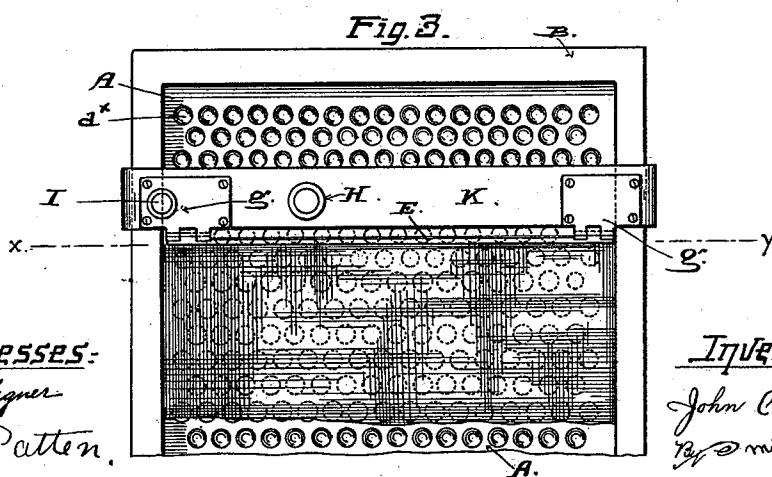
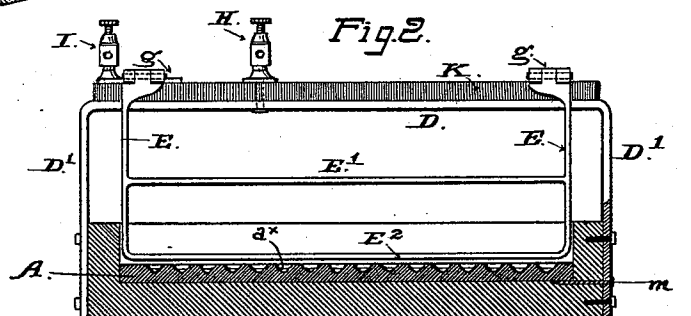
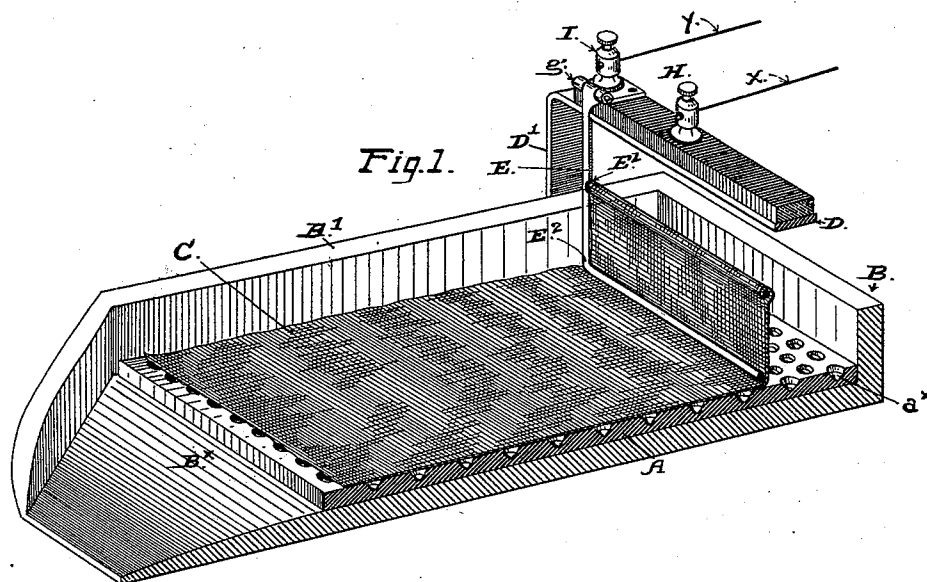


(No Model.)

J. C. LUDWIG.
ELECTRIC ORE AMALGAMATING APPARATUS.

No. 527,150.

Patented Oct. 9, 1894.



Witnesses:-

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UNITED STATES PATENT OFFICE.

JOHN C. LUDWIG, OF SAN FRANCISCO, CALIFORNIA.

ELECTRIC ORE-AMALGAMATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 527,150, dated October 9, 1894.

Application filed March 5, 1894. Serial No. 502,406. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. LUDWIG, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented certain new and useful Improvements in Electric Ore-Amalgamating Apparatus, of which the following is a specification.

This invention relates to improvements made in machines or apparatus for extracting the precious metals from their ores by amalgamation; and my invention therein consists in certain novel construction and combination of parts producing a machine or apparatus in which electricity is employed and applied in a novel manner as an agent or means to secure the more complete and thorough extraction and saving of the metal from the pulp and water. This apparatus is especially adapted for operating on ores of a rebellious character which require roasting and other similar treatment with heat and chemical agents to prepare the metal for effective amalgamation.

The principal and novel features of my said machine or apparatus comprise a sluice-box or trough with a flat bottom and standing sides, a bottom-plate of zinc or other suitable metal which is a good conductor, a flexible loosely-lying apron or blanket formed of woven or flexible felted fabric capable of absorbing and retaining water upon said plate, and suitable electrical conductors and connecting means by which the said plate is connected with one pole of a dynamo-electric machine, or other generator of electricity, and the said blanket or apron is similarly connected with the other pole of the generator. The mingled pulp and water is fed in at the upper end of the apparatus upon the zinc-plate, the sluice-box being suitably inclined from that end downward to give the stream of pulp proper movement or rate of travel between the surface of the zinc and the overlying blanket. These features of improvement and the manner in which I proceed to construct, apply and operate the same are fully described in the following description—reference being had to the accompanying drawings that form part of this specification.

In the said drawings:—Figure 1 is a perspective view of an amalgamating apparatus

embodying my said improvements the figure showing the one-half of the apparatus on one side of a longitudinal center-line. Fig. 2 is a vertical cross-section taken at the line $x-y$ Fig. 3; and Fig. —3— is a plan or top view of the apparatus at and near the head or upper end.

A— is a plate of zinc or other good conductive metal fixed on the bottom of a sluice-box or trough —B— and filling the space from side to side. This box or trough has a flat bottom —B^x— and raised sides —B'.

C—is a blanket or apron of some flexible fabric such as felt or flannel overlying the metal-plate but not attached either to the plate or to the standing sides.

The trough is set upon a suitable bed or support and has a pitch or inclination from the head, or upper end, which is closed, to the tail, or lower end, which is open to discharge the tailings; the standing sides being returned at an angle partly across the open end to produce a contracted outlet as shown in Fig. 1.

I make in the plate —A— in close order and at regular intervals or spaces all over the surface small cup-shape depressions or pockets —a^x— —a^x— to hold quicksilver, the plate being usually from one-fourth to one-half an inch thick, and the cups or cavities about one half the thickness of the metal in depth more or less. Across the upper part of the trough and a short distance below the head of the plate is a fixed bridge or frame consisting of a top cross-piece —D— and perpendicular ends —D'— setting against the standing sides of the trough on the outside, and fixed in place by bolts. The office of this top-frame is to carry a swinging-frame composed of perpendicular side-bars or arms —E— —E— and two horizontal and parallel cross-bars —E'— —E²— one at the bottom and the other at a short distance above. The arms —E— are attached to the stationary cross-piece —D— by hinge-joints —g— —g— fitted loosely, so that the frame swings freely from these points under the cross-piece. From the upper cross-bar of this swinging frame the upper end of the blanket —C— is laid under the bottom cross-bar and thence carried over the top of the plate —A— covering its entire surface between the standing sides and down-

ward for the whole or the greater part of the length of the plate. The bottom cross-bar —E²— sets quite closely to the surface of the plate —A, but at a suitable distance to accommodate the thickness of the blanket and swing or play freely over the plate without binding or sticking when the blanket is under the cross-bar. The blanket is attached to the top-cross bar —E'— by wrapping the end around the cross-bar, and from that end hanging loosely the blanket passes under the bottom cross-bar and is held down in place principally by the weight of the frame.

On the top of the stationary cross-piece over the trough already described, are fixed binding posts —H— —I, of which one —H— is connected electrically with the plate —A— while to the other —I— is connected the swinging frame. The two parts are set on a block —K— of wood or other insulating substance, fixed on the top of the cross-piece, so that they are insulated from each other and the connections are made of the first binding post —H— with the plate —A, through the metal of the stationary cross-piece and its uprights —D'— —D'— and a metal wire or strip —m— through the side of the trough, and also between the second binding-post —I— and the swinging-frame through the hinge —g— of one of the arms. The swinging-frame is best made of copper rod to secure good conducting power. To the binding posts —H— —I— are attached the wires —x— and —y— from the two poles of an electric generator such as a dynamo electric machine.

As thus constructed and arranged for operation, the stream of pulp is fed in at the head of the trough behind the raised end of the blanket so that it will flow or pass between the blanket and the surface of the plate that forms the bottom of the trough, the swinging-frame acting at such time and during the operation to hold down the blanket in such close relation to the face of the plate that the pulp is spread out in a thin sheet or film and distributed in an even manner across the whole surface of the plate. In such operation the blanket becomes saturated and is kept in such wet condition that the whole surface thereof is an excellent conductor and in consequence of that condition the film of water and pulp passing under the blank comes necessarily in the circuit and receives the action or effect of the electric current. It should here be observed that the flexible fabric covering will retard the flow of pulp upon the plate, and impart to the surface a sort of ripple, that will cause the finer particles such as flour gold to be brought nearer the surface and be longer held in suspension in the pulp at the same time the electric energy will be less liable to be dissipated

from the pulp. In this operation the finest particles of metal as well as all the particles are brought completely within the influence of the current and are precipitated and retained on the surface of the metal-plate, while the worthless matters not susceptible to the electric action are carried off from between the blanket and the plate by the stream of water and thus discharged at the tail of the apparatus.

In operating with an apparatus of this construction upon rebellious ores previously roasted I have found that the metal in the condition known as "chlorides" will be changed or converted into a spongy condition susceptible to the action of the amalgam and thus effectually extracted and recovered from the pulp.

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

1. The combination substantially as hereinbefore set forth, of a suitable trough or sluice-box having a plate of conducting metal on the bottom, an apron of fabric lying loosely upon and covering the surface of said plate to retard the flow of pulp and arrest the finer particles of gold, a metallic connection of one end of said apron with a conductor adapted for connecting the same with one pole of a dynamo electric machine, and means for connecting the metallic plate with the opposite pole of the machine.

2. The combination substantially as hereinbefore set forth, of a suitable trough or sluice-box, the metallic plate A having pockets or depressions in its surface, the swinging frame E and means adapted to connect said frame with one pole of an electric generator, the apron C attached at one end to said swinging frame and covering the surface of the metallic plate, and means for connecting to said plate a conductor from the other pole of the electric generator.

3. The herein described amalgamating apparatus comprising a zinc plate forming the bottom of a trough or box with raised sides means for connecting said plate with one pole of a dynamo-electric machine a flexible apron of textile fabric lying loosely on and covering the surface of said plate undulating with the surface of the pulp and a metallic connection at one end of said apron and means for connecting the same with the opposite pole of the same generator, substantially as described for operation as set forth.

In testimony that I claim the foregoing I have hereunto set my hand and seal.

JOHN C. LUDWIG. [L. S.]

Witnesses:

C. W. M. SMITH,
LEE D. CRAIG.