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BENJAMIN F. J. ODELL, OF CHICAGO, ILLINOIS

PREPARED FUEL AND METHOD OF PRODUCING IT

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My process relates to the treatment of solid fuels to reduce their tendency to form dust upon agitation. In particular it relates to spraying or otherwise causing the deposit of a dust-settling medium upon the surface of solid fuel. The medium, which may be complex as regards chemical composition, may contain an odoriferous material added to produce a particular odor and it may also contain a coloring matter or product that through change will produce a color effect upon the solid fuel.

One of the objects of my invention is the elimination of fuel dust formed during delivery and use of solid fuels, without adding thereto a corrosive material such as calcium chloride. Another object is to give a more pleasant odor to certain fuels that have only a faint odor, an unpleasant odor or no odor at all. A further object is the production of a so called dustless solid fuel that does not retain or absorb excessively large amounts of water vapor such as a fuel heavily loaded with calcium chloride. Still another object is the simultaneous coloring, coating and perfuming of a solid fuel in the treatment for eliminating the dust-forming properties.

I have found that in wetting the surface of solid fuels the use of a solution of calcium chloride as commonly employed the prepared fuel tends to cause corrosion of metal not only in the transportation of the fuel but during storage in households.

My process differs from others with which I am familiar in that the wetting medium is not a corrosive salt. Briefly my process comprises the wetting of the surface of a solid fuel with a medium comprising an oil having a high boiling point, that is, with an oil that is not highly volatile. Water may be present in said medium in varying amounts even to much more than fifty per cent of the whole. The water and oil may exist initially as an emulsion or they may be applied simultaneously from separate sources. I prefer to apply the wetting medium comprising an oil and water, by discharging it in a fine state of division under superatmospheric presure, the oil containing a perfume material when it is so desired in predetermined amounts, and the water containing in solution or suspensions when so desired, a pigment or the equivalent.

The oil may be a heavy tar, a petroleum product boiling at a high temperature, tar preparations, asphaltic preparations or similar product. When a light color is not essential I prefer to use a tar that has been freed from some of the fractions distilling at relatively low temperatures. For example benzole and napthalene are not desirable in the oil or tar used. I find that by employing the prepared tar as the oil-medium only a small amount of it is necessary per ton of coke or coal treated, particularly when it is used along with water in producing a substantially dustless fuel. The moisture is absorbed by the fuel (coke in this example) and the tar wets the outer surface and oxidizes in air to a non-tacky surface. Under these conditions the absorbed water does not evaporate so readily as when water alone is employed as the wetting medium. Another advantage in using tar is that it is a fuel available almost everywhere at a very low price. Because of its cheapness it can be used at a minimum application cost, the sale price of the coke being in some instances as high as that of the tar per pound. The amount used may vary from about a gallon or two gallons per ton of fuel treated upwardly according to the effect desired. In mixtures with other oil-like materials less tar may be used. More of it is required or rather more of it can be used when treating a fuel such as coke than in treating a fuel having less surface for absorption. Likewise a greater total amount of wetting material can satisfactorily be used with coke than with certain coals.

The perfume material used is preferably dissolved in the oil or water according to its solubility characteristics. Diphenyl oxide is an example of a perfume material that is effective, cheap and required only in small amounts. Phenetol, methyl salicylate, pine oil, cedar oils and similar odoriferous materials may be used as the perfuming component, dissolved, preferably in the oil-like constituent.

Lime in the form of $Ca(OH)_2$ may be used in solution or in suspension in the water component of the wetting medium and as thus used it contributes a light color to the solid fuel, varying in intensity with the amount used. Lime alkalies or soaps may be used in the water and the function as an emulsifying agent causing the dispersion of oil or tar in water. Kaolin also behaves in the same manner. Carbon black tends to form emulsions of the reverse type, namely, those in which the water exists as the inner phase; it, also may be used when desired.

Summarily my process comprises depositing on the surface of solid fuel a film or coating of a fluid comprising initially an oil-like material that is not readily volatile and water; the two components are preferably in the form of an emulsion as applied and the oil-like component preferably contains a perfume material therein. The whole mass may also include a pigment or the equivalent that will remain as a surface coating on said fuel.

Because carbon and coal are preferentially wetted by oil the moisture absorbed is more tenaciously retained by the fuel when an oil-like material is applied simultaneously with or immediately thereafter the wetting with water. An oxidizable material such as heavy tar is preferable in most cases to a nonoxidizing oil.

With coke fuel a mixture that may be used is as follows:—

Water	12 gallons
Oily matter or tar (heavy tar)	3 gallons
Total	15 gallons

The above quantity will suffice for about 1 ton (2000 lbs.) of coke when the coke is dry at the time of application. More or less may be used according to the effect desired and the proportions of water and tar may be changed to suit the fuel and the effect desired. When using a tar or other oxidizable material it is desirable to use a high pressure pump in atomizing the wetting medium and to apply it in an atmosphere of air which hastens oxidation. The high pressure, using a suitable spray nozzle, permits the intimate contact of the tar with oxygen by virtue of more perfect atomization of the tar. Moderately warm wetting medium is sometimes preferable to cold particularly with coke fuel but with some grades of bituminous coal this is apt to cause spontaneous ignition of the fuel.

Another mixture that may be used is:—

Water	12 gallons
Tarry matter	3 gallons
$(C_6H_5)_2O$—Diphenyl oxide	2 ozs.
Total	15 gallons 2 ozs.

Another comprises approximately:—

Water	12 gallons
Oily matter including perfume	3 gallons
Total	15 gallons

The oily matter may be tar or a heavy tar product or an oil that does not have a high vapor pressure or it may comprise a perfume material such as a pine oil, cedar oil or the equivalent.

Another mixture may include the pigment material, as follows:—

Water	8 to 15 gallons
Oily matter	2 to 5 gallons
Pigment material	1 to 10 pounds

The proportions may be changed to suit conditions and the pigment may comprise lime, $Ca(OH)_2$, or CaO, or other material.

An emulsifying agent such as a soap may be used when lime is not used in any of the above mixtures.

My process is particularly adaptable for use in treating fuel for domestic use and is preferably applied to the prepared or sized fuels for that use.

Having described my invention so that one skilled in the art can practice it, I claim:

1. The method of producing a prepared fuel, comprising spraying on the surface of a solid fuel an atomized emulsified mixture of water, and an oil-like material comprised only of components boiling at temperatures above those of benzol and naphthalene, the amount of said oil-like material in the emulsion being 20 to 50 per cent.

2. The method of producing a prepared fuel, comprising spraying on the surface of a solid fuel an atomized emulsion of an oil-like material in water, said oil-like material comprising only components having high boiling points and including diphenyl oxide, said emulsion comprising at least 20 per cent of said oil-like material.

3. The method of producing a prepared fuel, comprising, spraying on the surface of a solid fuel an atomized emulsified mixture of water in an oil having a low vapor pressure and a high boiling point, the water-in-oil emulsion containing sufficient carbon black to stabilize it.

4. The method of producing a prepared fuel, comprising, spraying on the surface of

a solid fuel an atomized emulsion of water in oil which emulsion is stabilized by carbon black, said oil comprising a perfume material having a high boiling point.

5. A prepared fuel, comprising, a solid fuel having deposited on its surface a film coating comprising oil and carbon black, said oil as applied being the outer phase of an emulsion with water stabilized by said carbon black.

BENJAMIN F. J. ODELL.