

(No Model.)

C. NÉGRIER.

APPARATUS FOR CONCENTRATING SULPHURIC ACID.

No. 468,891.

Patented Feb. 16, 1892.

Fig. 3.

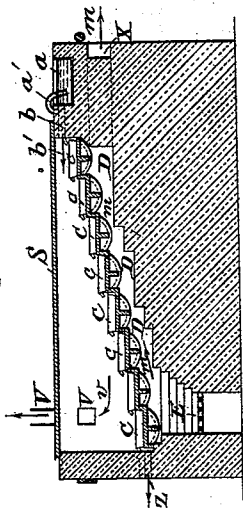


Fig. 2.

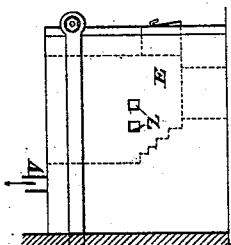


Fig. 1.

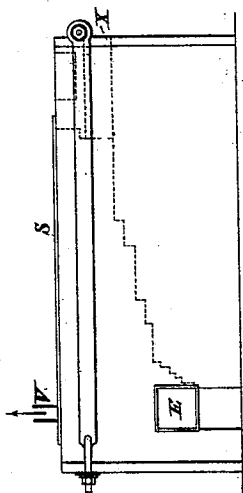


Fig. 4.

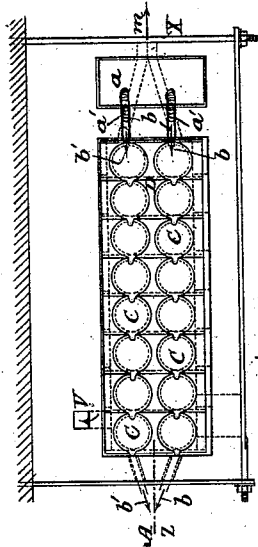


Fig. 7.

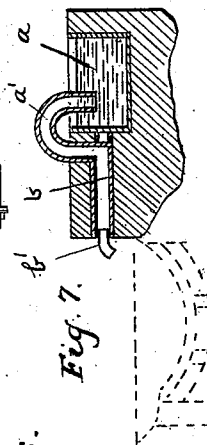


Fig. 5.

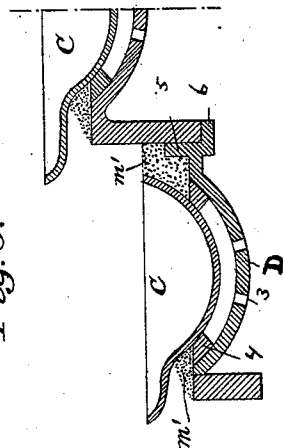
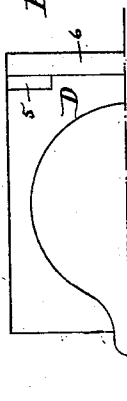


Fig. 6.



Witnesses:

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UNITED STATES PATENT OFFICE.

CHARLES NÉGRIER, OF PERIGUEUX, FRANCE.

APPARATUS FOR CONCENTRATING SULPHURIC ACID.

SPECIFICATION forming part of Letters Patent No. 468,891, dated February 16, 1892.

Application filed February 13, 1891. Serial No. 381,392. (No model.) Patented in Sweden April 4, 1890, No. 2,830; in France April 26, 1890, No. 205,239; in Italy July 2, 1890, No. 27,843; in England September 6, 1890, No. 14,022, and in Brazil December 30, 1890, No. 1,052.

To all whom it may concern:

Be it known that I, CHARLES NÉGRIER, a citizen of the French Republic, residing at Perigueux, in the Department of the Dordogne, in the Republic of France, have invented certain new and useful Improvements in Apparatus for Concentrating Sulphuric Acid, (patented in France April 26, 1890, No. 205,239; in Great Britain September 6, 1890, No. 14,022; in Italy July 2, 1890, No. 27,843; in Sweden April 4, 1890, No. 2,830, and in Brazil December 30, 1890, No. 1,052,) of which the following is a specification.

It is the object of my invention to provide an apparatus for effecting the concentration of sulphuric acid whereby the operation may be cheaply performed.

In order to make my invention more clearly understood, I have shown in the accompanying drawings a means for carrying the same into practical effect.

Referring to said drawings, Figure 1 is a longitudinal elevation of my apparatus. Fig. 2 is a transverse elevation. Fig. 3 is a longitudinal section on line A B of Fig. 4, and Fig. 4 is a top plan view. Fig. 5 is a view in vertical section of a capsule and its supporting devices, and Fig. 6 is a plan view of a portion of the supporting-basin D. Fig. 7 is a sectional view of means for preventing the overflow of reservoir *a*.

Like letters and numerals of reference refer to like parts in the several figures.

My apparatus is composed, essentially, of two rows of porcelain capsules C, arranged in gradation, so that the liquid flowing from the spout of one capsule falls into the mass of liquid contained in the next succeeding capsule. These capsules are supported by cast-iron basins D. The said basins D are each capable of bearing two capsules, and are themselves supported on each side by gradual offsets in the masonry. These basins have five holes in the bottom, arranged in quincunx, destined to allow the escape of the liquid in case of rupture. Between each capsule and its basin is placed a tissue of permeable asbestos intended to insure the stability of the capsules, which might break in case of a too-vio-

lent boiling, and as an additional precaution I sometimes put small pieces of porcelain into the capsules to facilitate the boiling without starts. The fire-place E is situated under the last basin, and at the height of the second basin the gases and the flame are conducted on an inclined plane. The separation between the gases of the fire-place and the upper part of the apparatus is assured by the support for the foot with which the basins are provided. Between the joints I place a cement of the asbestos powder. The basins are then covered after the capsules are set up with a coat of sand *m'* touching the upper rim of the latter. In this way the play resulting either from the heat or the swelling of the masonry has no influence on the working of the apparatus, which remains regular despite these causes of trouble. All the masonry situated above and from the level of the basins is of brick. The cover S is made of cast-iron plates or glass.

Referring to Fig. 5, C is the porcelain capsule; D, the basin of white pig-iron; 3, the holes in this basin for the admission of hot gases and the escape of acid in the case of breaking of the capsule. 4 is an annular packing of asbestos powder or fibrous asbestos, which is deposited to form a lining between the basin and the capsule. This lining plays a double part—first, to prevent the gases of the fire-place from mixing with the gases coming from the evaporation of the acids; second, to give the capsule a perfect stability, which insures its conservation despite the ebullitions or bumpings of the liquid.

5 are heels cast with the basin and serve to prevent the upper basins from encroaching on the surface of the lower basins and in consequence breaking the lower porcelain capsule, which almost touches the right leg of the basin. 6 is the base of the joint cast with the basin and in which the right foot of the upper basin fits.

The operation of the above-described apparatus is as follows: The acid to be concentrated being placed in the reservoir *a*, arranged at the top of the apparatus, is led by the two siphons *a' a'* into the pipes *b*, from whence it

flows in the direction of the arrows *b'* into the first upper capsule C, where it begins to heat and to concentrate. It flows from there successively into each of the other capsules to come out perfectly concentrated at the lower part *z*. The acid vapors produced by the concentration follow the direction of the arrows *v* and are blown through a lead pipe V, placed at the height of the second basin. The aspiration is made by means of a stream of steam or in any other suitable manner. The water can be condensed or not, according to the use for which it is intended. The hot gases of combustion follow the direction of the arrows *m* and come out of the concentration-furnace at X. They are utilized for the formation of the acid at sixty degrees in an apparatus analogous to this one or in lead basins resting on cast plates.

Having thus described my invention, what I claim is—

In a furnace for concentrating sulphuric acid, the combination, with two rows of capsules arranged in gradation, so that the liquid flowing from one capsule falls in the capsule immediately below it, of perforated cast basins supporting the same, each basin being constructed to support two capsules, a packing of asbestos between the capsules and basins, a fire-place E, siphons for the admission of acids, and a pipe for the escape of acid vapors, substantially as described.

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

CHARLES NÉGRER.

Witnesses:

J. A. S. LAUNNBETH,
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