(No Model.)

W. McDONALD.

WAVE MOTOR.

No. 583,689. Patented June 1, 1897.

Fig. 1.

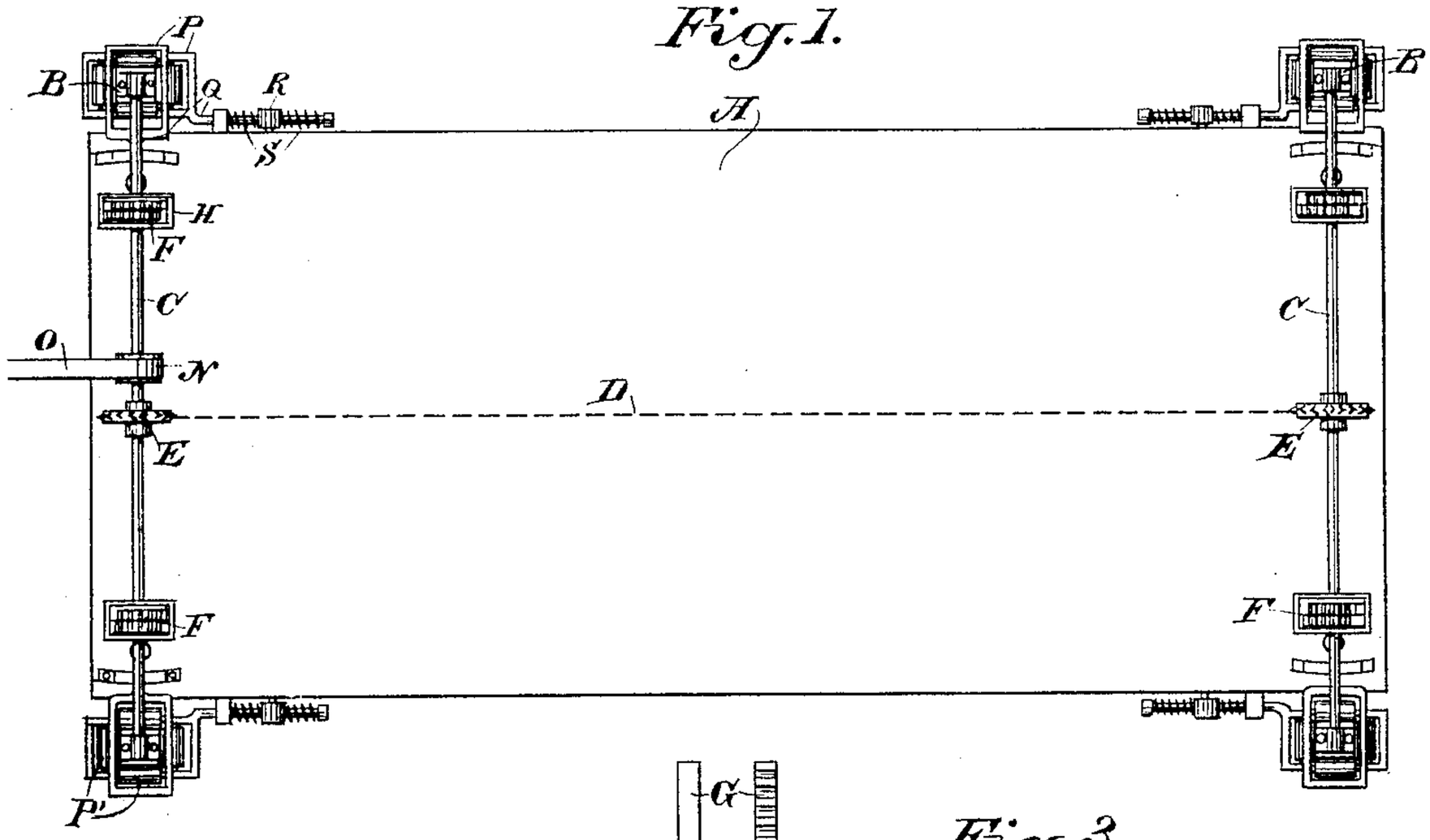

Fig. 2.

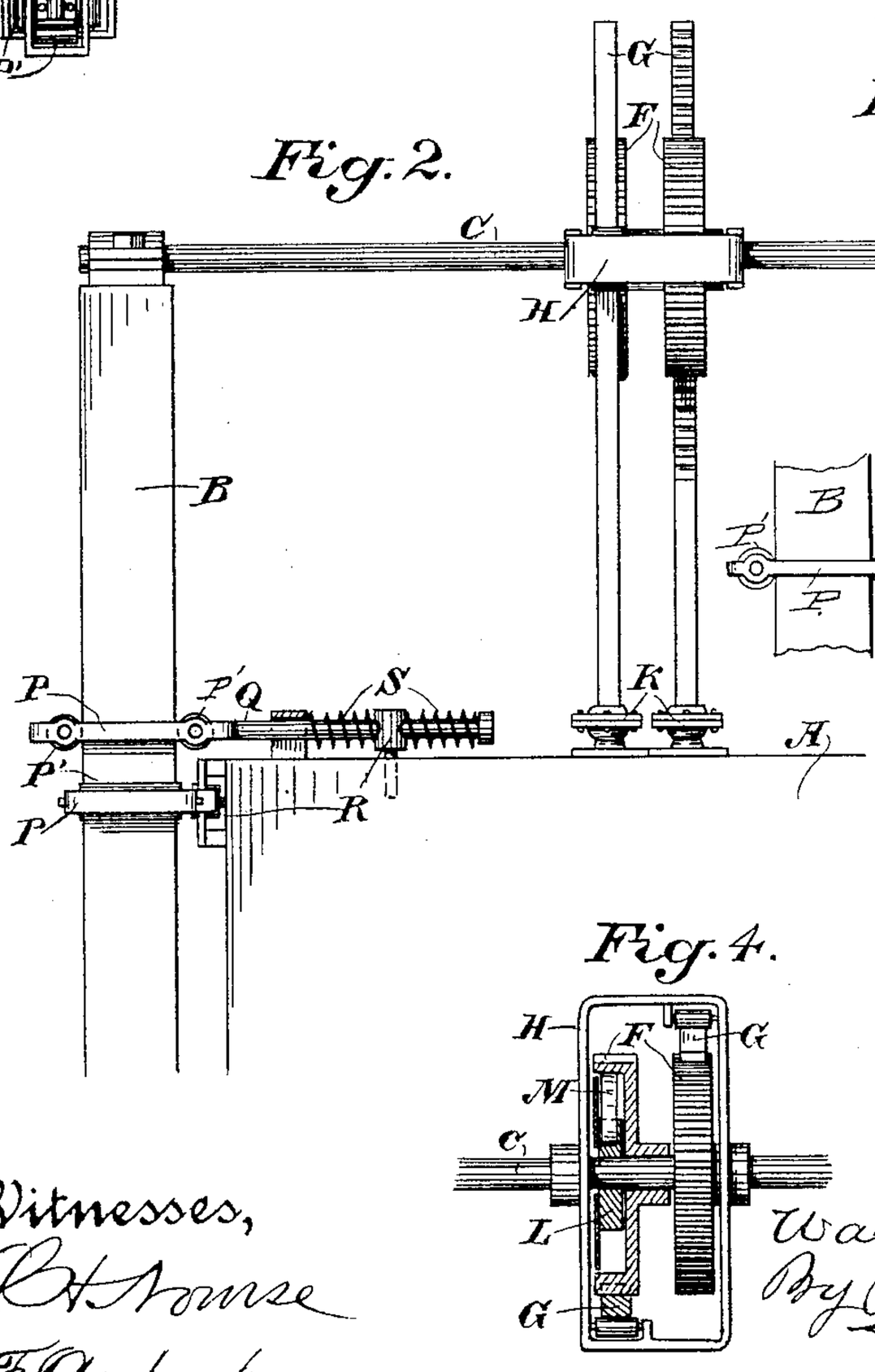

Fig. 3.

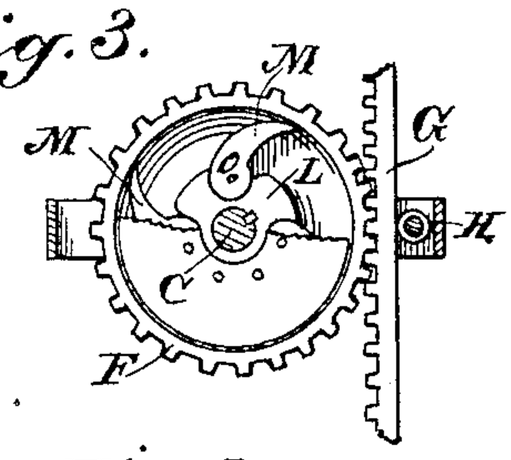

Fig 5

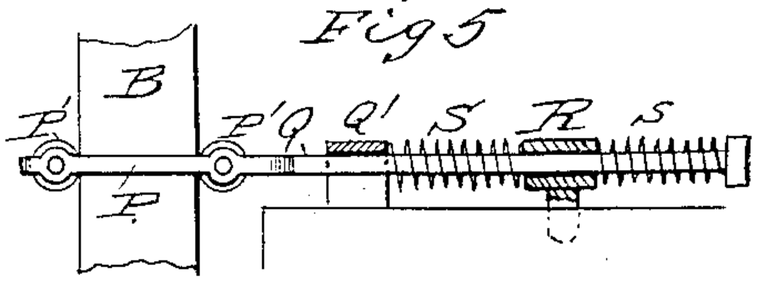

Fig. 4.

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WALLACE McDONALD, OF CHICAGO PARK, CALIFORNIA.

WAVE-MOTOR.

SPECIFICATION forming part of Letters Patent No. 583,689, dated June 1, 1897.

Application filed January 15, 1897. Serial No. 619,321. (No model.)

To all whom it may concern:

Be it known that I, WALLACE McDONALD, a citizen of the United States, residing at Chicago Park, county of Nevada, State of California, have invented an Improvement in Wave-Motors; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to an apparatus for applying the power produced by the movement of waves or swell of the ocean.

It consists of a rising and falling float with suitable guiding piles or posts to keep it in place and a mechanism by which the rise and fall of the float is transmitted to produce a continuous rotary motion.

Referring to the accompanying drawings, Figure 1 is a plan view of my device. Fig. 2 is an elevation of one corner of the float. Fig. 3 is a face view of one of the clutch-gears. Fig. 4 is a plan and partial section of the same. Fig. 5 is an enlarged detail of one of the arms Q and its adjuncts.

A is the float, which is suitably guided between vertical posts or piles B. Antifriction-rollers P′ at the angles of the float prevent an injurious rubbing and cause it to move up and down freely.

Upon the piles B, or suitably journaled with relation to the float, are shafts C, one of these shafts being journaled in proximity to each end of the float. These shafts are connected by a chain D, passing over sprocket-wheels E upon the shafts C, and through this chain any motion of either shaft may be transmitted to the other.

Upon each of the shafts D are fixed gear-wheels F, which are engaged by vertical racks G, extending sufficiently above the gear-wheels and held in contact with them by guards H. The lower ends of these racks are connected by ball-joints K with the ends of the float, so that the float may move backward and forward or right and left within the limits of the guiding-piles without throwing the rack-bars out of engagement with the gear-wheels and without interfering with their proper action as the float rises and falls. Each of the gear-wheels consists of a hollow casing which is turnable loosely upon the shaft C. Within this casing is a hub L, which is fixed to the shaft C, so as to turn with it. This hub carries the pawls M, the outer ends of which are in contact with the interior of the rim of the gear-wheel F and may be retained in yielding contact by springs or other means, so that when the rim F is turned in one direction it will move over the ends of the pawls, which yield for this purpose, but when turned in the other direction the ends of the pawls engage the inner surfaces of the rims F so as to cause them to rotate, so that the rotation of the rims F is communicated through the pawls to the hubs L and the shaft C. Each pair of these gears F has the pawls set in opposite directions, so that when one end of the float A rises one of the rack-bars G will act upon its gear-wheel to rotate the shaft C in the desired direction and when the float again sinks by the recession of the wave or swell the other rack-bar G will act upon its gear-wheel, so as to make a continuous movement of the shaft C in one direction. Both ends of the float are equipped with similar mechanism, and as the two shafts C are, as before described, connected by the chain D, and as each of the sprocket-wheels E is provided with a similar clutch mechanism to that just described, it will be seen that all the movements of the float will be communicated to rotate the shafts in one direction and that the movement of either shaft may be effected while the other one is temporarily not being acted upon, the pawls within the sprockets allowing each one to be acted upon and to communicate its motion respectively to the other.

By means of a pulley or sprocket-wheel N, upon one of the driving-shafts C, a belt or chain O may be led to drive any other desired machinery.

The guide antifriction-rollers P′, which travel against the piles, are mounted, as shown, in yokes or frames P, having arms Q extending inwardly and attaching to the float. These arms have swivel-joints formed, as shown at R, so as to allow the yokes P a certain amount of movement with relation to the float A as the latter is caused to swing either longitudinally or sidewise within the space formed by the piles B by reason of the movement of the waves.

The inwardly-projecting arms Q pass through suitable guides Q′ on the float and

are surrounded by springs S on each side of the swivel-joint R, which are designed to yield and to allow the movements of the float while maintaining the guide-rollers essentially in contact with the piles against which they travel.

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

1. In an apparatus for transmitting the movement of waves, a float, guiding-posts whereby it is retained in position and its movements made approximately vertical, shafts journaled upon the guide-posts above opposite ends of the float, having sprocket-wheels, connected by a chain, said shafts having oppositely-disposed clutch mechanisms and pawls, gear-wheels forming shells which inclose the clutch mechanisms, rack-bars yieldingly connected with the float and yokes by which the teeth of the bars are retained in contact with the toothed gear-wheels whereby the rise of the float acts through one of the gears to rotate the shaft in one direction and the fall of the float acts through the other gear to rotate it in the same direction.

2. In an apparatus for converting the vertical movements of waves to a rotary movement, a float adapted to rise and fall between guiding-posts, shafts journaled horizontally upon said posts above opposite ends of the float, and having gear-wheels, a chain-and-sprocket connection from one shaft to the other, rack-bars with yokes whereby the teeth are maintained in contact and upon opposite sides of the gear-wheels respectively, said rack-bars being flexibly connected with the float, clutch mechanism by which the upward movement of the float is transmitted through one of the gears to rotate the shafts in one direction, and the downward movement is transmitted through the other gear to continue the motion in the same direction.

3. In an apparatus for converting the vertical movement of waves to a rotary movement, a float adapted to rise and fall by the action of the waves, guiding-posts whereby the float is prevented from considerable end or side movements, rack-bars flexibly connected in pairs with the opposite ends of the float extending upwardly therefrom, shafts journaled upon the guiding-posts and passing between the pairs of rack-bars, gear-wheels turnable upon the shaft having interior clutch mechanisms whereby the upward movement transmits power through one rack-bar and gear-wheel to rotate the shaft in one direction, and the downward movement acts through the other rack-bar and gear-wheel to continue the movement of the shaft in the same direction, sprocket-wheels upon the shafts at each end of the float having corresponding clutch mechanisms whereby the movements of either shaft may be made independently of the other, and a chain connecting said sprocket-wheels so that the movements of the two shafts are communicated through a chain, and means for transmitting the rotation thus communicated to other machinery.

4. In an apparatus for converting the vertical movement of waves to a rotary movement, a vertically-guided movable float adapted to rise and fall by the action of the waves, rack-bars flexibly connected therewith, pinion-shafts journaled upon the guide-posts above opposite ends of the float connected by sprocket-wheels and chain, pinions and clutch mechanism whereby the various movements of opposite ends of the float are transmitted so as to rotate the driving-shafts continually in one direction, guiding-rollers fixed to the angles of the float so as to travel against the sides of the guiding-posts, said rollers being journaled in yokes and said yokes having swivel-joint connections with the float whereby the latter is allowed a certain amount of movement within the inclosing posts and with relation thereto.

5. In an apparatus for converting vertically-reciprocating motion to a circular motion, a rising and falling float adapted to be moved by the action of the waves, and mechanism whereby said movement is converted into a rotary motion, yokes inclosing the corner guide-posts having pulleys journaled within them so as to travel upon opposite sides of the posts, said yokes having projecting arms or shanks with swivel connections between them and the float, and springs whereby the float is allowed to move sidewise or endwise with relation to the posts and guide-rollers.

In witness whereof I have hereunto set my hand.

WALLACE McDONALD.

Witnesses:
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JESSIE C. BRODIE.