Patented Feb. 25, 1936

2,031,930

UNITED STATES PATENT OFFICE

2,031,930

STABILIZED REFINED MINERAL, VEGETABLE, AND ANIMAL OILS

Hyym E. Buc, Roselle, N. J., assignor to Standard Oil Development Company, a corporation of Delaware

No Drawing. Application April 21, 1932, Serial No. 606,759

21 Claims. (Cl. 87—9)

This invention relates to certain highly refined oil and fat compositions and will be fully understood from the following description:

It is an old experience that highly refined kerosene which has been acid treated to such a degree that it is practically odorless develops a rancid odor when standing exposed to the air. This is probably due to oxidation and it appears that the more highly refined a kerosene is the more it is subject to deterioration. Simultaneously with the development of the rancid odor, the kerosene goes off color.

Another class of highly refined mineral oils which show deterioration by oxidation on standing consists of the so-called petroleum white oils. The white oils ranging in viscosity from that of a heavy lubricating oil to a light spindle oil, develop a rancid odor, bad taste and organic acidity when standing exposed to the air. Highly refined animal and vegetable oils and fats undergo similar changes by oxidation.

The main object of the present invention is to find anti-oxidants for such highly refined mineral, animal and vegetable oils and fats which will efficiently prevent the development of bad odor, taste, color and organic acidity when added in such small amounts that they do not influence the taste of those members of this highly refined oil class which are taken internally as medicine.

Another object of the invention is to add such anti-oxidants to the highly refined oils and fats that will not impart an undesirable odor to the same when added in effective quantities for the prevention of oxidation.

I have discovered that those homologues of monohydric phenols and more generally of phenolic compounds which have a side chain consisting of a tertiary aliphatic hydrocarbon comply with the above requirements for an anti-oxidant for highly refined mineral, animal and vegetable oils and fats. As members of this class of compounds tertiary butyl phenol, tertiary amyl phenol, tertiary butyl resorcinol and di-tertiary butyl resorcinal, may be cited. The term phenolic compound is meant to include monohydric and polyhydric phenols and naphthols. The best results are obtained with the monohydric phenols having a tertiary alkyl side chain.

The above mentioned phenols are very efficient anti-oxidants for highly refined oils when added in amount between 0.001 and 0.1% of the oil or fat. They have a very superior odor as compared to other phenols so that they do not impart an undesirable odor to the highly refined oils or fats. The majority of anti-oxidants which are soluble in oil are odoriferous and could not, therefore, be used with highly refined oils. The usual amount of tertiary phenol to be used to prevent the oxidation of highly refined oils is in the neighborhood of 0.01%. The tertiary phenols are soluble in the highly refined oils or molten fats and are added to a batch of the oil or fat and admixed therewith.

The following examples will illustrate my invention:

Highly refined water white kerosene was heated in a can provided with a hole in the cork at 75° C. for 72 hours. The kerosene became rancid and lost its original water white color, turning into pale yellow. In another experiment 0.02% of tertiary butyl phenol was added to kerosene of the same kind and heated under exactly similar conditions as in the previous case. No rancid odor developed and the kerosene retained its water white color.

Examples of other compositions which proved very stable against deterioration are the following:

A technical petroleum white oil of medium lubricating oil viscosity + 0.01% of tertiary butyl phenol, or tertiary butyl resorcinol.

Cotton seed oil + 0.02% of tertiary amyl phenol.

In the following claims the expression "highly refined mineral oil" is meant to include highly refined kerosene, various grades of the so-called white oils and similar heavy oils, vaseline, etc., which have undergone a very extensive refining process. Such oils must be either odorless or have only a very slight odor.

This application is a continuation in part of my co-pending application Serial No. 542,103, filed on June 4, 1931.

My invention is not to be limited by any theory or the examples given by way of illustration but only by the following claims in which it is my intention to claim all novelty inherent in the invention.

I claim:

1. As a stable composition of matter a member of the class of substances consisting of highly refined mineral, animal and vegetable oils and highly refined fats, having incorporated therein a relatively small amount of a phenolic compound containing a tertiary aliphatic hydrocarbon radical as side chain.

2. The composition according to claim 1 in which the phenolic compound is present in an amount between 0.001 and 0.1%.

3. As a stable composition of matter a member of the class of substances consisting of highly refined mineral, animal and vegetable oils and highly refined fats, having incorporated therein a relatively small amount of a monohydric phenol containing a tertiary aliphatic hydrocarbon radical as side chain.

4. A composition according to claim 3 in which the phenol homologue is present in an amount between 0.001 and 0.1%.

5. As a composition of matter a highly refined mineral oil and 0.001–0.1% of a monohydric phenol containing a tertiary aliphatic hydrocarbon radical as side chain.

6. As a stable composition of matter a highly refined kerosene having incorporated therein 0.001–0.1% of a monohydric phenol containing a tertiary aliphatic hydrocarbon as side chain.

7. As a stable composition of matter a petroleum white oil having incorporated therein 0.001–0.1% of a monohydric phenol homologue containing a tertiary aliphatic hydrocarbon radical as side chain.

8. As a stable composition of matter a member of the class of substances consisting of highly refined mineral, animal and vegetable oils and highly refined fats, having incorporated therein a relatively small amount of a hydroxy aromatic compound having at least one tertiary aliphatic hydrocarbon side chain.

9. Composition according to claim 8, in which the major ingredient is a mineral oil having a viscosity between that of a heavy lubricating oil and a light spindle oil.

10. An anti-oxidant for organic compounds comprising hydroxy aromatic compounds having at least one tertiary aliphatic hydrocarbon side chain.

11. An anti-oxidant for organic compounds comprising tertiary butyl phenol.

12. A method of stabilizing highly refined oil and fat compositions against development of rancidity, bad odor, taste, and color, which comprises adding to such compositions a relatively small amount of hydroxy aromatic compounds having at least one tertiary aliphatic hydrocarbon side chain.

13. A method of stabilizing highly refined oil and fat compositions against deterioration without imparting thereto an undesirable odor, which comprises adding to said composition between 0.001 and 0.1% of hydroxy aromatic compounds having at least one tertiary aliphatic hydrocarbon side chain.

14. Process according to claim 13, in which a tertiary alkyl phenol is the addition agent.

15. As a stable composition of matter a member of the class of substances consisting of highly refined mineral, animal and vegetable oils and highly refined fats, having incorporated therein a relatively small amount of tertiary butyl phenol.

16. A stable composition of matter comprising a mineral white oil having incorporated therein a relatively small amount of tertiary butyl phenol.

17. A substantially tasteless and odorless oil-soluble anti-oxidant, comprising a hydroxy aromatic compound having at least one tertiary aliphatic hydrocarbon side chain.

18. A substantially tasteless and odorless oil-soluble anti-oxidant for highly refined oil and fat compositions, comprising a hydroxy aromatic compound having at least one tertiary aliphatic hydrocarbon side chain.

19. The method of stabilizing highly refined oil and fat compositions against development of rancidity, bad odor, taste and color, which comprises adding to such compositions a relatively small amount of a substantially tasteless and odorless oil-soluble anti-oxidant.

20. A method of stabilizing highly refined oil and fat compositions against development of rancidity, bad odor, taste and color, which comprises adding thereto a relatively small amount of tertiary butyl phenol.

21. A composition comprising a highly refined kerosene substantially free from unsaturated hydrocarbons and from 0.001 to 0.01% of tertiary amyl phenol.

HYYM E. BUC.