

(No Model.)

2 Sheets—Sheet 1.

D. F. SPANGLER.
WAVE MOTOR.

No. 578,612.

Patented Mar. 9, 1897.

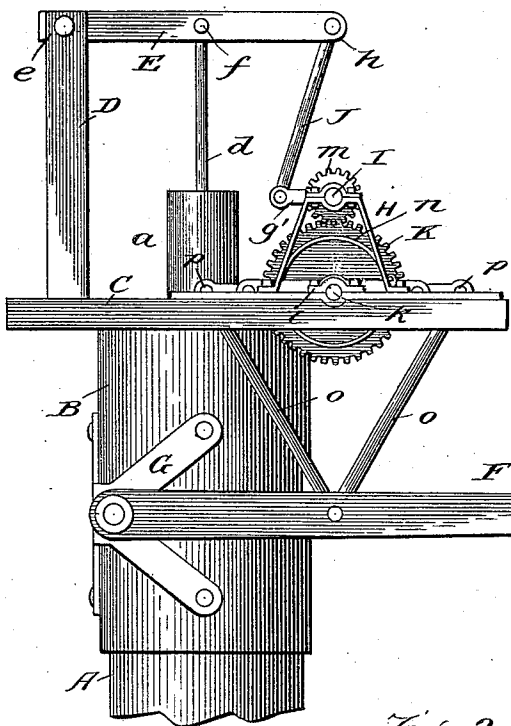


Fig. 1.

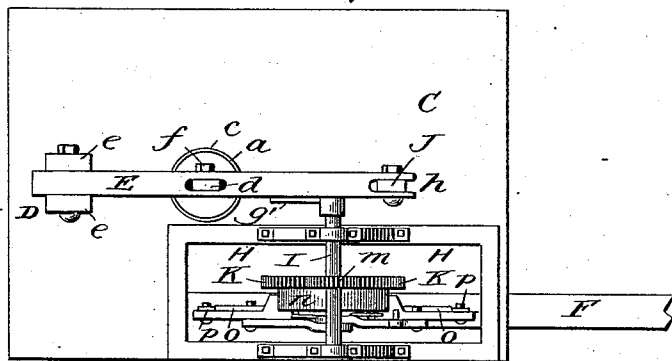


Fig. 2.

Fig. 4.

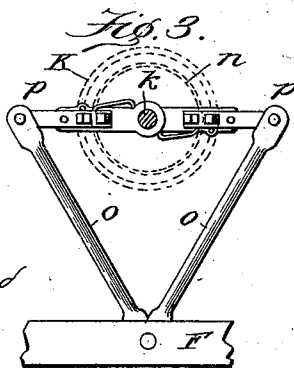
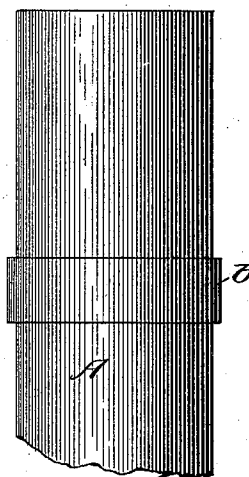


Fig. 3.

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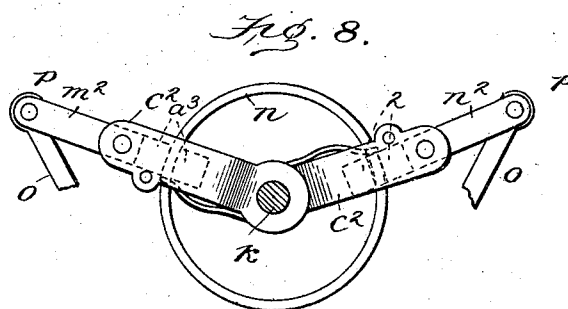
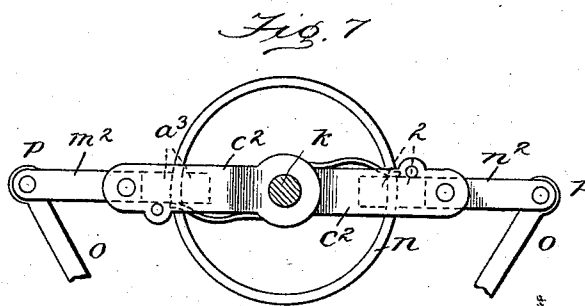
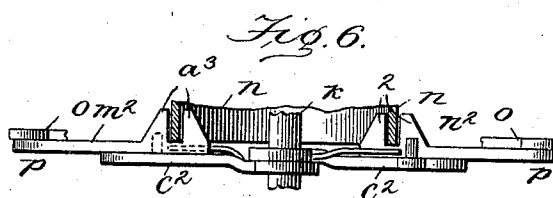
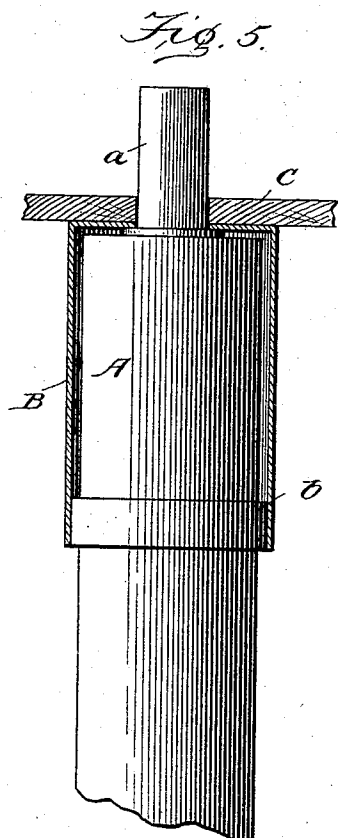
(No Model.)

D. F. SPANGLER.
WAVE MOTOR.

2 Sheets—Sheet 2.

No. 578,612.

Patented Mar. 9, 1897.



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UNITED STATES PATENT OFFICE.

DAVID F. SPANGLER, OF SANTA ANA, CALIFORNIA.

WAVE-MOTOR.

SPECIFICATION forming part of Letters Patent No. 578,612, dated March 9, 1897.

Application filed May 19, 1896. Serial No. 592,167. (No model.)

To all whom it may concern:

Be it known that I, DAVID F. SPANGLER, of Santa Ana, in the county of Orange and State of California, have invented an Improved Wave-Motor, of which the following is a specification.

My invention relates to wave-motors, and has for its object the provision of a motor which will utilize the buoyancy of the waves for operating the said device.

With this object in view the invention consists of the details of construction and arrangement which will more fully appear hereinafter.

In the accompanying drawings, which form a part of this application, Figure 1 is a side elevation of my invention in position. Fig. 2 is a top plan view thereof. Fig. 3 is a detail view of the two alternating levers and friction-clamps. Fig. 4 is a view of the pier with the cylinder and other mechanism removed.

Fig. 5 is a vertical sectional view showing the pile A encircled by the cylinder B, also showing the flange *b* and the platform C, which is secured to the said cylinder and rotates therewith, also showing the cylinder *a* attached to the pile. Fig. 6 is a detail of the friction-clamp-operating mechanism. Fig. 7 is a side elevation of the same when the operating-lever F is horizontal. Fig. 8 is a side elevation of the same when the said lever F is raised upward by the waves.

Like numerals or letters of reference indicate corresponding parts in the several views.

Referring to the said drawings, A designates a pier projecting out of the water and having a hollow compressed-air cylinder *a* projecting from the top thereof. An annular flange *b* is suitably placed on the pier, as shown. A cylinder B, having the platform C with hole *c*, is placed over the pier A, the lower end thereof working over the annular flange *b*. The hollow compressed-air cylinder *a* projects up through the hole *c* and allows the plunger *d* to work therein.

At one end of the platform C is placed an upright standard D, having bifurcated ends *e*, between which is pivoted the end of the lever E. The upper end of the plunger *d* is pivoted at *f* to the said lever E.

A lever F is pivoted to the bracket G, said

bracket being situated on the side of the cylinder B, the said lever projecting out into the sea and having attached to the free end of the said lever a buoyant float S. A gear-supporting frame H is secured to the platform C and has journaled therein the shaft I, said shaft projecting beyond the frame and having keyed to the outer end of said shaft a crank *g'*, the lower end of which is pivoted to the lower end of the pitman J, the upper end of the pitman J being pivoted to the bifurcated end *h* of the lever E. A large toothed wheel K is keyed to the shaft *k*, said shaft being journaled in bearings *i*, suitably situated in the gear-supporting frame H, the said large toothed wheel K meshing with the gear-wheel *m*, said gear being keyed to the shaft I. A flange or rim *n* is situated on the side of the toothed wheel K. At a suitable intermediate point of the lever F is pivoted two rods *o*, the upper ends of which being pivoted at *p* to two friction-clamps working upon the rim *n*, so as to produce a continuous rotary motion in one direction of the toothed wheel K, the lever F being operated by the rise and fall of the buoyant float S.

In the present invention I use a compressed-air cylinder for transmitting the power generated by my invention, but I do not confine myself to such, and any other method can be used which will answer the purpose.

In case one float does not give speed enough, I will lengthen the main shaft and put on another friction-wheel and set of levers, and so arranged that when one float is on top of a wave the other will be in the trough, thus increasing the speed twofold.

The annular flange *b*, which surrounds the pile A, is made of leather or suitable material and serves to keep the revolving cylinder B from coming in contact with the said pile A except on the said flange, the object being to lessen the friction between the outer cylinder and the pile A.

The platform C is rigidly attached to the cylinder B and rotates therewith. The cylinder *a* passes down through the hole *c* and is securely situated in the pile A, the said hole *c* being situated in the platform C.

It will be readily seen from the foregoing description that when the lever F is raised by the action of the waves the rods *o* are lifted

upward and being pivoted to the friction-clamps n^2 and m^2 causes the outer ends of the said clamps to be raised. When the said clamps are raised, the jaws 2 of the clamp n^2 grip the rim n and rotate it. The other clamp m^2 slides along at the same time without coming in contact with the said rim n . Now when the lever F reaches the limit of its upward movement and begins to fall the jaws a^3 of the friction-clamp m^2 grip the rim n and continue the rotation of the said toothed wheel. During this operation the clamp n^2 slides along without gripping the said rim n . It will thus be seen by the above-described operation that the large toothed wheel K , to which the rim n is rigidly attached, is given a continuous rotary movement which sets the mechanism in operation.

Arms c^2 are pivotally attached to the shaft k at one end and at the other or outer end to the said friction-clamps and act as a support for the said friction-clamps.

The pile A , upon which the mechanism rests and rotates, is placed out in the water at any suitable distance from shore, and the power generated by the foregoing mechanism may be transmitted to the shore in any suitable and convenient manner.

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

1. In the herein-described invention, the combination of a pier, an annular flange situated thereon, a cylinder a projecting upwardly therefrom, a cylinder B rotating around said pier, a platform C situated on the top of the said cylinder B , said platform having a hole c through which the upper end of the cylinder a projects, substantially as described.

2. In the herein-described device, the combination of a pier or pile A , a cylinder rotating over said pier, platform secured to said cylinder, gear-supporting frame secured to said platform, a shaft journaled in lower part of said frame, a toothed wheel keyed on said shaft, a circumferential rim placed on the side of said wheel, a bracket secured to the side of said cylinder, a lever pivoted to said bracket, a buoyant float attached to the free end of the said lever, rods hinged at an intermediate point of said lever, friction-clamps gripping said circumferential rim, the said rods connecting the said friction-clamps and the operating-lever F , substantially as set forth and described.

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

DAVID F. SPANGLER.

Witnesses:

W. S. BARTLETT,
C. E. PARKER.