

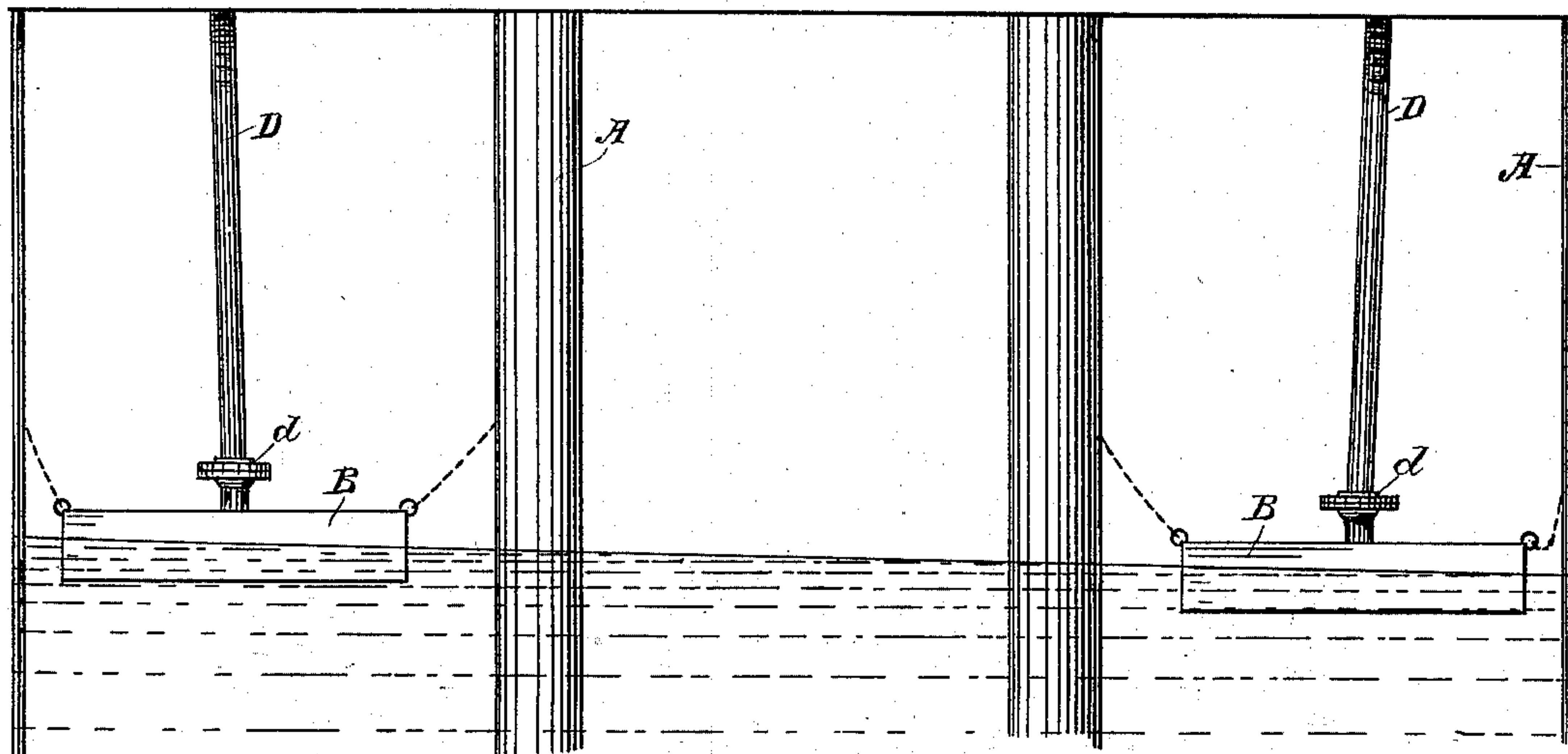
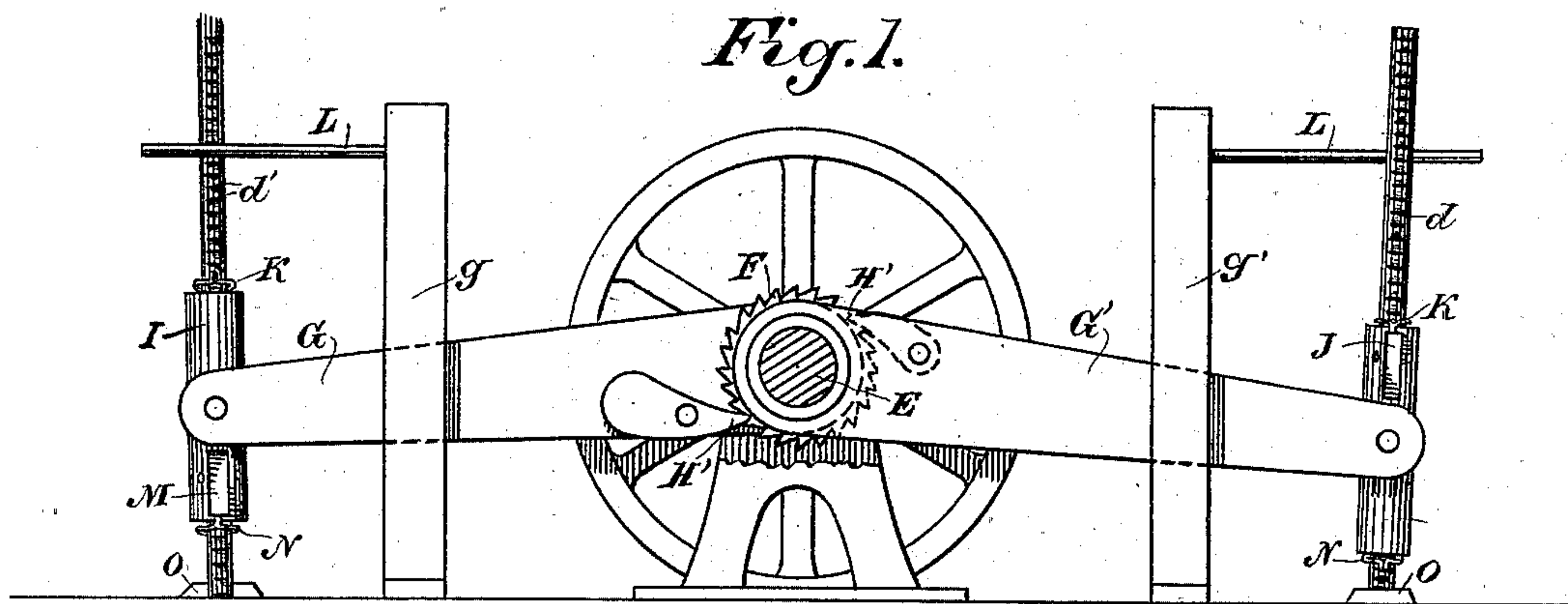
(No Model.)

W. E. P. ROSE.  
WAVE POWER.

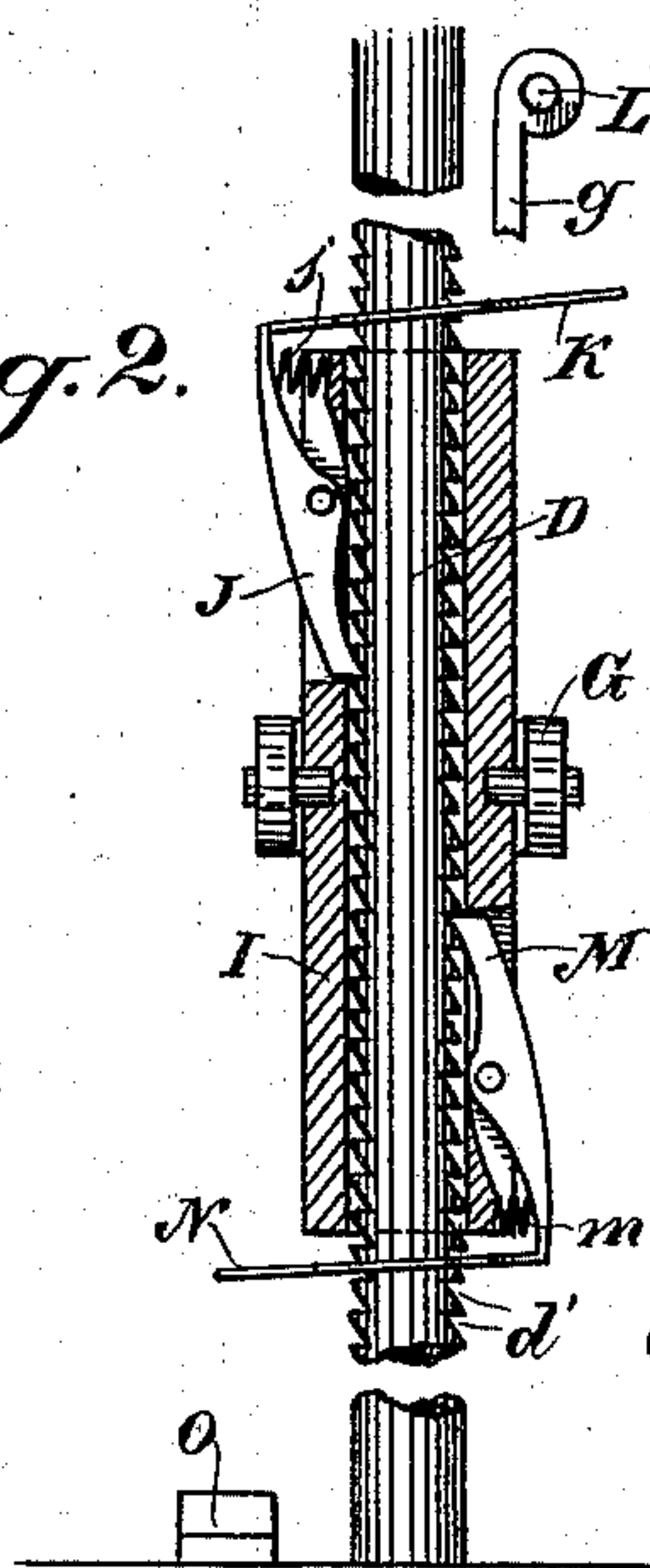
No. 559,107.

Patented Apr. 28, 1896.

*Fig. 1.*



*Fig. 2.*



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# UNITED STATES PATENT OFFICE.

WILLIAM E. P. ROSE, OF ANGEL ISLAND, CALIFORNIA.

## WAVE-POWER.

SPECIFICATION forming part of Letters Patent No. 559,107, dated April 28, 1896.

Application filed February 20, 1896. Serial No. 580,003. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM E. P. ROSE, a citizen of the United States, residing at Angel Island, county of Marin, State of California, have invented an Improvement in Wave-Powers; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to that class of wave powers or motors in which a float is employed and suitable transmitting mechanism to convey the power of said float, due to its rise and fall in the waves, to operate a shaft adapted to be connected with suitable machinery.

My invention consists in the construction, arrangement, and combination of the parts of the power-transmitting mechanism, which I shall hereinafter fully describe and specifically claim.

The object of my invention is to provide a simple and effective wave-power provided with suitable adjustments by which it may be made to operate under all conditions, especially those occasioned by waves of different or unusual heights, and also under those occasioned by the rise and fall of the tide.

Referring to the accompanying drawings, Figure 1 is an elevation of my wave-power. Fig. 2 is a section of the tripping mechanism.

The apparatus may be set up in any suitable location, and for the purpose of illustration I have here shown it as being arranged in connection with a wharf, of which A represents the piles.

B are the floats. There are two of these and they may be of any suitable size and construction. They are anchored by suitable means, as by the chains C, to the piles in such a way that they may have freedom of movement and may rise and fall under the power of the waves. Extending upwardly from each float is a rod D, the lower end of which is pivotally connected with the float, as at *d*, so that it may accommodate itself to the movements of said float and still operate substantially vertically in its guides. On the framework above is mounted in suitable bearings a shaft E, to which the power is applied. This shaft carries a ratchet-wheel F. Mounted freely upon the shaft is a lever G, which is fitted in a guide *g*, and its extremity is connected with the rod D of one of the floats. A similar lever G' is

mounted freely upon the shaft and is fitted in a guide *g'*, and its outer extremity is connected with the rod D of the other float. To the lever G is connected a pawl H, which engages with the teeth of the ratchet-wheel F, and to the lever G' is connected a similar pawl H', which also engages the teeth of the ratchet-wheel. The pawls are oppositely located and their engagement with the teeth of the ratchet is in such a direction that upon the rise of the lever G its pawl H engages the teeth and turns the ratchet-wheel and shaft, while upon the rise of the lever G' its pawl H' slips the teeth of the ratchet. Upon the downward movement the reverse takes place—namely, the pawl H slipping the teeth of the ratchet and the pawl H' engaging therewith, so that one of the floats B on the up-rising movement turns the shaft E and on the downward movement the other float turns it, so that the movement of the shaft is continuous and is in the same direction.

Provision must be made for waves of unusual heights and also for the rise and fall of the tide. In the first of these contingencies it is obvious that if the connection between the rod D and the pawl-levers G and G' were a rigid or fixed one a wave of very great height would raise the float so high as to occasion an excess of movement and tend to injure, if not in fact to demolish, the structure, and in the latter contingency—that is, the fall of the tide—if provision were not made for the lowering of the float to follow the water the water would leave it, and the float would be high and dry and inoperative. To provide for these conditions, the connection between the pawl-levers G and G' and the rods D is an adjustable and controllable one by means of the following construction: Upon each rod D is fitted and adapted to slide freely a sleeve I, and it is with these sleeves that the pawl-levers G and G' are connected. The rods D are toothed on each side, as shown at *d'*, and in the upper portion of the sleeve I is mounted a pawl J, which is controlled by a spring *j*, adapting the pawl to remain normally in engagement with the teeth of the rod, thereby connecting the sleeve I with said rod. An arm K is connected with the pawl J, and the extremity of this arm is adapted to come in contact with a fixed stop L above.



Now when a wave of unusual height rolls in and the float is raised very high, the arm K, coming in contact with the stop L, causes the disengagement of the pawl J with the teeth of the rod D, so that the sleeve I is free of the rod, thereby permitting the rod to move on up through the sleeve, which remains stationary and does not any longer affect the driven mechanism. In the lower portion of the sleeve I is pivoted another pawl M, which is controlled by a spring *m*, adapting the pawl to remain in normal engagement with the teeth on the other side of the rod D. Connected with this pawl is an arm N, which is adapted to come in contact with a fixed stop O below. When now the tide falls and the float in following it descends, it will come far enough down to bring the arm N into contact with the stop O, thereby relieving the pawl M and permitting the rod D to slip down freely through the sleeve I, thus providing for the float to follow the lowering water. By this adjustment, therefore, the device is rendered operative even under the conditions of unusually high or variable waves and that of the lowering of the tide, so that the device will operate under all conditions.

It will be understood that there may be as many duplications of this apparatus as may be needed to obtain the required power.

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

1. A wave-power comprising a suitably-restrained float, a rod extending therefrom, a shaft having a ratchet, and a lever carrying a pawl engaging the ratchet, said lever being connected with the float-rod.

2. A wave-power comprising suitably-restrained duplicate floats, a rod extending from each float, a shaft having a ratchet, duplicate levers, one connected with each rod, and a pawl carried by each lever and engaging the ratchet in such manner as that each shall engage and slip the ratchet alternately whereby said shaft is turned in the same direction.

3. In a wave-power, the combination of a suitably-restrained float, a rod extending therefrom, a shaft having a ratchet, a lever having a pawl engaging the ratchet, and an adjustable connection between the lever and the rod of the float comprising a sleeve freely sliding upon the rod and to which the lever is connected, a pawl carried by the sleeve and engaging with teeth of the rod and tripping devices whereby the pawl is released upon the limit of movement of said sleeve.

4. In a wave-power, the combination of a suitably-restrained float, a rod extending therefrom and having teeth, a shaft having a ratchet-wheel, a lever having a pawl en-

gaging said wheel, a sleeve freely slidable upon the rod of the float and to which the lever is connected, a pawl in the upper portion of the sleeve adapted to normally engage the teeth of the rod, an arm of said pawl and a fixed stop above in the path of said arm whereby when the sleeve rises to its limit, its pawl is disengaged from the rod of the float.

5. In a wave-power, the combination of a suitably-restrained float, a rod extending therefrom and having teeth, a shaft having a ratchet-wheel, a lever having a pawl engaging said wheel, a sleeve freely slidable upon the rod of the float, and to which the lever is connected, a pawl in the lower portion of the sleeve adapted to engage with the teeth of the rod, an arm connected with said pawl and a fixed stop below with which said arm comes in contact on the downward movement of the sleeve whereby the rod is freed and the float allowed to descend.

6. In a wave-power, the combination of a suitably-restrained float, a rod extending therefrom and having teeth, a shaft having a ratchet-wheel, a lever having a pawl engaging said wheel, a sleeve freely slidable upon the rod of the float and to which the lever is connected, a pawl in the upper portion of the sleeve adapted to normally engage the teeth of the rod, an arm of said pawl, a fixed stop above in the path of said arm whereby when the sleeve rises to its limit, its pawl is disengaged, a pawl in the lower portion of the sleeve adapted to engage with the teeth of the rod, an arm connected with said pawl and a fixed stop below with which said arm comes in contact on the downward movement of the sleeve, whereby the rod is freed and the float allowed to descend.

7. A wave-power comprising duplicate, suitably-restrained floats, a rod extending upwardly from each float, a shaft having a ratchet-wheel, duplicate levers each carrying a pawl adapted to alternately engage and slip the ratchet whereby the shaft is turned in the same direction, and an adjustable connection between each lever and the rod of the float, consisting of a sleeve freely slidable upon the rod and to which the lever is connected, and pawls in said sleeve engaging oppositely-arranged teeth upon the rod, said pawls having trip-arms, and fixed stops above and below whereby the pawls are released at the upper and lower limits to free the sleeve, substantially as and for the purposes described.

In witness whereof I have hereunto set my hand.

WILLIAM E. P. ROSE.

Witnesses:

S. H. NOURSE,

JESSIE C. BRODIE.