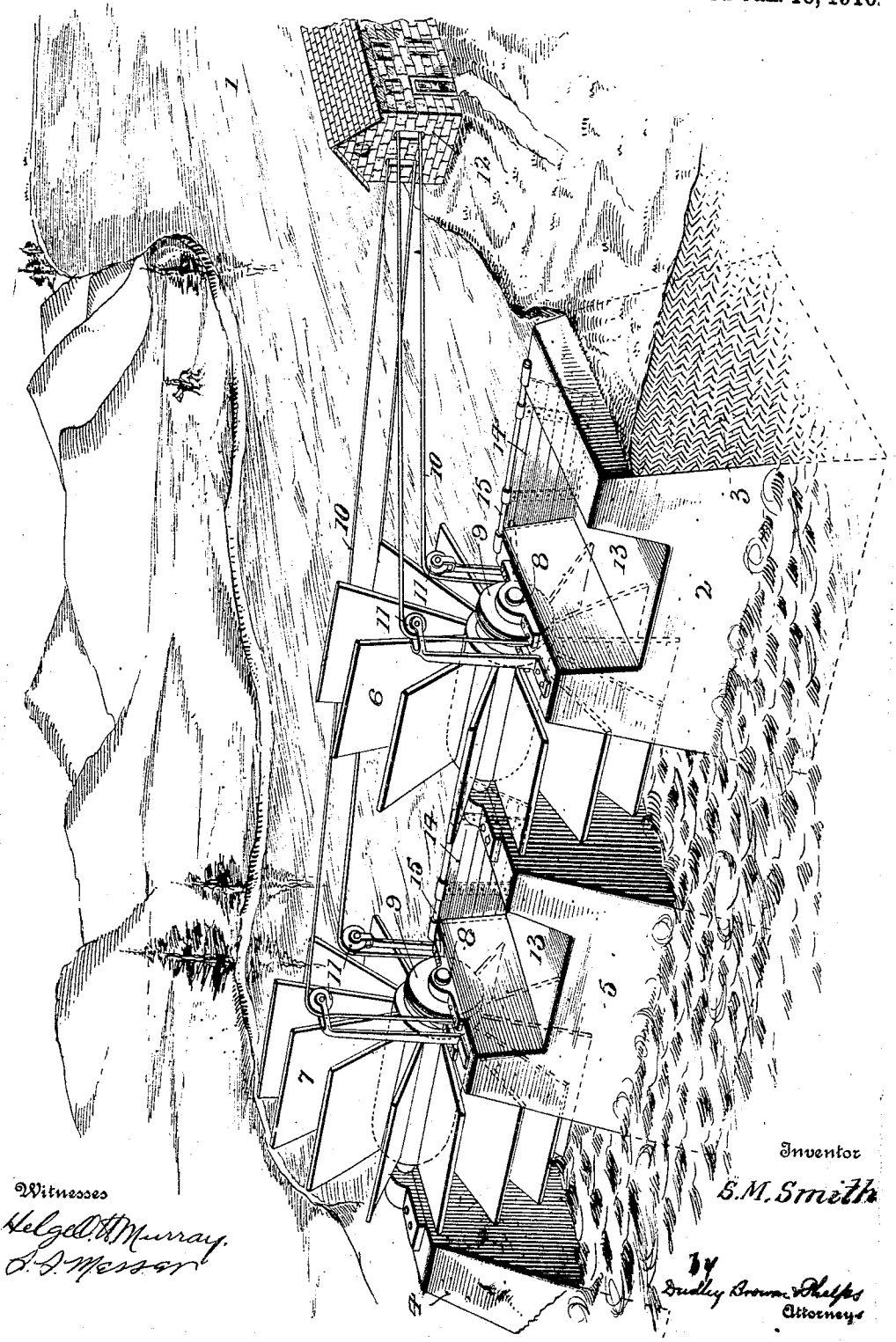
S. M. SMITH.

DEVICE FOR UTILIZING TIDE WATER AS MOTIVE POWER.

APPLICATION FILED MAR. 13, 1909.

946,585.

Patented Jan. 18, 1910.



Witnesses

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UNITED STATES PATENT OFFICE.

STEPHEN M. SMITH, OF BOISE, IDAHO.

DEVICE FOR UTILIZING TIDE-WATER AS MOTIVE POWER.

946,585. Specification of Letters Patent. Patented Jan. 18, 1910.

Application filed March 13, 1909. Serial No. 483,289.

To all whom it may concern:

Be it known that I, STEPHEN M. SMITH, a citizen of the United States, residing at Boise, in the county of Ada and State of Idaho, have invented certain new and useful Improvements in Devices for Utilizing Tide-Water as a Motive Power, of which the following is a specification.

My invention relates to certain new and useful improvements in devices for utilizing tide water as a motive power.

It is well known that an enormous power is daily wasted by not harnessing the currents produced by the ebb and flow of the tide, and particularly at those places where the sea flows into bays through narrow inlets and where the difference between high and low tide is sometimes many feet. By my invention this energy which is now wasted can be utilized and the power developed both by the ebb and flow of the tide may be used for the operation of machinery.

With this and other objects in view my invention consists in placing across an inlet to a bay a dam provided with one or more openings extending to the level of the water at low tide, and in these openings are placed one or more water-wheels. The dam is also provided with one or more openings which extend below the normal high tide level, these openings being provided with gates operating to permit the water when it has risen above the sill of these depressions to force back the gates and flow in freely to fill the bay. When the tide has reached flood and begun to ebb these gates close, holding the water back in the bay and forcing all the water to pass under the wheels.

My invention further consists in certain constructions, combinations and arrangements of parts, the preferred form of which will be first described in connection with the accompanying drawing and then the invention particularly pointed out in the appended claims.

Referring to the drawings wherein I show a view of an inlet to a bay, said inlet being provided with a dam constructed in accordance with my invention, 1 designates the bay; 2 a pier extending out from one of the banks 3 of the inlet; 4 a pier extending out from the other bank and 5 a pier located between the piers 2 and 4.

6 and 7 are a pair of water-wheels, the water-wheel 6 being journaled between the piers 2 and 5 and the water-wheel 7, between the piers 4 and 5. These water-wheels may be of any ordinary or desired construction and, for the purpose of illustration, are shown as journaled at 8 on the top of the piers, each being provided with a pulley 9 from which extends rope belts 10, said belts extending over guide-pulleys 11 into a mill or power house of any desired character, as indicated at 12.

It is to be understood that the number of the piers crossing the inlet may be increased or diminished as desired or required by the width of the inlet, and the number of the wheels may also be varied, the particular construction illustrated being merely for the purpose of showing one form of my invention.

The upper portions of the piers 2 and 5 are cut away, as shown at 13, to form what I term spill-ways, the floor of these spill-ways being located below the normal line of high tide, so that before high tide is reached the water will flow through the spill-ways. At the back end of each spill-way I hinge a gate 14, said gate being shown as supported on a shaft 15, said gate being so mounted that it can be freely swung in on the bay side of the dam, but will be prevented from swinging toward the other side of the dam by its edges striking against the edges of the spill-way.

In describing the operation of my invention I will suppose that the tide has passed flood and has begun to ebb. The gates 14 will consequently be closed by the pressure of the water, and as the tide ebbs the water of the sea will be lower than the water in the bay, and as the only outlet for the water in the bay will be between the piers it will consequently operate to rotate the wheels 6 and 7. As the water cannot flow freely between the piers because of the wheels there will be a fall between the water on the two sides of the dam. Furthermore because of the fact that the flow of the water past the wheels is impeded the water in the bay will not reach low tide mark until after low tide has been reached outside of the dam, and consequently the wheels will continue to operate even after slack water has been reached outside of the dam. When the tide turns and begins to flow back into the bay it will at first have to pass entirely through the openings between the piers and, consequently all the water passing into the bay will operate to turn the wheels. The

interference with the free flow of the water, due to the presence of the wheels in the openings will consequently cause the water to pile up outside of the dam and form a head to operate the wheels in the opposite direction and from which they formerly turned. This will continue until the tide has reached the height of the bottom of the spill-ways. Now the water, in addition to flowing through the spaces between the piers of the dam, will have a passage over the spill-ways, due to the fact that the pressure of the water will at once force open the gates 14, consequently at the last portion of the flow of the tide, before high tide is reached, the water is permitted to flow freely into the bay, and when flood tide is reached and the direction of the tide turns the gates will automatically close and all water will again have to pass from the bay through the wheels as previously described.

I realize that considerable variation is possible in the details of construction and arrangement of parts without departing from the spirit of my invention, and I therefore do not intend to limit myself to the specific form shown and described.

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

1. In a means for utilizing tide water as a motive power at points where the sea connects with bays through inlets, the combination of a dam composed of a plurality of piers across such inlet, a water-wheel mounted between the piers, means for conveying the power generated by the water-wheel to any desired point, and means for permitting the water from the sea to flow into the bay without passing under the wheel when the tide has reached a certain height, said means preventing water from passing from the bay to the sea except past the wheel.

2. In a means for utilizing tide water as a motive power at points where the sea connects with bays through inlets, the combination of a dam composed of a plurality of piers, a spill-way formed on top of one of said piers, a gate mounted on said last mentioned pier and adapted to prevent the flow of water from the bay while permitting the flow of water from the sea when the tide has reached the level of the bottom of the spill-way, and a water-wheel located between the piers and adapted to be operated by the ebb and flow of the tide.

3. In a means for utilizing tide water as a motive power at points where the sea connects with bays through inlets, the combination of a dam composed of a plurality of piers and extending across the inlet, said piers being provided with spill-ways in their top, gates mounted in said spill-ways and adapted to operate to permit water to flow from the sea to the bay and to close to prevent water flowing from the bay and the sea, water-wheels mounted between the piers, and means for conveying power from the water wheel to any desired point, said water-wheels being adapted to be operated by the ebb and flow of the tide.

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

STEPHEN M. SMITH.

Witnesses:
K. E. KLEIN,
R. L. NORTON.