

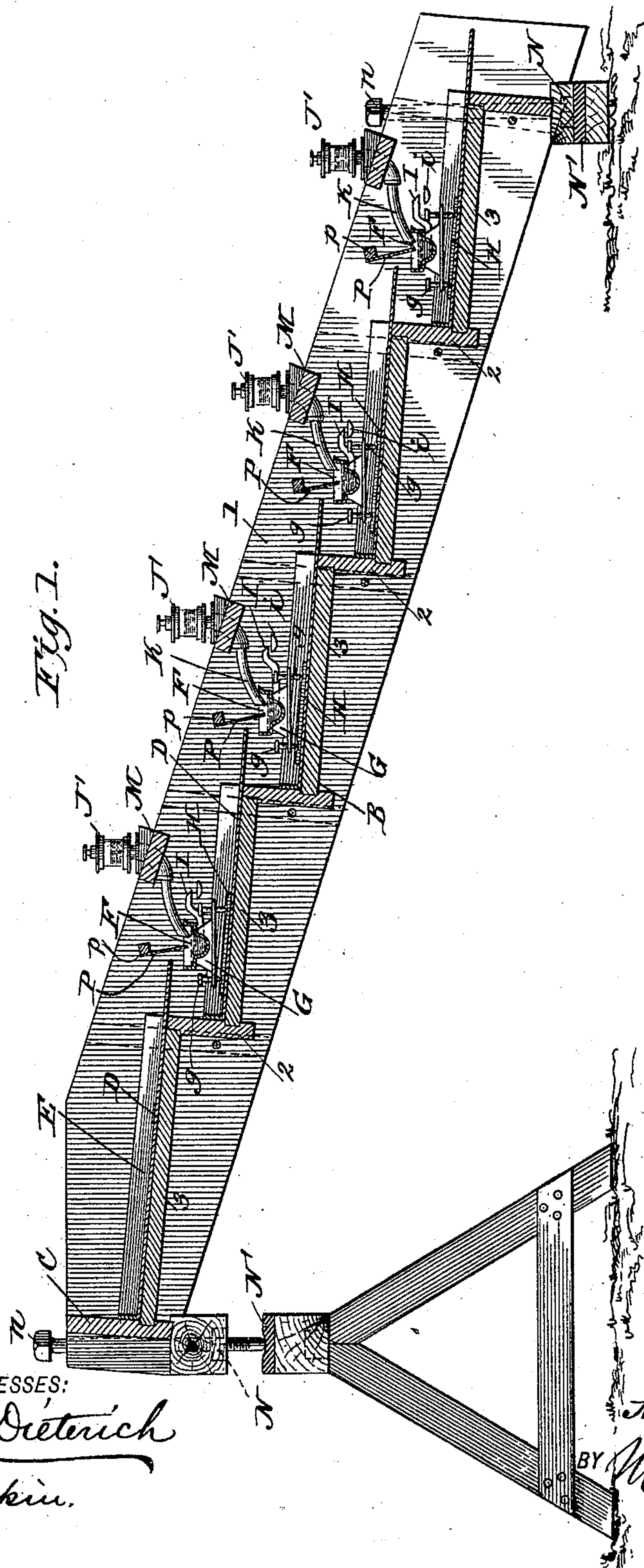
(No Model.)

2 Sheets—Sheet 1.

N. L. RABER.
AMALGAMATOR.

No. 497,603.

Patented May 16, 1893.



WITNESSES:

Fred G. Dieterich
P. B. Turpin.

INVENTOR

Nathan L. Raber.

BY

M. L.
ATTORNEYS.

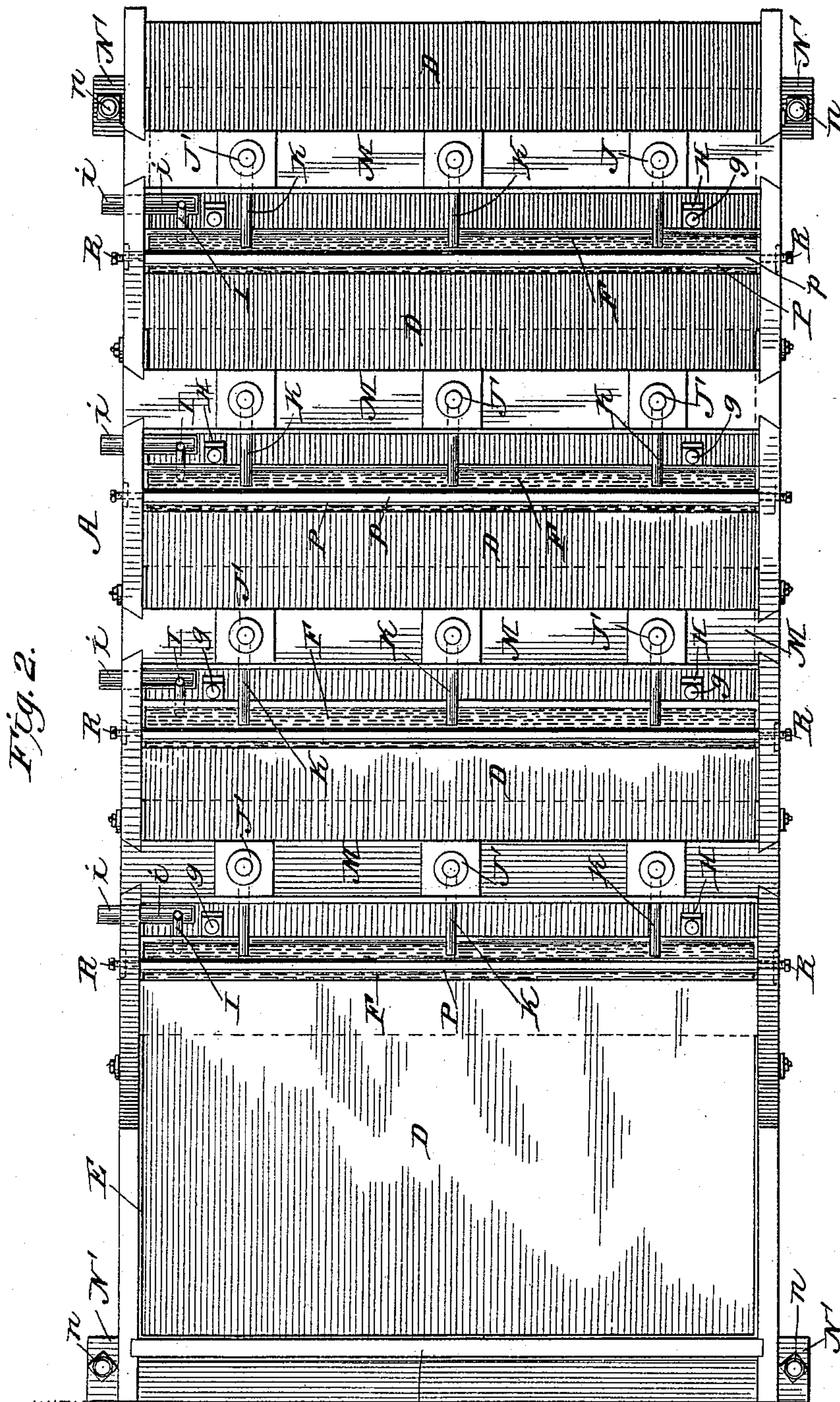
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UNITED STATES PATENT OFFICE.

NATHAN L. RABER, OF CORVALLIS, ASSIGNOR TO THE PORTLAND AMALGAMATOR AND MINING COMPANY, OF PORTLAND, OREGON.

AMALGAMATOR.

SPECIFICATION forming part of Letters Patent No. 497,603, dated May 16, 1893.

Application filed September 7, 1892. Serial No. 445,274. (No model.)

To all whom it may concern:

Be it known that I, NATHAN L. RABER, residing at Corvallis, Benton county, in the State of Oregon, have invented a new and useful Improvement in Amalgamators, of which the following is a specification.

This invention is an improvement in amalgamators and particularly in that class of such machines employing mercury in the invention seeks among other improvements to provide simple means whereby the sand, pulp, &c., are properly directed to the mercury, also means for keeping the mercury constantly sensitive, pure and active and devices by which the adjustments of the main frame or box and the mercury cup may be independently effected, so that either the main frame or the mercury cups may be adjusted to different angles to the horizontal without necessitating a corresponding change in the other parts.

The invention consists in the novel constructions and combinations of parts herein-after described and pointed out in the claims.

In the drawings—Figure 1 is a vertical longitudinal section of my improved amalgamator and Fig. 2 is a top plan view thereof.

In the construction shown I employ a main frame or box A, which is in the nature of a shallow box having vertical sides 1 and stepped bottom B, such bottom consisting of a series of steps formed with what may for convenience of reference be termed the risers 2 and treads 3. These risers and treads and the sides 1 are properly joined usually by rabbeting as shown and are firmly nailed and clamped together.

At its upper end the main frame or box is closed by a cross board C, while its lower end is open so that the tailings, pulp, &c., may freely discharge. The sides 1 are braced by tie beams or bars M extended between their upper edges and firmly secured to both sides. I prefer to use one of these tie bars M above each step below the first or upper one as clearly shown in Fig. 1. These tie bars not only brace the sides of the main frame, but they also serve as supports for the holders of the mercury renewing material as presently more fully described.

At its four corners the main frame is provided with adjusting screws or bolts *n* turned

through threaded bearings at N and against base supports or seats N', which may be on sills as shown. By this means the frame or box may be adjusted to any desired inclination both longitudinally and laterally and so be set to suit the quality or quantity of the material being treated. Upon each step is placed a plate D of silver plated copper held at its upper edge and sides by cleats E and projecting at its lower edge beyond its supporting step so that each plate overlaps at its lower edge the upper edge of the plate on the next lower step. Beneath the lower projecting edges of the plate D are arranged the mercury cups or troughs F which rest upon the steps or may be otherwise supported as desired. These cups are supported so that they may be adjusted independently of the adjustments of the main frame such independence of adjustment coacting in permitting the angle of the main frame to be varied to regulate the speed with which the material may pass through the apparatus and at the same time enabling the angle of the mercury cup to be retained or varied as may be desired. In the construction shown the troughs are carried upon suitable brackets or supports G at each end which are provided with adjusting screws *g g* bearing upon iron plates or carriers H resting upon the steps. These screws permit the adjustment of the cups as may be desired. These cups or troughs are formed of copper, silver plated and are of the cross section shown in Fig. 1, the bottom being concave to insure stiffness and their rear edges preferably turned down and flared to insure the free and easy delivery of the sand, pulp, &c. In operation it will be understood that the cup overflows onto the step and the overflow passes thence down the plate into the cup of the next lower step being discharged directly into such cup. At one end of each trough and near its bottom I provide a small copper, silver plated delivery tube I which leaves the cup beneath the level of the mercury and then turns upward and outward and empties into an out-flow trough *i* which extends beyond the frame and may discharge into any suitable vessel. The purpose of this construction is to regulate the level of the mercury in the cup and maintain it at a permanent uniform level and au-

tomatically discharge the surplus mercury into a suitable receptacle. At the same time this construction also permits the level of the mercury to be varied as by bending the discharge end of the tube I up or down the level of the mercury may be raised or lowered. This construction for automatically drawing off the surplus mercury is especially desirable in connection with my devices for preserving the activity of the mercury in the cup which include feeders for supplying constantly any of the well known suitable chemicals used to cleanse and quicken the mercury. Sodium amalgam may be the preferred chemical and it may be of any strength the work required renders necessary. The feeders shown include cups J' J' J' usually three for each trough supported upon the tie beams M and provided with discharge pipes K which deliver the chemicals continually in small quantities to the middle of the mercury cups. This construction enables me to secure a constant and automatic cleansing and quickening of the mercury in the amalgamating troughs.

Immediately above the cups F and in rear of the discharge edges of the plates D are arranged the copper gates P P against which the material discharged from plates D strikes and by which it is directed downward into the mercury. These gates P are supported so that they may be adjusted to present a different angle to the material discharged against them being to such end secured to a bar p which is held in position by set screws R which serve to hold the gates firmly in any desired position. The purpose of this gate is to insure the delivery of the said pulp, &c., directly to the center of the trough and its adjustability enables this result to be accomplished no matter what may be the angle of the main frame, or box, or the quantity or condition of the material being treated.

In practice the water, sand pulp, &c., is fed in at the desired pitch to secure a suitable flow from any ordinary sluice box and falls from the upper step into the first amalgamating cup or trough being directed thereto by the gate.

By my improved apparatus I am able to cause the water pulp, &c., to strike the mercury with a certain force sufficient to give the desired contact. I also insure that the mercury itself shall be constantly kept clean and sensitive to render certain the amalgamation of the precious metal as soon as it strikes it. It is important to regulate the fall of the material from the plates D to the surface of the mercury cups inasmuch as it is by such careful regulation of the fall that the necessary contact is secured. This fall should be variable between one and five inches and this variation is secured as follows: By varying the angle of the main frame or box, by altering the level of the mercury in the cups, by raising or lowering the ends of the outflow tubes, and by raising and lowering the

amalgamating cups or troughs and by the combined action of the several adjustments as will be understood.

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

1. In an amalgamator, a main frame or box having a series of steps and provided with mercury cups supported independently upon said steps and with devices by which to direct the material from each step into the mercury cup of the next lower step, substantially as set forth.

2. In an amalgamator, the combination of the main frame or box devices by which the angle of such frame or box may be adjusted, the independent mercury cups supported upon the main frame or box and devices whereby to adjust the angle of said cups whereby the level or angle of said cups may be preserved or varied irrespective of the angle of the main frame or box, substantially as set forth.

3. In an amalgamator the combination of the main frame or box having the stepped bottom, the plates secured upon said steps and extended at their lower edges to overlap the next lower step and the mercury cups arranged below the said extended overlapping portions of the said plates to receive the materials discharged therefrom, and above their supporting plates whereby to overflow thereon substantially as set forth.

4. An improved amalgamator comprising a main frame or box having a series of steps, a series of mercury holders on said steps and arranged to receive the pulp &c. from the preceding step and to discharge the same upon its supporting step, each cup having an outlet for the surplus mercury, and chemical feeders arranged and adapted to supply continuously renewing chemicals to said mercury holders substantially as set forth.

5. An amalgamator comprising a stepped main frame or box, devices for adjusting the angle of said box, plates secured upon and projecting below said steps to overlap the next lower step, mercury cups supported upon said steps in position to receive the material discharged from the lower extended edge of the projecting plates and adjustable supports for said mercury cups whereby the angle thereof may be varied or retained irrespective of the angle of the main frame, substantially as set forth.

6. In an amalgamator, substantially as described, the combination with the main frame or box of the plurality of mercury cups and the independently adjustable supports for said cups, substantially as set forth.

7. In an apparatus, substantially as described, the combination with the mercury cup or holder of a feeder for automatically supplying chemicals constantly to said cup and a level controlling tube opening into said cup and adapted to carry off the surplus mercury by which to maintain the level of mercury

therein, the cup or holder having a discharge for the pulp &c. substantially as set forth.

8. The combination with a mercury cup having an off-flow for the surplus mercury whereby to limit the rise of mercury within it and also having independent of said off-flow a discharge for the pulp &c., of a chemical feeder adapted to discharge a continuous supply of chemicals into said mercury cup or holder, substantially as set forth.

9. In an amalgamator the combination with a mercury cup and devices for discharging the material to be treated in said cup, of a gate arranged above the mercury cup and adapted to receive the supply of material and to direct it to said cup, the said gate being adjustable to different angles relatively to the discharging devices whereby it may be set to properly direct the material under different circumstances, substantially as set forth.

10. In an amalgamator having a mercury cup and means for directing the material thereto, a gate by which to deflect the material to the mercury and consisting of a plate adjustably supported whereby it may be set to different angles to the direction of the material discharged against it to suit the varying conditions of the material and the speed of its delivery, substantially as set forth.

11. In an amalgamator, the combination with the stepped main frame or box and the plate secured upon the step and projecting beyond the lower end of the same of the mercury cup supported below the lower end of said plate and the gate arranged above the mercury cup and in position to receive against it the material discharged from the plate and to direct the same to the mercury, said gate being adjustable to different angles, whereby it may be set to suit variable conditions substantially as described.

12. In an amalgamator the combination with a mercury cup or holder, of a chemical supply consisting of a vessel supported above the mercury cup and a tube connected with the said vessel and arranged to discharge con-

tinuously a supply of renewing chemical to the mercury cup, an outflow pipe opening into the cup below the normal level of the mercury and adapted to conduct off the surplus mercury, the cup having independent of said outflow pipe a discharge for the sand, pulp, &c., substantially as set forth.

13. In an amalgamator, substantially as described, the combination of the main frame or box having a stepped bottom, the sides and the tie bars or beams connecting said sides, the plates secured upon the steps and extended to overlap the next lower step, the mercury cups arranged below the lower ends of said plates, the gates supported adjustably above said cups and in rear of the extended step plates, the holders or vessels supported on the tie bars M and the tubes connected with said vessels and arranged to discharge into the mercury cups, all substantially as set forth.

14. The combination in an amalgamator of a main frame or box, devices for adjusting the angle of said frame or box mercury cups supported on said frame or box, devices by which to adjust the angle of such cups irrespective of the adjustment of the frame, conducting devices for directing the material to the mercury cups and the gates supported adjustably above said cups, substantially as set forth.

15. In an amalgamator the combination of the main frame or box having a stepped bottom, the mercury cups upon said steps in position to receive the material from the preceding steps, adjustable supports for the said cups and the gates arranged above said cups and in position to receive the material discharged from the next upper steps said gates being adjustable to different angles substantially as set forth.

NATHAN L. RABER.

Witnesses:

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