

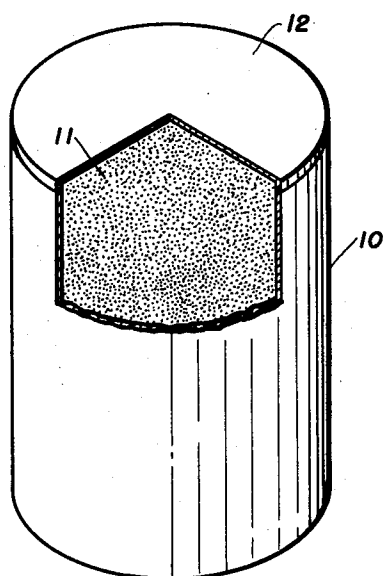
Nov. 18, 1952

J. M. HATFIELD

2,618,384

PACKAGING OF OIL-SOLUBLE DYES IN OIL-SOLUBLE CAPSULES

Filed Jan. 28, 1950



INVENTOR.
JESSE M. HATFIELD

BY

Edmund H. Long
ATTORNEY

UNITED STATES PATENT OFFICE

2,618,384

PACKAGING OF OIL-SOLUBLE DYES IN
OIL-SOLUBLE CAPSULES

Jesse M. Hatfield, Cabin Creek, W. Va., assignor
to The Pure Oil Company, Chicago, Ill., a cor-
poration of Ohio

Application January 28, 1950, Serial No. 141,023

3 Claims. (Cl. 206-84)

1

This invention relates to an article formed of hydrocarbon soluble plastic material incorporating therein coloring matter so that the article constitutes a unitary measured quantity of the coloring matter for use in dyeing hydrocarbon fuel, such as gasoline.

In a bulk plant or refinery storage system, the problem of conveniently coloring gasoline, and other hydrocarbon fuels, for commercial sale is a constant and irritating one because safety requirements of municipal legislation require frequently that hydrocarbon products conform to certain color codes. This creates the necessity of performing the dyeing operation at some stage in the process of bringing the hydrocarbon from the refining steps to the distribution point. In so doing, considerable time is consumed in coloring the fuel, for removing the dye from storage, weighing out of needed quantity, and blending it with the fuel are necessary steps. These matters in themselves are not serious, but it is impossible to handle a dye in the solid form without getting it on the operator. Consequently, the operator must take time to remove the dye from his clothing and hands, inasmuch as the compounds, if they contact scratches, can be the sources of considerable irritation and possibly infection.

It is, accordingly, a fundamental object of the instant invention to provide a hydrocarbon coloring capsule or cartridge containing the requisite amount of dye so that it can be added to the batch of gasoline to be colored.

It is a second object of the invention to provide a formed article composed of gasoline-soluble material containing a measured amount of dye for incorporation in a hydrocarbon blend.

Other objects and advantages of the invention will in part be obvious and in part appear hereinafter.

The invention, accordingly, comprises an article which is essentially a hydrocarbon soluble plastic composition, such as a high melting paraffin wax, formed into a container or capsule which can serve to contain a dye or a blend of hydrocarbon soluble plastic with dye to be used to color the hydrocarbon, and in its preferred embodiment will consist of a high melting paraffin wax capsule containing a measured quantity of dye, or a paraffin wax-dye paste enclosed therein as a cartridge, the entire article containing a unit measured amount of dye.

In the drawing, the figure represents a capsule forming a typical embodiment of the invention, having a broken section taken to illustrate its structure.

2

Referring to the drawing, 10 represents the body or capsule, 11 the dye filling which may be the dry powder or paste, and 12 represents the cover. The preferred embodiment of the invention involves forming a wax capsule strong enough to withstand ordinary handling and packaging, which means that it might be 2 or 3 inches high and an inch or two in diameter, and have a wall thickness of about $\frac{1}{8}$ inch, thereby to give it sufficient volume and strength to contain a relatively large quantity of dye, and yet be a small enough amount of wax so that its presence in the gasoline will be negligible. Microcrystalline waxes of high melting point, preferably those which melt above about 130° to 200° F. are used.

Any kind of oil-soluble dye which will dissolve in hydrocarbons can be used dry in the capsule or can also be incorporated with paraffin or petrolatum to form a paste containing a high proportion of dye which is then enclosed in the capsule of wax. A petrolatum melting (liquefying) at about 125° to 130° F. will readily dissolve a relatively large amount of dye, or wet about 5 to 10 times its weight of dye to form a plastic concentrated color paste. The paste is formed into measured units and then coated with a layer of hard microcrystalline wax to form a color cartridge.

Typical of the gasoline soluble dyes useful for inclusion dry in a capsule or for the formation of the paste, are the anthraquinone type which include phenolated amino anthraquinones, oxyphenol amino anthraquinones, and any other compounds of anthraquinone containing amino or hydroxyl groups. Specific dyes are 1,4-ditoluido anthraquinone, 1-oxy 4-para toluido-anthraquinone, 1,2-dihydroxy anthraquinone, 1,5-ditoluido anthraquinone, and the Oil Red EG which is diazotized amino azoxylene coupled with beta naphthol.

As a specific example in the application of the invention, a capsule 2 inches high and 2 inches in diameter having a wall thickness of about $\frac{1}{8}$ inch is formed of microcrystalline wax having a melting point of 160° F. and weighed. It will come to about 25 grams. When filled with a typical gasoline dye, such as "Ethyl Blue," identified as A. S. T. M. No. D910-47T, identified chemically as 1,4-dipara-toluido anthraquinone, it will easily hold about 6 to 8 ounces of dye as powder. To develop a nicely blue tinted gasoline, it will suffice for about 50,000 gallons. From the figures given, it will be apparent that the amount of dye constitutes about 1 part to 50,000 to 100,000 parts by weight of the solution.

Since dyes are commonly used in fuels in small

amount, just sufficient to color the product in accordance with legal requirements should be employed. Though quantities used will vary, in general they will be from 1 to 20 ounces of dye in 10,000 to 15,000 gallons of gasoline, which is 70,000 to 105,000 pounds. Thus, the proportion will be about 1 part to 50,000 or 100,000 parts by weight. However, since the intensity of the color of a particular batch of dye will vary and the dye has no effect on the gasoline other than to give it the required color, the quantities used should be minimum amounts, and the exact ratio of dye to be used in a particular gasoline will depend upon the intensity and purity of the materials used as the dye.

Experience in dyeing of gasoline, indicates that the application of dye in a blending operation through capsules packed with the dry dye or paste coated with paraffin, work notable economies in the blending operation. Principally, the dye package eliminates the dangerous and unsanitary handling of the dry powder.

Wastage in the handling of a dye powder is an appreciable item, for in the space where the dye is kept, the tendency of the material to form a fine dust renders it impossible to store anything other than the dye. It has happened that inadvertent contamination of other petroleum treating chemicals with dye dust at refineries has resulted in the inadvertent production of colored products. Also, when dry dye is added as a powder to the gasoline blending tank, inevitably some of it contacts the tank to form stains and discolorations at the inlet point.

Use of dye in concentrated solution in benzol can be practiced but has the disadvantage that the light solvent must be used in appreciable amount and might affect the flash point of a fuel oil. Similar considerations apply to the use of heavy hydrocarbon solutions to color oils or greases; for the amount of solvent added with the dye can be enough to have a noticeable effect on the finished product. The wax container or medium has the advantages of being closely related to the hydrocarbon being colored and of being added in substantially smaller proportion than the color.

Thus, experience indicates that a dye capsule sized in accordance with the amount of dye which is to constitute the unit to be used, one ounce, four ounce and eight ounce packages being quite convenient, work notable economies in operation in that they save time and eliminate the annoying features of handling the dye powders. Where a modest selection of units made up as dye capsules is used, it is possible to blend the appropriate amount of dye with variable amounts of hydrocarbon.

The alteration in technique necessary when the capsule is modified to be a wax-coated dye paste calls merely for melting a paraffin, melting point 125° to 135° F., or petrolatum, and blending it with several times its own weight of dye to form the paste. Much of the dye will dissolve in the paraffin of petrolatum to form essentially a saturated solution, but it is not essential that it all be in solution, inasmuch as the colored paste

binding the dye into a unit is formed into measured units of a specified amount of dye and these coated with the hard microcrystalline wax to unify them and make their handling convenient.

Thus, to incorporate the dye in a gasoline blend, the dye capsule or cartridge is simple dropped into the blend. Inasmuch as the paraffin is quite soluble in gasoline, it will substantially dissolve before the capsule has sunk to more than two or three feet below the surface of the gasoline. In this manner, the dry dye is released under the surface and all the dye is incorporated in the gasoline. To insure complete solution, the hydrocarbon is agitated or pumped from the bottom to the top of the tank to induce thorough mixing. The amount of wax used in a given capsule will generally be one-fifth to one-tenth of the amount of dye and, in such a case, the quantity of paraffin added to the gasoline by the use of the capsule is so small as to be negligible.

Though the invention has been described as a unit amount of dye or paste encased in a wax container, it is to be understood that any hydrocarbon soluble film having only a moderate amount of tensile strength would be adequate for forming an envelope or casing around the dye or paste as described.

Having described the invention with a modest number of examples, it is to be understood that the matter is intended to be illustrative and not to be interpreted as a limitation of the invention, other than as defined in the appended claims.

What is claimed is:

1. An article of manufacture for dyeing petroleum products comprising, a petroleum hydrocarbon oil soluble dye blended with a paraffin wax to form a paste containing at least 2 parts dye to 1 part wax, the dye paste being enclosed in a thin walled, hard wax container, said container being fabricated from a microcrystalline wax having a melting point above about 130° F.

2. A product in accordance with claim 1 in which the paste is petrolatum blended with oil soluble dye.

3. A product in accordance with claim 1 in which the paste is paraffin having a melting point of about 125° to 135° F. blended with oil soluble dye.

JESSE M. HATFIELD.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,018,570	Poetschke	Oct. 22, 1935
2,031,233	Stillwell	Feb. 18, 1936
2,265,189	Orelup	Dec. 9, 1941
2,396,667	Adler	Mar. 19, 1946
2,454,420	Adler	Nov. 23, 1948

FOREIGN PATENTS

Number	Country	Date
20,726	Great Britain	1910
314,149	Great Britain	June 27, 1929
525,042	Great Britain	Aug. 20, 1940