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DISTILLATE PETROLEUM PRODUCT AND METHOD OF TREATING THE SAME

James B. Rather and Leslie C. Beard, Jr., Brooklyn, and Orland M. Reiff, Jackson Heights, N. Y., assignors to Socony-Vacuum Oil Company, Incorporated, New York, N. Y., a corporation of New York

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This invention relates to distillate petroleum products, more particularly gasoline and kerosene, and to a method of and means for imparting a stability thereto with respect to color, gum formation and odor.

It is well recognized that distributors and consumers of the lighter refined petroleum distillates, notably gasoline and kerosene, insist that these products be clear and free from discoloration, gummy material 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 these products, particularly gasoline and kerosene, spontaneously become discolored and odorous and accumulate a gummy material upon continued exposure to air and thus become objectionable to the trade.

The principal object of the present invention is to provide a distillate petroleum product, generally those of A. P. I. gravity higher than 37 degrees, and particularly gasoline or kerosene, which will remain clear and free of discoloration, gummy material and odor, without impairment or lowering of its effectiveness and capabilities for use; and to provide a simple and inexpensive method of and means for producing distillate petroleum products having the characteristics and qualities referred to.

Other objects of this invention will be apparent from the following description.

In accordance with this invention, the improved product consists of a distillate petroleum product, notably gasoline or kerosene, which contains a negative oxidation catalyst, or a substance, such as a compound containing carbon, which retards the attainment of equilibrium in a chemical system in which oxidation is the fundamental reaction. The negative catalyst may be added in the still during distillation, or placed in the condenser in which the distillate is condensed, or may be added to the distillate after removal from the condenser. It is advisable, however, to add the negative catalyst before any appreciable quantity of atmospheric oxygen has been taken up by the distillate, because oxygen in appreciable quantities is apt to cause the formation in the distillate of substances which tend to promote the addition of further oxygen and thus may offset any advantage to be gained by the subsequent addition of the negative oxidation catalyst to the distillate. These objectionable substances, while frequently colorless and odorless, are apt to undergo changes which result in

the development of objectionable color, gummy material and odor in the distillates.

The negative oxidation catalyst or catalysts should preferably be of a nature such that, when added to the distillate petroleum products in sufficient quantities, they do not affect the color and odor, or materially increase the cost of production of the products to which they are added, since such effects would raise commercial objections to the products.

We have discovered that the ethanol amines comprising mono, di and tri ethanol amines are effective as stabilizers of distillate petroleum products with respect to color, gum formation and odor.

These compounds or agents may be added directly to the distillate or may be dissolved in a suitable solvent which is miscible with the distillate, such as an aliphatic alcohol, either isopropyl, ethyl or butyl alcohol, before being added to the product to be treated. A ten per cent solution of the compound or agent in the desired solvent may be thoroughly mixed with the product, and the amount of the solution to be added may vary from approximately one part in five hundred of the distillate to approximately one part in fifty thousand, the exact amount depending upon the amount of stabilization required, the character of the distillate, i. e., its susceptibility to oxidation, and the storage temperature.

Preferably, however, not more than approximately one part of compound to five thousand parts of the distillate or 0.02% should be added to the product to be treated; and the amount may, in some instances, be as little as one part of the compound to five hundred thousand parts of the distillate. Care should be exercised, however, to not add too large a quantity, otherwise the compound will tend to change the nature of the distillate by imparting some of its own characteristics thereto.

As an example of the practice of this invention, approximately five pounds of the mixed ethanol amines is mixed with approximately five gallons of isopropyl alcohol. This solution is added to the distillate petroleum product to be treated, with appropriate agitation, in the proportion of approximately one part of the above solution to from approximately five hundred to twenty thousand parts of the distillate, the exact amount depending upon the amount of stabilization desired. A gasoline treated with approximately one part of ethanol amine to approximately five thousand parts of distillate and allowed to stand for a period of fourteen months at 75° F., showed at

the end of this storage period a gum content (as measured by the evaporation of 100 ccs. in a porcelain dish) of only 14 milligrams as compared with 635 milligrams in the case of an untreated control sample, similarly stored.

Since the lighter distillate petroleum products, particularly gasoline and kerosene, must be maintained comparatively inexpensive in order to satisfactorily cope with commercial competition, any treatment to which these products are subjected, must be such that the cost of production of the products is not increased a prohibitive amount. The method and means herein disclosed satisfactorily meets this situation since the amount of negative catalyst required for the treatment is so small that the cost of production of the products is not material. And the products treated in accordance with this invention may be stored and handled without danger of becoming discolored or odorous or developing gummy substances therein.

While we have thus specifically described our invention, various modifications may suggest themselves to those skilled in the art, and it is therefore our intention that the invention be not limited except by the scope of the appended claims.

What we claim is:

1. A low boiling substantially gum stable gasoline product, which comprises gasoline which is initially of low gum content but which has the property of developing large amounts of gum during the usual conditions of storage, said unstable product having added thereto ethanol amine in small proportion but sufficient in amount, substantially as described, to prevent the formation of the objectionably large amounts of gum which otherwise would form in said product, whereby a relatively gum stable product is obtained from a product that normally develops large amounts of gum.

2. The method of producing a low boiling substantially gum stable gasoline product, which comprises adding to a gasoline, which gasoline is initially of low gum content but which has the property of developing large amounts of gum during the usual conditions of storage, ethanol amine in small proportion but sufficient in amount, substantially as described, to prevent the formation of the objectionably large amounts of gum which would normally form in said product, whereby a relatively gum stable product is attained from a product that normally develops large amounts of gum.

3. A low boiling distillate petroleum product of the class of gasoline or kerosene which normally tends to form gum during storage, having added thereto a small proportion of an ethanol amine sufficient substantially to retard the aforesaid gum formation.

4. A low boiling distillate petroleum product of the class of gasoline or kerosene which normally tends to form gum during storage, having added thereto a small proportion of mono-ethanol amine sufficient substantially to retard the aforesaid gum formation.

5. A low boiling distillate petroleum product of the class of gasoline or kerosene which normally tends to form gum during storage, having added thereto a small proportion of di-ethanol amine sufficient substantially to retard the aforesaid gum formation.

6. A low boiling distillate petroleum product of the class of gasoline or kerosene which normally tends to form gum during storage, having added thereto a small proportion of tri-ethanol amine sufficient substantially to retard the aforesaid gum formation.

JAMES B. RATHER.
LESLIE C. BEARD, JR.
ORLAND M. REIFF.