

(No Model.)

A. C. RUMBLE.
AMALGAMATOR.

No. 559,986.

Patented May 12, 1896.

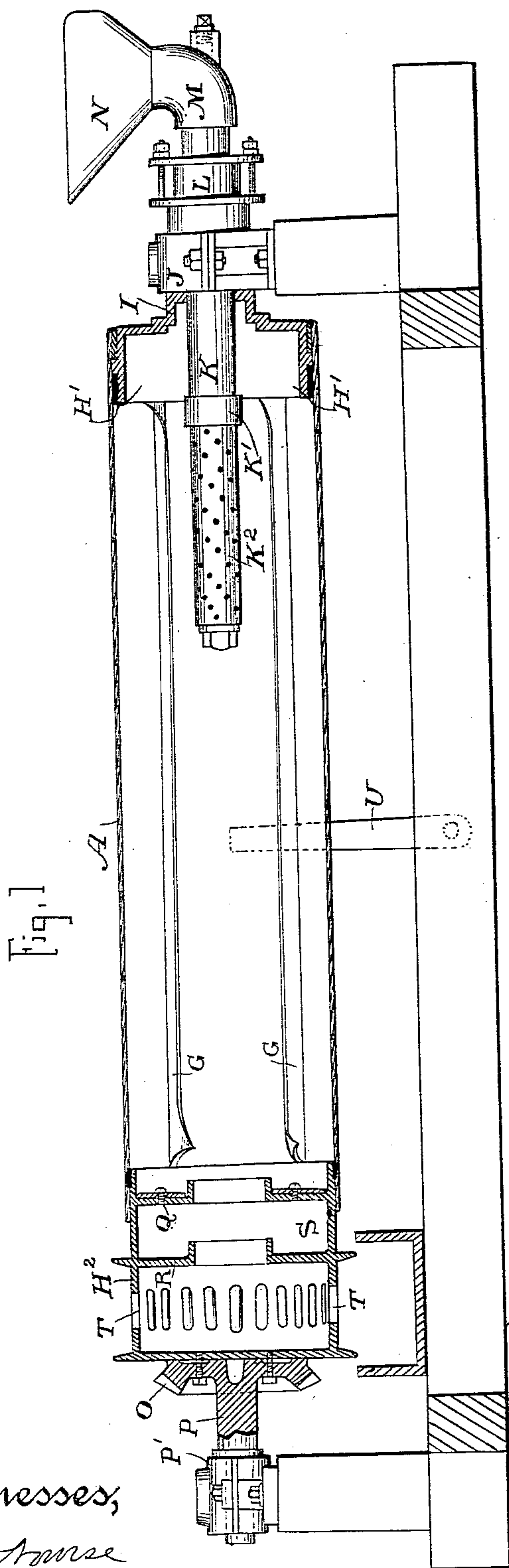


Fig. 1

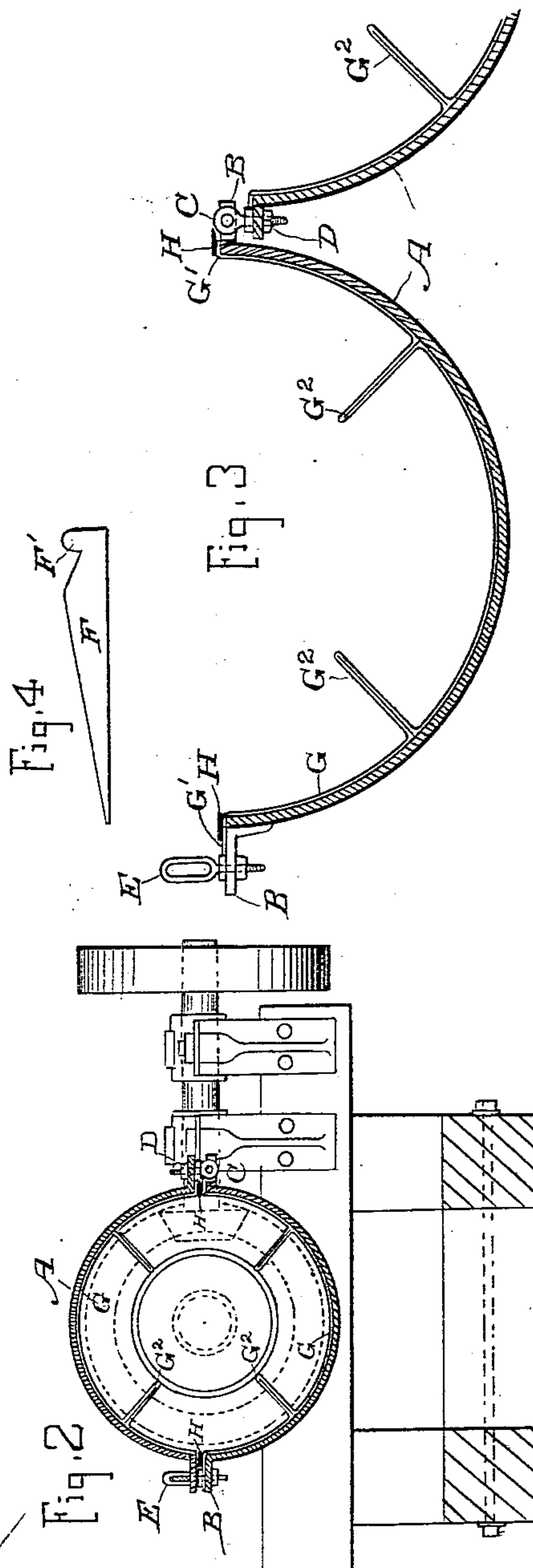


Fig. 2

Fig. 3

Fig. 4

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AMALGAMATOR.

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To all whom it may concern:

Be it known that I, ALEXANDER C. RUMBLE, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Amalgamators; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to an improved apparatus for the amalgamation and saving of valuable and precious metals.

It consists in certain details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a longitudinal vertical section of my apparatus. Fig. 2 is a transverse section taken through line *xx* of Fig. 1. Fig. 3 is an enlarged cross-section of the cylinder. Fig. 4 is a view of the key.

A is a cylinder of any suitable or desired length and diameter. A proportionate length of from six to seven feet for a diameter of fourteen inches is very suitable for the purpose. This cylinder is preferably made of iron tubing and is cut in halves longitudinally, so that it may be easily opened and closed, and is provided with flanges B upon each side of the meeting edges. The flanges upon one side of the cylinder serve to form a joint about which one half is turned to open and close the cylinder, and the flanges upon the opposite side serve for the locking devices by which the two parts are firmly held together.

The hinges consist of eyebolts C, pivoted in slots in one of the flanges B, so as to turn about their pivot-pins. These bolts are screw-threaded and extend through holes in the flange of the opposing segment, and by means of nuts D they are adjusted so as to bring the flanges into proper relative position when the parts are closed together and to lock the bolts firmly to the flange through which they pass. Through the flange on the opposite side of the cylinder passes another bolt, suitably locked thereto, and having an extension or plate with an elongated slot, as shown at E. This slotted portion projects up through the opposing flange of what would be the upper portion of the cylinder when it is in position to be opened or closed, and these two parts

are secured together by means of keys F, which are driven into the slots E, so as to lock firmly against the flange B of the cylinder. These keys are tapering or wedge-shaped, as shown, and they have reversed inclines terminating in vertical shoulders at the heads of the keys, as shown at F', so that when the keys are to be released they are easily driven out by striking against this shoulder, thus preserving the points from injury.

The interior of the semicylinders are lined with heavy copper silver-plated linings G, which are shaped to fit the cylinders, to which they are firmly bolted or otherwise secured. These linings have flanges G' extending outwardly between the meeting edges of the exterior semicylinders, and rubber gaskets H are fixed to the flanges B of the lowermost segments, so that when the two halves are closed together these gaskets form a hermetically-tight joint.

By constructing the hinges with the swinging bolts previously described the upper half is readily opened after the keys F have been disengaged from the locking-plates upon the opposite side by raising the upper half and turning it about these hinges. As the centers about which the hinges are turned are at some distance from the meeting faces of the cylinder-sections and the gaskets, the movement of the hinged edge of the upper half takes place in a small arc of a circle, which thus insures the two parts separating directly without any rubbing movement when opened and closing in the same manner when the parts are closed.

By reason of the locking-nuts on the bolts the hinges can always be adjusted to compensate for any wear or change in thickness of the gaskets, so that a tight joint can always be preserved at this point. The interior copper lining-segments are folded upon themselves, so as to form inwardly-projecting ribs G², which stand radially toward the center of the cylindrical structure when the parts are closed together, and by this method of forming the ribs the lining and ribs are made in a single continuous structure without any joints to leak or to catch and retain mercury or amalgam. These ribs are made essentially straight and of an equal depth from end to end and may be as many in number as desired.

The interior of this plate and the ribs are silver-plated or amalgamated, so as to form a surface for the retention of any gold, silver, mercury, or amalgam which may be delivered
5 into the apparatus. This cylinder is provided with heads H' and H^2 . The tube A extends over the inner ends of each of these heads, and is suitably secured thereto with intervening gaskets to make a tight joint.

10 The head H' has a hollow trunnion I, extending through a journal-box or bearing J, in which it turns. Through this trunnion passes a tube K, which extends into the head H' to about the line of its inner end. At this
15 point is a screw-collar K' , which serves to receive and hold the end of a distributing-tube K^2 , which is screwed into the collar and projects centrally and axially into the interior of the cylinder to any desired extent,
20 from one-eighth to one-half of the entire length of the cylinder. The inner end of this tube K^2 is closed, and its periphery is perforated with a series of spirally-arranged openings. The tube K passes out through the
25 trunnions and through a stuffing-box (shown at L) to prevent leakage at this point, and its outer end has an elbow M connected with it. To the upturned end of this elbow is connected a hopper N, which serves to receive
30 the pulp to be fed into the apparatus. This pulp, with a sufficient quantity of water for the purpose, is delivered into the hopper and through the pipe K passes into the extension K^2 , and is delivered through the perforations
35 therein in a fine spray, falling within the interior of the amalgamated cylinder, and being delivered by this extension to a considerable distance from the receiving end of the cylinder for the purpose of more generally
40 distributing it before it comes in contact with the amalgamated surfaces.

The head H^2 is closed at the outer end and carries a bevel-gear O, through which power is applied to rotate the cylinder. The shaft
45 P, extending outwardly from the center of this head, is supported in a suitable journal-box P' . The whole cylinder is thus supported from its opposite ends, and the relative position of the supports is such that the cylinder has a slight declination from the receiving to the discharge end, this being just
50 enough to cause a slow but perceptible flow from one end to the other. The head H^2 has within it two diaphragms Q and R. Both diaphragms have inwardly-projecting tubular
55 central portions, as shown, and are sufficiently separated from each other to form a trap or chamber S.

The inner face of the diaphragm Q may be
60 protected by an annular amalgamated copper plate bolted thereto. The pulp overflows when it rises in the cylinder to the height of the tubular opening, and, passing into the trap S, rises therein until it overflows through
65 the tubular opening in the diaphragm R.

Any fine particles of valuable metal which

may have been carried from the cylinder with the pulp will be deposited in the trap S, and the waste pulp, flowing into the exterior chamber in the head H^2 , will be delivered
70 through discharge-passages T, which are formed in this portion of the head, and will flow out into any suitable or desired receptacle below.

The ribs G^2 , formed on the copper lining of
75 the cylinder, previously described, have the ends next to the receiving-head bent or turned into a sort of incline or spiral, so that material falling near this end will be started toward the discharge end of the cylinder as
80 the latter rotates, and the opposite ends of the plates are, in like manner, bent in the opposite direction, so as to assist in expelling the pulp at that end.

The operation of the apparatus will then
85 be as follows: Pulp being delivered into the hopper N flows through the pipe K and is delivered through the distributor K^2 , falling upon the interior amalgamated surface or lining of the cylinder, and as the latter ro-
90 tates it constantly lifts and stirs the pulp which maintains a level within the cylinder up to the bottom of the discharge-opening at the opposite end. The slight inclination of the cylinder is such that as the pulp or ma-
95 terial is lifted by these flanges it always falls a little in advance of the point where it was lifted and is gradually carried from one end to the cylinder by an exceedingly slow move-
100 ment, while the constant lifting and falling bring it into intimate contact with the amalgamated surfaces a repeated and great number of times. A slight rubbing action takes place among the particles during all of these
105 movements, which serves to scour the gold if it is in any way coated or rusty and to generally brighten all the particles of metal, so that they will become amalgamated before they have time to reach the discharge end of the cylinder. The apparatus is continued in
110 operation until a sufficient quantity of amalgam has been deposited upon the plates, when it is brought to a state of rest with one of the halves of the cylinder lowermost and the other uppermost. The apparatus is then
115 held in this position by means of swinging arms or supports U, suitably fulcrumed upon the side timbers of the frame and adapted to be turned up, so as to stand below the flanges B of the lowermost half and prevent it from
120 turning. The keys F being then loosened and removed the upper half is turned about its hinges and the interior of the two halves is exposed, so that it may be perfectly cleaned and prepared for further operation. The
125 silvered lining of the cylinder and the ribs G^2 terminate a short distance from the discharge end of the apparatus, thus leaving a space not occupied by the lining and the ribs. Any surplus mercury leaving the plates and
130 any heavy or coarse particles of material will pass into this unoccupied portion of the cylin-

der and will not be subjected to the lifting action of the ribs, but will remain in the bottom of the cylinder as it revolves and may be removed when the cylinder is opened to clean up.

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

1. An amalgamator consisting of the inclined approximately horizontal cylinder formed in two segments, having an interior, silver-plated lining, said lining being folded at intervals to form radial ribs, and flanges projecting between the two parts of the cylinder in single continuous segments without joints.

2. An amalgamator, consisting of a cylinder formed of two segments, flanges along the edges of each segment, hinges by which the adjacent flanges upon one side are connected together, said hinges consisting of screw-threaded eyebolts pivoted to one of the flanges, extending through holes in the opposite flange having nuts by which the flange is adjusted with relation to its opposing one and clamped to the bolts, a means for locking the flanges upon the opposite side when the two parts of the cylinder have been closed, and an interior lining consisting of segmental amalgamated plates extending from end to end and having radially-projecting ribs formed by folding said plates, flanges projecting between the meeting edges of the two segments, and elastic gaskets whereby tight joints are formed along said edges.

3. An amalgamator consisting of a cylinder divided longitudinally to form segments having flanges upon the opposite and meeting edges, an interior lining composed of segmental amalgamated plates extending from end to end, having radially-projecting ribs formed by folding said plates, and having flanges extending outwardly between the meeting edges of the sections, screw-bolts having one end pivoted in the flange of one of the segments, and the opposite end adjustably secured to the adjacent flange of the opposing segment upon one edge, locking-clamps consisting of slotted bolts secured in one flange upon the opposite side of the cylinder, and passing through openings in the corresponding adjacent flange of the other segment when the parts of the cylinder have been closed, wedges adapted to be driven into said slots to draw the flanges together, said wedges

having depressions and heads F' formed upon them whereby they may be removed.

4. An amalgamator consisting of a cylinder formed of two segments longitudinally separable, with hinges and locking devices, interior segmental linings consisting of amalgamated plates folded longitudinally at intervals to form inwardly-projecting radial jointless ribs, and gaskets whereby the longitudinal joints are hermetically sealed when the segments are closed together, cylindrical heads upon which the ends of the cylindrical segments close with interposed gaskets, journal-boxes at opposite ends, a shaft turning in one of the journal-boxes whereby one end of the cylinder is supported, a hollow trunnion turning in the other journal-box having a tube extending therethrough connecting at the outer end with a feed-hopper and having the inner end extended into the cylinder and perforated to form a distributor.

5. An amalgamator consisting of a cylinder formed of segments longitudinally separable with flanges, hinges and locking devices whereby the two parts may be closed together, an interior lining consisting of segments fitting the two parts of the cylinder and folded to form inwardly-projecting radial jointless ribs, said ribs having their opposite ends bent spirally, cylindrical heads with gaskets about which the segments of the cylinder are fitted and secured, one of said heads having a feed-tube and distributor extending through it axially into the interior of the cylinder, the opposite head formed with transverse diaphragms with an intermediate trap and central discharge-openings through which the pulp flows and final discharge-openings formed around the outer chamber.

6. An amalgamator consisting of a cylinder formed of separable segments with an interior lining of silvered segmental plates folded to form inwardly-projecting jointless ribs, said plates and ribs terminating a short distance from the discharge end to leave a space for the collection of free mercury and heavy particles unacted upon by the ribs.

In witness whereof I have hereunto set my hand.

ALEXANDER C. RUMBLE.

Witnesses:

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H. F. ASCHECK.