J. HALL.

TIDE WATER MOTOR.

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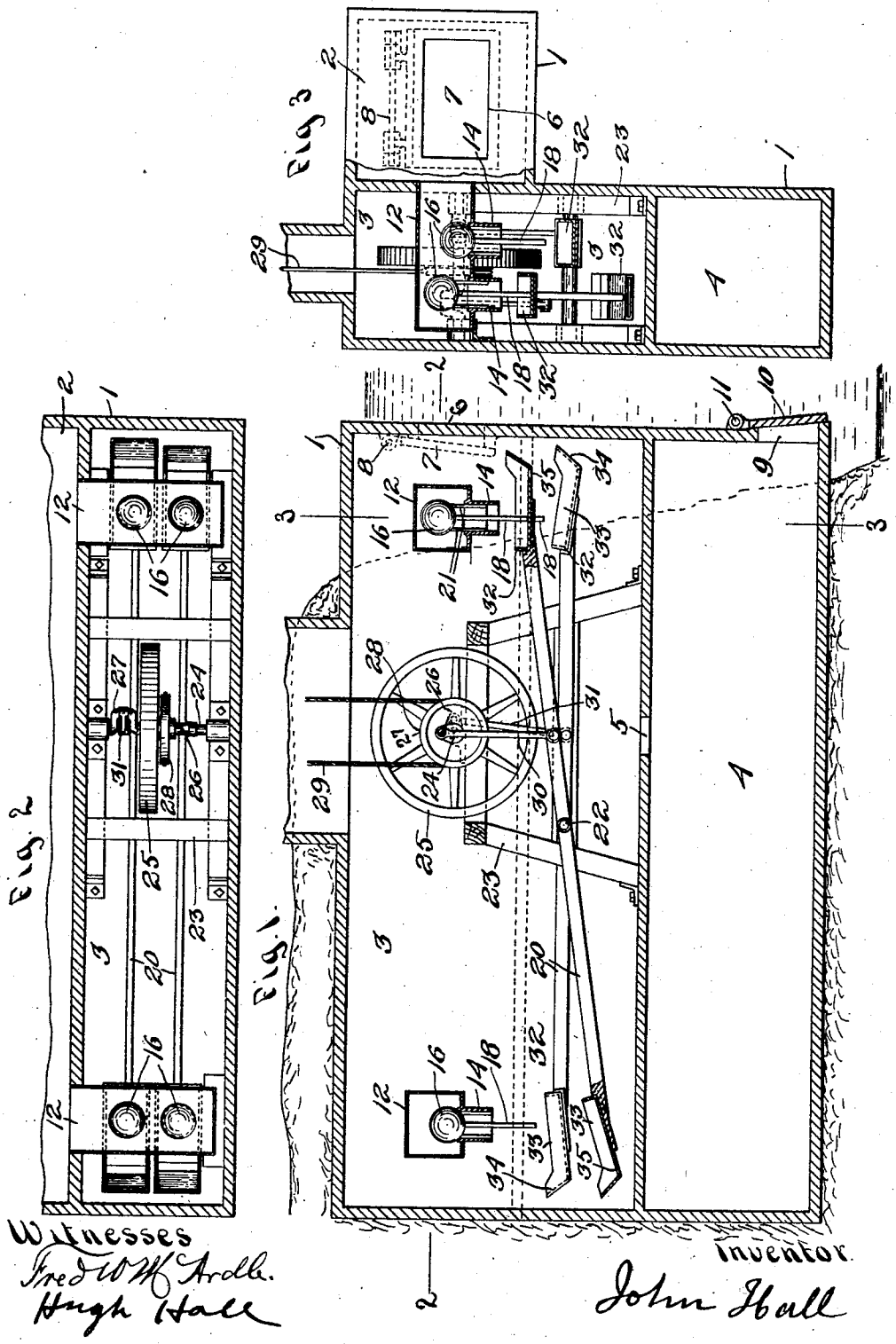
1,012,075.

Patented Dec. 19, 1911.



Witnesses

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TIDE-WATER MOTOR.

1,012,075. Specification of Letters Patent. Patented Dec. 19, 1911.

Application filed September 29, 1911. Serial No. 651,978.

To all whom it may concern:

Be it known that I, JOHN HALL, a subject of the King of Great Britain, residing at Cambridge, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Tide-Water Motors, of which the following is a specification.

My invention relates to tide water motors and it has for its object to provide a simple and efficient motor of this class.

To these ends my invention consists in the peculiar construction and combination of parts hereinafter set forth in the following description, the novel features being particularly pointed out and defined in the claims at the close thereof.

In the accompanying drawings:—Figure 1 is an elevation partly in section of a tide water motor embodying one form of my invention. Fig. 2 is a section on line 2—2 of Fig. 1. Fig. 3 is a section on line 3—3 of Fig. 1.

Having reference to the drawings, 1 represents a water tight housing or casing which is arranged with one end or face exposed to the tide and with its top about on a level with high water mark. Or, if desired, this housing may be entirely exposed to the tide.

The interior of housing 1 is divided by partitions into three chambers comprising a reservoir 2, a motor chamber 3 and a receiving vessel 4, the latter being connected with chamber 3 by a port 5 in the bottom of said chamber.

Reservoir 2 is made with an inlet port 6 which is controlled by an inwardly opening check valve 7 that is pivoted at 8 to the casing 1. The receiving chamber 4 is made with an outlet port 9 that is controlled by an outwardly opening check valve 10 pivoted at 11 to the casing 1.

The reservoir 2 is made with two extensions 12 each provided with a pair of outlet ports 14 controlled by ball valves 16. Each valve 16 is provided with downwardly extending stems 18 that coöperate with two walking beams 20, and each is in the form of a sphere or ball equipped with three or more downwardly extending wires or fingers 21 which loosely fit the interior of the discharge port controlled by the valve and guide the latter in its vertical movements. This form of valve combined with its coöperating walking beam I have found to be peculiarly effective and is a feature of importance.

The beams 20 are pivoted at 22 upon an upright frame 23 on which is also journaled a shaft 24 carrying a fly wheel 25, two cranks 26 and 27 arranged 90 degrees apart, and a pulley 28 from which power is transmitted to any desired point by a belt 29. The crank 26 is connected by a rod 30 with one walking beam 20 while the crank 27 is connected by a rod 31 with the other walking beam 20. The ends of each walking beam 20 are provided with buckets 32, each comprising a body 33 disposed substantially radially with relation to the pivot of the beams, and a deflecting end portion 34 which is arranged at an angle with relation to the body portion of the bucket from which latter it is separated so as to provide an intervening discharge port or passage 35 at the bottom of the bucket near the outer end of the latter.

As the tide rises it passes through entrance port 6 into and fills the reservoir 2 from which it passes through the extensions 12 and ports 14 into the buckets 32. From the buckets 32 the water discharges onto the bottom of the chamber 3 and flows by gravity through port 5 into the receiving chamber 4 where it is held out of the way of the working parts of the motor in chamber 3. When the tide falls and the level of the outside water reaches the valve 10 the water which has meantime accumulated in chamber 4 is discharged by gravity through the port 9. The reservoir is made sufficiently large to supply the buckets during the interval of time between high tides, that is, while the tide is falling and rising, while the receiving chamber 4 is made large enough to receive all of the water supplied to the buckets during that time so that chamber 3 is at all times kept clear of water which might interfere with the operation of the mechanism in said chamber.

Each bucket 32 coöperates with the stem 18 of one of the valves 16 and during the operation of the apparatus the walking beams 20 swing up and down on their pivot 22, their movements being produced by the intermittent discharge of water under head or pressure from reservoir 2. As each bucket rises it engages the stem 18 of the ball valve above it and lifts said valve whereupon a quantity of water is discharged from one of the extensions 12 of reservoir

2 into the bucket. The impact of this water as well as its weight forces the bucket downward, and as the bucket swings downward and tips toward its outer end the water therein flows down the body 33 of the bucket, across the discharge opening 35 of the bucket and up the angular end wall 34 on which it remains until the bucket reaches its lowest point whereupon the water discharges by gravity through the passage 35. That is to say, I have found that the buckets constructed as described will hold the water until the bucket reaches its lowest point and stops, and this is due, I believe, to the combined effects of the downward travel of the bucket and centrifugal force produced by the swing of the bucket about pivot 22. As each bucket reaches its lowest position the bucket at the opposite end of the walking beam reaches its highest position and opens another one of the valves 18 and the operation is repeated at that end of the walking beam.

My improved tide water motor is very simple in construction and inexpensive to build. Moreover all of the parts except the check valve 10 are inclosed and shielded by the casing 1. Another point of advantage is that by arranging the outlets of reservoir 2 well below high water mark, the water may be supplied to the buckets under considerable pressure or head thus deriving power from the force of the impact of the water against the buckets in proportion to the head. When the motor is in operation the walking beams rock back and forth rapidly and therefore the valves are opened only momentarily and but a small amount of water is discharged into a bucket at each opening of a valve. In this way my improved motor utilizes the water in an economical fashion so that a comparatively small reservoir is necessary to supply the motor during the interval between high tides.

What I claim is:—

1. A walking beam motor provided with a bucket comprising a body portion arranged substantially radial with relation to the pivot of the beam, and a relatively angular and upwardly inclined end wall separated from the body portion by a discharge port.

2. A walking beam motor provided with a reservoir having a discharge port; a ball valve controlling said discharge port; means to guide said valve to and from its seat, and a walking beam provided with a bucket, said beam automatically operating said valve.

3. A tide water motor comprising a walking beam water motor; a reservoir for supplying water to the beams of the motor; a discharge port for said reservoir; a valve controlling said discharge port that is automatically operated by movement of the walking beam; an inlet port for said reservoir accessible to high tide, and an inwardly opening check valve controlling said inlet port, the said reservoir having capacity to supply the walking beam with water during the interval between high tides.

4. A tide water motor comprising a walking beam water motor; a reservoir for supplying water to the beams of the motor, said reservoir having capacity to supply the walking beam with water during the interval between high tides; a discharge port for said reservoir; a valve controlling said discharge port that is automatically operated by movement of the walking beam; an inlet port for said reservoir exposed and accessible to high tide; an inwardly opening check valve controlling said inlet port; a chamber for receiving the water discharged from said motor, said chamber having capacity to receive and hold the water discharged from the motor during the interval between low tides; an outlet port for said chamber near low water level adapted to be uncovered at low tide, and an outwardly opening check valve for said outlet port.

5. A tide water motor comprising a walking beam water motor; a water tight housing for said motor; a water tight reservoir for supplying water to the beam of said motor, said reservoir having capacity to supply the walking beam with water during the interval between high tides; a discharge port for said reservoir; a valve for controlling said discharge port, said valve being automatically operated by movement of the walking beam of the motor; an inlet port for said reservoir exposed and accessible to high tide; an inwardly opening check valve controlling said inlet port; a water tight chamber for receiving the water discharged from said motor and for holding said water clear of the motor, said chamber having capacity to receive and hold the water discharged from the motor during the interval between low tides; an outlet port for said chamber adapted to be uncovered at low tide, and an outwardly opening check valve for said outlet port.

In testimony whereof I have affixed my signature, in presence of two witnesses.

JOHN HALL.

Witnesses:
HUGH HALL,
ARTHUR F. RANDALL.