(No Model.)

C. L. CALDWELL.

WAVE MOTOR.

No. 536,169. Patented Mar. 19, 1895.

Fig. 1.

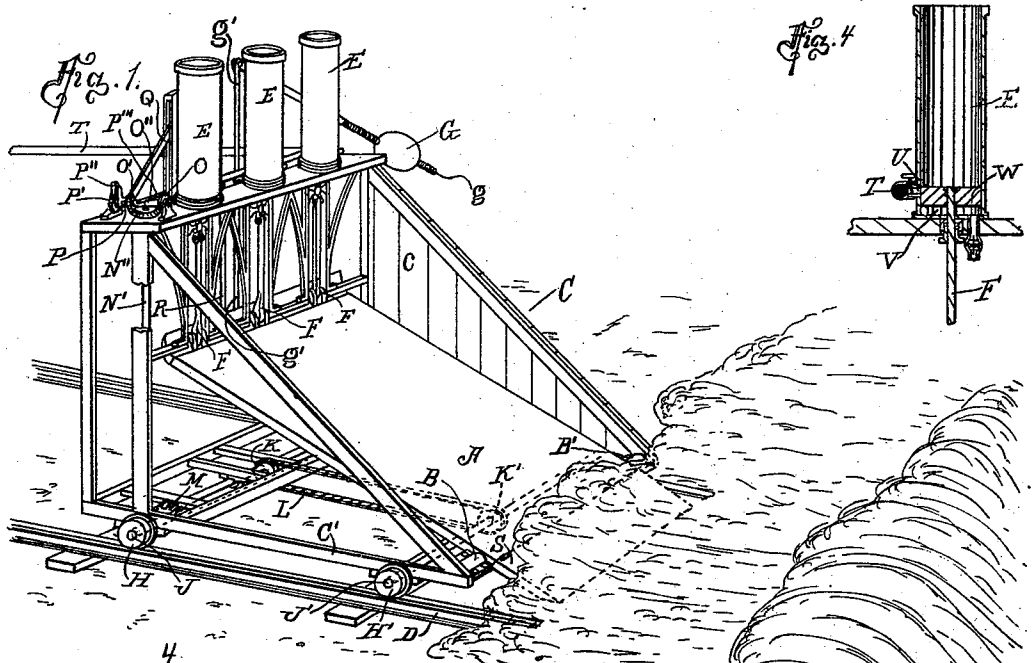


Fig. 4.

Fig. 2.

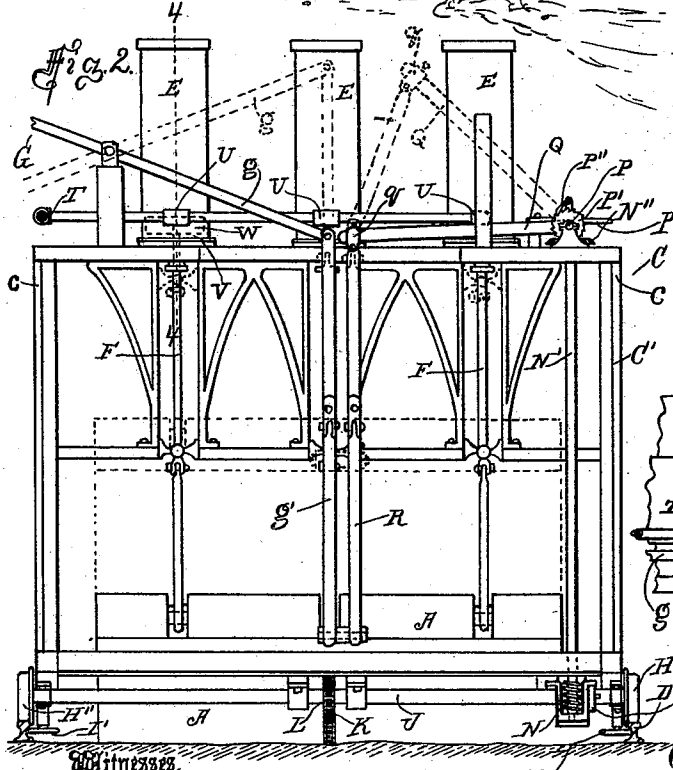
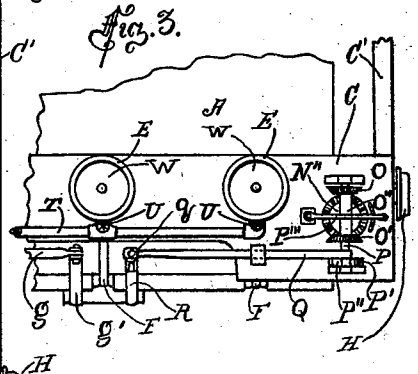


Fig. 3.



Witnesses.

O. W. Harbeson.

F. M. Townsend.

Inventor.

Charles L. Caldwell

By

Hazard & Townsend.

His Attys.

UNITED STATES PATENT OFFICE.

CHARLES L. CALDWELL, OF LOS ANGELES, CALIFORNIA.

WAVE-MOTOR.

SPECIFICATION forming part of Letters Patent No. 536,169, dated March 19, 1895.

Application filed July 25, 1894. Serial No. 518,498. (No model.)

To all whom it may concern:

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

One object of my invention is to provide a wave motor which will be operated by the weight of the water of incoming waves on the sea shore, and also by the force exerted by the impact of such waves or breakers.

Another object of my invention is to provide for adjusting the motor to the right position upon the beach to receive the full force of the breaker or incoming wave.

My invention comprises a platform pivoted so that one end can be raised and lowered, and arranged in an inclined position to receive the incoming wave upon its upper face, a power transmitting device or devices connected with such platform to be operated thereby when the platform is depressed by the weight of the water, and a suitable counterbalancing device for returning the free end of the platform to its elevated position when the weight of the waves has been removed.

My invention also comprises the combination of the carriage, the motor platform pivoted at one end to the carriage and arranged in an inclined position to receive the incoming wave upon its upper surface, and mechanism operatively connecting the wheels of the carriage with the motor platform, so that the movement of the platform drives the wheels of the carriage.

My invention also comprises other features and combinations of parts hereinafter specified.

The accompanying drawings illustrate my invention.

Figure 1 is a perspective view showing in position for operation, a machine embodying my invention. The side wall in the foreground is removed from the frame work of the carriage for clearness of illustration. Fig. 2 is a rear view, or a view from the shore side of the machine. The platform is shown at the end of its down stroke and dotted lines indicate the position of parts at the end of the up stroke. Fig. 3 is a plan of a portion of the top of the machine. Fig. 4 is a sectional detail on line 4—4, Fig. 2, showing a portion of the power converting device.

A indicates the wave receiving motor-platform pivoted at one end in journals B and B′ and mounted upon a carriage C, the wheels of which run upon a track D which leads down from the shore into the ocean.

E indicates suitable power converting and transmitting device comprising air compressors or pumps mounted upon the carriage and connected respectively with the motor-platform A by suitable connecting rods F.

G is a counterbalance connected with the platform A and arranged to lift the free end thereof and return it to its elevated position when the platform is relieved from the weight of the wave. This counterbalance comprises a weight lever *g* pivoted to the frame and connected with the platform A by connecting rods *g′*.

The carriage is supported by wheels H, H′, &c., and is held to the track by rail clamping wheels I, I′, &c., which extend under the flanges of the rails D of the track.

I lock the machine on the track by suitable mechanism which is also adapted to transmit power from the motor-platform when operated, and apply such power to drive the wheels H, &c., to propel the machine up and down the track to and from the shore.

The axles J, J′ are journaled to the frame C′ of the carriage and the traction wheels H, H′, &c., are fixed upon their respective axles J and J′ and such axles are connected by means of sprocket wheels K and K′ respectively fixed upon the axles, and a sprocket chain L trained over such wheels. The rear axle J is provided with a worm gear M clutched thereon by a clutch M′ and operated by a worm N mounted upon a shaft N′ having at its upper end a beveled cog-wheel N″.

O O′ are beveled cog-wheels mounted upon a shifting sleeve O″ which is mounted upon a shaft P and is arranged to rotate with and to slide along the shaft P which is driven by a ratchet wheel P′ fixed upon such shaft and operated by a pawl P″ which is operated by a lever Q which is pivoted upon the ratchet shaft P and has the pawl P″ pivoted to its shorter arm, and which has its longer arm connected with the motor-platform A by a connecting rod R.

In practical operation, when it is desired to move the machine along the track by hand, the worm gear M is unclutched from its axle J and then the machine can be moved down into the proper position to receive the full weight of the incoming wave at the time the wave breaks. When the carriage is in the desired position the clutch M′ is again applied to clutch the wheel and the axle J is thus locked by the worm. Through the medium of the sprocket wheels K and K′ and sprocket chain L this also locks the other axle J′ so that the wheels H, H′, &c., are locked against rotation except when the worm N is operated to drive the wheel M. If it is desired to leave the machine in this position for any considerable length of time the beveled wheels O and O′ are shifted, by means of lever P′′′′, out of engagement with the worm driving wheel N′′ and the worm is thus left stationary and the machine is held immovably locked to the track. If the tide is going out, however, it will be desirable to run the machine down toward the wave so as to receive the full efficient force of the incoming wave. For this purpose the shifting sleeve O′′ is shifted to throw the beveled cog O′ into engagement with the worm operating wheel N′′. This operates the worm to rotate the wheels H, H′, &c., to drive the machine down toward the ocean. The rate of movement of the machine can be regulated by changing the position of the connecting rod R at the end of the lever Q. A sliding sleeve *q* is provided on the end of the lever to allow the connecting rod, which is pivoted thereto, to be changed. When the tide turns and begins to come in shore, then the shifting sleeve O′′ is shifted by an attendant to throw the beveled wheels O′ out of engagement with the wheel N′′ and to throw the beveled wheel O into engagement with such wheel so that the movement of the worm will be reversed and the operation of the platform A will cause the propelling apparatus N′, N′′, M, &c., to drive the machine slowly up the shore at a speed corresponding to that of the tide, thus to cause the platform to receive the weight of wave at that portion of the wave which is most efficient for the purpose.

S indicates an apron pivoted to the carriage at its end to receive the waves and allow them to shoot up on the platform A without breaking too heavily against the end of the machine to force it shoreward.

The frame C′ of the carriage has its sides *c* closed to prevent the water from flowing off at the sides of the platform. When the wave flows in it ascends the platform and its weight is held on the platform by the sides *c* long enough to allow the free end of the platform to be depressed thereby, and when the wave has spent its force it will flow back again toward the ocean. Such part of the wave as may flow over the free end of the platform will flow back again beneath the platform and escape underneath the apron S which is pivoted so as to rise and allow the water to flow therebeneath.

T indicates the pipe which carries off the compressed air from the air compressors E E E. The ports U into this pipe open from the air compressors somewhat above the bottom thereof. This forms an air chamber V beneath the port to form an air cushion to receive the piston head W at the close of its downward stroke and thereby check the downward movement of the piston head without any jar. The pipe T is to have flexible connections, such as a hose, not shown, to allow the carriage to move freely.

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

1. The wave motor comprising a platform arranged so that one end can be raised and lowered and arranged to receive the incoming wave upon its upper face, a power transmitting device or devices connected with such platform to be operated thereby when the end of the platform is depressed by the weight of the water, and a suitable counterbalancing device for returning the end of the platform to its elevated position when the weight of the water has been removed.

2. A wave motor comprising a pivoted platform arranged in an inclined position to receive the incoming wave upon its upper surface; power transmitting device connected with such platform to be operated thereby when the platform is depressed by the weight of the water, and a suitable counterbalancing device for raising one end of the platform when the weight of the waves has been removed.

3. The combination of the carriage; the motor-platform pivoted to the carriage and arranged in an inclined position to receive the incoming wave upon its upper face; and mechanism operatively connecting the wheels of the carriage with the motor-platform whereby the movement of the platform drives the wheels of the carriage.

4. The combination of the carriage having traction wheels fixed upon an axle which is journaled to the frame of the carriage; the worm gear fixed upon such axle to drive the same; the worm geared with such worm gear to drive the same; a platform pivoted to the carriage and arranged to receive the incoming wave upon its upper face; and operative mechanism connecting the platform with the worm to propel the same.

5. The combination of the carriage having power transmitting mechanism mounted thereon; the motor-platform pivoted to the carriage and arranged to receive the weight of the incoming wave upon its upper face; operative mechanism connecting the platform with the power transmitting mechanism to drive the same; counterbalancing means to return the free end of the platform to its elevated position, and the apron extension pivoted to the front of the machine to receive

the incoming wave and direct it upon the platform, and arranged to allow the receding water to escape therebeneath.

6. The wave motor comprising a frame having its sides inclosed and front open; a motor-platform pivoted to the front of the frame; power transmitting mechanism; operative means connecting the power transmitting mechanism with the platform, and a counterbalancing device to return the free end of the platform to its elevated position.

CHAS. L. CALDWELL.

Witnesses:
JAMES R. TOWNSEND,
ALFRED I. TOWNSEND.