

UNITED STATES PATENT OFFICE.

ALEXANDER A. CROLL, OF LONDON, ENGLAND.

IMPROVEMENT IN THE MANUFACTURE OF SULPHATE OF ALUMINA.

Specification forming part of Letters Patent No. **221,787**, dated November 18, 1879; application filed July 15, 1879; patented in England, August 20, 1878.

To all whom it may concern:

Be it known that I, ALEXANDER ANGUS CROLL, of Coleman Street, in the city of London, England, have invented a new and useful Improvement in the Manufacture of Sulphate of Alumina, which improvement is fully set forth in the following specification.

The object of the invention is to facilitate the economical manufacture of sulphate of alumina and the production of different qualities thereof from the same batch.

I proceed as follows: I take, say, nine parts, by weight, of china or other aluminous clay and, say, seven and a half parts, by weight, of sulphuric acid of specific gravity about 1.845; or a quantity of acid is to be used equal to the quantity stated, but it may be only of the specific gravity, say, 72° Twaddell when heated to the temperature of 220° Fahrenheit.

The china or other aluminous clay I burn or roast to the extent desired; and I retain in the product as much as possible of the heat obtained by the roasting until its submission to saturation.

I reduce the sulphuric acid, by the addition of water thereto, to about 72° specific gravity Twaddell, and its temperature is raised to about 220° Fahrenheit. The heated china or other aluminous clay is then combined with such solution of sulphuric acid in a saturating-vessel or a series of saturating-vessels.

I prefer to employ several saturating or combining vessels, in all of which the like process is proceeding at the same time or nearly so. Each of these vessels I find it convenient to form of dimensions such as to operate on as large a charge in each as convenient; but one of these vessels is, however, sufficiently large to contain the matter not only of one charge, but also, in addition, the contents of the other vessels, and these others are so placed in position that their contents may be readily discharged into the larger vessel. Each of these saturating-vessels is by preference surrounded by non-conducting material, so as to prevent as much as possible the escape of the heat therefrom, and when the whole of the clay intended for each vessel has been added to the acid therein I cover such vessels with wood

supporting a layer of charcoal, or with other suitable non-conducting material.

When, or even before, rapid ebullition has ceased in the respective saturating-vessels, I discharge the contents of each of the smaller ones into the larger one, care being taken to avoid the escape of the material by ebullition from the larger vessel, and also the escape of heat. This larger vessel, with its combined mass, is maintained at its highest point of heat, or as nearly so as possible, for several hours by means of a surrounding non-conducting jacket or medium of charcoal or woolen or similar non-conducting material, and by a wooden or other suitable non-conducting cover, for the purpose of maintaining the heat and consequent fluidity of the mass.

Supposing the quantity of material at any one time under operation to be about fifteen tons, the desired operation is generally effected in about twelve hours, upon which, or at any convenient time after, I proceed to open sluices in the vessel at three or four or other number of different points in the height of the material therein, and at about equal distances apart in such height. From these openings I allow the sulphate of alumina to flow; or it is drawn out in succession from such openings, commencing with the highest one; or successive quantities thereof are otherwise removed from this vessel, and the product is then, when cooled, collected in a condition favorable to its ready and cheap reduction to small pieces suitable for commerce.

The time during which such heat is maintained will vary with the quantity of material for the time under operation, the object being to maintain a high degree of heat, so as to secure the desired fluidity of the material as long as possible.

I would also state that, although I prefer to employ several vessels in which the operation is simultaneously proceeding, I do not confine myself to such use, as one large vessel might be employed.

By these means I am enabled to obtain various qualities of sulphate of alumina from one batch or manufacture, and it will be found that a more intimate and complete action of the

acid with the clay is effected, and the sulphate of alumina obtained is of a superior character for commercial purposes.

Having thus described my invention and means which I adopt in carrying the same into effect, I would have it understood that what I do claim is—

The improved process of manufacturing sulphate of alumina, which consists in retarding the escape of heat from the mass during the

chemical reaction of the acid upon the clay, and in drawing off different grades in succession from the same batch.

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

A. ANGUS CROLL.

Witnesses:

JNO. P. SUYATT,
WILLIAM BROOKES.