

Sept. 24, 1940.

H. REYNOLDS

2,215,766

BALL MILL

Filed Aug. 1, 1939

2 Sheets-Sheet 1

Fig. 1.

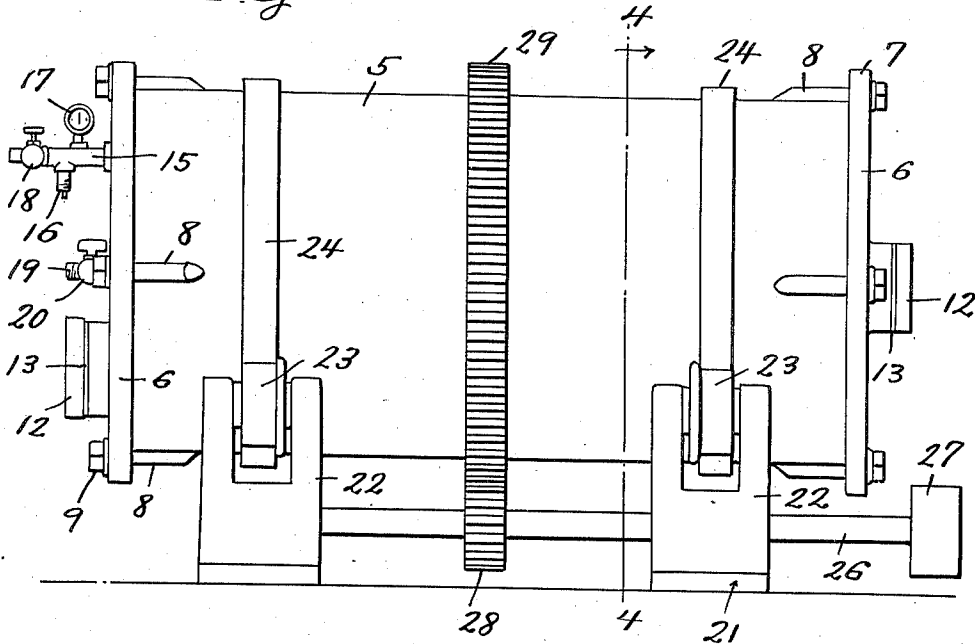
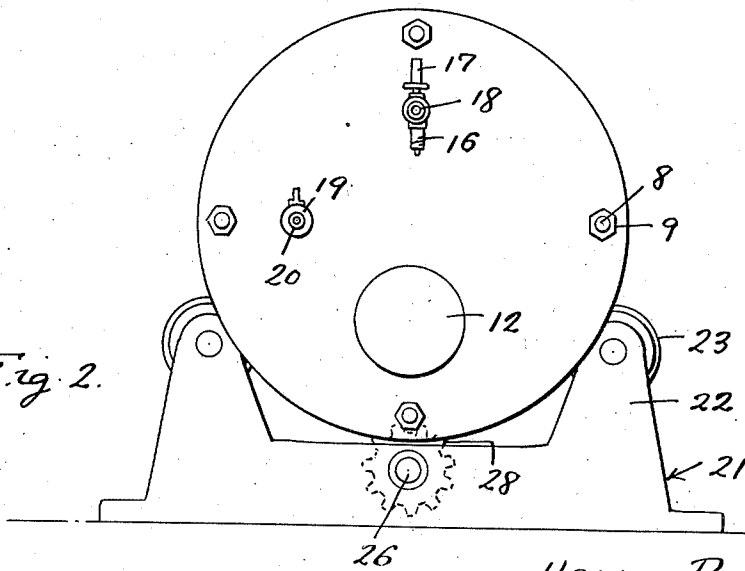


Fig. 2.



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Fig. 3.

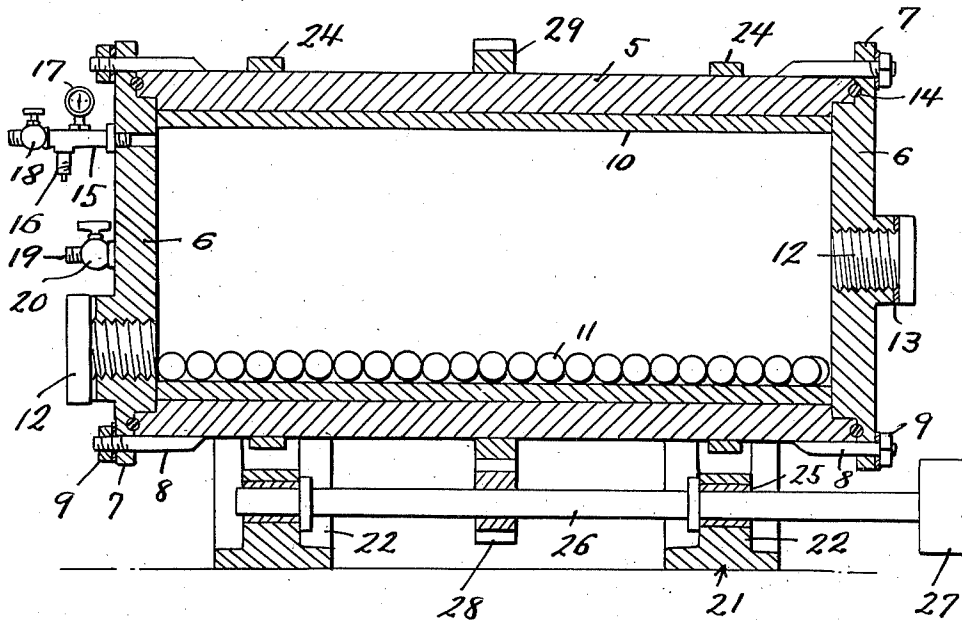
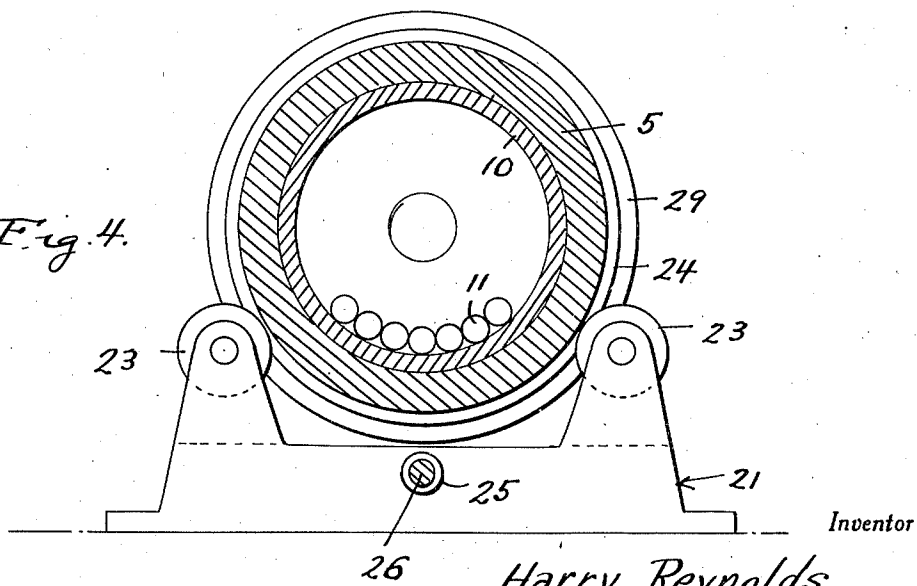


Fig. 4.



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UNITED STATES PATENT OFFICE

2,215,766

BALL MILL

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Application August 1, 1939, Serial No. 287,838

1 Claim. (Cl. 83—9)

This invention relates to mills for the separation of precious metals, such as gold and silver from other ore and undesirable materials, and has for the primary object the provision of a device of this character which will permit the precious metal recovery to be rapidly, successfully and economically carried out through the use of chemicals, a desired amount of air pressure and the thorough pulverizing of the ore or materials, the device being so constructed that the operation thereof may be had through the use of a minimum amount of motive power and with a minimum loss in chemicals with a maximum percentage of recovery of the precious metals.

With these and other objects in view, the invention consists in certain novel features of construction, combination and arrangement of parts to be hereinafter more fully described and claimed.

For a complete understanding of my invention, reference is to be had to the following description and accompanying drawings, in which—

Figure 1 is a side elevation illustrating a mill constructed in accordance with my invention.

Figure 2 is an end elevation illustrating the device.

Figure 3 is a vertical sectional view illustrating the device.

Figure 4 is a transverse sectional view illustrating the device.

Referring in detail to the drawings, the numeral 5 indicates a cylinder the ends of which are arranged in stepped formation to match stepped formations of heads 6, the latter having apertured extensions 7 through which extend tie bolts 8 secured on the cylinder and have threaded thereon nuts 9 whereby the heads may be easily removed when necessary and to effectively secure the heads to the ends of the cylinder to prevent leakage.

Arranged in the cylinder 5 is a metallic liner 10 the ends of which are abutted by the heads 6. Arranged within the liner is a series of agitating balls 11 free to move within the liner during the rotation of the cylinder and the purpose therefor being to bring about a thorough agitation and grinding of substances introduced into the cylinder.

The heads 6 are provided with man openings closed by removable plugs 12. Suitable gaskets 13 are provided for the plugs and also gaskets 14 are provided between the heads and the cylinder. The plugs 12 are preferably threaded into the man openings so that they can be removed when

inspection, cleaning, repairing and the like is necessary to the interior of the cylinder. Further, it is to be noted that one of the man openings is eccentrically located of its respective head which will permit ore and other materials to be readily placed in or removed from the cylinder. Also, the latter-named head is equipped with an air supply pipe 15 having direct communication with the interior of the cylinder and is provided with an air valve fitting 16 to which an air supply may be connected and also has an air pressure gage 17 and an outlet or exhaust valve 18. The last-named head is further provided with a drain pipe 19 eccentrically located thereof and equipped with a control valve 20.

The cylinder 5 is horizontally arranged on a supporting cradle 21 and is mounted for rotation thereon. The cradle 21 includes a pair of supports 22 carrying rollers 23 which engage with annular tracks 24 secured on the cylinder. The supports 22 further provide journals 25 for a power shaft 26. The power shaft at one end is provided with a pulley 27 so that the power shaft may be belted to a power source (not shown). A gear 28 is secured on the power shaft 26 and meshes with a ring gear 29 secured on the cylinder thereby establishing a drive connection between the drive shaft and the cylinder.

In operation, the chemicals in solution form and the ore are introduced into the cylinder by way of the eccentrically located manhole. An air pressure to a desired poundage is admitted to the cylinder. Said cylinder is then placed in operation by the power source (not shown) so that the ore is subjected to a thorough grinding operation under pressure which will rapidly bring about pulverizing of the materials and with the aid of the chemicals and air pressure the precious metal will rapidly become separated from the undesirable materials. This separation of the precious metals from the other materials can be successfully carried out within a comparatively short period of time through the foregoing described construction of device. After the elapse of the period of time necessary for the separation of the precious metals from the other materials the draining of the cylinder can be easily carried out through the eccentrically located manhole. Also the pipe 19 and its control valve will permit the pregnant solution to be easily drawn off from the cylinder. The air pressure within the cylinder can be rapidly reduced through the opening of the valve 18 of the pipe 15. The concentrically located manhole is for the purpose of permitting easy inspection of the ore within the cylinder and

also provides means whereby the latter may be easily cleaned.

While I have described the elements 11 in the form of balls for agitating purposes within the cylinder, it is to be understood that rods of short length may be employed in lieu of the balls.

It is believed that the foregoing description, when taken in connection with the drawings, will fully set forth the construction and advantages of this invention to those skilled in the art to which such a device relates, so that further detailed description will not be required.

Having thus described my invention, what I claim is:

15 A mill comprising a horizontally arranged cylinder having stepped faces on the ends thereof, heads for closing the ends of the cylinder and having stepped faces matching the stepped faces

of said cylinder, means for detachably connecting the heads to the cylinder, a cylindrical liner having frictional fit with the internal walls of the cylinder with the ends thereof in abutting engagement with said heads, one of said heads having a manhole located concentrically thereof, a removable closure for said manhole, the other head having a manhole located eccentrically thereof, a removable closure for the latter-named manhole, an air supply pipe including an inlet valve fitting and an escape valve carried by the latter-named head and arranged eccentrically thereof and in communication with the interior of said sleeve, a series of agitating balls riding the walls of said liner, means for rotatably supporting the cylinder, and means for rotating said cylinder.

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