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REFINING OF CRACKED HYDROCARBON OILS

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6 Claims. (Cl. 196—33)

This invention relates to the refining of cracked hydrocarbons, and refers more particularly to a process of removing and/or converting undesirable color forming, odor forming and analogous objectionable compounds present in the hydrocarbons.

The present invention is of particular advantage and importance in connection with the refining of the condensed overhead products or distillates produced in the conversion of hydrocarbons under heat alone, or under heat at superatmospheric pressure. It is of the utmost importance that cracked hydrocarbon products, as marketed, be stable as to color and odor, and the present invention has for its object a refining treatment for such products which will retain them relatively stable under all conditions.

This application is in part a continuation of my copending application, Serial No. 585,548, filed August 3, 1922.

In the practice of the present invention, and as a step in the accomplishment of the objects thereof, the cracked hydrocarbon distillate is subjected to treatment with a plumbite solution (litharge dissolved in caustic soda). When cracked hydrocarbon distillates are subjected to the action of plumbite in solution, certain objectionable compounds which were present before the treatment are converted, due to the reaction between the plumbite in solution and the cracked hydrocarbon distillate. These compounds may take the form, for instance, before a treatment of mercaptans and subsequent to the plumbite treatment, of mercaptides. The presence of these compounds is objectionable, of course, in the distillate, but their conversion permits their removal by the addition of an adsorbing agent, particularly an earthy adsorbent. It may be well to here state that the mercaptans per se would not be converted or removed by the addition of such an adsorbent prior to the step of conversion thereof to mercaptides. However, subsequent to their conversion following the plumbite treatment, they can be removed by the use of a proper adsorbent.

Therefore, the essence of the present invention resides in subjecting cracked hydrocarbon distillates to the action of plumbite in solution and thereafter subjecting said distillates to the action of an earthy adsorbent for the purpose of removing the conversion products produced by the plumbite treatment.

Depending upon the characteristics of the distillate treated, these two steps may comprise the sole refining steps, and the present invention contemplates their use alone for this purpose. With other types of cracked distillates, however, it is necessary or desirable to either precede or succeed the particular refining treatment which constitutes the essence of this invention with another standard form or forms of treatment, for instance, subjecting the oil to sulphuric acid, caustic soda, or other conventional or well known treating steps. It is, of course, understood that the present invention is applicable whether used as the sole refining step or used in conjunction with other well known refining steps.

The adsorbents contemplated for use in the present invention may comprise fuller's earth, Floridan earth, infusorial earth, various clays, sands, charcoals, bauxite, inorganic gels, such as iron oxide and silica gel, and other finely divided solids which have a tendency to adsorb the suspended particles.

Depending upon the characteristics of the distillate the mercaptides formed upon reaction with the plumbite solution will vary in degree of dispersion, some being so highly dispersed as to be considered as true dispersions, while others are in a state of coarser dispersion which may vary in the colloidal range to coarse suspensions. For some of the latter types the use of an adsorbent following a plumbite reaction and withdrawal of the sludges will suffice to satisfactorily remove the mercaptides. On the other hand, for some of the highly dispersed mercaptides it is desirable to introduce an intermdiate step, which is the subject of another feature of this invention.

This step comprises the introduction of a soluble sulphide, or polysulphide, such as the sulphides of sodium, potassium, ammonium, et cetera, or a sulphide of the alkaline earth metals, such as the sulphides of calcium, magnesium, et cetera. These sulphides will cause conversion in part or in whole of the mercaptides, and the resulting dispersions are coarser and can be more readily removed by the adsorbent.

In some cases it may be desirable to add the adsorbing agent to the sulphide simultaneously with the plumbite treatment. The amount of adsorbent required relative to the sulphide is small.

I claim as my invention:

1. Steps in the refining of the overhead liquid products produced in the conversion of hydrocarbons, which comprise first subjecting said products to the action of a plumbite solution, thereafter subjecting said products to the action of soluble sulphide and finally subjecting said products to the action of an adsorbing agent

capable of removing the reaction products of the plumbite and soluble sulphide treatments.

2. Steps in the refining of the overhead liquid products produced in the conversion of hydrocarbons, which comprise first subjecting said products to the action of a plumbite solution, thereafter subjecting said products to the action of hydrolyzable sulphide and finally subjecting said products to the action of an adsorbing agent capable of removing the reaction products of the plumbite and hydrolyzable sulphide treatments.

3. Steps in the refining of overhead liquid products produced in the conversion of hydrocarbons, which comprise successively subjecting said products to the action separately of plumbite in solution and a soluble sulphide, and thereafter removing precipitated particles held in suspension in said products by the addition of an adsorbing agent capable of removing such suspended particles.

4. The method of refining cracked hydrocarbon oils which comprises treating the oil with plumbite solution, and removing the reaction products of the plumbite treatment by subjecting the oil to the action of a soluble sulfide and an adsorbing agent capable of removing suspended solids.

5. The method of refining cracked hydrocarbon oils which comprises treating the oil with plumbite solution, and removing the reaction products of the plumbite treatment by subjecting the oil to the action of a hydrolyzable sulfide and an adsorbing agent capable of removing suspended solids.

6. In the refining of cracked hydrocarbon oil with alkali metal plumbite, the method which comprises removing the plumbite reaction products from the oil by the simultaneous addition to the oil of a metallic sulphide and an adsorbing agent.

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