April 11, 1967 R. L. MALSTER 3,313,052
LAMINATIONS
Filed April 29, 1965

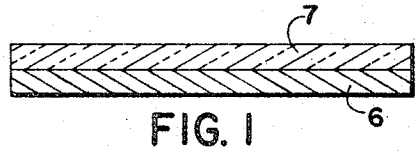

FIG. 1

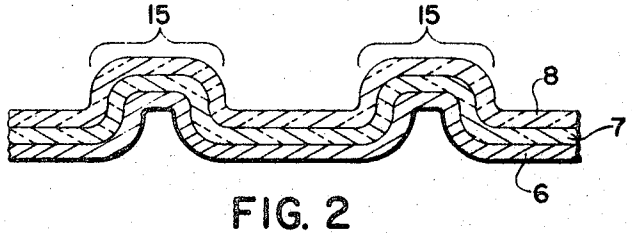

FIG. 2

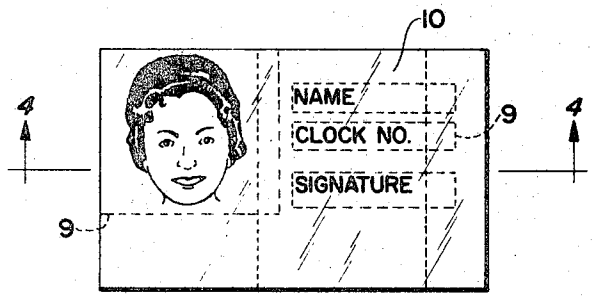

FIG. 3

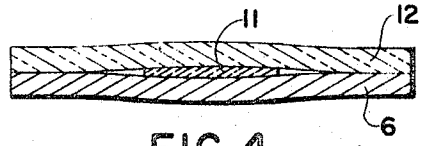

FIG. 4

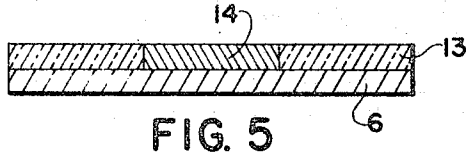

FIG. 5

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LAMINATIONS

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8 Claims. (Cl. 40—2.2)

This invention relates to a security device for printed matter and the like.

It is one object of this invention to provide a means for protecting information-bearing surfaces.

It is another object of the present invention to provide a device for protecting information-bearing surfaces from unwanted alteration.

It is another object of the present invention to provide a means for detecting unauthorized tampering with or alteration of information-bearing surfaces.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the process involving the several steps and the relation and order of one or more of such steps with respect to each of the others, and the product possessing the features, properties, and relation of elements which are exemplified in the following detailed disclosure, and the scope of the application of which will be indicated in the appended claims.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawing wherein:

FIGURE 1 is a cross-section, greatly magnified, of one embodiment of this invention;

FIG. 2 is a cross-section, greatly magnified, of a portion of another embodiment of this invention;

FIG. 3 is a plan view of still another embodiment of this invention;

FIG. 4 is a section, greatly magnified, taken along lines 4—4 of FIG. 3; and

FIG. 5 is a section, greatly magnified, of still another embodiment of this invention.

A host of materials is in commercial use for the provision of planar surfaces intended to carry information; such information may, for example, be written, drawn, or printed on, imbibed, carved, or etched in, or in any other desired way cast on such planar surfaces in the form of word or picture images. In many instances, it is highly desirable that once such information is placed on a given surface, the surface be treated in such a manner as to render it difficult or impossible to mechanically alter or amend, at least without rendering it clearly obvious that some tampering with the surface has taken place. For example, where the information-bearing surface comprises an identification card, such as the so-called "credit cards" issued by department stores, hotels, service stations and the like and intended to identify its holder, or where it comprises an identification badge bearing a portrait of its wearer, for example, of the type frequently issued by industrial or governmental installations for the purpose of identifying its wearer, it is highly desirable that such card or badge not be subject to alteration without defacing it or otherwise rendering apparent the attempted intrusion. To this end, numerous types of laminations have been employed, the most common type being one in which the information-bearing surface is heat- or solvent-laminated to a transparent support.

It has been found, however, that while such laminations provide some measure of protection against intrusion and alteration of the information contained therein, it is still possible for one to alter the information, such as by cutting into the lamination and subsequently re-

sealing or re-fusing the surface with heat, in such a manner that the intrusion is virtually impossible to detect.

It has now been found that by employing as a transparent overlay in laminations of the character described above, a sheet material which is capable of polarizing light, a lamination is provided which readily reveals any cutting and subsequent re-sealing, by heat or solvent action, of its surface when viewed through a suitable analyzing device.

My invention can best be understood by the consideration of a simple illustration thereof. An information-bearing surface, such as the face of an identification card or badge is affixed, by any appropriate technique known to the laminating art, to a transparent sheet which linearly polarizes light rays, such as an oriented polyvinylene-polyvinyl alcohol sheet. To the naked eye, the surface so treated appears to have merely a transparent overlay. However, when viewed through a suitable analyzing device, such as a linear light-polarizing sheet which is oriented in such a way that its polarizing axis is substantially perpendicular to that of the polarizer laminated to the information-bearing surface, little or no light passes through from the surface, which surface consequently appears uniformly dark. If any attempt has been made to alter the information-bearing surface which involved cutting into the surface together with its polarizer overlay and subsequently re-sealing it, the polarizing properties of the overlay will be altered at the site of intrusion and consequently, when the surface is viewed through an analyzer such as that described above, there will be discontinuity in the amount of light passing through. Such discontinuity will be readily apparent, either to the eye of a person or to a mechanical light-registering device.

The polarizing axis of the analyzing device need not be perpendicular to that of the polarizer overlay on the information-bearing surface, but may be placed at any desired angle thereto. To be sure, the greater the deviation of the axes from the perpendicular, the greater the amount of light that will be transmitted to the viewer; however, discontinuities in the light-polarizing ability of the polarizer-laminated surface will be apparent to the viewer nonetheless. In the preferred embodiments of the invention, however, where linear polarizers are employed, the axes are not parallel, for the reason that if this were the case, even though the analyzer might be able to detect any discontinuity in polarizing material, it would be unable to detect differences between surfaces having a uniform polarizer overlay and surfaces having transparent overlays which were not light-polarizers at all.

This invention is by no means limited to the use of linear polarizers, but includes circular and elliptical polarizers as well. In fact, in many instances a circular polarizer may be preferable to a linear one, for the reason that once a light beam has been polarized in a given direction, i.e., passed through a right-handed circular polarizer (or a left-handed polarizer), it cannot pass through an apposite circular polarizer, i.e., a left-handed polarizer (or a right-handed polarizer) no matter how the latter may be rotated. Thus, if, for example, a right-handed circular polarizing sheet is laminated to an information-bearing surface, any alteration in the surface of the nature described above can readily be detected by viewing the lamination through a left-handed circular polarizer no matter how the latter is oriented with respect to the former.

Numerous light-polarizing materials are well known commercially, and any of these which is capable of being cast or formed into a film or sheet and which is substantially transparent can be employed in preparing protected laminates such as that described above. Examples of such materials are oriented polyvinyl alcohol-based polarizers, such as metal or metal complex-containing

polyvinyl alcohol polarizers, iodine-containing polyvinyl alcohol polarizers, dichroic dye-containing polyvinyl alcohol polarizers, polyvinyl alcohol-polyvinylene polarizers, etc.; cellulose-based polarizers such as oriented cellulose stained with a dichroic dye, such as Congo Red, and dichroic crystal-containing cellulose acetate; glass-based polarizers, such as glass having an oriented dichroic dye on its surface, etc. The invention is not restricted to linear light polarizers, but may employ circular or elliptical polarizing material as well.

An even wider latitude is available for the choice of an analyzing polarizer for the purpose described above, since it need not be of the same chemical nature as the polarizer overlay, and need not necessarily be in the form of a sheet. Thus, for example, even a simple Nicol prism can be used as the analyzing device.

The manner in which the transparent polarizing overlays are laminated to the information-bearing surface will depend in part upon the particular polarizing material selected and in part upon the nature of the surface to which it is being applied. For example, where an information-bearing surface comprising metal, paper, wood, or a wood product is sought to be laminated to virtually any of the polarizing materials described above, any one of numerous commercially available pressure-sensitive adhesives, such as those based on butadiene-acrylonitrile copolymers may be applied to either the polarizer surface or the information-bearing surface, following which the two surfaces are pressed together. Alternatively, epoxy-based adhesives may be employed in bonding the surfaces. It should be borne in mind, however, that certain of the commercially available epoxy adhesives require the application of heat for the provision of a good adhesive bond; where such an adhesive is employed, care must be taken not to apply heat of such a degree that it will dis-orient the polarizing material or otherwise render its polarizing characteristics non-uniform.

As stated above, the present invention is especially well-suited to use in connection with identification cards or badges, which cards or badges frequently comprise photographic likenesses of their holders or bearers, together with other identifying indicia. Conventional photographs, the surfaces of which are generally gelatin or modified gelatin, may be affixed to any of the polarizing materials described above with the aid of a transparent, pressure-sensitive adhesive such as Kleenstik adhesive (commercially available from National Starch and Chemical Corporation, Newark, N.J.) or epoxy resins; of particular efficacy in this respect are polymeric adhesives such as Eastman 910 cement, a cyano-acrylate polymer, commercially available from Armstrong Cork Company, Lancaster, Pa.

Where the identification card or badge contains a photographic likeness of its holder, it is often desirable, in the interest of speed and efficiency, to provide a rapid means of obtaining such a likeness. Of particular advantage in this respect, where a black-and-white photographic image is sought, are silver transfer images of the type which may be produced by applying a processing composition containing a silver halide developing agent and a silver halide solvent to a photoexposed photosensitive silver halide element and an image-receptive element that are in superposed relation. The processing composition acts to reduce exposed silver halide to silver, to react with unreduced silver halide to form a water soluble, complex silver salt, and to transfer it to the image-receptive element, and there, reduce it to silver. Examples of photographic materials useful in the production of the foregoing type of photographic silver images are described in detail in U.S. Patent No. 2,543,181 issued in the name of Edwin H. Land on February 27, 1951, and in U.S. Patent No. 2,647,056 issued in the name of Edwin H. Land on July 28, 1953. In a typical process employing such materials a processing composition containing a viscous aqueous solution of a silver halide developing agent, a silver halide solvent and an alkali is spread in a uniformly thin layer between the superposed surfaces of the photoexposed gelatino silver halide stratum of a photosensitive element and the silver-receptive stratum of an image-receptive element. The elements are maintained in superposed relation for a predetermined period ordinarily of approximately 10 to 120 seconds in duration, during which exposed silver halide is reduced to silver and unreduced silver halide forms a water soluble, complex silver salt which diffuses through the layer of composition to the image-receptive stratum, where, upon being reduced to silver, it forms a silver print. At the end of this period, the photosensitive element, preferably together with the solidified layer of processing composition, is stripped from the image-receptive element.

Image-receptive strata of the foregoing type include silver precipitating nuclei dispersed in a macroscopically continuous vehicle comprising sub-macroscopic agglomerates of minute particles of a water insoluble inorganic, preferably siliceous material such as silica aerogel. Silver grains precipitated in the foregoing manner are concentrated primarily at the surface of the stratum. This stratum, both before and after receiving these precipitated silver grains, is extremely thin, preferably being approximately 1 to 8 microns thick. Materials of the foregoing type are specifically described in U.S. Patents Nos. 2,698,237 and 2,698,245 issued to Edwin H. Land on December 28, 1954.

The foregoing process is particularly adapted for use in a Polaroid Land camera made by Polaroid Corporation, Cambridge, Mass. 02139, or a similar camera structure such, for example, as the camera forming the subject matter of U.S. Patent No. 2,435,717, issued to Edwin H. Land on February 10, 1948.

Where photographic likenesses of inividuals are desired for identification card purposes, the foregoing process when used in cameras of the aforementioned type renders it possible to obtain such likenesses immediately upon making the photographic exposure, and obviates the necessity of the usual waiting period required for conventional photographic processes wherein a negative must be photoexposed and developed in a separate subsequent operation.

Silver transfer prints of the aforementioned type can be affixed to any of the previously described polarizing materials by way of a pressure-sensitive adhesive. It is also possible, however, to laminate such prints to certain polarizers in a security seal, that is, a seal which cannot be broken or tampered with without immediately clearly rendering obvious the intrusion by destroying or defacing the photographic likeness. Thus, not only is the surface of the lamination protected from intrusion by the polarizer, but also, the lamination cannot be separated from behind without being easily detected. In one type of security seal for such prints, the polarizer comprises a hydroxylated polymer such as polyvinyl alcohol or polyvinyl alcohol copolymers, or hydrolyzed celluose acetate, and is laminated to the transfer print by way of an interlayer which comprises a copolymer of methyl vinyl ether and maleic anhydride.

Methods for preparing security-sealed laminations as just described are set forth in copending U.S. patent application, Ser. No. 562,767 of Howard C. Haas, filed July 5, 1966.

In certain instances it is desirable to provide an identification card or badge comprising a color photographic likeness of its holder or wearer and at the same time, retain the efficiency in production of the silver transfer prints described above. Color photographs of this nature can be prepared by diffusion transfer processes, wherein a sheet of photosensitive material is exposed to create therein a latent image. The latent image is developed and, concurrent with and under the control of this development,

an imagewise distribution of color-providing materials is formed. At least a portion of these color-providing materials is transferred by means of an alkaline aqueous processing liquid to a superposed image-receiving layer to form a colored positive image thereon. As examples of such processes, mention may be made of the processes claimed and disclosed in U.S. Patent No. 2,983,606, issued May 9, 1961, to Howard G. Rogers wherein dye developers (i.e., dyes containing a silver halide developing function and capable of developing exposed silver halide) are the color-providing materials; the processes claimed and disclosed in U.S. Patent No. 2,647,049, issued July 28, 1953, to Edwin H. Land, wherein color developers are employed to develop the latent image and color couplers are the color-providing materials; and the processes disclosed in U.S. Patent No. 2,774,668, issued December 18, 1956, to Howard G. Rogers, wherein complete, preformed dyes which are capable of coupling are used as the color-providing substances.

The image-receiving elements used in such processes generally comprise an opaque or transparent support coated with an image-receiving layer of a dyeable material which is permeable to the alkaline aqueous processing solution. The dyeable material generally comprises a film-forming material such as polyvinyl alcohol, and polyvinyl-pyridine polymers. The image-receiving layer may also include other materials useful in diffusion transfer processes, such as dye mordants, antifoggants, oxidizing agents, and acids and alkalies for pH adjustment.

Image-receiving elements of the foregoing type are described in U.S. Patent No. 3,148,061, issued September 8, 1964, to Howard C. Haas, and the aforementioned U.S. Patent No. 2,983,606.

In accordance with the present invention, color photographs of the aforementioned type may be affixed to any of the polarizing materials previously described via commercially available pressure-sensitive adhesives. Where the particular polarizing material selected comprises a polyvinyl alcohol-based polarizer, it is also possible to provide a security-sealed lamination by simply wetting the diffusion transfer color print, either with water or with water containing dissolved polyvinyl alcohol as a dope, or by employing a freshly prepared diffusion transfer color print whose surface is still wet from photographic processing and pressing the face of the print directly against the surface of the polarizer. Processes for preparing security-sealed diffusion transfer color photographs are disclosed and claimed in my copending U.S. patent application, Ser. No. 451,705, filed concurrently herewith.

It will be appreciated that the information-bearing surfaces are not limited to those described previously, but may comprise virtually any material which is capable of being printed on or otherwise impregnated with any desired data. Care must be taken, however, where the surface comprises a synthetic resinous material to select an adhesive bond, or interlayer which forms a good bond not only to the polarizer but to the particular information-bearing surface as well.

Where laminations of the aforementioned types are employed as so-called "credit cards," it is often desirable that the final card be embossable with certain information, such as with the holder's name, address or code number. These embossed cards may be placed in a small imprinter whereby the embossed indicia are applied to a receipt form or the like. Such cards are generally termed "self-writing" since they eliminate the time that would be required to manually imprint the necessary indicia on the receipt form. Embossed or embossable cards may be prepared which incorporate a light-polarizing element and which are thus provided with the security feature described above. Such cards preferably comprise a flexible information-bearing layer such as paper or a photograph, to which is bonded a flexible light-polarizing element, such as a polyvinyl alcohol-based polarizer. An additional transparent layer is then bonded to the surface lamination, which comprises a synthetic material capable of providing stable, sharp-edged raised letters or numerals as a result of a suitable embossing procedure, the techniques for which are well known to the art. Synthetic films of the aforementioned nature are conventionally known as "rigid vinyl" or "semi-rigid vinyl," and generally comprise polyvinyl chloride, or blends or copolymers of polyvinyl chloride and polyvinyl acetate.

It will be appreciated that the use of transparent non-polarizing films laminated over the polarizing element to polarizer-protected information surfaces is not limited to those instances wherein an embossable lamination is desired. Such a technique can be employed whenever it is sought to further protect the information-bearing surface; the transparent non-polarizing film may comprise any substantially transparent material, such as synthetic resins such as polystyrene, or glass, depending in part upon the desired flexibility of the final protected lamination.

Referring now to the drawing, FIGURE 1 represents a cross-section, greatly magnified, of the simplest embodiment of this invention. The lamination consists of an information-bearing layer **6**, which may comprise, for example, paper, wood or a photograph, to the surface of which is bonded a substantially transparent, light-polarizing overlay **7**.

FIG. 2 represents a cross-section, greatly magnified, of another embodiment of this invention, which comprises an embossed card or the like. The lamination comprises a flexible information-bearing layer **6**, to the surface of which is bonded a substantially transparent, flexible, light-polarizing sheet-like element **7**. A substantially transparent embossable vinyl overlay **8** is bonded to polarizer **7**. Raised areas **15** represent the areas "punched out" as a result of a suitable embossing procedure.

FIGS. 3 and 4 represent still another embodiment of this invention, which embodiment is particularly adapted to those situations in which only a portion of an information-bearing surface is sought to be protected by a light-polarizing element. FIG. 3 is a plan view of a partially protected surface, and comprises a lamination the surface of which comprises an image **9** having a substantially transparent light-polarizing area **10** over a portion thereof.

FIG. 4 represents a section taken along lines **4—4** of FIG. 3, showing the relationship of the image-bearing layer **6** and superposed polarizer **11**. In the preferred form of this embodiment, the lamination also includes a transparent, sheet-like overlay **12** which protects the entire information-bearing surface, especially the outer edges of the polarizer element. It is noted that transparent layer **12** may comprise a material capable of providing a security seal to the information-bearing surface, such as those previously described.

Laminations of the foregoing type may also be prepared by bonding a single substantially sheet-like element of which only a portion may be characterized as light-polarizing, to an information-bearing surface. For example, a portion of a transparent, molecularly oriented linear polymeric plastic sheet may be stained or dyed with a suitable dichroic stain or dye, and such sheet then be employed as an overlay for an information-bearing surface. Suitable molecularly oriented linear polymers, dichroic stains and dyes, and techniques for applying the dyes to the molecularly oriented linear polymeric films are well known to the art of polarizers and vectography.

FIG. 5 represents a section, greatly magnified, of a lamination prepared as just described. As shown, the lamination comprises an information-bearing surface **6**, covered with a layer **13** of a transparent, molecularly oriented linear polymeric material, a portion **14** of which has been stained or dyed with a dichroic stain or dye. If desired, the lamination may also have a transparent protective overlay, as described previously, where it is desired that the final surface have some particular feature

not characteristic of the linear polymeric material itself, such as embossability or a high degree of hardness.

The embodiments of FIGS. 3 through 5 are useful, for example, in embossable or embossed laminations in which it is desired not to have a polarizer interlayer in the specific areas of the lamination which are embossed. Also, it is useful in certain instances where for reasons of sensitivity the polarizer selected has an extremely low extinction value (i.e., transmits little or no light when viewed through a suitably oriented light-polarizing analyzer) but which by itself is only partially transparent or possesses a finite color. Examples of such polarizers are oriented polyvinyl alcohol having a relatively great amount of an absorbed dichromophore such as iodine, and dichroic dye polarizers in general. It is thus possible, in an identification card comprising a photographic likeness of its holder together with other printed indicia for example, to protect the printed indicia an da portion of the photographic likeness with such a polarizer overlay and still leave that portion of the photographic likeness containing the features of the holder unaltered so that it may readily be examined with the naked eye.

The following nonlimiting examples provide illustrations of polarizer-protected information-bearing surfaces in accordance with this invention.

Example I

A half mil Mylar film coated on both sides with pressure-sensitive resin 85–018, commercially available from Kleen-Stik Division of National Starch and Chemical Corporation, Newark, N.J., was applied to the surface of a linear dichroic polyvinylene-polyvinyl alcohol light polarizing sheet having a cellulose acetate butyrate backing, commercially available from Polaroid Corporation, Cambridge, Mass. 02139 and designated as type KN 42. The remaining adhesive surface was applied to the face of a silver transfer photographic print prepared from a Polaroid 3000 Speed Land Film, Type 107, and pressure was applied to the "sandwich" thus formed. The resulting laminar structure comprised a silver transfer photographic print having a transparent, light-polarizing overlay firmly affixed to its surface.

Example II

A pressure-sensitive adhesive known commercially as Shawinigan Resin D–263, available from Shawinigan Resins Corporation, Springfield 1, Mass., was doctored directly onto the surface of a polarizer similar to that described in Example I. The image-bearing face of a diffusion transfer color photograph, prepared from Polaroid Polacolor Land Film, Type 108, was juxtaposed onto the adhesive-coated polarizer, and the layers firmly pressed together. The resulting laminar structure comprised a diffusion transfer color photograph the face of which was protected by a transparent, polarizing overlay.

Example III

A polarizer similar to that described in Example I was given a single coating with a No. 18 Meyer rod of a 10% by weight aqueous solution of a high-molecular-weight poly(methyl vinyl ether/maleic anhydride), commercially available from General Aniline & Film Corporation, New York 14, N.Y., under the trade name Gantrez AN–169, which coating was allowed to dry until all tackiness had disappeared. A drop of water was placed along one side of a silver transfer print similar to that employed in Example I; the print was then passed through V-ing rolls along with the prepared polarized sheet in such a way that the print surface was pressed firmly against the coated surface of the polarizer, forcing the water across the face of the print between the surfaces being pressed together. The final laminar structure was similar to that prepared in Example I. After a period of about 5 minutes, an attempt was made to separate the print from its polarizer overlay; it was found that the image adhered firmly to the overlay.

Example IV

The face of a diffusion transfer color photograph similar to that used in Example II was swabbed with a solution of 10% polyvinyl alcohol in water. While the surface of the photograph was still wet it was pressed firmly against the surface of a sheet polarizer similar to those employed in the foregoing examples. The final laminar structure was similar to that prepared in Example II; after a period of about a minute, the color image was found to adhere firmly to the polarizer in a security seal.

Example V

A diffusion transfer color photographic image was made using Polaroid Polacolor Land Film, Type 108, and a Polaroid Automatic Model 100 camera. The image-receptive layer together with its superposed photosensitive element was pulled from the camera; the elements were maintained in superposed position for fifty seconds, after which they were stripped apart. Immediately after stripping, while the image-receiving surface was still fresh and wet, it was pressed firmly against the surface of a sheet polarizer similar to those used in the foregoing examples. The final laminar structure was substantially identical to the one prepared in Example IV.

Example VI

A high chloride content vinyl acetate/vinyl chloride rigid vinyl film, commerically available from Nixon Baldwin Co., Nixon N. J., under the trade name Vynex NHV 860 grade, was subcoated on one side with a 7:3 vinyl acetate-vinyl chloride copolymer; the surface of the subcoated vinyl film was partially hydrolyzed to convert at least part of the vinyl acetate in the subcoat to vinyl alcohol. A one-inch wide strip of sheet polarizer similar to that employed in the foregoing examples was swabbed with a doping solution consisting of 10% by weight polyvinyl alcohol dissolved in water, and was pressed against the subcoated surface of the vinyl film. The image-bearing surface of a diffusion transfer color photograph similar to those employed in the foregoing examples was swabbed with the same doping solution, and was then pressed onto the vinyl film in such a way that the polarizer strip was "sandwiched" between the image-bearing surface and the vinyl film, and covered a portion but not all of the photographic image. The resulting lamination exhibited a security seal similar to that of the laminations of Example IV and V.

A detailed description of the procedure for subcoating vinyl sheets with vinyl acetate-vinyl chloride copolymers and surface-hydrolyzing the resulting material may be found in copending U.S. patent application of Harold O. Buzzell and Howard C. Haas, Ser. No. 451,894, filed concurrently herewith.

Example VII

A polarizing area was conferred upon a sheet of molecularly oriented polyvinyl alcohol by imbibing Diazamine Light Red 7B 45, a dichloric dye, from a 2½% aqueous solution of the dye, at a temperature of about 45–47° C., into a strip about one inch wide at the center of the sheet. The face of a diffusion transfer color photograph similar to that used in Example II was swabbed with a solution of 10% polyvinyl alcohol in water. While the surface of the photograph was still wet it was pressed firmly against the surface of the oriented polyvinyl alcohol sheet described above in such a way that the polarizing area covered a portion of the photographic image. The final laminar structure was similar in appearance and properties to that described in Example VI.

Where laminations within the scope of this invention comprise identification or credit cards or badges, any of the laminations described above as being suitable for such a purpose can be slipped into a protective pouch or envelope, at least one side of which is transparent so as to reveal the information-bearing surface, together with

its protective light polarizer. Where such an envelope or pouch is used, a portion of the transparent wall through which the information-bearing surface is viewed may comprise a second light polarizer, the polarizing axis of which is oriented with respect to the light polarizer of the lamination in such a way as to provide a "built-in" analyzing device for the lamination taken as a whole. Thus, any alteration of the nature described previously, at least in that portion of the information-bearing surface adjacent to or near the analyzer portion of the pouch or envelope wall, is readily detectable to the naked eye by the discontinuity of light extinction resulting therefrom. For example, the transparent wall of the envelope or pouch may comprise suitably oriented polyvinyl alcohol or cellulose, containing a stripe, or a plurality of stripes of a suitable dichroic dye, metal complex, iodine, etc.

It will be obvious that the foregoing principle can be readily extended for use with larger information-bearing surfaces to which polarizers are laminated. Thus, for example, a built-in analyzing sheet can be provided by placing over and suitably affixing to any of the information-bearing surfaces described previously, a transparent sheet-like element comprising glass, oriented polyvinyl alcohol, oriented cellulose, cellulose acetate, etc., selective portions of which are treated so as to render them light polarizing, which analyzing sheet is suitably oriented with respect to the polarizer laminated to the information-bearing surface so as to at least partially extinguish the light passing through. As in the case of identification cards or badges, alterations to information-bearing surfaces so protected are readily revealed to the naked eye.

Since certain changes may be made in the above process and product without departing from the scope of the invention herein involved, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. A polarized-protected laminar structure comprising an information-bearing layer, to the information-bearing surface of which is laminated a substantially transparent light-polarizing sheet-like element, and a transparent sheet-like overlay suitably affixed to said substantially transparent polarizing sheet-like element, which overlay is characterized in that a portion of it is a light polarized, and further characterized in that its polarizing axis is oriented with respect to said light-polarizing sheet-like element in such a way as to at least partially extinguish the light passing therethrough.

2. A polarizer-protected identification card comprising a laminar structure comprising a first layer which comprises a photographic print and a second layer bonded to the image-bearing surface of said photographic print which comprises a flexible, light-polarizing, substantially transparent sheet-like element, which laminar structure is contained in an envelope, the wall of said envelope adjacent to said second layer of said lamination being substantially transparent and being characterized in that at least a portion thereof comprises a light polarizer, the axis of which is oriented with respect to said second layer as to at least partially extinguish the light passing therethrough.

3. A method of detecting tampering with an information-bearing surface which comprises viewing said surface through a light-polarizing device, said information-bearing surface being characterized in that it has affixed thereto a substantially transparent, uniformly light-polarizing element which if cut and subsequently re-fused, undergoes a detectable change in light-polarizing characteristics, and said light-polarizing device through which said information-bearing surface is viewed being characterized in that the light-polarizing axis thereof is oriented with respect to said uniformly light-polarizing sheet-like element in such a way as to at least partially extinguish the light passing therethrough.

4. The method of claim 3 wherein said information-bearing surface comprises a photograph.

5. The method of claim 3 wherein said substantially transparent uniformly light-polarizing sheet-like element comprises a molecularly oriented linear polymer.

6. The method of claim 5 wherein said polymer is polyvinyl alcohol.

7. The method of claim 3 wherein said substantially transparent uniformly light-polarizing sheet-like element comprises molecularly oriented polyvinyl alcohol, uniformly stained with a dichroic dye.

8. An identification card comprising an information-bearing surface having laminated thereto a substantially transparent, uniformly light-polarizing sheet-like element which if cut and subsequently re-fused, undergoes a detectable change in light-polarizing characteristics, in which card unauthorized tampering may be detected by viewing said card through a light-polarizing device, the light-polarizing axis of which is oriented with respect to said uniformly light-polarizing sheet-like element in such a way as to at least partially extinguish the light passing therethrough.

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EUGENE R. CAPOZIO, *Primary Examiner.*

W. J. CONTRERAS, *Assistant Examiner.*