No. 646,815. Patented Apr. 3, 1900.

S. H. EMMENS.

SURF MOTOR.

(Application filed Dec. 27, 1899.)

(No Model.)

Fig. 1.

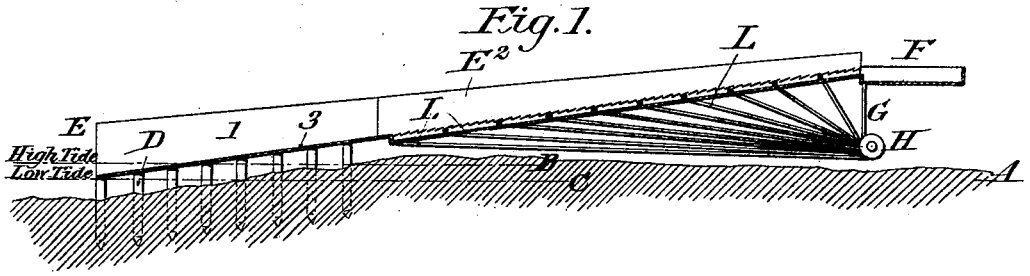


Fig. 2.

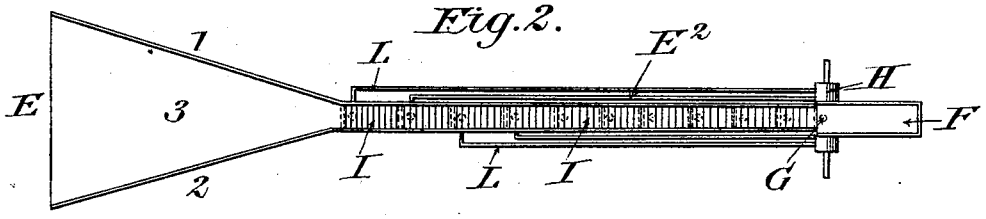
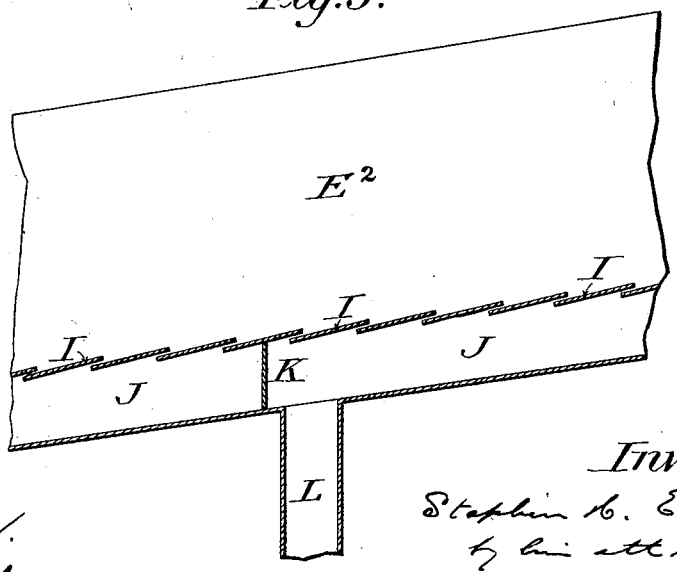


Fig. 3.



Witnesses:

A. M. Young.

E. Thos. Loftus

Inventor:

Stephen H. Emmens

by his attorney

D. L. Ewin.

UNITED STATES PATENT OFFICE.

STEPHEN H. EMMENS, OF NEW YORK, N. Y.

SURF-MOTOR.

SPECIFICATION forming part of Letters Patent No. 646,815, dated April 3, 1900.

Application filed December 27, 1899. Serial No. 741,738. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN HENRY EMMENS, a subject of the Queen of Great Britain and Ireland, and a resident of the borough of Richmond, in the city and State of New York, have invented a new and useful Improvement in Surf-Motors, of which the following is a specification.

This invention consists in apparatus whereby the momentum of the swell of the sea or of waves or billows advancing upon a shore may be availed of for the purpose of lifting much of the water that enters a receiving-trough to a comparatively-high level, and thus obtaining a source of hydraulic power; also, in certain novel combinations of parts in such apparatus, as hereinafter set forth and claimed.

The accompanying sheet of diagrammatic drawings will enable the invention to be readily understood and applied by persons skilled in the art.

Figure 1 of the drawings represents a longitudinal section of the improved surf-motor. Fig. 2 represents a plan view of the same, and Fig. 3 represents a vertical longitudinal section of a portion of the apparatus on a larger scale.

Like letters and numbers refer to like parts in all the figures.

The line A, Fig. 1, represents the natural surface of the ground of the ocean shore, and the broken lines B and C represent the high and low tide levels, respectively. Upon piles D or other suitable foundation a tapering ascending trough E is constructed with adequate converging side walls 1 and 2 and an impervious smooth platform or floor 3, such trough discharging into a conduit E^2, preferably of the same inclination and which may be of uniform width. The trough E and conduit E^2 together slope upward from at or below the low-tide level and extend inland until they reach a height corresponding to the maximum height ordinarily obtainable by the influx of the swell or billows in the particular locality where the apparatus is constructed and that is controlled by the dimensions and general arrangement of the motor. At the summit of the conduit E^2 a tank F receives the water that reaches this elevation. From this summit tank a discharge-pipe G descends and delivers the water within the casing of a suitable water-wheel H. Such water-wheel may be of any known or improved type and may be used for transmitting power in any approved way. In order to utilize that major portion of the water that does not reach the summit of the conduit E^2, the floor of this throat portion of the apparatus is composed of transverse boards or plates I, fixed at a slightly-greater angle than the floor as a whole, with the upper edge of each board or plate overlapping the lower edge of the next one above, but out of contact therewith. The interstices thus formed admit the reflux water to a trough J, constructed underneath the conduit E^2 and having transverse partitions K, which divide this trough into relatively-short sections. From each of these trough-sections a discharge-pipe L leads to the water-wheel H.

More than one water-wheel may obviously be connected with one and the same summit tank and reflux-trough, either or both. The number of sections into which the reflux-trough is divided may vary greatly, and other like modifications will suggest themselves to those skilled in the art.

This apparatus is in principle a reproduction of the spouting or blowing holes frequently met with in nature on rocky coasts where advancing waves enter a funnel-shaped cavity and by the consequent concentration of their momentum upon a reduced cross-section elevate a column of water to a considerable height. This is what takes place in the present apparatus. The force represented by the whole wave area at the mouth of the receiving-trough E is gradually transferred to a greatly-diminishing volume of water, which accordingly mounts higher and higher until it ascends the conduit E^2 and pours over into the summit tank F. The water that does not rise to the summit flows back through the interstices between the transverse boards or plates I into the respective sections of the reflux-trough J, and from thence finds its way through the pipes L to the wheel H. Nearly the whole of the head of water produced by so much of a wave as enters the mouth of the receiving-trough E is thus utilized, and there is no considerable reflux upon the floor 3 of the receiving-trough to check the flow of the next succeeding wave, while by properly pro-

portioning the dimensions of the pipes G and L the water wheel or wheels H may be continuously supplied with water and the power maintained at a fairly-uniform rate.

I am aware that attempts have been made to utilize surf-power by constructing funnels having mouths open to the advancing waves and delivering the water through valves into pipes. Such devices are, however, quite distinct from my invention, whereby I not only make use of the advancing waves without any shock or interposed mechanical obstacle, but I also utilize the reflux.

Having thus described said improvement, I claim as my invention and desire to patent under this specification—

1. An apparatus for utilizing surf energy, which apparatus comprises a tapering ascending trough arranged to receive the direct impact of the waves and extending inland, a summit tank in communication with the upper end of said trough, and a water-wheel in communication with said tank.

2. An apparatus for utilizing surf energy, which apparatus comprises a conduit, the floor of which is composed of upwardly-inclined transverse boards or plates separated by interstices, a reflux-trough in communication with said interstices, and a water-wheel in communication with said reflux-trough.

3. An apparatus for utilizing surf energy, which apparatus comprises a conduit, the floor of which is composed of upwardly-inclined transverse boards or plates separated by interstices, a reflux-trough in communication with said interstices and divided by partitions into sections, and a water-wheel in communication with such trough-sections.

4. An apparatus for utilizing surf energy, which apparatus comprises a tapering ascending trough, a conduit in communication therewith, having its floor composed of upwardly-inclined transverse boards or plates separated by interstices, a reflux-trough in communication with said interstices, and a water-wheel in communication with said reflux-trough.

5. An apparatus for utilizing surf energy, which apparatus consists of a tapering receiving-trough, an ascending conduit in communication with said trough, having its floor constructed with upwardly-inclined transverse boards or plates separated by interstices, a summit tank at the higher end of said conduit receiving the primary discharge therefrom, a reflux-trough in communication with said interstices, discharge-pipes leading from said summit tank and reflux-trough, and a water-wheel in communication with said discharge-pipes.

6. An apparatus for utilizing surf energy, which apparatus consists of a tapering receiving-trough, an ascending conduit in communication with said trough, having its floor constructed with upwardly-inclined transverse boards or plates separated by interstices, a summit tank at the higher end of said conduit, a reflux-trough in communication with said interstices and divided by partitions into sections, discharge-pipes leading from said summit tank and trough-sections, and a water-wheel in communication with said discharge-pipes, substantially as hereinbefore specified.

STEPHEN H. EMMENS.

Witnesses:
NEWTON W. EMMENS,
CHARLES MILES.