

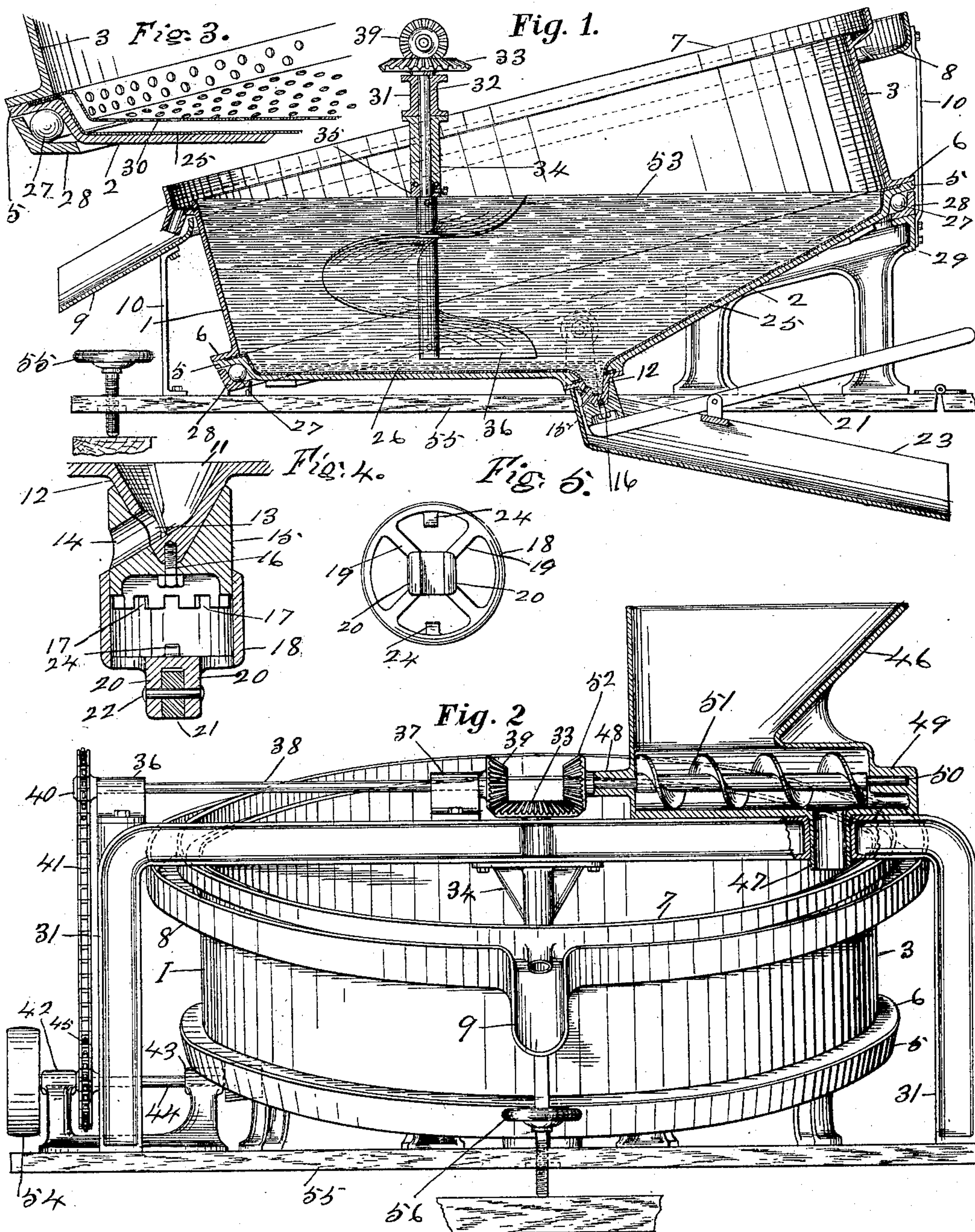
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E. J. KISS.
AMALGAMATOR.

(Application filed Aug. 12, 1901.)

(No Model.)



WITNESSES:

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UNITED STATES PATENT OFFICE.

ERNEST J. KISS, OF FORT WAYNE, INDIANA.

AMALGAMATOR.

SPECIFICATION forming part of Letters Patent No. 707,597, dated August 26, 1902.

Application filed August 12, 1901. Serial No. 71,723. (No model.)

To all whom it may concern:

Be it known that I, ERNEST J. KISS, a citizen of the United States, residing at Fort Wayne, in the county of Allen, in the State of Indiana, have invented certain new and useful Improvements in Amalgamators; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to improvements in amalgamators which are employed in the extraction of the precious metals from their ores.

The primary object of my present invention is to provide a cheap and efficient self-cleaning amalgamator and concentrator in which all parts are conveniently accessible, having a positive downfeed and an easy drainage and mode of operation so constructed that all the amalgamating-surfaces are below the water-line and are constantly utilized in use and so arranged that while but a small surface for containing the mercury is required the machine by its own movements continually distributes the mercury over a relatively large amalgamating-surface, whereby but a small amount of mercury is required to silver a relatively large area.

My improvement consists of a rotatable amalgamating-tank having a concave bottom and pivotally mounted in an inclined position, whereby the lowest portion of said bottom is at all times when in use in an approximately horizontal plane, improved means for draining the said tank, means for catching the overflow, and means for agitating the ore-pulp in said tank and for giving it a positive downfeed.

The principal novel feature of my invention resides in the arrangement of the amalgamating-tank whereby a radius-body of mercury successively coats the entire tank-bottom, the means for draining the same, and the means for agitating and feeding downward its contents.

In the accompanying drawings similar reference-numerals indicate like parts throughout the several views, in which—

Figure 1 is a vertical section of my improvement, showing the relative arrangement of the operative parts. Fig. 2 is a view in elevation of my invention, taken at right angles to Fig. 1 and looking from the left, showing the means for actuating the feeding and agitating devices. Fig. 3 is an enlarged detail view showing a modified form of bottom for the amalgamating-tank. Fig. 4 is an enlarged detail view, in vertical central section, of the means for draining the tank. Fig. 5 is a bottom plan of the means for closing the said drainage-opening.

The agitator-tank 1 of any proper contour and dimensions and preferably cylindrical and of cast metal is preferably cast in two parts—the concave bottom 2 and the cylindrical sides 3. These parts are then rigidly united at their adjacent and respective lateral flanges 5 and 6 by proper bolts or other suitable manner. The sides 3 at their upper edges have an integral annular trough 7 to catch the overflow in use. A second or auxiliary annular drip-trough 8 is supported just below the trough 7 and is adapted to receive both the drip and the discharge therefrom. This trough 8 has a discharge-spout 9 and may be supported in position in any suitable manner, as by the braces 10. The bottom 2 of the said tank is inclined, as shown, to the center and has a central discharge-opening arranged as follows: At a central point in the bottom 2 is arranged an outlet-opening in register with the opening 11 of the conical casting 12, which is rigidly fixed to the lower face of the bottom 2 about the said central opening. This hollow casting 12 has a lateral outlet-opening 13, Fig. 4, in register with the lateral opening 14 in the sleeve 15, which is pivotally secured to the lower end of said casting 12 by a proper screw 16 or other proper manner. The lower end of the said sleeve 15 is preferably recessed, as shown, and provided with a series of peripheral notches 17. On the lower end of the sleeve 15 is loosely mounted an outer sleeve 18, open at its upper end and having its lower end provided with integral spider-arms 19 and central pendent apertured ears 20, in parallel arrangement, between which the forward end of the operating-lever 21 is pivotally secured by means of the pin 22. This hand-lever 21 is fulcrumed on the dis-

charge-spout 23, leading from the said central discharge-opening, or other proper manner. On the inner face and lower end of the said sleeve 18 are arranged a pair of diametric and
 5 upright peripheral lugs 24, adapted for a locked engagement with the said notches 17 when the said sleeve 18 is elevated to the uppermost limit of its adjustment for the purpose of closing the said outlet-opening 14 in
 10 the manner hereinafter described. The tank-bottom 2 has a copper lining 25, secured therein in any suitable manner, as shown in Fig. 1, and, if desired, one or more perforated false bottoms 30, of copper, may be arranged there-
 15 in with a suitable intervening space, as shown in Fig. 3. By this construction I conveniently increase the amalgamating-surface, and such pulp and concentrates as find their way beneath the false bottom 30 will be car-
 20 ried or dragged through the mercury-bath. My improved tank thus constructed is rotatably mounted in such an inclined position that some portion of the bottom 2 will be in a horizontal position at all times in use, where-
 25 by the bed of mercury 26 will successively coat every part of the inner face of said bottom at each revolution of the tank and yet will remain in the lowest or horizontal portion of said bottom.

30 The tank 1 is mounted on antifriction ball-bearings 27, which balls are loosely mounted on the inner concave face of the annular casting 28, which in conjunction with the coöperating adjacent flange 5 of the said bottom 2
 35 forms a ball race or cage. This annular casting 28 is rigidly fixed upon any proper inclined supporting-standard 29, which in turn is rigidly fixed on a hinged or pivoted sup-
 40 porting base or platform 55, which is normally in a horizontal position, but whose outer edge can be vertically adjusted by means of the hand-screw 56. By means of this hand-screw the operator can still further tilt the said tank
 45 when it is desired to collect the mercury at the outer edge of the tank for the purpose of draining off the concentrates through the valved central opening therein. In proper
 50 transverse relation to the said tank is erected the upright standard 31, having a vertical opening midway of its ends, in which is loosely mounted the upper end of the shaft 32, carry-
 55 ing a fixed bevel gear-wheel 33. To the lower face of the said standard 31 is rigidly fixed the pendent journal-bearing 34, adjacent to whose lower end and on the said shaft 32 is
 60 arranged a fixed collar 35, provided with an antifriction ball-bearing, as shown in Fig. 1. On the lower end of the shaft 32 is rigidly fixed an agitator 36 of any proper construc-
 65 tion, preferably having a spiral blade, as shown in Fig. 1, though the blade may, if desired, be constructed in the form of a common propeller-wheel. (Not shown.) The lower end of the said agitator hangs free and
 preferably just clears the bed of mercury 26 in its rotation. The function of this agitator

is to give the ore-pulp a positive downward feed to and through the mercury-bath 26.

On the upper face of one end of the stand-
 ard 31 are detachably mounted the journal-
 70 bearings 36 and 37, in which is rotatably mounted the horizontal shaft 38, carrying upon its inner end a bevel gear-wheel 39 in mesh with the said wheel 33 and carrying upon its outer end a rigid sprocket-wheel 40,
 75 on which is mounted a vertically-arranged sprocket-chain 41. In suitable journal-bearings 42 and 43 is rotatably mounted the driving-shaft 44, carrying near its outer end a fixed sprocket-wheel 45, with which the said
 80 chain 41 forms an actuating engagement. On the outer end of this driving-shaft is fixed a proper driving-pulley 54, which can be connected to any suitable source of power. On the opposite end of the said standard 31 is
 85 removably but firmly mounted the feeding-hopper 46, having an integral pendent spout 47, adapted to snugly fit within a proper vertical opening in the channel-bar standard 31, Fig. 2, and thereby firmly secure the said
 90 hopper in position, and also adapted to discharge the contents of the hopper into the tank 1. This hopper 46 is provided upon two of its opposite faces with the respective
 95 apertured lugs 48 and 49, in which the corresponding ends of the conveyer-shaft 50 are rotatably mounted. On this shaft is fixed the spiral conveyer 51, adapted to feed the contents of the hopper uniformly forward to
 100 the discharge-spout 47. On the inner end of this conveyer-shaft is fixed a bevel gear-wheel 52 in mesh with the said gear 33.

The mode of operation and manner of employing my invention thus described is obvious and, briefly stated, is as follows: When
 105 the ore-pulp is placed in the hopper 46, it will be continuously and uniformly fed forward to the spout 47 by means of the said conveyer 51. On account of the inclined bottom of the tank the ore thus fed thereto will by gravity
 110 seek the lowest portion of the bottom containing the body of mercury 26, where it will be thoroughly mixed with the mercury and with the water 53 by means of the rotary agitator 36. The slow rotation of the tank 1, which
 115 can be effected in any proper or well-understood manner, also materially aids in the circulation and thorough mixing of the ore. It is obvious that when the spiral-bladed agitator is rotated in the proper direction it will
 120 continuously force the ore and all floating particles down to an immersion in the mercury 26. It is also obvious that as the water-line is maintained to the highest limit, as shown in Fig. 1, the ore-pulp is thoroughly
 125 agitated, washed, and mercury-coated and the tailings will be continuously discharged over the upper edge of the slowly-revolving tank into the said trough 7 and thence through the trough 9 to a proper receiving-receptacle.
 130

When it is desired to discharge the mercury 26, it can readily be done without stop-

ping the rotation of the tank, as follows: The opening 13 being normally closed by the rotatable sleeve 15 and the outer vertically-adjustable sleeve 18, the operator first rotates 5 the said sleeve 15 by means of the lever 21 until the said opening 13 is in register with the outlet-opening 14 and then lowers the outer sleeve 18 by the same means sufficiently to uncover said openings. This outer sleeve 10 18 may be omitted, if desired, in which case the forward end of the lever 21 will directly engage the said inner sleeve 15.

When it is desired to drain the concentrates from the tank, it can be done without either 15 removing the mercury or stopping the rotation of the tank by so tilting the tank forward by means of the screw 55 that the mercury will be collected at the perimeter of the tank, after which the concentrates can be 20 drained off through the opening 11.

When power is applied to the driving-pulley 54, it will actuate the said shaft 38 through the medium of the shaft 44, the sprocket-wheel 45, the chain 41, and the wheel 40, 25 thereby actuating the gear-wheel 33 by means of the meshing gear 39, which in turn actuates the conveyer 51 through the medium of the meshing gear-wheel 52.

In my improved amalgamating apparatus 30 thus described the following advantages are evident: All the amalgamating-surfaces are under water, a positive downfeed of the ore is secured by the operation of the rotary agitator, the drainage of mercury and concentrates can conveniently be effected while the 35 tank is in full operation, a relatively large

area can be continuously silvered by a very small amount of mercury, and all operative parts are conveniently accessible at all times.

Having thus described my invention and 40 the manner of operating the same, what I desire to secure by Letters Patent is—

1. In an amalgamator, a rotary open-topped cylindrical tank; a tilting adjustable support for the said tank; a revoluble spiral agitator 45 mounted in said tank in vertical arrangement and adapted to impart a positive downfeed to the contents thereof; means for draining said tank while in operation; and means 50 for actuating said tank.

2. An inclined rotary tank having a concave bottom and a peripheral overflow-trough; a tilting adjustable support for said tank; an upright spiral agitator revolubly mounted in 55 said tank and adapted to impart a positive downfeed; means for centrally draining said tank while in operation consisting of an inner and an outer sleeve, the inner sleeve having a lateral outlet-opening, and being adapted to be fixed to said tank, the outer sleeve 60 having a vertical adjustment on the inner sleeve and adapted to close said lateral opening; and means for operating the said outer sleeve.

Signed by me at Fort Wayne, Allen county, 65 State of Indiana, this 9th day of August, A. D. 1901.

ERNEST J. KISS.

Witnesses:

AUGUSTA VIBERG,
ELMO WEIR.