

(No Model.)

2 Sheets—Sheet 1.

P. EDDY.

COMBINED ORE GRINDER AND AMALGAMATOR.

No. 287,256.

Patented Oct. 23, 1883.

FIG. 1.

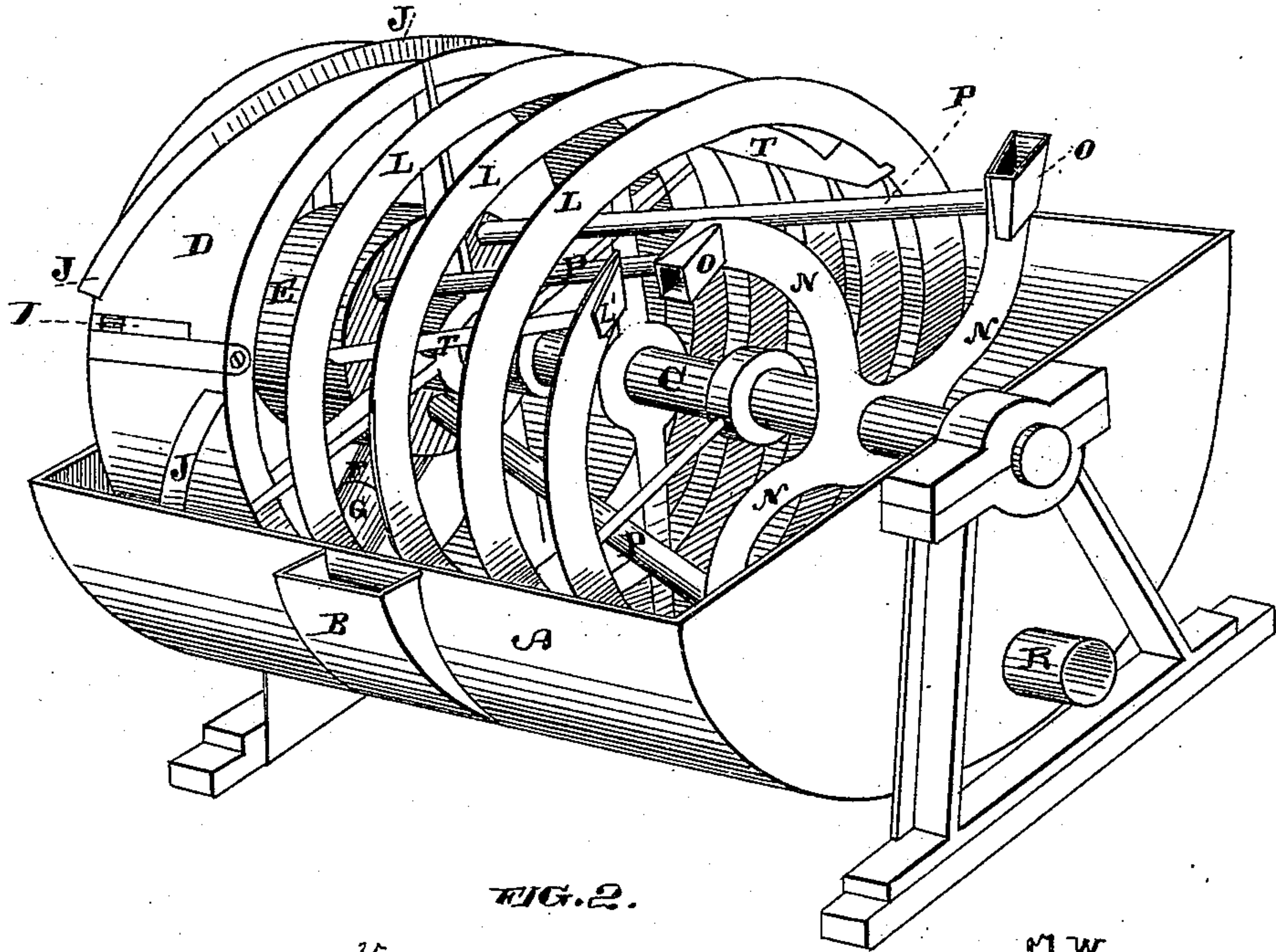
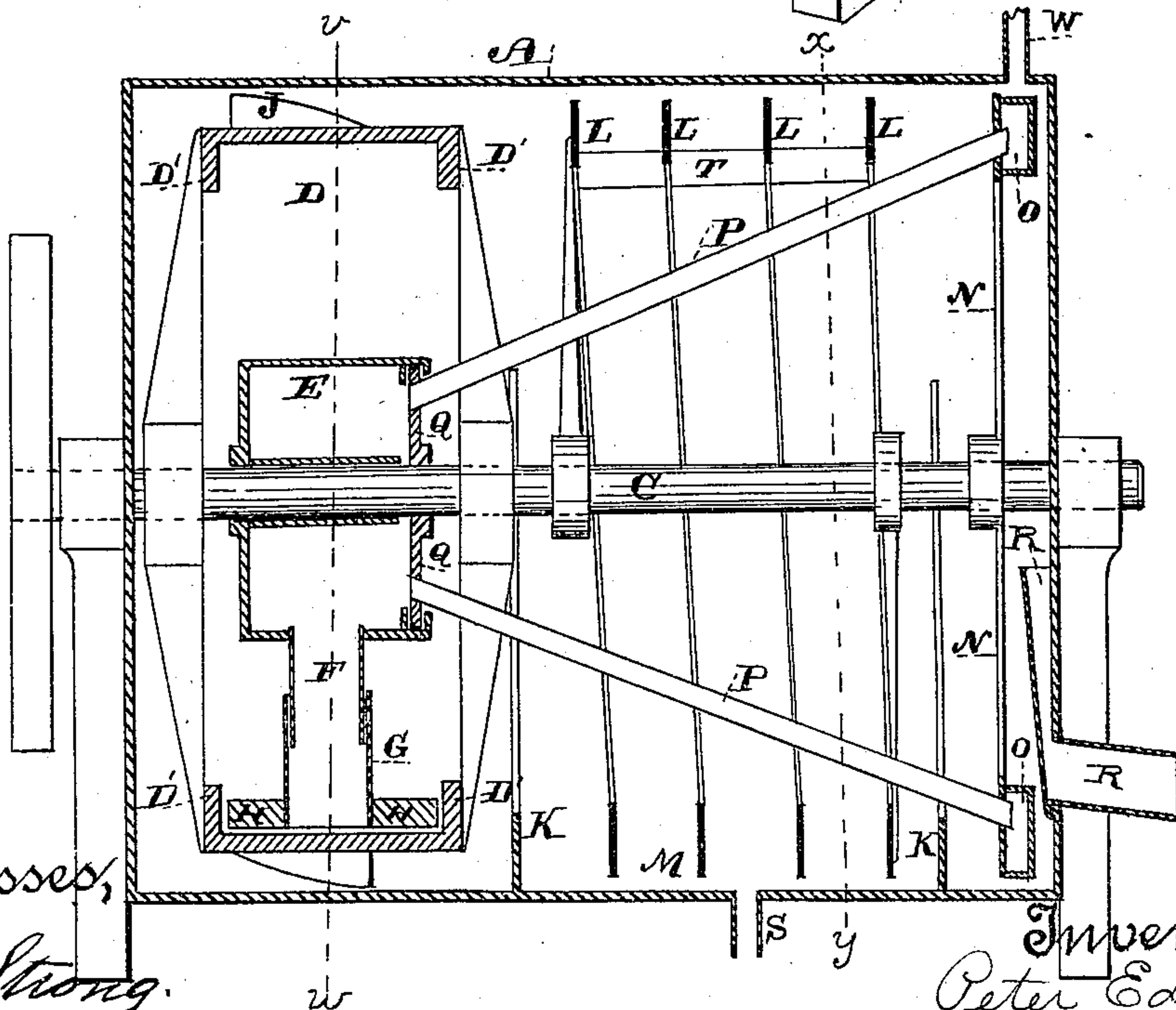


FIG. 2.



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FIG. 3.

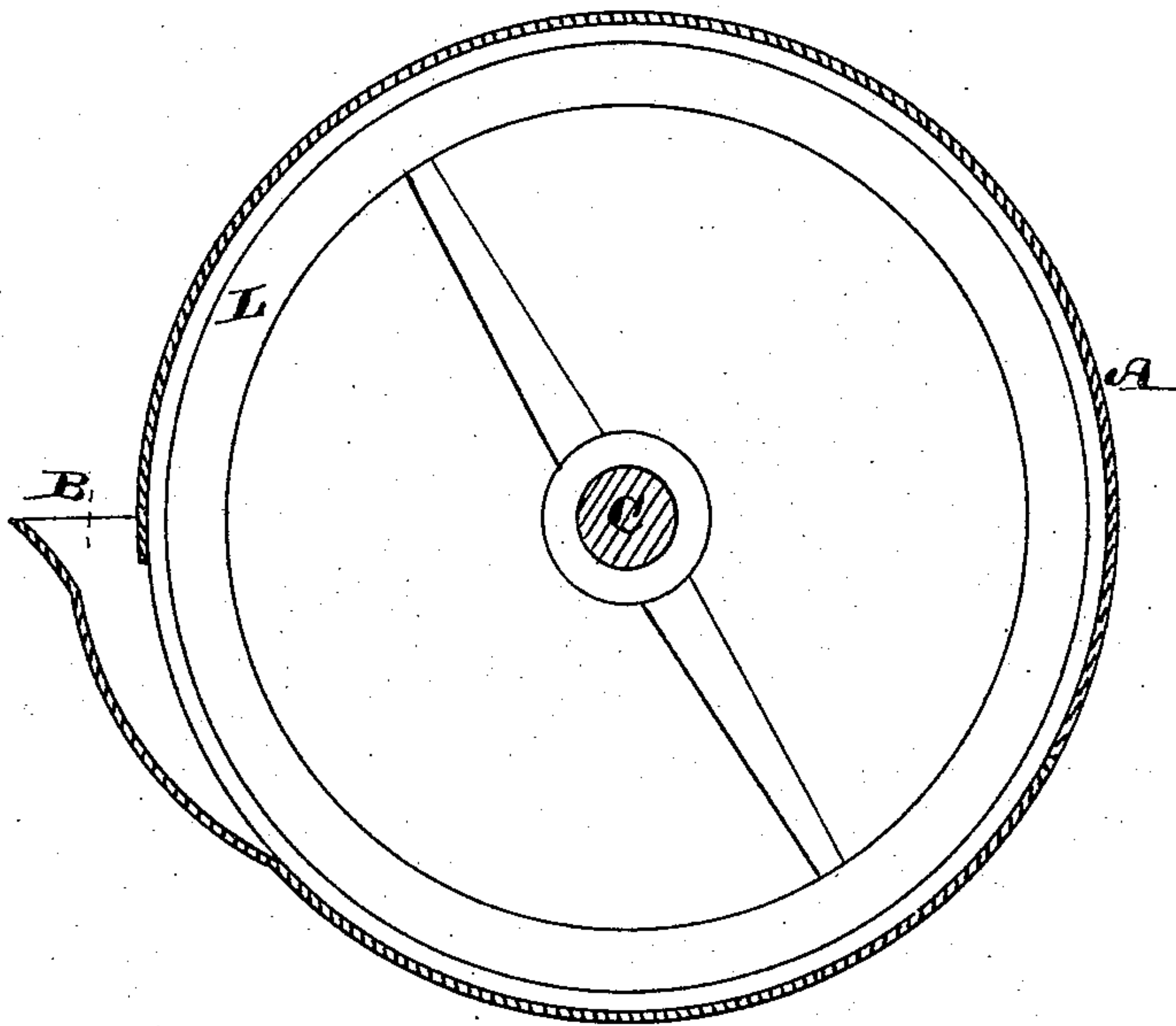
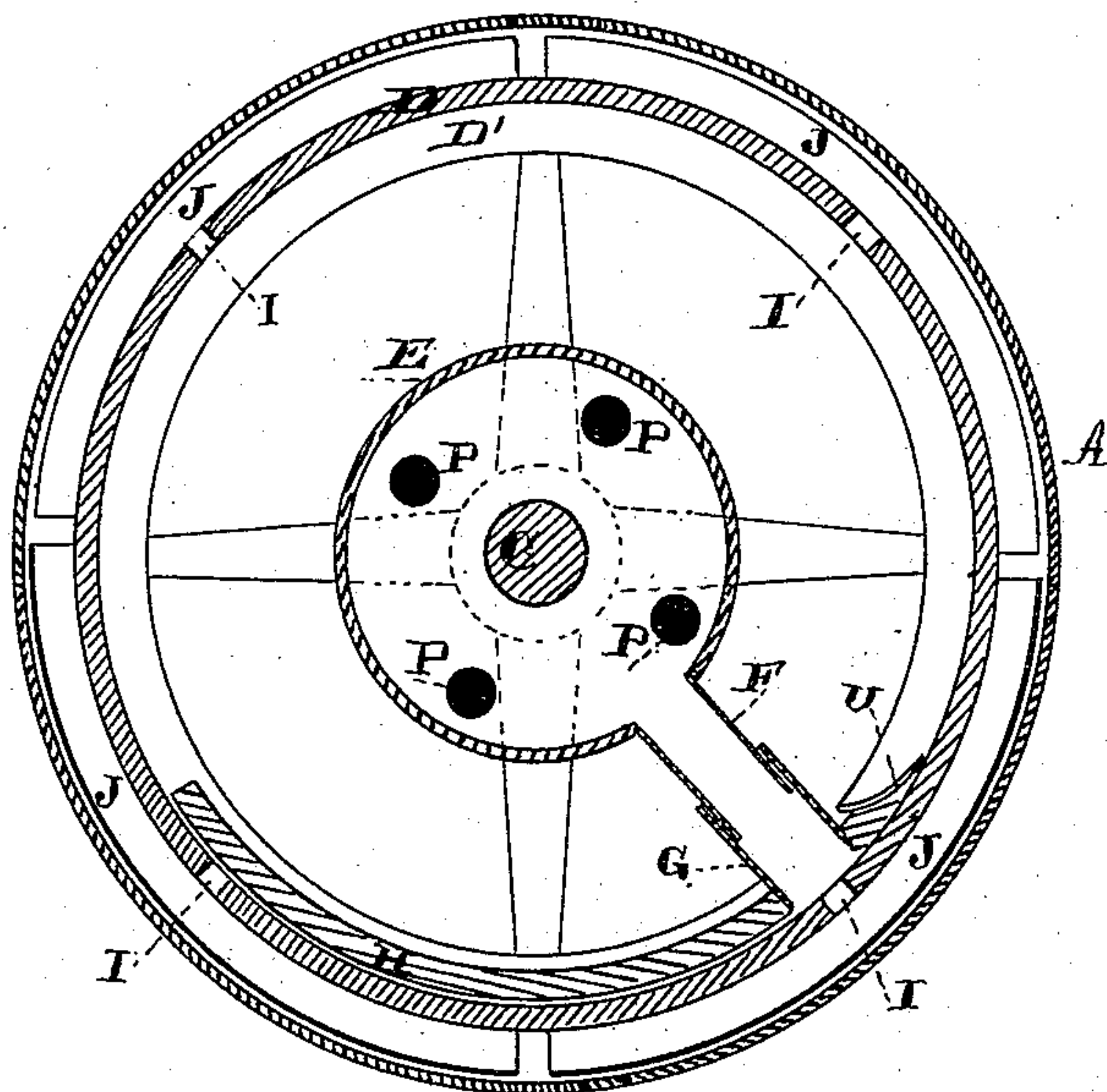


FIG. 4.



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# UNITED STATES PATENT OFFICE.

PETER EDDY, OF NEVADA CITY, CALIFORNIA, ASSIGNOR OF ONE-HALF TO  
JAMES G. HARTWELL, OF SAME PLACE.

## COMBINED ORE-GRINDER AND AMALGAMATOR.

SPECIFICATION forming part of Letters Patent No. 287,256, dated October 23, 1883.

Application filed July 20, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, PETER EDDY, of Nevada City, county of Nevada, and State of California, have invented an Improvement in  
5 Combined Ore-Grinder and Amalgamator; and I hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to an improved apparatus for working ores; and its object is principally to render profitable the further reduction of quartz-mill tailings known to contain  
10 free gold, but classed as of too low grade to be worked with the ordinary apparatus now in use.

15 My invention consists of an exterior horizontal cylindrical shell or case, into which the pulp or tailings are fed, and from which they are lifted by revolving buckets and conveyed through suitable pipes into a grinder revolving  
20 on a horizontal shaft within the shell, and are thus conveyed thence by revolving spiral flanges, so as to pass through a body of mercury contained in a compartment in the lower part of the case, and again returned by the  
25 buckets to the grinder, while the lighter slimes overflow and are carried off, the details of construction being more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a view of my apparatus with the  
30 upper part of the case removed. Fig. 2 is a longitudinal vertical section taken through the line of the axis. Fig. 3 is a section through  $xy$  of Fig. 2. Fig. 4 is a section through  $vw$  of Fig. 2.

35 A is an exterior cylindrical case, of any desired or convenient diameter, placed with its axis horizontal, and supported by a suitable frame-work.

B is a hopper through which the material to  
40 be worked is fed into the apparatus. The case might be formed by scooping out a space in the ground, where of the proper quality, and lining it with clay; but in most cases it will be formed of wood or metal.

45 C is a shaft journaled upon the frame-work and extending across the case in the line of its axis. At one end of this shaft a cylindrical shell, D, of a diameter nearly equal to the interior diameter of the drum, is supported from  
50 the shaft by radial arms, and has inwardly-

turned flanges D', as shown. This shell may have its interior lined with removable plates, or "dies," as they are termed, which may be removed and replaced by others when worn. For convenience in construction, the shell is  
55 made in sections and bolted or otherwise fastened together. Within this shell is a receiver, E, of smaller diameter, which serves to receive the material from supply-pipes hereinafter described, and from which it is conveyed to the  
60 grinding-shoe through a radial pipe, F, which extends outward from its periphery and telescopes into a similar pipe, G, which projects inwardly from the shoe H. This shoe is a heavy iron arc of the same curve as the interior of the shell D, and it rests upon the interior  
65 of the cylindrical shell between the flanges D'. The receiver E turns loosely upon the shaft, and as the shell is caused to rotate by the rotation of the shaft to which it is fixed, the  
70 shoe slides around within it on account of the tendency of gravitation to keep it at the bottom. As it is connected with the receiver by the pipes F G, the receiver turns with it. The pipe G opens through the shoe near the  
75 front end and discharges the material beneath it, so that it is ground as the shell revolves, while the shoe, as before described, remains comparatively stationary at the lowest point. After the separated pulp has passed under the  
80 shoe and been ground, a further separation will take place. The lighter material is floated over flange D' by the action of the water, while the heavier material is carried by the rotation of the shell upward and around the die to  
85 where it comes in contact with scraper U, which diverts it toward 'mercury-tank K.' Beveled or inclined slots I in the shell D serve to let in water, which would otherwise follow around the exterior of the shell as it revolves.  
90

Spiral or screw-shaped flanges L are supported from the axle or shaft C, which have an exterior diameter about equal to that of the shell D, and as these are revolved they carry the material over and through the mercury,  
95 so that any gold contained therein may be amalgamated and saved. The action of this spiral flange causes a slight wave or movement of the mercury in the direction of the discharge, and to counteract this the end of  
100



the spiral flange is provided with a portion having an angle,  $L'$ , in the opposite direction, which checks any further tendency of the mercury to be carried out.

- 5 A series of arms, N, are secured to the shaft C, and have buckets O fixed to them, so as to dip into that portion of the case at the opposite end from the grinding-dies in shell D. These buckets may be made adjustable in size  
10 in any suitable manner, and have pipes P leading from them to the receiver E, which surrounds the shaft within the die. These pipes do not extend in a plane cutting the shaft in line with its axis, but are carried back, so that  
15 as the buckets are brought up to a horizontal position the pipes incline downward toward their discharge end, and the sand or material will thus flow through them without packing or choking. The ends of these pipes pass  
20 through a disk, Q, which is fixed to the shaft, and turns with it and the pipes, while the other portion of the receiver E remains stationary and is kept in place by the gravitating action of the shoe. The telescopic pipe F G allows  
25 the shoe to adjust itself for wear, and by being made square or polygonal in shape it serves as a guide to retain the shoe centrally within the shell and prevent its wearing on either side.  
30 R is an overflow and discharge passage through which the slimes and light worthless particles pass off, while the heavier sand settles to the bottom and is lifted up by the buckets O, and, flowing through the pipes P into  
35 the receiver, is carried thence through the pipe F G, beneath the shoe, to be ground, after which it is again carried by the spiral flanges over the mercury-trough and into the space where the buckets work.  
40 When the pulp or material first enters the case through the hopper B, it is stirred up by the spiral flanges and by the paddles T, which are fixed to them, and an action takes place which allows the heavier valuable portion to  
45 settle to the bottom, where they come in contact with the mercury which is kept in motion, so that any free gold will be amalgamated, while the slimes and light waste are kept in constant agitation and are carried off. A dis-  
50 charge-trap, S, allows the mercury to be drawn off whenever desired.  
It will be seen that the die and grinding-shoe might be removed, the other portions remaining essentially the same, and the apparatus will then act as a separator and amalga-  
55 mator only. A plow or scraper, U, upon the shoe H acts to throw off any sand which may accumulate upon the die. The separated pulp all passes beneath the shoe and escapes at the  
60 rear end, and this is effected by the feed through the pipes F G and the opening through the shoe which cause every particle of the pulp to pass beneath the shoe. Spiral flanges J upon the exterior of the cylindrical shell serve to  
65 agitate and keep the same from packing, and also to force it toward the mercury-chamber in the center. The lower part of the chamber

is kept about one-third full of the material, and provision is made for the introduction of water to thin it, if necessary.

A pipe, W, opens into the case above the buckets O, so that a spray of water may be admitted through it.

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

1. In an apparatus for working gold-bearing sand or pulp, a cylindrical containing-case with a mercury-chamber in the bottom, a series of buckets supported from and revolving with a shaft journaled axially in the case and passing through it, pipes leading from said buckets to a receiver upon the opposite end of the shaft, having a discharge-passage in its periphery, in combination with spiral flanges supported from the shaft, so as to carry the sand through the mercury and separate the heavy from the lighter portions, substantially as herein described.

2. In an apparatus for working gold-bearing sand or pulp, a cylindrical containing-case having a mercury-chamber at the bottom and a central revolving shaft with buckets supported therefrom at one end, and having pipes discharging into a receiver surrounding the shaft near the opposite end, in combination with a revolving cylindrical shell surrounding said receiver, and a shoe sliding in said shell by gravitation, and connected with the pulp-receiver by a pipe, so that the pulp or sand may pass beneath the shoe, substantially as herein described.

3. The cylindrical case A, with the feed-hopper B, the overflow discharge-passage R, and the shaft C, extending through the case, and having the buckets O supported from and rotated by it, and the inclined conveying-pipes P, leading from them to the receiver E, in combination with the cylindrical flanged revolving shell D, the interior sliding shoe, H, and the pipe F G, conveying the pulp from the receiver beneath the shoe and acting as a guide for the shoe, substantially as herein described.

4. The cylindrical case with its revolving buckets, conveying-pipes, revolving shell, and shoe acting by gravitation within the shell, in combination with an inclined flange or plow fitted to the shoe, and spiral flanges upon the exterior of the shell, substantially as herein described.

5. In an apparatus for working gold-bearing sand or tailings, a cylindrical case with a mercury-chamber, and grinding and circulating devices, in combination with the spiral flange L, with its return angular portion  $L'$ , and the transverse paddles T, substantially as herein described.

In witness whereof I have hereunto set my hand.

PETER EDDY.

Witnesses:

NILES SEARLS,  
FRED SEARLS.