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DISTILLATE PETROLEUM PRODUCTS AND METHOD OF TREATING THE SAME

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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 and for removing any objectionable color developed therein during storage.

This application is a continuation in-part of our prior copending application Serial No. 315,914, filed October 29, 1928.

It is well known that during storage, the lighter refined petroleum distillates, notably gasoline and kerosene, frequently become discolored and develop a quantity of gummy material and an objectionable odor, as a result, it is generally believed, of atmospheric oxidation. And it is known that cracked gasoline will generally accumulate a gummy material during comparatively short periods of storage, particularly in the glass bowls of visible service pumps.

This discoloration and odor developed in gasoline and kerosene are objectionable to consumers and distributors of these products and the presence of gummy material in gasoline causes such undesirable effects, when used in internal combustion engines, as sticking of the valve stems and excessive carbon formation.

In accordance with this invention the development of these undesirable characteristics in distillate petroleum products may be readily prevented or materially delayed and any discoloration may be effectually removed and without appreciably increasing the cost of production thereof.

One of the objects of the present invention is to provide a method of and means for preventing or materially delaying the development of discoloration, objectionable odor and the formation of gummy materials in distillate petroleum products.

Another object of the invention is to provide a method of and means for removing objectionable color developed in distillate petroleum products during storage and for preventing initial and recurrent discoloration thereof.

A further object is to provide compounds or agents which are effective as decolorizers and color stabilizers of distillate petroleum products and also effective to prevent or materially delay the formation of gum and objectionable odor therein.

Another object is to provide a method and means of the character referred to that will not appreciably increase the cost of production of distillate petroleum products.

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

We have discovered that thiocarbanilid is effective as a decolorizer and stabilizer with respect to color, gum formation and odor of distillate petroleum products, particularly such products of A. P. I. gravity higher than 37 degrees.

The method employed preferably comprises the thorough mixing of a relatively minute amount of the thiocarbanilid with the distillate to be treated, although it will be understood that the distillate may be percolated through a mass of the compound or agent, if desired. Preferably, however, the thiocarbanilid is first dissolved in a suitable solvent which is miscible with the distillate, such as acetone, or an aliphatic alcohol, either isopropyl, ethyl or butyl alcohol, and the resulting solution then added to the distillate in the desired proportion. With this method, the compound or agent is distributed throughout and dissolved in the distillate more readily than if it were added directly thereto.

It has been found that as little as one part by weight of thiocarbanilid to approximately 75,000 parts of distillate is an effective proportion for decolorizing and for preventing the development of objectionable color, odor and the formation of gummy substances. Somewhat larger proportions may be used, if desired, but the absorption of too large a quantity of the compound or agent may result in cloudiness due to the compound remaining suspended in the distillate. In most instances, however, the distillate will absorb only a limited amount of the compound and if the process is carried on at ordinary temperatures, there will be no danger of the absorption of an objectionable or quality impairing quantity of the same.

As an example of the practice of this in-

vention, a 10% solution of thiocarbanilid in acetone may be prepared, or, five pounds of thiocarbanilid may be dissolved in five gallons of acetone. The thiocarbanilid solution is then added gradually to the distillate to be treated and preferably in such quantities that the ratio of the amount of thiocarbanilid to the distillate will be one part by weight of thiocarbanilid to not more than 10,000 parts of distillate, or, not more than 0.01%. After the thiocarbanilid and the distillate have been thoroughly mixed, the resulting solution is conducted into a clean, dry tank, and allowed to stand until the reaction of the thiocarbanilid with the distillate is complete. At ordinary temperatures, this usually requires about 24 hours, but at higher temperatures the time required may be less. During this treatment the distillate should preferably be kept out of contact with water, otherwise the compound or agent may be dissolved in the water and possibly result in the return of some degree of discoloration.

Tests have shown that a distillate petroleum product having an initial color of minus 9, as measured by the Saybolt chromometer, when treated with as little as one part of thiocarbanilid to 75,000 parts of the distillate and allowed to stand for five days, had a color of plus 13 Saybolt, thus showing an improvement in color of 22 points Saybolt.

The foregoing treatment has been found most satisfactory and effective in the decolorization and stabilization of distillate petroleum products of A. P. I. gravity higher than 37° with respect to color, gum formation and odor, and is particularly advantageous because it does not appreciably increase the cost of production or the handling charges thereof.

While we have thus specifically described our invention, various modifications thereof may suggest themselves to those skilled in the art, and it is therefore our intention that the invention be limited only by the scope of the appended claims.

What we claim is:

1. A low boiling light colored distillate petroleum product of the class of gasoline or kerosene which normally tends to become discolored or to form gummy material under normal commercial conditions of storage and handling, having added thereto thiocarbanilid in quantity sufficient substantially to delay the aforesaid discoloration or gum formation.

2. A distillate petroleum product suitable for use as a fuel, particularly gasoline or kerosene, of light color and low gum content but normally having the objectionable property of becoming discolored or of forming gummy material during storage, which product has had its aforesaid light color and low gum content substantially preserved by addition to said product of thiocarbanilid in quantity sufficient substantially to improve the stability of said product in the matter of color and gum content.

3. A distillate petroleum product suitable for use as a fuel, particularly gasoline or kerosene, normally having the objectionable property of becoming discolored during storage, which product has had color removed therefrom and has had its resulting light color preserved by the addition to the said discolored product of thiocarbanilid in quantity sufficient substantially to restore the product to its original natural light color and sufficient substantially to delay subsequent formation of color and gum in the said product.

4. A low boiling light colored distillate petroleum product of the class of gasoline or kerosene which normally tends to become discolored or to form gummy material under normal conditions of storage and handling, to which product has been added a quantity of thiocarbanilid of the general order of one part of thiocarbanilid to from ten thousand to seventy-five thousand parts of the said distillate product, sufficient substantially to delay the aforesaid discoloration and gum formation.

5. A motor fuel of the gasoline-kerosene class which normally tends to deteriorate upon storage, to which has been added thiocarbanilid in small quantity, substantially as described, sufficient to effect stabilization of the product as to color and gum content, substantially as described.

6. A light colored distillate petroleum product of the nature of gasoline or kerosene having added thereto thiocarbanilid in quantity sufficiently great to effect substantial color and gum stability thereof, substantially as described, and in the case of a product which has become discolored, to effect substantial decolorization thereof, substantially as described, and in quantity sufficiently small to avoid a visible cloudiness in the said product.

7. 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 color or gum, which comprises adding thereto prior to substantial discoloration or gum formation a small quantity of thiocarbanilid sufficient substantially to delay objectionable color or gum formation.

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 color or gum during storage, which comprises adding to the said product prior to any substantial discoloration or gum formation a quantity of thiocarbanilid of the general order of one part of thiocarbanilid to from ten thousands to seventy-five thousand

parts of the said distillate product, said proportion of thiocarbanilid being sufficient substantially to delay objectionable color or gum formation.

9. The process of treating light colored distillate petroleum products, particularly gasoline and kerosene, to retard deterioration thereof in the matter of color and gum formation, which comprises adding to the product prior to any substantial discoloration or gum formation thiocarbanilid in quantity sufficient substantially to delay the aforesaid deterioration, substantially as described.

10. The process of treating light colored distillate petroleum products, particularly gasoline and kerosene, which have become discolored, which comprises adding thereto in quantity sufficient to effect substantial decolorization thereof, a small quantity of thiocarbanilid.

11. The method of treating a motor fuel of the gasoline-kerosene class, that normally tends to develop color and gum, which comprises adding to said motor fuel prior to substantial discoloration thereof or gum formation therein, a small quantity of thiocarbanilid, sufficient substantially to delay objectionable coloration or gum formation.

This specification signed this 9th day of June, 1930.

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