Patented Aug. 7, 1934

1,969,249

UNITED STATES PATENT OFFICE

1,969,249

GASOLINE

Gellert Alleman, Wallingford, Pa., assignor to Sun Oil Company, Philadelphia, Pa., a corporation of New Jersey

No Drawing. Application October 9, 1933, Serial No. 692,826

7 Claims. (Cl. 44—9)

In the sale of gasoline at retail under a trademark, or as the advertised product of a particular manufacturer, it is important that the purchaser shall receive the precise product for which he asks. Unless, however, the manufacturer operates his own filling stations, there is nothing to prevent an unscrupulous retailer from substituting a cheaper and inferior gasoline, thereby damaging the reputation of the manufacturer and inflicting upon him serious loss, the extent of which it is difficult to compute.

The prevention of this substitution of inferior gasoline for superior gasoline by imparting to the gasoline a peculiar and distinctive color which it will be difficult or practically impossible for the vendor to impart to any uncolored gasoline is one of the objects of the invention. This problem presents serious difficulties. The color must not be one which will impart any cloudy appearance to the gasoline. The color must not be one that characterizes inferior gasoline, or which is, rightly or wrongly, associated, in the mind of the purchasing public, with inferior gasoline. The color must be fast; that is, must not change on exposure to light or during storage for a shorter or longer time. The gasoline should not be colored with a dye that, if the gasoline is used for dry cleaning, will impart an objectionable color to the garments. The color must also be insoluble in water for reasons hereinafter stated. The gasoline should be carefully refined in order to insure that an otherwise fast color will be effective to maintain the color imparted to the gasoline.

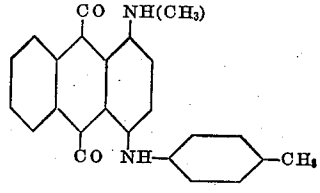
The coloring of petroleum products by means of different dyes and coloring matters is well known. Most of these colors or dyes, when mixed with oil, will, when water is subsequently added, leave the oil, in whole or in part, and go into the water. Some of the known colors or dyes impart an objectionable color to the gasoline. Some of the dyes render the gasoline unfit for dry cleaning. Most of the colors or dyes do not impart a fast color to the gasoline, the color changing, say from blue to green, on exposure to light or during storage.

The colors that have been found to most nearly respond to all the requirements are among those which are sometimes classed in the alizarine group and sometimes in the anthraquinone group. There is a vast number of such colors, however, and very few are available that will respond, even in degree, to the requirements hereinbefore mentioned.

Among the colors meeting the above requirements which heretofore have never been successfully imparted to gasoline is a blue color. This color is, on the whole, the most desirable, not only because no inferior gasoline has this color, but also because the color is not suggestive of inferiority in the mind of the public.

Many efforts have been made, without success, to secure a gasoline of this color that will have no objectionable characteristics. In most instances, where gasoline has been satisfactorily colored blue in the first instance, it turns to a green, or greenish blue, or yellow, upon exposure to sunlight or after storage. The nearest approach to a blue color possessing the required characteristics that has heretofore been made has been secured by coloring with an alizarine cyanine green, which produces a greenish blue color that is not acceptable as a substitute for blue. Moreover, such coloring matter must be used in the proportion of about one part of color to one hundred thousand parts of gasoline, which renders its use fairly expensive.

After experimenting with and thoroughly testing a great number of colors I have discovered one color that imparts to the gasoline the desired blue color and that, in maximum degree, meets all the requirements above enumerated. This color is a derivative of anthraquinone having the chemical formula, 1 methylamino-4 para-tolylamino-anthraquinone. It has a structural formula as follows:

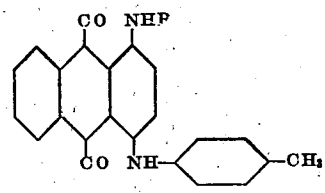


This color has also the advantage that it has the maximum coloring effect sought when used in proportions less than one part in about 300,000 parts of gasoline and is not desirably used in proportions exceeding one part in about 200,000–250,000 parts of gasoline. Gasoline so colored is a beautiful blue free from any cloudy effect. It is so reliably fast that it does not substantially change color when exposed to sunlight for long periods. Its color is not affected when it is brought into contact with concentrated or dilute solutions of caustic soda or of other alkalies or with concentrated or dilute mineral acids.

The color specified is a synthetic product derived through the union, or reaction between, various "intermediates" derived directly or indirectly from coal tar or from synthesized analogous or equivalent products. Besides being completely soluble in gasoline, it is completely soluble in ethyl alcohol, methyl alcohol, amyl acetate, chloroform, carbon tetrachloride, ethyl ether and benzol, but is insoluble in water. It melts, without decomposition, and, after melting, is soluble in the solvents enumerated. The melting point of this color varies with the degree of purity of

the intermediate employed in its manufacture. Some samples have a melting point of 178° C. to 180° C.; other specimens melt between 191° C. and 192° C. Its insolubility in water is an important characteristic. Most dyes, when mixed with oil, will, when water is subsequently added, leave the oil, in whole or in part, and go into the water. A color that cannot be washed out with water has the additional advantage that it insures against the addition of water to the gasoline, because, if water be added thereto, the buyer can see the water, as a transparent mass against a blue background, flowing through the glass on the pump.

Its exact molecular structure is also capable of some variation without producing any noticeable change in the shade or coloring properties, among these variations being that of substituting another alkyl radical for the methyl group attached to the nitrogen atom in the 1 position whereby the structure would be represented as follows:



in which R stands for an alkyl radical such as methyl, ethyl, propyl, etc.

It should be understood, however, that the gasoline, when colored with the above mentioned material, may not retain the desired color unless, as hereinbefore stated, the gasoline is carefully refined and is substantially water-white in color. Refined gasoline having a yellow tinge will produce a green product. Even if the refined gasoline has no yellow tinge, still, if it is not properly refined, it will become yellow on standing and will eventually turn green.

An example of a process that has been successfully employed for manufacturing water-white gasoline to which a blue color may be permanently imparted by means of the above mentioned dye is the process set forth in the Thomas Patent No. 1,624,692, dated April 12, 1927, for Process of manufacturing gasoline, but it is to be understood that the improved color may be used to advantage in the coloring of petroleum distillates other than gasoline.

It is preferred to add the color to the gasoline by dissolving it in a small quantity of gasoline and gradually adding the concentrated solution to the quantity of gasoline intended to be colored. This procedure follows known methods of adding colors or dyes to petroleum products.

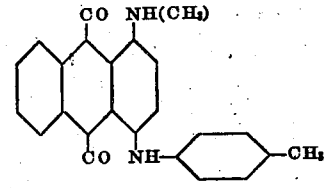
This application is in part a continuation of my application Serial No. 269,312, filed April 11, 1928.

Having now fully described my invention, what I claim and desire to protect by Letters Patent is:

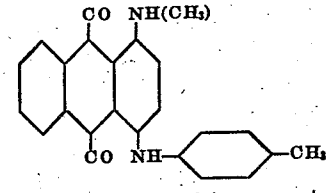
1. A colored gasoline comprising commercial gasoline and a small proportion of 1 methylamino-4 para-tolylamino-anthraquinone.

2. A colored gasoline comprising commercial gasoline and a small proportion of 1 methylamino-4 para-tolylamino-anthraquinone, the latter comprising not over about five ten thousandth of one per cent. of the solution.

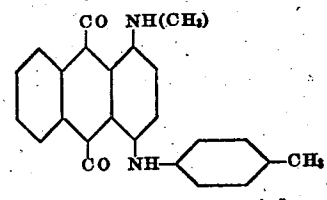
3. A colored gasoline comprising commercial gasoline and 1 methylamino-4 para-tolylamino-anthraquinone having the following structural formula:



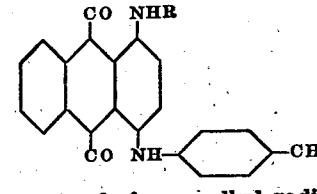
4. The combination of a petroleum distillate, and as a coloring material, a small quantity of 1 methyl amino, 4 toluido anthraquinone, having the following formula:



5. A motor fuel comprising a petroleum distillate and as a coloring material a small quantity of 1 methyl amino, 4 toluido anthraquinone, having the following formula:

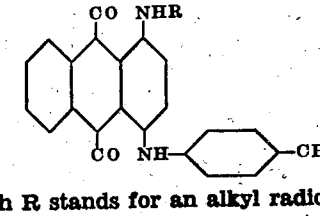


6. The combination of a pertoleum distillate, and as a coloring material, a small quantity of 1 alkyl amino, 4 toluido anthraquinone, having the formula:



in which R stands for an alkyl radical.

7. A motor fuel comprising a petroleum distillate, and as a coloring material, a small quantity of 1 alkyl amino, 4 toluido anthraquinone, having the formula:



in which R stands for an alkyl radical.

GELLERT ALLEMAN.