[Second Edition.]

PATENT SPECIFICATION

277,273

Application Date: March 13, 1926. No. 19,279 / 27.

(Patent of Addition to No. 247,217. dated Feb. 7, 1925: as improved upon or modified by No. 249,155. Convention Date (Germany): March 14, 1925).

Complete Accepted: Sept. 13, 1927.

1224

COMPLETE SPECIFICATION.

Improvements in the Production of Liquid Hydrocarbons and Derivatives thereof from Coal, Tar and the like.

We, I. G. FARBENINDUSTRIE AKTIENGESELLSCHAFT, of Frankfort-on-Main, Germany, a joint stock company, organised 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 is an improvement in or modification of the invention described and claimed in Specification No. 247,217 as modified by Specification No. 249,155, in the latter of which it has been shewn that in the conversion of coal, tars, mineral oils and the like into valuable hydrocarbons and derivatives thereof by treatment with gases containing hydrogen and carbon oxides under pressure and at an elevated temperature in the presence or absence of catalysts, an apparatus should be employed the hot surfaces of which coming into contact with the high pressure gases are made of a metal not reacting with carbon monoxide, such as copper, silver, aluminium and alloys thereof, or chromium, manganese, vanadium, or uranium, or special steels with a considerable percentage of manganese, titanium, chromium, tungsten, vanadium or molybdenum, or alloys of nickel or cobalt corresponding to such special steels.

According to the present invention we have also found that in the less hot and cold parts of the apparatus there occurs the possibility of undesirable decompositions of carbon monoxide and of a formation of iron, nickel or cobalt carbonyl, which carbonyls would be carried along with the gases and suffer decomposition when reacting with the hot parts of the apparatus, thereby forming a deposition of iron, nickel or cobalt which would give rise to undesirable by-reactions.

We have now found that in order to meet these difficulties also the less hot and cold parts of the apparatus should be made of a metal not reacting with carbon monoxide. For this purpose either the beforementioned metals or even metals of low melting point such as tin, zinc, cadmium, lead and their alloys may be employed.

We have also found that the process of the said Specification No. 249,155 as well as its present modification are of importance not only when employing gases containing hydrogen and carbon oxides, but also when using other reducing gases, as also in this case there is the risk of a formation of carbon monoxide, for example by the action of hydrogen on phenolic or other oxygenated compounds contained in the initial materials.

We do not claim in this application the destructive hydrogenation of brown coal producer tar mixed with crude brown coal or peat in reaction vessels coated with manganese bronze, nor the conversion of phenols into the corresponding hydrocarbons in reaction vessels consisting of or lined with copper and the appended claims should be read with this limitation.

We are aware that in Specification No. 231,295 a process for the catalytic reduction of carbon monoxide at an elevated temperature and pressure has been described and claimed, in which the hot parts of the apparatus and also the less hot and cold parts thereof are coated or lined with, or made of, a metal or alloy which does not form carbonyl compounds and withstands the temperature conditions; in contradistinction thereto the

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present invention relates to the destructive hydrogenation of carbonaceous materials.

We are also aware that it has already been proposed to heat tar oils in the presence of tin and hydrogen and under pressure at temperatures of 250° Centigrade and more, the said process being carried out in tin-lined apparatus; under the said conditions the tin-coating will melt and the reacting materials have access to the iron walls of the apparatus thus giving rise to undesirable bye-reactions.

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. The improvement in or modification of the invention described and claimed in Specification No. 247,217 as modified by Specification No. 249,155 which consists in the employment, in the conversion of coal, tars, mineral oils and the like into hydrocarbons and derivatives thereof with reducing gases containing hydrogen and carbon oxides under pressure and at a high temperature, of an apparatus, of which not only the hot surfaces, but also the less hot and cold parts coming into contact with the gases are made of a metal not reacting with carbon monoxide.

2. A modification of the process claimed in Specification No. 247,217 as modified by Specification No. 249,155, consisting in the employment, instead of gases containing hydrogen and carbon oxides, of other reducing gases.

3. A modification of the process claimed in the preceding Claiming Clause 1, consisting in the employment, instead of gases containing hydrogen and carbon oxides, of other reducing gases.

Dated this 20th day of July, 1927.

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