No. 822,067. PATENTED MAY 29, 1906

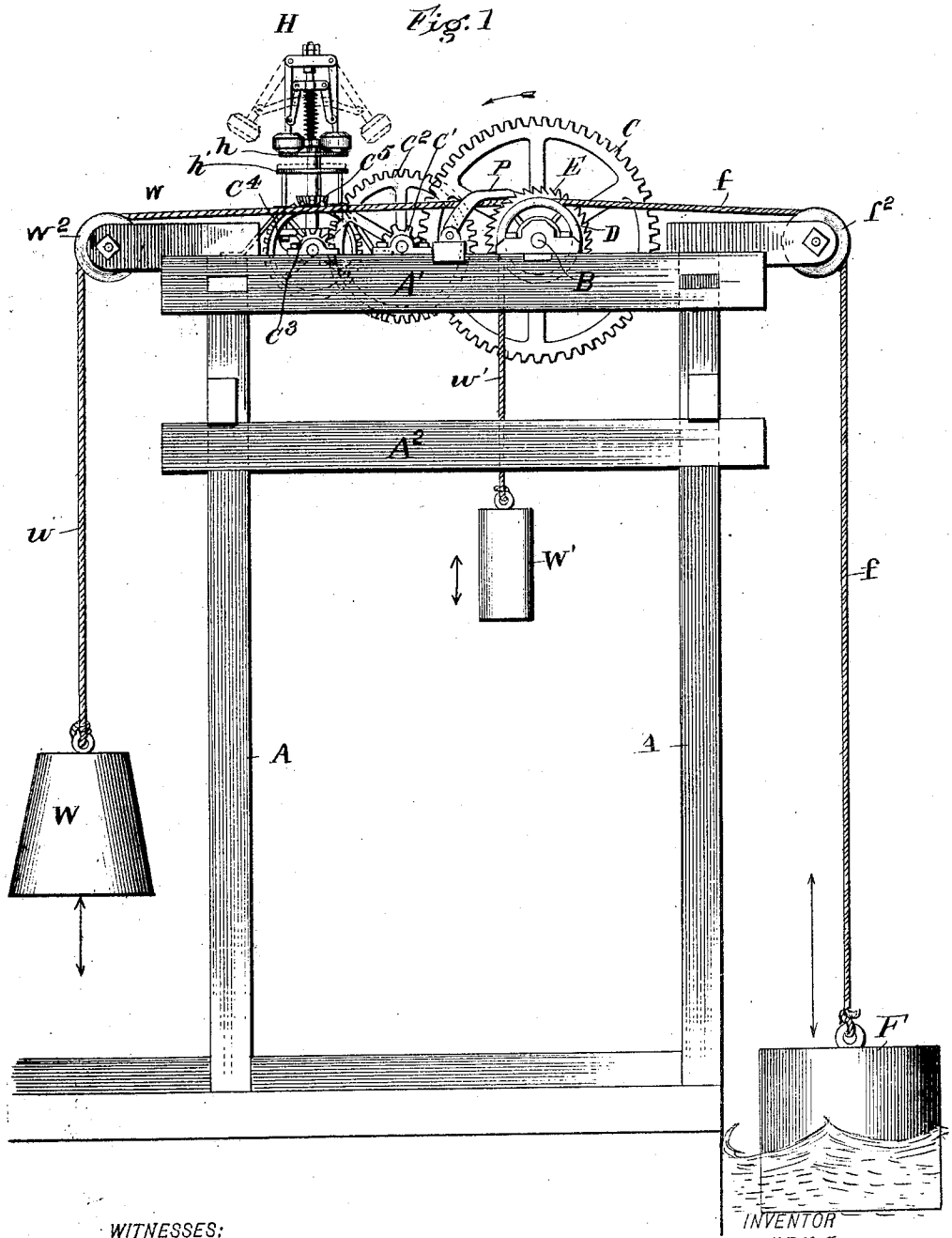
D. H. MOWEN.

WAVE MOTOR.

APPLICATION FILED SEPT. 21, 1905.

2 SHEETS—SHEET 1.

Fig. 1



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2 SHEETS—SHEET 2.

Fig. 2

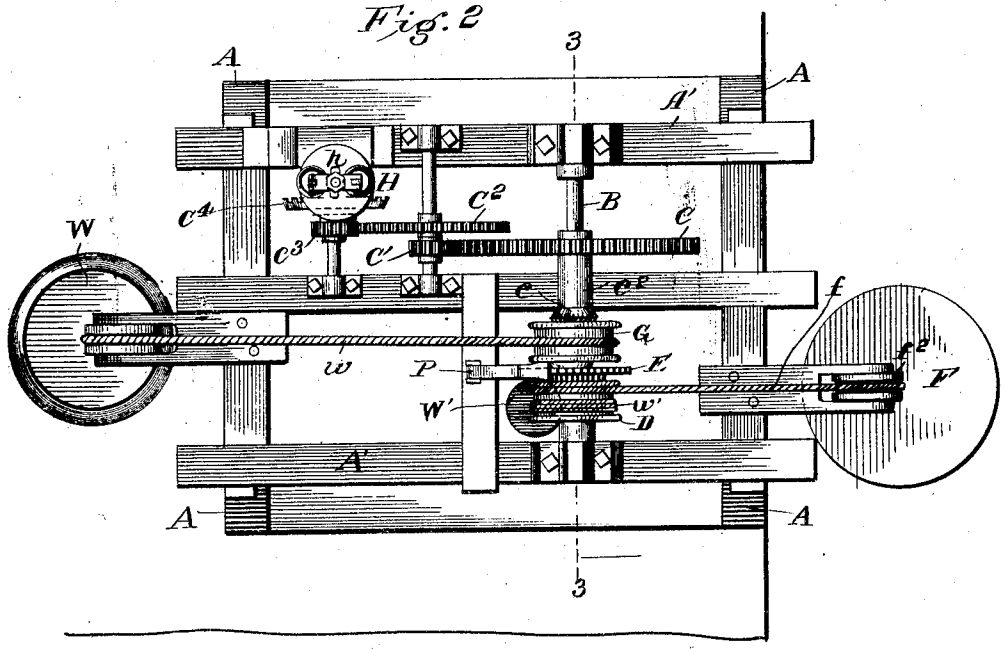


Fig. 3

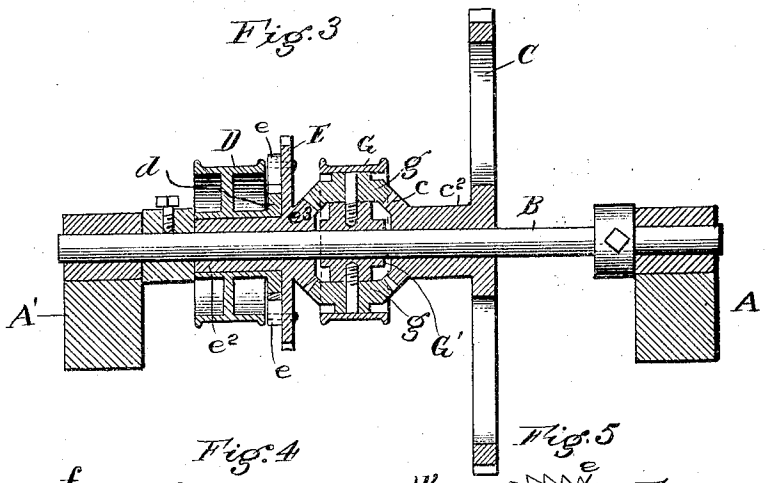


Fig. 4

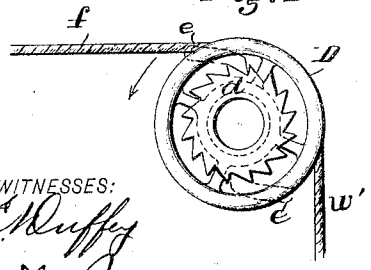
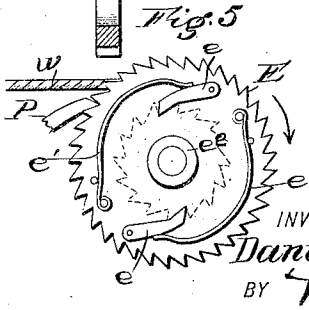


Fig. 5



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UNITED STATES PATENT OFFICE.

DANIEL H. MOWEN, OF MYERSVILLE, MARYLAND.

WAVE-MOTOR.

No. 822,067. Specification of Letters Patent. Patented May 29, 1906.

Application filed September 21, 1905. Serial No. 279,528.

To all whom it may concern:

Be it known that I, DANIEL H. MOWEN, a citizen of the United States, residing at Myersville, in the county of Frederick and State of Maryland, have invented a new and useful Improvement in Wave-Motors, of which the following is a specification.

My invention is in the nature of a wave-motor designed to be operated by the action of the waves or tide; and it consists in the novel construction and arrangement of parts in which a weight is raised by the action of a float as a source of power and in which a novel combination of gears is arranged to transform the movements of the float into a continuous rotary motion for any useful purpose, as hereinafter fully described with reference to the drawings, in which —

Figure 1 is a side elevation of the motor with the float immersed in and actuated by the waves. Fig. 2 is a top plan view. Fig. 3 is a sectional view through the transforming mechanism, taken on line 3 3 of Fig. 2; and Figs. 4 and 5 are adjacent face views of the two adjacent and coöperating parts D and E.

In the drawings, Fig. 1, A A′ A^2 represent an upright framework erected upon the side of a dock, the side of a river-bank, or the side of a ship.

F is a float immersed in the waves.

W is the main actuating-weight, which is intermittently wound up and allowed to run down to actuate the running parts of the motor, and W′ is a supplemental weight which coöperates with the float F, as hereinafter described.

On top of the upright framework in transverse position (see Figs. 1, 2, 3) is journaled in bearings a main shaft B. On this shaft are two loose oscillating drums D and G, and between them is a ratchet-wheel E, engaged by a detent P, which compels this ratchet-wheel to have always a forward movement in one direction, which detent is mounted on the framework.

The drum D is formed integrally with a sleeve bearing a ratchet-wheel *d*, (see Figs. 3 and 4,) and the ratchet-wheel E is formed integrally with a sleeve e^2, Figs. 3 and 5, which turns inside the sleeve of drum D, and on the opposite face of the ratchet-wheel is rigidly fixed a concentric bevel gear-wheel e^3.

On the face of the ratchet-wheel E adjacent to ratchet-wheel *d* are two pawls *e e*, held by springs *e′ e′* to engagement with the smaller adjacent ratchet-wheel *d*, as seen in dotted lines in Fig. 5.

The drum G has two housed bevel gear-wheels *g g*, arranged on radial axes, the hub G′ of this drum turning loosely on the shaft B. The bevel-gears *g g* in this drum engage on one side with the concentric bevel-gear *e* of the ratchet-wheel E, and on the opposite side of the bevel-gears *g g* engage a concentric bevel-gear *c*, formed on the end of a sleeve c^2, which is rigidly attached to the main gear-wheel C, which is rigid on shaft B. This gear-wheel C transmits a continuous rotary motion through the train of gears C′ C^2 C^3 C^4 C^5 to a centrifugal governor H, whose balls in rising force down a friction-disk *h* into frictional engagement with a subjacent stationary plate *h′*, as shown by dotted lines, to form a friction-governor to regulate the speed.

The float F is connected to a rope or other flexible connection *f*, which passes around a pulley f^2 at the top of the framework and is wound upon the drum D. The weight W′ is connected to rope *w′*, which is wound upon the drum D, but in reverse direction to rope *f*, so that as the float F falls the weight W′ is wound up and as weight W′ falls from the rise of float F the slack in rope *f* is taken up and wound upon the drum D.

The main weight W is connected to a rope *w*, which passes around a pulley w^2 at the top of the framework, and is thence extended to and wound upon the drum G in the same direction that rope *w′* is wound upon the drum D— *i. e.*, the strain of weight W tends to turn the gear-wheel C in the direction of the arrow in Fig. 1 and furnishes the effective power for the motor, which is intermittently stored up by the alternate rise and fall of float F and weight W′ through the intervening transforming or power-converting mechanism, composed of the two drums, the two ratchet-wheels with pawls, and the bevel-gears.

That the above action may be understood let it be assumed that the float F is falling and weight W′ is rising. This turns the drum D and ratchet-wheel *d* in the direction of the arrow in Fig. 4. Ratchet-wheel *d* catching against pawls *e e* of the large ratchet-wheel E turns it in the direction of the arrow in Fig. 5. Ratchet-wheel E being rigid with bevel-gear e^3, Fig. 3, turns the two housed bevel-gears *g g* in drum G, and these two bevel-gears turning both on their individual axes and also about the shaft B rotate the

drum G and engaging with the bevel-gear *c* on sleeve c^2 they travel around the same, winding up the rope *w* and raising the main weight W.

If now we consider the float F as rising and weight W′ as falling, the reverse action takes place to a certain extent—*i. e.*, the weight W′ turns drum D backward in reverse direction to the arrow in Fig. 4 and the ratchet *d* passes freely under the pawls *e e* of the large ratchet-wheel E, producing no effect thereon, as the latter is held against backward motion by the stationary detent P. While this is taking place, however, the weight W, which has been raised, now moving downward turns the drum G, and with it the wheel C, in the direction of the arrow in Fig. 1, but with this effect that the wheel C travels twice as fast as the drum G, owing to the fact that as the drum G turns it gives to the sleeve c^2 and wheel C not only the revolution of the drum G, but the augmented revolution due to the bevel-gears *g g* traveling over the now stationary bevel-gear e^3 on one side and advancing the bevel-gear *c* on the opposite side with a compound effect. The power of this motor may be taken off from any of the several wheels C C^2 C^3 or their shafts at the varying speeds of these gears to suit any application of power that may be desired.

It will be understood that the float F and the actuating-weight W need not be close together; but the support for the pulley f^2 may be so removed as to have the motor at a considerable distance from the water, if desired.

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

1. A wave and tide motor, comprising a float, a flexible connection for the same, an oscillating drum having said flexible connection wound thereon, a weight with a flexible connection wound upon the drum in opposite directions to that of the float, a main actuating-weight with flexible connection, an oscillating drum receiving the same, means for transferring the oscillations of the first-named drum to the second oscillating drum, and means for converting the oscillations of the second drum into continuous rotary motion.

2. A wave and tide motor, comprising a float, a flexible connection for the same, an oscillating drum having said flexible connection wound thereon, a weight with a flexible connection wound upon the drum in opposite directions to that of the float, a main actuating-weight with flexible connection, an oscillating drum receiving the same, means for transferring the oscillations of the first-named drum to the second oscillating drum, means for converting the oscillations of the second drum into continuous rotary motion, and a governor for regulating the speed.

3. A wave and tide motor comprising a float, a flexible connection for the same, an oscillating drum having said flexible connection wound thereon, a weight with a flexible connection wound upon the drum in opposite directions to that of the float, a main actuating-weight with flexible connection, an oscillating drum receiving the same, means for transferring the oscillations of the first-named drum to the second drum consisting of a ratchet-wheel fixed to the first drum, an independent ratchet-wheel bearing pawls engaging the first-named ratchet-wheel and bearing also a concentric bevel-gear, a detent and means for converting the oscillations of the second drum into continuous rotary motion consisting of one or more radially-arranged bevel-gears housed in the second drum and engaging on one side the bevel-gear of the ratchet-wheel and a sleeve having a bevel-gear engaging the opposite side of the housed bevel-gear and actuated thereby with an accelerated speed.

4. A wave and tide motor, comprising a shaft, a loose drum thereon, a float and an oppositely-acting weight with cords wound on said drum for storing up the power, a second drum on the same shaft, a main weight with cord wound on said second drum for receiving the stored-up power and means for converting the gravitating movements of the main weight into continuous rotation.

5. A wave and tide motor, comprising a float and an oppositely-acting weight with cords, an oscillating drum having rigidly-attached ratchet-wheel, a juxtaposed ratchet-wheel with a pawl on one side engaging the first-named ratchet-wheel, and a concentric bevel-gear on the other side, a detent for the pawl-carrying ratchet-wheel, a loose drum arranged beside the pawl-carrying ratchet-wheel and having one or more radially-arranged and housed bevel-gears engaging the bevel-gear of the ratchet-wheel, a main weight with cord wrapped around said last-named drum and a second bevel-gear engaging the housed bevel-gears and deriving therefrom a continuous rotation.

DANIEL H. MOWEN.

Witnesses:
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WILLIAM S. WACHTEL.