(No Model.) 3 Sheets—Sheet 1.

M. B. DODGE.

ROTARY PULVERIZER.

No. 401,878. Patented Apr. 23, 1889.

Fig. 1.

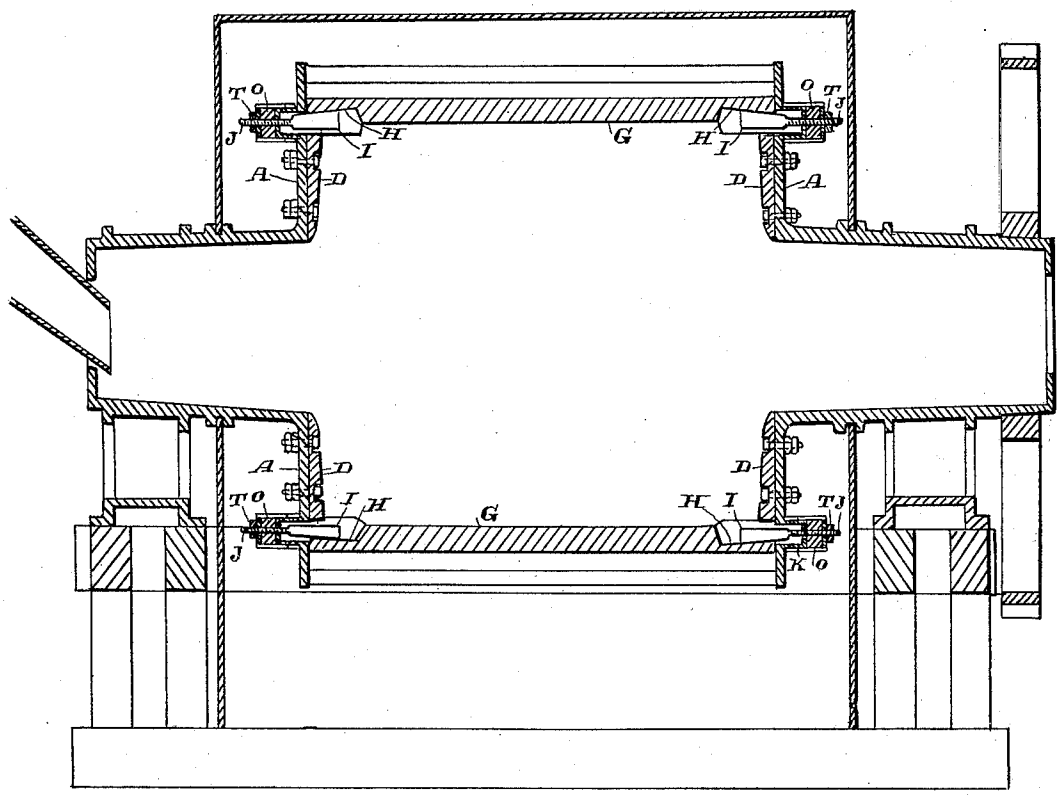

Fig. 2.

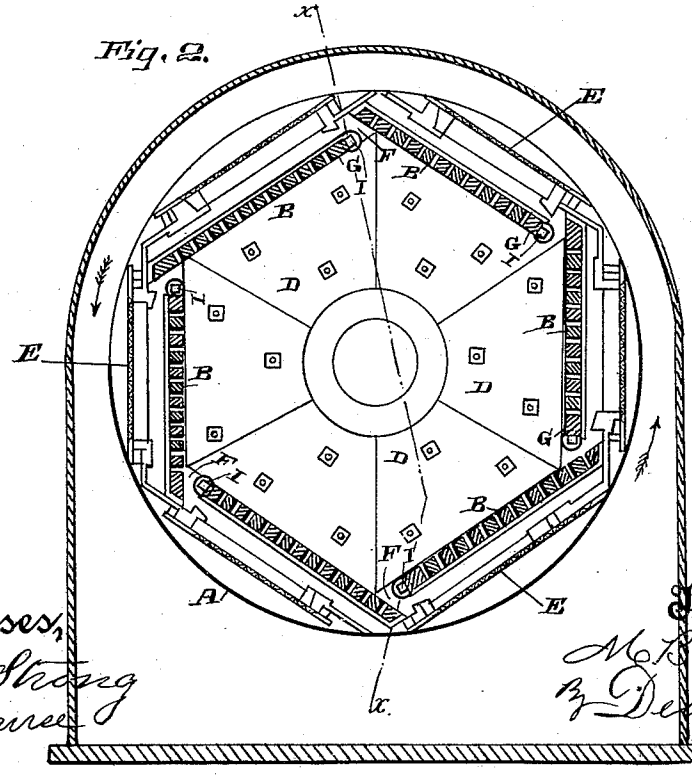

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Fig. 3.

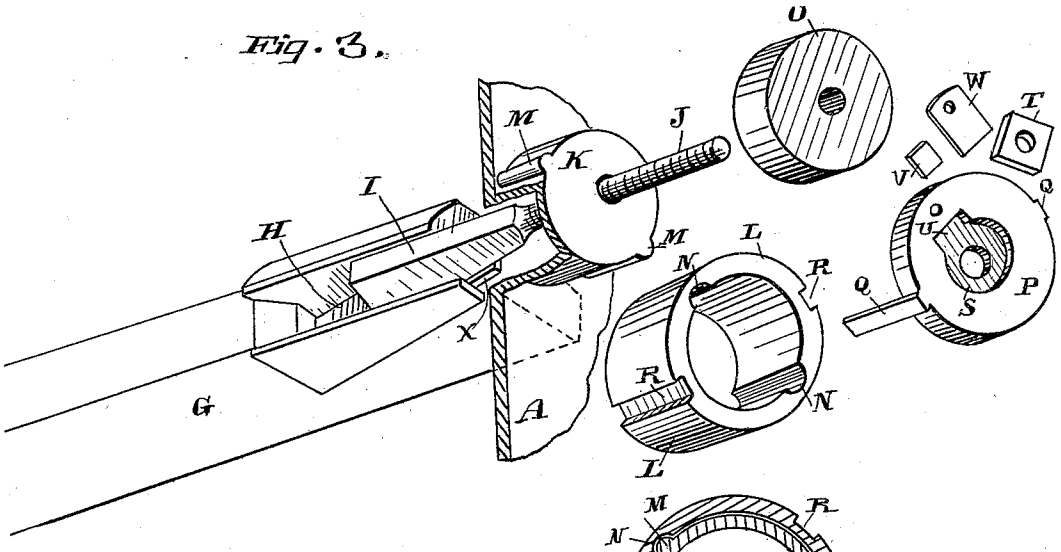

Fig. 5

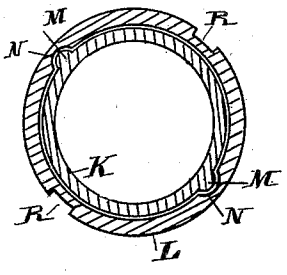

Fig. 4.

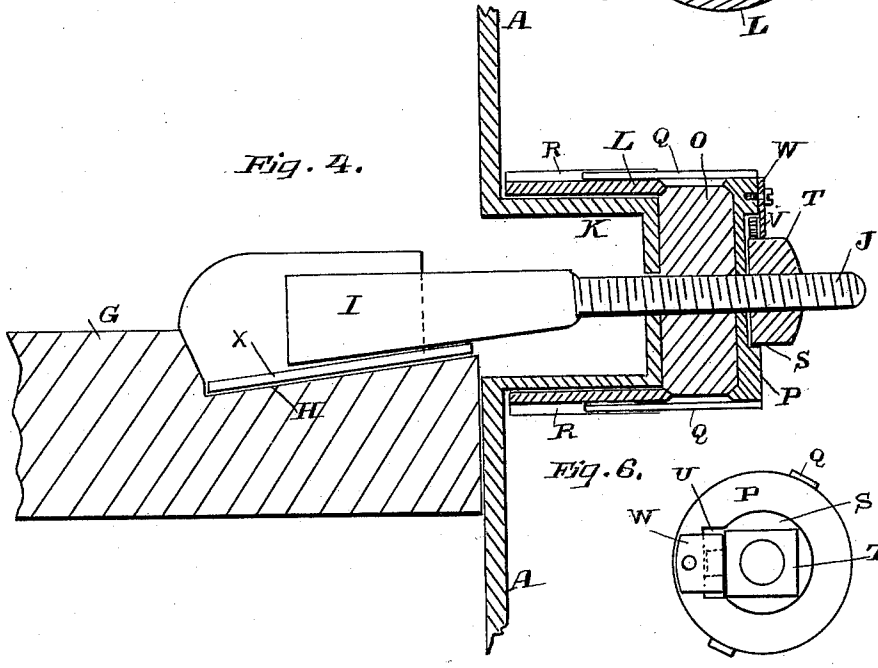

Fig. 6.

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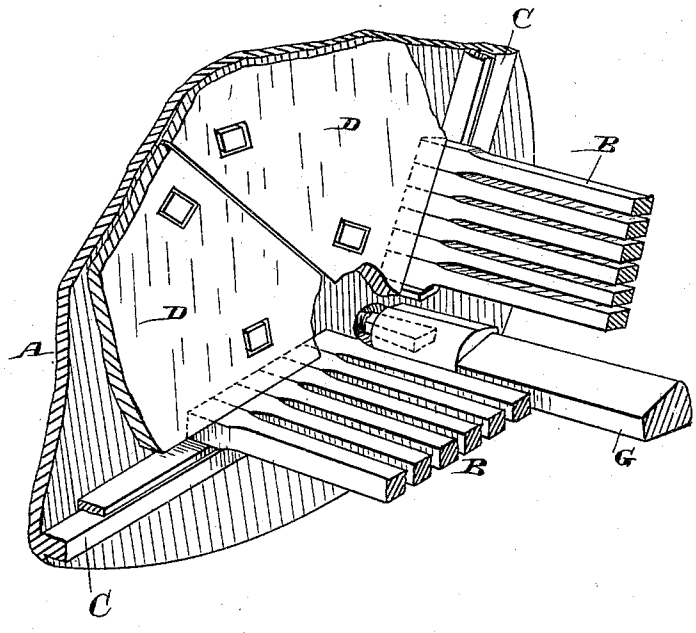
ROTARY PULVERIZER.

No. 401,878. Patented Apr. 23, 1889.

Fig. 7.



Witnesses,
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UNITED STATES PATENT OFFICE.

MILES B. DODGE, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO PARKE & LACEY, OF SAME PLACE.

ROTARY PULVERIZER.

SPECIFICATION forming part of Letters Patent No. 401,878, dated April 23, 1889.

Application filed May 23, 1888. Serial No. 274,819. (No model.)

To all whom it may concern:

Be it known that I, MILES B. DODGE, of the city and county of San Francisco, State of California, have invented an Improvement in Rotary Pulverizers; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to improvements in that class of pulverizers in which the ore or cement is crushed or pulverized in a rotating cylinder or chamber by means of mutual attrition of particles, assisted by pieces of iron or other material which is contained in the chamber with the material to be crushed; and my invention consists in the constructions and combinations of devices, which I shall hereinafter fully describe and claim.

Figure 1 is a longitudinal section of my pulverizer on the line *x x*, Fig. 2. Fig. 2 is a vertical section taken transversely through the axis and the grate-bars from the sides. Fig. 3 is an enlarged perspective view showing the wedge, the devices for locking the grate-bars in place, and the elastic buffer, the parts being separated from each other. Fig. 4 is an enlarged section of a portion of the pulverizer, taken through one end, showing the wedge, cushion, and locking device. Fig. 5 is an enlarged transverse section of one of the cylindrical projections and the sleeve fitting over it. Fig. 6 is an end view of the nut-lock. Fig. 7 is an enlarged interior perspective view showing a portion of one of the heads of the machine, the grate-bars, and the locking-bar at the angle.

A A are the heads of the machine, between which extend the grate-bars B, the ends of these grate-bars slipping into slots or channels which are formed by projecting strips C, cast on the head of the machine, and supplemental plates D, which are bolted so that their edges are a sufficient distance from the strips C to form the proper channels to receive the ends of the bars B, as plainly shown in Fig. 7. The shape of the interior chamber when the bars are in place is hexagonal, there being narrow spaces between the bars B, through which the material can escape when pulverized finely enough, and that portion of the material which is sufficiently fine will pass through the screens E, which are exterior to these bars.

There are spaces left where each of the sides overlap the next adjacent sides, as shown at F, Fig. 2, and the drum turning from right to left, as shown by the arrows, Fig. 2, it will be seen that material within the drum will be prevented from passing through these spaces F, so as to fill the space between the outside of the bars and screens; but any material which passes between the bars and is not fine enough to pass through the screens will be returned into the drum through these spaces F, and will be again subjected to the attrition and crushing action until it is sufficiently fine to pass through the screens.

I have found great difficulty in securing the bars B so that they will not become loose and wear themselves out rapidly by the constant jar and action of the machine, and for the purpose of overcoming this difficulty and securing these bars solidly in place I employ longitudinal bars G, which extend from end to end of the machine and in line with one side of each set of bars B. The end of this bar G is chambered and has an inclined surface, as shown plainly at H, Fig. 4, and a wedge, I, fits into this chamber in such a manner that when drawn outward it presses against the inclined surface H, and thus forces the bar against the edge of the outer grate-bar, B, so as to crowd the grate-bars against the opposite end of the channel in which they lie and prevent their moving. In order to operate this wedge I, the outer end is continued in the form of a long screw-bolt, J, which extends out through the end A of the crushing cylinder or drum. A cylindrical chamber, K, is formed upon the end of the drum, through which each of the screw-shanks J passes, and outside of these cylinders is fitted a sleeve, L, which slips over the cylinder K.

Upon the outside of the cylinder K are formed lugs M, which extend lengthwise of the cylinder, and corresponding grooves or channels, N, are made in the inside of the sleeve L, so that these channels fit over the lugs and thus prevent the sleeve L from turning around upon the cylinder.

O is a spring of any description, but preferably a rubber buffer in the form of a thick disk or cylinder, and it has a hole through its center, so that it may slip down over the screw-shank J and rest upon the head of the cylinder K, as shown plainly in Fig. 4. Outside of this rubber disk is an iron disk, washer, or plate, P, which also slips over the bolt J and rests upon the outside of the elastic buffer O. In order to prevent this plate P from turning round upon the buffer, it is provided with projecting arms Q, which enter corresponding slots, R, in the outside of the sleeve L.

It will be manifest that by making the cylder K and washer P of larger diameter or the spring O of smaller diameter I can omit the sleeve L, and by the arms Q engaging lugs or grooves on the outside of K the parts are prevented from loosening by the constant jar of the machine.

The outer face of the plate P is chambered, as shown at S, so that the nut T, which screws onto the end of the bolt J, fits into this chamber. A small rectangular extension of the depressed chamber S is made, as shown at U, and into this chamber is laid a small rectangular piece of metal, V, so that when the nut T is turned to present one of its rectangular sides to this chamber and the piece V is laid into this chamber it acts as a nut-lock, preventing the nut from turning backward. Outside of this chamber is fitted a guard-plate, W, which is secured by a bolt and screw upon the exterior of the plate P, and this retains the locking-piece V in its chamber and prevents its falling out.

The machine is constructed as follows: The grate-bars B having been laid in their channels so as to form the hexagonal chamber, as shown more plainly in Fig. 2, the bars G are laid so as to rest against the side of the grate-bar nearest the opening F, the opposite grate-bar resting against a stop at the opposite end of the channel. The wedge I is then laid into the channel in the bar G, so that its inclined face rests upon the inclined bottom H of the channel, the screw-shank J passing out through the cylindrical chamber K, the elastic buffer O, and the exterior plate or washer, P. The nut T is then screwed upon the bolt J and screwed down upon the exterior plate or washer, P, until the spring O is compressed as much as may be desired, this action drawing the wedge J outward and forcing the bar G strongly against the sides of the adjacent grate-bar B, which action crowds all the grate-bars closely together and prevents any motion. The nut T, being turned to the proper place, is secured by the locking-plate V and the guard-plate W outside of it. The elasticity of the buffer O causes it to maintain a constant pull upon the bolt J and wedge I, so that any wear or tendency to loosening in any of the parts will be immediately and automatically taken by this action, and the bars will thus be prevented from moving and from the rapid and excessive wear which takes place whenever they are allowed to become loose and move upon each other and the particles of rock which are forced in between them. Wherever there is so much wear that the wedge I has moved out as far as possible, it may be moved back by unscrewing the nut. Then, by introducing a shim, X, upon the inclined bottom H of the chamber in the end of the bar G, the wedge will again act as at first described.

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

1. A rotary pulverizer comprising a polygonal drum having channeled heads and having its sides composed of parallel bars, the ends of which are fitted in said channels, locking-bars parallel with and adjacent to the side bars and having inclines at their ends, wedges fitting said inclines, and screw-shanks and nuts by which said wedges are drawn out and locked, substantially as described.

2. A rotary pulverizer comprising a polygonal drum having channeled heads, parallel bars forming the sides of said drum, locking-bars G, lying parallel with and adjacent to each of the sides and having inclines at their ends, wedges acting upon said inclines, screw-shanks and nuts by which the wedges are drawn out and locked, and the elastic springs or buffers upon which the pressure is exerted and by which the wedges are automatically adjusted, substantially as and for the purpose described.

3. In a rotary pulverizer, a rotary drum having its sides composed of bars lying parallel with each other, the locking-bars G, with the inclines at their ends, the wedges I, with the screw-shanks and nuts, and the elastic springs or buffers O, in combination with the exterior plates or washers, P, having outer sides chambered to receive the said nuts, the nut-locking plates V, and the guard-plates W, substantially as herein described.

4. The locking-bars G, having the inclined surfaces at their ends, the wedges I, pressing upon said inclines and having the screw-shank J, by which they are operated, in combination with the cylindrical extension from the head of the rotary drum, into which the wedges are drawn, the keys or lugs M on the extensions, the springs O, and the exterior plate or washer with the corresponding key-ways or channels by which the washer is prevented from turning upon the cylinder, substantially as herein described.

5. A rotary pulverizer comprising the polygonal drum, the parallel bars forming the sides thereof, wedge-shaped locking-bars having screw-shanks adjacent to said side bars, the cylindrical extension K, through which

the screw-shank of the wedge-shaped bars passes, the springs O, the exterior washers or plates, P, the nuts resting against said plates, and the arms Q upon said washers or plates and engaging lugs or grooves, whereby the washers are prevented from turning, substantially as herein described.

In witness whereof I have hereunto set my hand.

MILES B. DODGE.

Witnesses:
S. H. NOURSE,
H. C. LEE.