(No Model.) 2 Sheets—Sheet 1.

H. VOELMY.

WAVE MOTOR.

No. 589,675. Patented Sept. 7, 1897.

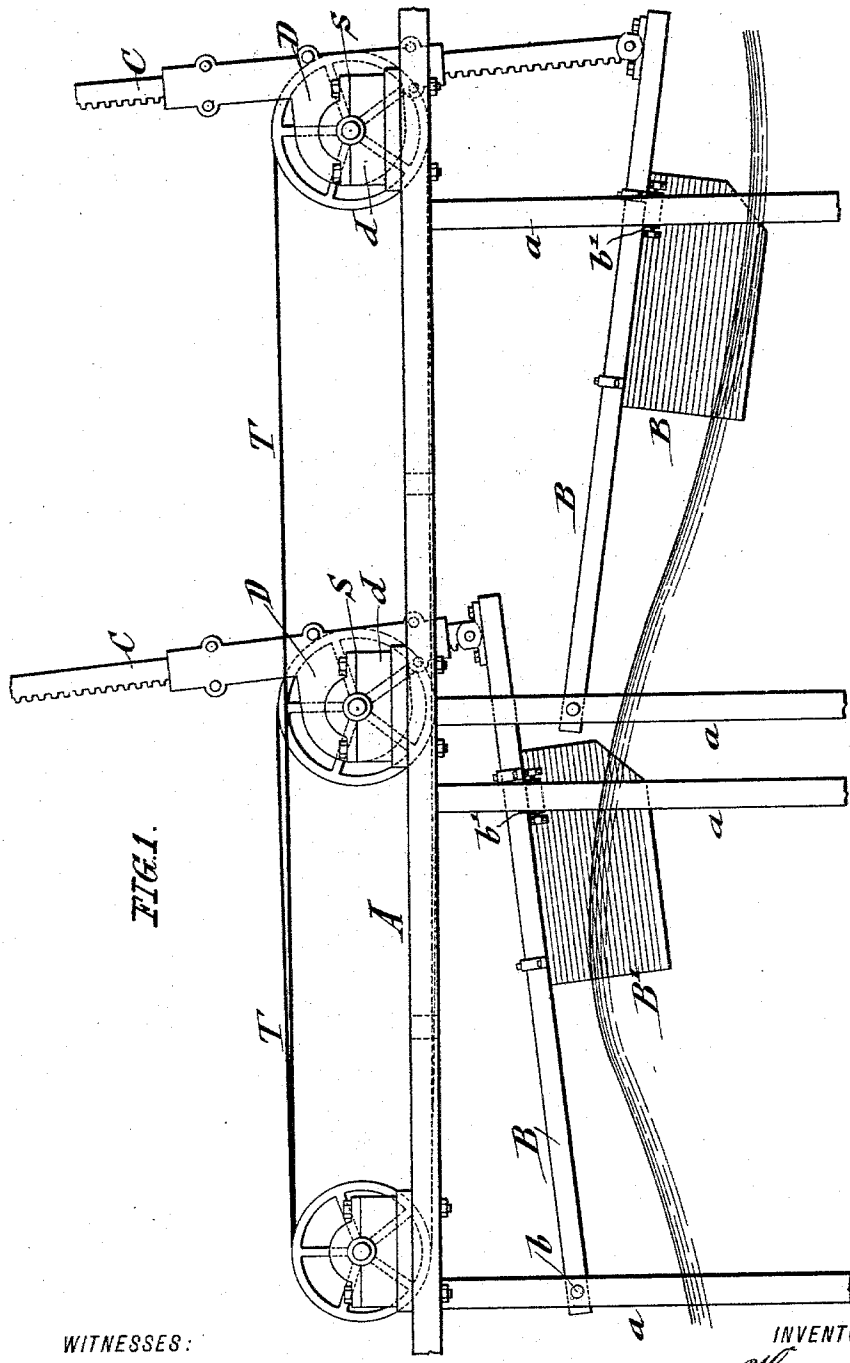


FIG. 1.

WITNESSES:

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(No Model.)

2 Sheets—Sheet 2.

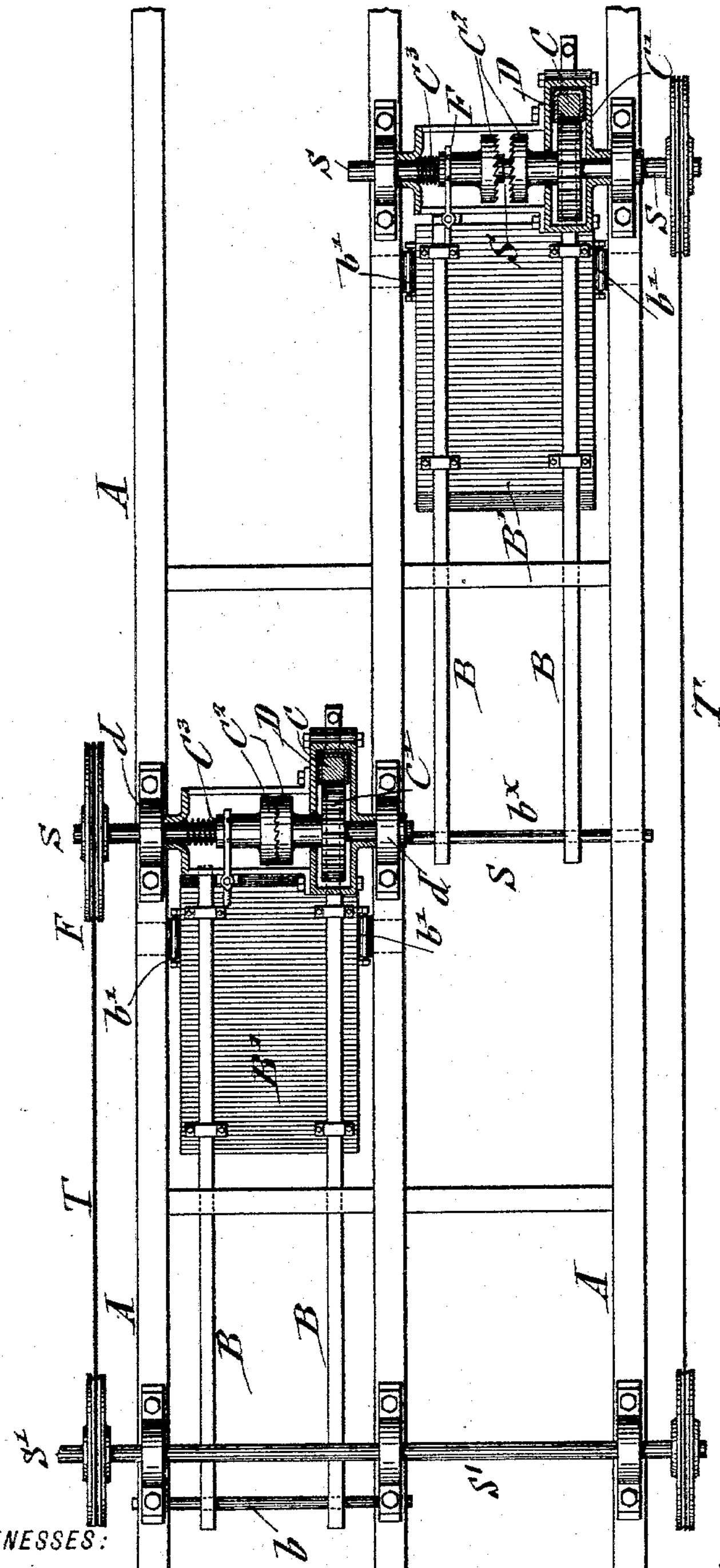
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FIG. 2.



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UNITED STATES PATENT OFFICE.

HENRI VOELMY, OF NEW YORK, N. Y.

WAVE-MOTOR.

SPECIFICATION forming part of Letters Patent No. 589,675, dated September 7, 1897.

Application filed June 2, 1897. Serial No. 639,128. (No model.)

To all whom it may concern:

Be it known that I, HENRI VOELMY, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Wave-Motors, of which the following is a specification.

This invention has reference to certain improvements in that class of motors which are designed for utilizing the power of the waves to produce a continuous rotary motion for the purpose of supplying power for various purposes; and the invention consists of a wave-motor in which a float-actuated lever is raised and lowered by the rising and falling waves and is guided in its up-and-down motion by suitable piles, said lever being pivotally connected with a rack-bar which is guided in a suitable box that is independently pivoted on a transmitting-shaft, so as to follow the oscillating motion of the rack-bar in its up-and-down motion. On the transmitting-shaft is mounted a loose pinion, which meshes with the rack-bar and which is connected with a clutch, the members of which may be thrown in and out of mesh, so that the rotary motion of the pinion and transmitting-shaft is transmitted to the driving-shaft, from which the power produced by the rising and falling of the float is again transmitted by suitable mechanism, as will be fully described hereinafter and finally pointed out in the claim.

In the accompanying drawings, Figure 1 represents a side elevation of my improved wave-motor, and Fig. 2 is a plan view of the same, partly in horizontal section.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents a supporting-frame which is supported on piles *a*, that are driven into the ground at the bottom of the sea along the coast and at a suitable distance from the same. The frame A consists, mainly, of a number of longitudinal supporting-beams, which are transversely braced together so as to form a structure of sufficient strength capable of resisting the power of the waves. To transversely opposite supporting-piles of the beams A is applied a transverse shaft *b* or $b^{\times}$, on which swing levers B, to the outer ends of which is applied a float B′, which is constructed of layers of wood or of hollow sheet metal or other suitable material. The float B′ is firmly attached to the levers B and is provided at opposite sides with antifriction-rollers *b*′, the axes of which are supported in suitable bearings attached to the float B′. The rollers *b*′ serve for guiding the float while it is raised or lowered in following the up-and-down motion or swell of the waves, so that the float is prevented against being jarred or impeded by lateral motions or vibrations. To the outer end of the float-actuated levers B is pivoted a rack-bar C, which extends in upward direction and which is guided in a box D, that is pivoted near its middle portion to the transverse shaft S, the tubular hubs or gudgeons of the box D, as well as the shaft, being supported in bearings *d*, applied to the top of the supporting-beams A. The independent pivoting of the guide-box D to the transmitting-shaft S enables it to follow freely the oscillating motions of the rack-bar C as the same is moved up or down by the rising or falling of the float-actuated lever B.

The box D is made of two parts, which are bolted together and provided with special guideways for the rack-bar C. The rack-bar C meshes with the pinion C′, that is placed loosely on the shaft S, and the hub of which is provided with one member of a clutch C^2, the teeth of which mesh with the second and sliding member of the clutch that is also placed on the shaft S and is actuated by a helical spring C^3, that is interposed between it and the adjacent end of the box D, as shown in Fig. 2. The second member of the clutch C^2 is splined in the usual manner onto the transmitting-shaft S, so that it can be moved in the direction of the axis of the shaft S but prevented from axial rotation on the same. To the hub of the splined member of the clutch C^2 is applied the inner forked end of a fulcrumed lever F, which can be moved in one direction against the tension of the spring C^3 when it is desired to place the members of the clutch C^2 out of mesh with each other, or which can be moved in the opposite direction when it is desired to bring the two members of the clutch into mesh with each other, in which position they are held by the spring acting on the sliding member. When the members of the clutch

C are placed in mesh with each other, the rotation imparted to the pinion C′ by the reciprocating motion of the rack-bar is transmitted to the shaft S during the upward motion of the rack-bar, while during the downward motion of the rack-bar the clutch member on the hub of the pinion passes loosely over the teeth of the splined and spring-actuated member of the clutch without transmitting power to the shaft S. It appears thus that by every upward movement of the lever B intermittent rotary motion is transmitted to the shaft S. This motion is preferably transmitted by a belt-and-pulley transmission T to a second driving-shaft S′, which is supported in independent bearings on the supporting-beams A.

In order to impart continuous motion to the driving-shaft, it is preferable to provide two or more wave-motors, which are built in the same manner as the one described and arranged at a distance corresponding to the average length of the waves from each other, so that they are alternately operated upon by the waves, and thereby continuous motion transmitted to the driving-shaft S′, by which the power is transmitted by suitable pumping mechanism or machinery, according to the purpose for which the motor is constructed. By coupling in this manner a number of wave-motors together and transmitting the intermittent motion of the same to the driving-shaft a comparatively cheap source of power is obtained that may be used along the sea-coast for irrigating and other purposes.

I do not broadly claim a wave-motor comprising a supporting-frame, a series of pivoted actuating-levers provided with floats fixed to their outer ends, rack-bars pivoted to the outer ends of said levers, and suitable gearing in connection with the racks for transmitting power.

Having thus described my invention, what I claim is—

In a wave-motor, the combination of a supporting-frame, an actuating-lever, a stationary pivot on which the lever is fulcrumed, a float fixed to the outer end of the lever, a rack-bar pivoted to the outer end of the lever, a transmitting-shaft journaled in the frame, a guide-box pivoted on the transmitting-shaft and provided with ways for said rack-bar, a gear-wheel on said transmitting-shaft with which the rack-bar is held in mesh by the guide-box, and a clutch on said shaft formed of a member attached to said gear-wheel, and a spring-actuated member splined to said shaft, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

HENRI VOELMY.

Witnesses:
PAUL GOEPEL,
GEO. W. JAEKEL.