M. H. COLLINS.

Ore Amalgamator.

No. 51,021. Patented Nov. 21, 1865.

Fig. 3.

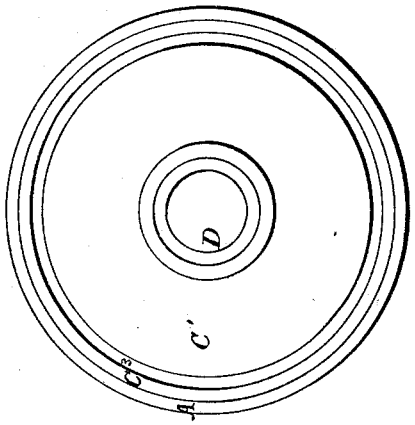


Fig. 4.

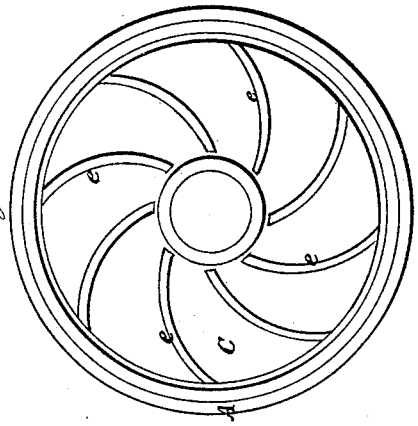


Fig. 2.

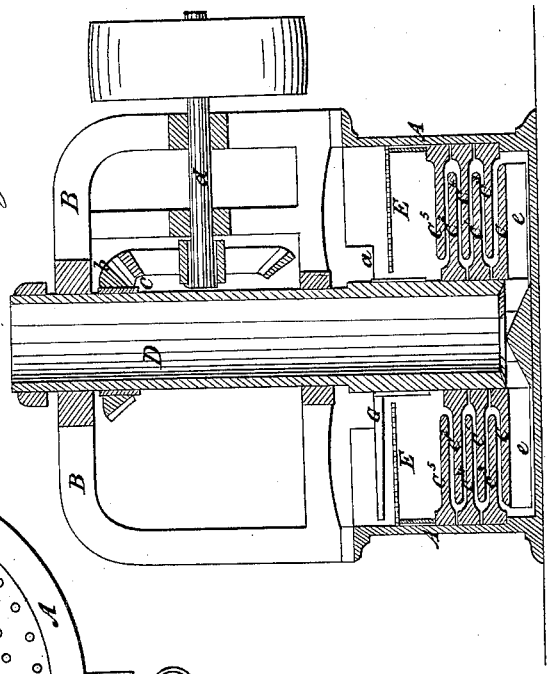
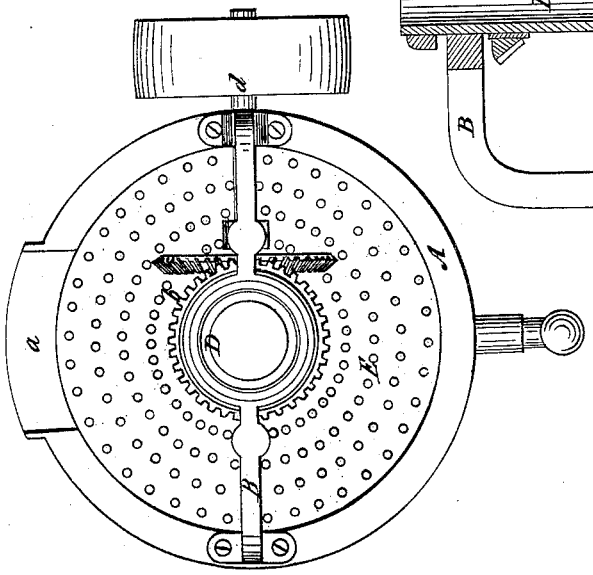


Fig. 1.



UNITED STATES PATENT OFFICE.

MICHAEL H. COLLINS, OF CHELSEA, MASSACHUSETTS.

IMPROVED AMALGAMATOR.

Specification forming part of Letters Patent No. **51,021**, dated November 21, 1865.

To all whom it may concern:

Be it known that I, MICHAEL HENRY COLLINS, of Chelsea, in the county of Suffolk and State of Massachusetts, have invented a new and useful Machine or Apparatus for Amalgamating and Desulphurating Metallic Ores; and I do hereby declare the same to be fully described in the following specification and represented in the accompanying drawings, of which—

Figure 1 is a top view, Fig. 2 a vertical section, and Fig. 3 a horizontal section of it, the latter section being taken through one of the circular disks. Fig. 4 is a horizontal section taken through the propelling-wings, to be hereinafter described.

In such drawings, A is a cast-iron circular tub or vessel provided at its top with a discharging-spout, *a*, and having a frame, B, arranged above and fixed to it. This frame serves to support a tubular shaft, B, and mechanism for putting it in revolution, such mechanism being a bevel-gear, *b*, fixed on the shaft, and a beveled pinion, *c*, carried by a horizontal shaft, *d*. By revolving the shaft *d* and such gears rotary motion may be imparted to the shaft D. The said shaft D, at its lower end, is attached to and opens through a circular plate, C, which is arranged a short distance above the bottom of the tub A, and has a series of radial wings or floats, *e e*, projecting from its lower surface. These wings may be curved or straight or may be otherwise properly formed, in order that they may produce or aid in producing a whirling motion of the auriferous liquid while flowing between them from the shaft D. Besides the plate C there are one or more circular plates or disks, C' C^2, affixed to the shaft, one being arranged over the other, with spaces between them, as shown in the drawings.

Flat annuli C^3, C^4, and C^5 are arranged within the said spaces and against the inner curved surface of the tub in manner as exhibited in Fig. 2. The number of the plates and annuli may be more or less, as circumstances may require.

A foraminous plate or partition, E, is extended across the tub and near its top, and on or about on a level with the bottom of the spout or discharging-opening *a* of such tub. There may also be a discharging-orifice at or near the bottom of the tub, which, when the apparatus may be in use, should be kept plugged.

The object of my invention is to thoroughly scour pulverized auriferous quartz under or in mercury, and to retain the quartz in contact with the mercury a sufficient period for the extraction of the gold.

While the shaft D is in revolution pulverized ore or quartz is to be run into and through it in or with a stream of water let into its upper end, the tub being charged with mercury to a level above its upper annulus, C^5. The shaft being in motion will revolve the plates C C' C^2 and the series of wings *e e*, each of the said plates, except the first, C, being held to the shaft by a feather connection, which will admit of the wing being readily removed from the shaft. The material on entering between the wings will be instantly thrown outward from the axis of the shaft by the action of centrifugal force generated in such material by the wings, and it will be made to pass upward through the serpentine space formed between the plates C C' C^2 and the annuli C^3 C^4 C^5. The said plates, while in motion, not only, by their operation with the annuli, serve to retard the upward flowage of the quartz dust through the mercury, but bring its particles into thorough contact therewith, whereby the precious metal will be effectually removed from the pulp. As the pulp may arise from the mercury and pass through the strainer E any small particles of mercury which would be likely to be driven off with the column of pulp and water will be caught and retained by the said strainer.

The plates C, C', and C^2, fastened to the rotary shaft D, may be fluted or ribbed on their operative surfaces, if desirable, and the same may be said with reference to the annuli. These plates are not to run in contact with the annuli. When the mercury may have become sufficiently charged with the gold the amalgam may be discharged from the bottom part of the tub.

When melted lead is to be substituted for mercury, the tub should have a furnace or suitable means of heating it applied to it, whereby the lead may be heated or melted and kept in a proper state for the performance of the process of amalgamation and desulphurization of

the auriferous quartz, which, under these circumstances, is to go through the lead in a dry state, or without water.

For removal of the oxides and superfluous matters, I employ one or more arms or scrapers, G, which I affix to the shaft D, just at or a little above the upper surface of the lead. The said arm or series of arms while in revolution with the shaft will throw off the dross and rubbish or cause it to be discharged by the spout *a*.

The perforated or foraminous partition E will not be required when melted lead is employed in the tub.

I claim—

1. The combination as well as the arrangement of one or more wings, *e*, or their equivalent, with the tubular shaft D, its plate C and tub A, the whole being as and for the purpose or object hereinbefore explained.

2. The combination as well as the arrangement of a series of plates, C C′ C^2, and a series of annuli, C^3 C^4 C^5, with the tub A and the tubular shaft D, or the same and one or more wings *e*, applied to the said shaft or the lower plate, C, the whole being to operate together, substantially as and for the purpose as specified.

3. The combination as well as the arrangement of the foraminous partition E with the tub A, the series of plates and annuli, and the tubular shaft D or the said shaft and its wing or wings.

M. H. COLLINS.

Witnesses:
R. H. EDDY,
F. P. HALE, Jr.