

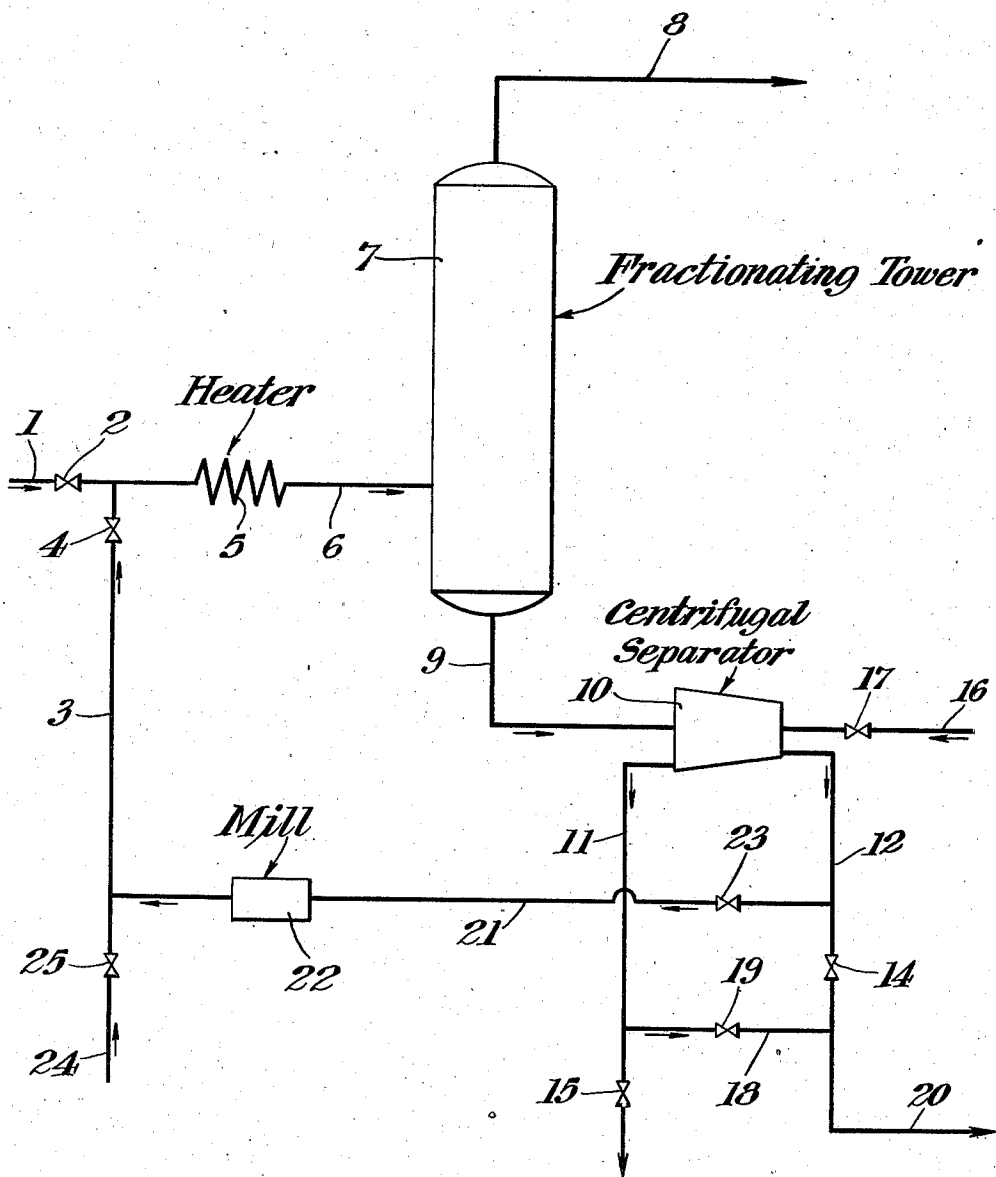
Nov. 9, 1948.

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2,453,641

METHOD OF PRODUCING COLLOIDAL FUEL

Filed Feb. 5, 1944



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UNITED STATES PATENT OFFICE

2,453,641

METHOD OF PRODUCING COLLOIDAL FUEL

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Application February 5, 1944, Serial No. 521,215

2 Claims. (Cl. 196—55)

1

This invention relates to a method and apparatus for obtaining valuable constituents from heavy residual hydrocarbon materials, and more particularly to a method and apparatus of processing residual hydrocarbon oils whereby lighter volatile fractions may be extracted from the residuum with the simultaneous formation of colloidal fuel.

An object of the present invention is the production of a fuel mixture consisting of a fuel oil containing pulverized carbonaceous material suspended therein from heavy residuum stocks, and the removal and recovery of volatile hydrocarbons from the residuum.

Essentially the present process comprises admixing a pulverized carbonaceous material, such as coke dust, either in the dry state or in the form of thick oil paste, with a reduced crude bottoms and passing the mixture through a cracking heater similar to a conventional viscosity breaker. In passing through the heating zone the oil-coke mixture is subjected to a cracking temperature wherein the oil undergoes substantially drastic cracking with the carbonaceous coke particles which have been introduced serving as a nucleus for the deposit of additional carbon particles resulting from the cracking of the oil. After removal of the cracked vapors, the bottoms containing the combined accumulating carbonaceous particles from the cracked oil and the initially added coke dust are passed to a mechanical separator. The liquid and solid separated portions of the bottoms residue are thereafter blended into desired combinations to give substantially stable colloidal fuel of the proper viscosity. In some instances it may be desirable to add a wash fluid or thinning agent during the liquid-solids separation step to assist in the control of the ultimate viscosities of the liquid and solid components.

The accompanying drawing is a diagrammatic layout of the apparatus wherein the present process may be expeditiously and economically carried out. In this drawing numeral 1 denotes a conduit for the introduction into the system of heavy oil, such as residuum bottoms, heavy tars and the like, and as shown the line is controlled by valve 2. Joining the line 1 is a second line 3 controlled by a valve 4 for supplying carbonaceous particles such as coke dust, preferably in the form of a viscous paste with oil. The admixture of heavy oil and carbonaceous material is thereafter pumped into a suitable heater, which may be a coil, indicated by numeral 5, wherein the mixture is subjected to a crack-

2

ing temperature. The heater 5 is operated in such a manner and at such temperatures that substantial drastic cracking results and substantial coking occurs in the heavy oil and the oil coke formed is deposited on the coke dust or other carbonaceous material added, inasmuch as this latter initially introduced material forms nuclei for deposition of the oil coke. The outlet of heater 5 is connected by line 6 to a fractionating tower 7 where the vapors from the cracked oil mixture pass out as overhead through line 8 in any suitable recovery or collection station. These recovered vapors may thereafter be treated in any desired manner.

The bottoms, comprising the oil, oil coke and added coke dust nuclei, are drawn off from bottom line 9 in the form of a viscous slurry, inasmuch as the heavy bottoms contain some unvaporized liquid hydrocarbons. The bottoms are passed into a separating apparatus, which is preferably a Bird type centrifugal separator although any other suitable liquid-solids separator may be used. This separator separates the bottoms slurry into heavy fuel oil, which is carried out of the separator through line 11, and the oil coke and coke dust base, which are removed from the separator through line 12. The separator is also provided with a line 16 controlled by valve 17 for the introduction thereto of a suitable hydrocarbon wash fluid or thinning agent if it becomes desirable or necessary to wash or add diluent to the bottoms slurry being separated.

The solids line 12 leading from the separator 10 is connected to line 21 through valve 23 and leads to a suitable grinding mill 22 connected to the carbonaceous material inlet line 3 whereby the separated coke paste after separation in the centrifugal separator 10 may be ground into proper size and reintroduced into the system to form the initial nuclei for treatment of further heavy oil. The liquid oil line 11 leading from the separator 10 and controlled by valve 15 is cross-connected to the coke paste line 12 through line 18 controlled by valve 19, to enable the operator to properly proportion the ultimate colloidal fuel discharged from the system through line 20. The coke paste or solids discharge line 12 is also controlled by mixing valve 14, and thus this system of valve controlled conduits permits the operator to regulate the end products for the most economical operation and characteristics of the ultimate oil and colloidal fuel components.

I claim:

1. The method of producing a substantially stable colloidal fuel containing pulverized car-

3

bonaceous material suspended therein which comprises continuously introducing finely divided coke particles of petroleum origin into a feed stream of reduced crude bottoms, continuously passing the mixture thus formed through a cracking zone, heating the mixture in said zone to a cracking temperature sufficient to deposit some petroleum coke on the said coke particles but insufficient to form a completely dry coke, removing the volatile materials liberated by such heating, separating the thus treated bottoms into a liquid fraction and a coke paste fraction, blending the liquid fraction with an amount of the coke paste fraction sufficient to produce a colloidal fuel of desired viscosity, and continuously recycling a portion of the separated coke paste fraction through a mill and thence into the feed stream of reduced crude bottoms.

2. The method of producing a substantially stable colloidal fuel containing pulverized carbonaceous material suspended therein which comprises continuously introducing finely divided coke particles of petroleum origin into a feed stream of reduced crude bottoms, continuously passing the mixture thus formed through a cracking zone, heating the mixture in said zone to a cracking temperature sufficient to deposit some petroleum coke on the said coke particles but insufficient to form a completely dry coke, remov-

4

ing the volatile materials liberated by such heating, separating the thus treated bottoms into a liquid fraction and a coke paste fraction, blending the liquid fraction with an amount of the coke paste fraction sufficient to produce a colloidal fuel of desired viscosity, and continuously recycling a portion of the separated coke paste fraction into a feed stream of reduced crude bottoms.

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