NOTE.—*The application for a Patent has become void.*
This print shows the Specification as it became open to public inspection.

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PATENT SPECIFICATION

Convention Date (France): July 27, 1925. **255,829**

Application Date (in United Kingdom): May 27, 1926. No. 18,455/26.

Complete not Accepted.

COMPLETE SPECIFICATION.

Improved Manufacture of Petroleum Spirits from Methane or from Gases Containing Methane.

We, SOCIÉTÉ ANONYME: COMPAGNIE DE BETHUNE, a company duly organised under the French laws, of Bully-les-Mines (Pas-de-Calais), 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:—

The preparation of synthetic petroleum from methane, is a synthesis which is not new. Up to now, however, this synthesis can be carried out only in two stages; the first stage consists in first subjecting methane to the action of high temperatures in order to decompose it, as shown by Berthelot, into acetylene and hydrogen:

$$2CH_4 = C_2H_2 + 3H_2$$

the second stage consists in causing this mixture to pass, after addition or not of hydrogen, on a catalyser, in accordance the Sabatier's method, this giving either Roumanian, American and other petroleums, or benzene according to the conditions of the operation.

This synthesis of petroleum, which is the only one known starting from methane, has not yet been commercially carried into practice owing to the too high price of electric current which the indispensable agent for decomposing methane.

Theoretically, it would not be indispensable to pass through the intermediary of acetylene for obtaining petroleums starting from methane, if the latter could be easily deshydrogenated into groups CH_2, CH_3 or CH, which group CH could be subsequently transformed, by a subsequent hydrogenation, into groups CH_2, CH_3 which would unite for forming the hydrocarbons to be obtained. However, the deshydrogenation of methane, when it is desired to effect it is too complete and most of the time carbon and hydrogen are only found; no suitable catalyser has yet been found for checking this reaction of decomposition. Theory indicates also that, in this case, the pressure cannot intervene since this reaction takes place with increase of volume.

The present process which has for object the preparation of petroleum spirits from methane, consists in effecting the decomposition of methane under pressure and at a relatively low temperature of 200 to 600° C. in presence of catalysers and, contrarily to any expectation, it has been found that, owing to pressure, liquid hydrocarbons were thus obtained, hydrocarbons constituted by real petroleum spirits the greater portion of which distills from 38 to 100° C.; at the same time, gases such as butane, ethane, etc. are obtained.

The methane which serves as starting point for the synthesis of petroleum spirits need not be rigorously pure; on the contrary, it seems that the presence of hydrogen in the gas and, besides, that of oxygen or of bodies capable, of combining with hydrogen, promote the reaction.

As catalyser, it is possible to use for instance metallic oxides, such as iron oxide, or a mixture of metallic oxides or of reduced metals arising from these oxides.

Having now particularly described and ascertained the nature of our said inven-

tion and in what manner the same is to be performed, we declare that what we claim is:—

1. Process for the preparation of petroleum spirits from methane or from gas containing methane, characterised in that the decomposition of methane takes place under pressure on a catalytic agent and at a suitable temperature, from 200 to 600° C. for instance.

2. Process as claimed in Claim 1, characterised in that the catalytic agent is preferably a metallic oxide, a mixture of oxides, or a mixture of metals arising from the reduction of these oxides.

3. Process as claimed in Claim 1, characterised in that the methane is preferably mixed with another gas capable of combining with the hydrogen, in the medium of the reaction; oxygen for instance or any other gas.

4. Process as claimed in Claim 1, characterised in that the methane can be mixed with hydrogen.

5. The process for the manufacture of petroleum spirits from methane or from gas containing methane, substantially as herein before described.

Dated this 26th day of May, 1926.

SOCIETE ANONYME: COMPAGNIE DE BETHUNE,
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