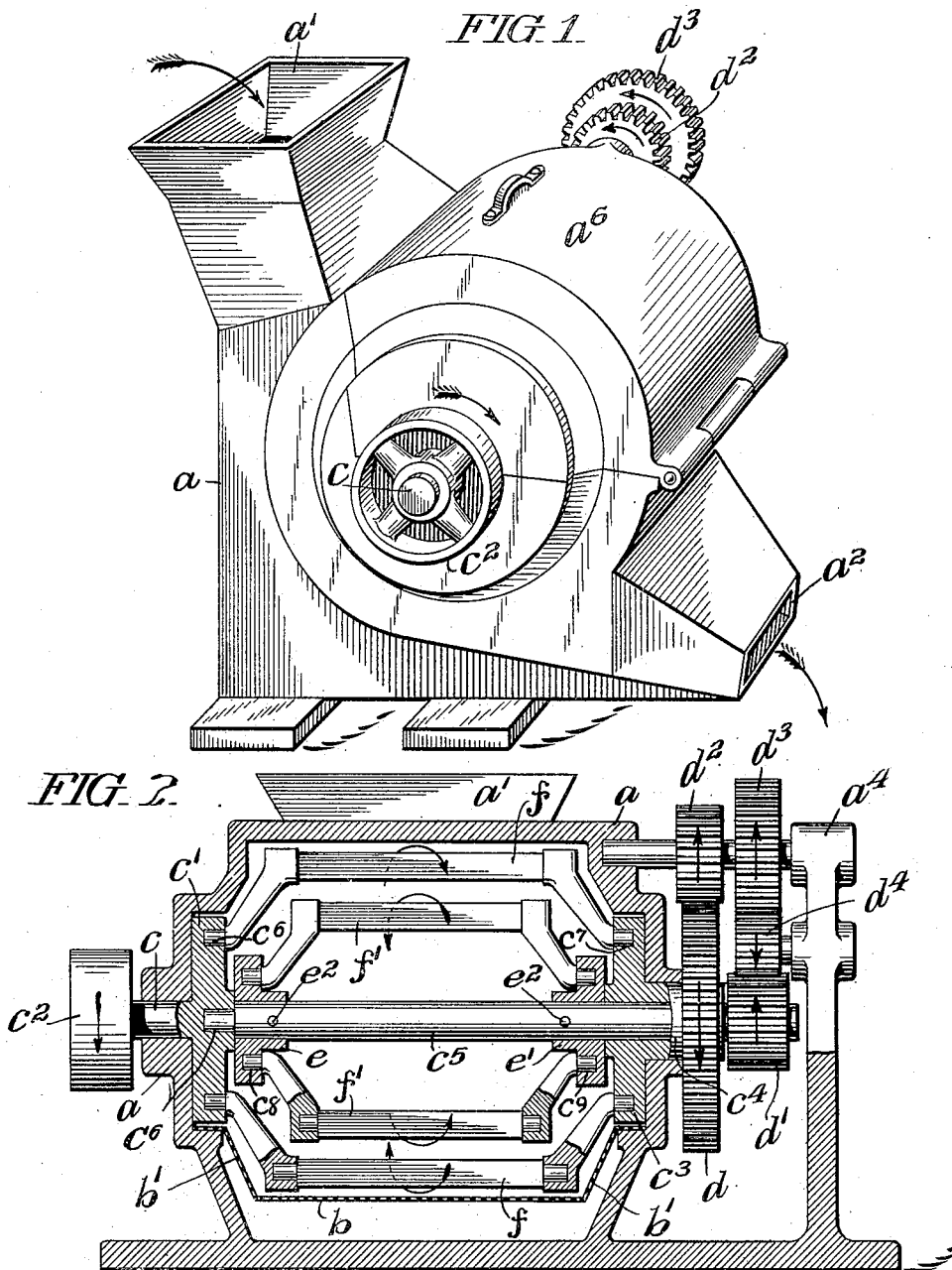


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PULVERIZER.
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980,978.

Patented Jan. 10, 1911.



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PULVERIZER.

980,978.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ROYER LUCKENBACH, a citizen of the United States, residing at Colwyn, in the county of Delaware and State of Pennsylvania, have invented certain new and useful Improvements in Pulverizers, of which the following is a specification.

My invention has relation to improvements in an ore pulverizing mill; and in such connection relates to a pulverizing mill so arranged as to reduce expeditiously mineral and other ores to required degrees of fineness and to facilitate liberation of the same for subsequent use.

My invention stated in general terms, consists of a pulverizing or crushing mill, constructively arranged in substantially the manner hereinafter described and claimed.

In the drawings:—Figure 1, is a perspective view of a pulverizing or crushing mill, embodying main features of my said invention; and Fig. 2, is a vertical sectional view through the housing and working parts of a mill of Fig. 1, showing the main operating shaft and positive gear-mechanism to operate the two series of revoluble beaters or arms of the mill occupying nested relationship and actuated in reverse directions and at different rates of speed.

In the drawings, *a* is a housing of suitable shape or form, having in the top a hopper *a*¹, and in the base portion a discharge-chute *a*². The base portion of the housing as clearly shown in Fig. 2, is arranged substantially conical in shape and in which is placed as walls of the same, a screen *b*. This screen is extended so as to compass the sides *b*¹, of the conical portion of the housing to facilitate freedom of discharge of reduced matter from the crushing or pulverizing means of the mill, to be hereinafter more fully explained.

c, is a horizontal shaft journaled in one side of the housing *a*, and therein terminating in a disk *c*¹. The outer end of the shaft *c*, carries a driving-pulley *c*², for a belt, not shown. On the opposite side of the housing *a*, is arranged a disk *c*³, having a journal *c*⁴, thereon carrying outside of the housing *a*, a gear *d*. The said described disks being designated as the primary rotary disks. In recesses *c*⁶ and *c*⁷ of the disks *c*¹ and *c*³, are mounted the journals or ends of the sectional beaters or arms *f*, constituting

the outer series of beaters or arms of the said mill. In a central opening of the disk *c*¹, is loosely mounted a shaft *c*⁵, and which extends through the disk *c*³, and its journal *c*⁴, and on the free end of which shaft is mounted a gear *d*¹.

e and *e*¹, are secondary recessed disks fitted or keyed at *e*², to the shaft *c*⁵, and located between and coaxial with said primary disks and in recesses *c*⁶ and *c*⁷ of the said secondary disks are mounted the journals or ends of the sectional beaters or arms *f*¹, constituting the inner series of beaters or arms of the said mill. The two series of beaters or arms nested together within the housing *a*, constitute the reducing or pulverizing means of the said mill. The gears *d* and *d*¹, mesh respectively, with the gears *d*², *d*³ and *d*⁴, journaled to a standard *a*⁴, and the housing *a*, as clearly illustrated in Fig. 2.

The direction of rotation of the gear-mechanism, when actuated is indicated by the arrows, in Fig. 2. When motion is imparted to the shaft *c*, by means of a belt applied to the pulley *c*², is revolved the primary disks *c*¹ and *c*³, of the sectional beaters or arms *f*, and through the intervention of the shaft *c*⁵, the inner series of beaters or arms *f*¹, are actuated, but in a reverse direction to that of the beaters or arms *f*. By the arrangement of gear-mechanism, as shown, these two series of beaters or arms together are revolved in opposite directions but at a different rate of speed with respect to each other, that is, the inner series of beaters or arms *f*¹, faster than the outer series of beaters or arms *f*, whereby crushed ore matter deposited in the path of the said two series of revoluble beaters or arms by their respective rotations in opposite directions and at relatively different rates of speed will be crushed and pulverized quickly and effectively and then be freed through the bottom of the screen *b*, and the sides *b*¹, thereof, into the discharge-chute *a*². The foregoing action upon the said matter is accomplished economically, because the operation upon the matter to be reduced is entirely automatic and the resultant product is efficiently brought to the desired pulverized condition, for use. The rapid revolving action of the two series of nested beaters or arms within the housing *a*, maintain while in operation, the screen in a thoroughly clean condition, thus faci-

tating liberation of the reduced matter into the discharge chute of the mill. By the sectional arrangement of the said two series of beaters or arms, as shown particularly in Fig. 2, repairs may be readily made there-
5 to and access had to them, by simply raising the mill cover *a*⁶, by the handle thereof, as shown in Fig. 1, of the drawings.

Having thus described the nature and ob-
10 jects of my invention, what I claim as new and desire to secure by Letters Patent is:—

A pulverizer, comprising a casing, primary rotary disks mounted in opposite ends
15 of said casing, beaters or arms connecting said disks, secondary rotary disks between

and coaxial with said primary disks, beaters or arms connected with said secondary disks and coöperating means causing differential rotary movement of said primary and secondary disks and beaters or arms, in 20 opposite directions.

In witness whereof, I have hereunto set my hand, this 6th day of July A. D. 1910, in the presence of two subscribing witnesses thereto.

ROYER LUCKENBACH.

Witnesses:

ELISABETH A. SHELDRAKE,
THOMAS M. SMITH.