

(No Model.)

2 Sheets—Sheet 1.

H. SEE.  
PISTON.

No. 422,453.

Patented Mar. 4, 1890.

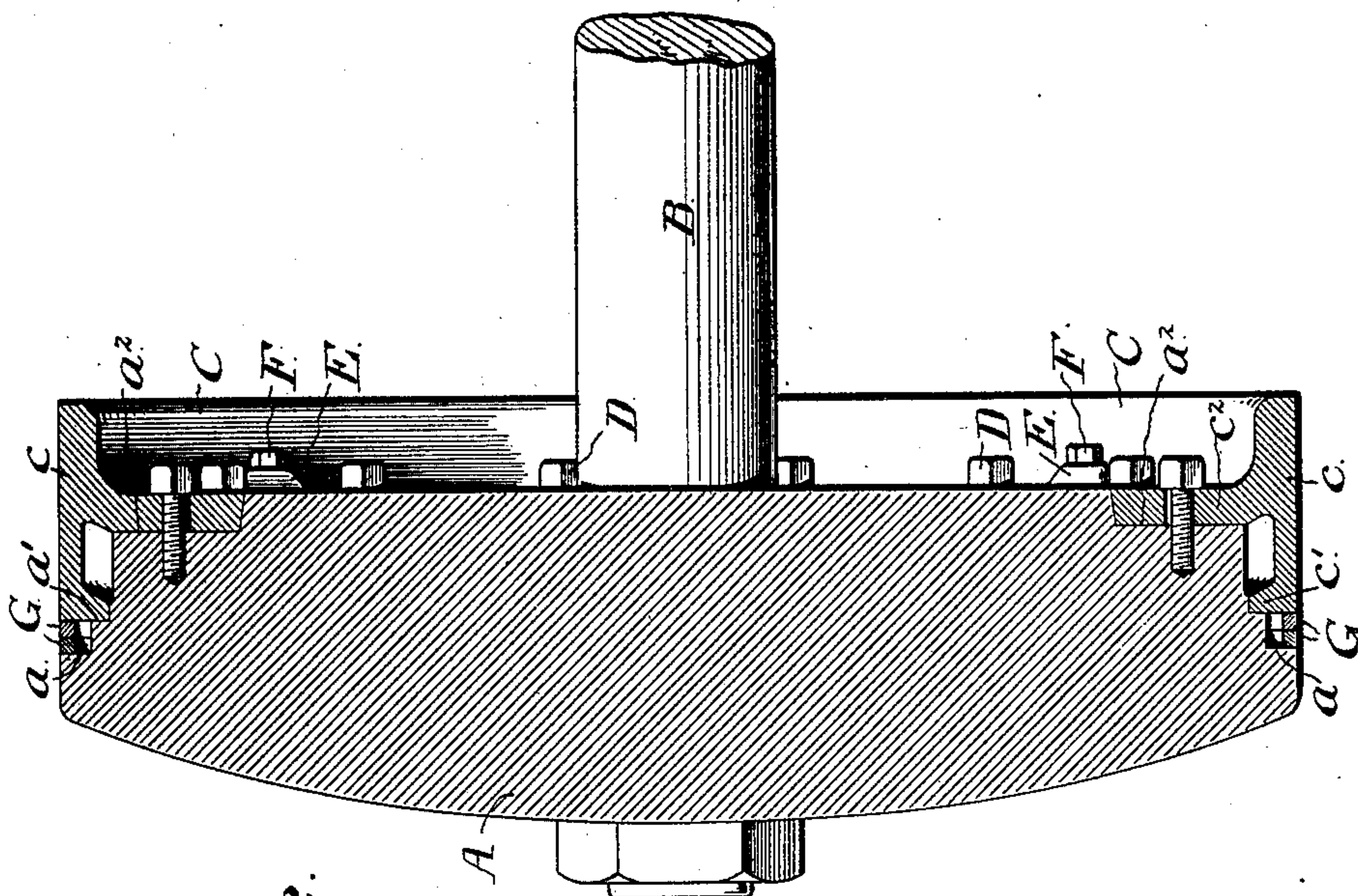


Fig. 2.

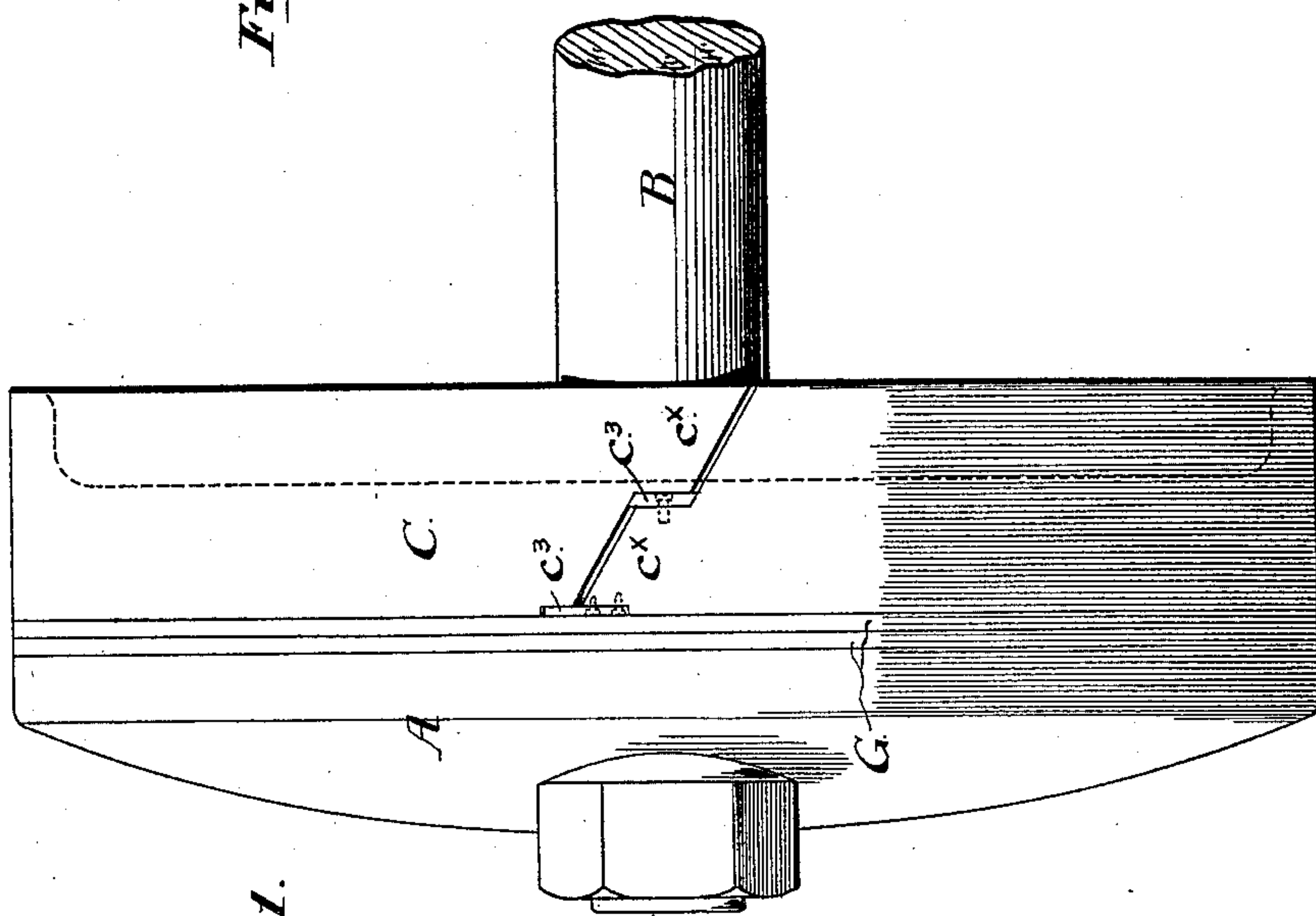


Fig. 1.

WITNESSES:

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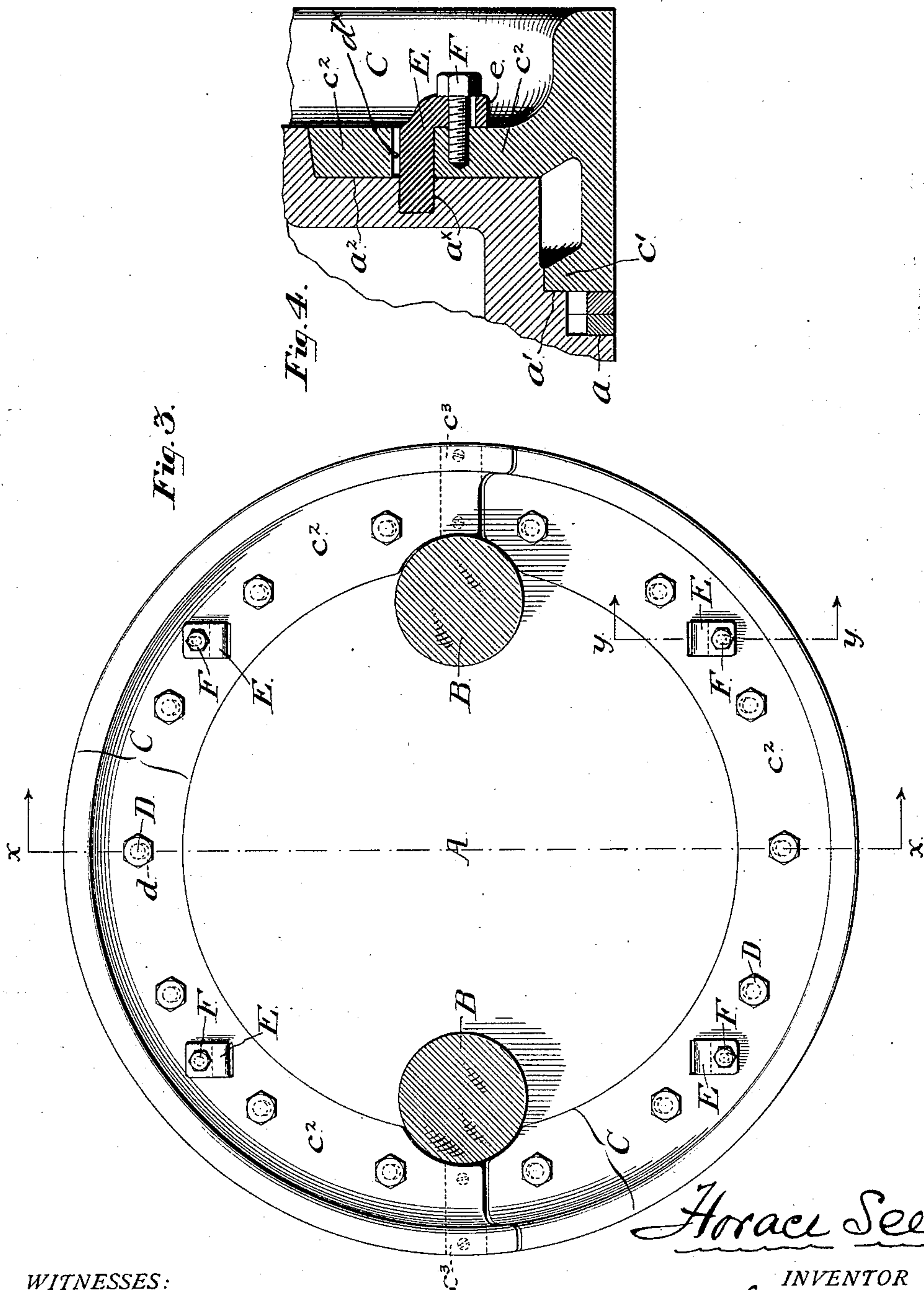
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J. Norman Dixon  
Lewis Altmeyer.

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# UNITED STATES PATENT OFFICE.

HORACE SEE, OF PHILADELPHIA, PENNSYLVANIA.

## PISTON.

SPECIFICATION forming part of Letters Patent No. 422,453, dated March 4, 1890.

Application filed August 5, 1889. Serial No. 319,818. (No model.)

*To all whom it may concern:*

Be it known that I, HORACE SEE, a citizen of the United States, residing in the city and county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Pistons, of which the following is a specification.

My invention relates to the pistons of either horizontal, diagonal, or vertical engines, and its object is such a construction of a piston as will permit of adjustment to compensate for wear and of centering without the employment of a tail rod, and such a construction, moreover, as will insure the interception of the passage of steam and prevent undue friction.

To the foregoing ends my invention comprehends a piston a good form of a convenient embodiment of which is represented in the accompanying drawings and hereinafter described, the particular subject matter claimed as novel being hereinafter definitely specified.

In the accompanying drawings, Figure 1 is a side elevational view of a piston embodying my improvements. Fig. 2 is a central, vertical, sectional elevation through the same, in the plane of the dotted line  $x x$  of Fig. 3, and sight being taken in the direction of the arrows upon said line. Fig. 3 is a rear elevational view of the piston shown in Figs. 1 and 2. Fig. 4 is a fragmentary, sectional elevation through a portion of the piston represented in Fig. 3, in the plane of the dotted line  $y y$  upon said figure, and sight being taken in the direction of the arrows upon said line.

Similar letters of reference indicate corresponding parts.

In the drawings, A represents a piston, conveniently made of the form shown, and provided with two piston rods B B. The rear face of the piston is turned off, or otherwise conformed, to present three circumferential rearwardly-facing surfaces, which are respectively, herein termed the outer shoulder  $a$ , the middle shoulder  $a'$ , and the inner shoulder  $a^2$ . The planes or faces of these shoulders are preferably parallel. C is what I term a follower; it being an angular ring of metal, composite of segments as hereinafter set forth, and conveniently of the form represented in the drawings, that is to say, as

to each segment having a horizontal member  $c$  terminating in an upturned ring flange  $c'$  adapted to bear against the middle shoulder  $a'$  of the piston, and a vertical member  $c^2$  adapted to the inner shoulder  $a^2$  of the piston, and being as to all of its assembled segments adapted for application against said inner and middle shoulders of said piston. The wearing surface of the follower as an entirety is composed of the outer peripheral faces of the horizontal members of its respective segments.

In the drawings I have represented the follower as composed of but two sections. It is, however, to be understood that three, four, or more segments may, at will, be employed. At their intersections or joints the segments are not radially squared off, but are respectively provided with overlapping tongues  $c^x$ , Figs. 1 and 3, the meeting ends of which are preferably correspondingly oppositely angled as particularly illustrated in Fig. 1.

The purpose of making the follower in segments instead of in a single annular piece being, as stated, to permit of the radial outward adjustment of the segments to effect the accurate centering of the piston and to compensate for wear,—the object of providing the meeting extremities of the segments with overlapping tongues is to intercept the passage of steam or other fluid at the points of meeting or separation.

$c^3$  are what I term tongue plates, preferably formed of steel, which are, as shown, secured in vertical planes at regions of the intersection or overlap of the tongues. These plates not only serve as wearing surfaces in the adjustment of the segments of the follower, but also assist to intercept the passage of the steam. The segments of the follower are secured to the piston by follower bolts D, which pass through radial elongated bolt-seats  $d$  in the said follower and thread into the piston as shown. It is evident that by loosening or tightening the follower bolts, the segments of the follower can be adjusted and fixed in their adjusted positions.

In addition to the follower bolts, and in order to accurately gage the radial set of the segments of the follower, I employ in connection with each segment one, two, or more, key plates or wedges E, the inner extremities of



which are snugly fitted to plate seats  $a^x$  in the piston, the shanks of which pass through radial elongated shank seats  $d^x$  in the follower, and the outer extremities of which are angled or overturned to bear against the outer face of the segments to which said plates happen to be applied and are provided with radial elongated bolt seats  $e$  through which pass the shanks of key plate bolts  $F$  which thread into the substance of the segments. As is obvious the radial set of a key plate with respect to its segment of the follower is easily adjusted by the screwing and unscrewing of its bolt, while when the desired set has been obtained the application of the plate to its seat in the piston gages the set of the segment of the follower to which it is applied.

G are segments of packing rings interposed between the outer shoulder  $a$  of the piston and the flange  $c'$  of the follower. These packing rings may be of any preferred description, and are conveniently of a character invented by me and set forth in United States Letters Patent No. 365,102, granted to me June 21st, 1887.

It will be apparent from a consideration of the foregoing construction that the segments of the follower can be both removed and applied in the direction of the length of the cylinder to which the piston is adapted without unseating said piston from said cylinder. This capacity for application and removal of the follower without unseating the piston constitutes one of the material advantages of my invention.

Such being a description of the construction of a piston embodying my improvements, it is obvious that each segment of the follower may be independently set out by the means of adjustment described, and may, if desired, be likewise adjusted by the insertion of packing between its inner peripheral face and the piston.

It is obvious that any segment of the follower when worn can be cheaply replaced, or that it can be reshod or packed upon its wearing surface.

The forms of parts represented in the accompanying drawings are well adapted to subserve the ends of my invention,—I do not however confine myself to such forms, as

neither the form of the follower in conformation to the piston nor yet the form of the overlapping tongues of its segments, is of the essence of the invention.

Having thus described my invention, I claim:

1. The combination of a steam or other fluid cylinder, a piston adapted to said cylinder, and a follower made in segments adapted to the circumferential portion of said piston and applicable thereto and removable therefrom in the direction of the length of the cylinder, substantially as described.

2. In combination with a piston, a circumscribing packing, and a removably applied follower made in segments and by segments radially adjustable with respect to the body of the piston, substantially as described.

3. In combination with a piston, a removably applied follower made in segments and by segments radially adjustable with respect to the body of the piston, substantially as described.

4. In combination with a piston, a removably applied follower made in segments the meeting ends of which are provided with overlapping tongues, and means for effecting the radial adjustment of the segments with respect to the body of the piston, substantially as set forth.

5. In combination with a piston, a circumscribing packing, a removably applied follower made in segments the meeting ends of which are provided with overlapping tongues, and means for effecting the radial adjustment of the segments with respect to the body of the piston, substantially as set forth.

6. In combination with a piston, a removably applied follower made in segments, and key plates, constructed and applied as set forth and secured by key plate bolts, for gaging the set of the segments of the follower in given positions of radial adjustment, substantially as set forth.

In testimony that I claim the foregoing as my invention I have hereunto signed my name this 18th day of July, A. D. 1889.

HORACE SEE.

In presence of—

J. BONSALE TAYLOR,  
WM. C. STRAWBRIDGE.