

UNITED STATES PATENT OFFICE.

HENRY S. BLACKMORE, OF MOUNT VERNON, NEW YORK.

PROCESS OF MAKING SULFUR TRIOXID.

SPECIFICATION forming part of Letters Patent No. 686,021, dated November 5, 1901.

Application filed February 14, 1900. Serial No. 5,202. (No specimens.)

To all whom it may concern:

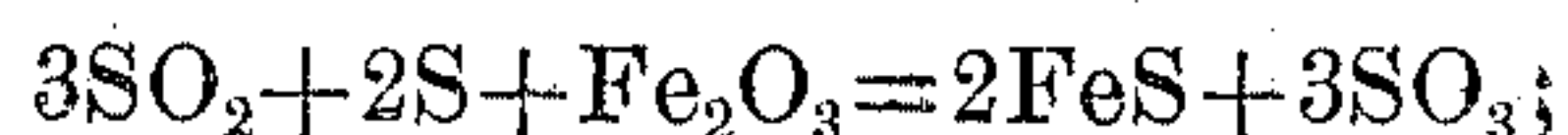
Be it known that I, HENRY SPENCER BLACKMORE, a citizen of the United States, residing at Mount Vernon, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Processes of Producing Sulfur Trioxid; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of my invention is to produce sulfur trioxid in a rapid and economical manner; and it consists, essentially, in displacing oxygen from a metallic oxid in the presence of sulfur dioxid, whereby in its nascent state it combines readily without difficulty.

In carrying out my invention on a commercial scale I place ferric oxid in a proper receptacle and slightly heat the same, say between 100° and 300° Fahrenheit. I then pass sulfur dioxid through a molten mass of sulfur, whereby it becomes heated and absorbs free sulfur vapor. This mixture of heated sulfur dioxid, carrying free sulfur, is introduced into the mass of ferric oxid, whereupon the free sulfur combines with the iron, producing iron sulfid and liberating free oxygen, which is immediately absorbed or taken up by the sulfur dioxid, converting the same into sulfur trioxid, which distils or is conveyed out of the apparatus and condensed.

It is preferable to superheat the sulfur dioxid before introducing into the presence of the iron oxid, so that the heat of occlusion may assist in transforming without elevating the applied heat to a point approaching dissociation of the sulfur trioxid into free oxygen and sulfur dioxid, and also as the temperature is elevated the affinity of iron for oxygen increases and for sulfur decreases, so the reaction should be performed or induced, preferably, by occluded heat of gases introduced.

The reaction which takes place may be illustrated by the following chemical formula or equation: Employing ferric oxid,

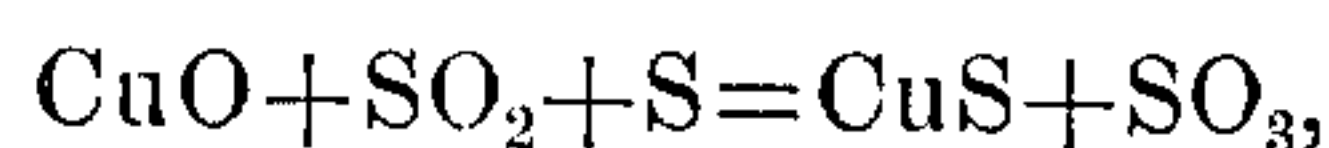


employing ferroso-ferric oxid,



It is obvious also that other metallic oxid

may be substituted for iron oxid without departing from the spirit of my invention, such as cupric oxid, which may be illustrated thus:



one of the essential features of my process being the displacement of oxygen from a metallic oxid in the presence of sulfur dioxid, which immediately absorbs or combines with it, producing sulfur trioxid.

Instead of passing sulfur dioxid through molten sulfur, I can pass it over heated pyrites, the principal object being to impregnate the sulfur dioxid with sulfur and heat the same, so that final reaction takes place below the dissociating-point of sulfur trioxid.

Care must be taken to avoid excess of free sulfur; otherwise it will absorb considerable of the liberated oxygen, producing sulfur dioxid.

Instead of conveying the sulfur in contact with the metallic oxid with the sulfur dioxid, I can employ any reagent with the oxid, so long as the oxygen is displaced from the metallic oxid in a nascent condition in the presence of the sulfur dioxid and it does not contaminate the generated sulfur trioxid to an injurious degree.

It is almost unnecessary to state that the metallic sulfid produced by the displacement of oxygen by the sulfur at low temperatures may be decomposed at high temperatures by action of oxygen regenerating iron oxid and producing sulfur dioxid, both of which can be employed in further operation, as stated, thus making the process practically continuous.

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

1. The process of producing sulfur trioxid, which consists in chemically displacing oxygen from a metallic oxid in the presence of sulfur dioxid, by action of a substance having greater affinity for the base of the oxid.

2. The process of producing sulfur trioxid which consists in exposing a metallic oxid to the action of sulfur dioxid and sulfur in a heated state.

3. The process of producing sulfur trioxid which consists in conveying into the presence of a metallic oxid, sulfur dioxid carrying free sulfur in a heated state.

4. The process of producing sulfur trioxid
which consists in heating sulfur dioxid, im-
pregnating the same with free sulfur, and
conveying the heated mixture in contact with
5 a metallic oxid.

5. The process of producing sulfur trioxid
which consists in exposing iron oxid to the
action of sulfur dioxid and sulfur in a heated
state.

10 6. The process of producing sulfur trioxid

which consists in heating sulfur dioxid, in-
troducing sulfur into the same, and convey-
ing the mixture in the presence of iron oxid.

In testimony whereof I affix my signature
in presence of two witnesses.

HENRY S. BLACKMORE.

Witnesses:

D. W. GARDNER,

HARRY R. KING.