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(54) **Security coating of documents**

(57) A coating process that when applied to non-impact print/markings will improve the wear (or rub) characteristics and the security of the markings against fraudulent alteration.

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Description

This invention relates to the security coating of documents, so that tampering or alteration of the previously fused or dried computer generated data is deterred as tampering or alteration can be detected.

When documents are printed by traditional techniques - such as typing or impression printing, the paper substrate is indented and/or partially penetrated by the marking medium, typically ink. As a result, even when the document is altered, by scraping off surface ink, or by using blanking material, traces of the original imprint can be found in compression of the paper substrate by type impact, or residual ink particles which have entered into the substrate.

Increasingly however, printing techniques which involve no impact of type on the paper are used, for economic reasons, and are generally associated with computer generated digital images. Impact free printers using bubble-jet, ink-jet, laser, LED, Ion Deposition and similar imaging technologies are increasingly used, since computer generated impact printing methods cannot operate at the very high character per second speeds required or have the imaging flexibility.

Consequently, it is relatively easy for laser-printed or other toner printed documents to be altered by removing the fused toner deposit, and substituting fresh characters, leaving no trace of the original characters. It has thus not so far been possible to use laser printing for the creation of secure documents which are proof against relatively simple fraudulent alteration.

An object of the invention is to provide a process for secure printing of documents in such a way that fraudulent alteration or attempted alteration can be detected, so that any printing method can be used for the creation and economic reproduction of secure documents.

In accordance with the invention, a process for secure coating of variable computer generated markings on documents comprises the steps of first printing the desired markings generated by computer onto a substrate, and then applying a fixing composition over at least the areas containing said markings.

The markings may be any image or characters generated by a computer and printed by any method, including impact printing or typing as well as non impact methods such as those set out above.

Application of the coating may be restricted to the areas of the substrate with such markings and may be effected by a flexographic, gravure, silk screen or other suitable process. Any further coatings, to achieve other effects are carried out by similar means.

Using the process of the invention, it is possible to create security documents, e.g. with personalisation and/or encoding. The application of the coating may be further restricted to specific critical areas of a document such as a financial sum, or a digitally created signature, making the technique cost effective, and allowing use of conventional security printing techniques.

The method may for example be used in the creation of financial documents, cheques, payment warrants, identification documents or the like, where alteration to a figure or a name by fraudulent alteration would give financial or other gain.

The coating may comprise any one or more of a monomer, polymer or copolymer of vinyl's, acrylates, polyesters, and/or urethanes; and a catalytic initiator which activates cross-linking when irradiated by e.g. an electron beam, UV, IR radiation or other suitable energy source. The coating may also be a resin based system capable of polymerisation by an external energy source, such as an electron beam, IR, UV radiation or other suitable energy source.

Generally speaking, no organic or inorganic solvent or extender is used.

Further coatings may be applied over areas where the coating has been applied using the same or different compositions. This makes it possible to create opportunities to develop high gloss effects over the non-impact laser toner print. The primary or subsequent coatings may be further enhanced by the addition of optically variable effects, such as UV or IR fluorescent reactions, thermo and/or photosensitive reactions, iridescent and interference pattern effects including the simulation of holograms.

The application of the coating is preferably performed by a printing process so that it is possible to create intricate registered patterns and interactions which are not feasible by other techniques. It is also possible to produce tactile effects on the surface over the critical areas.

The coating is preferably applied at a film weight of over 4 gm².

A number of examples of the process according to the invention will now be described by way of example, and with reference to the accompanying drawing, which is a diagrammatic view of an apparatus for use in the process according to the invention.

Example 1 - Laser Printing

In accordance with the invention, a process for the coating of documents printed by laser printing comprises the steps of first laser printing and fusing the desired image or characters onto a paper substrate, and then applying a coating over at least the laser printed area of the substrate.

In the case of laser printing an electrostatic image is formed on a drum or belt or other suitable surface by the laser in a dense dot matrix pattern corresponding to the characters desired. The counter charged toner particles are attracted to these areas, any toner in the non image areas is removed and recycled. The toner in the image areas is then transferred to the substrate and then fused by heat and overall pressure (or other suitable method) to the substrate. The fused toner forming the printed characters is however essentially a superfi-

cial deposit on the surface of the paper substrate and no impression is made either by entry of pigment into the substrate, or by deforming of fibres by impact or pressure in the image areas.

The application of the coating has the effect of causing part of the non-impact laser toner print to enter into the substrate. This is caused by the coating penetrating into the fused toner and substrate wetting them thus allowing some penetration of the toner into the substrate. Consequently, in an attack on the printed image, not only the toner is removed, but also toner covered fibres are pulled from the paper. The result of this tampering will either leave a trace image of toner in the paper fibres, or detectable disturbance of the paper fibres.

Example 2 - Improving wear (or rub) resistance

The invention can be used to increase the wear resistance of computer generated data e.g. bar codes, MICR, etc. In the case of bar-codes which are read many times during their life cycle the image can deteriorate due to the reading head being in contact with the image and rubbing off some of the image each time. The application of the coating over the previously fused image (in the case of laser printing) protects the image extending its life. MICR characters tend to be used on documents which are read only once (or a few times). In this case particles are removed from the image and deposited on the reading head. This deposit can build up to a degree that the reading head becomes ineffective. The application of the coating over the MICR prevents the particles being removed thus the deposit on the head is avoided.

Example 3 - Application of the coating using the flexographic printing process

An image such as an emblem or a group of characters is printed by non-impact printing onto a paper substrate and is fused or dried then coated by this preferred method.

In the process, a substrate sheet 1, such as paper of a suitable grade and weight is fed between an impression roller 2, and a plate cylinder or print roller 3. A coating chemical is circulated in an ink duct 6 in contact with an anilax roller 4, (or other suitable transfer device). The chemical is transferred to raised image areas 5 on a flexographic plate on the print roller 3 which in turn transfers the chemical to the required areas on the substrate 1 by use of the impression roller 2.

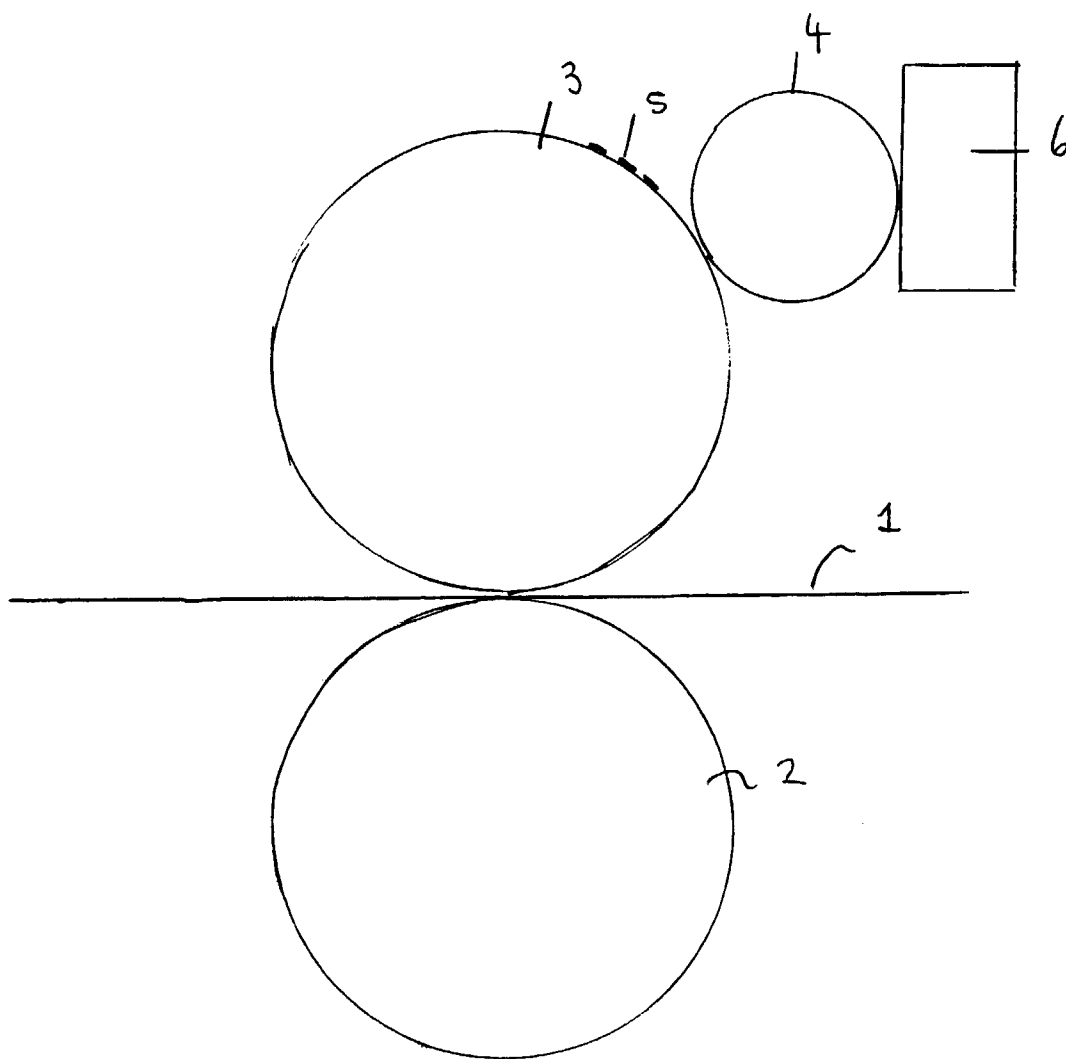
After the chemical is coated onto the substrate 1, it is then exposed to an energy source which initiates polymerisation.

generated markings on documents characterised by the steps of first printing the desired fused markings generated by computer onto a substrate and then applying a coating over at least the areas containing said markings.

2. A process according to claim 1, wherein said coating is a monomer, polymer or copolymer of any one or more of vinyls, acrylates, polyesters, urethanes and/or other similar substances.
3. A process according to claim 2, wherein the coating is polymerised by application of an external energy source comprising an electron beam, or IR, UV radiation or other suitable energy source.
4. A process according to claim 3, wherein said coating comprises a synthetic plastics material and catalytic reaction which activates cross-linking when irradiated by said external energy source.
5. A process according to claim 4, wherein said coating is a resin based system capable of polymerisation by an external energy source.
6. A process according to claim 1 or 2, wherein the coating crosslinks without exposure to an external energy source.
7. A process according to any preceding claim, wherein application of the coating is restricted to specific critical areas of a document.
8. A process according to any preceding claim, wherein the area or areas to which said coating has been applied are treated by application of one or more further coatings, using the same or different compositions
9. A process according to any preceding claim, wherein said coating or coatings are applied by a printing process.
10. A process for secure printing of documents by non impact printing substantially as hereinbefore described with reference to the examples given.

Claims

1. A process for secure coating of variable computer





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EUROPEAN SEARCH REPORT

Application Number
EP 97 30 8777

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.6)
X	EP 0 500 372 A (KONISHIROKU PHOTO IND) * claim 6 * * page 17, line 3 - line 5 * * page 17, line 51 - line 55 * * the whole document *	1-5,7,9	B41M7/00 B41M3/14
Y	---	8	
Y	DE 36 10 204 A (SCHORN RAINER DIPL ING) * claims 3,4 *	8	
X	US 5 232 812 A (MORRISON IAN D ET AL) * the whole document *	1-6	
X	EP 0 081 887 A (COULTER STORK PATENTS) * claim 1 * * the whole document *	1,7,9	
A	EP 0 737 593 A (WESTVACO CORP) * page 3, line 28 - line 29 * * claims 6,8,9 * * the whole document *	1-10	
A	WO 96 29205 A (LUNDGREN CLAES G L) * page 6, line 17 - line 22 * * claim 4 * * the whole document *	1-10	B41M G03G
A	US 5 084 095 A (FRITZ THOMAS M) * claim 3 * * the whole document *	1-10	
A	PATENT ABSTRACTS OF JAPAN vol. 012, no. 145 (M-693), 6 May 1988 & JP 62 267193 A (DAINIPPON PRINTING CO LTD), 19 November 1987, * abstract *	1-10	
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 14 January 1998	Examiner Martins Lopes, L
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 O : non-written disclosure 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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Application Number
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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.6)
A	US 4 067 737 A (LEWIS ANTHONY VINCENT) * claims * * the whole document * -----	1-10	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 14 January 1998	Examiner Martins Lopes, L
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 O : non-written disclosure 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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