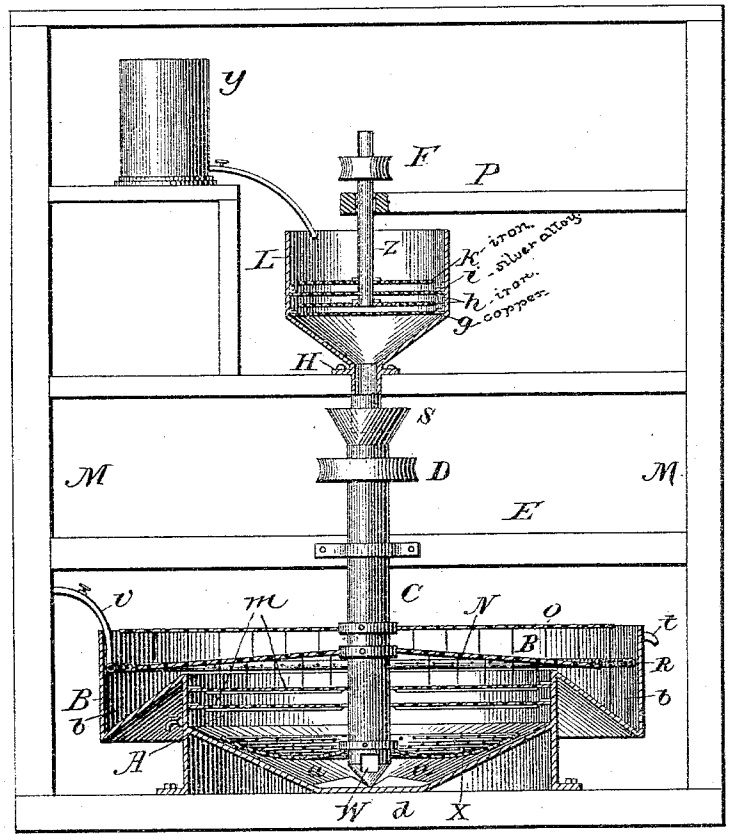
(No Model.)

S. L. TRIPPE.

AMALGAMATOR.

No. 318,932. Patented May 26, 1885.



Witnesses:
Edward Maundel.
W. S. Voeelius

Inventor.
Sylvanus L. Trippe

N. PETERS. Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

SYLVANUS L. TRIPPE, OF DENVER, COLORADO.

AMALGAMATOR.

SPECIFICATION forming part of Letters Patent No. 318,932, dated May 26, 1885.

Application filed January 5, 1885. (No model.)

To all whom it may concern:

Be it known that I, SYLVANUS L. TRIPPE, a citizen of the United States, residing in the city of Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Amalgamators for Amalgamating and Separating Gold and other Metals from their Ores by Means of Mercury; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to certain improvements upon the amalgamator shown and described in certain Letters Patent of the United States, No. 308,642, which were granted to me December 2, 1884. The process which the amalgamator is designed to carry into effect is fully described in said Letters Patent, and need not be described herein. It is sufficient to say that in that process the pulverized ore wet to a pulp is fed into a hopper on the top of a hollow pipe standing in a seat near the bottom of a vessel containing mercury, and forced through openings near the lower end of the pipe beneath the surface of the mercury, and through a series of muller-plates near the bottom of the mercury-containing vessel, passing through one or more amalgamating perforated plates into an enlarged cylindrical section of the vessel, where the gangue is washed away, and the remaining mineralized portion of the ore is concentrated for further treatment. As is stated in the specification of said Letters Patent, an actual contact of the mineral particles with mercury is absolutely necessary to amalgamation, and to insure such contact was one of the objects for which a series of muller-plates was designed, which are described in said Letters Patent as being preferably made of steel, and were located beneath the body of mercury contained in the amalgamator.

My present invention relates particularly to the location, construction, and material of the muller-plates described in said Letters Patent.

I have found by experiment that when it is desirable to roast certain ores in order to break up the chemical combinations in which mineral particles are mechanically or otherwise associated, that in nature or in the process of roasting some of the gold particles have become coated with some kind of an oxide, or from some other cause fail to amalgamate readily, and that with some ores which have not been roasted the gold particles are in the condition usually called "rusty," and that a rubbing or scouring of them, so they will present a clean bright surface to the action of the mercury, is of great advantage, if not absolutely necessary, in order to obtain a good result by amalgamation. With the class of ores mentioned I find that in order to prepare the gold particles for amalgamation by the attrition of the muller-plates when the plates are located beneath the body of mercury in the amalgamator the process is more slow than is desirable, for the rotation of the muller-plates in the mercury must be slow, or too great a commotion is caused therein. I have for that and other reasons, which appear herein, designed a change in the location of the muller-plates, and removed them from the vessel containing the mercury and placed them in an iron cylinder situated above the hopper on the end of the feed-pipe C, as shown in the figure, which is a vertical sectional view of my apparatus. By changing the location of the muller-plates to the cylinder L a much more rapid rotation can be had, as they are rotated by the separate pulley F. The plates are made of less size, and will do as much work as larger ones would when slowly rotated within the mercury in the vessel A. By feeding into the cylinder L the quantity of mercury required for amalgamation, as hereinafter described, an actual contact between the mercury and the mineral particles is as effectually secured, and no mercury except such as is required to amalgamate the mineral will be liable to be cut up and floured by the muller-plates, as no other will come in contact therewith. As mercury which is charged with amalgam is much more easily saved on the copper plates and in a body of mercury than is floured mercury not so charged, there will be no danger of any loss of floured mercury.

By locating the muller-plates outside the vessel A the vessel can be much diminished in size without diminishing the capacity for work, and effecting a great saving in the cost of the required amount of mercury.

For reasons, which will appear further on, I have made a change in the material of which the muller-plates are composed, and also a

change in the construction thereof, as follows: The lower plate, *g*, in the cylinder L is made of copper. It extends across the cylinder. It is perforated and fastened to the sides of the cylinder by set-screws, and remains stationary. Above the plate *g* is a perforated iron plate, *h*, having corrugated or ribbed surfaces. It is fastened to the shaft *z* by a collar, and it rotates with the shaft. It is so adjusted as to bring its lower surface in contact with the plate *g*. Above the plate *h* is a plate, *i*, preferably made of a silver alloy, which is perforated, and is fastened to the side of the cylinder L by means of set-screws. It is so adjusted in the cylinder as to bring its under surface in contact with the rotating plate *h*. Immediately above the plate *i* is a perforated iron plate, *k*, having a ribbed or corrugated under surface. It is fastened to the shaft *z* by means of a collar, and so adjusted on the shaft as to bring its under surface in contact with the plate *i*. It also rotates with the shaft *z*.

The shaft *z* is made of a suitable rod of iron. It is stayed and supported by the frame cross-piece shown in Fig. 1, (marked P,) and it is rotated by means of the pulley F. The cylinder L is preferably made of cast-iron, having a sloping base, elongated into a pipe extending downward and opening into the hopper S, as shown in Fig. 1. It is held in place by a collar or clamp, which is fastened by screws or bolts to the timber cross-piece of the frame M, as shown.

In place of the muller-plates removed from the vessel A, I have substituted a simple distributing device, X, made of a perforated iron plate, having grooves on the under side thereof. It is fastened to the pipe C by a collar just above the openings W therein. It is made to conform in part to the bottom of the vessel in shape, and it rotates with the pipe C and spreads the pulp discharged therefrom beneath the mercury contained in the vessel A.

I have provided a suitable vessel, *y*, to contain a supply of mercury, having a tube leading therefrom to the cylinder L. The tube is provided with a stop-cock to regulate the flow, and the vessel is placed at a proper elevation above the cylinder L, so as to discharge automatically into the cylinder. The vessel *y* is supported by a frame, as shown in Fig. 1. I have also inserted a faucet in the vessel A, from which mercury can be drawn to supply the vessel *y*.

In working the apparatus, a supply of mercury for any determined period having been placed in the vessel *y*, and the feed therefrom being properly adjusted, the pulverized ore, wet to a pulp, is fed into the cylinder L and mixed with the mercury, and by the rotation of the muller-plates the mixture is rubbed or ground through the several plates, and passes down the pipe C into the vessel A, beneath the mercury contained therein, the distributer X spreading it evenly beneath the body of mercury, when the gold and gold amalgam, being of greater specific gravity than the mercury, tends downward and settles on the bottom of the vessel, while the material of less specific gravity than the mercury is carried by the pressure thereof through the amalgamating-plates into the enlarged cylindrical section B, where the gangue is washed away by the water-currents therein, and the heavy or mineralized portion is concentrated and falls into the space *b b*, from whence it is discharged for further treatment. As the mercury from the supply-vessel *y* passes with the pulp through the muller-plates it comes in contact with the copper plate *g*, and is spread over the surface thereof, keeping it constantly in a condition to amalgamate the gold particles as they are brought in contact therewith by the rotation of the plate *h*. All excess of amalgam on the plate *g* is rubbed off, and is carried down the pipe C into the vessel A, where it is separated from the pulp, as above described.

In the amalgamator described in my former patent the function performed by the several muller-plates and by the distributer X is in part performed by the muller-plates described in said patent as located in the cylinder A beneath the mercury contained therein. The present device is not intended to supersede the other construction under all circumstances, but will be found preferable in most cases.

The particular object of constructing the muller-plates of different metals is to develop frictional electricity on the plates in the presence of the mineral and mercury for amalgamation, by reason of which much better results are obtained. With some ores it will be found advisable to dispense with metallic mercury and use certain chemicals in the cylinder L, where the ore is rubbed through the muller-plates, and rely on the amalgamation on the copper plates in the vessel A and the mercury contained therein. In such cases a supply of the proper chemicals is placed in the vessel *y* and the required amount automatically fed into the cylinder L.

I have found by experiment that when working ore containing silver, and which has been roasted with salt, or when using a salt of mercury in place of the metallic mercury for amalgamation, an arrangement of the perforated plates in the cylinder L which will bring the two iron plates in contact with each other, or the use of two additional iron plates, of similar construction as those described, through which the pulp is required to pass, will be found an advantage in more readily dechlorinating the silver and in reducing the salt thereof to metallic mercury. Where additional plates are used, one should revolve with the shaft *z* while the other remains stationary. I do not, therefore, wish to confine myself to the exact number or precise arrangement of the perforated plates as described above, though such will in most cases be found preferable.

I am aware that devices somewhat similar

to the distributer X are in use for spreading pulverized ore beneath a body of mercury; but

What I claim as new, and desire to secure by Letters Patent, is—

The combination of an amalgamating-vessel containing mercury, amalgamating-plates, means for distributing pulverized ore beneath the surface of a body of mercury, enlarged cylindrical section of the vessel containing applicances for separating the mineralized portion of the ore from the gangue, and the cylindrical vessel L located above the hopper S, discharging pulp therein, and containing the series of muller-plates *g*, *h*, *i*, and *k*, constructed of different metals for the development of electricity by friction on the muller-plates and in the presence of the mineral and mercury for amalgamation, substantially as described.

SYLVANUS L. TRIPPE.

Witnesses:
H. L. WADSWORTH,
F. W. STANDART.