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MANUFACTURE OF ARTIFICIAL SILK

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Our present invention relates to the manufacture of artificial structures consisting of regenerated cellulose.

It is an object of the present invention to provide delustered artificial structures.

A further object resides in the provision of artificial silk having a matt luster resembling that of natural silk.

Still further objects of the invention will become apparent from the detailed specification following hereinafter.

This invention is based on the observation that artificial structures, particularly artificial silk, having an especially good matt effect and capable of being advantageously worked up and dyed are obtained from viscose or a solution of cellulose in an ammoniacal copper oxide solution which contains liquid residues of the production of alcohol by catalytic methods, or products of similar composition which have been subjected to a deeply seated change by hydrogenation, preferably catalytic hydrogenation and boil between 100° C. and 350° C. The boiling point of the liquid residues used in the single cases usually will only cover about 40–120°, that is to say there will be used liquids having a boiling point of about 100 to 140° C., 160 to 220° C. and 240 to 300° C. or mixtures of these fractionations. The liquids with a lower boiling point are particularly suited for cellulose solutions with a low degree of ripeness and in the case that the articles have to receive only a superficial matt effect, whereas the liquids with a higher boiling point are particularly suited in the case that a deep matt effect is desired. By hydrogenation practically all aldehydes and ketones contained in the residues are converted into alcohols and at the same time double linkages present are saturated so that the inherent disagreeable odour of the residual oil is fully removed. These liquid residues are added to the viscose solutions in quantities of about 0.5–10 per cent, the best results being obtained with quantities of about 2 per cent. In this manner there may be produced, for example, artificial silk which in respect of lustre comes very close to natural silk.

Suitable substances for addition to the cellulose solution for the purpose of the invention are, for example, the fractions boiling within the above named limits of the hydrogenation products of the high boiling portions obtained in the methanol synthesis; also the products obtainable as described in U. S. Patents Nos. 1,889,251, 1,562,480, 1,791,568 and German Patent 442,840, and products of similar composition. Products of this type comprise mixtures of unsaturated hydrocarbons with branched aliphatic carbon chains, branched chain lactones, branched chain higher alcohols and complicated organic compounds of unknown structure. These several materials may also be fractionated before the hydrogenation and the fractions suitable for the invention may then be hydrogenated and used as a whole or after a subsequent fractionation. It is also possible to separate the chemical individuals existing within the prescribed limits of boiling point from the non-hydrogenized or hydrogenized parent material and to use these, if desired after hydrogenating them, particularly when alcohols having branched chains or secondary alcohols are obtained. The substance to be added may either before or after its hydrogenation be subjected to a refining operation by means of alkali lye or some other agent, for example by distillation with steam. The hydrogenated product may be used in admixture with other substances.

The following examples illustrate the invention:

1. The fraction boiling between 160 and 220° C. of the product condensing during the catalytic reduction of carbon monoxide by means of hydrogen is refined by treatment with alkali lye and then hydrogenized catalytically at 200 atmospheres pressure. The hydrogenation is so conducted that besides the reduction of the unsaturated compounds the ketones and aldehydes present in the crude product are converted into alcohols. The product thus obtained is subjected to distillation in steam to expel about 10 per cent of the first runnings. Viscose before being spun is mixed with about 2 per cent of the product thus prepared, care being taken that the best possible distribution of the added substance in the viscose may be procured. The artificial silk produced has a matt appearance closely similar to that of natural silk and a soft feel.

2. The fraction boiling between 120° C. and 220° C. of the product which condenses in the catalytic reduction of carbon monoxide by means of hydrogen is treated with alkali lye and then hydrogenized catalytically under 200 atmospheres pressure. From the reduction product thus obtained there is separated by fractional distillation the portion that boils between 180° C. and 200° C. Before spinning 2 per cent of this product are added to the viscose. The artificial silk produced has a very beautiful matt appearance similar to that of natural silk and a soft feel.

3. A mixture of residues from the catalytic reduction of carbon monoxide with hydrogen is refined with alkali lye and subjected to catalytic hydrogenation under 200 atmospheres pressure; this product boils above 240° C., for example betwen 240° C. and 300° C. The viscose ready for spinning receives an addition of 2 per cent of this product or this proportion may be emulsified with the crude material used for making the viscose; in either case the finished viscose is spun in the usual manner in a Müller bath. The artificial silk obtained has a beautiful matt lustre similar to that of natural silk. If it is desired to diminish the lustre the proportion of the hydrogenated product may be reduced to more or less below 2 per cent.

In the case that an aqueous copper oxide ammoniac solution of cellulose is used in these foregoing examples the following composition may be given to the solutions:

	Per cent
Cellulose	6
Ammonia	5.5
Copper	2.5

and any of the liquids specified in the foregoing examples: about 3%, the rest being water.

What we claim is:

1. Artificial silk of regenerated cellulose containing a catalytically hydrogenated liquid residue of the production of alcohol by a catalytic process, said residue comprising mixtures of unsaturated hydrocarbons with branched aliphatic carbon chains, branched chain lactones, branched chain higher alcohols and complicated organic compounds of unknown structure, said residue boiling between 100 and 350° C.

2. Artificial fibers of regenerated cellulose containing a catalytically hydrogenated liquid residue of the production of alcohol by a catalytic process, said residue comprising mixtures of unsaturated hydrocarbons with branched aliphatic carbon chains, branched chain lactones, branched chain higher alcohols and complicated organic compounds of unknown structure, said residue boiling between 100 and 350° C.

3. Artificial silk of regenerated cellulose containing about 0.5 to 10 per cent of a catalytically hydrogenated liquid residue of the production of alcohol by a catalytic process, said residue comprising mixtures of unsaturated hydrocarbons with branched aliphatic carbon chains, branched chain lactones, branched chain higher alcohols and complicated organic compounds of unknown structure, said residue boiling between 100 and 350° C.

4. Artificial silk of regenerated cellulose containing about 0.5 to 10 per cent of a catalytically hydrogenated liquid residue of the production of alcohol by a catalytic process, said residue comprising mixtures of unsaturated hydrocarbons with branched aliphatic carbon chains, branched chain lactones, branched chain higher alcohols and complicated organic compounds of unknown structure, said residue boiling between 160 and 220° C.

5. Artificial silk of regenerated cellulose containing about 0.5 to 10 per cent of a catalytically hydrogenated liquid residue of the production of alcohol by a catalytic process, said residue comprising mixtures of unsaturated hydrocarbons with branched aliphatic carbon chains, branched chain lactones, branched chain higher alcohols and complicated organic compounds of unknown structure, said residue boiling between 240 and 300° C.

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