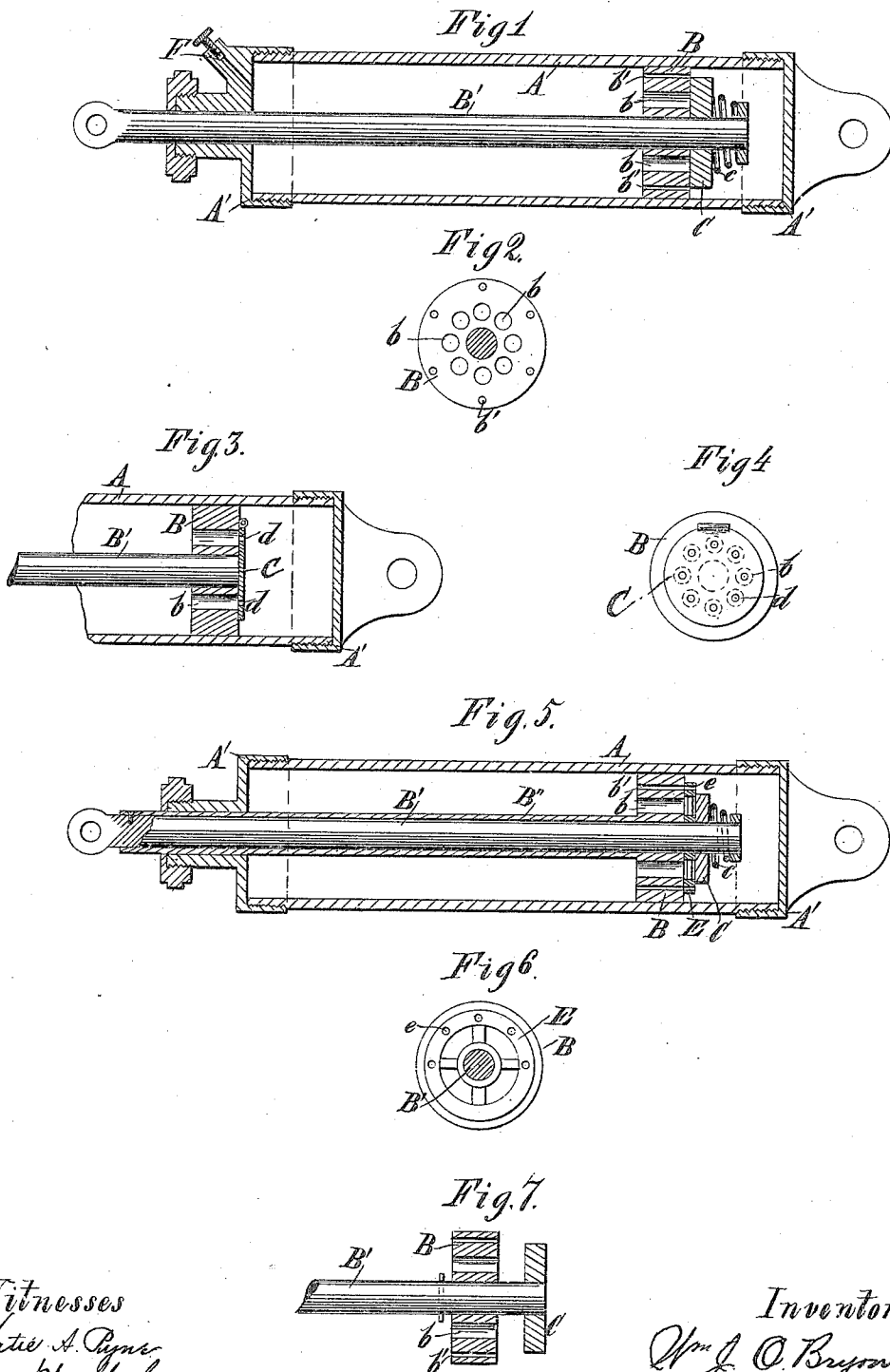


(No Model.)

W. J. O. BRYON, Jr.
WATER OR AIR CYLINDER.

No. 446,426.

Patented Feb. 17, 1891.



Witnesses
Hattie A. Ryan
Joseph M. Crane

Inventor
Wm J. O. Bryon Jr.
By his atty
Chas. F. Dane

UNITED STATES PATENT OFFICE.

WILLIAM J. O. BRYON, JR., OF NEW YORK, N. Y.

WATER OR AIR CYLINDER.

SPECIFICATION forming part of Letters Patent No. 446,426, dated February 17, 1891.

Application filed July 27, 1889. Serial No. 318,966. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. O. BRYON, Jr., a citizen of the United States, and a resident of the city, county, and State of New York, have invented new and useful Improvements in Water or Air Cylinders, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to water or air cylinders more especially adapted in the present instance for use in connection with exercising-machines to form the resisting power in the same, although they may be equally applicable for other purposes, as will hereinafter appear obvious to those skilled in the art; and it consists, first, in the construction and arrangement of the piston-head and valve, whereby the resisting power in the cylinder, whether air or water, is exhausted or forced from the forward into the rear end of the cylinder through suitable connecting channels or passages, as will hereinafter be set forth, and, secondly, in the adjusting means for varying the pressure upon the piston.

The object of my invention is to provide a water or air cylinder of few parts and of simple construction to form an adjustable resisting power more especially adapted to be used in connection with rowing or other exercising apparatus, in combination with suitable operating mechanism.

Referring to the drawings, in which I have represented my invention embodied in several different forms, Figure 1 represents a sectional view through the center longitudinally of the cylinder, piston, and valve; Fig. 2, an end view of the piston; and Figs. 3, 4, 5, 6, and 7, different views in detail of modifications of my invention, to be referred to and described hereinafter.

Referring to Figs. 1 and 2, A represents the cylinder; A' A', the cylinder-heads; B', the piston-rod, and B the piston, which in this instance is provided with two series of openings or passages (represented at *b* and *b'*) connecting opposite ends of the cylinder-chamber, as clearly shown. Said series of openings *b* and *b'* are arranged in circles, or nearly so, one within the other, as more clearly shown in Fig. 2. The openings of the inner series *b* are of larger diameter than the outer series, be-

ing adapted for the free passage of the water or air through the same at the back-stroke of the piston B, at which time the valve, (represented at C,) free to slide on the piston-rod, is held away from contact with the face of said piston B over the said inner series of openings by the action of the water or air against the same, and at the forward stroke of the piston the said inner series of openings are closed by the valve, which is held against the same by means of its spring *c*, and the water or air is forced into the rear of the cylinder-chamber through the outer series of smaller openings or passages *b'*, which are located beyond the outer periphery of the valve C, as clearly shown in Fig. 1, thus obviating the use of outer connecting-pipes as heretofore used. The pressure upon the piston at the forward stroke of the same, or the force required to move the same forward, is regulated by the size or number of the passages in said outer series *b'*, as will appear obvious to those skilled in the art, and a greater or less number of said openings may be closed by screws or other suitable means, according to the pressure desired. I sometimes, however, employ an adjusting device, whereby the resistance offered to the piston may be regulated from the exterior of the cylinder, which device I have represented in Figs. 5 and 6. In this case I have secured the piston B on the end of a cylindrical tube B'', adapted to fit on and be adjustably secured to the piston-rod, as clearly shown in said Fig. 5, in a manner to allow the piston-rod to be turned within said tube B'' when desired, in order to change the position of an adjusting device E, located thereon, in its relation to the piston or the openings therein, for the purpose to be hereinafter explained. Said adjusting device consists of a circular plate adapted to be secured in a fixed position on the piston-rod at a point between the valve and piston, and is partially cut away, as more clearly shown in Fig. 6, in a manner to leave the inner series of openings *b* in the piston unobstructed within one-half of the outer rim thus formed in the device E. I provide openings *e* therein, located directly opposite the openings *b'* in the piston, which piston in this instance is provided with an outer series of openings within one-half of

its circumference only in such manner that when the adjusting device E is turned through the medium of the piston-rod the number of openings b' in the piston through which the water or air may pass at the forward stroke of the piston (the valve C closing the inner series) are reduced according to the position of said adjusting device, and when the same has been turned half-way around all the openings b' in the piston are shut, thus closing communication between opposite sides of the cylinder-chamber, as will be readily understood by those skilled in the art. In this case the valve C operates in its relation to the inner series of openings b in the piston at the backward and forward strokes of the same, as hereinbefore described in relation to Figs. 1 and 2. When in operation, the piston-rod B' and the cylindrical tube B'' thereon are held in a fixed position in relation to each other by a screw or other suitable means.

Referring to Figs. 3 and 4, I have shown a modification in the arrangement of the two series of openings in their relation to each other and in the construction of the valve and piston. In this instance I have located the piston on the end of the piston-rod and have provided the same with a hinged valve (represented at C) in lieu of a sliding valve, as hereinbefore described, which valve I have provided with a series of small openings d , corresponding in function and operation to the outer series of openings b' in the piston, as hereinbefore described, which openings d are located in the valve directly opposite the openings b in the piston, the operation of which thus constructed is as follows: At the backward stroke of the piston the water or air in the cylinder forces the valve open, thus allowing the same to pass freely through to the opposite side of the cylinder-chamber, and at the forward stroke of the piston the valve is closed and the water or air is forced through the double series of openings, and the resist-

ing power is greater or less, according to the number of openings d in the valve.

Referring to Fig. 7, I have shown the valve as being secured in a fixed position on the piston-rod and the piston loose thereon, which arrangement of parts might be applied when desired, in lieu of the arrangement as hereinbefore explained, and it is also obvious that the position of the valve on the piston-rod in its relation to the piston may be reversed—that is, be placed at the opposite side of the piston from that shown in the drawings—according to the use for which it may be adapted.

When water or other fluid is used in the cylinder as the resisting force for the piston, the said cylinder may be filled through an opening or passage located in one or both of the cylinder-heads, as shown at F, or at any other suitable point, which opening or passage may be closed by a screw or other suitable means.

Having thus set forth my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A cylinder provided with a piston having two series of openings therein arranged parallel, or nearly so, with the line of the piston-rod, one set of which is adapted to be closed, substantially as described, by a covering or valve, and the other series left uncovered, substantially as and for the purpose set forth.

2. A cylinder provided with a piston having two series of openings therein arranged parallel, or nearly so, with the line of the piston-rod, a valve, and an adjusting device whereby the force to be overcome by the piston is regulated, substantially as described, and for the purpose set forth.

WILLIAM J. O. BRYON, JR.

Witnesses:

CHAS. F. DANE,
KATIE A. PYNE.