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PATENT SPECIFICATION

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1191

COMPLETE SPECIFICATION.

Improvements in the Manufacture and Production of Organic Compounds Containing Oxygen.

We, I. G. FARBENINDUSTRIE AKTIENGESELLSCHAFT, of Frankfort-on-Main, Germany, a Joint Stock Company organized under the Laws of 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:—

This invention relates to improvements in the manufacture and production of organic compounds containing oxygen.

We have found that the production of organic compounds containing oxygen, either alone or in conjunction with hydrocarbons, by reducing oxides of carbon with hydrogen under diminished, ordinary or slightly elevated pressure up to about 20 atmospheres and at an elevated temperature, may be carried out in a particularly advantageous manner by operating at temperatures below 300° Centigrade, when the catalyst employed consists of iron containing small additions of oxides or hydroxides of the alkali metals or alkaline earths, and being used alone or in conjunction with other substances. The resulting products are partly solid, and partly liquid and gaseous. In contrast to the conditions in the production of hydrocarbons alone, less water and more carbon dioxide are formed, and merely traces of the lower members of the paraffin series of hydrocarbons are produced.

The solid products are yellow to yellowish brown in colour and contain, besides white paraffin melting at about 65° Centigrade, brown viscous resins containing oxygen. The liquid portions have a yellow green to yellow brown colour and boil at approximately between 40 and 200 degrees Centigrade. They, too, contain paraffins. Their specific gravity is 0.74—0.80 and their bromine value about 0.35—0.45. The oxygen is contained in amounts up to about 17 to 18 per cent. The water of condensation contains, in addition to carbon dioxide, organic acids volatilisable by steam.

It has already been proposed in Specification No. 2306 A.D. 1914 to hydrogenise carbon compounds, including the oxides of carbon, by treatment with hydrogen in the presence of a catalytic agent consisting of an intimate mixture of either iron, nickel, cobalt or copper with a compound containing oxygen characterised by being or containing or giving rise to high melting and difficultly reducible oxides or oxygen compounds of weak basic or neutral or acid character, tungstates and selenates of the alkaline earth and of lithium being mentioned as examples of such compounds. It has further been proposed in the said specification to add an alkali metal compound, for example caustic soda, even traces of such compounds being sufficient to the said catalyst. It is mentioned that the reaction may be carried out at ordinary or under increased pressure and in most cases at temperatures considerably below 180° Centigrade. The present invention relates solely to the production of organic compounds containing oxygen either alone or in conjunction with hydrocarbons, which we have found can be produced by the catalysts herein claimed but there is no disclosure in the Specification referred to that the said catalysts will produce such products.

The following examples will further illustrate how the said invention may be carried into practical effect but the invention is not limited to the Examples.

EXAMPLE 1.

Ferric oxide, obtained by precipitating ferric nitrate with ammonia, and carefully washed and dried at 350° Centigrade is impregnated with an aqueous solution of 0.75 per cent of potassium hydroxide, and re-dried. After the catalyst has been reduced with hydrogen at 350° Centigrade for 36 hours, a mixture of carbon monoxide and hydrogen containing 60 per cent of the latter is passed over it at 200° Centigrade. The treatment furnishes yellowish green solid products containing 2.2 per cent of oxygen and melting at from 54° to 57° Centigrade, a yellow brown oily product with 17.8 per cent of oxygen and having the density 0.767, and an aqueous solution, with a strongly acid reaction requiring 2 cc. of decinormal NaOH per cubic

centimetre for neutralisation and containing volatile organic acids.

EXAMPLE 2.

An aqueous solution containing ferric nitrate and cupric nitrate in the molecular ratio 2:1 is precipitated with dilute caustic soda solution, and the precipitate is washed until it is free from nitrate, but still contains 0.32 per cent of NaOH when dried. The catalyst is reduced with hydrogen for 64 hours at 350° Centigrade and over it is then passed a mixture of carbon monoxide and hydrogen containing about 60 per cent of the latter at 200° Centigrade. Products similar to those specified in Example 1 are obtained.

We are aware of Specification No. 255,818 and do not claim anything described or claimed therein. We are also aware of Specifications Nos. 270,705 and 271,452 and do not claim anything claimed therein.

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 what we claim is:—

1. In the production of organic compounds containing oxygen, either alone or in conjunction with hydrocarbons, by the reduction of oxides of carbon with hydrogen under diminished, ordinary or slightly elevated pressure and at an elevated temperature, the step of operating at temperatures below 300° Centigrade and employing a catalyst consisting of iron with small additions of oxides or hydroxides of the alkali metals or alkaline earths, the said catalyst being used alone or in conjunction with other substances.

2. The process for the production of organic compounds containing oxygen according to claim 1, substantially as described in each of the foregoing examples.

3. Organic compounds containing oxygen when prepared in accordance with the preceding claiming clauses.

Dated this 28th day of October 1927.

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