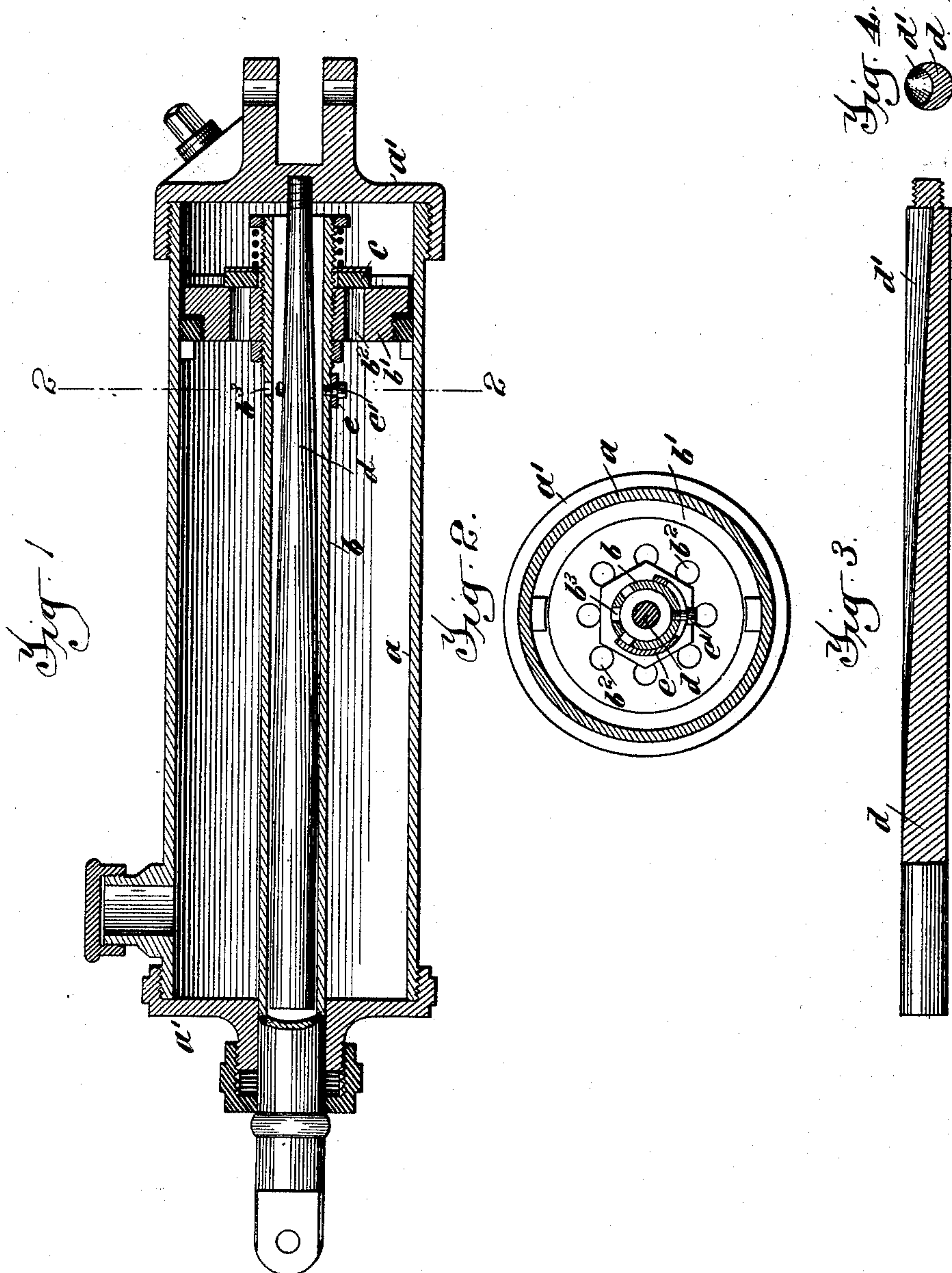


(No Model.)

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

No. 483,829.

Patented Oct. 4, 1892.



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UNITED STATES PATENT OFFICE.

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

AIR-CYLINDER.

SPECIFICATION forming part of Letters Patent No. 483,829, dated October 4, 1892.

Application filed December 5, 1891. Serial No. 414,087. (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 Fluid or Air Cylinders, of which the following description, taken in connection with the drawings herewith accompanying is a specification.

My invention relates to cylinders which in the present instance are particularly adapted for use in connection with exercising-machines to serve as the resisting power in the same; and my present invention consists of an improvement or modification of the means for giving a uniformly-varying degree of pressure to the piston from a maximum degree at one end of its stroke to a minimum degree toward its opposite end, as embodied in an application of mine now pending, bearing Serial No. 405,388 and filed September 11, 1891.

The stroke-regulating device as embodied in my above-mentioned application is located within the cylinder at a point between the piston-rod and the inner wall of said cylinder and extends through an opening in the piston. This location of the stroke-regulating device or rod in the space between the piston and the wall of the cylinder may be objectionable in some cases, and especially so in cylinders of small diameter, where it is desirable to have such space unobstructed and secure the full capacity of the cylinder. In order to secure such unobstructed space between the piston and wall of the cylinder and at the same time provide means for regulating the stroke of the piston in a manner as before referred to and at a reduced cost has been the object of my present invention, which object I attain by the means as will hereinafter be described in detail, and pointed out in the claims.

Referring to the drawings, Figure 1 represents a longitudinal sectional view through the center of a cylinder embodying my invention, showing the piston at the end of its forward stroke. Fig. 2 represents a cross-section of the same through line 2 2 of Fig. 1. Figs. 3 and 4 represent a longitudinal section through the center and a cross-section,

respectively, of the regulating rod or device in a modified form.

To explain in detail, *a* represents the cylinder; *a' a'*, the cylinder-heads, *b*, the piston-rod; *b'*, the piston, and *c* the valve. The piston *b'* is provided with the usual openings *b²*, which are adapted to be closed by the valve when moved in one direction and opened to allow the fluid or air to pass through the same when moved in the opposite direction in a manner as well understood by those skilled in the art.

According to my present invention the piston-rod *b* is made hollow, with an open inner end, and a regulating device consisting of a rod *d* is inserted therein and held stationary in its relation to the cylinder by being secured at one end to one of the cylinder-heads. As shown in Fig. 1, this rod *d* at its free end and for part way of its length is of sufficient diameter to fill or close the opening in the piston-rod and for the rest of its length gradually tapers toward its opposite end, forming an opening or passage between its surface and the inner wall of the piston-rod of gradually-increasing dimensions from its beginning to its opposite end. The openings *b²* are adapted to be closed when the piston is at the forward end of the cylinder and at the beginning of its stroke by the enlarged end of the rod *d* being in close or actual contact with the inner wall of the piston-rod adjacent to said openings *b²*, thus cutting off communication between the opposite ends of the cylinder-chamber and making a maximum degree of pressure to the piston. This pressure continues until the piston has been moved a sufficient distance to bring the openings *b²* to a point where the rod *d* begins to taper or decrease in size and form a slight outlet or passage for the fluid to pass from the advancing side of the piston to the retreating side, thus serving to relieve the pressure to the piston, which pressure is gradually relieved as the piston moves toward the end of its stroke by reason of the gradually-increasing size of the opening or passage between the rod *d* and the inner wall of the piston-rod, until a minimum degree of pressure is reached at the end of the stroke, as will be readily understood by those skilled in the art.

I do not wish to be understood as confining myself to the particular form of the rod d as shown in Fig. 1 to produce the desired result, as described, as it is obvious that the same may be formed in various ways without departing from the spirit of my invention. For instance, referring to Figs. 3 and 4, I have shown the rod d in a modified form. In this instance the rod is of the same size or diameter its entire length and may be provided with one or more grooves, as shown at d' , which gradually increases in size from a point at the forward end of the rod toward its rear end in such manner as to allow of an increased flow from one portion of the cylinder-chamber to the other as the piston moves toward the end of its stroke, as will appear obvious.

The uniform degree of pressure to the piston for its entire stroke, as distinctive from the varying degree of pressure, as described, may be regulated by increasing or diminishing the number of the openings b^3 or in case of one opening by adjusting the size of the same in order to regulate the flow of fluid or air through it by means of an adjustable plate or device e , which may be moved or adjusted by means of an adjusting-screw e' in its relation to the said openings b^3 to regulate the number or size of the same, as will be readily understood.

Having thus set forth my invention, I do not wish to be understood as confining myself to the particular construction or arrangement of the parts as described, as it is obvious that various changes might be made without departing from the spirit of my invention; but

What I do claim, and desire to secure by Letters Patent of the United States, is—

1. A cylinder provided with a piston, a valve, a hollow piston-rod having openings communicating with the cylinder-chamber at opposite sides of the piston, and a rod extending into said hollow piston-rod, constructed in a manner to allow for a uniformly increasing or decreasing flow of fluid or air from one end of the cylinder-chamber to the other through the opening in the piston-rod as the piston moves from one end of its stroke to the other, substantially as and for the purpose set forth.

2. A cylinder provided with a piston, a hollow piston-rod having openings or outlets communicating with opposite sides of the cylinder-chamber, and a device for adjusting the size of one of said outlets to regulate the pressure to the piston, substantially as and for the purpose set forth.

3. A cylinder provided with a piston, a hollow piston-rod provided with openings or outlets communicating with the cylinder-chamber at opposite sides of the piston, a rod or device extending within said hollow piston to form a variable passage between said openings, and a device for regulating the size or capacity of one of said outlets in the piston-rod, substantially as and for the purpose set forth.

WILLIAM J. O. BRYON, JR.

Witnesses:

CHAS. F. DANE,
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