

(No Model.)

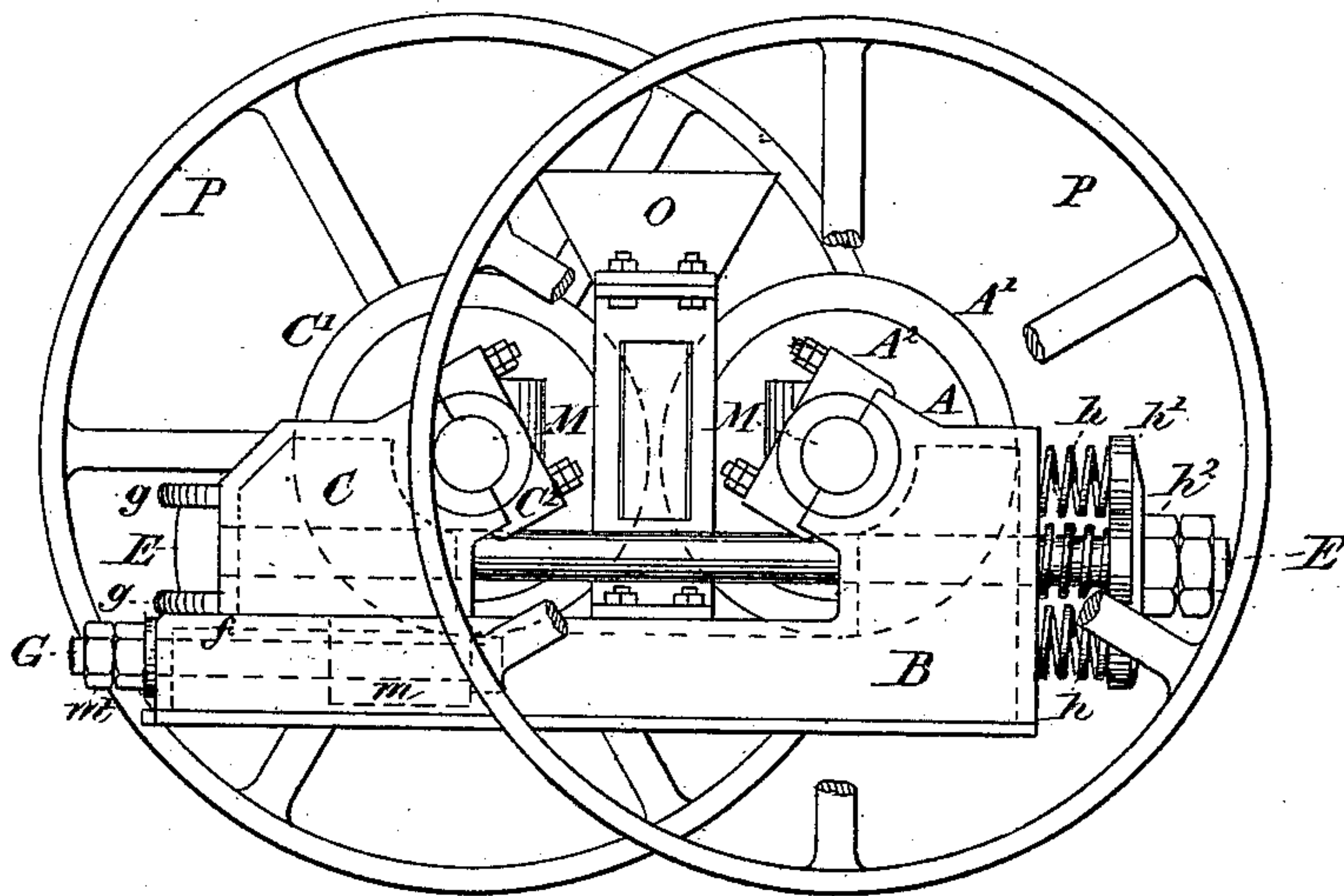
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C. G. BUCHANAN.  
CRUSHING ROLLS.

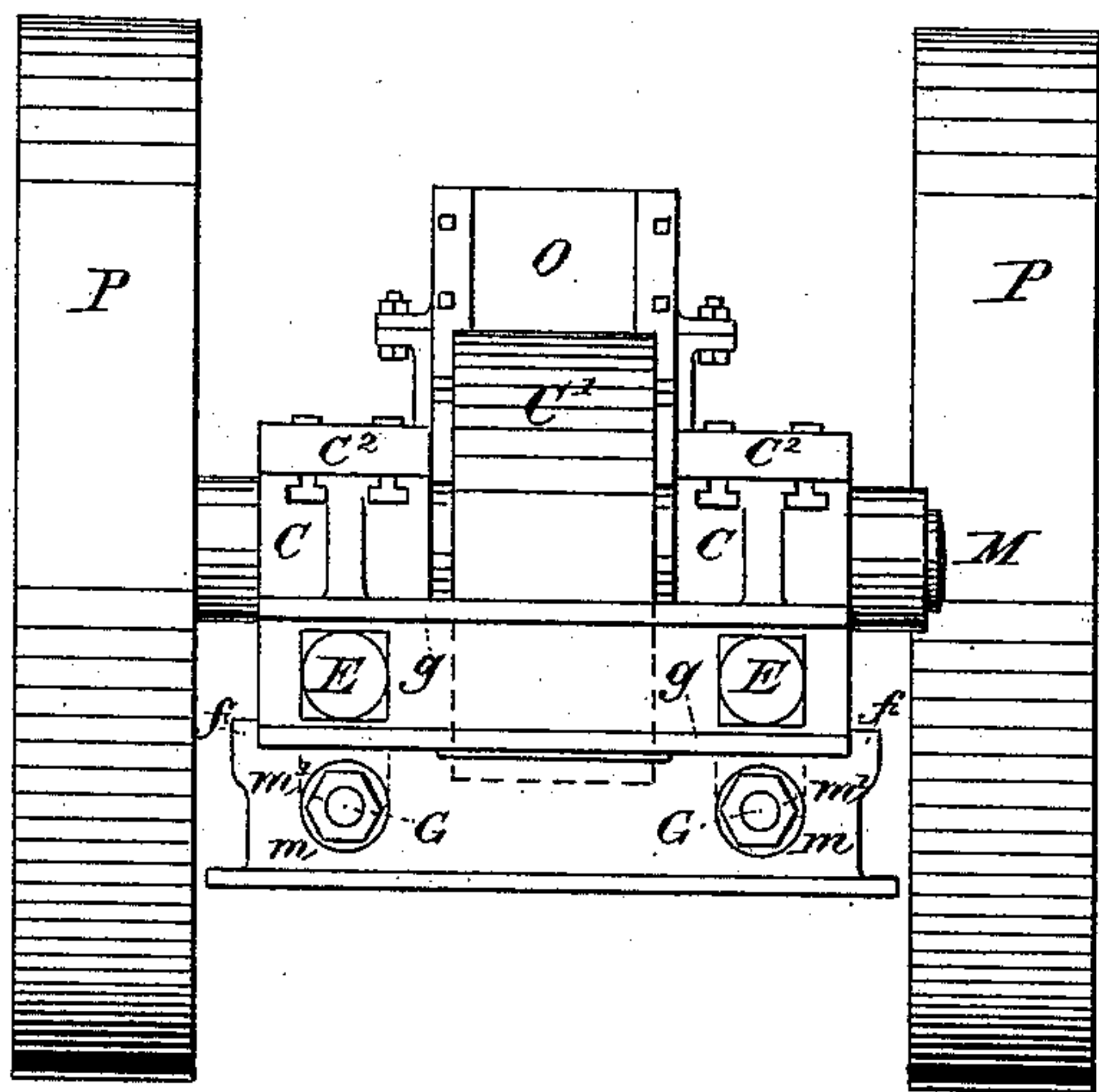
No. 420,571.

Patented Feb. 4, 1890.

*Fig. 1*



*Fig. 2*



Witnesses:  
Frank W. May.  
W. Buckingham

Inventor:  
Charles G. Buchanan,  
by Isaac L. Storey,  
his Attorney

(No Model.)

2 Sheets—Sheet 2.

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CRUSHING ROLLS.

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Fig. 3

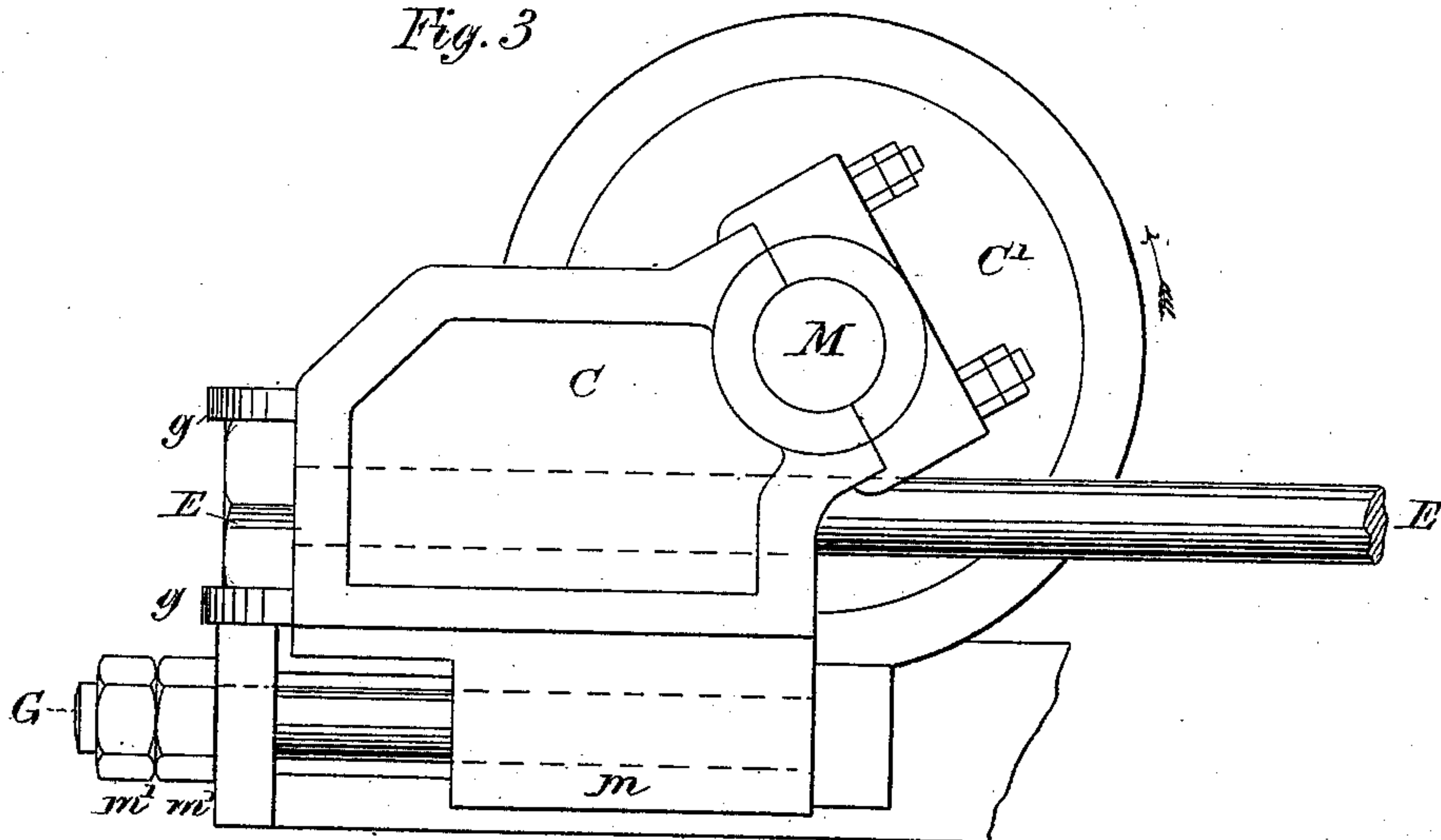


Fig. 4

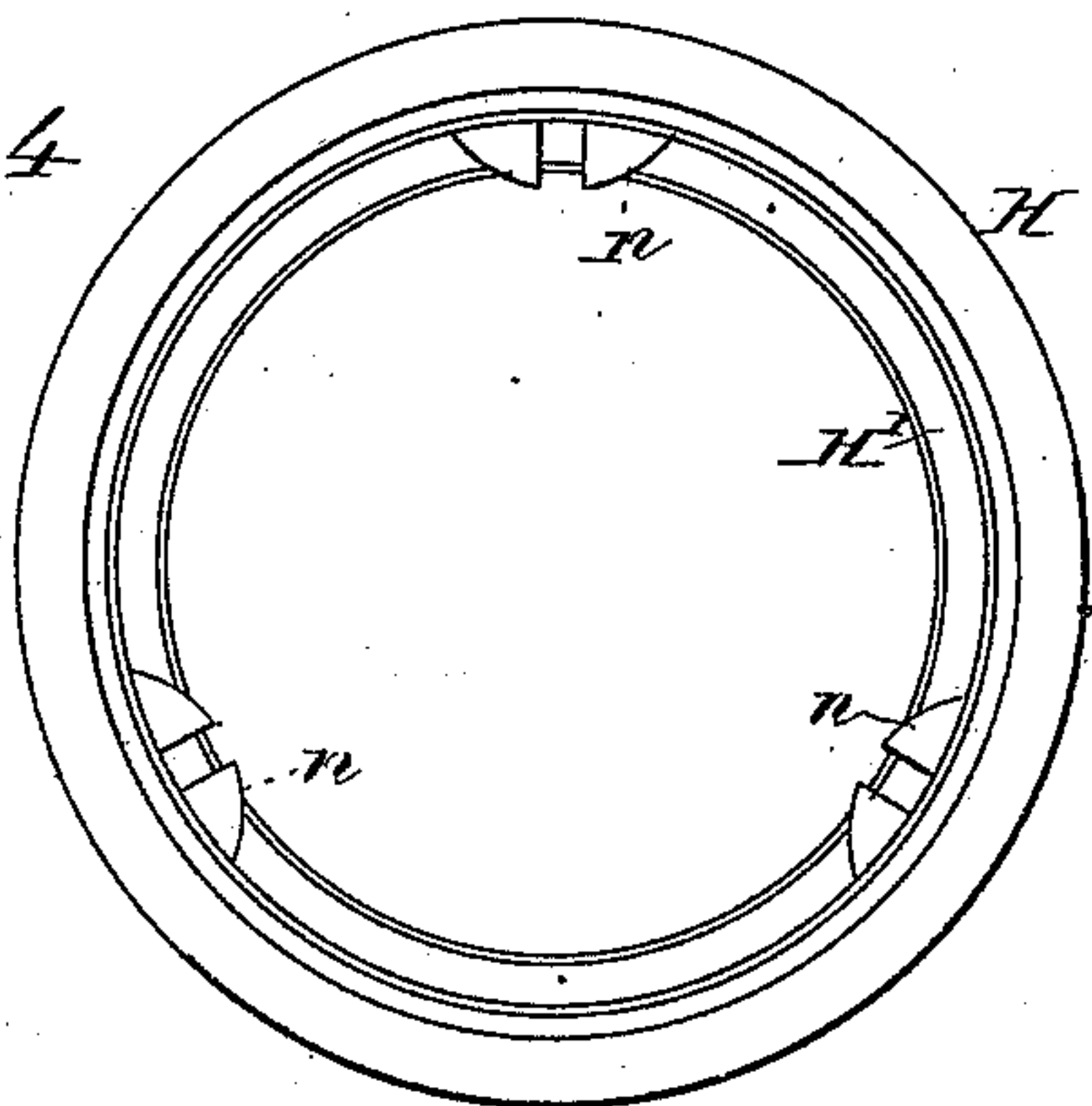
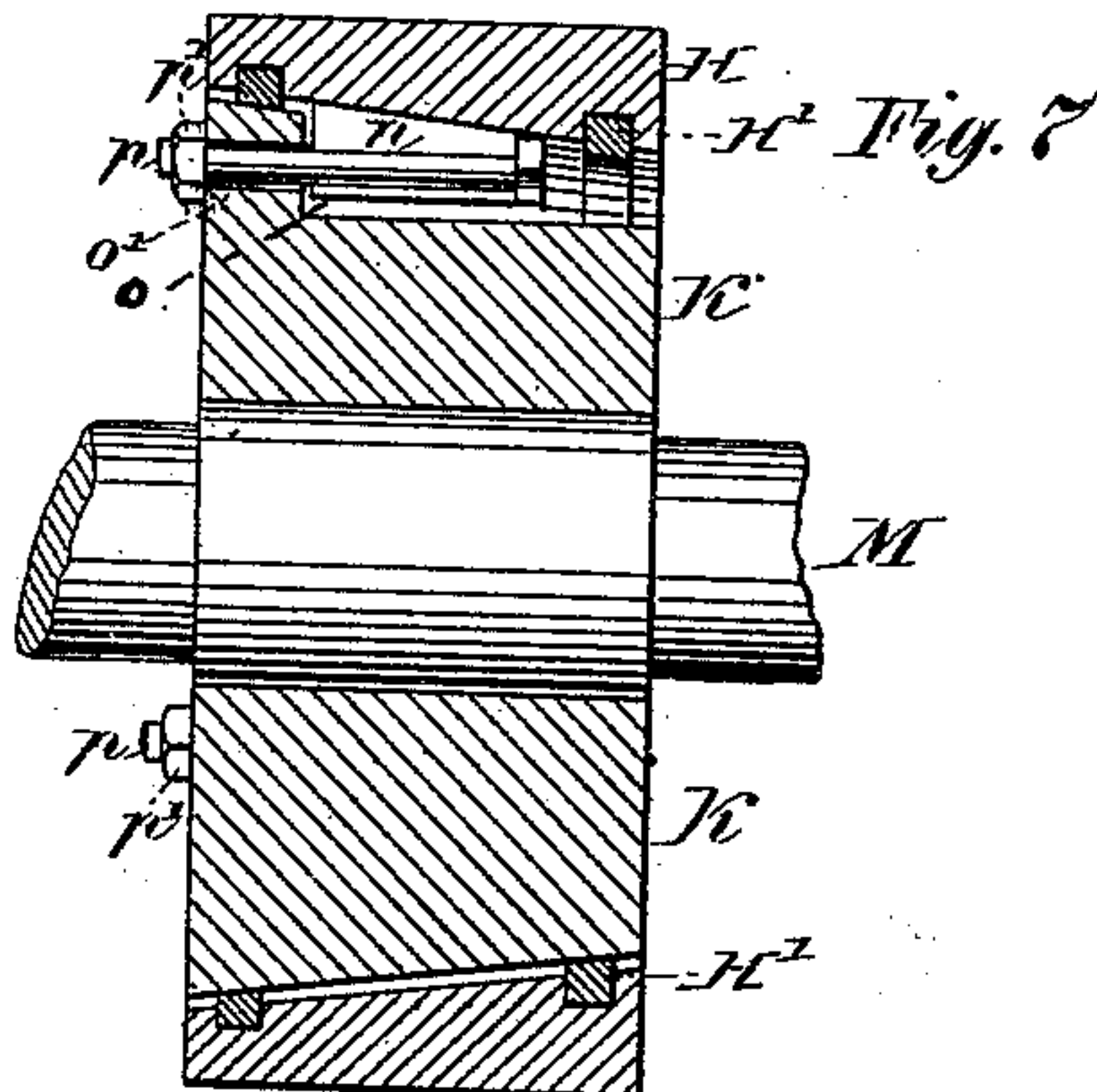
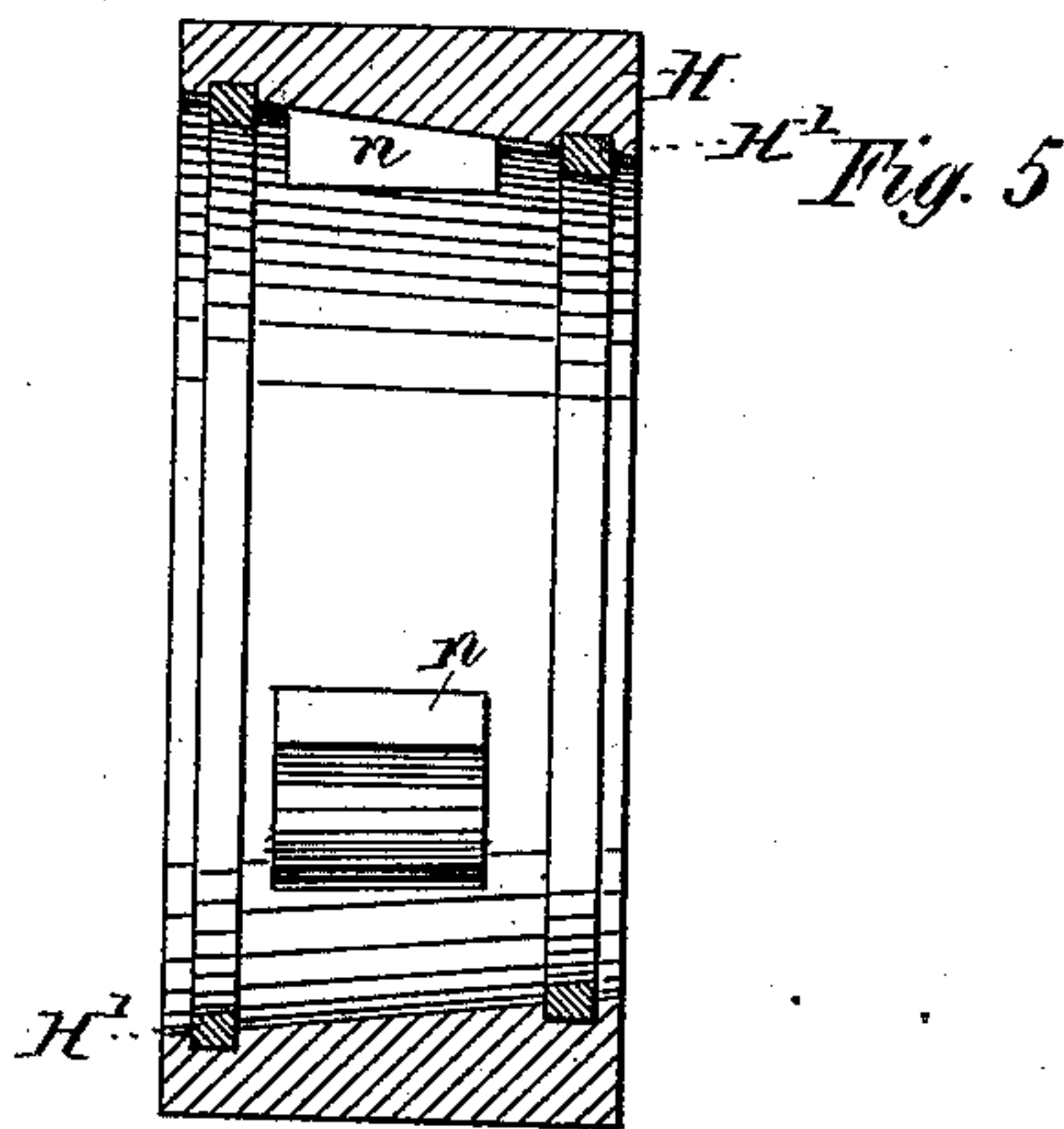
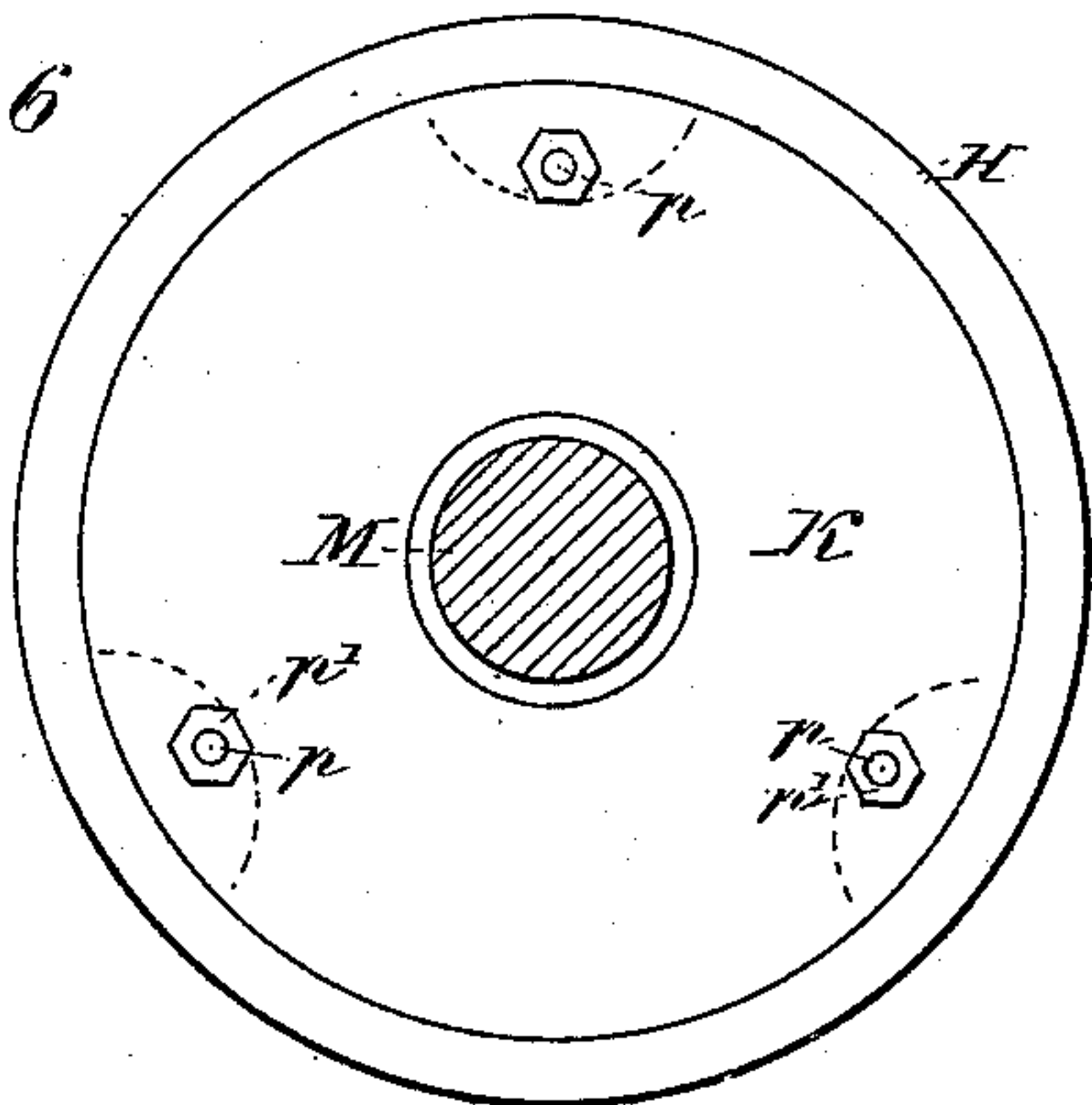


Fig. 6



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Inventor:  
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his Attorney.



# UNITED STATES PATENT OFFICE.

CHARLES G. BUCHANAN, OF NEW YORK, N. Y.

## CRUSHING-ROLLS.

SPECIFICATION forming part of Letters Patent No. 420,571, dated February 4, 1890.

Application filed April 24, 1889. Serial No. 308,385. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES G. BUCHANAN, of New York, county of New York, and State of New York, have invented certain new and  
5 useful Improvements in Crushing-Rolls, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

10 The object of this invention is to secure greater strength, rigidity, and simplicity of parts in the construction of ore-crushing rolls, to insure that the sliding roll shall always be parallel to the stationary roll, and to other-  
15 wise improve the rolls with the view of making them capable of performing their work with more accuracy and less wear, and so that the parts may be repaired or renewed with greater facility.

20 The invention embraces improved devices whereby a perfect alignment of the journal-boxes is secured, whereby the sliding roll is enabled to slide back and forth when requisite for adjustment or for relief from sudden  
25 strain in a straight line parallel to the stationary roll, and whereby it is prevented from lifting and unequal wear on its guides is prevented, and whereby the roll-shells are more rigidly secured to their centers and prevented  
30 from turning thereon; and the invention embraces other novel devices designed to further perfect the rolls and to provide a machine accessible in every part, easily and quickly adjustable, and especially strong and  
35 durable, all of which will be hereinafter set forth.

Reference is to be had to the accompanying drawings, forming a part of the specification, in which similar letters of reference  
40 indicate corresponding parts in all the figures.

Figure 1 is a side elevation of my improved rolls secured in a frame and ready for work, with parts broken away to exhibit other parts. Fig. 2 is a front elevation of the same. Fig.  
45 3 is an enlarged partly-sectional side elevation of a portion of the rolls. Fig. 4 is an enlarged end elevation of a roll-shell. Fig. 5 is an enlarged longitudinal sectional elevation of a roll-shell. Fig. 6 is an enlarged end  
50 elevation of a roll. Fig. 7 is an enlarged longitudinal sectional elevation of a roll.

In the construction of these rolls the journal-boxes A, provided with caps A<sup>2</sup>, of the stationary roll A' are cast in one piece with and as an integral part of the roll-frame B. 55 This construction of frame and journal-boxes insures perfect alignment of the journals of the stationary roll and great strength and rigidity, avoids loose joints, and dispenses entirely with the many bolts and nuts com- 60 monly used in the assembling of the frame and stationary-roll journal-boxes, and so objectionable to milling and mining men.

Occasionally when the rolls are in operation a piece of iron or steel, a broken drill 65 or pick-point, or a bolt may be accidentally fed to the rolls with the ore to be crushed, and it is evident that in such case one roll must recede from the other in order to avoid fracture. 70

In my improved rolls the two journal-boxes C C of the sliding roll C' are cast together in one piece, their standards or bases being connected by a strong heavily-ribbed cross-bar g, which is an integral portion thereof. 75 Heavy guides ff, (best shown in Fig. 2,) for guiding the boxes C C in their forward or backward movements, are made integral parts of the frame B, and said boxes being set on the upper face of the frame B between 80 the guides ff the sliding roll C' can move to or from the stationary roll only in a line parallel to the latter. This construction and arrangement of the sliding-roll journal-boxes, aside from being stronger and more durable, 85 dispenses with nearly all of the loose joints, the nuts, and bolts common to other crushing-rolls.

The journal-boxes C C are held to the frame B by two heavy steel tension-bolts E E, which 90 pass through them or their bases and the said frame, and are nearly in line with the greatest strain when the rolls are in operation. About those ends of these bolts E E which extend beyond the front of the roll-frame are 95 nests h h of steel springs, held in position by heavy washers h' h', which in their turn are kept in place by nuts h<sup>2</sup> h<sup>2</sup> on the ends of said bolts. These springs are designed to be strong and stiff enough to resist without com- 100 pression the strain resulting from the regular work of the rolls, and only yield under



abnormal strains, as when a drill-point or other substance too hard to crush gets between the rolls. Their resisting power may be increased or diminished by screwing up or unscrewing the nuts  $h^2 h^2$ , as the case may be.

The sliding roll is adjusted relatively to the stationary roll by means of the adjusting-bolts G G.

The journal-boxes C C, provided with caps C<sup>2</sup>, are provided with strong downward-projecting lugs  $m m$ , which extend down into corresponding slots (not shown) in the frame B, and through these lugs and the rear portion of the frame B these adjusting-bolts G G are passed horizontally and secured by nuts  $m' m'$ . By turning these nuts  $m' m'$  in one or the other direction the distance between the sliding roll C' and the stationary roll A' can be nicely adjusted while the rolls are in operation. These bolts G G serve also to counteract the tendency which all sliding rolls have of lifting in the direction of the arrow, Fig. 3, when the rolls are at work. The bolts G G also serve, in combination with the lugs  $m m$ , to prevent the rolls from striking together on the recoil of the sliding roll after the passage of any uncrushable foreign substance between them, and consequently to prevent the chipping of the roll-shells, which often occurs in the case of other crushing-rolls because of their striking together.

My improved rolls are made with removable shells H H, as best shown in Figs. 4, 5, and 6, cast on rings H' H', of wrought or soft cast iron, which rings may be easily turned down to form suitable bearings for the roll-center, and these shells are also cast slightly tapering inside, as indicated, that they may be more easily fitted to their centers.

From the inner face of a roll-shell near the center of its length three slotted lugs  $n n$ , equidistant from each other, project inward, as best shown in Figs. 4, 5, and 6, and in assembling the parts these lugs enter into corresponding pockets  $o o$ , formed in the periphery of the roll-center K, as shown in Figs. 6 and 7, and serve for setting the drift-bolt against when driving the shell on the center, and they serve, also, to effectually prevent the turning of the shell on the center when the rolls are in operation. The pockets  $o o$  in the roll-centers extend about half the length thereof, and from their closed ends bolt-holes  $o' o'$  extend out through the ends of the said centers.

Strong bolts  $p p$  are passed through the shell-lugs  $n n$  and the bolt-holes  $o' o'$ , and are provided with suitable nuts  $p' p'$ . These

bolts and nuts assist in drawing the shells H in place on the tapering roll-centers and firmly hold them there.

The centers K are designed to be securely keyed on their respective shafts M, which latter are preferably made of wrought-steel.

The rolls when in position, as shown in Figs. 1 and 2, are provided with a hopper O, through which the material to be crushed is fed to them.

Driving-pulleys P are fixed on the roll-shafts; but an arrangement of gears may, when desired, be substituted for them.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In crushing-rolls, the combination of a slotted frame, two sliding roll-boxes cast in one piece and provided with depending lugs  $m m$ , working in the slots of said frame, adjusting-bolts G, passing through said lugs and into the frame, the adjusting-nuts  $m' m'$ , the tension-bars E, the springs  $h$ , the washer  $h'$ , and nuts  $h^2$ , all substantially as shown and described.

2. A crushing-roll constructed substantially as herein shown and described, consisting of internally-tapering roll-shell provided with internal bearing-rings near its edges and slotted lugs, tapering roll-center provided with peripheral pockets adapted to receive the shell-lugs and with bolt-holes for receiving drawing-bolts, and suitable drawing bolts and nuts, all arranged substantially as set forth.

3. The combination, with a crushing-roll shell, of interior wrought or soft cast metal rings embedded therein, and a tapering center fitting the internal diameter of said rings, substantially as and for the purposes described.

4. A crushing-roll consisting of an internal tapering roll-shell having embedded therein internal bearing-rings of wrought or soft cast metal and slotted lugs, tapering roll-center provided with peripheral pockets adapted to receive the shell-lugs and with bolt-holes for receiving the drawing-bolts, and suitable drawing bolts and nuts, all arranged substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand, in the presence of two witnesses, this 6th day of March, 1889.

CHARLES G. BUCHANAN.

Witnesses:

JACOB J. STORER,  
FRANK W. MAY.