PATENT SPECIFICATION

Convention Date (Germany): July 10, 1936.

482,093

Application Date (in United Kingdom): June 28, 1937. No. 17933/37.

Complete Specification Accepted: March 23, 1938.

307

COMPLETE SPECIFICATION

Process for the Recovery of Anti-knock Motor Fuel from Synthetic Process Gases

We, CARBO-NORIT-UNION VERWALTUNGS-GESELLSCHAFT MIT BESCHRÄNKTER HAFTUNG, of 17/19, Gervinusstrasse, Frankfurt-on-the-Main, Germany, a Corporation 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 relates to a process for the recovery of liquid anti-knock motor fuel from synthetic-process gases and vapours, by means of solid adsorbents, such as active carbon.

In the production of motor fuel by synthetic processes, such as the Fischer-Tropsch process, the cooled gases from the contact furnace are passed into adsorbers containing solid adsorbent media, in which the condensable vapours are separated from the gases. The vapours of gasoline boiling range are expelled from the adsorbent by means of steam and then recovered in liquid form by condensation. The resulting motor fuel contains fractions with low and high boiling points—usually ranging between 40 and 200°C.—and must therefore be put through a rectification process, if a fuel satisfactory for engine use, especially as regards anti-knock properties, is desired.

It has now been ascertained, in accordance with the present invention, that the special rectification of the gasoline boiling range vapours deposited by condensation can be omitted and a low-boiling anti-knock fuel, and a high-boiling residual oil obtained by subjecting the mixture of steam and fuel vapours, issuing from the adsorber, to direct rectification. The separation of the mixed steam and fuel vapour is thus effected without any application of extraneous heat, since, as is shown by experience gained in connection with the invention, the heat content of the mixture issuing from the adsorber, is quite sufficient for this operation. In carrying out the invention, the live scavenging steam passed into the adsorber, for expelling the adsorbed fuel vapours, is drawn upon after discharging that function, to perform additional work by furnishing the energy needed for fractionating the motor fuel.

The foregoing operation of separating the mixture of steam and fuel vapours issuing from the adsorber, can be controlled in a simple manner by regulating the supply of cooling water to the dephlegmator with the aid of the transition temperature of the vapours, the supply of cooling water being increased in the case of a rising transition temperature, whereas the water supply is throttled down in the event of a falling temperature.

The distillate obtained, in the foregoing manner, up to a transition temperature of about 90°C., is practically free from the higher-boiling paraffin hydrocarbons which adversely affect the anti-knocking properties, and is enriched in the unsaturated hydrocarbons specially valuable in connection with anti-knocking.

In some instances, the gases admitted into the adsorber also contain oxygen compounds, such as organic acids, the presence of which is undesirable in the fuel. In the foregoing method of operating, these substances can be eliminated prior to the condensation of the fractionated fuel by subjecting the vapour mixture to be passed to the fractionating column to a washing treatment with water, or aqueous solution (or suspensions) of chemicals. If, for example, carboxylic acids are to be eliminated from the vapour mixture to be passed to the column, a milk of lime suspension is preferably employed as the washing liquid. This washing of the vapours may be performed prior to the rectification, or in the column itself, for example by irrigating the trays carrying the fillers with washing liquids. The lower portion of the column, designed as separator for residual oil and aqueous condensate, is then so arranged that the washing liquids, or suspensions, can also be led away. In special cases, it may happen that the vapour mixture issuing from the adsorber no longer contains sufficient energy to effect, by itself, adequately clean fractionation of the motor fuel vapours. In

[Price 1/-]

such event, the introduction of a little additional steam at the bottom of the column will suffice.

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. A process for the recovery of liquid anti-knock motor fuel from gases and vapours derived from the Fischer-Tropsch or like processes for the synthesis of motor fuels, by means of solid adsorbent media such as active carbon, in which the adsorbed substances are expelled from the adsorbent medium by means of steam and the resulting mixture of fuel vapour and steam is directly separated into a low boiling anti-knock motor fuel, and a high boiling residual oil, in a rectifying column, without the application of extraneous heat.

2. Process as claimed in claim 1, in which the mixture of steam and fuel vapour is washed with water, or solutions of suitable chemicals, prior to entering the fractionating column, or within the column itself.

3. The process for the recovery of anti-knock motor fuel from synthetic process gases, substantially as described.

Dated this 28th day of June, 1937.

ALBERT L. MOND & THIEMANN,
19, Southampton Buildings,
Chancery Lane, London, W.C.2,
Agents for the Applicants.

Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1938.