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PATENT SPECIFICATION

Application Date: May 11, 1922. No. 13,340/22. **179,951**

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COMPLETE SPECIFICATION.

Improvements in the Process of Manufacturing Formic Aldehyde.

I, ARTHUR HEINEMANN, a citizen of the German Republic, of Dorfstrasse 23, Berlin-Tempelhof, Germany, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The invention relates to the manufacture of formic aldehyde from carbon monoxide and hydrogen.

It is known that carbon monoxide and hydrogen combine in certain circumstances to form a polymeride of formic aldehyde. It is also known that carbon monoxide and hydrogen, in the presence of water vapour, at a very high temperature and at atmospheric or higher pressure form small quantities of formic aldehyde.

In one known process of producing formic aldehyde carbon monoxide and hydrogen, without water vapor, are passed over platinum, platinized asbestos or other suitable contact substance.

In another known process formic aldehyde is produced from a mixture of carbon monoxide, hydrogen and steam by passing the mixture over a hydrogen activating catalyst and a hydrated metal oxide.

I have found that the combination of hydrogen with carbon monoxide can be effected on a commercial scale by causing a mixture of carbon monoxide, with hydrogen and a small quantity of water vapour to pass over a contact substance heated to a temperature which may range from about 240 to 350 degrees Centigrade. By this means I obtain a mixture of water vapour and formic aldehyde, which I condense and collect as a liquid solution of formic aldehyde. Carbon monoxide and hydrogen which have not been converted can be recovered.

In carrying out the process about two litres of the mixture are passed per hour through a contact chamber of about 750 ccm. capacity. Suitable contact substances are porous materials such as unburnt porcelain, pumice stone, asbestos, coke, charcoal, and artificially produced carbon.

In order to obtain the greatest possible yield of formic aldehyde it is preferable to apply to the contact substances a metallic deposit of copper, nickel or the like capable of accumulating or occluding hydrogen.

My invention is differentiated from one of the above mentioned prior processes by the use of steam, and from the other by the use of porous contact substances such as those mentioned, within the particular range of temperatures stated. As regards the prior processes, I am acquainted with Specifications No. 108,855, No. 157,047, No. 180,016, and No. 20,488/1913 and make no claim to any matter therein described.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. The process of producing formic aldehyde from carbon monoxide and hydrogen, in the presence of water vapour, characterized in that the mixture is passed at a temperature ranging from about 240 to 350 degrees Centigrade over a porous contact substance such as porcelain, pumice stone or the like.

2. The process claimed in Claim 1, performed with a porous contact substance having metal deposited thereon.

Dated this 11th day of May, 1922.

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