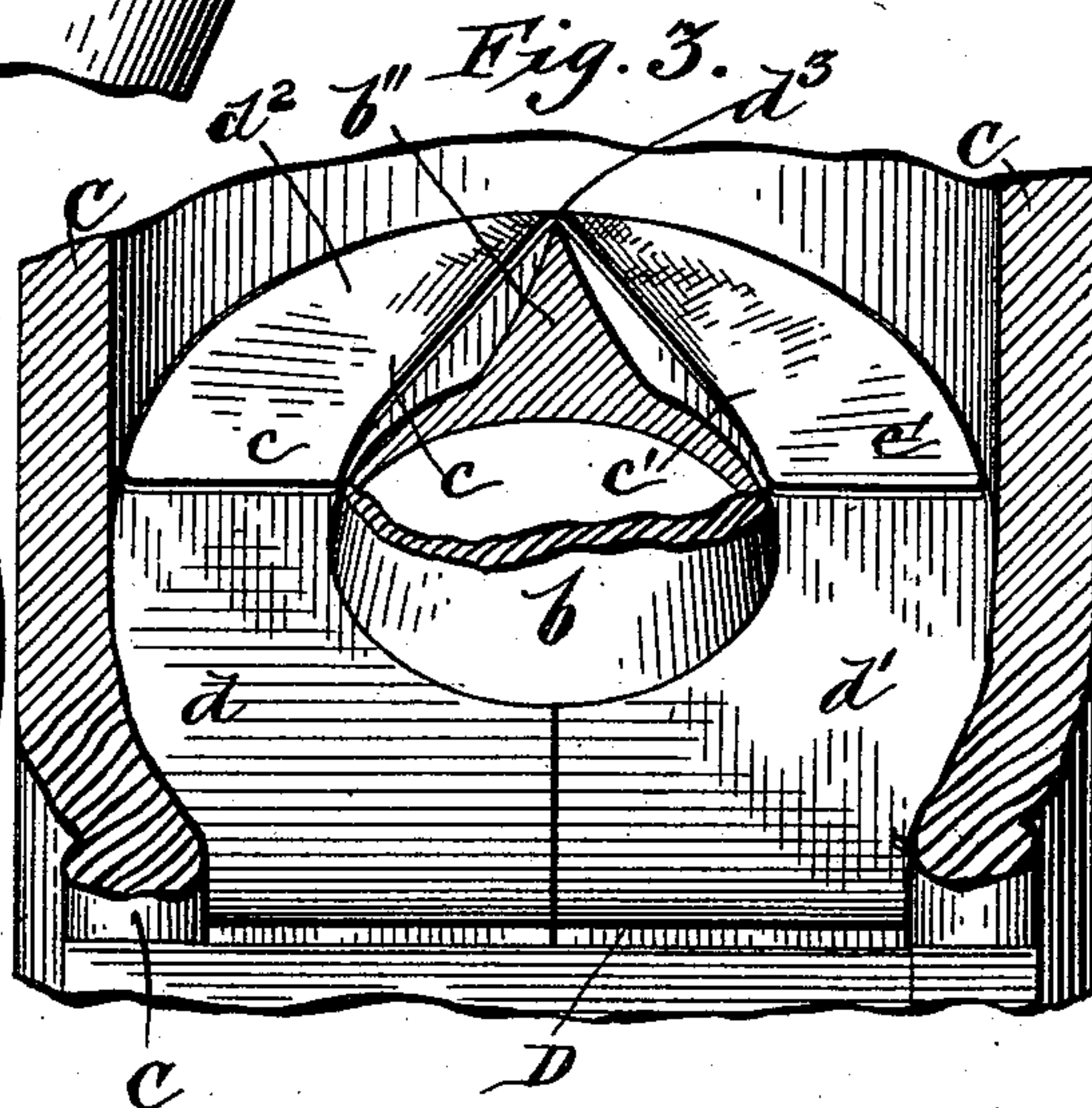
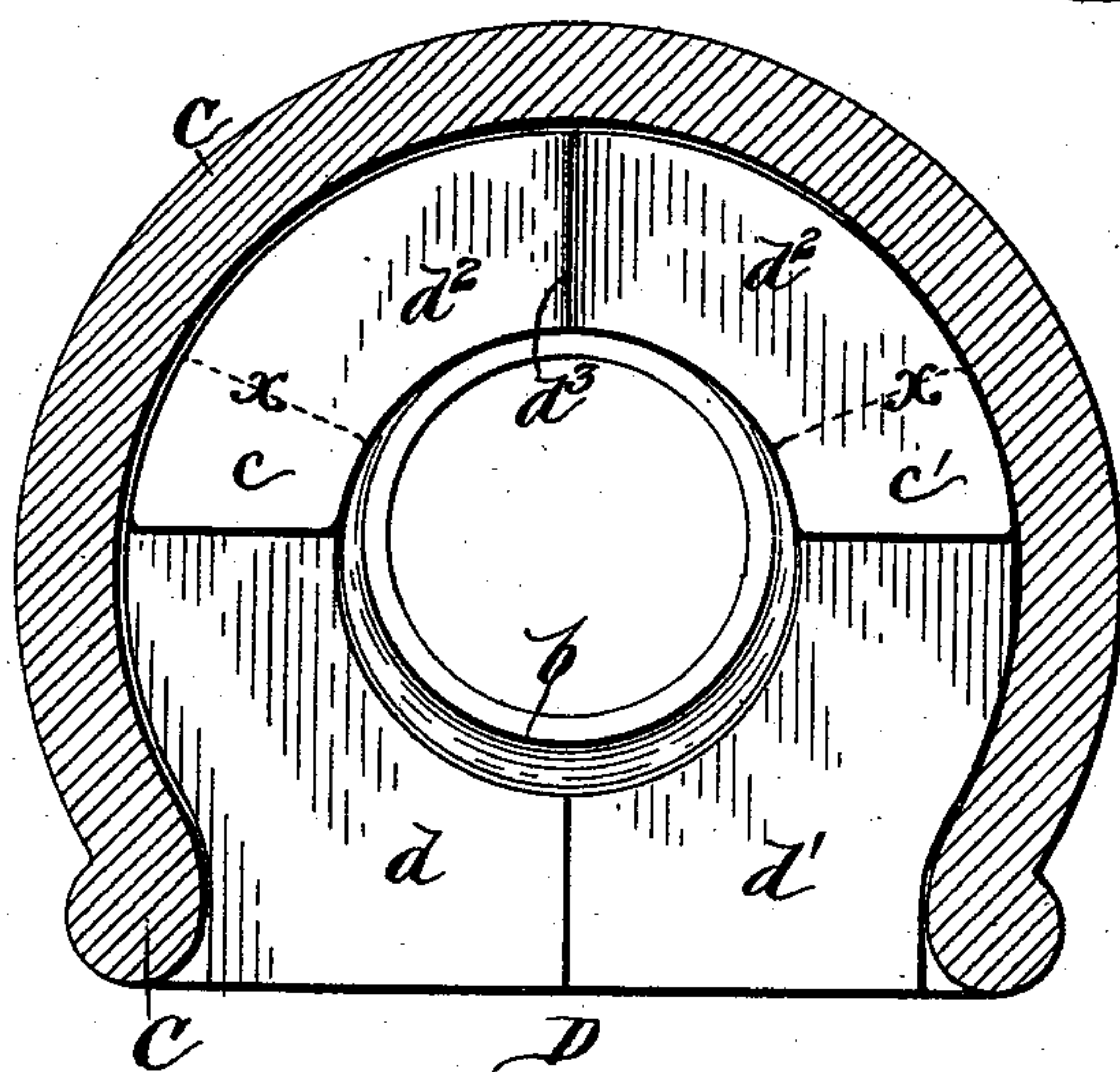
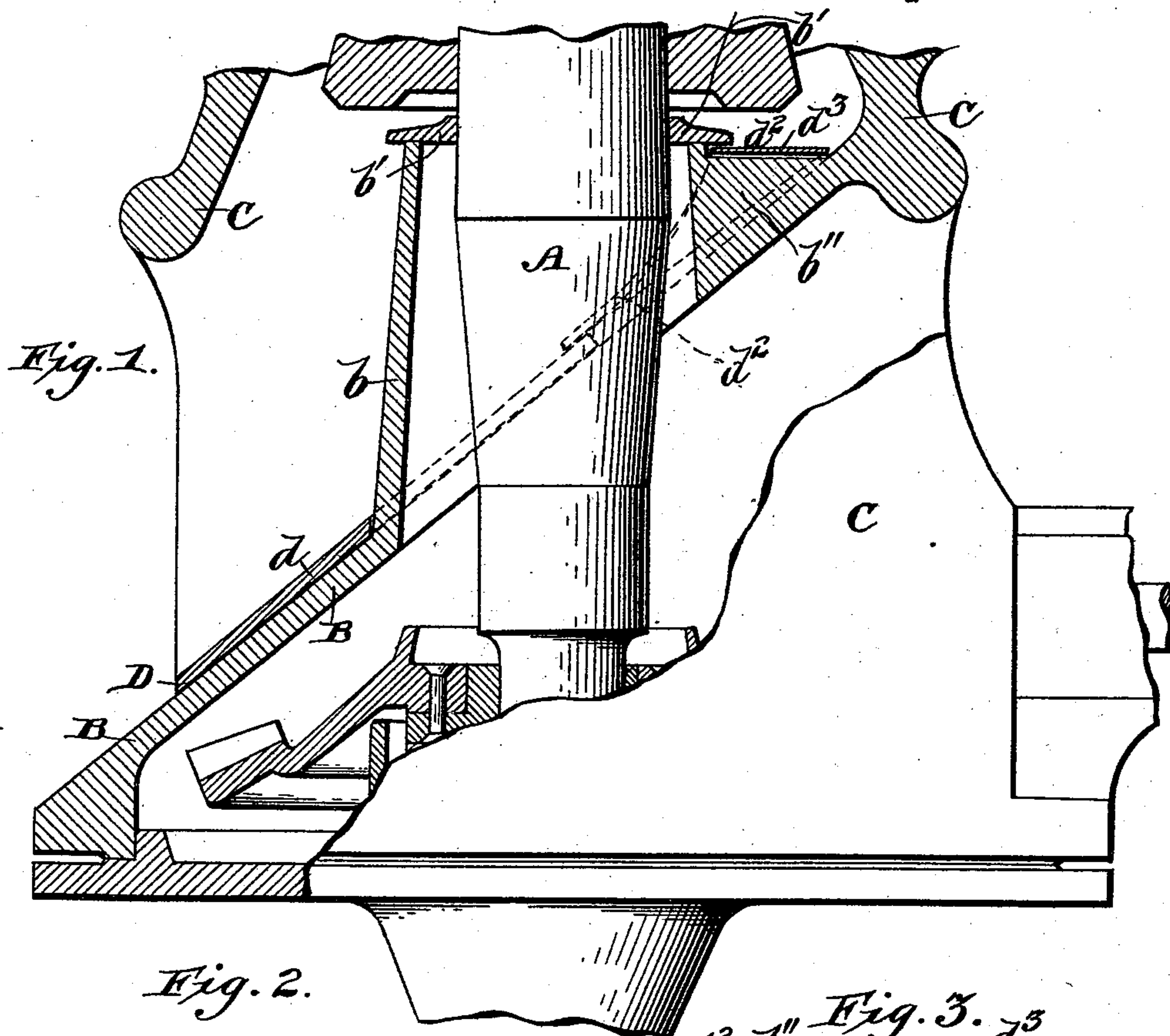


(No Model.)

P. W. GATES.

INCLINED DIAPHRAGM OF GYRATORY STONE BREAKERS.
No. 525,405. Patented Sept. 4, 1894.

Patented Sept. 4, 1894.



Witnesses

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Inventor

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 by
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 Attorneys

Attorneys

UNITED STATES PATENT OFFICE.

PHILETUS WARREN GATES, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE GATES
IRON WORKS, OF SAME PLACE.

INCLINED DIAPHRAGM OF GYRATORY STONE-BREAKERS.

SPECIFICATION forming part of Letters Patent No. 525,405, dated September 4, 1894.

Application filed October 23, 1893. Serial No. 488,917. (No model.)

To all whom it may concern:

Be it known that I, PHILETUS WARREN GATES, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Inclined Diaphragms of Gy-
ratory Stone-Breakers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it ap-
pertains to make and use the same.

My invention relates to improvements in removable, hard metal protecting diaphragms applied to the ordinary cast metal, inclined, transverse diaphragm chutes arranged and employed within the framing or casing of gyratory stone breakers or crushers, for guarding the gearing or operating mechanism against clogging or impeding substances, such as crushed rock, and the fine particles thereof, which in the absence of such diaphragms would discharge upon the same and cause serious trouble.

My invention is an improvement on Patent No. 265,957, issued October 17, 1882, and its object is to provide a surface protecting, chilled iron or steel diaphragm of novel construction and arrangement, and which can be more readily fitted in position and removed; and also to have the upper section of said chilled iron or steel protecting diaphragm, by its peculiar construction, shape and arrangement, serve as a director of the crushed stone, while it serves for closing the pocket left between the two upper ends of the two shortened lower members, the outer wall, and the common cast iron base-diaphragm.

The invention will be more fully understood from the following specification and claims in connection with the accompanying drawings, in which latter—

Figure 1. represents a vertical section of a gyratory stone crusher with my improvements applied thereto. Fig. 2. represents a top plan view of my said improvements, the crusher head being shown in horizontal section and Fig. 3. represents a front elevation of the same, the tubular diaphragm extension or flange being partly broken away, and the broken portions section lined.

In drawings, A is the gyratory shaft of the stone crusher, B the diaphragm chute, shown

as cast integral with the frame C of the crusher. This diaphragm is necessary in order to receive and direct the rock, stone, or dust, laterally out of the casing, while falling from the crusher head and thus keep it away from the operating mechanism about the lower portion of the gyratory shaft. The diaphragm is provided with a tubular extension or flange *b*, which forms a seat for the horizontal loose collar *b'* which surrounds the shaft A and thereby prevents the stone and dust from falling down between the shaft and the said flange, but at the same time allows of the gyratory movement of the shaft by sliding on the top of the said flange.

It has been found that the upper surface of the diaphragm chute wears away rapidly because of the continual striking of the rock, &c., thereon, and it becomes necessary to provide a protecting means for the same, that can be quickly and readily applied and removed without disturbing other parts of the machine. It has also been found in the ordinary construction that rock, dust, &c., will accumulate on the inclined diaphragm behind the tubular extension or flange *b*, until it interferes with the action of the crusher head above. I avoid these objections by constructing the removable chilled diaphragm D in three separable parts *d*, *d'*, *d*². The parts *d*, and *d'* being similar in form and construction to one another, and adapted to be inserted on each side of the tubular extension *b* of the diaphragm B; said parts *d*, *d'*, being so formed that when in position, they will be locked or prevented from sliding out, by their ends engaging the sides of the tubular extension, but said ends are not of sufficient length to meet in rear of said extension or to interfere with their ready insertion into the casing C so as to extend partially about the rear half of said tubular extension *b* as indicated by the dotted lines *x-x*. The third part *d*² of the chilled diaphragm has, as a whole, the form approximately of a wedge, the apex or highest point forming a ridge *d*³ at its middle, and the portion each side of said ridge, dropping to form two downwardly and forwardly inclined wings *c*, *c'*, the ends of said wings resting upon and overlapping the respective ends of the parts *d*, *d'*, on each side of the tubular extension or flange *b*, the ridge

d^3 being supported by a ridge shaped extension b'' of the tubular flange b . It can readily be seen that any rock or dirt falling behind the tubular extension b will strike the ridge d^3 and immediately slide down one or the other of the inclined wings c, c' , onto the diaphragm plates d, d' , which will discharge said rock or dirt at the front of the machine. By this peculiar construction of the diaphragm in three parts, and of such novel form, the whole diaphragm can be instantly changed when desired; and as the parts d, d' , automatically lock themselves in position when inserted on account of their inner ends extending past the widest portion of the tubular extension they cannot become loose or detached until they are turned or tilted in the casing C so as to disengage their ends from the surface of the tubular extension.

It is obvious that the improved construction of hard metal wearing surface for the inclined diaphragm of stone breakers, would be useful, in the manner as described, whether the base upon which it is applied is made integral with the frame, or constructed separately and bolted in position in the manner described in the Letters Patent hereinbefore referred to.

What I claim as my invention is—

1. The inclined diaphragm chute formed of

a base portion having a tubular extension, and a removable chilled iron or steel wearing portion consisting of three separable parts, the upper part forming a continuation to the two lower parts, substantially as described.

2. The combination with the crusher casing, of an inclined diaphragm chute having a tubular extension and formed of a base portion and a removable wearing portion consisting of a ridge shaped rear part and two forward parts adapted to be overlapped by the ends of the said rear part, substantially as described.

3. The inclined diaphragm chute formed of a base portion, and a removable wearing portion consisting of three self locking parts, one of which is ridge shaped and overlaps the others, substantially as described.

4. The inclined diaphragm chute formed of a base portion and a removable wearing portion consisting of separable parts one of which is ridge shaped, substantially as described.

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

PHILETUS WARREN GATES.

Witnesses:

H. W. HOYT,
J. L. FARGO.