

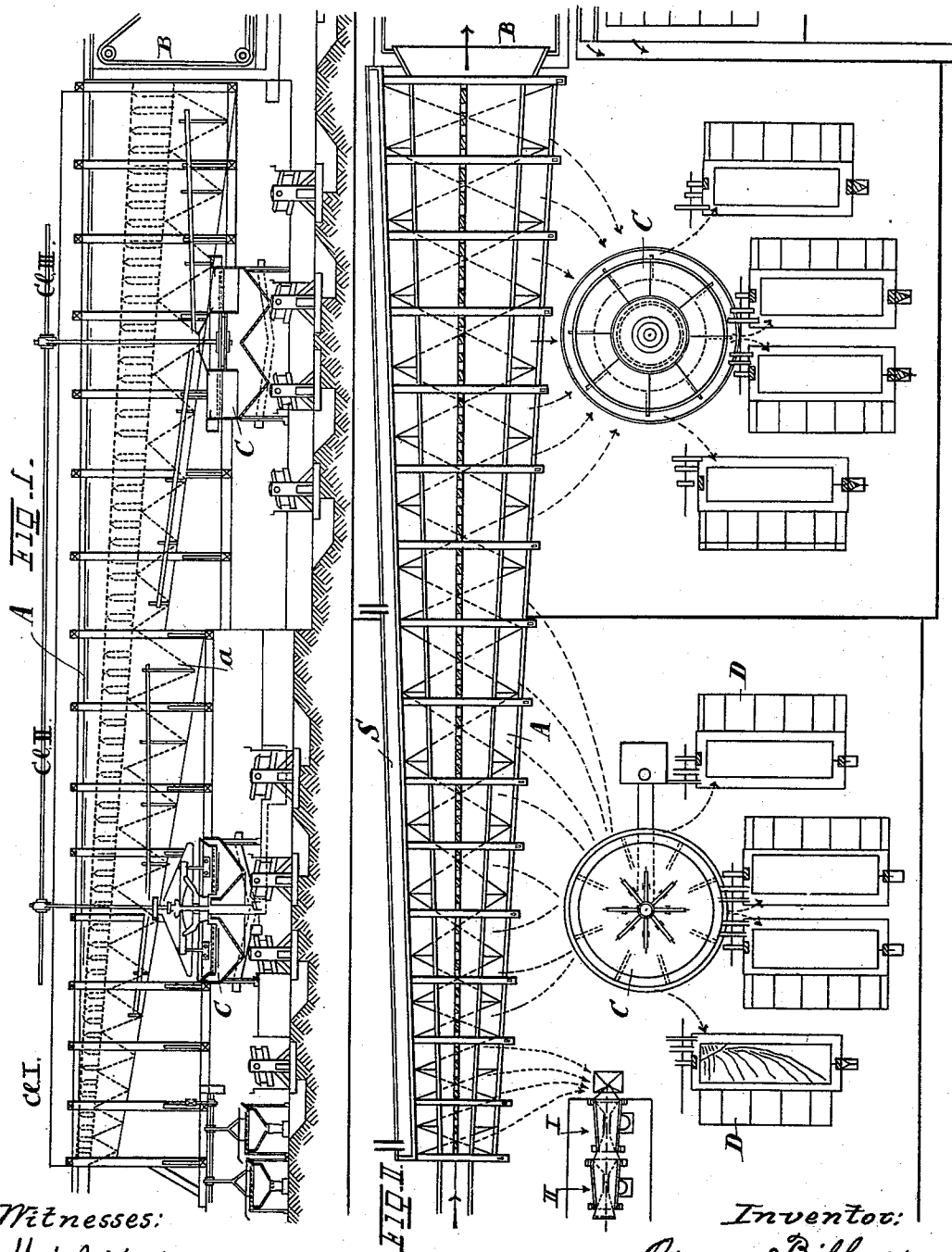
(No Model.)

3 Sheets—Sheet 1.

O. BILHARZ.
APPARATUS FOR TREATING ORES.

No. 469,037.

Patented Feb. 16, 1892.



Witnesses:
H. de Vos.
C. L. Richards

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(No Model.)

3 Sheets—Sheet 2.

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FIG. 1. (continuation)

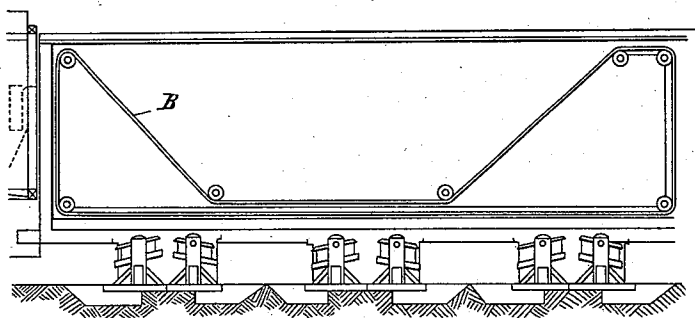
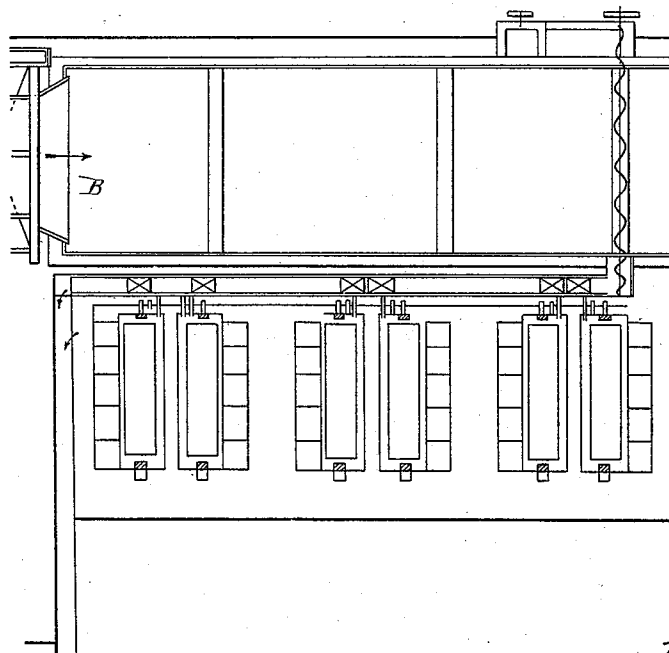


FIG. II. (continuation)



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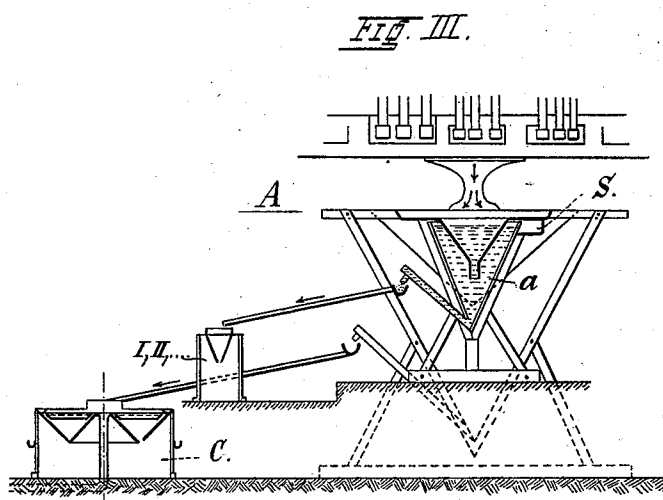
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UNITED STATES PATENT OFFICE.

OSCAR BILHARZ, OF FREIBERG, GERMANY.

APPARATUS FOR TREATING ORES.

SPECIFICATION forming part of Letters Patent No. 469,037, dated February 16, 1892.

Application filed June 15, 1889. Serial No. 814,443. (No model.)

To all whom it may concern:

Be it known that I, OSCAR BILHARZ, a subject of the King of Saxony, residing at Freiberg, Saxony, Germany, have invented an Improved Apparatus for Treating Ores, of which the following is a full, clear, and exact description.

The usual process for dressing crushed ores and the like consists in treating the ore water on ordinary percussion-frames, which of course must be emptied from time to time. This does not only interrupt the regular working at certain constantly-returning intervals, but at the same time does not obtain a thorough separation of the ore, so that this process is very expensive. In the apparatus which is the object of the present invention these disadvantages are overcome, as the treatment of the ore is performed continuously, which enables me to treat much larger quantities, while at the same time a complete separation of the ore is obtained in any desired number of grades.

In the annexed drawings, which form a part of this specification, Figure 1 shows a side view of the different apparatus used for the performance of my process. Fig. 2 shows a top view of the same, and Fig. 3 a transverse sectional view.

In order to obtain a thorough treatment of such ores that bear the metal in very fine grains, it is desirable to treat them first in a stamping apparatus. Such is more particularly the case for quartz, gold ore, or gold-bearing quartz, gold-bearing rubbles, gravel, &c. These ores are stamped in the usual manner, and the stuff is then raised by elevators or centrifugal pumps should the stamping apparatus not be placed at an elevated point. The stuff is then fed in a closed sluice, wherein the grains are classified according to their specific gravity, after having first removed the coarsest stuff by means of a sieve-trommel with holes of one-half to three-fourths millimeters diameter. The sluice A serves me for this classification of the grains according to their specific gravity. This sluice is gradually widened toward its end in order to obtain a better and quicker classification. This sluice receives its fresh-water pressure from the side conduit S, and is divided lengthwise into as large a number of compartments as pos-

sible by means of the funnel-shaped receptacles *a*, arranged under its bottom. In the drawings nineteen of these receptacles are shown, so that every funnel will be filled during the operation with grains of different coarseness, while at the same time the grains in every funnel will have about the same specific gravity. Consequently the first four funnel-shaped receptacles will contain the particles of the largest sizes, the following (located in the middle) will contain finer grains, and the last funnels will contain the finest grains, while the slime (the sand barely perceptible under the fingers) will be washed out of the sluice and settle on the waste-launders B, adjoining the sluice.

If the sluice and the waste-launders are given the necessary dimensions in correspondence with the nature of the stuff, any losses are entirely out of question.

The grains classified in the sluice A are removed in an automatic manner by means of discharge-pipes in the different funnels, and are thus conveyed to the different concentration apparatus. The coarsest grains, class one, from the four first funnels are directly conveyed to a small hydraulic jigger. The medium grains, class two, in the middle part of the sluice can be collected every two funnels together and then be conveyed in separate gutters to so-called "hydraulic circular percussion-jiggers" C, each of which will further treat the ore which is fed to it, the only thing necessary being to change the beddings or layers on the sieves accordingly. The fine grains contained in the enriched stuff collected in the sluice A, and which in compound ores constitutes the different metallic substances in mineral form and in less compound ores—for instance, gold ore—constitutes the gold, is entirely taken up by the layer of the sieve and sinks to the bottom of the jigger. The other part, wherein no metal is contained, is carried away by the stream over the border and discharged by the central pipe of the apparatus in the natural stream or to a central apparatus. The particles passed through the beddings of the jiggers are conveyed to continuous percussion-frames D, suitably placed to this effect, where they are separated into their different components, as galena, arsenic pyrites, iron pyrites, blende, and waste.

The ore of the third class of the sluice is submitted to a treatment similar to that of the ore of the second class. The only difference is that the finer grains are conveyed to a round piston-jigger, which concentrates the same in a similar manner, and from where they are transferred to similar percussion-frames as those used for the grains of the second class.

The fourth and last class of the stuff, the slime, is collected by a waste-launders B, and is from there conveyed to percussion-frames, receiving weaker blows and with a smaller supply of fresh water to yield here the same products as on the other percussion-frames.

It being possible that in this process, according to the nature of the treated stuff, side products may be met with, it will be useful to keep ready for use some reserve apparatus. So the treatment of the stuff of the first class may require one or two Salzburger percussion-frames, the second class some percussion-frames with revolving belts, and for the third and fourth classes some buddles of a limited diameter.

For gold, coal, and iron slime the probability

of finding such by-products is much smaller, and such reserve apparatus may therefore be dispensed with.

If only the extraction of a single precious product is aimed at, the percussion-frame treatment may, if not dispensed with altogether, be considerably limited at any rate.

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

The combination, with the chute having a series of pockets having openings at their bottoms, of compartments surrounding said pockets, and the duct S, delivering into said compartments and adapted to produce a counter or upward pressure through the bottoms of and in said pockets, substantially as set forth.

In witness whereof I have hereunto set my hand in presence of two witnesses.

OSCAR BILHARZ.

Witnesses:

P. SPRECKELS,
PAUL DRUCKMÜLLER.