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MARKING PETROLEUM PRODUCTS

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3 Claims. (Cl. 87—9)

This invention relates to the marking of petroleum products. More particularly, it relates to the combination with petroleum products of radioactive compounds whereby the authenticity or origin of such petroleum products is determinable.

More specifically, my invention relates to petroleum products in which there have been incorporated small quantities of radioactive compounds which may with advantage be oil soluble radioactive salts. Since the presence of these radioactive compounds can be determined quantitatively with a high degree of accuracy, petroleum products treated in this way bear a distinctive and characteristic marking which may be employed for identifying the same.

In the practice of my invention, I propose the use of oil soluble salts of such radioactive elements as, for example, radium, thorium and uranium. The advantages underlying the use of oil soluble radioactive compounds are manifold. The radioactive compounds being oil soluble, it is possible to impart a uniform radioactivity to petroleum products by dissolving the radioactive compounds therein. Furthermore, since radioactivity is an atomic phenomenon which is substantially unaffected by temperature, light and ordinary conditions, petroleum products to which radioactivity has been imparted are substantially permanently marked.

It is an object of my invention to make possible a ready and accurate method of identifying salable petroleum products so that these products may be identified and counterfeiting and substitution determined without question of doubt. The method of identification embodied in my invention is necessitated by conditions which have come about within recent years and which have resulted in the marketing of inferior petroleum products under the trade names of reputable manufacturers. In many cases there have not been complete substitutions, but merely adulterations of reputable products with varying quantities of inferior products which have the general appearance of the original products. By employing the method of marking which forms the basis of my invention, it is possible to readily and accurately determine whether a particular petroleum product has been adulterated or whether an inferior product has been substituted therefor.

The invention provides for the solution of a small proportion of an oil soluble radioactive compound in the petroleum product to be identified. The quantity of the radioactive identifying material is preferably so regulated that there is imparted to the petroleum product a certain, definite and measurable radioactivity. At any time in the history of the marked specimen, it is possible to remeasure its radioactivity and by comparing it with the radioactivity originally imparted to it, determine whether any dilution or substitution has been practiced.

In practicing the invention, any oil soluble radioactive compound may be used. This includes particularly the fatty acid and naphthenic acid salts of radioactive elements such as radium, thorium and uranium. From the practical standpoint, I have found that the use of radioactive derivatives of naphthenic acids such as are disclosed in my copending application Serial No. 716,334 are preferable for the purposes of my invention. I do not, however, intend to limit myself to such compounds but prefer to embody in my invention all oil soluble compounds which display a definite and measurable radioactivity.

In a preferred embodiment of my invention, as applied to the marking of petroleum hydrocarbon lubricating oils, I add to the lubricating oils a definite quantity of a mixture of barium and radium naphthenates. A sufficient quantity of the radioactive material is used to impart to the oil a standard measurable radioactivity. The radioactivity may be determined by any of the well-known electroscopic methods. In this connection it may be observed that the method recently described by Robley D. Evans in the April, 1933 issue of The Review of Scientific Instruments, when modified to adapt it to hydrocarbon materials, permits of a high degree of accuracy.

When once radioactivity has been imparted to any petroleum hydrocarbon oil or product, the same is permanent insofar as ordinary conditions of storage and transportation are concerned. This being so, it is apparent that thereafter by again determining the radioactivity of a sample of the product under investigation, and comparing it with the radioactivity originally imparted to the product, it is possible to determine definitely whether or not the petroleum product has in any way been diluted or adulterated. The present method of identification is not limited only to oils but is advantageously applicable to all types of products containing liquid or solid petroleum hydrocarbons and includes motor fuels, kerosenes, lubricating oils, greases, paraffin waxes, insecticides, petroleum product emulsions and in fact any materials containing petroleum hydrocarbons. Although I prefer to

use oil soluble radium compounds, oil soluble radioactive derivatives of thorium and uranium may also be employed.

Obviously many modifications and variations of the invention, as hereinbefore set forth, may be made without departing from the spirit and scope thereof, and therefore only such limitations should be imposed as are indicated in the appended claims.

I claim:

1. A method of identifying normally liquid and solid petroleum products which comprises dissolving therein a predetermined quantity of an oil soluble substantially permanently radioactive salt selected from the group consisting of naphthenic acid salts of radium, thorium and uranium, which serves as a unique marking of the hydrocarbons, and then quantitatively determining the radioactivity of the said products.

2. A marked petroleum product comprising a petroleum product and a predetermined quantity of an oil soluble substantially permanently radioactive salt selected from the group consisting of the naphthenic acid salts of radium, thorium and uranium, the said salt being dissolved in the petroleum product in an amount to permit identification of the petroleum product.

3. A marked petroleum product comprising a petroleum product and a predetermined quantity of a substantially permanently radioactive mixture of barium and radium naphthenates dissolved in the said product in a quantity to permit identification of the petroleum product.

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