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PRODUCTION OF ASSISTANTS FOR THE TEXTILE AND RELATED INDUSTRIES

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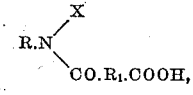
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13 Claims. (Cl. 260—109)

The present invention relates to a process for the production of agents suitable as assistants in the textile and related industries.

In the co-pending application Ser. No. 38,215, filed on August 28, 1935, in the name of Gerhard Balle, there has been described a process for the production of agents suitable as assistants in the textile industry which consists in causing an amine containing at least one free hydrogen atom attached to nitrogen and at least one high molecular aliphatic or cycloaliphatic radicle, to react with a polycarboxylic acid or a functional derivative thereof thus forming a carboxylic acid amide which still contains at least one unaltered carboxylic acid group in the molecule.

We have now found that valuable products suitable in the textile and related industries can also be obtained by causing an amine containing at least one free hydrogen atom attached to nitrogen and at least one aromatic radicle substituted in the nucleus by at least one hydrocarbon radicle to react with a polycarboxylic compound selected from the group of di- and tricarboxylic compounds of the aliphatic and aromatic series while providing that the carboxylic amide formed contains at least one unaltered carboxylic group. Thus reaction products of the following general formula are obtained:



wherein R stands for an aromatic radicle substituted in the nucleus by one or more hydrocarbon radicles, X stands for hydrogen or a hydrocarbon radicle, and R_1 stands for an aromatic, cycloaliphatic or an aliphatic radicle which may be interrupted by oxygen, sulphur or nitrogen atoms.

The condensation products obtained (which may also be referred to as carbon amide acids) are converted, if desired, into their water-soluble salts, for example by neutralizing with sodium hydroxide, potassium hydroxide, ammonia or amines such as dimethyl amine, ethyl amine and the like. Amines suitable for the said process are for example, aromatic amines which are substituted in the nucleus by one or more aliphatic or cycloaliphatic radicles, as for example para-butylaniline, C-dibutylaniline, para-isohexyl-methylaniline, p-dodecyl-orthotoluidine, 4-hexyl-alpha-naphthyl amine, C-benzyl aniline (a mixture of or ortho- and para-benzylaniline), para-cyclohexylethylaniline. The said amines may be caused to react with various polycarboxylic acids, as for example oxalic acid, tartaric acid, citric acid, diglycollic acid, ethylene-bis-glycollic acid, maleic acid, succinic acid, adipic acid, or with aromatic polycarboxylic acids, such as phthalic acid. The said acids may be employed as such, or in the form of their anhydrides, halides or their acid salts. The esters of the said polycarboxylic acids may also be employed with advantage for the instant process; in this case the condensation product which contains an ester group is to be converted into the free carboxylic acid by saponification with caustic soda solution. In the manner described carbon amide acids, for example, diglycollic para-butylanilide acid, diglycollic para-dodecylmethylanilide acid, phthal-isooctyltoluidide acid and maleic dibutylanilide acid. Generally speaking the employment of a corresponding excess of the polycarboxylic acids or their derivatives is preferable.

The condensation of the said amines with the polycarboxylic acids may be carried out by simply heating the two components somewhat in an equimolecular proportion until the reaction is complete. Generally speaking temperatures of between 60° and 250° C., preferably between 80° and 150° C. may be employed. In many cases organic solvents or diluents which do not react with either of the initial substances may be added with advantage. Suitable solvents or diluents are for example benzine, chlorinated low molecular hydrocarbons and the like. If the esters of the polycarboxylic acids to be employed for the condensation with the amines as described above are liquid at normal temperature or have a comparatively low melting point, these esters may be employed in a moderate excess thus serving as solvents or diluents.

The carbon amide acids and their salts obtained according to the present process are distinguished by excellent capillary-active properties, therefore they can be employed in various branches of the textile, leather or paper industry, preferably as washing and cleansing agents.

The following examples will further illustrate the nature of this invention, but the invention is not restricted to these examples; the parts are by weight.

Example 1

275 parts of para-dodecyl-N-methylaniline are heated together with 116 parts of diglycollic acid anhydride to from about 90° to about 110° C. until the reaction product has become clearly soluble in caustic soda solution. The mono-para-dodecyl-N-methylanilide of diglycollic acid

formed is then converted into its sodium salt by adding caustic soda solution. The product is very stable even in hard water; it possesses also a high washing power.

Example 2

205 parts of a mixture consisting essentially of ortho- and para-isooctyl aniline are heated together with 100 parts of maleic acid anhydride at a temperature of between 80° and 90° C. until a sample of the reaction mixture is soluble in an aqueous solution of sodium carbonate. The reaction product is then converted into the sodium salt for example by adding aqueous caustic soda solution. The sodium salt of the carbon amide acid is well soluble in water, its aqueous solutions possessing a high foaming power.

Example 3

219 parts of C-isononylaniline are boiled together with 400 parts of oxalic acid diethyl ester for about 2 hours on the reflux condenser. Then the excess of oxalic acid diethyl ester is distilled off in vacuo and the carbon amide ester thus obtained is saponified by treating it with caustic soda solution at low temperature. The sodium salt of the carbon amide acid possesses excellent wetting and washing properties.

What we claim is:—

1. The process for the production of agents suitable as assistants in the textile and related industries which comprises causing an amine containing at least one free hydrogen atom attached to nitrogen and at least one aromatic radicle substituted in the nucleus by at least one hydrocarbon radicle containing more than one carbon atom to react with a polycarboxylic compound selected from the group consisting of di- and tricarboxylic compounds of the aliphatic and aromatic series while providing that the carboxylic amide formed contains at least one unaltered carboxylic group.

2. The process for the production of agents suitable as assistants in the textile and related industries which comprises causing an amine containing at least one free hydrogen atom attached to nitrogen and at least one aromatic radicle substituted in the nucleus by at least one aliphatic hydrocarbon radicle containing more than one carbon atom to react with a polycarboxylic compound selected from the group consisting of the di- and tricarboxylic compounds of the aliphatic and aromatic series while providing that the carboxylic amide formed contains at least one unaltered carboxylic group.

3. The process for the production of agents suitable as assistants in the textile and related industries which comprises causing an amine containing at least one free hydrogen atom attached to nitrogen and at least one aromatic radicle substituted in the nucleus by at least one cycloaliphatic hydrocarbon radicle to react with a polycarboxylic compound selected from the group consisting of di- and tricarboxylic compounds of the aliphatic and aromatic series while providing that the carboxylic amide formed contains at least one unaltered carboxylic group.

4. The process for the production of agents suitable as assistants in the textile and related industries which comprises causing an amine containing at least one free hydrogen atom attached to nitrogen and at least one aromatic radicle substituted in the nucleus by at least one aliphatic-aromatic hydrocarbon radicle to react with a polycarboxylic compound selected from the group consisting of di- and tricarboxylic compounds of the aliphatic and aromatic series while providing that the carboxylic amide formed contains at least one unaltered carboxylic group.

5. The process for the production of agents suitable as assistants in the textile and related industries which comprises causing an amine containing at least one free hydrogen atom attached to nitrogen and at least one aromatic radicle substituted in the nucleus by at least one hydrocarbon radicle containing more than one carbon atom to react with a polycarboxylic compound selected from the group consisting of di- and tricarboxylic compounds of the aliphatic and aromatic series and containing from 2 to 8 carbon atoms while providing that the carboxylic amide formed contains at least one unaltered carboxylic group.

6. The process for the production of agents suitable as assistants in the textile and related industries which comprises causing an amine containing at least one free hydrogen atom attached to nitrogen and at least one aromatic radicle substituted in the nucleus by at least one hydrocarbon radicle containing more than one carbon atom to react with a dicarboxylic compound selected from the group consisting of aliphatic and aromatic acid compounds and containing from 2 to 8 carbon atoms while providing that the carboxylic amide formed contains at least one unaltered carboxylic group.

7. The process for the production of agents suitable as assistants in the textile and related industries which comprises causing an amine containing at least one free hydrogen atom attached to nitrogen and at least one aromatic radicle substituted in the nucleus by at least one hydrocarbon radicle containing more than one carbon atom to react with an aliphatic acid compound selected from the group consisting of aliphatic di- and tricarboxylic compounds and containing more than 3 carbon atoms, the carbon chain of which is interrupted by at least one atom selected from the group consisting of oxygen, sulphur and nitrogen, while providing that the carboxylic amide formed contains at least one unaltered carboxylic group.

8. Condensation products suitable as assistants in the textile and related industries comprising carboxylic amides derived from polycarboxylic compounds selected from the group consisting of di- and tricarboxylic compounds of the aliphatic and aromatic series, containing on the nitrogen atom at least one aromatic radicle substituted in the nucleus by at least one hydrocarbon radicle with more than one carbon atom and containing at least one unaltered carboxylic group linked with the carboxylic amide group.

9. Condensation products suitable as assistants in the textile and related industries comprising carboxylic amides derived from polycarboxylic compounds selected from the group consisting of di- and tricarboxylic compounds of the aliphatic and aromatic series, containing on the nitrogen atom at least one aromatic radicle substituted in the nucleus by at least one aliphatic hydrocarbon radicle with more than one carbon atom and containing at least one unaltered carboxylic group linked with the carboxylic-amide group.

10. Condensation products suitable as assistants in the textile and related industries comprising carboxylic amides derived from polycarboxylic compounds selected from the group consisting of di- and tricarboxylic compounds of the aliphatic and aromatic series, containing on the nitrogen atom at least one aromatic radicle sub-

stituted in the nucleus by at least one cycloaliphatic hydrocarbon radicle and containing at least one unaltered carboxylic group linked with the carboxylic amide group.

11. Condensation products suitable as assistants in the textile and related industries comprising carboxylic amides derived from polycarboxylic compounds selected from the group consisting of di- and tricarboxylic compounds of the aliphatic and aromatic series, containing on the nitrogen atom at least one aromatic radicle substituted in the nucleus by at least one aromatic hydrocarbon radicle and containing at least one unaltered carboxylic group linked with the carboxylic amide group.

12. Condensation products suitable as assistants in the textile and related industries comprising carboxylic amides derived from polycarboxylic compounds selected from the group consisting of di- and tricarboxylic compounds of the aliphatic and aromatic series, containing on the nitrogen atom at least one aromatic radicle substituted in the nucleus by at least one hydrocarbon radicle with more than one carbon atom and containing at least one unaltered carboxylic group linked with the carboxylic amide group by means of an alkylene radicle.

13. Condensation products suitable as assistants in the textile and related industries comprising carboxylic amides derived from polycarboxylic compounds selected from the group consisting of di- and tricarboxylic compounds of the aliphatic and aromatic series, containing on the nitrogen atom at least one aromatic radicle substituted in the nucleus by at least one hydrocarbon radicle with more than one carbon atom and containing at least one unaltered carboxylic group linked with the carboxylic amide group by means of an alkylene radicle which is interrupted by at least one atom selected from the group consisting of oxygen, sulphur or nitrogen.

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