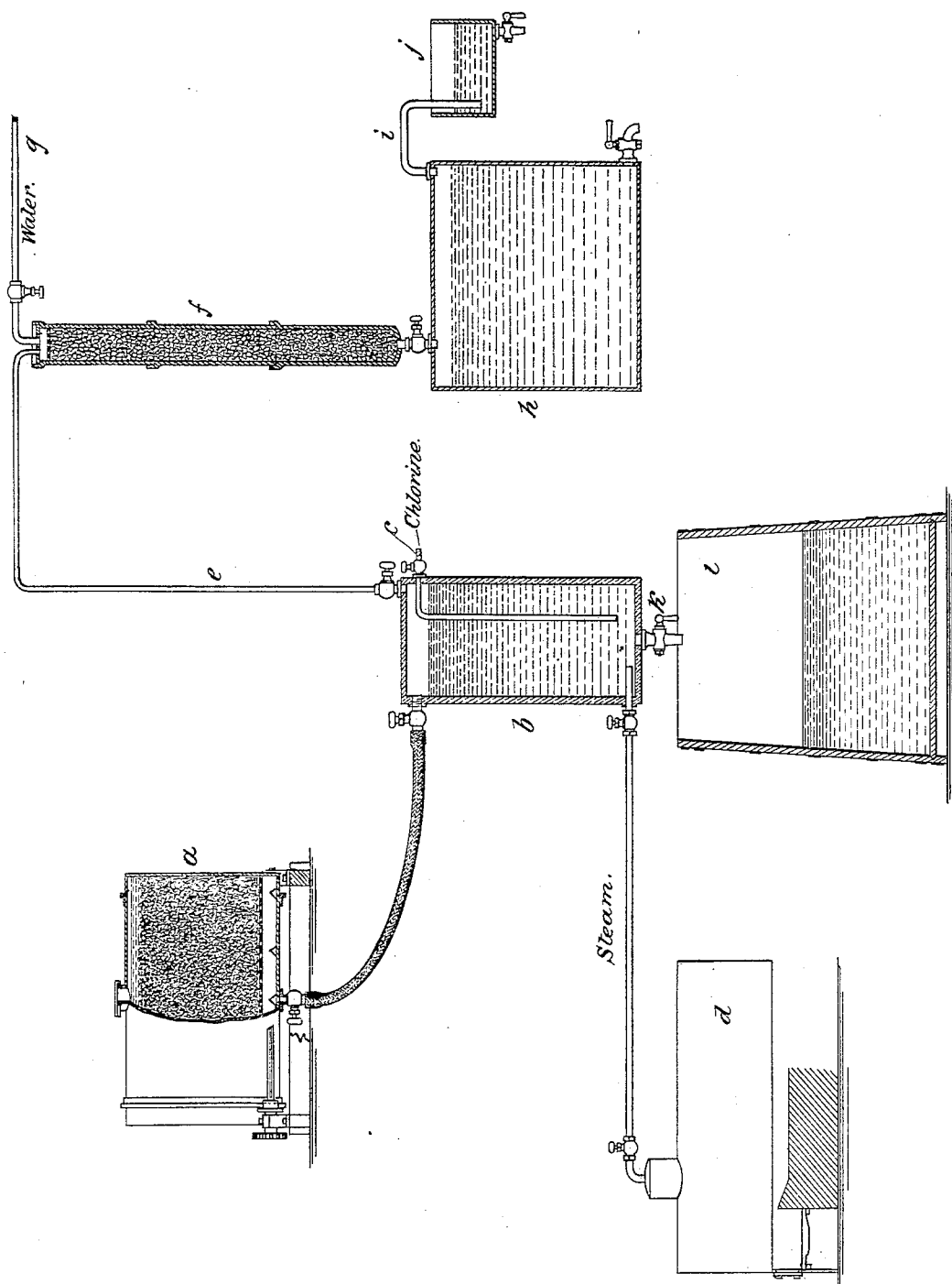


(No Model.)

B. C. HINMAN.
PROCESS OF EXTRACTING GOLD.

No. 569,334.

Patented Oct. 13, 1896.



Witnesses:
John Becker.
Frederick Seibel.

Inventor:
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UNITED STATES PATENT OFFICE.

BERTRAND C. HINMAN, OF NEW YORK, N. Y., ASSIGNOR TO THE GOLD AND BROMINE SEPARATING COMPANY, OF SAME PLACE AND WEST VIRGINIA.

PROCESS OF EXTRACTING GOLD.

SPECIFICATION forming part of Letters Patent No. 569,334, dated October 13, 1896.

Application filed November 15, 1895. Serial No. 569,035. (No specimens.)

To all whom it may concern:

Be it known that I, BERTRAND C. HINMAN, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Processes of Extracting Gold, of which the following is a specification.

This invention relates to an improved process of extracting gold from ores in an economical and simple manner.

It is well known that chlorin readily combines with the bases in the ore and dissolves the gold, but as chlorin is a gas it cannot be employed in its gaseous form without pressure, which renders its use both complicated and expensive. I propose to combine the chlorin with a liquid carrier—viz., bromin, with which it forms bromin chlorid, (BrCl), which is a volatile liquid that contains the chlorin in a liquid form. The chlorin constituent of this liquid has the property of very readily combining with the bases of the ores, for which the chlorin has the greater and the bromin the lesser affinity. Thus not only do I obtain the beneficial effect of both these halogens but the chlorin in its liquid form is more readily handled.

Of course the bromin is by far the more expensive constituent of the bromin chlorid, and therefore the employment of the latter would be commercially impracticable if means were not provided for recovering the bromin. I provide such means and recombine the bromin of the decomposed bromin chlorid with a fresh body of chlorin, so as to again form bromin chlorid. This bromin chlorid may be used upon a new supply of ore and in this way the process is practically continuous and very inexpensive, so that it is well adapted for commercial purposes.

The accompanying drawing represents an elevation, partly in section, of an apparatus for carrying my invention into effect.

The pulverized ore is placed into a revolving barrel or cylinder *a*, and upon it is poured a solution in water of bromin chlorid, which may be prepared by any of the well-known methods. The amount of bromin chlorid necessary to completely dissolve the gold va-

ries considerably with the nature of the ore, but in most instances from about five to twenty pounds of bromin chlorid per ton of ore, and dissolved in as much water as is necessary to make an easily-flowing pulp of the ore, is sufficient.

The mixture is stirred by the rotation of the barrel *a* for from one to three hours, when the gold will be dissolved. The dissolved gold is leached and separated from the gangue by any suitable method, and is collected in a tank *b*. The solution in this tank will contain the gold as well as other soluble bases which may have been present in the ore. These bases will exist in the form of chlorids, they having abstracted the chlorin from the bromin chlorid, and thus set the bromin free. In order to reconvert this liberated bromin into bromin chlorid, I introduce chlorin into the solution. This chlorin may be generated in any suitable manner outside of the solution and introduced into it through pipe *c*, or the chlorin may be set free in the solution itself. The chlorin thus introduced or generated will at once combine with the free bromin and re-form bromin chlorid. In those cases in which the bases in the ore preponderate to such a degree that some of the bromin has also combined with them the chlorin will also set these bromin combinations free and convert the liberated bromin into the bromin chlorid.

Instead of forming the bromin chlorid in the tank *b*, by the introduction or generation of a fresh body of chlorin, I may set free the old chlorin from its combinations with the bases of the ores by the introduction of an oxidizing agent.

After the bromin chlorid has been formed in the tank *b*, as described, it must of course be separated from the auriferous solution. To this effect the liquid in the tank *b* is heated in any desired manner, preferably by conducting into it a current of steam, which is drawn from a suitable generator *d*. The steam will separate the bromin chlorid from the solution in the form of vapor, which is carried by the escaping steam through a pipe *e* and into the condenser *f*.

As the bromin chlorid is a very volatile

liquid, its complete separation from the solution in the tank *b*, by the aid of heat, may be readily effected.

The condenser *f*, which serves to liquidize the bromin-chlorid vapors, may be of an suitable construction, the drawing showing a Gay-Lussac tower, into which water is admitted from pipe *g*. The liquidized bromin chlorid collects in a tank *h*, having a vent *i*, that dips into a tank *j*, containing an alkali, to absorb any of the vapors that may escape. Thus the bromin chlorid is in condition to be used over again upon a fresh body of ore.

After all the bromin chlorid has been expelled from the tank *b* the gold solution is run through a tap *k* into a precipitating-tank *l*, where the gold is precipitated and recovered in any suitable manner. The *rationale* of this process is that as the bromin constitutes an excellent carrier for the chlorin all the beneficial effects attending the use of both these halogens may be obtained in the most economical manner. Heretofore enough

chlorin could only be obtained by means of pressure, necessitating the use of complicated and expensive apparatus, and involving, moreover, the loss of all the chlorin used, while with my improved process only so much chlorin is consumed as enters actually into combination with the bases.

What I claim is—

The process of extracting gold from ore, which consists in dissolving the precious metals by bromin chlorid, adding chlorin to the liberated bromin, separating the bromin chlorid thus formed from the solution in the form of vapor, condensing such vapor, and precipitating the gold, substantially as specified.

Signed at New York, in the county of New York and State of New York, this 14th day of November, A. D. 1895.

BERTRAND C. HINMAN.

Witnesses:

F. V. BRIESEN,
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