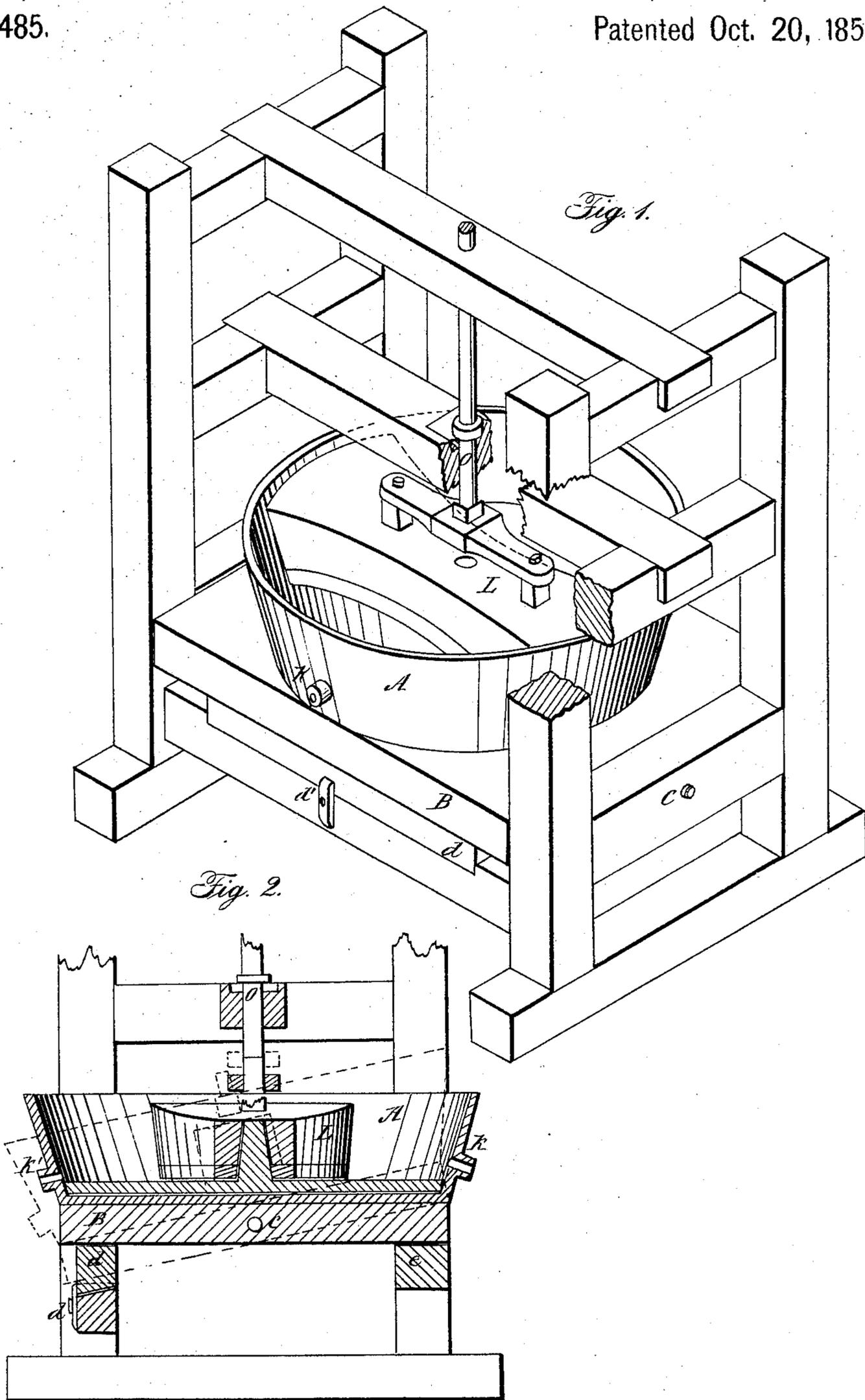


J. A. BERTOLA.  
Ore Amalgamator.

No. 18,485.

Patented Oct. 20, 1857.



# UNITED STATES PATENT OFFICE.

JOSEPH A. BERTOLA, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF AND JOHN STAGG, OF SAME PLACE.

## AMALGAMATOR.

Specification of Letters Patent No. 18,485, dated October 20, 1857.

*To all whom it may concern:*

Be it known that I, JOSEPH ALCIDE BERTOLA, late of Turin, but now of New York, county of New York, and State of New York, have invented certain new and useful Improvements in Machinery for Amalgamating the Precious Metals with Mercury; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being made to the annexed drawing, making a part of this specification, in which—

Figure I is perspective view of my amalgamator. Fig. II is a transverse vertical section thereof.

Similar letters indicate similar parts throughout.

My machine for amalgamating gold and silver ore with mercury consists of a tub secured upon a strong frame in such manner as to be capable of being tilted over, *i. e.* may rock upon an axis. The sides of this tub may be of wood or metal, but the bottom should for greater durability be always of metal. This is put in in the form of a false bottom, so that when worn out it can be easily and cheaply replaced without disturbing the other parts of the machine. In this tub there is a revolving muller, which is driven around by a shaft, but so as to allow its weight to rest upon the bottom, and in such manner also as will permit it to be readily disengaged at the times when the tub is to be tilted to empty its contents. Two openings for emptying are employed. The first is to be used to draw off the water and refuse, and the other to empty the amalgamated mercury. The first spout is therefore a little above the bottom, while the latter is about upon a level with it. At A is a circular tub, which I prefer to have made with the sides flaring. This is set upon a base B, supported in a strong frame by a journal or bolt placed at about the middle, as at (c). It is, while in operation, to be kept in a longitudinal position, and for this purpose a wedge shaped block (d) fits in a space made for the purpose upon the front cross rail, a button (d') keeping it in. When the wedge (d) is in place the back of the bed rests upon the back cross rail (e) Fig. II. The false bottom is seen at (i) Fig. II; it has an upright post or pin cast upon it at its center, and which pin, entering a cavity in the muller, keeps

the latter in a central position in the tub as it revolves. At (k) is the spout for drawing off the ground ores after they have been sufficiently acted upon and while the tub is maintained in its level position; the spout, it will be seen, has its interior orifice a little above the false bottom, as has already been mentioned. At (l) is seen the spout for pouring off the amalgamated mercury, and, as is shown, has its orifice very nearly or quite on a level with the bottom. Into a tub thus constructed is placed a revolving muller, and this is not to be considered either as an agitator simply, or as a grinding apparatus, but its office is to effect the bringing of all the particles of solid matter, however finely divided or pulverized previous to being introduced into the tub, into intimate contact with the quicksilver. A certain degree of pressure upon the bottom is one of the conditions necessary, and another is the mode in which the materials are agitated to insure the passing of all regularly under the bottom of the said muller. For effecting this it is constructed to act as a partition dividing the tub into two compartments from top bottom, or nearly so, or at least to the height at which the ground ores are admitted. If the muller were of metal of these dimensions (in a full sized mill) it would be too heavy. I make it therefore of a block of wood, and face its bottom with iron or other metal. The muller is seen at L, shaped as a cross-bar with its sides concave, and its ends tapering to the shape of the side of the tub. The concavity is for the purpose of insuring equality of wear of the bottom, as by this means the surface is enlarged outward toward the ends and since the rate of wear increases in the proportion of the space passed over. The muller L is made to rotate by a spindle (o) which enters at its lower end into a cross arm fitting upon two pins upon the top of the muller so as to allow of play and also that the arm may be readily removed, which is done by slipping it upon the square part of the spindle, when the muller is set free. This is required to be done before tilting the tub. The bottom of the muller is also grooved like a mill stone. From the above it will be seen that the ores containing the precious metals, and which are to be amalgamated with the mercury, are to be treated by a somewhat

lengthened operation, and in this it differs from other amalgamators wherein the mixtures are flowing in and out of the amalgamating vessels in a constant stream; consequently the mercury can act in those only upon such particles as are brought in contact with it, and which contact is effected in various ways but always in a transient manner. Hence the great waste, but by my process a given quantity of materials are only acted upon at a time and which action is maintained for the required period to effect the amalgamation of the greatest quantity possible out of such given materials, and the results of which plan have proved successful. The operation is therefore as follows: A slow and regular revolution of the muller L is to be maintained by a suitable power. The spouts (*k*) and (*k'*) are to be plugged up. The pulverized ores containing the precious metals are introduced in a mixture of water until the tub is nearly full; the mercury being then poured in the operation goes on, the quantity of mercury being regulated somewhat by the richness of the ores. In a full sized mill from one to four or five pounds is sufficient. As the muller revolves it constantly passes over the mercury spreading it out in a thin stratum upon the bottom, while at the same time that it sweeps over it also agitates the ores, the lightest spangle of gold in which will if brought into contact be caught by the mercury. The motion of the muller is such as, while carrying around the whole mass of ores in the two compartments formed by said muller, to cause a continual change of that in one side to that in the other, in order to do which all must pass beneath in a very thin stratum, and thus be brought into contact with the mercury. This action is to be maintained for such a period of time as may be found necessary, requiring generally from one to two hours to exhaust a charge. It will thus be seen that mine is not a rapid process, but I claim that it is a certain

and economical one, because it will readily be seen that the power required to operate my amalgamator is very moderate and the attendance necessary very little. In the large way therefore a great train will be kept in operation at once, and these need only be charged and discharged at regular periods, the attendance of an operator being only required at those times. At the time for discharging the exhausted ores the plug in the spout (*k*) is to be removed, and the refuse allowed to flow out; this will be done slowly, the muller still continuing in operation until the whole has been discharged as nearly as may be. The amalgamated mercury will now be exposed and may be examined. If it is still capable of taking up more gold, the tub may be filled up with a fresh supply of ore; if otherwise, then stop the spindle (*o*), lift the driving arm off the pins on L, turn the button (*d'*), take out the wedge (*d*), when the tub may be tilted over as seen in the duplicate lines Fig. II. The plug being then taken out of the spout (*k'*) the mercury is readily removed. The whole of the mercury by my process is saved, while by the old a large quantity is lost with the waste ores, or in the crevices of the machines. The tub may now be tilted back and the work continued as before.

I claim—

The machine herein described for effecting the complete amalgamation of precious metals from ores containing such metals—consisting of a double concave muller with grooved bottom extending diametrically from side to side of the tub A, leaving spaces or chambers on each side of it and revolving in said tub upon a central and vertical axis substantially as set forth.

In witness whereof I have hereunto subscribed my name.

JO'PH ALCIDE BERTOLA.

Witnesses:

J. P. PIRSSON,  
S. H. MAYNARD.