No. 628,499. Patented July 11, 1899.

J. E. SUTPHEN.

ORE AMALGAMATOR.

(Application filed Nov. 20, 1897.)

(No Model.)

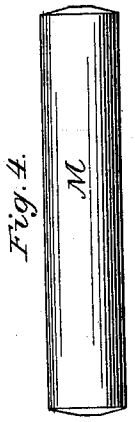


Fig. 4.

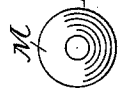


Fig. 5.

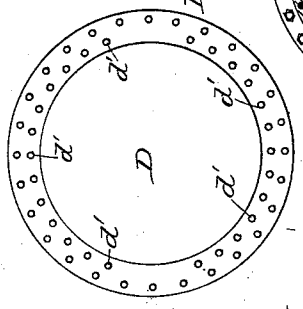


Fig. 6.

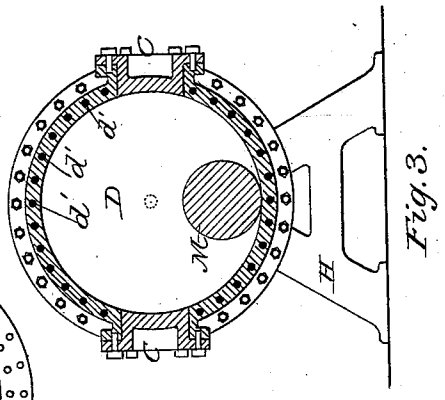


Fig. 3.

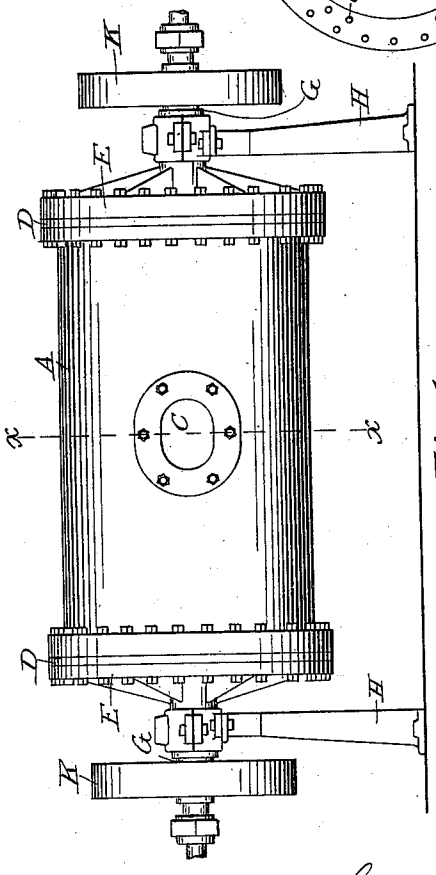


Fig. 1.

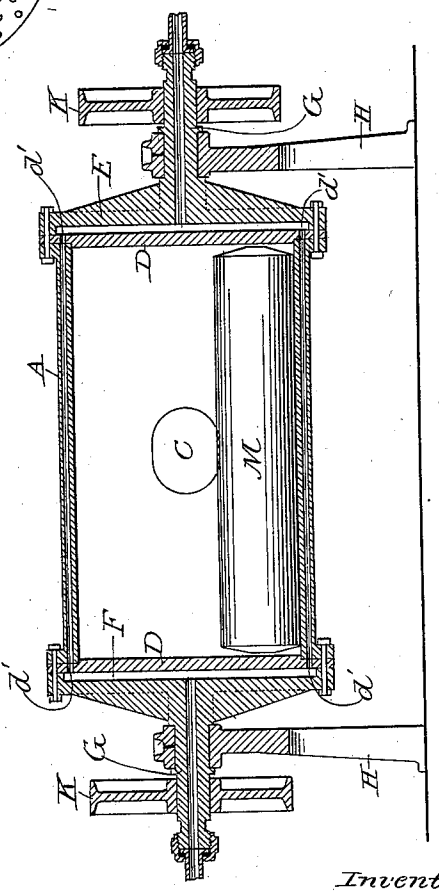


Fig. 2.

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UNITED STATES PATENT OFFICE.

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ORE-AMALGAMATOR.

SPECIFICATION forming part of Letters Patent No. 628,499, dated July 11, 1899.

Application filed November 20, 1897. Serial No. 659,350. (No model.)

To all whom it may concern:

Be it known that I, JOHN E. SUTPHEN, a citizen of the United States, residing at Albany, in the county of Albany and State of New York, have invented a new and useful Ore-Amalgamator, of which the following is a specification.

My invention has for its object to provide an ore-amalgamator adapted to readily and economically extract the precious metals from gold and silver bearing ores; and it consists of the device illustrated in the accompanying drawings, in which—

Figure 1 is a side view of an amalgamator embodying my invention. Fig. 2 is a vertical longitudinal section of the device shown in Fig. 1, taken on the axial line of the cylinder. Fig. 3 is a vertical cross-section taken on line *x x* of Fig. 1. Fig. 4 is a plan view of a roller adapted to work within the cylinder of the amalgamator. Fig. 5 is an end view of the roller shown in Fig. 4. Fig. 6 is a plan view of the inner surface of an inner cylinder-head.

As illustrated in the drawings, A represents an outer shell or cylinder provided with longitudinal apertures *a* and with laterally-extending flanges B. This cylinder is also provided with hand-hole plates C, preferably arranged opposite each other and having their central portion depressed and curved so as to form a smooth and even inner surface in harmony with the inner curved surface of the cylinder, as shown in Fig. 3. The outer portion of these hand-hole plates is provided with a flange *c*, which bears against and by means of suitable bolts and nuts is detachably secured to the corresponding flange *a'*, formed on or secured to the shell or cylinder A.

D represents an inner cylinder-head having a solid central portion and at its outer edge is provided with bolt-holes, which are arranged in line with the corresponding bolt-holes formed on the outer flanges B of the cylinder A. This head D is preferably reduced at its outer edge, so as to form a shoulder *d* at the part where it bears against the inner portion of the cylinder A, so as to extend in part into said cylinder. Openings *d'* are also formed in the outer portion of the head D, arranged in line with the apertures *a* of the cylinder. The outer cylinder-head E is secured to the end of the cylinder A next to the inner head D of the cylinder and is provided on its outer edge with bolt-holes registering with the corresponding bolt-holes in the outer portion of the inner head D and cylinder-flange B, respectively. The outer portion of these outer heads E is provided with an offset ring *e*, which places the main portion of the outer head E at a distance from the inner head D of the cylinder, thereby forming a heat-chamber F between such inner and outer heads. The central portion of this outer head E is provided with trunnions G, hollowed out, so as to connect with the inner steam or heat chamber F, hereinbefore described. These trunnions G are journaled on suitable standards H, provided with journal-bearings I. A driving-pulley K is secured to one or both of said trunnions. The ends of the trunnions G are also provided with suitable couplings L, adapted to admit heat in the form of steam or air into the heat-chambers F.

M represents a roller arranged within the cylinder and of a length smaller than the interior of such cylinder, and its outer surface, together with the inner surface of the cylinder, is finished to such a degree of smoothness that such roller will revolve upon the inner surface of the cylinder without jars or concussion.

When the device is in operation, the ore, reduced to a powder and mixed with suitable chemicals and with sufficient moisture to reduce the mass to a pulp, is placed within the cylinder A through the hand-holes, where it is mixed with quicksilver. The cylinder is then revolved slowly while the heat is applied to the end chambers F of the cylinder and the connecting-apertures *a*. The heat expands the quicksilver to the desired degree and the gentle and even pressure of the roller brings such quicksilver in close contact with the mass, and thereby facilitates the action of the quicksilver upon the precious metals. By this means pressure is exerted upon the ore and mercury without producing any concussion or jars, thereby avoiding the injurious results produced in prior devices of this nature, which have necessarily subjected the quicksilver to jars and concussions to such an extent as to cause the quicksilver to form

in fine globules, which become suspended in the water and float away, whereas in my device the mercury is subjected to a gentle and even pressure, which produces the most efficient results in the most economical manner.

I do not claim herein the method of amalgamating ores hereinbefore described, as such method is claimed in a pending application filed by me November 20, 1897, bearing the Serial No. 659,351.

What I claim is—

1. In an ore-amalgamator, the combination of a rotary cylinder having outer heads provided with hollow trunnions, heat-receptacles formed about the shell and ends of said cylinder in communication with the openings of said trunnion, and a roller having a smooth outer surface arranged within said cylinder, substantially as shown and described.

2. In an ore-amalgamator, the combination with a rotary cylinder having its shell provided with longitudinal heat-chambers, of outer cylinder-heads provided with hollow trunnions, inner cylinder-heads having closed central portions separated from the outer cylinder-heads to form heat-chambers communicating with the openings of said trunnions and provided on their outer edge with openings communicating with the longitudinal chambers of said shell, and a roller having a smooth outer surface arranged within said cylinder, substantially as shown and described.

3. In an ore-amalgamator, the combination with a rotary cylinder having its shell provided with longitudinal heat-chambers, of outer cylinder-heads provided with hollow trunnions, and inner cylinder-heads having closed central portions separated from the outer cylinder-heads to form heat-chambers communicating with the openings of said trunnions and provided on their outer edge with openings communicating with the longitudinal chambers of said shell, substantially as shown and described.

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