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PRODUCTION OF NONKNOCKING MOTOR FUELS

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4 Claims. (Cl. 196—10)

The present invention relates to the production of non-knocking motor fuels by the catalytic reaction of carbon monoxide and hydrogen.

It has already been proposed to prepare motor fuels of low boiling point by the catalytic reaction of carbon monoxide and hydrogen at elevated temperatures, in particular at temperatures of from 150° to 350° C. and under atmospheric or superatmospheric pressures.

We have now found that the constituents of low boiling point can be recovered in a simple manner from the products of the said reaction and that their non-knocking properties can be improved by treating them or their fractions rich in olefines with condensing agents at elevated temperatures. By "fractions" are meant not only fractions obtained by condensation (by compression or cooling) but also portions obtained by other separating operations, as for example selective absorption or washing out or the like.

In order to carry out the process according to this invention, the gases and vapors leaving the reaction chamber may for example first be freed from constituents of high boiling point, in particular those boiling higher than benzine, by cooling, the products of low boiling point then being separated in a suitable manner, as for example by compression. The reaction gases may be compressed in three or more stages, advantageously for example at 3, 8, 24 and, if desired, 50 atmospheres. The benzine constituents of high boiling point (boiling for example above 100° C., such as those boiling between about 150° and 200° C.) obtained in the first two stages, and which only contain slight amounts of olefines, may be directly employed, preferably in admixture with benzine fractions of low boiling point. The products obtained in the third and higher stages (if any) are subjected to a polymerizing treatment. For this purpose the products, after separation of the gases or also together with the same, are treated at from 20° to 250° C., preferably without releasing the pressure, with condensing agents, as for example halogen, sulphur or halides, such as boron fluoride, aluminium chloride, zinc chloride, titanium chloride or tin chloride, or advantageously with bleaching earths which have been impregnated with phosphoric acid or halides, or mixtures of the said substances. The particular temperatures employed depend upon the nature of the condensing agents and upon the duration of treatment. With agents having a strong condensing action the temperatures are lower than with agents having a weaker action, and when working for longer periods of

time lower temperatures are necessary than when working only for short periods of time. The polymerization is preferably carried so far that mainly hydrocarbons boiling within the boiling point range of benzine are formed. In this manner the olefines contained in large amounts in the benzine fractions of low boiling point are polymerized with the formation of a non-knocking motor fuel which is advantageously mixed with the benzine fractions of higher boiling point separated in the first stage of the compression.

The condensing treatment may be carried out with the whole of the benzine obtained by compression. The benzine may also be recovered by absorption or washing instead of by compression. During the condensing treatment, olefines from other sources may be added, whereby they are converted into non-knocking hydrocarbons in the same operation.

The following example will further illustrate the nature of this invention but the invention is not restricted to this example. The parts are by volume.

Example

A gas mixture consisting of 2 parts of hydrogen and 1 part of carbon monoxide is led at 190° C. over a catalyst consisting of cobalt, manganese and kieselguhr. The mixture leaving the reaction chamber is cooled to 20° C., the fraction boiling above about 180° C. thus being separated. The remaining gaseous mixture then passes into a three-stage compressor. The condensate obtained in the first stage at 3 atmospheres and boiling between about 150° and 180° C. is not further treated. The benzine fractions of low boiling point obtained in the second and third stages at 8 and 24 atmospheres (said fractions boiling between about 100° and 150° C. and between about 70° and 100° C. respectively) are treated under the same pressures at 235° C. with bleaching earth which has been impregnated with phosphoric acid. The treatment of the separated benzine fractions may be carried out in the presence of the gas present under pressure in the single compression stages.

The benzine obtained is mixed with the fraction obtained in the first stage. The mixture has an octane value of 65 and is accordingly capable of use in the usual manner.

What we claim is:—

1. A process for the production of valuable motor fuels which comprises catalytically converting a gaseous mixture of carbon monoxide and hydrogen into hydrocarbons boiling at least in part within the boiling point range of benzines,

separating these hydrocarbons into higher boiling benzine constituents and lower boiling constituents and subjecting at least part of the lower boiling constituents to a polymerizing treatment
5 in the presence of a condensing agent, the activity of the condensing agent, the temperature and duration of the polymerizing treatment being so correlated that hydrocarbons boiling at a more elevated temperature but within the boiling range
10 of benzine are formed.
2. In the process as claimed in claim 1 subjecting only the portion of the constituents boiling below 150° C. to a polymerizing treatment.
3. A process for the production of valuable
15 motor fuels which comprises passing a gaseous mixture of carbon monoxide and hydrogen through a space maintained under conditions at which conversion of the said mixture into hydrocarbons takes place, recovering from the products
20 leaving the said space the higher boiling hydro-

carbons by cooling and separating the lower boiling hydrocarbons by compression, and subjecting at least part of the said lower boiling hydrocarbons to a polymerizing treatment in the presence of a condensing agent, the activity of
5 the condensing agent, the temperature and duration of the polymerizing treatment being so correlated that hydrocarbons boiling within the boiling range of benzine are formed.

4. The process as defined in claim 3 wherein
10 the part of the said lower boiling hydrocarbons subjected to the polymerizing treatment boils below 150° C., wherein the temperature of the polymerizing treatment is about 235° C. and
15 wherein the condensing agent is bleaching earth which has been impregnated with phosphoric acid.

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