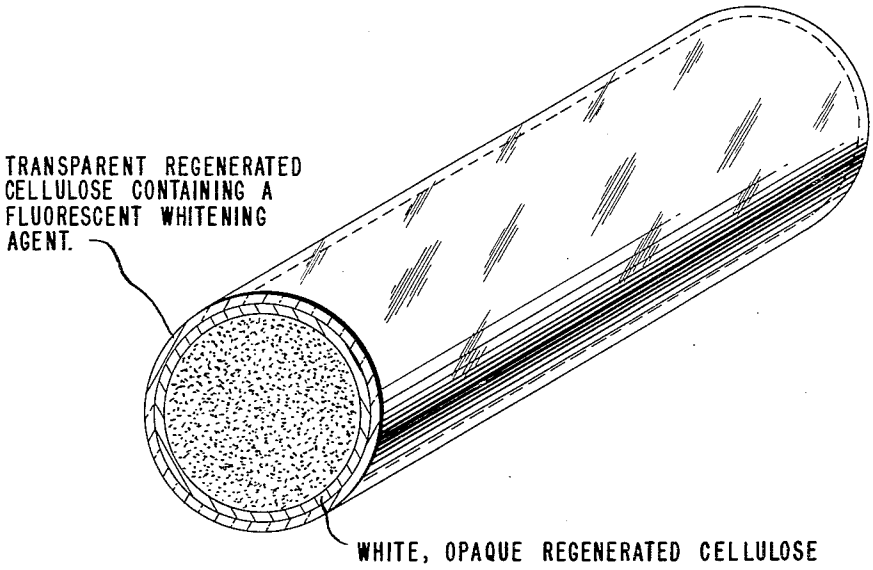
June 19, 1962 I. P. BATT 3,039,905

CELLULOSIC BAND STRUCTURE

Filed March 1, 1960



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CELLULOSIC BAND STRUCTURE

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3 Claims. (Cl. 154—46)

This invention relates to cellulosic bands and more particularly to white, opaque, regenerated cellulose secondary closure bands.

Gel regenerated cellulose bands which shrink upon drying are well known as secondary closures for bottles, jars, etc. Upon drying, these bands shrink to tightly fit over and seal the primary closure to the container. These bands may be plain and transparent, they may be colored and transparent, they may be opaque and of any desired color, window type bands, etc.

The usual white opaque band made as described above is slightly off-white in color and because of its creamy appearance is objectionable to some customers who use a snow-white paper label on their containers. This creamy appearance is further emphasized when a transparent overlay (cf. Czapek, United States Patent 1,918,383) is used to give a high lustre band.

An object of this invention, therefore, is to provide opaque, regenerated cellulose secondary closure bands of improved brightness. A more specific object is to produce opaque, white, regenerated cellulose secondary closure bands of improved whiteness.

The objects are realized by the present invention which, briefly stated, comprises a secondary closure band of regenerated cellulose film said film consisting essentially of a bottom (inner) layer of regenerated cellulose having distributed therethrough a white pigment in an amount sufficient to render said layer substantially opaque and a substantially integral top (outer) layer of transparent regenerated cellulose containing from 0.15% to 3.0% by weight based on the weight of cellulose, of a fluorescent whitening agent.

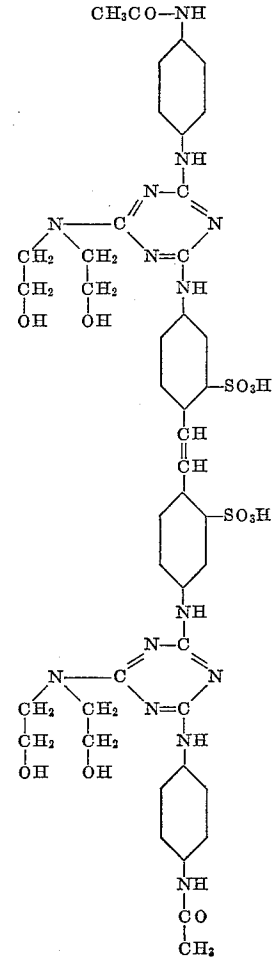
The present invention is predicated upon the unexpected discovery that off-white coloration of white opaque regenerated cellulose secondary closure bands can be overcome, and a band of excellent whiteness produced, by providing the usual white opaque band with an overlay of regenerated cellulose containing a conventional fluorescent whitening agent. This result is quie unexpected because the use of the fluorescent whitening agent directly in the viscose mix from which the opaque band is produced does not give satisfactory results.

The novel structure of this invention is illustrated in the accompanying drawing wherein the single FIGURE is a perspective, cross-sectional view of regenerated cellulose tubing embodying the opaque bottom or inner layer and an integral transparent top or outer layer containing a fluorescent whitening agent.

The unitary band structure of this invention can be produced from separate viscose mixes containing white pigment and fluorescent whitening agent, respectively, by any of the conventional dipping, extruding, and like procedures heretofore employed for producing opaque, regenerated cellulose secondary closure bands having an overlay of transparent regenerated cellulose. A preferred embodiment for the continuous production of bands comprises extruding a transparent viscose containing from 7–10%, by weight, and preferably 8%±0.05%, by weight, of cellulose, based on the total weight of the viscose composition, from 6–8.5%, and preferably 7.0%±0.5% of sodium hydroxide, and, as the fluorescent whitening agent, from 0.15% to 3.0%, and preferably from 0.25% to 2.0%, by weight, based on the weight of cellulose, of 4:4' - (bis - [2 - p - acetylamino-phenylamino - 4 - diethanolamine - 1:3:5 - triazinyl-

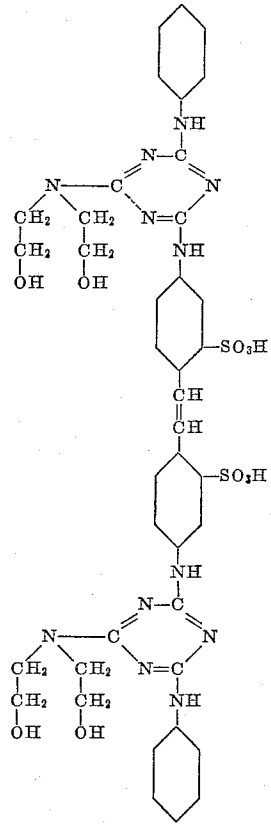
(6)]) diamino-stilbene-2:2' - disulfonic acid, over an opaque viscose containing cellulose and alkali in the ranges above specified, and about 20%, by weight, of titanium dioxide, based on the weight of cellulose, through a concentric die (such as disclosed in Vautier et al. United States Patent 2,141,776), and into a coagulating regenerating bath to form integral regenerated cellulose tubing, comprised of an opaque layer and a transparent layer each about 0.006" thick, which, after the usual desulfuring, washing, and softening steps is cut into short lengths to form gel bands. The resultant bands when applied to containers as secondary closures, and dried, exhibit, in addition to high lustre, an excellent degree of whiteness comparable to snow-white paper.

For the purposes of this invention any of the fluorescent whitening agents customarily employed to produce optical bleaches on textile fabrics, papers, soaps, etc., may be used. In general these agents are the fluorescing aminostilbene derivatives as described, for example, in Alien Property Custodian patent application Serial No. 381,856, published May 11, 1943. Preferred agents of the class of fluorescing aminostilbene derivatives are: 4:4' - (bis-[2 - p - acetylamine - phenylamine - 4 - diethanolamino - 1:3:5 - triazinyl - (6)]) diamino-stilbene-2:2'-disulfonic acid of the formula:



and, 4:4' - (bis - [2 - phenylamino - 4 - diethanolamino-

1:3:5 - triazinyl - (6)]) diamino-stilbene - 2:2' - disulfonic acid of the formula:



The amount of fluorescent whitening agent used in the transparent viscose may vary from 0.15% to 3.0%, based on the weight of the cellulose in the viscose, depending on the results desired. Below 0.15% the whitening agent has a negligible effect on the whiteness. Over 3.0% there is practically no increase in whiteness. The preferred range is 0.25% to 2.0%.

This invention makes it possible to produce a band which, when dry, is a high-lustre, transparent overlay band of brilliant whiteness. The brilliant white background, by way of contrast, when printed, such as described in Fletcher, United States Patent 1,997,769, greatly increases the attractiveness of the final printing colors, especially the reds and greens. Pastel colored bands with increased brightness may also be obtained.

I claim:

1. A secondary closure band of regenerated cellulose film, said film consisting essentially of a bottom layer of white, opaque, regenerated cellulose film, and an integral top layer of transparent regenerated cellulose film containing from 0.15% to 3.0% by weight, based on the weight of the cellulose in said top layer, of a fluorescent whitening agent.

2. A secondary closure band of regenerated cellulose film said film consisting essentially of a bottom layer of regenerated cellulose film having distributed therethrough sufficient titanium dioxide pigment to render said film substantially opaque and an integral top layer of transparent regenerated cellulose film containing from 0.15% to 3.0% by weight, based on the weight of the cellulose in said top layer, of a fluorescent whitening agent.

3. A secondary closure band of regenerated cellulose film, said film consisting essentially of a bottom layer of regenerated cellulose film having distributed therethrough about 20% by weight titanium dioxide pigment, based on the weight of cellulose in said bottom layer, to render said film substantially opaque and an integral top layer of transparent regenerated cellulose film containing from 0.25% to 2.0% by weight, based on the weight of the cellulose in said top layer, of 4:4'-(bis-[2-p-acetylaminophenylamino-4-diethanolamine-1:3:5-triazinyl-(6)]) diamino-stilbene-2:2'-disulfonic acid.

References Cited in the file of this patent

UNITED STATES PATENTS

1,918,383	Czapek et al.	July 18, 1933
2,733,165	Williams et al.	Jan. 31, 1956

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UNITED STATES PATENT OFFICE

CERTIFICATION OF CORRECTION

Patent No. 3,039,905 June 19, 1962

Irving Paul Batt

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

In the grant, lines 1 to 3, for "Irving Paul Batt, of Buffalo, New York," read -- Irving Paul Batt, of Buffalo, New York, assignor to E. I. du Pont de Nemours and Company, of Wilmington, Delaware, a corporation of Delaware, --; line 12, for "Irving Paul Batt, his heirs" read -- E. I. du Pont de Nemours and Company, its successors --; and in the heading to the printed specification, line 3, for "Irving Paul Batt, 225 Sterling Ave., Buffalo 16, N. Y." read -- Irving Paul Batt, Buffalo, N. Y., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del., a corporation of Delaware --.

Signed and sealed this 6th day of November 1962.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents