

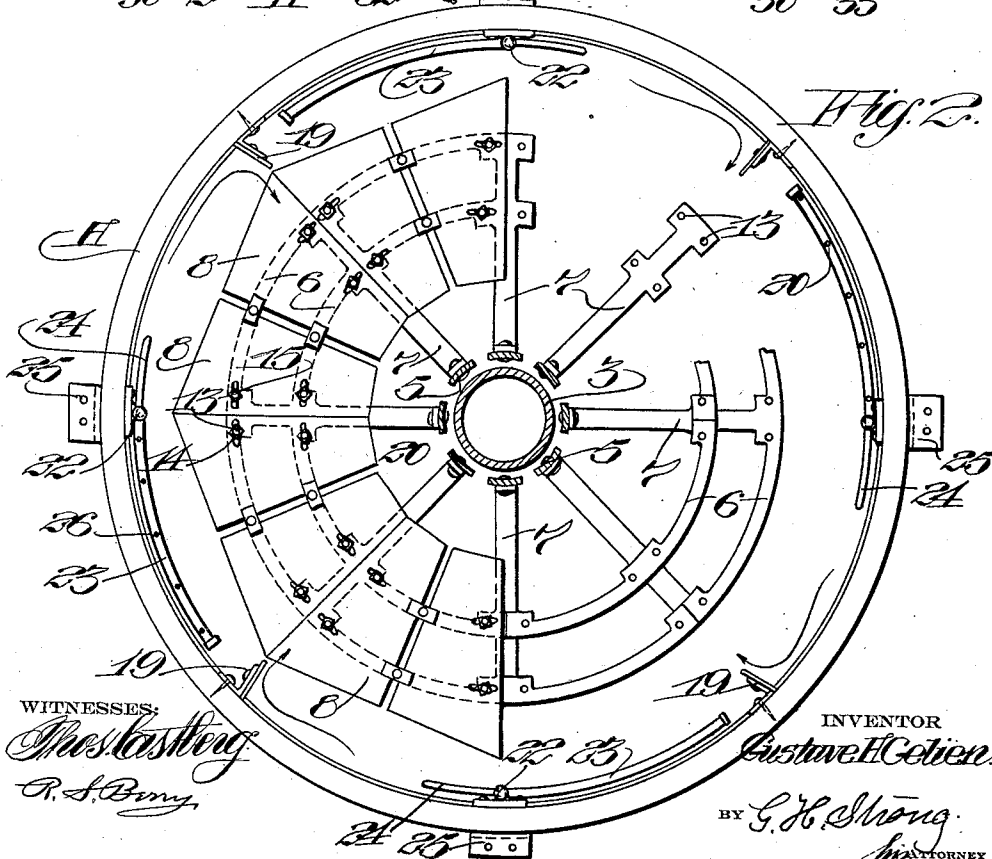
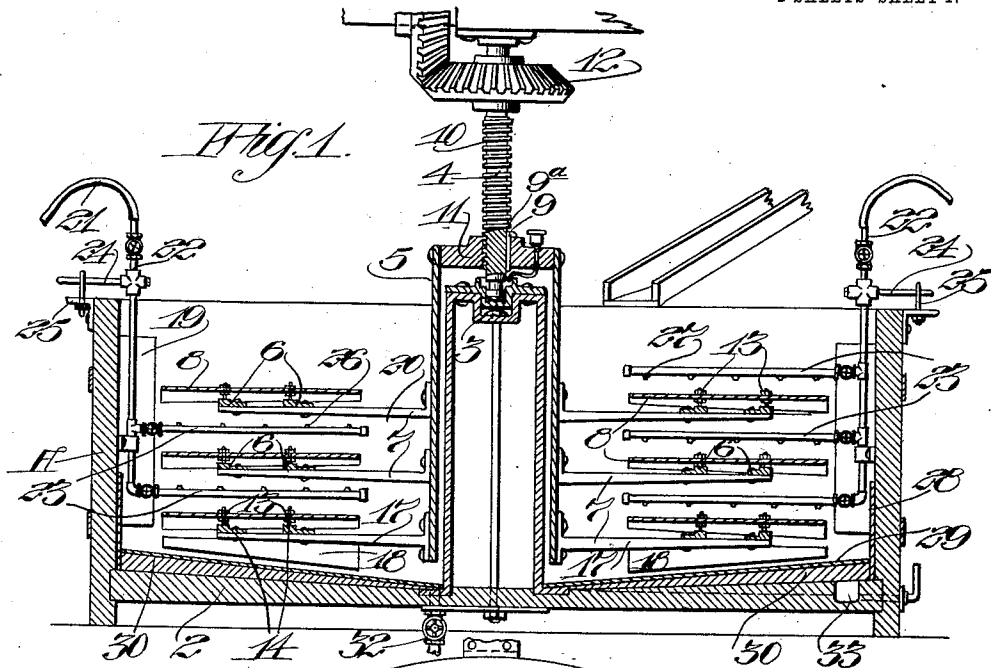
G. A. GELIEN.
AMALGAMATOR.

APPLICATION FILED JUNE 29, 1912.

1,056,986.

Patented Mar. 25, 1913.

2 SHEETS—SHEET 1.

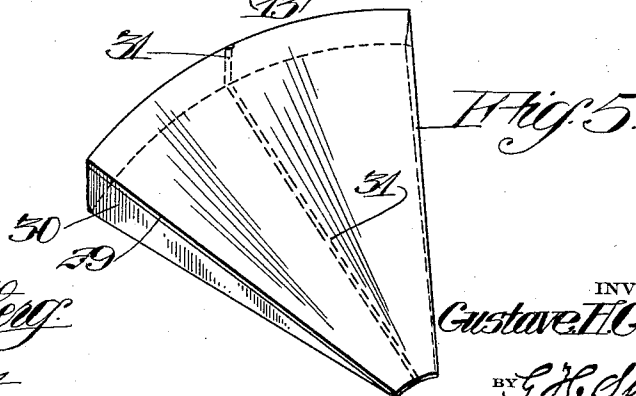
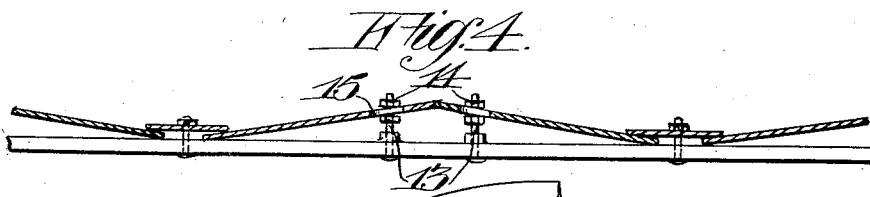
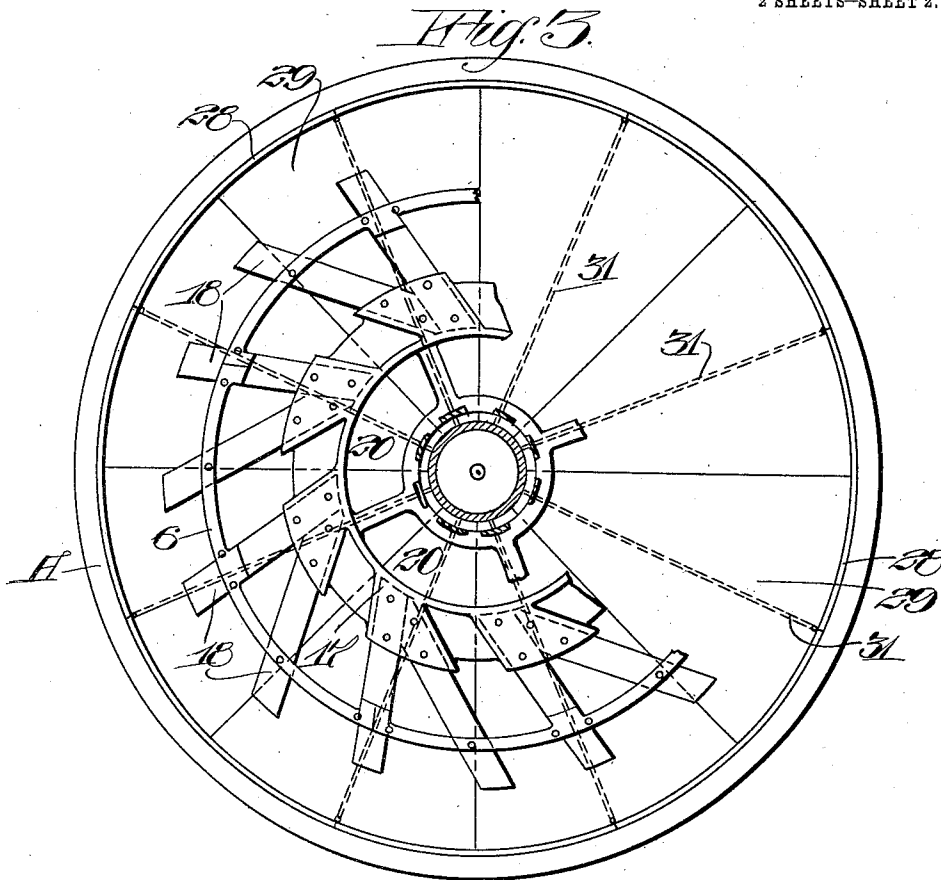


G. A. GELIEN.
 AMALGAMATOR.
 APPLICATION FILED JUNE 29, 1912.

1,056,986.

Patented Mar. 25, 1913.

2 SHEETS—SHEET 2.



WITNESSES:
Thos. Kestner
R. S. Berry

INVENTOR
Gustave H. Gelien
 BY *E. H. Strong*
 ATTORNEY

UNITED STATES PATENT OFFICE.

GUSTAVE A. GELIEN, OF SAN FRANCISCO, CALIFORNIA.

AMALGAMATOR.

1,056,986.

Specification of Letters Patent.

Patented Mar. 25, 1913.

Application filed June 29, 1912. Serial No. 706,637.

To all whom it may concern:

Be it known that I, GUSTAVE A. GELIEN, a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented new and useful Improvements in Amalgamators, of which the following is a specification.

This invention relates to an ore-amalgamator which is principally adapted for extracting gold and silver from slimed sulfids.

The main object of the invention is to provide a simple, inexpensive and efficient amalgamator, in which the amalgamating plates can be easily and quickly removed from the tank for inspection, adjustment, or clean-up purposes.

Another object of the invention is to provide a novel agitating means which will keep the material in constant circulation within the tank for the purpose of bringing the minerals and slimes held in suspension in contact with the amalgamating plates.

A further object of this invention is generally to improve this class of apparatus so as to increase their utility, durability and efficiency.

The invention consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a vertical section of the amalgamator. Fig. 2 is a plan view, partly broken away. Fig. 3 is a plan view partly broken away, showing the lower portion of the skeleton frame carrying the agitating arms. Fig. 4 is a detail side elevation showing the means for adjusting the angular position of the amalgamating plates. Fig. 5 is a perspective view showing a bottom plate section.

A indicates the pan or tank provided with an inclined bottom 2 and a hollow central pillar with a stationary step bearing 3, upon which is mounted an upright driving shaft 4. Secured to the driving shaft 4 is a carrier 5, to which is secured a series of skeleton frames; these consist of segmental rings 6, suitably secured to radial arms 7 carried by the carrier 5; upon these are mounted a series of amalgamating plates. Rotary motion is given to this carrier through the medium of the upright shaft 4, to which the carrier is keyed; such connection being made by a key 9, or feather on one part, and a slot or keyway 9^a in the other part, so that

the carrier can be moved and adjusted longitudinally upon the shaft. The object of this adjustment is to regulate the distance of the bottom of the carrier above the bottom of the pan; or when it is desired to entirely remove the carrier from the pan for inspection, adjustment or clean-up purposes. Such adjustment is made by a screw 10, cut in the driving shaft 4, working through the head 11 of the carrier. Rotary motion is given to the driving shaft and attached carrier by any suitable means, as the gears 12.

When it is desired to raise the parts out of the pan or to adjust their position therein, it is only necessary to remove the key 9 and hold the carrier stationary while the driving shaft is turned in one direction or another. The desired adjustment having been made, the key is again replaced, which will allow the parts to revolve as a unit.

As before described, the skeleton frames are provided for the purpose of carrying the amalgamating plates 8. These are formed in segments and are bolted to the segmental rings 6. In practice it has been found desirable to place the segmental amalgamating plates at a slight incline with relation to the horizontal plane of the carrying frames, as shown in Fig. 4, for the reason that the minerals and slimes held in suspension are given more opportunity to come in contact with the plates when these move through the liquid, than when they are placed in a horizontal plane. To accomplish this angular adjustment, I have provided the segmental rings 6 with stud bolts 13, upon which are screwed two nuts 14, between which the amalgamating plate is secured; the plate being slotted as at 15 to pass over the bolt, the lower edges being secured by the clamps 16. From this it can be seen that the angular position of the plates may be adjusted to secure the greatest efficiency, by adjusting the position of the nuts 14 on the stud bolts. By this construction a corrugated surface is provided, having greater efficiency and amalgamating area than a flat surface. Another advantage is that the plates being formed in sections, one or more can be readily taken out for cleaning or making repairs without disturbing the others.

In order to agitate the material being treated, and keep it in constant circulation to bring the slimes and minerals in contact with the amalgamating plates, I have provided the bottom frame 17 with a series of

arms 18 set at an angle most suitable for that purpose, as shown in Fig. 3. The arms 18 keep the liquid in constant circulation by impelling the liquid out from the center of the pan. The inclined bottom of the tank gives the liquid an upward direction and a series of stationary guide vanes as 19 secured to the sides of the pan direct the current flow back between the amalgamating plates to the center. The opening 20 in the center of each one of the tables is designed to leave a clear passage all around the cylinder from top to bottom of the open frame, so that a free circulation of the pulp in a perpendicular direction from top to bottom, as well as between the plates, will be produced by the rotary motion of the tables and agitating arms. By this means the whole contents of the pan is brought to and maintained in such a state of motion that the metallic particles therein cannot fail to come in contact with the amalgamated surfaces of the tables.

Quicksilver is applied to both surfaces of the amalgamating plates from time to time, as required, either by removing the plates from the skeleton frame and cleaning and replacing them, or, by flowing quicksilver over the surfaces of the plates. For this purpose I have provided a mechanical means for applying a quantity of quicksilver to any one of the tables in the frame, or to either surface; the same consisting chiefly of a stationary quicksilver tank or holder, not here shown, mounted at some elevated position this is connected by a flexible connection as 21, with a turnable stand pipe 22, provided with radial perforated tubes and nozzles 23. These may be turned out to extend between the plates as shown in Fig. 1, when it is desired to apply quicksilver to the plates.

In Fig. 2 of the drawings, I have shown the pan as provided with four stand pipes and connected radial tubes; these may be swung out to stand in position between the tables when the machine is in operation, and are held in this position by handles or extensions 24, secured by U-bolts to brackets 25. When it is desired to adjust the tables or remove them from the pan, it is only necessary to release the handles 24, and swing the radial arms into the position shown in Fig. 2. The stand pipes are normally connected with a suitable source of air supply which constantly discharges through the perforations in the radial arms for the purpose of aiding agitation of the pulp, and to force it in contact with the amalgamating plates. For this purpose one set of tubes is provided with nozzles 26 on the upper surface, and another set has nozzles as at 27 on the underside; thus the pulp is brought into contact with both the upper and lower surfaces of the amalga-

mating plates. The air blast is only used when necessary for the purpose of forcing the pulp containing slimed sulfids into contact with the plates. The plates are adjusted to lie flat on the supporting rings when the air blast is used, as this position seems to give the greatest efficiency. When it is desired to apply quicksilver to the plates, it is only necessary to disconnect the air supply and connect one or more of the stand pipes with the source of quicksilver supply. All portions of the surfaces of the plates or tables are reached and coated while the skeleton frame is revolving.

The lower sides and bottom of the pan may be lined with amalgamating plates as at 28 and 29; the bottom plates being formed in segments and secured to blocks 30, for the purpose of making the plates easily removable. The blocks 30 are shown as provided with radial grooves 31, which will catch any mercury thrown out toward the outer walls of the pan and allow it to drain back to the center where it is again thrown out by the current flow of the pulp. The pan may be supplied with a suitable drain-cock 32 and a mercury trap 33, for the purpose of draining off either the pulp or mercury when cleaning up.

The amalgamator is substantial in construction and reliable and efficient in operation, and takes no more space than another machine. The material and finish of the several parts of the apparatus are such as experience and judgment of the manufacturers may dictate.

I wish it understood that various changes in form, proportions and minor details of construction may be resorted to within the scope of the appended claims, and that I do not wish to limit myself to the specific design and construction here shown.

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

1. The combination with a pan having a sloping bottom and a central stationary step bearing, of a carrier mounted for rotation thereon, consisting of inner and outer rings secured to radial arms on the carrier, a series of separable and detachable amalgamating plates secured to said rings, a series of separable and detachable amalgamating plates secured to the sides of the pan, a series of inclined segmental, removable amalgamating plates secured to the bottom of the pan, a series of segmental carriers secured to said plates, means carried by the frame for agitating the pulp within the pan, means carried by the tank for assisting agitation, means carried by the pan for supplying mercury to the amalgamating plates, means for producing a circulation of mercury over the bottom plates, and means for rotating the frame.

2. An amalgamator, comprising a pan having a central post and a step upon the top thereof, a carrier having a vertically adjustable bearing supported on said step, 5 superposed radial arms supported by the carrier and concentric rings upon the arms, amalgamating plates, vertical bolts on the rings, nuts by which said plates may be adjusted angularly, and means to discharge 10 columns of air and quicksilver against both upper and lower sides of the plates.

3. An amalgamator, comprising a pan having a central post and a step upon the top thereof, a carrier having a vertically adjustable bearing supported on said step, 15 superposed radial arms supported by the carrier and concentric rings upon the arms, amalgamating plates, vertical bolts on the rings, nuts by which said plates may be adjusted angularly, and means to discharge 20 columns of air and quicksilver against both upper and lower sides of the plates, said means including pipes with upwardly and downwardly discharging nozzles extending 25 between the plates.

4. An amalgamator, comprising a pan having a central post and a step upon the top thereof, a carrier having a vertically adjustable bearing supported on said step, 30 superposed radial arms supported by the carrier and concentric rings upon the arms, amalgamating plates, vertical bolts on the rings, nuts by which said plates may be adjusted angularly, and means to discharge 35 columns of air and quicksilver against both upper and lower sides of the plates, said means including pipes with upwardly and downwardly discharging nozzles extending between the plates, said means including

vertical turnable pipes journaled contiguous to the inner sides of the pan, and having pipes with upwardly and downwardly directed nozzles adapted to swing with the vertical pipes and extend between the plates. 40

5. An amalgamator, comprising a pan 45 having a central post and a step upon the top thereof, a carrier having a vertically adjustable bearing supported on said step, superposed radial arms supported by the carrier and concentric rings upon the arms, 50 amalgamating plates, vertical bolts on the rings, nuts by which said plates may be adjusted angularly, and an agitating means consisting of angularly disposed arms and shoes projecting from the bottom of the 55 carrier.

6. An amalgamator, comprising a pan having a downwardly convergent bottom, a central post, a carrier stepped, turnable, and adjustable upon the top of the post and 60 composed of downwardly dependent arms, a series of superposed radiating arms carrying radial adjustable plates, pipes and nozzles adjustable to project between the plates or be turned to lie against the inner periph- 65 ery of the pan, wedge-shaped dies having radial passages beneath and amalgamating plates upon the upper surfaces, and corresponding co-acting shoes carried by the lowermost radial arms in proximity with the 70 shoes.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

GUSTAVE A. GELIEN.

Witnesses:

JOHN H. HERRING,
R. B. GELIEN.