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DISTILLATE PETROLEUM PRODUCTS AND METHOD OF TREATING SAME

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This application is a division of our copending application issued as Patent No. 1,909,985.

This invention relates to distillate petroleum products and to method of treating same to prevent spontaneous discoloration and formation of odor therein.

It is well recognized that the distributors and consumers of kerosene and gasoline insist that these products be clear and free from discoloration and odor as an entirely distinct and separate matter from the actual capabilities and usefulness of the products for the ordinary uses for which they are intended. It is also well recognized that kerosene and gasoline spontaneously become unclear, discolored and odorous gradually upon continued exposure to air, thus after a while becoming objectionable to the trade.

The principal object of this invention is to provide a distillate petroleum product, notably kerosene and gasoline, which will remain clear and free from discoloration and odor without impairment or lowering of its effectiveness and capabilities for use; and to provide simple and inexpensive method of producing a distillate petroleum product having the characteristics and qualities referred to.

Other objects of this invention will be in part obvious and in part pointed out hereinafter.

In accordance with this invention, the improved product consists of a petroleum distillate, notably kerosene and gasoline, containing a negative oxidation catalyst. The catalyst may be added in the still during distillation, or placed in the condenser in which the distillate is condensed, or the catalyst may be added to the distillate after removal from the condenser, it being advisable, however, to add the catalyst before any appreciable quantity of atmospheric oxygen has been taken up by the distillate, because such oxygen is apt to cause the formation in the distillate of substances which are apt to promote the addition of further oxygen and may tend to offset any advantage to be gained by the subsequent addition of the negative oxidation catalyst. These objectionable substances, while frequently colorless and odorless, are apt to undergo change resulting in the development of objectionable color and odor.

The negative oxidation catalyst or catalysts should be of such nature that when added to kerosene or gasoline in sufficient quantities for the purpose they do not affect the color and odor, or materially increase the cost of production, since such effects would raise commercial objections to the product.

If the distillate requires to be sweetened either before or after treatment with the catalyst, the catalyst should be of a nature such that it will not react with sodium plumbite.

The following substances and classes of substances are mentioned as suitable for the treatment above described:

Aliphatic alcohols; for instance, a butyl alcohol.

Aromatic alcohols; for instance, benzyl alcohol.

Aromatic aldehydes; for instance, benzyl aldehyde.

Aromatic amines, for instance, alpha naphthylamine, para phenylenediamine and phenylhydrazine.

Substituted phenols and polyphenols; for instance, cresol and hydroquinone.

Ureas and urea derivatives; for instance, urea and thiourea.

Alkaloids; for instance, brucine and nicotine.

For the practice of this invention we prefer to use secondary or tertiary butyl alcohol alone or in admixture with hydroquinone or brucine. In the latter case a saturated solution of hydroquinone or brucine in secondary or tertiary butyl alcohol is used, the secondary or tertiary butyl alcohol serving to facilitate the solution of the hydroquinone or brucine in the oil. The amounts of secondary or tertiary butyl alcohol, or of the saturated solution of hydroquinone or brucine in secondary or tertiary butyl alcohol, may vary from 1 part in 5 thousand to 1 part in 50 thousand, depending upon the amount of stabilization desired, the character of the distillate, i. e., its susceptibility to oxidation, and the storage temperature.

Any of the above mentioned substances are suitable either alone or in combination with others. It is never required to add more than 0.02% to the kerosene or gasoline, and the amount may be as small as 1 part negative catalyzer to 500 thousand parts oil.

It will be apparent from the above that this invention is directed primarily to preventing discoloration and formation of odor in the lighter petroleum distillates, notably those of A. P. I. gravity higher than 37 degrees, and particularly kerosene and gasoline. Consumers and distributors of these products require that they be clear and free from discoloration and objectionable odor without considering the question of serviceability for the use intended.

Kerosene and gasoline, however, must be maintained comparatively inexpensive in order to sat-

isfactorily cope with commercial competition, and therefore any treatment must be such that the cost of production is not increased a prohibitive amount. Applicants' method satisfactorily meets this delicate situation since the amounts of negative catalyst the treatment requires are so small that increase in the cost of manufacture and price to the consumer is negligible. At the same time the treated kerosene and gasoline is capable of being stored and handled without danger of its becoming discolored or odorous.

It is understood that this invention is not intended to be limited to the precise substances mentioned specifically, nor to the exact proportions stated, since applicants have described merely certain possible applications of the invention which are preferred at this time.

We claim:

1. The method of stabilizing the characteristics of a low boiling light colored distillate petroleum product of the class of gasoline or kerosene that normally tends to develop objectionable products of oxidation during storage, which comprises adding thereto a small quantity of an aryl amine of the class consisting of alpha naphthylamine and phenyl hydrazine sufficient substantially to retard the formation of said objectionable products of oxidation.

2. A low boiling light colored hydrocarbon fuel product of the class of gasoline or kerosene normally tending to develop objectionable oxidation products during storage having added thereto, as an addition agent incorporated into the said product which normally does not contain said agent, a small quantity of an aryl amine of the class consisting of alpha naphthylamine and phenyl hydrazine sufficient in amount substantially to retard the formation of said objectionable products of oxidation.

3. A motor fuel containing unsaturated hydrocarbons tending to oxidize to form objectionable products and containing as a stabilizing agent .0002 to .02% alpha naphthylamine.

4. A low boiling substantially stable distillate petroleum product of the class of gasoline or kerosene, which comprises a low boiling distillate petroleum product of the class of gasoline or kerosene that has the property of developing an objectionable product of oxidation during storage, said petroleum product having added thereto, as an addition agent incorporated into the said product which normally does not contain said agent, a small quantity of a naphthylamine sufficient in amount substantially to retard the formation of said objectionable product of oxidation.

5. A low boiling substantially stable distillate petroleum product of the class of gasoline or kerosene, which comprises a low boiling distillate petroleum product of the class of gasoline or kerosene that has the property of developing an objectionable product of oxidation during storage, said petroleum product having added thereto, as an addition agent incorporated into the said product which normally does not contain said agent, a small quantity of nuclear amino-substituted condensed-ring aromatic compound sufficient in amount substantially to retard the formation of said objectionable product of oxidation.

6. A low boiling substantially stable distillate petroleum product of the class of gasoline or kerosene, which comprises a low boiling distillate petroleum product of the class of gasoline or kerosene that has the property of developing an objectionable product of oxidation during storage, said petroleum product having added thereto, as an addition agent incorporated into the said product which normally does not contain said agent, a small quantity of alpha naphthylamine sufficient in amount substantially to retard the formation of said objectionable product of oxidation.

7. A substantially color stable petroleum product of the class of gasoline or kerosene, which comprises a low boiling distillate petroleum product of the class of gasoline or kerosene which is initially clear and free from discoloration but which has the property of becoming discolored during storage, said color unstable product having added thereto alpha naphthylamine in small proportion but sufficient substantially to stabilize said product against color deterioration under the usual conditions of storage.

8. The method of stabilizing the characteristics of a low boiling light colored distillate petroleum product of the class of gasoline or kerosene that normally tends to develop objectionable products of oxidation during storage, which comprises adding thereto a small quantity of alpha naphthylamine sufficient substantially to retard the formation of said objectionable products of oxidation.

9. A low boiling light colored hydrocarbon fuel product of the class of gasoline or kerosene normally tending to develop objectionable oxidation products during storage having added thereto, as an addition agent incorporated into the said product which normally does not contain said agent, a small quantity of alpha naphthylamine sufficient in amount substantially to retard the formation of said objectionable products of oxidation.

10. The method of stabilizing the characteristics of a low boiling light colored distillate petroleum product of the class of gasoline or kerosene that normally tends to develop objectionable products of oxidation during storage, which comprises adding thereto a small quantity of phenylhydrazine sufficient substantially to retard the formation of said objectionable products of oxidation.

11. A low boiling light colored hydrocarbon fuel product of the class of gasoline or kerosene normally tending to develop objectionable oxidation products during storage having added thereto, as an addition agent incorporated into the said product which normally does not contain said agent, a small quantity of phenylhydrazine sufficient in amount substantially to retard the formation of said objectionable products of oxidation.

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