No. 702,324. Patented June 10, 1902.

W. McILVRID.

AIR LOCK FOR CAISSONS.

(Application filed Apr. 14, 1902.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 2.

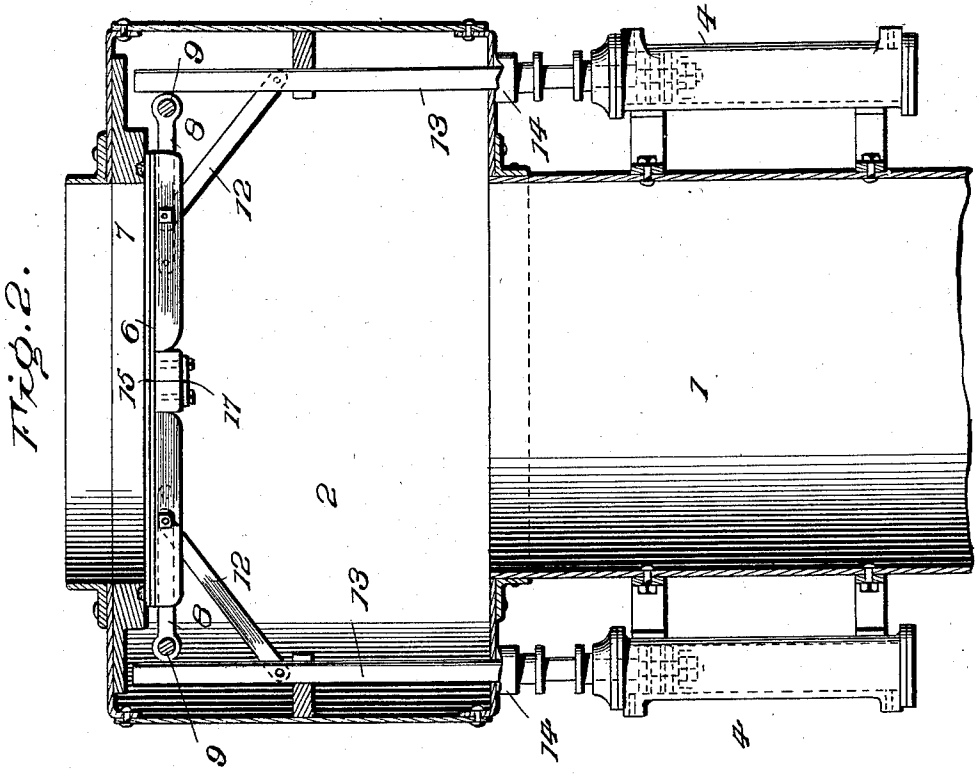
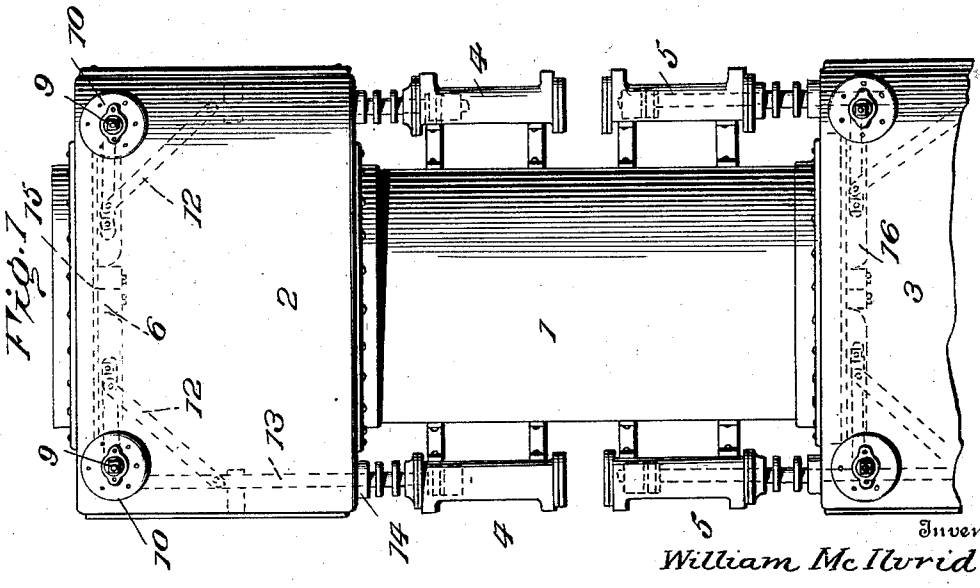


Fig. 1.



Witnesses

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Fig. 3.

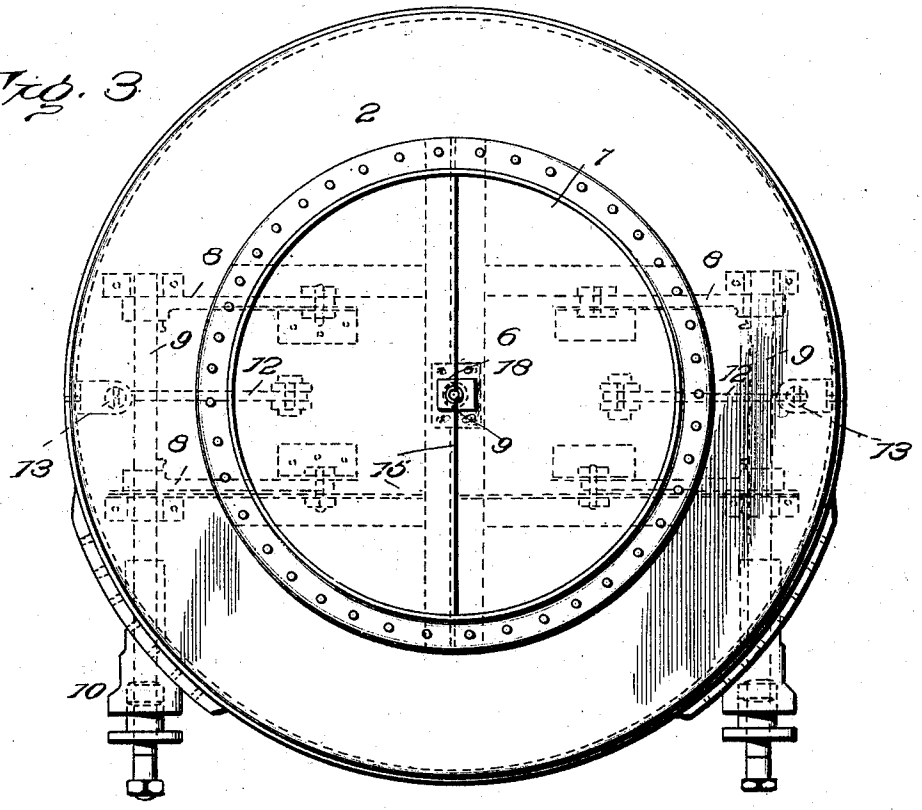


Fig. 4.

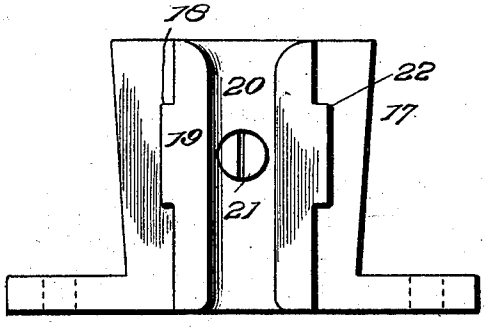
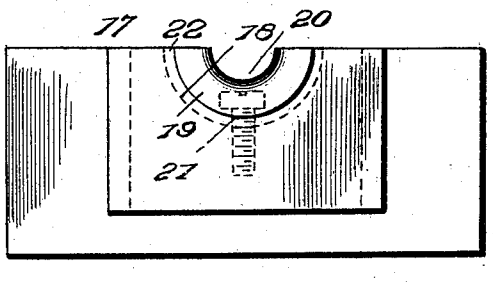


Fig. 5.



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UNITED STATES PATENT OFFICE.

WILLIAM McILVRID, OF JERSEY CITY, NEW JERSEY.

AIR-LOCK FOR CAISSONS.

SPECIFICATION forming part of Letters Patent No. 702,324, dated June 10, 1902.

Application filed April 14, 1902. Serial No. 102,903. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM McILVRID, 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.

The primary object of this invention is to provide improved means for operating the gate-sections, so as to prevent the escape of air.

A further object is to so locate such operating means that it will be out of the way of the bucket, thereby avoiding all chance of being broken or injured by the latter; and a further object is to render unnecessary the employment of several bushings or sleeves for the rope-opening when several ropes of the same size are used, and to provide a rope guide or bushing that may be easily removed and replaced by a new one, either when worn or for accommodating ropes of different sizes.

The invention will be hereinafter fully set forth, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 shows the general outline of the lock portion of a caisson. Fig. 2 is an enlarged vertical sectional view of the upper portion of the lock. Fig. 3 is a plan view. Fig. 4 is an enlarged view of one half or section of the rope-guide. Fig. 5 is a plan view thereof.

Referring to the drawings, 1 designates a reduced connecting portion of the casing between the upper gate-section 2 and the upper end of the caisson-cylinder 3. This reduced portion forms a continuous space between the upper end of the caisson and the gate-section 2, in which space are located two upper piston-cylinders 4 and two lower piston-cylinders 5.

6 designates the upper gate, which is formed in two parts or sections designed to fit up against a seat surrounding the central opening 7. Each of these gate-sections is loosely connected by arms 8 to a shaft 9, one end of which is shown as extended through a stuffing-box 10 to the exterior of the cylinder. To each gate-section is secured the upper end of a link 12, said links at their lower ends being articulated to rods 13 of pistons movable within cylinders 4, such rods being passed out through stuffing-boxes 14 in the overhanging portions of gate-section 2. When these pistons are moved upwardly, they not only force the gate-sections to their seat, but also, by reason of the loose connections with shafts 9, cause the meeting edges 15 to bear tightly against each other. By this means all danger of escape of air between the meeting edges of the gate-sections is avoided.

The lower gate-sections 16 are operated by the pistons movable in cylinders 5. If, however, the lower gate be made in one part, as it may be and usually is, but one cylinder 5 need be employed. Although I have shown no pipe connections for admitting air, steam, or water to the several cylinders, yet it is obvious that a pipe with a four-way valve is all that is requisite for admitting pressure to the cylinders of the upper gate and a like pipe for admitting pressure to the cylinders or cylinder of the lower gate.

To the centers of the meeting edges of the sections of the upper gate are secured depending blocks 17, having each a central opening or cut-out and a recess 18. Within this opening of each block is placed a bushing 19, of hemispherical formation, with a central cut-out 20 and a transverse opening, through which is passed a retaining-screw 21. When the two gate-sections are closed, the flat faces of these bushings come together and the cut-outs 20 form a circular opening for the passage of the bucket rope or cable. On the exterior of each bushing is a peripheral enlargement 22, which fits within the recess 18 of the opening in block 17. The screws 21 serve merely to hold the bushings in place, no strain being thereon, as all such is against the ends of the recesses wherein are located the peripheral enlargements of the bushings. The opening through the bushing is belled at the ends, so as to guide the rope to the center when the gate-sections are in the act of closing, thus avoiding the necessity of the operator guiding the rope with his hand. By means of this improvement any number of bucket-ropes may be used, all being of uniform diameter, without the necessity of having the long old-style sleeve or thimble on each rope. When the new bush-

ing is to be employed, as when a rope of different size is to be used, it is only necessary to remove the retaining-screws and substitute a bushing having an opening of the desired diameter.

The advantages of my invention are apparent. It will be noticed that the sections of the upper gate are forced into position by the air and the upward motion of their actuating-pistons and that the lower gate or gate-sections are drawn into position by the upward motion of their pistons. This is accomplished without the use of counterweights, since the pressure exerted on the pistons holds them in position until the air-pressure is equalized in the upper chamber by the opening of the lower gate or admission-valve (not shown) on the side of the air-lock. It will be observed that the cylinders of these actuating-pistons are out of the way, so that they cannot be injured by the raising and lowering of the bucket, and also that by forming the rope bushing or sleeve in two parts or sections and removably securing the same to the gate-sections not only may several ropes of the same size be employed, but ropes of various diameters may be used and new bushings substituted without having to remove the gate-sections or throw the lock out of use for any length of time. All danger of the waste of air is avoided by the loose mounting of the gate-sections and forcing their edges together when closed.

I claim as my invention—

1. An air-lock for caissons, comprising a casing having exterior lateral extensions, upper and lower gates, and means for actuating said gates located outside of the casing within the vertical planes of said lateral extensions, and connected within the casing of the gates, as set forth.

2. An air-lock for caissons, comprising a casing having exterior lateral extensions, upper and lower gates, piston-rods connected to said gates and extended outward through the casing, and cylinders for the pistons located on the exterior of the casing within the vertical planes of said lateral extensions, as set forth.

3. An air-lock for caissons comprising a casing having a diametrically-reduced portion, upper and lower gates, piston-rods connected to said gates and extended through the casing parallel with the reduced portion thereof, and cylinders for the pistons of said rods located adjacent said diametrically-reduced portion, as and for the purpose stated.

4. An air-lock for caissons, comprising a gate or gates designed to move upwardly against their seats, vertically-movable piston-rods, and links connecting said rods to the gates, as set forth.

5. An air-lock for caissons having a gate formed in sections and with central meeting edges, each section being hinged or hung at its outer side, vertically-movable piston-rods, and links connected to said rods and to said gate-sections, said links being forced into oblique positions when the gate-sections are against their seat, thereby holding the meeting edges of said sections in firm engagement, as set forth.

6. In an air-lock for caissons, a gate having an opening formed with a recess and a bushing for said opening having a peripheral enlargement fitted in said recess, said bushing having an opening therein for the passage of the rope, as set forth.

7. An air-lock for caissons having a gate formed in two sections with opposite openings in their meeting edges, bushings located in said openings having each a hemispherical cut-away portion forming a rope-opening, and a retaining-screw for each bushing, as set forth.

8. An air-lock for caissons having a gate formed in two sections with opposite openings in their meeting edges, a recess being formed in each opening, a bushing formed in two sections, one for each gate-section, having peripheral enlargements fitting in said recesses, and central cut-aways belled at their ends and forming conjunctively a rope-opening, and retaining-screws for said bushing-sections, as set forth.

9. An air-lock for caissons having its gate or door formed in sections, said sections having a rope-opening in their meeting edges, a removable bushing in said opening having itself an opening belled at its ends, said bushing being formed in two parts, and means for securing each part to its respective gate-section, substantially as set forth.

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

WILLIAM McILVRID.

Witnesses:
A. T. SCHMIDT,
CHARLES A. DONOHUE.