(No Model.) 3 Sheets—Sheet 1.

C. R. MARTIN.

WAVE MOTOR.

No. 562,317. Patented June 16, 1896.

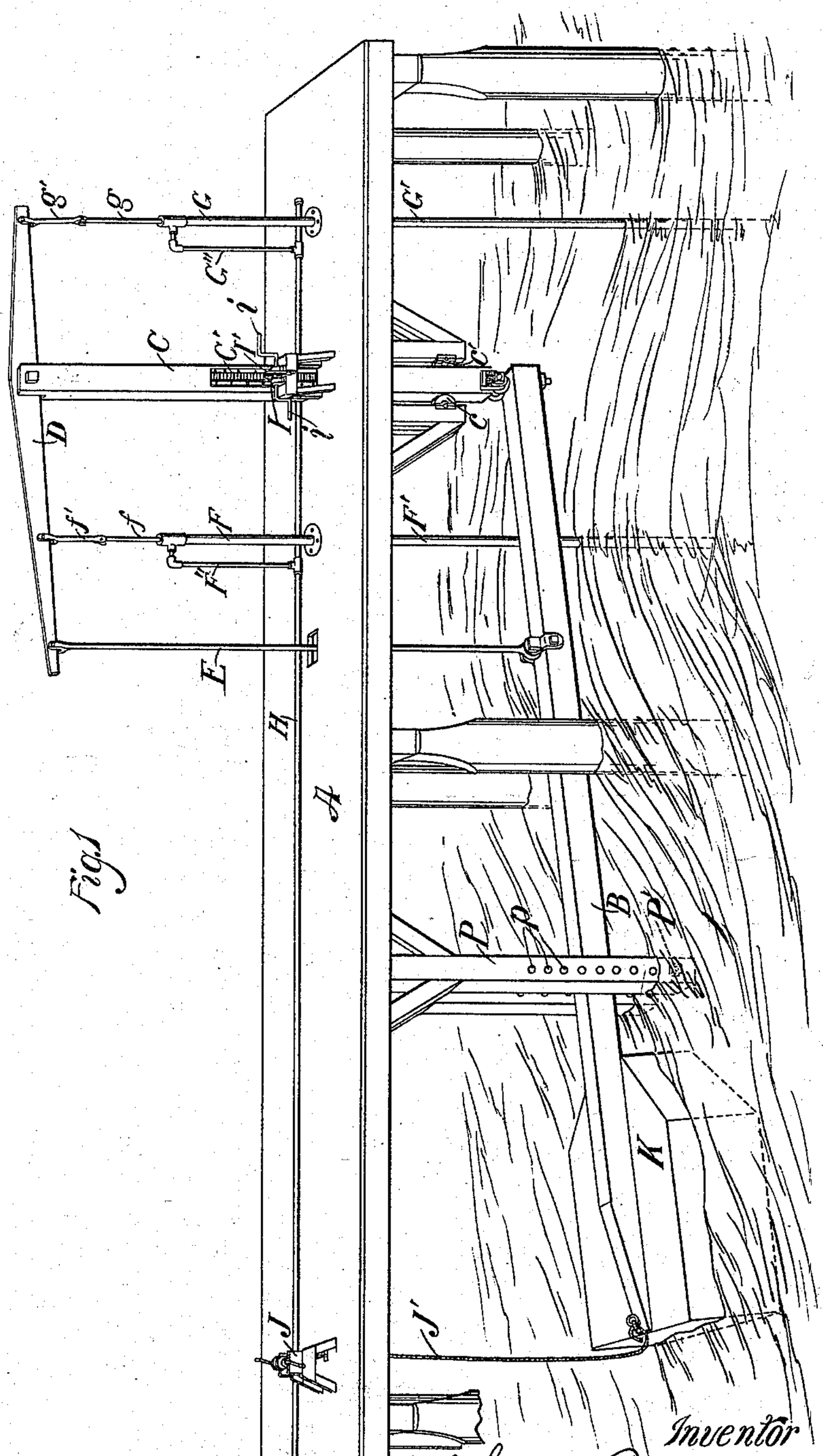

Fig 1

Witnesses:
F. T. Johnson.
Alford I. Townsend.

Inventor
Charles R. Martin
by Hazard & Townsend
his Attys.

(No Model.)

3 Sheets—Sheet 2.

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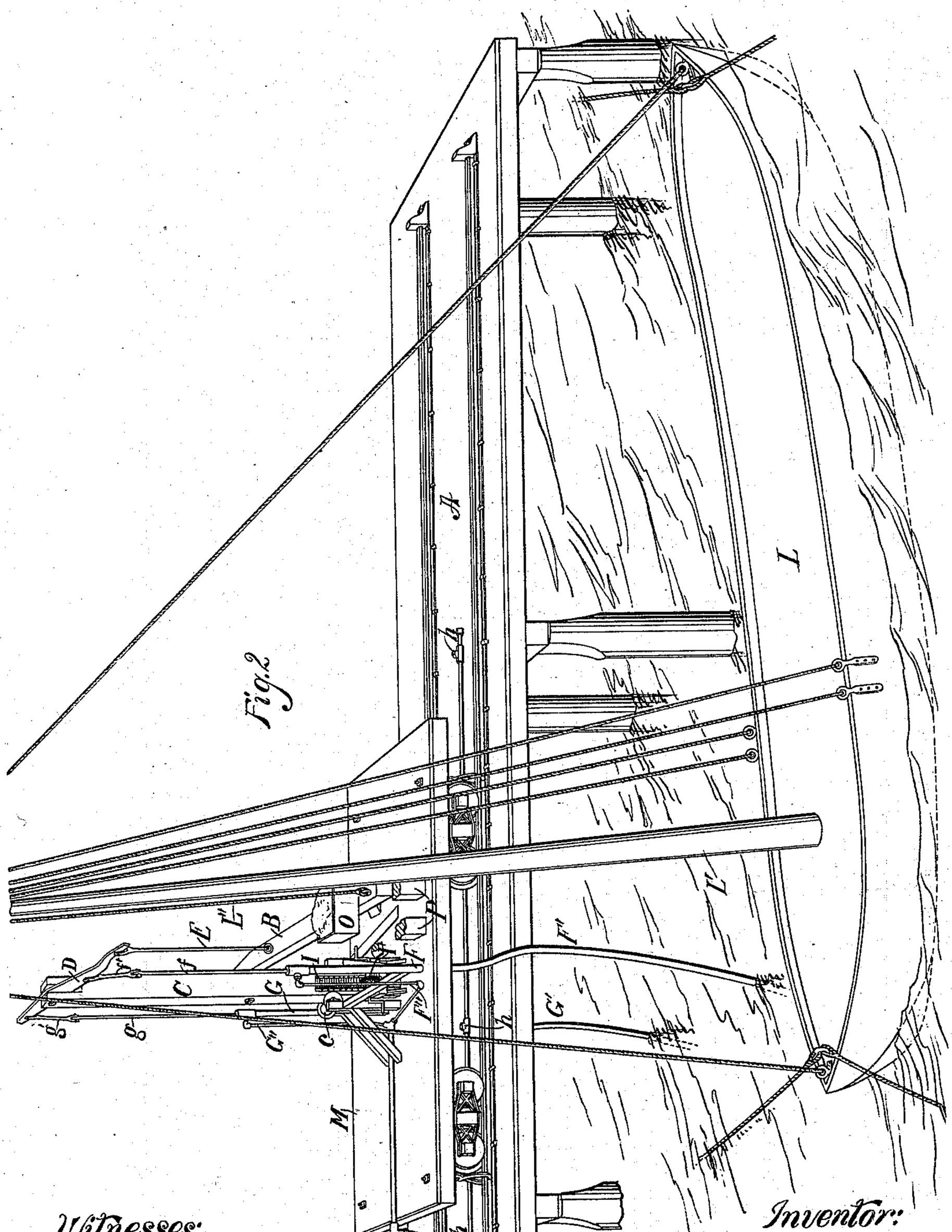

Fig. 2.

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ANDREW B GRAHAM, PHOTO-LITHO. WASHINGTON, D.C

(No Model.)

3 Sheets—Sheet 3.

C. R. MARTIN.

WAVE MOTOR.

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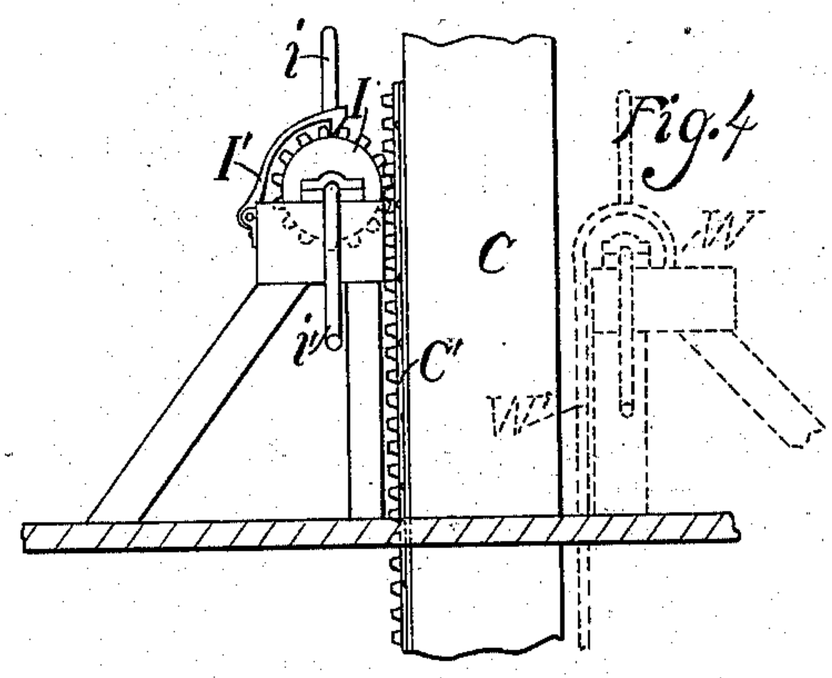

Fig. 4

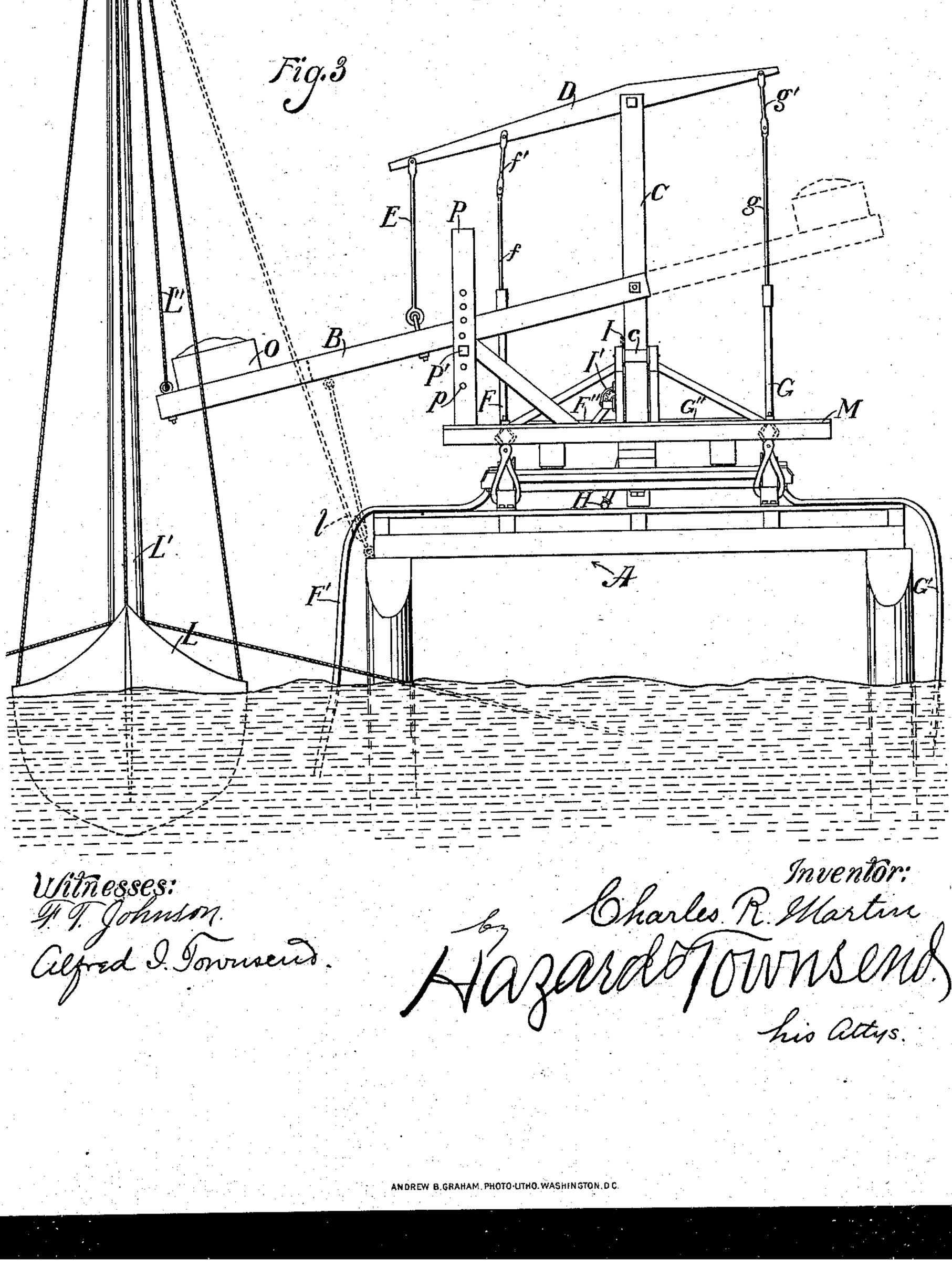

Fig. 3

Witnesses:
F. T. Johnson.
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Inventor:
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UNITED STATES PATENT OFFICE.

CHARLES R. MARTIN, OF REDONDO, CALIFORNIA.

WAVE-MOTOR.

SPECIFICATION forming part of Letters Patent No. 562,317, dated June 16, 1896.

Application filed November 21, 1895. Serial No. 569,608. (No model.)

To all whom it may concern:

Be it known that I, CHARLES R. MARTIN, a citizen of the United States, residing at Redondo, in the county of Los Angeles and State of California, have invented new and useful Improvements in Wave-Motors or Devices for Utilizing Ocean-Power, of which the following is a specification.

My invention relates more particularly to that class of ocean-motors employing a pivoted lever having a float attached thereto.

One difficulty to be overcome with devices of this class arises from the varying inclination of the lever, owing to the rise and fall of the tides. This variation makes it difficult to transmit the power from the lever to the motor, and necessitates the use of somewhat complicated devices therefor and these devices are liable to get out of order when most needed.

One object of my invention is to produce an exceedingly simple device of this class which may be readily adjusted to suit the rise and fall of the tides.

It frequently happens that vessels lie for a long time at a wharf. This is true especially of lumber and coal vessels which at times lie for months tied up alongside of a wharf. The power developed by the action of the waves upon a vessel is enormous but heretofore no satisfactory way of utilizing such power has been devised, since such vessels are necessarily anchored in such a manner as to allow them to move back and forth to a certain extent. This makes it difficult to attach the vessel to a motor arranged upon a wharf or other stationary support, by a connection which will apply the power from the vessel to the motor and yet will not be broken or cause the motor to be broken by reason of the varied movements of the vessel with relation to the wharf.

A further object of my invention is to produce a device which may be attached to a vessel anchored alongside of a wharf, in such a manner as to cause the device to be operated by the motion of the vessel, thus to actuate a pump to pump water into an elevated reservoir from which it may be drawn as desired and utilized for running hydraulic motors, the power from which may be utilized for any purpose desired.

The accompanying drawings illustrate my invention.

Figure 1 is a side elevation of a wharf with my invention in position thereupon, and arranged to be operated by an ordinary float. Fig. 2 is a fragmental side elevation of my device arranged upon a car and to be operated by a vessel. Fig. 3 is an end view of the same looking from the seaward end of the wharf. Fig. 4 is a fragmental detail showing the means for adjusting the device to the rise and fall of the tides.

In the drawings, A represents the wharf or pier which extends from the shore (not shown) out into the ocean or other body of water.

In Fig. 1 B represents a float-actuated lever which is pivoted to a vertically-adjustable support C. To the upper end of this support is pivoted a walking-beam D, which is connected by means of a piston-rod E with the float-actuated lever.

F G represent two pumps which are secured to the wharf and are provided with pump-rods *f g*, which are respectively secured to the walking-beam by means of pivoted pitman-rods *f' g'*. Each pump is provided with a suction-pipe F' G', respectively, which extends downward into the water, and is provided at its top with a discharge-pipe F'' G'', respectively, which communicates with the main H which leads to an elevated reservoir. (Not shown.)

The vertically-adjustable support C is engaged by guide-wheels *c c'*, which hold the support in its upright position. Suitable means are provided for readily adjusting the support C with relation to the wharf. Such means, as shown, consist of a cog-rack C' secured to the support and a pinion I meshing with such cog-rack and provided with crank-arms *i*, by which the pinion may be rotated to raise and lower the vertically-adjustable support. A ratchet I' is arranged to control the movement of the pinion. In Fig. 4 I have indicated in dotted lines a windlass W and a rope W' attached to such windlass and extending downward along the support C, to which it is attached, so that by operating the windlass the support may be adjusted vertically. Any other means for adjusting the support may be employed without departing from the spirit of my invention. The pump-cylinders are made of sufficient length to allow the horizontal adjustment of the walking-beam without impairing the operation of the pumps.

J represents a windlass upon which is wound one end of a rope J′, the other end of which is attached to the float K, so that the float can be raised from the water, if desired.

In Figs. 2 and 3 I have illustrated what I deem the most effective manner of applying the power to the motor. This consists of a float L, which may be a vessel, if conveniently anchored for this purpose. This float or vessel is provided with an upwardly-projecting mast L′, to which the lever is attached by means of a cable L″. My improved motor is arranged upon the wharf and, as shown in Figs. 2 and 3, is mounted on a car M, so that the motor may be moved along the wharf to bring it into proper position with relation to the vessel by which it is to be operated.

The water-main H is provided with a series of nipples *h* arranged along the main at suitable intervals, so that the motor may be moved where desired and yet the pumps may be readily connected with the main by means of the hose *h′*, as shown in Fig. 2.

The vertically-adjustable support C is provided with a cog-rack and a pinion, as described hereinbefore, whereby to adjust the support to accommodate the motor to the rise and fall of the tide. In order that the motor as thus arranged shall operate effectively, it is essential that one end of the lever be of sufficient weight to operate the pumps when the lever is allowed, by the movement of the float, to lower, as shown in Figs. 2 and 3. In these figures I have shown a suitable weight O arranged upon a lever, and have in Fig. 3 indicated in dotted lines the cable passing down and around a pulley *l*, thence upward and attached to the lever, and also have indicated an extension of the lever beyond the pivotal point, and a weight arranged thereupon, to thus show that it is immaterial to the operation of the device which end of the lever is weighted, but the form as shown in solid lines in the drawings is preferable for the reason that it is more economical as regards space, and also requires less material in its construction.

The arrangement of the pumps, walking-beam, &c., is the same in Figs. 2 and 3 as it is in Fig. 1, excepting that I have shown the flanged supporting-wheels *c c′* arranged above the car to engage the movable support to retain it in its upright position, instead of arranging such wheels below the wharf, as shown in Fig. 1.

In Figs. 1 and 3 P indicates a guide-frame for the lever B. This frame is provided with a series of pin-holes *p*, through which a pin or bolt P′ is passed to limit the downward motion of the lever. In Fig. 2 this guide is broken away for the purpose of more fully showing the arrangement of parts.

In practice, in the form shown in Fig. 1, the pump-rods being connected with the walking-beam D, and the float K and the lever B being also connected with the walking-beam, as the waves raise and lower the float, the power is transmitted through the medium of the lever and the walking-beam and thus operates the pumps F G to draw water from the ocean and force it through the main H to an elevated reservoir. (Not shown.) When the tide rises or falls, so that the walking-beam D stands at too great an angle with relation to the horizon, the support C is adjusted by means of the pinion and cog-rack to raise or lower the support, as the case may be, until the walking-beam is brought into its proper position.

In Figs. 2 and 3 the lever is attached by means of a cable L″ to the mast of the float, but the cable may be attached to a boom or any portion of the rigging suitable for the purpose. As the waves raise and lower the float or vessel the motion is transmitted through the medium of the mast and cable and thus raises and lowers the end of the lever.

The weight O upon the lever B tends to force the lever downward and is sufficient to operate the pump upon its downstroke. By reason of attaching the actuating-cable to the mast at a point considerably above the end of the lever the swaying of the mast will operate the lever effectively and the flexible connection therebetween will allow lateral movement of the mast with relation to the motor without breaking the lever.

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

1. In a wave-motor, the combination of the support provided at its top with a walking-beam; a weighted lever pivoted to such support; a pitman-rod connecting the lever and the walking-beam; pumps connected with the walking-beam; a float; and a flexible connection leading from the float to the lever and arranged to operate the lever in opposition to its weight.

2. A wave-motor having a vertically-adjustable upright support provided at its top with a walking-beam; a float-actuated lever pivoted by one end to the vertically-adjustable support and having its other end operatively connected with a float; such float; a pitman-rod connecting the walking-beam with the lever; a suitable pump connected with the walking-beam, and suitable means for adjusting the support, substantially as set forth.

3. In a wave-motor, the combination of the vertically-adjustable support provided at its top with a walking-beam; a weighted lever pivoted to such support; a pitman-rod connecting the lever and the walking-beam; pumps connected with the walking-beam; a float; and a flexible connection leading from the float to the lever and arranged to operate the lever in opposition to its weight.

CHARLES R. MARTIN.

Witnesses:
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GEO. CATE.