(No Model.) 2 Sheets—Sheet 1.

A. K. HUNTINGTON & W. E. KOCH.

AMALGAMATING APPARATUS.

No. 281,629. Patented July 17, 1883.

Fig. 1.

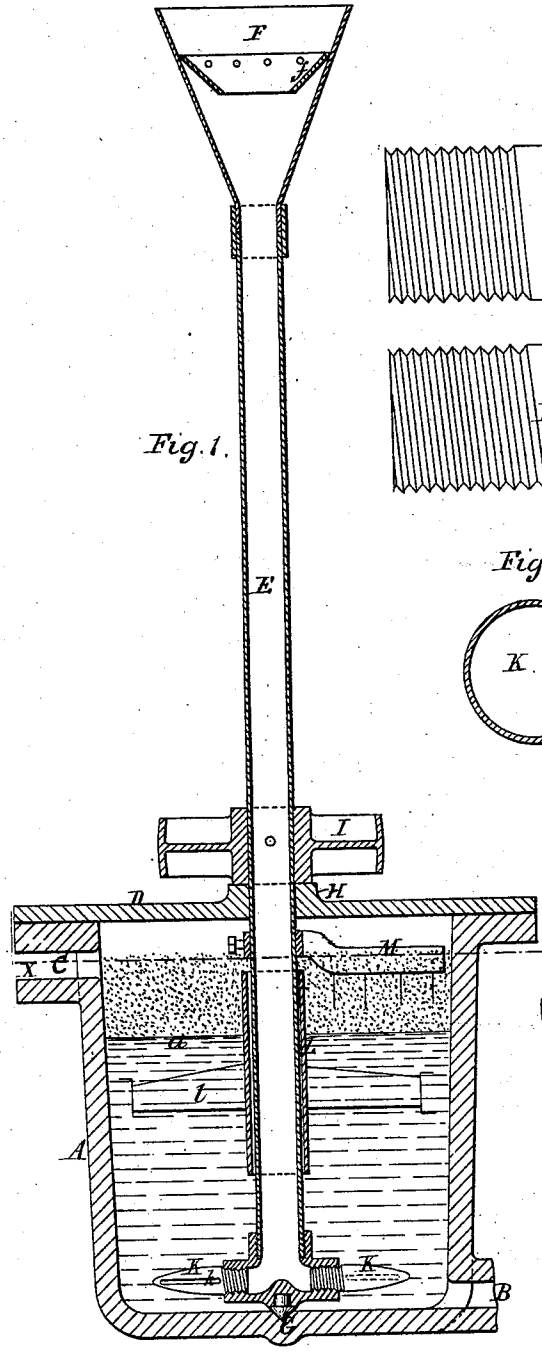


Fig. 4.

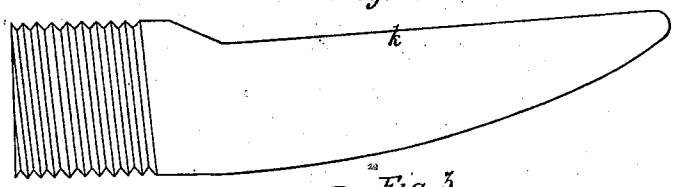


Fig. 3.

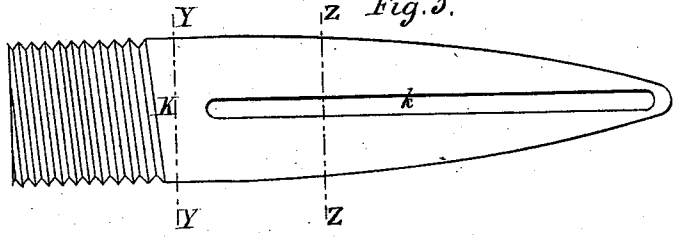


Fig. 5.

Fig. 6.

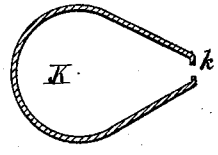
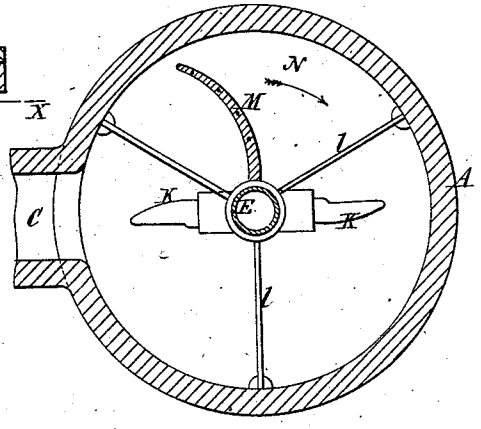


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 7.

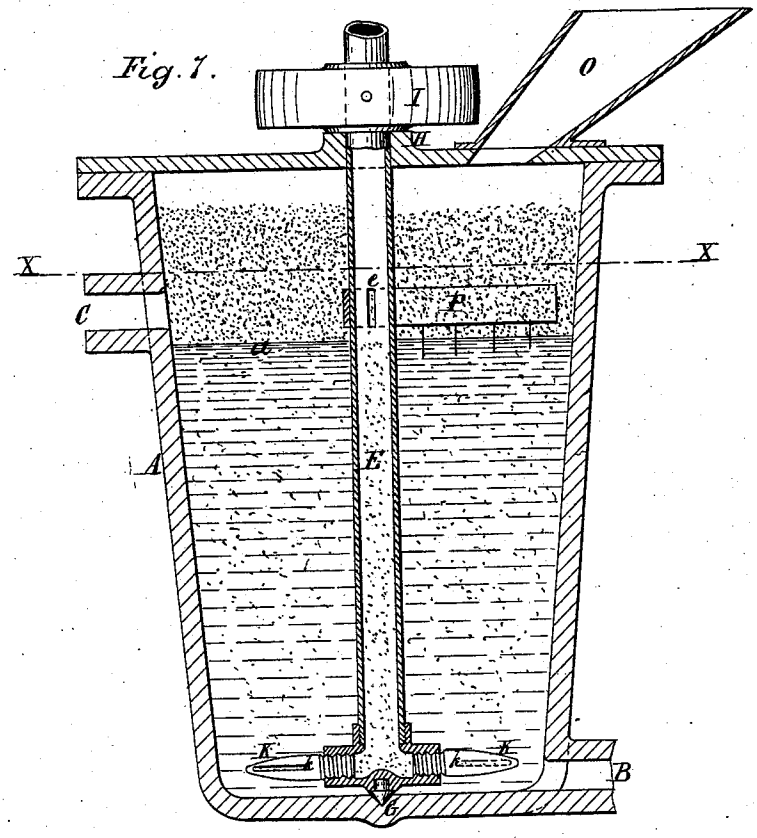
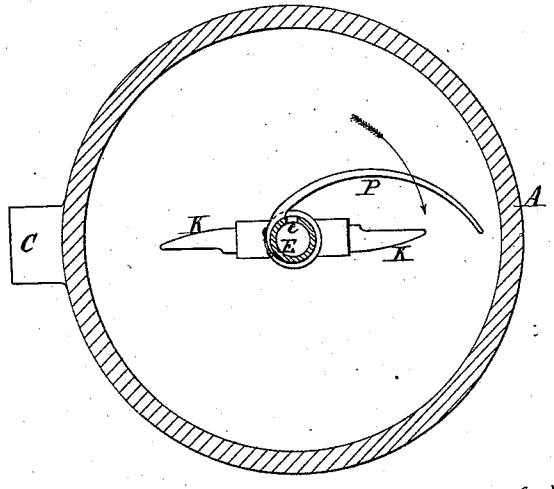


Fig. 8.



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UNITED STATES PATENT OFFICE.

ALFRED K. HUNTINGTON, OF HAMPSTEAD, AND WALTER E. KOCH, OF KENSINGTON, COUNTY OF MIDDLESEX, ENGLAND.

AMALGAMATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 281,629, dated July 17, 1883.

Application filed May 3, 1883. (No model.) Patented in England April 7, 1883, No. 1,758.

To all whom it may concern:

Be it known that we, ALFRED KIRBY HUNTINGTON, and WALTER EDWARD KOCH, citizens of England, residing, respectively, at Hampstead and at Kensington, both in the county of Middlesex, England, have invented a new or Improved Amalgamating Apparatus, (for which we have obtained provisional protection in Great Britain, No. 1,758, dated April 7, 1883,) of which the following is a specification.

Our invention relates to apparatus for separating by amalgamation particles of precious metal from pulverized ores or tailings, the object which we have in view being to provide for thorough exposure of these particles to the action of the amalgamating metal, and for conducting the amalgamation as a continuous operation.

We will describe the apparatus according to our invention, referring to the accompanying drawings.

Figure 1 is a vertical section of the whole apparatus. Fig. 2 is a sectional plan of the same on the line X X of Fig. 1. Figs. 3, 4, 5, and 6 show, to an enlarged scale, the construction of one of the tubular arms K—that is to say: Fig. 3 is an elevation of the arm. Fig. 4 is a plan thereof, and Figs. 5 and 6 are transverse sections at Y Y and Z Z, respectively.

A is the pan or cylindrical vessel in which the amalgamation takes place. At the bottom it has an outlet-pipe, B, for running off the liquid amalgam, and near the top it has an outlet, C, for discharging the ore or material from which the precious metal has been extracted. D is the cover of the pan. A pipe, E, having at the top a funnel-mouth, F, is mounted to revolve on a pivot, G, at the bottom of the pan, and in a bearing, H, formed in the cover. It is driven by a belt on a pulley, I, or by other suitable gearing. At the bottom of the pipe E are two radial branch pipes, K, as shown in Figs. 3, 4, 5, and 6, each of these having along one side of it a long slit or aperture, *k*. The funnel F is made with an internal lip, *f*, inclined inward and downward. Part of the pipe E within the pan is surrounded by a stationary sleeve, L, which is supported from the side of the pan by ribs *l*. On the pipe E above the sleeve L is fixed a backwardly-curved arm, M, having pins or tines projecting down from it.

The pan A being charged with the amalgamating metal up to about the level *a*, the pipe E is caused to revolve in the direction of the arrow N, and the pulverized ore or tailings to be operated on being fed into the funnel F, (whence the lip *f* prevents it from being ejected,) descends the pipe E, and issues by the lateral slits *k* from the radial branches K. The ore ascends in a subdivided condition through the amalgamating metal (which extracts the particles of precious metal) and collects at the upper part of the pan. The tines of the arm M rake the material and the recurved arm ejects it through the aperture C. When the amalgamating metal in the pan is sufficiently saturated, it is run off by the pipe B by opening a suitable cock, valve, or plug.

In many cases it is desirable to pass the ore or tailings several times through the amalgamating metal. This may be done by employing several sets of the amalgamating apparatus, which we have described, feeding the second with the material discharged from the first, the third with that discharged from the second, and so on; or, when only one set of the amalgamating apparatus is available, the material discharged from it may be elevated and again fed into its funnel-mouth, and this may be repeated as often as desired. In order, however, to avoid in such cases complexity of apparatus and labor in moving or elevating the material operated on, we modify the apparatus, as shown in the vertical section, Fig. 7, and sectional plan, Fig. 8, taken on the line X X, Fig. 7. We make a lateral slit, *e*, in the tube E, and at the level of *e* we fix on the tube a blade, P, curved forward in the direction of revolution. We feed a quantity of the ore or tailings through the hopper O, and the blade P guides portions of the material continuously to the slit *e*, by which they enter the tube E. They descend the tube and are ejected from the slits *k* of its arms K. They rise through the amalgamating metal, are again guided to

the slit *e*, and so on continuously, being thus made to circulate as often as desired through the amalgamating metal. When the metal is thus treated as long as necessary, a door or shutter closing the outlet C is opened, and the pipe E, being made to revolve in the direction opposite to the arrow, its curved blade P ejects the greater part of the material. The outlet C is then closed, and, a fresh quantity of material being fed through the hopper O or down the pipe E, the pipe E and its blade P are again made to revolve in the direction of the arrow, and the action is repeated.

The apparatus above described may be employed for amalgamating with mercury at ordinary temperatures, in which case the pan A might be made of wood or other suitable material not acted on by mercury; or it may be employed for amalgamating with molten lead or other suitable molten metal, in which case the pan A is made of iron or of refractory material, and set in a furnace-flue, so as to be kept sufficiently heated to maintain the molten metal in a liquid condition. In order to prevent oxidation of the molten metal, a reducing atmosphere—such as combustible gas—from a producer is supplied to the pan by a pipe-opening through the cover of the pan.

Having thus described the nature of our invention, and the best means we know for carrying it out in practice, we hereby declare that we make no general or broad claim to an amalgamating apparatus, consisting of a vessel in which revolves a vertical tube having outlets or branch pipes at its lower end; but

We claim—

In an amalgamating apparatus consisting of a pan or vessel in which a vertical pipe revolves, the radial tapered branch pipes K, each made with a slit, *k*, opening from the branch in a direction opposite to that in which it revolves, in combination with an agitating blade and rake, substantially as herein described.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 17th day of April, A. D. 1883.

ALFRED KIRBY HUNTINGTON.
WALTER EDWARD KOCH.

Witnesses:
D. H. ROGERS,
JNO. P. M. MILLARD.