Patented Jan. 21, 1941 2,229,028

UNITED STATES PATENT OFFICE

2,229,028

ZEIN SOLUTION

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No Drawing. Application July 14, 1939, Serial No. 284,497

4 Claims. (Cl. 154—40)

This invention relates to zein solutions which may be used, for example, for coating, impregnating or laminating operations; and the primary object of the invention is to provide a composition of matter containing zein in solution which, in comparison with known zein solutions, will have greater penetrability into porous matter, which will give a coating of increased strength, tenacity and resistance to water, and which when used in laminating operations, will make the paper less likely to stick to the pressure plates of the laminating machine.

A further object is to provide a zein solution containing an effective plasticizer, for giving the zein film flexibility, which will consist of a relatively cheap material.

The zein solution of the present invention is composed essentially of zein, a low boiling point zein solvent, such, for example, as 95% ethyl alcohol, and a blown castor oil as a plasticizing substance. Preferably an aromatic hydrocarbon of the benzene series, such as benzol, toluol, or xylol, which is a solvent of blown castor oil, is incorporated into the solution for the purpose of increasing the compatibility of the blown castor oil with the zein solution. Any blown castor oil solvent having a low boiling point and compatible with the other ingredients may be employed.

Where water resistance is required, the compound also contains formaldehyde.

The zein solvent consists, preferably, of ethyl alcohol of 95% concentration. Equivalents are isopropyl alcohol and methyl alcohol. In fact any low boiling point zein solvent compatible with blown castor oil, benzol and formaldehyde may be employed.

Castor oil when blown in the usual manner by passing a current of air through it is oxidized and its density increased with decrease of solubility in alcohol but no decrease in solubility in mineral oils or aromatic hydrocarbons of the benzene type. These characteristics make the blown castor oil, which is a relatively cheap material, suitable as a plasticizer for zein compounds, particularly when used with benzol or its equivalent as a solvent.

The following exemplifies the application of the invention to the production of a zein solution suitable for use in making laminated paper articles. The proportions are by weight.

Example 1

	Parts
Zein	100
95% ethyl alcohol	275 (from 200 to 300 parts)
Benzol	10 (from 10 to 135 parts)
Blown castor oil	10 (from 5 to 15 parts)
Formaldehyde	5 (from 2 to 15 parts)

The following is an example of the use of this compound in laminating operations:

Example 2

The paper sheets are dipped in the solution, made in accordance with Example 1, for 2 seconds, the impregnated sheets dried at 60°–75° C. (149°–167° F.), and the dried sheets superposed and subjected to pressures between 1200 and 2000 pounds per square inch at temperatures between 110°–160° C. (230°–320° F.) for from 2 to 15 minutes.

The presence of the blown castor oil prevents the sticking of the laminated paper to the pressure plates. The blown castor oil and benzol increases the penetration of the zein solution into the paper sheets so that when superposed and subjected to heat and pressure, the sheets lose their identity and the finished article consists of a homogeneous mass, to a large extent, instead of consisting of alternate layers of zein and paper. The result is the increase of strength and increase of water resistance of the product.

I claim:

1. Process of making laminated paper articles which comprises dipping paper sheets in a zein solution containing blown castor oil and drying the sheets and subjecting the sheets, superposed, to heat and pressure.

2. Process of making laminated paper articles which comprises dipping paper sheets in a zein solution containing blown castor oil, and an aromatic hydrocarbon of the benzene series; drying the sheets; and subjecting the sheets, superposed, to heat and pressure.

3. Process of making laminated paper articles which comprises dipping paper sheets in a zein solution containing blown castor oil, an aromatic hydrocarbon of the benzene series and formaldehyde; drying the sheets; and subjecting the sheets, superposed, to heat and pressure.

4. Laminated paper article consisting of paper sheets impregnated with the reaction product of formaldehyde and zein, containing blown castor oil and benzol.

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