

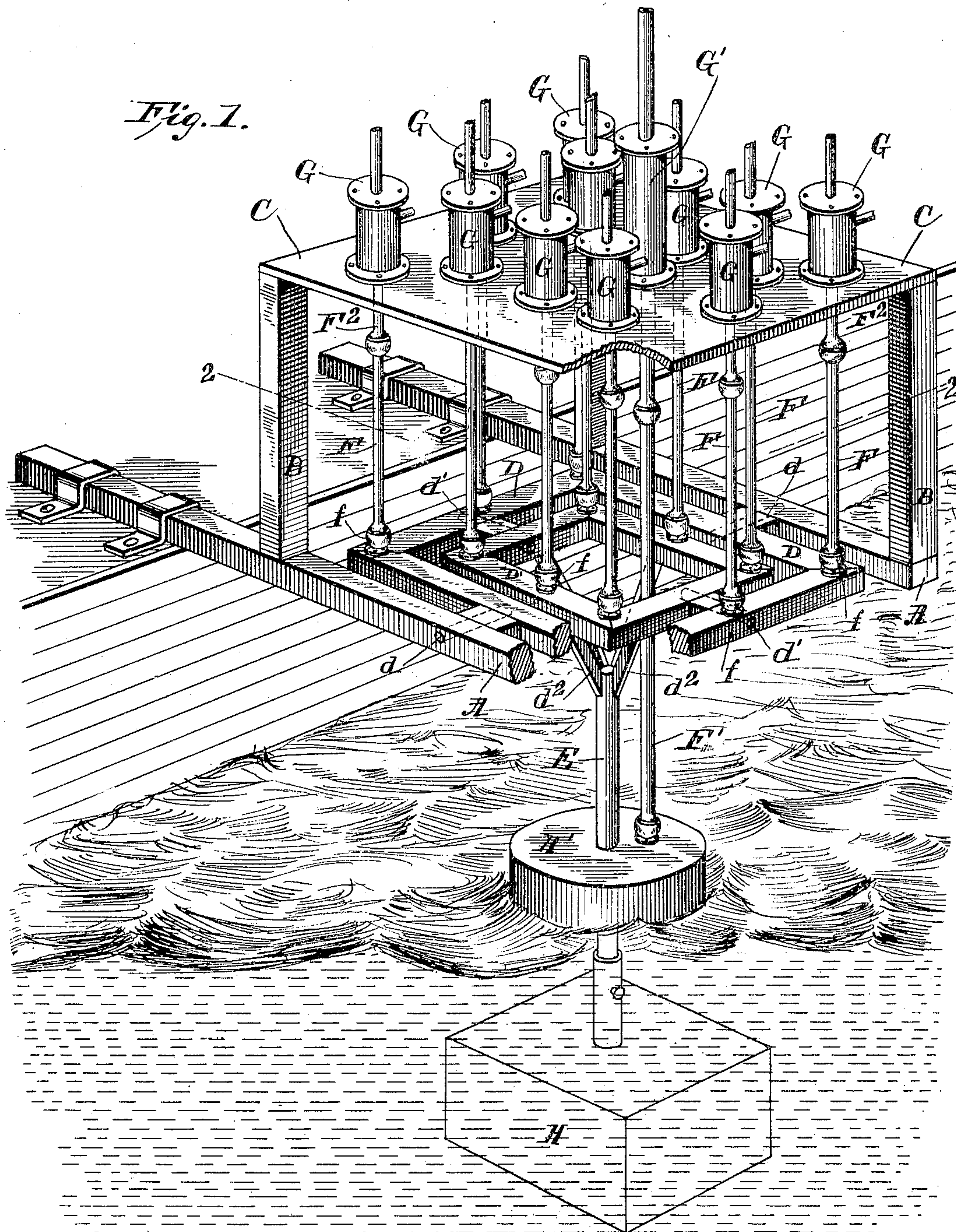
No. 793,497.

PATENTED JUNE 27, 1905.

J. L. ARIZTIA.
WAVE MOTOR.

APPLICATION FILED APR. 14, 1905.

2 SHEETS—SHEET 1.



WITNESSES:
E. M. Callaghan.
Edw. W. Byrnes.

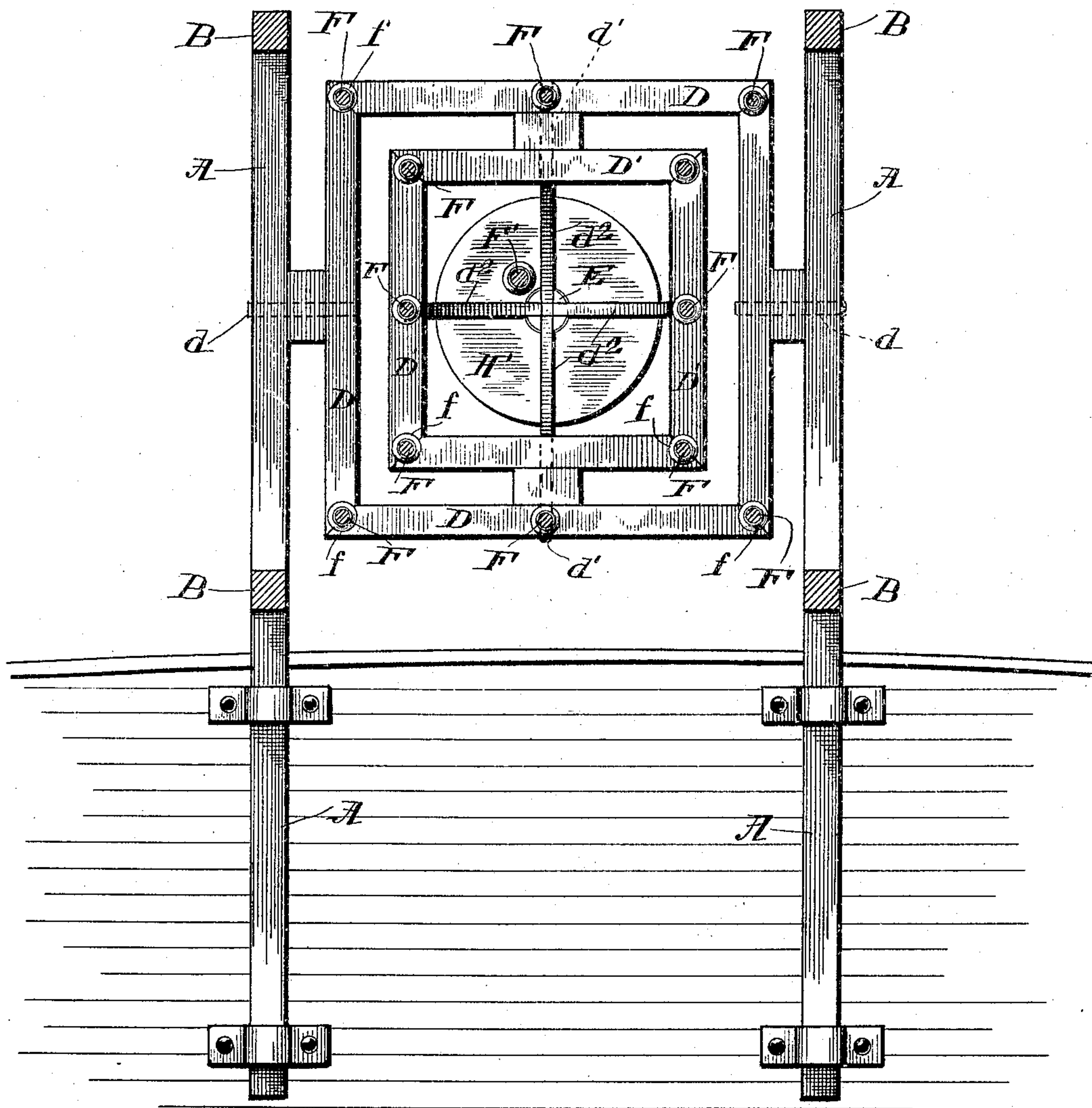
INVENTOR
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2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

JUAN LUIS ARIZTIA, OF IQUIQUE, CHILE.

WAVE-MOTOR.

SPECIFICATION forming part of Letters Patent No. 793,497, dated June 27, 1905.

Application filed April 14, 1905. Serial No. 255,559.

To all whom it may concern:

Be it known that I, JUAN LUIS ARIZTIA, a citizen of Chile, residing at Iquique, in the Republic of Chile, have invented a new and useful Improvement in Wave-Motors, of which the following is a specification.

The object of my invention is to provide an improved wave-motor adapted to be located either upon shipboard or along the shore line.

It relates to that form of wave-motor in which a pendulum bearing at its lower end a float or a weight is hung at the top upon a universal joint and is swayed by the action of the waves in any direction to impart through the universal joint a movement which may be converted into available power for any useful purpose.

My invention consists in the novel construction and arrangement of a framework mounted on the general principle of the universal joint within horizontal arms for supporting the same, a plurality of vertically-reciprocating rods mounted upon the tilting framework and extending vertically into a corresponding series of stationary pump barrels or cylinders on an upper deck or platform, as hereinafter more fully described with reference to the drawings, in which—

Figure 1 is a perspective view of my improved wave-motor shown applied to the side of a ship. Fig. 2 is a horizontal section taken on line 2 2 of Fig. 1.

In the drawings, A A represent two strong horizontally-extending arms which at their inner ends are firmly secured to the side of the ship or to the sea-wall, if located on the shore line, said arms being strongly secured, so as to support the other elements of my motor between the same. Upon these arms are rigidly mounted four corner-posts B B B B, which at their upper ends support an upper platform or deck C.

Between the arms immediately below the platform C are arranged two concentrically-arranged square frames D and D'. The frame D is pivotally supported on trunnions $d\ d$ within the arms A A, and the frame D' is pivotally supported within the frame D upon trunnions $d'\ d'$, whose axis is at right angles to the axis of the trunnions $d\ d$, so that the two

frames D and D' together form a universally-mounted framework that is susceptible of tilting in any direction.

To the inner frame D' there is pendently secured, by means of converging arms $d^2\ d^2\ d^2\ d^2$, a pendulum-rod E, which extends down to and is partly immersed in the waves of the sea. On the lower end of this pendulum-rod is firmly secured a resistance-body H, which is designed to be acted upon by the force of the waves to sway the pendulum. This resistance-body may be a float or a submerged weight and is made relatively large, as shown, so as to offer a large resistance to yield to the waves for transmitting their power to the tilting frame above.

On the two frames D and D' are mounted by suitable ball-and-socket bearings f a series of vertical rods, each made in two sections $F\ F^2$, connected by a ball-and-socket joint. The upper sections of each rod extend through guides in the platform C and enter the barrels G of a corresponding series of pumps. These pumps may be for raising water, or for pumping air for ventilating the ship, or for blowing the furnaces, or they may be used for any other useful purpose. As shown, these pumps are each connected to feed into a separate pipe or carrier; but it is obvious that they may have a single and common inlet and outlet connection, if desired.

In addition to the rods mounted upon the tilting frame I also employ one or more other rods F' , which are connected to a float H' below, which has a central hole through it and is guided upon the pendulum-rod, so that as the level of the sea rises and falls or as the ship rises and falls this float will ride up on the pendulum-rod and again descend, and so act by a direct thrust upon the rod F' to operate other pumps G' . These pumps G' , it will be seen, do not depend upon the lateral action of the waves, but may be operated by the ground-swell when the surface of the sea is comparatively calm.

The pendulum-weight H, it will be seen, is acted upon by the lateral movement of the waves and being universally mounted may be oscillated in any direction and have its power transformed above into a movement

of the pump-pistons. These pump-pistons, it will be seen, act in a more or less regular sequence, so that the pistons of some of the pumps may be moving up while the pistons of others of the pumps may be moving down, and thereby the flow of water or air from the pumps when coupled together may be rendered practically continuous.

To vary the power and stroke of the pendulum, its submerged weight or resistance-body H is preferably made adjustable vertically on the pendulum-rod by means of suitable screws or couplings. When this weight is raised, the stroke of the pendulum is longer, but its power or leverage is correspondingly reduced. When the weight is lowered, the stroke is shorter, but its power or leverage is increased.

The form of the apparatus may be square, circular, or of any other shape, and it may be located anywhere either on the ship or the shore. The form and arrangement of the tilting frame resolves it into a combination of levers of infinite number adapted to all the movements of the sea, and it utilizes all of the movements of the sea, stream, or tide, whether in a horizontal or vertical direction. The suspended position of the device upon the horizontal arms leaves the apparatus entirely unobstructed by any inclosing framework at the water-level, and so gives the full effect of the waves on the resistance-body or float. There may be any number of vertical rods or plungers and pumps, and they may operate together, or separately, or in groups.

In carrying out my invention I do not confine myself to the exact construction and arrangement of the parts as shown, as these may be varied in detail without departing from the scope of my claims. Thus, for instance, the apparatus instead of being supported upon horizontal arms, as shown, may be supported upon vertical posts or standards,

such as are shown at B, or may be supported in any other way.

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

1. A wave-motor comprising two horizontal supporting-arms, vertical posts mounted thereon and bearing at their upper ends a platform, two concentrically-arranged frames mounted respectively upon axes at right angles to each other within the supporting-arms, a series of vertical rods stepped upon said tilting frames and extending through the platform above, and a corresponding series of pump-barrels inclosing said rods and pistons and mounted upon the said platform substantially as and for the purpose described.

2. A wave-motor, comprising two rectangular tilting frames arranged concentrically and mounted upon axes at right angles to each other, a pendulum fixed to and depending from the inner frame, and a series of vertical piston-rods jointed and having their lower sections stepped upon said tilting frames as described.

3. A wave-motor, comprising a frame universally mounted, a pendulum bearing a resistance-body at its lower end and rigidly attached to the universally-mounted frame, vertically-reciprocating rods stepped upon the universally-mounted frame, a rising-and-falling float guided upon the pendulum-rod, and a connecting-rod for the said float for transmitting its power substantially as described.

4. A wave-motor, comprising a laterally-swaying pendulum and a float guided on said pendulum and means for taking off the motion of each as described.

JUAN LUIS ARIZTIA.

Witnesses:

EDW. W. BYRN,
 SOLON C. KEMON.