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(54) A document, in particular a credit instrument able to reveal forgeries.

(57) To prevent the forgery of a document such as a bank cheque, or a personal credit instrument in general, perpetrated by photocopying or by doctoring the original printed data in any way, the support (1) is coated on one or both faces with a layer (3) of microencapsulated dye protected at least on the outside by a film of transparent lacquer (6), such that any attempt to write on the document produces an indelible mark visible from one or both sides; unauthorized photocopying is prevented by applying a metallized strip (7) with a reflective surface to one or both faces of the document, which causes an opaque, darkened area to appear in any photostatic reproduction, immediately distinguishing the copy from the original. Documents might be produced with the microencapsulation layer (3) only, or with the reflective strip (7) only, according to whether the main threat is falsification or reproduction.

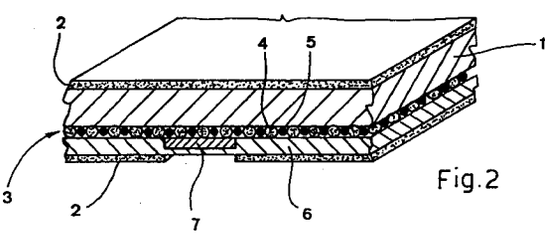

Fig.2

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The invention relates to a document, in particular an instrument of credit, enabling the detection of forgeries perpetrated by photostatic reproduction and/or modification of its original printed data, that is, typically, a cheque, share certificate, bond, credit card, IOU, coupon etc., incorporating means such as will show up falsifications produced by photocopying and/or by altering the data printed originally on such a document.

The prior art embraces means by which to detect the falsification of credit instruments, in particular bank drafts or bank cheques, effected by photocopy; such means consist in holograms of complex design applied to one face of the document, which assume a colour of greyish and bluish hue when photocopied, providing evidence of an attempt at forgery.

Notwithstanding their effectiveness as a preventive measure,
holograms must necessarily be applied at the end of the printing process, a factor tending to complicate the manufacture of the document and thus involving a considerable additional cost.

The prior art further comprises documents in which protection against the unwarranted alteration of printed data is obtained by impregnating or coating the support with substances sensitive to chemical or mechanical attack; treatments of this type are not sufficiently reliable, however, as forgers are able to obtain sympathetic chemical agents that can be utilized to erase printed data wholly or in part without leaving any trace of their use.

The prior art thus stands in need of considerable improvement, to the end of overcoming the drawbacks outlined above.

The object of the present invention is to provide a document that will reveal forgeries perpetrated by photocopying and/or altering original data, through the incorporation of means such as can enable any individual to recognize an attempt at falsification without the need for close examination, i.e. at a glance or by cursory inspection, and thus dissuade such attempts or in any event jeopardize the end result; to advantage, such means will be simple in embodiment, hence inexpensive, and easy to apply.

In a document according to the present invention, the stated object is realized by coating at least one face of the support, fashioned generally from paper though other materials are not excluded, with a layer of microcapsules such as those marketed by BAYER of Germany under the name Baymicron, which contain one component of a dye substance destined to leave an indelible mark when any attempt is made at writing on the support; applied in such a way as to cover the surface of the support either entirely or in part, the microcapsules are dispersed in a binder containing the remaining component of the dye substance and coated, at least externally, with a protective film of transparent impressionable material.

A second version of the invention comprises means by which to enable the detection of any attempt at photostatic reproduction, applied to the surface of the document and consisting in at least one foil or wafer element, advantageously of linear geometry in the interest of minimizing costs, which affords a specular exposed surface of reflective material and is secured preferably direct to one or both faces of the support, typically occupying a longitudinal or transverse portion of the surface area. In a third version of the invention, the document incorporates both the microencapsulated dye and the foil element, thereby enabling detection both of alterations and of photostatic reproduction.

It will be noted that pertinent prior art already embraces NCR (No Carbon Required) stationery, used mostly for the simultaneous duplication of forms such as invoices, receipts etc., formerly effected with carbon paper. The recto of a bottom copy is coated with a layer of microcapsules containing one half of a dual component dye substance destined to leave an impression of any mark made on the top copy; the capsules are dispersed in a binding agent containing the second component of the dye, in such a way that the two components are caused to react at any point where the encapsulation is fractured by pressure applied with a writing implement.

Advantages afforded by the present invention are: the facility of distinguishing a photocopy of the original document at a glance, whether black and white or in colour; the simplicity with which the photocopy detection element can be applied when printing the document; the fact that any attempt at changing, erasing or altering data printed on the original document can be identified immediately and safely even with a cursory inspection; reasonable cost.

The invention will now be described in detail, by way of example, with the aid of five accompanying sheets of drawings, in which:

Figure 1 is the front view of a document according to the invention, comprising a pair of reflective elements embodied as transverse strips, applied to the rear face;

Figure 2 shows the document in section through II-II of Figure 1, enlarged and in perspective, in a version comprising a reflective element sandwiched between a layer of dye microcapsules and a transparent protective film applied over the microencapsulation layer;

Figure 3 is the cross section through a document as in Figure 1, in a version with the reflective element applied over an outer ink layer;

Figure 4 is the cross section through a version in which the reflective element is associated with a self-adhesive layer of microcapsules;
Figure 5 is the cross section through a support, and a self-adhesive layer of microcapsules applied to one face of the support;
Figure 6 is the cross section through a support, a self-adhesive layer of microcapsules applied to the support, and a reflective element applied over the microencapsulation layer;
Figure 7 is the cross section through a support, a self-adhesive layer of microcapsules applied to the support, and a reflective element applied over an outer ink layer;
Figure 8 is the front view of a document according to the invention, illustrated in a version with the dye microcapsules only;
Figure 9 shows a section through IX-IX of Figure 8, enlarged and in perspective, illustrating the layer of microcapsules distributed over one of the two faces of the support;
Figure 10 is a further section through a document as in Figure 8, enlarged and viewed from the left hand end, in a version with two layers of microcapsules applied one to each face of the support;
Figure 11 is the section through a self-adhesive layer of microcapsules designed for application to a support in the manner of a label;
Figure 12 is a section showing the support of the document and a self-adhesive layer of microcapsules applied directly to the support;
Figure 13 is a section as in Figure 12 showing a version of the document in which a layer of microcapsules is applied to the outer ink layer;
Figure 14 is the front view of a document comprising reflective elements able to reveal a photostatic reproduction, in a version with two such elements, transversely disposed, applied respectively to the front and rear faces;
Figure 15 is the section through XV-XV in Figure 14, enlarged and in perspective;
Figure 16 is the enlarged section through XVI-XVI in Figure 14, showing a version of the document with a reflective element applied over the outer ink layer on the rear face.

In the drawings, 1 denotes a support consisting typically though not necessarily in paper with a mass of, say, between 60 and 120 g/m^2, and/or in a plastic material. 2 denotes an optional layer of ink covering either or both faces of the document, appearing continuous in most instances and of some few microns or more in thickness. 3 denotes a layer of microcapsules 4, of thickness corresponding to a mass of 8 g/m^2 or thereabouts, sandwiched between the support 1 and the ink 2. The microcapsules 4 contain a first component of a dual component dye substance, of which the purpose is to leave an indelible trace of any mark made on the document.

5 denotes the particles of a binder in which the second component of the dye is embedded, and 6 a film coating of clear protective lacquer applied to the exposed face of the encapsulation layer 3 and corresponding in thickness to some 8-10 g/m^2 mass; such a coating 6 must possess superior mechanical strength and flexibility while affording a readily impressionable surface. 7 denotes a foil or wafer of reflective material such as polyester with a metallic finish, measuring up to between 2 and 5 mm in width and between a few µm and some tens of µm thick, which to best advantage will be sandwiched between the microencapsulation layer 3 and the transparent coating 6 but might also be applied over the ink layer 2 (Figures 3 and 16) or in a break afforded by this selfsame layer 2 (Figures 6 and 15). 8 denotes a leaf of siliconized paper of thickness corresponding to 60...90 g/m^2 mass, which in the case of an embodiment featuring the self-adhesive microencapsulation layer 3 (Figure 4) is detachably associated with the transparent lacquer coating 6; 9 denotes a further coating of lacquer equal in thickness to the first coating 6, which is applied to the face of the capsule layer 3 opposite to that in contact with the first coating; 10 denotes a layer of adhesive spread over the second coating 9, of thickness corresponding to 10...15 g/m^2 mass, which is detachably associated with a further leaf of siliconized paper 11, and finally, 12 denotes a layer of ink (Figure 12) partially covering the first protective coating 6 applied to the microcapsules.

In a preferred embodiment of the present invention, with the layer 3 of microcapsules applied direct to the support 1, for example by laminar airflow, by self-adhesion using a label type medium (Figure 4), or by any other suitable process, or alternatively, applied over the ink layer 2, any attempt to write on either face of the document will result in the fracture of the microcapsules 4 and a consequent reaction between the two components of the dye, thus leaving an indelible mark on the support 1 that is visible from either or both sides.

Likewise if a document incorporating the reflective strip 7 is photocopied, the strip 7 will leave an opaque, black, or at all events a dark line across the copy, coinciding with the part of the original occupied by the strip, which provides evidence at a glance that the copy is simply a reproduction and possibly a forgery.

In practice, the materials, details of the design, shape and dimensions of the reflective strip might be other than as described in the specification, while remaining equivalent in terms of the art and by no means straying from the bounds of protection afforded by the appended claims.

For example, the reflective foil or wafer element might also exhibit patterns, holograms, cyanograms, perhaps in script or ornamentation, and could also take the form of a layer of metallic ink suitable for application by means of the particular transfer process adopted in printing the document.

Similarly, the support 1 itself might be fashioned in a plastics material such as polypropylene, PVC, polymethyl methacrylate, polyethene, etc.

Claims

1. A document, in particular an instrument of credit, able to reveal forgeries, consisting in a support coated on one or both faces wholly or in part with a thin layer of ink, characterized in that it comprises: a layer of dye microcapsules dispersed in a chemically active binding medium applied to at least one face of the support; an optional layer of ink applied over the layer of microcapsules and occupying the relative surface area entirely or in part; a protective film of impressionable transparent material applied at least to the face of the layer of microcapsules exposed to view; and optionally, applied to one or both faces, at least one foil element of metallized material affording a specular reflective outer surface and occupying a longitudinal or transverse or angled portion of or otherwise disposed on the relative face or faces.

2. A document able to reveal forgeries, embodied as a self-adhesive label, characterized in that it comprises: a layer of dye microcapsules dispersed in a chemically active binding medium applied to at least one face of the support; two protective films of flexible material applied to the respective faces of the layer of microcapsules, of which at least one is transparent and coated with a layer of adhesive enabling stable attachment of the label to the support, and the other, if not similarly transparent or if destined to coincide with the external surface of the document, is impressionable; two removable protective leaves of siliconized paper between which the encapsulation layer and the two protective films are sandwiched; and optionally, applied to the face of the label exposed to view, at least one foil element of metallized material affording a specular reflective outer surface and occupying a longitudinal or transverse or angled portion of or otherwise disposed on the exposed face.

3. A document as in claim 1 or 2, wherein the foil element is sandwiched advantageously between the layer of dye microcapsules and the transparent protective film.

4. A document as in claim 1 or 2, wherein the foil element is applied directly to the surface of the support during the relative printing process.

5. A document as in claim 1 or 2, wherein the foil element is applied over the layer of ink deposited on the support, following the relative printing process.

6. A document as in claim 1 or 2, wherein the foil element is embodied as a linear or nonlinear strip, or as a patch, band, script or figure plain or decorative in design.

7. A document able to reveal forgeries, characterized in that it comprises a layer of dye microcapsules dispersed in a chemically active binding medium applied to at least one face of a support, an optional layer of ink applied over the layer of microcapsules and occupying the relative surface area entirely or in part, and a protective film of transparent impressionable material applied at least to the face of the layer of microcapsules exposed to view.

8. A document able to reveal forgeries, embodied as a self-adhesive label, characterized in that it comprises a layer of dye microcapsules dispersed in a chemically active binding medium applied to at least one face of the support, two protective films of flexible material applied to the two respective faces of the layer of microcapsules, of which at least one is transparent and coated with a layer of adhesive enabling stable attachment of the label to the support, and the other, if not similarly transparent or if destined to coincide with the external face of the document, is impressionable, and two removable protective leaves of siliconized paper between which the encapsulation layer and the protective films are sandwiched.

9. A document able to reveal forgeries, characterized in that it comprises, exposed to view on one or both faces, at least one foil element of metallized material affording a specular reflective outer surface and occupying a longitudinal or transverse or angled portion of or otherwise disposed on the relative face or faces.

10. A document as in claim 9, wherein the foil element is applied directly to the surface of the support during the relative printing process.

11. A document as in claim 9, wherein the foil element is applied over the layer of ink deposited on the support, following the relative printing process.

12. A document as in claim 9, wherein the foil element is embodied as a linear or nonlinear strip, or as a patch, band, script or figure, plain or decorative in design.

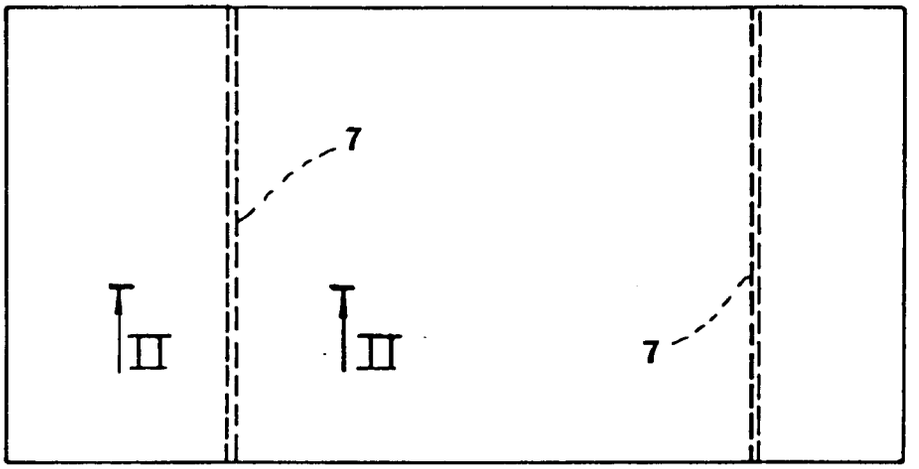

Fig.1

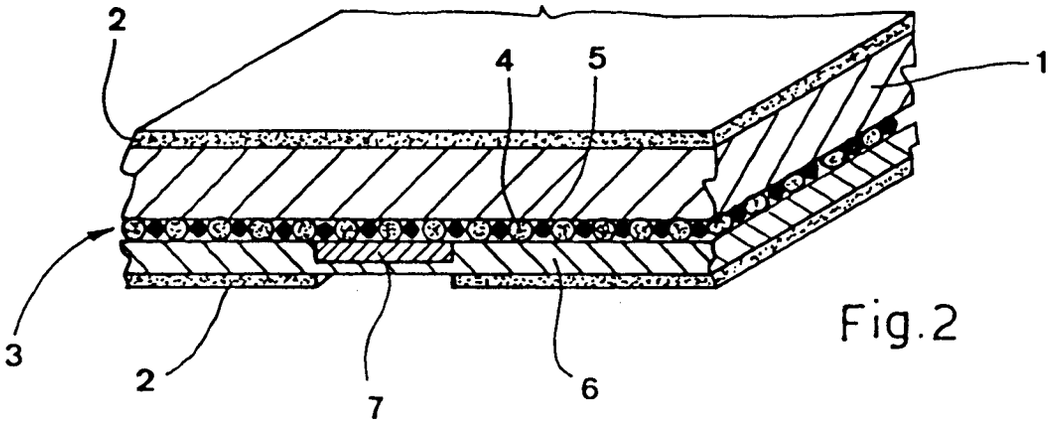

Fig.2

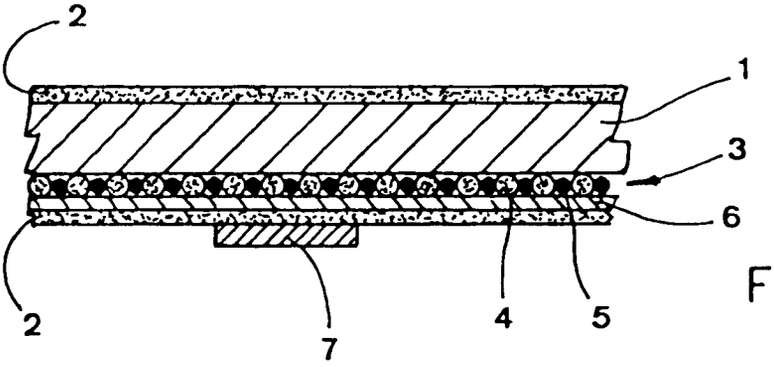

Fig.3

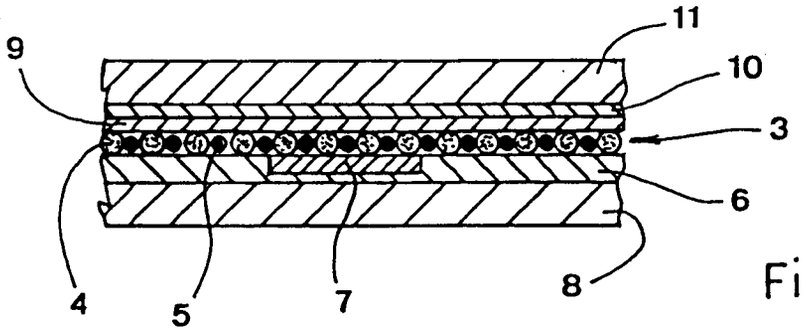

Fig.4

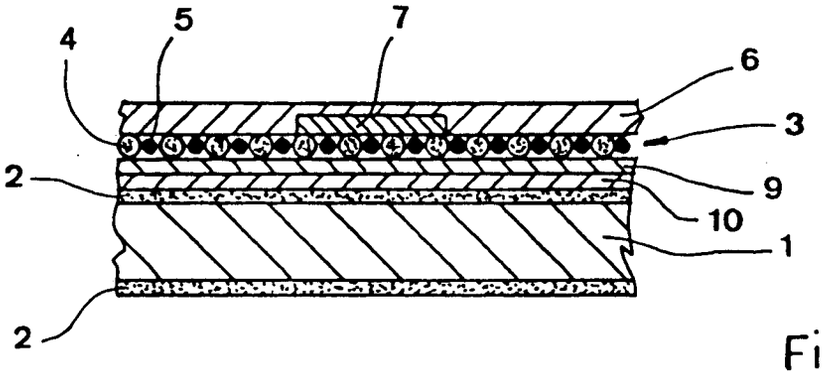

Fig.5

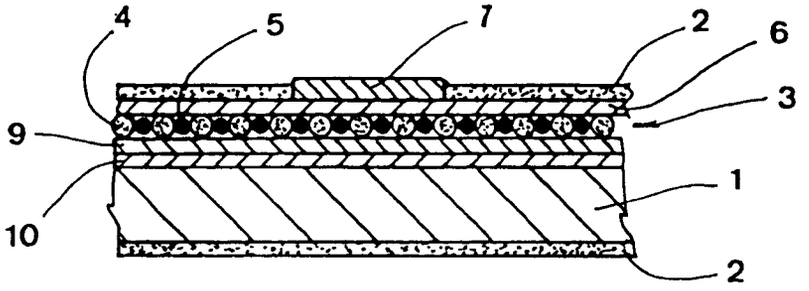

Fig.6

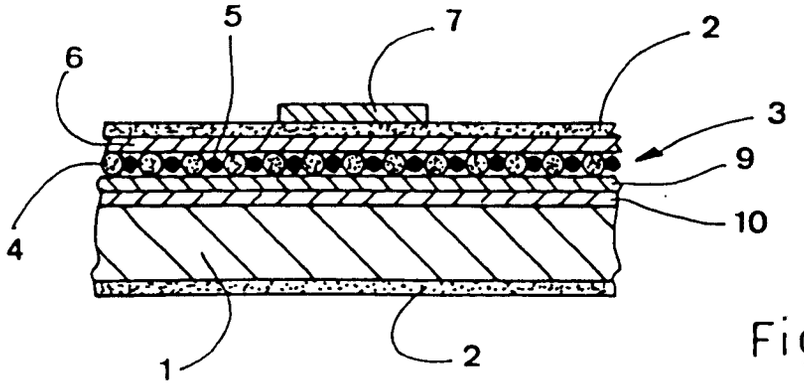

Fig.7

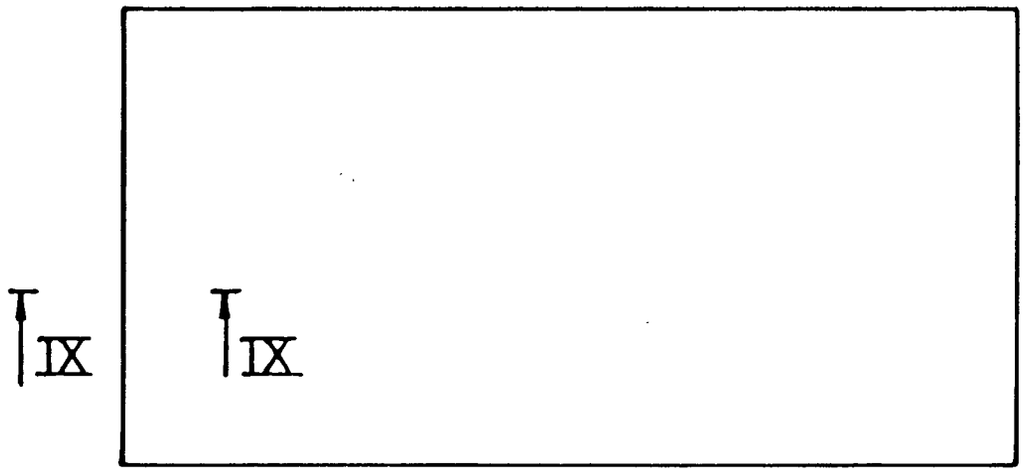

Fig.8

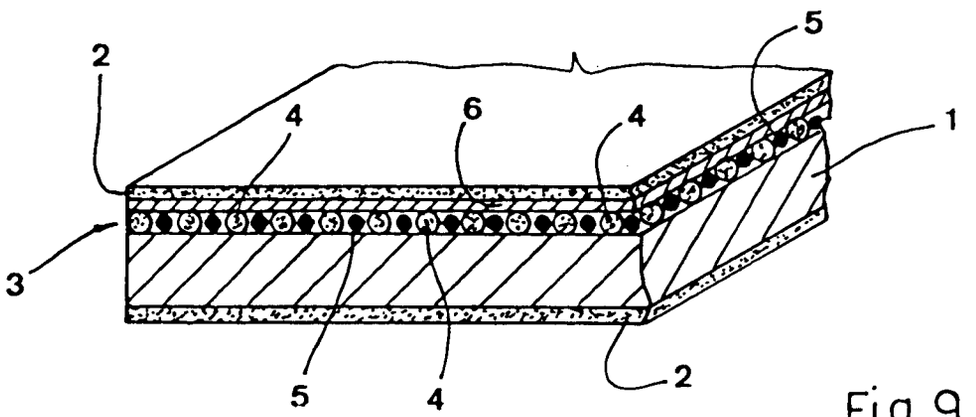

Fig.9

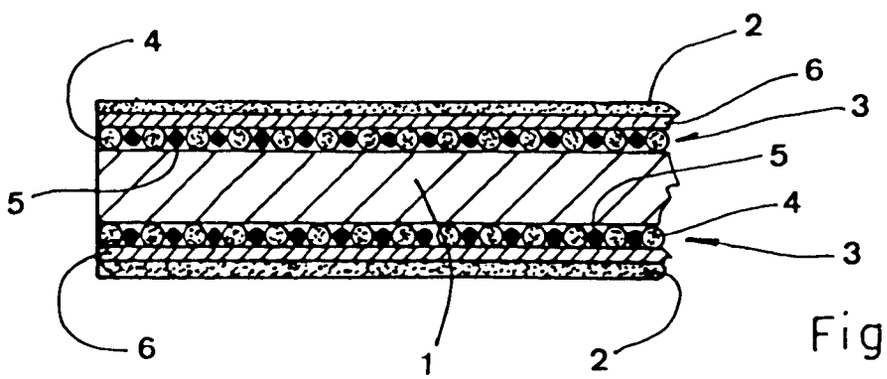

Fig.10

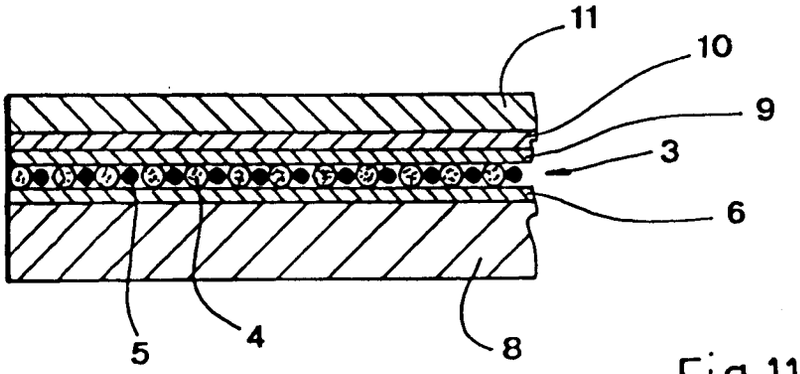

Fig.11

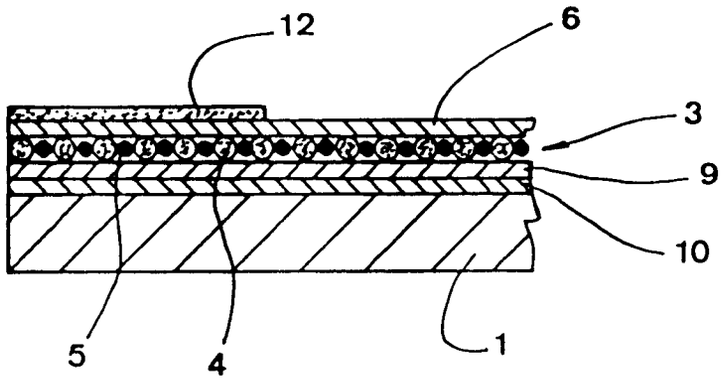

Fig.12

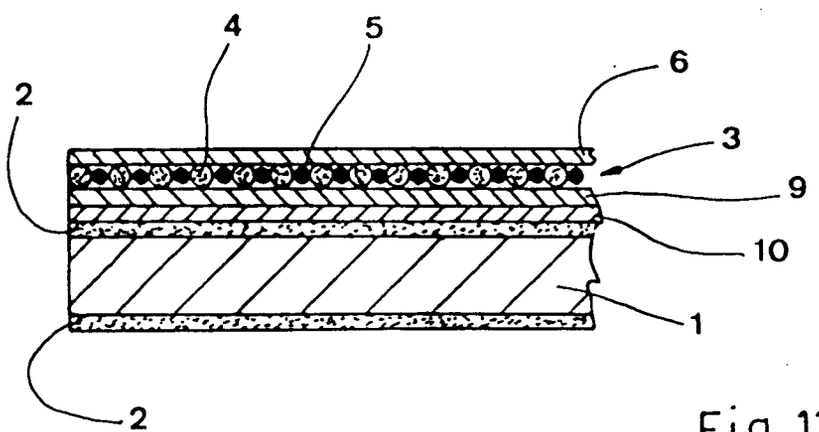

Fig.13

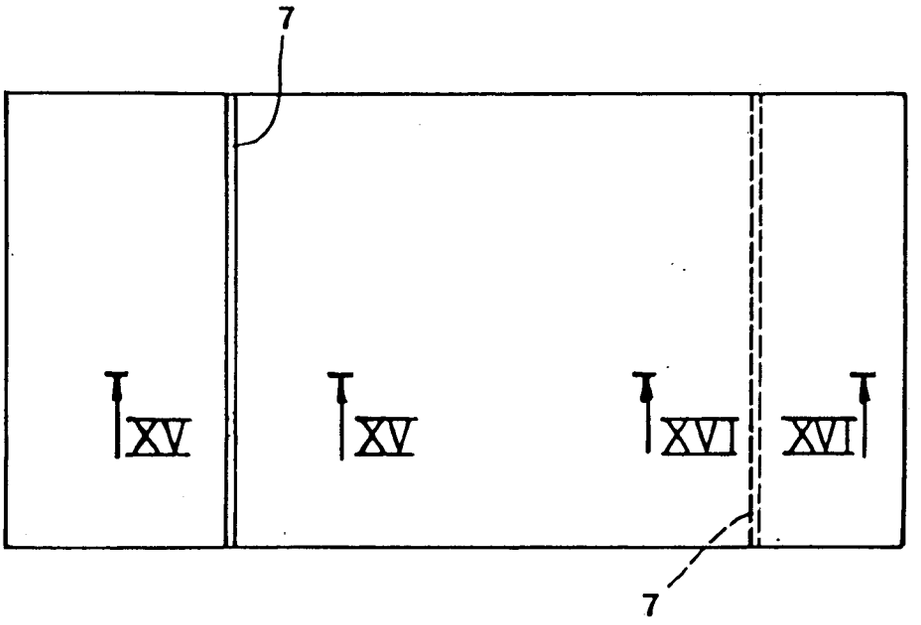

Fig.14

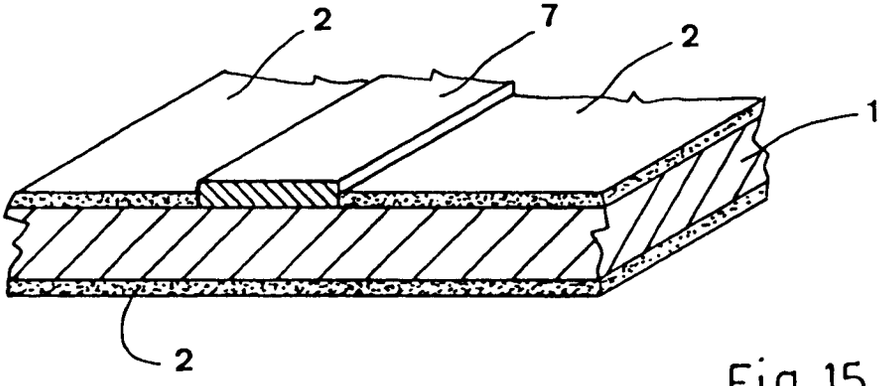

Fig.15

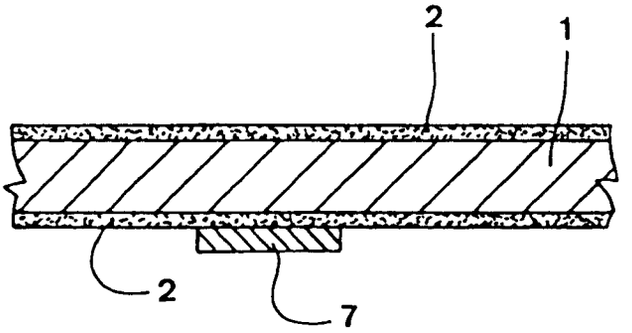

Fig.16

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 92 10 1228

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X Y	GB-A-2 139 951 (SMALL) * page 1, line 27 - line 85; figure 2 *	7 1	G07D7/00 B42D15/02 G03G21/00
X Y	GB-A-2 033 839 (WIGGINS TEAPE) abstract * figures 1,4 *	9,12 1	
A	US-A-4 511 616 (PITTS, SALIT) abstract * figure 6 *	2,8	
A	GB-A-2 026 385 (BARCHAS) abstract * figure 1 *	2,8	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)
B42D G09F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	16 APRIL 1993	EVANS A.J.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
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P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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