

(No Model.)

M. T. VAN DERVEER.
AMALGAMATOR.

2 Sheets—Sheet 1.

No. 405,447.

Patented June 18, 1889.

FIG. 1.

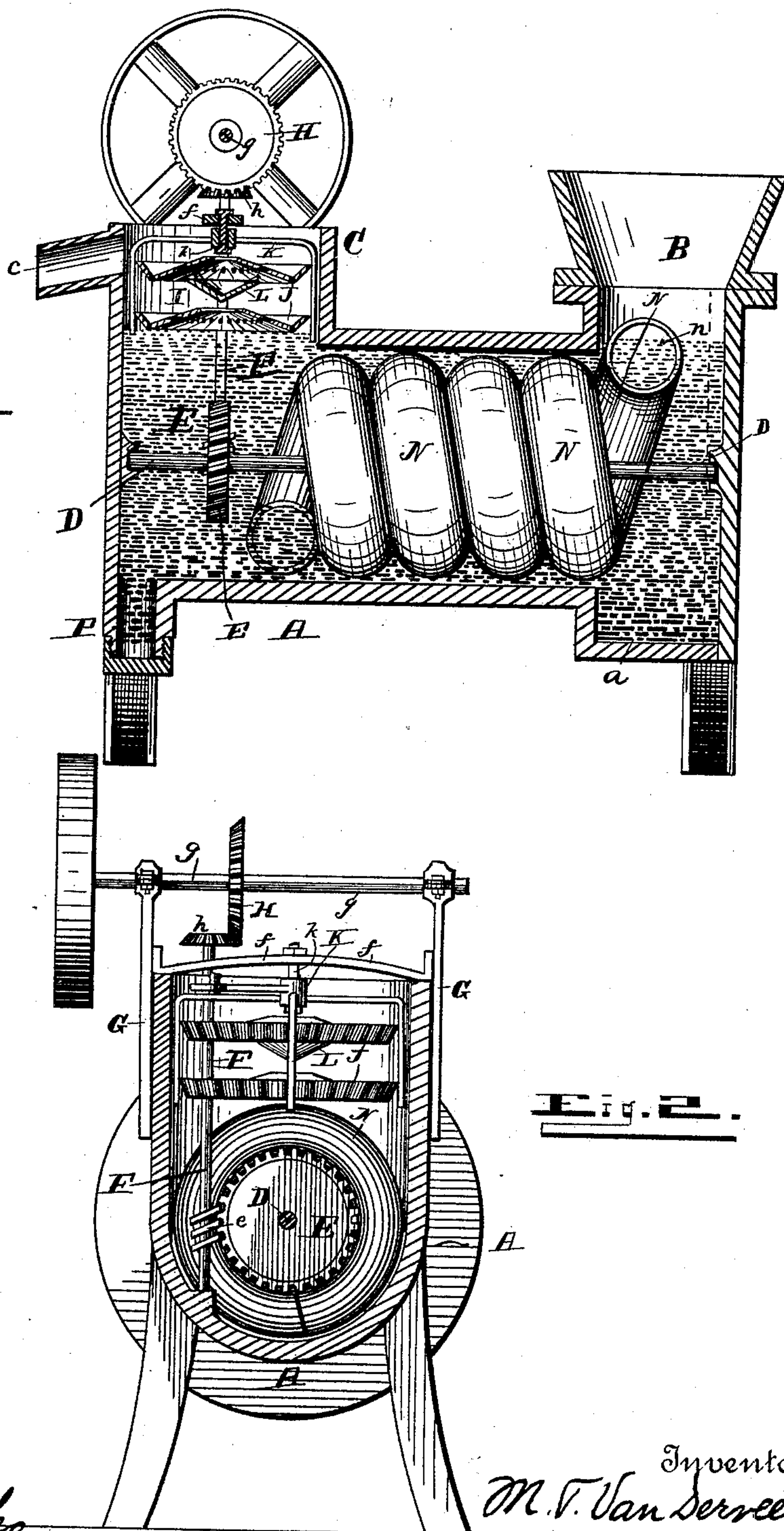


FIG. 2.

Witnesses

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A. E. Dowell

Inventor

M. T. Van Derveer

By His Attorney

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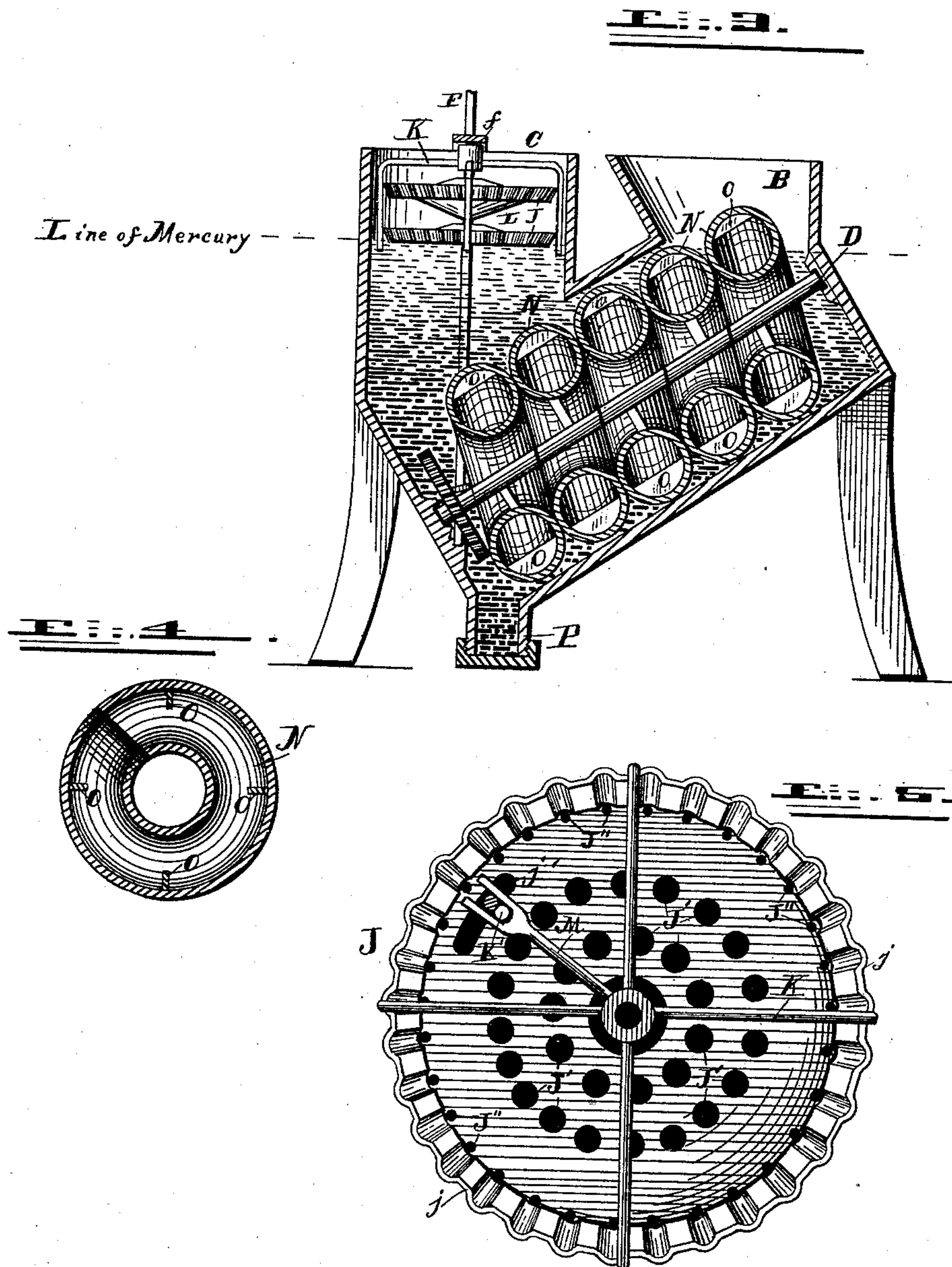
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UNITED STATES PATENT OFFICE.

MILTON T. VAN DERVEER, OF AMSTERDAM, NEW YORK.

AMALGAMATOR.

SPECIFICATION forming part of Letters Patent No. 405,447, dated June 18, 1889.

Application filed April 1, 1889. Serial No. 305,578. (No model.)

To all whom it may concern:

Be it known that I, MILTON T. VAN DERVEER, of Amsterdam, in the county of Montgomery and State of New York, have invented
5 certain new and useful Improvements in Amalgamators; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of
10 reference marked thereon, which form part of this specification, in which—

Figure 1 is a side elevation, partly in section, of my improved amalgamating-machine. Fig. 2 is an end view of the same, partly in
15 section, showing the conveyer and agitator operating devices. Fig. 3 is a sectional elevation of a desirable modification of the machine. Fig. 4 is a detail sectional view through the Archimedean screw conveyer on line *x x*,
20 Fig. 1. Fig. 5 is a detail view, enlarged, of part of the agitator.

My invention is an improvement in machines for amalgamating ores of the class in which mercury is employed as the amalga-
25 mating agent; and it consists, essentially, in a tubular screw conveyer submerged in mercury and through which the ore is conveyed, and in which it is repeatedly depressed more deeply into the mercury, whereby a thorough
30 mixing of the ore pulp and the mercury is effected.

Further objects of the invention are to provide improved devices whereby the pulp, after being passed through the mercury, is separated therefrom and delivered from the machine; and to these ends the invention consists in the novel construction and arrangement of parts, hereinafter clearly described and claimed.

Referring by letters to the drawings, A designates the casing of the machine, having a tubular body and at one end an upstanding hopper B and at the other end an upstanding discharge-chamber C, having a delivery-spout
45 *c* near its top.

D designates a shaft journaled in the ends of the casing and lying in the axial line of the body thereof.

E designates a worm gear-wheel on the end
50 of shaft D below chamber C, which meshes

with a worm *e* on a shaft F, rising in chamber C and journaled in the bottom of the casing, and a cross-bar *f*, secured to the sides of chamber C.

G G are two uprights secured to the side
55 walls of chamber C, on the upper ends of which are suitable journal-bearings, in which is mounted a horizontal shaft *g*, carrying a driving-pulley on one end, and a bevel-gear H, which meshes with a small bevel-gear *h* on
60 the upper end of shaft F. By this means motion is imparted from shaft *g* to shaft F.

I designates the agitating device, which is suspended in chamber C, and is composed of a series of conical disks J J, attached to the
65 arms of a spider K, that has a central hub, through which passes a stud *k*, by which the agitator is loosely suspended from bar *f*. The agitator can be oscillated freely on the stud, the disks being cut away, as at *j'* and *l'*, to ac-
70 commodate shaft F. The disks J have upstanding corrugated edges *j*, and are perforated, as shown at *J'*, to permit the rise of pulp and mercury therethrough, and between each pair of disks J may be arranged an in-
75 verted disk L, as shown, so that the material or pulp rising by and through the agitator is alternately directed toward the periphery and center of the chamber C. The disks J are also perforated at their peripheries, as at *J''*,
80 to permit the mercury to escape back into the chamber.

M designates an arm connected to one arm of spider K and to a crank K' of shaft F, by which an oscillatory or rotatory motion is im-
85 parted to the agitator from the revolving-shaft.

N designates a tubular screw conveyer, which may be circular, oval, or angular in cross-section, being shown circular, and is
90 mounted on shaft D by proper supporting-arms, or in other convenient manner, and extends from gear E to the opposite end of the casing, having an open delivery end below chamber C and a receiving end or mouth *n* below
95 the hopper B. When the screw rotates in a horizontal plane, as in Fig. 1, the mouth *n* is elongated, so as to rise above the level of the mercury in hopper B, and thus gather a quantity of the ore-pulp which floats on top of the
100

mercury in the hopper, and where the mouth is elongated an enlargement *a* of the casing below the hopper must be made to accommodate the mouth as it is revolved. Where the casing is inclined, as in Fig. 3, the screw being inclined also, its mouth *n* will naturally rise above the level of the fluid at intervals, and hence will not require any elongation, and the enlargement *a* of the casing is dispensed with.

Within the coils of the screw *N* are secured a series of blades *O*, which lie transversely of the tubular bore of the screw and are secured to the outer wall thereof and occupy about one-third of the area of the bore. About four blades to each turn of the screw I deem desirable, but more or less may be employed.

P is a draw-off tube at the delivery end of the casing, closed by a suitable cap or valve.

The casing, screw, and main working parts are preferably made of or coated with copper, which will readily take a coating of mercury, and thus prevent adhesion of the ores or pulp thereto and consequent clogging of the machine.

I preferably employ mercury as the amalgamating agent and fill the casing therewith until the tubular part thereof is filled and the screw submerged, except the mouth *n* thereof, which rises at intervals above the mercury-level. The pulp fed into the hopper is entirely separated from chamber *C* by a body of mercury through which it is obliged to pass to reach said chamber. The machine being started, screw *N* is revolved in the direction indicated by the arrows, so that the fluid or material therein will be directed toward its discharge end. At each turn thereof mouth *n* takes in a quantity of the pulp floating on the mercury within the hopper and carries it downward, and the blades *O* come into play and catch the pulp and force it down to the bottom, as is evident. Since the pulp is lighter than the mercury it rises to the top of the screw as it escapes from the blades when the latter begin to ascend during the revolution of the screw, and were it not for the blades the pulp would pass along the top portion of the conveyer to the exit end. This the blades prevent, as they catch and force the pulp down to the bottom and insure its thorough dissemination and commingling with the mercury and consequent assimilation of the ores therewith and formation of amalgams. While the mercury in the screw is forced or directed toward the discharge end thereof, the level of the mercury in the casing is maintained by the backflow thereof through the bore of the screw, and, as shown, the spaces between the convolutions of the screw form a spiral channel *o*, by which the mercury is directed upward toward the hopper as the screw revolves. The inclination of the screw assists the mercury in naturally maintaining its level. After the worked pulp escapes from the screw it rises in chamber *C* above the level of mercury therein,

and is caught by the disks of agitator *I*, and as it passes through the disks it is thoroughly shaken and loose particles of mercury rising therewith are shaken off and fall back into the chamber through the perforations in the disks.

Having thus described my invention, what I claim as new is—

1. In an amalgamating-machine, the combination of the casing filled with mercury and having a feed-hopper and delivery-chamber, with a revoluble tubular screw conveyer submerged in the mercury and having a mouth to receive the pulp from the hopper and a delivery end below the chamber, and the mechanism for operating said screw, substantially as specified.

2. The combination of the casing having an upstanding feed-hopper and delivery-chamber at its opposite ends, and a tubular body, with a tubular screw conveyer mounted in the tubular body, having a series of internal blades secured to the outer wall thereof, and the mechanism for operating said conveyer, substantially as described.

3. The combination of the casing having a feed-hopper and delivery-chamber at opposite ends, and the revoluble tubular screw conveyer therein adapted to receive and carry the pulp from the hopper to the delivery-chamber through the body of amalgamating fluid, with the agitator in the delivery-chamber composed of conical perforated disks, constructed and arranged substantially as set forth.

4. The combination of the casing having a feed-hopper and delivery-chamber, with the agitator mounted in said chamber and composed of the spider and conical disks perforated near their center and having corrugated edges, all substantially as specified.

5. The combination of the casing having a tubular body and a feed-hopper and delivery-chamber at opposite ends thereof, with the shaft *D*, the tubular screw conveyer mounted thereon, having an internal series of transverse blades and a receiving-mouth *n*, adapted to rise above the level of mercury in the feed-hopper, the agitator in said chamber, and the mechanism, substantially as described, for imparting motion to the screw and agitator, substantially as set forth.

6. The combination of the casing having an inclined tubular body and a feed-hopper and delivery-chamber at opposite ends thereof, with an inclined Archimedean screw conveyer for the pulp mounted on an inclined shaft in the tubular body of the casing, and mechanism for operating the same, substantially as set forth.

7. The combination of casing *A*, having an inclined tubular body with the inclined tubular screw conveyer *N*, submerged in mercury, and the blades *O* in said conveyer, and the shaft and gearing for operating said conveyer, all substantially as specified.

8. The combination of the casing construct-
ed substantially as described and the tubular
screw conveyer therein mounted on a central
shaft and having a series of internal blades
5 O and mouth *n*, and the shaft and gearing
for operating said conveyer, with the oscillat-
ing agitator I, composed of spider K and per-
forated disks J J L, all substantially as and
for the purpose described.

In testimony that I claim the foregoing as 10
my own I affix my signature in presence of two
witnesses.

MILTON T. VAN DERVEER.

Witnesses:

RAYMOND CHRISTMAN,
A. E. DOWELL.