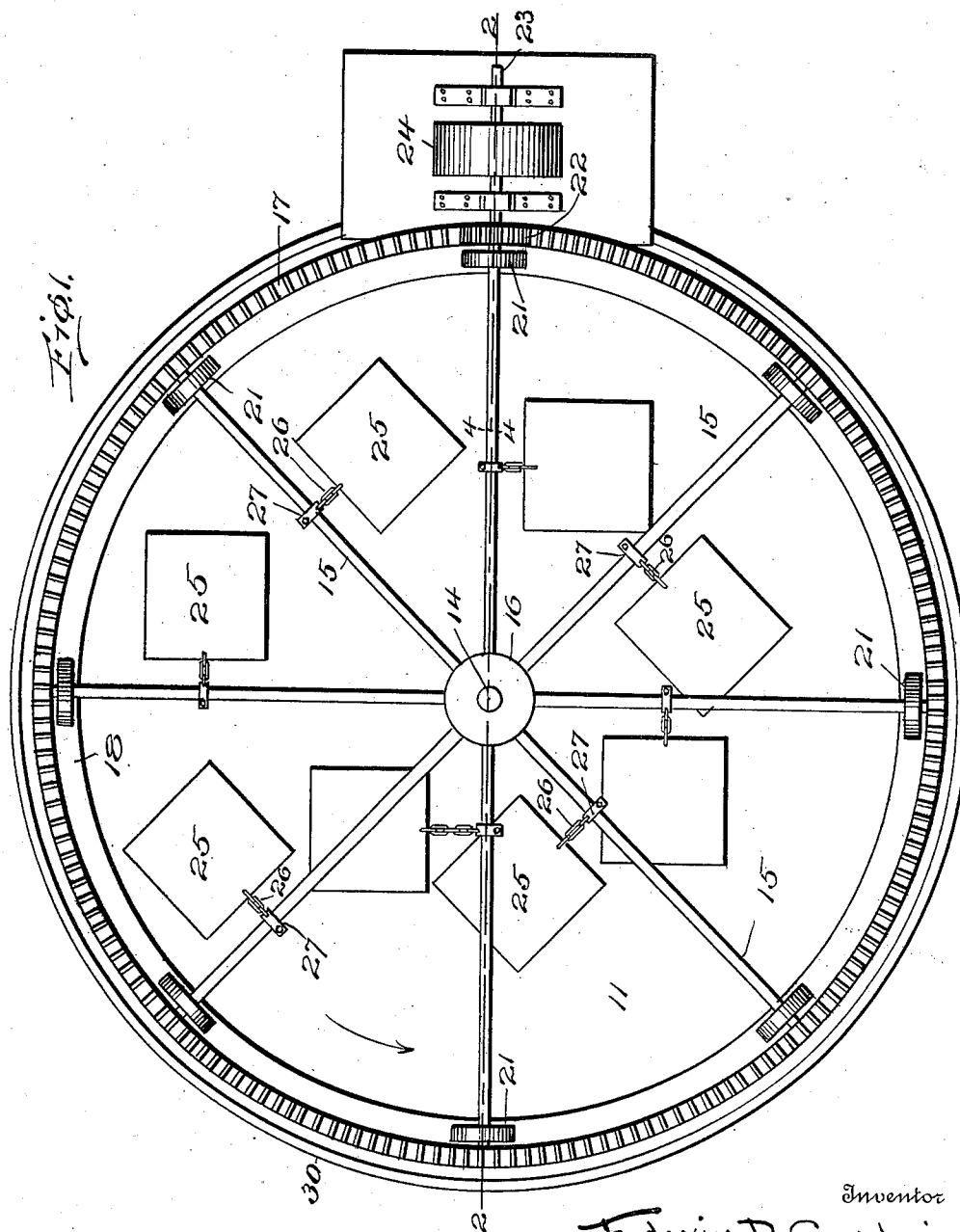


E. B. GOODWIN.
AGITATING AND GRINDING MECHANISM.
APPLICATION FILED JAN. 19, 1910.

1,014,871.

Patented Jan. 16, 1912.

3 SHEETS—SHEET 1.



Witnesses
J. M. Fowler
A. Strauss

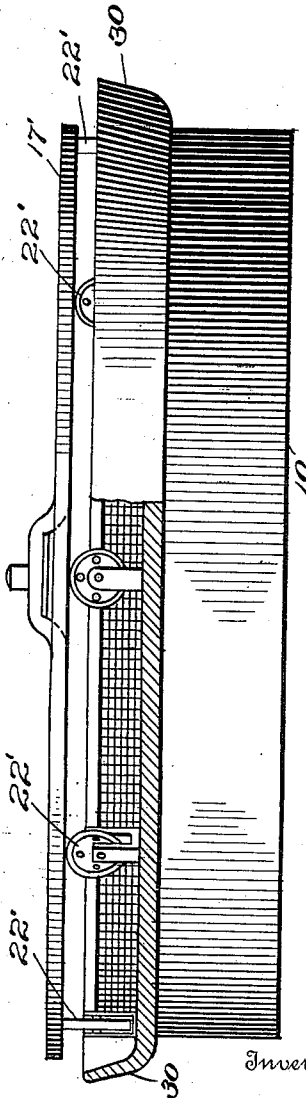
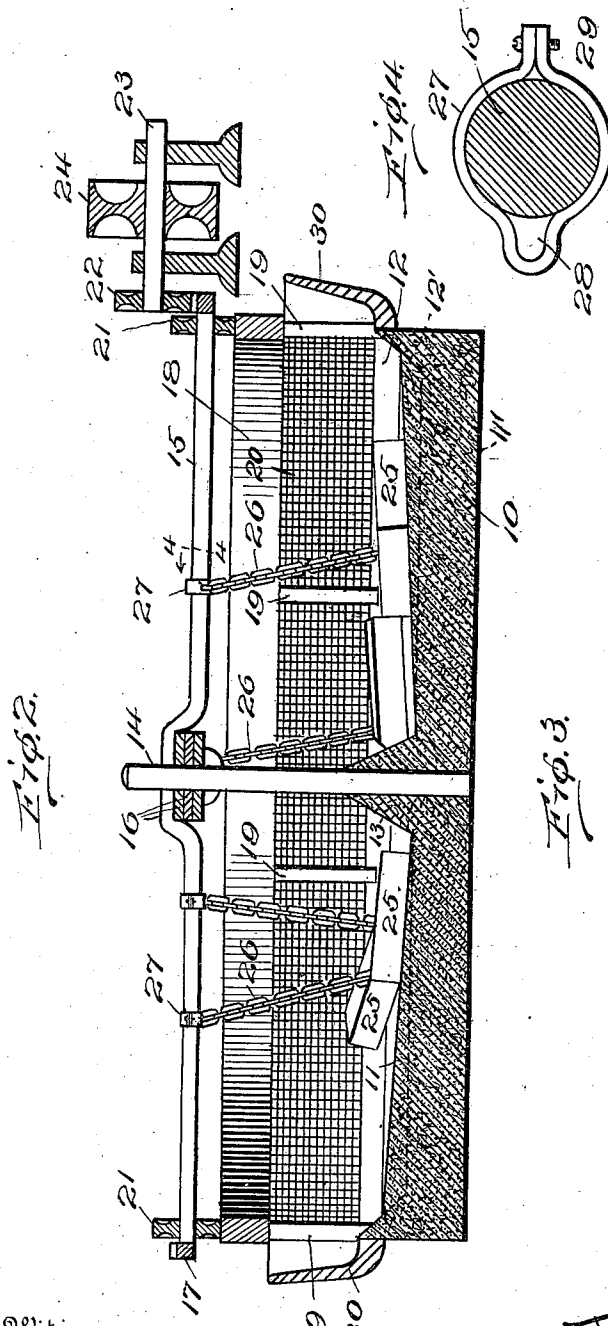
Inventor
Edwin B. Goodwin
By *Mason F. Lawrence*,
Attorneys

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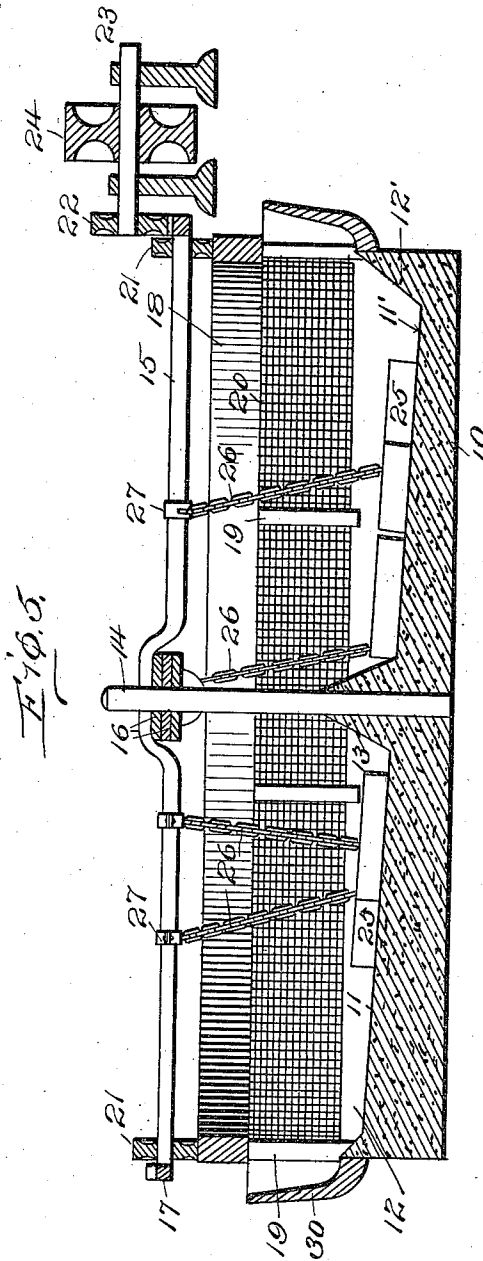
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By *Mason Farnick Lawrence,*

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H. Strauss

UNITED STATES PATENT OFFICE.

EDWIN B. GOODWIN, OF PUZZLER, COLORADO.

AGITATING AND GRINDING MECHANISM.

1,014,871.

Specification of Letters Patent.

Patented Jan. 16, 1912.

Application filed January 19, 1910. Serial No. 538,879.

To all whom it may concern:

Be it known that I, EDWIN B. GOODWIN, a citizen of the United States, residing at Puzzler, in the county of Boulder and State of Colorado, have invented certain new and useful Improvements in Agitating and Grinding Mechanism; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to mechanisms for use in grinding and in the treatment of ores and like substances, and has for an object to provide improved mechanism of the class ordinarily and technically known as arrastres, and embodying new and improved features for thoroughly and completely grinding and disintegrating the ore masses, for agitating ore pulp and for aiding in the process of amalgamation.

A further object of the invention is to provide a mechanism of the class described, the operation of which shall be economical as regards the power required but which shall, at the same time, be effective and efficient as regards the amount of grinding surface operated and the amount of ores subjected to atmospheric action.

A further object of the invention is to provide an arrastre with an inclined floor with drag stones drawn over such inclined floor so arranged and proportioned that the passage of each stone exposes behind such stone or in the wake thereof a surface of floor covered only by an infinitesimally thin layer of finely divided ore masses.

A further object is to provide a simple, economical and yet efficient apparatus for thoroughly and completely grinding and disintegrating the ore masses and for polishing the free metal particles contained in said ore and thoroughly agitating the same, thereby rendering said particles amenable to amalgamation with mercury and aiding in such amalgamation.

The present invention is presented as a continuance of co-pending application Serial Number 457,666, filed October 14, 1908, so far as the arrastre is disclosed in said co-pending application, and also a continuance of co-pending application, Serial Number 492,680, filed April 28, 1909, so far as such arrastre is disclosed in said co-pending application, but with description of construc-

tion, operation and uses given more fully than in said co-pending applications.

With these and other objects in view, the invention comprises certain novel constructions, combinations and arrangements of parts as will be hereinafter fully described and claimed.

In the drawings:—Figure 1 is a top plan view of the improved agitating and grinding mechanism. Fig. 2 is a diametrical sectional view of the improved agitating and grinding mechanism taken on line 2—2 of Fig. 1. Fig. 3 is a view in side elevation with part of the rim and screen broken away and showing a slightly different embodiment of the operating features. Fig. 4 is a view in transverse section as on line 4—4 of Figs. 1 and 2 showing the means for connecting the drag stones with the radial arms and permitting the adjustment of such stones. Fig. 5 is a transverse sectional view of an embodiment of the machine the floor of which is an inclined plane.

Like characters of reference designate corresponding parts throughout the several views.

The base 10 is composed of an approved material and preferably formed upon its upper surface integrally to produce a floor 11 having its peripheral edges sharply upturned as at 12 and sloping from such peripheral upturned edge downwardly toward the center with an upstanding cone at the center preferably higher than the upper edge of the upturned portion 12, or said floor may be constructed with a continuous slant from one side to the other as shown at Fig. 5, the upturn at the edge having its upper rim level all around but its depth increasing with the slant of the floor from one side to the other as shown by the dotted lines. Axially of the cone 13 a shaft 14 is mounted serving as the axis for a plurality of radial arms 15 pivotally mounted upon such shaft 14 by any suitable means such as central disks or plate-like portions 16 and connected at their extremities with a circular rack 17.

About and above the upturned portion 12 of the floor a circular track 18 is constructed supported above the same in any approved manner as by the posts 19 and the space between such track 18 and the upper edge of the upturned periphery 12 filled by a screen 20 for the whole circumference or for any desired portion thereof. The radial arms 15

are provided with rollers or idlers 21 mounted adjacent the rack 17 and bearing upon the track 18. To rotate the radial arms and rack a gear 22 is intergeared with such rack and carried upon a shaft 23 which, in turn, is driven by any approved means as the pulley 24 for transmitting power to such pinion 22 and rack 17.

Upon the floor 11 a plurality of drag stones 25 are disposed to which are connected chains 26, the opposite ends of which are connected with the radial arms 15 in any approved manner as by clips 27 shown particularly at Fig. 4 having loops 28 for engagement with such chains, and a bolt 29 for tightening such clips upon the arm 15. It will be apparent that by loosening the screw bolt 29 the clips 27 may be adjusted longitudinally of the arms to vary the path of travel of the drag stones 25 and consequently prevent uneven wear upon the floor 11. Another object of changing the position of the drag stones is that their order may be changed so that the contained material will be thrown toward the center or toward the circumference as desired. It will readily be seen that with the stones placed in the relative positions as shown in Fig. 1, with the rotation of the radial arms in the direction as there indicated, they form a spiral running from periphery to center as the arms rotate. It will also be readily seen that by reversing the relative position of the stones a spiral would be formed running from center to periphery as the arms rotate. In the former case the tendency of the revolution of the drag stones would be to concentrate the contained material or gather it toward the center and hold it longer within the arrastre while in the latter case the tendency would be to drive such material away from the center and out through the screen more quickly. The one or the other arrangement would be used according to the requirements of the particular ore mass to be treated or process being used at the time, or the stones could be arranged irregularly, for example so that the tendency of one to throw the material toward the center would be offset by that of another to throw it toward the periphery, etc.

As shown at Figs. 1 and 2 the idlers 21 for supporting the rack 17 are carried and moved with such rack. At Fig. 3 the idlers 22' are shown as journaled upon the upper edge of the upturned portion 12 of the floor and the rack 17 moves independently of such idlers but is carried upon the periphery thereof; in other words the axes of such idlers remain stationary instead of moving with the rotating parts as shown at Figs. 1 and 2. In either embodiment an upstanding flange 30 is formed about the upturned portion 12 of the floor forming outside of

the screen, a circular or annular trough which receives material thrown through the screen by the centrifugal action of the stones or which overflows through the screen by reason of the material upon the floor rising to a level above the edge of the upturned portion 12.

In operation the ore ground in the ordinary stamp mill or otherwise and in solution preferably of a solvent is introduced upon the floor 11 of the arrastre and the drag stones moved over such floor by rotating the rack 17 and with it the radial arms 15. As the drag stones are moved over the floor through the pulp upon such floor the action between the stones and the floor is to grind the ore to a still finer consistency and also by reason of the consistency of the pulp and the slant of the floor to leave in the wake of each stone a portion of the floor covered only by an infinitesimally thin layer of the pulp over which the stone has passed. The passage of the stone and the exposing of such infinitesimally thin layer of the ore suspended in solvent exposes to the action of the atmosphere the freshly exposed surfaces of the particles of the ore in conjunction with the solvents so that the freshly exposed ore is simultaneously acted upon by the air and the solvent.

This apparatus is especially designed for carrying into effect the process disclosed in co-pending application, Serial Number 457,667, filed October 14, 1908, but is equally efficient when used for the purpose of amalgamation either with or without said process. When used for amalgamation purposes the desired quantity of mercury is placed in the arrastre and tends to flow toward the lowest part by reason of the slope of the floor. The action of the revolving drag stones, however keeps it spread out over the floor and thoroughly mingled with the pulp so that its action upon the free metal liberated by the grinding is very complete and efficient. Moreover the action of the drag stones polishes all rusty or coated particles of metal and thus renders them amenable to amalgamation.

The most complete exposure to the atmosphere is obtained by placing upon the floor at one time only sufficient of the pulp to cover the lower half of the floor when at rest so that as the stones revolve a portion of the pulp will be washed up onto the otherwise bare portion of the floor, and, flowing back toward the lower part, the pulp will spread itself into a thin layer and thus exposure to atmosphere will be accomplished in addition to that hereinabove described.

In operating the embodiment of the invention as shown at Fig. 5 it is intended to fill material on to the floor so that the upper edge of the sloping floor is not covered by the material and receives material only

as it is dragged by the drag stones up on to such portion. In this way a very thin film of the material is dragged by the stones onto the uncovered portion of the stone and is
5 there subjected to the action of the atmosphere in combination with solvent to carry out the process disclosed in co-pending application Number 457,667.

What I claim is:—

- 10 1. In a mechanism of the class described, a floor constructed as an inclined plane, means moved from the center of the floor for dragging weights over such floor and
15 floor.
2. In a mechanism of the class described, a floor constructed as an inclined plane, drag stones disposed upon the floor and means centrally of the floor for moving the
20 drag stones.

3. In a mechanism of the class described, a floor constructed as an inclined plane and operating means mounted centrally of the floor.

4. In a device of the class described, a 25 floor constructed as an inclined plane, drag stones mounted upon the floor and means to move the stones upon the plane.

5. In a mechanism of the class described, an inclined floor, drag stones disposed upon 30 the floor, and means for moving the drag stones alternately between the higher and the lower levels of said floor.

In testimony whereof I affix my signature in presence of two witnesses.

EDWIN B. GOODWIN.

Witnesses:

CARLE WHITEHEAD,
ALBERT L. VOGL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."