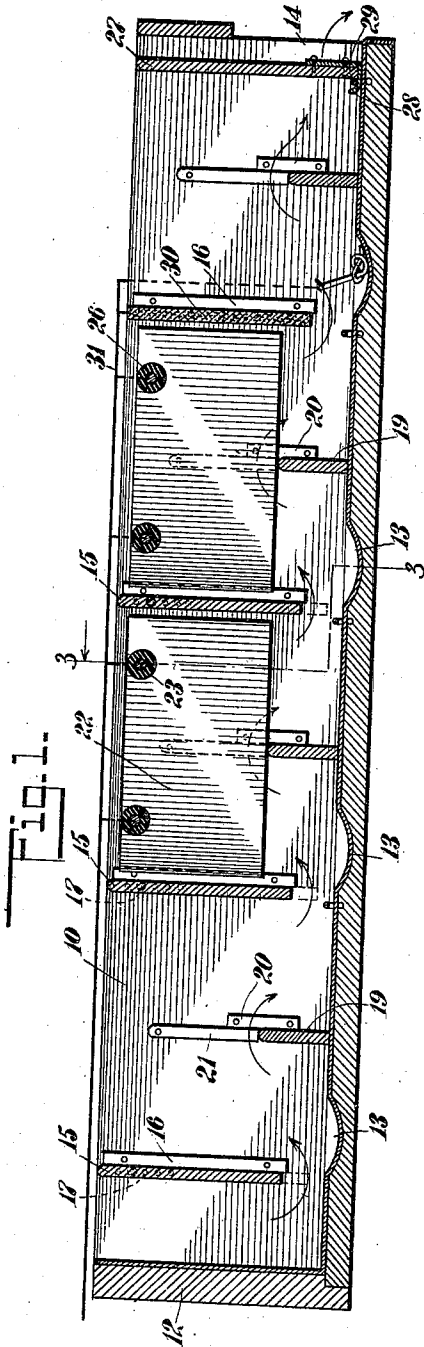


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CONCENTRATOR AND AMALGAMATOR.
APPLICATION FILED AUG. 24, 1909.

989,396.

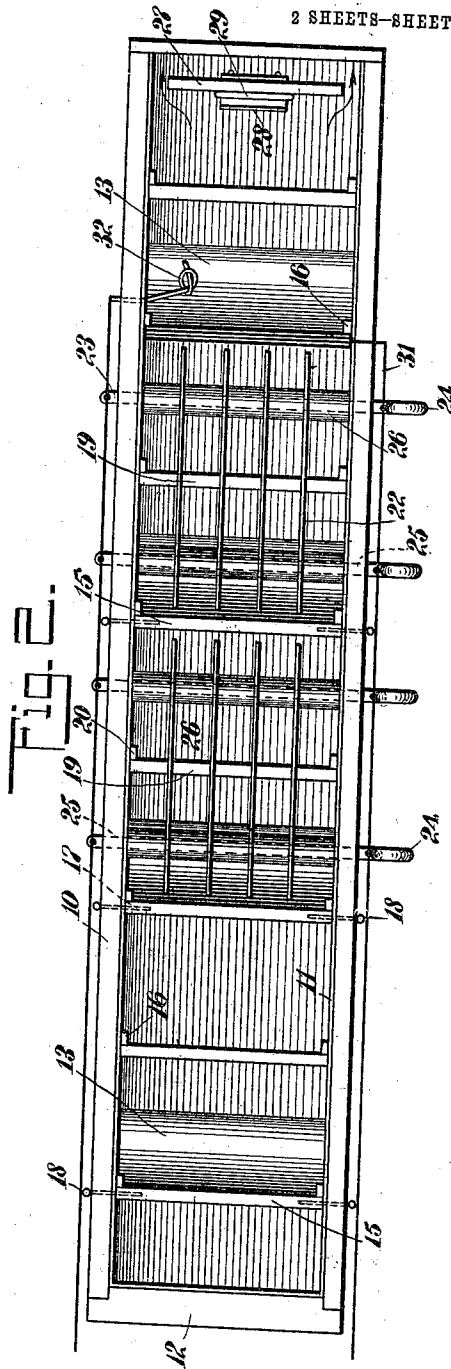
Patented Apr. 11, 1911.

2 SHEETS-SHEET 1.



WITNESSES

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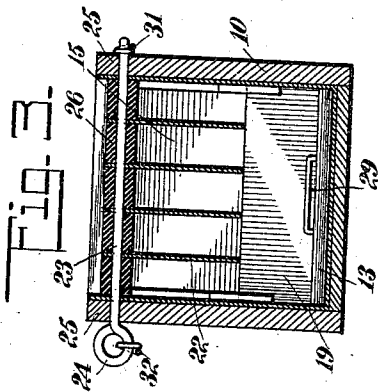
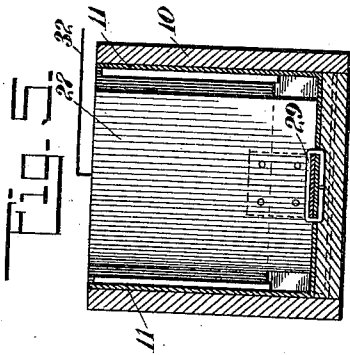
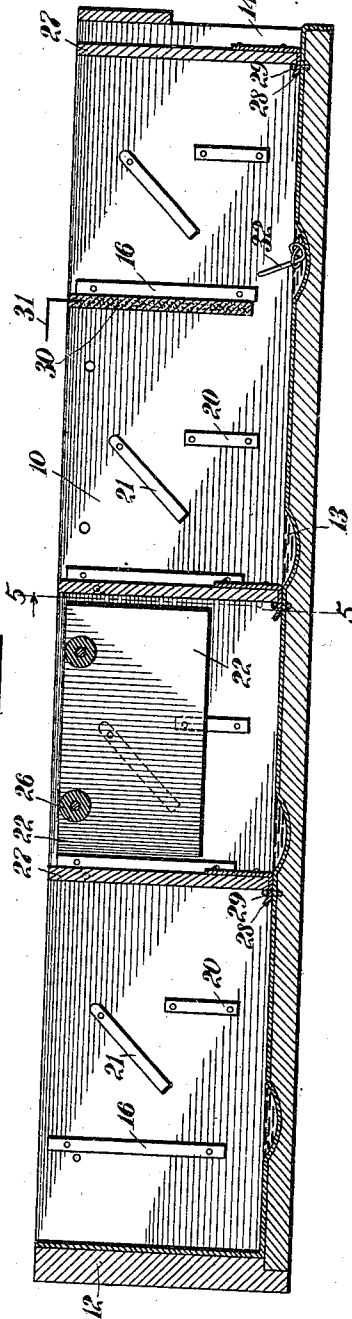


Fig. 4



WITNESSES

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CONCENTRATOR AND AMALGAMATOR.

989,396.

Specification of Letters Patent. Patented Apr. 11, 1911.

Application filed August 24, 1909. Serial No. 514,361.

To all whom it may concern:

Be it known that we, WATSON M. NESBIT and EDWARD PIKE, citizens of the United States, and both residents of Eureka, in the county of Juab and State of Utah, have invented a new and Improved Concentrator and Amalgamator, of which the following is a full, clear, and exact description.

This invention relates to concentrators and amalgamators, and relates more particularly to a device of this class comprising a sluice box having transverse riffles arranged upon and above the bottom of the box so that the pulp and other material flowing through the box is forced to pass over and under these respective riffles, the box being provided with quicksilver pockets under the last-mentioned riffles, and being preferably provided with longitudinal riffles or amalgamating plates, as well as with suitable electrical connections for electrolytic reduction.

The object of the invention is to provide a simple, durable and inexpensive concentrator and amalgamator, by means of which the small particles of precious metals, of the kind known, for example, as "flour gold" and "flour quicksilver" can be easily and expeditiously recovered from the pulp, tailings, sand, or other material, as well as metal such as coarse or float gold; which can be used as a concentrator for materials of different kinds, and which is adapted for the use of electricity as an aid in the recovery of the metals.

The invention consists in the construction and combination of parts to be more fully described hereinafter, and particularly set forth in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views, and in which—

Figure 1 is a longitudinal section of an embodiment of our invention; Fig. 2 is a plan view of the device; Fig. 3 is a transverse section on the line 3—3 of Fig. 1; Fig. 4 is a longitudinal section of the device showing certain of the parts removed and replaced by other parts; and Fig. 5 is a transverse section on the line 5—5 of Fig. 4.

Before proceeding to a more detailed explanation of our invention, it should be clearly understood that while the device is peculiarly adapted for the recovery of fine gold from pulp or tailings, in certain mining

operations, it can also be used for concentrating operations and for the recovery of certain other metals. We prefer to employ transverse riffles so arranged that the pulp or other material passing through the sluice box is forced to flow under and over the adjacent riffles, alternately. In this way the material is forced into contact with the quicksilver or mercury arranged in pockets provided therefor, so that the precious metals are amalgamated with the quicksilver and thereby withdrawn from the waste material. At the same time, the riffles preferably constitute amalgamating plates, that is, copper plates coated with a suitable amalgamating material. If so desired, the sides of the sluice box can also be provided with amalgamating plates, to assist in the recovery of the material. The longitudinal riffles consist of the usual amalgamating plates.

It is well-known that when amalgamating plates are used for collecting gold, silver and the like, from their crude ores, the surfaces of these plates are liable to become tarnished or "sickened" by certain substances contained in the ores or in the current of water which is employed to carry the "pulp" over the plates, and that in this condition they are unfitted for amalgamating the particles of gold, silver, etc. To prevent this, and to keep the surfaces of the amalgamating plates dry and in suitable condition for collecting and amalgamating the particles of the precious metals, electric currents are employed, the water of the pulp constituting part of the conducting circuit and suitable electrical connections being provided for the purpose.

Referring more particularly to the drawings, we provide a sluice box or casing fashioned from any suitable material and preferably lined at the sides and bottom with amalgamating sheets or plates. The sluice box has a head at which the pulp or other material is introduced, and is provided at the bottom with recesses or pockets suitably spaced apart and adapted for the reception of quicksilver. The tail end of the sluice box has an outlet opening through which the pulp finally escapes.

We provide transverse riffles preferably constituting amalgamating plates and extending across the sluice box at suitable intervals, being positioned against supporting or bracing cleats secured at the sides of the box. The riffles are adjustable vertically, and for this purpose are each pro-

vided with a plurality of recesses 17 adapted to receive supporting pins or studs 18 in the sides of the box. These riffles 15 are arranged above and adjacent to the recesses or pockets 13, so that the material is forced to flow under the riffles and directly over the pockets and into contact with the mercury therein.

Below the ends of the pockets 13 toward which the material flows through the sluice box, is arranged a stop riffle 19 preferably constituting an amalgamating plate, and extending only part way to the top of the sluice, so that the material is forced to flow over the stop. Cleats 20 are secured at the inside of the pockets and serve to hold the stop riffle in place. Further pivoted cleats 21 coöperate with the cleats 20 for a like purpose, as is shown most clearly in Figs. 1 and 4. The pivoted cleats can be swung aside to permit the insertion and removal of the stop riffle.

When employed in connection with our device, longitudinal riffles or concentrating plates 22, which are preferably of the usual form, are arranged in sets between each pair of adjacent riffles 15. Supports 23 consisting for example, of metal rods, each having one end bent to form an eye 24, are arranged in openings 25 of the side walls of the sluice box and extend across the same. These supports serve to carry the riffle plates 22 which are provided with openings for the purpose. The plates 22 are spaced from one another and from the sides of the sluice box, by means of suitable formed spacing members 26 mounted upon the supports. The plates 22 of course assist in the usual manner in collecting the precious metals from the pulp, being provided with amalgamating surfaces. We also provide concentrating riffles 27 mounted at suitable points of the sluice box by means of lugs 28 which fit removably in eyes or brackets 29 arranged to rest upon the bottom of the sluice box, as is shown most clearly in Fig. 5. The concentrating riffles are so proportioned that the side edges thereof are spaced from the sides of the box, so that the pulp is forced to pass at the sides of the concentrating riffles. The action of these riffles is to cause the heavier particles in the pulp to accumulate in front of them, while the lighter particles or waste pass off at the sides.

When it is desired to remove the concentrates, the riffles can be easily unhooked from the bottom of the box and a stream of water can then be employed to wash the concentrates out of the box and into the collecting receptacle or the like. If so desired the riffles 15, as well as the riffles 19, can be dispensed with when the device is being used

as a concentrator, as these will not at all times be necessary.

The electrical connections which we prefer to employ in connection with our device, include the anode 30 which consists of a carbon or like plate replacing one of the riffles 15 and connected by means of a suitable conductor 31 with a source of electrical supply. The cathode is formed by the amalgamating copper plate at the bottom of the box and one of the quicksilver baths in its pocket 13, a suitable conductor 32 being introduced into the bath to lead the current to this point. One of the conductors 31 and 32 preferably, also passes through the eyes 24 of the supports 23.

Having thus described our invention, we claim as new, and desire to secure by Letters Patent:

1. A device of the class described, comprising a sluice box having transverse riffles arranged upon the bottom of said box, and transverse riffles arranged above the bottom of said box, whereby material passing through said box is forced to flow over and under said riffles, respectively, and amalgamating plates positioned above said first-mentioned riffles and between said last-mentioned riffles.

2. A device of the class described, comprising a sluice box having transverse riffles arranged upon the bottom of said box, and transverse riffles arranged above the bottom of said box, whereby material passing through said box is forced to flow over and under said riffles, respectively, and amalgamating plates positioned above said first-mentioned riffles and between said last-mentioned riffles, said sluice box having in the bottom thereof, quicksilver pockets arranged adjacent to said first-mentioned riffles and under said amalgamating plates.

3. A device of the class described, comprising a sluice box having the sides and bottom lined with concentrating plates, the bottom of said box being provided with recesses constituting pockets for quicksilver, transverse riffles spaced above said pockets, stop riffles upon the bottom of said box and extending partly to the top thereof, longitudinal riffles, said riffles constituting amalgamating plates, and a concentrating riffle spaced from the sides of said box.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

WATSON MARSHALL NESBIT.
EDWARD PIKE.

Witnesses:

D. B. CRONIN,
DAN MARTIN.