



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/IT92/00067 (22) International Filing Date: 25 June 1992 (25.06.92) (30) Priority data: RM91A000471 28 June 1991 (28.06.91) IT (71) Applicant (for all designated States except US): ITAL IDEE S.R.L. [IT/IT]; Via Vallelunga, I-00060 Castelnuovo di Porto (IT). (72) Inventor; and (75) Inventor/Applicant (for US only) : CANTONI, Angelo [IT/IT]; Via Vitaliano Brancati, 51, I-00145 Roma (IT). (74) Agents: CAVATTONI, Fabio et al.; Cavattoni - Raimondi, Viale dei Parioli, 160, I-00197 Roma (IT).		(81) Designated States: JP, RU, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LU, MC, NL, SE). Published <i>With international search report.</i>
(54) Title: SECURITY INFORMATION CARRIER, ESPECIALLY FOR GRAPHIC INFORMATION		
(57) Abstract		
<p>The information carrier (1) is of the paper type, having at least two layers (2, 3) which are operatively coupled to one another, in which the graphic information is produced at the time of writing in the interface between two layers by means of activation by physical means such as mechanical pressure, visible or invisible light radiation or heat energy. At least one of the layers (2, 3) is transparent or semi-transparent, in order to be able to see the graphic information after it has been written. The information carrier (1) exhibits security features against counterfeiting, modification or erasure by virtue of the fact that the items of graphic information are present in the inaccessible interface between the at least two layers (2, 3). The information carrier is particularly useful in securities, bank cheques, bills of exchange and other documents in which the information, however recorded, must not be altered and/or any attempt at tampering therewith must be made manifest.</p>		

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"Security information carrier, especially for graphic information"

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Description

The present invention relates to a security information carrier, especially for graphic information.

For many years, it has been felt that there is a need to make documents bearing graphic information written either manually or mechanically using various means available with modern technology unalterable.

Particular importance is ascribed, as is known, to bank cheques of all types, securities such as bills of exchange and the like, legal deeds, etc., in which a fraudulent alteration of the graphic information present on the document might involve very serious damage.

Up to the present time, use has been made of writing instruments which left an indelible mark. The classic example was that of the so-called indelible pencil, which has been in widespread use in public offices.

Writing instruments using indelible inks have also been devised.

All these known techniques for increasing the difficulty of illicitly altering documents have not proved to be entirely satisfactory, since the face of the substantive writing carrier is exposed and is thus subject to relatively easy interference on the part of malevolent parties.

The object of the present invention is to provide a security information carrier, especially for graphic information items, which exhibits a very high degree of security with regard to unlawful tampering, while

maintaining the convenience of use of the information carriers of conventional type.

According to the present invention, the security information carrier, especially for graphic information items, is composed of a carrier of the paper type, having at least two layers which are operatively coupled to one another, in which the graphic information is produced at the time of writing in the interface between the two layers by means of activation by physical means such as mechanical pressure, visible or invisible light radiation or heat energy.

At least one of the two layers is transparent or semi-transparent, in order to be able to see the graphic information after it has been written. The information carrier exhibits security features against counterfeiting, modification or erasure, by virtue of the fact that the items of graphic information are present in the inaccessible interface between the at least two layers.

The information carrier is particularly useful in securities, bank cheques, bills of exchange and other documents in which the information, however recorded, must not be altered and/or any attempt at tampering therewith must be made manifest.

The present invention will now be described with reference to its currently preferred embodiments given on an illustrative and non-limiting basis, and based on the figures of the accompanying drawing, in which:

Figure 1 shows an information carrier according to the invention of the paper type, obtained by means of adhesive bonding of two sheets, the facing surfaces of which have been covered with active material;

Figure 1a diagrammatically shows the two sheets of paper according to Figure 1, prior to their assembly;

Figure 2 diagrammatically shows the carrier of Figure 1 after the graphic information has been recorded;

Figure 2a shows a cross-sectional view according to the plane II-II of Figure 2; and

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Figure 3 shows how the recorded graphic information would be seen, upon separating one of the two sheets making up the information carrier.

With reference to Figures 1 and 1a, the information carrier indicated in its entirety by 1 is composed of two elementary sheets 2 and 3 having surfaces 4 and 5 covered with a material which is capable of constituting a graphic recording with writing means.

The covering materials of the surfaces 4 and 5 must clearly be compatible with an adhesive intended to unite the elementary sheets 2 and 3.

In a particular embodiment such as that shown in Figure 1, the graphically active surface present on the elementary sheets 2 and/or 3 is produced only on the zone 6 of the document 1.

Clearly, there is nothing to prevent a situation in which the graphic activation treatment is extended to any other part or to the entire surface of the document 1.

The graphically active material spread on the surface 4 and/or 5 may be of a variety of types.

Various types of materials and their possible combinations which have proved to be convenient in the practical realisation of the present invention are listed:

a) Leuco-dyes enclosed in microcapsules, which can be easily broken by exerting pressure, of the one-component or two-component type and which are commercially known as "Carta Action" or "Carta NCR". These type of materials are well known and it is not considered necessary to give a detailed description thereof.

b) Heat-sensitive materials essentially composed of leuco-dyes, the colour centres of which are thermally activated, and which are well known from the technology applied to heat printers.

c) Photosensitive materials which can be activated by sources of actinic light of high intensity,

capable of bleaching a dye or of activating its colour centres.

The particular selection of the solutions exemplified in a, b and c will essentially be linked to the particular intended purpose of the information carrier according to the invention.

It should hardly be necessary to state that in the case of documents which are to record handwriting it will be obligatory to select the solution "a".

In the case of reprographic machine writing, etc., solutions a, b or c will be selected according to the technology of the printing or stamping equipment.

Figure 2 shows the appearance of the information carrier 1 after a graphic information item exemplified as "CM" has been entered in the zone 6.

Figure 2a shows how the graphic element "CM", indicated by 7, is situated substantially within the information carrier 1, i.e. within the interface between the elementary sheets 2 and 3.

It should be noted that the dimensionings and the relative thicknesses, as are presented in Figures 1, 1a, 2 and 2a, are simply illustrative for the sake of an improved understanding of the structure of the information carrier in question.

Finally, Figure 3 shows the presentation of the graphic information recorded in the zone 6 when the elementary sheets 2 and 3 have been separated.

In this connection, it is useful to state that the adhesive which unites the elementary sheets 2 and 3 must be selected from among the adhesive materials which are non-reversible and insoluble in solvents and possibly having a penetrating action into the fibres of the paper material. Particularly suitable adhesives are those which are composed of polymerising resins forming a polymer which is insoluble and thermally stable.

Clearly, the adhesive employed must be such as not to inhibit the process of internal storage, or, alternatively, must be applied to the surface in a

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selective manner, avoiding the zones (obviously not too close to the edges) intended for the storage of the information items to be protected. The aforementioned zones would in any event remain inaccessible from the outside, since they are surrounded by adhesively bonded zones.

The present invention has been described with reference to its currently preferred embodiments given on an illustrative and non-limiting basis, and it will be understood that variations and modifications may be made in practice by an expert in the field, without departing from the scope of protection of the present industrial monopoly right.

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CLAIMS

1. Security information carrier, especially for graphic information items, characterised in that it comprises a carrier of the paper type, having at least two layers which are operatively coupled to one another, in which the graphic information is produced at the time of writing in the interface between two layers by means of activation by physical means such as mechanical pressure, visible or invisible light radiation or heat energy.
2. Information carrier according to Claim 1, characterised in that at least one of the two layers is transparent or semi-transparent, in order to be able to see the graphic information after it has been written.
3. Information carrier according to Claims 1 or 2, characterised in that the zone or zones of graphic recording extend over a limited part of the information carrier.
4. Information carrier according to one or more of the preceding claims, characterised in that in the case of writing by means of mechanical pressure, between said at least two layers there are interposed leuco-dyes enclosed in microcapsules, which can be easily broken by exerting pressure, of the one-component or two-component type.
5. Information carrier according to one or more of Claims 1 to 3, characterised in that in the case of writing by non-mechanical physical means, between said at least two layers there are interposed heat-sensitive materials composed of leuco-dyes, the colour centres of which are thermally activated.
6. Information carrier according to one or more of Claims 1 to 3, characterised in that in the case of writing by non-mechanical physical means, between said at least two layers there are interposed photosensitive materials which can be activated by sources of actinic light of high intensity, capable of bleaching a dye or of activating its colour centres.

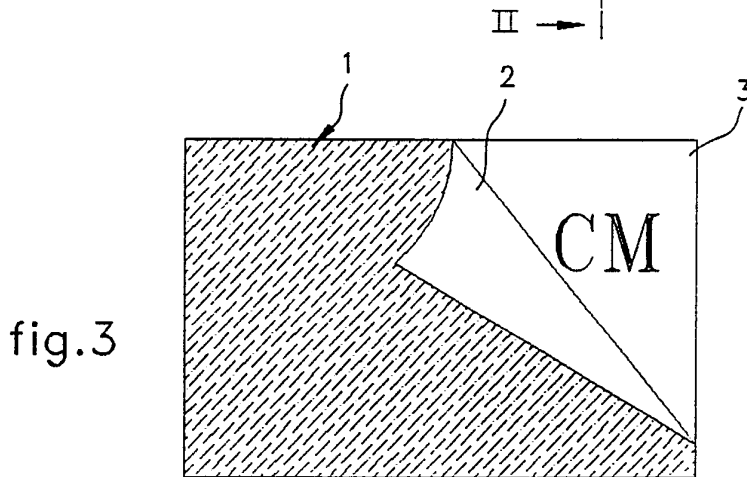
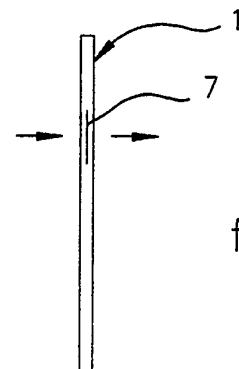
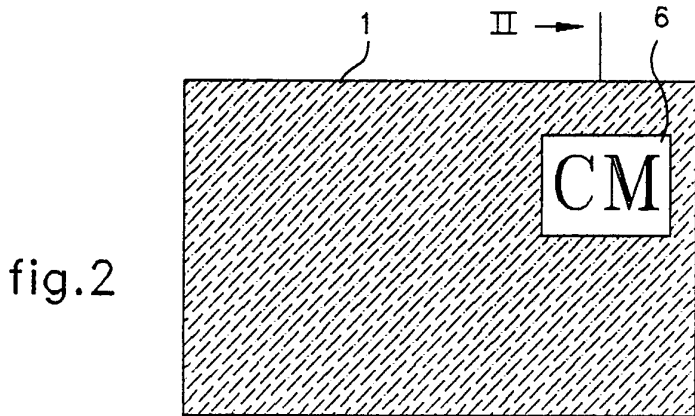
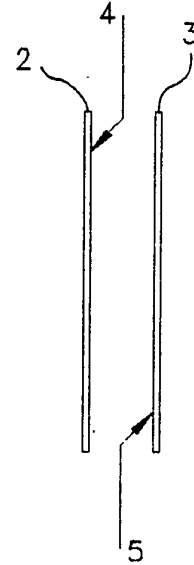
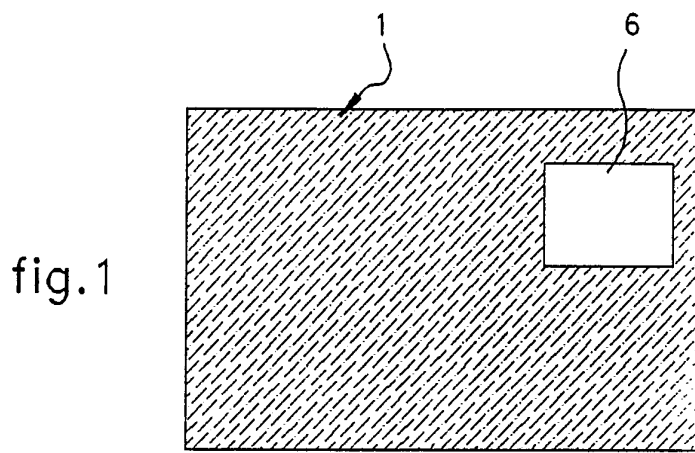
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7. Information carrier according to one or more of the preceding claims, characterised in that said at least two layers are adhesively bonded by means of adhesives which are non-reversible and insoluble.

8. Information carrier according to one or more of the preceding claims, characterised in that the adhesive is of the type such as not to inhibit the process of internal storage.

9. Information carrier according to one or more of the preceding claims, characterised in that the adhesive, where of the type consisting of a film interposed between the two layers such as to inhibit the process of internal storage, is applied to the surface in a selective manner, avoiding the zones intended for the storage of the information items to be protected.

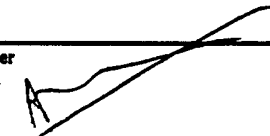
10. Security information carrier, especially for graphic information items, according to one or more of the preceding claims and substantially as described and illustrated with reference to the figures of the accompanying drawings.



INTERNATIONAL SEARCH REPORT

PCT/IT 92/00067

International Application No

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC Int.Cl. 5 B42D15/10; B42D15/00		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
Int.Cl. 5	B42D ; G06K	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹		
Category ⁹	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	GB,A,2 139 951 (SMALL) 21 November 1984	1-4,7-10
Y	see the whole document ---	5,6
X	GB,A,2 111 430 (BA SECURITIES RESEARCH) 6 July 1983 see the whole document ---	1-4,7-10
X	GB,A,2 075 917 (MAGNETDRUCK STEENKEN) 25 November 1981 see the whole document ---	1-4,7-10
Y	US,A,2 953 454 (BERMAN) 20 September 1960 see column 2, line 25 - line 56; figures 1-4 -----	5,6
<p>⁹ Special categories of cited documents :¹⁰</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
30 SEPTEMBER 1992	22. 10. 92	
International Searching Authority	Signature of Authorized Officer	
EUROPEAN PATENT OFFICE	EVANS A.J. 	

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO. IT 9200067
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information. 30/09/92

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