

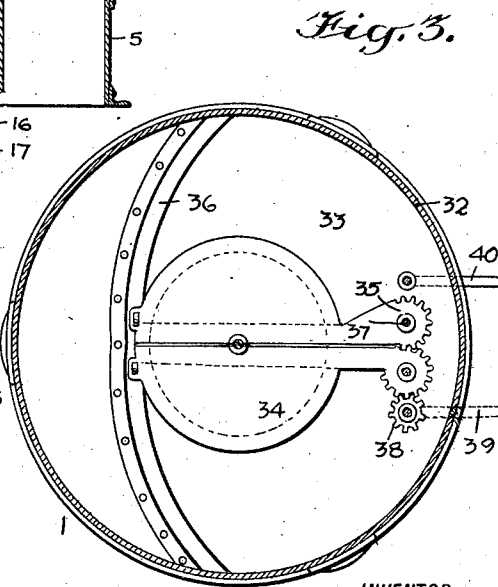
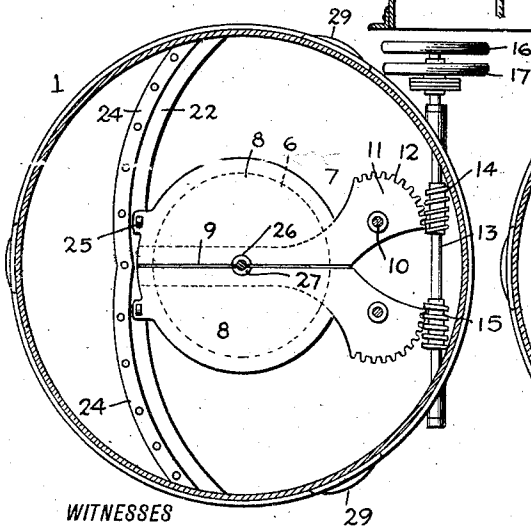
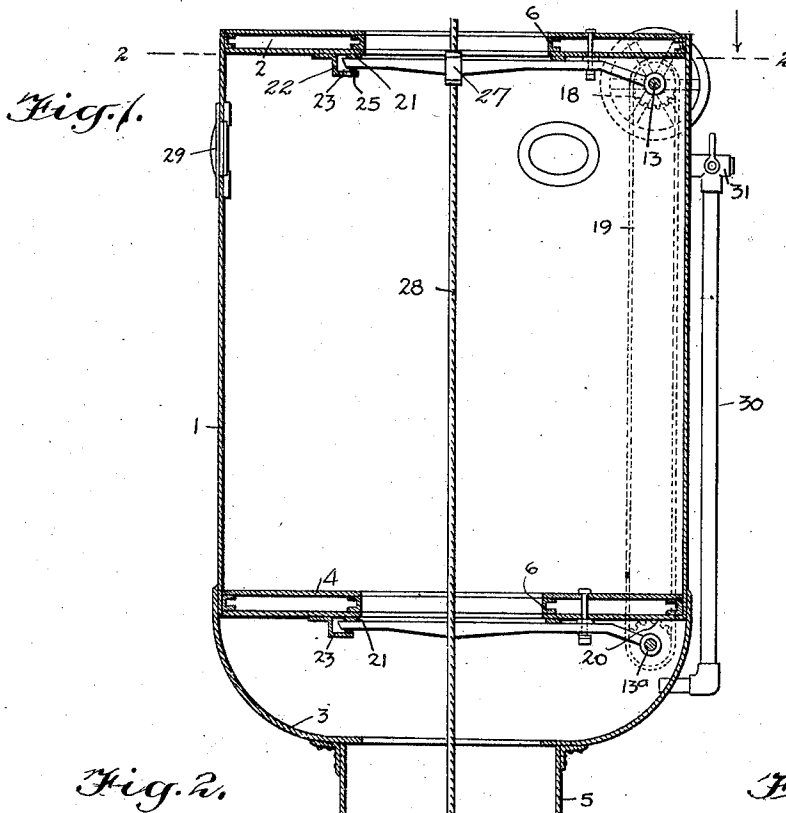
W. H. FLAHERTY.

AIR LOCK.

APPLICATION FILED DEC. 7, 1910.

986,970.

Patented Mar. 14, 1911.



WITNESSES

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AIR-LOCK.

986,970.

Specification of Letters Patent. Patented Mar. 14, 1911.

Application filed December 7, 1910. Serial No. 596,041.

To all whom it may concern:

Be it known that I, WILLIAM H. FLAHERTY, a citizen of the United States, and a resident of the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Air-Lock, of which the following is a full, clear, and exact description.

This invention relates to air locks such as used in construction work employing caissons into which air is forced under pressure and which may also be used in connection with wrecking vessel and located on the deck of the same.

The object of the invention is to produce an air lock the doors of which can be operated conveniently from the exterior of the lock, the construction being such as will enable a great force to be applied to the doors in opening or shutting the same, giving more room and preventing accidents which usually occur with the swinging type of door.

The invention consists in the construction and combination of parts to be more fully described hereinafter and particularly set forth in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a vertical central section through an air lock constructed according to my invention; Fig. 2 is a horizontal section on the line 2—2 of Fig. 1; and Fig. 3 is a sectional view similar to Fig. 2, but showing a modified construction.

Referring more particularly to the parts, 1 represents the shell or case of the air lock, the upper end of which is provided with an upper head 2 having a double wall as shown. The lower end of the lock is formed with a dished bottom 3, and above this bottom a lower head 4 is provided similar to the head 2. Below the bottom 3 a neck 5 is provided, by means of which the air lock is attached to the upper end of the shaft of the caisson. The heads 2 and 4 are provided with manholes 6 disposed centrally therein as shown. In the preferred form of the invention, these manholes 6 are closed by doors 7 formed in sections 8. These door sections 8 or doors are of substantially semi-circular form as shown, meeting on a diametrically disposed line 9. At one side they

are mounted upon pivot bolts 10, and beyond these bolts they are formed into extensions in the form of segments 11, said segments having teeth 12 which are circumferentially disposed about the bolts 10 as centers.

Passing through the air lock just below the heads 2 and 4, I provide worm shafts 13 and 13^a which have worms 14 and 15 which are respectively of right- and left-hand pitch, as shown. The shaft 13 which is disposed beneath the upper head, projects from the shell or case 1, and carries a rigid hand wheel 16 by means of which the worm shaft may be rotated. A similar hand wheel 17 is provided, but this hand wheel is loosely mounted on the shaft 13, and is provided with a rigid sprocket wheel 18. Over this sprocket wheel a sprocket chain 19 passes, the lower end of this chain passing around a sprocket wheel 20 which is rigidly attached to the shaft 13^a. The doors 8 are closely held against the under sides of the heads as illustrated, packing rings 21 of rubber or similar material being placed between the doors and the under faces of the heads as indicated. On its under side, each head is provided with guide irons 22 which are in the form of Z-bars riveted to the under sides of the heads, and having flanges 23 which project toward the pivot bolts 10. These guide irons or guide bars are disposed in two arcs or bows 24 struck from the axes of the bolts 10 as centers. Each of the doors 8 is provided at its outer edge with a roller 25, and these rollers run on the upper sides of the flanges 23, as illustrated most clearly in Fig. 1. The doors 8 at the upper end of the lock, on their meeting edges 9, are formed with enlarged semicircular notches or recesses 26 which form a circular opening when the doors come together, as will be readily understood, and in this opening I provide a stuffing-box 27 which will permit a suspending cable 28 to pass downwardly through the air lock into the interior of the caisson. This stuffing-box is not provided at the lower head, as it is unnecessary, the doors at this point being constructed so as to form an opening of reduced diameter for the cable. The stuffing-box is unnecessary at the lower head, as the doors at this point are open when the cable is in motion.

At suitable points, the shell or casing 1 is provided with windows 29 which admit light to the interior of the lock. The chamber which is formed below the lower head

4 and above the dished bottom 3, is connected by means of a suitable pipe 30 with the interior of the shell between the heads 2 and 4. Near the point of connection, a two-way valve 31 is provided, which enables air under pressure to be admitted from the caisson into the interior of the lock, and which also enables air under pressure within the lock to be allowed to escape into the atmosphere. It should be understood that by rotating the hand wheel 16 the doors 8 of the upper head may be opened or closed simultaneously. By reason of the worms and segments, a great leverage results which tends to prevent the doors from becoming stuck or jammed in any position. By rotating the hand wheel 17, the doors of the lower head may be operated.

In the form of the invention illustrated in Fig. 3, 32 represents the cylindrical shell having an upper head 33 closed by doors 34. These doors are of substantially semi-circular form like the doors 8, but are constructed with extensions having the form of segments 35 which mesh with each other, the doors being brought together on a diametrical line as shown. The outer edges of the doors are guided, as in the first form, upon guide irons or guide bars 36. The doors are adapted to swing outwardly upon their pivot bolts 37, the moving force being imparted to the doors through the medium of a pinion 38 which is operated from a point above the upper head by means of a suitable lever 39. The doors of the lower head are similarly operated by a lever 40 disposed at the lower end of the lock. Except for the manner of constructing the doors around their pivot bolts, and the means for operat-

ing the doors, the construction in this form is substantially the same as that described in connection with the form first set forth.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. An air lock having a flat head with an opening therethrough, a pair of doors having edges meeting on the diameter of said opening, said doors having pivots disposed at right angles to the plane of said head, means for simultaneously opening and closing the said doors, and means for guiding the outer ends of said doors on the under side of said head.

2. An air lock comprising a shell and having doors having meeting edges, said doors having segments formed thereupon and pivot bolts about which they rotate, and a worm shaft extending through said shell, and having worms of opposite pitch engaging said segments to open and close said doors.

3. An air lock comprising a shell, a head, doors pivotally mounted on said head and having meeting edges, said doors having segments formed therewith and pivots about which said doors may swing, a worm shaft having worms meshing with said segments for opening and closing said doors, and means for guiding the outer ends of said doors on said head.

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

WILLIAM H. FLAHERTY.

Witnesses:

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PHILIP D. ROLLHAUS.