

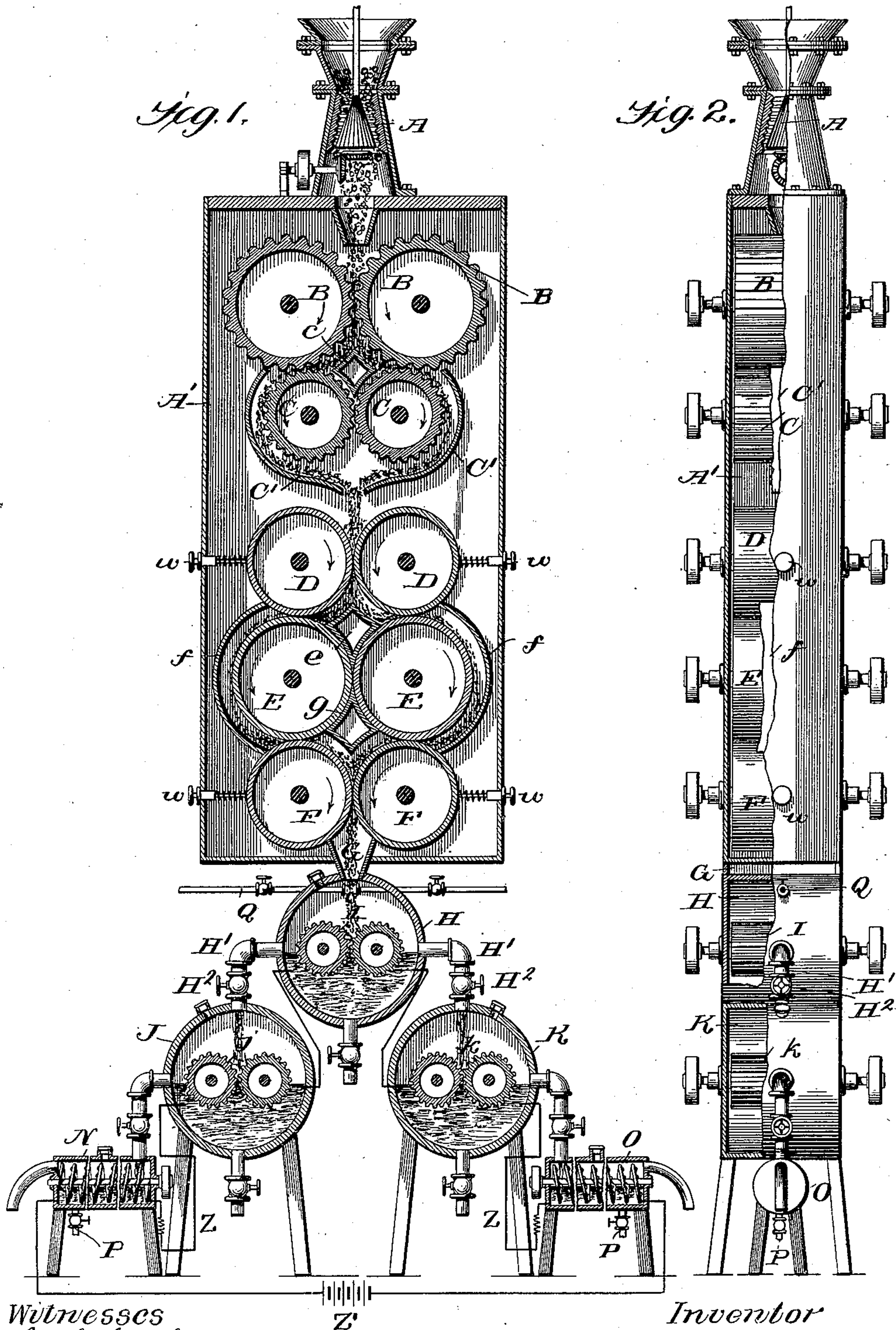
(No Model.)

J. MANES.

MACHINE FOR PULVERIZING AND AMALGAMATING ORES.

No. 566,992.

Patented Sept. 1, 1896.



Witnesses
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UNITED STATES PATENT OFFICE.

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MACHINE FOR PULVERIZING AND AMALGAMATING ORES.

SPECIFICATION forming part of Letters Patent No. 566,992, dated September 1, 1896.

Application filed March 6, 1896. Serial No. 582,109. (No model.)

To all whom it may concern:

Be it known that I, JAMES MANES, of Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Machines for Pulverizing and Amalgamating Ores; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

This invention is an improved machine or apparatus for obtaining precious metals from mineral ores; and it consists in a novel combination and arrangement of breaking, crushing, and pulverizing rolls, and in connection therewith a series of amalgamators so arranged and connected that the process of treating the ores may be carried on uninterruptedly and the amalgamators cleaned or emptied when desired during the operation of the apparatus. In my invention I so arrange the rolls that the majority of them operate twice in succession upon the ores, thereby doubling the capacity of the rolls and reducing the cost and size of the apparatus, while increasing its effectiveness.

The accompanying drawings illustrate the best form of apparatus now known to me, and the following is a description thereof.

Figure 1 is a central vertical section through the machine, showing the rolls and amalgamators in cross-section. Fig. 2 is an edge view of the apparatus with casing broken away in parts.

A designates an ore-breaker of any suitable construction which is mounted on top of a casing A', within which are journaled the series of reducing-rolls, this casing being supported in a vertical position in any suitable manner. Within the casing and just below breaker A are a pair of corrugated crushing-rolls B B, lying side by side in a horizontal plane and between which the ore from breaker A falls and is crushed. Below rolls B B are a pair of smaller corrugated crushing-rolls C C, which respectively coast with the superimposed roll B and crush the ore a second time in its passage between the rolls B C, the ore being properly directed between rolls B C by the deflector c, as shown. Thus each roll B

crushes the ore at two different points, there being three crushing-points between the four rolls. The rolls C C are partly surrounded by a hopper-casing C', by which the crushed ore is concentrated and directed onto and between a pair of pulverizing-rolls D D, below which and contacting therewith is another pair of rolls, E E, and below these and contacting with rolls E and with each other is a pair of rolls F F. The rolls D D rotate toward each other, rolls E E rotate away from each other, and rolls F F rotate toward each other. A deflector e is placed below rolls D, so as to divide and deflect the material falling between rolls D outward between the rolls D E, and a casing f is placed around the exterior of rolls D E, so as to direct the material back between rolls E F, a scraper g being placed below rolls E, so that their surfaces will be kept clean, while the sides of delivery-spout G below rolls F keep the latter clean. It will be noticed that the rolls D E F are so arranged that there are six crushing-points between these six rolls, each pair of rolls operating at two points. By this arrangement I get the effect of six pairs of rolls from three pairs. The material, after finally passing through rolls F, is delivered in a finely-pulverized condition, through spout G, into the first amalgamator H, which consists of a horizontal tubular casing half filled with a bath n, of mercury or other amalgamating agent, and a pair of corrugated rollers I, half submerged in the amalgam, catch the material delivered from spout G and force it into and beneath the surface of the amalgam M. The overflow from amalgamator H escapes through pipes H', which are preferably valved, as at H², into similar amalgamators J K on opposite sides of and below amalgamator H, said amalgamators J K being respectively provided with rollers j k, which force the material into the amalgam baths m m. The overflow from amalgamator J passes into an ordinary screw-amalgamator N, and that from amalgamator K into an ordinary screw-amalgamator O, so that the tailings which eventually escape from amalgamators N O are practically valueless, all the precious metals having been caught in the amalgamators. The amalgamators are

each provided with draw-off cocks P, which are preferably made so that they can be locked up, and thus the entire product of the apparatus be under the control of one man, and thus thieving be prevented. Water or air can be introduced into amalgamator H through the valved pipe Q, and utilized to assist the passage of the pulverized ores through the amalgamators. Obviously the amalgamators K or J can be shut off from amalgamator H and cleansed without stopping or choking the apparatus.

The apparatus may be employed for reducing other than precious ores, and for reducing grain, &c.

The parts marked W indicate spring-adjusting devices of any suitable construction to keep the rollers together with a yielding pressure. An electric current is conducted into and through the amalgamators on wires Z for the purpose of increasing the affinity of the bath of tin, sodium, and quicksilver for the fine particles of gold, and vice versa, and the current returns to the battery Z', making a circuit with positive and negative poles terminating in the baths. The rollers may be driven by belting or gearing, as desired.

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

1. The combination of three pairs of rolls arranged one pair above the other, the rolls of the upper and lower pairs contacting with each other, and with the rolls of the middle

pair, whereby six crushing-points are formed between the six rolls, substantially as and for the purpose set forth.

2. In an ore-mill the combination of a breaker, and the crushing-rolls below the same, with three pairs of pulverizing-rolls below the crushing-rolls arranged substantially as described, so as to make six crushing-points, substantially as and for the purpose specified.

3. In an ore-mill the combination of a breaker, and the crushing-rolls below the same, with three pairs of pulverizing-rolls below the crushing-rolls arranged substantially as described so as to make six crushing-points, the amalgamator H, into which the pulverized ores are delivered, and the opposite amalgamators J and K below and connected with amalgamator H, all substantially as described.

4. The combination of the amalgamator H having rollers I and bath M, into which the pulverized ore is delivered the amalgamator J on one side of amalgamator H, and the amalgamator K on the other side thereof, the rollers and baths in amalgamators J, K, the pipe Q and the valved pipes H', H', all substantially as and for the purpose described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JAMES MANES.

Witnesses:

HENRY C. BROWN,
JOHN PRINZING.