

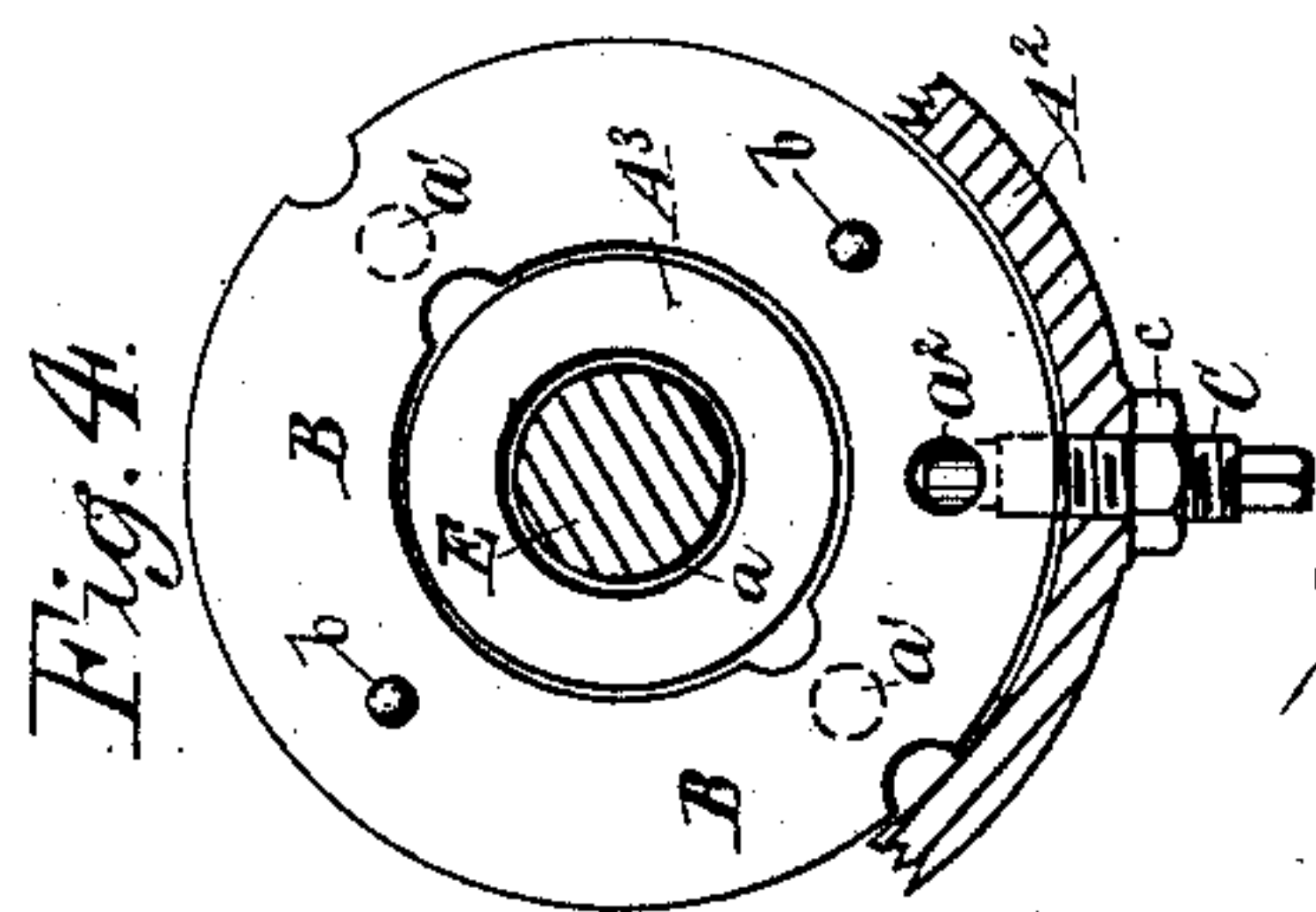
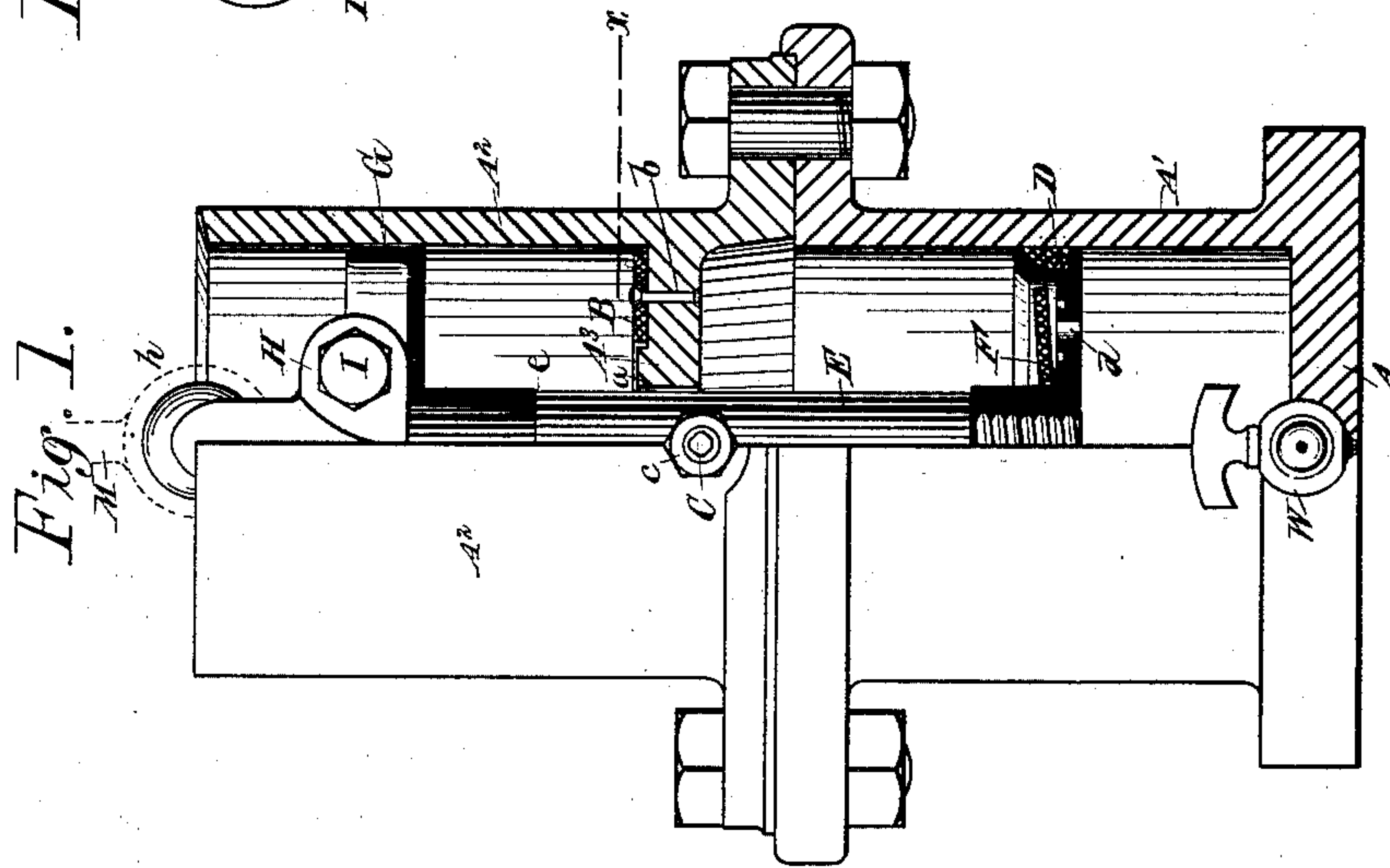
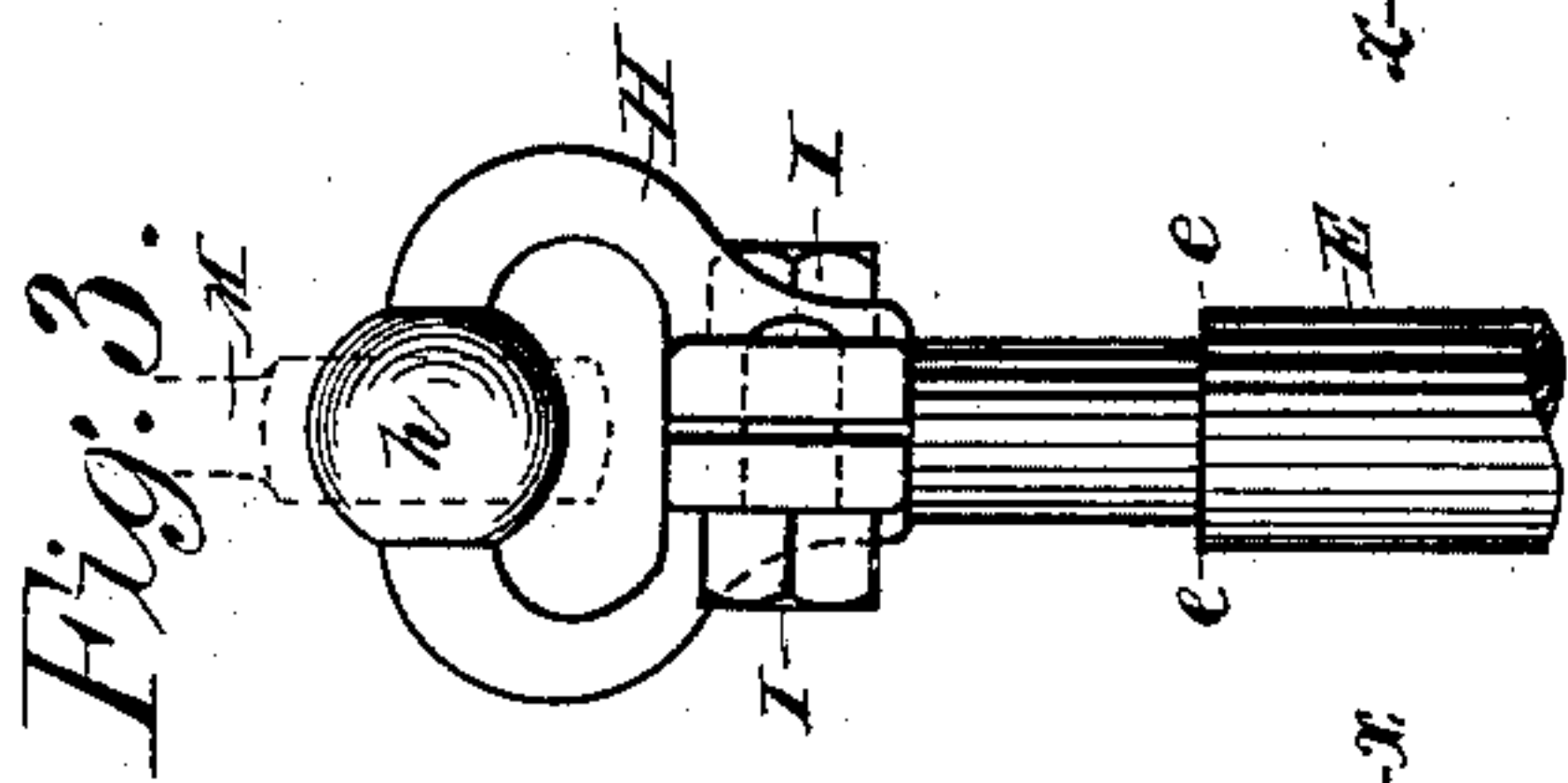
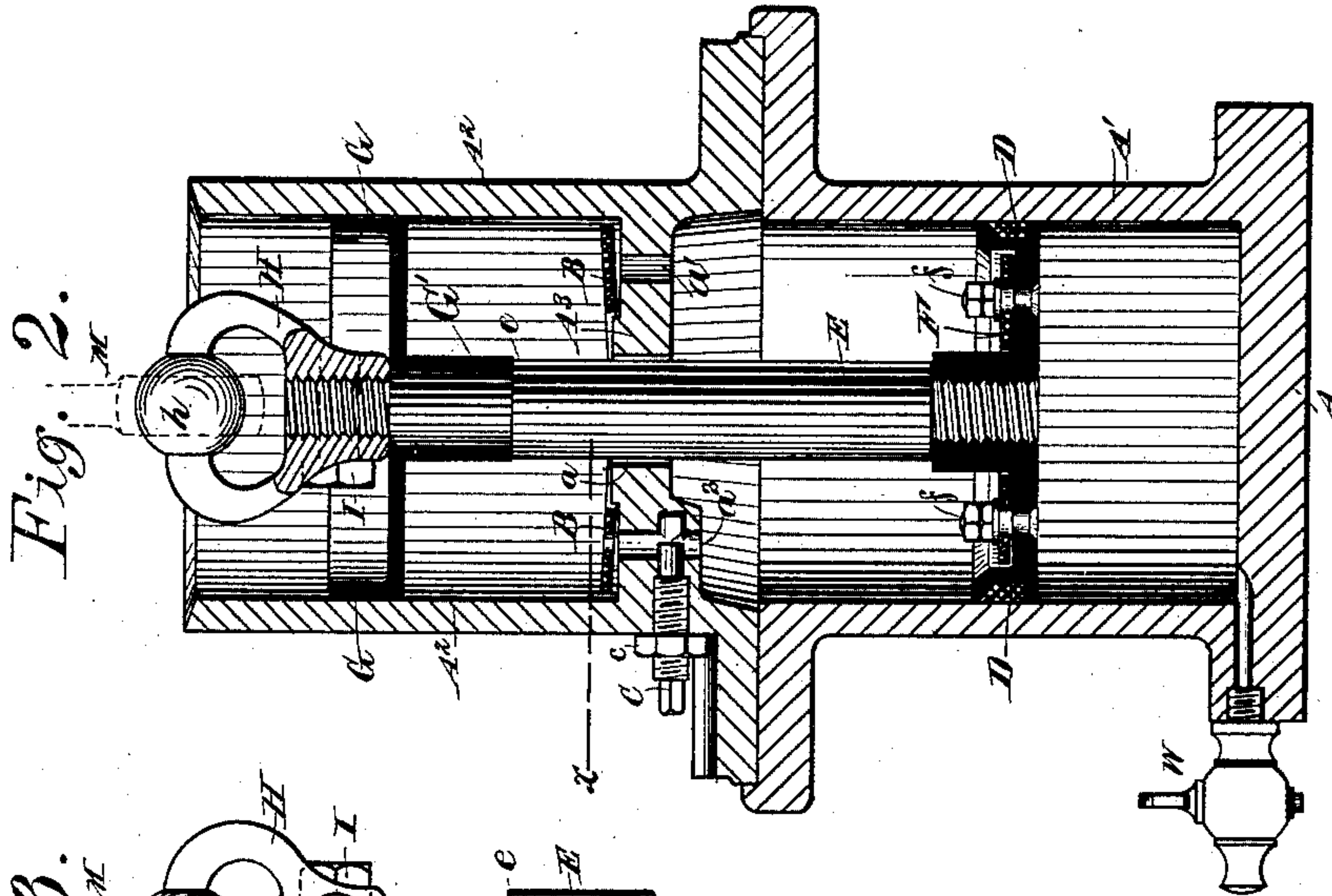
(No Model.)

G. H. CORLISS.

DASH POT.

No. 333,831.

Patented Jan. 5, 1886.



Witnesses:  
Wm. B. Sherman  
John T. Fenthorn

Inventor  
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# UNITED STATES PATENT OFFICE.

GEORGE H. CORLISS, OF PROVIDENCE, RHODE ISLAND.

## DASH-POT.

SPECIFICATION forming part of Letters Patent No. 333,831, dated January 5, 1886.

Application filed June 13, 1885. Serial No. 168,592. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE H. CORLISS, a citizen of the United States, residing in the city and county of Providence, in the State of Rhode Island, have invented certain new and useful Improvements in Dash-Pots for Valve-Gear of Steam-Engines, of which the following is a specification.

I have in Letters Patent granted to me dated June 6, 1876, No. 178,275, set forth a dash-pot having two pistons rigidly connected, one operating to produce a vacuum, and the other operating in an annular chamber to form a cushion for arresting the movement of the liberated mechanism.

The present improved dash-pot differs from the former, both in construction and arrangement, in important respects.

My invention consists of two cylinders of equal or nearly equal diameter, having a common axis, with a diaphragm between the two, provided with means for allowing the air to flow freely through it on each upward movement of the pistons, and with means for restricting the return-flow at will. There is a piston fitted in the lower cylinder with nearly an air-tight fit, and a piston of equal or nearly equal size similarly fitted in the upper cylinder. The lower piston is, in addition, provided with a packing to render it practically air-tight. Both pistons are rigidly connected by a stem passing through a central orifice in the diaphragm. The lower piston is valved, and at each descent passes any air or other fluid up through itself into the chamber above it, thereby maintaining an adequate vacuum beneath it. The upper piston has no valve. It is intended to keep the same air always imprisoned beneath it.

In dash-pots as ordinarily constructed a whistling noise is caused by the escape of air from the chambers outward to relieve the pistons.

By confining the air within the chambers and relieving the pistons by the alternate flow of air from one chamber to the other, as is hereinafter described, I am enabled to work my invention with the desired freedom from noise.

I provide for holding the parts of the compound or double piston together with great

firmness by compact mechanism, with facility for separation when desired.

The accompanying drawings form a part of this specification, and represent what I consider the best means of carrying out the invention.

Figure 1 is an elevation, partly in vertical section. Fig. 2 is a central vertical section in a plane at right angles to the plane of section in Fig. 1. Fig. 3 is an elevation of a portion corresponding to the section in Fig. 2, and Fig. 4 is a horizontal section of a portion on the line  $x x$  in Figs. 1 and 2.

Similar letters of reference indicate like parts in all the figures.

I will designate by A all the stationary parts, using additional marks, as A' A<sup>2</sup>, when necessary to indicate particular portions thereof. Its base is equipped with a stop-cock, W, by which it may be instantly relieved from its vacuum whenever it is desired to remove the piston for any reason.

A<sup>2</sup> is the upper cylinder.

A<sup>3</sup> is the diaphragm, which, for convenience, is made in one with A<sup>2</sup>, and is provided with a central orifice,  $a$ , and air-holes  $a'$   $a''$ , the functions of which will be more fully described hereinafter. The lower piston, D, and the upper piston, G, work in their respective cylinders with a fit nearly air-tight, and are connected by the rigid connection E, which passes through the orifice  $a$  in the diaphragm A<sup>3</sup>. The connection E is shouldered at  $e$  to receive the sleeve G' of the upper piston, G. The connection E is screwed into D, and a screw-thread at its upper end secures G by a screw-threaded clamp, H, presenting a ball-bearing,  $h$ , and tightly set by transverse clamping screw-bolts I. This method of securing connection between the piston-rod and the ball-bearing is of importance, because it is desirable that the rod and its two pistons should be free to rotate in both cylinders, as well as to move longitudinally therein. The ball-bearing is therefore provided with this screw-threaded clamp, fitted to work freely while it is being screwed on into its place until it reaches the disk of the piston. If left in that condition it would work loose. The transverse clamping screw-bolts I serve to firmly set the clamp upon the piston-rod, and in prac-



tice is found to prevent the liability of working loose. This form of clamp H, operated by transverse screw-bolts I, insures at all times a firm connection and true alignment of the several parts. The central orifice, *a*, in the diaphragm A<sup>3</sup> is made of sufficiently larger diameter than the connection E to allow of the proper passage of air around the connection E from one chamber or cylinder to the other.

Two air-holes, *a'*, in the diaphragm A<sup>3</sup> are covered by a flap-valve, B, secured to the upper face of the diaphragm by rivets *b*, and opening upward to allow the air to pass freely from the lower to the upper chamber or cylinder on each upward movement of the pistons.

An orifice, *a*<sup>2</sup>, in the diaphragm A<sup>3</sup> is for the purpose of graduating the flow of air from the upper to the lower chamber on the descent of the pistons, more or less obstructed at will by a screw-plug, C, adjusted from the outside and held firmly by a jam-nut, *c*.

I make the sleeve G' of the piston G slightly tapering, and of larger diameter than the connection E, in order that as the pistons descend the sleeve G', entering the orifice *a*, will more nearly close it and check the downward flow of air and cushion it under the upper piston, thereby retarding the downward movement of the pistons, which up to that point has been nearly instantaneous. The air cushioned beneath the upper piston by the action of G' is, as regulated by C, discharged through *a*<sup>2</sup> into the lower chamber, to allow the pistons to settle gently to their seats. The lower piston, D, has air-holes *d*, covered by flap-valves F, secured by rivets *f*. These valves open upward, when necessary, to allow of the passage of air or other fluids up through the piston above it, to insure an adequate vacuum beneath the piston. The piston D is also provided with packing to make it air-tight. The ball-bearing *h* receives a connection, M, (indicated in dotted lines,) which transmits to the two pistons the motion of the valve-arm, (not shown,) which may be understood to be one of the rocker-arms of the circular slide-valves known as "Corliss" valves.

Modifications may be made in the forms and proportions without departing from the principle or sacrificing the advantages of the invention.

One aperture with a suitable valve may serve, instead of two, to pass the air up through piston D and up through the diaphragm A<sup>3</sup>.

Parts of the invention may be used without the whole.

I claim as my invention—

1. A dash-pot for steam-engine valve-gear, consisting of two cylinders, A' A<sup>2</sup>, of equal or nearly equal diameter, having a common axis, with a diaphragm, A<sup>3</sup>, situated between them, and provided with means for allowing the air to flow freely through it on each upward movement of the pistons, and with means for restricting the return-flow at will, in combination with each other and with the pistons D G, working air-tight, or nearly so, in the cylinders, a rigid connection, E, and a suitable connection to the valve mechanism.

2. The cylinders A' A<sup>2</sup> and diaphragm A<sup>3</sup>, with its orifice *a* and valve or valves B, in combination with the double piston D G, sleeve G', connection E, and with means, as C, for adjusting the area for allowing the air to escape from the cylinder A<sup>2</sup> into the cylinder A', and a suitable connection to the valve mechanism, as herein specified.

3. The screw-threaded clamp H and its operating means I, in combination with the stem E and two pistons, D G, and with the inclosing-cylinders A' A<sup>2</sup>, and a suitable connection, as M, to the valve-operating mechanism, the clamp H being arranged as shown, so as to serve the double functions of confining the piston G to the stem, and forming a bearing for the connection M, as herein specified.

4. A screw-threaded clamp, H, and transverse clamping screw-bolts I, in combination with each other and with a screw-threaded connection, E, said clamp H being adapted to work freely while it is being screwed onto the connection E until it reaches its seat, and then to be firmly set upon the connection E by the transverse screw-bolts I, to insure at all times a firm connection and true alignment of the parts, as shown and described.

5. In a dash-pot for steam-engine valve-gear, the piston G, provided with a sleeve, G', combined with a connection, E, diaphragm A<sup>3</sup>, provided with a central orifice, *a*, piston D, and cylinders A' A<sup>2</sup>, said sleeve G' being of slightly larger diameter than the connection E, and adapted to more completely fill the orifice *a*, thereby checking the flow of air from A<sup>2</sup> into A' and retarding the descent of the pistons, as herein specified.

In testimony whereof I have hereunto set my hand, at Providence, Rhode Island, this 2d day of June, 1885, in the presence of two subscribing witnesses.

GEORGE H. CORLISS.

Witnesses:

HENRY MARSH, Jr.,

WILLIAM B. SHERMAN.