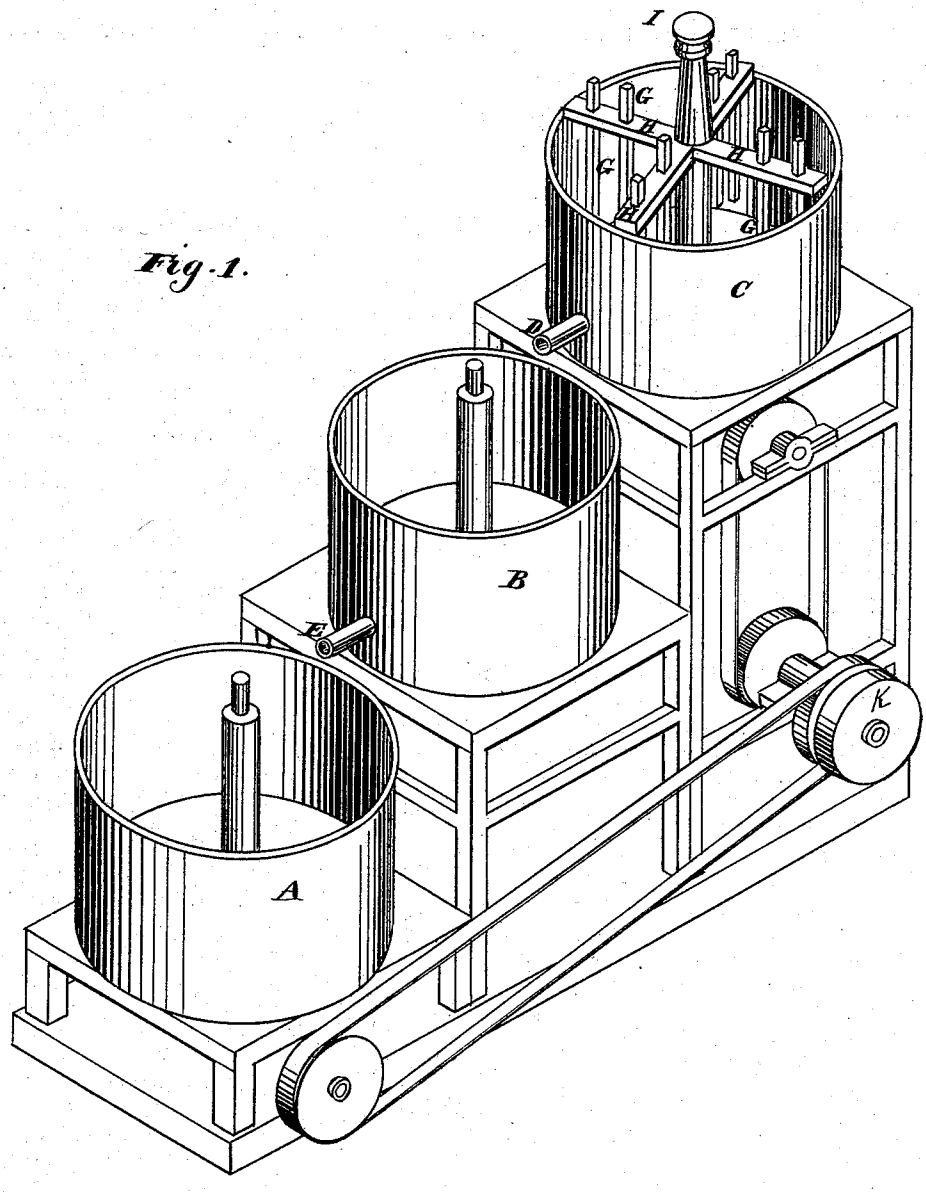
A. PATCHEN.

Apparatus for Treating Ore-Pulps.

No. 156,464. Patented Nov. 3, 1874.

Fig. 1.



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ABEL PATCHEN, OF WESTFIELD, NEW YORK.

IMPROVEMENT IN APPARATUS FOR TREATING ORE-PULP.

Specification forming part of Letters Patent No. **156,464**, dated November 3, 1874; application filed October 26, 1874.

To all whom it may concern:

Be it known that I, ABEL PATCHEN, of Westfield, Chautauqua county, State of New York, have invented an Improved Apparatus for Treating Ore-Pulp; and I do hereby declare the following description and accompanying drawings are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use my said invention or improvement without further invention or experiment.

My invention relates to an improved process and apparatus for treating ore-pulp, for the purpose of more thoroughly amalgamating the gold and silver contained therein; and it consists in the employment of a separate chloridizing tub or pan, in which the pulp is treated chemically, and stirred mechanically, before introducing it into the amalgamating pan or vessel, for the purpose and in the manner more fully described in the following specification, in which reference is had to the accompanying drawing.

The figure is a perspective view of my invention.

A is an ordinary settler. B is an ordinary amalgamating-pan, and C is my chloridizing-pan. These pans or vessels are secured upon a suitable frame or frames alongside of each other, and at different elevations, so that the contents of the upper or chloridizing pan can be discharged through a spout, D, into the amalgamating-pan, while the amalgamating-pan has a spout, E, through which its contents can be discharged into the settler, the transfer from one pan to the other being accomplished without manual labor. The chloridizing-pan C is provided with wooden stirrers G G, which are secured to arms H, the arms being rotated in the ordinary manner of rotating the muller of an amalgamating-pan.

The best manner of constructing my chloridizing tub or pan, as far as my experiments have gone, is to make it like the ordinary amalgamating-pan, and completely line it upon the inside with wood or copper.

The driver K is made the same as the driver of an ordinary amalgamating-pan or settler, with a screw, I, for raising and lowering the stirrers in the pan.

The arms H, which carry the stirrers G G, are supported above the upper rim of the pan, and the stirrers are adjustable up and down in the arms, so that the distance which they extend into the pulp can be regulated independent of the elevation of the arms.

The bottom of the pan is made double, so as to provide a space (not shown) between the two bottoms, into which steam can be admitted, for the purpose of heating the pulp when it is under treatment.

The operation is as follows: The mill being started and steam turned into the steam-chamber, the chloridizing tub or pan is filled from the settling-tanks the same as in charging a common amalgamating-pan. The chemicals are then added to the pulp and the stirring-arms set in motion. When the tub is charged with heavy ore the arms should be set in motion before filling the pan. This operation is kept up from four to six hours, according to the character of the ore under treatment. The charge is then drawn off into the amalgamating-pan B through the spout D, and a fresh charge of pulp from the settling-tanks is introduced into the chloridizing-pan C. In the amalgamating-pan B the pulp is treated in the ordinary way, with the exception that no chemicals or heat are introduced, and from thence is drawn off into the settler A. After the first charge is drawn from the chloridizing-pan the operation becomes continuous.

One of the chief points of my invention consists in the arrangement of the chloridizing-pan, amalgamating and settling pans relatively with each other, as above described, whereby I am able to transfer the pulp from one pan to the other through their respective spouts D and E without increasing the labor required in the ordinary manner of accomplishing this object.

By constructing and applying the chloridizing-pan in the above-described manner the charge of pulp is worked twice the ordinary length of time—say, six hours in the chloridizing-pan C and six hours in the amalgamating-pan B, making twelve hours, with a charge drawn every six hours, thus producing a continuous operation from one pan to the other. Only a slow motion of the stirrers G G is necessary—say about eighteen to twenty revolutions per minute—and only a small expendi-

ture of power is required, while the heating and chemical action is taking place in the chloridizing-pan C.

By the ordinary process the common iron pan as now used is charged with ore-pulp from settling-tanks, the chemicals (blue-stone and common salt) are added, and the charge is then heated by steam and ground for two hours. The quicksilver is then added, and the operation of grinding and amalgamation is continued three or four hours longer, when the charge is drawn into the settler and the pan again charged with ore-pulp.

By my process the chloridizing-pan is also charged with ore-pulp from the settling-tanks in the ordinary way; the blue-stone and salt or other chemicals added; the charge heated by steam and stirred for six hours. It is then drawn off, through pipe D, into the iron amalgamating-pan, and the chloridizing-pan again charged with ore-pulp, as before, and so on continuously, thus being enabled to work a mill to its full capacity, there being no time lost.

After the charge is passed into the amalgamating-pan no chemicals are used, and no heat is admitted; but the quicksilver is introduced after the charge has been stirred, so as to cause the chlorine to attach itself to the iron of the amalgamating-pan, and thus dechloridize the ore. The quicksilver is then introduced, and the rest of the operation is in the ordinary manner.

The difficulties of the common process of amalgamation are, first, sufficient time is not and cannot be given for the proper chloridizing and amalgamation of the ores with profit, because the cost of running the pan longer than the ordinary time, and the consequent diminished capacity of the mill, more than counterbalances the increased yield by longer working. By my invention the process is continuous, and the increased time for working is made up by the several pans. Second, the imperfect action of the chemicals in the short time allowed, and the unfavorable conditions for amalgamation, in consequence of the chemicals having a stronger affinity for the iron of the pans and the quicksilver than for the ore. By my process no chemicals are introduced into the amalgamating-pan. Third, the loss of quicksilver by the action of the blue-stone. A great loss of quicksilver also arises from the grinding process, by which it is floured and caused to float off. These several difficulties are so great that many first-class mills do not use chemicals in the amalgamation of ores, and only attempt to amalgamate free gold, natural chloride, and metallic silver that the ores may contain, and as a consequence obtain a less percentage of the value of the ores.

The advantages of my invention are, first, that sufficient time is given for the action of the chemicals upon the ores under favorable circumstances, as only wood and copper, for which blue-stone or chloride of copper has no affinity, come in contact with the ores, and are free to act upon the ores only; second, when the charge of ore is introduced from the chloridizing into the amalgamating pan very little chemical action takes place, except the dechloridizing of the ore, which is mainly accomplished by the iron pan.

I claim, and have by carefully-tried experiments fully ascertained, that by my invention I can add from ten to thirty per cent. to the bullion obtained in the ordinary way of working ores by quartz-mills by what is known as the "wet process," and accomplish this in the same time, with the same chemicals, with one-half the loss of quicksilver, and without any increase of labor, and without any diminution in the capacity of the mill.

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

1. The chloridizing-pan C, lined with wood or copper, and having the stirrers G G and steam-chamber, in combination with the amalgamating-pan B and settler A, all constructed and arranged substantially as and for the purpose set forth.

2. The process herein described of treating ores, by first treating them in a chloridizing-pan lined with wood or copper, in which the chemicals are placed, and afterward in an iron amalgamating-pan, in which the quicksilver is introduced, substantially as and for the purpose above described.

In witness whereof I hereunto set my hand and seal.

ABEL PATCHEN. [L. S.]

Witnesses:
JNO. L. BOONE,
C. M. RICHARDSON.