G. D. DELPRAT.
APPROATUS FOR USE IN CERTAIN PROCESSES OF EXTRACTING SULFIDS FROM ORES.
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Inventor.
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To all whom it may concern:

Be it known that I, GUILLAUME DANIEL DELPRAT, general manager of the mines and works of the Broken Hill Proprietary Company, Limited, of Victoria, a subject of the Queen of the Netherlands, residing at Broken Hill, in the State of New South Wales and Commonwealth of Australia, have invented new and useful Improved Apparatus for Use in Certain Processes for the Extraction of Sulfids from Ores, of which the following is a specification.

The processes for the extraction of sulfids from ores to which this invention refers are akin to those described in the specifications of former applications for Letters Patent of the United States of America, Serial Nos. 137,585 and 137,886, filed January 2, 1903. In these processes the ores finely divided are subjected to the influence of a chemical fluid or solution in order to cause the ascension of the more valuable particles to the top of such solutions, whence they may be removed; and this invention relates to improved apparatus for use in such processes for the extraction of sulfids from ores whereby the process is made a continuous one and the extraction of the sulfid is effectively carried out.

Improved apparatus for use in certain processes for the extraction of sulfids from ores consists of a pan of peculiar construction having a sloping bottom, a sump or tailings-receiver at the lower end of said sloping bottom, an adjustable feed-directing plate at upper end of said bottom, a baffle-plate or divisional piece separating, except for a small outlet at the bottom, said sump from said bottom, and a discharge-launder for the ascended products. The pan is constructed, of course, of material resistant to the effects of the chemical fluid or solution. Devices whereby the contents of such pan may be heated, if required, are placed below the pan and preferably closely under the sloping bottom.

In order that this invention may be clearly understood, reference will now be made to the drawings herewith, which show a convenient construction of this improved apparatus specially suitable for the extraction of sulfids from ores by the use of hot (not boiling) solutions of salt cake or of sodium sulfate and sulfuric acid or by the use of solutions of nitrate of sodium, nitrate of potassium, or nitrate of zinc in water and nitric acid.

Figure 1 is a perspective view, and Fig. 2 a longitudinal central section.

Below an ordinary ore bin or hopper 1, having a regulating-discharge door 2, is the pan 3, (in this case made of copper,) having an inclined or sloping bottom 4. The liquor or chemical fluid or solution is supplied by pipe 5 from a suitable reservoir at an upper level. Just below the door 2 is the plate 6 on pintles or pivots 7 in slots 8, adapted to be clamped by set-screws 9 when the plate is adjusted to the required angle and with the required extent of opening between the lower edge of said plate 6 and the bottom 4. This adjustment is rather a question of skill than otherwise, it being dependent upon the observation of the attendant as to the effect of the solution upon the ore, taking into consideration the rate of feed of said ore and of the liquor and the like, the utility of said adjustable directing-plate 6 being primarily to insure the total immersion of all particles of the ore in the fluid or liquor. At the lower end of bottom 4 is the tailings-receiver or sump 10, having a let-out cock 11 in its bottom for the running off of the tailings at intervals. At the receiving end of this sump 10 (and lower end of bottom 4) is a baffle-plate 12, extending closely to the face of the said bottom 4. The purpose of this baffle-plate is to prevent any accumulation of ascended particles (or concentrates) above the sump 10, in which during operation there is more or less agitation consequent upon the precipitation of the tailings and which agitation would be injurious, inasmuch as ascended particles or concentrates just above it would more or less be caused to precipitate with the tailings. Extending from...
the pan is a launder or trough to receive the overflow on which is floating the ascended particles or concentrates to conduct these to where desired for bagging or subsequent treatment. Under the bottom 4 is piping 14, forming with the air-inlet cock 15 a Bunsen burner for gas supplied thereto, so that the solution or chemical liquor may be raised to any desired degree of temperature.

In operation the ore-bin 1 is kept supplied with finely-divided ore, as also the reservoir from which pipe 5 leads is kept supplied with the chemical liquor, as hereinbefore set forth. The feed-directing plate 6 being adjusted, the ore will gravitate down the bottom 4 under the influence of the liquor, (which is heated by flame from piping 14, if desired or required,) causing the more valuable particles to ascend to the surface of the liquor and to flow away through launder 13. The tailings precipitate in sump 10 and are drawn off through cock 11 when desired.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In an ore-concentrating apparatus in which the concentrates are floated to the top of a body of liquid, a pan having an inclined perforate bottom down which the ore slides, means to feed liquid to the pan, a sump at the lower edge of the bottom for tailings, a discharge for concentrates at the liquid-level of the pan, a baffle-plate extending from the discharge to near the lower edge of the inclined bottom to maintain a quiescent body of liquid in the sump and at the same time maintain a flow of liquid from the pan through the discharge, substantially as described.

2. In an ore-concentrating apparatus in which the concentrates are floated to the top of a body of liquid, a pan having an inclined perforate bottom down which the ore slides, means to feed liquid to the pan, an adjustable distributing-plate at the upper end of the pan and whose lower edge is close to and cooperates with the bottom of the pan to distribute the ore below the liquid-level therein, a sump at the lower end of the inclined bottom, a discharge for concentrates at the upper part of the pan over the sump, a vertical baffle-plate extending from the beginning of the discharge to near the lower edge of the inclined bottom to separate the sump from the pan and maintain a submerged entrance for tailings from the pan to the sump, and means to heat the pan, substantially as described.

3. In an ore-concentrating apparatus, a pan having an inclined bottom, a sump at the lower edge of the bottom, a discharge for concentrates at the liquid-level in the pan, a baffle-plate extending from the discharge to near the lower edge of the inclined bottom to divide the sump from the pan and maintain a quiescent body of liquid in the sump and at the same time maintain a flow of liquid from the pan through the discharge and means to feed ore and an acid solution to the pan, substantially as described.

4. In an ore-concentrating apparatus, a pan having an inclined bottom, an adjustable distributing-plate at the upper end of the pan and whose lower edge is close to the bottom of the pan, a sump at the lower end of the inclined bottom, a discharge for concentrates at the upper part of the pan over the sump, a vertical baffle-plate extending from the beginning of the discharge to near the lower edge of the inclined bottom to separate the sump from the pan and maintain a submerged entrance for the tailings from the pan to the sump, means to heat the pan and means to feed ore and an acid solution to the pan, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GUILLAUME DANIEL DELPRAT.

Witnesses:
J. BRISTOME,
F. M. MITCHELL.