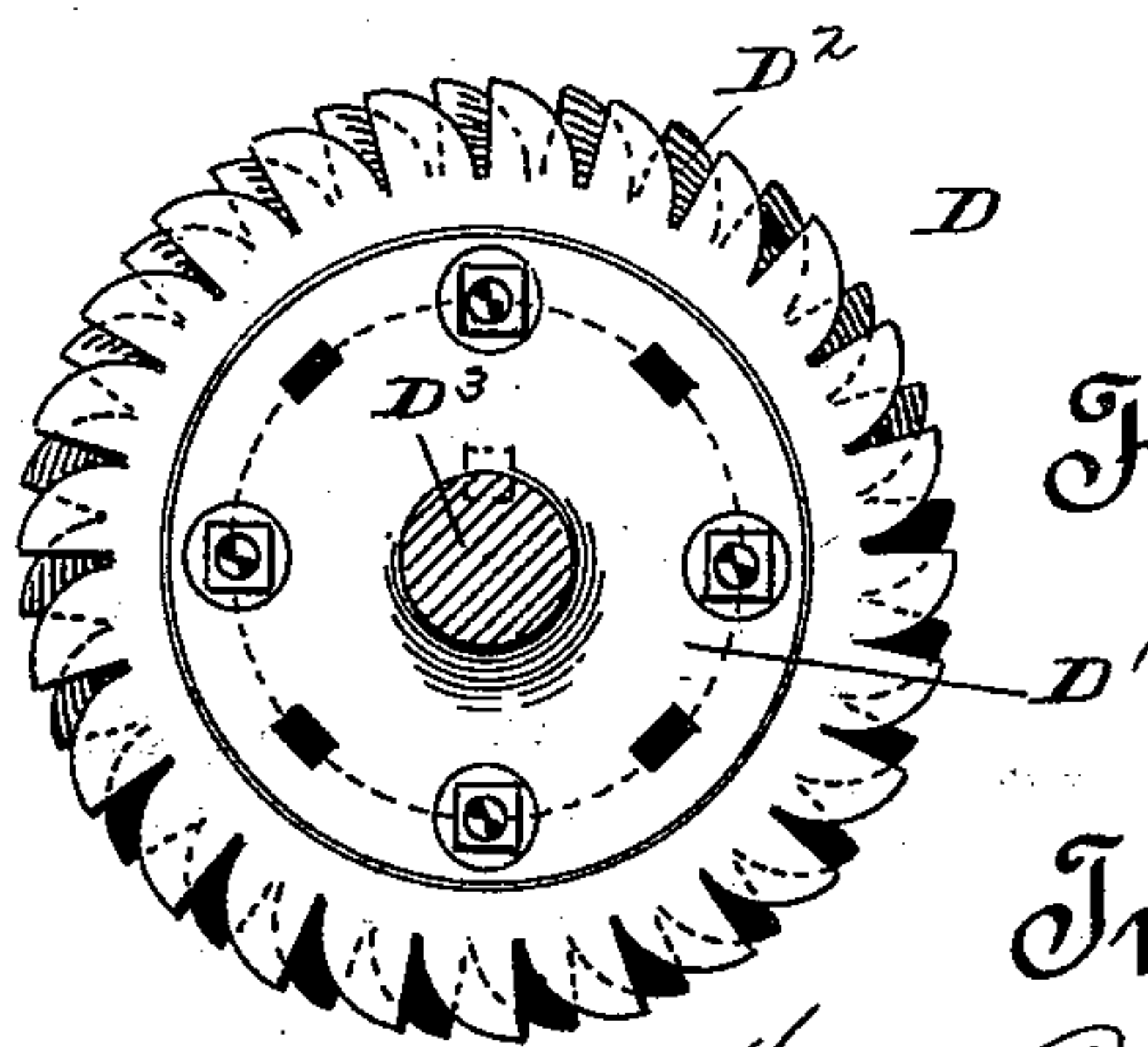
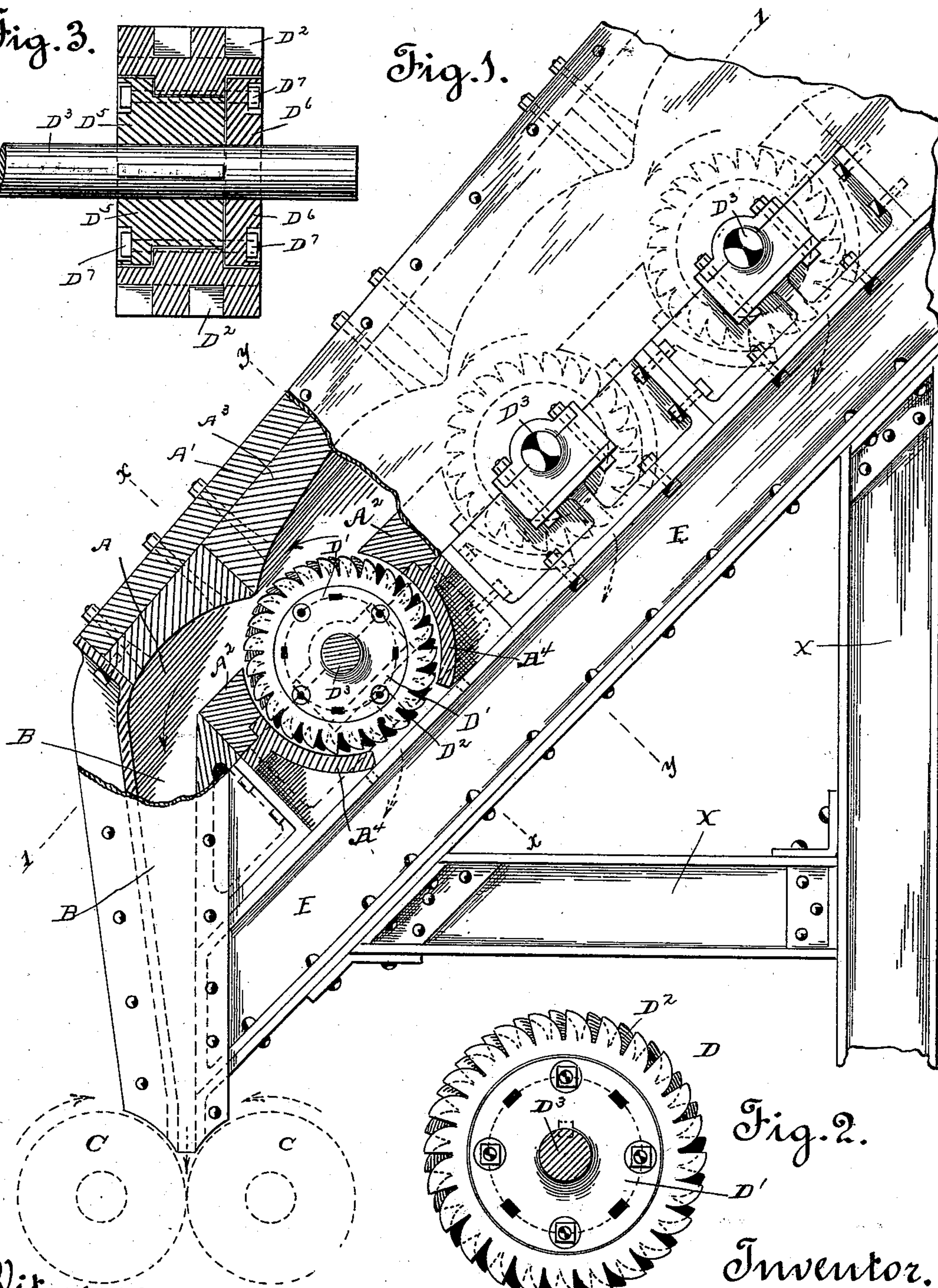
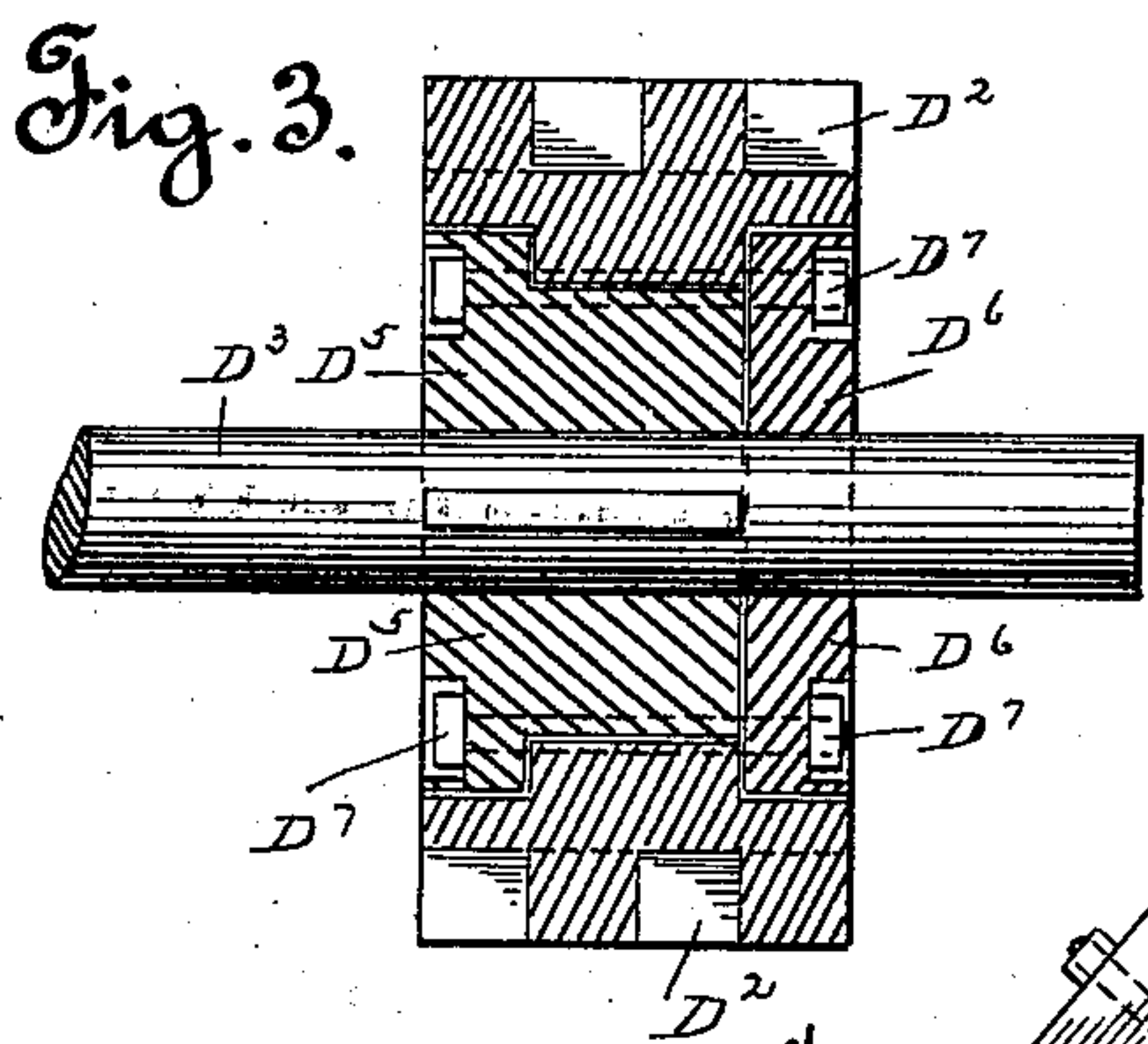


2 Sheets—Sheet 1.

Patented Mar. 10, 1896.

No. 556,187.



Witnesses.

*Stellvertewende.*

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(No Model.)

2 Sheets—Sheet 2.

H. P. HOLLAND.  
ORE PULVERIZER.

No. 556,187.

Patented Mar. 10, 1896.

Fig. 4.

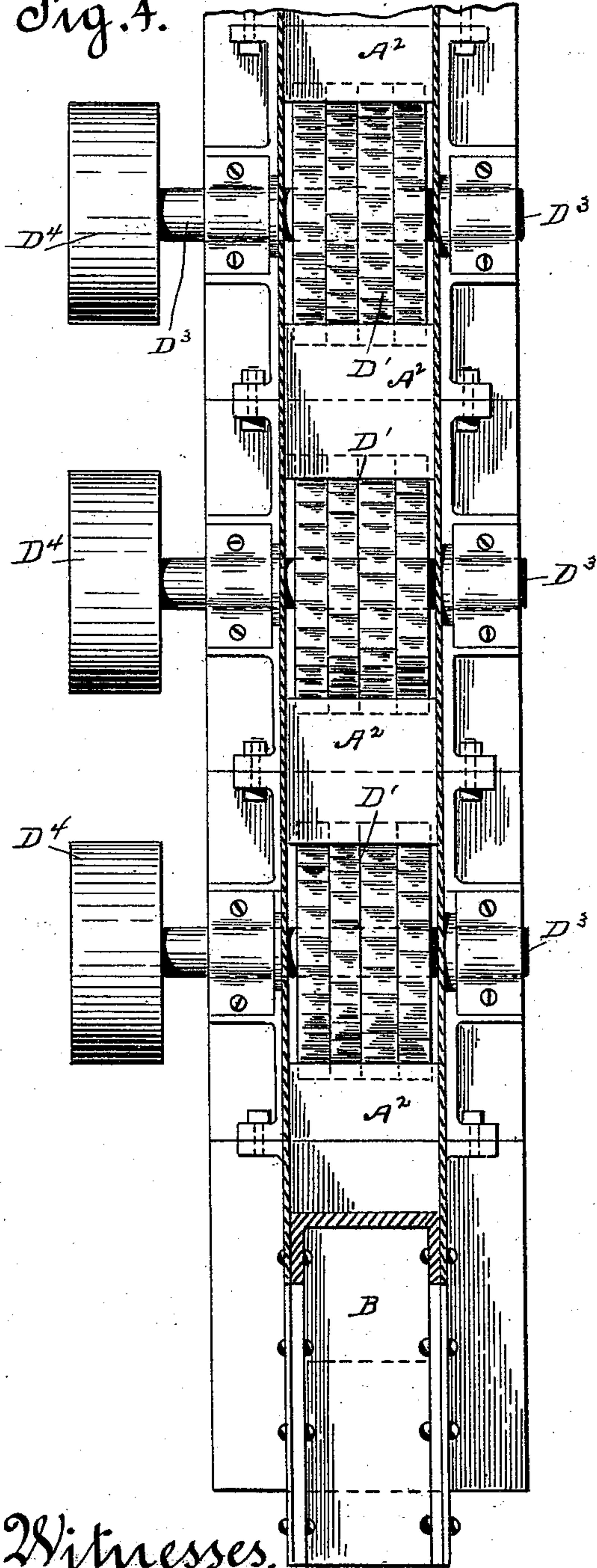


Fig. 5.

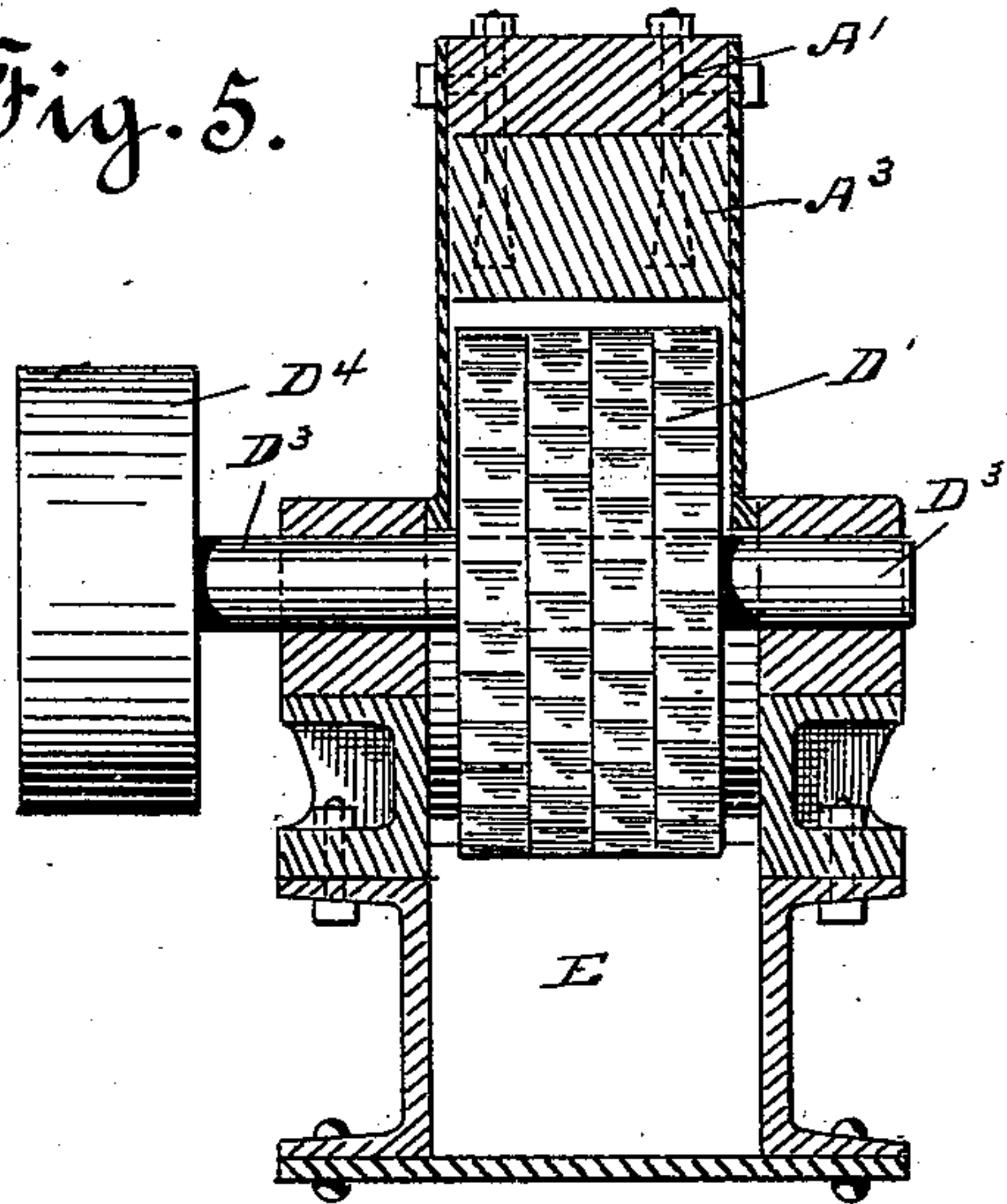
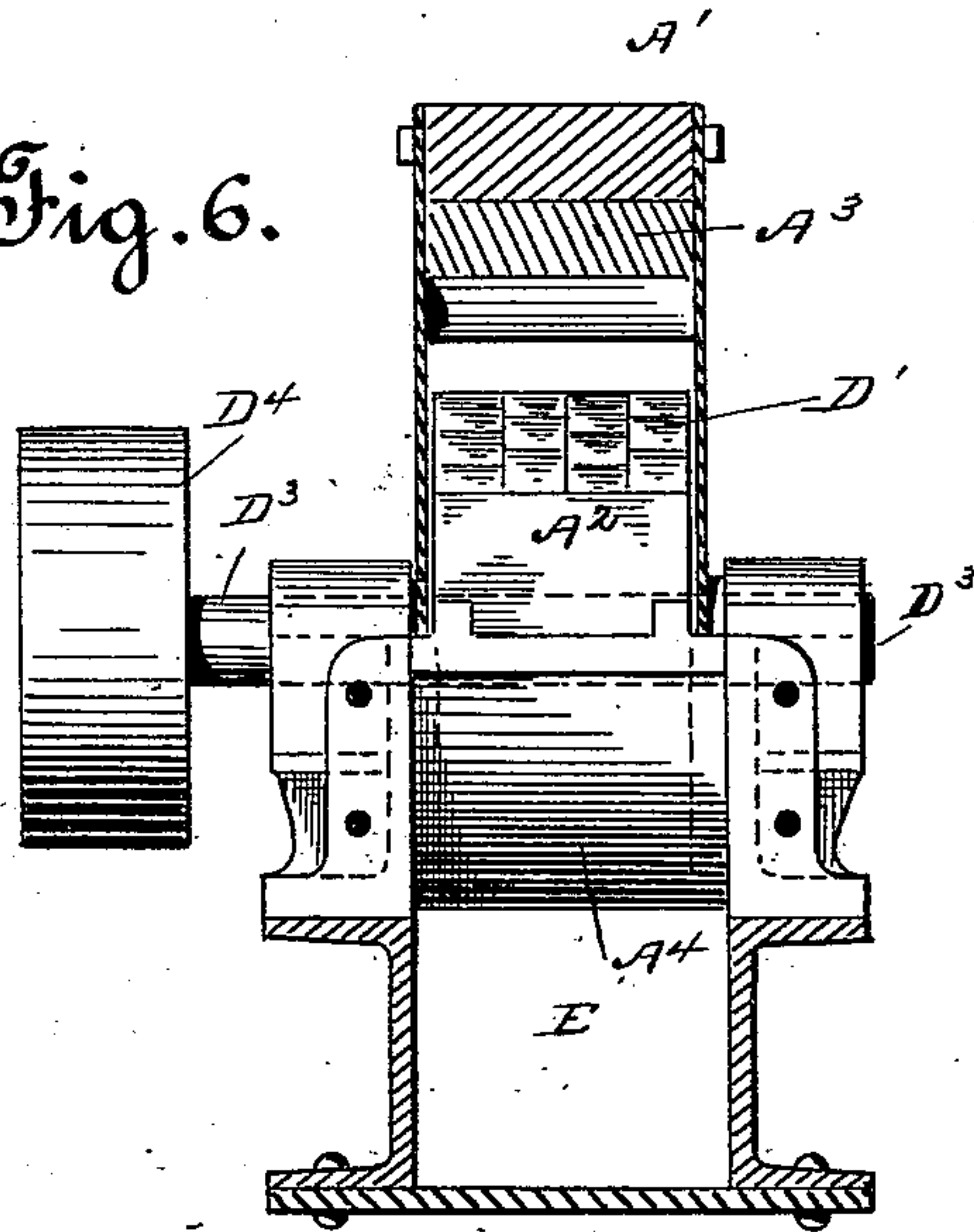


Fig. 6.



Witnesses.

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*per*

*Bonus Mundock*

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# UNITED STATES PATENT OFFICE.

HENRY P. HOLLAND, OF OAKLAND, CALIFORNIA.

## ORE-PULVERIZER.

SPECIFICATION forming part of Letters Patent No. 556,187, dated March 10, 1896.

Application filed June 13, 1895. Serial No. 552,728. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY P. HOLLAND, a citizen of the United States, residing at Oakland, in the county of Alameda and State of California, have invented certain new and useful Improvements in Ore-Pulverizers; and I do hereby declare the following to be a full, clear, and exact description of said invention, such as will enable others skilled in the art to which it most nearly appertains to make, use, and practice the same.

This invention relates to improvements in ore-pulverizers; and it consists in the novel construction and arrangement of the parts, as hereinafter more fully set forth and described.

In the drawings, Figure 1 is a side elevation of the pulverizer, the side being partly cut away to show the construction. Fig. 2 is an end elevation of the pocketed rolls. Fig. 3 is a cross-section of the same. Fig. 4 is a plan view of the pulverizer, the top being removed on the line 1 1 in Fig. 1. Fig. 5 is a cross-section of the pulverizer, showing the pocketed rolls and the trough. Fig. 6 is a cross-section of the pulverizer, taken on the line Y Y, Fig. 1, showing a pocketed roll and its casing.

The purposes for which this invention is designed are to reduce the size of the ore to the desired dimensions before introducing it between the pulverizing-rolls, and, further, to accomplish this gradually, so as to relieve the strain on the machinery and motive power, and, further, to utilize the reduction effect of driving the ore violently against a solid wall and disintegrating the ore by means of the impact.

To facilitate the description of this invention I have given to each part a distinctive letter, while distinguishing their elements by figures used in conjunction with their common letter. Thus I have lettered all the elements in the reduction-channel A, the delivering-chute B, the pulverizing-rolls C, the driving mechanism D, the trough E, and the supporting-frame X.

To the top A' of the reduction-channel are bolted the heavy metal sections or dies A<sup>2</sup>. These sections are concave in form, and at their meeting edges they approximate the pocketed drums D' in increasing degree. This is effected by reason of the slight converg-

ing of the bottom A<sup>2</sup> and top A' at the delivering end. The bottom A<sup>2</sup> is constructed of heavy metal, as shown in Fig. 1, which is cut away to admit the pocketed rolls D'. To the under side of the said bottom A<sup>2</sup> are bolted the casings A<sup>4</sup>, which partly surround said drums and deliver the material which remains in the pockets thereof into the trough E. As above mentioned the sections A<sup>3</sup> are concave in shape and are of a length equal to the distance between the centers of the said drums. When placed together the butted ends form the downward projections, as shown in Fig. 1. These projections are so arranged as to come slightly in advance of the centers of the pocketed drums, and by reason of the slightly-converged shape of the reduction-channel the said projections are gradually approximated more closely to the periphery of the rolls as they approach the chute B, the distance between the last of the said projections and rolls being the size it is desired to reduce the ore to before delivering to the pulverizing-rolls.

The pocketed rolls are mounted on the frame of the pulverizer in suitable journals, as shown at Figs. 1, 4, 5, and 6, the driving-shafts being each provided with a separate pulley D<sup>4</sup>, by means of which gradually-increased speed may be given to each drum. These rolls are constructed, as shown in Figs. 2 and 3, with the pocketed hard-metal felly, which is mounted upon the hub D<sup>5</sup> and plate D<sup>6</sup>, between the edges of which the felly is clamped by the bolts D<sup>7</sup>. By means of this construction the wearing part of these drums may be easily removed and replaced at any time by the removal of the plates D<sup>6</sup>.

In its operation this reduction-channel is as follows: The ore is delivered in the top of the said channel and reaches the first pocketed drum. Here the ore is picked up by the pockets in the said drum, which is whirling in the direction shown by the arrow. Those particles which are small enough to pass between the downward projection of the concave sections directly above this drum are passed on to the second pocketed drum. Those pieces of ore which are large are caught in the said pockets and thrown violently upward against the wall of the sections A<sup>3</sup>, where they are broken to fall again into the pockets



of the drum, which, if the pieces are small enough to permit, deliver them past the said projections to the next section of the reduction-channel and its pocketed drum, where  
 5 the same operation is repeated, still further reducing the ore to admit of its passing the diminished interval between this drum and the projection directly over it, and so on past  
 10 the last drum, where the particles are broken to the desired dimensions to deliver to the pulverizing-rolls.

It will be observed that in the action above described the reduction is materially effected by precipitating the ore against the upper  
 15 wall of the channel. While the ore is passing down the channel A there will be produced a large proportion of very small particles and dust. These are permitted to fall between the rolls and the casings A<sup>4</sup> to the trough E,  
 20 where they are delivered to the chute B and thence to the pulverizing-rolls; also, these particles and dust are held in the pockets and dropped into the trough when the drums turn over.

25 The chute B is bolted on the end of the channel A and converged to the end, as shown in Fig. 1, to deliver the ore between the rolls C C.

The pulverizer is mounted on the frame X, which is constructed of channel-iron and so  
 30 arranged as to throw the reduction-channel at a sharp angle to insure the descent of the ore.

Having thus described this invention, what I claim is—

35 1. In an ore-pulverizer such as described the combination in the reduction-channel thereof, of a top having a series of projections extending downward into the said channel and converging toward the bottom thereof as  
 40 they approach the delivery end, with a series

of drums extending into the said channel directly beneath the projections thereof and provided with pockets adapted to receive particles of ore, and driving mechanism to rotate  
 45 the said drums to precipitate the ore against the said projections of the top sections, substantially as described.

2. In an ore-pulverizer such as described the combination in the reduction-channel thereof of a top constructed of heavy metal  
 50 sections or dies concave on their under sides and joined together so that their butting ends form projections extending crosswise of the said channel and converging toward the bottom thereof toward the delivery end, with a  
 55 series of drums extending into the said channel and provided with pockets adapted to receive broken particles of ore, and driving mechanism adapted to rotate the said drums  
 60 to precipitate the ore against the said concave sections substantially as described.

3. In an ore-pulverizer such as described the combination in the reduction-channel thereof of a top constructed of heavy metal  
 65 sections or dies concave on their under sides and joined together so that their butting ends form projections extending crosswise of the said channel, with a series of drums extending into the said channel under the projections  
 70 formed by the abutting ends of the said top sections and each drum approaching nearer its corresponding projection in its serial order toward the delivery end of the said channel, substantially as described.

In testimony whereof I have hereunto set  
 75 my hand this 1st day of June, 1895.

HENRY P. HOLLAND.

Witnesses:

CHAS. J. ARMBRUSTER,  
 J. M. NOUGUES, Jr.