

(No Model.)

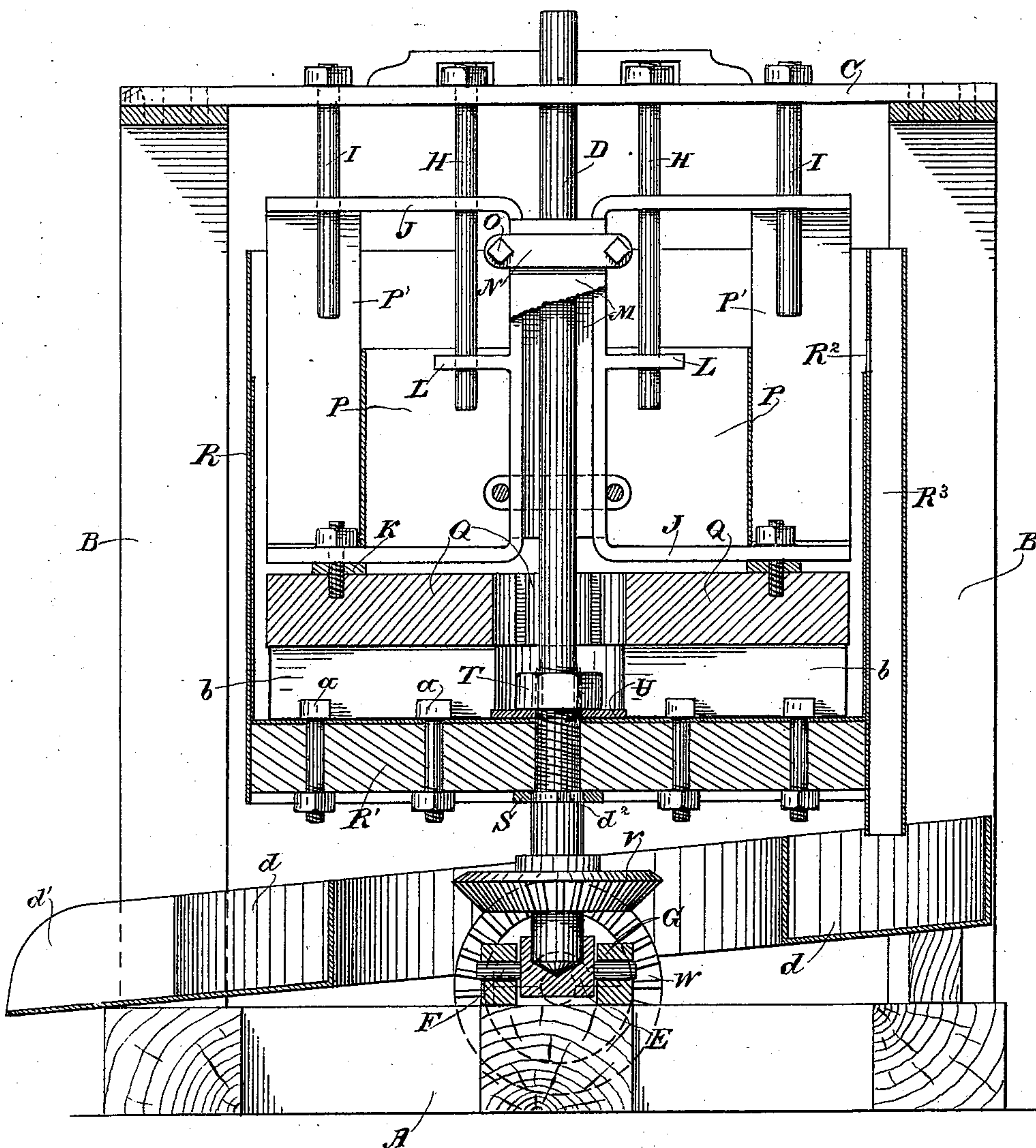
2 Sheets—Sheet 1.

A. BOWES & F. E. PHILBRICK.  
AMALGAMATOR.

No. 551,178.

Patented Dec. 10, 1895.

*Fig. 1.*



Witnesses,  
*R. H. H. H.*  
*H. F. Ascheck*

Inventors  
*Alfred Bowes*  
*Fred C. Philbrick*  
*By Dwyer & Co. attys*

(No Model.)

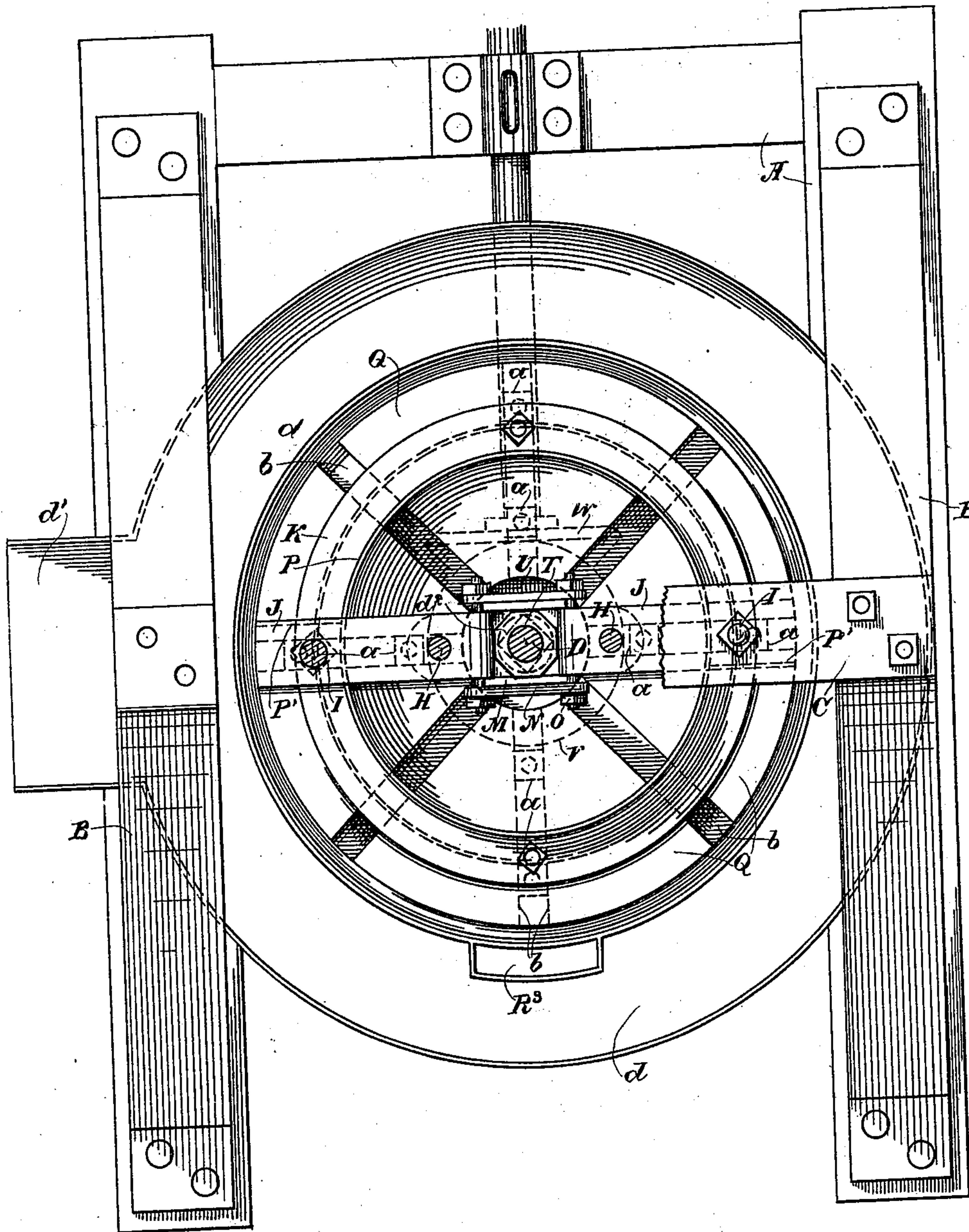
2 Sheets—Sheet 2.

A. BOWES & F. E. PHILBRICK.  
AMALGAMATOR.

No. 551,178.

Patented Dec. 10, 1895.

Fig. 2.



Witnesses,

*J. H. Brown*  
*J. F. Aschbeck*

Inventors,

*Alfred Bowes*  
*Fred E. Philbrick*  
*By Dewey H. Co. atty*



# UNITED STATES PATENT OFFICE.

ALFRED BOWES AND FRED E. PHILBRICK, OF SAN FRANCISCO, CALIFORNIA.

## AMALGAMATOR.

SPECIFICATION forming part of Letters Patent No. 551,178, dated December 10, 1895.

Application filed September 3, 1895. Serial No. 561,328. (No model.)

*To all whom it may concern:*

Be it known that we, ALFRED BOWES and FRED E. PHILBRICK, citizens of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Amalgamators; and we hereby declare the following to be a full, clear, and exact description of the same.

Our invention relates to an improved apparatus for amalgamating precious metals.

It consists in certain details of construction which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a vertical section of our apparatus. Fig. 2 is a plan view, part broken away.

A is a base-plate or frame having the upright yokes or supports B secured to it. Across the top of these supports a plate C is secured having a centrally-disposed journal-box in which the upper end of the driving-shaft D is adapted to turn. The lower end of this shaft is fitted into a step E, having journals F upon each side, which turn in horizontally-disposed boxes G, so that the device may be tilted from side to side for automatic adjustment with relation to the upper journal-box, and also when it is necessary for other purposes. Through the bar C pass vertical rods H H and I I.

J J are bent arms, the central portions of which stand parallel with and upon each side of the shaft D. The upper and lower ends are bent horizontally and extend outwardly from the central portion, as shown. The lower ends have bolted to them the annular ring K, and the shafts H and I pass through the upper portions, the inner shafts H extending down and passing through lugs L, which project from the vertical portions of the plates J.

Upon the edges of the vertical portions of the plates J are fitted other plates M, the four plates thus forming an inclosure through which the shaft D passes. The plates M are firmly secured by means of transverse bars N and bolts passing through their ends exterior to the vertical portions of the plates J, so that they extend across from one plate M to the other and are secured by nuts O. This construction provides a stiff, strong frame-

work from which the ring K is suspended. Around the inner periphery of the ring is fixed the annular rim or hopper P, into which the pulp is delivered.

To the lower part of the ring K are secured the shoes Q, which extend radially out toward the inner periphery of the pan R. These parts, previously described, including the hopper and the shoes Q, being supported from the stationary bar C and the frame, remain stationary, while the pan R is connected with the shaft D, so that it is revoluble. This pan is made with sides which are capable of receiving removable amalgamated plates, and beneath the bottom of the pan is a wooden bottom R'. Across the center of this bottom extends a metal bar or plate S having in the center a rectangular opening. The shaft D has a rectangular portion  $d^2$  adapted to fit the opening in this bar, and above this the shaft is screw-threaded and adapted to receive a nut T.

U is a disk or washer which is first placed over the shaft, resting upon the bottom of the pan. The nut T is then screwed down and the whole device is clamped firmly together, so that the pan is supported by and secured to the shaft D to be revolved with it. Upon the lower end of the shaft and above the step E is fixed the bevel-gear V, and this is engaged by a corresponding gear-wheel W upon the horizontal driving-shaft, through which power is communicated to rotate the pan. The wooden bottom R' is secured to the interior metal bottom of the pan by bolts having heads  $a$  of considerable size projecting up above the interior bottom, so that they stand in radial lines from the center toward the outside. Between these heads are fitted the dies  $b$ , which rest upon the interior bottom of the pan and are retained in place by these projecting bolt-heads. The framework J, which carries the ring K and shoes Q, being vertically slidable upon the guide-rods H and I, will settle down by its own weight, so that the shoes Q rest upon the dies  $b$ , and when the pan is rotated the dies will move beneath the stationary shoes, and grinding will take place at this point.

Vertical plates P' are fixed at top and bottom to the arms J and extend from the outside of the stationary hopper to as near the



inner sides of the pan as possible, and these plates check and prevent centrifugal currents which would otherwise be produced when the pan is in operation.

5 Pulp is delivered into the interior hopper P and passes thence between the shoes and dies, and, having free access to the amalgamated side plates of the pan, any valuable precious metal will be thus amalgamated and  
10 arrested.

In the side of the pan R is made an opening or openings  $R^2$ , and these lead into an exterior vertical channel  $R^3$ , which is formed or secured on the side of the pan, as shown.

15 Beneath the pan and supported upon the base or framework is an annular channel  $d$ . This channel is of such diameter that it lies beneath the line of travel of the vertical discharge-passage  $R^3$ , which is also extended  
20 slightly below the bottom of the pan, as shown, and the overflow from the pan is delivered into this annular channel. Upon one side of this channel is a discharge spout or passage  $d'$ , and the channel is supported at such an  
25 inclination that this discharge passage is lowest, so that the tendency of the flow from the channel will be in this direction, and the overflow will be discharged freely from this channel to any desired receptacle or apparatus  
30 for further treatment. This channel is made in sections, so as to be removed when the pan is to be cleaned up.

Whenever the pan is to be cleaned up after a sufficient amount of valuable material has  
35 been collected, the plate C, with its vertical rods I and H, is lifted off and the framework J and ring K may then be removed, together with the shoes, and finally the dies are removed, thus leaving the bottom of the pan  
40 clear. The pan can then be tilted about the journals of the step E after removing the channel  $d$ , so that any material deposited in the bottom can be cleaned out and the pan placed in condition for further operation.

45 Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In an amalgamator, the combination, of a pan, a vertical driving shaft to which the  
50 pan is secured, means for rotating said shaft, dies fixed in the bottom of the pan, a stationary frame work comprising a central portion upon each side of and parallel with the shaft, having upper and lower outwardly bent arms, means engaging the upper bent arms for hold-  
55 ing the frame stationary, an annular ring secured to the lower bent arms, shoes secured to said ring, and resting upon the dies in the pan, and an open-bottomed hopper fixed to  
60 the periphery of said ring, for delivering the material between the shoes and dies.

2. An amalgamator consisting of a pan with amalgamated sides, a supplemental wooden bottom having a transverse metal bar,  
65 with a polygonal central hole, a vertical shaft extending through said bottom and bar having a corresponding polygonal portion to

fit the hole in the bar, and screw-threads to receive a nut, and plates or washers whereby the bottom is clamped and united to the ver- 70 tical shaft, driving mechanism whereby the shaft and pan are rotated, bolts arranged in radial lines whereby the wooden bottom is secured to the interior metal bottom of the pan, said bolts having upwardly projecting 75 heads within the pan, and segmental dies adapted to fit between the lines of bolts by which they are retained in place, in combination with a stationary frame, annular ring and hopper secured thereto and shoes con- 80 nected with the frame and resting upon the dies in the bottom of the pan.

3. An amalgamator consisting of a pan hav- ing sides adapted to receive amalgamated 85 surfaces, dies removably fixed in the bottom of the pan, a vertical central shaft extending through the pan, and mechanism comprising a transverse metal bar, with a polygonal central hole to receive a corresponding portion of the shaft, said shaft having also a threaded 90 portion to receive a nut, whereby the pan is clamped and secured so as to revolve with the shaft, a non-revoluble vertically movable frame-work having horizontally extending 95 arms engaged and guided by devices supported from above, a ring secured to said frame-work carrying an annular hopper and shoes connected with the ring and resting upon the surfaces of the dies in the pan, an opening or openings made in the side of the 100 pan, a vertical passage into which said openings discharge, said passage extending below the bottom of the pan, and an annular inclined discharge trough in line beneath the passage to receive the discharge therefrom as the pan 105 rotates.

4. An amalgamating apparatus consisting of a pan having the interior sides adapted to be amalgamated, dies removably fixed in the 110 bottom of the pan, shoes supported by a stationary frame from above the pan, adapted to rest upon the dies, a vertical discharge passage exterior and at one side of the pan, with communicating side openings, said ex- 115 terior passage being extended below the bottom of the pan, an annular inclined receiving trough in line beneath the lower end of the passage, a vertical shaft extending through the bottom of the pan and devices whereby it is clamped thereto so that the pan is rotated 120 with the shaft, a step in which the lower end of the shaft turns, said step having horizontal journals turning in corresponding boxes whereby the pan may be tilted about said 125 journals, after removing the shoes and dies therefrom for the purpose of cleaning.

5. An amalgamator consisting of a vertical revoluble pan, with interior amalgamated sides or plates, and shoes fixed in the bottom of the pan, mechanism by which the pan is 130 rotated about its vertical axis, a non-revoluble frame-work supported from above, and comprising a central portion on each side of the shaft and upper and lower outwardly ex-



tending horizontal arms, a ring secured to  
said frame-work carrying an annular hopper  
and shoes which rest upon the surfaces of the  
dies within the pan, and vertical plates ex-  
5 tending from the upper to the lower horizon-  
tal arms of the stationary frame, and from the  
hopper outwardly toward the inner periph-  
ery of the pan.

In witness whereof we have hereunto set  
our hands.

ALFRED BOWES.  
FRED E. PHILBRICK.

Witnesses:

S. H. NOURSE,  
J. A. BAYLESS.