E. T. ODOM.

WAVE AND TIDE MOTOR.

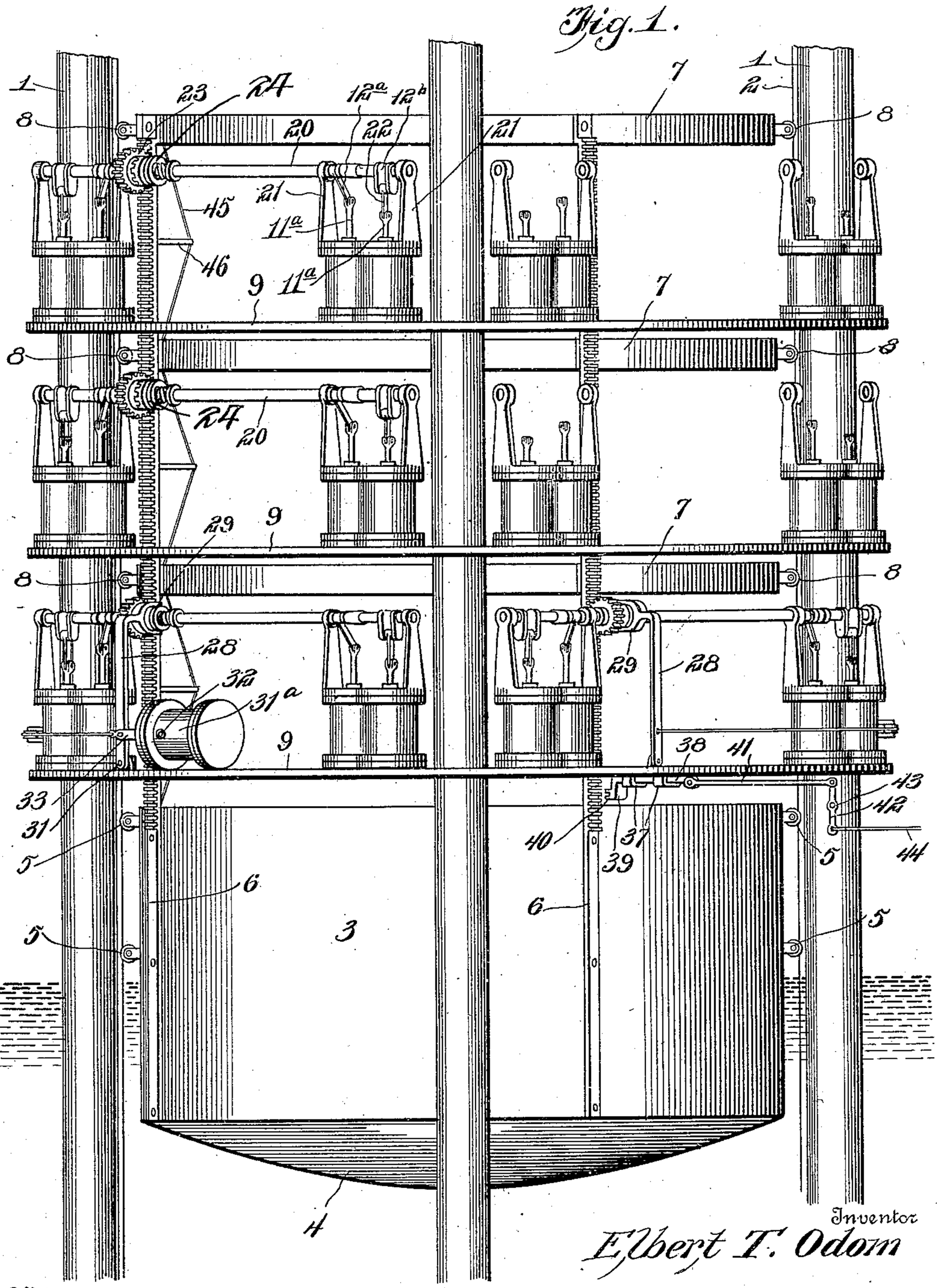
APPLICATION FILED SEPT. 9, 1908.

917,647.

Patented Apr. 6, 1909.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 2.

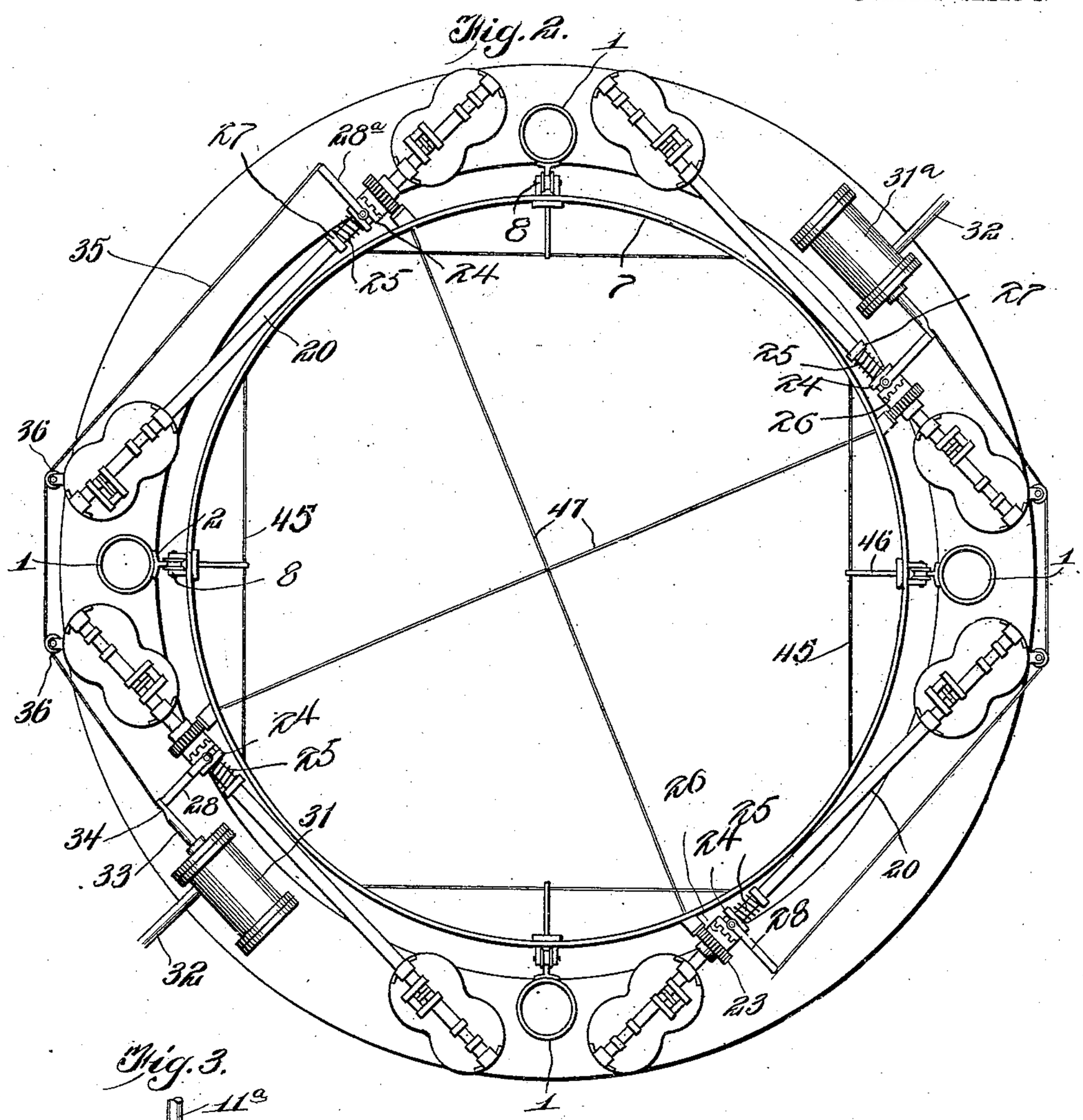


Fig. 3.

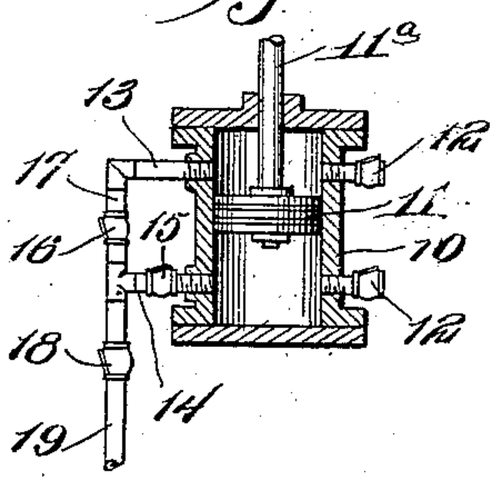
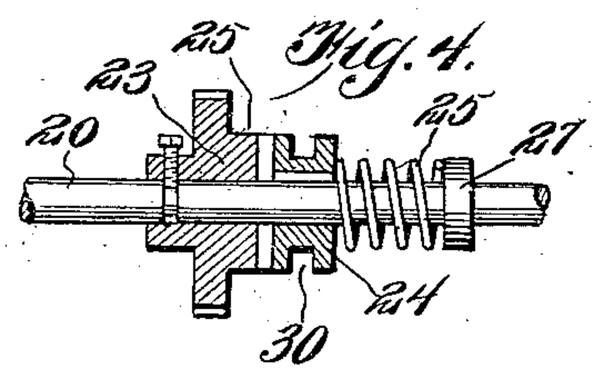


Fig. 4.



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WAVE AND TIDE MOTOR.

No. 917,647. Specification of Letters Patent. Patented April 6, 1909.

Application filed September 9, 1908. Serial No. 452,224.

To all whom it may concern:

Be it known that I, ELBERT T. ODOM, a citizen of the United States of America, residing at Birmingham, in the county of Jefferson and State of Alabama, have invented new and useful Improvements in Wave and Tide Motors, of which the following is a specification.

This invention relates to wave and tide motors, the principal object of the same being to utilize the movement of the water in actuating a float to operate a series of air pumps and to store the compressed air for future use.

Another object of the invention is to provide a simple, reliable and efficient tide and wave motor which will operate a series of pumps during the movement of a float, said pumps being of the double-action type in order that both movements of the float will actuate the pumps.

Still another object of the invention is to provide means for disconnecting or throwing out of operation any number of the pumps whenever desired.

Another object is to provide means for rendering the float inoperative in order to cut out the entire series of pumps during very inclement weather.

These and other objects may be attained by means of the construction illustrated in the accompanying drawings, in which,—

Figure 1 is a side elevation of a wave and tide motor made in accordance with my invention. Fig. 2 is a plan view of the same. Fig. 3 is a detail sectional view illustrating one of the pumps. Fig. 4 is a detail sectional view of one of the clutches which may be utilized for throwing into and out of operation a number of the pumps.

Referring to the drawings, the numerals 1 designate a series of hollow piles comprising metal pipes of the required thickness in diameter, four such piles being shown, but any suitable number may be utilized. These pipes are driven into the bottom or bed of a stream or other body of water and may extend under the water any suitable distance, depending upon the size, character and number of pumps to be operated. On the inner sides of the piles 1 tracks 2 are secured. Mounted between the piles 1 is a sheet metal watertight float 3, said float being hollow and preferably provided with a rounded bottom 4. Connected to the float 3 is a series of rollers 5, said rollers being grooved and mounted to travel on the tracks 2. Secured to the float 3 is a series of rack bars 6 extending vertically inside the piles 1, and connected to these rack bars is a series of metal rings 7. Mounted on the rings 7 is a series of grooved rollers 8 which also run on the tracks 2. A series of annular platforms 9 are supported upon the piles 1, and mounted upon each of these platforms is a series of pumps. Each platform supports a series of pumps of like construction; hence a description of one of the pumps will answer as a description for all.

As shown in Fig. 3, each of the pumps comprises a cylinder 10 provided with a piston 11. Secured to the cylinder 10 are the check valves 12, and the outlet pipes 13, 14 are extended from the opposite side of said cylinder. The pipe 14 is provided with a check valve 15, and a check valve 16 is located in a branch pipe 17 extending from the pipe 13 and connected to the pipe 14. A check valve 18 is connected to the discharge pipe 19 which leads to a compressed air tank located upon the shore. Each of the piston rods 11^a is connected to a crank arm 12^a or 12^b carried by a rock shaft 20 mounted in brackets 21 supported upon the pump cylinders. The crank arm 12^b is double, and a link 22 is pivoted to the piston rod 11^a of its respective pump, said link being pivoted between the arms of the crank. The rock shaft 20 carries a pinion 23 which meshes with one of the rack bars 6.

Mounted upon each of the rock shafts 20 is a clutch 24, said clutch mounted to slide upon the rock shaft. A spring 25 moves the clutch into engagement with a clutch member 26 formed upon the hub of each of the pinions 23. A stop collar 27 on the shaft 20 holds the spring 25 in position. A clutch lever 28 is provided with a yoke 29 which engages the groove 30 in the clutch member 24, said lever being pivoted at 31 to a bracket supported upon the annular platform 9. A cylinder 31^a provided with a piston is operated by compressed air from the storage tank, communication being established by a pipe 32. The piston rod 33 is pivotally connected at 34 to the clutch-operating lever 28. A flexible connection 35 extends from one of the clutch levers 28^a over pulleys 36 to the piston rod 33 to which it is secured at the outer end of said rod.

Mounted in keepers 37 secured underneath

the lower platform 9 is a sliding bolt 38 having an offset end 39 provided with teeth 40 designed to engage the teeth of each of the rack bars 6. The bolt 38 has connected to it a bar 41 to which a two armed lever 42 is pivoted, said lever being pivoted at 43 to one of the piles 1 and provided with a flexible connection 44 which leads to the shore. By pulling upon the flexible connection 44 the bolt 38 is moved to engage the rack bar 6 to render the float and the pumps inoperative whenever required. The rings 7 are properly braced by truss rods 45 extending over standards 46 disposed between the rings and connected to the rack bars, as shown at the left of Fig. 1. Brace rods 47 extend across the rings to provide a substantial and rigid framework for the motor.

The operation of my invention may be briefly described as follows:—The piles 1 are driven in the tide water stream or other body of water at a suitable distance from the shore where the waves will move the float 3 up and down. The rack bars 6 carried by the float will actuate the rock shafts 20, and these rock shafts will move the piston rods 11^a in the cylinders 10. By the arrangement shown it is not necessary that the pistons receive an entire stroke at each movement of the float. Any movement of the float will actuate the pistons sufficiently to compress air within the cylinders and to discharge the same to the tank or reservoir on the shore. Whenever it is desired to cut out some of the pumps, as may be the case in mild weather when the waves are not running high, the clutch 24 is disconnected from the clutch member 25, thus permitting the pinions 23 to rotate freely upon the shafts 20. Should it be deemed necessary to render the entire device inoperative for any purpose, the sliding bolt 38 is operated to engage each of the rack bars 6 to stop the movements of the float.

My invention is of comparatively simple construction, can be readily erected and installed, is constant in its operation and will develop a great power.

I claim:—

1. In a wave and tide motor, the combination of a float, rack bars secured to the float, vertical piles provided with platforms, air pumps mounted upon the platforms, rock shafts provided with pinions to engage said rack bars, and connections between said rock shafts and pumps.

2. In a wave and tide motor, a series of vertical piles, guide tracks on the piles, a float provided with grooved rollers running on the tracks, a series of rack bars connected to the float, said rack bars being supported by metal rings having rollers mounted to travel on the tracks, a series of platforms supported upon the piles, air pumps mounted on the platforms, rock shafts journaled in brackets on the pumps, pinions on the rock shafts to engage the teeth of the rack bars, connections between the rock shafts and the pump pistons, and means for disconnecting a number of said pumps from said rock shafts.

3. In a device of the character described, a float, a series of piles, guide tracks on said piles, a series of rack bars connected to the float, rings connected to the rack bars, grooved rollers connected to the float and rings for moving upon the guide tracks, a series of annular platforms connected to the piles, a series of double-acting pumps supported upon the platforms, rock shafts, pinions on the rock shafts for engaging the rack bars, connections between the rock shafts and pump pistons, and means for rendering any number of said pumps inoperative, said means comprising a sliding clutch, a clutch member formed on said pinions, a flexible connection, and a cylinder and piston.

4. In a device of the character described, the combination, with a float and a series of pumps operated thereby, of a series of clutches for rendering said pumps inoperative and operative at will, flexible connections between two of said clutches, a cylinder, a piston, and clutch-operating levers.

5. In a wave and tide motor, the combination of a float, rack bars carried by the float, a series of pumps actuated by the rack bars, and means for rendering the float inoperative, said means comprising a sliding bolt designed to engage each of the rack bars, and means for operating said bolt.

In testimony whereof I affix my signature in presence of two witnesses.

ELBERT T. ODOM.

Witnesses:

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E. P. BUNYEA.