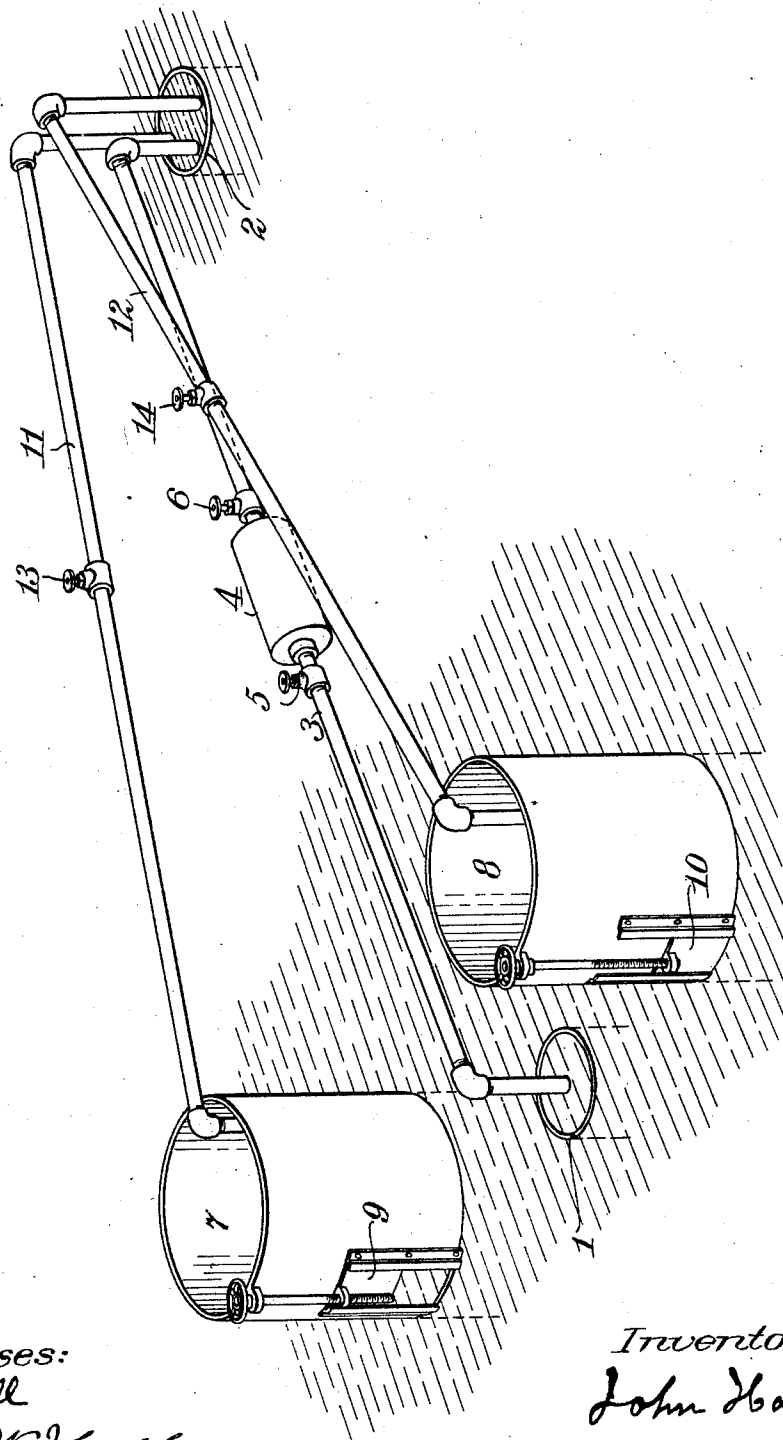


J. HALL.  
TIDE WATER MOTOR.  
APPLICATION FILED JAN. 21, 1909.

1,002,986.

Patented Sept. 12, 1911.



Witnesses:  
Hugh Hall  
James W. Hall

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# UNITED STATES PATENT OFFICE.

JOHN HALL, OF CAMBRIDGE, MASSACHUSETTS.

## TIDE-WATER MOTOR.

1,002,986.

Specification of Letters Patent.

Patented Sept. 12, 1911.

Application filed January 21, 1909. Serial No. 473,595.

*To all whom it may concern:*

Be it known that I, JOHN HALL, a subject of Canada, and resident at Cambridge, in the county of Middlesex and State of Massachusetts, have invented an Improved Tide-Water Motor, of which the following description, in connection with the accompanying drawings, is a specification.

This invention relates to tide water motors and has for its object to provide an improved apparatus of this kind of inexpensive and simple construction.

The invention consists in providing a well connected by a siphon pipe with tide water in which pipe is arranged a motor which is actuated during the rising of the tide by water flowing through said pipe into the well and during the fall of the tide by water flowing through said pipe from the well and in combining therewith means for maintaining the level of the contents of the well below the level of the tide while the latter is rising and for maintaining the level of the water in said well above the level of the tide while the latter is falling, said means preferably consisting of a pair of supplemental wells within reach of the tide provided with gates on a level with low water and connected each by a siphon pipe, with the well.

The accompanying drawing is a perspective view, more or less diagrammatic, of a tide water motor embodying one form of my invention.

Having reference to the drawings, 7 and 8 are two tanks or docks located upon the shore within reach of the tide. The tops of the tanks 7 and 8 reach to a point about on a level with high water mark and their bottoms are below low water level. These two tanks are connected by siphon pipes 11 and 12 with a well 2 located upon the shore out of reach of the tide and its top is considerably above low water level and preferably on a level with high water mark or thereabout.

Between the two tanks 7 and 8 and within reach of the tide at low water is a well 1 whose top may be upon a level with low water mark. This well 1 is connected by a pipe or conduit 3 with the well 2, the horizontal part of conduit 3 being at or above high water level. In the conduit 3 is a water motor represented conventionally at 4 while 5 and 6 are valves in conduit 3 for controlling motor 4. The siphon pipes 11

and 12 are also provided with valves 13 and 14 by which they are controlled. The motor 4 may transmit power to any desired point through any suitable connections.

The tanks 7 and 8 are made with gates or valves 9 and 10, respectively, which control ports provided through the walls of said tanks at about low water level. Also the ends of siphons 11 and 12 within tanks 7 and 8 extend well down into the tanks so that said ends are near the bottoms of the tanks.

Normally all of the pipes are full of water and the gate of one tank is open while the gate of the other tank is closed. Also the period of each cycle of the operation of the apparatus is the rise and fall of the tide.

The operation is as follows: With the valves of the apparatus properly adjusted with respect to the movement of the tide, the level of the water in wells 1 and 2 will be the same at low tide, or at least the level of the water in well 2 will be no higher than the level of the water in well 1 at that time. It will therefore be clear that as the tide rises water will flow through conduit 3 and motor 4 into well 2 and the motor will be actuated. With the gates 9 and 10 in their normal positions as shown in the drawing, tank 8 is empty; the valve 13 is open and the valve 14 closed. Now as the water flows into well 2 from conduit 3 and tends to raise the level of the water in the well 2, water will flow from well 2 through pipe 12 into tank 8 as fast as it flows into well 2, or substantially so. Owing to the fact that the tanks 7 and 8 are much larger in cross-sectional area than well 2 the level of the water in tank 8 will not rise at a rapid rate or to any great extent during the time that the tide is rising, or if it does then the valve 14 may be adjusted to retard the flow through pipe 12 so that the level of the water in well 2 will rise at the same rate and the same relation will be maintained between the height of the water in well 2 and the height of the water in tank 8.

During the rising of the tide the gate of the tank 7 is left open and at high tide when that tank is full of water said gate is closed. Also, at high tide, the valve 14 is closed and the valve 13 opened so that the well 2 is filled from tank 7 to the same level as the level of the water in tank 7. Consequently as the tide falls water will flow through conduit 3 and motor 4 from

well 2 which is supplied from tank 7 until low tide is reached, or until tank 7 is exhausted of water. At low tide the gate of tank 7 is again opened and left in that position until next high tide while the gate of tank 8 is opened only long enough to remove the water which entered said tank from well 2 during the rising of the tide. During each rise and fall of the tide the operation above described is repeated.

From the above description it will be seen that during the rising of the tide the siphon pipe 12 and tank 8 serve as means for maintaining the level of the water in well 2 below the level of the tide water, and that during the fall of the tide the siphon pipe 11 and tank 7 serve as means for supplying the well 2 with water so as to maintain the level of the water in well 2 above the level of the tide water. In this way the motor 4 is kept in operation both during the rising and the falling of the tide.

What I claim is:

1. In an apparatus of the character described, in combination a well whose top is higher than low water level; a pipe con-

necting said well with the tide water; a water motor in said pipe; means for maintaining the level of the contents of said well below the level of the tide during the rising of the tide water so that a current flows through said pipe into the well and actuates the motor, and means for automatically supplying water to the well and maintaining the level of the water in said well above tide water during the fall of the tide so that a current flows from said well through said pipe and actuates the motor as the tide falls.

2. In an apparatus of the character described, in combination, the well 2; pipe 3 connecting well 2 with the tide water; motor 4 in pipe 3; tank 7 arranged within reach of the tide; pipe 11 connecting tank 7 with well 2 and provided with valve 13; tank 8 arranged within reach of the tide; and the pipe 12 connecting the tank 8 with well 2 and provided with valve 14.

JOHN HALL.

Witnesses:

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JAMES W. HALL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."