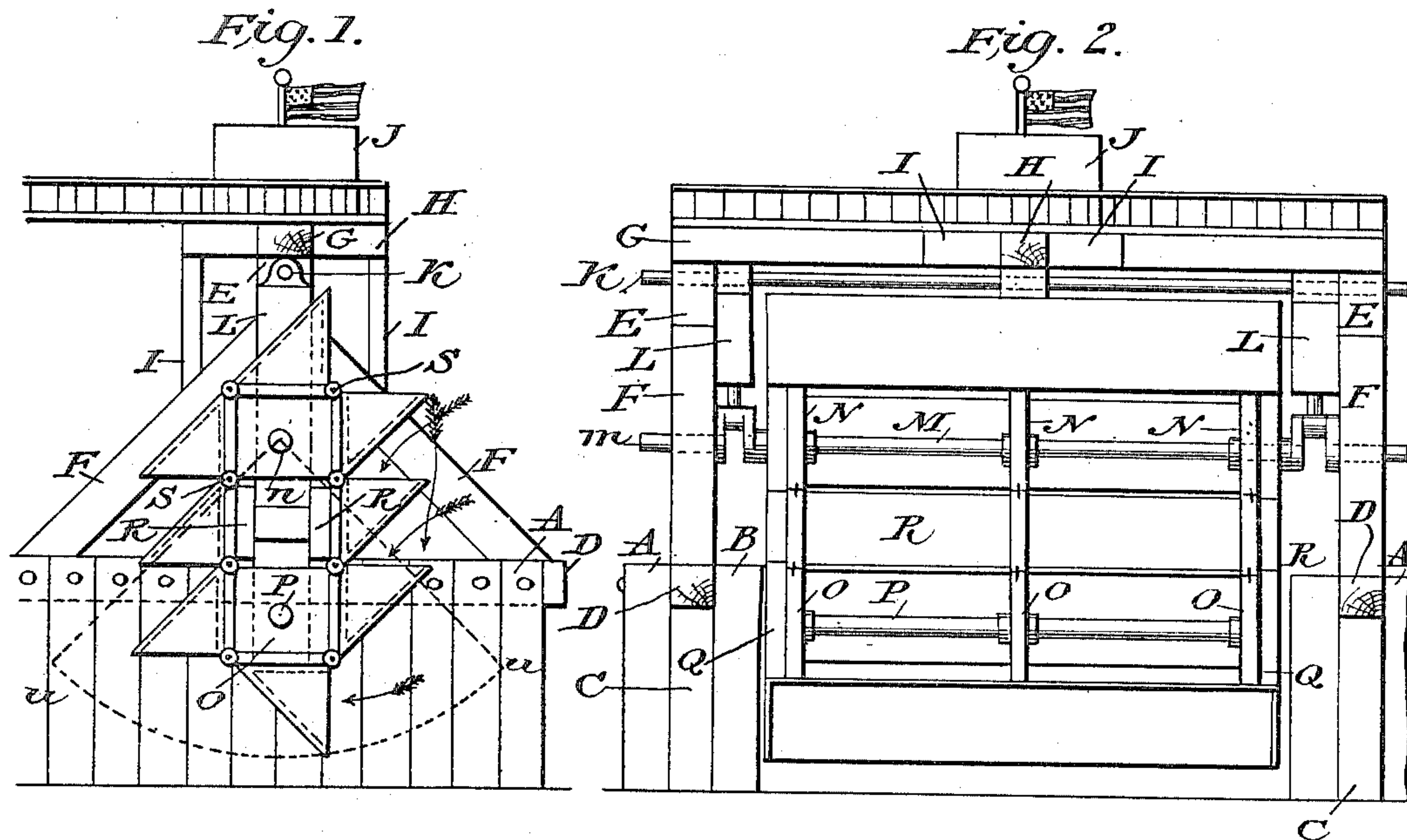
No. 660,036.

Patented Oct. 16, 1900.

G. N. TODD.
WAVE MOTOR.

(Application filed June 8, 1899.)

(No Model.)



Witnesses:

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WAVE-MOTOR.

SPECIFICATION forming part of Letters Patent No. 660,036, dated October 16, 1900.

Application filed June 8, 1899. Serial No. 719,821. (No model.)

To all whom it may concern:

Be it known that I, GEORGE N. TODD, a citizen of the United States of America, residing at Los Angeles, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Wave-Motors; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

15 This invention relates to a novel wave-motor consisting of a series of troughs or buckets arranged to catch the rolling waves of the ocean and adapted to be rotated around one or more centers by being filled, sunk, and
20 pushed downward and around said center or centers by said rolling ocean-waves.

The primal object of this invention is to arrange a series of longitudinal troughs or buckets around one or more centers in such
25 positions that they form buckets, which are constantly filled and emptied and rotated or traveled around said center or centers by the ocean-waves, and thereby to develop power for the operation of other mechanical devices.

30 The second object of this invention is to arrange said troughs or buckets so as to form hollow arms, wings, or propeller-blades secured to rotate or travel about one or more shafts journaled in a pendulum or swing
35 frame.

The third object is to secure said pendulum-frame pivotally to a foundation and support built upon and secured to the ocean bed or bottom and to adjust said pendulum-frame
40 to swing to and fro with the action of the waves or to secure said pendulum-frame rigid to the said foundation-support at any desired angle or position by means of bolts, pins, or keys.

45 The fourth object is to form said wave-motors into an ocean-wall or breakwater or an ocean-dam.

The fifth object is to store and compress air by means of the motion of said wave-motor,
50 and to thereby obtain a steady, even, and

controllable power for generating electricity and operating mechanical devices.

The sixth object is to arrange said wave-motor to form a breakwater and a quiet anchorage or harbor between said wave-motor and
55 the shore and to connect said wave-motor to the shore by pier-walks over the water.

These several objects are attained by the devices illustrated in the accompanying drawings, in which—

60 Figure 1 is an end view of my invention with one of the foundation-supports removed. Fig. 2 is a front view thereof with the front troughs or propeller-arms removed to show the pendulum-frame. Fig. 3 is a side view
65 detail of the pendulum-frame. Fig. 4 is an end view of a pendulum-frame with the propeller arms or troughs arranged about one center, forming a cylinder.

Similar letters of reference indicate the
70 same parts of the drawings and the several figures thereof.

Referring by letter to the accompanying drawings, in Figs. 1 and 2, A indicates a row of outside piles driven down into the ocean
75 bed or bottom. B is a similar inside row of piles. C is a center row of similar piles driven down a little farther in order to form a foundation for a timber sleeper D, provided with an upright timber E, having braces F F, and
80 a cross-timber G, connecting the two upright timbers E E, having a cross-timber H and braces I I, arranged, as in Fig. 1 or as in Fig. 2, for the purpose of supporting an air-compressor J, connecting with an air-pipe K, to
85 which are pivoted air-pumps L L, actuated by a crank-shaft M, upon which are keyed sprockets N N N, connected by chains with idler sprockets or rollers O O O, mounted
90 loosely upon a bolt-shaft P, fast to two timbers or arms Q Q at the bottom, while the crank-shaft M is loosely journaled to rotate therein at the top thereof, its outer ends being journaled to rotate in the upright timbers
95 E E and also form a pivot-support for the swing of the pendulum-frame, which latter is cross-braced by the planks R R, as further illustrated in Fig. 3. The chain is preferably formed with rollers S, as in Fig. 1, and the troughs formed into triangular propeller
100

buckets or arms, which set mouth upward to catch the waves as they roll shoreward, they falling into and filling the troughs above the water-line, thus sinking and driving them
 5 down, and when turning the bottom roller the troughs empty themselves and come bottom upward on the shore side of the chain. It will in practice be preferable to pivot the pendulum-frame by its bars Q Q to the air-
 10 pipe K and connect the crank-shaft M only to the pumps L L, dispensing with any journal or connection of said shaft M to the upright timber E, thereby suspending the weight of the pendulum-frame and its mech-
 15 anism upon the air shaft or pipe K and not upon shaft M, thereby relieving said shaft of friction consequent upon the suspended weight, which is the plan illustrated in Fig. 4, the entire weight of the pendulum-frame
 20 and its mechanism being suspended upon the air-pipe shaft K. The propeller arms or troughs are here shown mounted upon a cylinder T, made of sheet metal, wood, or other material, the pendulum swing and suspen-
 25 sion-point being shown in Figs. 1 and 4 by dotted radius lines U. The pendulum-frame will be of value in this form of wave-motor in sinking a part of the troughs under the water to form a breakwater, while holding
 30 others above high tide-water and may be set to swing loosely to give to any sudden storm or shock or may be secured fast to the foundation-supports at any desired angle or position.
 35 In the operation of my invention the waves roll against the pendulum-frame and its troughs, filling the troughs, sinking and pushing them downward, thereby causing a rotary movement or motion of said troughs around
 40 one or more centers, thereby actuating the air-pumps and forcing air into the air-compressor, from which the power thus generated and stored is used as a steady, even, and con-
 45 trollable power to generate electricity or operate mechanical devices of any form. The wall of troughs forming a barrier to the waves upon which they expend their force, it is ob-
 50 vious that still water or a quiet harbor will be formed thereby between said wave-motor and the shore, the size of which harbor and the power developed depending solely upon the length of the structure and the size of its troughs, and as they are made in sections, as seen in Fig. 2, it will be understood that such
 55 can be duplicated and set side by side, forming an ocean-wall of miles in length, as de-

sired, the top of which may be arranged to form a walk or promenade connected to the shore by pier-bridges.

In Figs. 1 and 4 the small arrows indicate 60 the direction of the flow of the ocean-waves into the troughs, and the large arrows indicate the direction of rotation caused thereby. The force of the waves being broken upon the troughs by filling, sinking, and driving them 65 down and around their center or centers sets up a downward suction underflow of the ocean-water, which is also an additional force in imparting motion to the troughs, as illustrated in Fig. 4. 70

Having described my invention, what I claim is—

1. A wave-motor consisting of a series of troughs arranged around one or more centers and mounted upon a pendulum-frame to catch 75 the overflow waves or ocean-rollers; said rollers thereby causing said troughs to travel around said center or centers.

2. A wave-motor consisting of a series of troughs linked together in an endless chain, 80 journaled to rotate upon a pendulum-frame; and adapted to be rotated by the ocean-waves.

3. A wave-motor consisting of a support pivoting a pendulum-frame; a series of troughs journaled to rotate on said frame; and adapt- 85 ed to be rotated by the ocean-waves.

4. A support or supports secured to an ocean bed or bottom; a pendulum-frame pivoted to said support; a series of troughs journaled to rotate on said pendulum-frame; and 90 adapted to be rotated by wave-power.

5. A series of piles driven into an ocean bed or bottom; timbers secured thereto forming supports; a swinging or pendulum frame, pivoted between said supports; a series of 95 troughs journaled to rotate on said pendulum-frame; and adapted to be rotated by wave-power.

6. A wave-motor consisting of a support or supports pivoting a pendulum-frame; a crank- 100 shaft journaled on said frame, and provided with chains and sprockets, and idlers for said chains journaled on a rod or shaft on the lower end of said frame; a series of troughs bolted to said chains; and adapted to be rotated by 105 wave-power.

In testimony whereof I affix my signature in the presence of two witnesses.

GEORGE N. TODD.

Witnesses:

KATE L. LUCE,
 JAMES P. CLARK.