

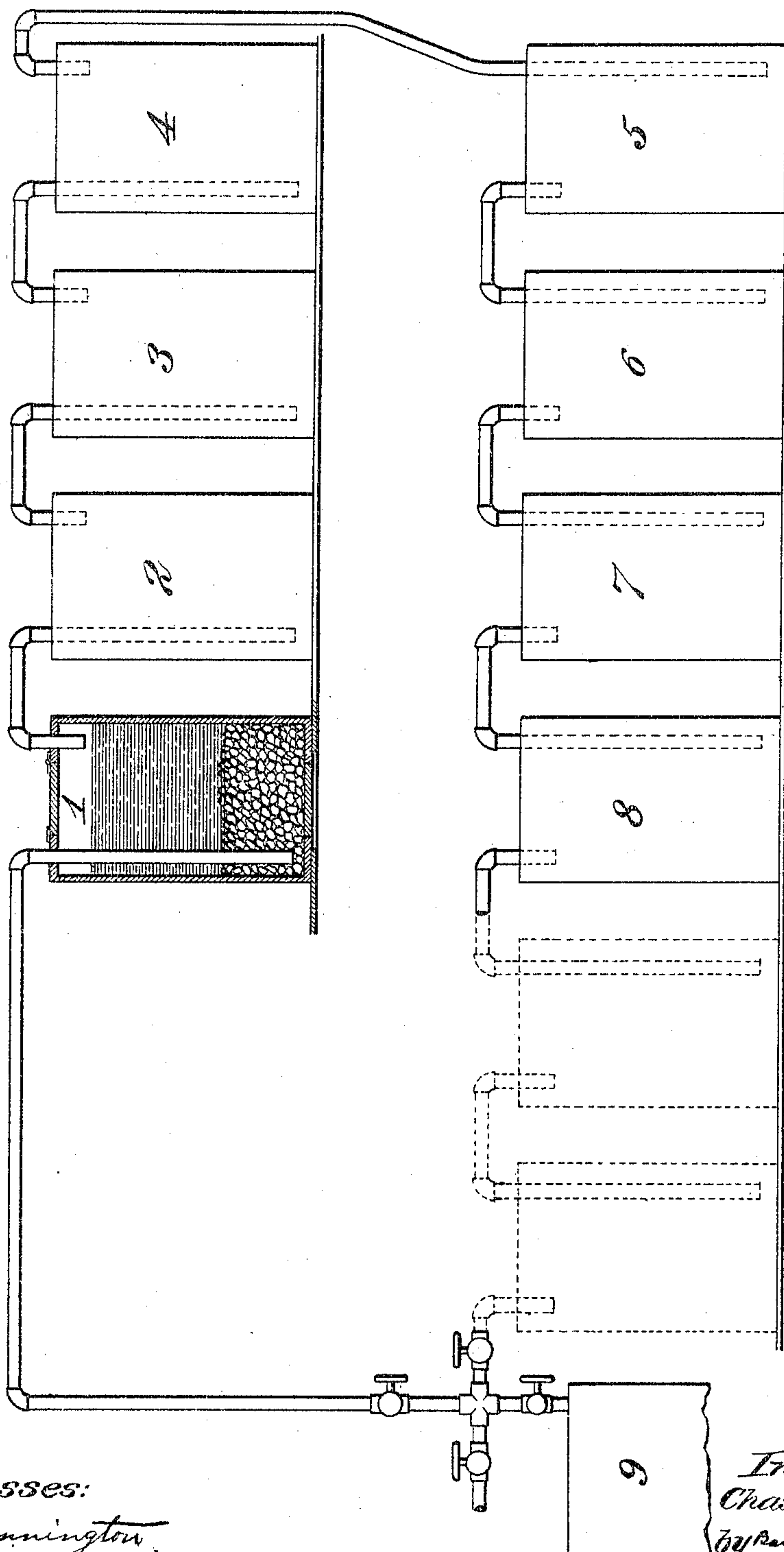
No. 776,424.

PATENTED NOV. 29, 1904.

C. H. RIDER.
PROCESS OF TREATING GOLD AND SILVER ORES.

APPLICATION FILED MAR. 19, 1903.

NO MODEL.



Witnesses:
G. A. Pennington,
J. H. Gibbs

Inventor:
Chas. H. Rider,
By R. Russell & Cornwall
Attys.

UNITED STATES PATENT OFFICE.

CHARLES H. RIDER, OF ST. LOUIS, MISSOURI.

PROCESS OF TREATING GOLD AND SILVER ORES.

SPECIFICATION forming part of Letters Patent No. 776,424, dated November 29, 1904.

Original application filed May 22, 1902, Serial No. 108,519. Divided and this application filed March 19, 1903. Serial No. 148,570.
(No specimens.)*To all whom it may concern:*

Be it known that I, CHARLES H. RIDER, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Processes of Treating Gold and Silver Ores, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

This application is a division from an application filed by me May 22, 1902, Serial No. 108,519, for process of treating ores.

15 This invention relates to a new and useful process of extracting metal from ores, the object being to extract metals, such as gold in metallic state, while silver is precipitated as chlorid.

20 Another object of my improved process is to recover the extracting and precipitating agents in the form of by-products for repeated use in carrying on my process.

In the drawings I have shown an apparatus 25 for working my improved process, the same in this instance consisting of eight tanks numbered, respectively, from 1 to 8, inclusive, said tanks being connected by pipes running from the top of one of them down into the bottom of the next adjacent tank of higher order. These 30 tanks are constructed of wood and made so as to be preferably air-tight by the use of rubber placed under a removable cover arranged in the top wall thereof and a dumping-door being arranged in the bottom thereof. Openings 35 are also provided whereby the resultant liquid in the tanks may be racked or drawn off. In general operation the ore after being finely pulverized is placed in tanks 1 to 4, inclusive, 40 and the dissolving solution added through the opening in the top, said opening being subsequently closed. The action of the chemicals on the pulverized ore causes a steady and rapid flow of gas from the top of one tank to the 45 bottom of the next adjacent tank of higher order, which results in keeping the ore constantly in motion until all the soluble matter is decomposed, which is effected usually in from ten to twelve hours. This agitation of

the ore effects a quicker decomposition than 50 would be possible if the ore was permitted to lie in a quiescent state in the bottoms of the several tanks. After the decomposition referred to sufficient time is allowed for the solid matter to settle, and the clear fluid is drawn 55 off and placed in tanks 5 to 8, with a sufficient quantity of a saturated solution of sodium chlorid. The residue in tanks 1 to 4 is preferably washed with clear water and allowed to settle, after which the water is transferred 60 to the clear fluid. The residue in tanks 1 to 4 in the form of sulfur, silica, or earthy matter is discharged through the openings in the bottoms of the respective tanks. For the sake of description I will term tanks 5 to 8 65 the "precipitating-tanks," into which the clear solution from tanks 1 to 4 is placed in following the first step of my process. The second step consists in recharging the first four tanks and repeating the operation above described, 70 the resultant gases produced thereby being carried through the precipitating-tanks for the purpose of agitating the fluid after the proper precipitating reagent has been added thereto. This agitation of the contents in the 75 precipitating-tanks hastens this operation, and in most cases the gases coming over from the decomposing-tanks supply some necessary element or elements required.

In practicing my improved process in connection with gold and silver ores I proceed as follows: The ore is ground or crushed to size which will pass through a twenty to forty mesh sieve. A charge of approximately five hundred pounds is added to each of the tanks 80 1 to 4. To this is added in each tank a solution which is made up of water, one hundred gallons; commercial sulfuric acid, three to five gallons, and commercial nitric acid, fifteen to twenty gallons. After the silver is dissolved from the ore remove the solution to 90 the tanks 5 to 8 and add a fresh solution to the undissolved ore, composed of water, forty gallons; nitric acid, five gallons, and hydrochloric acid, ten gallons. This will dissolve 95 the gold, and by adding this solution to the solution now in the tanks 5 to 8 will cause an immediate precipitation of the silver as

chlorid. Remove the solution from which the silver has been precipitated and precipitate the gold by adding one or two quarts of a saturated solution of ferrous sulfate. This
5 brings the gold down in a metallic state. In extracting gold and silver it is best to have ten or more tanks, using one or two tanks following the ore-tanks, said last-mentioned tanks being partly filled with water. This
10 will take up the gases from the ore-tanks, forming an acid, usually nitric and hydrochloric, to be used again in the next charge, in which case less acid may be used than above stated.

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

1. The herein-described process of treating gold and silver bearing ores, which consists
20 in placing a charge of approximately five hundred pounds of crushed ore in each of the four receptacles, adding in each receptacle a solution composed of one hundred gallons of water, three to five gallons of commercial
25 sulfuric acid, and fifteen to twenty gallons of commercial nitric acid, and after the silver is dissolved removing the resultant solution to new receptacles, adding the fresh solution to the undissolved ore in the first receptacle,
30 said solution comprising forty gallons of water, five gallons of nitric acid, and ten gallons of hydrochloric acid, thus dissolving the gold in the first receptacle, then combining the two solutions and precipitating the silver,
35 substantially as described.

2. The herein-described process of treating gold and silver bearing ores, which consists of placing a charge of crushed ore in a receptacle, adding in the receptacle a solution
40 composed of water, sulfuric acid and nitric acid, to dissolve the silver, removing the silver-bearing solution to a new receptacle, adding a fresh solution to the undissolved ore in the first receptacle, said fresh solution comprising water, nitric acid, and hydrochloric
45 acid, to dissolve the gold, then combining the gold and silver bearing solutions and precipitating the silver; substantially as specified.

3. The herein-described process of treating gold and silver bearing ores, which consists
50 of placing a charge of crushed ore in a receptacle, adding in the receptacle a solution composed of water, sulfuric acid and nitric acid, to dissolve the silver, removing the silver-bearing solution to a new receptacle, add-
55 ing a fresh solution to the undissolved ore in the first receptacle, said fresh solution comprising water, nitric acid and hydrochloric acid, to dissolve the gold, then combining the gold and silver bearing solutions and precipi-
60 tating the silver, removing the solution from the silver and adding ferrous sulfate to precipitate the gold; substantially as specified.

In testimony whereof I hereunto affix my signature, in the presence of two witnesses, 65
this 2d day of March, 1903.

CHARLES H. RIDER.

Witnesses:

F. H. GIBBS,
GEORGE BAKEWELL.