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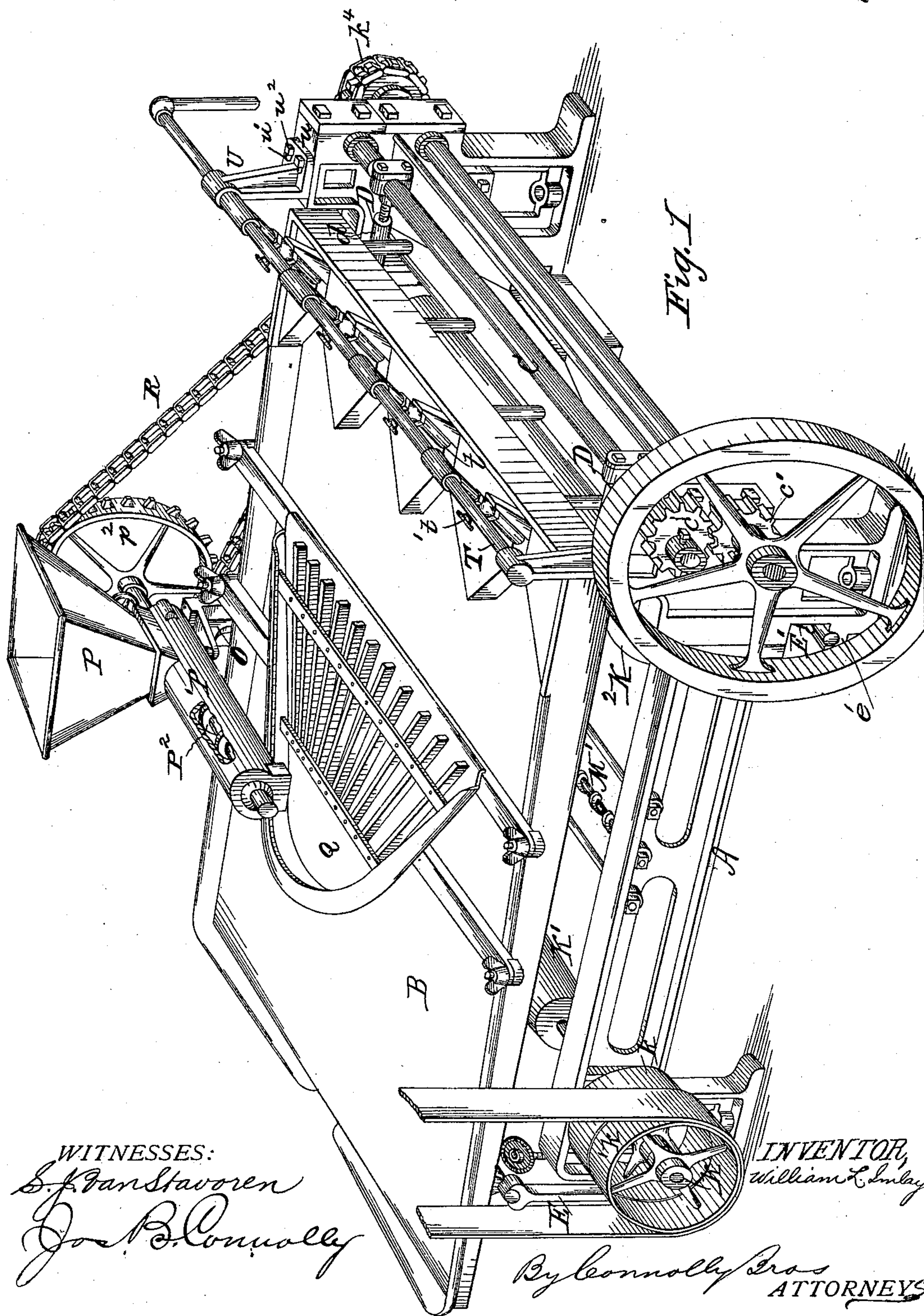
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W. L. IMLAY.

CONCENTRATOR AND AMALGAMATOR.

No. 247,061.

Patented Sept. 13, 1881.



WITNESSES:  
*S. J. Vanstavoren*  
*Joe B. Connolly*

INVENTOR,  
*William L. Imlay*

*By Connolly Bros*  
ATTORNEYS.



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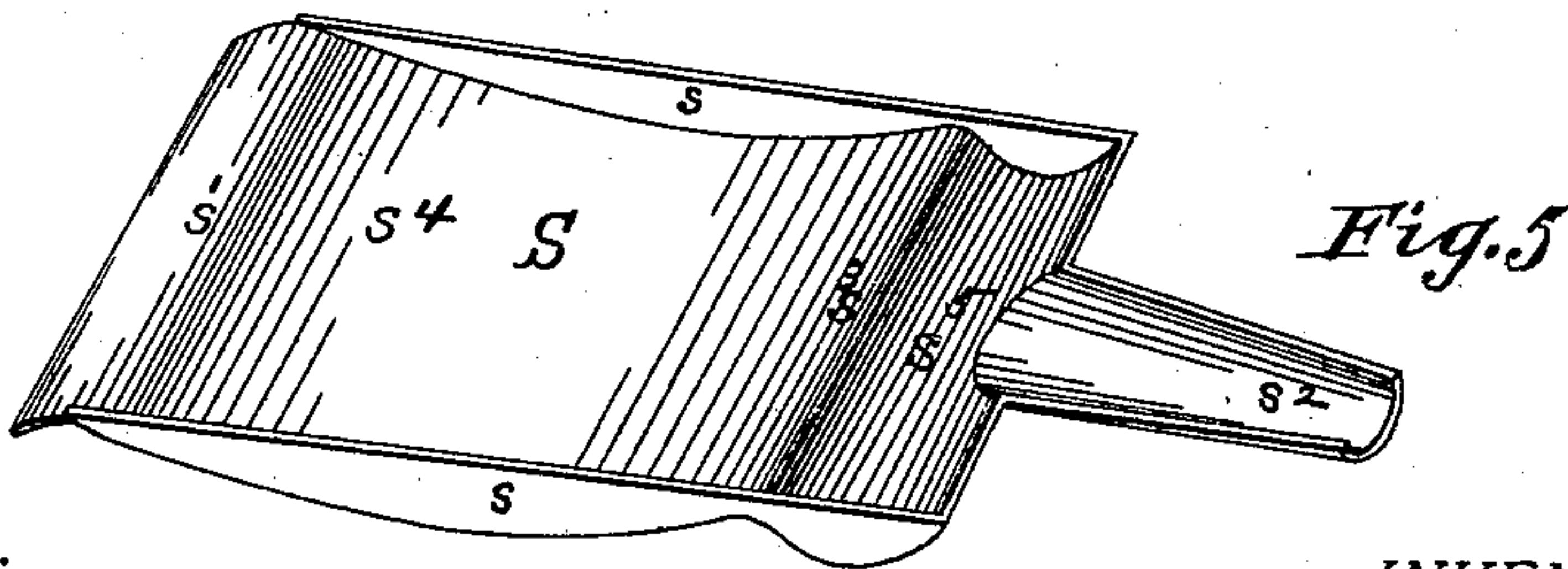
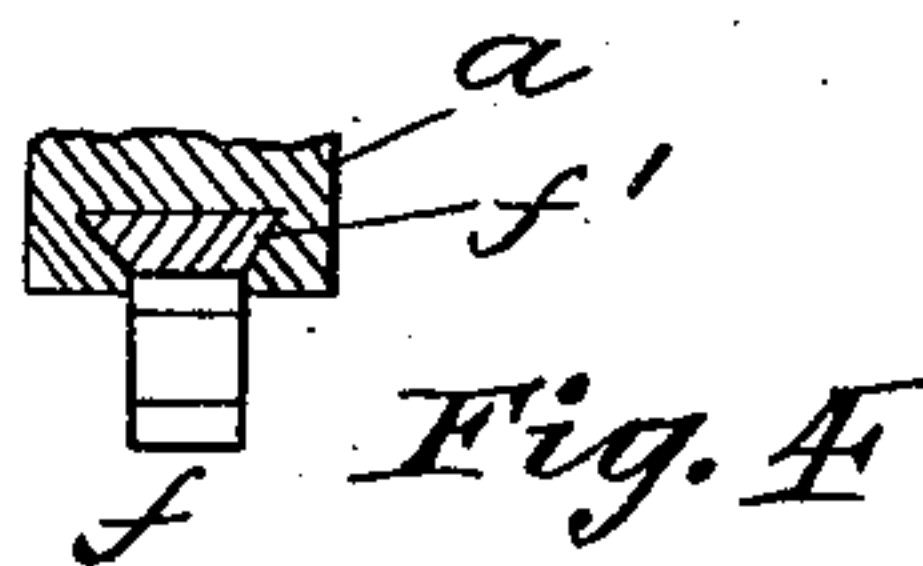
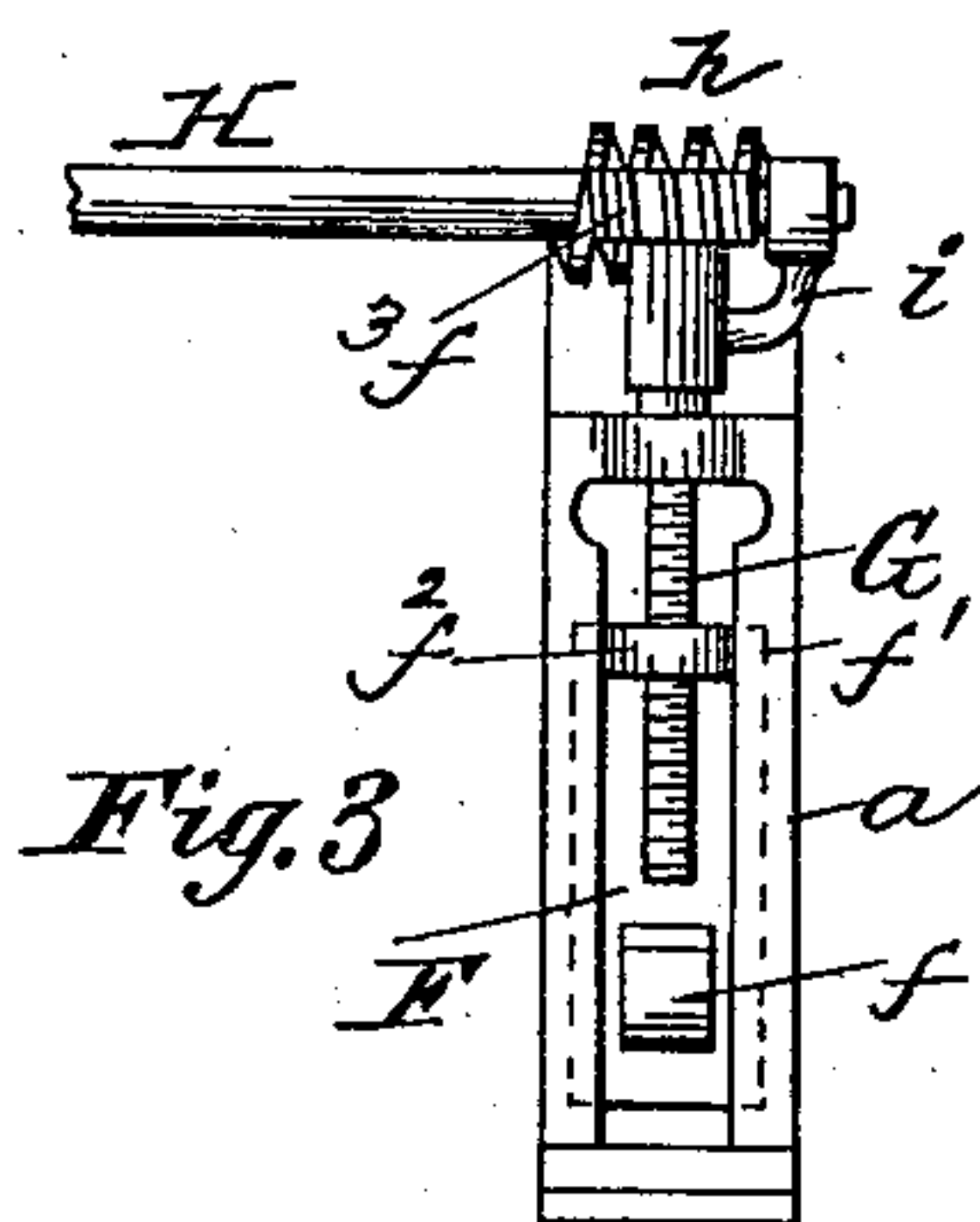
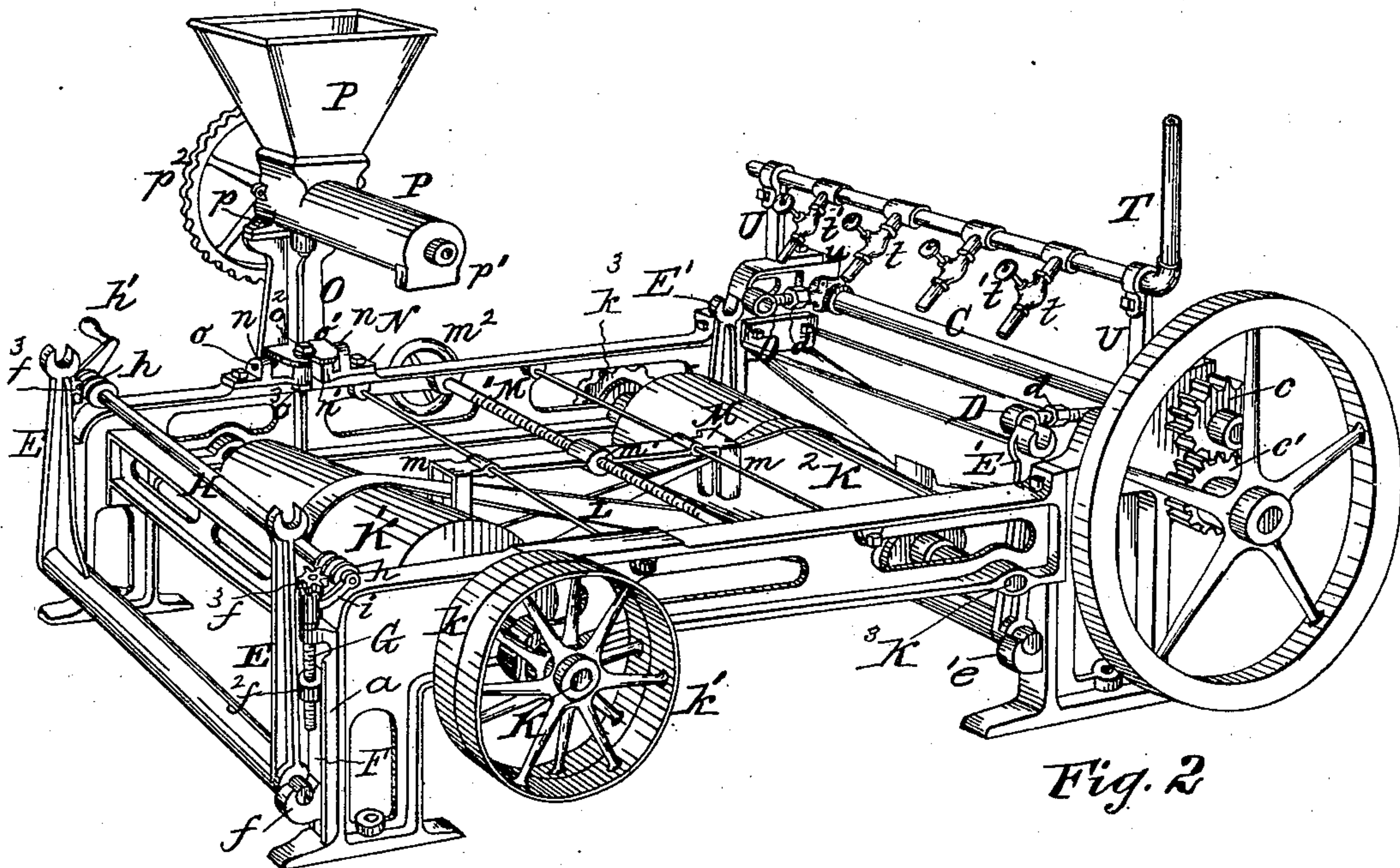
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# UNITED STATES PATENT OFFICE.

WILLIAM L. IMLAY, OF CAMDEN, NEW JERSEY.

## CONCENTRATOR AND AMALGAMATOR.

SPECIFICATION forming part of Letters Patent No. 247,061, dated September 13, 1881.

Application filed June 7, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM L. IMLAY, a citizen of the United States, residing at Camden, in the county of Camden and State of New Jersey, have invented certain new and useful Improvements in Concentrators and Amalgamators; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, which form part of this specification, in which—

Figure 1 is a perspective of a concentrator and amalgamator embodying my invention. Fig. 2 is a similar view with the reciprocating table removed. Figs. 3 and 4 are detail views, and Fig. 5 is a perspective of a modified form of distributor.

My improvements relate to the invention for which Letters Patent of the United States, dated October 21, 1879, No. 220,842, were granted to me, and have for their object to increase the efficiency and perfect the details of said patented invention.

My present improvements have particular reference to the following points:

First. To means for regulating the speed at which the table or vanner moves, and herein consist in the combination, with said table, of double cone-pulleys and a belt-shifter, as hereinafter specified.

Second. To means for regulating the incline or pitch of the table, and in this connection relate to the combination, with said table and its rocking arms or vibratory supports, of bearings, which slide on the main frame and are capable of being vertically adjusted by means of a worm-shaft and pinions.

Third. To means whereby ore may be supplied at or over the side of the machine and delivered centrally to or over the middle of the table, and, touching this feature, relate to the construction of the hopper with a laterally-projecting throat or delivery-spout provided with a spiral conveyer for producing a force-feed, as hereinafter specified.

Fourth. To means whereby the machine may be specially adapted either to wet or dry feed, and under this head relate to a construction of the hopper, whereby it may be used with dry ore and turned over out of the way without being absolutely taken off the machine when wet feed is used. This capability of move-

ment of the hopper also secures access to the table and other parts of the machine for cleaning purposes, as hereinafter fully set forth. 55

Fifth. To means for excluding surplus water from the table in treating ore direct from the stamps, and, incidental to this, contemplate the employment; as a substitute for the fan-shaped distributor used with dry ores, of a supplemental or superposed table carried on the vanner and partaking of the motion of the latter, as hereinafter specified. 60

Sixth. To means for regulating the point at which the water-currents shall be caused to impinge upon the table, and in this relation pertain to movable supports for the water-supply pipe, whereby the position of the water-nozzles may be varied, as hereinafter set forth. 65

Referring to the accompanying drawings, A designates the base or supporting frame of the table, which is a casting of the configuration substantially as illustrated. 70

B is the reciprocating table, supported on said frame, and receiving its peculiar to-and-fro movement (as fully explained in the Letters Patent above named) from an eccentric-shaft, C, which is revolved at a variable speed through the medium of the eccentric-gears *c c'*. 75

D D represent the connecting-rods between the table B and eccentric-shaft C, said rods having swiveled nuts or turn-buckles *dd*, whereby they may be increased or shortened in length, so as to regulate the throw of the table. For example, the rods D D may be made of such length that with the cranks of shaft C at their top centers the supporting-arms of the table will stand exactly vertical. When the shaft C revolves, then the arms will describe an arc of equal length on either side of a vertical line drawn centrally through the rock-arms. By lengthening or shortening said rods the arms may be caused to vibrate farther to one side of such vertical line than to the other side, or may be caused to describe their arcs wholly on either side of such line, with a corresponding change in the movement of the table. 80 85 90 95

E E represent the rear supporting rock or vibratory arms of the table. These arms rest or have their fulcrum-bearings in hooks *ff*, which project from slides F, dovetailed, as shown at *f'*, to fit corresponding grooves in the legs *a a* of the main frame A. 100

G G represent screw-spindles fitted in



threaded lugs  $f^2 f^2$  on the slides F, and carrying pinions  $f^3 f^3$ , which engage with worms  $h$  on a horizontal shaft, H. Said shaft has its bearings in arms  $i i$ , which project from collars I I, encircling the spindles G G below the pinions  $f^3 f^3$ . By turning shaft H, which is provided with a handle,  $h'$ , for that purpose, the slides F F may be moved up and down, thus elevating or lowering, as may be desired, the arms E E and regulating the pitch or incline of the table A. The forward arms, E' E', which support said table, have bearings in fixed hooks  $e' e'$ , which are cast on the front legs of the main frame.

K represents the shaft through which power is applied to the machine to operate the table B, said shaft carrying outside of the frame A, in which it has bearings, fast and loose pulleys  $k$  and  $k'$ . It carries also, inside said frame, an elongated cone-pulley,  $K'$ , from which proceeds a belt, L, to another cone-pulley,  $K^2$ , of like dimensions as pulley  $K'$ , and sustained inside frame A on a shaft,  $K^3$ .

M represents a belt-shifter, consisting of a bar forked at either end, as shown at  $m m$ , and having a threaded central opening at  $m'$  for the passage of a supporting screw-shaft,  $M'$ , which has its bearings in the main frame A, and is provided with a hand-wheel,  $m^2$ . By turning said shaft through the medium of its hand-wheel the bar M is caused to travel and to shift the belt L on the cone-pulleys  $K' K^2$  to produce any desired variation of the rate of movement of the table B. Such variation, it will be noted, is effected by means wholly within the machine, thus allowing the driving-shaft or source of power to run at a uniform velocity. On the end of the shaft  $K^3$  is a sprocket-pulley,  $k^3$ , which, by means of a drive-chain,  $k^4$ , communicates motion to the shaft C.

N represents a box or bearing, sustained on one of the side bars of the main frame A, having bosses  $n n$  for the reception of the trunnions  $o o$  of a vertical standard, O. Said standard has a flange or foot,  $o'$ , through which passes a bolt,  $o^2$ , secured by a nut,  $o^3$ , in a flange,  $n'$ , of the box N. When this nut is tightened the standard O is held rigidly upright. When it is loosened the standard may be rocked on its trunnions  $o o$ .

P represents a hopper, flange-bolted, as shown at  $p p$ , to the head of the standard O. It is formed or provided with a laterally-extending throat or delivery-spout,  $P'$ , whose mouth or discharge-orifice  $p'$  is over a medial longitudinal line of the table B, or coincident with the receiving end of the fan-shaped distributor Q. Within the spout  $P'$  is a spiral conveyer,  $P^2$ , duly supported in bearings, and adapted to be revolved through the medium of a drive-chain, R, running on a pulley,  $p^2$ , on the end of the shaft of said conveyer. This conveyer forms a force-feed for effecting an even delivery of the ore supplied to the hopper and for carrying such ore from the hopper, which is located, as shown, over the side of the

frame, to a point of discharge coincident in alignment with a line drawn longitudinally through the middle of the table. The hopper and force-feed are used with dry ore. When wet ore is required to be concentrated, or it is desired to get access to the table for cleaning or other purposes, the hopper may be thrown back by causing its standards to be rocked, as already described. When pulp from five or more stamp-mills is fed to the table the distributor Q is also removed, and in its stead is supplied a supplementary table, S. This table is designed to relieve the concentrating-table B of the excess of water delivered from so many stamps. It consists of a plate, S, with upturned sides  $s$ , tail-piece or apron  $s'$  at one end, and excess-water discharge or spout  $s^2$  at the other end. It is made with a concave bottom, having the double curves  $s^4 s^5$ , the junction of said curves forming a ridge,  $s^3$ , or transverse division of the table, between the sand and the excess-water ends, the excess water flowing over the ridge  $s^3$  and out of the spout  $s^2$ , while the sand and the mineral pass over apron  $s'$  and descend to the table below. The apron end of the table S should be slightly higher than the water-discharge end. The water-discharge spout  $s^2$  is supported on the lower end of the concentrating-table B.

T represents the water-supply pipe used with a dry feed, and having nozzles or branches  $t t$ , with cocks  $t' t'$ . Said pipe is supported in standards U U, whose feet  $u u$  are slotted at  $u' u'$  for the passage of bolts  $u^2 u^2$ , whereby they are secured to the frame A. By means of these connections the standards U U may be moved along the frame to adjust the position of the branches  $t t$  with reference to the plane of the table B, it being desired to vary such adjustment with different kinds of ores requiring to be concentrated.

The table B is covered with a plate of copper, so as to form an amalgamating-surface, thereby effecting amalgamation of such metals as are free, and at the same time concentrating the minerals.

What I claim as my invention is as follows:

1. In an ore concentrator or amalgamator, the combination, with a table or vanner, B, connected to an eccentric or crank shaft, whereby it is reciprocated longitudinally, cone-pulleys  $K' K^2$ , and a belt-shifter, M, supported in the frame of said table, whereby the speed of said table may be regulated by means within the machine, substantially as specified.

2. In an ore concentrator or amalgamator, the combination, with the table B, supported on rock-arms or vibratory supports E E, of slides F F, having hooks or bearings  $f f$ , screw-spindles G G, with pinions, and worm-shaft H, substantially as shown and specified.

3. In an ore concentrator or amalgamator having a longitudinally-reciprocating table, B, a feed-hopper, P, located outside said table, having a lateral delivery-spout,  $P'$ , extending to the middle of said table, with a spiral conveyer,  $P^2$ , whereby a force-feed is provided for



said table and ore supplied to said hopper at the side of the machine is delivered over the middle of the table, substantially as shown and described.

5 4. In an ore separator or amalgamator having a feed-hopper, the combination therewith of a standard, O, sustained on the frame of the machine and having trunnion or pivot bearings, whereby it is adapted to be rocked or  
10 moved out of the way without being detached from the machine, substantially as shown and described.

15 5. In an ore concentrator or amalgamator having a table, B, designed and adapted to be reciprocated longitudinally, a supplementary table, S, supported thereon, and having discharges at opposite ends for excess of water and for pulp, respectively, and a concave bottom with double curves, forming a transverse

ridge between said ends, substantially as shown 20 and described.

6. In an ore concentrator or amalgamator, and in combination with a water-supply pipe, T, having inclined nozzles or branches *t t*, standards U for supporting said pipe, having 25 slotted feet *u u*, whereby said standards may be adjusted on the frame of the machine and the position of said nozzles regulated with reference to the table, substantially as shown and described.

30 In testimony that I claim the foregoing I have hereunto set my hand this 28th day of May, 1881.

WILLIAM L. IMLAY.

Witnesses:

EDWIN PARAMOOR,  
CHAS. F. VAN HORN.