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UNITED STATES PATENT OFFICE

2,222,532

SHEET MATERIAL

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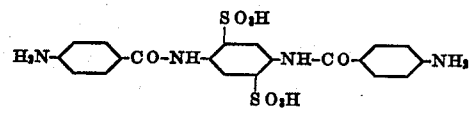
14 Claims. (Cl. 91—68)

Our present invention relates to and one of its objects is an improved protective envelope for goods of any kind capable of being affected by light and air, such as victuals, books, textile fabrics or the like.

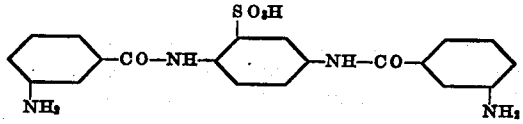
It has already been proposed to render impervious to ultra-violet rays envelopes consisting of sheets of paper, regenerated cellulose, superficially saponified cellulose acetate or the like by impregnating them with aesculin and quinine sulfate. The protective envelopes prepared in this manner, however, have the drawback that the substances incorporated in them are eliminated by the action of moisture. Thus it happens, for instance, that by the moisture of victuals wrapped in envelopes of such kind, part of the incorporated substance is transferred to the victuals.

According to this invention the aforesaid drawback is avoided by incorporating in the envelopes a substance which has not only the required optical properties, but also has a substantive character and therefore has so strong an affinity to the sheet material from which the protective envelopes have been produced that it is no longer removed by moisture. The envelopes may be made from sheets of cellulose hydrate, paper, parchment, cellulose derivatives or the like. As compounds which have the required properties for instance, the following are suitable:

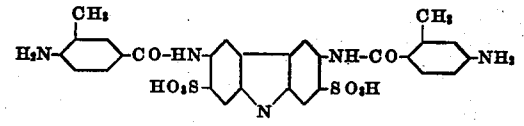
(1) The diaminodibenzoyl compounds of p-phenylenediamine disulfonic acid, corresponding with the formula



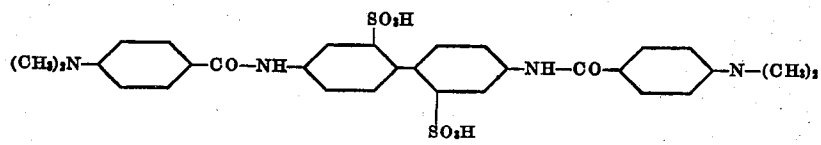
p-phenylenediamine sulfonic acid corresponding with the formula



and 3.6-diaminocarbazole disulfonic acid, corresponding with the formula

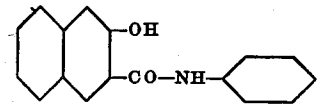


(2) The sodium salt of 4.4'-tetramethyldiaminodibenzoyl-4.4'- diamino - diphenyl -2.2'-disulfonic acid corresponding with the formula

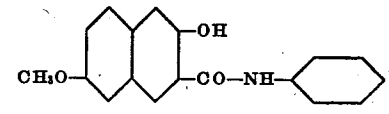


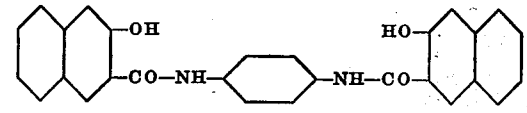
or a substitution product thereof, for instance, the dianisidine disulfonic acid derivatives,

(3) The arylides of 2.3-hydroxynaphthoic acid corresponding with the formula



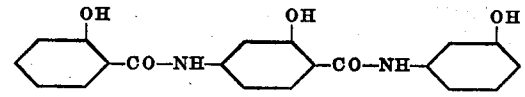
and derivatives, for instance



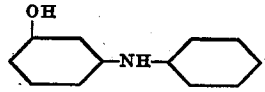


and the arylides of 2.3-hydroxynaphthoic-aminosulfonic acid,

(4) Salicyl -p'-aminosalicoyl-m''-aminophenol corresponding with the formula

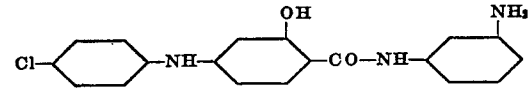


(5) 3 - hydroxydiphenylamine, corresponding with the formula

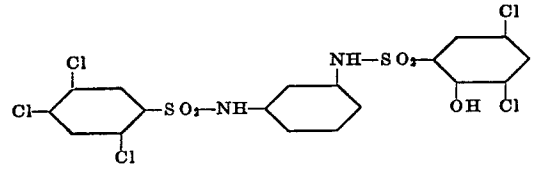


(6) The m-aminoanilide of 3-hydroxy-4'-

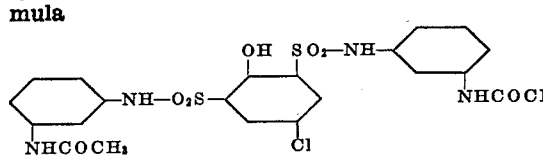
chlorodiphenylamine carboxylic acid, corresponding with the formula



(7) (1.2.5-trichlorobenzene-4-sulfo)-(4'.6'-dichloro-1'-phenol-2'-sulfo)-1''.3'' phenylenediamine corresponding with the formula



(8) 4-chloro-1-phenol-2.6-disulfo-bis-3'-acetylamide-1'-anilide corresponding with the formula

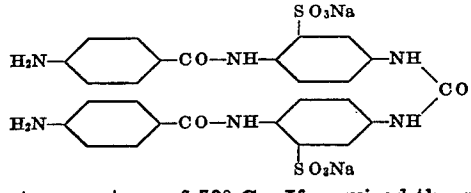


All compounds enumerated are suitable for use with sheets made from cellulose for instance, paper or parchment or for use with sheets from cellulose hydrate or from gelatin. The 2.3-hydroxynaphthoic-amino sulfonic acid is also suitable for use with sheets from cellulose acetate.

If required, the sheets having incorporated in them colored or colorless substances absorbing ultra-violet rays, may also receive an addition of a substance preventing oxidation of the first named substance, for instance, hydroquinone.

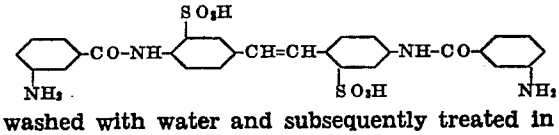
The following examples illustrate the invention:

Example 1.—A sheet of cellulose hydrate is soaked with an aqueous solution of 2 to 5 per cent strength of the sodium salt of the urea of p-aminobenzoyl-p-phenylenediaminosulfonic acid corresponding with the formula:



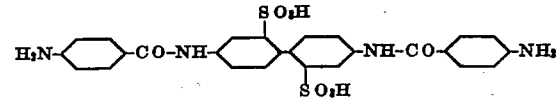
at a temperature of 50° C. If required the solution may contain an addition of 1 to 5 per cent. of hydroquinone. If desired the sheet may be after-treated with glycerine for increasing flexibility.

Example 2.—A sheet of cellulose hydrate is soaked with an aqueous solution of the sodium salt of di-m-aminobenzoyl-diaminostilbenedisulfonic acid, corresponding with the formula



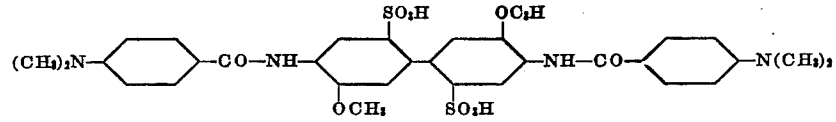
washed with water and subsequently treated in a glycerin bath.

Example 3.—Pergamyne paper is treated with a solution of the sodium salt of 4.4'-di-(p-aminobenzoylamino)-diphenyl-2.2'-disulfonic acid corresponding with the formula



of 0.5 per cent strength for about 5 minutes at room temperature, and is then washed and dried. Instead of the 2.2'-disulfonic acid there may also be used the 3.3'-disulfonic acid, the corresponding carboxyl acids and the compounds in which the hydrogen atoms of the amino groups are exchanged for alkyl.

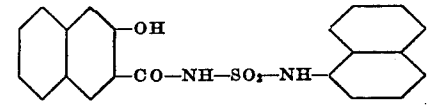
Example 4.—To the paper pulp there is added a solution of the sodium salt of the tetramethyldiaminodibenzoyl compound of dianisidinedisulfonic acid corresponding with the formula



After the compound has been absorbed the mass is made into paper in the usual way.

Example 5.—A sheet of cellulose hydrate is treated with a solution of the sodium salt of 4₁.4₁'-tetramethyldiaminodibenzoyl-4.4'-benzidine-2,2'-disulfonic acid of 0.5 per cent strength for about 3 minutes at 80° C. The material is then washed and dried.

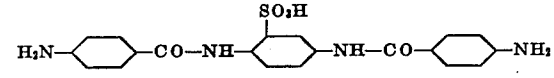
Example 6.—A solution of gelatin of 10 per cent strength is mixed with a solution of caustic alkali of 0.5 per cent strength containing 10 per cent of the weight of the gelatin used of 2.3-hydroxynaphthoic-aminosulfonic acid-α-naphthalide corresponding with the formula



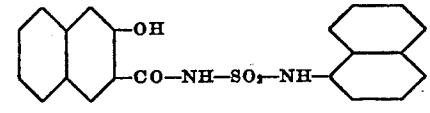
The solution is then caused to solidify and washed with water. The gelatin obtained is mixed with three times its weight of untreated gelatin and made into sheets.

What we claim is:

1. A process of producing a wrapping material which comprises incorporating in a sheet of cellulose hydrate the sodium salt of the urea of p-aminobenzoyl-p-phenylenediamine sulfonic acid corresponding with the formula

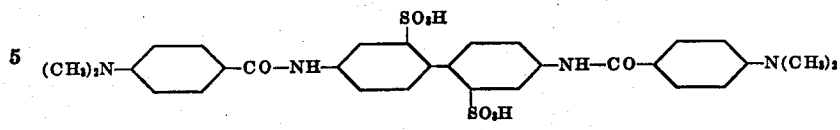


2. A process of producing a wrapping material which comprises incorporating in a sheet of gelatin 2.3-hydroxynaphthoic-aminosulfonic acid-α-naphthalide corresponding with the formula

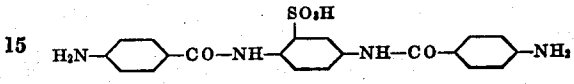


3. A process of producing a wrapping material which comprises incorporating in a sheet of cellulose hydrate the tetramethyldiaminodibenzoyl

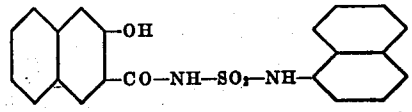
compound of benzidine-2.2'-disulfonic acid corresponding with the formula



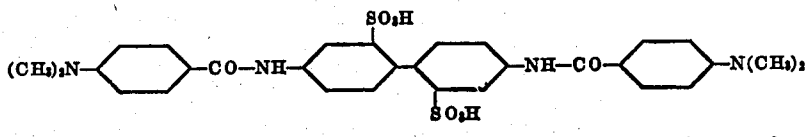
4. A sheet of cellulose hydrate containing the sodium salt of the urea of p-aminobenzoyl-p-phenylenediamine sulfonic acid corresponding with the formula



5. A sheet of gelatin containing 2.3-hydroxynaphthoic - aminosulfonic acid - α - naphthalide corresponding with the formula



6. A sheet of cellulose hydrate containing the tetramethyldiaminodibenzoyl compound of benzidine-2.2'-disulfonic acid corresponding with the formula



7. A process of producing a wrapping material which comprises incorporating in a sheet material permeable to ultra violet rays a compound, substantive to said sheet material, selected from the class consisting of diaminodibenzoyl compounds of p-phenylenediamine disulfonic acid, p-phenylenediamine sulfonic acid and 3.6-diaminocarbazole disulfonic acid, the sodium salt of 4.4'-tetramethyldiamino-dibenzoyl-4.4'-diaminodiphenyl-2.2' disulfonic acid and substitution products thereof, the sodium salt of di-m-amino-benzoyl-diaminostilbene disulfonic acid, the arylides of 2.3-hydroxynaphthoic acid, the arylides of 2.3 - hydroxynaphthoic - aminosulfonic acid, salicyl-p'-aminosalicoyl-m''-aminophenol, 3-hydroxy-diphenylamine, m-aminoanilide of 3-hydroxy-4'-chlorodiphenylamine carboxylic acid, (1.2.5 - trichlorobenzene-4-sulfo)-(4'.6'-dichloro-1'-phenol-2'-sulfo)-1''.3''-phenylenediamine, and 4-chloro-1-phenol-2.6-disulfo-bis-3'-acetylamide-1'-anilide in sufficient amount to effectively absorb ultra-violet rays.

8. A process of producing a wrapping material which comprises incorporating in a sheet material permeable to ultra violet rays a substance preventing oxidation and a compound, substantive to said sheet material, selected from the class consisting of diaminodibenzoyl compounds of p-phenylenediamine disulfonic acid, p-phenylenediamine sulfonic acid and 3.6-diaminocarbazole disulfonic acid, the sodium salt of 4.4'-tetramethyldiamino - dibenzoyl-4.4'- diamino-diphenyl-2.2' disulfonic acid and substitution products thereof, the sodium salt of di-m-amino-benzoyl-diaminostilbene disulfonic acid, the arylides of 2.3-hydroxynaphthoic acid, the arylides of 2.3-hydroxynaphthoic-aminosulfonic acid, salicyl - p'- aminosalicoyl - m''- aminophenol, 3-hydroxy-diphenylamine, m-aminoanilide of 3-hydroxy - 4' - chloro - diphenylamine carboxylic acid, (1.2.5 - trichlorobenzene-4-sulfo)-(4'.6'-dichloro-1'-phenol-2'-sulfo)-1''.3''- phenylenediamine, and 4-chloro-1-phenol-2.6-disulfo-bis-3'-acetylamide-1'-anilide in sufficient amount to effectively absorb ultra-violet rays.

9. A sheet material permeable to ultra violet rays containing a compound, substantive to said sheet material, selected from the class consisting of diaminodibenzoyl compounds of p-phenylenediamine disulfonic acid, p-phenylenediamine sulfonic acid and 3.6-diaminocarbazole disulfonic acid, the sodium salt of 4.4'-tetramethyldiamino-dibenzoyl-4.4'-diamino - diphenyl-2.2' disulfonic acid and substitution products thereof, the sodium salt of di-m-amino-benzoyl-diaminostilbene disulfonic acid, the arylides of 2.3-hydroxynaphthoic acid, the arylides of 2.3-hydroxynaphthoic-aminosulfonic acid, salicyl-p'-aminosalicoyl-m''-aminophenol, 3-hydroxy - diphenylamine, m-aminoanilide of 3-hydroxy-4'-chlorodiphenylamine carboxylic acid, (1.2.5-trichlorobenzene - 4 - sulfo)-(4'.6'-dichloro-1'-phenol-2'-sulfo)-1''.3''-phenylenediamine, and 4-chloro-1-phenol - 2.6-disulfo-bis-3'-acetylamide-1'-anilide in sufficient amount to effectively absorb ultra-violet rays.

10. A sheet material permeable to ultra violet rays containing a substance preventing oxidation and a compound, substantive to said sheet material, selected from the class consisting of diaminodibenzoyl compounds of p-phenylenediamine disulfonic acid, p-phenylenediamine sulfonic acid and 3.6-diaminocarbazole disulfonic acid, the sodium salt of 4.4'-tetramethyldiamino-dibenzoyl - 4.4'- diamino-diphenyl-2.2' disulfonic acid and substitution products thereof, the sodium salt of di-m-amino-benzoyl-diaminostilbene disulfonic acid, the arylides of 2.3-hydroxynaphthoic acid, the arylides of 2.3-hydroxynaphthoic-aminosulfonic acid, salicyl-p'-aminosalicoyl-m''-aminophenol, 3-hydroxy-diphenylamine, m-aminoanilide of 3-hydroxy-4'-chlorodiphenylamine carboxylic acid, (1.2.5-trichlorobenzene - 4 - sulfo)-(4'.6'-dichloro-1'-phenol-2'-sulfo)-1''.3''-phenylenediamine, and 4-chloro-1-phenol-2.6-disulfo - bis-3'-acetylamide-1'-anilide in sufficient amount to effectively absorb ultra-violet rays.

11. A process as defined in claim 7 wherein the sheet material is a cellulosic material.

12. A process as defined in claim 8 wherein the sheet material is a cellulosic material.

13. A product as defined in claim 9 wherein the sheet material is a cellulosic material.

14. A product as defined in claim 10 wherein the sheet material is a cellulosic material.

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BRUNO WENDT.