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PROCESS FOR THE RECOVERY OF OILS AND COKE FROM OIL-BEARING RESIDUES

Mathias Pier, Heidelberg, and Karl Winkler and Hans Schmitt, Ludwigshafen-on-the-Rhine, Germany, assignors, by mesne assignments, to Standard-I. G. Company, Linden, N. J., a corporation of Delaware

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3 Claims. (Cl. 202—33)

This invention relates to improvements in the working up of the oil-bearing residues obtained in the heat treatment of distillable carbonaceous materials.

The said invention is an improvement in or modification of the invention described and claimed in the copending application for Letters Patent, Ser. No. 271,400, filed April 19, 1928, for a Process for working up the oil-bearing residues from the destructive hydrogenation of coals of all varieties, tars, mineral oils and the like and from the treatment by extraction under pressure of substances of the nature of coal and the like according to which these residues are subjected to low temperature distillation in conjunction with finely divided dusty or fine grained carbonizable materials and, if desired, together with further additions.

We have now found that in addition to the oils, a valuable high temperature coke is obtained when the residues obtained by destructive hydrogenation are carbonized in conjunction with natural carbonizable solid materials as for example mineral coal, peat, sawdust and the like, by heating to temperatures above 600° C. In this manner the more or less volatile substances, in particular oil, contained in the mixtures of oil and coal and in the said carbonizable substances are on the one hand recovered and on the other hand a good coke is obtained. If necessary, for example in the working up of residues from the destructive hydrogenation of brown coal, the heating may be preceded by a shaping of the mixture, as for example by forming it into briquettes. The process may be carried out, for example, by subjecting the mixture at first to temperatures of from about 400° to 500° C. and then raising the temperature to from 900° to 1000° C. and higher. In order to obtain as high a yield as possible of valuable, only slightly cracked oils, the process, especially when the temperatures are not yet very high, may be assisted by rarefaction, namely by operating under reduced pressure or with the addition of scavenging gases, such as nitrogen or carbon dioxide. If it is desired to obtain cracked or unsaturated hydrocarbons, the materials may be subjected to high temperatures from the beginning, for example by rapidly heating them to about 800° C.

A special advantage of the process in accordance with the present invention consists in the fact that the coke obtained is of good quality even when coal which in itself is non-coking or badly coking is employed as an addition to the oil-bearing residues. Thus in the said process a far reaching utilization of difficultly utilizable fuels is effected with the production of valuable products.

Instead of recovering the whole of the oil contained in the residues and the like by dry distillation it may be preferable to work by first subjecting the residues to a mechanical treatment at elevated temperatures, for example by centrifuging or filtration, so that a part of the oil is separated, the remaining fraction being mixed with the other solid materials in the manner hereinbefore described and coked, and the still adherent oil being thus distilled off.

The oils obtained by mechanical treatment or by distillation or by both methods may be further treated either alone or in admixture with each other. For example they may be subjected to a treatment with catalysts, in particular to a destructive hydrogenation or a cracking. A particularly suitable and economical working up of oils arising from residues from destructive hydrogenations may be effected by working up the constituents of lower boiling point (for example having a boiling point up to 325° C.) into benzines and the constituents of higher boiling point into a pasting oil for a coal which is to be destructively hydrogenated.

The following example will further illustrate the nature of this invention, but the invention is not restricted thereto.

Example

In the destructive hydrogenation of mineral coal an oil-bearing residue is obtained which consists of up to 35 per cent of solid constituents (non-hydrogenated coal and ashes) and up to 65 per cent of oils. The residue leaves the high pressure reaction vessel at a temperature of from about 230° to 250° C. and flows directly into a centrifuge kept at about the same temperature. About from 50 to 60 per cent of the oil is thus recovered free from residue. The solid constituents leave the centrifuge with from about 42 to 45 per cent of oil and are then mixed in a disintegrator with a badly coking coal, preferably small size coal or coal dust, and are charged into a coking chamber. The temperature of the chamber is from about 400° to 500° C. at the commencement and is slowly raised to about 1000° C. It is preferable to employ a chamber of which only one wall is heated while the others are provided with numerous openings for leading off the gases and oil vapors so that any long stay of tar vapors in the chamber, which might lead to decomposition, is avoided; the vapors are pref-

erably sucked off under slightly reduced pressure. By the slow and uniform progress of the heat from the heated wall of the furnace to the non-heated walls, the oil is expelled slowly and in a protected manner. A solid coke which is well suited for employment is obtained and may be readily forced out from the chamber. From about 90 to 95 per cent of the oil introduced into the chamber is obtained from the effluent vapors by condensation, and the lighter constituents (having a boiling point up to 350° C.) may be subjected to destructive hydrogenation without further treatment for the production of benzine, while the constituents of high boiling point may be returned to the process as pasting oil for fresh coal, which is to be hydrogenated.

The coke obtained is particularly highly reactive. It can be employed for the production of water gas with particular advantage. The hydrogen thus obtained, is preferably employed for the destructive hydrogenation of fresh coal.

What we claim is:

1. A process for the recovery of oils and coke, which comprises centrifuging at a temperature of about 230° to 250° C. a residue from the destructive hydrogenation of coal, mixing the centrifuged residue in a disintegrator with badly coking coal, and heating the mixture at a temperature beginning at about 400° C. and slowly rising to about 1000° C.

2. A process for the recovery of oils and coke from oil-bearing residues obtained by destructive hydrogenation of distillable carbonaceous materials, which comprises mixing said residues with a natural carbonizable solid material, subjecting the mixture to a temperature between 400° and 500° C. under reduced pressure, and then heating it under atmospheric pressure to a temperature of from 900° to 1000° C.

3. A process for the recovery of oils and coke from oil-bearing residues obtained by destructive hydrogenation of distillable carbonaceous materials, which comprises mixing said residues with a natural carbonizable solid material, subjecting the mixture to a temperature of between 400° and 500° C. while passing a scavenging gas therethrough, and then heating said mixture under atmospheric pressure to a temperature of from 900° to 1000° C.

MATHIAS PIER.
KARL WINKLER.
HANS SCHMITT.