

N. A. HELMER.

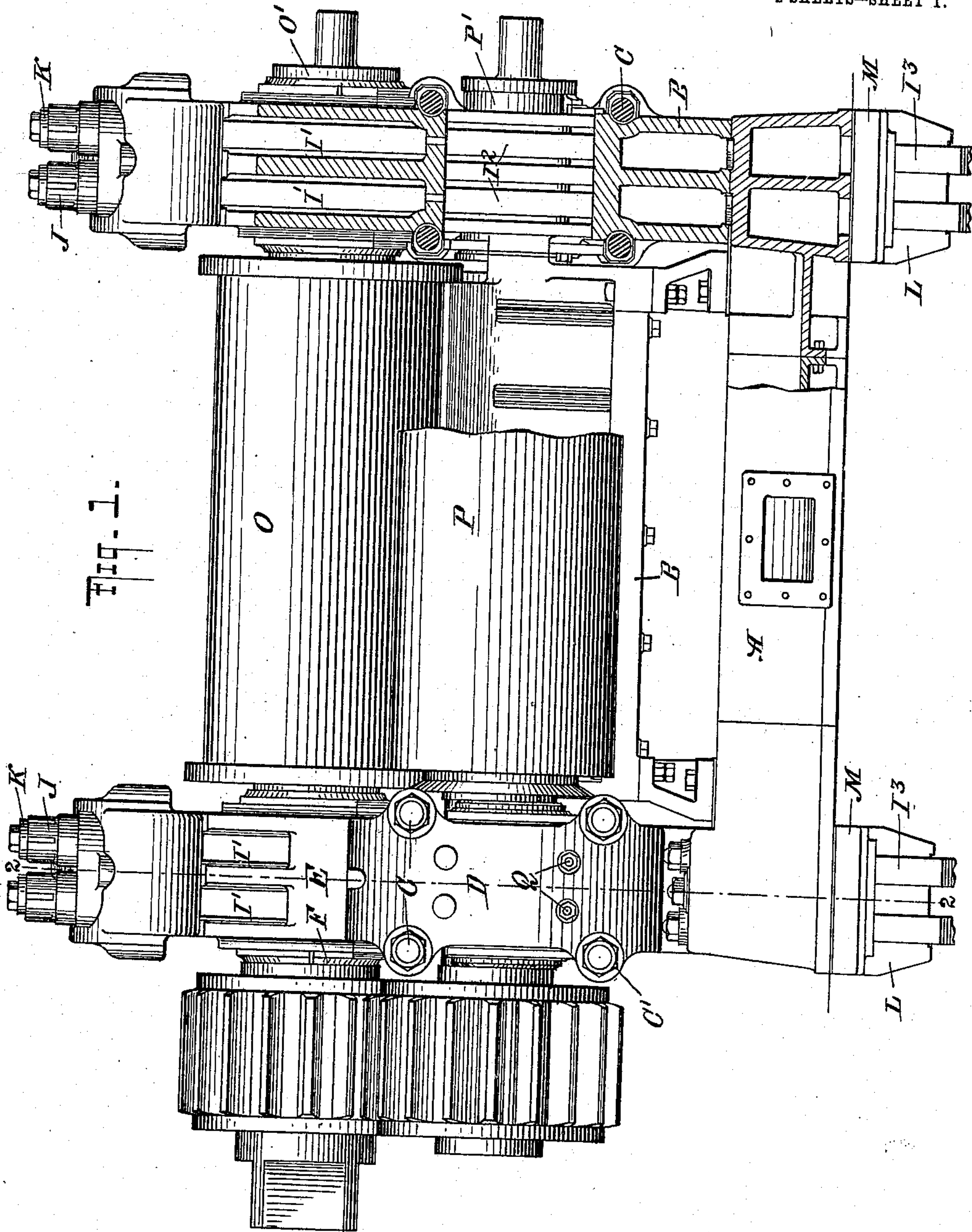
CRUSHING MILL.

APPLICATION FILED OCT. 1, 1908.

924,062.

Patented June 8, 1909.

2 SHEETS—SHEET 1.



WITNESSES

*G. V. Rasmussen*

*John Lotka*

INVENTOR

NICOLAS A. HELMER

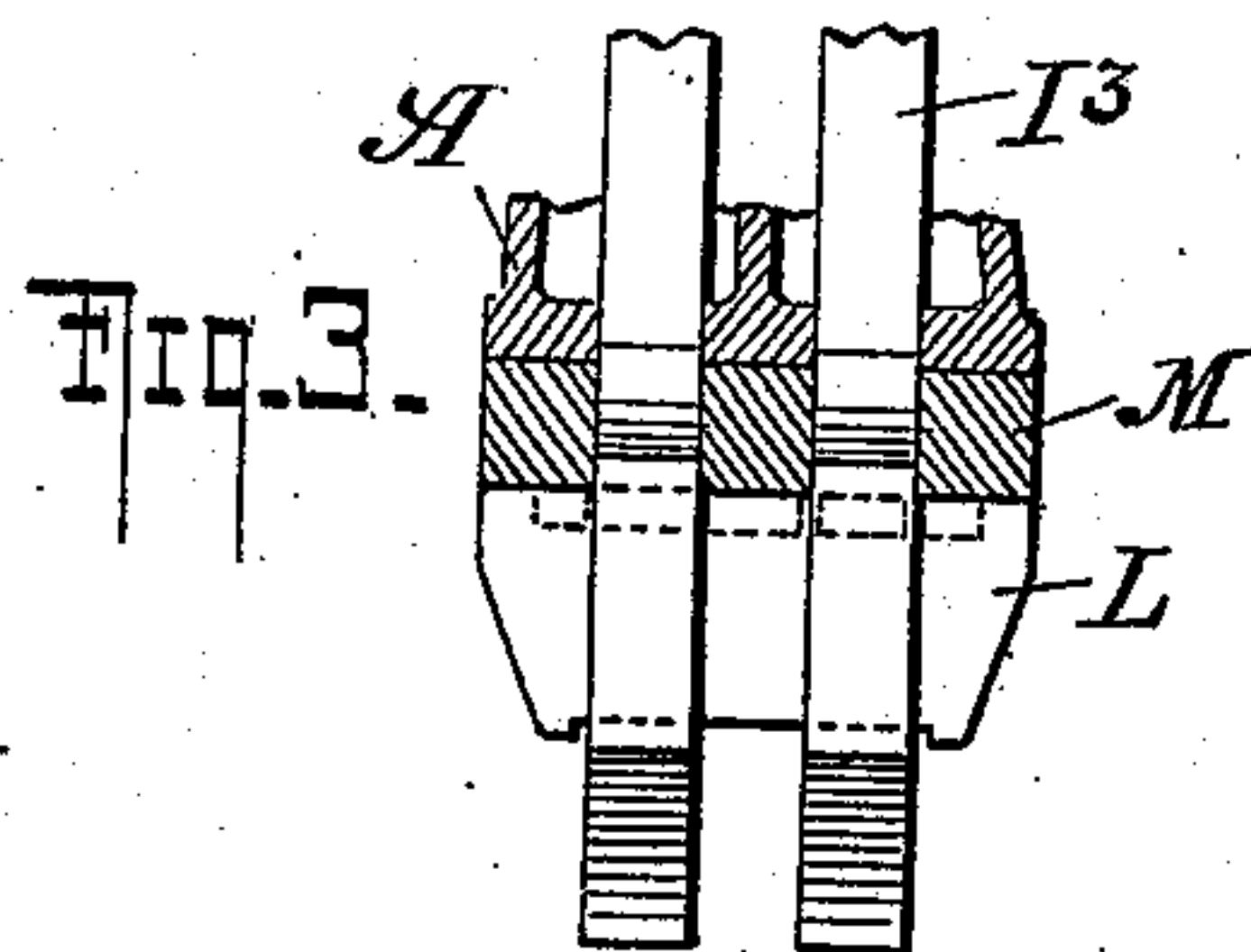
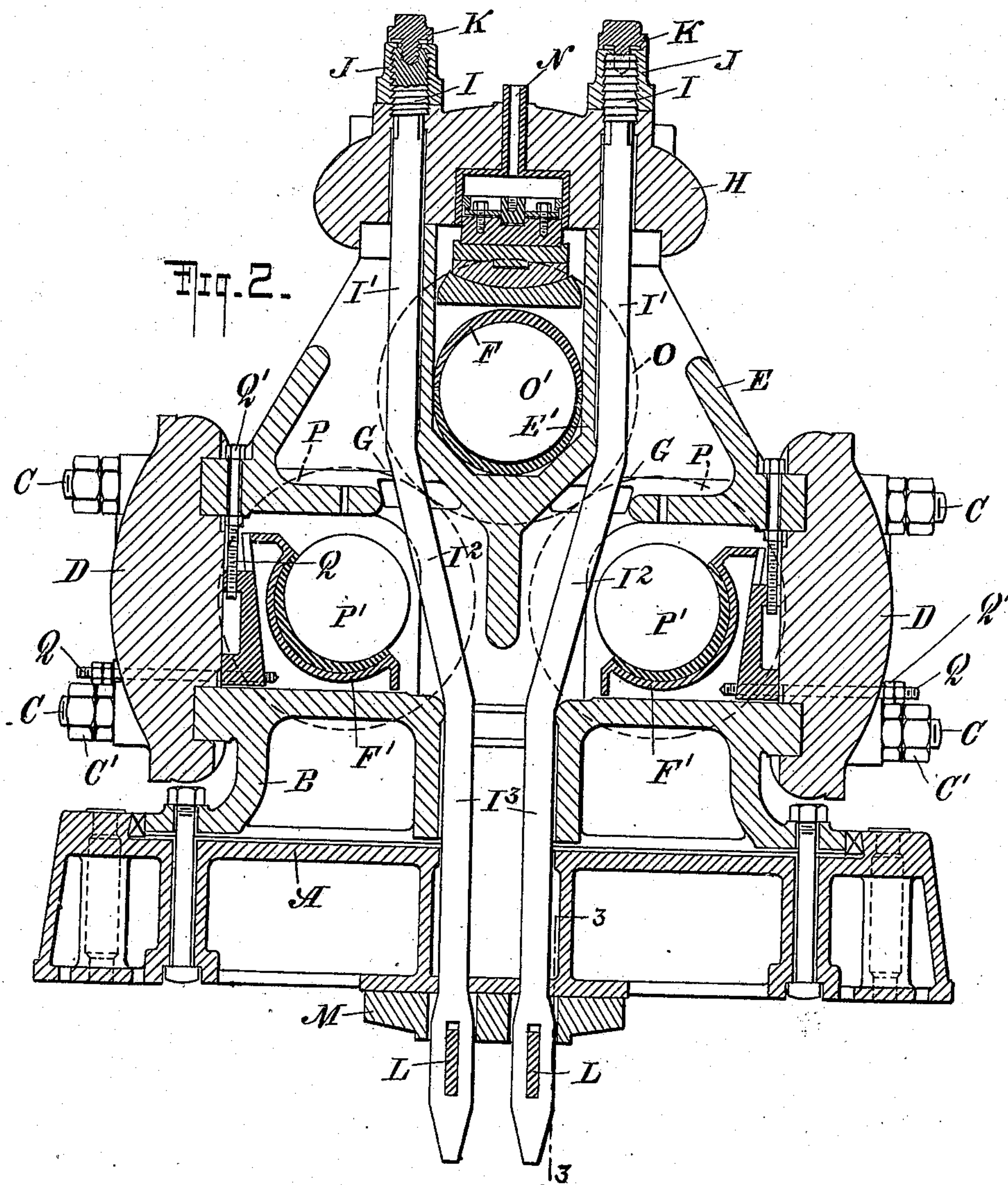
BY

*Briese & Thwaite*  
ATTORNEYS

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*G. V. Rasmussen*  
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# UNITED STATES PATENT OFFICE.

NICOLAS ARTHUR HELMER, OF NEW YORK, N. Y.

## CRUSHING-MILL.

No. 924,062.

Specification of Letters Patent.

Patented June 8, 1909.

Application filed October 1, 1908. Serial No. 455,666.

*To all whom it may concern:*

Be it known that I, NICOLAS ARTHUR HELMER, a citizen of the United States, and resident of Oakwood Heights, in the borough and county of Richmond, city and State of New York, have invented certain new and useful Improvements in Crushing-Mills, of which the following is a specification.

My invention relates to crushing mills, particularly for the treatment of sugar cane and the like and has for its object to strengthen the construction especially of those parts which are used to resist the pressure exerted on the bearings of the crushing rollers, and to hold these rollers in their desired position.

The invention will be fully described hereinafter and the features of novelty pointed out in the appended claims.

Reference is to be had to the accompanying drawings in which—

Figure 1 is a front elevation of a sugar cane mill provided with my improvements, with parts broken away; Fig. 2 is a sectional elevation on line 2—2 of Fig. 1; and Fig. 3 is a detail in section on line 3—3 of Fig. 2.

The frame or casing of the mill is suitably constructed and in the particular machine illustrated by the drawing such frame comprises a base A on which rests a supporting member B having horizontal surfaces at the top. These surfaces are spaced from each other at their inner ends, leaving a vertical passage between them, with which passage connect vertical perforations located in the base A. Against the supporting member B are clamped as by means of bolts C and nuts C', side plates D which serve to hold in position the guide E for a centrally located movable bearing F above said member. Passages G are left at the sides of the central portion E' of the guide E, the outside width of said central portion being greater than the distance between the lower portions of the perforations located in the frame below the horizontal surfaces mentioned above. A cap H is fitted on the upper end of the guide E and this guide is firmly connected with the remainder of the machine by means of king bolts, the upper portions of which are screw-threaded at I to receive nuts J and lock-screws K. These bolts have also vertical portions I' which extend through the cap H and along the outside of the central guide portion E', being in engagement therewith.

Then the bolts have downwardly converging portions I<sup>2</sup> which extend to the openings left in the base A and in the supporting member B. The lower portions I<sup>3</sup> of the bolts are again vertical and parallel and they are held or secured by means of fastening keys L which are passed through the enlarged lower ends of the bolts and engage a suitable bearing plate M located in contact with the base A. The bolts are preferably square except at their threaded ends.

Through the pipe N located in the cap H, a suitable fluid under pressure may be introduced to force the bearing F downward and with it the journal O' of the upper roller O. Any approved hydraulic mechanism may be employed for this purpose. On the horizontal surfaces which are located at each side of the converging bolt portions I<sup>2</sup>, are located bearings F' for the journals P' of the front and back rollers P, the rollers O and P being arranged in triangle fashion. The bearings F' are suitably secured as by means of screws Q and nuts Q'.

It will be seen that the parallel upper portions I I' of the bolts engage the central guide portion E' on its outer surfaces, while the parallel lower portions I<sup>3</sup> of said bolts engage the inner surfaces of the support B between the bearings F'. By making the bolts with converging intermediate portions, I am enabled to bring the two rollers P very close together, which is an advantage in machines of this character. At the same time by having both end portions of the bolts parallel, I avoid the production of lateral weakening strains on the fastened portions of the bolts. I am thus enabled to obtain a very compact construction and to avoid breakage of the bolts under the severe strain to which the operation of the machine subjects them.

The manner of gearing the rollers together forms no part of my present invention and may be the usual one. Fig. 1 shows that four pairs of king bolts are employed in conjunction with the machine, but of course I do not restrict myself to this specific construction. The intermediate portion I<sup>3</sup> of the bolts form angles with the end portions, and in these angles are received respectively the corners at the top of the supporting member B and the corners of the central guide portion E', the bolts pressing inwardly against the corners of the guide portion E', and outwardly against the corners of the sup-



porting member B. To remove a king bolt I remove the keys L, the lock screw K and nut J and the cap H, whereupon by a slight lateral tilting of the bolt, it may be withdrawn in an inclined direction up through the frame of the machine.

I claim:

1. In a crushing mill for sugar cane and the like, a frame having two horizontal aligning surfaces, having a space between said surfaces, and a guide for a centrally located movable bearing above said space, the outside width of said guide being greater than the distance between said surfaces, additional bearings supported on each of said surfaces, bolts having parallel upper portions at the central bearing, parallel lower portions, and converging intermediate portions, and a cap held by the upper ends of said bolts.

2. In a crushing mill for sugar cane and the like, the combination of a pair of rollers, a central roller, their bearings, and a guide for the bearing of the central roller, with bolts for holding said guide, the end portions of said bolts being parallel, and their intermediate portions being convergent.

3. In a crushing mill for sugar cane and the like, the combination of three rollers arranged in triangle fashion, the bearings of said rollers, and a guide for the bearing of one of said rollers with bolts for holding said guides, said bolts having convergent portions between the other two rollers, and parallel end portions.

4. In a crushing mill for sugar cane and the like, the combination of three rollers arranged in triangle fashion and the bearings of said rollers, with a cap, hydraulic pressure mechanism interposed between the

said cap and one of the rollers, and bolts connected with the cap, said bolts having convergent portions between the other two rollers, and parallel end portions.

5. In a crushing mill for sugar cane and the like, the combination of a frame, bearings on the frame, two parallel rollers spaced apart and having reduced trunnions resting in said bearings, a third roller mounted independently intermediate between said parallel rollers and parallel therewith, bolts to maintain the relative position of the three rollers said bolts being closest together at one end and farthest apart at the other and having an intermediate portion at an angle with one of the said end portions, and in said angle pressing against a portion of the frame, the said bolts passing between the trunnions of the two first named parallel rollers.

6. In a crushing mill for sugar cane and the like, the combination of three rollers arranged in triangle fashion and a frame having bearings for said rollers, with bolts for maintaining said rollers in their proper relative position, said bolts passing on opposite sides of the axis of one roller and between the other two rollers, and being closest together at one end and farthest apart at the other end, and having an intermediate portion at an angle with one of the end portions, and in said angle pressing against a portion of the frame.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses this 20th day of April, 1908.

NICOLAS ARTHUR HELMER.

Witnesses:

JOHN LOTKA,

JOHN A. KEILLENBECK.