

(No Model.)

2 Sheets—Sheet 1.

H. SEE.

HORIZONTAL PISTON.

No. 365,102.

Patented June 21, 1887.

Fig. 1.

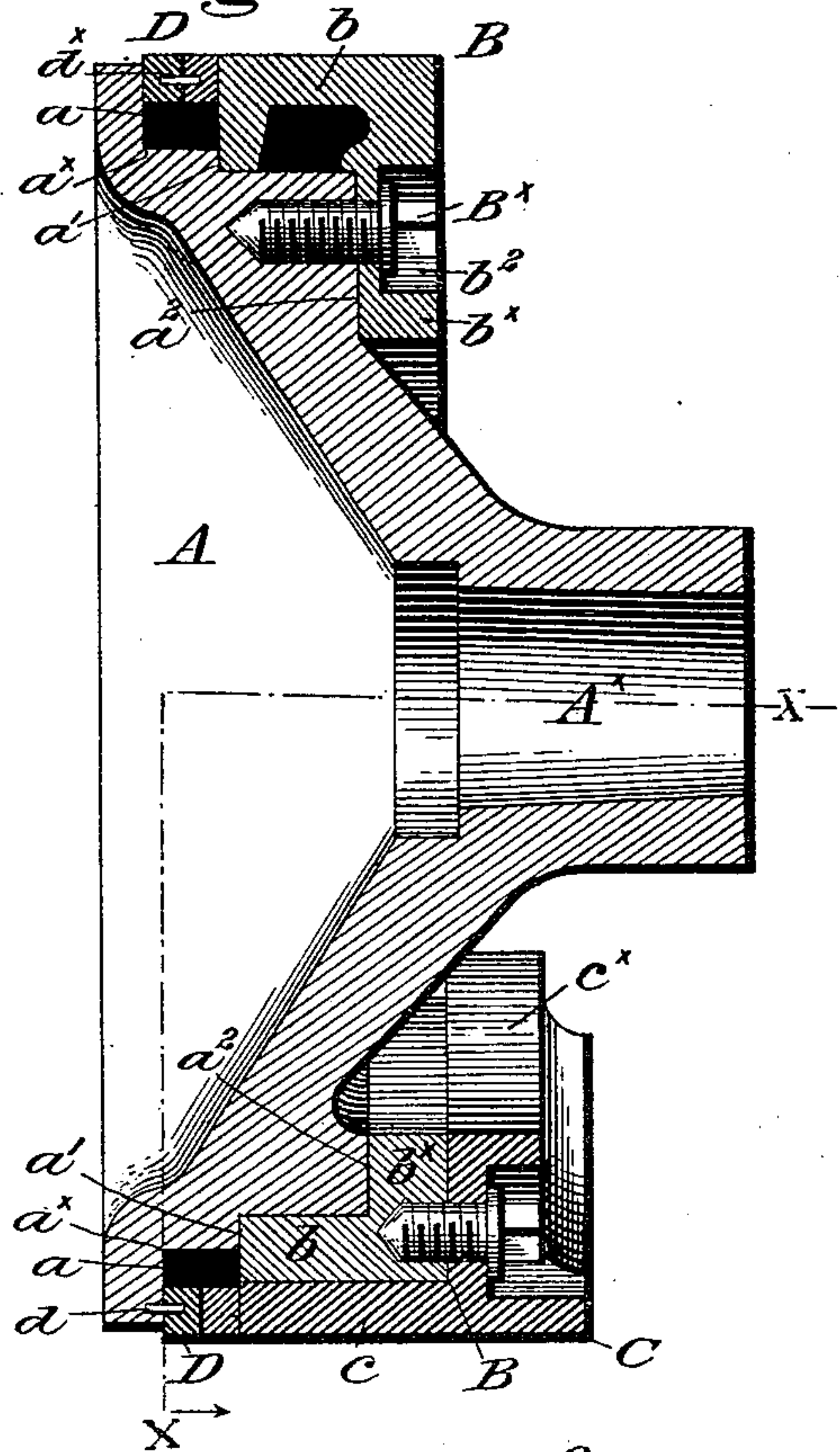


Fig. 3.

Fig. 2.

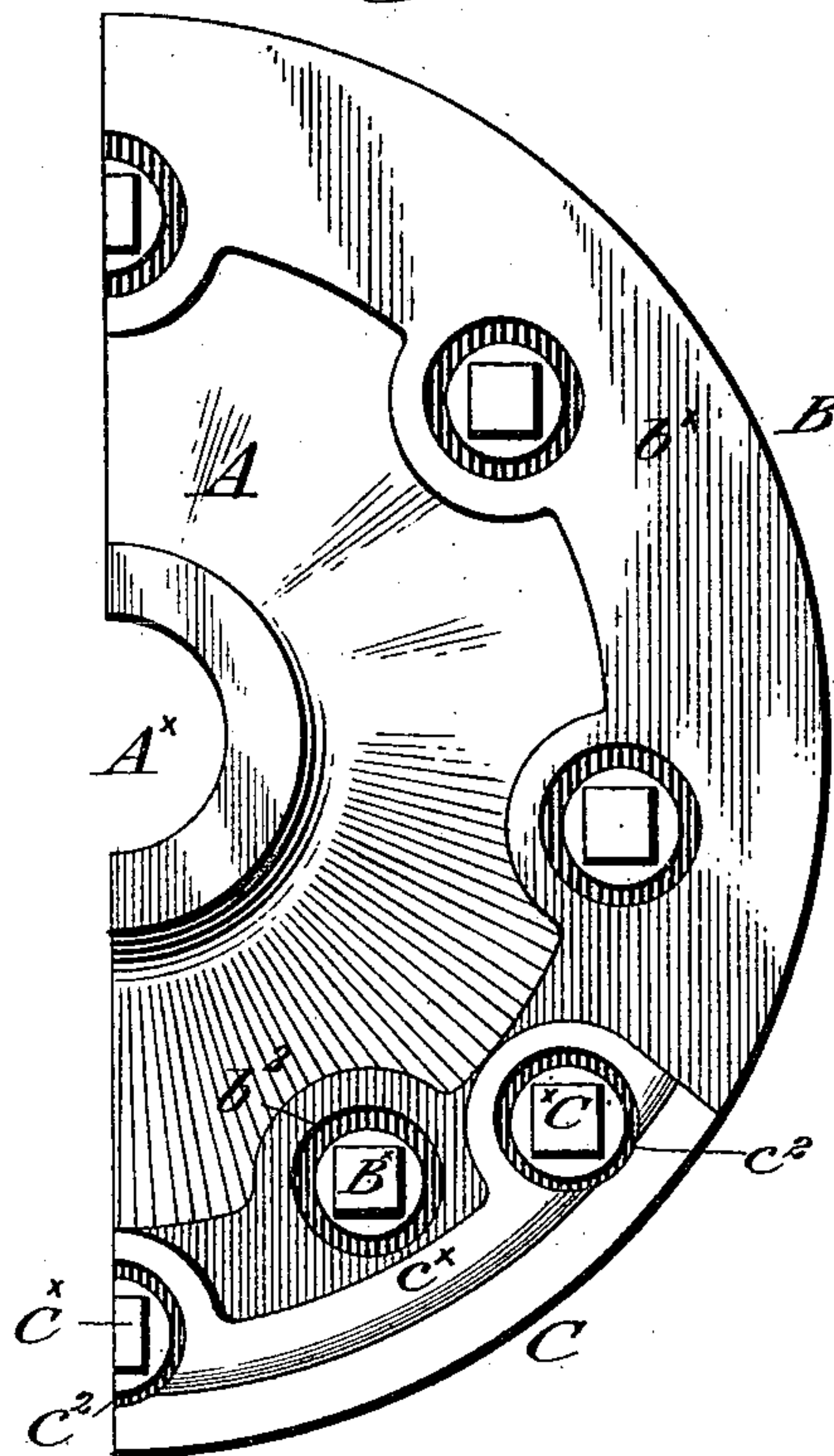
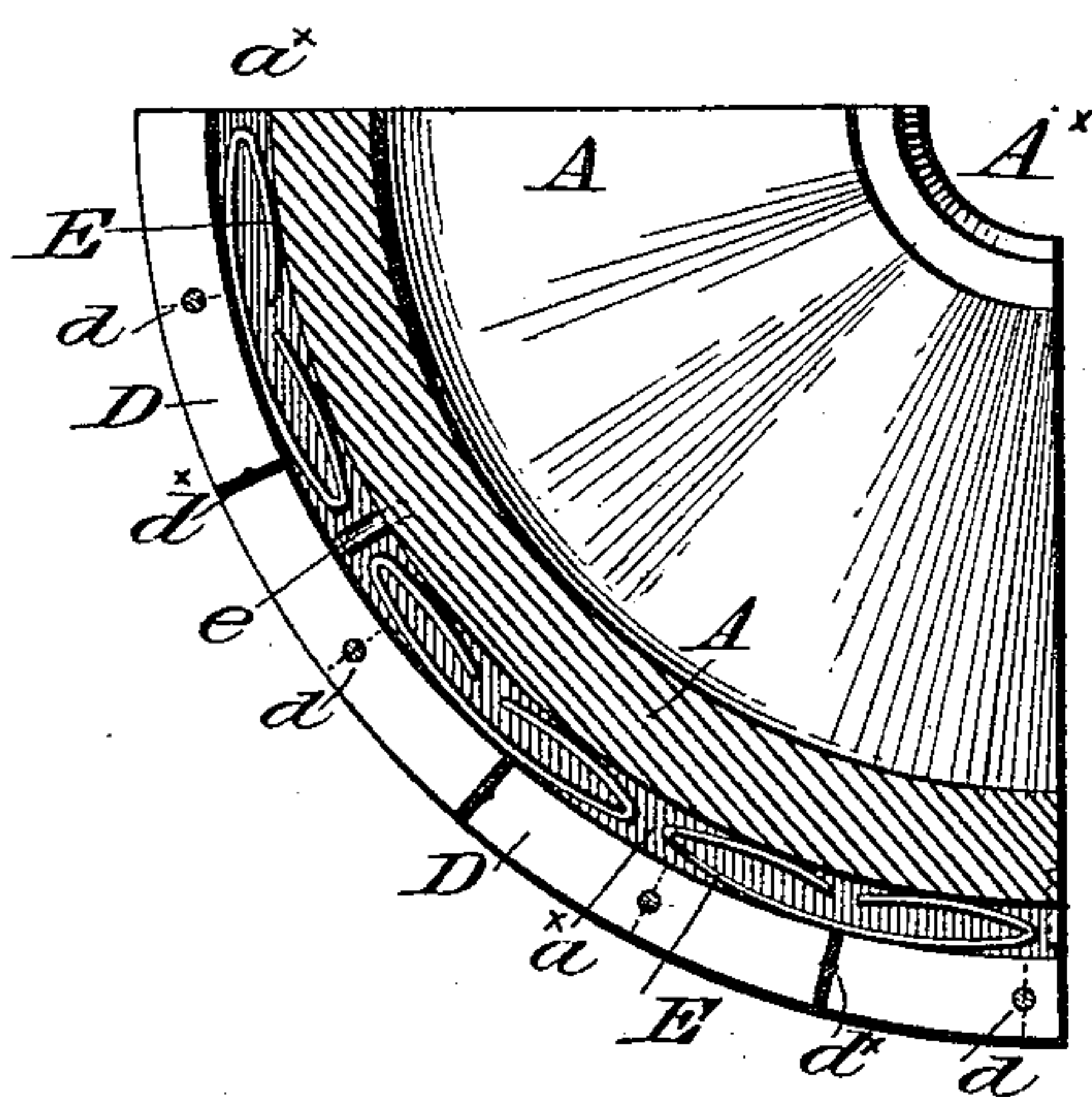
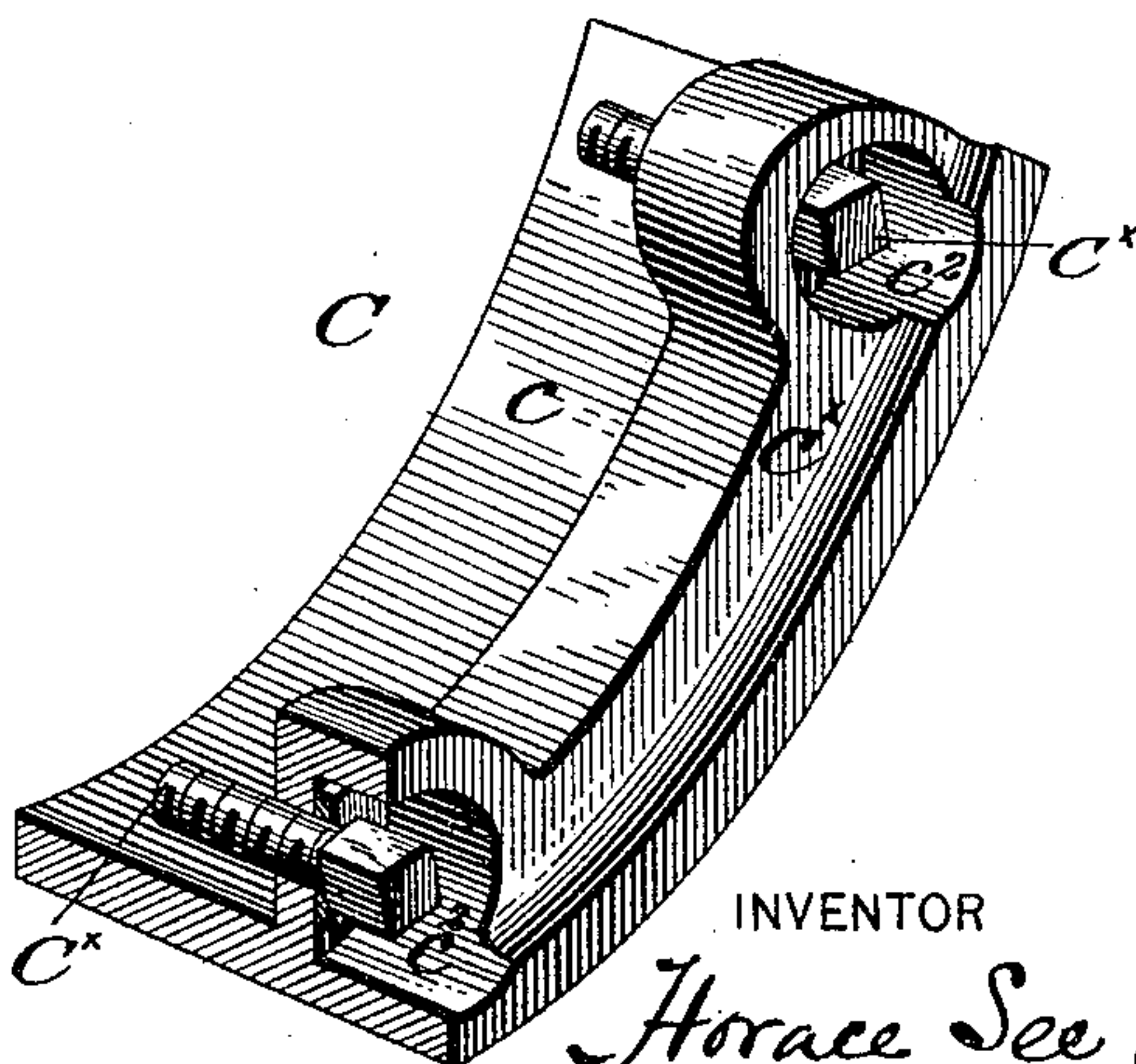


Fig. 4.




WITNESSES:

P. F. Hagle
John Polley Jr



INVENTOR

 Horace See,
By his Attorney,
Wm B Strawbridge,
vs Bonsall Taylor.

(No Model.)

2 Sheets—Sheet 2.

H. SEE.

HORIZONTAL PISTON.

No. 365,102.

Patented June 21, 1887.

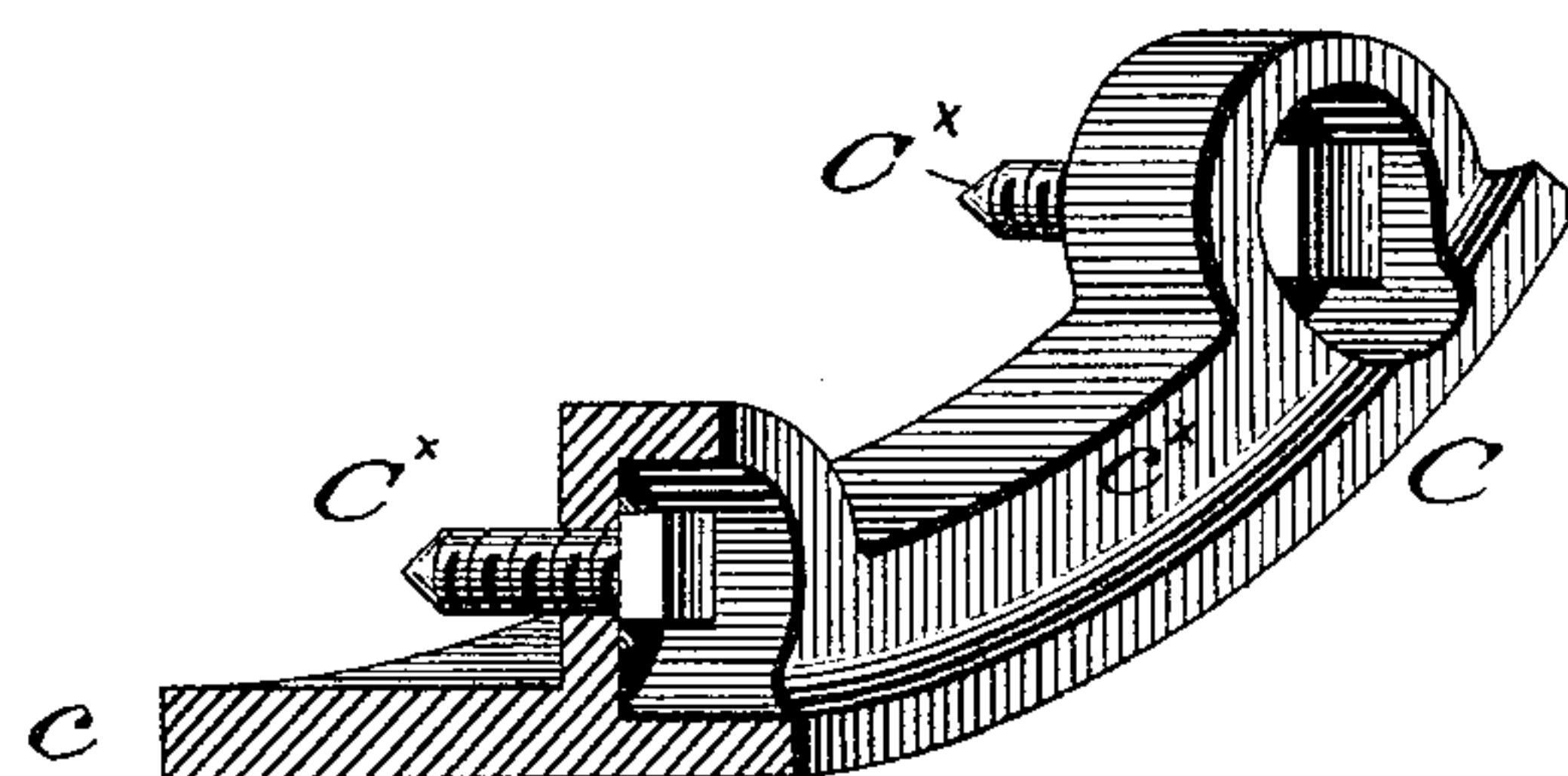
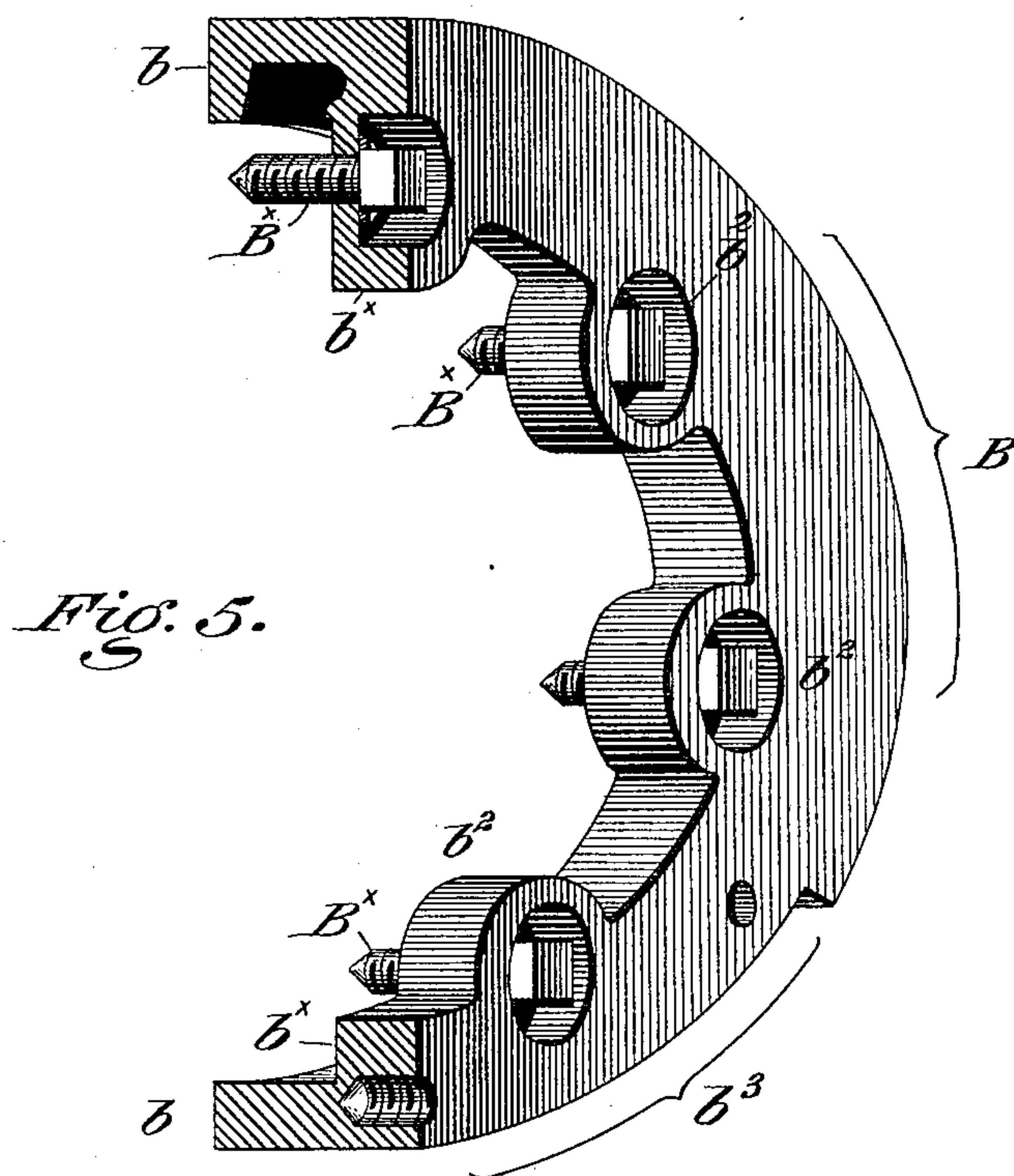


Fig. 6.

Witnesses

John Polley
J. Norman Dixon,

Horace See,

Inventor

By his Attorneys,
Wm C. Strawbridge,
Bonsall Taylor.

UNITED STATES PATENT OFFICE.

HORACE SEE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF
TO THE WILLIAM CRAMP & SONS SHIP AND ENGINE BUILDING COMPANY,
OF SAME PLACE.

HORIZONTAL PISTON.

SPECIFICATION forming part of Letters Patent No. 365,102, dated June 21, 1887.

Application filed March 9, 1887. Serial No. 230,247. (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, in the State of Pennsylvania, have invented certain new and useful Improvements in Horizontal Pistons, of which the following is a specification.

It is well understood that the piston of a cylinder which is disposed in a horizontal position wears more quickly upon its under portion, or that arc of its circumference which in the mounting of the piston lies below its horizontal diameter, than upon its upper portion,—the weight of the piston as an entirety coming upon its lower semi-circumference, and in fact coming only upon an arc of the same but little in excess of forty-five to sixty degrees upon each side of its vertical diameter.

My invention relates in general and is applicable to all pistons and kindred disks which play horizontally or in a plane slightly inclined from the horizontal within a cylinder, and its object is the provision of means for increasing the durability or augmenting the wearing qualities of the under or wearing surface of the piston, without to any material extent increasing the weight, and also the provision of means for facilitating adjustment to wear, and for accurately packing the piston.

The foregoing objects I attain by devices represented in the accompanying drawings and described in this specification, the particular subject matter claimed as novel being hereinafter definitely specified.

In the drawings, Figure 1 is a central vertical, side sectional elevation of a piston embodying my improvements. Fig. 2 is a rear elevational view of so much of a piston as is represented in Fig. 1, the sight being taken from the right hand side of said Fig. 1. Fig. 3 is a partly sectional and partly elevational view of a quarter portion of a piston embodying my improvements,—it being the under half portion of so much of a piston as is represented in Fig. 1, the section being in the plane of the dotted line $x-x$ of said figure, and sight being taken in the direction of the arrows upon said line. Fig. 4 is a view in perspective of so much of the shoe as is represented in Figs. 1 and 2. Fig. 5 is a view in perspective of the follower removed from the

piston, exhibiting its shoe recess; and Fig. 6 a similar view of the shoe in readiness to be applied to said recess.

Similar letters of reference indicate corresponding parts.

In the drawings, A represents a piston of conical form, which is conveniently provided with a hub designated A^x . 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'' . The planes or faces of these shoulders are preferably parallel.

B is what I term a follower; it being an angular ring of metal conveniently of the form represented in the drawings, that is to say, having a horizontal member b and a vertical member b^x ,—and being adapted for application against the inner and middle shoulders of the piston. This follower is conveniently secured to the piston by follower bolts B^x which pass through bolt seats b^2 in it the said follower, and thread into the piston as shown. An arc of the under portion of the periphery of the follower, being an arc of that portion of its circumference which is comprised below its horizontal diameter is provided with a recess b^3 , Fig. 5, to receive an arc shaped shoe C, which latter is a right angularly flanged metal plate composed of an under member, which is the wearing surface c , and of a lateral member, right angular to said under member, which is the back flange c^x ,—through the medium of which flange the shoe as an entirety is by shoe bolts C^x , which pass through bolt seats c^2 and thread into the follower, secured to said follower. The horizontal wearing surface c of the shoe preferably extends at least as far forward as the horizontal member b of the follower, so that said follower is as to its entire recessed portion b^3 shod by the shoe, which latter is of circumferential length equal to the length of the shoe-recess in the follower, and preferably of a breadth in excess of the average breadth of the piston and follower, in order to afford a very broad bearing surface for the piston.

It will be apparent from a consideration of

the foregoing construction that the shoe can be both removed and applied without unshipping the piston from its cylinder. This capability for application and removal without unseating the piston, constitutes one of the material advantages of my invention.

Interposed between the outer shoulder *a* of the piston and both the front face of the horizontal member *b* of the follower B and the front face of the wearing surface *c* of the shoe C,—the said two faces together forming a complete circumferential face opposing the aforesaid outer shoulder of the piston,—is a packing ring which completely circumscribes the piston and is composed of a double series of segments D, each of which series of segments as to the segments which compose it completely circumscribes the piston as stated, and the segments composing the respective series of the which said two series are interdisposed so as to break joints, in a manner which will be understood by a reference to the full and dotted radial lines designating the intersection of segments,—in Fig. 3. The segments of the outer series are conveniently loosely attached by pins *d* to the outer shoulder *a* of the piston, the said shoulder and the said segments being correspondingly bored to let in the pins. The segments of the inner series are similarly loosely secured by pins *d*^x to the segments of the outer series, the said pins being let into holes correspondingly oppositely bored into the opposing faces of the segments of the respective series.

The various packing segments D, considered together as forming a composite packing ring to the piston, are adapted, as above, to be maintained laterally between the follower and its shoe and the outer shoulder of the piston. They are maintained radially outward against the inner walls of the cylinder by the interposition within a circumferential recess *a*^x,—formed about the piston to the rear of its outer shoulder by the application of said follower and shoe,—of a series of elliptic or other springs E, or equivalent spring contrivances, which act between the base of said recess and the inner sides of said segments. The springs are conveniently maintained in proper circumferential disposition, and prevented from dropping down together, by radial pins *e*, or kindred stops, erected from the base of the spring recess. The function of the packing rings is to maintain the piston steam-, air-, or fluid-tight within the cylinder. It is, of course, preferable that the packing, as such, should completely encircle or, technically, "circumscribe," the piston. It is apparent, however, that to the extent of the length of the shoe the packing proper may be dispensed with, and the shoe proper constitute in effect, and subserve the functions of, a portion of the packing, and I use the term "circumscribing packing" in the claims subject to this obvious limitation. The function of the shoe is as to its wearing surface to take the weight of, and wear off of, the piston proper.

It is obvious that the shoe when worn can be, as an entirety, cheaply replaced, or that it can be reshod or packed upon its wearing surface, or set out by the interposition of a filling piece between the horizontal member of the follower and its own 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, nor yet to the special mode of application and securing respectively of the follower and shoe,—nor yet indeed to the special construction and mode of attachment of the packing ring, although I prefer a packing ring constructed, applied, and held to duty in the manner set forth.

Having thus described my invention, I claim and desire to secure by Letters Patent:

1. The combination of a horizontal cylinder, a piston adapted to said cylinder, and a shoe adapted to the under circumferential portion of said piston and applicable thereto and removable therefrom in the direction of the length of the cylinder, substantially as and for the purpose set forth.

2. In combination with a horizontal piston, a circumscribing packing, and a removably applied shoe or wearing surface applied to the under circumferential portion of said piston, substantially as set forth.

3. The combination of a piston, a circumscribing packing, a circumferential follower, and a segmental shoe applied to the under circumferential portion of the piston, substantially as set forth.

4. The combination of a piston, a circumscribing packing composed of segments, springs for holding said segments radially outward, a circumferential follower, and a segmental shoe applied to the under circumferential portion of the piston, substantially as set forth.

5. The combination of a horizontal piston, a circumscribing packing applied to said piston, means for maintaining the packing radially pressed out, a circumferential follower having a recess formed in its under peripheral portion, and a segmental shoe adapted to said recess and removably secured to said follower, substantially as set forth.

6. The combination of a piston, a removably applied shoe, a follower, packing segments, pins for maintaining said segments in their relative positions, springs for forcing said segments radially outward, and pins for maintaining said springs in proper circumferential distribution, substantially as set forth.

In Testimony Whereof I have hereunto signed my name this 2d day of March A. D., 1887.

HORACE SEE.

In the presence of
J BONSALL TAYLOR
F. NORMAN DIXON.