

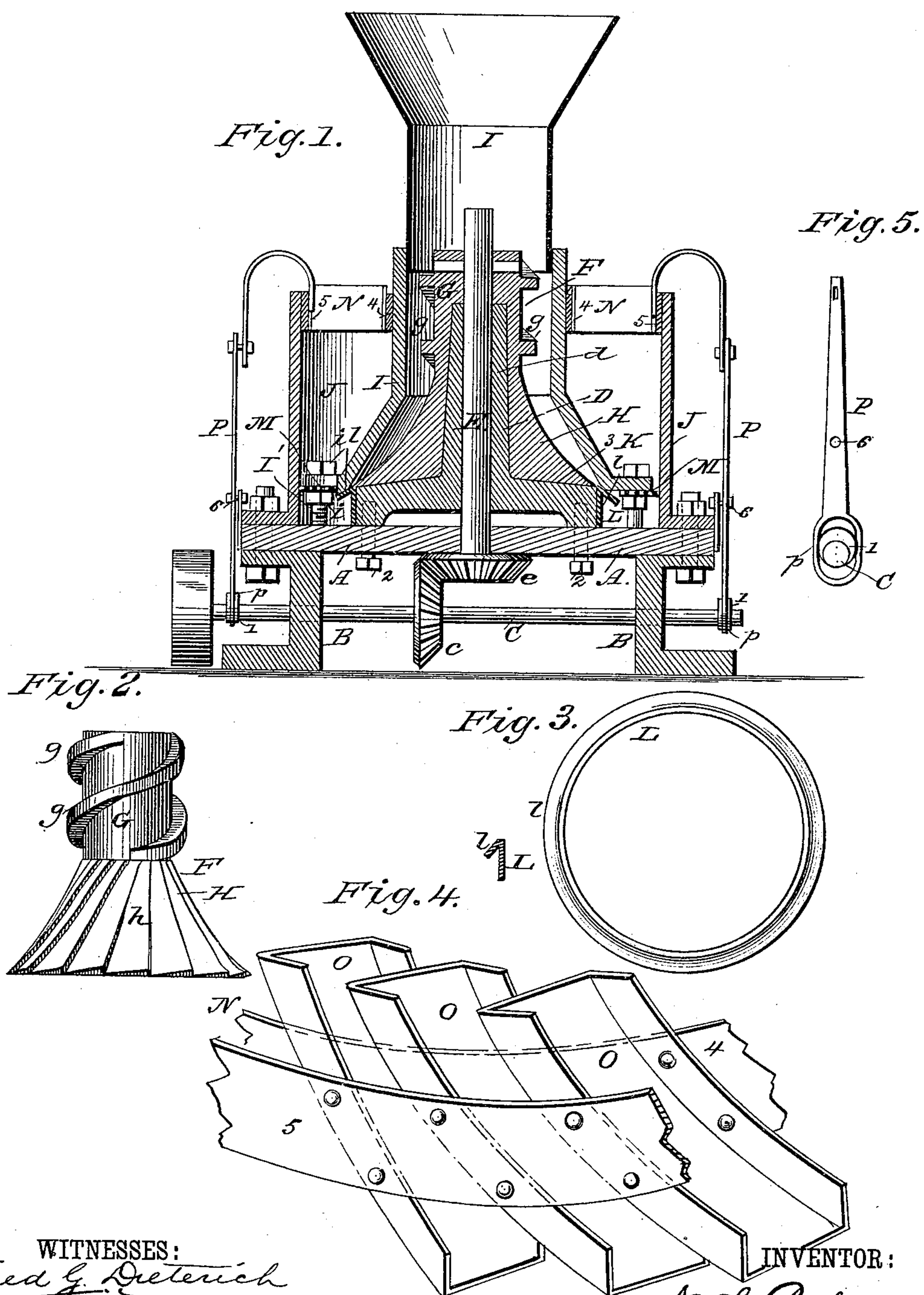
(No Model.)

N. L. RABER.

AMALGAMATOR.

No. 377,272.

Patented Jan. 31, 1888.



WITNESSES:

WITNESSES:  
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# UNITED STATES PATENT OFFICE.

NATHAN LEROY RABER, OF CORVALLIS, OREGON.

## AMALGAMATOR.

SPECIFICATION forming part of Letters Patent No. 377,272, dated January 31, 1888.

Application filed November 23, 1886. Serial No. 219,704. (No model.)

*To all whom it may concern:*

Be it known that I, NATHAN LEROY RABER, of Corvallis, in the county of Benton and State of Oregon, have invented a new and useful Improvement in Amalgamators, of which the following is a specification.

This invention is an improvement in amalgamators, and particularly in that class of such machines employing mercury; and the invention consists in certain features of construction and novel combinations of parts, as will be described.

In the drawings, Figure 1 is a vertical longitudinal section of my machine. Fig. 2 is a detail view of the feed-wheel. Fig. 3 represents the valve in detail. Fig. 4 represents the concentrator in detail, and Fig. 5 is a detached view showing the eccentric and lever-arm for giving motion to the concentrator.

In carrying out my invention I usually support the base-plate A on legs B, the latter also forming bearings for the drive-shaft C, having bevel-wheel *c* and a band-pulley by which to receive motion from a suitable driver. This shaft C also has eccentrics 1, for operating the concentrator. Centrally on the base-plate I secure—it may be by screws 2, as shown—a pedestal, D, having its upper surface beveled at 3 downward toward its outer edge and provided with a central upwardly-projected portion, *d*. This pedestal is bored axially, and an opening is formed through the base-plate in line with said bore to permit the insertion of the shaft E for connecting the drive-shaft C with the feed-wheel. This shaft E has bevel-wheel *e*, geared with wheel *c*, and is connected at its upper end with the feed-wheel F. I journal the screw feed-wheel F on the pedestal and form such wheel with a cylindrical portion, G, having a spiral thread, *g*, and a lower tapered portion, H, having flutes *h*.

From the foregoing it will be seen that the feed-wheel is revolved by the drive-shaft through the described connections.

Over the feed-wheel I secure the cover-tube I, conformed approximately to said wheel and having its lower edge extended down close to and below but separated from the lower edge of the wheel, as shown in Fig. 1. This cover I is supported on threaded bolts I', which pro-

ject from the base-plate up through openings in lugs on the cover, and the latter is secured by nuts *i i* on said bolts—one above and the other below said lugs. By this construction the cover is supported so it can be adjusted to regulate the feed of the machine by raising or lowering the cover by properly turning the nuts *i*. The drum J is secured on the base surrounding the cover I, and is made sufficiently larger than said cover to form the mercury-space K.

The valve L, which I call the "check-valve," is formed, by preference, of a ring of rubber adapted to encircle the pedestal D, and is provided with an annular flange, *l*, which bears against the cover I. This valve, it will be seen, permits the pulp, &c., to be forced by the wheel past it into the mercury, and yet prevents said mercury from coming in direct contact with the wheel. By so preventing contact of the wheel and mercury I avoid the flouring of the latter, as will be readily understood by those skilled in the art.

Within the drum I secure a perforated plate, M, which serves to divide the mercury-space, and is arranged above the point at which the pulp, &c., is fed into the mercury. By this plate, it will be seen, I break up the rotary motion given to the mercury by the pulp, &c., as it enters the mercury, so that the upper portion of the mercury—that is, the mercury above said plate—is free from all rotary currents, and will consequently act with better effect on the minerals contained in the sand, pulp, &c., than if disturbed by the rotary motion it would have if it were not for the dividing-plate.

In the upper end of the mercury-space I arrange the concentrator N. This concentrator comprises two concentric rings, 4 and 5, fitting, respectively, the exterior of the cover I and the interior of the drum J, and plates or sections O, preferably of copper, secured between said rings and charged with mercury. As the pulp and sand pass over the sections of this concentrator the globules of mercury or amalgam are held on the sections or discharged into the body of quicksilver in the drum. By preference the sections O are placed at angles of forty-five degrees. In order to secure a better effect on the pulp and sand it is preferred



to give the concentrator an oscillatory motion. In the construction shown this is attained by connecting said concentrator with one end of lever-arms P, which are pivoted between their ends at 6, and have at their lower ends yokes p, fitting on the eccentrics 1. Thus it will be seen as the shaft C revolves the concentrator will be given an oscillatory rotary motion, as desired.

While for convenience of reference the part N may be termed a "concentrator," it is perhaps, more strictly speaking, an "agitator," for it operates to prevent sand and pulp from accumulating and packing and clogging at the top of the mercury in the mercury-space. This is done by its agitating motion, and at the same time it takes up or accumulates any globules of mercury and precious metals contained therein that may be in the sand or pulp which rises to the top of the mercury and prevents such globules from being carried off with sand and pulp. This is effected by means of the construction of the sections of the concentrator and the shaking movement given such part, as before described. It will be understood that when the mercury and precious metals have accumulated on the sections to a sufficient degree of size or weight they will pass by their own gravity back into the mercury in the drums.

In practice the sand, pulp, &c., is fed into the hopper i, mounted on the cover I, and passes thence to the wheel, by which it is forced into the lower portion of the mercury and near the bottom of same. The sand and pulp, being lighter, will rise to the surface, and in passing up will be freed of all the precious metals, which, being heavier than the mercury, settle to the bottom of the drum. Silver, though lighter, readily amalgamates with the mercury, and will remain in drum.

The drum may be filled with mercury to any desired height; but ordinarily, say, from fourteen to eighteen inches will prove sufficient.

Heretofore amalgamators have comprised pans and feeders revolving therein, and the ore has been supplied centrally to the feeder and forced thence out in the pan, wherein it passes upward in the operation of such machines. My improvement differs in these among other respects, in that it provides a check-valve for preventing the immediate contact of the feeder and the mercury and the consequent flowing of the latter from the motion of the former, provides a perforated partition-plate for breaking up the rotary circulation given to the lower portion of the mercury by the action of the pulp forced thereinto, and leaving the upper portion of such mercury undisturbed, and I also provide a concentrator at the upper end of the pan and means for oscillating such concentrator.

Having thus described my invention, what I claim is—

1. In an amalgamator, the combination of the base, the drum mounted thereon, the feed-wheel, the cover fitted over said wheel, the annular ring-valve having a flange bearing against the cover, the concentrator located at the upper end of the mercury-space, and means for operating said concentrator and feed-wheel, substantially as set forth.

2. The combination, in an amalgamator, of the feed-wheel, means for operating the said wheel, the cover, the drum forming the mercury-space, and an annular ring check-valve, substantially as set forth.

3. The combination of the drum, a feeder, an agitator or concentrator consisting of a series of fixed inclined amalgamating-plates connected together, and means for oscillating said concentrator, substantially as set forth.

4. The combination of the base, the drum, the screw feed-wheel, the cover fitted over said feed-wheel, the bolts I', extended through said cover, and nuts i i, whereby such cover may be adjusted, substantially as set forth.

5. The combination of the drum, the revolving feeder, the cover fitted over said feeder and forming an annular mercury-space within the drum, the annular agitator or concentrator arranged at the upper end of said mercury-space and provided with amalgamating-plates, and operating means, substantially as set forth.

6. The combination of the feed-wheel, means for operating said wheel, the cover, the drum forming the mercury-space, the annular ring-valve, and the annular agitator or concentrator located at the upper end of the mercury-space and provided with fixed inclined amalgamating-plates, substantially as set forth.

7. The combination, with the screw feed-wheel, means for operating the same, and the pedestal, of the cover extended down below the lower edge of the screw feed-wheel, the drum, and an annular ring-valve secured to the pedestal and having an annular flange bearing against the cover, substantially as set forth.

8. The combination of the screw feed-wheel, means for operating the same, the drum, the cover, the pedestal, and the annular ring-valve surrounding the pedestal and having an annular flange bearing against the cover, substantially as set forth.

9. The improved amalgamator herein described, comprising the base, the drum, the pedestal, the screw feed-wheel, the cover, the annular ring-valve supported on the pedestal and having the flange bearing against the cover, the perforated dividing-plate, the concentrator, and means for oscillating the latter, substantially as set forth.

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Witnesses:

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