

2. The improved process for extracting gold from ores, minerals, or other gold-bearing substances consisting in submitting such ores, minerals; or other gold-bearing substances in a powdered condition to the action of a dilute solution containing sulphuric acid, chloride of sodium, permanganates or manganates of soda, and water, substantially as set forth.

3. In a process for extracting gold from ores, minerals, or other gold-bearing substances, a solvent solution prepared by mixing, and composed of fresh water and sulphuric acid in the proportion of 50 gallons of water to 10 lb. to 20 lb. of sulphuric acid, and then mixing such solution with fresh water, chloride of sodium, and permanganates of potash in the proportion of 50 gallons of water to 12 lb. to 20 lb. of chloride of sodium and 5 oz. to 9 oz. of permanganates of potash, substantially as set forth.

4. In a process for extracting gold from ores, minerals, or other gold-bearing substances, consisting in submitting such ores, minerals, or other gold-bearing substances in a powdered condition to the action of a dilute solution containing sulphuric acid, chloride of sodium or other suitable chloride, permanganates or manganates of potash or of soda, and water, substantially as set forth.

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A NEW PROCESS FOR THE TREATMENT OF GOLD AND AURIFEROUS ORES, ENTITLED "ETARD'S GOLD-DISSOLVENT."

I, Alexander Etard, of 14, Rue Monsieur le Prince, Paris, France, chemist, engineer, and professor of sciences, do hereby declare the nature of my invention for "A New Process for the Treatment of Gold and Auriferous Ores, entitled 'Etard's Gold-dissolvent,'" and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to processes used for obtaining gold from ores or auriferous minerals or substances, and its object is to obtain the gold in a rapid, efficient, and inexpensive manner.

The invention is carried into effect by treating the ore, after it has been reduced to a powder in any well-known manner, with a dilute solution containing about 45 lb. to 66 lb. of strong commercial hydrochloric acid and about 12 oz. to 16 oz. of permanganate of potash per cubic metre of water (one cubic metre of water being equal to 35.32 cubic feet), or, in other words, about 45 lb. to 66 lb. of strong commercial hydrochloric acid and about 12 oz. to 16 oz. of permanganate of potash in every 2,207 lb. of water. Solutions of from a quarter of the above strength to four times the above strength are serviceable, but I prefer the strength as above, the solvent solution to be made up as follows: (1.) Mix together—fresh water, 100 gallons; ordinary hydrochloric acid, 40 lb. to 60 lb. (2.) Mix together—fresh water, 100 gallons; permanganate of potash, 12 oz. to 16 oz. These two mixtures are mixed together to form a dissolving liquor, which must be used within twenty-four hours to keep its strength. It would be advisable to keep the two mixtures apart until they are required for use.

Manganate of potash or permanganate or manganate of soda may be used instead of permanganate of potash, but so that 20 oz. of manganate of potash or 11 oz. of permanganate of soda or 17 oz. of manganate of soda shall be used in place of 12 oz. of permanganate of potash; and, if manganates are used, about a third more of hydrochloric acid will be required.

Ores or other auriferous substances containing sulphur, tellurium, selenium, arsenic, antimony, pyrites, or organical substances must be thoroughly roasted before treatment with the solution.

In carrying out the invention any suitable apparatus may be used, but I prefer to provide tanks wherein to mix the solution, which tanks are of any convenient shape and of any desired size, according to the quantity of solution to be made. In one tank I mix fresh water and strong commercial hydrochloric acid, in the proportion previously given of 100 gallons of water to 40 lb. or 60 lb. of acid. In another tank I dissolve and mix permanganate of potash in fresh water, in the proportion previously given of 12 oz. to 16 oz. of potash to 100 gallons of water.

These two mixtures are mixed in another tank, to form the dissolving liquor, which must be employed within twenty-four hours to keep its strength, as previously stated.

The raw or roasted ore or other auriferous substance is put into leaching-tanks having a false bottom, fixed at about 1 in. or 2 in. above the true bottom, and perforated with holes of about $\frac{1}{2}$ in. in diameter, and 6 in. to 10 in. apart. On this false bottom is placed a filter-bed of quartz pebbles and sand about 6 in. deep, larger pebbles resting immediately on the false bottom, with smaller pebbles above, the size gradually diminishing upwards, with coarse sand above, and finally fine sand at the top.

Instead of such filter-bed the false bottom may be covered with any suitable textile material (such as asbestos) as will allow the liquid to pass through freely, and will not decolourise the purple-red colour of the permanganate solution.

The leaching-vats are filled to within about 10 in. of the top with the raw or roasted ore or other auriferous substance in a finely powdered condition, and the solvent solution is then added until there is a depth of about 6 in. above the surface of the ore. All the above tanks may be lined with enamelled iron, glazed earthenware, a preparation of paraffin, or any material which will not affect the permanganate solution. A stop-cock communicating with the space between the two bottoms is afterwards opened, when the solution which will have filtered or percolated through the filter-bed and false bottom is drawn off into precipitating-tanks, which are preferably made of wood. The tanks may be of any convenient size and shape.

As it is necessary that the dissolving solution should be in contact with every particle of the ore it is necessary or desirable to agitate the mixture in the leaching-tanks to secure such contact. After agitation and standing some time—from about twelve to seventy-two hours, or longer if necessary, according to the coarseness of the particles of gold—the solution is drawn off into the precipitating-tanks by opening a stop-cock communicating with the space between the two bottoms.