

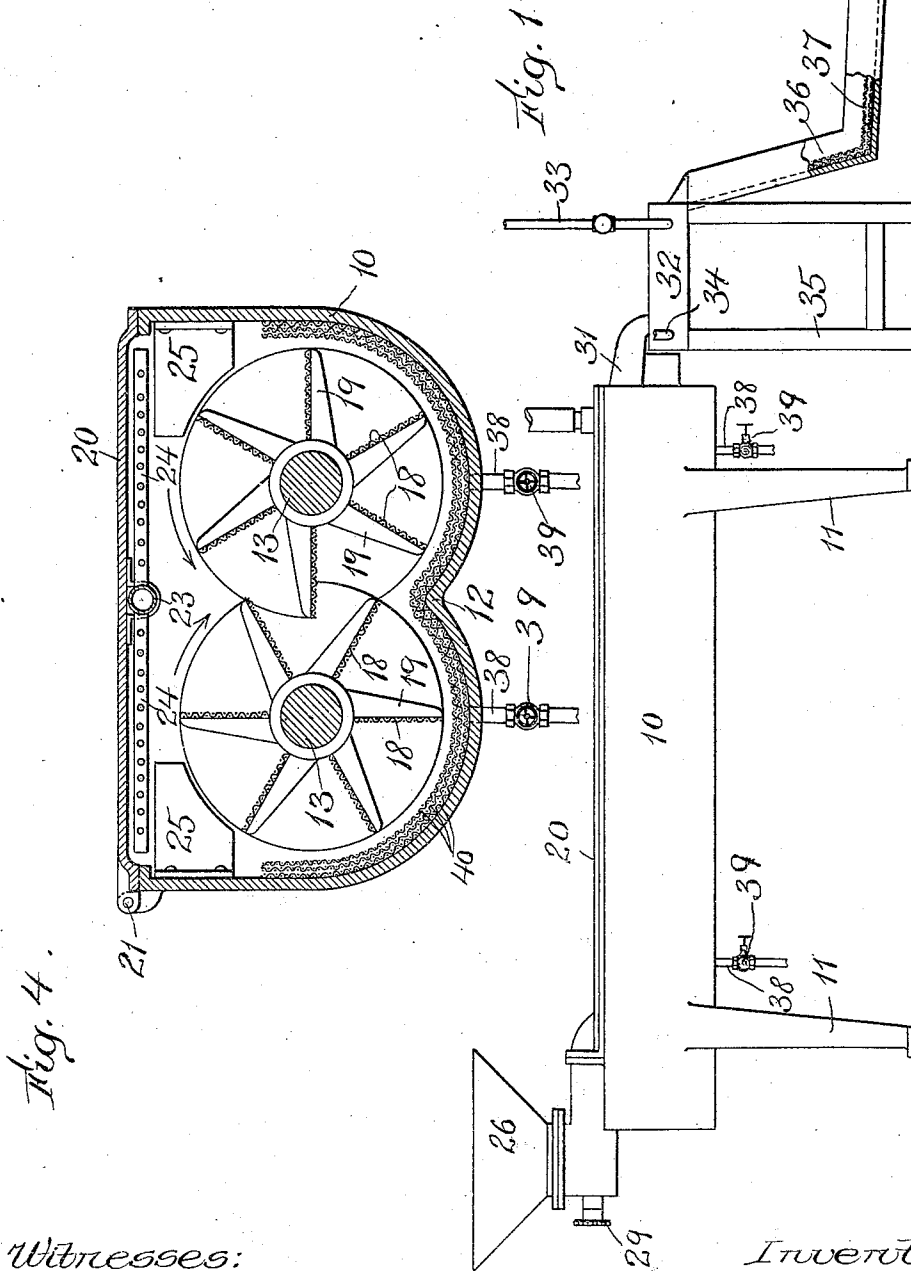
F. STIENEN.
AMALGAMATOR.

APPLICATION FILED SEPT. 16, 1909.

956,222.

Patented Apr. 26, 1910.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2

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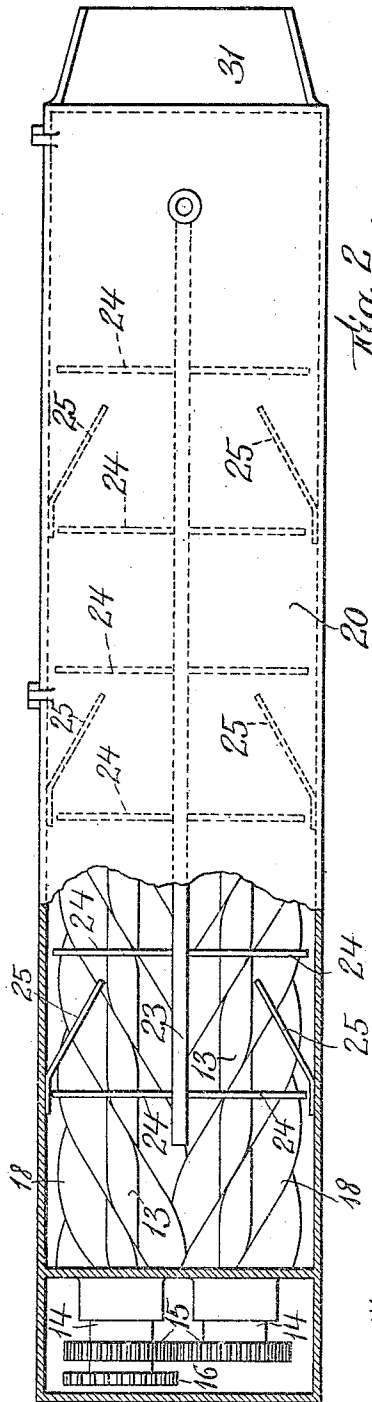


Fig. 2.

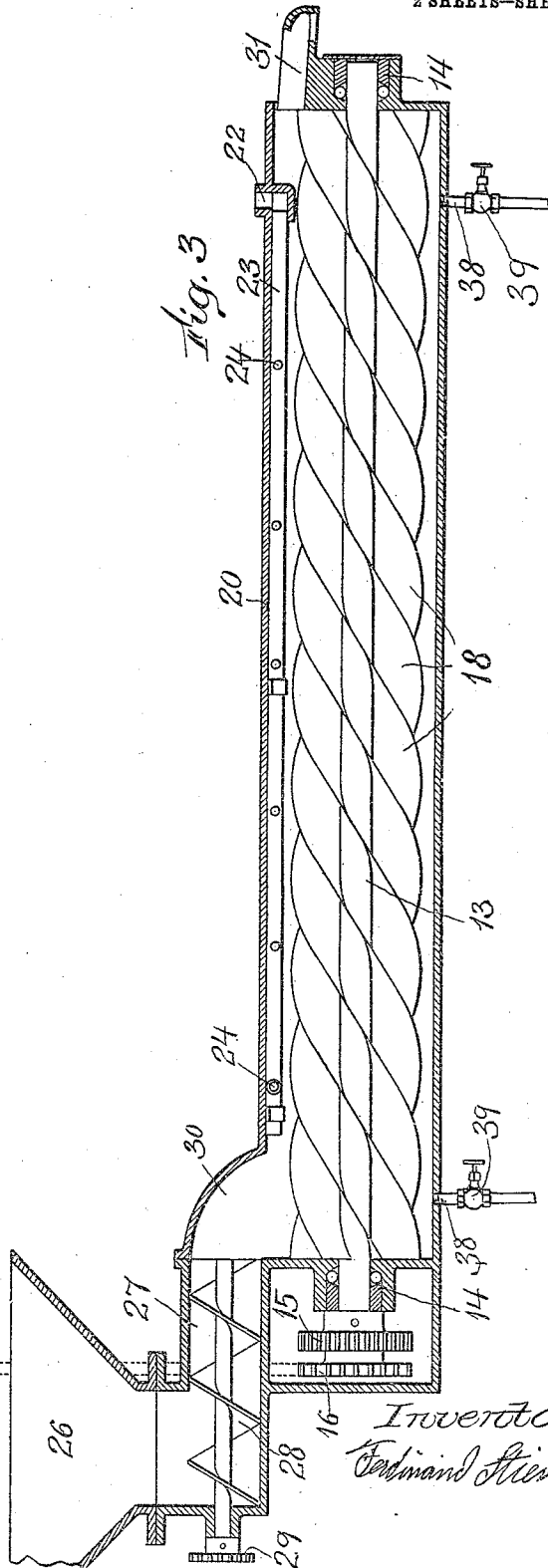


Fig. 3.

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UNITED STATES PATENT OFFICE.

FERDINAND STIENEN, OF LYNN, MASSACHUSETTS.

AMALGAMATOR.

956,222.

Specification of Letters Patent. Patented Apr. 26, 1910.

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To all whom it may concern:

Be it known that I, FERDINAND STIENEN, of Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Amalgamators, of which the following is a specification.

This invention relates to apparatus for the treatment of ore in the form of what is usually called ore-pulp, to separate the precious metals therefrom, the type of machine to which this invention belongs being usually known as amalgamating machines because of the employment of mercury to effect the separation of the precious metals from the tailings.

One of the objects of my invention is to provide an apparatus of this character having means whereby the ore-pulp is continuously turned over and worked into the body of mercury while being fed or worked along said body.

Another object of the invention is to provide a machine of this character having means for stirring up or agitating the upper strata of the mercury, and opposing agitation of the lower strata to permit the precious metals to settle gradually to the bottom.

Another object of the invention is to provide means for heating the tailings to loosen the mercury therefrom, a sluiceway or chute being employed for retaining the mercury which might otherwise be washed out.

To these ends my invention consists in the construction and combination of parts substantially as hereinafter described and claimed.

Of the accompanying drawings:—Figure 1 is a side elevation of a complete apparatus embodying my invention, a portion of the tailings chute being broken out. Fig. 2 is a detail plan view, partially broken away, of the main portion of the apparatus. Fig. 3 is a front elevation of the main portion of the apparatus, on a larger scale than in Fig. 1, but with the inclosing casing shown in section. Fig. 4 represents a transverse section of the trough and its cover and the agitating and conveying screws, on a larger scale than the other figures.

Similar reference characters indicate the same or similar parts in all of the views.

The trough 10, for containing the mercury, is supported upon suitable legs 11. Its bottom is preferably formed with an internal rib or ridge 12, so that on each side of said

ridge or rib the bottom is formed in the arc of a circle of which the axis of a shaft 13, forms the center. There are two of the shafts, each mounted in bearings 14, in the end walls of the casing or trough, said two shafts having gears 15 which mesh with each other so that the two shafts will rotate in opposite directions. To one of the shafts is also secured a sprocket 16, which may engage and be driven by a chain indicated at 17 by dotted lines.

Each shaft 13 is provided with spiral blades 18, which, as indicated conventionally in Figs. 2 and 3 may be of sheet metal. Preferably, however, said blades are formed of a suitable wire mesh or screen material as indicated in Fig. 4, the said blades being held in position by suitable arms 19, connected to and radiating from the shafts.

As shown in Figs. 2 and 4, the blades 18 of one shaft overlap those of the other. That is, the radial length of the blades is greater than one-half of the distance between the two shafts. Consequently it is impossible for any of the material to escape the depressing effect of said blades.

A cover 20 is hinged at 21 and is provided with a port 22, to which a water supply pipe may be connected. Mounted on the under side of the cover and leading from said port 22, is a pipe 23, having branches 24 provided with perforations as indicated in Fig. 4. Said perforations are preferably formed in the sides of the branches so that numerous fine jets of water will be projected in the direction in which the ore-pulp is being caused to move by the spiral-bladed shafts. To deflect such water toward the center of the trough, and to also guide the ore to the longitudinal center of the trough so that it will be repeatedly submerged, I may employ suitable wings 25 secured to the sides of the trough and inclined in a proper direction to deflect the water as stated. A hopper 26, into which the ore-pulp for treatment is delivered, is connected by a passage 27 with the trough, a feed-screw 28 being preferably employed to facilitate the introduction of the ore-pulp into the trough. Said feed-screw may be actuated by a suitable chain (not shown) engaging sprocket 29 on the shaft of said feed-screw. The cover 20 is provided with a guiding enlargement 30 to direct the ore-pulp downward into the trough at a point substantially midway of one end thereof so that the material

will pass toward the space between the two shafts 13. The other end of the trough is provided with a discharge spout 31 to direct the tailings into a heater box 32. Said heater box may comprise a simple chamber having an inlet and outlet, the spout 31 entering the inlet, and having a steam supply pipe 33, and an outlet or escape pipe 34. Said heater box is supported by means of a suitable frame 35, preferably so that it may be moved aside from the trough and the discharge spout 31. The heater-box is provided with a suitable outlet to discharge the tailings into a chute 36 having one or more screens 37, preferably of suitable wire fabric which are adapted to catch and hold mercury which might be escaping to prevent said mercury from being washed away by the escape water. The object of heating the tailings escaping from the amalgamating trough is to loosen the mercury from the particles of waste material, so as to enable the separating devices in the tailings chute to perform their functions.

Suitable outlets 38 having valves 39 are provided to enable the precious metals and the mercury to be withdrawn from the bottom of the trough.

In Fig. 4, I have illustrated an especial feature of my invention, said feature comprising one or more layers of screen material 40 in the bottom of the trough. Said material is not illustrated in Figs. 2 and 3 because said figures are on a smaller scale. As shown in Fig. 4, I preferably employ three layers, although I may employ a greater number. In practice these layers are of different degrees of fineness, the inner or upper one having the coarser mesh. The object of the employment of open-work material in the bottom of the trough is to present obstacles to lateral movement of the lower strata of material in said trough so as to gradually quiet down the mercury which is agitated by the blades of the shafts 13 and consequently enable the precious metals to better settle to the bottom without being affected by the continual agitation that is going on in the upper strata of mer-

cure. This gradual reduction in the amount of movement which the mercury can have, as it works its way downward, brings the lowest stratum of mercury to a standstill so that the precious metals can settle and be drawn off from the trough without having to draw off the entire body of mercury.

It will thus be understood that the shafts and their spiral blades not only continually advance the ore-pulp in the trough and act to repeatedly depress the minerals into the mercury during its progress, but also keep the pulp and mercury in a continual state of agitation. But the layers of open-work material in the bottom of the trough gradually reduce this amount of agitation to nothing at the extreme bottom of the trough.

Having now described my invention, what I claim is:

1. An amalgamator comprising in its construction a mercury trough, a pair of shafts mounted therein connected to rotate in opposite directions, and spiral blades of screen material carried by said shafts, the blades of the two shafts overlapping each other.

2. An amalgamator comprising in its construction a mercury trough having a longitudinal ridge or rib, the bottom being curved on each side of said rib or ridge, two spiral bladed shafts connected to be rotated in opposite directions, and open-work material in the bottom of the trough.

3. An amalgamator comprising in its construction a mercury trough, means for mechanically forcing ore-pulp longitudinally of the trough, a movable cover, means carried by said cover for supplying water in the same direction as that in which the ore-pulp is forced, and deflectors in position to direct both the water and the upper portions of the ore-pulp toward the center of the trough while it is being carried longitudinally of the trough.

In testimony whereof I have affixed my signature, in presence of two witnesses.

FERDINAND STIENEN.

Witnesses:

P. W. PEZZETTI,
FRANKLIN E. PARKER.