

UNITED STATES PATENT OFFICE.

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PROCESS OF TREATING FIBROUS MATERIAL.

No Drawing.

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One object of my invention is to prepare a fibrous material which will be water-resistant and mechanically strong and will have a hard, smooth, lustrous surface.

5 Another object is to provide a means of covering a fibrous material with a transparent, colorless and highly polished coating.

10 A further object of my invention is to make a laminated material which will be water-proof, mechanically strong, hard, compact, and relatively inexpensive to make.

Another object of my invention is to provide a novel means for preparing the above product.

15 The product comprising my invention broadly comprises fibrous material, which has been impregnated with a solution of a cellulose ester and subsequently subjected to heat and pressure.

20 The fibrous sheets may be made of any of the large class of substances which, when passed through a bath of the cellulose ester, will absorb the solution. Paper, textile fabrics, fibre board, and asbestos sheets have proved to be satisfactory.

25 The term "cellulose ester" embraces that class of compounds which are formed by the action of acids on cellulose, and includes the cellulose acetates and cellulose nitrates. Due to the non-inflammable nature of cellulose acetate, I prefer to use this compound. It may be dissolved in any solvent desired, such as alcohol, acetone, acetic acid, chloroform, acetylenetetrachloride.

30 The fibrous material to be impregnated is passed through the bath of the cellulose ester in the solvent, whereupon the solution is absorbed. The solvent is then usually evaporated by passing the sheets over heating coils at a temperature sufficiently high to volatilize the solvent but not high enough to cause the cellulose acetate to fuse.

35 The impregnated fibrous material is then ready to be vulcanized, that is to be subjected to heat and pressure. The single sheets, if they are of the desired thickness, are vulcanized per se, or a laminated product is built up by superimposing one sheet upon another until the requisite thickness is obtained. In either case, the vulcanization is accomplished in the same manner.

The sheets are placed between the heated

platens of a suitable press whereby they are subjected to pressure such as one thousand pounds per square inch at a temperature of one hundred and twenty-five pounds of steam. This heat and pressure are maintained for a time sufficient to cause the cellulose ester to fuse throughout the fibrous mass and to flow completely over the surface forming a continuous coating. If the platens are highly polished, there will result a smooth, uniform and highly polished coating of the acetate on the surface of the fibrous material.

Since the cellulose ester is colorless and transparent, suitable designs may be printed upon the uppermost sheet which designs will be clearly visible through the coating of the cellulose ester. This gives a simple and effective means of imitating the grain of wood.

A very desirable product will be made if a natural or synthetic resin such as bakelite is added to the bath. The process is carried out in exactly the same manner as described above for the phenol or other condensation product is converted to the hard, infusible, insoluble compound at the same time that the cellulose acetate is fused under the heat and pressure. The amount of phenol condensation product that may be added varies and I have found that as high a ratio as fifty parts of phenol condensation product to fifty parts of cellulose acetate is satisfactory.

Modifying agents such as starch, glue, oils, camphor or naphthalene, and filling materials such as zinc oxide, soapstone or carbon black may be added to the bath and thus be incorporated in the laminated product. I have also found that the addition of suitable dyes to the solvent containing the cellulose ester will result in the coloring of the product as desired.

The above described material is available for a wide variety of uses, such as a raw material from which machine elements such as gears, pulleys, or the like may be formed or machined and also as an electrical insulator, especially in the construction of switchboards for radio apparatus, a material for making containers, or other structures which it is desirable shall be unaffected by moisture, oil or other liquids. It is also applicable for the surface veneering of wood or cardboard.

It will be understood that the above described products may be built up, molded,

machined or otherwise formed into any desired shapes, since its nature is such as to lend itself with peculiar facility to these operations.

5 I claim:

1. The process of making laminated material which comprises passing fibrous sheets through a solution of cellulose ester, thereafter evaporating the solvent and drying the sheet and then superimposing the dried sheets one upon the other to obtain the thick-

ness desired, and thereafter heating the same under pressure.

2. The process of making laminated material which comprises passing fibrous sheets through a solution of cellulose acetate, thereafter evaporating the solvent and drying the sheet and then superimposing the dried sheets one upon the other to obtain the thickness desired, and thereafter heating the same under pressure. 15 20

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