

A. W. MELANDER.
 APPARATUS FOR UTILIZING WAVE TOWER.
 APPLICATION FILED JAN. 21, 1913.

1,074,060.

Patented Sept. 23, 1913.

Fig. 1.

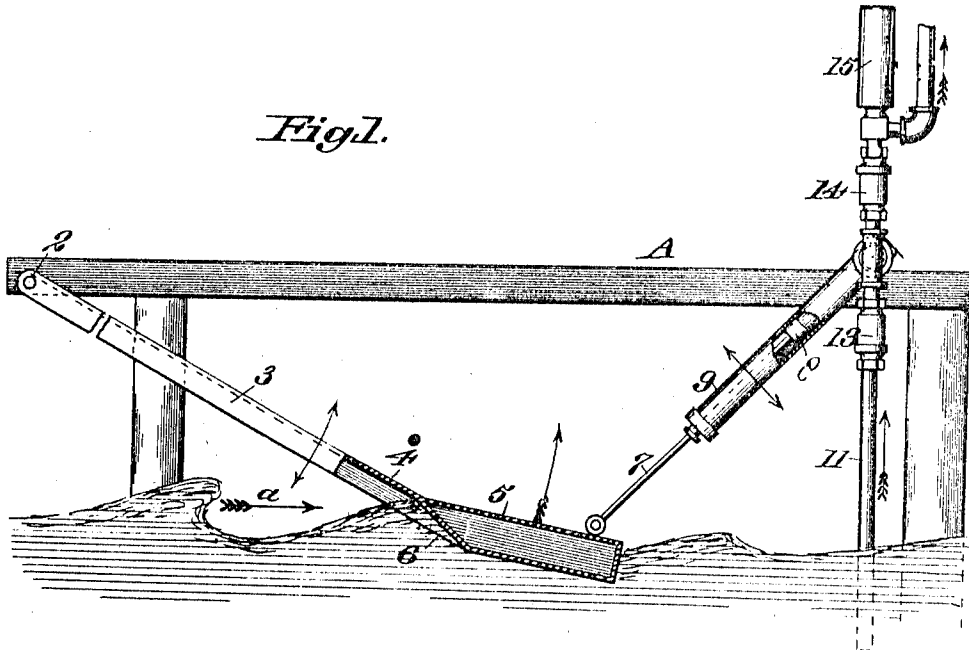


Fig. 2.

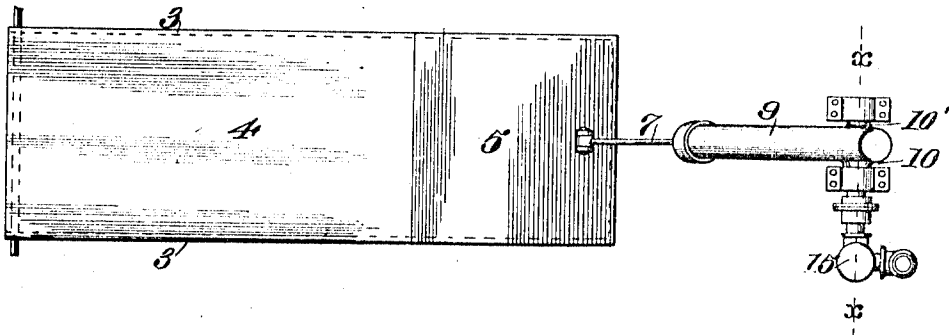


Fig. 3.

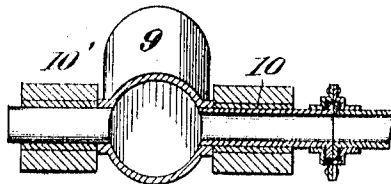
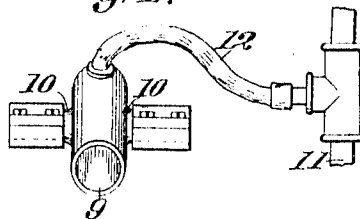


Fig. 4.



WITNESSES:

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AUGUST W. MELANDER, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO UNIVERSAL WAVE POWER CO., OF SAN FRANCISCO, CALIFORNIA, A CORPORATION OF CALIFORNIA.

APPARATUS FOR UTILIZING WAVE-POWER.

1,074,060.

Specification of Letters Patent. Patented Sept. 23, 1913.

Application filed January 21, 1913. Serial No. 743,312.

To all whom it may concern:

Be it known that I, AUGUST W. MELANDER, a subject of the King of Sweden, residing in the city and county of San Francisco and State of California, have invented new and useful Improvements in Apparatus for Utilizing Wave-Power, of which the following is a specification.

This invention relates to an apparatus for utilizing wave power, and particularly pertains to a means for raising water by the action of waves.

It is the object of this invention to provide a simple, practical, and efficient means by which a pump can be operated by the action of waves, and which is adapted to utilize the energy of waves to a high degree.

Other objects will appear hereinafter.

The invention primarily resides in a float having an inclined end against which the waves impact, connected to a pivoted rocking frame to have an oscillating movement in a vertical direction, and a pump pivoted to have an oscillating movement and having a reciprocal piston connected to the float.

The invention further consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a side elevation of the invention with parts broken away. Fig. 2 is a plan view with the framework removed. Fig. 3 is a detail section on the line X—X of Fig. 1 showing the pivoted mounting of the pump. Fig. 4 is a detail illustrating a modified form of the pump mounting.

In the drawings A represents a pier or similar structure, which may be of any desired construction, and is designed to extend over the surface of a body of water a suitable distance therefrom. Pivotally connected to the pier at 2 is a depending frame which extends downwardly at an angle, in the direction of travel of the waves, and terminates in a float 5.

The frame is constructed to have a wide transverse area, and is here shown as formed of side rails 3 connected together by plates 4; the side rails 3 forming downwardly extending flanges on the edges of the plates 4 to prevent lateral spreading of a wave at the point of impact with the underside of the rocking frame. The float 5 is here shown as rigidly connected to the

frame, and is preferably quadrilateral or box-like in form. The side 6 of the float adjacent the frame is inclined at an acute angle in relation to the surface of the water, and is a continuation of the plates 4 on the frame.

Pivotally connected to the float 5 is a piston rod 7 which extends upward and has a piston 8 on its outer end; the piston 8 being reciprocally mounted in a pump cylinder 9. The pump cylinder 9 is pivotally mounted in suitable bearings to permit of an oscillating movement thereof; trunnions 10 and 10' on the pump cylinder adjacent its upper end being provided for this purpose.

A vertically disposed stand-pipe 11 is provided, the lower end of which extends into the water, while its upper end leads to any suitable point of discharge. This stand-pipe 11 is connected to the pump casing 9 either through the trunnion 10 as shown in Fig. 3, or through a flexible connection 12 as shown in Fig. 4. Check valves 13 and 14 are provided in the stand-pipe 11; the check-valve 13 being disposed below the connection with the pump casing 9, and the check-valve 14 above the connection with the pump casing. The stand-pipe 11 is turned at right angles immediately above the check-valve 14, and connected to the stand-pipe 11, and opening thereto immediately above the vertical portion thereof adjacent the check-valve 14 is an air cylinder 15 for cushioning the flow of water through the stand-pipe 11.

An important feature of this invention resides in the inclined side 6 of the float 5, and the inclined oscillating frame connected therewith. The frame and the inclined side 6 of the float 5 are so arranged in relation to the surface of the water that when the waves strike thereagainst the impact of the wave will be transmitted to the float gradually.

In the operation of the invention, a wave traveling in the direction of the arrow *a* in Fig. 1 strikes the inclined side 6 of the float, or the underside of the plates 4 on the inclined frame, causing the latter to move upward on its pivotal mounting 2, the float 5 rising on the wave. As the float 5 moves upward, the piston rod 7 is caused to advance in relation to the cylinder 9 of the pump, thereby moving the piston 8 upwardly therein. The upward movement of

the piston in the pump cylinder forces such liquid as is displaced by the piston through the connection leading to the stand-pipe 11 upward through the check-valve 14, against the air cushion 15 and out through the discharge end of the stand-pipe. The wave on passing under the float 5 allows the latter to gravitate to a lower position, thereby retracting the piston 8 in the pump casing. The retracting movement of the piston creates a suction in the upper end of the pump cylinder and acts to draw water through the stand-pipe 11 and check-valve 13 into the pump cylinder through a connection therewith from the stand-pipe 11.

By pivotally mounting the pump cylinder it will be caused to have an oscillating movement as the piston rod 7 is reciprocated therein by the oscillating movement of the float 5. The piston rod 7 and the cylinder 9 are of such length as to allow for the rise and fall of the tide; the piston 8 varying its position in the pump cylinder according to the water level.

The pump cylinder 9 and the piston rod 7 are preferably positioned in relation to the float 5 at an angle opposite that of the frame, as shown in Fig. 1. It is manifest

that a plurality of pumps may be connected to the float 5 if desired.

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

In an apparatus of the character described, a fixed structure, an inclined channel frame pivoted at one end to the fixed structure having a top plate and downwardly extending inclosing side plates, a box float, one end of which is closed by an inclined continuation of the top plate of the frame, a stand pipe and pump column with check valves located at a distance from the float, a pumping cylinder with hollow conducting trunnions connected with the column, and a plunger rod extending from the pump cylinder and connected with the float-supporting frame at an obtuse angle substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

AUGUST W. MELANDER.

Witnesses:

JOHN H. HERRING,
W. W. HEALEY.