(No Model.)

A. MILLER.

AMALGAMATING APPARATUS.

No. 311,352. Patented Jan. 27, 1885.

Fig. 1.

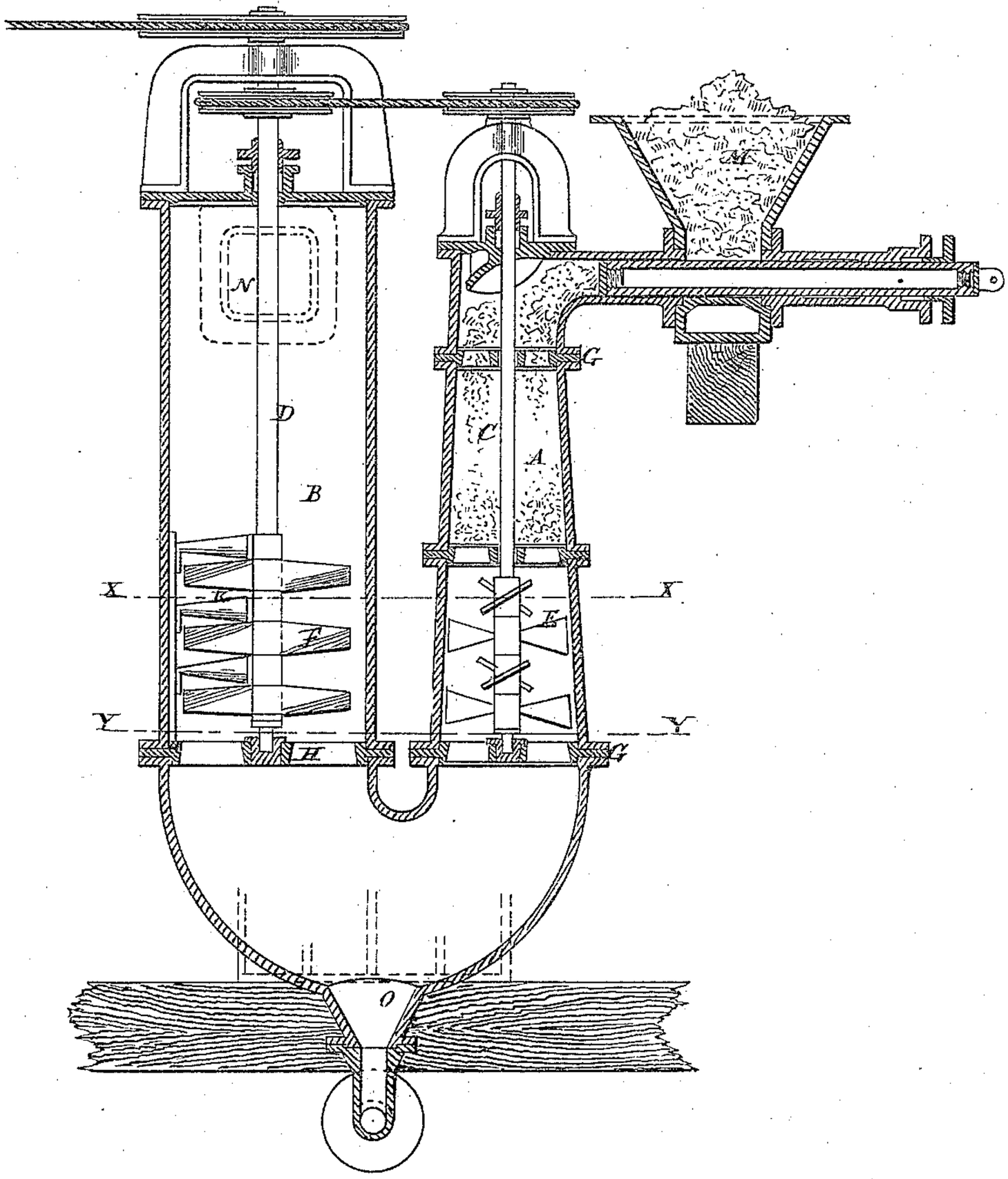


Fig. 3.

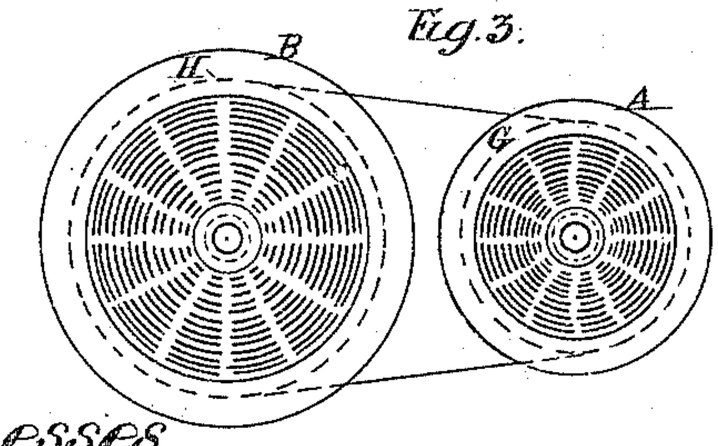
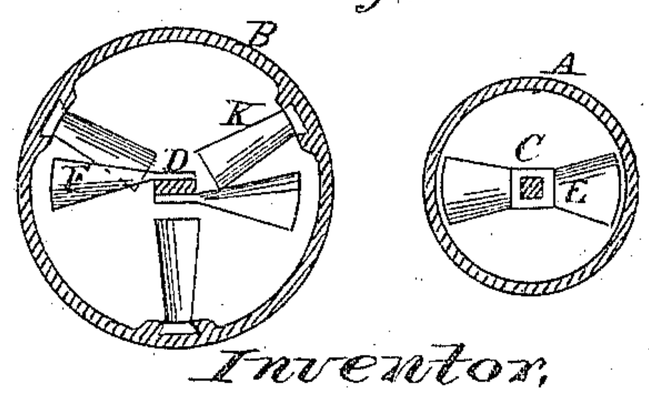


Fig. 2



Witnesses,
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UNITED STATES PATENT OFFICE.

ADAM MILLER, OF LONDON, ENGLAND.

AMALGAMATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 311,352, dated January 27, 1885.

Application filed September 23, 1884. (No model.) Patented in England June 18, 1884, No. 9,151; in France September 11, 1884; in Belgium September 15, 1884, No. 66,310; in Germany September 26, 1884, and in Austria October 11, 1884.

To all whom it may concern:

Be it known that I, ADAM MILLER, a citizen of England, residing at Lime Street, in the city of London, England, engineer, have invented a new and useful Amalgamating Apparatus, (for which I have made application for patents in Great Britain, dated June 18, 1884, No. 9,151; in France, dated September 11, 1884; in Belgium, dated September 15, 1884, No. 66,310; in Germany, dated September 26, 1884, and in Austria, dated October 11, 1884,) of which the following is a specification.

My invention relates to apparatus for extracting by amalgamation precious metals from pulverized ores, tailings, or other material containing them. The object which I have in view is to provide for thorough exposure of the metallic particles to the action of the amalgamating metal, and for conducting the apparatus in a continuous manner.

I will describe my invention, referring to the accompanying drawings, which represent an apparatus suitable for amalgamating by mercury. When molten metal—such as molten lead or alloy—is used instead of mercury, the apparatus is generally similar to that shown, but it is placed over a fire or in a heated flue, to keep the amalgamating metal in a fluid condition, and in order to prevent oxidation of the molten metal, I keep the apparatus above its level supplied with combustible gas, such as that obtained from a gas-producer.

Referring to the drawings, Figure 1 is a vertical section of amalgamating apparatus according to my invention. Fig. 2 is a sectional plan on X X, and Fig. 3 is a plan on Y Y.

The apparatus consists of a vessel in the form of an inverted siphon or U, having one limb, A, preferably smaller in diameter than the other limb, B. Both limbs are closed at the top, and have mounted centrally within them vertical shafts C and D, carrying several sets of inclined or helical blades, E and F.

In the limb A there are several grids, G, and at the bottom of the limb B there is also a grid, H. In this limb also are fixed inclined or helical blades K, to prevent the contents from acquiring rotation from the movement of the blades F. At the top of the limb A there is a lateral passage, in which a plunger, L, is made to reciprocate to and fro under the mouth of a feed-hopper, M. At the top of the limb B there is a lateral opening, N, for discharge of the spent material. Also, from the bottom bend there is a passage, O, for drawing off the amalgam. The vessel being charged with mercury, and the shafts C and D being caused to revolve, and the plunger L being caused to reciprocate by connection to any suitable motor, the ore, tailings, or other material to be treated is fed into the hopper M, and is acted on as follows: At every back stroke of the plunger L a portion of the material descends from the hopper. By the forward stroke of L this is forced into the upper part of the limb A, and partly by the pressure due to the stroke of the plunger and partly by the action of the revolving blades E the material is made to descend through the mercury, the grids G subdividing and distributing it as it descends. It is essential that the plunger L should fit the feeding-channel with tolerable accuracy, so as to prevent the ore from escaping back between the two as some force is requisite to cause the ore to descend through the mercury. From the bottom bend of the apparatus the material ascends through the mercury in the limb B, and is finally discharged by the opening N, having in its course through the mercury left a large portion of the precious metal which it contained amalgamated with the mercury. Should further amalgamation be required, the material discharged at N may be led to the hopper of another similar apparatus to be operated on a second time, and from this it may be led to third or to several successive amalgamators, arranged so that the process may go on continuously. The amalgam or the mercury can, when required, be withdrawn by opening a valve in the outlet-pipe *o*.

Having thus described the nature of my invention and the best means I know for carrying the same into practical effect, I claim—

In amalgamating apparatus, the combination of the siphon-shaped vessel A B with the grids G H, shafts C D, blades E, F, and K, hopper M, and plunger L, arranged and operating as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 5th day of September, A. D. 1884.

ADAM MILLER.

Witnesses:

OLIVER IMRAY,

JNO. P. M. MILLARD.