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MANUFACTURE OF ARTIFICIAL FIBROUS SHEET MATERIAL

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2 Claims. (Cl. 117—65)

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This invention is concerned with the manufacture of an artificial fibrous material of the kind composed of a mass of vegetable fibres impregnated with a binding agent, the treated mass being compressed into sheet or board form and subsequently dried. Prior proposals for the manufacture of a material of this kind have generally employed textile fibres of full staple length, and the object of the present invention is to provide an improved process whereby it is rendered possible to make use of a valuable source of supply of starting material which exists in the great quantity of textile waste which is available in the form of fly, lint, flocks and the like which are collected in textile spinning mills, weaving sheds and other textile manufactories.

The invention consists in making a fleece or web of waste vegetable fibres which are too short to be suitable for spinning, treating the fleece with a binding agent in aqueous dispersion form, compressing the impregnated mass into sheet or board form and simultaneously expressing the excess impregnant, and drying the product. The process of impregnation may be carried out upon a single thickness of fleece, or one or more fleeces may be piled more or less haphazard in a hopper or other receptacle where they are thoroughly saturated by spraying.

The process according to the invention is conveniently performed on a continuous scale with the object of producing the finished material either in the form of a sheet which can be batched on a roller as it is dried and produced, or in the form of comparatively stiff boards which are cut to length from the stock as it is produced, on attaining a convenient length for handling.

The invention is only concerned with the utilization of textile waste material which is too short in the fibre to be suitable for manufacture into yarns by spinning, and for the purpose of this application such material is defined as having at least 90% of its bulk of a fibre-staple less than two millimetres in length, and having practically no fibres exceeding ten millimetres. Although there are many forms of textile waste available which comply with these conditions, and particularly in the form of fly or lint collected in spinning mills and weaving sheds, we have found that the waste cotton flocks which are removed from cloth-raising machines are eminently well adapted for use in the process according to the invention, since by reason of their naturally fluffy and open character they are easily converted into a closely felted fleece, of which the fibres extend irregularly in all diricetions and which is amenable to thorough impregnation by the binding agent.

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When cotton raising flocks are used they can conveniently be prepared for impregnation by passing them through a carding engine, preferably a "breaker" card, which is furnished at the delivery side with an attachment known as a "cross-folding attachment," by which the carded fibres are delivered in a matted or felted fleece or web at right angles to the longitudinal axis of the card. Such a delivery may be arranged to discharge the fleece directly upon a travelling lattice conveyor by which the fleece is fed continuously towards the impregnation stage.

Any appropriate method may be adopted for impregnating the fibrous mass with the binding agent. It is convenient to spray the binding agent, which is in the form of an aqueous dispersion, over the fleece or fibres as it travels beneath the sprays on the travelling conveyor aforesaid, or the mass may be fed into a hopper where it is subjected to spraying and stirring until thoroughly saturated.

After impregnation the mass is passed continuously between pressure rollers, so as to be extruded into a sheet or board of the requisite thickness, which sheet or board is conveyed through a drying chamber, or between heated jackets, so as to evaporate the water content of the impregnant. On emerging from the drying stage the sheet or board is in a fit condition to be handled and it may then be batched in roller form or cut into lengths, as desired.

Suitable binding agents for use in accordance with the invention are india-rubber latex, nitrocellulose, cellulose acetate solution, phenol-formaldehyde or urea-formaldehyde, animal or vegetable proteins, and animal or vegetable oils of the kind which are rendered siccative by addition of such metallic salts as aluminium acetate or aluminium sulphate. Any of these agents may be prepared in the form of an aqueous dispersion and administered to the fibrous mass in the form of a spray or flat jet. The fibrous mass and binding agent may be mixed in any proportions by weight of from 50 to 80 pounds of the former and respectively from 50 to 20 pounds of the dry weight of the binding agent weighed prior to its preparation in the form of an aqueous dispersion, any excess in the proportion of the binding agent being expressed and removed in the course of the process. For example, a mixture of substantially equal proportions of the fibres and binding agent will form a material useful in the manufacture of boot solings. Alternatively, a much less content

of binding agent, say from one-fifth to one-quarter of the total mass will produce a mixture suitable for the manufacture of floor and wall coverings.

The sheet material obtained by treatment of such a fleece in the aforesaid manner is characterised by great strength and high powers of resistance to tearing.

When using an aqueous dispersion of india-rubber latex as the binding agent, the compressing operation should be performed under heat, so as to vulcanize the rubber content of the impregnated material. When other binding agents, such as the alternative materials specified above, are employed, it is necessary to add plasticisers to the dispersion. In either case, any desired pigments may also be added so as to produce a sheet material of the requisite color.

What we claim as our invention and desire to secure by Letters Patent is:

1. A process of manufacture of an artificial fibrous material which consists in carding a mass of waste vegetable textile fibres into a dry web or fleece at least 90% whereof are not greater than 2 mm. in length whilst the remainder do not exceed 10 mm., impregnating the carded mass with a binding agent in aqueous dispersion form, compressing the impregnated mass into sheet or board form and simultaneously expressing the excess impregnant, and drying the product, the proportion of the fibrous mass to the binding agent in the finished product being from 50 to 80 lbs. of the former to from 50 to 20 lbs. of the dry weight of the latter.

2. The process claimed in claim 1, using a carded fleece or web of cotton raising flocks.

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