

(No Model.)

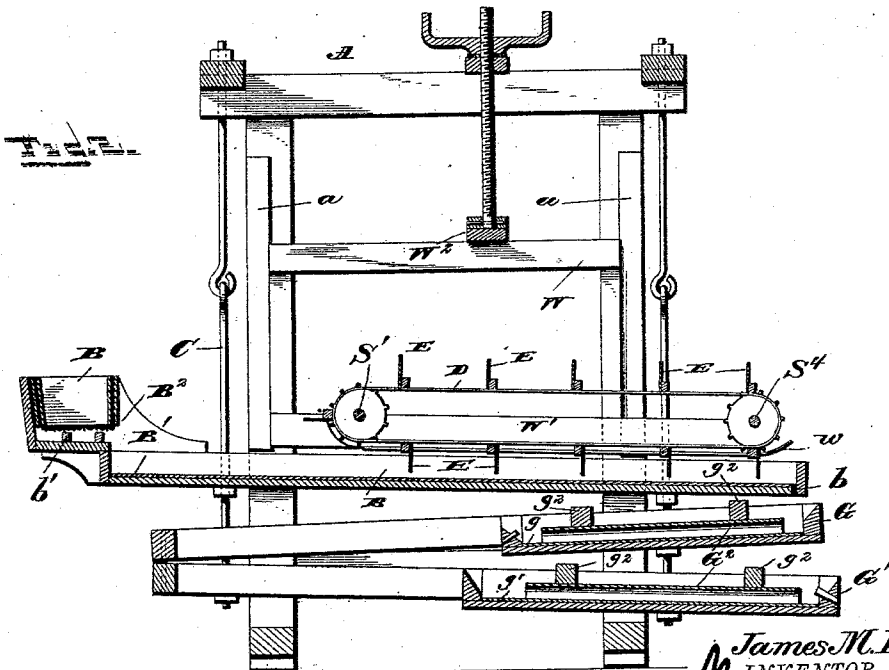
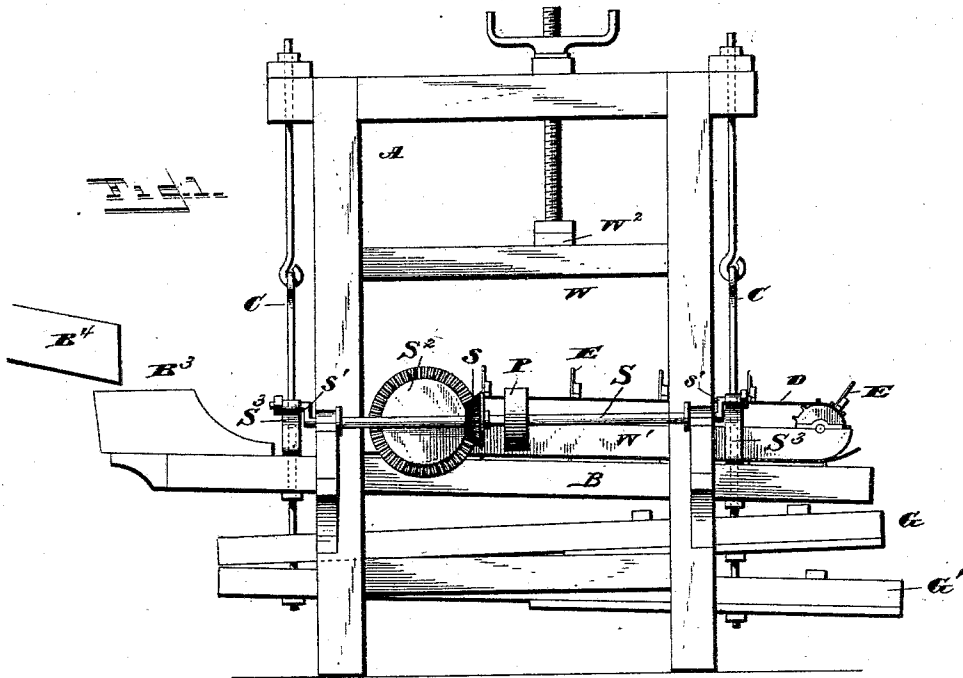
2 Sheets—Sheet 1.

J. M. LEE.

APPARATUS FOR RECLAIMING ORES FROM RESIDUUM.

No. 414,554.

Patented Nov. 5, 1889.



WITNESSES

L. S. Elliott.
W. M. Johnson.

James M. Lee.
INVENTOR

by *[Signature]*
Attorney

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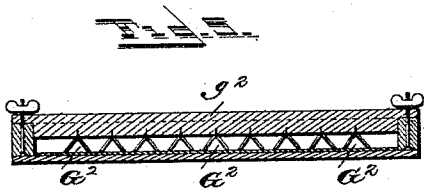
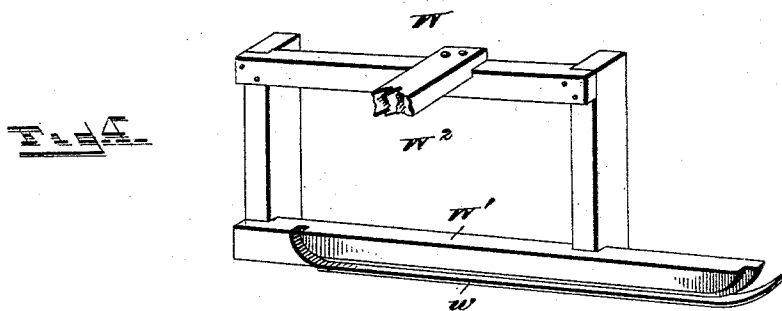
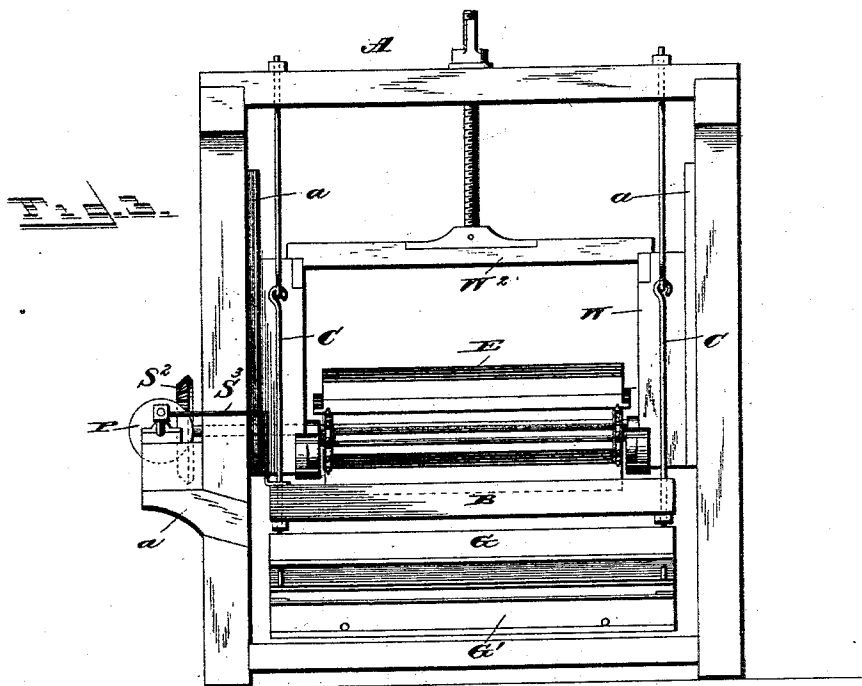
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UNITED STATES PATENT OFFICE.

JAMES MOLTON LEE, OF EUREKA, UTAH TERRITORY.

APPARATUS FOR RECLAIMING ORES FROM RESIDUUM.

SPECIFICATION forming part of Letters Patent No. 414,554, dated November 5, 1889.

Application filed January 24, 1889. Serial No. 297,348. (No model.)

To all whom it may concern:

Be it known that I, JAMES MOLTON LEE, a citizen of the United States of America, residing at Eureka, in the county of Juab and Territory of Utah, have invented certain new and useful Improvements in Apparatus for Reclaiming Ores from Residuum; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to certain new and useful improvements in an apparatus or amalgamator designed especially for collecting or reclaiming from tailings, pulp, or residuum the ores or quicksilver contained therein; and the invention consists in the novel construction and arrangement or combination of the parts thereof, as shown in the accompanying drawings and as will be hereinafter described.

In separating metals from ores as usually carried on a certain percentage of ore and quicksilver is lost, and the object of my apparatus or amalgamator is to regain this lost material, as far as practical, by providing an apparatus which will operate substantially automatically and require but little, if any, attendance. My improvement may be employed for reworking tailings, pulp, or waste, such as is usually discarded.

In the accompanying drawings, Figure 1 is a side view of an apparatus constructed in accordance with my improvements. Fig. 2 is a longitudinal vertical section thereof. Fig. 3 is an end elevation. Fig. 4 is a detail perspective view of a part of the chain-belt frame. Fig. 5 is a detail transverse sectional view.

A indicates the main frame of the machine, which frame is constructed of beams arranged vertical and horizontal, said beams being braced where found necessary. The working mechanism is supported above the base or lower part of said frame, so as to allow free movement of the parts thereof, and the corner-posts have guide-strips *aa* secured to the inner faces thereof, which secure the vertical

movement of the frame which carries the chain belt. A pan or box B is suspended within the supporting-frame by means of jointed or linked rods C, which pass through the main frame and are secured thereto by nuts passed over the upper threaded ends thereof. The lower ends of these linked rods pass through the longitudinal side pieces of the box or pan B, and beneath the same they are screw-threaded to receive nuts for supporting the pan. The lower ends of the linked rods are continued downward below the pan or box B to support frames located beneath the same. The bottom of the pan or box B is covered by a removable plate B', which is preferably copper, the surfaces of which are amalgamated to cause adhesion of the amalgam as it is formed by the contact of the mercury or quicksilver with the precious metals in the pulverized ore. All the metal plates are amalgamated, as is customary in this line of invention. The front portion of the pan or box B is provided with a chair or seat B², which serves to support a horizontal board to which are attached riffles or irregularly-arranged strips *b'*, and over this board is secured a trough B³, having a sieve-bottom. The tailings, pulp, quartz, or residuum from the stamping or crushing mill or slum-pits is fed through a sluice-box B⁴ into the trough B³. The lower end of the pan or box B is provided with an outlet-opening *b*, which is located above a pan G, located beneath the same and oppositely inclined. Beneath the pan G is placed another pan G', oppositely inclined to the one above and of a slightly greater length. These pans G and G' are provided above their bottoms with removable plates *g* and *g'*, and above said plates, by means of transverse bars *g*², are secured a series of bent plates G², said bent plates being longitudinally placed and held in position by transverse strips removably secured to the side pieces of the pans or frames. It will be observed that the pan G, at its lower end, has an inclined cross-piece, over which the overflow passes into the pan beneath. Thus the tailings which enter the trough B³ through the sluice-box flow from the upper pan to the lower ones, from whence they are discharged into a slum-pit.

S refers to a shaft mounted on one side of

the frame of the apparatus in suitable bearings attached to the extensions *a*, which are secured to the corner-posts. This shaft is provided with a miter-gear *s* and a band-pulley *P*, by which said shaft is driven from a suitable source of power. The miter-gear *s* engages with a large miter-wheel *S*², mounted on the end of a transverse shaft. The ends of the shaft *S* beyond its bearings are formed into cranks *s'*, to which are secured metallic straps *S*³, the other ends of these straps being attached to the side frame of the pan *B* by the lower ends of the rods *C*, which pass through openings therein. By this means when the shaft *S* is rotated the rods which support the pans *B*, *G*, and *G'* will be oscillated laterally.

A frame *W* is held within the main frame *A*, and is adapted to be adjusted vertically by a screw and nut or wheel, this screw being attached at its lower end to the cross-bar *W*² of the frame *W*, and passes through an opening in the cross-bar secured to the upper portion of the main frame. This frame *W* and the parts carried thereby can be raised and lowered toward the pan by adjusting the screw, and the bearing of the shaft which carries the large miter-wheel *S*² may have a curved slot, through which the shaft will pass, so that it will remain in engagement with the small miter-wheel when the frame *W* is elevated or depressed. The upward movement of this frame is very little, not exceeding an inch or two in a full-sized machine. The two lower side pieces *W'* of the frame *W* have slots with upwardly-curved ends formed therein, the lower wall of said slot being formed by metallic guide-strips *w*, the rear ends of which project outwardly and upwardly beyond the ends of the side pieces *W'*. A shaft *S'* is mounted upon the side pieces *W'*, and between said side pieces is provided with sprocket-wheels, said shaft also carrying beyond the side pieces a large miter-wheel *S*². Near the rear ends these frames also carry a similar shaft with sprocket-wheels, and over the sprocket-wheels pass chain belts *D*, which at regular intervals have amalgamated plates *E* removably secured thereto. The ends of these metallic plates are reduced to provide projecting ends, which enter the slots and bear on the metallic strips *w*, secured to the side pieces *W'* of the frame *W*. The movement of the plates *E* is steadied by this construction, as well as by the chain carrying the same, and when the frame is adjusted these plates *E* may be brought to the desired distance from the bottom of the pan, the object of said plates being to save as much gold and quicksilver as possible. It will be observed that the chain belts move in a direction opposite to the current or flow of tailings or pulp in the pan *B*.

In practice the tailings or pulp is carried by a sluice-box by a required amount of water and is discharged into the trough *B*³, and is separated by passing through the sieve in

the bottom thereof, and further separated by riffles, which are alternately arranged. The driving-shaft *S* having been set in motion, the rods *C* are oscillated laterally, as hereinbefore described. By reason of the pans *B*, *G*, and *G'* being inclined the pulp or tailings containing the quicksilver and ore with foreign matter flows downward over the amalgamated plates in the pan, and the belt with the amalgamated paddles thereon will partially intercept the flow in the pan *B*, and the float metal and quicksilver will collect on said paddles. The chain belt and the impact of the metal from the sluice-box will cause a slight longitudinal movement of the pan supported by the rods *C*, and thus the material is kept constantly agitated in its downward flow. To further collect the metal and quicksilver, it flows into the pans, beneath which are provided strips *G*², which present a large surface. After a sufficient quantity of tailings, pulp, quartz, or slum has been worked or reworked the paddles, metal plates, and the series of bent plates *G*² are removed from the apparatus and subjected to sufficient heat to cause the amalgam to be removed therefrom, which is then treated in the usual manner.

If desirable, the sluice-box may be provided with a mesh or screen of larger diameter than that used in the trough to prevent said trough clogging, and should said trough become clogged it can be readily removed and the contents dumped therefrom. By means of this device discarded material can be reworked profitably, and the use of beaters is not required.

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

1. In an amalgamator for the purpose set forth, the combination of a supporting-frame, a laterally-reciprocating pan supported thereby, and an independent vertically-adjustable frame carrying a belt having blades or paddles secured thereon, said paddles arranged to move over and through said pan in a reverse direction to the flow of material in said pan, substantially as and for the purpose set forth.

2. In an amalgamator or metal-regaining apparatus, the combination of a supporting-frame and oscillating pan suspended within said frame by links, a driving-shaft having cranks connected to the links for oscillating the pan, and the independent vertically-adjustable frame carrying shafts upon which are mounted belts carrying paddles, the pan being inclined in an opposite direction from the line of movement of the paddles, substantially as shown, and for the purpose set forth.

3. The combination, in an amalgamator, of a supporting-frame, a laterally-reciprocating pan supported thereby, and an independent vertically-adjustable frame carrying a belt having detachable blades or paddles carried

thereby, said paddles arranged to move over and through said pan in a reverse direction to the flow of material therein, substantially as set forth.

- 5 4. The combination, in an amalgamator or apparatus for reworking ores, of the alternately-inclined pans B, G, and G', arranged beneath each other, as shown, said pans being provided with removable amalgamated plates,
10 one or more of the lower pans having a lon-

gitudinally-arranged series of bent plates secured above its bottom plate for the purpose of catching and retaining float metal of value, substantially as shown.

In testimony whereof I affix my signature in 15 presence of two witnesses.

JAMES MOLTON LEE.

Witnesses:

JOHN H. MCCHRYSTAL,
WM. R. WALLACE.