United States Patent [19]

Hunter

[11] **3,904,420**

[45] **Sept. 9, 1975**

[54] **INFORMATION RECEIVING ELEMENT CONTAINING A YELLOW DYE AND AN OPTICAL BRIGHTENER**

[75] Inventor: **C. Shelburn Hunter**, Rochester, N.Y.

[73] Assignee: **Eastman Kodak Company**, Rochester, N.Y.

[22] Filed: **Sept. 10, 1973**

[21] Appl. No.: **395,792**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 285,398, Aug. 31, 1972, abandoned.

[52] **U.S. Cl.** ..... **96/82;** 96/44; 96/45; 96/87 R; 96/75; 96/84 R; 96/84 UV; 96/1 R; 117/33.5; 117/35.6; 283/6.17; 283/60

[51] **Int. Cl.**[2] ... **G03C 1/92;** G03C 1/94; G03C 1/52

[58] **Field of Search** ..... 96/84 R, 84 UV, 8 N, 87 R, 96/44, 45, 75; 117/33.3, 35.6; 283/6, 17, 60

[56] **References Cited**

UNITED STATES PATENTS

2,304,838	12/1942	Marx	96/45
2,373,489	4/1945	Marx	96/45
3,322,680	5/1967	Hedberg et al.	117/33.5 T
3,406,070	10/1968	Detiker et al.	96/82
3,460,961	8/1969	Young et al.	96/84 UV
3,499,762	3/1970	Cressman et al.	96/82
3,503,779	3/1970	Young et al.	96/84 UV
3,506,470	4/1970	Young et al.	96/84 UV
3,525,618	8/1970	Keller et al.	96/75
3,622,582	11/1971	Schefczik	8/55
3,626,008	12/1971	Biland et al.	96/84 UV
3,630,738	12/1971	Dear et al.	96/84 UV
3,666,591	5/1972	Reed	96/75
3,679,415	7/1972	McNally	96/49
3,694,211	9/1972	Sato et al.	96/84 UV
3,705,807	12/1972	Busatto	96/84 R

Primary Examiner—Roland E. Martin, Jr.
Assistant Examiner—J. P. Brammer
Attorney, Agent, or Firm—E. W. Milan

[57] **ABSTRACT**

An element comprising a support that transmits visible radiation, a radiation sensitive layer, and containing both an optical brightener and a yellow dye which, together, absorb radiation in the range from about 300 to about 460 nm. The element is useful for providing a microfilm from which an image cannot be duplicated by the diazo process.

26 Claims, No Drawings

INFORMATION RECEIVING ELEMENT CONTAINING A YELLOW DYE AND AN OPTICAL BRIGHTENER

This application is a continuation-in-part of U.S. Pat. application Ser. No. 285,398, filed Aug. 31, 1972, now abandoned.

FIELD OF THE INVENTION

This invention relates generally to information receiving elements and more particularly to a photographic film element suitable for receiving microimages, such as microfilm.

BACKGROUND OF THE INVENTION

In recent years, microfilm has been used as a medium for publishing books, reports, catalogs, and other useful information having a market value to interested readers. Microfilm is ideally suited to the publication field because it is a form of information receiving element by means of which a large amount of information can be condensed within a small storage area. One of the practical difficulties that a producer or distributor of microfilms of copyrighted material faces is the possibility of copying, or duplication of the material, by persons without permission of the copyright owner. Such unauthorized duplication often is carried out by means of an inexpensive copying method, i.e., by the diazo process. The possibility that such copying will occur often results in reluctance on the part of copyright owners to make disclosures to the public. As a result of the subject matter of this invention, these copyright owners are now provided with means by which they will be better able to control dissemination of their copyrighted material and should be more inclined to copyright more information for divulgation to the general public. Accordingly, it is an object of the present invention to provide microfilm form of information receiving element from which an image cannot be duplicated readily by the diazo process.

Customarily, microimages are reproduced by the diazo process by the use of radiation from a mercury lamp or a thorium doped mercury lamp to project a microimage from a microfilm onto diazo film or paper. The radiation reaching the film or paper consists primarily of radiation of wavelengths 313.15, 366.3, 404.6, 420, and 435.8 nm (nanometers). Diazo film and paper normally are sensitive to radiation in a wavelength range from 300 to 460 nm.

It is an object of this invention to provide an information receiving element which is useful for recording thereon a microimage, and thereby make possible storage of information in microsize form, and which also renders substantially impossible duplication of the recorded microimage from the element onto diazo paper or film. This object is accomplished by incorporation in the element of materials which together absorb radiation to which the diazo system is sensitive. Preferably, the information receiving element is a photographic film. The invention will be exemplified herein by means of such a film. As used generally, the term "photographic film" includes an element having in combination a radiation sensitive layer, a suppport material in the form of a film, and various other layers which comprise a photographic element.

The element of the present invention comprises a support and one or more layers carried by the support. Generally, one of the layers comprises a radiation sensitive composition suitable for recording microimages therein. The element contains, in addition, an optical brightener and yellow dye incorporated in the support and/or in at least one of the layers coated on the support. Broadly, the element of this invention is an element comprising a support that transmits visible radiation and a radiation sensitive layer, said element being characterized in that it contains both an optical brightener and a yellow dye which, together, absorb radiation in the range of about 300 to about 460 nm. Particularly, the element of the invention is an element adapted to substantially impede duplication of the image therefrom by the use of actinic radiation in the region between 300 nm and 460 nm, said element comprising a support having incorporated therein an optical brightener and a yellow dye which together absorb actinic radiation in the range of about 300 to about 460 nm, and an image-bearing layer carried by said support.

In practicing the invention, the dye and brightener are incorporated preferably in a layer or layers other than a radiation sensitive layer, since the dye and brightener can adversely affect sensitometric properties of the radiation sensitive composition. Within the context of the invention it is the intention that the combination of the yellow dye and optical brightener does not prevent the exposure of the radiation sensitive layer, i.e., the radiation sensitivity of the layer is not restricted to that part of the specturm in which said combination of dye and brightener absorbs light radiation.

From U.S. Pat. Nos. 3,322,680 and 3,260,715, as well as from Japanese Patent 11242/68, it is known to incorporate fluorescent organic compounds as whiteners and brightening agents into a variety of synthetic polymers. However, the incorporation is carried out for the sole purpose of improving the whiteness and brightness of industrial products and fabrics using such synthetic resins. This prior art is not concerned with the problem solved by the present invention, namely, effective suppression of transmission of radiation in the region between 300 and 460 nm. The present invention solves this problem by the combined use of an otpical brightener and a yellow dye in the support and/or in at least one of the layers coated on the support of an element, as discussed above.

In this combined use, the optical brightener has the function of suppressing transmission of radiation by absorbing between 300 and 400 nm in wavelength. The yellow dye has as one of its functions a similar function, namely, to absorb radiation in the region between 400 and 460 nm and to suppress its transmission. In addition, the yellow dye has the further function of absorbing the fluorescent radiation accompanying light absorption by the optical brightener. A preferred range of absorption of the combination of yellow dye and optical brightener lies between 300 and about 435 nm. The combined effect of optical brightener and yellow dye in the element, or photographic film, prevents the copying of images contained in an information receiving element made from photographic film, such as a microfiche, by means of the diazo copying method, or by any other copying method using as its principal light source radiation between 300 and 460 nm. (e.g. a mercury lamp).

The present invention is intended especially for use in film from which microimages are projectable or readable by transmission of light radiation. The expression "projectable or readable" is used herein to refer

to any film for producing images when light radiation is directed therethrough and is intended to include elements with image patterns consisting of silver, dyes, minute bubbles, and other image forming materials in a light transmissive medium. In a preferred embodiment the film comprises a silver halide emulsion coated on a yellow, transparent linear polyester support. The emulsion is developable by conventional methods.

Any of the support materials which will transmit at least some visible radiation can be used in the practice of this invention. Such support materials are typically polymeric and include, for example, cellulose nitrate film, cellulose acetate film, poly (vinyl acetal) film, polystyrene film, polycarbonate film and related films or resinous materials. Linear polyester is a preferred support material, since linear polyester materials have excellent dimensional stability. These polyester materials are generally linear polyesters of at least one glycol having 2 to 10 carbon atoms and at least one dibasic acid comprising at least 50 mole percent of an acid having two carboxyl radicals attached to a carbocyclic nucleus having from 4 to 6 carbon atoms per ring. The ester generally has a number average molecular weight of from about 10,000 to about 100,000, an inherent viscosity in a mixture of 60% phenol and 40% chlorobenzene of at least about 0.3 to about 1.3 deciliters per gram and melts at from about 175° to about 350°C. Viscosity is determined at 25°C. with solutions of 0.25g of the polyester per 100 milliliters of phenol: chlorobenzene.

In this regard, particularly preferred polyester materials are poly (ethylene terephthalate), poly (1,4-cyclohexylenedimethylene terephthalate), poly(ethyleneisophthalate), poly(ethylene naphthalenedicarboxylate), and mixtures of at least two of these. The term linear polyester also includes copolyesters based on these polyesters, such copolyesters being obtained by replacing a portion of the terephthalic acid by another acid or by a hydroxycarboxylic acid, and/or by replacing a portion of the glycol with a different glycol.

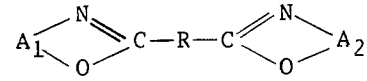
In conventional microfilm reproduction methods, the microimages are reproduced on diazo film or paper by exposing the film or paper to actinic light projected through the microimage carrying element. According to the present invention, in order to prevent such copying, an optical brightener and a yellow dye are incorporated into the support or together in at least one of the layers other than the radiation sensitive layer of the information receivng element, or separately in at least two such layers. The location in the element of a layer containing dye and/or brightener is not important.

In a preferred embodiment, the brightener and dye both are incorporated in a polyester support.

In such a preferred embodiment, any optical brightener that (a) is compatible with the polyester, (b) does not adversely affect the sensitometric properties of the radiation-sensitive layer, and (c) is stable at the temperatures encountered in forming the polyester support and in processing the photographic element can be used.

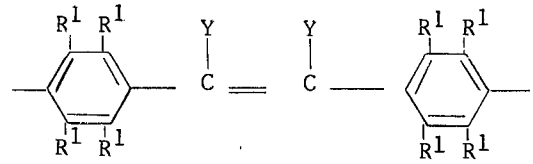
In a preferred embodiment, the optical brightener is a fluorescent 4,4′-bis(benzoxazol-2-yl) stilbene compound of the following formula I:

I.



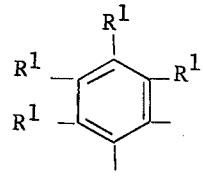
wherein R is a bivalent 4,4′-stilbene radical of the formula

II.



and A_1 and A_2 are each an o-phenylene radical of the formula

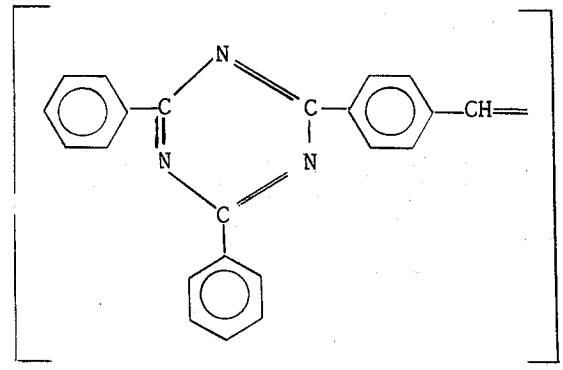
III.



The substituents R^1 of the bivalent 4,4′-stilbene radical and each of the phenylene radicals can be the same or different monovalent substituents. Typical substituents R^1 which are suitable include a hydrogen atom, a halogen atom, and alkyl, aryl, substituted aryl, hydroxy, alkoxy, aryloxy, acyl, acyloxy, amino, and substituted amino radicals. In the preferred embodiment the substituents R^1 are all hydrogen atoms. Other substituents are defined in U.S. Pat. No. 3,322,680 which is incorporated herein by reference.

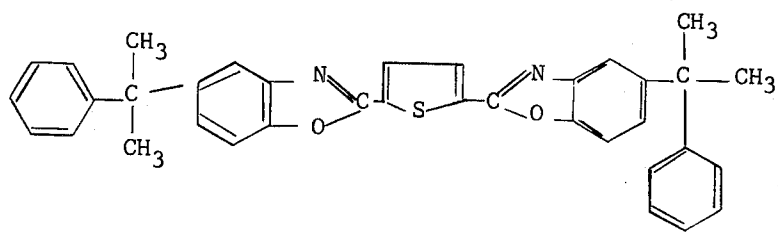
The substituents Y which are suitable include a hydrogen atom, and alkyl, aryl and cyano radicals. In the preferred embodiment the substituents Y are hydrogen atoms. Reference may be had to the above patent for further definition of Y substituents.

Among other optical brighteners that may be used in this invention are those indicated below:

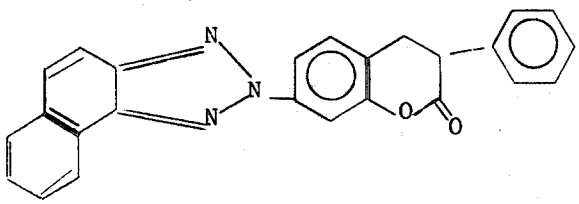


2

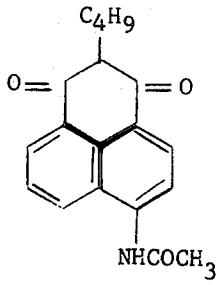
4,4′-Bis(4,6-diphenyl-s-triaxin-2-yl)-stilbene



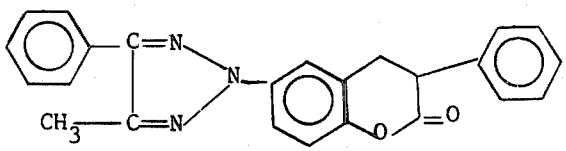
2,5-Bis[5-(αα-dimethylbenzyl) benzoxazol-2-yl]- thiophene



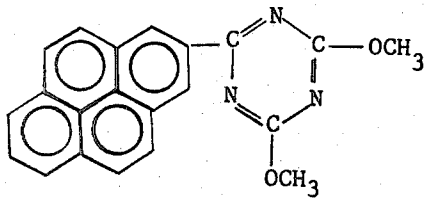
7-(2H-Naphtho[1,2-d]triazol-2-yl)-3-phenyl-2-chromanone



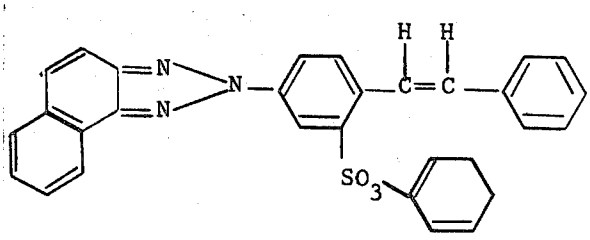
6-Acetamido-2-butyl phenalene-1,3-(2H)-dione



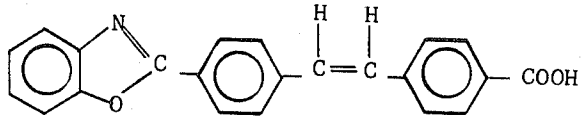
6-(4-Methyl-5-phenyl-v-triazol-2-yl)-3-phenyl-2-chromanone



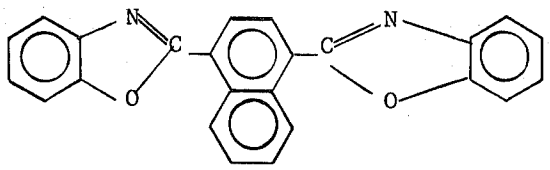
2-(4,6-dimethoxy-2-s-triazinyl)pyrene



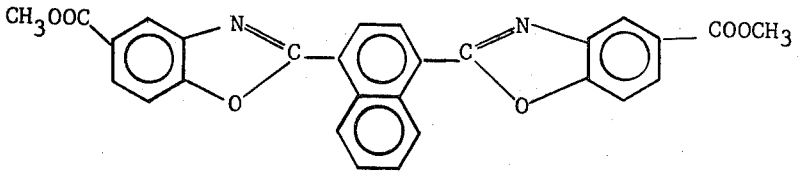
Phenyl 4-(2H-Naphtho[1,2-d]triazol -2-yl)-2stilbene Sulfonate



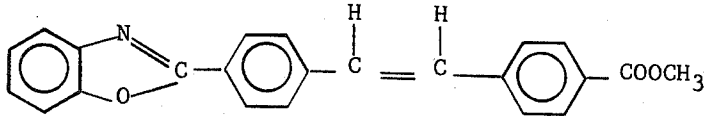
4′-(2-Benzoxazolyl)-4-stilbenecarboxylic acid



1,4-Bis (2-benzoxazolyl) naphthalene

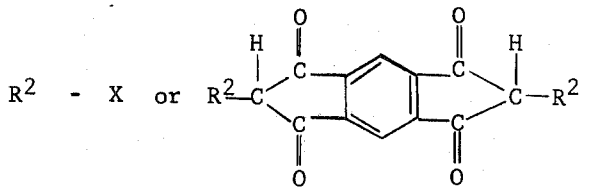


1,4-Bis(5-methoxycarbonyl-2-benzoxazolyl)naphthalene

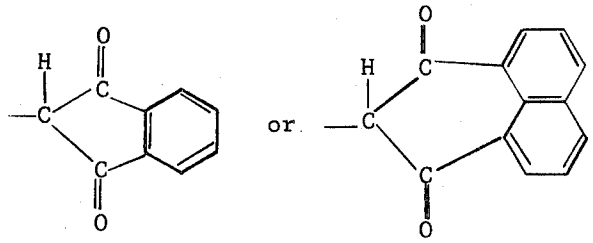


Methyl 4′-(2-Benzoxazolyl)-4-stilbenecarboxylate

In the preferred embodiment, the yellow dye is a dyestuff of the following formulas:

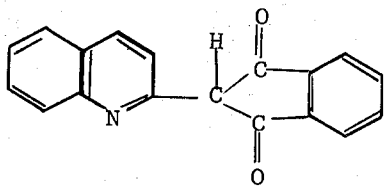


wherein X is selected from the group

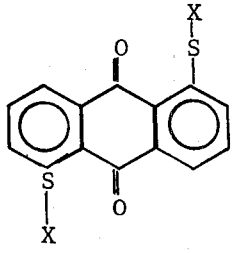


R^2 represents a 5 or 6 membered nitrogen-containing heterocyclic ring having a heterocyclic nitrogen atom attached through a double bond to a carbon atom of the ring to which X is attached. The heterocyclic ring may contain substituents or it may form part of a fused ring system which may also contain substituents such as the radical —$COOR^3$, wherein R^3 represents hydrogen, alkyl, hydroxyalkyl, alkoxyalkyl, or hydroxyalkoxyalkyl. One of R^2 and X may be substituted by at least one radical —$COOR^3$ as hereinbefore defined.

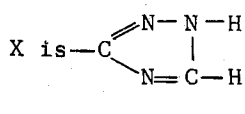
A dye suitable for incorporation in the polyester supports mentioned above is 2-(2-quinolyl)-1,3-indandione. In its pure form, this dye is a skin sensitizer, but polyester film containing the dye is not. This dye has the following structure:

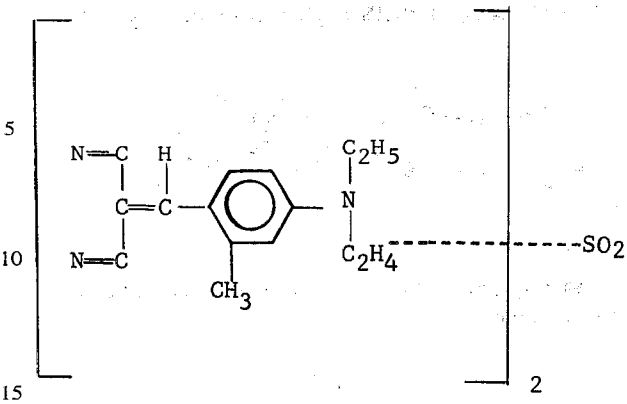


This yellow dye and other yellow dyes which may be used according to this invention are disclosed in and prepared by the methods disclosed in U.S. Pat. Nos. 3,417,048 and 3,622,582 incorporated herein by reference. Among the other yellow dyes which may also be used are the following:

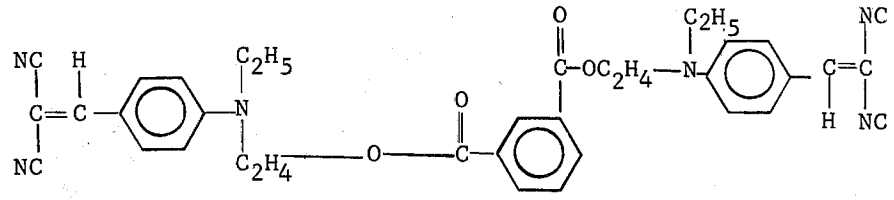


1,5 Bis(1,2,4-triazol-5-ylthio)anthraquinone

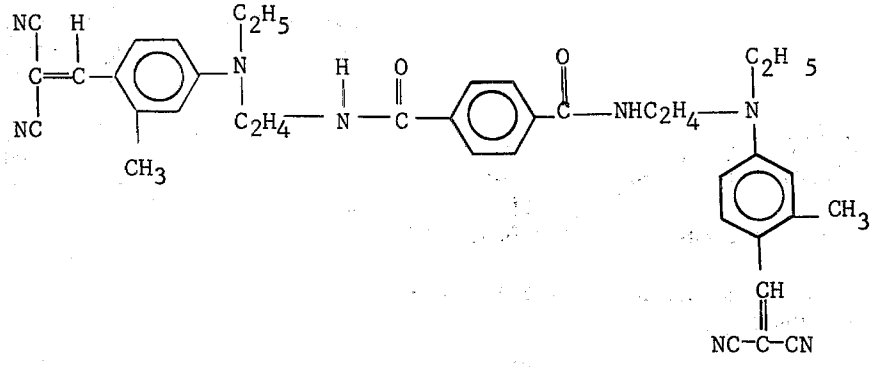




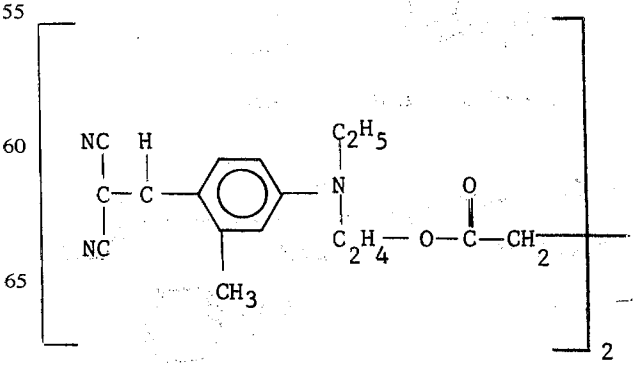
2,2'-Bis[4(2,2-dicyanovinyl)-N-ethyl-3-toluidino]diethyl Sulfone



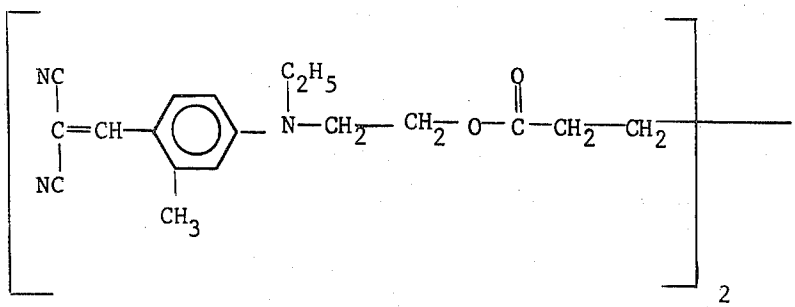
2,2'-Bis[4(2,2-dicyanovinyl)-N-ethyl anilino]diethyl Isophthalate



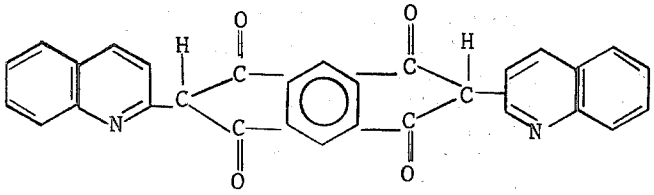
N,N'-Bis[2-{4-(2,2 dicyanovinyl)-N-ethyl-3-toluidino}ethyl]terephthalamide



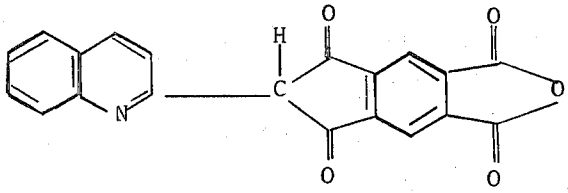
2,2'-Bis[4(2,2 dicyanovinyl)-N-ethyl-3-toluidino]diethyl Succinate



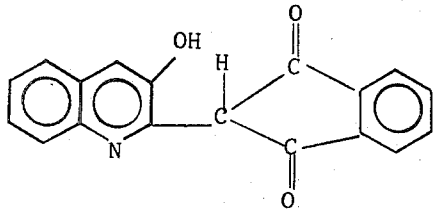
2,2'-Bis[4-(2,2-dicyanovinyl)-N-ethyl-3-toluidino]diethyl Adipate



2,6-Bis(2-quinolyl)-s-hydrindacene-1,3,5,7-tetrone



2-(2-Quinolyl)-1,3-indandione-5,6-dicarboxylic anhydride



2(3-Hydroxyquinol-2-yl)-1,3-indandione

In one embodiment, a polyester support is prepared in a conventional manner by mixing an optical brightener and a yellow dye with polyester powder or pellets and the mixture is then melted at a temperature of about 250° to 300°C. The melt is then extruded into sheet form which is then biaxially stretched in conventional manner to form film useful as a support for a photographic element. The dye may also be mixed with a small portion of the polyester and then heated to about 160°–190°C for about 2 hours as taught in copending U.S. Pat. application of Barkey et al., Ser. No. 285,397, filed Aug. 31, 1972, incorporated herein by reference. The concentrate so prepared can then be mixed with the remainder of the polyester and the optical brightener as above.

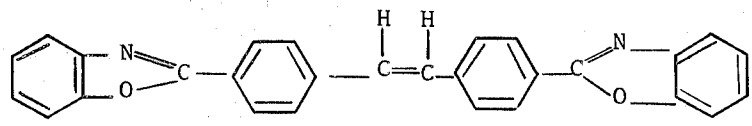
The photographic element can be of conventional structure, and it can be exposed in conventional manner to form a projectable or readable microimage information bearing element. If an unauthorized person attempts to duplicate the information onto diazo film or paper, he or she is prevented from obtaining a diazo copy in the normal way because the actinic light used to expose diazo emulsions is absorbed by the film of this invention and its transmission is suppressed.

When used with a polyester support, the optical brightener is added to the polyester at a concentration of about 300 to 4000ppm, and the yellow dye is added in amounts of from about 300 to about 8000ppm. These quantities would be suitable in polyester used for casting a film support having a final thickness of about 0.004. inches. Of course, the quantities could be adjusted for polyester used for casting film support whose thickness is other than 0.004. inches. The concentration of dye and optical brightener should be inversely proportional to the thickness.

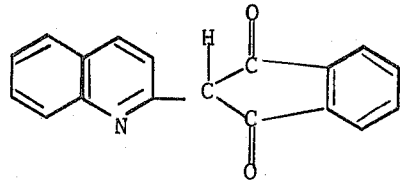
The following examples further illustrate the invention.

EXAMPLE I

To poly(ethylene terephthalate) resin having a number average molecular weight of about 20,000 and an inherent viscosity of about 0.62 were added 2000ppm optical brightener of the formula:



which compound is 4,4'-bis[benzoxazole-2-yl]stilbene. Also added were 1750ppm yellow dye of the formula:



which compound is 2-(2-quinolyl)-1,3-indandione sold by National Aniline Division of Allied Chemical Corporation as Plasto Yellow Y. The resin mixture was melted and extruded as 4 mil film base or support. The filter factor for this film base was approximately 150.

Filter factor is defined as the increase in the amount of light that is required to expose a diazo emulsion using a master coated on the special (yellow) film base. The number 150 indicates that an increase of 150 times in the amount of light is needed to get a usable copy

when the master is on the special (yellow) film base, compared to the amount of light that is needed to get a usable copy when the master is on regular (water white) film base.

EXAMPLE II

To poly(ethylene terephthalate) as in Example I were added 2000ppm of the preferred optical brightener and 2000ppm of 2,2'bis[4-2,2 dicyanovinyl) N-ethyl-3toluidino]diethyl adipate. The mixture was melted and extruded to form a support 4 mils thick. This support had a filter factor of about 275.

Although in a preferred embodiment of the present invention, an optical brightener and a yellow dye are incorporated into a polyester support, it is also advantageous to prepare information receiving elements of this invention in which the optical brightener and the yellow dye are incorporated in one or several other layers of the information receiving elements of the invention; e.g., such layers can be interlayers between the support and the radiation sensitive layer, or they may be outer layers or overcoats on the side opposite the radiation sensitive layer, or on the radiation sensitive layer itself. It should be emphasized that the combination of the optical brightener and the yellow dye may be incorporated in one and the same layer or the optical brightener may be located in one layer and the dye in another while still obtaining the advantages and benefits of the invention.

The invention has been described in detail with particular reference to preferred embodiments thereof, but it will be understood that variations and modifications can be effected within the spirit and scope of the invention.

What is claimed is:

1. An information receiving film element for providing a processed, substantially non-fluorescent, optically brightened, substantially transparent information bearing, polymeric film element from which the information processed thereon is substantially non-reproducible when said information bearing film element is placed over a diazo film or print paper and is subjected to exposure to radiation having a wavelength in the range of between about 300 and 460 nanometers, said information receiving film element comprising:

i. a transparent polymeric film support that transmits visible radiation, and which can absorb radiation having a wavelength in the range between about 300 and 460 nanometers, said support having incorporated therein

a. an optical brightening amount of at least one optical brightener compound capable of absorbing radiation in said wavelength range, and

b. a fluorescence and radiation absorbing amount of at least one yellow dye capable of absorbing radiation in said wavelength range, and

ii. at least one radiation sensitive layer, which, when exposed to informaion-providing radiation and processed to develop the information received forms an information bearing transparency, said optical brightener and said yellow dye both being present in said support in a total amount at least sufficient to absorb radiation having said wavelength but insufficient to prevent passage of visible light through the element while said yellow dye also absorbs the fluorescence of said optical brightener both before and after processing of the element to its information bearing film element form, said optical brightener being a fluorescent compound selected from

a. at least one fluorescent 4,4'-bis-(benzoxazol-2-yl) stilbene compound;

b. 4,4'-bis(4,6-diphenyl-s-triaxin-2-yl)-stilbene;

c. 2,5,bis[5-(α,α-dimethylbenzyl)benzoxazol-2-yl]-thiophene;

d. 7-(2H-naphtho[1,2-d]triazol-2-yl)-3-phenyl-2-chromanone;

e. 6-acetamido-2-butyl phenalene-1,3-(2H)-dione;

f. 6-(4-methyl-5-phenyl-v-triazol-2-yl)-3-phenyl-2-chromanone;

g. 2-(4,6-dimethoxy-2-s-triazinyl)pyrene;

h. phenyl-4-(2H-naphtho[1,2-d]triazol-2-yl)-2-stilbene sulfonate;

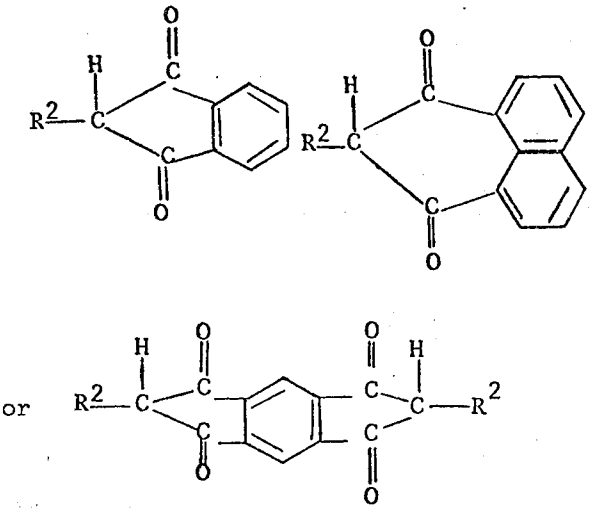
i. 4'-(2-benzoxazolyl)-4-stilbene carboxylic acid;

j. 1,4-bis(2-benzoxazolyl)naphthalene;

k. 1,4-bis(5-methoxycarbonyl-2-benzoxazolyl) naphthalene;

l. methyl-4'-(2-benzoxazolyl)-4-stilbene carboxylate; and said yellow dye being selected from

a. at least one dyestuff of the following formulas:



wherein R^2 is selected from the group consisting of 5 or 6 membered nitrogen-containing heterocyclic rings having a heterocyclic nitrogen atom attached through a double bond to a carbon atom of the ring through which R^2 is attached;

b. 1,5-bis(1,2,4-triazol-5-ylthio)anthraquinone;

c. 2,2'-bis[4(2,2-dicyanovinyl)-N-ethyl-3-toluidino]diethyl sulfone;

d. 2,2'-bis[4(2,2-dicyanovinyl)-N-ethyl anilino]diethyl isophthalate;

e. N,N'-bis[2-{4-(2,2-dicyanovinyl)-N-ethyl-3-toluidino} ethyl] terephthalamide;

f. 2,2'-bis[4(2,2-dicyanovinyl)-N-ethyl-3-toluidino]diethyl succinate;

g. 2,2'-bis[4-(2,2-dicyanovinyl)-N-ethyl-3-toluidino]diethyl adipate;

h. 2,6-bis(2-quinolyl)-s-hydrindacene-1,3,5,7-tetrone;

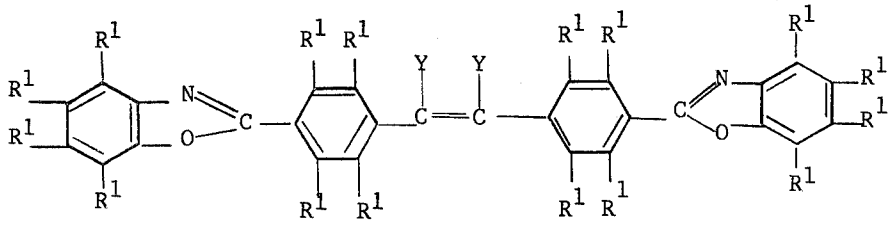
i. 2-(2-quinolyl)-1,3-indandione-5,6-dicarboxylic anhydride; and

j. 2-(3-hydroxyquinol-2-yl)-1,3-indandione.

2. An element according to claim **1** characterized in

that said suport is a polyester, cellulose nitrate, cellulose acetate, poly(vinyl acetal), polystyrene, or polycarbonate support.

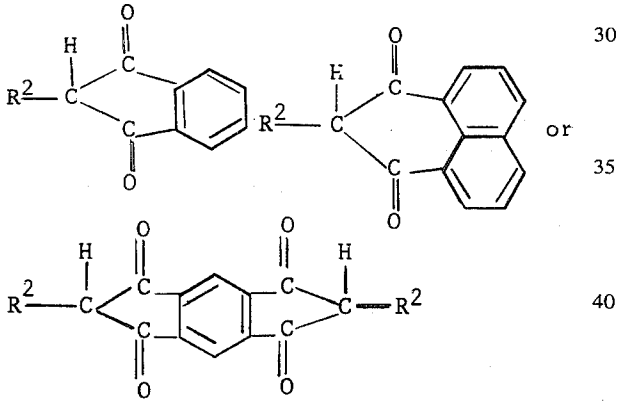
3. An element according to claim 1 wherein said stilbene compound is of the formula:



wherein each R^1 which can be the same or different is selected from the group consisting of hydrogen atoms, halogen atoms, alkyl, aryl, substituted aryl, hydroxy, alkoxy, aryloxy, acyl, acyloxy, amino, and substituted amino radicals and each Y which can be the same or different is selected from the group consisting of hydrogen atoms, alkyl, aryl, and cyano radicals.

4. An element according to claim 3 wherein each R^1 and each Y are hydrogen atoms.

5. An element according to claim 3 wherein said yellow dye is selected from the group consisting of:



wherein R^2 is selected from the group consisting of 5 or 6 membered nitrogen-containing heterocyclic rings having a heterocyclic nitrogen atom attached through a double bond to a carbon atom of the ring through which R^2 is attached.

6. An element according to claim 4 wherein said yellow dye is 2-(2-quinolyl)-1,3-indandione.

7. An element according to claim 4 wherein said yellow dye is 2,2'bis[4(2,2 dicyanovinyl)-N-ethyl-3-toluidino]diethyl adipate.

8. An information receiving film element according to claim 1 wherein said support is a linear polyester support wherein the polyester is poly(ethylene terephthalate), poly(1,4-cyclohexylenedimethylene terephthalate), poly(ethylene isophthalate), poly(ethylene naphthalenedicarboxylate), or a mixture of at least two of said polyesters.

9. A substantially non-fluorescent, optically brightened, substantially transparent information bearing polymeric film element from which the information carried thereon is substantially non-reproducible when said element is placed over a diazo film or print paper and is subjected to exposure to radiation having a wavelength in the range between about 300 and 460 nanometers, said element comprising:

i. a transparent polymeric film support that transmits visible radiation, and which can absorb radiation having a wavelength in the range between about 300 and 460 nanometers, said support having incorporated therein

a. an optical brightening amount of at least one optical brightener compound capable of absorbing radiation in said wavelength range, and

b. a fluorescence and radiation absorbing amount of at least one yellow dye capable of absorbing radiation in said wavelenth range, and

ii. at least one information bearing layer, which when exposed to information-reproducing radiation transmits visible radiation and absorbs radiation in said wavelength range, said optical brightener and said yellow dye both being present in said support in a total amount at least sufficient to absorb radiation having said wavelength but insufficient to prevent passage of visible light through the element while said yellow dye also absorbs the fluorescence of said optical brightener both before and after processing of the element to its information bearing film element form, said optical brightener being a fluorescent compound selected from

a. at least one fluorescent 4,4'-bis- (benzoxazol-2-yl) stilbene compound;

b. 4,4'-bis(4,6-diphenyl-s-triaxin-2-yl)-stilbene;

c. 2,5,bis[5-(α, **60**-dimethylbenzyl)benzoxaol-2-yl]-thiophene;

d. 7-(2H-naphtho[1,2-d]triazol-2-yl)-3-phenyl-2-chromanone;

e. 6-acetamido-2-butyl phenalene-1,3-(2H)-dione;

f. 6-(4-methyl-5-phenyl-v-triazol-2-yl)-3-phenyl-2-chromanone;

g. 2-(4,6-dimethoxy-2-s-triazinyl)pyrene;

h. phenyl-4-(2H-naphtho[1,2-d]triazol-2-yl)-2-stilbene sulfonate;

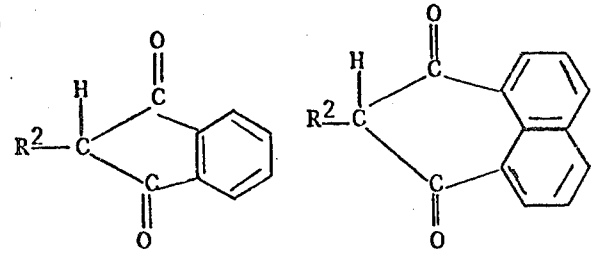
i. 4'-(2-benzoxazolyl)-4-stilbene carboxylic acid;

j. 1,4-bis(2-benzoxazolyl)naphthalene;

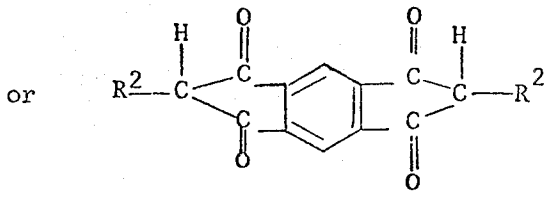
k. 1,4-bis(5-methoxycarbonyl-2-benzoxazolyl) naphthalene;

l. methyl-4'-(2-benzoxazolyl)-4-stilbene carboxylate; and said yellow dye being selected from

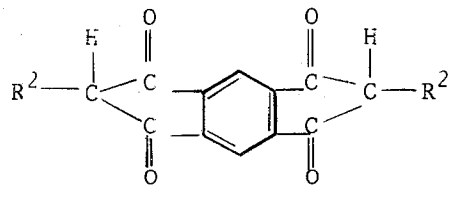
a. at least one dyestuff of the following formuals:



15



16



wherein R^2 is selected from the group consisting of 5 or 6 membered nitrogen-containing heterocyclic rings having a heterocyclic nitrogen atom attached through a double bond to a carbon atom of the ring through which R^2 is attached;

b. 1,5-bis(1,2,4-triazol-5-ylthio)anthraquinone;

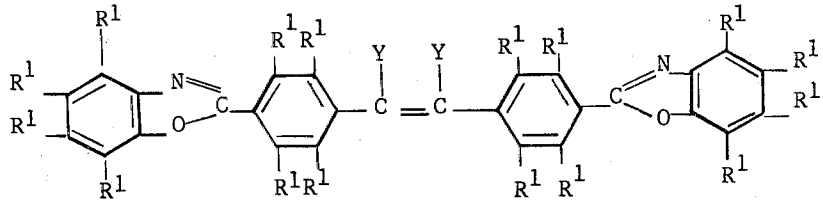
c. 2,2'-bis[4(2,2-dicyanovinyl)-N-ethyl-3-toluidino]diethyl sulfone;

d. 2,2'-bis[4(2,2-dicyanovinyl-N-ethyl anilino]diethyl isophthalate;

e. N,N'-bis[2-{4-(2,2-dicyanovinyl)-N-ethyl-3-toluidino}ethyl] terephthalamide;

f. 2,2'-bis[4(2,2-dicyanovinyl)-N-ethyl-3-toluidino]diethyl succinate;

g. 2,2'-bis[4(2,2-dicyanovinyl)-N-ethyl-3-toluidino]diethyl adipate;

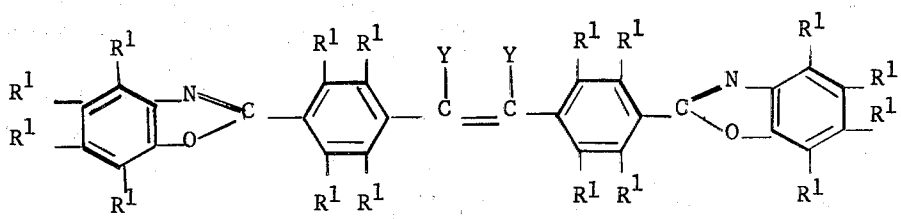


h. 2,6-bis(2-quinolyl)-s-hydrindacene-1,3,5,7-tetrone;

i. 2-(2-quinolyl)-1,3-indandione-5,6-dicarboxylic anhydride; and

j. 2-(3-hydroxyquinol-2-yl)-1,3-indandione.

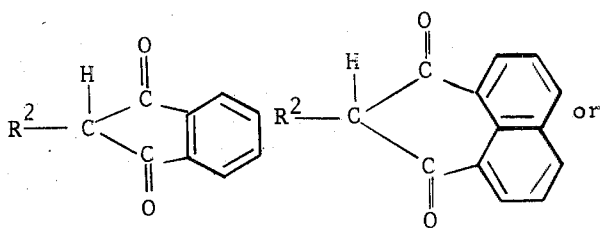
10. An element according to claim **9** wherein said stilbene compound is of the formula:



wherein each R^1 which can be the same or different is selected from the group consisting of hydrogen atoms, halogen atoms, alkyl, aryl, substituted aryl, hydroxy, alkoxy, aryloxy, acyl, acyloxy, amino, and substituted amino radicals and each Y which can be the same or different is selected from the group consisting of hydrogen atoms, alkyl, aryl, and cyano radicals.

11. An element according to claim **10** wherein each R^1 and Y are hydrogen atoms.

12. An element according to claim **10** wherein said yellow dye is selected from the group consisting of:



wherein R_2 is selected from the group consisting of 5 or 6 membered nitrogen-containing heterocyclic rings having a heterocyclic nitrogen atom attached through a double bond to a carbon atom of the ring through which R^2 is attached.

13. An element according to claim **11** wherein said yellow dye is 2-(2-quinolyl)-1,3-indandione.

14. An element according to claim **11** wherein said yellow dye is 2,2'bis[4(2,2 dicyanovinyl)-N-ethyl-3-toluidino] diethyl adipate.

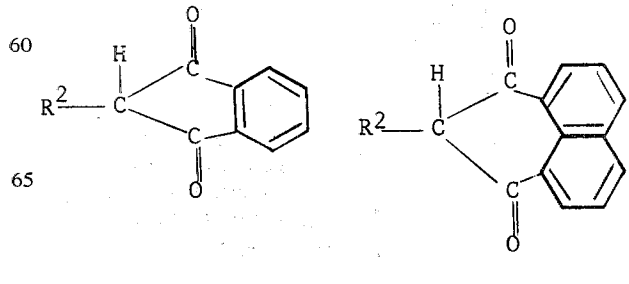
15. A light projectable, substantially nonfluorescent, optically brightened substantially transparent information bearing microfilm element according to claim **9.**

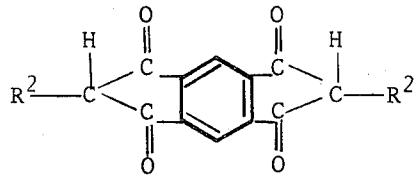
16. A microfilm element according to claim **15** wherein said stilbene compound is of the formula:

wherein each R^1 which can be the same or different is selected from the group consisting of hydrogen atoms, halogen atoms, alkyl, aryl, substituted aryl, hydroxy, alkoxy, aryloxy, acyl, acyloxy, amino, and substituted amino radicals and each Y which can be the same or different is selected from the group consisting of hydrogen atoms, alkyl, aryl, and cyano radicals.

17. A microfilm element according to claim **16** wherein each R^1 and Y are hydrogen atoms.

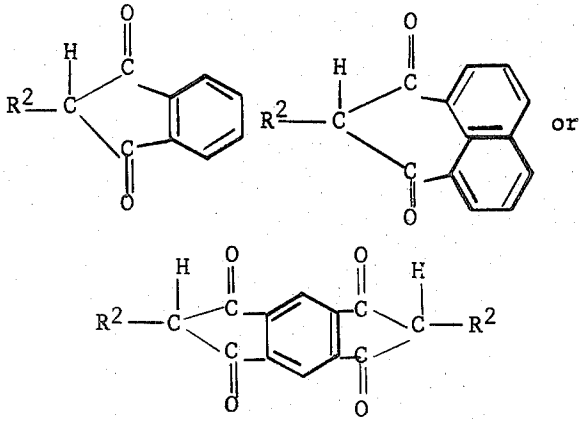
18. A microfilm element according to claim **16** wherein said yellow dye is selected from the group consisting of:



or 

wherein R^2 is selected from the group consisting of 5 or 6 membered nitrogen-containing heterocyclic rings having a heterocyclic nitrogen atom attached through a double bond to a carbon atom of the ring through which R^2 is attached.

19. A microfilm element according to claim **17** wherein said yellow dye is selected from the group consisting of:



wherein R^2 is selected from the group consisting of 5 or 6 membered nitrogen-containing heterocyclic rings having a heterocyclic nitrogen atom attached through a double bond to a carbon atom of the ring through which R^2 is attached.

20. A microfilm element according to claim **17** wherein said yellow dye is 2-(2-quinolyl)-1,3-indandione.

21. A microfilm element according to claim **17** wherein said yellow dye is 2,2'bis[4(2,2 dicyanovinyl)-N-ethyl-3-toluidino]diethyl adipate.

22. A microfilm element according to claim **15** in which said support is a polymeric support.

23. A microfilm element according to claim **22** in which said polymeric support is a polyester, cellulose nitrate, cellulose acetate, poly(vinyl acetal), polystyrene, or polycarbonate support.

24. An information bearing film element according to claim **9** wherein said support is a linear polyester support wherein the polyester is poly(ethylene terephthalate), poly-(1,4-cyclohexylenedimethylene terephthalate), poly(ethylene isophthalate), poly(ethylene naphthalenedicarboxylate), or a mixture of at least two of said polyesters.

25. An information bearing film element according to claim **9** wherein said support is a polyester, cellulose nitrate, cellulose acetate, poly(vinyl acetal), polystyrene or polycarbonate film support.

26. A microfilm element according to claim **24.**

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 3,904,420

DATED : September 9, 1975

INVENTOR(S) : C. Shelburn Hunter

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Col. 14, line 41 should read:

-- c. 2,5-bis/5-(α,α-dimethylbenzyl) benzoxazol-2-yl_7-thiophene; --

Signed and Sealed this

third Day of *February 1976*

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 3,904,420

DATED : September 9, 1975

INVENTOR(S) : C. Shelburn Hunter

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Col. 14, line 41 should read:

-- c. 2,5-bis/5-(α,α-dimethylbenzyl) benzoxazol-2-yl_7-thiophene; --

Signed and Sealed this

third Day of *February 1976*

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks