

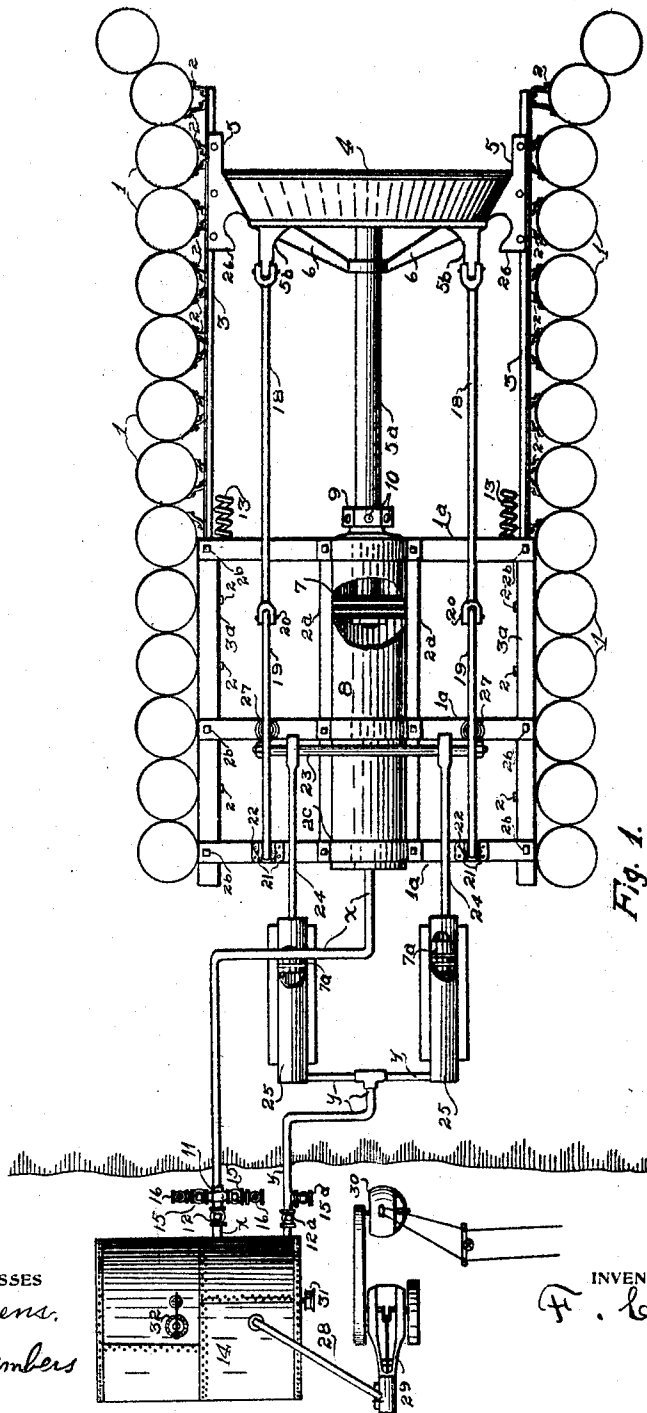
F. C. BATES.
WAVE MOTOR.

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Patented Sept. 24, 1912.

3 SHEETS—SHEET 1.

1,039,081.



WITNESSES
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UNITED STATES PATENT OFFICE.

FRANCIS C. BATES, OF SAN JOSE, CALIFORNIA.

WAVE-MOTOR.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FRANCIS C. BATES, a citizen of the United States, residing at 84 South First street, San Jose, county of Santa Clara, State of California, have invented certain new and useful Improvements in Wave-Motors, of which the following is a specification.

It is the object of my invention to provide practical, economic and effective means for obtaining constant and regular power from the intermittent and irregular force of the ocean waves; for the purpose of producing compressed air as a motive power, and to avoid danger of breakage and destruction from excessive force of the waves; and to take advantage of the high and low tide.

Another object of my invention is to provide a wave motor which will be operated by the force of the water of incoming waves on the sea shore, and to provide for automatically adjusting the motor head to the right position to receive the full force of the next incoming wave, and means whereby the same can be protected against a heavy storm.

My invention may be placed on a beach by driving piles down on an incline for a support or the same may be bolted on an incline to rocks on a rock-bound coast.

My invention consists in certain details of construction, which will be more fully explained by reference to the accompanying drawing, in which—

Figure 1, is a plan view showing in position for operation a wave motor embodying my invention. Fig. 2 is a side view of Fig. 1.

Similar numerals refer to similar parts throughout the several views.

1, indicates the rows of piling on a beach driven down on an incline, a distance so as to make a solid support and extending a distance above high water mark and out below low water mark a distance, where the same curves to the right and left a distance, for the purpose of concentrating the incoming waves against the motor head 4. To this incline piling 1, at 2, are fastened guides 3. Cross ties 1^a, are fastened in a strong manner to timbers 3^a, by bolts as shown at 2^b. To cross ties 1^a, is fastened plate 2^a, said plate may extend from one row of piling to the other or the same may be fastened as shown, leaving a space under the same for the free action of the water to return against

the rear side of motor head 4, for the purpose of assisting the motor head 4, in returning to meet the next incoming wave. Guides 3, may be made of any suitable material of the proper strength to maintain motor head 4, said motor head can be made of any suitable composition of metal dishing in shape and any size required, the same is connected to guides 3, by slides 5; said crossheads are adjustable to guides 3. Piston rod 5^a, is connected to motor head 4, rigidly and braced by stay rods 6, in such a manner as to withstand the on-rushing power of the waves. On the other end of piston rod 5^a, is piston head 7, supplied with any suitable packing. The air compressing cylinder 8, is fastened to plate 2^a in a strong manner as shown at 2^c. On the lower end of cylinder 8 is piston-guide nut 9, the same being perforated as shown at 10, for the purpose of allowing a free intake and outlet of air at the lower end of cylinder 8, to prevent any back pressure on the rear end of piston head 7. At the upper end of air compressing cylinder 8, is attached pipe x, to this pipe farther up on the bluff is attached a four way connection 11, which has outlet leading through check valve 12, and through pipe x, to compressed air tank 14. This check valve 12, allows the air to be compressed into air tank 14, and checks the air from returning to cylinder 8, thereby holding the air pressure in tank 14. Check valves 15, are connected to connection 11, and allow the air to be drawn into cylinder 8, on the downward stroke of piston head 7. These valves 15, close on the up stroke of piston head 7, and thereby the air is forced through check valve 12, to compressed air tank 14. Air intake valves 1^b, are connected to the outside of check valves 15, are for the purpose of controlling the air intake to cylinder 8, the same controls the downward movement of motor head 4. To cross ties 1^a, springs 13, are fastened for the purpose of receiving any over powerful stroke of motor head 4, on the upward movement, the same coming in contact with the ends of slides 5, at 26.

Attached to the rear side of motor head 4, at 5^b, are connecting rods 18, which extend back a distance and connect to lever arms 19, by fulcrum pins 20, lever arms 19, extend back and are connected at their upper ends to angle irons 21, by fulcrum pins 22; lever arms 19, carry cross shaft 23, this

cross shaft is for the purpose of giving a greatly increased power to air compressing cylinders 25, by leverage shaft 23, may be adjusted up or down lever arms 19, according to the stroke required. Attached to shaft 23, are connecting rods 24, the same connect to piston heads 7^a, in air compressing cylinders 25, from which air is compressed into air tank 14, through pipes 7, and check valve 12^a, at each upward stroke of motor head 4, which is driven back and upward by the force of the incoming waves; on the downward stroke air is taken into cylinders 25, through valve 15^a. Springs shown at 27, are directly under the center of lever arms 19, and are for the purpose of relaxing the downward velocity of motor head 4, and stopping the same at the end of down stroke, and holding the motor head 4, in place to receive the full power of the next incoming wave. There may be other connecting rods attached to shaft 23, leading to other air compressing cylinders should the same be required, the compressed air is taken from tank 14, through pipe 28, to any ordinary stationary engine shown at 29, from this engine rotary power is transmitted to a dynamo as shown at 30, producing electricity for light, heat, and power. Air tank 14, is fitted with pressure gage 31, and safety valve 32, for the purpose of designating and controlling the pressure of the air in said tank.

The power of my wave motor will be determined by the size of motor head used, the downward movement of motor head is controlled by the air intake valves 16. The amount of air compressed into receiving tank per hour will depend upon the size and number of compressing cylinders that may be used, and the power of the incoming waves against the motor head.

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

1. In a wave motor of the character described the combination of a solid incline support, guides, timbers, and cross-ties fastened to said support, slides which travel up and down on said guides, a motor head fastened to said slides, a piston rod fastened to said motor head, stay-rods connecting to said piston rod and said motor head, a piston head having any suitable packing, a cylinder having a perforated piston guide nut attached thereto, air intake and outlet check valves, and air intake valves controlling air intake to intake check valves for the purpose set forth.

2. In a wave motor having a solid inclined support; power producing means attached to said support; lever arms fulcrumed

to said support; a motor head and means for connecting the same to said power producing means, and connecting rods fulcrumed at each end connecting said lever arms and said motor head.

3. In a wave motor the combination with a solid incline support; of a motor head made dishing in shape, slides to which the same is fastened, guides on which said slides travel, means of fastening the same to the solid support, means for water to return against the rear side of motor head, a compressing cylinder, a plate to which said compressing cylinder is fastened, a perforated piston guide nut, a three-way pipe connection to which check valves are connected, air controlling valves connected thereto, springs fastened to the side of cross ties to check the up stroke of the motor head, and springs fastened to the upper side of cross ties with which lever arms come in contact to check the down stroke of the motor head.

4. In a wave motor of the character described the combination of a rigid incline support extending above high-water a distance, and below low-water a distance, metallic guides fastened thereto, slides operated on said guides, a motor head attached to said slides, an air compressing cylinder, a piston rod and piston head working in said air compressing cylinder, connecting rods, lever arms connected thereto, an adjustable cross-shaft, connected to said lever arms, springs connecting to said lever arms to check the down stroke of the motor head, springs to check up stroke of the motor head, a perforated guide nut, check valves and air intake controlling valves.

5. In a wave motor the combination of a motor head, slides to which said motor head is fastened, guides on which said slides travel back and forth, and means of fastening the same, a piston and means of fastening the same to the motor head, an air compressing cylinder, and means of fastening the cylinder to said solid incline support, a piston head adjusted to said cylinder by any suitable packing, connecting rods fastened to said motor head, which extend back and connect to lever arms, an adjustable cross shaft connected to said lever arms to which connecting rods are attached, the same being connected to piston heads in the air compressing cylinders, the stroke of the same being adjustable.

In witness whereof I have hereunto set my hand this 19th day of February, 1912.

F. C. BATES.

Witnesses:

H. J. B. WRIGHT,
C. C. GRAICTRES.