

UNITED STATES PATENT OFFICE.

LINDON W. BATES, OF MOUNT LEBANON, NEW YORK.

METHOD OF INCREASING THE SPECIFIC GRAVITY AND FLASH-POINT OF LIQUIDS.

1,390,233.

Specification of Letters Patent.

Patented Sept. 6, 1921.

No Drawing. Original application filed November 6, 1919, Serial No. 336,918. Divided and this application filed June 16, 1920. Serial No. 389,461.

To all whom it may concern:

Be it known that I, LINDON W. BATES, a citizen of the United States, residing at Mount Lebanon, in the county of Columbia and State of New York, have invented certain new and useful Improvements in Methods of Increasing the Specific Gravity and Flash-Point of Liquids, of which the following is a specification.

This application is a division of my co-pending application Serial Number 336,918, filed November 6th, 1919. It refers to a process for increasing the safety of a liquid fuel against fire by raising its specific gravity so that it will support a water seal or layer and by raising its flash point, in some cases above the preheat temperature necessary for proper atomization. The process consists in combining with one or more liquid hydrocarbons particles of artificially pulverized solid carbonaceous substance in such amount as will raise the specific gravity of the composite above unity and in such a fashion as will elevate the flash point and stabilize the particles in the liquid.

Most liquid fuels, such as oils and tars, have a specific gravity between about .85 and .98, although the gravity of certain tars exceeds unity. The gravity of coals lies between about 1.2 and 1.6. In order to raise the specific gravity of the oils and tars lighter than water, it is necessary to add thereto amounts of coal between about 10% and 35% by weight, depending upon the gravity of the liquid base. Anthracite, bituminous and lignite coals are usable for this purpose.

The flash point of liquid combustibles varies within wide limits. It is frequently lower than 180° F. On the other hand the requisite preheat to atomize may exceed even 200° F. in the case of liquids of high viscosity. The amount of carbonaceous substance used to elevate the specific gravity has also a perceptible effect upon the flash point when the mixture is duly made, as hereinafter described.

In order to facilitate the stabilization of the coals in oil or tar or both, it is desirable to reduce the solid carbons to the form of particles by artificial means such as mechanical pulverization, or electrical or chemical reduction. The size should be such that about 85% of the particles would pass a 200-mesh screen. The treatment to obtain

stability presented in this divisional application involves the peptization of the particles. Certain liquid or liquefiable coal products are usable to peptize coal particles in oil or other liquid hydrocarbon. For example, one may mention coal tar, creosote, naphthalene, solvent naphtha tar and partially or completely dehydrated water gas tar. From 5% to 20% by weight of a coal distillate will produce adequate stability under proper conditions of application. These substances are not equally effective. Some are active peptizers and in others the quality is so to speak latent, to be brought out by heat or time in storage to render the substance operative on the particles.

In order to obtain a homogeneous mixture and to elevate the flash point as much as possible or desired, the carbonaceous substance should be pulverized in liquid hydrocarbon. It is possible however to obtain the desired results by blending with the liquids already pulverized material. The heat treatment to induce peptization or to accelerate it consists in heating the composite for over and hour at a temperature between 65° C. and 95° C., more or less. Proper heat treatment may take a considerable time, up to about three hours, when certain tars are used whose peptizing qualities are less active than those of other liquids or when anthracite coal is employed which is more difficult than bituminous to peptize.

By "peptizing" is meant partial dissolving of the particles by the peptizer and to some extent spongifying, pitting and cavitating the individual particles, thereby promoting stability. If the particles are over peptized a less stable product may be formed. Stability is obtained by such action upon the particles and not by modifying the nature of the dispersion medium. No principal or chief reliance is placed upon increasing the viscosity of the medium to obtain stability. A product of low or moderate viscosity consistent with the desired gravity and flash point is sought. It is possible to obtain a stable fuel of lower viscosity than the oil base when certain low viscosity peptizers, such as water gas tar, are employed. The stability of fuel in which the particles are peptized is such that elevation of the temperature for atomization, and hence reduction of viscosity, does not cause such sedimentation as will

congest the pipe system or prevent the use of the fuel in ordinary liquid fuel installations. During the period of adequate stability the liquid and particles do not separate to a disadvantageous extent. During the period of "life" the components form a composite whose specific gravity remains practically and sufficiently uniform and whose flash point remains elevated. The duration and degree of stability may be controlled within reasonable limits by varying the treatment given. A shorter period of treatment will produce a less stable fuel than the treatment mentioned.

15 It is frequently advantageous for economic reasons to stabilize more coal in oil than the percentage strictly necessary to raise the specific gravity above unity. The elevation of flash point is greater the more coal used, within certain limits, inasmuch as upon peptization the liquids enter into pores and seams of the coal. Absorption, occlusion and adsorption may account for the phenomenon, and the volatiles in the oil may have a preferential affinity for coal, which is brought into operative play in a suitably homogenized composite. An ordinary mixture of coal and oil would not display so much higher a flash point than that of the original oil as the fuel herein described.

Having thus presented my invention, what I claim in this divisional case is:

1. That method of raising the specific gravity and flash point of liquid hydrocarbon so that a fluid composite is formed which will support a layer of water and will atomize at a temperature below its flash point, which consists in adding solid carbonaceous particles to liquid hydrocar-

bon in an amount which will give the mixture a specific gravity heavier than that of water and a flash point above the temperature of preheat necessary for proper atomization, uniting therewith coal distillate having qualities which will peptize the particles and stabilize them, and peptizing therein the particles to form a stable liquid fuel of such elevated flash point and gravity.

2. That method of causing a composite fluid comprising a liquid hydrocarbon to sink in water instead of floating thereupon, which consists in raising the specific gravity of the hydrocarbon above that of water by combining therewith pulverized solid carbonaceous substance in an amount which will raise the specific gravity above unity, and in maintaining the particles in dispersed and suspended condition throughout the liquid by peptizing them therein with partially or completely dehydrated water gas tar.

3. That method of raising the specific gravity and flash point of liquid hydrocarbon, which consists in converting the same into a fluid composite containing solid carbonaceous substance and coal distillate having peptizing qualities upon such substance, pulverizing the carbonaceous substance in the liquid hydrocarbon in the presence of the coal distillate and applying heat thereto until the solid substance is reduced so that about 85% would pass a 200-mesh screen and the particles are peptized and stabilized and the flash point and gravity are elevated.

In testimony whereof I have signed my name to this specification.

LINDON W. BATES.