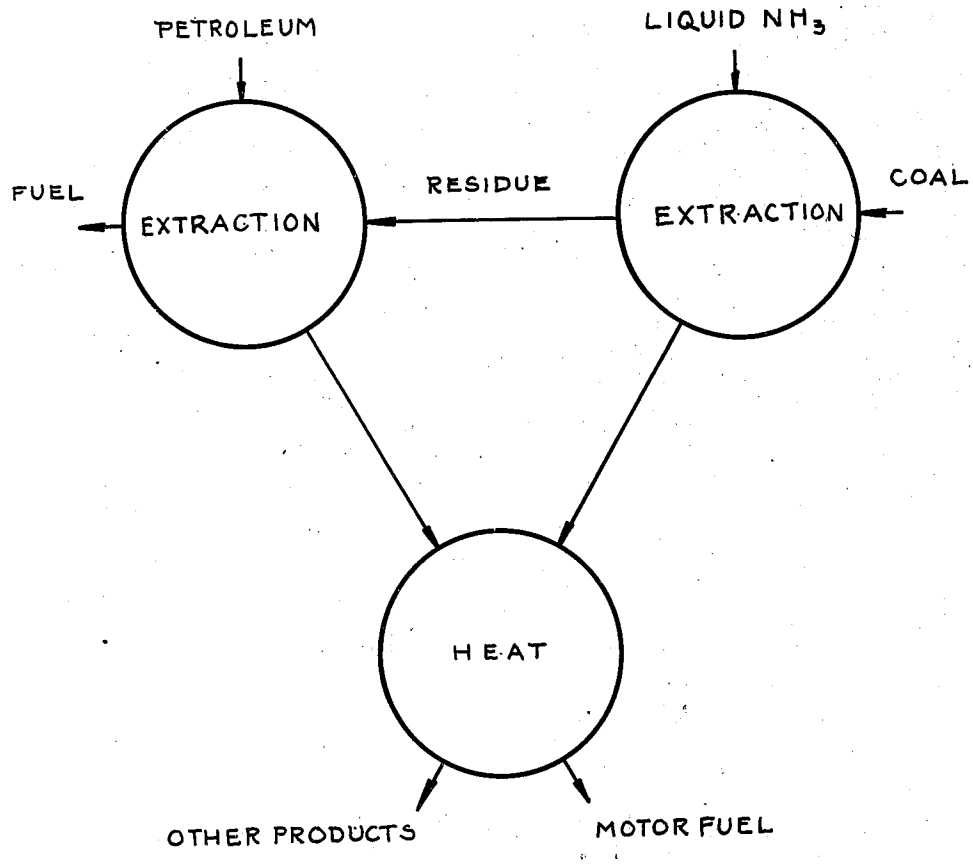
Oct. 18, 1938. R. E. BURK 2,133,280

PREPARATION OF MINERAL OIL PRODUCTS AND THE LIKE

Filed April 26, 1935



INVENTOR.

Robert E. Burk

BY

Fay, Oberlin & Fay

ATTORNEYS.

Patented Oct. 18, 1938 2,133,280

UNITED STATES PATENT OFFICE

2,133,280

PREPARATION OF MINERAL OIL PRODUCTS AND THE LIKE

Robert E. Burk, Cleveland, Ohio, assignor to The Standard Oil Company (Ohio), Cleveland, Ohio, a corporation of Ohio

Application April 26, 1935, Serial No. 18,407

3 Claims. (Cl. 196—14)

This invention relates to mineral oils, etc., and it is among the objects of the invention to provide improved utilization of potential properties of materials now substantially wasted. Other objects and advantages will appear as the description proceeds.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described and particularly pointed out in the claims, the following description and the annexed drawing setting forth in detail certain illustrative embodiments of the invention, these being indicative however, of but a few of the various ways in which the principle of the invention may be employed.

In said annexed drawing:—

The sole figure is a diagrammatic illustration on the order of a flow sheet.

As indicated in the drawing, bituminous solid material, as coal or the like, is subjected to the action of a solvent. In proportion as the coal is finely divided, the action is hastened, and in general it is profitable to crush the coal or the like to about 150 to 250 mesh. The present invention contemplates solvent-extraction with petroleum and with a non-oleaginous solvent. While the petroleum may be natural crude oil or a topped crude, generally it is more advantageous to employ a distillate fraction, and particularly hydrocarbons in the boiling range of 100 to 800° F. The non-oleaginous solvent may be an alcohol, an ether, a ketone, a halogenated hydrocarbon compound, sulphur dioxide, liquid ammonia or alkyl ammonia derivative. Having reference to costs and commercial availability, such solvents as denatured alcohol, isopropyl alcohol, commercial ether, acetone, methyl-ethyl acetone, carbon tetrachioride, ethylene chloride, liquid ammonia, etc. are particularly feasible. In some cases the oleaginous and non-oleaginous solvents may be mixed and applied to the solid bitumens together. The undissolved coal residue is directly available as a fuel, in its pulverulent state, or briquetted, and as the extraction treatment removes constituents causing smokiness and disagreeable combustion odors, such product is particularly desirable. The effectiveness of the extraction is increased by raise of temperature, and particularly in the range of 60 to 600° F., and the solvent may be initially heated before being brought into contact with the coal, or the mixture be heated. The dissolved constituents removed from the coal are subjected to heat of sufficient elevation to produce molecular change, and the heating stage may be carried out in the presence of the solvent, or after the solvent has been separated, as preferred in any instance. Desirably, the coal is first subjected to the action of the non-oleaginous solvent, and a temperature of 60 to 600° F. being maintained, the lower temperatures applying more particularly to the lower boiling solvents, although where desired, pressure may be maintained sufficient to realize the higher range of temperatures irrespective of the normal boiling point. The solvent is separated from the residue in suitable manner, as by decantation, filtration, etc., and the constituents so obtained are subjected to high temperature. The coal residue may then desirably be extracted with petroleum, for instance a petroleum distillate of boiling range 100 to 800° F., and on separation of the liquid and the solid residue, the latter is available as such, or as briquetted, for fuel, while the extracted constituents are subjected to molecular-change temperature. In the case of the constituents taken up by the non-oleaginous solvent, it is more usually desirable to evaporate and recover the solvent, and then heat-treat the constituents obtained. A temperature range of 800 to 1100° F. is advantageous, and in this various changes go on, chiefly cracking, but with some polymerization, and whereas in the customary treatment of coal by distillation methods, a rather conventionalized course of products ensues, with the present treatment hydrocarbon and nitrogen compounds of unusual character may be obtained, as need not here be detailed. The petroleum solution of extracted components may also be separated, the solvent being driven off and recovered, and the obtained constituents being then heat treated, or more usually it is desirable to subject the solution as such to the heat action, and at temperatures of 800 to 1100° F., a mixture of cracked products is obtained which can be fractionated into motor fuel, burning oils, lubricating oils and asphalt. Of particular advantage in the present treatment is the feasibility of conveniently obtaining anti-gum and anti-knock constituents of value for the motor fuels.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims, or the equivalent of such, be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. A process of the character described, which comprises subjecting solid bituminous mineral matter to solvent action by a non-oleaginous non-aqueous solvent, separating undissolved resi-

due, separating dissolved constituents from the solvent, subjecting such constituents to cracking heat, subjecting the aforesaid undissolved residue to the action of a petroleum solvent, separating undissolved residue from the petroleum solvent, separating petroleum solvent from the dissolved constituents, and subjecting the latter constituents to cracking heat.

2. A process of the character described, which comprises subjecting solid bituminous mineral matter to solvent action of a halogenated hydrocarbon, separating undissolved residue, separating halogenated hydrocarbon solvent from the dissolved constituents, subjecting such constituents to cracking heat, subjecting the aforesaid undissolved residue to the action of a petroleum solvent, separating undissolved residue from the petroleum solvent, separating petroleum solvent from the dissolved constituents, and subjecting the latter constituents to cracking heat.

3. A process of the character described, which comprises subjecting solid bituminous mineral matter to solvent action by liquid ammonia, separating undissolved residue, separating ammonia solvent from the dissolved constituents, subjecting such constituents to cracking heat, subjecting the aforesaid undissolved residue to the action of a petroleum solvent, separating undissolved residue from the petroleum solvent, separating petroleum solvent from the dissolved constituents, and subjecting the latter constituents to cracking heat.

ROBERT E. BURK.