

R. LUCKENBACH.

APPARATUS FOR PULVERIZING, DESULFURIZING, OR OXIDIZING METALLIC AND OTHER ORES.

APPLICATION FILED OCT. 24, 1907. RENEWED SEPT. 16, 1909.

938,005.

Patented Oct. 26, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

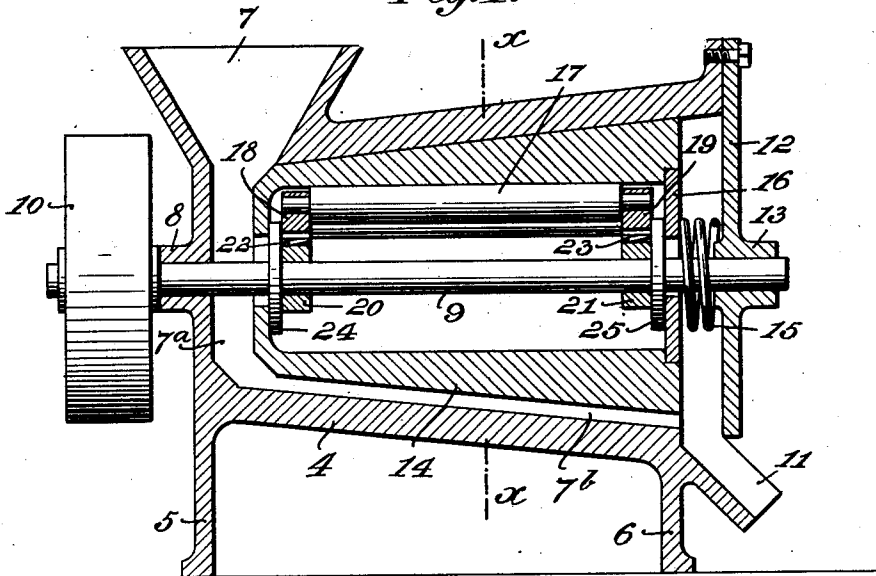
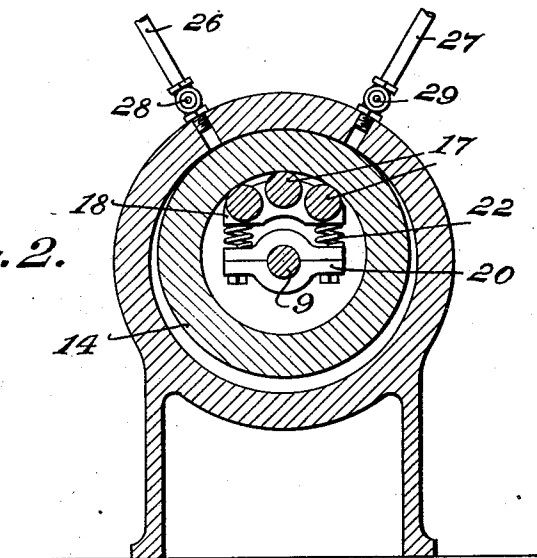


Fig. 2.



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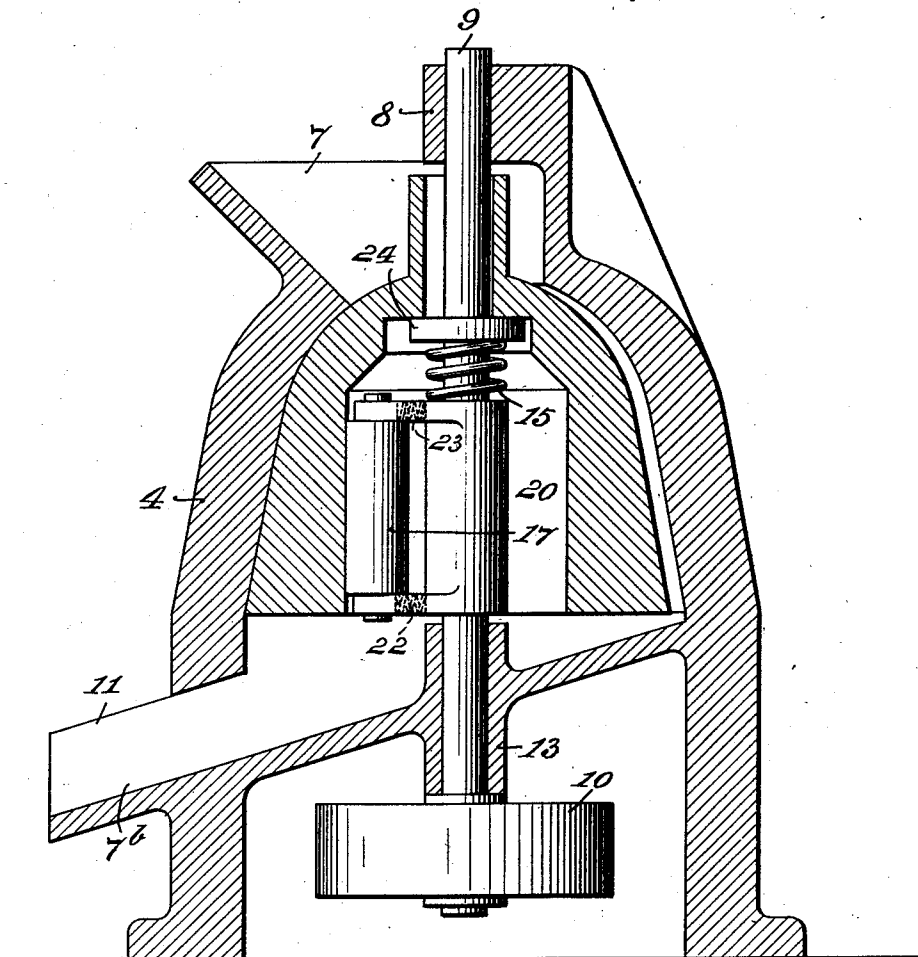
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2 SHEETS—SHEET 2.

Fig. 3.



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ROYER LUCKENBACH, OF COLWYN, PENNSYLVANIA, ASSIGNOR TO BORINDUM EXTRACTION COMPANY, A CORPORATION OF ARIZONA TERRITORY.

APPARATUS FOR PULVERIZING, DESULFURIZING, OR OXIDIZING METALLIC AND OTHER ORES.

938,005.

Specification of Letters Patent.

Patented Oct. 26, 1909.

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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 the city of Colwyn, in the county of Delaware and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Pulverizing, Desulfurizing, or Oxidizing Metallic and other Ores, of which the following is a specification.

My invention has relation to an apparatus for pulverizing or grinding by attrition, metallic and other ores to a finely divided state or impalpable powdered condition, as well as under certain conditions in the treating of metallic sulfid ores, as gold and silver, in reduction to a finely divided state, desulfurizing or oxidizing, to bring into a free milling condition so as to effect amalgamation or concentration by employing a solution or amalgam for such purpose; and in such connection my present invention relates more particularly to the constructive arrangement of apparatus for the defined purposes of the invention.

The nature and scope of my said invention will be more fully understood from the following description taken in connection with the accompanying drawings forming part hereof, in which—

Figure 1 is a longitudinal sectional view, partly in elevation of an apparatus embodying features of my invention in one form for reducing crushed ore matter to a pulverized or impalpable powdered condition. Fig. 2 is a transverse sectional view on the line *x, x*, of Fig. 1, showing means for introducing superheated steam and compressed air for desulfurizing and oxidizing metallic ore matter during treatment in the apparatus; and Fig. 3 is a vertical sectional view, partly in elevation, of a modified form of apparatus for the defined purposes of my invention.

Referring to the drawings 4, in Figs. 1 and 2, represents a shell or casing arranged longitudinally and provided with supporting standards 5 and 6, a feed-hopper 7 and a bearing 8, for one end of a shaft 9, carrying a driving pulley 10, a discharge chute 11, and having an end plate 12, detachably secured to the shell with a bearing 13, for the other end of the shaft 9, as clearly shown in Fig. 1. 14 is an inner cone-shaped grinding or pulver-

izing device or drum loosely supported in an inclined position longitudinally of the shell or casing 4, and arranged to eccentrically revolve within the shell or casing against crushed ore matter in the grinding or pulverizing of the same by the said device against the shell. The device or drum 14, is held under tension within the casing or shell 4, by means of a coiled spring 15, which abuts against an inserted end plate 16, of the drum and end plate 12, of the shell or casing 4, and respectively, connected therewith. Mounted in the device or drum 14, and bearing against the inner surface of the same is a series of roller bearing bars 17, connected by means of end brackets 18 and 19, with the shaft 9, and interposed between the said brackets for the roller bearing means 17, and connection 20 and 21, with the shaft 9, are coiled springs 22 and 23, acting as bumpers for said bearing means and by which the said bearing means are maintained in an operative position as shown in Fig. 2, to actuate the device or drum 14, supported in operative position thereby within the shell 4, and to cause the same to be operated around against the shell or casing 4, so as to permit the crushed ore matter falling through the hopper 7, and the throat 7^a thereof, into the inclined chamber 7^b, to be ground or pulverized by the actions of the device 14, by degrees gradually to an impalpable powder and then by gravity to be discharged through the chute 11, away from the pulverizer. The grinding device or drum 14, is maintained in operative position loosely connected with the shaft 9, by means of friction rings 24 and 25, to enable the roller bearing means 17, to eccentrically impart a gyratory motion to said grinding device 14, with the attending effects by attrition upon the ore matter undergoing treatment between the said device or drum 14, and shell or casing 4. Moreover, the rings 24 and 25, prevent any shifting of the drum to interfere with the roller bearing means 17, in its action upon the drum 14, with the shell 4, in order that the best possible action of the drum upon ore matter to be reduced to an impalpable powder can be had, by the eccentric gyratory movements of the same, within the shell 4. In the treatment of sulfid or other metallic ores, containing gold and

silver, it is highly desirable to reduce the matter to an impalpable powdered condition, because such facilitates free milling conditions to effect when concentrated or amalgamated with a suitable substance, quick recovery, for use. During the above treatment of such character of ores, as defined, especially such as contain sulfur, by providing pipes 26 and 27, with regulating cocks 28 and 29, can be introduced respectively, therethrough into the grinding chamber 7^b, where the ore matter is undergoing treatment, superheated steam and air or other gases, to effect not only desulfurization of the ore matter, but also oxidation, which in some instances, is desirable, before concentration or amalgamation of the same. The effect of the superheated steam is to desulfurize and the air or other gas to oxidize the metallic matter of the pulverized ore body reduced to an impalpable powdered form.

In Fig. 3, the apparatus is the same as that already fully described in all main features of the invention, save that the working parts are arranged vertically instead of horizontally as in Fig. 1, but the actions of the working parts upon matter to be reduced are the same.

Having thus described the nature and ob-

ject of my invention, what I claim as new and desire to secure by Letters Patent is:—

1. A pulverizing or grinding apparatus, comprising a shell, a driven shaft extending therethrough, a spring controlled grinding drum located in the shell, roller-bearing means connected with said shaft and means for holding said roller bearings under tension in contact with said drum against the influence of matter fed between the shell and drum in rotations thereof, substantially as and for the purposes described.

2. A pulverizing or grinding apparatus, comprising a shell arranged to provide a feed-hopper and a discharge-chute, a driven shaft therein, a spring controlled grinding drum mounted in said shell, roller-bearing means connected with said shaft and held to said drum by spring bumpers against the influence of matter fed between said shell and drum in rotations thereof, substantially as and for the purposes described.

In witness whereof, I have hereunto set my signature in the presence of the two subscribing witnesses hereto.

ROYER LUCKENBACH.

Witnesses:

WILHELM VOGT,
THOMAS M. SMITH.