INTIMATE MIXTURES OF PITCH DUST WITH OTHER MATERIALS AND METHOD OF PROVIDING SAME

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This is a continuation-in-part of my co-pending application, Serial No. 493,016, filed March 17, 1955, now abandoned.

In the manufacture of pitch coal briquettes, substantial amounts of pitch are required as a binding agent for the fine coal. In general, the amount of pitch used varies between 6.5 and 8 percent by weight. Inasmuch as the price of pitch is substantially higher than that of fine coal and since the pitch market is subject to pronounced fluctuations with the result that coal tar pitch is occasionally in short supply, the briquette industry has for a long time been in search of a method for reducing the amount of pitch in coal briquettes without detrimentally affecting the quality of the briquettes with respect to compressive strength, resistance to shattering in the fire, etc.

Aside from devices of the mechanical type, experiments with the aforementioned purpose in mind have also been conducted heretofore with chemical processes. None of them, however, has produced satisfactory results. For instance, instead of the regular briquette pitch with a softening point of 65–75° C. (K.S.), it has been attempted to use directly moist pitch with a softening point of 45–55° C. (K.S.), or else to add to the briquette pitch, while it was being mixed with the fine coal, a corresponding amount of tar oil, that is, about 10 percent. Attempts have also been made to convert the briquette pitch, prior to mixing with fine coal, into a solution in oil or an emulsion in water. In the latter case the emulsion water had to be removed through heating before the material was fed into the briquetting presses.

Similar conditions prevail in connection with the manufacture of electrodes, where the dry coke is mixed with pitch as a binding agent (in the form of “binding coke") which develops during the burning process. In this case the aim is not so much to reduce the amount of pitch, but rather to obtain a more intensive distribution of the pitch in the dry coke so that the binding coke skeleton developing during the burning of the electrode will be as finely distributed as possible.

The present invention relates to a method which meets the requirements of both of the aforementioned industrial purposes, since it permits an extraordinarily fine distribution of the pitch within the briquetting coal and within the electrode mass, respectively, through the addition to the two components of a wetting agent in the form of an oil-soluble emulsifier dissolved in tar oil. Relatively moderate quantities of this wetting agent are sufficient to assure an unusually fine distribution of the pitch during the pressing operation, inasmuch as the presence of the emulsifier improves the wetting of the fine coal and of the dry coke, respectively. In the manufacture of pitch coal briquettes, this improved distribution of the binding agent affords a reduction in the addition of pitch averaging one to two percent or more. The emulsifier used is a triethanolamine oleic acid

soap dissolved in tar oil in the relative proportions of 1:2. For the sake of completeness, numerous commercially available oil-soluble emulsifiers, wetting agents, and adhesives may also be used for the same purpose, and in all cases the same success is achieved.

The following examples will illustrate the invention and the method of its practical application, all percentages given being by weight.

Example 1.—The ground and pre-dried anthracite intended for the manufacture of 27-gram egg briquettes which normally required an addition of 8.0% pit-coal tar pitch binder, was supplemented by only 5.9% pit-coal tar pitch and 0.12% of a solution of trisopropanolamine stearic acid soap in light tar oil (one part soap to two parts tar oil). With a compressive strength of 36 kilograms, the briquettes thus produced were of a better quality than those obtained with the customary amount of tar of 8%.

Example 2.—The ground and pre-dried coal intended for the manufacture of 50-gram egg briquettes which normally required an addition of 7.3% pit-coal tar pitch, was supplemented by only 5.5% pitch and 0.13% of a solution of tributanolamine oleic acid soap in medium heavy pit-coal tar oil (one part soap to two parts tar oil). With a compressive strength of 33 kilograms, the briquettes thus produced were of a better quality than those obtained by using 7.5% binding agent and whose compressive strength was only 27 kilograms.

Example 3.—In producing 36-gram egg briquettes, the ground anthracite which normally required the addition of 7.8% pit-coal tar binder, was supplemented by only 5.9% ground pit-coal tar pitch and 0.12% of a solution of triethylamine (triethanolamine, triethanolamine) stearic acid soap in pit-coal tar oil (one part soap to two parts tar oil). The briquettes thus possessed the same compressive strength and resistance to shattering as those obtained when using the conventional amount of 7.8% pit-coal tar pitch binder.

Example 4.—In producing 50-gram egg briquettes, the ground anthracite which normally required the addition of 7.5% pit-coal tar pitch binder, was supplemented by only 3.5% pit-coal tar pitch and 0.12% of a solution of alkyl halide alanes Si,C,H,Cl in twice the amount of a light tar oil, whereby the same compressive strength was obtained as when using 7.5% pit-coal tar pitch binder alone.

Example 5.—The so-called “green” electrode mass which is to be shaped by compression and subsequently burned and which consists of ground petroleum coke and pit-coal tar pitch, was supplemented by 0.1% of a solution of trisopropanolamine stearic acid soap in light pit-coal tar oil (one part soap to two parts tar oil). After the electrode mass had been compressed and burned, the electrodes or artificial carbons thus produced showed a mechanical breaking strength which was about twice that of the products obtained without the addition of the tar oil and trisopropanolamine soap solution. Practical evidence of this increase in breaking strength was provided by the manufacture of contact carbons for high-speed electric trains.

From the preceding description it is clear that the process of the present application represents for two important branches of industry an innovation which, in a simple manner and without resorting to costly installations and equipment, permits substantial savings.

1. The method of reducing the quantity of coal tar pitch necessary as a binding agent in water-free compressed briquettes of finely divided coal, comprising, adding to the coal, prior to compressing it, approximately 5.5 to 5.9% of coal tar pitch in finely divided form and approximately 0.1 to 0.13% of a solution of one part of

\[1\] Kramer Sarow method of measuring melting points.
oil soluble alkanolamine fatty acid soap in two parts of coal tar oil, thereby forming a water-free composition.

2. The method of manufacturing high strength water-free coke electrodes comprising mixing finely divided coke with approximately 5.5 to 5.9% finely divided coal tar pitch and approximately 0.1 to 0.13% of a solution of one part of oil soluble alkanolamine fatty acid soap in two parts of coal tar oil.

3. The method of manufacturing high strength water-free coke electrodes comprising mixing finely divided coke with approximately 5.5 to 5.9% finely divided coal tar pitch and approximately 0.1 to 0.13% of a solution of one part of oil soluble trialkanolamine fatty acid soap in two parts of coal tar oil.

4. The method of reducing the quantity of coal tar pitch necessary as a binding agent in water-free compressed briquettes of finely divided coal, comprising adding to the coal, prior to compressing it, approximately 5.5 to 5.9% of coal tar pitch in finely divided form and approximately 0.1 to 0.13% of a solution of one part of an oil soluble compound selected from the group consisting of alkanolamine fatty acid soaps and alkyl halide silanes in two parts of coal tar oil, thereby forming a water-free composition.

5. The method of claim 4 wherein the oil soluble compound is Si(C\textsubscript{2}H\textsubscript{4})\textsubscript{2}Cl.

6. The method of manufacturing high strength water-free coke electrodes comprising mixing finely divided coke with approximately 5.5 to 5.9% finely divided coal tar pitch and approximately 0.1 to 0.13% of a solution of one part of an oil soluble compound selected from the group consisting of alkanolamine fatty acid soaps and alkyl halide silanes in two parts of coal tar oil.

7. The method of claim 6 wherein the oil soluble compound is Si(C\textsubscript{2}H\textsubscript{4})\textsubscript{2}Cl\textsubscript{2}.

8. A water-free composition of matter consisting essentially of finely divided coal intimately admixed and compressed with approximately 5.5 to 5.9% of finely divided pit-coal tar pitch and approximately 0.1 to 0.13% of a solution of one part of oil soluble alkanolamine fatty acid soap in two parts of coal tar oil.

9. A water-free composition of matter consisting essentially of finely divided coal intimately admixed and compressed with approximately 5.5 to 5.9% of finely divided pit-coal tar pitch and approximately 0.1 to 0.13% of a solution of one part of oil soluble trialkanolamine fatty acid soap in two parts of coal tar oil.

10. A water-free composition of matter consisting essentially of finely divided coal intimately admixed and compressed with approximately 5.5 to 5.9% of finely divided pit-coal tar pitch and approximately 0.1 to 0.13% of a solution of one part of an oil soluble compound selected from the group consisting of alkanolamine fatty acid soaps and alkyl halide silanes in two parts of coal tar oil.

11. A water-free composition of matter consisting essentially of finely divided coal intimately admixed and compressed with approximately 5.5% of finely divided pit-coal tar pitch and approximately 0.12% of a solution of one part of Si(C\textsubscript{2}H\textsubscript{4})\textsubscript{2}Cl\textsubscript{2} in two parts of coal tar oil.

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