

# UNITED STATES PATENT OFFICE.

EMIL FISCHER, OF BERLIN, GERMANY, ASSIGNOR TO C. F. BOEHRINGER & SOEHNE, OF WALDHOF, GERMANY.

## METHOD OF OBTAINING TETRA-ALKYL URIC ACID.

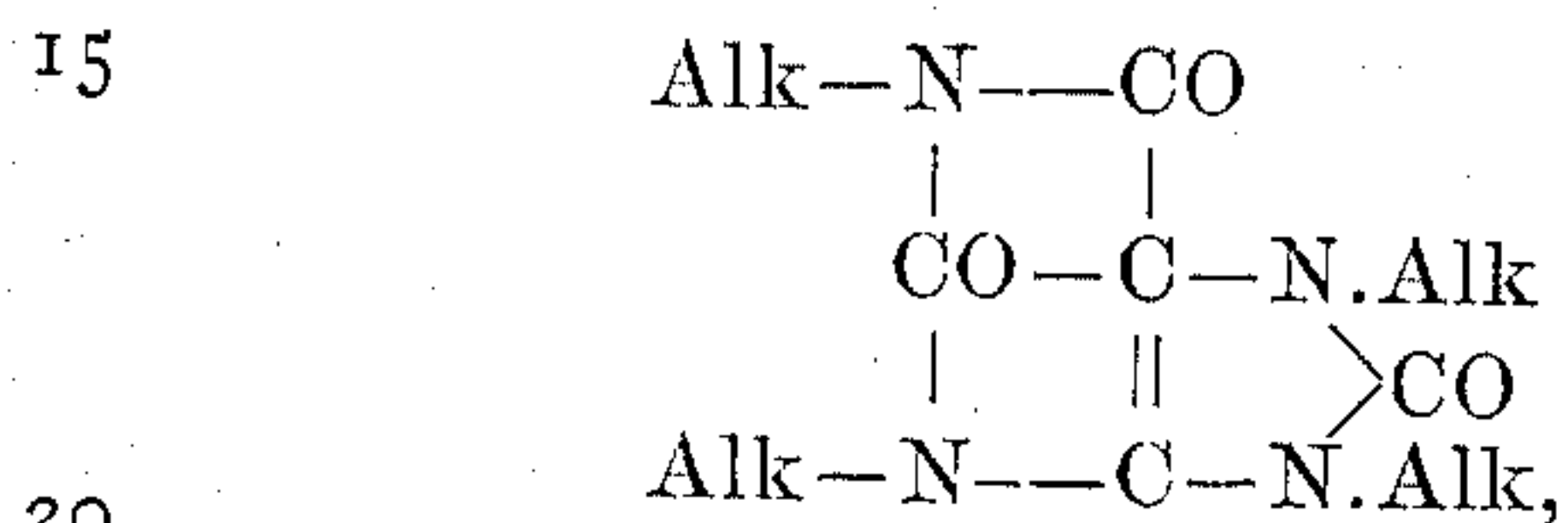
SPECIFICATION forming part of Letters Patent No. 571,352, dated November 17, 1896.

Application filed June 16, 1896. Serial No. 595,791. (No specimens.)

To all whom it may concern:

Be it known that I, EMIL FISCHER, a citizen of Germany, residing at Berlin, Germany, have invented certain new and useful Improvements in the Art of Obtaining Tetra-Alkyl Uric Acids; 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.

This invention relates to the preparation of the alkyl derivatives of uric acid, and in particular the tetra-alkyl derivatives, having the general formula



where "Alk" is used to designate any alkyl or alcohol radical, such as methyl.

The object of the present invention is to enable the tetra-alkyl derivatives to be obtained directly by alkylizing methods from uric acid.

With this object in view my invention, broadly considered, is distinguished by the treatment of the salt of a dialkyl uric acid with a haloid either in an indifferent or inert diluting agent, such as ethyl ether. The said invention, moreover, embraces such further features, steps, and methods as will be set forth hereinafter and pointed out in the claims annexed.

The following will serve as an illustration of the preferred method of carrying out my invention.

To obtain tetramethyl uric acid from a dimethyl uric acid in the dry way, I proceed as follows: I prepare the cuprous salt, which corresponds to the known salt of uric acid, (see Balke, *Journal für Praktische Chemie*, vol. 47, p. 546,) and whose formula is probably  $\text{C}_5\text{H}_2\text{N}_4\text{O}_3(\text{CH}_3)_2.\text{Cu}_2\text{O}$ , (the proportion of Cu found by analysis being 33.7 per cent.,) in the form of an almost colorless powder by heating an alkaline solution of a dimethyl uric acid with Fehling's solution, that is, an alkaline solution of potassio-tartrate of copper in excess. The powder is then dried in

*vacuo* at 100° centigrade. One part by weight of the dried powder is mixed with powdered glass and heated to from 120° to 130° centigrade for eight hours with one part by weight of methyl iodid and two parts by weight of ether, as a diluent, in a closed vessel. The resulting product is then boiled with water to separate the tetramethyl uric acid. The solution is then evaporated to dryness and the residue is extracted with chloroform. The tetramethyl uric acid which remains after evaporation of the chloroform is then purified by crystallizing the same from an aqueous or alcoholic solution.

The reaction resulting in the formation of the tetramethyl compound may be expressed in the following equation:



The tetra-alkyl compounds may be used in the art of preparing alkyl derivatives of xanthin, such as trimethyl xanthin or caffein, as set forth in my application for Letters Patent of the United States, Serial No. 595,792, filed June 16, 1896.

Having thus set forth my invention and what I consider the preferred manner of carrying the same into effect, what I claim, and desire to secure by Letters Patent of the United States, is—

1. The process which consists in acting upon the salt of an alkyl derivative of uric acid with a haloid ether, for the purpose, substantially as set forth.
2. The process which consists in acting upon the salt of a dialkyl uric acid with a haloid ether, for the purpose substantially as set forth.
3. The process which consists in acting upon the cuprous salt of dialkyl uric acid with a haloid ether, for the purpose substantially as set forth.
4. The process which consists in acting upon the cuprous salt of dimethyl uric acid with methyl iodid to form tetramethyl uric acid.
5. The process which consists in mixing the copper salt of dimethyl uric acid with powdered glass and heating the same with methyl iodid and ether in the manner and in the proportions, substantially as set forth.

6. The process which consists in mixing the copper salt of dimethyl uric acid with powdered glass and heating the same with methyl iodid and ether in the manner and proportions substantially as stated and then purifying the resulting product by first boiling in water, and then evaporating to dryness and extracting with chloroform.

7. The process which consists in warming an alkaline solution of a dimethyl uric acid with a solution of potassio-tartrate of copper in excess, then treating the resulting cuprous salt of dimethyl uric acid with a haloid ether, substantially as set forth.

8. The process which consists in warming an alkaline solution of a dimethyl uric acid with Fehling's solution in excess, then mixing the resulting copper salt of dimethyl uric acid with powdered glass and heating the mixture with methyl iodid and ether, in the manner and in the proportions substantially as set forth.

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

EMIL FISCHER.

Witnesses:

WOLD HAUPT,  
G. PINKUS.