S. GARDINER, Jr.

Amalgamator.

No. 13,645. Patented Oct. 9, 1855.

Fig. 1

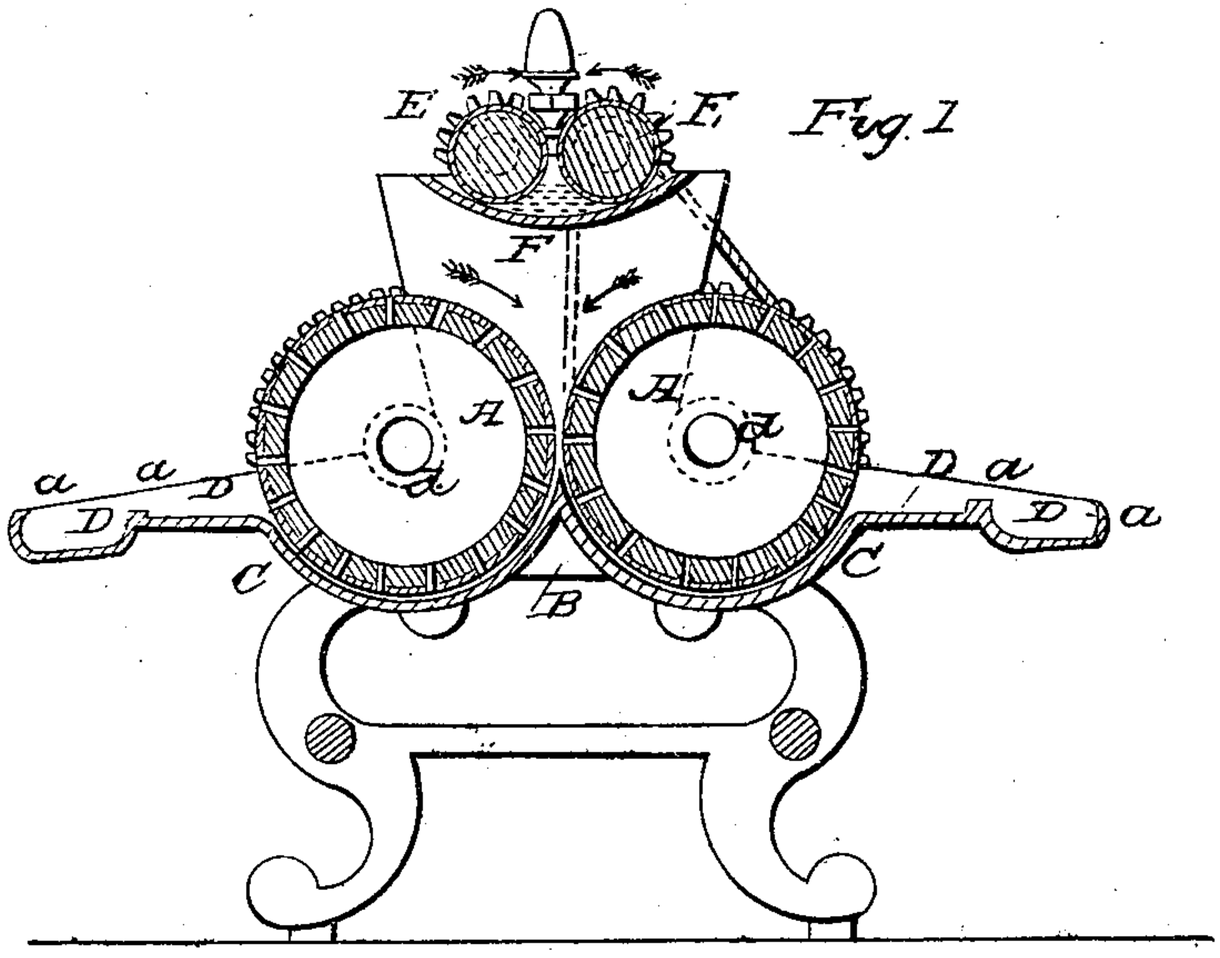
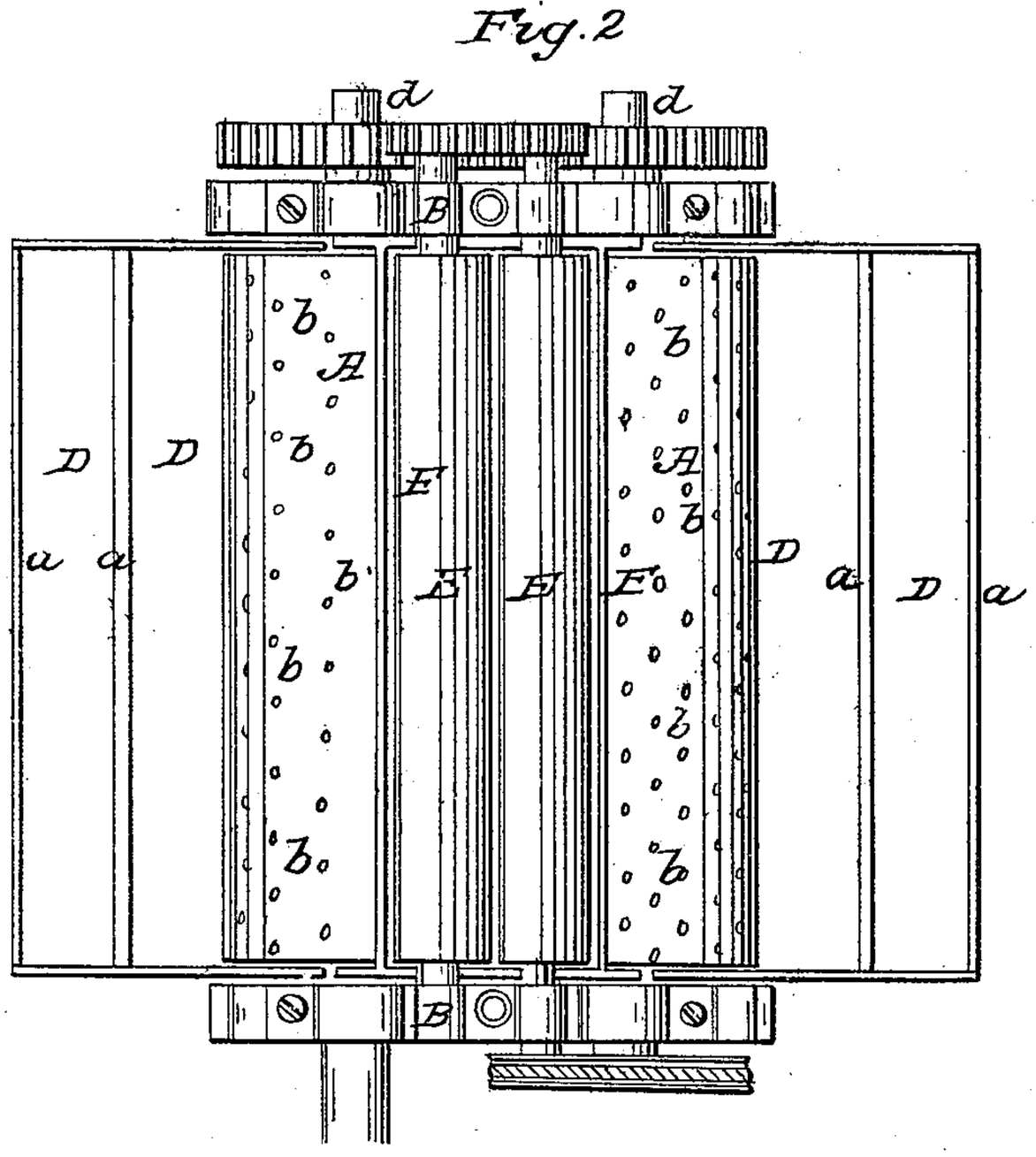


Fig. 2



UNITED STATES PATENT OFFICE.

SAMUEL GARDINER, JR., OF NEW YORK, N. Y.

IMPROVED AMALGAMATOR.

Specification forming part of Letters Patent No. **13,645**, dated October 9, 1855.

To all whom it may concern:

Be it known that I, SAMUEL GARDINER, Jr., of the city, county, and State of New York, have invented a new and useful Improvement in Machinery for Separating Gold and other Metals from Foreign Matter by Amalgamation; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a transverse vertical section of a machine embracing my improvements. Fig. 2 is a plan of the same.

Similar letters of reference indicate corresponding parts in the two figures.

This invention consists in the employment of amalgamating-rollers of novel construction, and in a certain arrangement of such rollers to keep them supplied with the auriferous or other metalliferous matter.

To enable those skilled in the art to make and use my invention, I will proceed to describe its practical application.

A A are a pair of cylindrical rollers of equal size arranged horizontally side by side, parallel with each other, and nearly close together, being supported in bearings in the framing B B of the machine, and dipping and rotating in separate troughs, C C, which are placed close together and contain quicksilver. These rollers are made hollow of cast-iron covered with a tight shell of copper plated externally with silver, to enable them to take up a coating of quicksilver as they rotate. They are closed at one end, and at the other end they receive water to their interior from a suitable head through hollow journals *d d*, and are perforated with small holes *b b*, at not too great intervals, all over their peripheries for the water to issue therefrom in small jets. They are geared together to rotate at the same speed in opposite directions, so that their upper parts approach each other, as shown by the arrows in Fig. 1.

Above the rollers A A and parallel therewith is another pair of rollers, E E, of smaller size, arranged in suitable bearings and in a similar manner to A A relatively to each other, but rotating both in a single trough, F, containing quicksilver. These rollers are so arranged that a vertical plane passing between them will also pass between the rollers A A, and their trough is of a width less than the distance between the centers of the rollers A A, so that any overflow at its sides will fall on the descending portion of the rollers A A. These rollers may be solid, the bodies like those of A A being of cast-iron turned truly to receive a tight shell of copper plated on the outside with silver, to which by reason of its great affinity therefor the quicksilver will adhere readily as the rollers rotate through it.

At the outer sides of the troughs C C are shelves D D, having one or more riffles, *a a*, on each.

The operation of the machine is as follows: The quartz or other mineral matter containing the gold having been previously pulverized, if not already in such a state, is fed with a stream of water through a suitable spout or conductor between the rollers E E, which, by revolving in the trough, are kept constantly coated with quicksilver, which, being spread over a large surface, has the best possible opportunity of collecting the gold from the material which passes over it in a thin sheet. The greater part of the amalgamating process is, however, performed on the surfaces of the rollers A A, and though some of the larger particles of gold are caught in the trough F these rollers E E and trough F are more particularly intended to serve the purpose of distributing the matter, so that it shall be carried by the overflow of water over the sides of the trough F, to be presented in a thin and uniform stream or sheet over the whole length of the surface of the amalgamating-rollers A A. By being thus distributed in a thin sheet over the broad expanse of surface of the rollers almost every particle of the matter will be at once brought in contact with the quicksilver; or, if not at once, it will be as the rollers move onward, for the reason that the matter all falls on the descending parts of the rollers which are approaching each other, and is being thereby compelled to pass between the rollers, which being so close together, compel every particle to be brought in contact with their quicksilver-coated surfaces, and thus almost every atom of gold must be amalgamated. The rollers in revolving through the quicksilver will be washed in quicksilver, and the gold being heavier than the quicksilver will be continuously washed off the rollers and will sink to the bottom of the troughs, and the rollers

will be continually coated with clean quicksilver. The foreign mineral matter will be washed away by the water overflowing from the troughs C C over the shelves D D, part of the said water being supplied with the auriferous matter and part by the jets issuing through the holes *b b* in the cylinders. The jets from the cylinders are to keep the cylinders clean and keep the matter from packing between the rollers, and keep it in a lively state or in constant motion at all parts of the surface of the rollers.

The reason why the two troughs C C are employed instead of a single trough, like that under the distributing-rollers E E, is that a less quantity of quicksilver is required, and that in a single trough the foreign matter is very liable to pack and form a bank of nearly the same form as the figure formed by the union of those two troughs, and the amalgamation would be thereby obstructed; but, by carrying up the inner sides of the two troughs E E till they meet in a sharp edge the packing is prevented and the matter caused to be washed down into the troughs. The riffles *a a* will catch any gold escaping from the troughs; but they are more particularly intended to catch any globules of quicksilver that may be washed off the rollers by jets issuing toward the shelves.

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

1. The hollow perforated rollers A A, receiving water at their journals and discharging it in small streams all over their peripheries, and revolving in opposite directions in a trough or troughs of quicksilver, so that their upper parts are constantly approaching each other, and having the auriferous or other metalliferous matter fed above or between them, all substantially as herein described.

2. The arrangement of the amalgamating-rollers and the distributing-rollers and trough, substantially as herein shown and described, whereby the matter is fed equally on both amalgamating-rollers and on the descending portions thereof.

SAMUEL GARDINER, JR.

Witnesses:

JOS. GEO. MASON,

WM. TUSCH.