UNITED STATES PATENT OFFICE.

WILLIAM O. WEBBER, OF BOSTON, MASSACHUSETTS.

AUTOMATIC TIDAL AIR-COMPRESSOR.


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To all whom it may concern:

Be it known that I, William Oliver Webber, of the city of Boston, county of Suffolk, and State of Massachusetts, have invented a new and useful Improvement in Automatic Tidal Air-Compressors; and I declare that the following is a full, clear, and exact description of the same.

This invention relates to a tide actuated hydraulic air compressor, and has for its purpose the construction and operation of an automatically stopping and starting hydraulic air compressing apparatus, actuated by the rise and fall of the tide.

Figure 1 is a plan view of the inlet and outlet passageways, with the necessary gates appertaining thereto. Fig. 2 is a vertical section on the line 2—2 of Fig. 1. Fig. 3 is a vertical elevation on the lines 3—3 of Fig. 1, and Fig. 4 is a horizontal section on line 4—4 of Fig. 3, reference being had to the accompanying drawings forming part of these specifications, in which similar characters represent corresponding views in all the parts.

1 is the inlet passageway; 2 is the outlet passageway.

3 is the longer leg, and 4 the shorter leg, of an inverted siphon connecting the inlet and outlet passageways. The grade of the bottom of the outlet passageway 2 is below that of the inlet passageway 1.

5 is preferably made of a larger area than 3. 5 and 5a are inwardly opening gates situated in the inlet passageway, and 6 and 7 are outwardly opening gates situated in the outlet passageway.

8 is an enlarged separating chamber, situated at the bottom of the inverted siphon, and 9 is an abutment wall transversely situated in said chamber.

10 are pontoons situated in the inlet passageway 1, carrying fulcrums 11, on which are pivoted weighted levers 12. One end of these levers is pivoted to beams 13, which support transversely disposed beams 14, which, in turn, support downwardly depending air pipes 15. These air pipes are adjustably located by the collars 16.

Upon the side of the inlet passageway 1 are located stop blocks 17.

Rising from the upper part of the separating chamber 8 is a service pipe 18, provided with a stop valve 19.

The operation of this invention is as follows:—These two passageways are transversely disposed through a dam which spans the neck of a tidal basin. If, now, we assume that the water impounded in a tidal basin enters the inlet passageway 1, from the left, as shown by the arrows, it will automatically swing open the inlet gate 5, pass down the long leg of the siphon 3, and, in passing in and around the vertically depending air pipes 15, entrain air with the water. The descending column of air and water then impinge upon the transversely disposed abutment wall 9, at the bottom of the siphon, which causes the air to be rapidly freed from the water. This air then is caught and held by the pocket, or air chamber, 8, while the water passes around the end of the abutment wall 9, and thus into the shorter and larger leg of the siphon 4, then flows upward into the outlet passageway 2, forcing open the gate 7, and passing into the ocean, the gate 5 in the inlet passageway, and the gate 6 in the outlet passageway, being held tight by the pressure of water against them.

Upon the reversal of the tide, so that it flows from the right into the inlet passageway 1, the gate 5 is automatically forced open, the gate 5 shut, the water and entrained air flow down the longer leg of the siphon, as before, up the shorter leg, and, shutting the gate 7, force open the gate 6, thereby emptying into the tidal basin again, as before. As the water falls in either the tidal basin or the ocean, the water will correspondingly fall in the inlet passageway 1, and the air inlet pipes will descend as the level of the water falls in the inlet passageway, thus maintaining the lower end of these inlet pipes at a constant depth below the surface of the water in the inlet passageway. This would continue until the flotation tanks rested upon the bottom of the passageway, when any further fall of the water would vary the submersion. To overcome this, just before the bottom of the flotation tanks would strike the bottom of the inlet passageway the outer end of the levers are brought in contact with the stops 17, causing the frame carrying the inlet pipes to descend at a faster rate, in proportion to the leverage, thus obtaining an increased rate of submersion at the lower depth of water in the inlet passageway. This mechanism will result in this apparatus continuing in an operative state with a very small difference in the level of the tide, and also provides an automatically starting, stopping, and operative device.
Having fully described my invention, what I desire to claim in Letters Patent is as follows:

1. An automatic tidal air compressor, consisting of passageways connecting a tidal basin with the ocean, each communicating with a leg of an inverted siphon, air inlets situated in the inflow passageway, and an air separator situated at the lower part of said siphon.

2. An automatic tidal air compressor, consisting of passageways connecting a tidal basin with the ocean, each communicating with a leg of an inverted siphon, swinging gates situated in such passageways and adapted to cause any flow of water in either direction to pass through the siphon, air inlets situated in the inflow passageway, and an air separator situated at the lower part of said siphon.

3. An automatic tidal air compressor, consisting of an inlet passageway at one level, connecting a tidal basin with the ocean, and communicating with the longer leg of an inverted, submerged siphon, a tidal basin situated in the inflow passageway and an air separator situated at the lower part of said siphon.

4. An automatic tidal air compressor, consisting of an inlet passageway at one level, connecting a tidal basin with the ocean, and communicating with the longer leg of an inverted, submerged siphon, an outlet passageway at a lower level, connecting a tidal basin with the ocean, and communicating with the shorter leg of said siphon, swinging gates situated in said passageways and adapted to cause any flow of water in either direction to pass down the longer, and up the shorter, legs of said siphon, air inlets situated in the inflow passageway and an air separator situated at the lower part of said siphon.

5. An automatic tidal air compressor, consisting of an inlet passageway at one level, connecting a tidal basin with the ocean, and communicating with the longer leg of an inverted, submerged siphon, an outlet passageway at a lower level, connecting a tidal basin with the ocean, and communicating with the shorter leg of said siphon, an enlarged chamber located at the bottom of said inverted siphon, provided with an abutment wall, transversely situated to the axis of the descending leg of said siphon.

6. An automatic tidal air compressor, consisting of an inlet passageway at one level, connecting a tidal basin with the ocean, and communicating with the longer leg of an inverted, submerged siphon, an outlet passageway at a lower level, connecting a tidal basin with the ocean, communicating with the shorter leg of said siphon, and a floating head piece provided with air inlet pipes situated in the inlet passageway, directly over the longer leg of said siphon, adapted to automatically maintain a variable degree of submersion of said air inlet pipes.

7. An automatic tidal air compressor, consisting of an inlet passageway at one level, connecting a tidal basin with the ocean, and communicating with the longer leg of an inverted, submerged siphon, an outlet passageway at a lower level, connecting a tidal basin with the ocean, and communicating with the shorter leg of said siphon, a floating head piece provided with air inlet pipes situated in the inlet passageway, directly over the longer leg of said siphon, and adapted to automatically maintain a constant degree of submersion of said air inlet pipes for part of the rise and fall of the tide, and a variable degree of submersion for the remainder of said rise and fall.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WM. O. WEBBER.

Witnesses:

F. B. McNAMEE,
J. A. HUME.