(No Model.)

S. F. CLOUSER.

Process of and Machine for Amalgamating Gold and Silver Ores.

No. 239,448. **Patented March 29, 1881.**

Fig. 1.

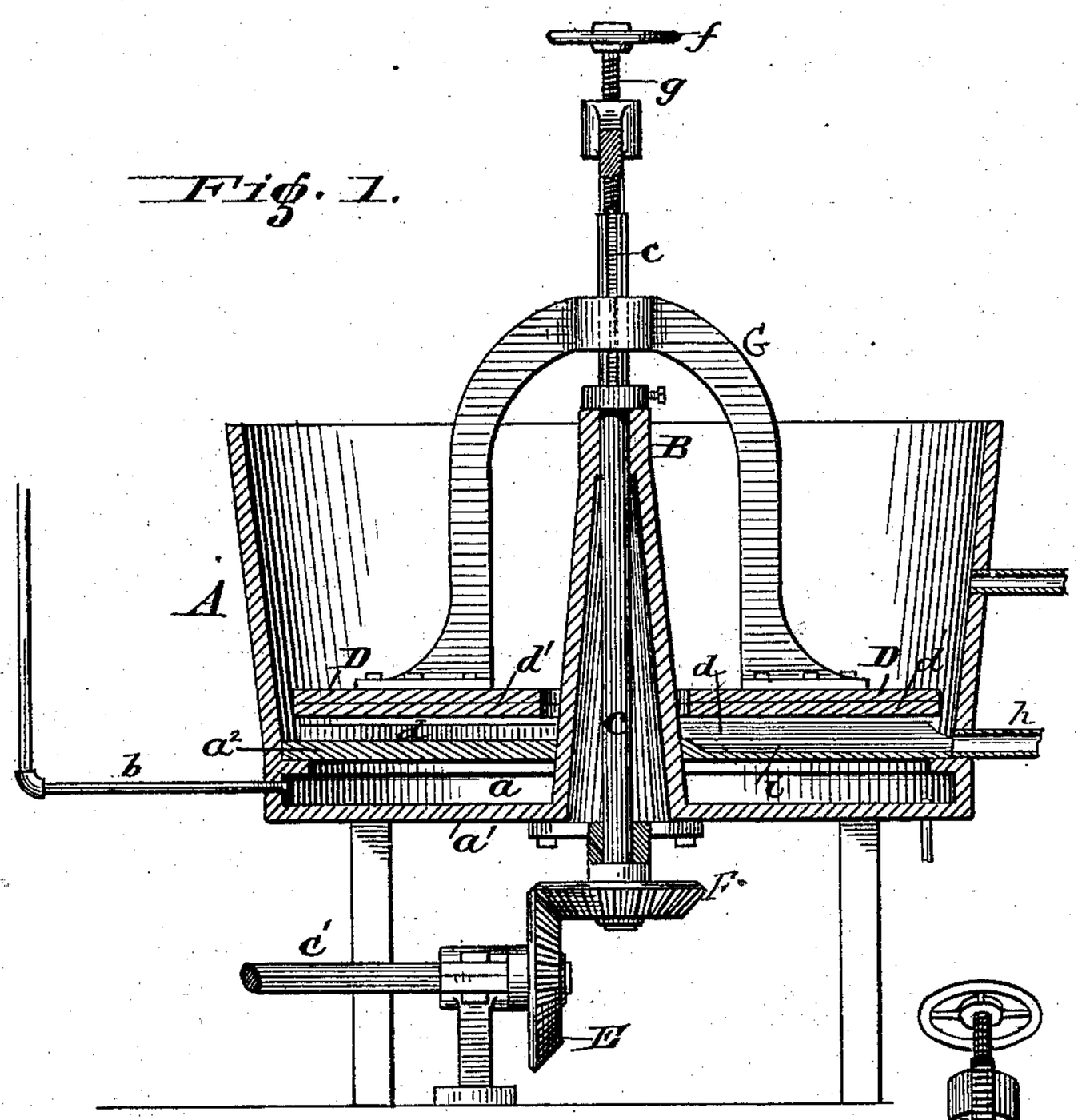
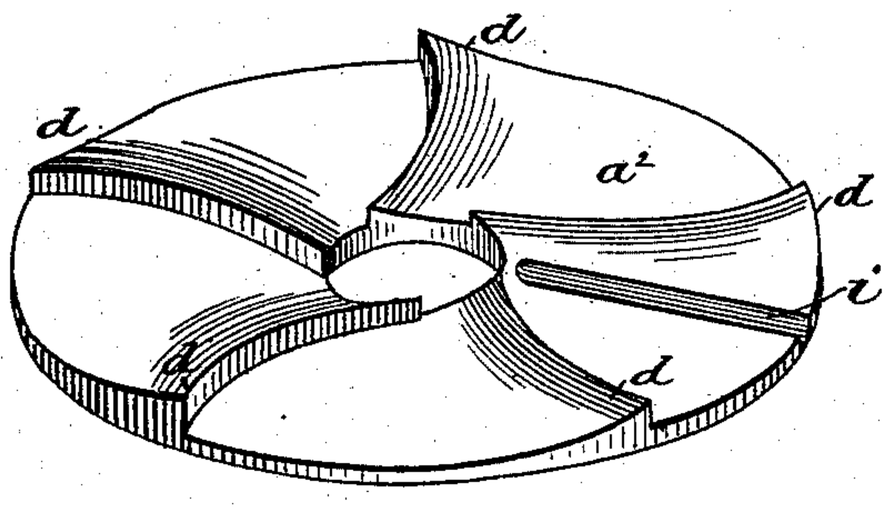
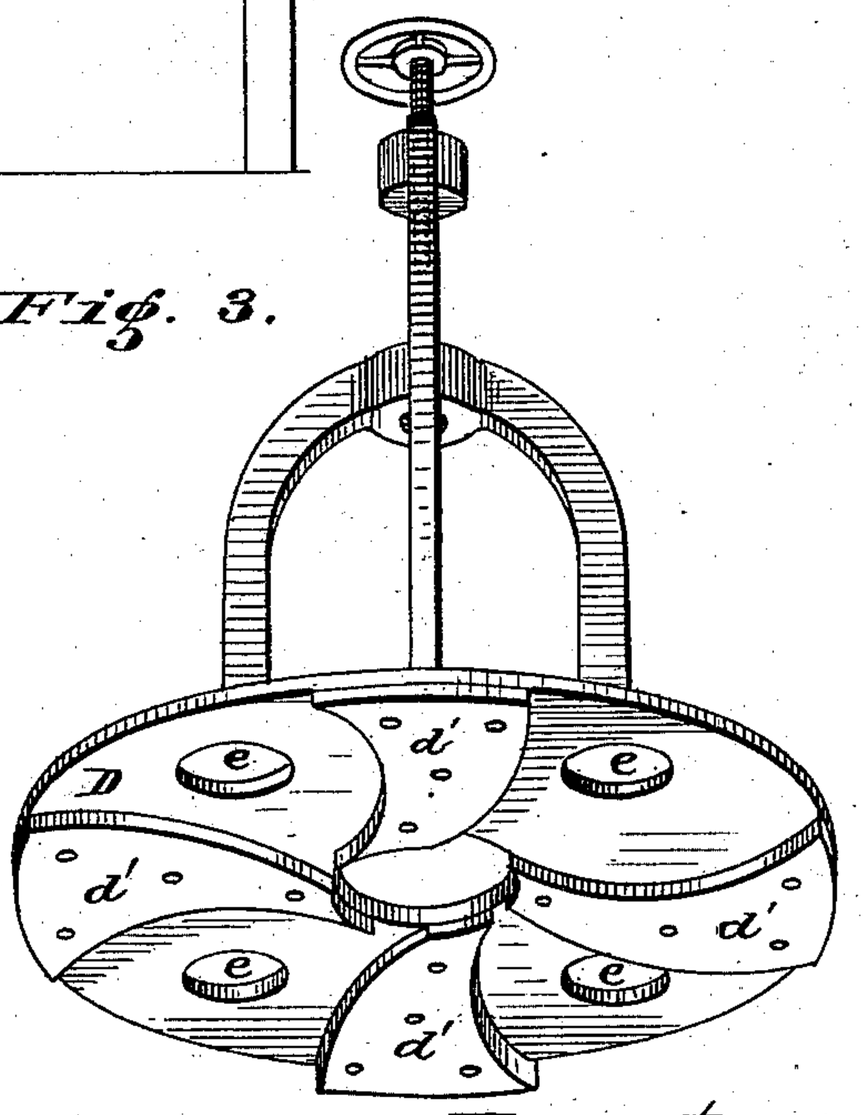


Fig. 2.

Fig. 3.





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UNITED STATES PATENT OFFICE.

SAMUEL F. CLOUSER, OF NEW YORK, N. Y., ASSIGNOR TO THE CLOUSER LIQUID MERCURY AND ELECTRIC AMALGAMATING PROCESS COMPANY, OF NEW JERSEY.

PROCESS OF AND MACHINE FOR AMALGAMATING GOLD AND SILVER ORES.

SPECIFICATION forming part of Letters Patent No. 239,448, dated March 29, 1881.

Application filed September 22, 1880. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL F. CLOUSER, of the city, county, and State of New York, have invented a certain new and Improved Process of Amalgamating Gold and Silver Ores, and those of other precious metals, together with improvements in a machine for carrying said process into effect, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

In the accompanying drawings, showing the machine aforesaid, Figure 1 is a vertical section. Figs. 2 and 3 are perspective views of different parts of the machine, as hereinafter described.

Similar letters of reference indicate similar parts of the invention.

A is the pan of the machine, of the ordinary construction, having the steam-chamber *a* between the bottom proper, *a'*, and the false bottom a^2. The steam-chamber is supplied with steam by means of the pipe *b*. The pan is provided with a tubular column, B, which serves as the bearing for the vertical shaft C, driven by gearing, as shown. The upper surface of the false bottom a^2 is formed, as indicated in Fig. 2, with a series of teeth, *d*, radiating in curved lines from the center to the periphery, which teeth or projections give a grinding or cutting character to the said surface. Above the false bottom, and driven by the vertical shaft C, is a revolving disk or plate, D, the under side of which is shown in perspective in Fig. 3. The disk D is provided with curved plates or shoes *d'*, bolted thereto, the sides or edges of which are radially curved in reverse order to the curvature of the teeth or projections *d* of the false bottom. In the disk or plate D are cut openings *e*, which afford communication to the space between the disk and the false bottom. The disk or plate D is connected with and driven by the shaft C, by means of the driver E, and may be regulated with respect to its distance from the false bottom by the use of the hand-wheel and screw *f g*.

In conducting the process by the use of the machine, the desired amount of ore—say one hundred pounds—after having first been ground or crushed in the ordinary manner, is placed in the machine, which contains thirty to fifty pounds of ordinary commercial mercury or quicksilver, and which is running at a speed of about forty revolutions per minute. The following chemicals are then added—that is to say, one ounce bisulphate of mercury, two ounces chloride of calcium, one ounce sulphate of copper, one-fourth ounce bichromate of potash, and one-half ounce sulphuric acid. The ordinary heat is then applied, by admitting steam between the bottom and false bottom of the pan, and the ore treated for three hours, being rubbed or ground between the teeth of the false bottom and the shoes of the disk or plate D. It is then removed through the opening *h*. The mercury and precious metals collect in the pan in the space between the disk D and the false bottom, and are removed at stated times through the trough *i*, cut in the top of the false bottom, and which leads through the side of the pan. The process is then begun anew with another charge of ore.

The compound introduced into the amalgamator consists of the bisulphate of mercury, chloride of calcium, sulphate of copper, bichromate of potash, and sulphuric acid. The reaction will be as follows: The sulphuric acid will, in part, attack the chloride of calcium and bichromate of potash, liberating hydrochloric and chromic acids, whereby a large amount of acid is present to favor the passage of the electric current, which induces the decomposition of the bisulphate of mercury, and the mercury thus liberated amalgamates with any flour or meal gold, which otherwise would be lost, because of not sufficient weight to be precipitated. Any excess of acid above that needed to produce electrolysis would also remove such earthy materials in the mixture as are soluble therein, which would be precipitated, leaving the solution free of such impurities, thus giving a better electric action.

The proportions of the chemicals may be varied somewhat, according to the richness of the ores treated. The machine is preferably of a capacity for the treatment of three hundred pounds at one charge.

I am aware that a process of amalgamating a precious metal in a finely-divided state, by

depositing mercury thereon from a soluble salt of mercury by local electro-chemical action induced between the precious metal and particles of zinc or other suitable material distributed throughout the mass to serve as a positive pole or anode, has heretofore been employed; and I am also aware that, during the operation of grinding the auriferous or argentiferous ores, dilute acid has been added to put the ores under favorable condition for the galvanic influence, the gold and silver in a metallic state being thrown down either by the grinding-machine itself, or by appendages attached thereto in the form of scrapers, rakes, or plates made of iron, copper, or zinc, and I therefore lay no claim to such invention.

Having described my improved process and machine, I claim as my invention—

1. The within-described process of amalgamating gold and silver and other ores, by placing the ground or crushed ore in a revolving mill containing mercury, adding (for one hundred pounds of ore) one ounce bisulphate of mercury, two ounces chloride of calcium, one ounce sulphate of copper, one-fourth ounce bichromate of potash, and one-half ounce sulphuric acid, applying steam heat, and treating, substantially as set forth.

2. The combination, with the amalgamator A, having the tubular column B and opening *h*, of the false bottom a^2, having the series of teeth *d*, radiating in curved lines, and trough *i*, steam-chamber *a*, perforated disk D, provided with shoes *d'*, radially curved in reverse order to the curvature of the teeth of the false bottom, arch G, hand-wheel *f*, screw *g*, shafts C C', and pinions E F, substantially as described, and for the purpose set forth.

In testimony whereof I hereto set my hand this 22d day of September, A. D. 1880.

SAMUEL F. CLOUSER.

Witnesses:

F. C. SOMES,

H. J. BAILEY.