

No. 641,505.

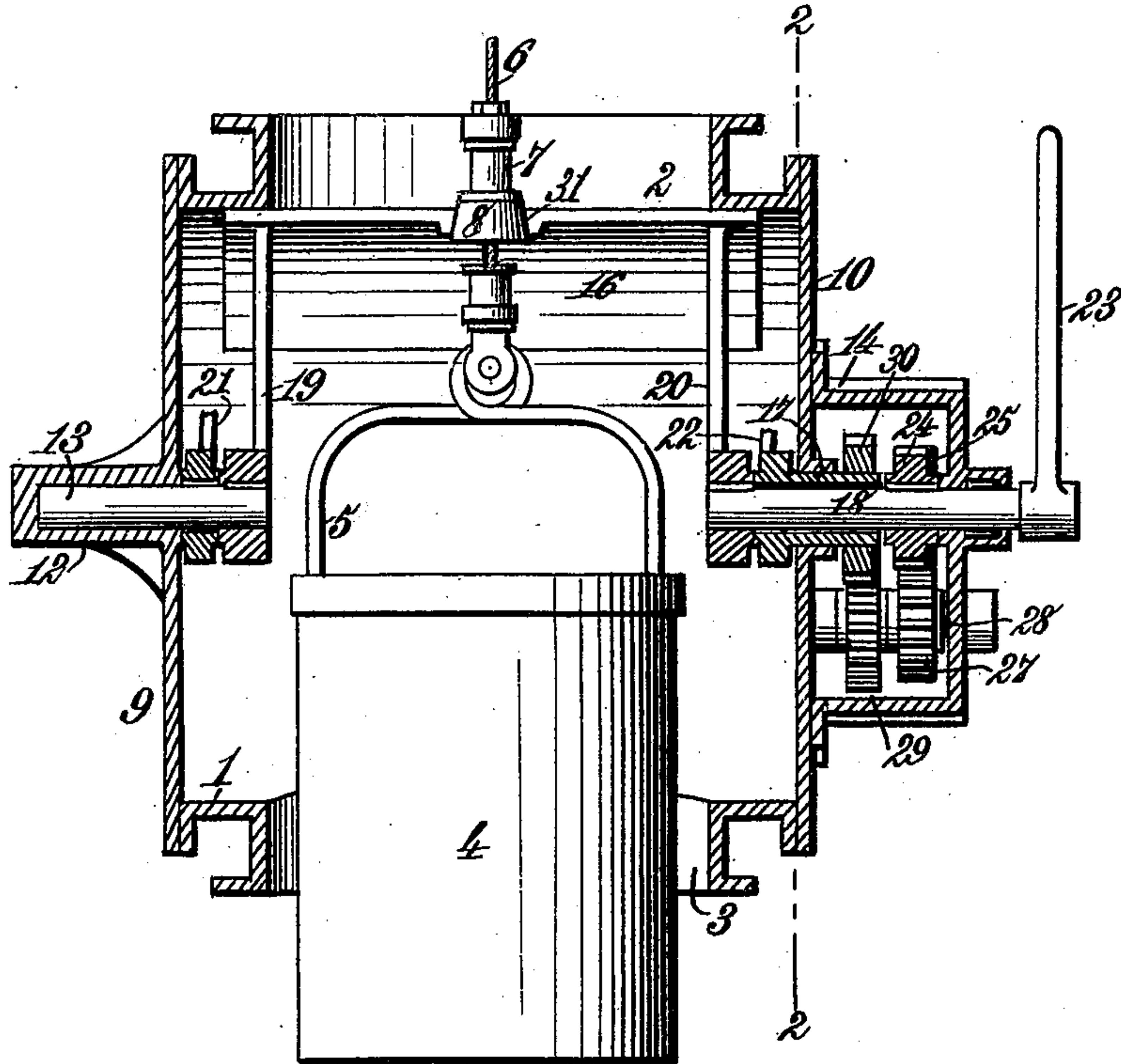
Patented Jan. 16, 1900.

R. S. GILLESPIE.  
AIR LOCK FOR CAISSONS, &c.

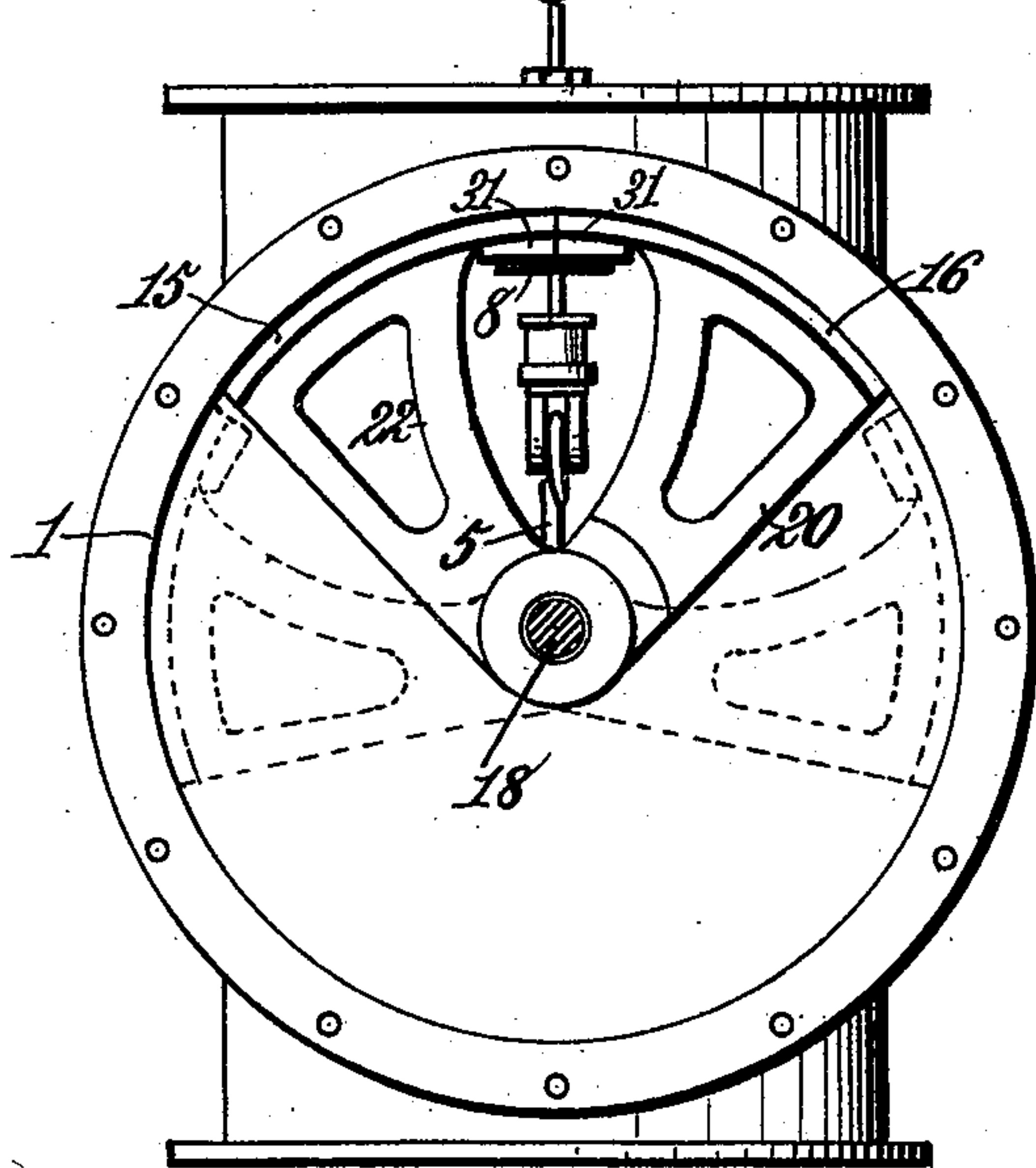
(Application filed July 29, 1896.)

(No Model.)

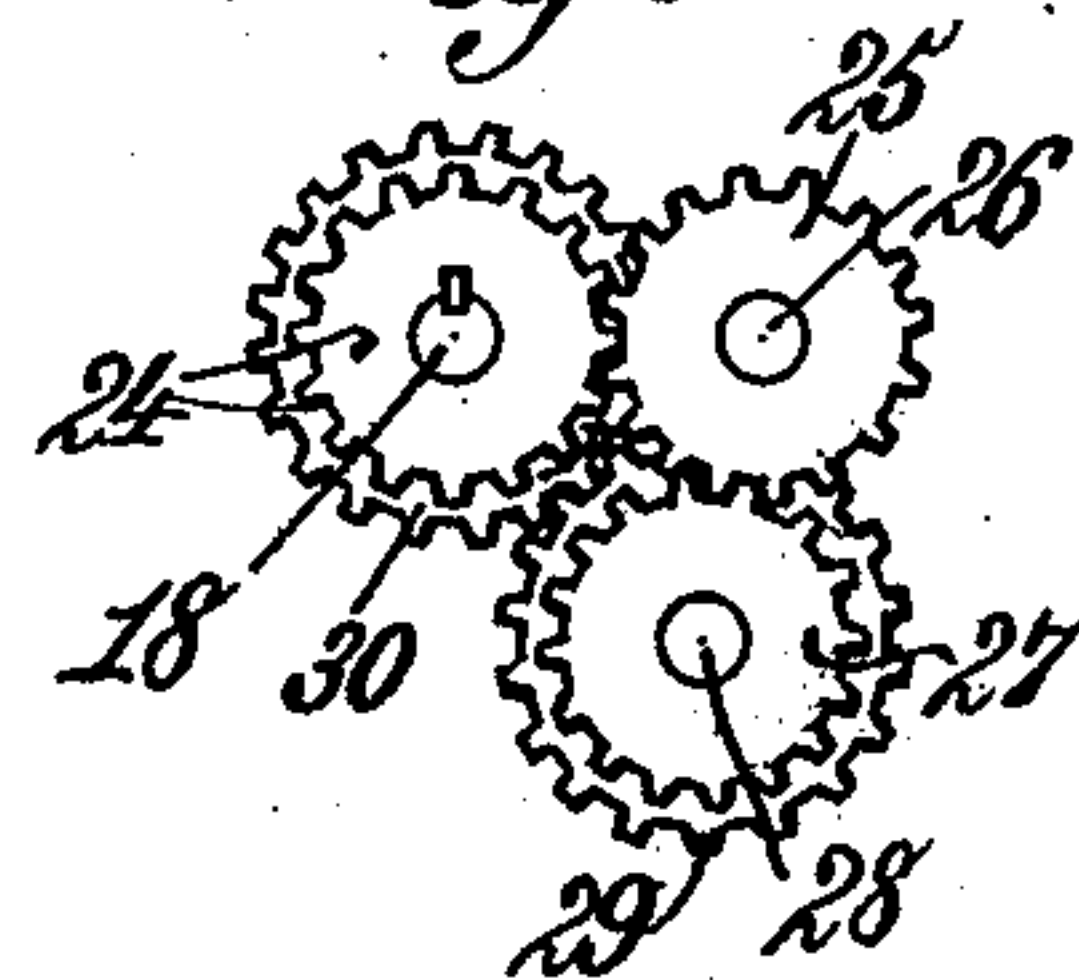
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



Witnesses:  
*Robert G. Pratt,*  
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*Att'y.*



# UNITED STATES PATENT OFFICE.

RICHARD S. GILLESPIE, OF NEW YORK, N. Y.

## AIR-LOCK FOR CAISSONS, &c.

SPECIFICATION forming part of Letters Patent No. 641,505, dated January 16, 1900.

Application filed July 29, 1896. Serial No. 600,942. (No model.)

*To all whom it may concern:*

Be it known that I, RICHARD S. GILLESPIE, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented new and useful Improvements in Air-Locks for Caissons, &c., of which the following is a specification.

This invention relates to air-locks employed in connection with caissons designed for building subaqueous and other foundations and apparatus for constructing tunnels.

The object of my present invention is to provide a novel, simple, efficient, and economical closing-door for air-locks, a novel arrangement thereof, and means for operating the same.

To accomplish this object, my invention consists, essentially, in the combination of an air-lock casing having a bucket-passage there-through, two oscillatory doors journaled in the casing and movable on a common axis to and from each other to close and open said bucket-passage, and mechanism for simultaneously oscillating said doors on their axes. The invention is illustrated by the accompanying drawings, in which—

Figure 1 is a vertical central sectional view of an air-lock embodying my invention. Fig. 2 is a sectional side elevation on the line 2 2, Fig. 1; and Fig. 3 is a detail side view of the gearing for operating the doors of the air-lock.

In order to enable those skilled in the art to make and use my invention, I will now describe the same in detail, referring to the drawings, which illustrate the upper portion of an air-lock caisson, and wherein—

The numeral 1 indicates the casing, which, as herein shown, is in the form of a horizontally-arranged cylinder provided at the top and bottom with passages 2 and 3, diametrically opposite each other, for the purpose of forming a bucket-passage vertically through the cylinder, whereby the usual bucket 4 can be passed through the cylinder into and out of the caisson or tunneling apparatus to which the air-lock is applied. The bucket 4 may be provided with a bail 5, with which the bucket-hoisting cable 6 is connected. This cable may be in the form of an ordinary wire rope, and it is movable through a stuffing-box 7 of any

suitable construction, but which is preferably constructed with an inclined or tapering lower end portion 8.

The horizontally-arranged cylindrical casing 1 is closed at its ends through the medium of suitable heads 9 and 10. The head 9 is provided with a bearing 12, in which is arranged an axle or shaft 13. The head 10 is provided with a laterally-extending housing 14, in which is placed the gearing which serves to operate the two air-lock doors 15 and 16. The housing, in connection with a sleeve 17, arranged in the center of the head 10, constitutes a bearing for a shaft 18, which is arranged in alinement with the shaft 13.

The doors 15 and 16 are each segmental-shaped, and their outward surfaces are struck from the centers of the shafts 13 and 18, so that they will accurately fit the internal surface of the cylindrical casing 1 and so hung as to follow the walls of the casing and form when closed a practical continuation of said walls across the opening. The door 16 is provided with arms 19 and 20, which are mounted, respectively, upon the axle and shafts 13 and 18. The door 15 is provided with similar arms 21 and 22, which overlap the arms 19 and 20, and one of which, as at 21, is mounted upon the shaft 13, while the other one of which, as at 22, is mounted on the opposite shaft 18, through the medium of the sleeve 17, said arm being secured to or forming a part of the sleeve 17. The arms 19 and 20, forming one pair, overlap each other, as do the arms 21 and 22, constituting the other pair, whereby it is possible to hang both doors on the same center, on which they are independently journaled. I prefer to rigidly secure the arms 19 and 20 to the axles or shafts 13 and 18 and to loosely mount the arm 21 on the axle or shaft 13, while the arm 22 is rigidly secured to the sleeve 17, as before stated. The shaft 18 is provided with a suitable device by which it may be turned in its bearings. As shown in the drawings, this device is composed of a simple hand-lever 23; but I do not wish to be understood as confining myself to any particular device for turning the shaft 18. This shaft is provided with a rigidly-attached gear-wheel 24, meshing into



a gear-wheel 25, which is secured to a short shaft 26, Fig. 3, journaled in the housing 14. The gear-wheel 25 meshes into a gear-wheel 27, secured to a short shaft 28, journaled in the housing 14. The short shaft 28 is also provided with and attached to a gear-wheel 29, meshing into a gear-wheel 30, which is secured to the sleeve 17, the construction being such that by swinging the hand-lever 23 in one direction the shaft 18 and the sleeve 17 will be turned in opposite directions, whereby the two doors 15 and 16 are caused to simultaneously swing either toward or from each other, according to the direction in which the hand-lever 23 is swung. The two edges of the doors 15 and 16, which face each other, are constructed to accurately fit together, and at their center they are provided with semicircular recesses, as at 31, adapted to fit the inclined or tapering portion 8 of the stuffing-box when the two doors are closed together. The tapering construction of the stuffing-box is such that the internal pressure in the air-lock will cause the stuffing-box to fit its seat in the edges of the two doors in such manner as to secure an airtight closure of the air-lock.

I have illustrated a single stuffing-box and a single bucket-hoisting cable; but obviously it is possible to employ two stuffing-boxes and two cables, which latter may be connected with the bucket in any suitable manner.

If two cables and two stuffing-boxes are used, it is only necessary to provide the meeting edges of the two doors 15 and 16 with suitable recesses, similar to the recesses 31, to receive the two stuffing-boxes.

The gearing illustrated in the drawings is only typical of many different mechanisms that may be employed to simultaneously swing the two arch-shaped or segmental doors 15 and 16 toward and from each other for closing and opening the air-lock, and therefore I do not wish to be understood as confining myself to the particular gearing illustrated and described.

Having thus described my invention, what I claim is—

1. The combination with the casing and the opposite alined shafts therein, of means for turning the doors to close the opening in the casing, and the overlapping arms provided at opposite sides of the doors, one arm of each door being mounted on one shaft and the opposite arm mounted on the opposite shaft, substantially as described.

2. The combination with an air-lock casing having a bucket-passage therethrough, two oscillatory doors adapted to be moved toward and from each other to close and open the air-lock, shafts, arms at opposite sides of the doors, the arms of one door overlapping those of the other door, and journaled on the same

center, and means for opening and closing the said doors, substantially as described.

3. The combination with an air-lock casing having a bucket-passage therethrough, of two oscillatory doors arranged in said casing and having a common center about which they oscillate, and mechanism connected with both of said doors, whereby they are caused to move in unison to their open and closed positions, substantially as described.

4. The combination with an air-lock casing, having a bucket-passage therethrough, of two oscillatory segmental doors journaled in said casing and movable in circular paths toward and from each other to close and open the air-lock, and gearing, substantially such as described, for oscillating the doors, substantially as described.

5. The combination with an air-lock casing having a bucket-passage therethrough, of two alined axles or shafts arranged in the casing, two oscillatory doors supported by said shafts and movable in circular paths toward and from each other, to close and open the air-lock, and a lever and gearing substantially such as described, for oscillating the doors, substantially as described.

6. The combination with an air-lock casing having a curved internal surface, and a bucket-passage, of two oscillatory doors provided with curved surfaces fitting the curved surfaces of the casing and both having a common center about which they oscillate, a lever, and gearing connecting the lever with both of said doors, whereby they are caused to move in unison to their open and closed positions, substantially as described.

7. An air-lock for caissons, comprising a casing having a rounding end portion with an opening therein for the passage of a bucket, and gates to close said opening, the gates being pivoted at the ends and shaped and hung so as to follow the walls of the casing and form when closed a practical continuation of said walls across the opening, substantially as described.

8. An air-lock for caissons, comprising a casing having a rounding end portion with an opening therein for the passage of a bucket, and gates to close said opening, the gates being pivoted at the ends and shaped and hung so as to follow the walls of the casing and form when closed a practical continuation of said walls across the opening, said gates being geared together so as to open and close in unison, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

RICHARD S. GILLESPIE.

Witnesses:

ALBERT H. NORRIS,  
THOS. A. GREEN.