

UNITED STATES PATENT OFFICE.

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DISTILLATION OF SULFUR.

1,398,960.

Specification of Letters Patent.

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No Drawing.

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To all whom it may concern:

Be it known that we, HAROLD SIMMONDS DAVIS, a citizen of Canada, residing in Pittsburgh, county of Allegheny, State of Pennsylvania, and WILLIAM ALLEN HAMOR, a citizen of the United States, residing in New Kensington, county of Westmoreland, State of Pennsylvania, have invented certain new and useful Improvements in the Distillation of Sulfur; and we 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.

This invention relates to the distillation of sulfur, and has for its object the provision of certain improvements in sulfur distillation.

The purification of crude sulfur by distillation is an old art and is the basis of a large industry. As ordinarily practised, this purification is accomplished by heating the crude sulfur in retorts and collecting the resulting vapor in suitable receiving chambers or condensers.

Retorts of many different shapes and sizes have been used in the purification of crude sulfur by distillation and heretofore it has been the general practice to construct such retorts of iron, usually gray iron. Since hot sulfur reacts with iron, corrosion of the distillation retorts takes place at the temperatures reached by the sulfur during its distillation, and in time such corrosion destroys the retort.

Our present invention contemplates the provision of a sulfur distillation apparatus having such parts thereof as are exposed in operation to the action of molten or vaporous sulfur protected against corrosion by a calorized coating. We have found that the so-called "calorized" iron resists to a remarkable degree the corroding action of boiling sulfur. For example, we have found a piece of calorized steel which was kept in boiling sulfur for a total period of four days and in sulfur at a temperature of 130° C. during certain intermediate intervals to have completely resisted attack by the sulfur.

The process of calorizing as most commonly practised consists in placing the material to be calorized in an appropriate ves-

sel or retort and heating the same in a reducing atmosphere, the retort being filled with a mixture containing finely divided aluminum. This treatment, conducted at high temperature, thoroughly infuses aluminum into the exposed portion of the metal being calorized so as to form a homogeneous aluminum alloy for a certain depth. This depth ranges from a few thousandths of an inch to the permeation of the entire mass, varying with the duration of the treatment and dependent upon the service requirements of the material being calorized.

In carrying out our present invention, retorts, stills and similar apparatus for the distillation of sulfur are constructed in whole or in part of calorized material. The distilling apparatus may be of any appropriate shape and size and the calorizing of the material thereof may be effected in any convenient manner. We prefer to construct the sulfur distilling apparatus of iron or steel and to protect such parts thereof as are exposed in operation to the corroding action of molten or vaporous sulfur by a calorized coating. In practice, the calorization of the interior of such sulfur distillation apparatus is carried out after the installation thereof, in order to insure an unbroken homogeneous calorized surface. The calorized coating is frequently rough on the outside, and, where desired, such a rough coating may be buffed down to form a smooth surface.

It is, of course, only necessary to calorize such surfaces or parts of the sulfur distillation apparatus as are exposed in operation to the corroding action of molten or vaporous sulfur. Thus, the calorizing of retorts, stills and the like is confined to the interior thereof, and the depth of calorization need be only sufficient to provide the desired protective coating or medium. In the case of calorized iron or steel this protective medium will contain aluminum and iron probably in the form of a homogeneous alloy. Other metals than iron may, of course, be calorized in practising the present invention.

Molten or vaporous sulfur exercises relatively little corroding action on a calorized coating or medium such as is contemplated by the present invention, and sulfur distilla-

tion apparatus protected against corrosion in accordance with the principles of the present invention have greatly prolonged life compared with similar apparatus of the prior art.

We claim:

1. The improvement in the distillation of sulfur which comprises carrying out the distillation in an apparatus having such surfaces thereof as are exposed in operation to the action of molten or vaporous sulfur protected against corrosion by a calorized coating.

2. The improvement in the distillation of sulfur which comprises carrying out the distillation in an apparatus having such parts thereof as contact during the operation with molten or vaporous sulfur protected against corrosion by a corrosion resistant medium containing iron and aluminum.

3. An apparatus for distilling sulfur having such surfaces thereof as are exposed in operation to the action of molten or vapor-

ous sulfur protected against corrosion by a corrosion-resistant calorized coating.

4. An apparatus for distilling sulfur having such surfaces thereof as are exposed in operation to the action of molten or vaporous sulfur protected against corrosion by a corrosion resistant medium containing iron and aluminum.

5. A retort for distilling sulfur having such parts thereof as are in contact during the distillation with molten sulfur protected against corrosion by a corrosion resistant calorized coating.

6. A retort for distilling sulfur having such parts thereof as are in contact during the distillation with molten sulfur protected against corrosion by a corrosion-resistant medium containing iron and aluminum.

In testimony whereof we affix our signatures.

HAROLD SIMMONDS DAVIS.
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