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SUSPENSION AND EMULSION AND PROCESS OF MAKING SAME.

No Drawing.

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To all whom it may concern:

Be it known that I, JACQUE C. MORRELL, a citizen of the United States, and residing at New York city, New York, have invented certain new and useful Improvements in Suspensions and Emulsions and Processes of Making Same, of which the following is a specification.

This invention relates to binding or agglomerating materials and their preparation—such binders as are used in agglomerating finely divided particles of solids to produce briquettes, electrodes, artificial charcoal, etc.

Among the objects of the invention is the preparation of an oleaginous or pitchy binder in such form as to allow it to disseminate throughout a mass of finely divided solid so as to wet substantially every particle thereof.

Another object of the invention is the preparation of a highly viscous binder in a form having very low viscosity.

Still another object is the preparation of a binder in such form as to necessitate the use of only a small amount to bring about the agglomeration of a large quantity of the solid particles.

With these and other objects in view, the invention consists in the preparation of a pitch binder in the form of an emulsion or suspension in a medium which will itself wet the particles of the material to be agglomerated and thus aid in the dissemination of the binder throughout a body of finely divided material.

Heretofore, in making agglomerates of finely divided carbonaceous material for the purpose of making artificial charcoal, electrodes, fuel briquettes, etc., a quantity of the carbonaceous material has been mixed with a binder of soft pitch and, on account of the sticky viscous nature of the latter, such mixing required the use of heated mixers and even then very intimate mixture was not obtainable. While very intimate admixture is not necessary in fuel briquetting, it is desirable in making electrodes and artificial charcoal in order that the product may have the best physical characteristics, the ideal condition being that each particle of the carbonaceous material is attached to its neighbors by a film of the binders. It will be readily seen, therefore, that such an ideal condition could hardly be brought about when the binder is a viscous material, even

at fairly high temperatures. If, on the other hand, a liquid pitchy binder is used, it to a large extent distils out in the heating step to which the material is subjected, leaving large pores and increasing the friability of the final product.

Accordingly, the present process and product have been devised to permit the use of a hard pitch binder which when used to cement together the finely divided carbonaceous particles and subsequently heated to a suitable temperature will not distil but will coke and leave finely porous residue along the positions previously occupied by the binder.

In carrying out the present process there is first produced a suspension and emulsifying medium of water containing a protective colloid.

An example of the preparation of such medium is as follows:—

A 2½ to 3% solution of tannic acid is first prepared and to this is slowly added a quantity of 35% ammonium hydroxide equal to about 40% of the weight of tannic acid used. The color of the solution changes gradually from a light amber to a dark orange and this affords a valuable check in making up the solution as the darker solutions do not give as good results as the lighter ones.

When this solution has been prepared, it is used to produce, first a suspension of finely ground hard pitch and, second, an emulsion of an oil such as heavy coal-tar oil, in the following methods, the proportions given being suitable for use in binding substances like carbon black which are not easily wet.

The "hard pitch" utilized in the present process and product is such material as is obtained in the distillation of bituminous coal and crude oils. It, for instance, may be the material described on page 25, volume 3, of Allen's "Commercial organic analysis," 1910 edition. Allen indicates hard pitch as softening at 80° C. and melting at temperatures between this and 122° C. Such material may be used in the present process with good results and hard pitch melting at even higher temperatures has been found suitable.

Hard pitch (for example, one melting at about 130° C.) is crushed and ground to a fineness sufficient to pass a 100 mesh screen or finer. A suitable quantity of this is then used for the suspension. A sufficient quan-

tity of the solution of the emulsifying medium containing the protective colloid is added to the hard pitch and mixed until a smooth, thick paste is produced, adding more of the diluted solution from time to time until the whole contains about 6% by weight of pitch, or to any other desirable consistency. The amount of tannic acid in the emulsified medium should be from 1-5% of the quantity of pitch in the final product.

The oil emulsion is prepared by admixing and, thoroughly agitating the required quantity of oil with some of the emulsifying medium above described until the whole contains about 5% of oil. Suitable oils for this purpose are the heavy coal tar oils and as an example anthracene oil may be mentioned as having given excellent results.

The oil emulsion and pitch-suspension are then mixed with agitation in suitable proportions.

These proportions are such that the amounts of pitch and oil contained, would if added to each other, produce a soft pitch of the required consistency.

The product prepared in the manner described has many valuable characteristics among which may be mentioned the property by virtue of which it allows the soft pitch to be completely adsorbed by such materials as carbon black, fuller's earth, and other adsorptive materials allowing the greater part of the water to be separated by simple filtration. It also may be diluted within very wide limits, so that the pitch content of the product may be widely varied. Further, as has already been indicated, the viscosity of the globules which make up the emulsion can be changed at will by the addition of one or the other of the two prepared constituents, i. e., the emulsion of oil and the suspension of hard pitch.

The product prepared as described is a true emulsion as is shown by the fact that it possesses an electric charge, the sign of which is dependent upon the nature of the protective colloid used. This is also shown by the fact that, although the particles will settle in time, the settling process can easily be reversed by simple agitation even though the emulsion has stood for months. It is also shown by the fact that the suspended matter is precipitable by various electrolytes.

In making briquetted carbon for electrodes, absorbent charcoal, and the like, the consistency of the binder is determined by several factors; if the binder contains too much oil, the cake of carbon material will be too soft for grinding and would have too much volatile matter, thus affecting the strength and porosity of the final product. On the other hand, too great a percentage of the pitch will raise the melting point too

near the coking temperature to allow proper handling of the carbon material after the addition of the binder.

It should be noted that, while in the above example an emulsion-suspension containing only about 6% of the oil and pitch is described, this proportion is used only with such carbons as carbon black and other light, fluffy, carbons which are difficult to wet. With other carbons the proportion of oil and pitch to the suspension medium may be greatly increased, and suspensions containing up to and over 50% oil and pitch have been used with satisfactory results.

It will readily be seen that the present invention is not limited to the preparation of a binder for preparing electrodes and absorbent charcoal and the like, but is of a broader aspect. Binders as herein described may be prepared and used for a number of purposes, such as briquetting fuel etc., road surfacing, dust laying and any purpose for which it is desirable to disseminate a small amount of pitchy binding material throughout a large amount of finely divided solid.

Having now described the invention and given examples of the manner in which the same may be practiced, it should be noted that the invention is not limited to the specific examples and the proportions therein given, as these may be varied without departing from the spirit of the invention, but is to be limited only to the processes and products set out in the accompanying claims.

I claim as my invention:

1. A suspension of non-fluid pitch in a medium containing a protective colloid, said medium constituting the continuous or external phase.

2. A dispersion of coalesced particles of non-fluid pitch and oleaginous material in a medium containing a protective colloid, said medium constituting the continuous or external phase.

3. A dispersion of coalesced particles of hard pitch and oleaginous material in a medium containing a protective colloid, said medium constituting the continuous or external phase.

4. An emulsion of coalesced particles of non-fluid pitch and oleaginous material in water containing a protective colloid, said water constituting the continuous or external phase.

5. A dispersion of coalesced particles of pitch and anthracene oil in a medium containing a protective colloid, said medium constituting the continuous or external phase.

6. In a process of producing emulsions of viscous liquids and semi-solids, adding a suspension of pitch to an emulsion of an oleaginous substance, said substance being

of such nature that it will flux with, disperse, or dissolve partly or wholly the said pitch.

5 7. The process of producing a material for binding or agglomerating finely divided substances which comprises suspending finely divided non-fluid pitch in a suspension medium containing a protective colloid and agitating the resulting composition.

10 8. The process of producing a material for binding or agglomerating finely divided substances which comprises preparing a suspension of finely divided pitch and mixing therewith a substance capable of softening the said pitch.

15 9. The process of producing a material for binding or agglomerating finely divided substances which comprises preparing a suspension of finely divided pitch and mixing therewith an oil.

20 10. The process of producing a material for binding or agglomerating finely divided substances which comprises preparing a suspension of finely divided pitch and mixing therewith an emulsified oil.

11. The process of producing a material for binding or agglomerating finely divided substances which comprises mixing with a suspension of finely divided pitch, an emulsion of oil in a medium the same as the pitch suspension medium. 30

12. The process of producing a material for binding or agglomerating finely divided substances which comprises preparing a suspension of pitch, also preparing an emulsion of oil and mixing the suspension and emulsion in such proportions that the oil and pitch are present in proportions to form soft pitch. 35

13. The process of producing a material for binding or agglomerating finely divided substances which comprises preparing a suspension medium containing a 1-5% protective colloid, suspending in a part of the medium from 5% to about 50% of finely divided pitch and in the remainder emulsifying from 5% to 50% of oil then mixing the suspension and emulsion. 40 45

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