

(No Model.)

A. MILLER.

AMALGAMATING APPARATUS.

No. 311,354.

Patented Jan. 27, 1885.

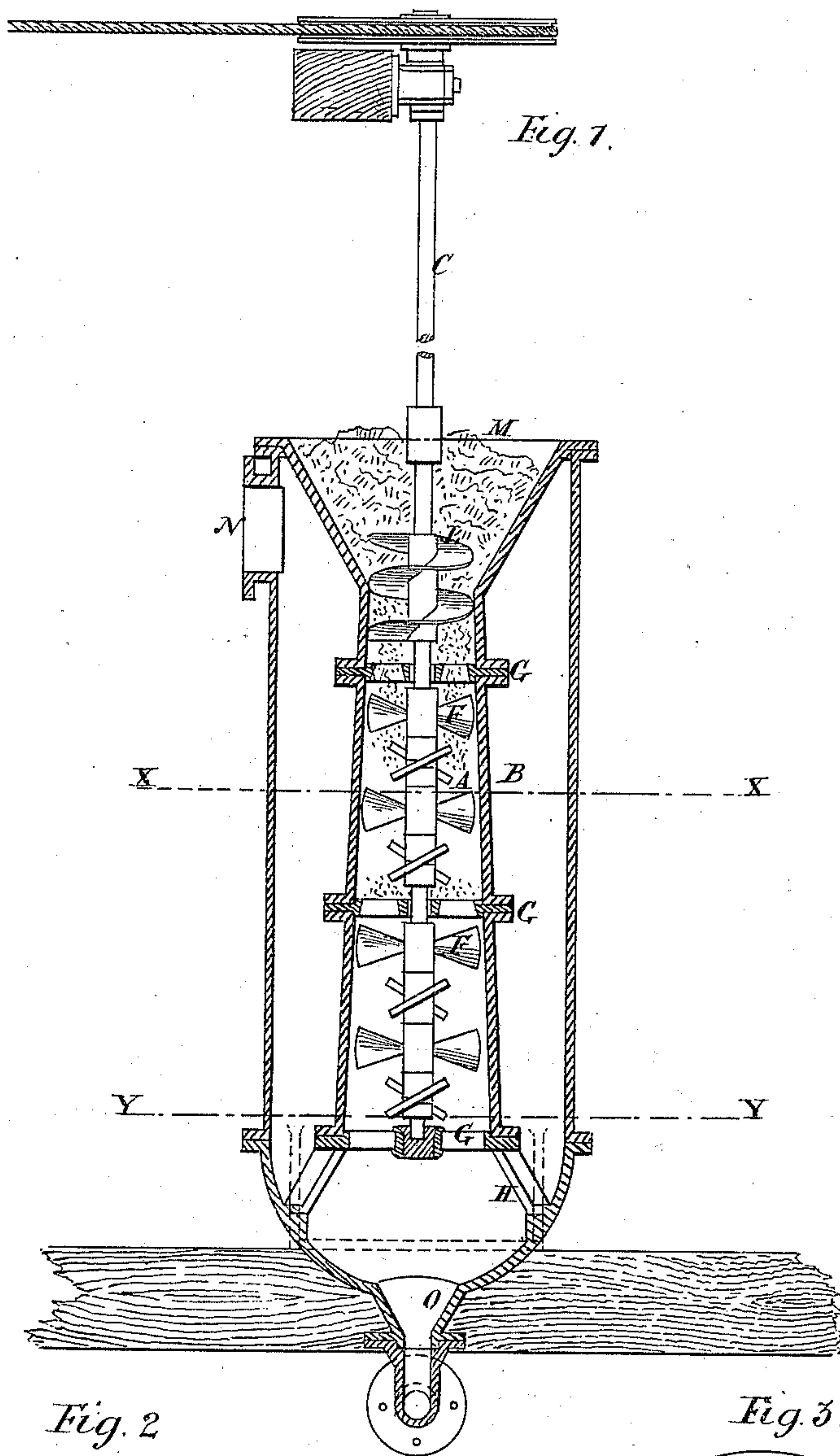


Fig. 2

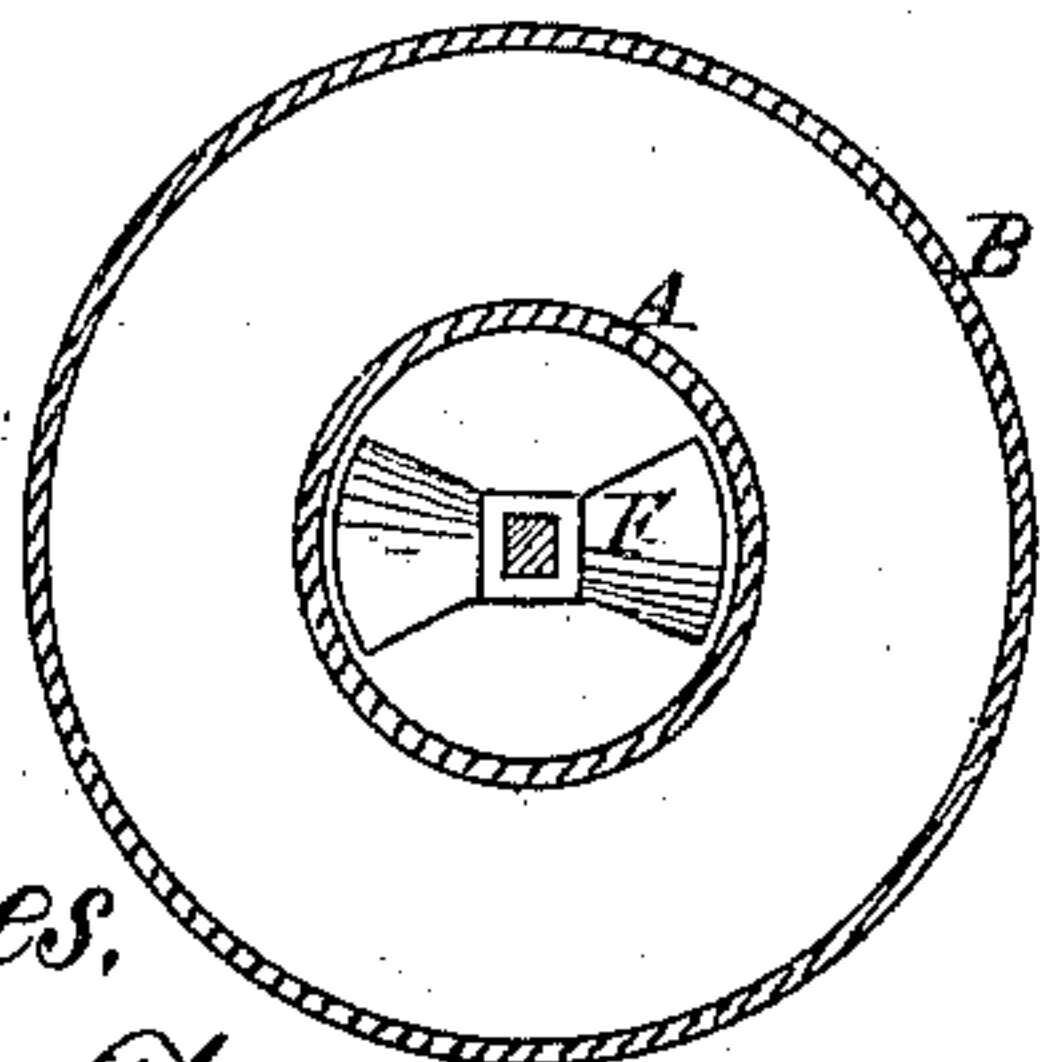
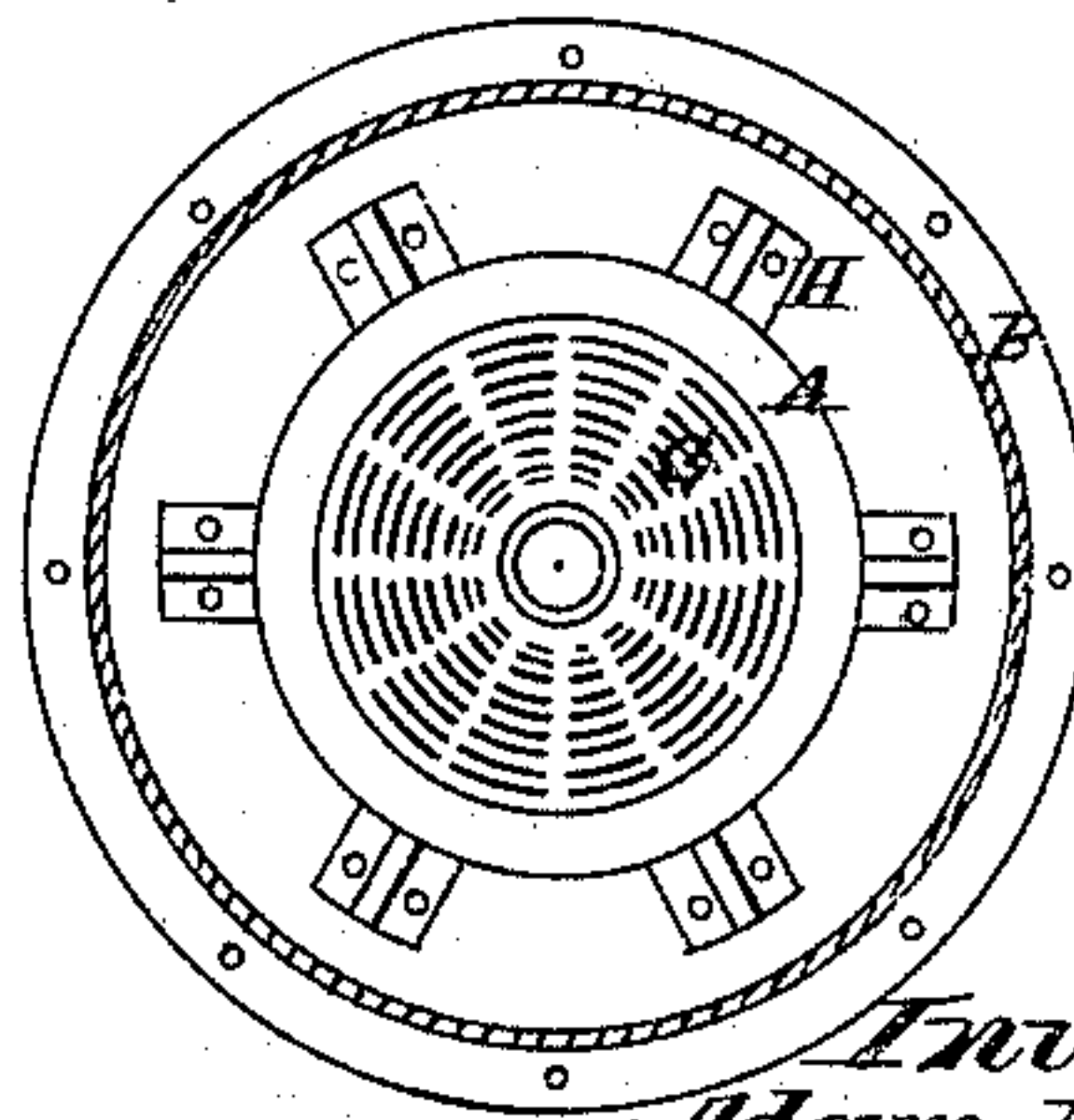


Fig. 3



Witnesses,

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Att'y.



# UNITED STATES PATENT OFFICE.

ADAM MILLER, OF LONDON, ENGLAND.

## AMALGAMATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 311,354, dated January 27, 1885.

Application filed November 6, 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  
5 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;  
10 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  
15 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  
20 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  
25 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  
30 the molten metal I keep the apparatus above its level supplied with combustible gas, such as that obtained from a gas-producer.

Figure 1 is a vertical section, Fig. 2 is a cross-section on line X X, and Fig 3 a cross-  
35 section on line Y Y, of amalgamating apparatus according to my invention.

The apparatus consists of a slightly-tapering vessel, A, contained within an outer vessel, B, and terminating at top in a hopper, M.  
40 Through the hopper and vessel A passes a shaft, C, carrying within the hopper a screw, L, and within the vessel A helical blades F. The screw L, being arranged in a vertical plane around the shaft C, acts to force the ore downward through the upper grid, G, and the helical blades F, extending laterally from the shaft  
45 at oblique angles to the axis thereof, act to agitate and also cause the ore to descend through the lower grid or grids. The amalgam is supplied to the two vessels to any suitable depth—say to about the line  $x x$ , Fig. 1.

The vessel A also has grids G, and communicates at bottom with the vessel B, in which it is supported by feet H. The vessel B has at its upper end a discharge-opening, N, and at  
55 bottom a passage, O, for drawing off the amalgam. The vessels A and B being charged with mercury and the shaft C caused to revolve by any suitable motor, the ore, tailings, or other material to be treated is fed into the  
60 hopper M, and by the rotation of the screw L is fed into the vessel A, where it is caused to descend through the mercury by the action of the blades F, the grids G subdividing and distributing it as it descends. From the bot-  
65 tom of the vessel A the material passes into the vessel B in which it ascends through the mercury, and is finally discharged through the opening N, having in its course through the mercury left a large portion of the pre-  
70 cious metal which it contained amalgamated with the mercury. The amalgam or the mercury can, when required, be withdrawn by opening a valve in the outlet-pipe O.

It is essential that the screw L should fit  
75 the neck of the hopper as closely as practicable, so that the ore cannot escape back between the two, as some force is required to cause the ore to descend through the mercury.

I do not broadly claim in this application  
80 the concentric outer and inner vessels, the latter being provided with grids, and the central shaft having the helical blades, as such construction is shown in my applications filed of even date herewith, Serial No. 147,296 and  
85 No. 147,298.

I am aware that it is not new to arrange a screw within a tube having a hopper at its upper end to force the ore downward through the tube into an outer vessel containing amal-  
90 gam.

I am also aware that a screw has been arranged to force ore downward into a vessel contained within an outer vessel, a vertical shaft being within the inner vessel and carrying stirring-arms. Such features, therefore,  
95 I do not broadly claim.

Having thus described the nature of my invention and the best means I know for carrying the same into practical effect, I claim—  
100

In an amalgamating apparatus, the combination of the concentric vessels A and B, the

hopper M at the upper end of the inner vessel, the grids G within the latter, the vertical shaft C, extending through the grids and the hopper, the screw L on the shaft in the hopper above the upper grid, and the helical blades F, also on said shaft between the upper and lower grids, substantially as described.

In testimony whereof I have signed my name

to this specification, in the presence of two subscribing witnesses, this 17th day of October, 1884.

ADAM MILLER.

Witnesses:

J. MULLENGER,

JNO. P. M. MILLARD.