

(No Model.)

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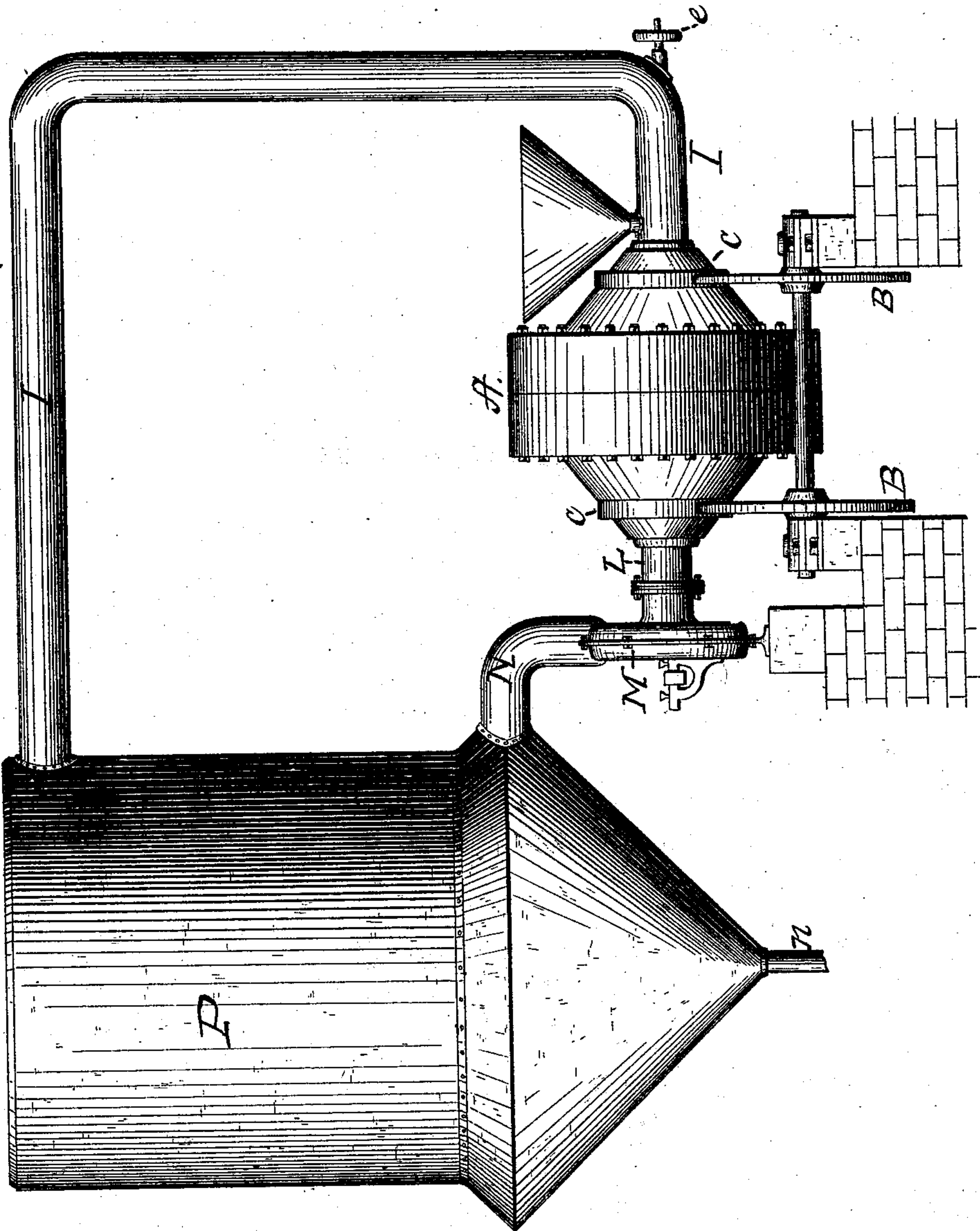
G. J. SHIMER.

CRUSHING AND GRINDING MACHINE.

No. 287,876.

Patented Nov. 6, 1883.

Fig. 1.



Witnesses:

J. Henry Kaiser.
J. Tyler Powell

Inventor:

Geo. J. Shimer.
by Heylmunt Kang,
Attorneys.

(No Model.)

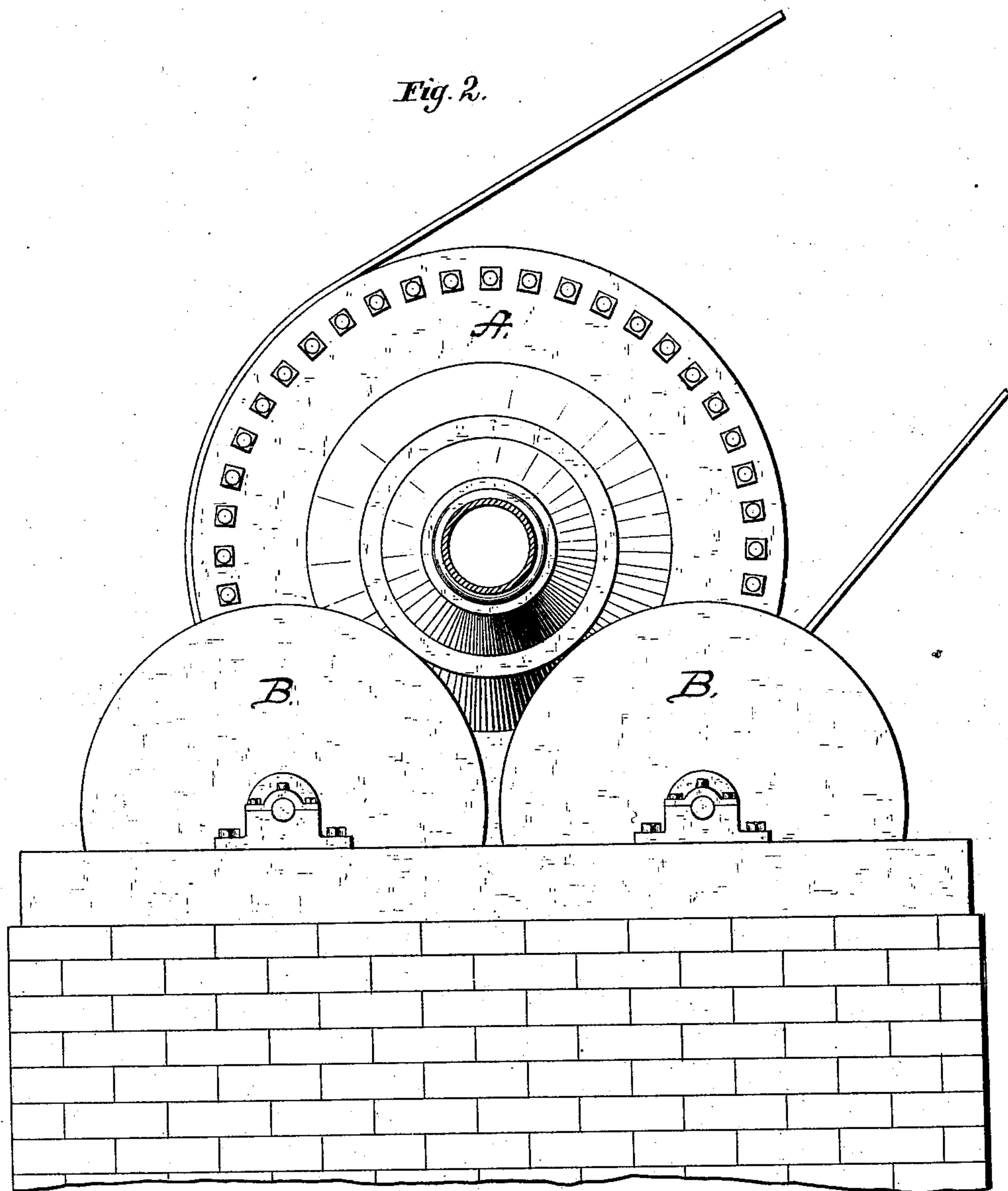
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by Heylmunt & Kang
Attorneys.

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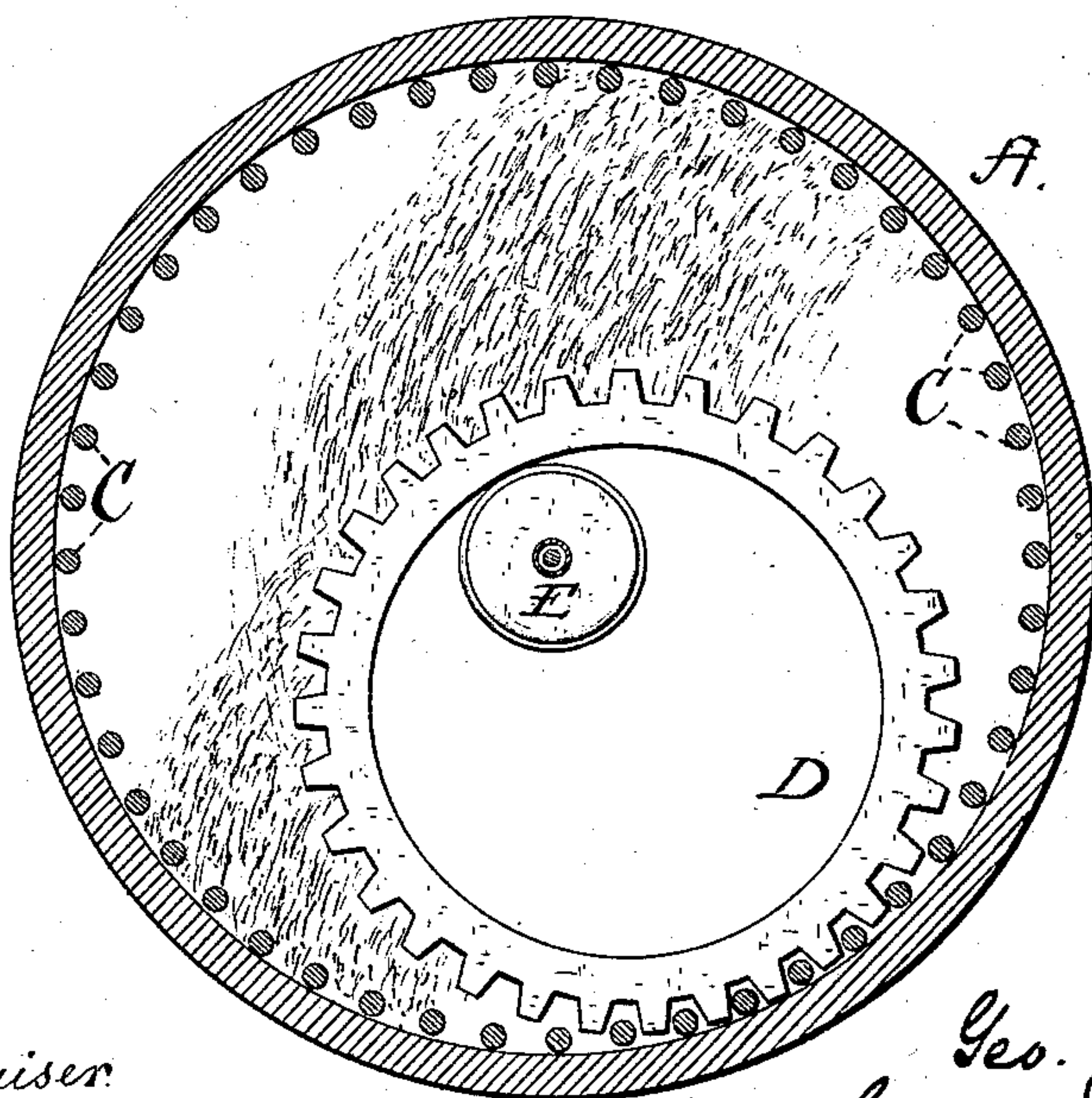
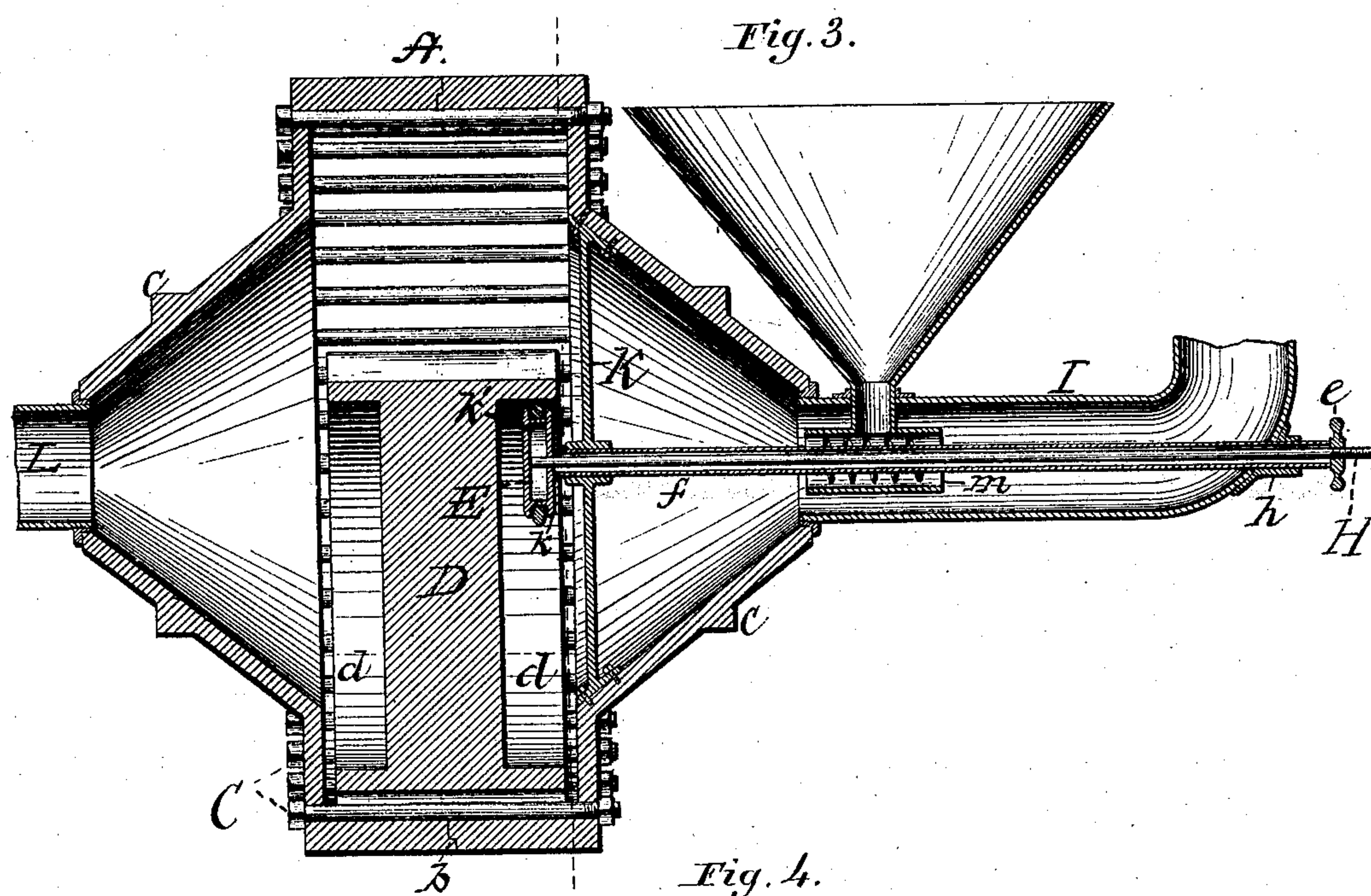
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Witnesses:

J. Henry Kaiser.
J. Tyler Powell

Inventor:

Geo. J. Shimer
by Hyman Karg,
Attorneys.

UNITED STATES PATENT OFFICE.

GEORGE J. SHIMER, OF FREEMANSBURG, ASSIGNOR OF ONE-HALF TO SAMUEL J. SHIMER, OF MILTON, PENNSYLVANIA.

CRUSHING AND GRINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 287,876, dated November 6, 1883.

Application filed March 22, 1883. (No model.)

To all whom it may concern:

Be it known that I, GEORGE J. SHIMER, a citizen of the United States of America, residing at Freemansburg, in the county of Northampton and State of Pennsylvania, have invented certain new and useful Improvements in Crushing and Grinding Machines; 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 appertains to make and use the same.

This invention relates to machinery of that special class in which the crushing or pulverizing effect upon the material is obtained by the rotation and crushing action of a roller or rollers within a drum or casing.

One of the objects of the improvements under consideration is to improve the efficiency of such machinery.

In the annexed drawings, Figure 1 is a front view of my improved apparatus for crushing or pulverizing materials, showing all the parts connected for operation. Fig. 2 is a side view of the drum and supporting-rollers. Fig. 3 is a longitudinal sectional view of the drum, roller, and feed means; and Fig. 4 is a transverse sectional view of the drum and interior roller, showing the position and operation of the same upon the material.

In the accompanying drawings, the letter A represents a drum or cylinder with conical ends mounted on the travelers or friction-wheels B, which are suitably journaled and arranged in pairs on opposite sides. This cylinder is composed of two parts or sections with side openings united at the center by the interlocking joint *b*, and are maintained in relative position to each other by the transverse bolts C, substantially as shown. Before the parts are put together it is desirable in some cases that the interior diameter should be bored out true, and the meeting edges fitted for a close joint. The bolts C are placed closely against the inner rim of the drum, making an interrupted or a broken inner surface, and serve the double purpose of holding the drum-sections together and carrying the crushed and uncrushed material upward in

the rotation of the drum and throwing the same (material) upon a corrugated roller working within the drum, as indicated in Fig. 4 of the drawings. The conical ends of the drum A, about midway, are formed with flanges *c*, serving as bearing-surfaces for the journaled travelers B, which are arranged below and on opposite sides of the center of the drum, as seen in Fig. 2 of the drawings. The roller D, having on its periphery a series of ribs or corrugations to register and work in conjunction with the bolts C, is loosely arranged within the drum, and forms a bearing-contact therewith for acting upon or crushing the material that is caused to be passed between the working-faces of said drum and roller, as indicated by Fig. 4 of the drawings. This roller, which is preferably made solid and heavy, and afterward turned true in a lathe, is formed with side recesses or chambers, *d*, likewise turned true, for the passage and reception, as will be hereinafter more fully described, of a friction-wheel, E, mounted on the inner end of the rod or shaft H. This shaft H passes longitudinally through the pipe I, and is formed at its outer end with screw-threads and provided with an adjusting hand-wheel, *e*, engaging with the screw-threads. The shaft H, with end-bearings in the disk K and hand-wheel *e*, works within a tube, *f*, located and properly arranged within the pipe, and this tube at its inner end is provided with a spider-frame, K, securely fastened to the conical end of the drum. The spider-frame K and the box or bushing *h* at the outer end of the pipe furnish the necessary end bearings to the tube and its shaft.

Arranged exteriorly on the tube *f* is a feed screw or worm, immediately under the hopper, which is connected to the pipe I, for conducting the material from the hopper to the interior of the drum for reduction.

The wheel E is composed essentially of two disks—one disk, *k*, being secured to the end of the tube *f*, and the other disk, *k'*, being secured to the end of the shaft H—with an elastic ring, preferably round in cross-section, interposed between the disks so as to project beyond their periphery and be clamped in

position, by the hand-wheel *e*, on the outer end of the shaft, substantially as shown in Fig. 3 of the drawings. The wheel *E*, with the feed-screw thus organized and arranged, as described and shown, receives rotary motion from the ribbed roller as it is revolved by the rotation of the drum, and causes the material to be automatically fed from the hopper; and by adjusting the hand-wheel on the shaft *H*, the further disk is drawn toward the other one, which expands the ring and increases the diameter of the wheel, thereby causing a heavier feed, and the reverse of the adjustment secures a lighter feed.

The feed-screw is surrounded by a pipe, *m*, with a branch leading to the bottom of the hopper for directing the material to the drum.

The letter *L* (see Figs. 1 and 3) represents an eduction-pipe leading from the off end of the drum to an exhaust-fan, *M*, and from the fan extends a pipe, *N*, leading to a dust bin or room, *P*, of a suitable size and shape. To the upper end of this dust-bin is connected the pipe *I*, which leads into the near end of the drum, as shown in Fig. 1 of the drawings, for the purpose hereinafter stated. The lower end of the dust-bin is provided with a draw-off pipe, *n*, with a suitable valve, supported by a spring, to prevent the escape of the air from the dust-bin to the packing-room or bolts. The spring should be of sufficient strength to resist the pressure of air, but not too strong to prevent the valve opening to a given pressure of material on it.

Operation: The material—mineral or grain—to be crushed or pulverized having been placed in the hopper, motion is communicated to the drum and exhaust-fan by suitable means—for example, a driving-belt—and by the revolving of the free-running roller within the drum motion is communicated to the feed-screw through the agency of the frictional-wheel *E*, and an automatic feed of the material to the drum is secured; and when the drum has the proper feed the material between the drum and the free-running roller will raise the roller from the friction-wheel and stop the feed. As the contact of the roller and friction-wheel increases and decreases the feed will correspondingly increase and decrease. The material as crushed or pulverized is withdrawn from the drum by the exhaust-fan through the pipe *L*, and forced into the dust-bin chamber or room. The material settles in this room or bin, where it is left, while the air is returned to the drum through the pipe-connection *I*, thus preventing waste of the ground material and dust in the mill.

From the foregoing description it will be observed that the conical ends of the drum prevent the coarser particles of the material within the drum from dropping into or near the air-pipes and being carried off with the fine material. The degree of fineness of the crushed material will be regulated by the strength of the current of air controlled by a blast-gate, the material, as elevated and tossed upon the

corrugated roller, being exposed to the action of the draft in the drum.

It is obvious to those skilled in the art that slight changes in the construction and arrangement of parts may be made without departing from the spirit of the invention; hence I reserve the right to make such changes as will be within the spirit of the invention.

A few slight changes will adapt this machine or apparatus for crushing or grinding wheat to middlings and regrinding into flour in a separate machine, or reducing the wheat at once to flour.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of the revolving drum, provided with transverse bolts, a free-running roller, having a corrugated periphery, a hopper, and an automatic feed device operated by the motion of the internal roller, substantially as described.

2. In a crushing-machine, the combination, with a revolving drum, a free crushing-roller, and a feed-mechanism, of a friction-wheel and adjusting means for increasing or decreasing the diameter of the friction-wheel, substantially as described.

3. The combination, with a revolving drum, a free-running crushing-roller, and a feed mechanism, of the shaft having at its inner end a disk and at its outer end an adjusting device, a tube having at its inner end a disk, and an elastic ring interposed between said disks, substantially as described.

4. In a crushing-machine, the combination of the crushing-roller, the shaft having at its inner end a disk and at its outer end an adjusting device, a tube having at its inner end a disk and provided with a feed-screw, an elastic ring interposed between said disks, and a feed-pipe, *m*, substantially as described.

5. In a crushing-machine, a drum composed of two parts united by transverse bolts interiorly arranged, the said bolts serving the double function stated, in combination with a free-running roller having its periphery corrugated or notched to engage with and cooperate with the transverse bolts of the drum, substantially as described.

6. A crushing and grinding machine composed of the following instrumentalities, to wit: the revolving drum, the travelers, the interior free-running roller, hopper, automatic feed device, exhaust-fan, and dust-chamber, all arranged substantially as described.

7. A crushing and grinding machine composed of the following instrumentalities, to wit: the revolving drum, the travelers, the interior free-running roller, hopper, automatic feed device, exhaust-fan, dust-chamber, and return-pipe, substantially as described.

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

GEORGE J. SHIMER.

Witnesses:

F. M. RAUCH,
LOUISA RAUCH.