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PREPARATION OF PULPS CONTAINING
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ration of OhioNo Drawing. Application June 27, 1932,
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5 Claims. (Cl. 92-21)

In Patent No. 1,771,150 of July 22, 1930, to Stevenson and Buron, there is described the production of pulps containing binders. To a non-solid bitumen or other heat plastic binder substance in a mixing machine is added a quantity of wet fibrous materials. The substances are then mixed to substantial homogeneity; but care is taken not to drive out all of the water, water additions being made from time to time if and when necessary. The object is to bring about an adhesive contact relation between the binder and the fibers, whereby the avidity of the fibers for water is not destroyed. At the end of this preliminary mixing operation, or "premixing" step, more water is usually added, and the revolution of the blades continued, until the mass breaks down into a semi-pulp. The material is then transferred to an ordinary paper mill beater or hollander, and is beaten off to fit the fibers for felting. Suitable water additions may be made to give the stock the proper consistency for forming up on the paper machine; and it will be found that the "bituminous pulp" forms up well on the screen, and makes an excellent final product in which the ratio of binder to fiber may be as high as 80% to 20%.

The bituminous pulp itself is a pulp of feltable fibers in water suspension with which is stably associated a bitumen (or other heat plastic binder) in minute, uncoated particles. By "uncoated" as applied to binder particles is meant the absence of an emulsification agent such, for example, as colloidal clay.

It is an object of my invention to provide a modified procedure for the production of useful pulps containing binders, whereby the making of pulps, particularly with the harder ranges of binder materials, is simplified and expedited. It is an object of my invention to provide a method wherein in initial association stages the maintenance of a critical water content is rendered unnecessary. It is still another object of my invention to provide a method wherein a pulp may be formed containing compositions of binders and other substances, particularly fibrous substances, and which are characterized by useful stability.

These and other objects of my invention which will be set forth hereinafter or will be apparent to one skilled in the art upon reading these specifications, I accomplish by that certain series of process steps of which I shall now describe a preferred embodiment.

Throughout this specification and claims I shall use the term "binder" to embrace thermoplastic binder substances including bitumens such as as-

phalt, tars, pitches, blown asphalts, or natural substances such as Gilsonite, waxes, resins, natural or synthetic, and other like substances.

Briefly, in the practice of my invention I have found that I may take a given quantity of binder substance and of fibrous material, and that I can secure a result comparable in stability at least to the premix pulps described, by first mixing a portion only of the fibrous material with the hard binder, to form a composition in which the fibers may be more or less completely coated and/or saturated with the binder, and that I can subsequently break down this mixture by mixing therewith the remainder of the fibrous material with the addition of water, to the end of producing a pulp which contains a large percentage of beaten fibers suitable for felting upon a paper mill screen (as distinguished from a mere sludge of suspended materials) in which pulp there will be stably associated with a large portion of the fibers a binder substance in particles which may or may not themselves contain entrapped fibrous materials. In a certain sense the pulp which I achieve is a pulp of feltable fibers in water suspension, with a large part of which is associated a composition of binder and fibrous material, with or without other filler, in relatively minute, uncoated particles, the character of the association having a stability similar to the stability of the premix pulp hereinabove referred to.

My invention may be employed with binders of widely varying characteristics and qualities, but it becomes of very great importance in the manufacture of pulps with the harder ranges of binder materials, or under circumstances such as present a problem in the maintenance of a considerable or critical water content. The initial stages of my mix may be made wholly without regard to the maintenance of a critical water content, and even from dry materials where this is desired.

In an exemplary procedure, say, with such a binder as Gilsonite, which has a ball and ring softening point of around 300 to 350° F. and is hard at the boiling point of water, or with an equivalent asphaltic blend or refined product (it will be understood that such binder substances are not a limitation upon my invention), I may separate the fibrous material into a couple of fractions, the one comprising, say $\frac{3}{4}$ or $\frac{5}{8}$ of the fibers, and the other retaining $\frac{1}{4}$ or $\frac{3}{8}$ of the fibers. Where the content of binder material is small, it may be desirable to mix with only $\frac{1}{2}$ or even less of the fibrous material, the remainder being saved out for the breaking down process. In making the mix, the large fraction may be

added air-dry to the molten binder material, and is mixed into the binder by a procedure which is essentially like that ordinarily used in the manufacture of a plastic composition for moulding. A characteristic of this procedure is that I need not maintain throughout a moisture content in my fibrous material, nor need I end up with a mixed mass in which the fibers are but partially coated, and therefore retain an avidity for water. After complete blackness is obtained in this mix, the remaining fraction of the fibrous material is added in a wet condition, where it serves to break up the compound sufficiently to permit its being beaten off in a paper mill beater by the ordinary procedure. In the second mixing operation the water content is maintained by additions of water from time to time and the mixing may proceed at a lower temperature, although the use of heat to keep the mixer contents as hot as possible, consistent with the maintenance of the water content, is desirable. The use of a lid on the mixer is of great help. I believe that the additional wet fibers not only serve to break up the mass, but also come into a contact association with the binder and fiber mixture, comparable to the contact association between binder and fiber produced in the ordinary premix operation, although in lesser degree.

Using this procedure, I have been able to make semi-pulps, beat them off, and form sheets therewith with exceedingly hard binder materials without regard to water content in the initial stages. Even though the action of the beater blades in considerable part may be merely to chop up the pulp into a fine state of subdivision, still a considerable part at least of the pulp consists of beaten and feltable fibers attached to binder and/or binder and fiber masses, and the pulp differs markedly from a mere comminution of a plastic mass in water, on the one hand, or binder substance in small particles unattached to but mixed with fibrous materials. It may be possible that the second mixing and addition of wet fibers causes the asphalt to come away from some part of the fibers in the original mix. The quality of the pulp can be improved by covering the mixer with a lid, maintaining the water content as low as possible and continuing the mixing for as long a time as practical, heat being applied to the mixer contents continuously.

Modifications may be made in my invention without departing from the spirit thereof.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A process of producing a pulp containing a binder substance which comprises mixing the said binder substance and fibrous material to the extent of forming a substantially homogeneous, plastic mass in which the fibres are included within the body of said binder, afterward mixing into said mass an additional quantity of fibrous material and water, whereby said mass is broken down in part at least, and finally beating off the combined mixture to form a pulp.

2. A process of forming a pulp containing a binder substance which comprises mixing a fibrous material with a binder substance to the extent of completely coating the fibers thereof and forming a substantially homogeneous mix in which the fibres are included within the body of said binder, and afterward breaking down said mix in the presence of water and additional fibrous material which is not permitted to become completely coated, and finally beating the broken down mass to form a pulp thereof.

3. A process of making pulp which comprises distributing a quantity of fibrous material throughout the body of a binder substance to form a substantially homogeneous mix characterized by substantially complete coating of the fibers therein, then mixing with said mass a quantity of uncoated, wet fibrous material while adding water to maintain the water content of the mixture, whereby the first mass is at least partially broken down, and portions thereof are caused to adhere to said additional quantity of fibrous material without completely coating the fibers therein, and finally beating off the mixture in a beater to form a pulp.

4. A process of forming a pulp containing a binder substance, which comprises mixing a fibrous material with a binder substance to the extent of completely coating the fibers with said binder material and forming a homogeneous plastic mass in which said fibres are substantially completely enclosed in a substantially continuous body of the binder substance, afterward mixing the homogeneous mass thus formed with additional uncoated fibrous material in the presence of water, so as to break down said homogeneous mass and to cause portions of it to adhere to the uncoated fibrous material, said water being present in amount insufficient to act as a circulating medium whereby said adhering contact is permitted to occur, and thereafter beating the broken down mass to form a pulp thereof, with water sufficient to act as a circulating medium.

5. A pulp comprising uncoated feltable fibres in water suspension in combination with binder particles including coated fibres, said binder particles including coated fibres being in substantial part at least in intimate adhering contact with said uncoated fibres.

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