

J. M. Phelps.
Amalgamating Ores.

Nº 44775

Patented Oct. 18, 1864

Fig. 1.

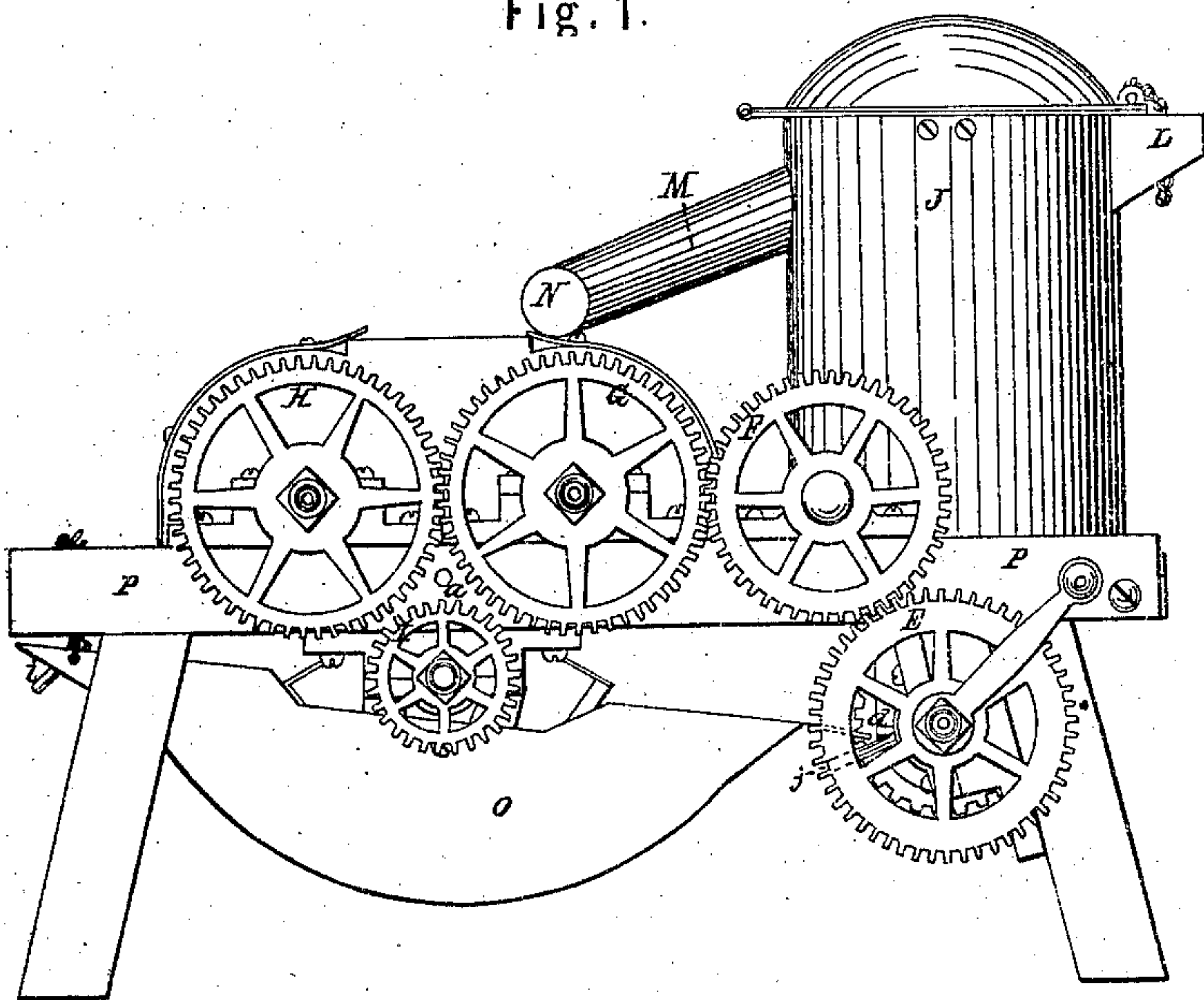
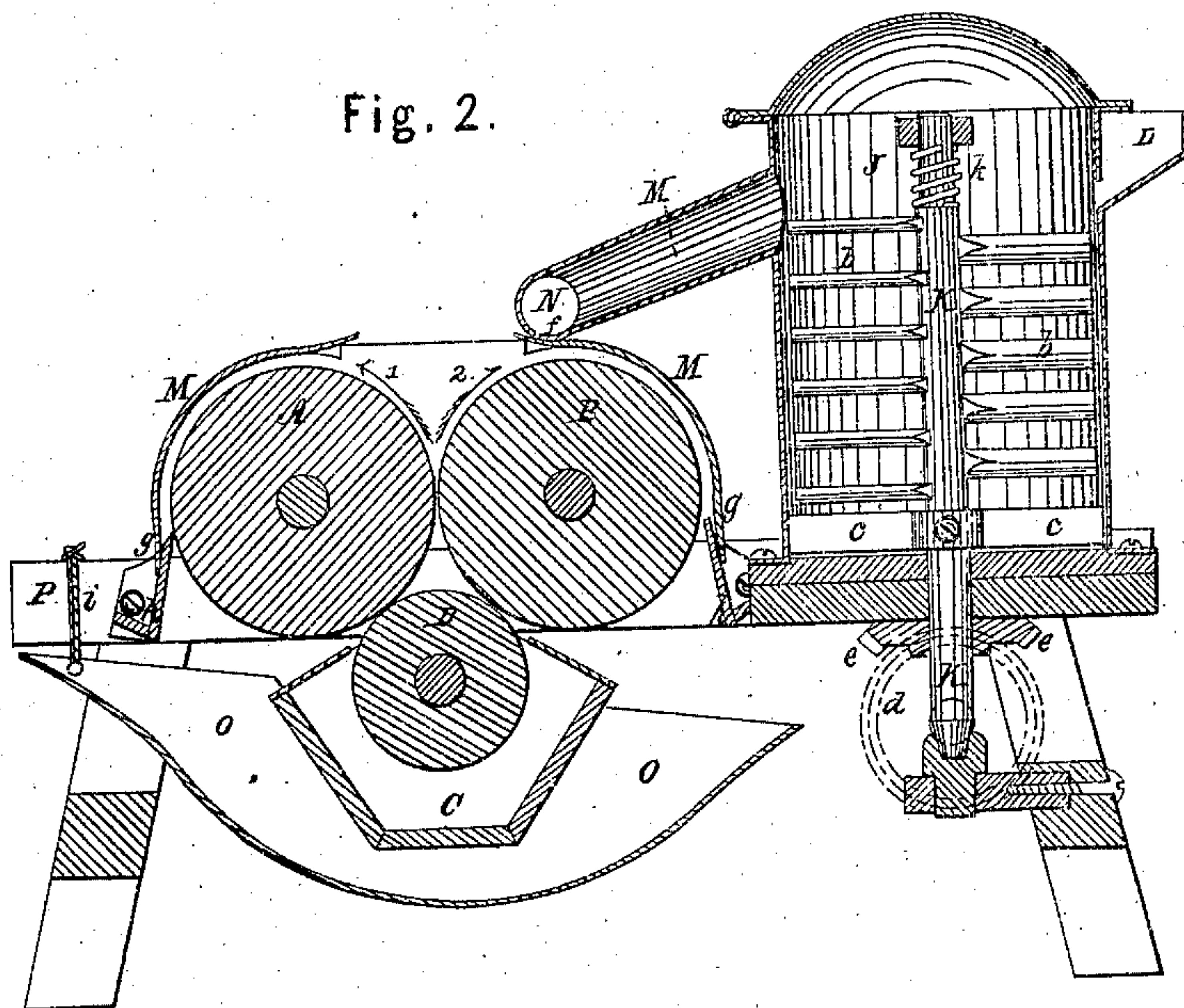


Fig. 2.



Witnesses.

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UNITED STATES PATENT OFFICE.

JAMES N. PHELPS, OF NEW YORK, N. Y., ASSIGNOR TO PHELPS ELECTRO-AMALGAMATING COMPANY, OF NEW YORK CITY.

IMPROVED AMALGAMATING APPARATUS.

Specification forming part of Letters Patent No. 44,775, dated October 18, 1864.

To all whom it may concern:

Be it known that I, JAMES N. PHELPS, of the city, county, and State of New York, have invented a new and useful Improvement in Machinery for Amalgamating Gold and Silver Ores; and I do hereby declare the following to be a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents an end view of the machine; Fig. 2 represents a transverse vertical section through the rolls, mulling, and steaming apparatus, mercury-fountain, and amalgam-receiver.

Similar letters of reference where they occur in the separate figures denote like parts in both the drawings.

I am aware that metallic surfaces have been coated with quicksilver by the aid of electric or galvanic action for the purpose of amalgamating gold and silver ores; but, as heretofore practiced, the process of coating the metal surfaces was not continuous and the amalgamating process could only continue so long as the surfaces contained quicksilver not charged with the precious metals. These coated surfaces, too, have most generally been flat like plates, or in the shape of screens, though the insides of hollow cylinders have been so coated; but in all these cases, when the amalgam is to be removed, the machine must be stopped, and when removed the surfaces were again to be re-coated before the process could again go on or be repeated.

The object and purpose of my invention is to make a continuous process out of what heretofore has been an intermittent one, and by which much time and expense are saved in the collecting of the precious metals from their ores; and my invention consists in applying a quicksilver-fountain to an amalgamating-machine and a carrying or conveying mechanism that takes the quicksilver therefrom and carries it to the external surfaces of revolving metallic cylinders, either constantly or at such stated intervals as may be found necessary to keep said cylinders supplied; and my invention further consists in the use of electric or galvanic action, chemical or mechanical, in combination with a quicksilver-fountain, conveyer, and re-

volving cylinders; and my invention further consists in combining with one or both of a pair of cylinders whose surfaces are constantly supplied with quicksilver a scraper or delivering mechanism for constantly or intermittently taking the amalgam from their surface and directing it into a proper receiver; and my invention further consists in delivering the crushed ores to the external surfaces of coated cylinders in a thin film from the mulling and steaming or purifying apparatus.

To enable others skilled in the art to make, use, and apply my invention, I will proceed to describe the same with reference to the drawings.

A B are two metallic-surfaced cylinders, one of which may be of copper and the other of iron, or both may be of iron or other metal, susceptible of being coated with quicksilver. Underneath these rolls or cylinders A B there is placed a receiver, reservoir, or fountain, C, to contain quicksilver, and a carrying or conveying roller, D, is so hung in said receiver or reservoir as to revolve in contact with the quicksilver contained in it, and in contact with the rollers A B above it, so that it may take and carry from C the quicksilver in small quantities and deliver it to the surfaces of the rolls A B. The rolls A B have motion communicated to them by suitable gearing, E F G H, and the conveying-roll D may be revolved through a spur-gear placed at *a*, Fig. 1, so as to work into a gear, I, arranged on its journal; or it may be turned by the friction simply between it and the rolls A B. This roll D may be of metal or of wood covered with rubber, felt, cloth, buckskin, or other material, and in the reservoir *c* may be placed the chemicals used for getting up the necessary electric or galvanic action for causing the surfaces of the rolls A B to be more readily coated or plated with the quicksilver, if chemical electricity or galvanism be used. If, however, a battery or mechanical electricity or galvanism be used, it may be applied by a wire or wires leading to the rolls from the apparatus. I, however, prefer the chemical electricity or galvanism, as it is more convenient.

J is a closed chamber, in which a hollow shaft, K, provided with arms *b* and plates or conical rollers *c*, is caused to turn through the

bevel-gears *d e*. Steam is admitted into this vessel or chamber J through the hollow shaft K, or otherwise; and the ore is supplied through the hopper L and the mulling and purifying process is there carried on. The comminuted ore passes from the chamber J through the pipe M, and thence into a pipe, N, that lies lengthwise along one of the amalgamating-rolls, and has a narrow slot, *f*, Fig. 2, through it, through which the ores pass onto the roll B in a thin sheet or film. Or it may be delivered onto both rolls, if found desirable.

A scraper, *g*, works in connection with the roll A (and another may work similarly in connection with B) and scrapes the amalgam from it, which gathers in the angle *h* of the scraper, and thence passes into a general receiver, O, where it may accumulate until ready to separate the precious metals from the quicksilver in the usual way. The receiver O is hung to the frame P of the machine by elastic or flexible cords or chains *i*, and an arm, *j*, on the shaft that carries the gears E *d* strikes it as it comes around to settle its contents and cause it to run together.

This machine may be kept in continuous operation for weeks or months, or so long as the two ore and quicksilver holders are kept supplied and the machine kept in motion. The amalgam may be removed from O without interfering with the operation of the machine. The scrapers may work continuously or intermittently, depending upon the richness of the ores or otherwise that are being treated.

The shaft K and its stirrers or mullers may rise, should they at any time be overstrained with the material in the chamber J, a spring, *k*, being affixed to the shaft for that purpose.

M M are jackets made of copper, zinc, or other metal or material. They partially surround the cylinders A B, and are designed for keeping the ores in contact with said rolls until the scrapers are ready to remove it therefrom. The rollers A B move in the directions shown by the two arrows 1 2 in red.

Having thus fully described my invention, what I claim therein as new, and desire to secure by Letters Patent, is—

1. In combination with the amalgamating-rolls, a reservoir of quicksilver and a conveying mechanism for constantly supplying said rolls with the quicksilver, as described.
2. In combination with the quicksilver-reservoir, conveying mechanism, and amalgamating-rolls, the use of chemical or mechanical electricity or galvanism for assisting in coating said rolls, as and for the purpose described.
3. Combining with the rolls that are constantly supplied with quicksilver the scrapers for constantly scraping off the amalgam and conveying or directing it to a proper receiver, substantially as described.
4. Delivering the crushed and purified ores from the muller to the coated rolls through a narrow slot in the pipe or tube conveying it, substantially as and for the purpose described.
5. In combination with the rolls A B, the jackets M, for holding the ores to the rolls until taken off by the scrapers, substantially as described.

JAS. N. PHELPS.

Witnesses:

L. PITKIN,
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