

PATENT SPECIFICATION

271,452

Convention Date (Germany) : May 22, 1926.

Application Date (in United Kingdom) : May 9, 1927. No. 12,403 / 27.

Complete Accepted : Sept. 10, 1928.



COMPLETE SPECIFICATION.

A Process for the Manufacture and Production of Hydrocarbons.

We, I. G. FARBENINDUSTRIE AKTIEN-GESELLSCHAFT, of Frankfort-on-Main, German, a corporation organized according to German laws, 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:—

We have found that the production of hydrocarbons and their oxygen-containing derivatives of the catalytic reduction of oxides of carbon by hydrogen, as described for example in Specification No. 20,488/13, may be carried out by passing a gas comprising mixtures of carbon oxides and hydrogen over such catalysts as consist of or contain iron, cobalt or molybdenum or mixtures thereof which have been prepared from the corresponding metal carbonyls. Owing to the fine state of division and the high degree of purity, especially freedom from sulphur, of the metals obtained in the manner specified, the catalysts prepared therefrom are distinguished by a particularly energetic catalytic action towards mixtures of carbon monoxide or dioxide and hydrogen.

The metals may be either deposited, by decomposing the vapours of the corresponding carbonyls, on a suitable carrier such as active silica, preferably by heating, or they may be used in the form of a fine powder, or flakes resembling cotton wool, such as is obtained, for example, by the thermal decomposition of the carbonyl vapour in an open space according to the Specification No. 269,677. Instead of producing the metals directly from the carbonyls, the pure oxides resulting from the combustion of the carbonyls may be used as the starting materials for the production thereof. Instead of a single metal, use may be made of mixtures of several metals prepared from the corresponding carbonyls, or mixtures with other substances, for example with difficultly reducible oxides.

The gaseous mixture containing the oxide of carbon and hydrogen may be passed over the catalyser at ordinary, diminished or increased pressure. The nature of the hydrocarbons, oxygen

derivatives or mixtures of the same produced will vary according to the composition of the gas, the pressure and temperature employed and the rate of flow.

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

EXAMPLE.

A shaft furnace heated to 250° Centigrade is filled with iron flakes resembling cotton wool, which have been produced by decomposing iron carbonyl vapour, diluted with carbon monoxide, according to the Specification No. 269,677. A mixture of carbon monoxide and hydrogen, in equal volumetric proportions, is passed through the furnace. On cooling, the gases issuing from the furnace deposit, in addition to water, hydrocarbons which are liquid at the ordinary temperature, and adapted to be used in part, for example as fuels or solvents, and in part, for example, as lubricating oils. When the formation of hydrocarbons diminishes the supply of reaction gases is interrupted and the catalyst removed; and fresh quantities of the catalyst may be produced by passing iron carbonyl vapour into the reaction chamber which is temporarily raised to a somewhat higher temperature. When sufficient catalyst has been produced, the temperature is lowered to what it was before, the reaction gases are again introduced, and the process is then carried on as before.

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 that it has already been proposed to produce finely divided metal oxides for use as mineral pigments, polishes or catalysts by burning metal carbonyls in an oxidising gas, or to produce mainly liquid hydrocarbons by heating metal carbonyls with smaller amounts of hydrogen or gases containing hydrogen, such as water gas than are theoretically required for the production of methane to temperatures sufficient to decompose the carbonyl, but what we claim is:—

1. A process for the manufacture and

production of hydrocarbons, their oxygen-containing derivatives and mixtures thereof which consists in passing a gas comprising mixtures of hydrogen and an oxide of carbon over catalysts consisting of or containing iron cobalt or molybdenum or mixtures thereof produced from the corresponding metal carbonyls, preferably in the form of flakes.

10 2. The production of hydrocarbons sub-

stantially as described in the foregoing example.

3. Hydrocarbons when prepared in accordance with the preceding claiming clauses.

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Dated this 9th day of May, 1927.

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47, Lincoln's Inn Fields, London, W.C. 2,
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Abingdon: Printed for His Majesty's Stationery Office, by Burgess & Son.

[Wt. 56A.—125/11/1928.]