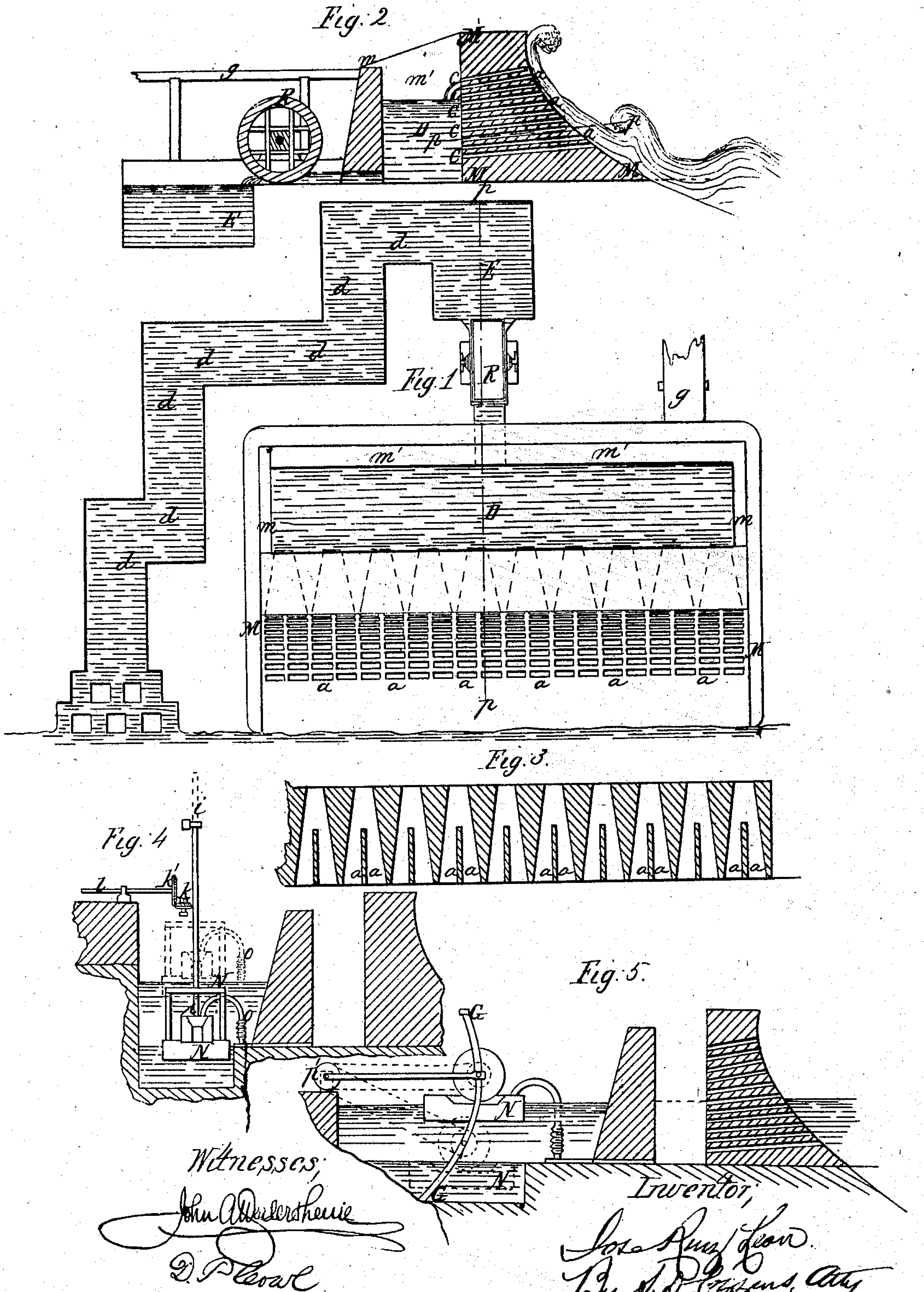
J. R. Leon.

Tide Power.

No. 88,491. Patented Mar. 30, 1869.



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JOSÉ RUIZ LEON, OF HAVANA, CUBA.

Letters Patent No. 88,491, *dated March* 30, 1869.

IMPROVED TIDE-POWER.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, JOSÉ RUIZ LEON, of Havana, in the Island of Cuba, have invented a new and useful Tide-Power, or device for enabling the movement of the waves of the sea to be applied as a mechanical force; and I hereby declare the following to be a full, clear, and exact description thereof, reference being had to the drawings which accompany and form a part of this specification.

Of these drawings—

Figure 1 is a plan view of one mode in which my invention may be put in practice;

Figure 2 is a transverse vertical section of the same apparatus;

Figure 3 is a section thereof, on the line *p p* of fig. 2; and

Figures 4 and 5 represent, in cross-section, two others of the many forms in which my apparatus may be employed.

The nature of this invention consists in suitable devices and combinations for making use of the movement and momentum of the waves of the sea, to deposit, in a convenient cistern or receptacle, a body of water, which may afterward be caused to fall into or toward another suitable cistern or receptacle, in which it shall be kept free from the agitation of the adjacent sea, but with which latter it is in communication, and which, either in its passage to the second cistern, or after it has flowed into it, may be employed, in any suitable way, to move machinery, or to perform a great variety of other mechanical operations.

To enable others to use my improvements, I will describe their construction and mode of working.

Upon the coast, or shore of a sea or bay, or other suitable body of water, I erect what may be termed a dike, or breakwater, as shown in the drawings at M M.

This dike may be constructed entirely or partly of wood, of any suitable metallic substance, of masonry, of hewn stone, or of any other proper material, or it may sometimes even be formed by means of an excavation, in cases where a suitable rock or rocks are found upon the coast.

The exterior wall, or face 1 1 of this dike, should preferably be upon an incline toward the sea, and have a smooth surface, so that the horizontal impulse of the incoming waves may, of itself, in part, cause them to shoot up and freely extend themselves over the incline.

In this exterior face of the dike, I construct numerous conduits, or passages, *a a a*, for the purpose of admitting the water, which is forced up the incline, through them into a suitable cistern or other receptacle, D, placed in the rear of the dike.

These conduits are preferably distributed in series over the face of the dike, at different heights above the mean level of the sea, so that the cistern D may be supplied from waves of varying heights, and I also prefer to arrange them upon an incline, as shown in fig. 2, in order to facilitate the flow of the water into the cistern.

These conduits are represented, in section, in figs. 2, 3, and 5, and their distribution, general arrangement, and internal construction, when employed in the manner which I prefer, are clearly shown in fig. 1.

I usually construct valves *c c c* in these conduits, at any suitable point, as, for instance, at or near their inner mouths, for the purpose of preventing the water which has entered them, from flowing out of the cistern again.

It will, of course, be understood, that the form, capacity, and arrangement of these conduits may be modified, at pleasure, without affecting the character of my invention.

The side, or wall *m m*, of the cistern D, and also the sides, or walls *m' m'* may, if desired, be constructed with and form part of the dike M M, or they may be made separately, and in any manner suitable for composing a receptacle for the water admitted through the conduits, or the cistern may be constructed in any other manner, and in any form preferred, and, if required, it may be provided with other walls or devices, for increasing its solidity and strength.

From the cistern D, there may be a channel, or communication, leading to another suitably-constructed cistern, or receptacle, E, and through this channel the water contained in the cistern D may flow into or toward the cistern E.

This latter cistern should be in communication with the sea, or other body of water, whence the water flowing from the cistern D is derived, but it should be so arranged that the water within it shall be kept tranquil at its natural level.

This latter effect may be produced in a great variety of ways; for instance, the water in the cistern E may communicate with a pond or other small body of water, which is itself in communication with the sea, but is sheltered from its agitation. Such a body of water often exists in nature, as, for instance, sheltered creeks, salt lakes, or springs, or wells, which communicate with the sea by subterranean passages; or it may be found in docks, basins, or canals, suitably constructed and located; or a special provision for the purpose may be made, one example of which is shown in the drawings, where fig. 1 represents a canal, *d d*, which has its sides arranged in a zigzag line, thereby producing so many changes in the direction of the flow of the contained water, that the force of the waves of the contiguous sea will be sufficiently broken to prevent any injurious movement in the cistern E.

When devices, such as described, or their equivalents, have been constructed and combined, as set forth, the water, which flows through the conduits into the cistern D, will, of course, have a certain elevation above the mean level of the sea, and the pressure of this water, as well as the force produced by its fall to the said level, may be employed in a great variety of ways, as a mechanical motor.

For instance, a wheel, R, may be placed in the channel, or passage running from the cistern D to the cis-

tern E, and may be turned by the water from the former, as it flows along the channel to the latter; or any other suitable form of hydraulic machinery may be combined with my apparatus, and be operated by the force of the water, as it falls from one of the said cisterns to the other; or the water entering the cistern D may be conveyed away to feed salt-pits or baths, or to inundate ditches, or answer many other useful purposes; or it may, by means of the chute, or pipe *g*, be carried to another cistern or cisterns beyond the cistern D, and when the waves of the adjacent sea are coming in with great force, these further or other cisterns may advantageously be filled, in order to serve as receivers to furnish water and force to propel the machinery after the sea has become calm, and thereby prevent the working of the apparatus from being interrupted.

It will be obvious that after the water has performed its duty, it must be conveyed away and returned again to the sea, and this is effected by means of the outlet already described in connection with the description of the cistern E.

Upon coasts where the tides rise and fall considerably, a modification of the above-described apparatus will be usually necessary, and figs. 4 and 5 of the drawings illustrate some of these modifications. In these figures, the machinery, which is propelled by the force of the water, is placed upon a suitably-constructed pontoon, N, adapted to rise and fall, according to the varying level of the sea, caused by the flux and reflux of the tide, and in this manner the due relation will at all times be preserved between the height to which the waves rise, by virtue of their agitation, and the level of the sea when calm.

This difference of elevation can also be availed of at all times, by constructing the dike at the proper height, and providing it with the requisite number of conduits, to suit any particular locality.

In fig. 4, the vertical bar *i i*, attached to the machinery placed on the pontoon, partakes of the rising-and-falling movement of the latter, and may be properly fluted to serve as a pinion, and the flutings should extend along a sufficient length of the bar to enable it, in all its positions, to communicate motion to the gears *k k'*, and, thereby, to the axle *l*.

The dotted lines and red letters in this figure, show the position of the system at high tide, the full lines and black letters being taken to represent it in its position at low tide.

If desired, the flutes on the bar *i i* may be made in winding curves, or as a screw, and produce the same effect.

The tube *o*, in this figure, also illustrates one mode in which power may be applied to a turbine-wheel, or other suitable machinery, by a fall of water, in this apparatus, from varying elevations.

This tube may be constructed of sail-cloth, covered with pitch, or it may be of India rubber, or other suitable material, and it may be shaped like a bellows, or have any other convenient form. Its operation will be obvious without further description.

Fig. 5 represents a hydraulic wheel, V, receiving motion from the water which falls from the cistern D. In this case, in order that its movement may be imparted with regularity to the fixed tackle-block *p'*, I provide a guide, G G, constructed in the form of the arc of a circle, so that the centre of the wheel, whether it is rising or falling, is at all times kept at an equal distance from the centre of the tackle-block *p'*.

In this figure, as in the other, the dotted lines and letters in red represent the position of the system at low tide.

Having thus described my invention, and pointed out several of the many ways in which it may be usefully employed,

I claim, and desire to secure by Letters Patent—

1. The dike, provided with the conduits, or passages set forth, in combination with the receiving-cistern, or receptacle D, provided with a suitable channel, or passage, adapted to permit water to fall from said cistern, the whole operating substantially as described.

2. The combination of the dike, containing the conduits, or passages, as set forth, with the cisterns D and E, substantially as and for the purposes described.

3. The dike, provided with the conduits, or passages set forth, in combination with the cistern D, and the canal *g g*, substantially as and for the purposes described.

4. The arrangement, in the cistern E, of the hydraulic wheel V, and the pontoon N, operating as shown and described.

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