

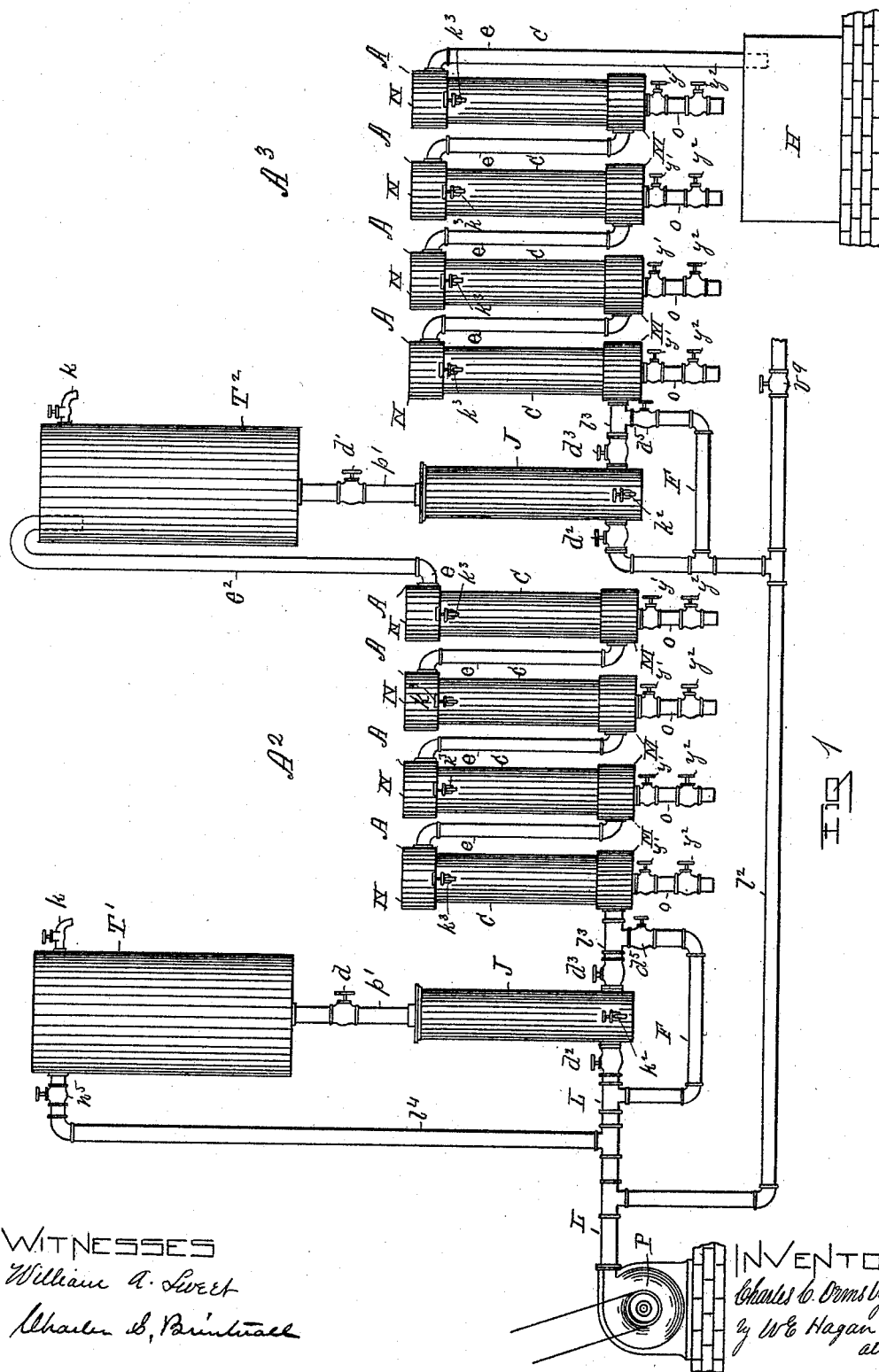
(No Model.)

2 Sheets—Sheet 1.

C. C. ORMSBY.  
PROCESS OF AMALGAMATING ORES.

No. 492,426.

Patented Feb. 28, 1893.



WITNESSES

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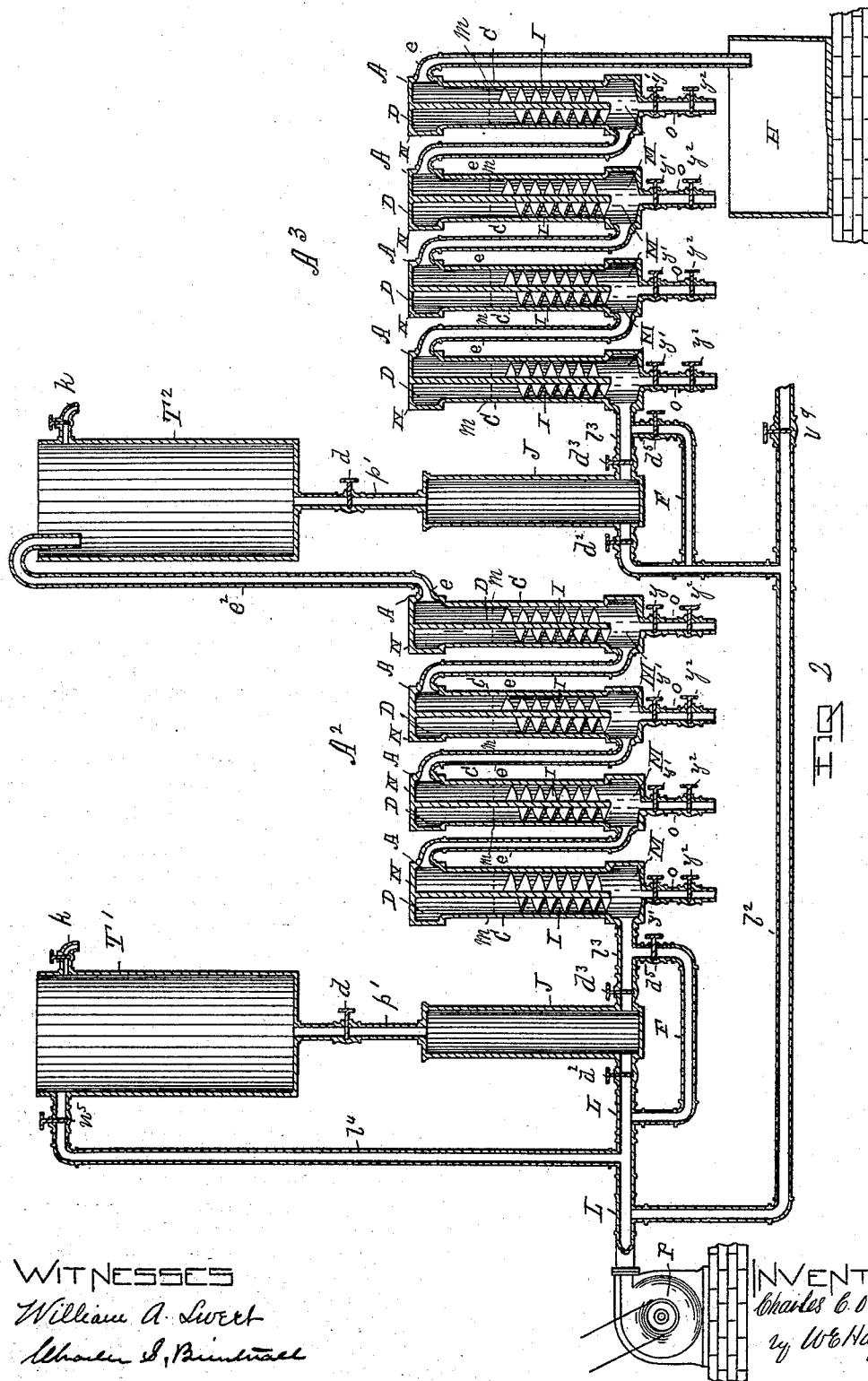
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# UNITED STATES PATENT OFFICE.

CHARLES C. ORMSBY, OF WATERFORD, NEW YORK.

## PROCESS OF AMALGAMATING ORES.

**SPECIFICATION** forming part of Letters Patent No. 492,426, dated February 28, 1893.

Application filed August 27, 1891. Serial No. 403,894. (No specimens.)

*To all whom it may concern:*

Be it known that I, CHARLES C. ORMSBY, of the village of Waterford, county of Saratoga, State of New York, have invented a new and useful Process for Amalgamating Ores, of which the following is a specification.

My invention relates to a process for the amalgamation and collection of gold from gold-bearing sands, tailings, or pulverized auriferous ores; and the object and purpose of my invention is to increase the measure of gold to be obtained by amalgamation, and to make more certain and reliable the steps used in its application.

My invention consists in the employment of a series of connected process steps which will be more fully set forth hereinafter in connection with their application, and defined in the claim.

The principle features of my process consist in the forcing of the gold-bearing material in connection with water and while in a pulpy condition up through a column of mercury contained in an amalgamating cylinder, and in such measure of volume relatively, to the column of mercury that the entering volume of ore, and water under pressure shall be enough less in cross area, than the cross area of the mercury column, to pass through the latter without displacing or acting upon the whole column of mercury; and after treating the ore in this manner by passing it through one or a series of amalgamators, to discharge the ore into a tank where in a pulpy condition it is allowed to stand from six to twenty four hours and then to pass it through a second amalgamation as before, with the treated material allowed to finally pass off into a tank provided for tailings.

I have discovered that when tailings, or ore in a powdered form are in connection with water passed through mercury that small pieces of the gangue to which small particles of gold adhere become partially amalgamated or coated with mercury, but not sufficiently so as to have the amalgam detach itself from the gangue particles; and when the material is rapidly passed over the mercury by the action of the water, the relatively greater size of the gangue particles as compared with the attached amalgam as acted upon by the water, carries them away so that they are not

caught by the mercury, and by allowing the partially amalgamated gold on the gangue particles to rest in the mass the adhering mercury acting as a mechanical solvent separates the gold from the gangue, and it is easily caught by the mercury on a second amalgamation.

Accompanying this specification to form a part of it there are two plates of drawings containing two figures illustrating an apparatus by which my improved process may be carried out with the same designation of parts by letter reference used in all of the figures.

Of the illustrations Figure 1 shows a side elevation of the apparatus, and Fig. 2 a central vertical section of the apparatus shown at Fig. 1, taken from end to end; with the pump for creating water pressure shown in side elevation.

The several parts of the apparatus thus illustrated are designated by letter reference and the operation of the parts as connected with the carrying out of my process described as follows:

The letter P designates a pump for creating water pressure and by which the ore mixed with water in a pulpy condition is forced through the mercury.

The letter A designates the amalgamators, of which there are two series, respectively designated as  $A^2$  and  $A^3$ . Each amalgamator of each of these two series is connected with the next adjacent one by means of a pipe  $e$ , that communicates the top of one and the bottom of the other adjoining one, with the exception of the last one of each series, which in the  $A^2$  series, connects with a tank  $T^2$ , by an upward extension of one of the pipes  $e$ , at  $e^2$ .

The letter L designates the discharge pipe of the pump P, and this pipe L is constructed with a branch pipe  $l^2$ , having a valve  $d^2$ , where it connects with the charging cylinder of the  $A^3$  series of amalgamators.

The letter J designates a charging chamber that is directly beneath the ore tank  $T'$ , and connected thereto by a vertical pipe  $p'$ , having thereon a valve  $d$ . The pipe L connects with the bottom of the charging chamber or cylinder J, of the  $A^2$  series of apparatus and this pipe where making this connection is provided with a valve  $d^2$ , and the branch pipe  $l^2$  connects with the bottom of the charg-

ing cylinder J of the A<sup>3</sup> series of apparatus, and this branch pipe is also provided with a valve  $d^2$ .

The letter  $l^3$  designates a short pipe connecting the cylinder J of each series of apparatus with the first amalgamator of each series, at the bottom where is located the mercury chamber M, and the letter  $d^3$  designates a valve on said short pipe  $l^3$ .

Each of the amalgamators is provided with a mercury chamber M, at the bottom and also is constructed to have an interiorly arranged spiral passage I, that at its lower end connects with the mercury chamber of each amalgamator and is therefrom extended upwardly to connect with the upper part of the amalgamator interior D. The letter C designates the amalgamator cylinder, N its cap, and O a pipe at its lower end having valve  $y'$  and  $y^2$ , the pipe O and its valves being used for the purpose of drawing off the amalgam.

The letter  $l^4$  designates a pipe connecting with the water supply at its lower end and at its top this pipe connects with the ore tank T', and is provided with a valve  $n^5$ .

The letters F designate flushing pipes of which there is one for each series of amalgamators; and each of these pipes connects with the water discharge pipe of the pump in advance of where it connects with the charging cylinder J, of each series of amalgamators, and also with the short pipe  $l^3$ , connecting said charging cylinder with the first amalgamator of each series, and each of these flushing pipes is provided with a valve  $d^5$ , and their function is to add water to the passing mixture of ore and water, and by an increased pressure to relieve any choking of the pipes.

The letters k, designate cocks arranged on the tanks T' and T<sup>2</sup> to draw off surplus water, and the letters  $k^2$ , designate cocks on the charging cylinders J, of each series of apparatus, and the letters  $k^3$ , designate cocks on the tops of the amalgamators which when open facilitate the drawing off of the mercury.

In carrying out my improved process by means of the apparatus thus described ore is supplied to the tank T', and water added by means of the pipe  $l^4$ , to give the ore a pulpy condition which is supplied the amalgamators by having said ore mix with the water while passing through the bottom of the charging chamber J, of the series of apparatus being in use. This water and ore in a pulpy condition under pressure is caused to enter the amalgamator of the first series next adjacent to charging chamber J, and being under pressure is forced up through the mercury therein to either descend to enter a second amalgamator where the latter are used in series to be again forced up through a column of mercury and so on until the last one of the series is reached when the ore is discharged into

the tank T<sup>2</sup>, of a second apparatus made like the first, or when one amalgamator is used after having been passed up through the mercury column to be discharged into a tank T<sup>2</sup>, connected with a second amalgamator. The ore discharged into the tank T<sup>2</sup>, in either instance while in its pulpy condition is allowed to stand or rest in the tank wherein deposited after the first amalgamation, for a period of from six to twenty four hours, when it is admitted to the second apparatus to be again amalgamated as before, and finally to be discharged into the tailings tank H. The period of rest given to the ores varies according to their character, where the gangue is soft less time is required to have the amalgam absorb the gold and detach itself, than where the gangue is hard quartz, and the time should be varied accordingly, and be decreased or increased as occasion may require.

The apparatus herein shown is made the subject of another application for Letters Patent filed by me bearing even date herewith, and numbered Serial No. 403,893, and now pending, and is illustrated to show how my improved process may be carried out, and without claiming said apparatus herein. Any apparatus in which the ore is caused to pass up through a column of mercury, made pulpy by water and under pressure may be used, provided the cross area of the water pressure column is less than that of the mercury chamber, and by any apparatus in which the ore in a pulpy state after having been thus treated is allowed to stand or rest until the mercury adhering to amalgamated portions of the gangue has removed the gold therefrom, or part of it, in condition to separate from the gangue on being retreated with mercury as before.

Having thus described my invention, what I desire to secure by Letters Patent is—

The process herein described for amalgamating auriferous ores and consisting in forcing them mixed with water in a pulpy state under pressure up through a column of mercury contained in an amalgamating cylinder, which column of mercury is greater in cross-measurement than the entering current of ore and water; then discharging the ore into a receiving tank and allowing it to rest from six to twenty four hours for the mercury to act upon amalgamated portions of the gangue, and then in a pulpy state to be again passed through the amalgamating cylinder under pressure as before, substantially in the manner set forth.

Signed at Troy, New York, this 16th day of June, 1891.

CHARLES C. ORMSBY.

Witnesses:

W. E. HAGAN,  
CHARLES S. BRINTNALL.