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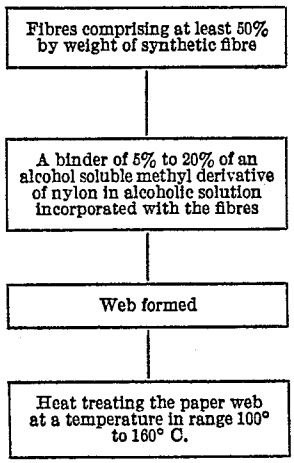
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METHODS OF MAKING WEBS OF FIBROUS MATERIALS

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This invention is for improvements in or relating to methods of making webs of fibrous material and is particularly concerned with the manufacture of filter papers.



In our co-pending application No. 679,778 filed August 22, 1957, we have described a method of making a web of fibrous material having a high flexibility and tear strength and consisting of or containing synthetic fibre, which method comprises incorporating with the fibres either during or after formation of the web a binder consisting of a methyl methoxy derivative of nylon. Thus, the web of fibrous material may be impregnated with a solution of the binder, any excess of the solution removed and the web subsequently dried. Alternatively, the binder may be added to the material from which the web is to be produced and the web subsequently formed and dried.

We have now found that if paper made in accordance with our above-mentioned application and containing a methyl methoxy derivative of nylon is heated to temperatures greater than those normally used for drying then the binder loses its solubility in alcohol and a paper is formed which can be used for the filtration of alcohol or alcohol-containing solutions, a use to which normally bound paper cannot be put.

According to the present invention there is provided a method of making filter paper having a high flexibility and bursting strength and consisting of or containing synthetic fibre, which method comprises incorporating with the fibre either during or after formation of the filter paper a binder consisting of a methyl methoxy derivative of nylon and subsequently heating the paper to a temperature in excess of 100° C. in order to render the binder substantially insoluble in alcohol.

The binder may be added to the material from which the filter paper is to be produced, the paper subsequently formed and thereafter subjected to the heat treatment. Alternatively, the filter paper may be impregnated with a solution of the binder, any excess of the solution removed and then the paper subsequently heated to render the binder insoluble in alcohol.

In a preferred form of the invention the filter paper is formed from a mixture of synthetic fibres with at least

10% by weight of cellulosic material. The synthetic fibres are preferably nylon fibres.

The filter paper may be formed by adding the synthetic fibres e.g. nylon fibres, cut to the desired staple length, to rag or cellulosic finish in a beater the synthetic fibres being dispersed throughout the total mass. The beaten stuff is diluted and formed into a web or sheet on a wire grid by couching in accordance with normal paper-making procedure, the couched sheet being passed to a drying cylinder, and dried in the conventional fashion. The paper web or sheet is then passed through a bath containing the binder and withdrawn therefrom through squeeze rolls, the impregnated sheet being subsequently heated in order to dry it and to render the binder insoluble in alcohol.

Alternatively, a web or sheet of filter paper is produced by adding the binder to the stuff either during beating or prior to the paper-making.

The temperature to which the paper containing the binder is subjected in order to render it substantially insoluble in alcohol is preferably between 120° and 160° C. At the 160° C. the heat treatment is carried out for a period of about half an hour. At lower temperatures the heating time is proportionally longer.

Filter paper made in accordance with the present invention has a higher bursting strength than conventional papers and can be used for pressure filtrations. By suitable adjustment of the paper substance and the content of binder bursting strengths greater than 80 lbs. per square inch can be obtained.

Following is a description by way of example of a method of carrying the present invention into effect:

An 80 g.s.m. paper containing 75% nylon: 25% cellulose bound by 10% methyl methoxy nylon had a bursting strength of 60 lbs. p.s.i. The paper was heated to 160° C. for 60 minutes and it was found that the alcohol soluble material was reduced to 2%. A solution of 5% cellulose nitrate in methyl alcohol was successfully filtered through the insolubilised nylon paper. An attempt to filter the cellulose nitrate solution through a paper which had not been insolubilised resulted in the paper being completely disrupted. The methoxy nylon employed in this example was a substance sold under the trade name "Maranyl."

I claim:

1. A method of making filter paper having high flexibility and bursting strength said paper comprising at least 50% by weight of synthetic fibre, which method comprises impregnating the fibres of the paper with a binder of an alcoholic solution of an alcohol-soluble methyl methoxy derivative of nylon and subsequently subjecting the paper to heat treatment in which the paper is heated to a temperature within the range of 100° to 160° C. in order to render the binder substantially insoluble in alcohol, the binder being present in an amount of between 5 and 20% on the weight of the fibres.

2. A method as claimed in claim 1 wherein the binder is added to the material from which the filter paper is to be produced, the paper subsequently formed and thereafter subjected to the heat treatment.

3. A method as claimed in claim 1 wherein the filter paper is impregnated with a solution of the binder, any excess of the solution removed and then the paper subsequently subjected to the heat treatment.

4. A method as claimed in claim 1 wherein the synthetic fibres are nylon fibres.

5. A method as claimed in claim 1 wherein the paper containing the binder is heated to between 120° and 160° C. in order to render the binder substantialy insoluble in alcohol.

6. A method as claimed in claim 1 wherein the filter paper is formed from a mixture of synthetic fibres con-

taining between 10% and 50% by weight of cellulosic material.

7. A method as claimed in claim 1 wherein the filter paper is formed by adding synthetic fibres to cellulosic furnish in a beater, beating the cellulosic material and synthetic fibres to produce a beaten stuff, diluting the beaten stuff and forming it into a web or sheet on a wire grid by couching, drying the couched sheet and thereafter passing it through a bath containing the binder, the impregnated sheet being subsequently heated in order to dry it and to render the binder insoluble in alcohol.

8. A method as claimed in claim 1 wherein the binder is present in the resulting paper in an amount of approximately 10% by weight on the weight of the fibres.

References Cited in the file of this patent

UNITED STATES PATENTS

2,324,838	Harz	July 20, 1943
2,355,822	Rugeley	Aug. 15, 1944
2,496,665	Hermanson	Feb. 7, 1950
2,533,145	Schorger	Dec. 5, 1950
2,714,097	Watson	July 25, 1955
2,723,971	Cupery	Nov. 15, 1955
2,746,941	Horn	May 22, 1956
2,794,754	Schroeder	June 4, 1957
2,930,106	Wrotnowski	Mar. 29, 1960

FOREIGN PATENTS

708,622	Great Britain	May 5, 1954
715,932	Great Britain	Sept. 22, 1954