

J. FREY.
 ELECTRICAL PRECIPITATOR AND AMALGAMATOR.
 APPLICATION FILED NOV. 18, 1910.

1,009,143.

Patented Nov. 21, 1911

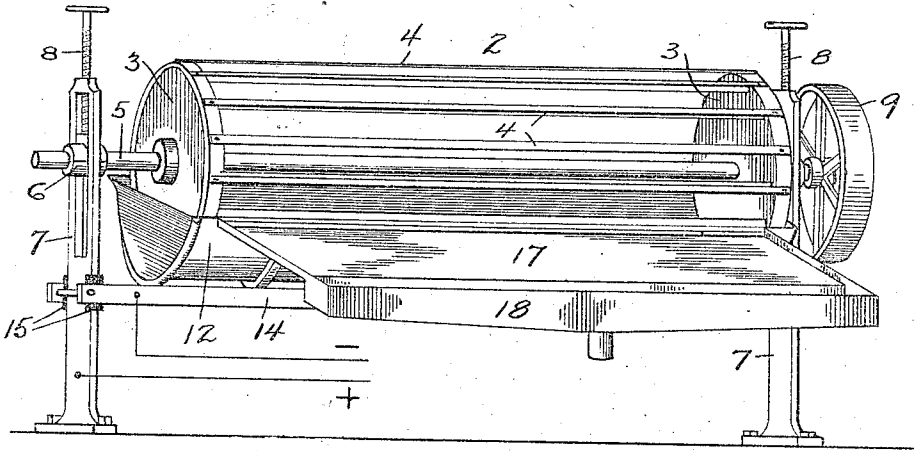


FIG. 1

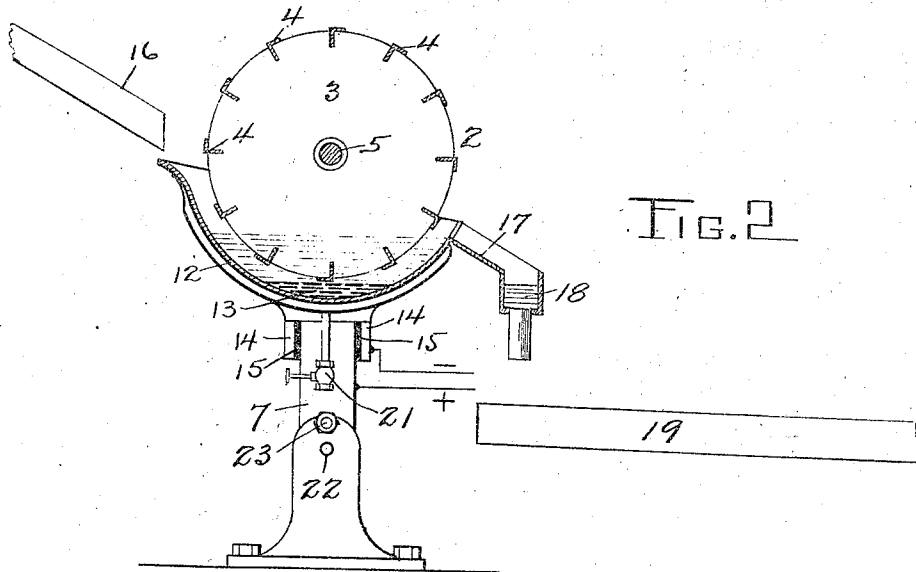


FIG. 2

WITNESSES:

H. J. Post
T. S. Ridwell

INVENTOR
 JOHN FREY.

by Miller & White

his ATTORNEYS.

UNITED STATES PATENT OFFICE.

JOHN FREY, OF SAN FRANCISCO, CALIFORNIA.

ELECTRICAL PRECIPITATOR AND AMALGAMATOR.

1,009,143.

Specification of Letters Patent.

Patented Nov. 21, 1911.

Application filed November 18, 1910. Serial No. 592,957.

To all whom it may concern:

Be it known that I, JOHN FREY, a citizen of the United States, and a resident of the city and county of San Francisco, State of California, have invented certain new and useful Improvements in Electrical Precipitators and Amalgamators, of which the following is a specification.

The invention relates to a machine for depositing and recovering the gold or other valuable metallic products from the pulp, slimes and water carrying the same, as it is discharged from the stamp mill. The action is carried on by means of an electric current passing through the liquid. The liquid mass, as it comes from the stamp mills, is passed through the machine and the valuable metals are deposited by the current into a mass of mercury with which they amalgamate and by which they are held, and from which they are subsequently recovered by further processes.

The apparatus is particularly efficient when the gold occurs as free gold, or fine float gold, and when the character of the ore is such that a large percentage of slimes occur in the material coming from the stamp mills. In certain kinds of ore it is desirable to mix a quantity of cyanid with the ore and water as it passes through the stamps, to assist in freeing the gold from the ore. The cyanid dissolves some of the gold so that some gold is held in solution.

In carrying out my invention, I employ a positive and negative electrode arranged in close relation to each other and constrain the material from the stamps to pass between the electrodes. The electrolytic action which occurs when the current passes through this material causes the metal in solution to be deposited on the cathode or negative electrode as is well known to persons familiar with the art and requires no further explanation.

In the machine as constructed according to the present invention, I prefer to have the anode or positive electrode a moving element and to so construct it that it acts as an agitator to keep the material in motion. By this means the gold held in suspension or solution must necessarily be subjected to the action of the electric current and the constant agitation allows it to be readily deposited and become amalgamated with the mercury. The positive electrode also acts to

deflect the material toward the negative electrode so that the metal may be more readily acted on by the current.

In practice I have found that different ores produce better results when acted on by currents of different amperage or different voltage and when the electrodes are formed of different materials. To allow for variations in the current and voltage, I have provided means whereby the distance between the electrodes may be varied. I have found that for some ores the positive electrode is preferably formed of iron and the negative electrode of mercury, but for others it is more advisable to form one or both of the electrodes of other metals, such as lead, copper, or other metal, according to the conditions of operation. While I have described the operation of the apparatus in connection with a gold bearing ore, it is evident that it may be used for ores bearing other minerals or metals with equal efficiency.

The object of the present invention is to provide a machine which is continuous in action and which is so constructed that it operates with a high efficiency to remove the valuable metal from the liquid and stream of water or cyanid solution carrying the same.

A further object is to provide a machine which may be readily adjusted to operate with the highest efficiency on various qualities of ores.

The apparatus possesses other advantageous features, which, with the foregoing, will be set forth at length in the following description where I shall outline in full that form or embodiment of the invention which I have selected for illustration in the drawings accompanying and forming part of the present specification. The novelty of the invention will be included in the claims succeeding said description. From this it will be apparent that I do not restrict myself to the showing made by such drawings and descriptions, as I may adopt many variations within the scope of my invention as expressed in said claims.

Referring to the drawings: Figure 1 is a view in perspective of the complete machine with the cover removed. Fig. 2 is a transverse vertical section taken through the center of the machine showing the construction of the electrodes.

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The positive electrode or anode consists of a cylindrical cage 2 formed of the end disks 3 having parallel longitudinal strips 4 attached thereto, so as to form a comparatively rigid structure. The disks and the strips are metallic so as to afford a path for the electric current; the strips being preferably formed of angle irons arranged with one leg projecting into the cage and so arranged that as the cage is revolved they exert a downward pressure on the material. The cage 2 is mounted on the shaft 5 which is journaled in bearings 6 at the opposite ends. These bearings are adjustable vertically in the posts 7 by means of the screw 8, the purpose of which will be hereafter set forth. Rotary motion is applied to the cage by means of a pulley 9 mounted on the shaft 5.

Arranged below the anode 2 is the trough 12 formed generally concentrically with the shaft 5, so that all points thereof are equidistant from the adjacent parts of the cage. In the present illustration this trough is formed of iron and contains a quantity of mercury 13 and is connected to the negative pole of the electrical generator so that it acts as a cathode or negative electrode. The amount of mercury 13 in the trough is such that the mercury will not come in contact with the cage 2 to form a short circuit of the electric current. The distance between the anode and cathode is regulated by raising or lowering the anode by means of the screws 8. As heretofore explained, different ores are acted on more efficiently for different distances between the electrodes.

The trough 12 is mounted on the cross braces 14, which are in turn secured to the posts 7 and insulated therefrom by the strips of insulation 15. The material from the stamp mills is fed into the trough by the spout 16 and the residue, after being acted on by the electric current, is discharged over the apron 17 into the trough 18 from whence it is deposited into the sluice 19 and carried away for subsequent treatment, or allowed to go to waste.

In the drawings I have shown the upper part of the apparatus open so that the con-

struction may be more clearly illustrated, but in practice it is my intention to inclose the cage by a cover resting on the trough. When a sufficient amount of metal has been deposited upon the mercury and becomes amalgamated therewith, the mercury may be drawn off through the valve 21. Another means of emptying the trough is also shown in Fig. 2, where I have provided a split support for the bearings. The post is formed of two parts pivoted at 22 and by removing the bolt 23 the entire apparatus may be tilted so that the mercury is discharged over the apron. This arrangement renders it more difficult for an unlicensed person to gain access to the amalgam.

I claim:

1. In an apparatus of the character described an anode comprising a cylindrical cage adapted to be rotated about a horizontal axis, a trough shaped cathode below the anode and means for varying the distance between the cathode and said axis.

2. In an apparatus of the character described, an anode comprising a cylindrical cage adapted to be rotated about a horizontal axis, a trough shaped cathode below the anode adapted to contain a quantity of material forming the real cathode and means for vertically moving the axis.

3. In an apparatus of the character described a cylindrical anode adapted to be rotated about a horizontal axis, a trough shaped cathode below the anode adapted to contain a quantity of material forming the real cathode, said trough being adapted to be tilted about a horizontal axis to discharge the material.

4. In an apparatus of the character described a cylindrical anode adapted to be rotated about a horizontal axis, a trough shaped cathode below the anode adapted to contain a quantity of material forming the real cathode, said trough being adapted to be tilted about a horizontal axis to discharge the material.

JOHN FREY.

Witnesses:

H. G. PROST,
P. S. PIDWELL.

Correction in Letters Patent No. 1,009,143.

It is hereby certified that in Letters Patent No. 1,009,143, granted November 21, 1911, upon the application of John Frey, of San Francisco, California, for an improvement in "Electrical Precipitators and Amalgamators," an error appears in the printed specification requiring correction as follows: Page 2, strike out claim 4, included in lines 89-96; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 26th day of December, A. D., 1911.

[SEAL.]

C. C. BILLINGS,

Acting Commissioner of Patents.