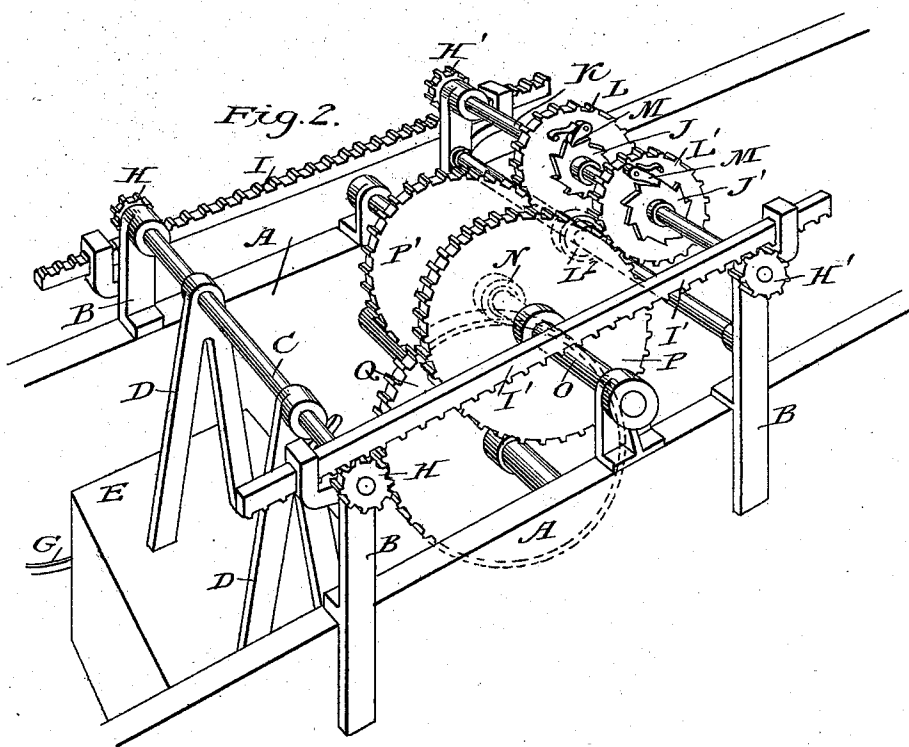
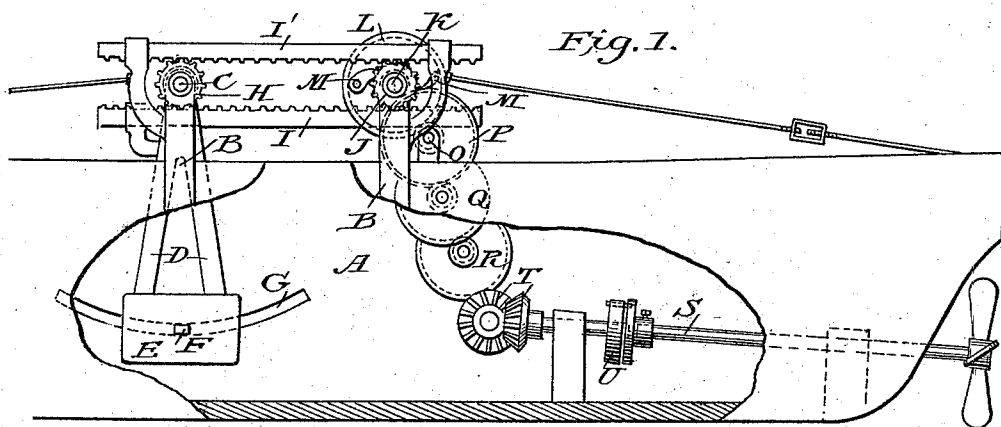


(No Model.)

J. GAMBETTA.
PENDULUM MOTOR.

No. 535,329.

Patented Mar. 5, 1895.



Witnesses:

Alex. Scott
Jas. W. Harrison

Inventor.

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UNITED STATES PATENT OFFICE.

JOHN GAMBETTA, OF STOCKTON, CALIFORNIA.

PENDULUM-MOTOR.

SPECIFICATION forming part of Letters Patent No. 535,329, dated March 5, 1895.

Application filed October 6, 1893. Serial No. 487,363. (No model.)

To all whom it may concern:

Be it known that I, JOHN GAMBETTA, a citizen of the United States, residing at Stockton, San Joaquin county, State of California, have invented an Improvement in Pendulum-Motors; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a device which I call a pendulum motor, and which is applicable for the propulsion of pumping or other machinery, but I have here especially shown it as applicable upon a vessel for the purpose of driving the propeller.

It consists of a swinging pendulum suspended within the vessel, and mechanism through which the oscillations of the pendulum are communicated to drive the propeller or other machinery.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a side elevation of a vessel provided with my improved motor mechanism parts being broken away. Fig. 2 is a perspective of the invention.

A is the hull of the vessel having mounted upon the deck or otherwise conveniently supported therefrom, the standards or support-B, in the upper end of which the shaft C is journaled. From this shaft arms D extend downwardly to a point within the vessel and preferably as low as possible where they are connected with the weight or weights E. If more than one weight is employed, they may operate independently between suitable guides, or they may be connected so as to act together.

In the present case I have illustrated the apparatus with a single weight E, having projecting tongues or lugs F at the sides which are adapted to fit in curved grooves or channels G formed or fixed upon the sides adjacent to the ends of the weight. These guide channels are curved with a radius from the central shaft C about which the weight is adapted to oscillate. By means of these side guides, the weight is prevented from swinging from side to side with the rolling of the vessel but is allowed to swing longitudinally by reason of the pitching or fore and aft motion of the vessel, or, if preferred, the appa-

ratus may be so placed that the rolling motion is utilized instead of the pitching.

At suitable points upon the shaft C are fixed pinions H. Below one of these pinions is a rack bar I adapted to slide in suitable guides, and above the other pinion is another rack bar I' sliding in the same manner. These two rack bars engage the upper and lower sides respectively of the pinions H' H' fixedly secured to the ends of shaft K. This shaft has two loose pinions L L' provided with pawls engaging oppositely arranged ratchet wheels J J' respectively which are fixedly secured to the shaft K. The pinion L meshes with a small pinion L² which in turn meshes with a large pinion P' on the shaft O and the pinion L' meshes with the pinion P which is the same size as the pinion P'.

As the pendulum vibrates the rack bars are reciprocated and impart a continuous rotary movement in the same direction to the shaft O, through the gearing and pawl and ratchet mechanism just described. Power from the shaft O is transmitted by a pinion N through a succeeding train of gearing Q and R until the speed has been sufficiently multiplied for transmission to the propeller shaft S. This is done by means of bevel gears T, or in any other suitable manner.

As the movements of the vessel are irregular, and the corresponding oscillations of the weight will vary considerably, it will be manifest that the power would not be applied with sufficient regularity to the propeller shaft, unless provision were made for the irregularity of motion. This provision consists in forming the propeller shaft in two parts and connecting them by a powerful coil spring U, one end of which is connected with one part of the shaft and the other by means of a disk to the other part. By this construction, when the pendulum is swinging to its greatest extent, the revolution of the wheels which transmit the power to the propeller shaft may be faster than the propeller is able to move. This will cause the spring to be coiled up in proportion to the difference, and the surplus power will thus be temporarily stored in the spring. Whenever the movements of the vessel are less pronounced, and the speed of the machinery is reduced below that which

the propeller is able to maintain the spring will continue to act upon the propeller, receiving power from the machinery and giving it out to that part of the shaft which carries
5 the propeller, and at a more rapid rate than it is received. By this construction I am enabled to apply the power derived from the motion of the vessel to the propeller itself.

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

1. A propelling mechanism for vessels comprising a suspended weight or pendulum swinging between guides to prevent trans-
15 verse oscillation, pinions fixed to the pendulum shaft, rack bars engaging the upper and lower sides respectively of the pinions, a transverse shaft having fixed pinions engaged on the upper and lower sides respectively
20 by said rack bars and also provided with loose pinions, oppositely arranged pawl and ratchet mechanisms connecting the loose pinions and their shaft and a train of gearing connecting the said loose pinions with the

propeller shaft for driving it continuously in
25 the same direction, substantially as herein described.

2. A propelling mechanism consisting of a pendulum suspended between guides which
allow it to oscillate in one plane, and having
30 a shaft provided with pinions, rack bars engaged by said pinions, a transmitting shaft geared to said racks and having loose pinions, oppositely arranged pawl and ratchet
mechanisms connecting it therewith, a train
35 of gearing driven continuously in the same direction from said loose gears, and a two-part propeller shaft having a coil spring by which the two parts are connected and driven
40 from said train of gearing, substantially as herein described.

In witness whereof I have hereunto set my hand.

JOHN GAMBETTA.

Witnesses:

FREDERICK LINN,
HARRY N. BAGGS.