

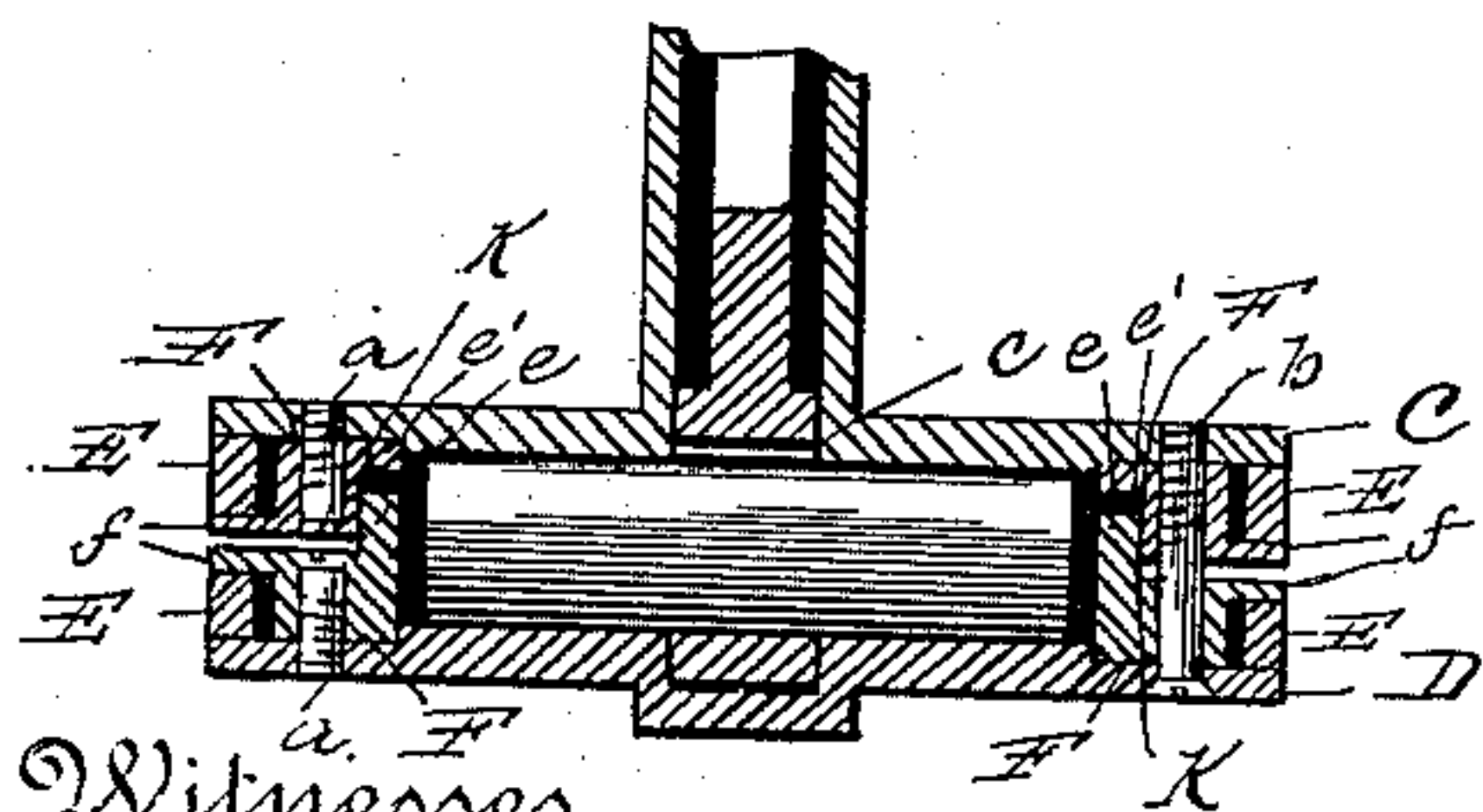
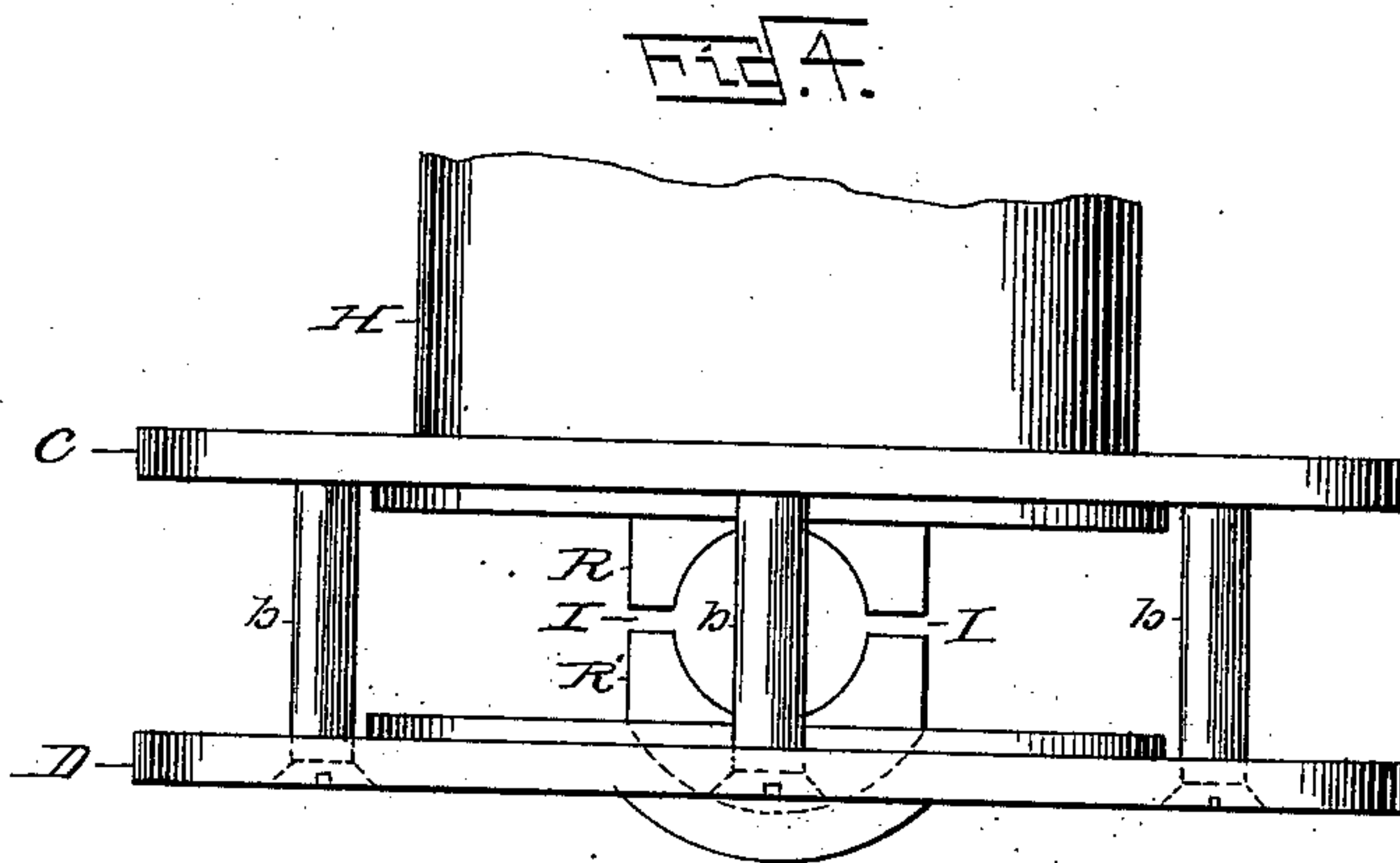
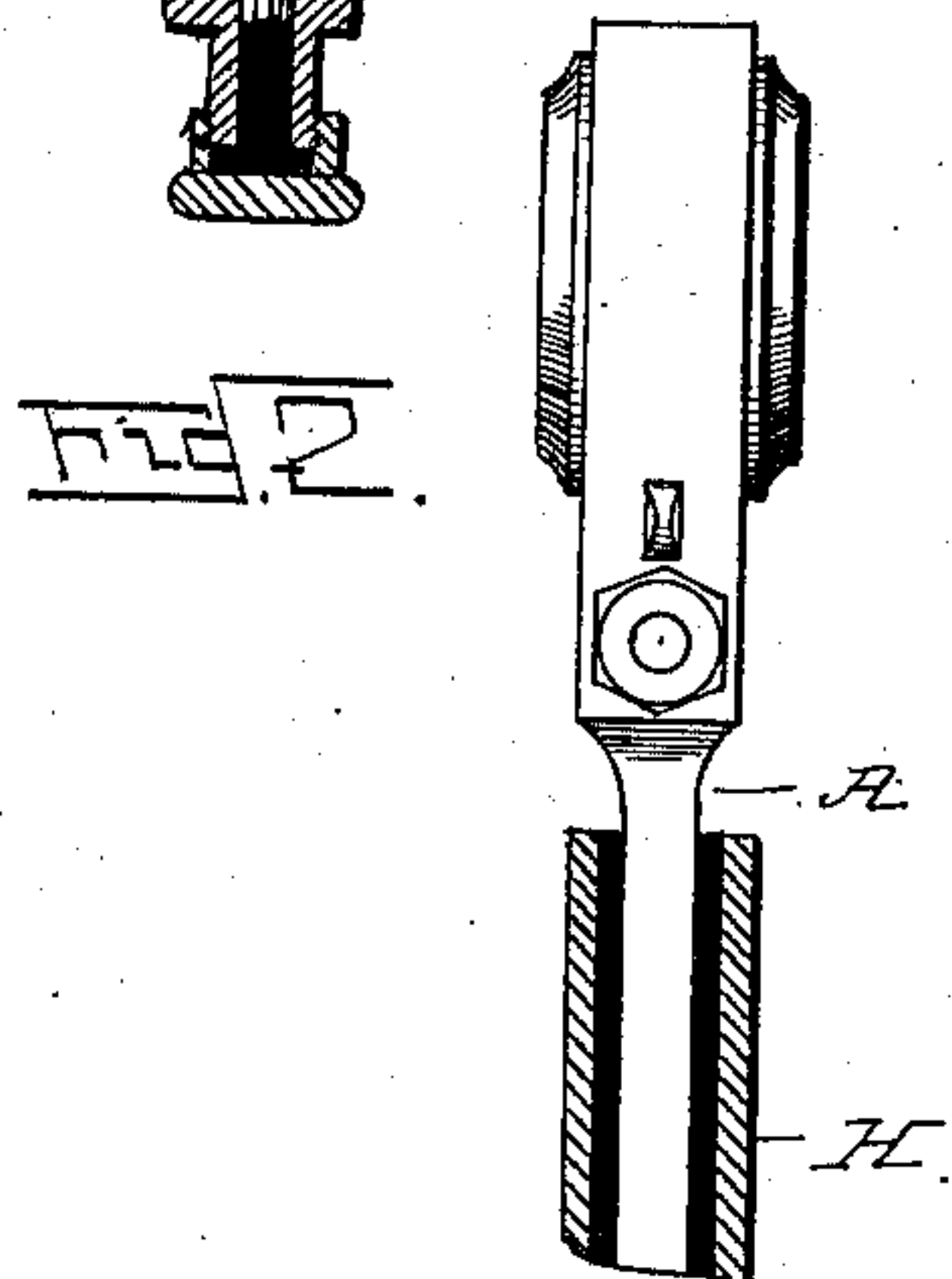
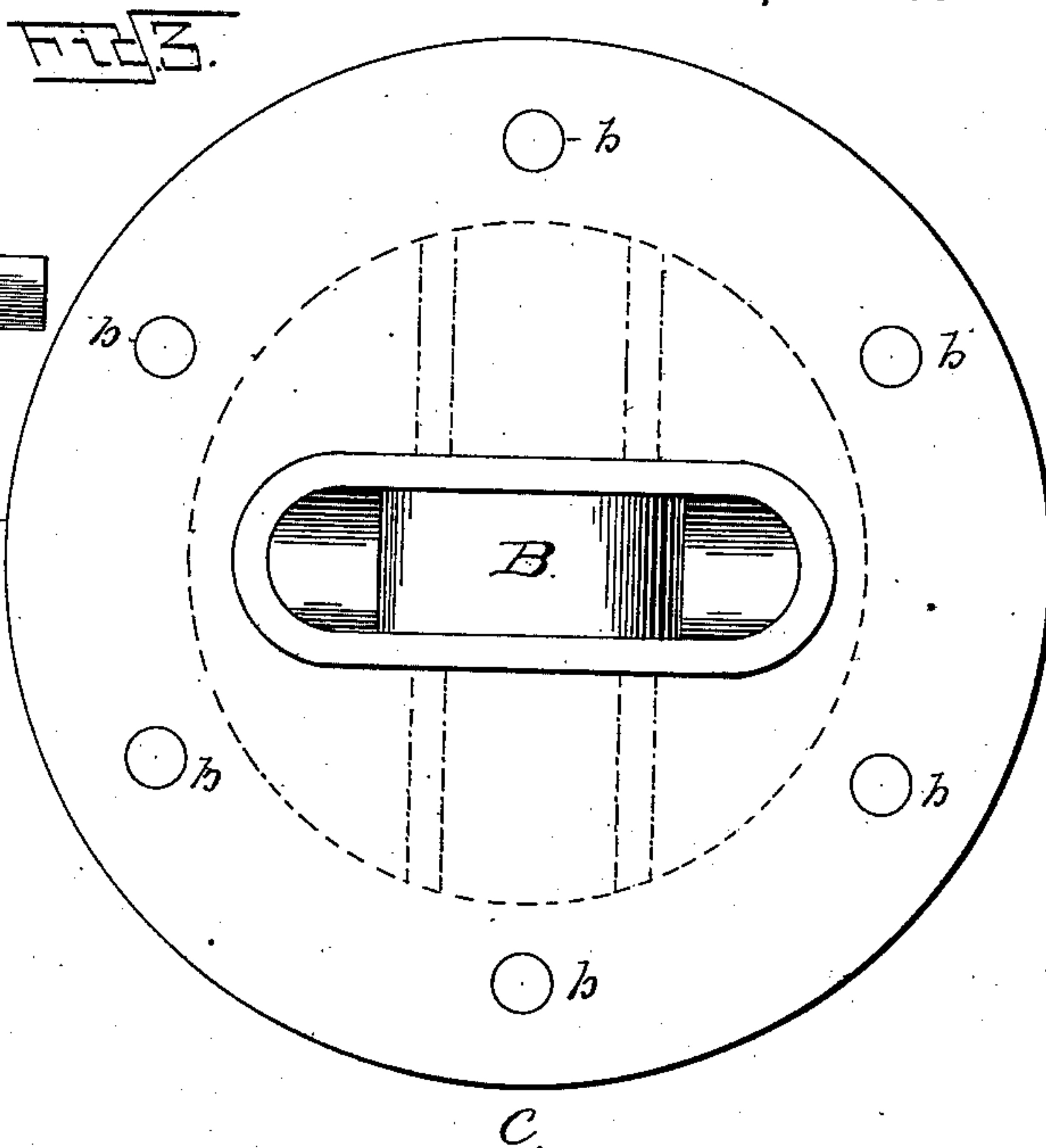
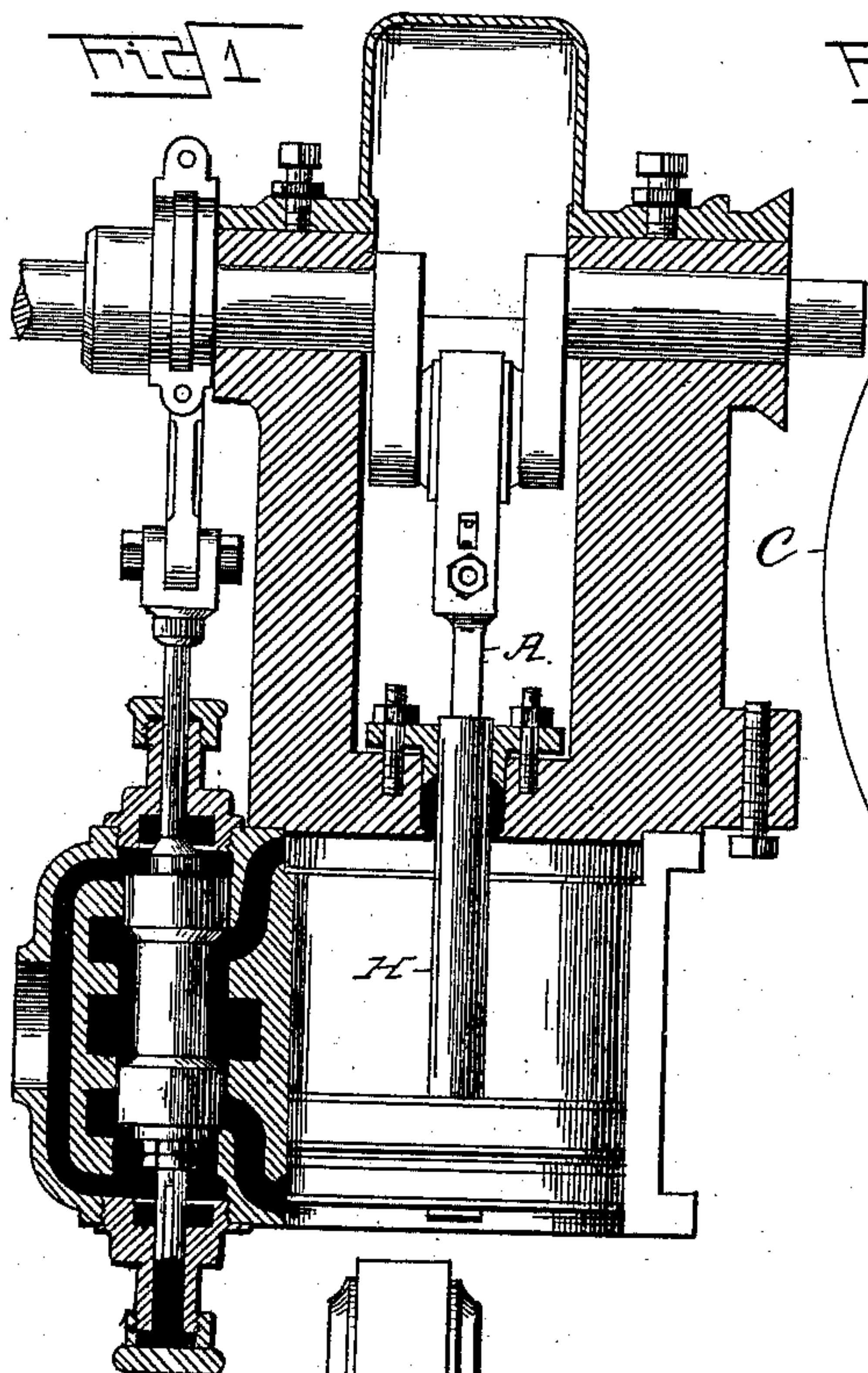
(No Model.)

A. BALL.

PISTON.

No. 351,565.

Patented Oct. 26, 1886.



Witnesses

Morris A. Clark

John C. Schroeder

Inventor

Albert Ball

By his Attorney

Geo. W. Allen



# UNITED STATES PATENT OFFICE.

ALBERT BALL, OF CLAREMONT, NEW HAMPSHIRE, ASSIGNOR TO THE SULLIVAN MACHINE COMPANY, OF SAME PLACE.

## PISTON.

SPECIFICATION forming part of Letters Patent No. 351,565, dated October 26, 1886.

Application filed December 2, 1885. Serial No. 184,438. (No model.)

*To all whom it may concern:*

Be it known that I, ALBERT BALL, of Claremont, in the county of Sullivan and State of New Hampshire, have invented a new and Improved Engine; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention relates to an improvement in pistons, and one more particularly intended for use in an engine for driving a rock-boring machine such as described in an application of mine filed December 2, 1885, Serial No. 184,440; but as it is equally well adapted for use in various other engines I do not wish to limit its application to any particular kind.

To more thoroughly understand the objects of this improvement, it may be well to here state that as usually constructed the piston-head is a single piece, (so far as concerns the connecting-rod,) and the connecting-rod in its oscillations to and fro with the crank moves upon the connecting-pin, which secures the rod to the piston, and causes rapid wear upon the pin or rod, or both, at the points of contact, and heretofore there has been no way of taking up this wear except by means of wedges or set-screws or similar devices, all of which require frequent stoppage of the engine in order to readjust the parts. It is my intention to avoid this rapid wearing away of the connections and the inconveniences attending such rapid wearing; and to these ends the invention consists in the peculiar construction of the piston-head, in a packing for the same, and in the connection of the connecting-rod with the piston, all as will be more fully herein-after described and claimed.

For a more thorough understanding of the parts in detail, attention is invited to the accompanying drawings, in which—

Figure 1 is a central vertical section of an engine such as shown in the application referred to, and embracing a piston of my improved construction. Fig. 2 is a central vertical section of the parts comprising the piston; Fig. 3, a plan view of the piston-head; and Fig. 4 a side view of the piston-head, omitting the packing.

Similar letters denote corresponding parts in the several views.

A is the connecting-rod from the crank, passing down through the hollow piston-rod H to the inside of the piston-head. The head of the piston is composed of an upper annular disk or plate, C, which carries the hollow piston-rod H, and a lower annular disk or plate, D, which disks or plates are connected by screws *b b b*, as shown in Figs. 3 and 4. These screws, while they prevent the two disks or plates from coming apart when in use, do not prevent them from being forced nearer together by the pressure of the steam to take up wear of the pin-bearings R R'. These pin-bearings are made in two parts or sections, with an intermediate space, I, to allow of self-adjustment in proportion to the wear upon these parts. The upper section, R, of these pin-bearings is cast with the upper disk or plate, C, on its under side, and the lower section, R', is likewise provided on the upper side of the lower disk or plate, D. The connecting-pin B, which has bearings between these sections R and R', passes through the lower end of the connecting-rod A, and is secured at its center to the same by the key *c*. If the pin-bearings are made true, the pin, being keyed to the rod, transfers all frictional wear to the bearings of the pin, and as this wearing goes on the two plates or disks comprising the piston-head adjust themselves accordingly, while there is absolutely no wear at the connection between the rod A and pin B, and, in fact, there is no wear upon any part of the rod, because it passes up through the hollow piston-rod free from contact with the sides thereof.

To prevent steam from passing the piston, two packing-rings, E E, are arranged between the disks or plates C and D of the piston-head, and said packing-rings are held by annular holders F F, secured each to its respective plate or disk of the piston-head by means of screws *a a a*. One of these annular holders F is made with a vertical flange, *e*, and the other with a corresponding recess, *e'*, so as to make a steam-tight joint, K, laterally, while there is a space between them in the line of movement of the piston, and both holders have a horizontal outer flange, *f*, which grasps its respect-



ive packing-ring. Incidentally the space between these holders on the outside of the piston-head also makes a steam-packing.

For the sake of economy it is preferred to  
5 cast the pin-bearings R R' with the disks or plates C and D.

By removing the holders F F and packing-rings E E the pin-bearings can be nicely bored and reamed.

10 In place of the holders F F, other rings could be substituted; but they would not be so convenient nor so effective.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—  
15

1. A piston-head composed of two separated disks or plates connected by screws, so that one of said disks or plates has freedom of movement toward and away from the other, substantially as described.  
20

2. The combination of a piston-head composed of two separated disks or plates, a series of screws connecting said plates or disks, a pin having bearings between said plates or disks, and a connecting-rod keyed to said pin, substantially as described.  
25

3. The combination of a piston-head composed of two separated disks or plates adjustably connected by screws, a pin arranged in adjustable bearings between said disks or plates, and a connecting-rod keyed to said pin, substantially as described.  
30

4. In combination, a piston-head made in two parts, C D, with an intermediate space, a connecting-rod, A, a pin, B, secured to said  
35

rod, bearings R R' for said pin, and the connecting-screws *b b b*, substantially as described.

5. In combination, the disks or plates C and D, their connecting-screws *b b*, the intermediate packing-rings, E E, the ring-holders F F, and their screws *a a*, substantially as described.  
40

6. In a piston made in parts, the combination of a connecting-rod, a connecting-pin, adjustable bearings for said pin, and packing-ring holders F F, substantially as described.  
45

7. The combination of the two disks or plates C D, and connecting-screws *b b*, the connecting-rod A, the pin B, the bearings R R', cast with said disks or plates, the packing-rings E E, and holders F F, substantially as described.  
50

8. The combination of a piston-head made in two adjustably-connected parts, C and D, and with a hollow piston-rod, H, a connecting-rod, A, passing down through said rod H, a pin, B, at the end of said rod A between the two parts of the piston-head, and adjustable bearings R R' for said pin, substantially as described.  
55

9. The combination of the two adjustably-connected disks or plates C and D, the intermediate packing-rings, E E, and the ring-holders F F, provided with the flanges *e* and *f*, combined with the rings, substantially as described.  
60

In testimony whereof I affix my signature in presence of two witnesses.

ALBERT BALL.

Witnesses:

GEO. O. BALL,  
FRANK A. BALL.