

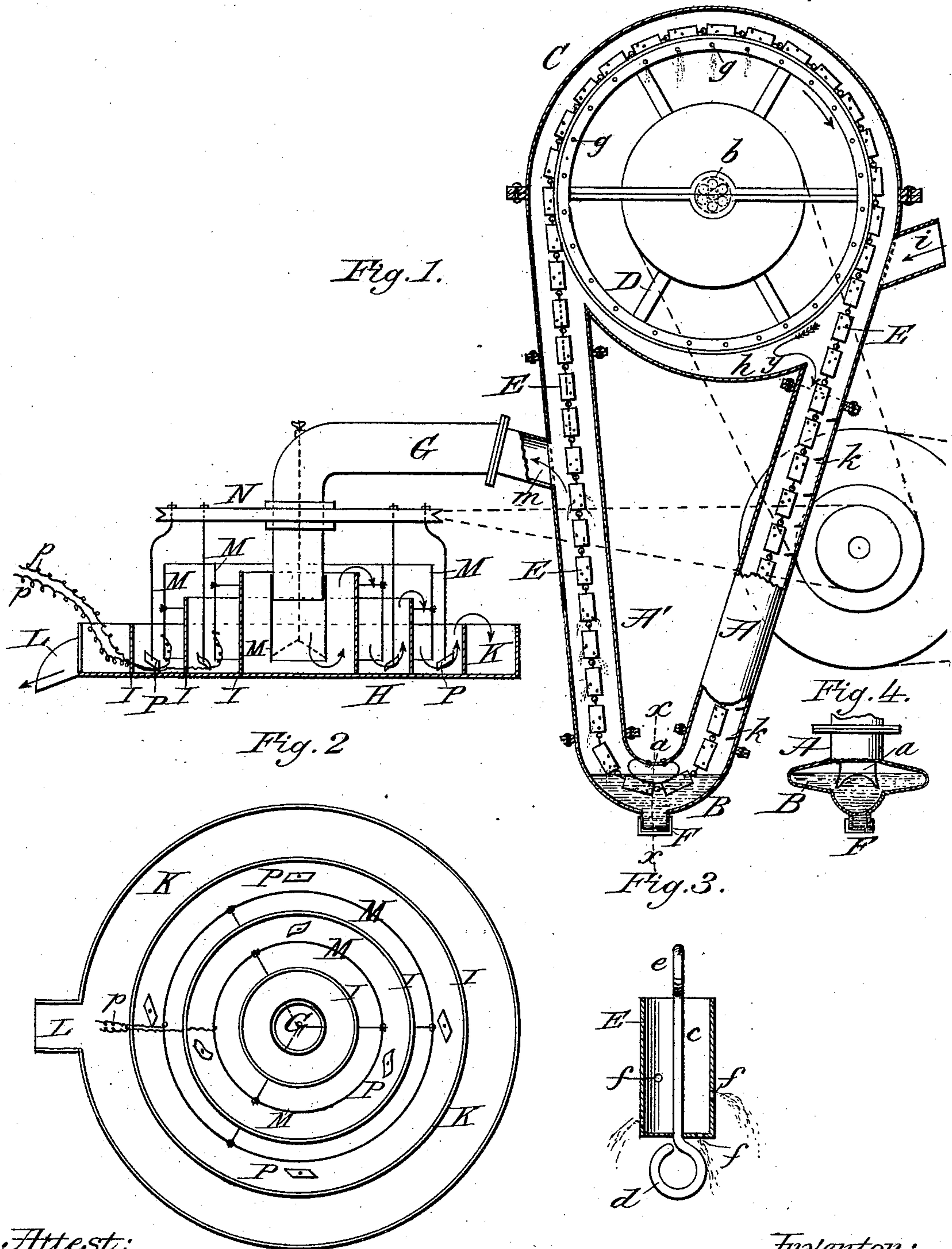
(No Model.)

M. T. VAN DERVEER & J. HEGEMAN.

AMALGAMATING APPARATUS.

No. 299,700.

Patented June 3, 1884.



Attest:

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UNITED STATES PATENT OFFICE.

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AMALGAMATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 299,700, dated June 3, 1884.

Application filed November 10, 1883. (No model.)

To all whom it may concern:

Be it known that we, MILTON T. VAN DERVEER and JOHN HEGEMAN, citizens of the United States, residing at Amsterdam, in the county of Montgomery and State of New York, have invented certain new and useful Improvements in Amalgamating Apparatus; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to an amalgamating apparatus for collecting gold, silver, or other metals for which mercury has an affinity.

The object of our invention is to retain all of the gold, silver, or other metals which will amalgamate with mercury, particularly the fine floating gold, which is so often lost. To this end we employ a series of perforated buckets adapted to contain an ounce of mercury, more or less, which buckets are arranged to travel through a pair of nearly-vertical tubes, that are connected at the bottom by a mercury-reservoir, the pulp being also passed through said tubes in contact with the mercury, which is carried up by said buckets and spattered over the mercury and thoroughly mingled therewith before the pulp is conducted to a settling-pan, where the finer particles of precious metal are collected with or without the aid of a battery.

The invention consists in the construction and combination of parts, as hereinafter more clearly described and claimed.

In the annexed drawings illustrating our invention, Figure 1 is a sectional side elevation of our improved amalgamating apparatus. Fig. 2 is a plan of the settling-pan. Fig. 3 is a longitudinal section of one of the elevator cups or buckets for distributing the mercury or other amalgamating material. Fig. 4 is a cross-section through the mercury-reservoir on the line *x x* of Fig. 1.

Like letters of reference designate like parts in the several views.

A A' represent two nearly-vertical tubes or

pipes, each of which is formed in sections connected by flanges and bolts, the lower ends of said tubes being connected by a bend or crook, B, which is elongated laterally, as shown in Fig. 4, and forms a reservoir for mercury. The upper ends of the tubes A A' are connected to a casing or chamber, C, with which they communicate, and in which is placed a grooved wheel or sheave, D, for carrying the elevator chain or band, the lower end of which passes under a saddle-shaped guide, *a*, of any suitable construction, which is arranged in the mercury-reservoir B, as shown in Figs. 1 and 4. The sheave D is mounted in anti-friction bearings *b*, and may be actuated by any convenient means. The elevating cups or buckets E E may be attached to a chain, strap, belt, or band of any suitable kind, a chain composed of links *c*, having a hook, *d*, and an eye, *e*, at opposite ends, being deemed preferable.

In the sides and bottom of each of the buckets E E are perforations *f f f*, for the escape of mercury in a shower upon the pulp that is passing through the tubes A A'. The grooved rim of the sheave or wheel D, in which the buckets E E are carried, is provided with perforations *g g*, through which the mercurial contents of the buckets are allowed to escape and fall into the horn-shaped space *h* at the bottom of the chamber C. The pulp, which is introduced to the tube A through the inlet *i*, is discharged partly upon the floor of the chamber C, as shown by the arrow *y* in Fig. 1, and is thus brought at once into contact with the mercury showered down by the buckets E, and by the perforated rim of the wheel D. It will be seen that the floor of the horn-shaped space *h*, beneath the wheel D, is inclined somewhat toward the tube A, so that the pulp is caused to pass into said tube with an oscillating movement, (indicated by the arrow.)

In the tube A are shelves or brackets *k k*, for the purpose of arresting and spattering the mercury as it falls through said tube over the pulp, thereby effecting a more intimate union of the metal and the amalgamating substance. As the buckets are passed down through the tube A by the rotation of the wheel D, the remainder of their contents is spilled through

the tube into the bend or reservoir B, in passing through which, however, they again become filled. As they pass up through the tube A', their contents are showered down through the perforations *f* upon the pulp that is being passed in a continuous current through the tubes A A' from the inlet *i* to the pulp-exit *m*, which is located in the side of the tube A' below the water-level of the inlet. There is thus effected a thorough admixture of the pulp and the amalgamating material.

At the bottom of the reservoir B is a nozzle, F, through which the amalgam may be withdrawn when desired, the nozzle being normally closed by a cap or other suitable device. The water and pulp delivered to the tubes A A' are passed through the opening *m* and tube G to the center of the settling-pan H, which is provided with a series of concentric annular partitions or rings, I I, that are firmly secured to the bottom of the pan and diminish in height from the center of the pan toward its periphery, as shown in Fig. 1. Between the outer ring or partition and the sides of the pan is an annular trough, K, for conducting the tailings to a discharge-spout, L, Figs. 1 and 2. It will be observed that the pulp will have to rise over the tops of each of the partitions I I successively, and the force of the water being thus slackened the particles of the metal will sink to the bottom of the pan.

Between the partitions I I, and also from the end of the tube G, we prefer to suspend other partitions or annular plates, M M, preferably of copper which is amalgamated. These partitions or plates M M are adjustably suspended at any desired height by suitable means, so as to leave a space beneath for the passage of pulp, and they may, if desired, be connected by wires *p p* with a battery, as in plating or gilding, so as to arrest the fine floating particles or flour of ores coming in contact with them. The bottom of the pan is covered with mercury for a similar purpose. A horizontal wheel, N, is mounted above the settling-pan H and carries a series of stirrers, P P, of any convenient form for agitating the pulp and preventing the deposit of sediment or extraneous matter, thereby causing the same to pass off with the tailings. The settling-pan will have suitable openings (not shown) for the passage of the battery-wires and for the withdrawal of the amalgam.

From the foregoing description the operation of our amalgamating apparatus will be readily understood. It will be observed that the elevator-buckets E E are so arranged as to cause a thorough circulation of the mercury by passing down one tube, into and through the mercury-reservoir B, and up the other tube, the perforations *f f* discharging all or a part of their contents in going up one tube, and spilling or pouring the balance in the horn-shaped space *h* of the compartment C, and down the other tube while descending. The mercury is thus showered or spattered in

drops over the pulp, with which it becomes thoroughly blended, and then returns to the reservoir below.

As it requires mercury free from oils, metals, or other substances of a less specific gravity to unite with gold, we cause the buckets to dip into the lower part of the reservoir of mercury and take from below its surface that which is more free from whatever has a retarding influence upon amalgamation. After the metals have thus been thoroughly treated, the passage of the pulp through the settling-pan slackens the force of its flow and enables the operation of amalgamating the finer particles to be perfectly completed.

It may be remarked that the settling-pan H, though preferably circular in form, can be made in any other suitable shape, and the partitions I and M, instead of being annular, may be arranged transversely, if desired. It is also obvious that the buckets or cups E E may, if desired, be made without perforations. These buckets or cups can also be made to travel through the tubes A A' in either direction. The mercury carried by these cups or buckets being all returned to the reservoir B, it is obvious that a much smaller quantity of mercury is required than ordinary.

We are aware that rotary amalgamators or amalgamating-pans have heretofore been provided with concentric partitions, the pulp being driven through the mercury by centrifugal force. In such pans as heretofore constructed the concentric partitions have been made to diminish in height from the circumference of the pan to its center. It will be observed that our settling-pan is stationary, and that the concentric partitions increase in height from the circumference to the center, thereby retarding the flow of the pulp and enabling the fine particles of metal to settle upon the amalgamated portions of the pan.

We are also aware that some forms of amalgamating apparatus have been provided with endless chains or belts, to which are attached buckets for carrying ore downward into an amalgamating-pan. In our apparatus, however, the perforated buckets E, which are preferably connected to a chain composed of links of amalgamated copper, are designed to carry mercury only. These buckets, it will be observed, are made to travel through the tubes A A' in the same direction with the pulp, and in their passage through the mercury-reservoir B they become filled with mercury, which begins to escape through the perforations *f f* as soon as the buckets leave the reservoir, and is thus spattered over the current of pulp that is on its way to the settling-pan. By this means a more intimate union of the pulp and mercury, and consequently a more perfect amalgamation, is attained than by methods heretofore in use.

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

1. In an amalgamating apparatus, the combination of a casing or chamber, C, a pair of tubular channels, A A', communicating with said chamber, a mercury-reservoir, B, connecting the lower ends of said tubes, a wheel or pulley, D, mounted in the chamber C, an endless belt or chain passed over said wheel and carrying perforated buckets E E, for raising mercury from the reservoir and spattering it over the pulp that is passed through the tubes A A', and a settling-pan, H, connected to one of said tubes, substantially as described.

2. In an amalgamating apparatus, the combination of the tubes A A', mercury-reservoir B, chamber C, wheel D, having a grooved periphery provided with perforations *g g*, the shelves or brackets *k k*, and the buckets E E, attached to a belt or chain, substantially as described.

3. In an amalgamating apparatus, the settling-pan H, having concentric partitions I I,

of varying height, and adjustably-suspended partitions or plates M M M, connected by wires to a battery, substantially as described.

4. In an amalgamating apparatus, the settling-pan H, having concentric partitions I I and M M, trough K, spout L, and stirrers P P, substantially as described.

5. In an amalgamating apparatus, the combination, with the tubes A A', mercury-reservoir B, and buckets E E, of the tube G, settling-pan H, having partitions I M, and the wheel N, carrying stirrers P P, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

MILTON T. VAN DERVEER.
JOHN HEGEMAN.

Witnesses:

M. L. STORER,
J. SPENCER FISHER.