

F. P. CAVANAH.  
 WASHING AND AMALGAMATING GOLD, &c.

No. 23,881.

Patented May 3, 1859.

Fig. 1.

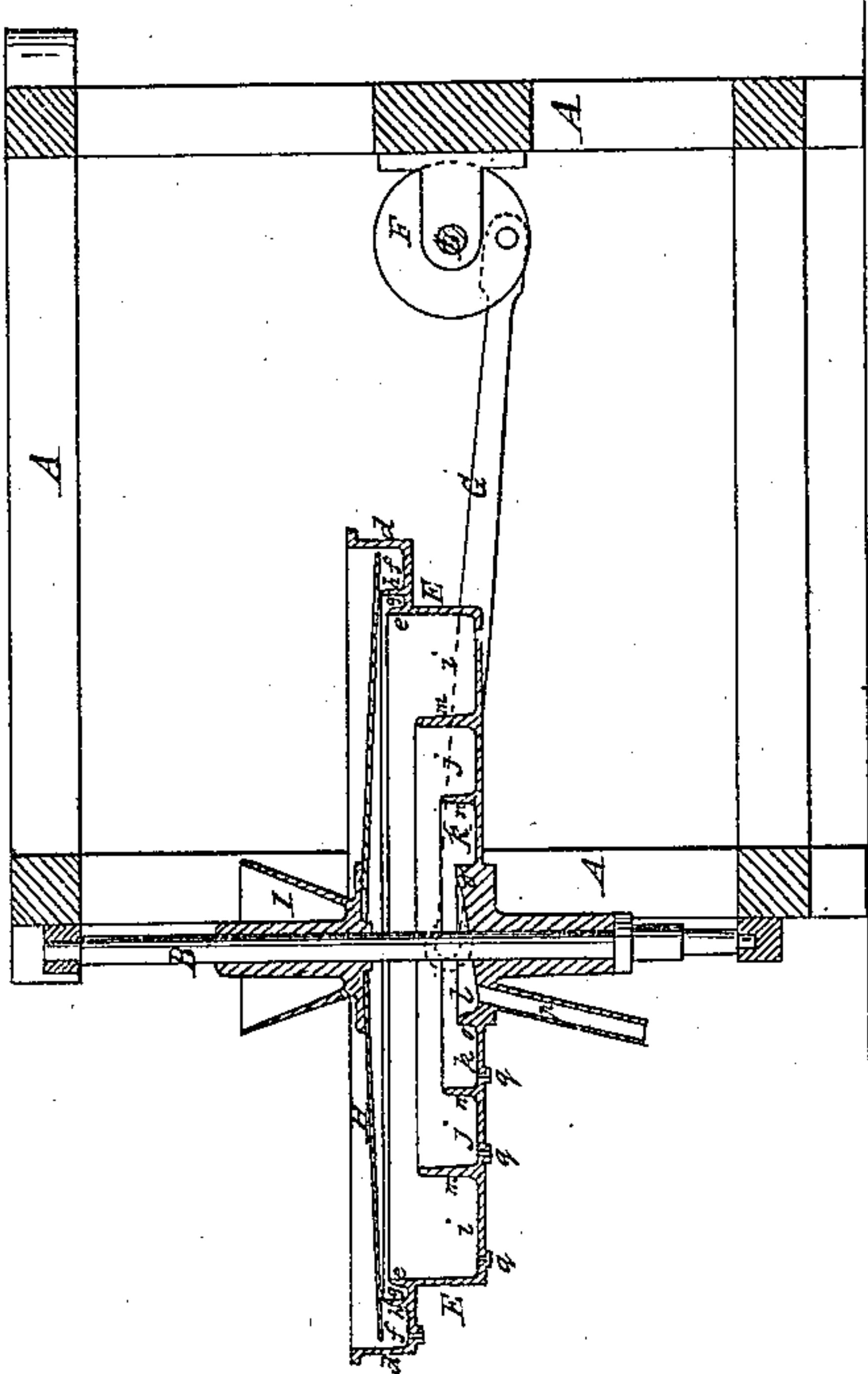


Fig. 3.

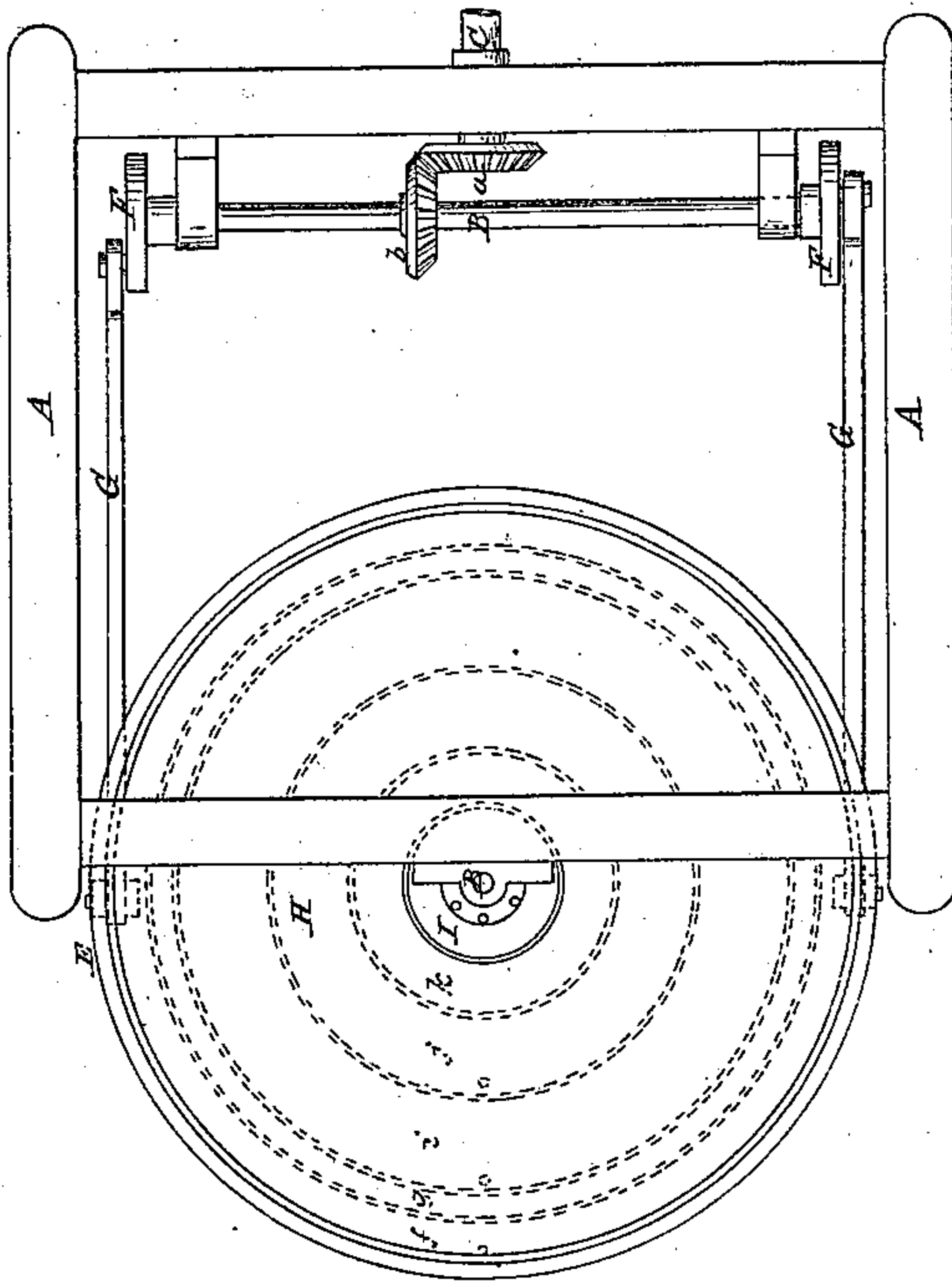
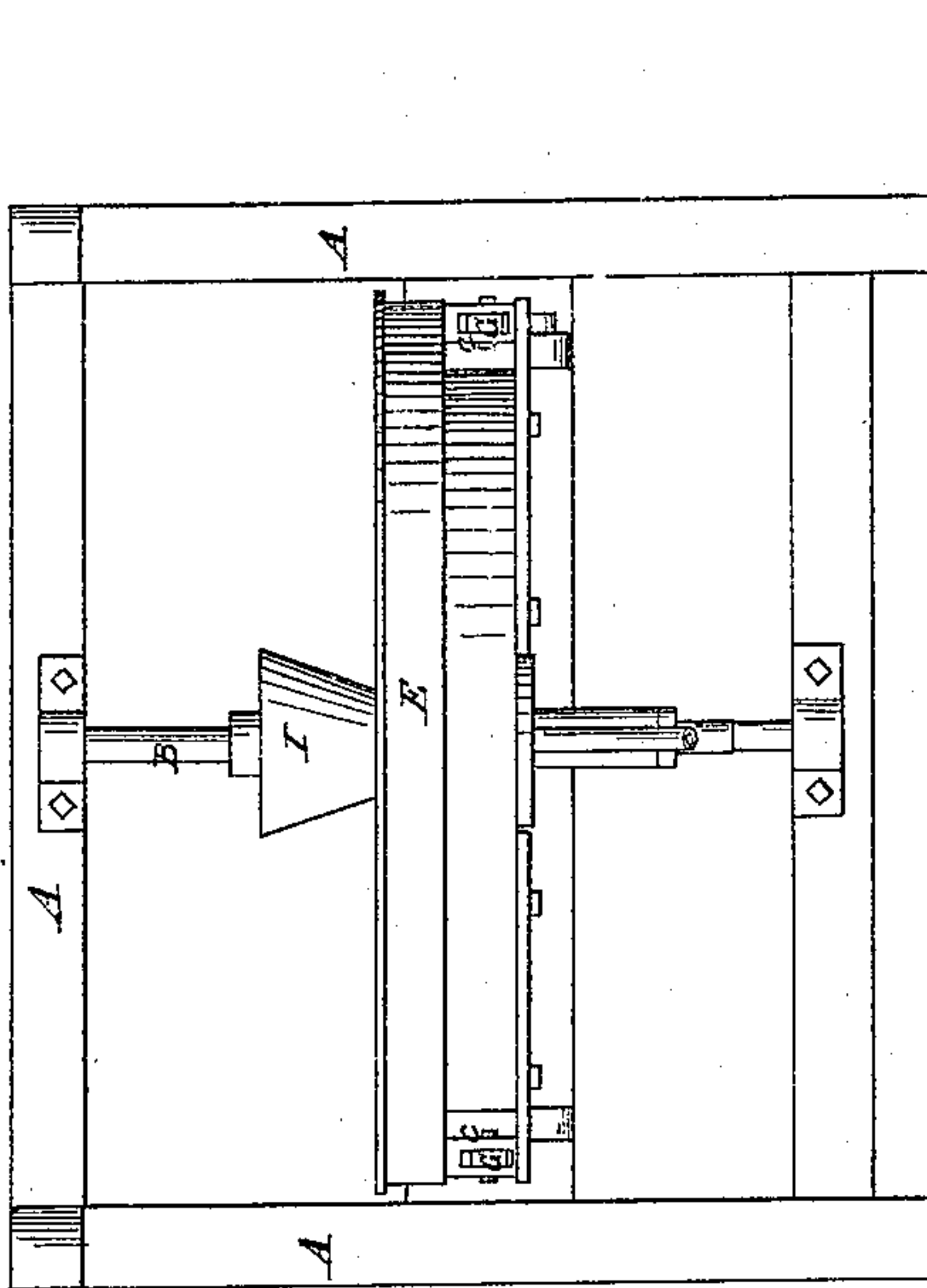


Fig. 2.



WITNESSES:

Morris & Melchor  
 R. A. Morrison

INVENTOR:

F. P. Cavanah.



# UNITED STATES PATENT OFFICE.

F. P. CAVANAH, OF PIONEER MILLS, NORTH CAROLINA, ASSIGNOR TO HIMSELF AND R. H. NORTHROP, OF SAME PLACE, AND W. A. MCCOLLOCH AND E. C. AIKEN, OF ALBANY, NEW YORK.

## AMALGAMATOR.

Specification of Letters Patent No. 23,881, dated May 3, 1859.

*To all whom it may concern:*

Be it known that I, F. P. CAVANAH, of Pioneer Mills, in the county of Cabarras and State of North Carolina, have invented  
5 a new and Improved Machine for Washing and Amalgamating Gold and other Metals; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying  
10 drawings, forming part of this specification, in which—

Figure 1 is a central vertical section of my machine. Fig. 2 is a front elevation of the same. Fig. 3 is a plan of the same.

15 Similar letters of reference denote like parts in all the figures.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

20 A, is the framing of the machine, having attached to it the bearings for an upright shaft B, and for two horizontal shafts C, and D. The shaft B has attached to it the circular separating and amalgamating  
25 pan E, and passes directly through the center of said vessel which is securely keyed to the said shaft. The shaft C, is the driving shaft and carries a bevel gear *a*, which gears with and drives a bevel gear *b*, fast  
30 on the shaft D, which shaft has secured to it two cranks or eccentrics F, F, set in opposite positions and connecting by rods G, G, with lugs *c*, *c*, situated at diametrically  
35 opposite points on the bottom or sides of the pan. The rotary motion of shafts C, and D, is caused by means of the above-mentioned cranks and rods to give the pan E, a horizontal oscillating motion. The pan  
40 E, may be of cast iron or other material of any convenient size. The outermost portion of said pan is elevated as shown at *d*, *d*, in Fig. 1, and separated by a raised circular partition *e*, *e*, from the inner and lower portion and divided into two circular  
45 channels *f*, and *g*, by a circular partition *h*, *h*, of greater height than the partition *e*, *e*, the outer channel *f*, being wider than the next one *g*. The inner and lower portion of the pan, which occupies by far the  
50 greater horizontal area, is divided into a series of circular channels *i*, *j*, *k*, *l*, by means of raised circular partitions *m*, *n*, *o*, the depth of which diminishes in the same ratio as their distance from the center of  
55 the pan. The lower channels should be

much deeper than those in the elevated portion of the pan. The innermost channel *l*, has a large discharge pipe *p*, and the others, including *f*, and *g*, are severally provided each with a small opening *q*, in its bot- 60 tom, which should be fitted with a stopper.

H, is the distributing cover consisting of a circular plate slightly convex on its upper surface and of a size to be received within the outer rim of the pan, and leave a 65 narrow opening all around. This plate is fitted concentrically to the shaft and keyed or otherwise secured thereon at such height that its outer edge is a little below the top of the outer rim of the pan. 70

I, is the funnel through which the pulverized material is introduced to the pan, said funnel being arranged concentrically to the shaft and secured thereto or to the distributing cover H, close to the top of the latter, 75 and having a number of openings in its sides, close to the bottom to discharge the material on to the said cover.

The operation of the machine in washing and amalgamating gold is as follows: The 80 elevated channels *f*, and *g*, have placed in them a sufficient quantity of quicksilver for a portion of it to work over the partition *e*, into the deep channel *i*. The material from which the gold is to be extracted is supplied 85 in a pulverized state continuously and with a suitable continuous supply of water to the funnel I, which delivers the whole on to the distributing cover H, over which it is distributed in all directions and from which it 90 is delivered all around the channel *f*, from which and from all the other channels *g*, *i*, *j*, *k*, there takes place a gradual overflow toward the central channel *l*, whence the water and the sand or quartz are permitted to escape 95 through the pipe *p*. The agitation produced by the oscillating movement of the pan causes lighter foreign matter, viz. sand or quartz, to be brought to the surfaces of the several channels and to be washed away 100 along with the water, while the heavier matters, viz. gold and pyrites, have greater tendency to subside to the bottoms of the channels. The heavier and brighter particles of gold are retained and amalgamated in the 105 outer elevated channels *f*, but such particles as are prevented amalgamating in that channel by the film of foreign metallic particles, which may also amalgamate but which, on account of their lightness, play upon the sur- 110



face of the quicksilver, pass on to the next channel *g*, where even though there may be a similar film upon the quicksilver, the overflowing particles of gold have a second opportunity of being brought into contact with a bright surface of quicksilver afforded by the disturbance produced by the overflow from the first trough which may carry them under said film where they will be amalgamated by the movement of the pan. If any of the gold passes the trough *g*, it falls into the first one *i*, of the larger and deeper troughs which are more especially intended for the concentration of the pyrites, and by the friction of the particles in said trough *i*, bright surfaces are constantly presented by the quicksilver at the bottom of said trough. Little if any gold passes this channel *i*; but if it does, it has a chance in each of the other channels *j*, *k*, of subsiding by its specific gravity to the bottom of such channel and being retained.

The operation can be continued till the channels *i*, *j*, *k*, are full of pyrites, and the latter substance begins to show in the escaping water, and when this condition is arrived at, the supply of matter to the machine is stopped and the operation continued with a supply of clear water through the funnel till all the sand or quartz that last arrived in the machine is washed out, after which the supply of water is stopped and the stoppers are removed one at a time from the holes *g*, in the bottoms of the troughs *i*, *j*, *k*, commencing with the one nearest the center, and (the machine being still in motion) the py-

rites and amalgam or gold contained in them drawn off into vessels placed below to receive it. The supply of mineral and water to the machine is then again commenced and proceeds as before. The amalgam may be withdrawn from the channels *f*, *g*, as often as may be desirable. It is the arrangement of the channels (*f*, *g*) upon or near the rim of the pan *E*, that I consider to be the feature of novelty in my improvement. To wash out the quicksilver amalgam or gold from the pyrites, I subject the latter to a similar operation, in a machine similar in all respects, except that it has no elevated quicksilver channels and is altogether shallower.

My machine may have the general surface of the bottom of the pan convex internally, but the same diminishing depth of the channels toward the center must be presented.

I do not claim, broadly, the invention of a circular washing and amalgamating trough with concentric circular projections on its bottom; but

What I claim as my invention and desire to secure by Letters Patent is,

The arrangement and combination of the elevated quicksilver channels (*f*, *g*) near the rim of the oscillating amalgamating pan *E*, as and for the purpose herein shown and described.

F. P. CAVANAHI.

Witnesses:

MONROE MELCHOR,  
R. H. MORRISON.