

(No Model.)

W. C. BARR.
AIR LOCK FOR CAISSONS.

No. 545,332.

Patented Aug. 27, 1895.

Fig. 1.

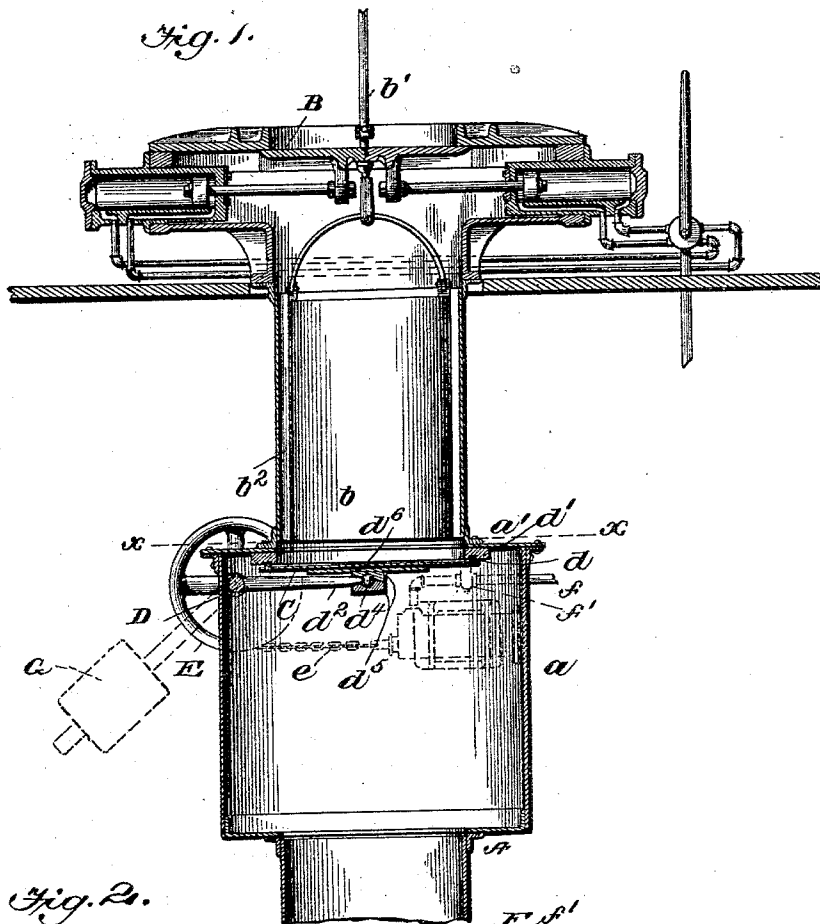


Fig. 2.

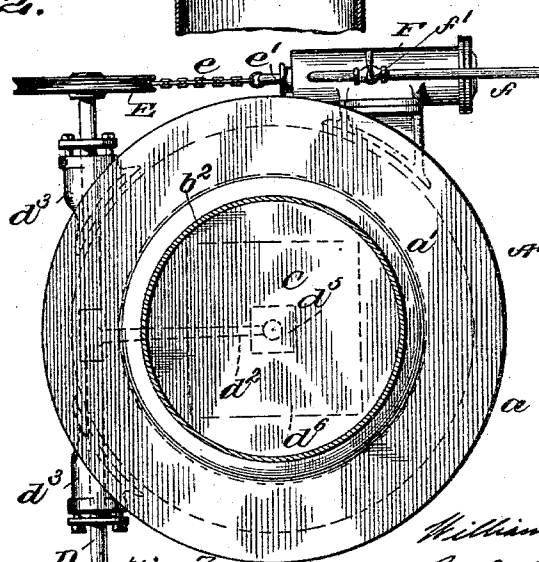


Fig. 3.



Witnesses

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WILLIAM C. BARR, OF JERSEY CITY, NEW JERSEY.

AIR-LOCK FOR CAISSONS.

SPECIFICATION forming part of Letters Patent No. 545,332, dated August 27, 1895.

Application filed May 9, 1895. Serial No. 543,787. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. BARR, of Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Air-Locks for Caissons; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention contemplates certain new and useful improvements in air-locks for caissons, and is specially designed as an improvement upon the air-lock shown and described in Letters Patent No. 514,843, granted to me February 13, 1894, in which I employ upper and lower gates operated by pistons movable in cylinders connected with the air-confining cylinder of a caisson. The upper and lower gates were shown as being composed of two corresponding parts or sections capable of being moved horizontally in opposite directions. While the form of gates above mentioned proved a great advance in the art and were highly satisfactory in practice, yet I have found that the construction of the lower gate can be greatly simplified and the annoyance consequent upon dirt or grit getting between the gate and its seat obviated. These are the principal objects of the present invention, and to accomplish the same I provide a pivotally-mounted gate carried by a rotary shaft. This shaft is preferably rotated to close the gate against its seat by a piston operated by air from the caisson or air-receiver, said connection consisting of a chain united at one end to the piston-rod and at the other end to a wheel or quadrant on said shaft. A single arm made fast to the shaft has a ball-and-socket connection with the under side of the gate, and the latter when seated bears against a rubber ring embedded in a ring of the air-lock.

The invention comprises the novel features of construction and also the detail combination and arrangement of parts, substantially as hereinafter fully set forth, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical sectional view. Fig. 2 is a horizontal

sectional view on the line $x x$, Fig. 1. Fig. 3 is an enlarged sectional detail.

Referring to the drawings, A designates the cylinder of a caisson, (not shown,) having a portion a of slightly-increased diameter, provided with upper and lower corresponding flanges or offsets a' . At the top of cylinder A is the upper gate B, the construction and mode of operation of which are fully set forth in my above-noted patent. The hoisting-bucket is designated b and its cable b' . The space or chamber b^2 between the enlarged portion a and gate B is of sufficient length to accommodate this bucket when located between the two gates.

C is the lower gate. It is preferably circular in form and of a diameter to entirely cover the lower end of chamber b^2 when held against its seat d . This seat consists of a rubber ring, dovetail in cross-section, fitted in a corresponding groove in the under side of an iron ring d' , attached to the upper offset a' . By thus locating the rubber ring dirt or grit cannot adhere thereto, and hence the gate always has a firm seat. The gate C is loosely mounted by a ball-and-socket connection on the free end of an arm d^2 , the other end of which is keyed on a shaft D, which extends through its bearings d^3 on the exterior of cylinder A. The free end of the arm d^2 is preferably rounded to form a ball d^4 , which fits snug in sockets of two corresponding plates d^5 , attached by a strengthening-plate d^6 to the under side of gate C. On one end of shaft D is a wheel E (or it may be a quadrant) and to its grooved periphery is connected one end of a chain e , the other end of which is attached to the outer end of a piston-rod e' , the piston (not shown) of which works in a cylinder F, suitably secured to the exterior of cylinder A. Into the top of this cylinder F, near one end thereof, opens a pipe f , which leads from the caisson or air-receiver (not shown) and is provided with a valve f' . When this valve is opened and pressure is admitted to the air-cylinder F, the piston therein is forced rearward, resulting in the seating of the lower gate through the agency of the chain, the rock-shaft, and the wheel.

In practice, while the bucket is lowered the

upper gate B is kept closed and the lower gate open, as is well known. When, however, the bucket is elevated into the space or chamber b^2 between the gates, pressure is admitted to the air-cylinder F for effecting the closing of the lower gate C, which is held firm to its seat by the pressure in said cylinder, and, subsequently, by the pressure in the caisson-cylinder beneath said gate. At the same time the gate C is seated the confined air in the bucket-inclosing space or chamber is permitted to escape through a suitable outlet-pipe. (Not shown.) This being accomplished, and the lower gate being now held firm by the pressure in the caisson-cylinder against its under side, the upper gate B is opened for the removal of the bucket. When the latter is emptied and replaced in the space or chamber, the upper gate being closed, air is admitted to said chamber through a suitable pipe (not shown) and the air in cylinder F is allowed to exhaust, releasing the strain on chain e , the gate C being lowered by its own weight and drawing the piston-rod outward, the chain being partially wound on the wheel E. In lieu of the air-cylinder for operating the lower gate a lever (G shown in dotted lines) may be attached to shaft D.

The advantages of my invention are apparent to those skilled in the art, and it will be particularly noted that by pivotally mounting the gate on its carrying-arm the same is free to conform to its seat, and thus the caisson is rendered air-tight when said gate is seated. The rubber valve-seat being out of the line of travel of the bucket and facing downward, no dirt can lodge thereon. It will be seen that the parts are exceedingly simple and positive in operation and not liable to readily get out of order.

I claim as my invention—

1. An air-lock for caissons, comprising a

cylinder having a seat therein, a swinging arm, a gate, and a ball-and-socket connection between said arm and said gate, as set forth. 45

2. An air lock for caissons, comprising a cylinder having a seat therein, a swinging arm having its free end rounded, a gate, and socket-plates secured to the latter and inclosing said rounded end of said arm, as set forth. 50

3. An air-lock for caissons, comprising a cylinder having a seat, a rock-shaft, a gate carried by said rock-shaft and a piston connected to said shaft and operating in an air-cylinder, as set forth. 55

4. An air-lock for caissons, comprising a cylinder having a seat, a rock-shaft having an arm, a gate loosely mounted on said arm, a piston operating in an air cylinder, and connections between said piston and said rock-shaft, as set forth. 60

5. An air-lock for caissons, comprising a cylinder having a seat, a rock-shaft having an arm, a gate mounted on said arm, a wheel on said rock-shaft, a piston operating in an air cylinder, and a chain connected at its ends to said piston and said wheel, as set forth. 65

6. The combination with the air-confining cylinder having an offset, of a ring secured thereto and having a groove, rubber in said groove, a shaft having a wheel on one end, an arm secured to said shaft at one end, a gate loosely mounted on the free end of said arm, an air-cylinder having a valved pipe opening therein, a piston movable in said air cylinder, and a chain connecting the rod of said piston to said wheel, substantially as set forth. 75

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

WILLIAM C. BARR.

Witnesses:

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