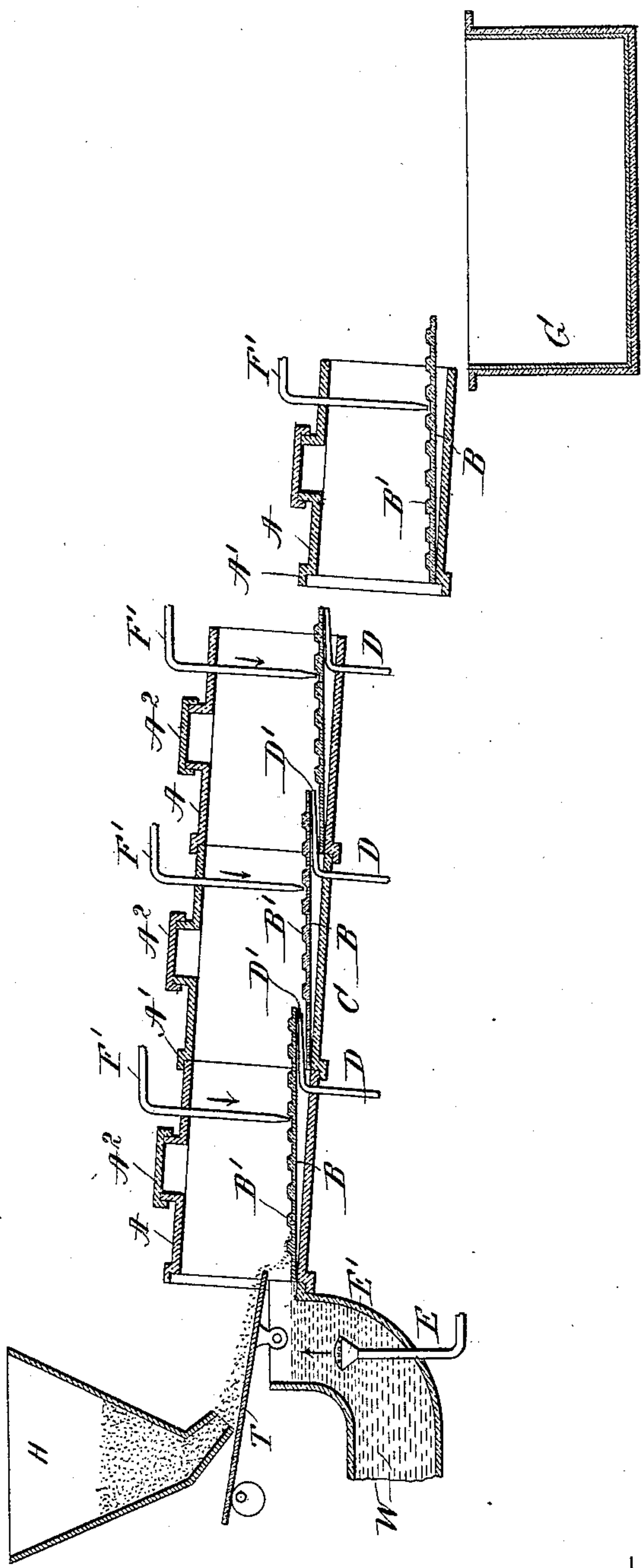


No. 841,330.

PATENTED JAN. 15, 1907.

W. V. LANDER.
ORE CYANIDING.
APPLICATION FILED APR. 27, 1906.



WITNESSES=

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WINTWORTH V. LANDER, OF NEWTON, MASSACHUSETTS.

ORE-CYANIDING.

No. 841,330.

Specification of Letters Patent.

Patented Jan. 15, 1907.

Application filed April 27, 1906. Serial No. 313,924.

To all whom it may concern:

Be it known that I, WINTWORTH V. LANDER, a citizen of the United States, and a resident of Newton, in the county of Middlesex and State of Massachusetts, have invented new and useful Improvements in Ore-Cyaniding, of which the following is a specification.

My invention relates to processes of cyaniding ores; and it consists in improvements in ore treatment by which the cyanid process is carried on with increased efficiency and economy over methods now in vogue.

In the drawing hereto annexed there is shown an apparatus which is adapted to the performance of my process. This apparatus is the subject of an application for Letters Patent of the United States, Serial No. 313,925, filed by me concurrently herewith and is expressly reserved for claim therein.

It has been found desirable, if indeed not essential, to oxygenate cyanid solution in order to effectuate the necessary reaction; but this oxygenation, so far as I am aware, has been carried on either during the stage of comminution or stamping of the ore itself or in settling-tanks wherein cyanid solution, with ore particles in suspension or mixture, has been run. Even though the comminuted ore and solution is running in a mingled stream the ore particles are to all practical intents and purposes submerged, and when they are submerged and out of contact with the air the cyaniding process is virtually suspended, and thus time and efficiency is lost to a very material extent. Moreover, when resort is had to the device of blowing air through the solution in the settling-tanks this mode of procedure adds another item to the time elements in the business and is to this extent wasteful.

By my process herein described the oxygenation of ore in cyanid solution is carried on with substantial continuity during the entire progress of the mingled ore and cyanid solution, so that when the final stage is reached and the materials have finished their transit between the terminals of the apparatus the cyaniding process, except for the subsequent recoveries, is completed and time, labor, and auxiliary apparatus saved or dispensed with.

In the drawing hereto annexed I have illustrated in skeleton form the essential elements of an apparatus whereby my process may be

conducted. I build a riffle-pipe in short sections, (marked A.) These sections may be made of any suitable material and supported upon a platform or trestle, so that the entire pipe slopes from its intake to its outlet end, the inclination being about one foot in ten. In each of the sections A there is secured a riffle-plate B, which is placed at a slight angle to the axis of the section itself, so that when the entire pipe is set up these riffle-plates should stand nearly level. The riffle-pipe is so inclined that the riffles B have a slight inclination from the horizontal, this inclination being sufficient to compensate for the friction between the stream and the riffle, so that the stream shall be nearly at uniform depth over the entire riffle-surface.

Each of the riffle-sections protrudes from the lower end of the section to which it is attached, so that it overhangs the next succeeding riffle-section, as at C. The lower end of the riffle-pipe delivers into a tank, as G, which may be connected with recovery-boxes or other suitable apparatus, which is not shown. The riffle-pipe sections A are preferably made interchangeable and of convenient lengths for handling—say, about eighteen inches long—and are provided at one end with flanges, as A', by which they are secured together. The joints between the riffle-sections should be made tight at the bottom to prevent leakage. Instead of a pipe the riffle-sections may, if desired, be merely troughs; but I prefer the pipe form for the sake of the strength which that form lends to the entire apparatus and also because the upper portions of these pipes serve as convenient means for the attachment or insertion of auxiliary parts of the apparatus and at the same time protect the riffles against the accidental admission of foreign matter.

When the pipe form of apparatus is employed, it is well to provide covered hand-holes, as at A², for the insertion of a hose to wash out the riffles. At the head of the riffle-pipe there is placed the ore-delivery hopper H and devices for feeding the ore in a uniform stream upon the riffle-plates, the device indicated in the drawing being a shaking platform or table whose forward lip projects over the head of the head riffle-plate B. The head section of the riffle-pipe is suitably joined to a supply-pipe W, through which the

cyanid solution is fed so as to flow out upon the riffle-plate, where it mingles with the stream of ore falling from the table T and carries the same down over the riffles. The riffle-plates B are provided with transverse ridges, as B', which form pockets wherewith to retard and arrest the insoluble ingredients of the ore mixture. The particles of ore carry with them on falling into the stream of cyanid solution a fairly liberal quantity of air for oxygenating purposes; but I provide also an air-pipe E, which enters the solution-pipe at or near the point of delivery to the riffles, and through this pipe E, I blow air, preferably through a strainer-head, as E', so that the solution is caused to foam with bubbles and to be in a state of froth when it comes in contact with the ore. Furthermore, in order to reoxygenate the mingled stream of ore and cyanid I provide other air-pipes either downwardly directed upon the mingled stream, as at F', or directed against the stream, as by the pipe D, which delivers at D', just behind the cascade which falls from one riffle-plate B to the next, as at C. The mingled stream is thus not only caused to flow over the riffles and be agitated thereby in contact with the air in the pipe, but is more or less forcibly filled with air which is forced into the stream at frequent intervals through the entire pipe. The downwardly-directed air-pipes, as F', preferably deliver their streams of air into the transverse troughs between the riffle-ridges, so that they serve not only to force air into the stream, but also to keep the insoluble concentrates in a condition of local agitation, thus facilitating and promoting the process or cyaniding.

The air-pipes F' may be multiplied as found desirable even to the extent of having a row of air-pipes delivering air and forcing it into the stream at each of the transverse riffle-plate troughs. Again, the delivery ends D' of the pipes D may with advantage be placed so that they are bathed with the solution falling

from one riffle-plate section to another, thus insuring an intimate mixture of air with the liquid which forms the stream.

When the riffle-plates have collected their maximum charge of insoluble concentrates, the operation of the apparatus is suspended, and the riffle-pipes are then washed out first by a gentle stream which washes out the cyanid solution into the tank G and then by a forcible stream which effectually cleans the riffles, the concentrates from this washing being delivered to a separate settling-tank for subsequent treatment.

What I claim, and desire to secure by Letters Patent, is—

1. The process of cyaniding ores which consists in mingling a stream of ore with a stream of cyanid solution, conveying the cyanid solution and ore as one stream, reoxygenating the stream while in transit, retarding the insoluble solids, collecting the dissolved ore components and recovering the same.

2. The process of cyaniding ore which consists in mingling a stream of ore with a stream of cyanid solution, conveying the cyanid solution and ore as one stream, meanwhile forcing air into the mingled stream while it is in transit, retarding the insoluble solids, collecting the dissolved ore components and recovering the same.

3. The process of cyaniding ore which consists in mingling a stream of ore with a stream of cyanid solution, conveying the cyanid solution and ore as one stream, meanwhile agitating the stream in transit in contact with air, retarding the insoluble solids, collecting the dissolved ore components, and recovering the same.

Signed by me at Boston, Suffolk county, Massachusetts, this 23d day of April, 1906.

WINTWORTH V. LANDER.

Witnesses:

JOSEPH T. BRENNAN,
MARGARET A. DANIHER.