In the production of so-called electrode paste for either the continuous or prebaked type of electrodes, the usual procedure is to crush the dry substance which may consist of anthracite, pitch coke, petrol coke or the like, and after grading the material according to size it is customarily blended to a preferred specification. In this blending it is customary to include both fine material and coarse material in predetermined proportion. The fine material (sometimes referred to as "fines") is usually fine enough to pass through a 100-mesh screen and preferably is fine enough so that a substantial part (say 40% or more) will pass through a 200-mesh screen. The coarse material will all be held by a 200-mesh screen and most of it will be held by a 100-mesh screen. The maximum size of the coarse material is usually such that the material will pass through a 1/8-inch screen though some slightly larger material may be employed. In many instances the coarse material is itself separated into two grades. For example, that which is held back by a 16-mesh screen and that which passes through such a screen. The desired proportions of the different fractions are customarily mixed in a dry state and a binder is added such as tar or pitch and the whole mass is mixed in a usual type of mixing machine.

It is an important factor in making a good paste of this type that the particles of dry material be thoroughly wetted. With the material that is coarse enough to be held back by a 100-mesh screen, this offers little difficulty. However, with the fine material (and particularly the portion which will pass through a 200-mesh screen) there is a tendency for the particles to ball up and a homogeneous mixture is not obtained.

If a poor moistening of the fines is had, an electrode paste of low quality is obtained which will not have the necessary mechanical strength and density. For example, if an electrode containing fines that are not properly wetted is used in the electrolytic production of aluminum, there is a tendency for foaming to take place and the bath will contain noticeable amounts of the fine dust sometimes referred to as soot.

It is recognized that this difficulty in wetting the fines is due to the adsorption of air on the surface of the separate particles. With the larger particles the ratio of surface to mass is such that the adsorption is not important but with very fine particles the layer of air adsorbed on the surface is in such a high ratio relative to the mass of the particles themselves that the wetting action is greatly impeded. Further it has been found that once these fines are formed with an air layer on their surface, the difficulty of removing or eliminating this air layer (even by use of vacuum) is so great as to be substantially impracticable.

According to the present invention, this difficulty is overcome by starting with solid masses or lumps (not aggregated particles) of the dry material of appreciable size, certainly large enough to be held back by a 100-mesh screen and preferably averaging much larger.
In order that the method of carrying out my invention may be thoroughly understood the following illustrative example is given:

Petroleum coke, all of which was retained on a 100-mesh screen and which included aggregates as large as ⅛-inch in diameter and even larger, was mixed with about 5% anthracene oil and ground in a ball mill until it contained between 50% and 70% of material that would pass through a 200-mesh screen. Substantially all of the material would pass through a 100-mesh screen. These fines were then mixed with coarser material (material that would pass through a ⅛-inch screen but would be retained on a 100-mesh screen) in the proportion of about 45% of the fine material with about 55% of the coarse material. 21% of tar pitch having a melting point of about 90° C. was then added and the mass was thoroughly mixed at a temperature high enough to maintain the binder in fluid state. The resulting paste was then cooled and allowed to harden and broken into pieces for use as "paste" in Soederberg electrodes.

The advantages obtained by our process are obvious. Because of the reduced quantity of binder required, a cheaper electrode may be produced. Further, a smaller quantity of binder means that the amount of volatile constituents driven off during baking of the electrode will be considerably lower than has heretofore been the ease. This reduction of volatile constituents is important both because of the effect of tar fumes on the workers where the electrodes are used and also their effect on neighboring vegetation. It has also been found that these effects give greatly improved economy of operation because the improved strength and density of the electrodes will reduce electrode consumption and generally improve the economy of the smelting processes.

What we claim is:
1. In the production of electrode paste the steps of mixing carbonaceous material in lump form selected from the group consisting of anthracite coal, pitch coke, and petroleum coke, the major part of which is retained on a 100-mesh screen with an organic fluid miscible with the binders used in making such electrodes selected from the group consisting of fluid petroleum hydrocarbons, and trichloroethylene, submitting such mixture to a grinding operation so that as the lumps are fractured newly exposed surfaces are immediately wetted with said fluid material and adsorption of air on such faces is kept to a minimum, continuing such grinding until a mass of fines is obtained that will pass through a 100-mesh screen and 40% or more will pass through a 200-mesh screen, mixing such fines with material of the same nature that passes through a ⅛-inch mesh screen but is retained on a 100-mesh screen and combining with such mixture from 10% to 35% of binder selected from the group consisting of tars and pitches.
2. A process as specified in claim 1 in which the organic fluid material mixed with the carbonaceous material is at the temperature of mixing liquid.
3. A method as specified in claim 1 in which the binder has a melting point between 40° C. and 130° C. and is mixed with the carbonaceous material in molten form.
4. In the process of preparing carbonaceous material for use in electrodes selected from the group consisting of anthracite coal, pitch coke or petroleum coke which comprises grinding integral lumps of such carbonaceous material that will not pass through a 100-mesh screen down to a size fine enough to pass through a 100-mesh screen, the improvement which comprises grinding at substantially normal pressure and in the presence of an organic fluid material miscible with the binders used in making such electrode, selected from the group consisting of fluid petroleum hydrocarbons and trichloroethylene, whereby the new surfaces of such carbonaceous material resulting from such grinding are wetted promptly as formed whereby adsorption of air on such surfaces is largely prevented, and maintaining the fluid present to protect the surfaces from adsorption of air until a binder is admixed with the carbonaceous material.

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