

UNITED STATES PATENT OFFICE

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MEANS FOR SAFEGUARDING BANK NOTES, BONDS, AND LIKE DOCUMENTS OF VALUE FROM FRAUDULENT IMITATION

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This invention relates to a method of safeguarding bank notes, bonds and like documents of value from fraudulent imitation and to bank notes, bonds and like documents so safeguarded and is a continuation-in-part of the invention of my co-pending application Serial No. 746,923 filed on the 4th October 1934.

In British patent specification No. 292,393 there is described a method of safeguarding cheques and like documents against unauthorised alteration and detecting whether ink-eradicating agents have been employed thereon, consisting in treating the paper with a substance, either by printing thereon with an ink containing said substance, or by directly immersing the paper in said substance, the latter being adapted to render the paper fluorescent when viewed by filtered ultra-violet light, such fluorescence being destroyed by the local or general application or use of ink-eradicating agents. The fluorescent substance described in the said specification is water-soluble and thus the surface fluorescence produced is susceptible to destruction by water alone.

In United States Patent No. 1,822,098 to Huntress, there is described and claimed an improvement in the art of marking comprising the combining with the article which is to be marked, of a substance which fluoresces with a distinctive aspect under light rays which are outside of the range of rays normally visible to the human eye, thereby constituting a mark on said article which becomes distinctive when said outside rays are applied.

The whole of the specific description of the United States specification No. 1,822,098 relates, however, to the identification of rope and according to a preferred embodiment there is employed a dye which produces in the yarn of the rope a colour which as ordinarily seen is approximately the same as that of the rope but which possesses a distinctive ultra-violet fluorescence.

The dye proposed for this purpose is the sodium salt of the sulphonic acid of methylated primuline base.

It is also stated that a yellow dye may be employed which leaves the yarn yellow in ordinary light but makes it so that it does not fluoresce at all in the ultra-violet rays, but merely appears a deep purplish brown in colour.

The dye proposed for this purpose is the sodium salt of 2:2' disulphostilbene 4:4' diazo-bis-phenetole.

According to another embodiment of the prior invention a dye may be used which has the characteristic that the yarn to which it has been ap-

plied is indistinguishable from yarn to which it has not been applied but which in ultra-violet rays fails to fluoresce, being barely seen as a purplish brown while the ordinary yarn fluoresces to a blue. The dye used for this purpose is the sodium salt of diphenyl-urea p.p'-diazo-bis-salicylic acid.

According to yet a further embodiment of the prior invention, the yarn is treated so that it is readily distinguishable from others by ordinary light and which confirms or verifies itself as being genuine by responding under ultra-violet rays by fluorescing distinguishably from the other yarn.

Examples of dyes which may be used for this purpose are a mixture of the sodium salts of the mono-sulphonic acids of more highly thionated dehydrothio-p-toluidine derivatives together with some dehydrothio-p-toluidine monosulphonic acid, the hydrochloride of tetramethyldiaminodiphenylketone imine, and the hydrochloride of diethyl-m-aminophenol-phthalein.

I have found by experiment that all the dyes specifically referred to in the prior United States specification are not resistant to laundering agents, for example, a boiling aqueous solution containing 0.1% of curd soap and 0.05% of sodium carbonate and are not entirely fast to light.

It is an object of the present invention to safeguard bank notes, bonds and like documents of value from fraudulent imitation by incorporating therein a fluorescent substance which is substantially fast to light, laundering and dry cleaning agents and ink-eradicating agents. It will be appreciated that even a partial loss of fluorescence is of importance because this increases the ease of fraudulent imitation because genuine bank notes, bonds and like documents of value will vary so much that considerable latitude will be available for the forger.

It is a further object of this invention to enable the authenticity or otherwise of bank notes, bonds and like documents of value to be identified or established whereby a genuine document may readily be distinguished from a spurious imitation, irrespective of whether or not the documents may have been accidentally exposed to laundering or dry cleaning agents.

Accordingly the method of the present invention of safeguarding bank notes, bonds and like documents of value from fraudulent imitation consists in incorporating in, or applying to, the paper a fluorescent substance which is in itself water-insoluble, such substance being protected against removal by flotation or chemical action

by a transparent film of suitable impermeability and strength.

According to an embodiment of the invention the insoluble fluorescent substance is incorporated in the form of artificial silk or like substance in the form of threads or the like containing the insoluble fluorescent substance into the banknotes, bonds or like documents of value. This may be effected by mixing the insoluble fluorescent substance with the spinning solution, for example, a cellulose acetate solution or viscose solution before the artificial silk is spun. This embodiment of the invention renders fraudulent imitation particularly difficult because it is necessary for the forger not only to know of and to have means for incorporating the fluorescent substance, but also renders it necessary for him to have at his disposal a plant for the manufacture of artificial silk.

Instead of incorporating artificial silk threads into the banknotes, bonds and like documents of value, films of artificial silk containing the fluorescent substance incorporated therein may be cut into suitable shapes and incorporated in the paper from which the banknotes, bonds and like documents of value are made. The fluorescent material is in this case also incorporated in the solution before the films are prepared.

According to another embodiment of the invention the paper, which is to be used for the banknote or bond, has a design or pattern printed upon it with a colourless or coloured ink having a cellulose ester base, containing a small proportion of a fluorescent water-insoluble material.

For example the zinc complex of 8-hydroxy-quinoline, or the zinc complex of its acid potassium sulphate derivative, that is to say, 8-hydroxy-quinoline potassium sulphate is suitable.

I prefer to use the zinc complex of 8-hydroxy-quinoline and the method of the invention may for example be carried out as follows:

8-hydroxy-quinoline was dissolved in excess of hydrochloric acid and to the solution there was added the theoretical quantity of zinc chloride necessary to form the zinc complex. Ammonia was then rapidly added until the pH value was 10, and the precipitate was filtered, washed and dried.

The finely divided powder thus obtained was then added to a solution of cellulose acetate in acetone containing a suitable plasticiser and the solution was spun in the usual manner.

The dry finished cellulose acetate thread contained 0.5% by weight of the zinc complex of 8-hydroxy-quinoline and the threads were incorporated into the paper which was to be employed for the preparation of bank notes and like documents.

By the term fluorescent substance as used in the appended claims, is meant one which is colourless or practically colourless in ordinary light but which fluoresces in filtered ultra-violet light.

By filtered ultra-violet light is meant light rich in ultra-violet radiation which is passed through a filter designed to intercept most of the visible portion of the spectrum, but which allows the passage of the ultra-violet rays.

Unless viewed by filtered ultra-violet light, the banknote prepared in accordance with this invention presents an ordinary appearance. Thus if a note, the authenticity of which is in question, is examined by ultra-violet light and

is found to possess no fluorescent properties (or is found to bear a fluorescent pattern disagreeing with that of the genuine issue) same may be readily detected.

What I claim and desire to secure by Letters Patent is:

1. A method of safeguarding banknotes, bonds and like paper documents of value against fraudulent imitation which consists in incorporating in the paper a finely divided solid substance which is practically colorless in ordinary light, fluorescent in ultra-violet light, insoluble in water and fast to light and to laundering, dry cleaning and ink eradicating agents, and protecting said substance against mechanical removal from the paper by a transparent flexible solid film which is insoluble in laundering and dry cleaning agents and sufficiently strong to resist the customary handling of paper.

2. A method as defined in claim 1 in which the fluorescent substance is the zinc complex of 8-hydroxy-quinoline.

3. A method as defined in claim 1 in which the transparent film is a cellulose ester.

4. A method as defined in claim 1 in which the transparent film is cellulose acetate.

5. A method as defined in claim 1 in which the transparent film is cellulose regenerated from viscose.

6. A method as defined in claim 1 in which the fluorescent substance is incorporated in filaments of the transparent material and the latter are incorporated in the paper.

7. A method as defined in claim 1 in which the fluorescent substance is deposited on the paper and then coated over with the transparent film.

8. A method as defined in claim 1 in which the paper is coated with a suspension of the fluorescent substance in a transparent film-forming liquid.

9. Paper adapted for use for banknotes, bonds and like documents of value to prevent fraudulent imitation, said paper having incorporated therein a finely divided solid substance which is practically colorless in ordinary light, fluorescent in ultra-violet light, insoluble in water and fast to light and to laundering, dry cleaning and ink eradicating agents, said substance being protected against mechanical removal from the paper by a transparent solid film which is insoluble in laundering and dry cleaning agents and sufficiently strong to resist the customary handling of paper.

10. Paper as defined in claim 9 in which the fluorescent substance is incorporated in filaments of the transparent film material which latter are incorporated in the paper.

11. Paper as defined in claim 9 in which the fluorescent substance is deposited on the paper and covered by the transparent film.

12. Paper as defined in claim 9 in which the fluorescent substance is incorporated in a transparent film deposited on the paper.

13. Paper as defined in claim 9 in which the fluorescent substance is the zinc complex of 8-hydroxy-quinoline.

14. Paper as defined in claim 9 in which the transparent film is a cellulose ester.

15. Paper as defined in claim 9 in which the transparent film is cellulose acetate.

16. Paper as defined in claim 9 in which the transparent film is cellulose regenerated from viscose.

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