No. 788,799. PATENTED MAY 2, 1905.

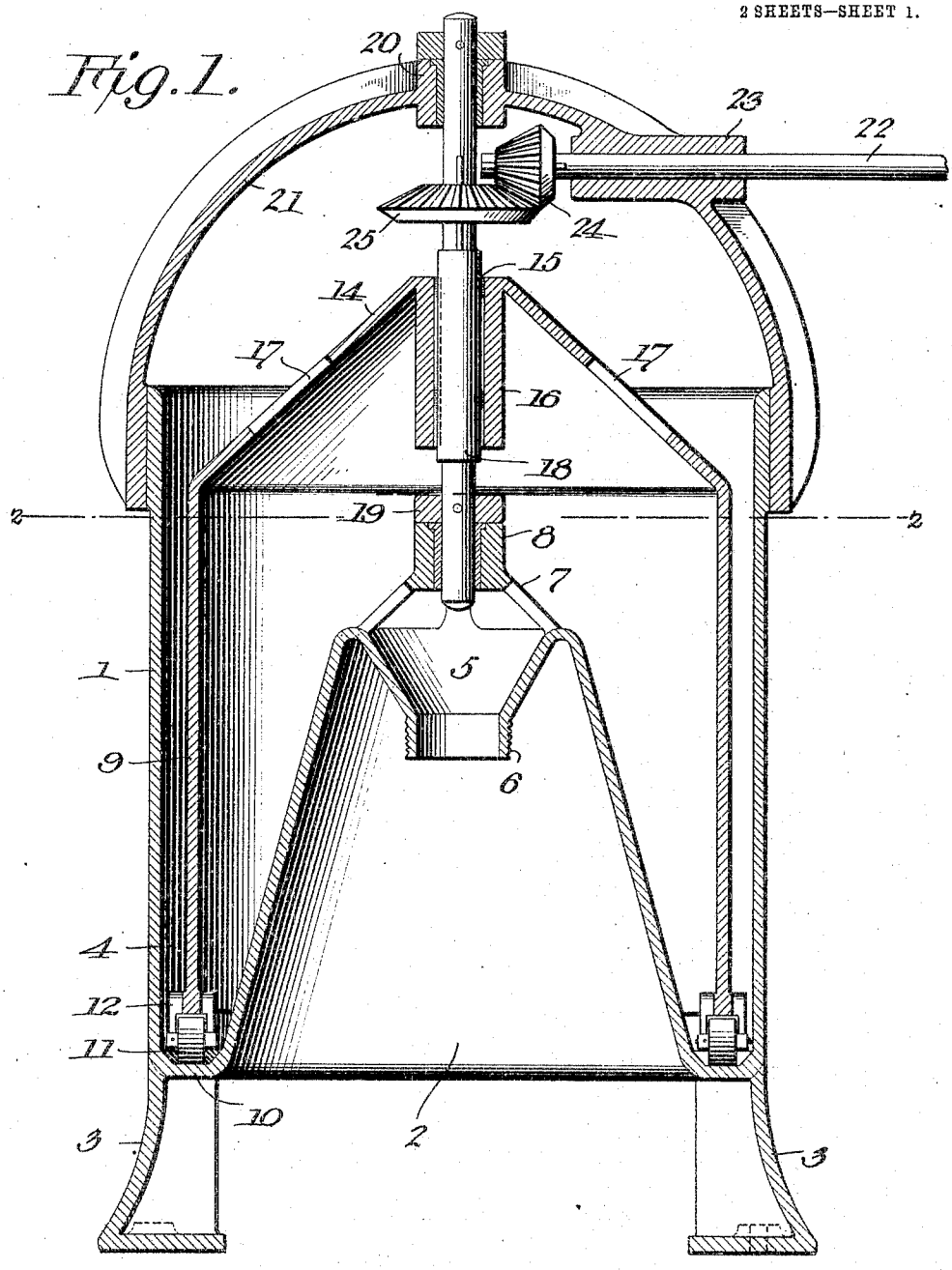
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ORE SEPARATOR.

APPLICATION FILED JULY 25, 1904.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses
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2 SHEETS—SHEET 2.

Fig. 2.

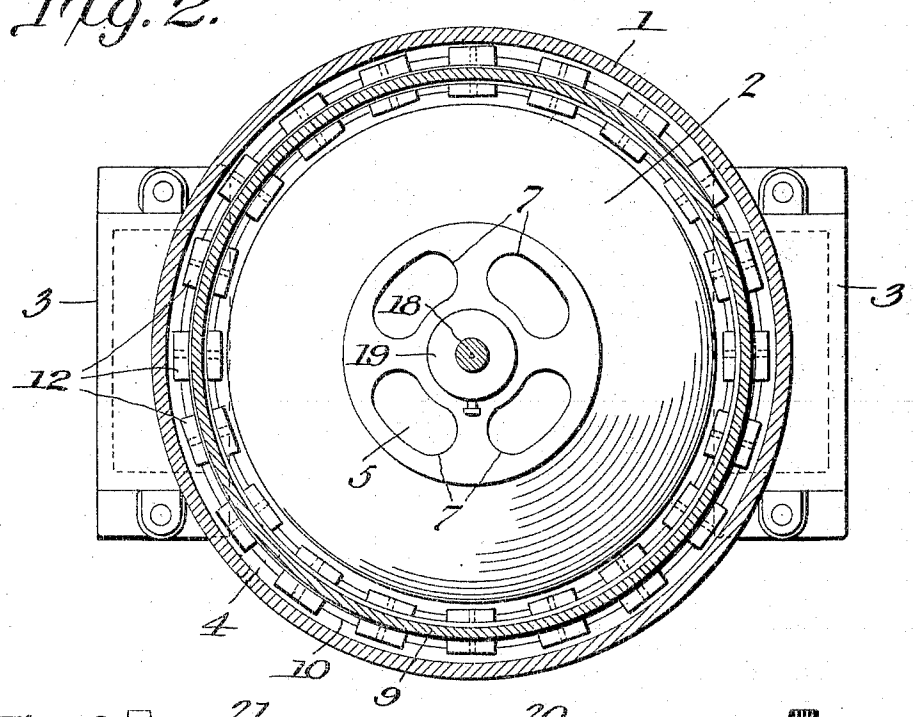


Fig. 3.

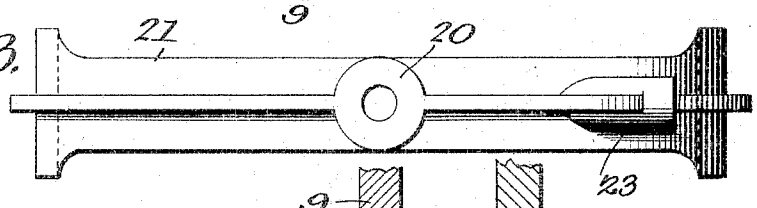
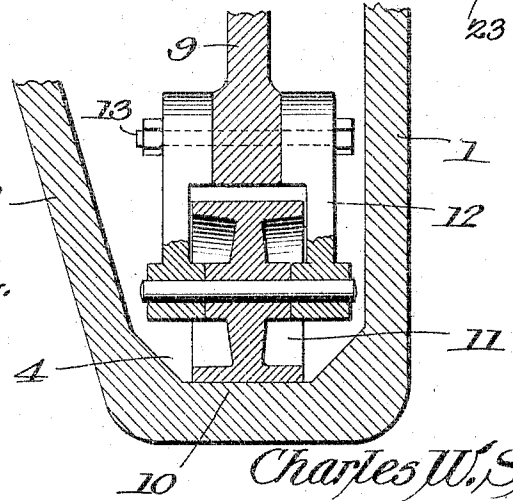


Fig. 4.



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No. 788,799. Patented May 2, 1905.

UNITED STATES PATENT OFFICE.

CHARLES W. STRONG, OF WARD, COLORADO.

ORE-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 788,799, dated May 2, 1905.

Application filed July 25, 1904. Serial No. 218,044.

To all whom it may concern.

Be it known that I, CHARLES W. STRONG, a citizen of the United States, residing at Ward, in the county of Boulder and State of Colorado, have invented a new and useful Ore-Separator, of which the following is a specification.

This invention relates to ore-separators, and is designed to provide for grinding pulp or ground rock to a finer state, so as to mechanically free the ore and to collect the same by amalgamation during the grinding operation, so as to retain the precious values within the machine and to permit of the escape of the tailings or refuse matter. This object is carried out through the medium of a machine of novel construction wherein the material for treatment may be conveniently fed to the machine and the movable grinding member of the latter conveniently rotated to effect a further reduction of the pulp and to bring the latter into contact with a body of amalgamating material to extract the precious values and trap the same within the machine to prevent it from being carried off with the tailings.

With these and other objects in view the present invention consists in the combination and arrangement of parts, as will be hereinafter more fully described, shown in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that changes in the form, proportion, size, and minor details may be made within the scope of the claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings, Figure 1 is a longitudinal sectional view of an ore-separator embodying the features of the present invention. Fig. 2 is a cross-sectional view thereof on the line 2 2 of Fig. 1. Fig. 3 is a detail plan view of the arch for the support of the driving-shafts. Fig. 4 is an enlarged detail sectional view taken through the lower edge of the rotating bell and the adjacent portion of the bottom of the tank to show the manner of mounting one of the rollers which supports the bell.

Like characters of reference designate corresponding parts in each and every figure of the drawings.

The machine of the present invention includes a cylindrical tank 1, which is open at its top and has a reëntrant frusto-conical bottom 2 and is supported upon suitable leg-standards 3. It is preferred to form the tank of metal, whereby the frusto-conical bottom 2 is integral with the outer wall of the tank and coöperates with the same to form an annular space 4 within the lower portion of the tank to constitute a trap, as will hereinafter appear. The open upper end of the frusto-conical bottom 2 is provided with a pendent integral hopper 5 to collect the tailings which overflow the upper edge of the bottom, and this hopper is screw-threaded at its lower end, as at 6, for connection with a suitable pipe (not shown) for carrying off the tailings. An integral open-work hood or spider 7 rises centrally from the top of the frusto-conical bottom 2 and terminates at its upper end in an open-ended cylindrical bearing 8.

Within the tank 1 is a rotatable bell 9, which is open at its lower end and embraces the frusto-conical bottom 2 and spaced at a suitable interval from the walls of the tank. This bell is mounted to travel upon the bottom flange 10 of the tank, which connects the frusto-conical bottom with the side walls of the tank, and is equipped with a series of rollers 11, journaled between hanger-brackets 12, embracing the lower edge of the bell and connected thereto by suitable fastenings 13, which pierce the brackets and the bell. In addition to forming a rotary support for the bell these rollers also operate to grind the pulp when it reaches the bottom of the tank. The top 14 of the bell is converged upwardly to a central opening 15, from which depends an integral tubular stem or sleeve 16, there being suitable hand-holes 17 formed in the conical top, at opposite sides of the middle thereof.

An upright driven shaft 18 is keyed within the tubular stem 16, with its lower end rotatably mounted within the bearing 8, carried by the top of the frusto-conical bottom 2,

there being a collar 19 fixed upon the shaft and engaging the step-bearing 8 for the support of the shaft. This shaft extends above the top of the bell and is mounted in a bearing 20, carried by the middle of an arch 21, which rises from the exterior of the upper portion of the tank 1 and extends diametrically across the same. A drive-shaft 22 is disposed at substantially right angles to the driven shaft 18 and extends through a horizontal bearing 23, carried by the arch 21, and is provided at its inner end with a beveled gear 24, meshing with a beveled gear 25, carried by the driven shaft 18, whereby the bell 9 is rotated within the tank 1.

In the operation of the machine the amalgamating material is placed within the bottom of the trap or annular chamber 4 and the pulp to be treated is fed into the open top of the tank 1, where it is deflected by the conical top of the bell into the annular space between the latter and the tank, wherein it feeds downwardly to the bottom of the tank and is there subjected to a grinding action on the part of the rollers 11, and at this point it is also subjected to the action of the amalgamating material, which operates to separate the values from the pulp, and the latter is forced upwardly within the bell and overflows the top of the frusto-conical bottom 2 into the hopper 5, from which it is carried off to any suitable point remote from the machine, leaving the values deposited in the bottom of the trap, from which they may be removed and finally recovered in any preferred or well-known manner.

From the foregoing description it will be understood that the present machine operates to grind the pulp to a finer state than ordinarily accomplished by stamp-mills, so as to mechanically free the values as far as possible, and the material is subjected to the action of the amalgamating material within the same machine, grinding action being accomplished by means of the rollers 11, which are subjected to the pressure of the bell 9, thereby accomplishing a very effective separation of the values in a simple and expeditious manner.

The bell 9 is a very important feature of the present invention in that it produces an annular space between itself and the tank 1, so as to insure a steady and continuous feed of the material to the grinding-rollers 11, thereby to prevent choking of the latter by an irregular feed of the material. Moreover, as the bell dips down close to the bottom of the annular tank all of the material which is fed to the machine is compelled to pass beneath the lower edge of the bell before it can reach the interior of the latter, whereby all of the material is subjected to the grinding action of the rollers, and no part whatever can escape such grinding action. While the mercury will of course become "floured" by the grinding action, its greater specific gravity causes it to separate itself from the tailings and drop back to a great extent before it can be carried out through the exit-hopper 5. It is determined by experiment how long to run the machine before the mercury becomes sufficiently floured to pass out to any material degree with the tailings, and in the operation of the machine it is run for the period thus determined and then stopped to permit of the removal of the mercury and the recovery of the values therefrom.

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

1. In an ore-separator, the combination of a tank having a reëntrant conical bottom portion which is open at its upper end, a spider supported upon the open end of the reëntrant bottom, a bearing carried by the spider, a rotatable grinding-bell open at its bottom and surrounding the reëntrant bottom of the tank, there being an annular space between the bell and the tank constituting a feed-space to receive the material for treatment, grinding-rollers carried by the bottom of the bell and traveling upon the bottom of the tank, the bottom edge of the bell being spaced above the bottom of the tank to permit of the passage therebetween of the material under treatment, the sides of the bell and the tank being substantially parallel with the top of the tank seated above the top of the reëntrant bottom portion, the top of the bell being conical and rising above the top of the tank, and an upright drive-shaft piercing the top of the bell with its lower end mounted in the bearing and terminated short of the top of the reëntrant bottom portion.

2. In an ore-separator, the combination of a tank for containing an amalgamating material, a grinding-bell open at its bottom and rotatable within the tank, there being an annular space between the bell and the tank constituting a feed-space to receive the material for grinding, and grinding-rollers carried by the bottom edge of the bell and traveling upon the bottom of the tank, the bottom edge of the bell being spaced above the bottom of the tank to permit of the passage therebetween of the material under treatment, and the bottom of the tank having a discharge located within the bell.

3. In an ore-separator, the combination of a tank having a reëntrant bottom portion, the annular space between the reëntrant bottom portion and the upright walls of the tank constituting a trap, a grinding-bell open at its bottom and rotatable within the tank between the upright walls thereof and the reëntrant bottom, the annular space between the bell and the tank constituting a feed-space for the material to be treated, the bottom edge of the

bell being spaced above the bottom of the tank to permit of the passage therebetween of the material under treatment, and grinding-rollers carried by the bottom edge of the bell and traveling upon the bottom of the tank between the reëntrant bottom portion thereof and the upright side walls.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

CHARLES W. STRONG.

Witnesses:

N. S. CHASE,

MARY E. STRONG.