

# UNITED STATES PATENT OFFICE.

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## PRODUCING ACETYLENE TETRACHLORID.

985,528.

Specification of Letters Patent.

Patented Feb. 28, 1911.

No Drawing.

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*To all whom it may concern:*

Be it known that we, ERICH HOEFER and MARTIN MUGDAN, citizens of the German Empire, and residing at Nuremberg, German Empire, have invented certain new and useful Improvements in Producing Acetylene Tetrachlorid, of which the following is a specification.

The present invention consists of a process for producing acetylene tetrachlorid.

As disclosed in German Patent 174068 (Salzbergwerk Neustassfurt) acetylene tetrachlorid is formed if acetylene and chlorin are allowed to re-act on chlorid of sulfur mixed with a suitable reaction facilitating agent, for instance, such as iron or iron-compounds. In this manner tetra- or hexachlorethane is formed according to the conditions under which the reaction is carried on.

In this process the employment of the chlorid of sulfur was regarded as indispensable for realizing the reaction; for as it is said in the above mentioned German patent, acetylene forms with the chlorid of sulfur in presence of the catalyzer a compound in which chlorid of sulfur and acetylene are the chief components.

There is no doubt, that working with chlorid of sulfur is extremely disagreeable, mainly, because, owing to the danger of explosion it is necessary to work with loosely closed or open apparatus. Moreover it is by no means easy to entirely eliminate the chlorid of sulfur. With this process it is also difficult to obtain a pure smelling and durable tetrachlorid of acetylene, while the tendency of the product thus obtained to decompose rendered a special stabilizing process necessary (German Patent 185374).

Acetylene and chlorin react very readily, and the great difficulty heretofore has been to properly control the reaction and at the same time allow it to proceed with smoothness and regularity. If the reaction is uncontrolled it readily goes too far, breaking up the acetylene molecule with deposition of carbon. To procure the desired regularity and control of reaction the presence of ferric chlorid is highly advantageous. Heretofore it has been often considered necessary, as before mentioned, to employ an active chlorinating agent in lieu of employing only the direct action of chlorin introduced with the acetylene. We have found however that under suitable conditions acetylene tetrachlorid may also be obtained, if

ferric chlorid alone is used to effect the reaction between the chlorin and acetylene, the presence of sulfur chlorid or other active supplemental chlorinating agent being unnecessary. If chlorin and acetylene are fed into heated acetylene tetrachlorid mixed with anhydrous ferric chlorid, the whole being stirred the while, these gases, if introduced into the mixture in proper proportions, will be united approximately quantitatively forming acetylene tetrachlorid. The acetylene tetrachlorid may be easily separated out by distillation in a current of steam or by any other suitable means and will be obtained in a good quality.

The ferric chlorid employed in the present process acts as a reaction-facilitating agent or true catalyzer. Being distributed throughout a body of diluent into which the acetylene and chlorin are introduced, the effect of the ferric chlorid is to cause the formation of acetylene tetrachlorid to occur with regularity and smoothness. The ratio between the amount of ferric chlorid and of diluent in the present process can of course be readily controlled if necessary. Furthermore, by causing the reaction to occur in a relatively large volume of a non-reacting medium or diluent, the heat of the reaction is distributed throughout a large mass and is readily dissipated and controlled, thus effectually precluding local overheating and consequent violence of reaction. The reaction therefore proceeds moderately and yet, by reason of the presence of the ferric chlorid, with great smoothness and continuity.

We claim as our invention:

1. The process of producing acetylene tetrachlorid which comprises introducing acetylene and chlorin into a mixture of a non-reacting liquid diluent with ferric chlorid.

2. The process of producing acetylene tetrachlorid which comprises introducing acetylene and chlorin into a mixture of acetylene tetrachlorid and ferric chlorid.

3. The process of producing acetylene tetrachlorid which comprises mixing anhydrous ferric chlorid with acetylene tetrachlorid and passing acetylene and chlorin into the mixture.

4. The process of producing acetylene tetrachlorid which comprises passing acetylene and chlorin in reacting proportions into a relatively large volume of a mixture of acetylene tetrachlorid with ferric chlorid.

5. The process of producing acetylene tet-

5 rachlorid which comprises passing acetylene and chlorin in reacting proportions into a relatively large volume of a mixture of acetylene tetrachlorid with ferric chlorid, and stirring the mixture while introducing the reacting materials.

6. The process of producing acetylene tetrachlorid which comprises mixing ferric chlorid with acetylene tetrachlorid, passing  
10 acetylene and chlorin into the mixture while

stirring, and separating acetylene tetrachlorid by distillation.

In testimony whereof we affix our signatures in presence of two witnesses.

ERICH HOEFER.  
MARTIN MUGDAN.

Witnesses:

LUDWIG SEMMIGER,  
ADAM KIRCHE.