

(No Model.)

A. C. HILSINGER.
STONE OR ORE CRUSHER.

No. 592,469.

Patented Oct. 26, 1897.

Fig. 2.

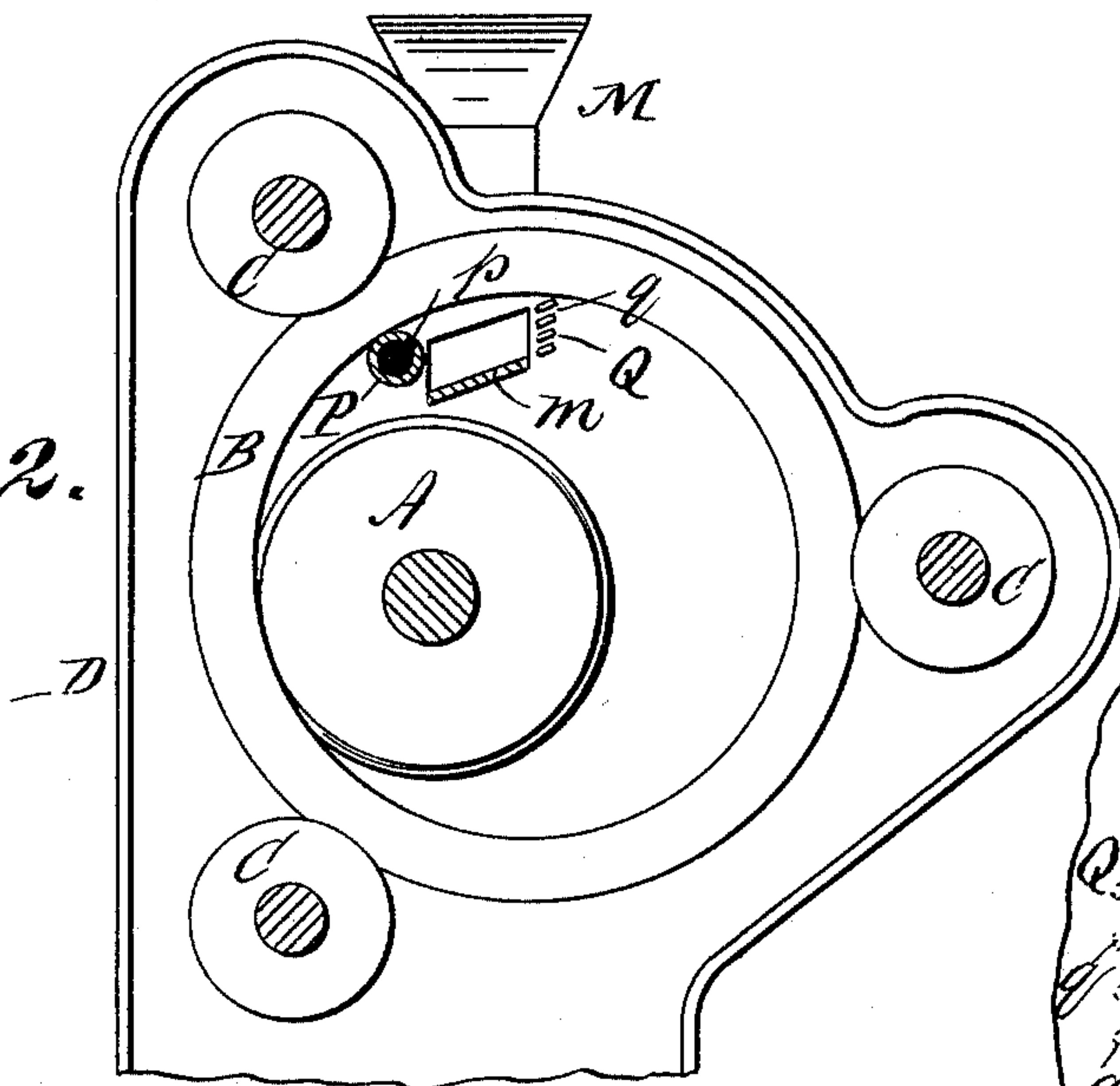


Fig. 3.

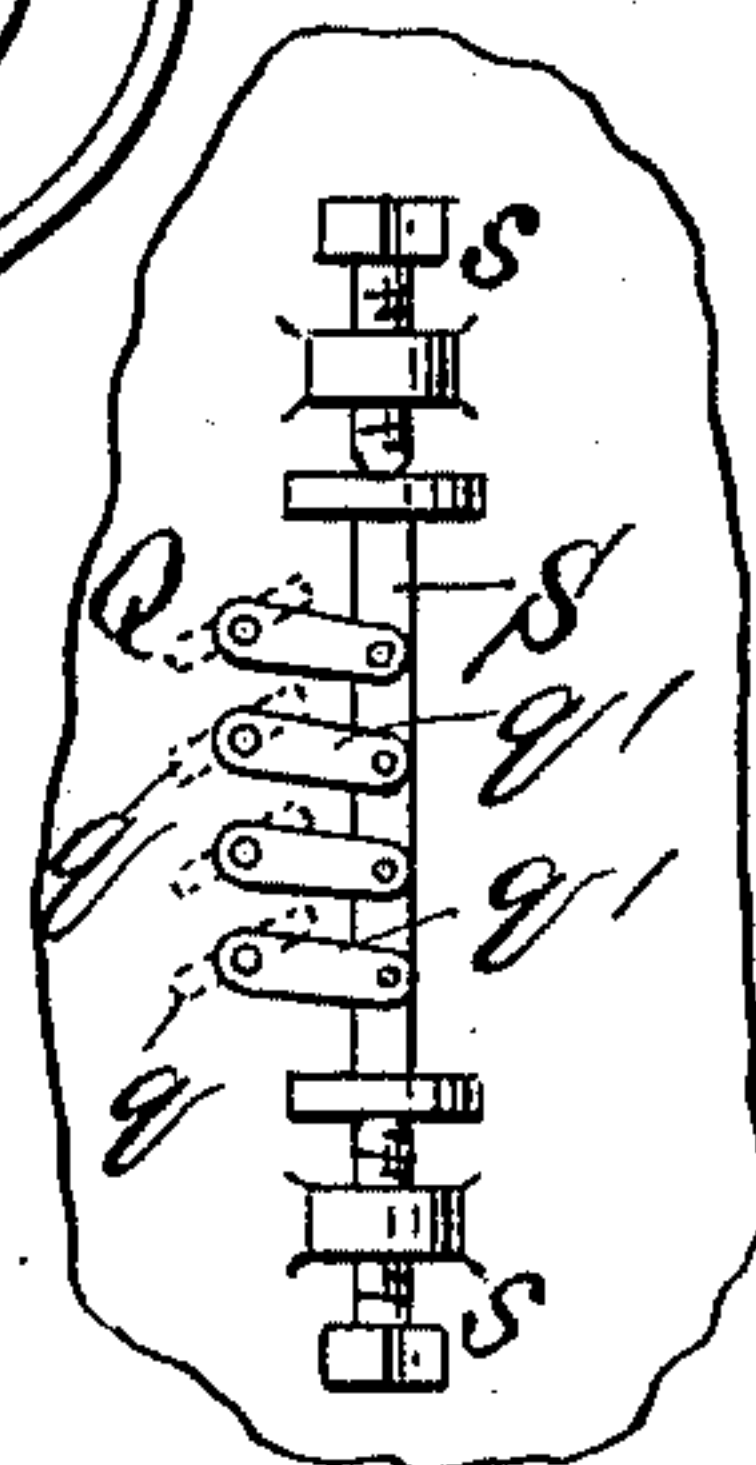
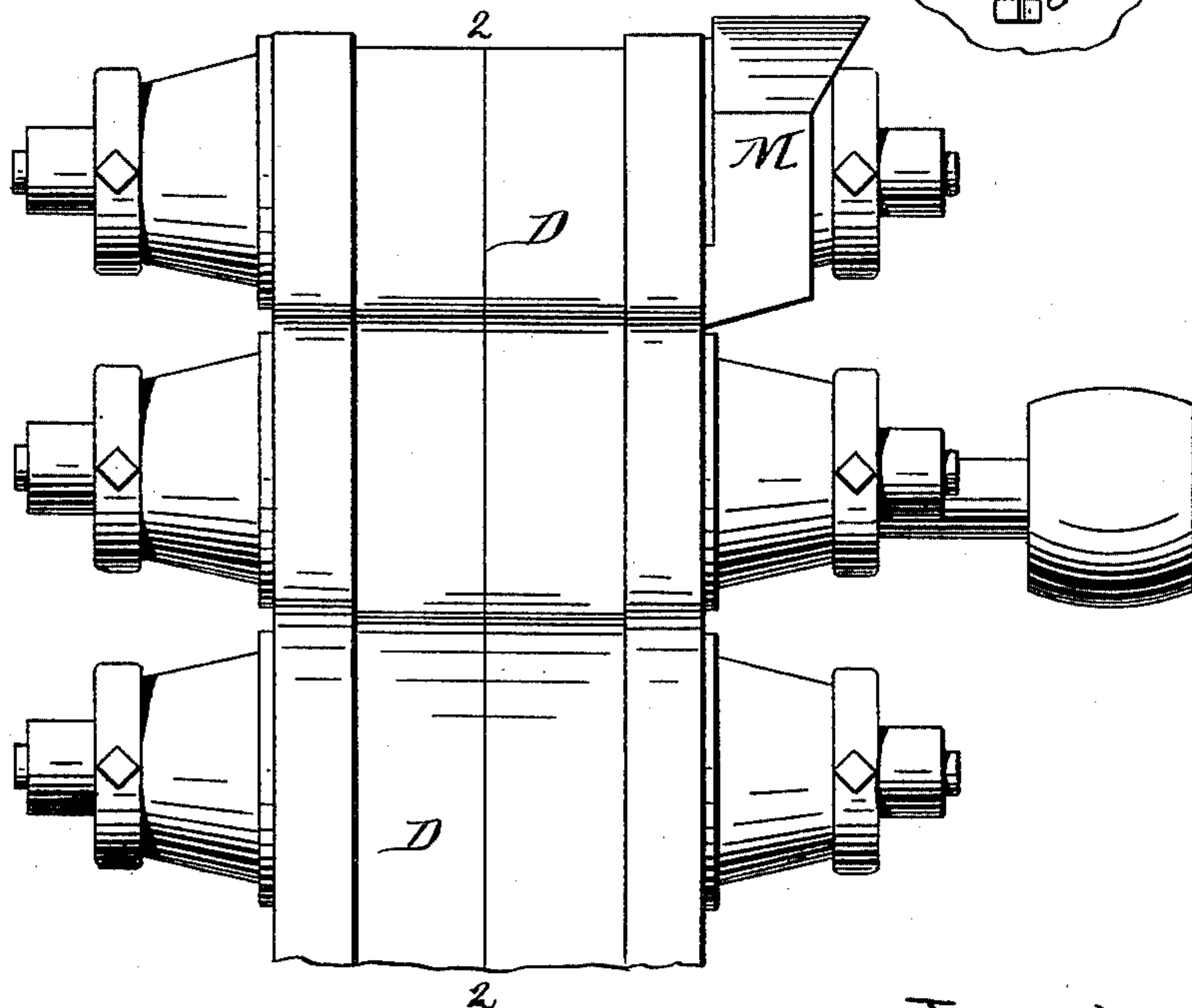


Fig. 1.



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By his Attorney
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UNITED STATES PATENT OFFICE.

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STONE OR ORE CRUSHER.

SPECIFICATION forming part of Letters Patent No. 592,469, dated October 26, 1897.

Original application filed September 11, 1895, Serial No. 562,151. Divided and this application filed February 26, 1897. Serial No. 625,104. (No model.)

To all whom it may concern:

Be it known that I, ALBURTIS C. HILSINGER, a citizen of the United States, residing at Killawog, in the county of Broome and State of New York, have invented certain new and useful Improvements in Stone or Ore Crushers, of which the following is a specification sufficient to enable others skilled in the art to which the invention appertains to make and use the same.

My improvements relate to crushers for reducing stones, ores, and other hard and refractory substances to a pulverized state of the class in which the reduction is effected between the inner surface of a ring and the outer surface of a roll, as set forth in the Kent patent, No. 513,114, of January 23, 1894, and in my concurrent application, Serial No. 562,151, filed September 11, 1895, for a duplex form of such mill, of which the present application is a division.

In my concurrent application above referred to I claim the special arrangement of the crushing-rings, crushing-rollers, and other parts of the apparatus, while my present invention is designed to prevent the reduced material resulting from the action of the mill from being carried repeatedly and unnecessarily between the crushing-surfaces, and also to effect the withdrawal of the finer portion of the reduced material from the coarser portion thereof; and I herein disclaim, in so far as this application is concerned, the features of construction specifically claimed in said original specification.

In other words, the present invention consists, primarily, in dislodging the reduced material from the inner surface of a revoluble attrition-ring by air under pressure, thereby counteracting or overcoming the tendency of centrifugal force to hold the reduced material in the ring to be carried repeatedly between the crushing-surfaces, and, secondarily, in screening or grading the material dislodged by the air-blast in such manner that only the finer material is withdrawn, while the coarser material is returned to the crushing-surfaces.

In the accompanying drawings, Figure 1 is an end elevation of the upper portion of an attrition-mill to which my improvements are

applied. Fig. 2 is a vertical section upon plane of line 2 2, Fig. 1. Fig. 3 is a detail view showing means for adjusting the deflecting-screens.

In the form of apparatus illustrated in the accompanying drawings, which is essentially like that shown and described in the application of which the present is a subdivision, but one crushing-roll A and one ring B are shown; but I do not confine myself in the application of my invention to this simple form of apparatus, since my invention is available in all mills in which the reduction of the material is effected between the concave surface of an attrition-ring B and the convex surface of a crushing-roll A. In my present specification, however, I shall confine myself to a description, in so far as is necessary, of the crusher described and claimed in my concurrent application, in which the crushing-roll A, ring B, and guide-rolls C are inclosed by a casing D, preferably formed in two sections, which are bolted together, substantially as shown.

The attrition-ring B is supported by and between the guide-rollers C, which are preferably flanged, so as to straddle the periphery of the attrition-ring B.

On the sides of the casing D is arranged a feed-hopper M, discharging onto an inclined feed-table *m*, arranged within the casing D, directly above the crushing-rolls A, the said feed-table being inclined inwardly and downwardly, so as to deliver the material from above and between the periphery of the crushing-roll A and the inner surface of the attrition-ring.

The inner surface of the attrition-ring is preferably made concave in cross-section, while the periphery of the crushing-roll is made convex to correspond, the object being to cause the material under treatment to tend by centrifugal force to collect in the center of the ring and be thereby retained and passed between the crushing-surfaces. This tendency of centrifugal force to carry around the material upon the inner surface of the attrition-ring has to be counteracted, however, in the case of material already sufficiently reduced, as otherwise there would be

a needless expenditure of power and a waste of time, and this I accomplish by an air-blast directed against the inner surface of the attrition-ring, preferably at or nearest the highest point. This may be effected by simply introducing a pipe P, connected with a suitable supply of air or other gas under pressure and formed with perforations *p*, through which the air or gas is caused to impinge upon the under sides of the ring B, loosening therefrom the lighter particles of reduced material, so that they are free to pass off at the sides of the ring and descend toward the hopper below.

In order to retain the coarser particles dislodged by air-current and return them to the crushing-surfaces, I employ a screen Q in conjunction with the air-blast P *p*, which permits only the finer particles to pass with the air-blast, returning the coarser particles to the feed-table *m*.

The screen is preferably adjustable, so as to regulate and grade the material passed through it, and, as shown in the drawings, consists of a series of slats *q q*, pivotally supported between the sides of the casing D and adjustable in inclination on their axes by means of an adjusting-rod S, to which they are connected by crank-arms *q' q'*, the rod S being adjusted longitudinally by and between set-screws *s s*. Any other suitable means of effecting the adjustment of the slats with relation to each other so as to increase or di-

minish the space between them may be substituted for that shown.

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

1. In a stone and ore crusher the combination of a revoluble attrition-ring, a crushing-roll within said ring, and an air-blast pipe above said crushing-roll arranged to cause air under pressure to impinge against the concave surface of said attrition-ring to drive the finer particles of material under treatment away from the upper side of the crushing-roll, substantially in the manner and for the purpose described.

2. In a stone and ore crusher the combination of a revoluble attrition-ring, a crushing-roll within said ring, an air-blast pipe above said crushing-roll arranged to cause air under pressure to impinge against the concave surface of said attrition-ring to drive the finer particles of material under treatment away from the upper side of said crushing-roll, and a screen interposed in the path of the air-blast and arranged to separate the coarser particles of material dislodged by the air-blast from the finer particles, and to deliver said coarser particles on top of the crushing-roll for further reduction, substantially in the manner described.

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Witnesses:

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