

(No Model.)

2 Sheets—Sheet 1.

G. F. E. BRINCKMANN.
ORE CRUSHER AND PULVERIZER.

No. 244,977.

Patented Aug. 2, 1881.

Fig. 1.

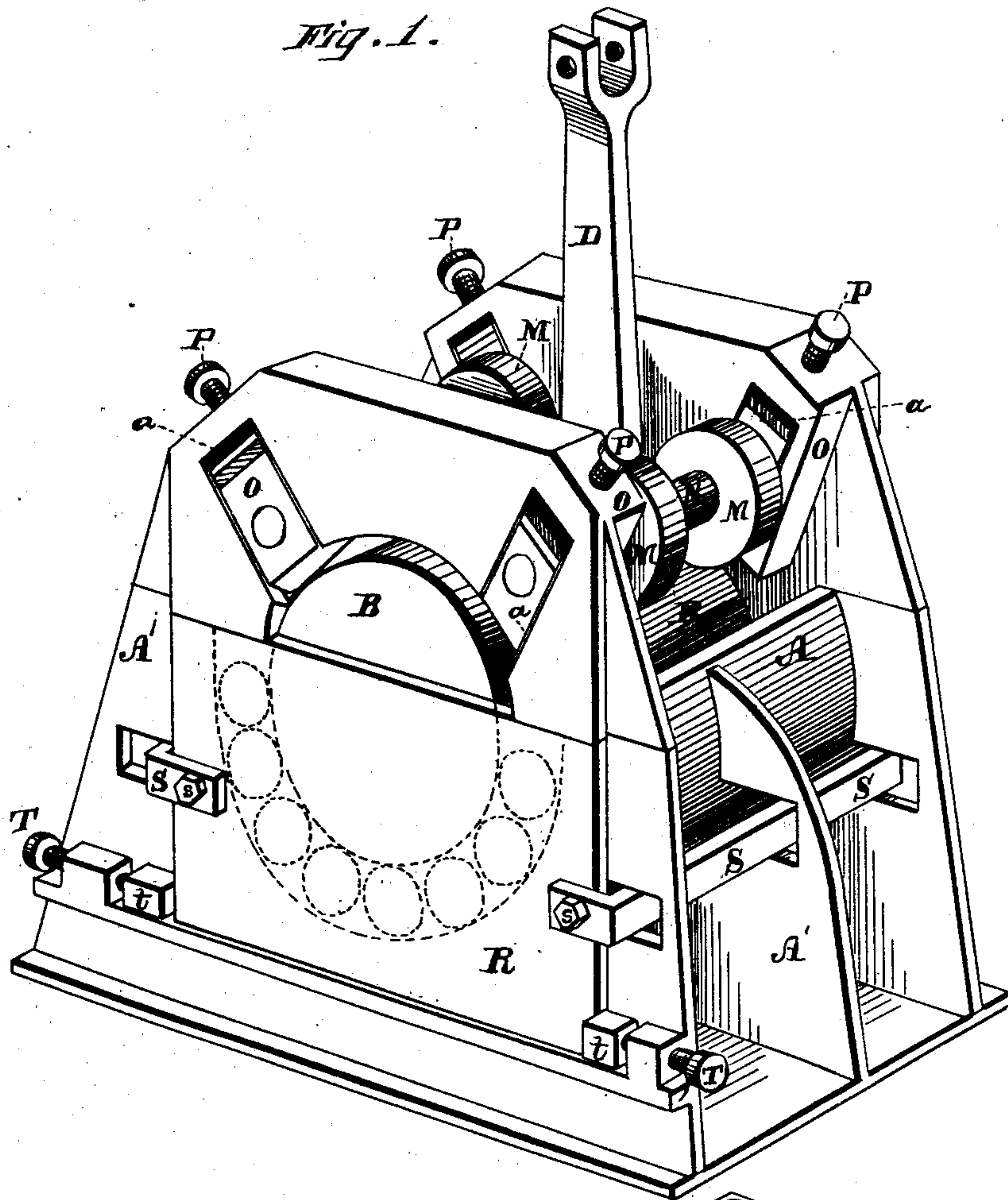
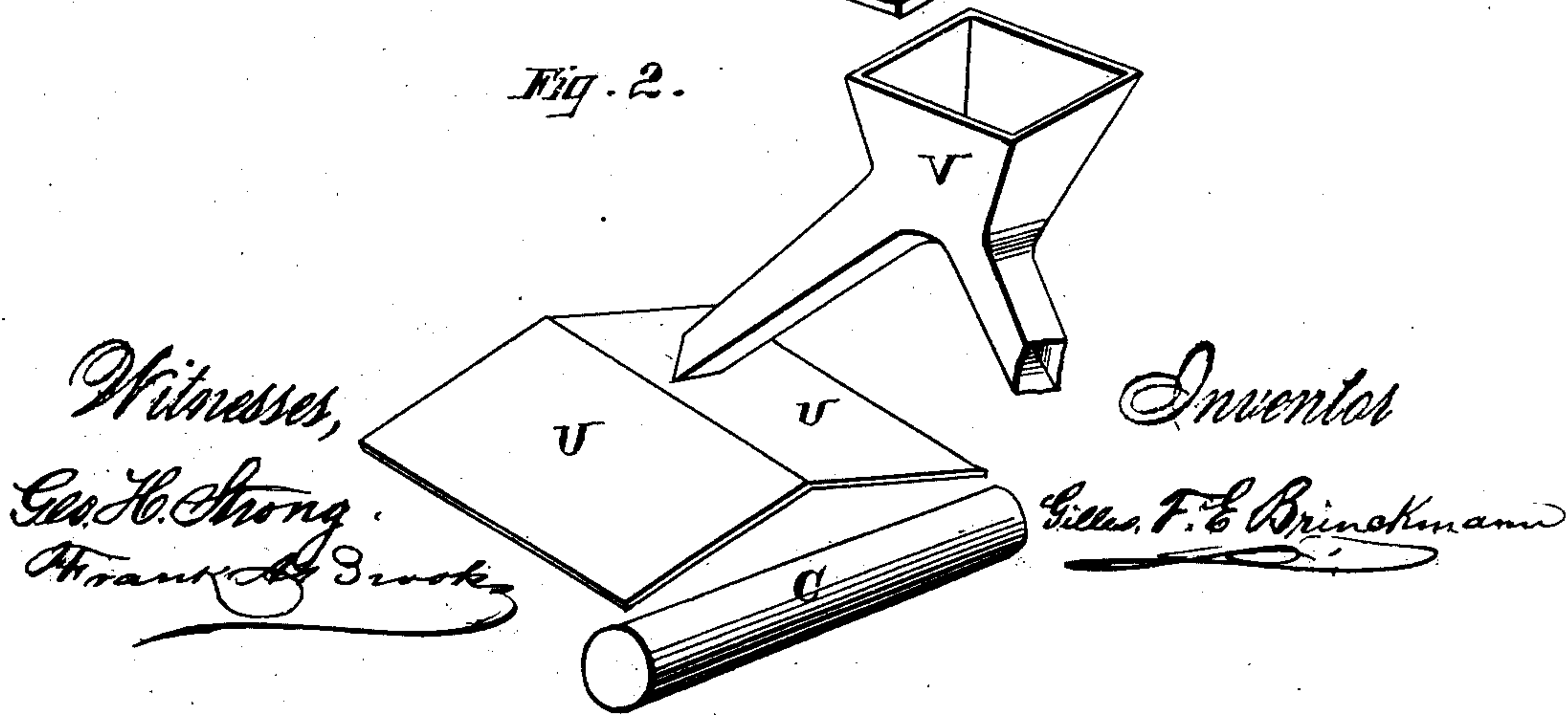


Fig. 2.



(No Model.)

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Fig. 3.

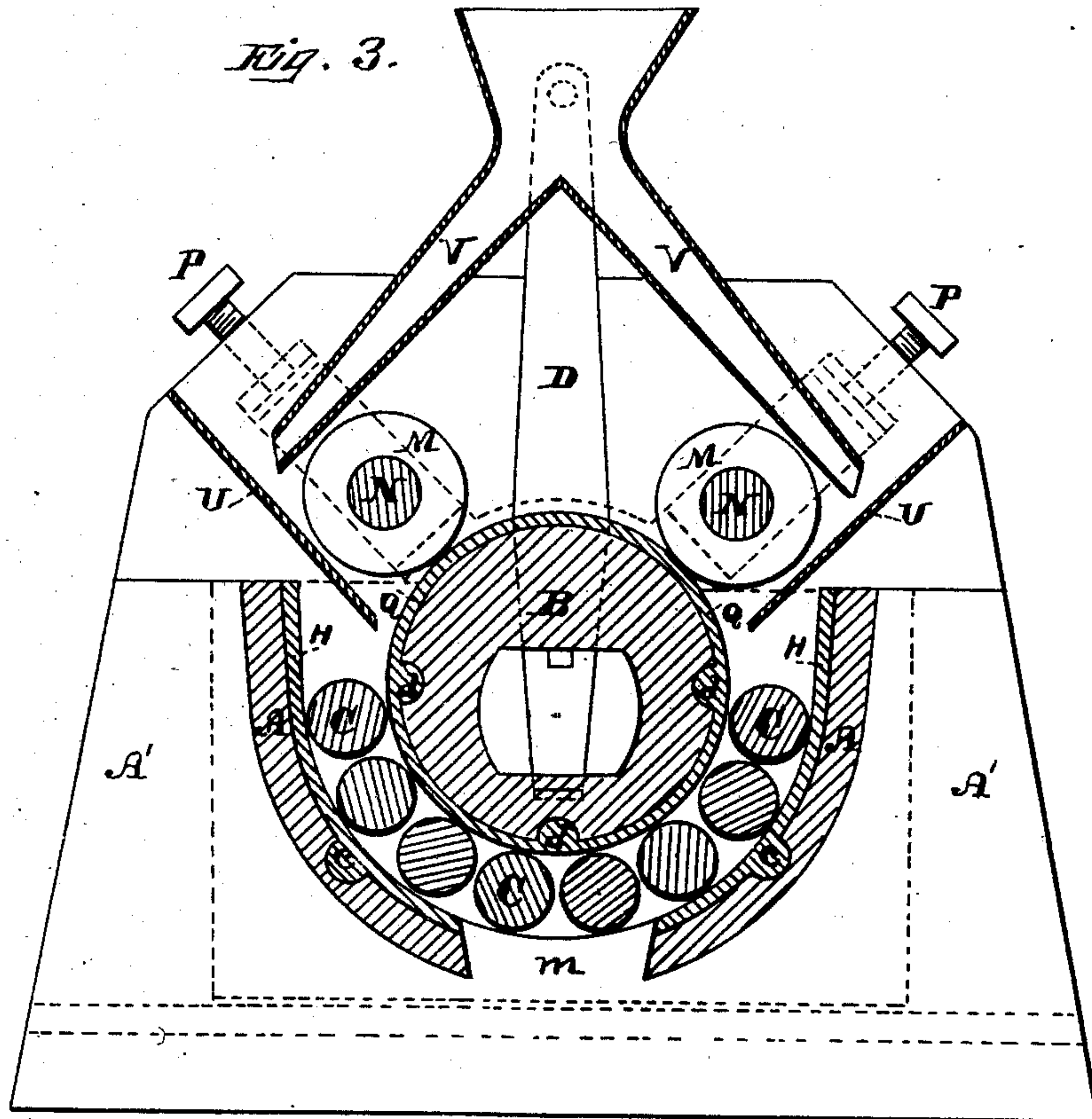
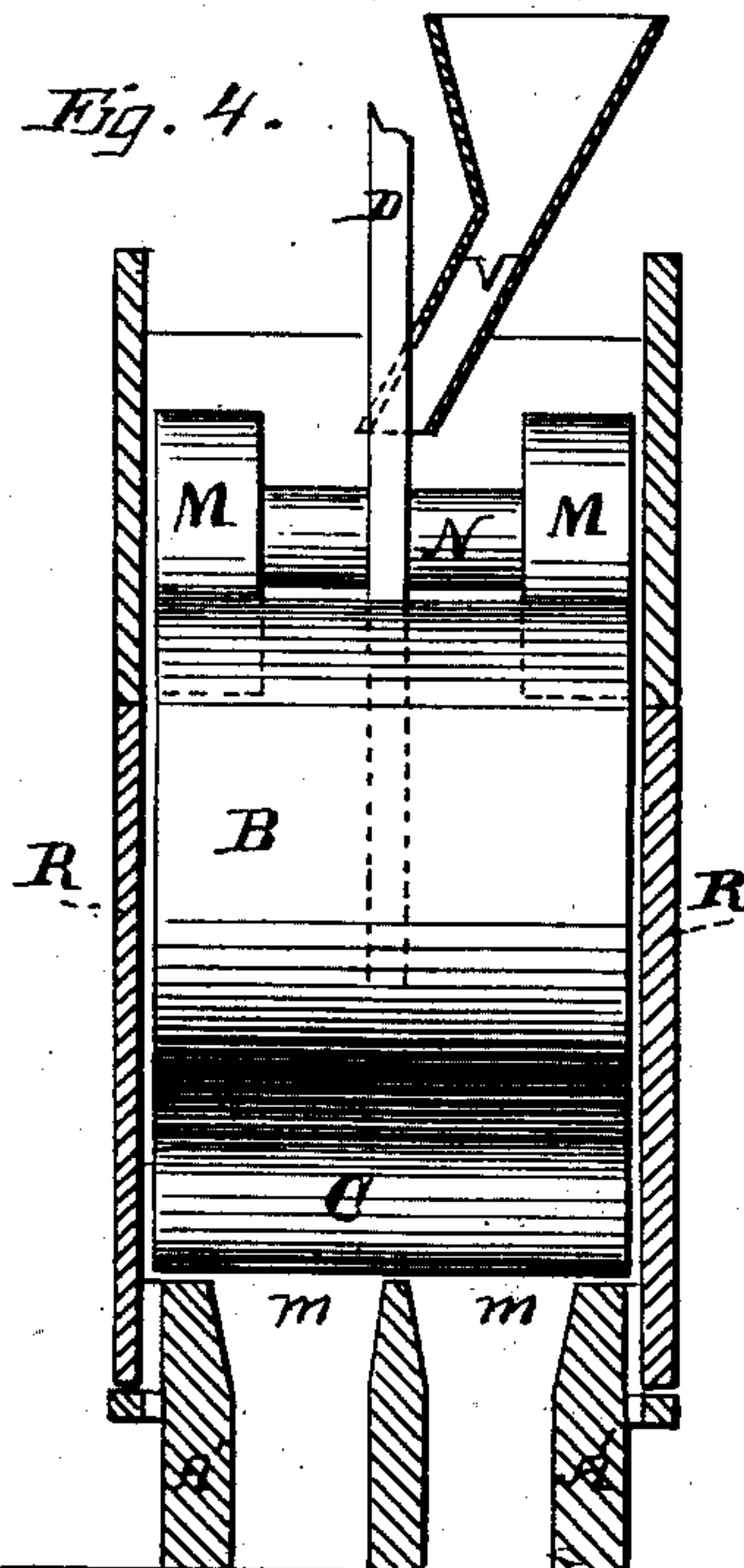


Fig. 4.



Witnesses,
Geo. H. Strong,
Frank A. Brinkmann

Inventor,
Giles F. E. Brinckmann

UNITED STATES PATENT OFFICE.

GILLES F. E. BRINCKMANN, OF OAKLAND, CAL., ASSIGNOR OF ONE-HALF TO
CHARLES B. JILLSON AND CARLOS D. JILLSON, OF SAME PLACE.

ORE CRUSHER AND PULVERIZER.

SPECIFICATION forming part of Letters Patent No. 244,977, dated August 2, 1881.

Application filed March 25, 1881. (No model.)

To all whom it may concern:

Be it known that I, GILLES F. E. BRINCKMANN, of Oakland, county of Alameda, State of California, have invented an Improved Ore Crusher and Pulverizer; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to certain improvements in ore crushers and pulverizers, and more especially to improvements upon the combined ore crusher and pulverizer patented to me, dated October 12, 1880, No. 233,139.

These improvements consist in providing a cylindrical muller and the necessary construction of the mortar or die in which it is contained to allow of its perfect operation; further, in providing adjustable roller-bearings or pressure-wheels tightened by set-screws, and pressing upon the top of the muller for the purpose of preventing it from rising, whereby I dispense with the use of the smaller or supplementary rollers described in my former patent, and also do away with the flanges and plates necessary to hold said rollers in place.

It further consists in a peculiar construction of the muller and of the mortar or die, whereby they may be easily and readily fitted with shoes; and, finally, in a peculiar device for feeding the ore on both sides of the machine, and evenly over the extent of the rollers.

Certain details of construction, changed somewhat from the construction of my patented machine, will be set forth as a necessary consequence of the various improvements.

The object of these improvements, it may be stated generally, is to overcome the disadvantages of my patented machine, and to improve in certain particulars thereon, all of which may be seen in the full and exact description, when taken in connection with the accompanying drawings, in which—

Figure 1 is a perspective view with the hoppers removed. Fig. 2 represents details. Fig. 3 is a horizontal cross-section. Fig. 4 is a vertical transverse section.

Let A' represent the outside casing or shell, cast in one piece, and having end openings covered by adjustable plates, as hereinafter described.

A represents the mortar or die, having an

open top and a curved base and straight sides, as shown—that is, the curve of the base of the mortar extends up on each side to points where it would, if continued as a curve, incline inwardly, at which points said curve is stopped and the sides continue straight up to the required height. This mortar is placed within the shell A', and is supported thereby. Within the mortar A is the muller B, cylindrical in shape.

In the mortar, between it and the muller, are placed rollers C, being of equal length with the mortar, and each being independent of the other, but resting one upon another. These encircle the muller up to the opening at the top of the mortar. These rollers bear upon the muller for its whole length, those above, on account of the divergence of the sides of the mortar from the muller, having more space in which to move. An arm or lever, D, is put upon the top of the muller, by means of which it is oscillated by any suitable power.

In the machine forming the subject of the Letters Patent above referred to the mortar was semi-cylindrical in form. This shape, when taken in connection with a cylindrical muller, would have left no openings on each side to allow the proper feeding and passage of the larger ore on top. It was consequently necessary to so shape the muller as to obviate this and prevent the binding of said muller in a contracted space when it was raised up by the quantity of ore beneath. This was accomplished by making the muller flattened out of the true circle on top, leaving two annular rims or edges in circular form to allow the rollers to act properly. On account of this binding, by reason of the limited space, it was further necessary to make offsets or shoulders in the muller, to form a pocket or space, in which to feed the ore between the muller and the rollers, and this space being so formed it is obvious that long rollers could not be there used, because they would close up this space. Resort was had to short rollers, running on the rims or edges, and in order to keep them in place the mortar had to have cast thereon flanges and guide-plates. To allow the lower rollers to rise up it was necessary to form annular grooves in some of the upper long rollers, to fit over the flanges and run properly, and to abut against the extended guide-plates to stop

their rising. All this construction was to obtain the requisite space at the feed-opening to admit the uncrushed ore and provide a passage toward the bottom, and to not clog or bind the muller.

By my present improvement of making the mortar with straight sides I obtain this space, and need not make the muller out of the cylindrical, nor have the offsets thereon. I can dispense with guide-plates and flanges, and with the small and grooved rollers.

The ore is fed in at the open top of the mortar, and falls by force of gravity as the muller is oscillated toward the bottom, having sufficient space above to be crushed without binding the rollers and muller, and being pulverized as it descends into the contracted space toward the bottom. When it reaches the bottom it discharges through the opening *m*. The upper rollers act upon the ore as in a rock-breaker, and as the space between the rollers and muller decreases the ore is more finely broken.

In order to prevent the muller from rising when the space below becomes filled with ore, I have constructed the pressure wheels or rollers *M*, bearing upon the muller and journaled on shafts *N*. There are four of these pressure-rollers *M*, two at each end of the muller, one on each side. They are rendered adjustable by boxes *O* having slots *a*, in which the ends of the shafts slide. A rubber or elastic buffer may be set in the boxes and covered by suitable plates, upon which the ends of the set-screws *P* impinge. By turning these screws the pressure wheels or rollers *M* are forced down upon the muller and keep it in place. They form an easy roller-bearing for the top of the muller. The rubber buffer will prevent any unusual jar.

H represents the shoe of the mortar *A*, the latter being formed with longitudinal grooves or channels *c*, and the shoe being formed with corresponding ribs fitting therein. The shoe can be thus slipped onto the end of the mortar, and secured, when in place, in any practicable manner. Likewise the shoe on the muller can be applied.

The muller is formed with longitudinal grooves or channels *d*, and the shoe *Q* formed with corresponding ribs or ridges for fitting therein. This construction is an improvement upon the one I have patented, rendering it unnecessary to remove the whole muller when worn.

When the muller, rollers, or mortar become worn the pressure-wheels *M*, by being set up, will take up all the slack occasioned by this wear and render the machine as tight as ever. I have hereinbefore referred to the end openings in the outer shell, *A'*. These are covered by the plates *R*, which thus inclose the ends of the mortar, rollers, and muller. If these plates were immovable, the constant oscillation of the rollers and muller would wear them away somewhat and allow the parts an unde-

sirable end play. I have therefore so constructed these plates as to allow them to be moved from side to side to present fresh points to the wear.

S represents clamps having end arms turned at right angles. These arms fit over the edges of the plates, and are provided with small set-screws *s*, which, when screwed up, press upon the plates and clamp them together. Each clamp secures the two plates, one on each side. When the screws *s* are loosened the plates may be pushed to one side to any limited distance. By doing this frequently they will be prevented from wearing out. For convenience in adjusting these plates I have here shown set-screws *T* and blocks *t* on both sides. By operating these screws and varying the number and size of the blocks the plates may be adjusted and held securely.

In feeding ore to the machine the object should be to feed to both sides of the muller, and at the same time to distribute the ore over the extent of the rollers. To do this I have placed longitudinally above the opening of the mortar the oppositely-inclined plates *U*. Each plate is slightly raised in the center, from which the surface of the plate inclines downwardly toward the ends of the rollers.

V represents the feed-spout, having a double discharge directed upon the inclined plates *U* to both sides, as shown. The ore, when passing down this spout, is discharged to both sides from the double funnel upon the inclined plates *U*, and is directed by their own side inclines over the full extent of the rollers, thus securing an even and well-directed feed and preventing the rollers from wearing in the center.

The ordinary operation of the crusher and pulverizer is the same as is described in my former Letters Patent, to which I have referred. It is obvious that my mortar *B* might be made with slightly-diverging sides, to secure the requisite feeding-space; but I prefer it as described. By casting the shell *A'* in one piece it requires no bracing. The rollers *C* are preferably made of cast-iron or cast-steel, cast on a chill.

This construction unites simplicity of machinery, reduced friction, perfect adjustability, and easy access to any part of the machine. By tightening up the pressure-wheels I have control over the machine to grind ore to any desired fineness.

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

1. In an ore-crusher having a cylindrical muller, *B*, and crushing-rollers *C*, the mortar *A*, having a circular or curved base and straight or diverging sides, said mortar being open on top, substantially as herein described.

2. In an ore-crusher having a mortar, *A*, with a curved or circular base and straight or diverging sides, and rollers *C*, contained therein, the oscillating or reciprocating cylindrical

muller B, arranged and constructed substantially as herein described.

3. The ore crushing and pulverizing device consisting of the mortar A having a curved base and straight or diverging sides, the rollers C, contained within said mortar, and the oscillating or reciprocating cylindrical muller B, arranged and constructed substantially as herein described.

10 4. In combination with the ore crushing and pulverizing device consisting of the mortar A, with its curved base and straight or diverging sides, the rollers C, and oscillating or reciprocating cylindrical muller B, the adjustable pressure rollers or wheels M, arranged and constructed substantially as and for the purpose herein described.

15 5. The ore crushing and pulverizing device consisting of the mortar A, having the longitudinal grooves or channels c, and fitted with a shoe, H, having corresponding ribs or ridges

to fit the grooves, the rollers C, and the oscillating or reciprocating cylindrical muller B, having grooves or channels d, and provided with a shoe, Q, fitting said muller by corresponding ribs or ridges, arranged and constructed substantially as herein described. 25

6. In combination with the ore crushing and pulverizing device consisting of the mortar A, rollers C, and oscillating or reciprocating muller B, the outside shell, A', cast in one piece, and having end openings covered with the adjustable plates R, secured by the clamps S, substantially as and for the uses and purposes herein described. 30

In witness whereof I have hereunto set my hand. 35

GILLES F. E. BRINCKMANN.

Witnesses:

GEO. H. STRONG,
FRANK A. BROOKS.