

(Model.)

M. B. DODGE.

APPARATUS FOR CRUSHING AND PULVERIZING ORES, CEMENT, &c.

No. 262,652.

Patented Aug. 15, 1882.

Fig. 1.

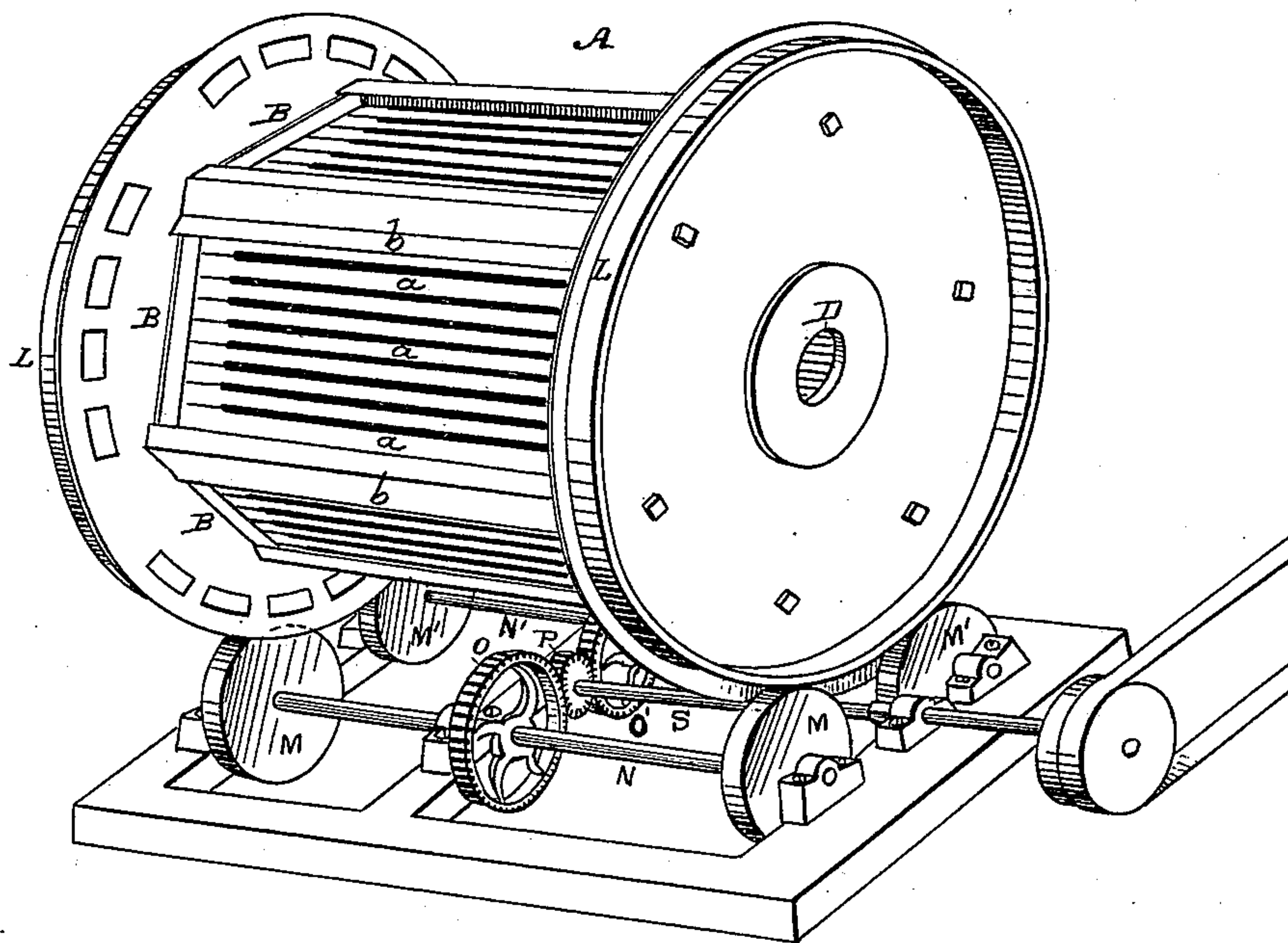
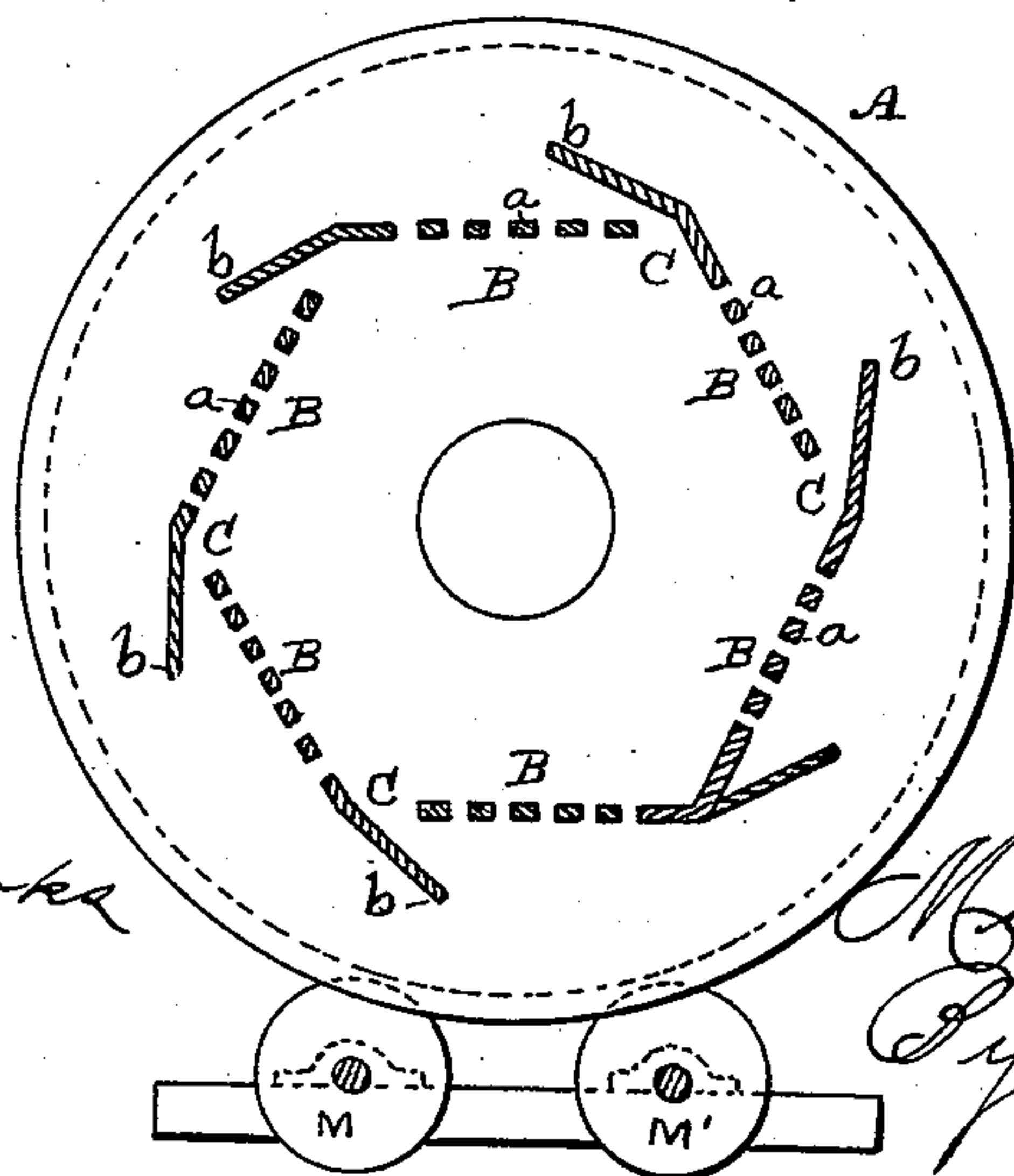


Fig. 2.



WITNESSES

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# UNITED STATES PATENT OFFICE.

MILES B. DODGE, OF SAN FRANCISCO, CALIFORNIA.

APPARATUS FOR CRUSHING AND PULVERIZING ORE, CEMENT, &c.

SPECIFICATION forming part of Letters Patent No. 262,652, dated August 15, 1882.

Application filed October 13, 1879. Renewed December 1, 1881. (Model.)

*To all whom it may concern:*

Be it known that I, MILES B. DODGE, of the city and county of San Francisco, and State of California, have invented an Apparatus for  
5 Crushing and Pulverizing Ore, Cement, &c.; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to certain improvements in that class of pulverizers in which the  
10 ore or cement is crushed or pulverized in a rotating cylinder or chamber by means of balls or rocks and mutual attrition of the particles; and it consists in certain details of construction, as hereinafter more fully set forth and  
15 claimed.

Figure 1 is a perspective view of my pulverizer. Fig. 2 is a transverse section.

In certain portions of the gravel-mining regions of California deposits of gold-bearing  
20 gravel are found, in which the cement and conglomerations are so hard that the ordinary hydraulic mining operation will not suffice to separate the gold. It is necessary therefore to drift out the material and crush it under  
25 stamps the same as quartz, or otherwise break up the lumps and masses. In doing this they have to crush also a good deal of material known to contain no gold, but which is so  
30 mixed up with the rest as to be impossible to separate by any mechanical means. This useless material is mainly what is known as "cobble-stones"—rounded boulders of water-worn rock, which contain no gold. They have, however, to be put under the stamps like that  
35 portion which contains the gold, being cemented in with it.

One object of my improved device is to separate these cobble-stones from the auriferous material and throw them to one side, meantime utilizing them in breaking up the remainder of the cement. In order to accomplish  
40 this, I make a rotary chamber or barrel, A, having two, four, six, eight, or any number of sides, B, said sides being formed of bars *a* of iron, with spaces between them, so as to form a grating. Any desired number of sides may be made, according to the size of the chamber. Each one of the sides overlaps the other,  
45 as shown at *b*, and an opening, C, is made at this overlapping part.

The material is fed in at the end opening, D, and the chamber is rotated, as hereinafter

described. The lumps of cement are broken up by the rotary motion, this action being assisted by the cobbles and pieces of rock which  
55 are set free, they acting like balls in the chamber in breaking up the gravel. All the gold-bearing earth, fine gravel, &c., are thus set free and pass out of the interstices between the bars into a sluice beneath, the cobbles, pieces  
60 of rock, &c., being retained in the chamber. To remove this from the chamber I rotate it in the opposite direction, and these cobbles, rocks, &c., will then slide along the sides and out of the openings *c* into another sluice,  
65 which carries them off in another direction. While the gravel, &c., are being ground up the chamber is revolved so that the material slides on the overlapping edges of the sides past the large openings *c*, so the cobbles, rock, &c.,  
70 which cannot pass out of the spaces between the bars are retained. As soon, however, as I commence to revolve the barrel in the opposite direction these cobbles, &c., are directed toward the large openings *c* and pass out,  
75 when the operation may be repeated.

By having the revolving chamber made with angular sides, as shown, a more perfect and rapid pulverizing action is obtained. When the chamber is made like a cylinder, perfectly  
80 round inside, the material simply slides around, and is not sufficiently agitated. In this, however, the action is somewhat like that of stamps, by the cobbles being lifted up by the sides, and then thrown down suddenly on the cement,  
85 &c., below. With the angular sides, however, the material is tumbled over and over irregularly. As one of the sides rises all that material upon it is suddenly thrown down, and is soon covered and pounded by the material  
90 on the next side. In this way all the gravel and cement are thoroughly and rapidly broken up and the auriferous material transferred to the sluice, while the worthless cobbles, rocks, &c., are separated into another sluice, which  
95 may be put in place when the chamber is revolved in the opposite direction. The wear on the grate-bars is very much less in this pounding action than when the material slides over them continually.

100  
Flanges L are formed on the heads of the barrel or chamber to keep it in place on the rollers M M'. On the shafts N N', carrying these rollers, are the pinions O O', and be-



tween them is a gear, P, on the driving-shaft S. With this arrangement of the gears and pulleys, as the driving-shaft is rotated in one direction, the gear P, being between the pin-  
5 ions O O', rotates both of them in the same direction, and with them the rollers M M', on which the barrel revolves, power being thus applied on both sides of the barrel at once and insuring its certain action.

10 In the class of pulverizers for ore, iron balls are usually used for crushing the ore. The cylinder is rotated and the balls roll over and over the ore, thus crushing it. I can, in my device, use metal balls also in crushing ore;  
15 but in the peculiar shape of my chamber an advantage is gained over those which are cylindrical. In cylindrical crushers the balls roll and slide over and over, and the ore slides or drags along the inside of the cylinder, thus  
20 wearing out by friction the bars or grates. In my polygonal chamber the ore is lifted by one of the sides and dropped suddenly, the balls dropping with it and acting like stamps, pulverizing the ore by impact rather than by at-  
25 trition. This facilitates the action of pulver-

izing and does not cause so much wear on the grates. Both grates and balls are more worn by the sliding than by the dropping action.

I am aware that rotary cylindrical sifters have heretofore been made, having an open- 30 ing tangential to the general outline of the cylinder; and I am also aware that rotary crushing-mills have heretofore been made with a series of interior solid crushing-faces tangential to the circle of the carrying-disks, and  
35 hence I do not broadly claim either of these features; but,

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

A rotary crusher composed of end disks, and a polygonal crushing-chamber having straight sifting sides, openings *c*, and overlapping chutes *b*, all substantially as described.

In witness whereof I have hereunto set my  
45 hand.

MILES B. DODGE.

Witnesses:

S. H. NOURSE,

FRANK A. BROOKS.