

(No Model.)

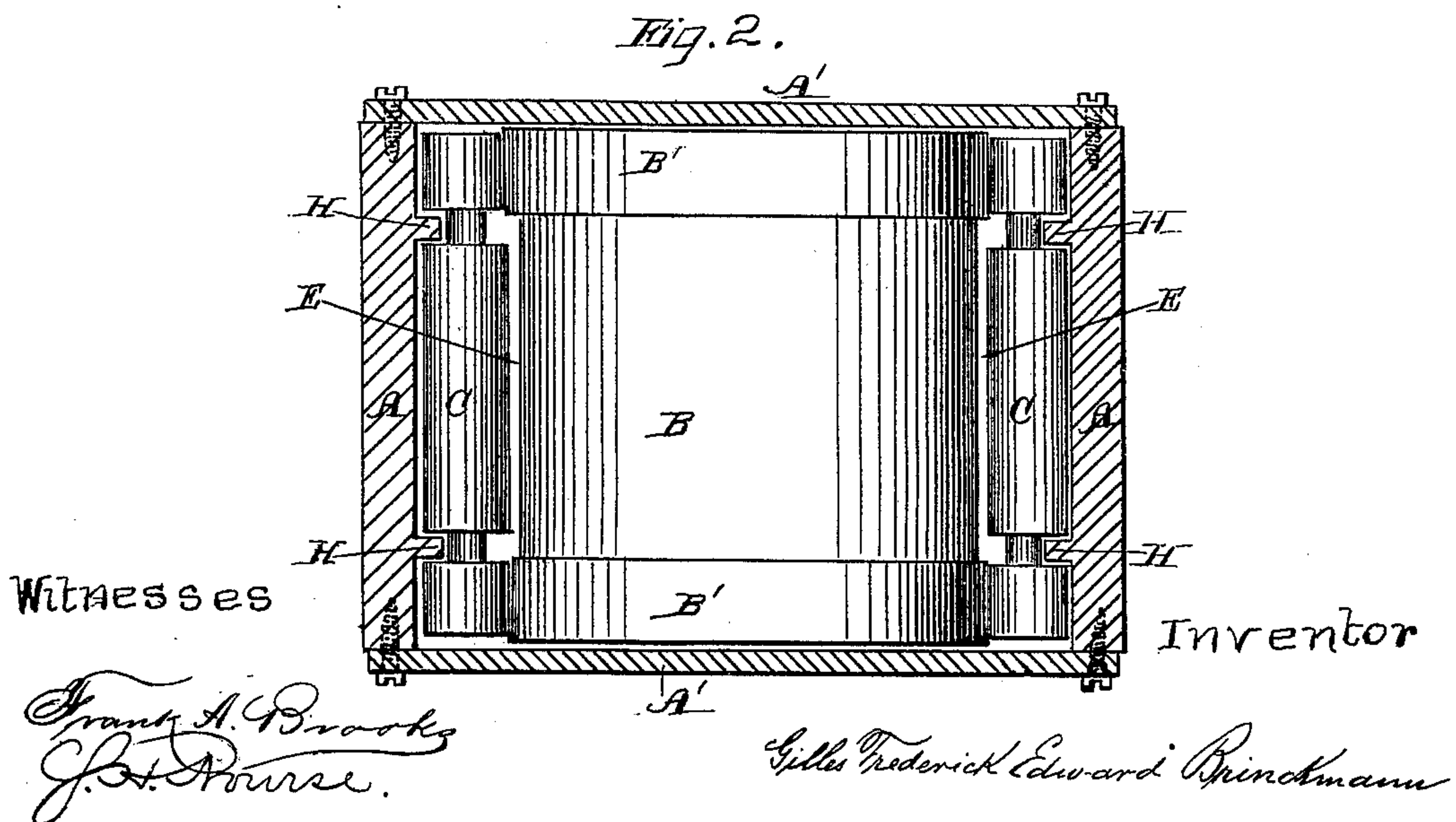
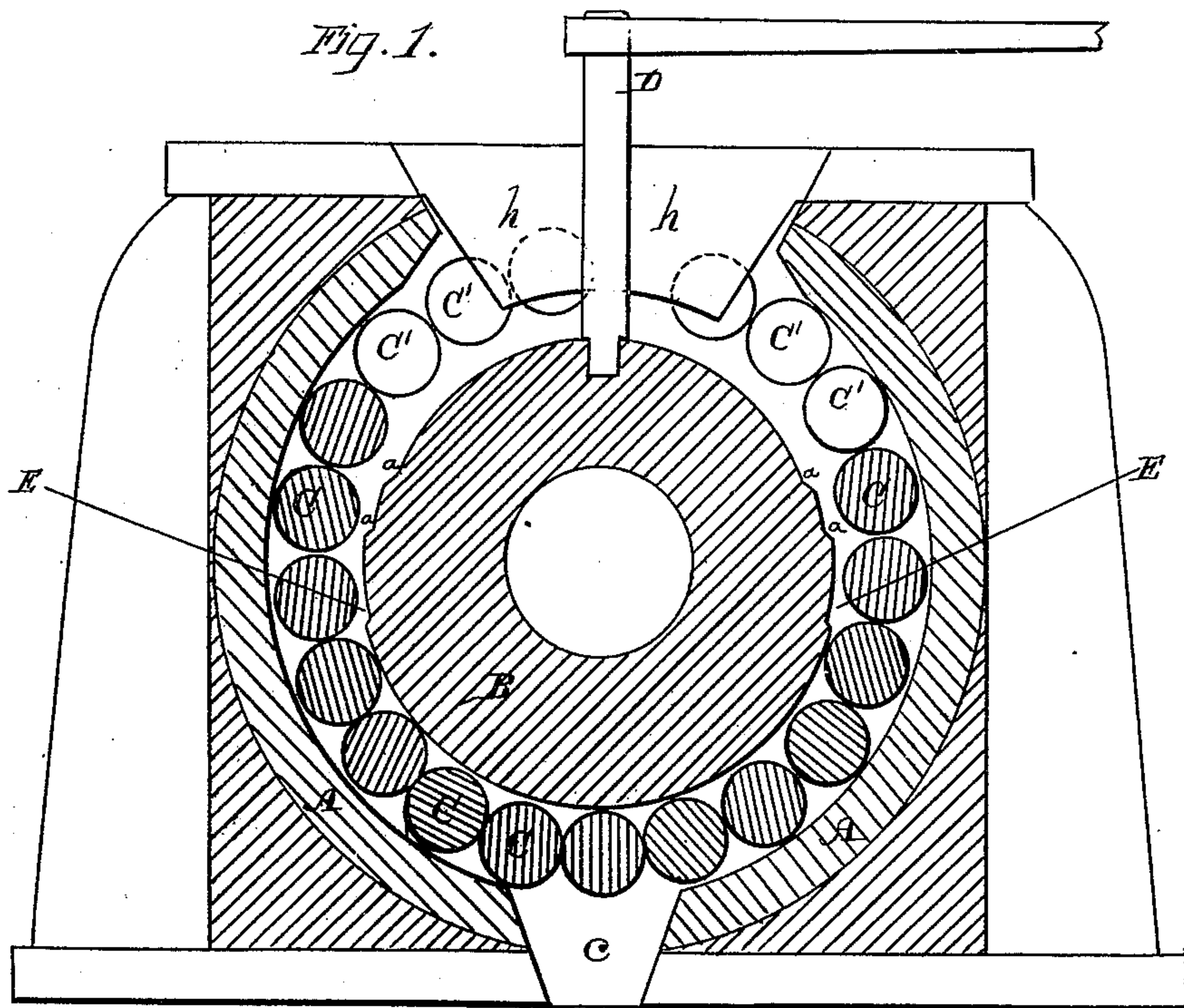
2 Sheets—Sheet 1.

G. F. E. BRINCKMANN.

Combined Ore Crusher and Pulverizer.

No. 233,139.

Patented Oct. 12, 1880.



(No Model.)

2 Sheets—Sheet 2.

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Fig. 3.

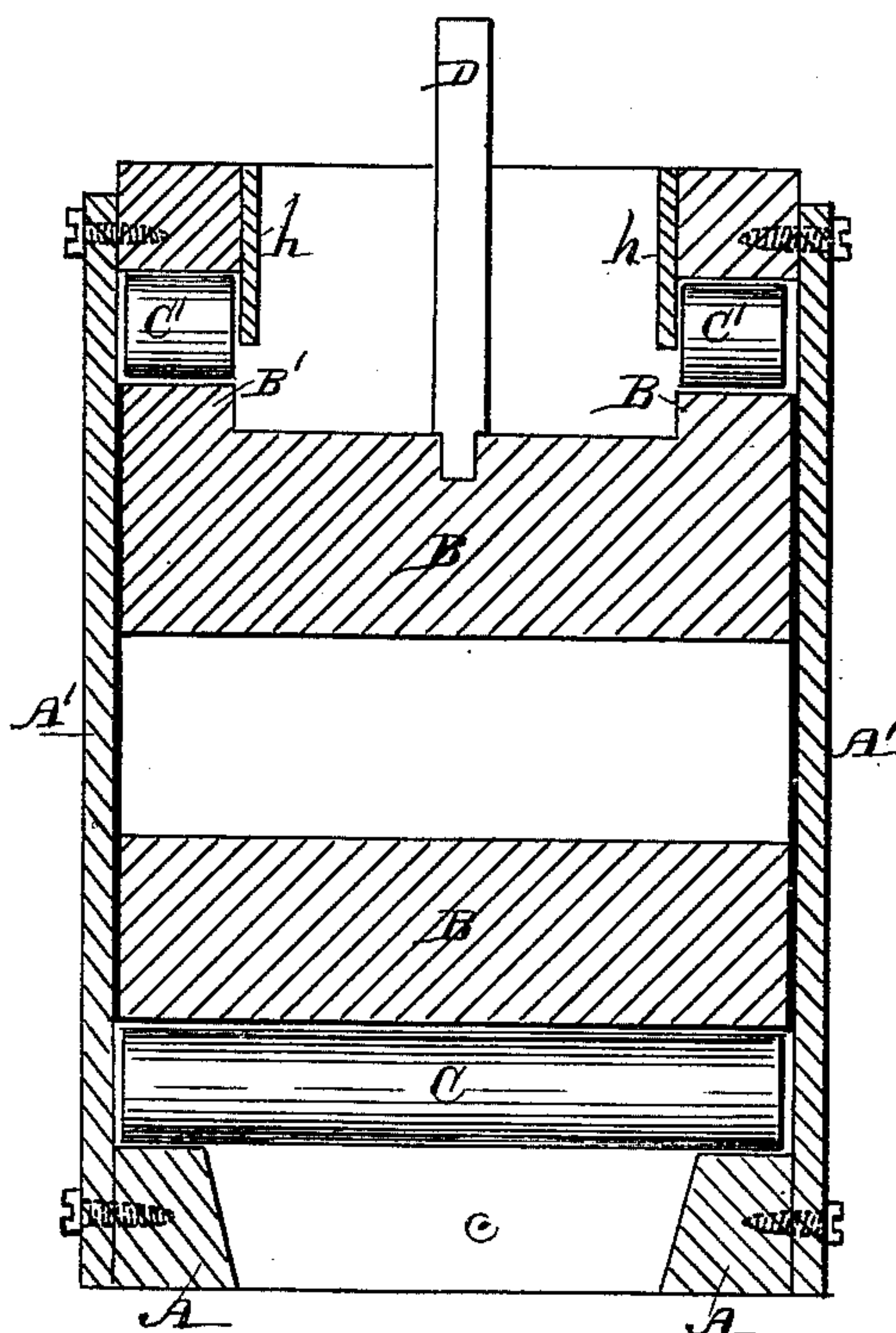
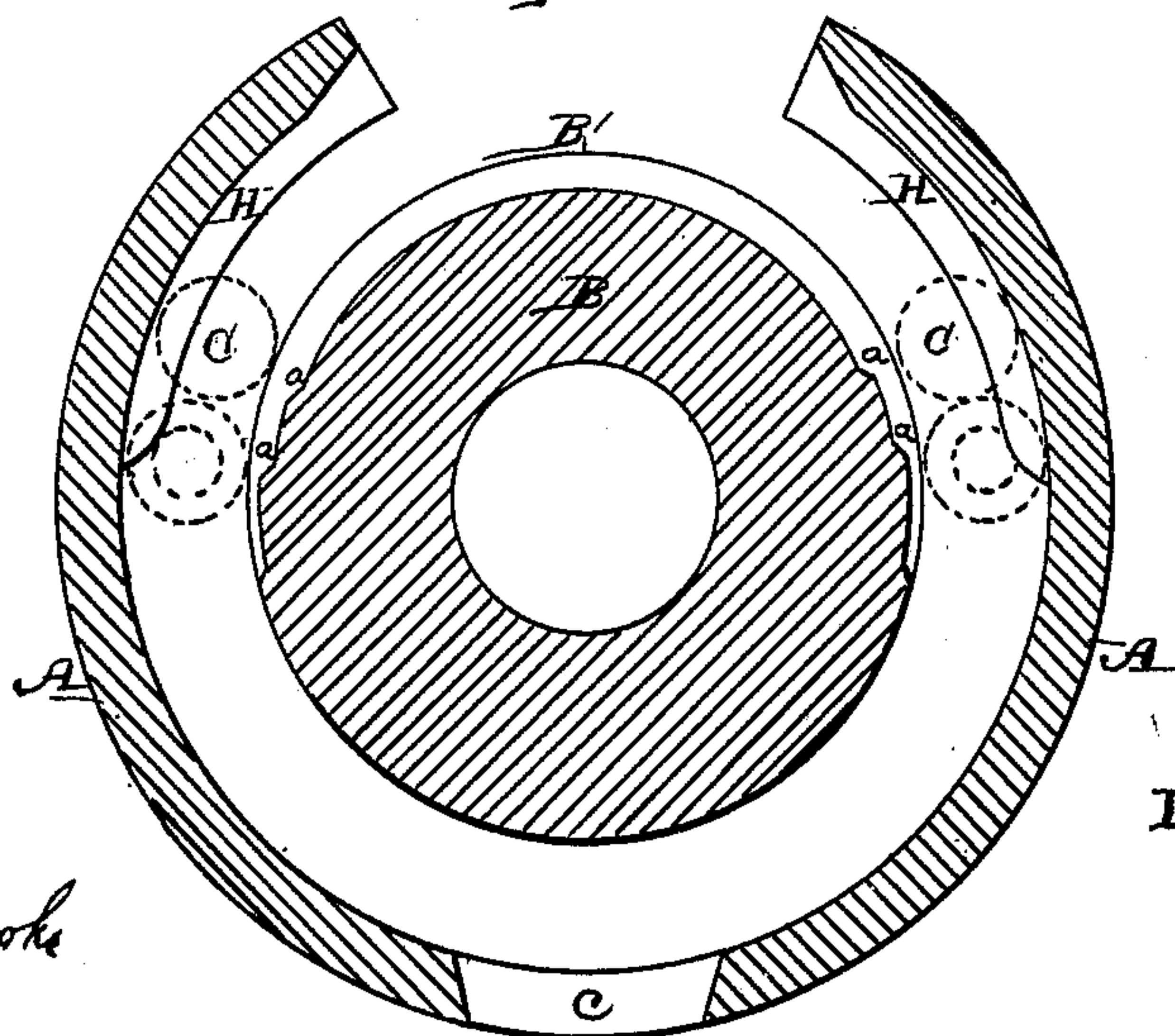


Fig. 4.



Witnesses

Frank A. Brooke
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UNITED STATES PATENT OFFICE.

GILLES F. E. BRINCKMANN, OF OAKLAND, CALIFORNIA.

COMBINED ORE CRUSHER AND PULVERIZER.

SPECIFICATION forming part of Letters Patent No. 233,139, dated October 12, 1880.

Application filed April 17, 1880. (No model.)

To all whom it may concern:

Be it known that I, GILLES F. E. BRINCKMANN, of the city of Oakland, county of Alameda, and State of California, have invented
5 an Improved Ore Crusher and Pulverizer; and I 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 my
10 improvements consist in placing inside a mortar or circular receptacle a peculiarly-shaped muller surrounded by a series of steel rollers. The muller is somewhat flattened at its upper end, but the bands encircling it continue in a
15 true circle. At the upper sides of the muller are peculiarly-formed offsets or shoulders, by means of which the ore is directed in behind the muller, so as to be caught by the rollers and crushed. These shoulders gradually less-
20 en in size toward the lower part of the muller, and the bottom of said muller is smooth, the space between rollers and muller gradually decreasing downward until the rollers move on the face of the muller. At the upper
25 part of the muller, therefore, the ore is crushed, and at the lower part it is finely pulverized by the oscillating motion imparted to the muller and the action of the rollers until it is finally discharged below. Means are provided for
30 equalizing the wear of the rollers, as is more fully described in the accompanying drawings, in which—

Figure 1 is a longitudinal vertical section. Fig. 2 is a horizontal section. Fig. 3 is a trans-
35 verse section. Fig. 4 is a longitudinal vertical section.

The mortar A is semi-cylindrical or circular in form, the top being open, as shown. The ends A' are formed of metallic plates bolted
40 to the sides, but removable at will. Suitably-placed braces connect the sides of the mortars, so as to furnish requisite strength, being formed of wrought-iron bolts or straps.

The muller B is made in a peculiar form.
45 While its rims or edges B' are formed in a true circle, the upper portion between these rims or edges is not a full circle, but is drawn in from the sides, as shown, so as to form pockets between the upper rollers and the
50 muller, as hereinafter described. The bands or rims are cast with the muller.

In the mortar, and between it and the muller, are placed steel rollers C, each being independent of the other, but resting one upon another. These encircle the muller up to the
55 sides of the opening at the top of the mortar, as shown.

The upper side portions of the muller, between the side rims or rings, have shoulders
60 a formed upon them, these shoulders gradually lessening in size toward the lower part, the whole bottom of the muller, however, being smooth, as shown. The shoulders are not corrugations, but are formed with an incline,
65 as shown, so as to jam the rock on the upward stroke against the rollers, and to allow the rock on the downward stroke to go downward. The top of the muller between the
70 rings is also smooth, and the rims or edges have no shoulders or projections, these being formed between the rims or edges only. The
rollers are kept in the true circle by their ends touching on the rims or rings, but at the upper
75 sides they do not touch the muller proper, but only the rims or rings. A space, therefore, is left between the smooth upper portion and
shoulders and the rollers, this space gradually decreasing until at the smooth lower portion
80 of the bottom the rollers bear for the whole width of the muller. An arm or lever, D, is put on the top of the muller, by means of which it is oscillated by any suitable power.

The ore is fed in at the open top of the mortar and falls onto the smooth rounded top of
85 the muller. As the muller is oscillated the ore slides down and rests on the first shoulder, a. As the muller is pushed back this shoulder pushes the ore against the under side of the
upper roller, C, causing the roller partly to
90 revolve and direct the ore downward to the next shoulder and roller.

As the quartz drops down onto the shoulder it is in a sort of pocket (represented by E) between the muller and the rollers. The oscillation back and forth causes this quartz to be
95 broken by the rollers, as in a rock-breaker, and as the space between the muller and rollers gradually decreases in depth the ore is more finely broken as it goes downward by its gravity and the action of the rollers. At these
100 points it is only the center of the rollers which do any crushing, the ends of the rollers rest-

ing on the rims or rings B'. As the ore gradually gets down, however, to the lower smooth portion of the muller, the rims or rings disappear, the muller at this part being in a true circle, and the rollers bear on the muller for the whole width. When, therefore, the ore has passed all the shoulders, it has gradually become reduced in size, and when it reaches the smooth portion of the muller the rollers pulverize it to a great fineness, it being crushed between the rollers themselves, as well as between the rollers and muller and sides of the mortar.

At the upper open portion of the mortar I form flanges or ribs H, behind which are the supplemental rollers C', which form the continuation of the circle of rollers. These flanges or ribs are continued down each side a short distance, and the upper crushing-rollers, C, have annular grooves, in which the rib or flange fits, to admit of said rollers revolving without reference to said ribs. The center part of the rib or flange is extended, as shown at h, near the central opening, so as to prevent the two upper long rollers, C, coming up any higher than said extensions or projections h.

The object of the short or supplemental rollers is to give a rolling bearing to the upper side of the muller, in case the fine ore at the lower side of said muller crowds it upward. If ore should accumulate in the bottom of the mortar under the rollers and muller, the tendency of the muller would be to lift up, in which case it would bind on the upper ones of the long rollers C. By putting these small supplemental rollers in and keeping them in place by the flanges H the muller is prevented from rising upward, while at the same time an open space is left at the upper central portion of the muller, into which the ore may be put, which would not be the case were these supplemental rollers as long as the crushing-rollers C.

This device is self-adjusting, since as soon as ore is fed in there is pressure on all sides of the rollers. Without any ore the machine is set to run easily, so as to leave room for ore among the rollers.

At each oscillation of the muller the rollers rotate back and forth, squeezing and crushing the ore.

By means of the shoulders forming the pockets the upper rollers are rotated, and will not ride upon the ore, but crush it and force it down.

The pulverized quartz continues to pass on down under the rollers by gravity until it is discharged through the opening c at the bottom.

The operation is the same on each side of the muller, so the machine works continuously, whether moved much or little, or in one direction or the other.

The rollers may be made to wear equally by change of position. One end of the mortar is

removed at stated intervals, and one or two of the bottom rollers drawn out and then dropped in at the top. This is done as often as desired, so that an equal wear is maintained, the other rollers then settling down to take the place of those removed.

This mill may be run wet or dry. It feeds from both sides and discharges at center. It is a very effective crushing appliance. The ceaseless rotation of the rollers on the ore pressed down by the weight of the muller pulverizes the ore very finely.

As many rollers as may be necessary can be used, according to the size of the muller. The sides of the mortar may be shod with shoes, if required.

This machine answers the purpose of both crusher and pulverizer in one, taking quartz in pieces as large as those received by an ordinary rock-breaker and discharging it as fine as is necessary. The crushing and pulverizing in this machine is done entirely by the rollers, the ore being crushed either wet or dry. By changing these rollers once in twenty-four hours a uniform wear upon the whole device is maintained.

When the rollers and sides of the muller are worn to a certain point, and the work of the machine is not satisfactory, a new muller of larger size is inserted to take the place of the one previously used.

The mortar is made of chilled iron or steel, and the rollers are also of tempered steel. The muller itself is preferably made of white iron and the side plates likewise. The wear and tear will therefore be reduced to a minimum.

The muller itself may be elliptical in form; but I prefer to make it with the shoulders, as described.

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

1. The quartz crushing and pulverizing device consisting of the semi-cylindrical mortar A, carrying the cylindrical rollers C, and the oscillating or reciprocating muller B, having the rings or rims B' and the inclined shoulders a, substantially as and for the purpose herein described.

2. In combination with an oscillating muller, B, provided with rims or rings B' and shoulders or projections a, the circularly-arranged cylindrical rollers C, the supplemental rollers C', and the mortar A, with its flanges H, whereby the ore is crushed and pulverized, and the muller kept in position, substantially as and for the purpose herein described.

In witness whereof I have hereunto set my hand.

GILLES F. E. BRINCKMANN.

Witnesses:

CHAS. G. YALE,
FRANK A. BROOKS.