

No. 636,666.

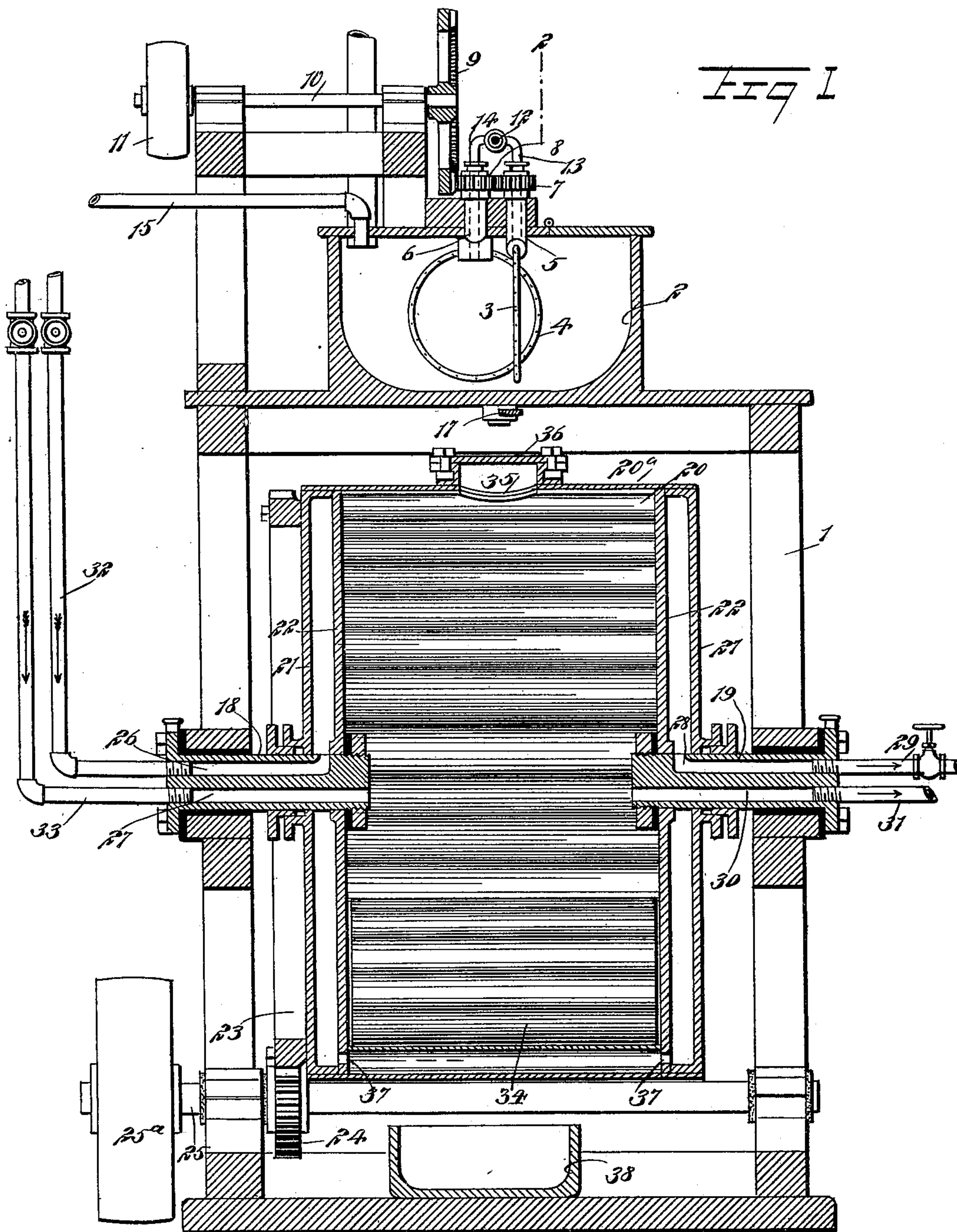
Patented Nov. 7, 1899.

J. M. HOLMES.
AMALGAMATOR.

(Application filed Oct. 27, 1898.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:

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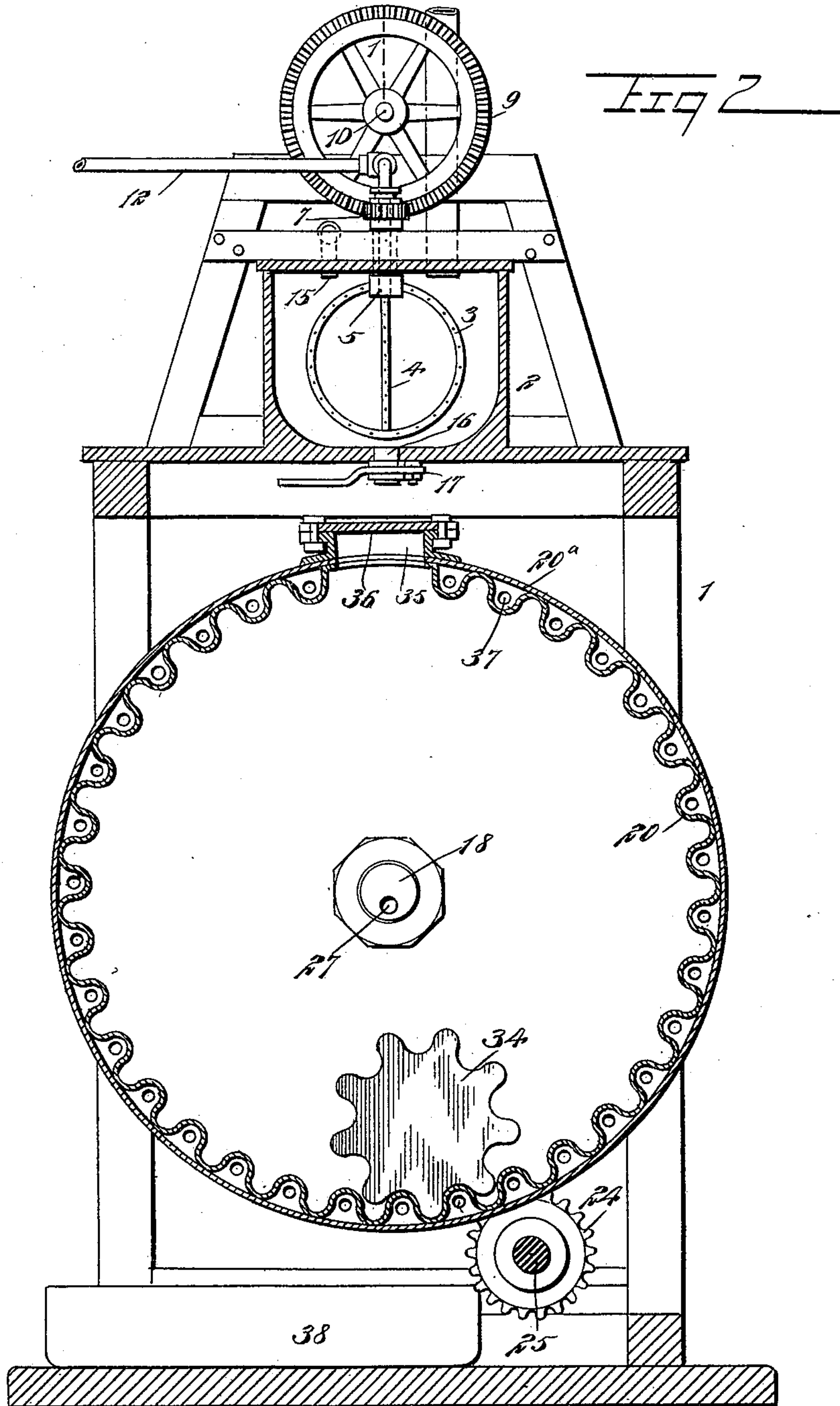
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UNITED STATES PATENT OFFICE.

JOHN M. HOLMES, OF GLENS FALLS, NEW YORK.

AMALGAMATOR.

SPECIFICATION forming part of Letters Patent No. 636,666, dated November 7, 1899.

Application filed October 27, 1898. Serial No. 694,704. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. HOLMES, of Glens Falls, in the county of Warren and State of New York, have invented a new and
5 Improved Amalgamator, of which the following is a full, clear, and exact description.

This invention relates to improvements in apparatus for separating precious metals from their ores or sand; and the objects are to
10 provide a simple and effective device for receiving and mixing the metal-bearing sand or crushed ore with the chemicals that are to be used to assist in liberating the precious metals from sand or ores containing tellurium and
15 base metals and, further, to provide an amalgamator of novel construction in which the precious metals may be quickly separated.

I will describe an amalgamator embodying my invention and then point out the novel
20 features in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in both views.

25 Figure 1 is a sectional elevation on the line 1 1 of Fig. 2 of an amalgamator embodying my invention, and Fig. 2 is a sectional elevation on the line 2 2 of Fig. 1.

The amalgamator comprises a frame 1, on
30 the upper portion of which is arranged a mixing-box 2, in which are agitators, here shown in the form of tubular and perforated rings 3 4, the ring 3 being mounted on a shaft 5, having a bearing through the top of the box
35 2, and the ring 4 is mounted on a shaft 6, also having a bearing through the top of the box 2. These shafts 5 and 6 are connected together so as to rotate in unison by pinions 7 8, and one of these pinions (here shown as
40 the pinion 8) meshes with a gear-wheel 9, mounted on a shaft 10, on which is also secured a band-wheel 11. The shafts 5 and 6 are made tubular, so as to form conduits for the entrance of steam, the steam being supplied from a pipe 12 through branch pipes
45 13 14, leading into stuffing-boxes on the outer ends of the shafts 5 and 6. The steam passes from the shafts 5 and 6 into the agitators 3 and 4 and escapes through the perforations
50 in said rings for the purpose of assisting in softening and blending the material and

keeping it warm and lively. A pipe 15 leads into the box 2 and is designed for supplying an alkaline solution or similar chemical to the material in the box, as will be hereinafter described, and the bottom of the box is
55 provided with an opening 16, controlled by a valve 17.

Fixed in opposite cross-bars of the frame 1 are trunnions 18 and 19, and on these trunnions the amalgamator is mounted to rotate. The amalgamator comprises inner and outer connected shells. The inner shell 20 is fluted or provided with transverse corrugations, as plainly indicated in the drawings. The shell
60 has double heads 21 22 at each end, the space between these heads forming a steam-space, as will hereinafter appear. The outer casing or drum 20^a forms the outer walls of peripheral steam-passages between the hollow heads.
70 Secured to one end of the amalgamator or to one head thereof is a gear 23, which meshes with a driving-gear 24 on a driving-shaft 25, to which rotary motion may be imparted by any desired means. As shown in Fig. 1, the
75 shaft 25 is provided with a band-wheel 25^a. The trunnion 18 has a longitudinal opening or port 26, which communicates with the space between the heads 21 and 22, that are mounted on said trunnion, and the trunnion also
80 has a longitudinal opening 27, which communicates with the interior of the shell. The trunnion 19 is provided with an exhaust port or opening 28, which affords communication between the space between the heads 21 and
85 22, mounted on this trunnion, and the discharge-pipe 29, and a longitudinal opening 30 in the trunnion 19 provides communication between the interior of the shell and a pipe 31. A steam-supply pipe 32 communicates
90 with the opening 26 in the trunnion 18, and an alkali-supply pipe 33 communicates with the opening 27.

Loosely arranged in the shell 20 is a mulling-cylinder 34, having its outer surface longitudinally corrugated, the corrugations being
95 of a size to fit nicely between the corrugations of the shell. The shell 20 has an opening 35, through which material is to be passed into the shell, and this opening is provided
100 with a cover 36. The heads 22 are provided with openings 37, so arranged as to discharge

steam across the shell at its outer side and between the outer flutings or corrugations beneath the outer drum or casing.

In operation the metal-containing sand or ore is first ground in a mill into a fine dust or powder, and then a quantity thereof is placed in the mixing-box 2, after which the desired amount of alkali or other chemical is to be run into the box. When the agitators are put in operation, they will thoroughly mix and blend the material into a pulp. After the material shall have been sufficiently mixed it is to be discharged from the box 2 into the amalgamator. This may be done of course by removing the cover 36 of the amalgamator and opening the valve 17, while the opening 35 is in line with the opening from the box. After placing the pulp in the amalgamator a sufficient quantity of quicksilver is to be placed therein. Then after tightly closing the amalgamator and putting it in motion steam is to be admitted, which will pass over the outer surface of the shell beneath the drum 20^a and thoroughly heat the contents and exhaust through the pipe 29, which is provided with a valve to regulate the temperature. As the apparatus rotates the mulling-cylinder 34 will be caused to roll in such manner as to thoroughly mix and agitate the pulp, bringing the quicksilver into contact with the particles of the precious metals contained in the pulp. If desired, a fresh supply of alkali may be furnished through the pipe 33.

It will be seen that the corrugated shell has a double function—that is, the corrugations form a peripheral series of longitudinal heating-tubes, and they also serve in place of gear-teeth, causing the rotation of the mulling-cylinder.

The heating of the shell and the action of the alkali will keep the quicksilver in a more lively condition, causing it to attack the gold or silver contained in the pulp more readily and resulting in a saving of quicksilver. In some other methods of amalgamating gold and silver there is a loss of the amalgam caused by the granulating and flouting of the amalgam and quicksilver, as the small globules

of quicksilver become coated with the baser metals and lose their activity and power of action and when in such condition are inactive and are lost in the tailings.

After the material shall have been sufficiently treated in the amalgamator it is to be drawn off into a trough 38, where the tailings are separated, after which the quicksilver is separated from the metal in the usual manner.

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

1. An amalgamator pulverizing-drum, comprising an inner and an outer sheet-metal shell, the inner one being corrugated to provide a series of ribs, a mulling-cylinder longitudinally corrugated, arranged within the corrugated shell and adapted to engage with the corrugations of the shell whereby the rotation of the shell will cause the cylinder to revolve, and means for directing steam through the peripheral passages formed by the corrugations of said inner shell, substantially as specified.

2. An amalgamator, comprising a pulverizing-drum, consisting of an inner and an outer sheet-metal shell, the inner shell being corrugated, double heads closing each end of the cylinder, the spaces in the heads being in communication through the peripheral passages formed by the corrugations of the inner shell, the space in one of the heads being adapted to receive a heating medium entering through a port in one of the trunnions of the drum, the space in the other head being adapted to discharge the heating medium through a port in the other trunnion of the drum, and a longitudinally-corrugated mulling-cylinder arranged within the inner shell and adapted to be rotated by the corrugations of said inner shell, substantially as specified.

JOHN M. HOLMES.

Witnesses:

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N. A. BOYLE.