PATENT SPECIFICATION

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COMPLETE SPECIFICATION.

Improved Manufacture of Oxygenated Organic Compounds.

We, "L'AIR LIQUIDE,", SOCIÉTÉ ANONYME POUR L'ETUDE ET L'EXPLOITATION DES PROCÉDÉS, GEORGES CLAUDE, of 48, Rue St. Lazare, Paris, France, a French Société Anonyme, assignees of SOCIÉTÉ CHIMIQUE DE LA GRANDE PAROISSE AZOTE ET PRODUITS CHIMIQUES, French Société Anonyme, of 40, Rue de Colisee, Paris, France, 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:—

It is known that in the catalytic manufacture of oxygenated organic compounds like alcohols in a cyclic process, it may be advantageous to use a gaseous mixture of hydrogen and oxides of carbon in the presence of an excess of one of the reacting gases or of inert gases or both simultaneously, and it has further been proposed, in a cyclic process of this kind, to re-subject the residual gases to the catalytic treatment, after adding the gases consumed by the reaction. It is therefore necessary to have available for the purpose at any rate at the beginning of the synthesis, a gaseous mixture containing not only hydrogen and carbon monoxide or carbonic acid in the stoichiometric proportions determined by the reaction, but also an excess of one of the reacting gases, inert gases or both simultaneously, these gases being taken in quantity necessary for the rapid removal of the heat generated by the reaction. The present invention affords a method of carrying out the manufacture from gaseous mixtures which do not contain the gases not required for the reaction. The invention consists in initially introducing into the gaseous mixture containing hydrogen and oxides of carbon in the stoichiometric proportions determined by the reaction, an excess of one of the reacting gases, or of inert gases, or both simultaneously: the gas which is to react is diluted by the mentioned gases, and the formed gaseous mixture is submitted to the synthesis. After separation of the products of reaction the whole gaseous mixture of the uncombined gases and of inert gases is sent back to the new gases, i.e. gases containing hydrogen and oxides of carbon in the stoichiometric proportions, the inert gases being destinated to circulate in a closed cycle.

Nitrogen may be used as the inert gas and in this case the whole or part of the available gaseous mixture can be passed at the beginning of the synthesis into an air burner for manufacturing there nitrogen by combustion, or the whole or a portion of the same mixture can be passed at the beginning of the synthesis over a suitable catalyser in a catalysing tube in the presence of steam for enriching this mixture in the hydrogen.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that we are aware of Specification No. 313,467 and do not claim anything claimed therein but that what we do claim is:—

1. A cyclic process for the catalytic manufacture of oxygenated organic compounds such as alcohols from gaseous mixtures containing hydrogen and oxides of carbon, in the presence of an excess of one of the reacting gases, or of inert gases or of both simultaneously, consisting in initially introducing into the gaseous mixture containing hydrogen and oxides of carbon in the stoichiometric proportions determined by the catalytic reaction, an excess of one of the reacting gases or inert gases, or both simultaneously, operating the synthesis with this gaseous mixture, and then sending back the whole of the residual gases, after separation of the formed products, to the new gases i.e. gases containing hydrogen and oxides of carbon in the stoichiometric proportions, to be treated there with.

2. A process according to Claim 1 consisting in causing the whole or a portion of the available mixture of carbon monoxide and hydrogen to pass at the beginning of the synthesis through an air burner to produce nitrogen by combustion.

3. A process according to Claim 1, consisting in passing the whole or a portion of the available mixture of carbon monoxide and hydrogen over a suitable cata-

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lyst in the presence of water vapour, at the beginning of the synthesis, for the purpose of increasing the proportion of hydrogen in the mixture.

4. The process for the synthesis of oxygenated organic compounds such as alcohols substantially as described.

5. Oxygenated organic compounds such as alcohols when obtained by the process claimed in any of the preceding claims.

Dated this 21st day of February, 1929.

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