Patented Oct. 14, 1941 2,258,910

UNITED STATES PATENT OFFICE

2,258,910

COMPOSITION OF MATTER AND PROCESS FOR PRODUCTION THEREOF

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No Drawing. Application September 29, 1938, Serial No. 232,454

2 Claims. (Cl. 44—7)

This invention relates to the solidification of liquid fuels and, in particular, is directed to solidification of liquid hydrocarbons whereby they may be readily employed as sources of illuminants.

Heretofore, many processes and products have been described which are directed primarily to the solidification of liquid hydrocarbons. Some of these products are designed for use as fuels, while others are designed for use as lubricants. Of the prior art products, typical examples are those described by Cronemeyer in his U. S. Patent No. 718,318; by Blass in his U. S. Patent No. 877,289; and by Klinkenstein in his U. S. Patent No. 1,848,568.

The solidified oils typified by the foregoing have not proved satisfactory for use as sources of illuminants. Cronemeyer, for instance describes a complicated process involving considerable manipulation of his basic materials. His process involves the use of high temperatures, specifying heating to the boiling point. Blass describes a process for the production of a lubricating material by the absorption of oil in a mass of naphthalene. Although Klinkenstein describes a material which can be used with a wick, the method for its production is complicated, and the product is not capable of being used as broadly as that of the present invention. My improvement in the aforesaid art results in greater simplicity of manufacture, and yields a product having much broader utilization as a source of illuminant.

It is an object of the present invention to provide a solid material which can be easily used for the same purpose as liquid illuminants.

Another object is to provide for increased economies in the use of liquid fuels.

It is another object of the invention to facilitate the transportation and use of such fuels by greatly lessening the hazards due to spillage, leaking and the like.

It is another object of the invention to provide a packaged solidified fuel which may be directly used in a lamp, flare or the like.

It is another object of the invention to provide a solidified fuel for use in the kindling of fires and the like.

Generally, my improved composition is made from liquid petroleum hydrocarbons, such as kerosene. Solidification thereof is effected by the use of small quantities of naphthalene and small quantities of resinous materials such as colophony. The addition thereto of a small amount of alcohol and alkali results, after thorough mixture and gentle warming, in a superior product.

An advantage of the product produced according to the process herein described is that it is of such nature that if an ordinary lamp wick be inserted in the solid, the wick, acting as an absorbent, will cause the solid to part with its combined illuminant and, therefore, due to the capillary attraction of the wick, will draw this liquid to the point of the wick, where, if ignited by a match, it will burn as in an ordinary kerosene lamp.

The gradual supply of the liquid from this form of solid to the lamp wick is such that the length of burning time is increased to at least twice the time as compared with the burning of ordinary liquid kerosene. For instance, if 6 ounces of liquid kerosene burns 20 hours in a lamp, I have found that kerosene solidified in accordance with the process of my invention will burn for more than 40 hours in a lamp under similar conditions.

The advantage of an illuminant such as kerosene solidified in accordance with the process of my invention is that when used for lamps, the factor of safety is considerably enhanced. A lamp operating with my solidified fuel permits the lamp to be inverted or turned upside down without spilling and probably causing a fire or an explosion. A farm lantern employing liquid kerosene often overturns and sets fire to the surrounding inflammable materials, such as hay, etc., but if a solidified fuel is used, there can be no spillage or danger due to the nature of the solidified illuminant.

Another advantage of the product produced according to my process lies in the fact that other absorbents may be used in place of a wick. Thus, for instance, cellular materials such as wood, paper, straw, sugar cane, etc., are excellent materials. I have found that when a piece of such cellular materials is impregnated or treated with solidified illuminants, for example, kerosene or even heavier petroleum products, and the cellular materials then ignited by a match, I am able to obtain a burning of said materials for more than twice as long as that compared with a piece of cellular material impregnated or saturated with an equivalent amount of liquid illuminant.

When used in the foregoing fashion, a solidified illuminant maintained in contact with a piece of cellular material functions as a kindler or substitute for charcoal in the starting of wood and coal fires or fires in stoves or fire places. I

may use as a source of illuminant a petroleum product of a slightly heavier nature than kerosene, such, for instance, as is commonly known as fuel oils of various specifications, including bunker oils.

I have also found it possible to use the lighter petroleum fractions, such as paint thinners, cigarette lighter fluids and the so-called gasoline fractions.

Under the term liquid hydrocarbons I also include the lower aromatic hydrocarbons, such as benzol, toluol, etc.

Solidified products produced from the latter materials can be used as fuels for cigarette lighters due to the definite yet peculiar property of the solidified hydrocarbon to adapt itself to the capillary attraction of the wick or other cellular medii.

Another advantage of the process and product lies in the fact that it is not at all necessary to reliquify the solid in order to use it as an illuminant, as it may be directly employed in its solid form. The product may also be used directly as a fuel without the aid of a wick or cellular material and may be burned directly in kerosene stoves, for instance, such as are used for cooking purposes.

Although the use of a resin such as colophony has heretofore been suggested in the production of solidified fuels, the products produced thereby are not suitable for illumination by using a wick or cellular material by which the burning time has been increased to twice that of the burning of liquid fuel. As distinguished from prior processes, my improved method and particular product is one in which no stearine is used or preheating of the component materials can be permitted.

In carrying out the process of this invention I generally take of the following by weight, 95 parts of petroleum hydrocarbon maintained at ordinary room temperature and dissolve therein 1 part of naphthalene and 1 part of colophony. I then add to the said solution 1 part of alcohol. Then I add to this mixture 2 parts of a 10% caustic soda solution. This solution is then agitated in a closed vessel by means of a paddle or other appropriate agency and subjected to a pressure of 15 pounds per square inch for a period of 10 minutes, whereby chemical combination of the active ingredients is effected. Under this slight pressure premature superficial congelation is prevented. At the termination of this step in the process the uncombined water and alkali are withdrawn and the remaining mass of the hydrocarbon mixture is then gently warmed until the naphthalene and rosin compound indicates completion of reaction by instant conversion to solid form. Such conversion occurs at approximately 125° F.

In carrying out my process I may use, as I have heretofore stated, any of the liquid hydrocarbons described.

In the preparation of materials to be used for starting fires I take cellular materials, such as wood, paper, straws, pressed sugar cane and the like, and place said materials in a closed vessel. The cellular materials may be placed in the vessel either in bulk or in previously cut forms or even in individual containers. Then I run into the said vessel the liquid fuel which has been treated as hereinbefore described. The vessel is thereupon closed and, by the action of gentle heat for about 10 minutes, the cellular material is thoroughly impregnated with the liquid fuel, which thereby undergoes solidification. On cooling, the vessel is opened and the impregnated cellular material may be used for packaging. The product so formed possesses superior characteristics.

It is to be understood, of course, that when the cellular material is first placed in an individual container the treated liquid fuel is run into the individual containers and thereupon the containers are subjected to the gentle heat.

I may also prepare my solidified liquid fuel by filling individual containers with the treated liquid fuel prior to solidification. In such cases a batch of filled containers may, by appropriate means, be heated until solidification is completed.

I may also use in the place of naphthalene such naphthalenic materials as anthracene or phenanthrene. I have also found that in the place of rosin I may use such other vegetable gums as arabic, sandarac and similar vegetable resins. The alcohol employed in my process may be methyl alcohol or any of the lower carbinols or mixtures thereof.

I have found that methyl alcohol is an excellent material for the use described. I have also found that in the place of caustic soda it is possible to use other alkalis, such as soda ash, silicate of soda and the like, as well as organic materials with decided alkaline characteristics, such as the various amines.

The material produced according to my process may be handled in a filling machine and packaged into containers of various sizes. The material may be filled in cans and securely closed. It is possible to use cans designed to be used directly in lanterns or the like. When used under such conditions, the can is opened and the wick carrying portion of the lamp fitted thereover. It is thus obvious that the material may be used under the most adverse circumstances and the need for refilling lanterns with liquid fuels completely eliminated.

It is to be understood that the proportions given in the foregoing example are merely illustrative and that it is possible to vary the quantities of the materials used in the solidification of the liquid hydrocarbon without departing from the spirit of the invention.

Having thus described my invention, I claim:

1. A composition of the class described comprising:

	Parts
Kerosene	95
Naphthalene	1
Rosin	1
Methyl alcohol	1
Caustic soda (10%) solution	2

prepared substantially as described.

2. The method of congealing a hydrocarbon liquid which includes the steps of combining 95 parts by weight of petroleum hydrocarbon at ordinary room temperature with 1 part of naphthalene and 1 part of colophony, adding 1 part methyl alcohol, then adding 2 parts of a 10% solution of caustic soda, agitating the resultant mixture in a closed vessel above atmospheric pressure, withdrawing the uncombined alkali and water, and raising the temperature of the mass only to a level completing the reaction of the added substances whereby a water free congealed product is obtained.

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