Patented Dec. 12, 1933

1,939,255

UNITED STATES PATENT OFFICE

1,939,255

PROCESS OF OXIDIZING HYDROCARBONS

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No Drawing. Application June 26, 1926, Serial No. 118,824. Renewed May 20, 1930

4 Claims. (Cl. 260—116)

This invention relates to improvements in process of oxidizing hydrocarbons, and refers more particularly to the production therefrom of alcohol, aldehydes, carboxylic acids and other oxidation compounds.

In the normal oxidation of hydrocarbons with air, the velocity of the reaction is so high that the end products formed are carbon-dioxide, carbon-monoxide and water.

The object of the present invention is to retard this oxidation of the hydrocarbons in such a way as to produce from the hydrocarbons the alcohols, aldehydes or acids heretofore referred to. I accomplish this by adding to the hydrocarbons while subjected to the treatment with air or other oxidizing agent a combustion retarding substance such as tetra-ethyl lead which so slows up the velocity of combustion that appreciable percentages of valuable products are derived due to the reaction of air, oxygen, ozone, or any other gaseous oxidizing agent.

One method of carrying out the invention is to add to the gasoline small percentages of tetra-ethyl lead, vaporizing the same in a heated coil or other suitable receptacle, while adding thereto regulated quantities of a gaseous oxidizing agent such as air.

In carrying out the process, a fraction of 1% of tetra-ethyl lead may be added to a given quantity of gasoline or other hydrocarbon treated, and the gasoline heated under atmospheric pressure to a temperature of upwards of 600° F. To this gaseous mixture may be added 25% by volume of air or other oxidizing agent. The air may be added in such quantities as to produce exothermic reaction. After the treatment, the products pass into a suitable water condenser and receiver where they are separated out in the usual way by fractional distillation.

Instead of treating gasoline in this manner, heavier oils may be treated, as for example, fuel oils, petroleums or solids may be distilled off, and the vapors therefrom treated in the manner heretofore described.

Instead of treating the heavier products, lighter products may be treated, as for example, natural gas or gases made from thermo distillation of coal or other carbonaceous material. The temperatures under which these various products will be treated, will depend of course, upon the result desired, and also the character of the material being subjected to reaction. The process may be carried out at atmospheric pressure or under vacuum. In certain cases it may be carried on under superatmospheric pressure, but in such cases care should be taken to regulate the oxidizing agent so as to avoid explosive mixtures.

I claim as my invention:

1. A process for producing alcohols, aldehydes, and acids from hydrocarbons consisting in subjecting such hydrocarbons while heated to a temperature upwards of 600° F. to the action of an oxidizing agent to produce substantial oxidation thereof, retarding the oxidation by the addition of tetra-ethyl lead, and limiting the extent of oxidation to produce alcohols, aldehydes and acids.

2. A process for treating hydrocarbons to produce alcohols, aldehydes, and acids comprising adding to the hydrocarbon while at a temperature upwards of 600° F. an oxidizing agent in such quantity as will produce an exothermic reaction, slowing up the velocity of combustion by the incorporation of a quantity of tetra-ethyl lead in the hydrocarbon undergoing treatment, and limiting the extent of oxidation to produce alcohols, aldehydes and acids.

3. A process for treating hydrocarbons to produce alcohols, aldehydes, and acids comprising adding to the hydrocarbon while at a temperature upwards of 600° F. an oxidizing agent in such quantity as will produce an exothermic reaction, showing up the velocity of combustion by the invorporation of less than 1% by volume of tetra-ethyl lead in the hydrocarbon undergoing treatment, and limiting the extent of oxidation to produce alcohols, aldehydes and acids.

4. A process for producing alcohols, aldehydes and acids from hydrocarbons which comprises subjecting the hydrocarbons while heated to oxidizing temperature to the action of an oxidizing agent to produce substantial oxidation thereof, adding tetra-ethyl lead to the hydrocarbons undergoing treatment to decrease the velocity of the oxidation reaction, and limiting the extent of oxidation to produce alcohols, aldehydes and acids.

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