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LIGHT PROTECTIVE WRAPPER

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This invention relates to light protective wrappers and the process of making the same and will be fully understood from the following description.

I have discovered that wrappers of paper, cloth, transparent films of cellulose or hydroxycellulose (made by precipitation from viscose, cuprammonium or other cellulose solutions), gelatine, acetylcellulose, nitrocellulose, pyroxylin or other thin flexible material, such as are used to wrap commodities which may be injuriously affected by sunlight or other actinic light, may be rendered wholly or partially impervious to such light by means of substantially colorless substances having the property of absorbing light waves of short wave length.

The following substances may, for example, be used in the preparation of light protective wrappers according to the present invention: quinine and its salts, aesculin, methyl esters of naphthalene carboxylic acids, salts of naphthol sulfonic acids, phthalic acid salts, and in general carbocyclic compounds containing conjugated nuclei and their derivatives.

Such substances may be incorporated with the paper pulp or with the wet sheet formed in the paper making machine either in the form of solution or in some other form of finely divided state, such as, for example, in suspension or in colloidal or emulsified form. Another method of incorporation is to pass dry paper sheet through a solution of light protective substance and to evaporate the solvent therefrom. With pyroxylin the best method is to add a solution of the light protective substance to the solvent used in the manufacture of the pyroxylin material. Such or similar methods may be used with other thin flexible materials to incorporate the light protective ingredient. Laminated sheets of two or more layers of the same or different materials, one or more layers containing the protective substance, may also be used.

The amount of the ingredient added depends on the substance and also on the degree of light protection desired and correspondingly may be varied within large limits.

The following examples will serve to illustrate my process and the method of carrying it out.

Example 1

Sheets of paper, preferably the translucent paper known in the trade as "glassine", are coated on one or both sides with a lacquer composed approximately as follows:

	Per cent
Pyroxylin.....	3
Amyl acetate or other medium boiling solvent.....	5-25 10
Aesculin.....	0.5-5
Monoethyl ether of ethylene glycol or other blending agent.....	3-10
Ethyl acetate, acetone or other low boiling solvent.....	10-30 15
Castor oil or other plasticizer.....	2- 5
Benzol, toluol, naphtha or other diluent.....	30-70

For aesculin in the above example may be substituted quinine alkaloid, quinine ricinoleate, linoleate or other quinine salt compatible with the lacquer film, phenanthrene, anthracene, or other substances of the types specified above.

Example 2

In the manufacture of thin sheets of cellulose or hydroxycellulose by regeneration (coagulation) from solutions of viscose, some of the light-protective materials specified above may be incorporated with the viscose solution before coagulation. Among such substances may be mentioned the sodium salts of carboxylic or sulfonic acids derived from naphthalene, anthracene, phenanthrene, fluorene and other conjugated hydrocarbons.

The transparent sheets of regenerated cellulose or hydroxycellulose, after washing and drying, may also be coated with lacquers as described in Example 1.

Example 3

Paper or "cellophane" is coated as described in Example 1, using a cellulose acetate lacquer instead of a pyroxylin lacquer.

Example 4

To a sizing bath of glue is added a water-soluble compound of the type mentioned above, as, for instance, potassium acid phthalate, sodium naphthol sulfonate, etc., in amounts varying from

1% to 20%. The sizing solution is then applied to paper or cloth.

Example 5

5 Transparent films, wrappers, caps, capsules, etc., made of gelatine, gelatine-glycerine, formaldehyde-gelatine or chromated gelatine have water-soluble protective substances such as quinine bisulfate, sodium naphthalene sulfonates or
10 other salts of sulfonic or carboxylic acids of conjugated hydrocarbons, added to the gelatine solution in amounts of 1% to 30% before drying coagulating or exposing to light.

Example 6

15 To paper pulp in the beater is added a light-protective substance insoluble in water, in finely divided form, such as a hydrocarbon of the phenanthrene, anthracene or fluorene series,
20 quinine resinate, phthalic anhydride, esters of naphthalene carboxylic acids, or the like, in amounts varying from two to thirty pounds per 1,000 lbs., of paper stock. The greater part of such substance remains in the paper when made
25 and confers upon it light-protective properties.

Example 7

To paper pulp in the beater is added a solution capable of furnishing a water-insoluble light-protective substance of the classes mentioned above, when such solution is decomposed by subsequent addition of another reagent such as acid or alkali, and the protective substance is there-
30 upon precipitated in intimate contact with the paper fiber, remaining in the finished paper. For example, to 1,000 lbs. of paper stock in the pulp state in the beater is added 10 lbs. of quinine hydrochloride dissolved in water. To the mixture is then added an amount of sodium
35 resinate, stearate, etc., equivalent to the quinine salt or in slight excess, thereby precipitating quinine resinate, stearate, etc., in the pulp. For sodium resinate or stearate may be substituted any alkali salt of an acid of which the quinine
40 salt is insoluble in water.

Similarly, water-insoluble protective substances

of acid nature, such as naphthalene carboxylic acids, may be precipitated in the pulp by adding their alkali salts to the pulp and then acidifying it with hydrochloric or other acid. In this case, I find it advantageous to combine the sodium
5 salts of naphthalene carboxylic acids (or carboxylic acids of other conjugated hydrocarbons) with sodium resinate. Subsequent acidification then precipitates the carboxylic acids mixed with rosin acids, which aid in their fixation in the
10 paper fiber. For example, 15 lbs. of sodium naphthalene beta-carboxylate and 20 lbs. of sodium resinate are dissolved in water containing 1,000 lbs. of paper stock in the beater. After thorough mixing, 2 gallons, or a suitable slight
15 excess, of hydrochloric acid is gradually added. In either case, when the pulp passes to the paper machine, it retains the light-protective substance intimately mixed with the fiber, and remaining
20 in the finished paper.

Having thus described my invention and the method of carrying it out what I claim is:

1. A thin, flexible transparent wrapper of regenerated cellulose, for articles tending to deteriorate if subjected to actinic light, said wrapper comprising a colorless substance adapted to prevent the passage of objectionable amounts of such light, in which the colorless substance is a coating having the following approximate composition:

	Per cent
Pyroxylin.....	3
Amyl acetate or other medium boiling solvent.....	5-25
Colorless absorber of actinic light.....	0.5- 5
Monoethyl ether of ethylene glycol or other blending agent.....	3-10
Ethyl acetate, acetone or other low boiling solvent.....	10-30
Castor oil or other plasticizer.....	2- 5
Benzol, toluol, naphtha or other diluent...	30-70

2. A wrapper according to claim 1 in which the colorless absorber of actinic light is aesculin.

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