

No. 613,075.

Patented Oct. 25, 1898.

J. W. PITTS.
WAVE MOTOR.

(Application filed Dec. 28, 1897.)

(No Model.)

2 Sheets—Sheet 1.

Fig 1

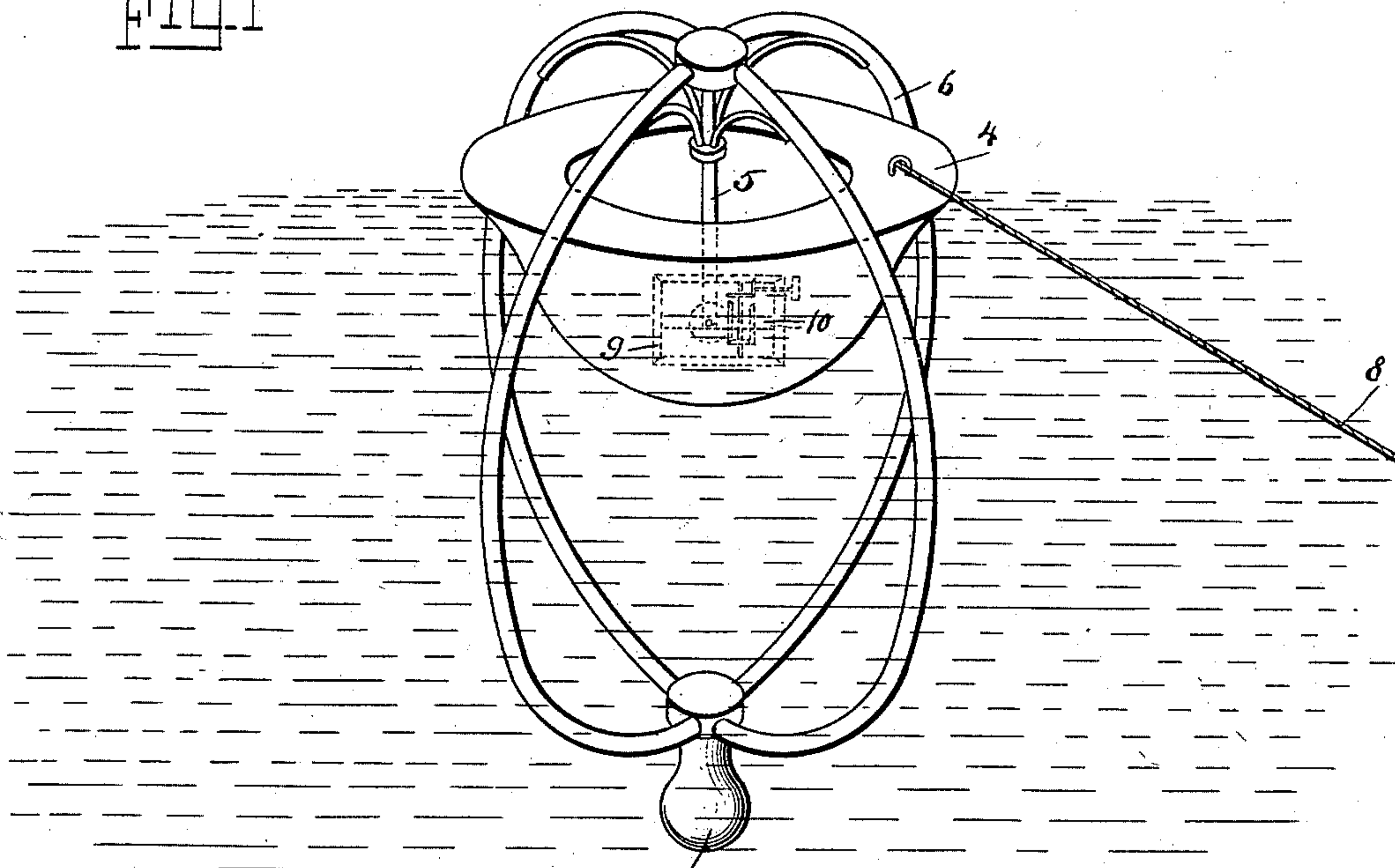
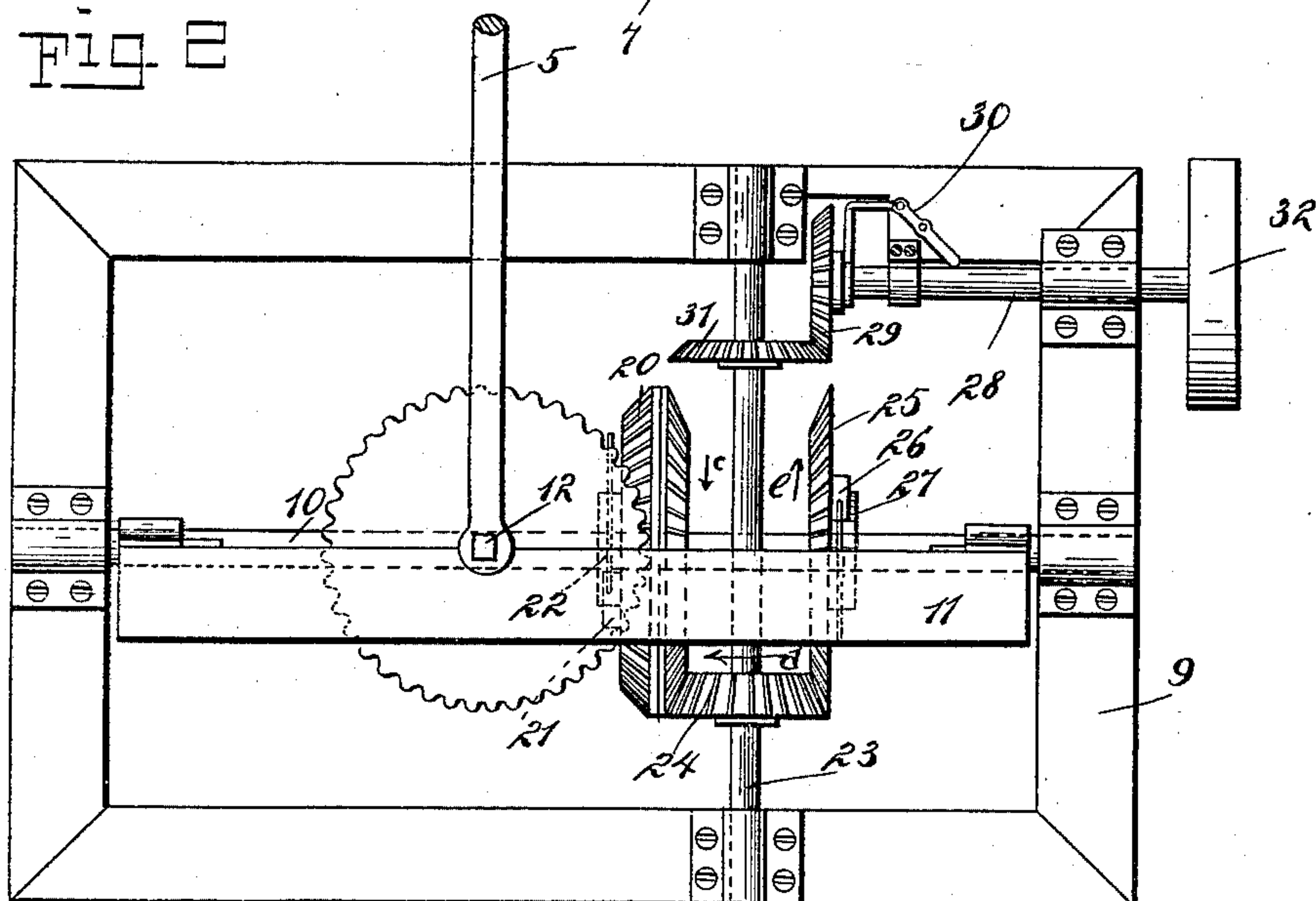


Fig 2



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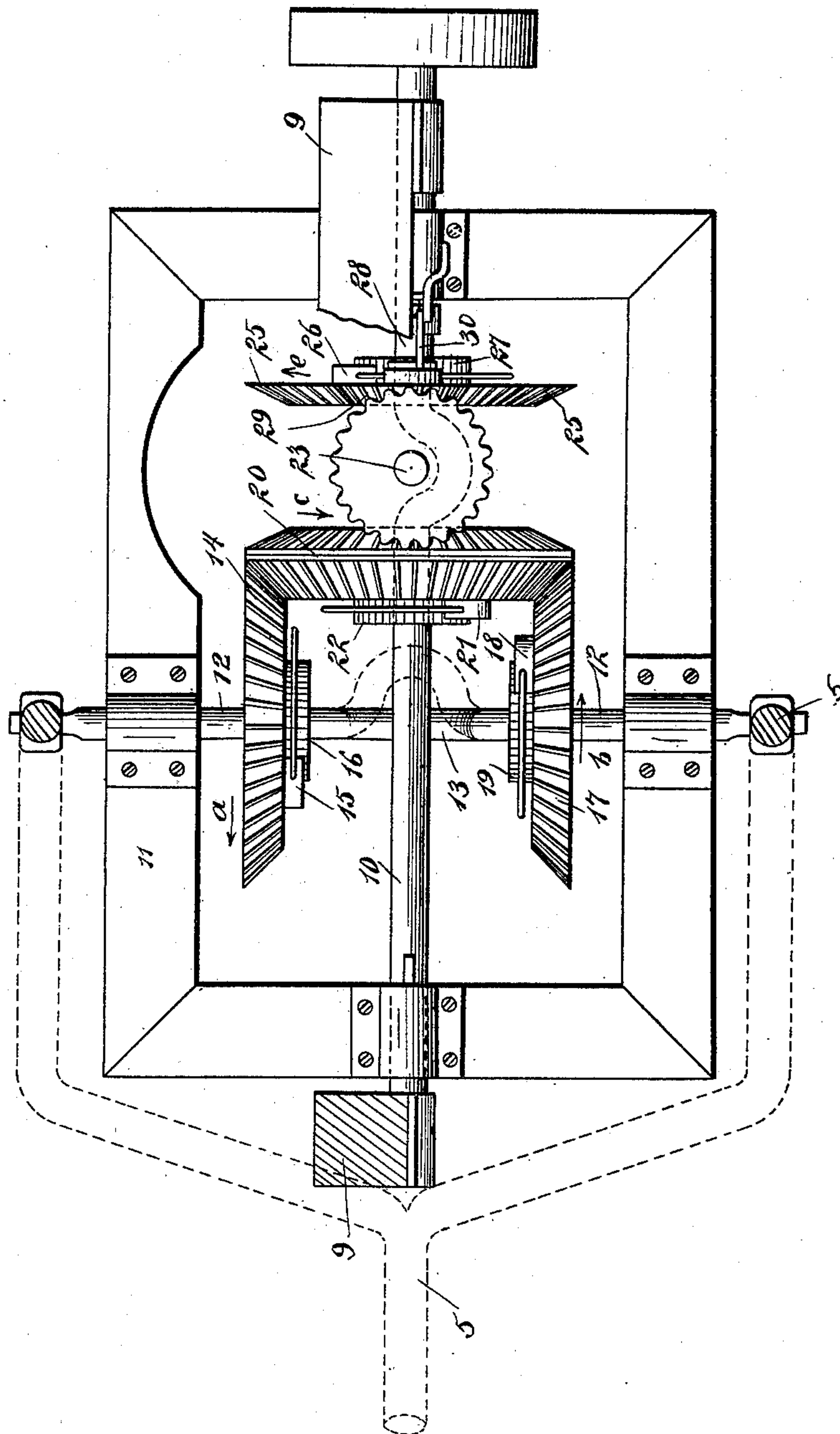
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2 Sheets—Sheet 2.

FIG. 5



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WAVE-MOTOR.

SPECIFICATION forming part of Letters Patent No. 613,075, dated October 25, 1898.

Application filed December 28, 1897. Serial No. 663,893. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. PITTS, of Hueneme, in the county of Ventura and State of California, have invented a new and Improved Wave-Motor, of which the following is a full, clear, and exact description.

This invention is a wave-motor having a float or buoyant vessel containing gearing and a frame hung from a mast attached to the gearing, so that the diversities of movement occurring between the frame and vessel will be transmitted to the gearing in a manner adapted for use in industrial arts.

This specification is the disclosure of one form of my invention, while the claims define the actual scope of the invention.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a perspective view of the invention. Fig. 2 is a side elevation of the gearing which I employ, and Fig. 3 is a plan view of said gearing with parts in section.

The vessel 4 has a deck with an orifice therein, through which passes a mast 5. This mast is mounted for universal movement on gearing contained within the vessel 4, as will be fully described hereinafter. Attached rigidly to the top of the mast at a point above the vessel 4 is a skeleton-like frame 6, which incloses the vessel and hangs down below the same. A weight 7 is attached to the lower portion of the frame 6 to keep the same perpendicular. The vessel 4 may be moored along shore, or it may be held by an anchor attached to a cable, such as the cable 8 shown in Fig. 1. The action of the waves in the water in which the vessel 4 is floated will cause the vessel to move rapidly about in diverse directions; but the waves will not have a great effect upon the movement of the frame 6. Now the gearing that is within the vessel is such as to receive and transform for transmission the differences in the movement between the parts 4 and 6.

The gearing referred to is mounted on a main or stationary rectangular frame 9, in which a shaft 10 is loosely mounted. Fixed by keys to the shaft 10, so as to rock therewith, is an auxiliary frame 11, which carries a rock-shaft 12, run transversely through the

shaft 10 and provided with an offset 13, by which to pass the shaft 10, the shafts 10 and 12 being arranged in the same plane. The mast 5 is bifurcated at its lower end, so as to span the frames 9 and 11, and has the lower ends of its arms respectively rigidly attached to the shaft 12 at points without the frame 11. As the mast 5 rocks laterally in Fig. 2 the shaft 12 will be rocked, while the frame 11 will not be moved. When the mast 5 rocks forward and back in Fig. 2, the shaft 12 will not rock, but will swing about the shaft 10, as will also the frame 11, and through the medium of the frame 11 the shaft 10 is caused to rock in its bearings on the frame 9.

Loose on the shaft 12 is a bevel-gear 14, carrying a pawl 15, which in turn engages a ratchet-disk 16, fixed to the shaft 12. The arrangement of the pawl 15 and disk 16 is such that the gear 14 may turn with the shaft 12 in the direction of the arrow *a*. When the shaft 12 turns in a direction opposite to the arrow *a*, the gear 14 will be idle. Also loose on the shaft 12 is a bevel-gear 17, similar to the gear 14 and having a pawl 18, which engages a ratchet-disk 19, fixed to the shaft 12.

The pawl 18 and ratchet 19 are disposed oppositely to the parts 15 and 16, so that the gear 17 will turn with the shaft 12 in the direction of the arrow *b*, and when the shaft turns in the opposite direction the gear 17 will be idle. Loose on the shaft 10 is a double gear 20, which carries a pawl 21, meshing with a ratchet-disk 22, fast on the shaft 10. The pawl 21 and ratchet-disk 22 are so arranged that the gear 20 will turn with the shaft 10 in the direction of the arrow *c*. When the shaft 10 moves in the opposite direction, it will not affect the action of the gear 20. When the shaft 12 rocks or oscillates independently of the frame 11, the gears 14 and 17 will be turned alternately, so as to drive the gear 20 in the single direction of the arrow *c*. When the shaft 10 moves in the direction of the arrow *c*, the gear 20 will be driven intermittently in the direction of such arrow. When the shaft 10 moves oppositely, the gear 20 will not be driven.

A perpendicular shaft 23 is revolvably mounted in the frame 9 and carries a bevel-gear 24, meshed with one section of the gear 20. The gear 20, therefore, revolving in the

direction of the arrow *c* aforesaid, turns the gear 24 and shaft 23 in the direction of the arrow *d*. Loose on the shaft 10 is a bevel-gear 25, which carries a pawl 26, engaging a ratchet-disk 27, fast on the shaft 10. The pawl 26 and ratchet are so arranged that when the shaft 10 turns in the direction of the arrow *e* the gear 25 will also be turned in such direction, but when the shaft 10 turns in the direction opposite to that indicated by the arrow *e* the gear 25 will not be moved. From this arrangement of parts it results that the oscillation of the shaft 12 transmits to the gear 20 a continuous rotary movement in the direction of the arrow *c* and that the oscillation of the shaft 10, occasioned by the swinging of the frame 11, transmits to the gear 24, through the medium of the gears 20 and 25, a continuous rotary movement in the direction of the arrow *d*. The gears 14 and 17 are exclusively devoted to the movements of the shaft 12. The gear 20 is employed both by the shafts 12 and 10, and the gear 25 is employed exclusively for transmitting the movement of the shaft 10 when such shaft moves in the direction of the arrow *e*.

Mounted in the upper portion of the frame 9 and arranged horizontally thereon is a revoluble shaft 28, which carries a splined gear 29, slidable on the shaft 28 through the action of a shifting device 30. Fixed to the shaft 23 is a gear 31, which meshes with the gear 29 to transmit to the shaft 28 the revoluble motion of the shaft 23. By operating the shifting device 30 the gear 29 may be engaged and disengaged with the gear 31 and the action of the shaft 28 may be controlled. The shaft 28 is provided with a pulley 32, from which the motion of said shaft may be taken and transmitted to any desired point.

From the above description it may be seen that the rolling and pitching of the vessel 4 will cause the mast 5 to be moved about in various directions. This various movement of the mast 5 results in the rocking of the shaft 12 and in the swinging of the frame 11. The gearing which I have described receives this movement and transforms the same into the regular rotary movement of the shaft 28, from which shaft power may be taken and employed in any desired manner. The apparatus may be moored along shore and the power transmitted ashore from the vessel 4, or the apparatus may be carried by a ship and the power generated may be used on ship-board for necessary purposes.

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

1. The combination of a vessel, gearing mounted therein, a mast attached to the vessel, and a frame hung from the mast and extending below the vessel.

2. The combination of a vessel having a deck with an orifice therein, gearing mounted within the vessel, a mast attached to the gear-

ing and extending up through the orifice in the deck, and a frame attached to the mast and hung downward below the vessel.

3. The combination of a stationary frame, a shaft mounted to rock therein, an auxiliary frame attached to and rocking the shaft, a second rock-shaft, the second rock-shaft being mounted in the auxiliary frame, two gears mounted on the second rock-shaft and having pawl-and-ratchet devices by which they move oppositely upon the movement of the second rock-shaft, a gear-wheel loose on the first rock-shaft and having pawl-and-ratchet devices by which the third gear-wheel moves in one direction upon the movement of the first rock-shaft, the first-named gear-wheels being meshed with the third gear-wheel, a fourth gear-wheel on the first-named rock-shaft and having pawl-and-ratchet devices by which the fourth gear-wheel is turned oppositely to the third gear-wheel, and a shaft mounted in the stationary frame and driven by the two gear-wheels of the first-named rock-shaft.

4. The combination of a main frame, a rock-shaft mounted therein, an auxiliary frame fixed to the rock-shaft, a rock-shaft carried in the auxiliary frame, a third shaft, the third shaft being mounted to turn in the main frame, and gearing carried on the two rock-shafts and transmitting the movements of said rock-shafts to the third shaft.

5. The combination of a revolubly-mounted rock-shaft, a frame fixed to the rock-shaft and swinging with the same, a rock-shaft carried in the frame, a revoluble shaft mounted adjacent to the first-named shafts, and gearing carried on the two rock-shafts and serving to transmit the movements thereof to the revoluble shaft.

6. The combination of a main frame, a rock-shaft 10 mounted therein, an auxiliary frame fixed to the rock-shaft and swinging in the main frame, a rock-shaft 12 carried by the auxiliary frame, a gear-wheel 14 mounted on the rock-shaft 12 and having pawl-and-ratchet devices by which it turns with the shaft 12 in one direction, a gear-wheel 17 mounted on the shaft 12 and having pawl-and-ratchet devices by which it turns with the shaft upon the movement of the shaft 12 in the direction opposite to that in which the shaft turns to move the gear 13, a double gear-wheel 20 mounted on the shaft 10 and having pawl-and-ratchet devices by which it moves in one direction upon the movement of the shaft 10, the gear-wheels 14 and 17 being meshed with the gear-wheel 20, a shaft 23 mounted in the main frame, a gear fixed to the shaft 23 and meshing with the gear-wheel 20, and a gear-wheel 25 loose on the shaft 10 and having pawl-and-ratchet devices by which it moves with the shaft 10 oppositely to the movement of the gear 20.

7. The combination of a buoyant vessel, gearing mounted in the vessel, and a frame supported on the gearing and hung pendent

from the vessel, the gearing being capable of receiving and transmitting the diversities of movement between the frame and the vessel.

5 8. The combination of a buoyant vessel, having a deck with an orifice therein, gearing mounted within the vessel, a frame extending above and below the vessel, and a connection between the gearing and the frame, the connection passing from the top of the

frame downward through the opening in the 10 deck of the vessel and the gearing being capable of receiving and transmitting the diversities of movement between the vessel and the frame.

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