Abstract: The present application describes products incorporating non-visible information for identifying the source of the product, the identity of the product, or the identity of an asset to which the product is affixed or for which the product serves as packaging. The product includes a base layer onto which information is encoded using a non-visible information encoding. An obscuring layer may also be provided. The obscuring layer is provided separately from the base layer and obscures the non-visible information encoding from view. The obscuring layer may be a card face, a thin material film, a latex sheet, foil, varnish, or opaque ink printed over the variable magnetic code. A method for incorporating a non-visible information into a product is also provided.
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METHOD AND APPARATUS FOR INCORPORATING NON-VISIBLE INFORMATION INTO A PRODUCT

TECHNICAL FIELD

The present application generally addresses product identification and packaging, and more specifically the association of identifying information related to a product with an item used to package the product, or which is affixed to the product or the product's packaging.

BACKGROUND ART

Sometimes, it is desirable to incorporate non-visible information into a manufactured product. Non-visible information can be incorporated into a product, such as a security document, using a variety of means. For example, an ePassport utilizes a chip, attached to an inlay and embedded in the cover of the passport, to provide identifying information about the passport. The chip is read using an electronic device. The inlay of the chip in the passport has an antenna attached to enable the electronic device to read the chip.

In some instances, security documents have incorporated a magnetic barcode. The magnetic barcode is a barcode which emits a magnetic field, and the properties of the magnetic field encode information. For example, in an ePassport, the magnetic barcode on the inlay encodes the serial number of the chip which is attached to the inlay. Since the information is encoded magnetically, it is non-visible.

However, previous products (such as the ePassport) utilizing electronically-readable non-visible information suffer from a number of limitations. For example, the magnetic barcode in an ePassport typically serves only as a checksum for the attached chip. That is, the magnetic barcode includes an identifier that should correspond to an identifier read from the chip. If the identifier encoded by the magnetic barcode and the identifier read from the chip do not match, the chip is rejected as defective or forged. This allows ePassport manufacturers to protect against, for example, manufacturing errors or subsequent corruption of the chip.
However, because the magnetic barcode in an ePassport serves only as a checksum for the attached chip, the magnetic barcode is only meaningful when deployed in conjunction with a corresponding chip. This is problematic because the chip is much heavier and larger in size than the barcode, as well as more expensive than the barcode.

Further, the barcode and chip must generally be provided on a relatively rigid surface in order to adequately support the antenna of the chip and protect the barcode and chip from wear and tear. Accordingly, the barcode and chip are generally provided on a special-purpose inlay designed to accommodate the barcode and chip. The inlay may then be incorporated into a security document, such as a passport, by affixing the inlay to the document in a suitable location, such as the inside cover. This incorporation of the inlay into the document entails additional risks and manufacturing costs. For example, if the inlay is removed, the inlay can be used to falsely identify another document to which the inlay is attached.

Additional drawbacks relate to the need to obscure magnetic barcodes. It is sometimes desirable to obscure the magnetic barcode, as obscuring the barcode may prevent the barcode from being copied and used to identify a forged document. Conventional obscuring methods have generally been limited to covering the magnetic barcode with paper (in the example of the ePassport), or folding the material on which the magnetic barcode is printed into leaves and fixing the leaves together. Such methods are often insufficient to fully obscure the barcode. As such, these methods can be circumvented.

Further, conventional obscuring methods rely on covering the entirety of a surface on which the magnetic barcode is provided. This requires extra material and adds to the weight and cost of manufacturing the product into which the magnetic barcode incorporated. Further, covering the entirely of the surface on which the magnetic barcode is provided prevents the covered surface from serving other useful purposes.

DISCLOSURE OF INVENTION

The present application provides a product employing non-visible information, such as a variable magnetic code. Non-visible information is information which is encoded in such a way as to be visually imperceptible to a human, but readable by means
of the encoding's energy signature, field, or some other non-visual means. For example, a
variable magnetic code is a symbol or group of symbols, such as a barcode, that give rise
to a particular magnetic field that can be used to encode information. The magnetic code
can be varied to give rise to a different magnetic field, and hence encode different
information. Due to the way that the variable magnetic code is incorporated into the
product, the product is cheap and easy to manufacture when compared to conventional
inlay-based incorporation methods. Other types of non-visible information and non-
visible encodings will be described in detail below.

It should be noted that non-visible information includes encodings, such as a
magnetic barcode, which themselves may be visible, but which are obscured in some way
so as to be visually imperceptible to a human. Although the term "non-visible
information" is generally used herein, it is to be understood that the non-visible
information will generally be encoded using a non-visible information encoding.

Unlike conventional inlay-based security documents, the non-visible information
described herein may be provided directly on a product. The surface on which the non-
visible information is provided is referred to as a "base layer," and the non-visible
information on the base layer can be obscured using a variety of methods described herein.
In exemplary embodiments, at least a portion of the base layer remains unobscured and
accordingly can serve additional functions, such as aesthetic or informational functions.
Also unlike conventional inlay-based security documents, the non-visible information is
not restricted to identifying an associated chip or serving as a checksum against chip-
manufacturing errors, but rather may provide information about the product on which the
variable magnetic code is printed, or an asset associated with the product.

Moreover, some embodiments provide non-visible information on a base layer in a
configuration that allows the non-visible information to be obscured when in use without
requiring that the base layer be totally covered. Such configurations allow the base layer
to serve other functions, such as providing a medium for displaying visually perceptible
identifying information, for example on a smart card, or serving as a label-front for an
affixable label. In other embodiments, the non-visible information is provided in
conjunction with secure obscuring layers that obscure the non-visible information from
view. These obscuring configurations and layers allow the non-visible information to be reliably obscured while leveraging the base layer for other functions.

Exemplary embodiments described herein generally relate to a product incorporating non-visible information for identifying the source of the product, the identity of the product, or the identity of an asset to which the product is affixed or for which the product serves as packaging. The product includes a base layer onto which information is directly encoded using the non-visible information.

In some embodiments, the non-visible information is provided on an exterior surface of the base layer. An obscuring layer may also be provided. The obscuring layer is provided separately from the base layer and obscures the non-visible information from view. The obscuring layer may be a card face, a thin material film, a latex sheet, foil, varnish, or opaque ink printed over the variable magnetic code. At least a portion of the base layer may remain unobscured when the product is assembled or in use.

In some embodiments, the non-visible information is provided on an interior surface of the base layer, and the base layer is provided in configurations that allow the non-visible information to be obscured without the need for a separate obscuring layer. The exterior surface of the base layer may provide additional functionality.

A method for incorporating non-visible information into a product is also provided herein. The method includes providing a base layer having an interior surface and an exterior surface. Information may be encoded directly on the interior surface of the base layer using non-visible information. The non-visible information may encode information that identifies the source of the product, the identity of the product, the identity of an asset to which the product is affixed, or the identity of an asset for which the product serves as packaging. The method may also include providing an obscuring layer separate from the base layer. The obscuring layer may be provided on the base layer and may obscure the non-visible information from view.

A number of applications are possible using the exemplary products and methods described herein. In one embodiment, the product incorporating non-visible information may be a card, such as a smart card, and the variable magnetic code may be sandwiched
between the base layer and the card face. In such an embodiment, the non-visible information may encode information that identifies the issuer or source of the card.

In another embodiment, the product may be a security document, and the obscuring layer may consist of opaque ink printed over the non-visible information. The non-visible information may uniquely identify the document.

In another embodiment, the product may be a ticket, such as a lottery ticket. In this embodiment, the non-visible information may encode identifying information related to a prize that is redeemable using the ticket. The non-visible information may be read by a gaming machine that informs a ticket holder of the redeemable prize.

In another embodiment, the product may be an attachable label. The label may be attached to an asset using adhesive, or by some other fixation means. The non-visible information may provide identification information for the asset to which the label is attached, and may be cross-referenced with an asset tracking database.

In another embodiment, the product may include packaging for an asset, and the non-visible information encodes brand information related to the asset. In such an embodiment, the non-visible information may provide, for example, brand information related to the asset.

**BRIEF DESCRIPTION OF THE DRAWINGS**

**FIG. 1A** depicts an exemplary product 100 including non-visible information and an obscuring layer in accordance with an exemplary embodiment.

**FIG. 1B** depicts an exemplary product 100 including non-visible information without an obscuring layer in accordance with an exemplary embodiment.

**FIG. 2** is a flowchart depicting an exemplary method for producing a product 100 according to the embodiment depicted in FIGs. 1A and 1B.

**FIG. 3** depicts an apparatus suitable for reading a variable magnetic code from a product 300 in accordance with an exemplary embodiment.
FIG. 4A depicts the top and bottom layers of a smart card 400 separately, in accordance with an exemplary embodiment.

FIG. 4B is an exploded view of an assembled smart card 400 incorporating non-visible information, according to an exemplary embodiment.

FIG. 5A depicts a prize ticket 500 according to an exemplary embodiment.

FIG. 5B depicts a ticket reader 540 suitable for use with the prize ticket 500 of FIG. 5A.

FIG. 6 depicts a security document 600 incorporating non-visible information, in accordance with an exemplary embodiment.

FIG. 7A depicts a first step in producing a security document 700 in accordance with an exemplary embodiment.

FIG. 7B depicts a second step in producing a security document 700 in accordance with an exemplary embodiment.

FIG. 7C depicts a third step in producing a security document 700 in accordance with an exemplary embodiment.

FIG. 7D depicts a fourth step in producing a security document 700 in accordance with an exemplary embodiment.

FIG. 8A depicts unassembled packaging 800 incorporating non-visible information according to an exemplary embodiment.

FIG. 8B depicts assembled packaging 830 incorporating non-visible information, according to an exemplary embodiment.

FIG. 8C depicts the packaging 830 with an additional obscuring layer 740.

FIG. 8D depicts the packaging 830 in a sealed in-use condition.

FIG. 9A depicts the front side of a label 900 incorporating non-visible information according to an exemplary embodiment.
FIG. 9B depicts the back side of a label 900 incorporating non-visible information according to an exemplary embodiment.

FIG. 9C depicts a side view of a label 900 incorporating non-visible information according to an exemplary embodiment.

FIG. 10A depicts a first step in producing a label incorporating non-visible information in accordance with an exemplary embodiment.

FIG. 10B depicts a second step in producing a label incorporating a non-visible information in accordance with an exemplary embodiment.

FIG. 10C depicts a third step in producing a label incorporating non-visible information in accordance with an exemplary embodiment.

BEST MODE FOR CARRYING OUT THE INVENTION

Exemplary embodiments described herein provide products incorporating non-visible information such as a variable magnetic code, and methods for incorporating non-visible information into a product. The non-visible information may identify, for example, the source of the product, the identity of the product, or the identity of an asset to which the product is affixed or for which the product serves as packaging. However, the types of information encoded by the non-visible information are not limited to only these types of information, and one of ordinary skill in the art will recognize that the non-visible information may be utilized to encode any suitable information.

The product incorporating the non-visible information includes a base layer onto which information is encoded using the non-visible information. The base layer may be an integral part of the product.

One example of a way to encode non-visible information is a variable magnetic code. A variable magnetic code represents information using a magnetic field. The properties of the magnetic field encode the information. The properties of the magnetic field may be modified by modifying the code which gives rise to the magnetic field. A variable magnetic code may include a symbol or material that emits a magnetic field which encodes information, such as a magnetic barcode or a magnetic stripe. However,
some forms of magnetic stripes which require direct physical contact with a reader may not be suitable for some applications, such as when the variable magnetic code is obscured by an obscuring layer.

The present invention is not limited to encoding non-visible information using variable magnetic code. For example, instead of a variable magnetic code, radioactive code, heat-sensitive code, ultraviolet-sensitive code, or other forms of encodings which are readable by non-visual means may be used. Although several examples in the present application are described in terms of a variable magnetic code, one of ordinary skill in the art will recognize that the exemplary embodiments described herein are equally applicable to other types on non-visible information. Further, although the Drawings depict the non-visible information encoded in a barcode form, one of ordinary skill in the art will recognize that other forms for encoding the non-visible information may also be employed.

An obscuring layer may be provided for the product incorporating non-visible information. The obscuring layer is provided separately from the base layer and obscures the non-visible information from view. The obscuring layer may be a card face, a thin material film, a latex sheet, foil, varnish, or opaque ink printed over the non-visible information. In the Drawings, broken lines are generally employed to represent non-visible information that is obscured in the perspective or view depicted.

In some embodiments where the non-visible information is encoded using means such that the encoding itself is not visible (for example, using so-called "invisible inks"), an obscuring layer may not be necessary because the non-visible information will generally not be visually perceptible.

**FIG. 1A** depicts an exemplary product 100 including non-visible information and an obscuring layer in accordance with an exemplary embodiment. The product 100 includes a base layer 110 having a front surface 112 and a back surface 114. The front surface in the product 100 depicted in **FIG. 1A**, the front surface 112 and back surface 114 are generally interchangeable due to the presence of an obscuring layer 130, so elements provide on the front surface 112 may equally be provided on the back surface 114.

Non-visible information 120, such as a variable magnetic code, is provided on the front surface 112 of the base layer 110. The non-visible information 120 may be provided
on the base layer 110 using a variety of methods. For example, the non-visible information 120 can be printed in magnetic ink or magnetic toner using a special-purpose printer. One example of magnetic ink is Magnetic Ink Character Recognition (MICR) compliant ink commonly used by banks for check-printing applications. MICR compliant ink is produced, for example, in the Versalnk™ line of inks from G7 Productivity Systems of San Diego, California. MICR compliant ink can be applied by many standard inkjet and laserjet printers. Alternatively, the non-visible information 120 may be provided by hand, using an applicator, using a spray, painting magnetic ink using a template, or any of a variety of methods known to those of skill in the art. For example, U.S. Patent No. 7,197,174, entitled "Magnetic Ink Encoding Pen," is directed to a magnetic ink encoding stylus having a magnetic ink write head.

Versalnk™ also provides other forms of ink suitable for encoding non-visible information in accordance with exemplary embodiments of the invention, such as invisible fluorescent ultraviolet ink. Other forms of non-visible encodings, such as heat-sensitive ink or radioactive ink, may also be employed. Further, the non-visible encoding is not limited to information encoded using ink, but may be encoded using other means.

The non-visible information 120 may encode information that identifies the source of the product 100. For example, if the product 100 is a credit card, the non-visible information 120 may identify the card issuer. Alternatively, the non-visible information 120 may encode information that identifies the identity of the product 130. For example, the non-visible information 120 may encode an identification number of the product 100, where the identification number uniquely identifies the product 100.

An obscuring layer 120 is provided separately from the base layer 110. The obscuring layer 120 may be non-integral with the base layer 110, and may be fabricated from different materials than the base layer 110. The obscuring layer 130 may be provided on the base layer 110 and obscures the non-visible information 120 from view. That is, when the obscuring layer 130 is in place, the non-visible information 120 is not ascertainable or perceivable by visual means. The obscuring layer 130 may be made from a variety of materials, including (but not limited to) a card face, a thin material film, a latex sheet, foil, varnish, or opaque ink printed over the non-visible information 120. The obscuring layer should generally not be a material that would interfere with achieving an
accurate reading of the non-visible information. For example, a magnetic material may distort a magnetic field encoded using the non-visible information, giving a different result than would be obtained by a non-distorting material.

In some embodiments, at least a portion of the base layer 110 remains unobscured when the product 100 is assembled or in use. The unobscured portion of the base layer 110 is ascertaintable or perceivable by visual means. The unobscured portion of the base layer may be provided on the front surface 112 or the back surface 114. The unobscured portion of the base layer 110 may be used to provide visual information which may correspond to the information encoded by the non-visible information 120. For example, if the product 100 is a credit card, and the non-visible information 120 encodes information that identifies the credit card issuer, the identity of the credit card issuer may also be provided on the unobscured portion of the base layer. In this way, a user may verify that the product 100 is genuine.

FIG. IB depicts an exemplary product 140 including non-visible information 160 without an obscuring layer in accordance with another exemplary embodiment. In the product 140, the non-visible information 160 (such as variable magnetic code) is obscured from visual perception using a means other than a separate obscuring layer. For example, the body of the base layer 150 may serve to obscure the non-visible information 140, or the product 140 may be employed in a configuration that hides the non-visible information 160 from view when the product 140 is in use.

As depicted in FIG. IB, the base layer 105 includes an exterior surface 152 and an interior surface 154. The exterior surface 152 will generally be exposed to visual perception when the product 140 is assembled or in use. By contrast, the interior surface 154 will generally remain hidden from visual perception when the product 140 is assembled or in use. Accordingly, the non-visible information 160 may be provided on the interior surface 154, and will generally be obscured by the base layer when the product 140 is assembled or in use.

On the other hand, because the exterior surface 152 is not obscured when the product is assembled or in use, the exterior surface 152 may be leveraged to provide visual information, or may serve other functions.
The non-visible information 160 may be provided on the interior surface 154 of the base layer 150. These configurations may be suitable, for example, when the non-visible information 160 encodes information that identifies the identity of an asset to which the product 140 is affixed or the identity of an asset for which the product 140 serves as packaging. These configurations will be addressed in more detail below.

The product 140 may also include an obscuring layer provided separately from the base layer 150 for extra security. The obscuring layer may be provided on the base layer 150 and may obscure the non-visible information 160 from view.

In choosing an appropriate obscuring medium, care should be taken to ensure that the non-visible information remains readable through the obscuring medium. The obscuring medium should not be so thick as to block the energy signature or field that is emitted by the non-visible information from an outside reader, and the obscuring medium should not be made from a material that will significantly distort the energy signature or field of the non-visible information. The obscuring medium used will depend on the application, and further will depend on the particular configuration of the non-visible information. For example, when a variable magnetic code emits a particularly strong magnetic field, a thicker obscuring medium may be employed.

**FIG. 2** is a flowchart depicting an exemplary method for producing a product according to the embodiment depicted in **FIGs. 1A and IB.**

At step 210, a base layer for the product is provided. In some embodiments, the base layer includes an interior surface that is not visually perceptible when the product is assembled or in use, and an exterior surface that is visually perceptible when the product is assembled or in use. In other embodiments, the base layer includes a front surface and a back surface, where both the front and back surface are at least partially visible when the product is assembled or in use. The base layer may be provided such that it is not totally enclosed or encompassed by another layer when the product is assembled or in use. That is, at least a portion of the base layer may be visible when the product is assembled or in use.

The base layer may be an integral part of the product, such as when the product is a smart card and the base layer is one of the layers of the card, or the base layer may be the
product itself, such as when the product is a security document. In some embodiments, the base layer is a part of the packaging for an asset. The asset may be any product, article, or manufacture accommodated in the packaging. For example, the asset may be a product with a particular brand-name for which brand-protection is desired. In other embodiments, the base layer is designed to be affixed to an asset, for example, for purposes of asset tracking. The base layer may be made from a number of different materials, depending on the application. Some examples of suitable materials include (but are not limited to) plastic, non-ferrous metal, paper, cardboard, wood, and rubber.

At step 220, information is encoded on one of the surfaces of the base layer using non-visible information, which includes non-visible encoding means. The information may be encoded directly on the base layer. The variable magnetic code may be in the form of a magnetic barcode or a magnetic stripe. Alternatively, the information may be encoded using other non-visual encoding means, such as radiation, ultraviolet-sensitive materials, and heat sensitive materials.

Non-visible information is encoded in such a way as to give rise to a unique energy signature or field. For example, a variable magnetic code gives rise to one or more magnetic fields, as described in more detail below with respect to FIG. 3. The one or more magnetic fields will be referred to herein in the singular, although the present application recognizes that multiple magnetic fields may be generated by magnetic code. The magnetic field has a number of properties dictated by the configuration of symbols in the magnetic code, the size of the symbols in the magnetic code, and the materials used in the magnetic code. Any of the properties of the magnetic code may be varied in order to give rise to a different magnetic field or combination of magnetic fields. Information may be encoded by varying the magnetic field produced by the variable magnetic code, so that different magnetic fields represent different pieces of information. By measuring the properties of a magnetic field, a user can either retrieve the information directly, or reconstruct the variable magnetic code that gave rise to the magnetic field. As will be understood by one of ordinary skill in the art, similar logic applies to other forms of energy signatures and fields emitted by other forms of non-visible information, such as radioactive materials, heat-sensitive materials, and UV-sensitive materials.
Because an individual may be able to reproduce an energy signature or field if they know which particular encoding gave rise the energy signature or field, it is sometimes useful to obscure the non-visible information for security. Accordingly, at step 230, the non-visible information may be obscured by providing an obscuring medium. The non-visible information may be permanently obscured by the obscuring medium, or may be obscured only when the product is assembled or in use.

In some embodiments, the obscuring medium is an obscuring layer separate from the base layer. Such a configuration might be beneficial if the product is, for example, a security document or a prize ticket, and the non-visible information would otherwise be visible to a user. In these situations, the non-visible information employed may encode information that identifies one of the source of the product or the identity of the product.

In other embodiments, the non-visible information may be obscured by other means. For example, the obscuring medium may be the exterior surface of the base layer. Such an embodiment may be useful when the non-visible information is provided in a location that is not accessible when the product is assembled or in use. For example, when the product is an affixable label and the non-visible information encodes information that identifies the identity of an asset to which the product is affixed, the non-visible information may be provided on an inside surface of the label and may not be visible while the label is in use. In another example, the product may be packaging for an asset, and the non-visible information may be provided on an interior surface of the packaging. In this case, the non-visible information may encode the identity of an asset for which the product serves as packaging.

In some embodiments, the obscuring medium is an obscuring layer affixed to the base layer. The obscuring medium may cover a portion, but not all, of the exterior surface of the base layer. The obscuring medium may be, for example, an obscuring layer made from card face, a thin material film, a latex sheet, foil, varnish, or opaque ink printed over the non-visible information.

**FIG. 3** depicts a reader 320 suitable for reading the energy signature or field emitted by non-visible information 302 from a document 300 in accordance with an
exemplary embodiment. The components depicted in FIG. 3 may be provided integrally or separately.

In FIG. 3, a product 300 is provided with integrated non-visible information 302. The non-visible information may be, for example, variable magnetic code gives rise to a magnetic field 310. For measuring a magnetic field, a reader 320 is provided. The reader 320 may include a field detector 322 that measures magnetic fields. When placed in a magnetic field, the field detector 322 measures the strength, location, and direction of the local magnetic field, and may therefore reconstruct field lines of the magnetic field. When a sufficient number of data points are established, the reader may determine the properties of the magnetic field.

In some embodiments, the reader 320 may include a display 323 or other means of alerting a user to the encoded information. Alternatively, the reader 320 may include an interface 324 for interfacing to an electronic device 330.

The electronic device 330 may be, for example, a computer, a server, a personal digital assistant, a cellular phone, or a custom-designed electronic device. The depicted electronic device 330 is exemplary only, and one of ordinary skill in the art will understand that other electronic devices, employing more or fewer components and in different configurations, may also be used in conjunction with the embodiments described herein.

The electronic device 330 may contain a storage 332 for storing instructions to be executed by one or more processors 334, such as a microprocessor, ASIC, FPGA, or a controller. The processors 334 may be single-core or may be multi-core processors. The stored instructions may cause the one or more processors 334 to perform a series of steps described in detail herein. The instructions may be in any form that describes how to perform these steps. For example, the instructions may be uncompiled code in any suitable programming language, compiled code, assembly language instructions, or any other type of instructions.

The storage 332 may include one or more electronic device readable storage media. Examples of electronic device-readable storage media include, but are not limited to, RAM, ROM, magnetic storage media, or optical storage media, such as CDs or DVDs.
The storage 332 may also store an operating system for operating the electronic device 330. The storage 332 may store additional applications for providing additional functionality, as well as data for use by the electronic device 330 or another device.

The electronic device 330 may have a communication device 338 for communicating with a communication network. The communication device 338 may be, for example, a modem, an Ethernet connection, a fiber optic connection, a radio antenna, or any suitable means for communicating with a network.

The electronic device 330 may also include an interface 336 sending data to and receiving data from the interface 324 of the reader 320. The interface 336 of the electronic device 330 may be the same type of interface as the interface 324 of the reader 320, or may be a different type of interface. Examples of suitable interfaces include, but are not limited to, USB interfaces, serial interfaces, parallel interfaces, optical interfaces, wireless interfaces employing visible light, sound, or radio waves, and wired interfaces.

The electronic device 330 may include one or more displays 340 for outputting information to a user, which may be (but are not limited to) a monitor, projector, or printer. The electronic device 340 may further include one or more input devices 350 for receiving information from a user, which may be (but are not limited to) a keyboard, a mouse, a touch-screen interface, a voice-activated interface, or a motion sensor.

Particular applications of products integrating non-visible information will now be discussed with reference to FIGs. 4A-10C.

FIG. 4A depicts an unassembled smart card 400 incorporating non-visible information, in accordance with an exemplary embodiment. As shown in FIG. 4A, the smart card 400 includes a base layer 410 and a top layer 420. The base layer 410 has an exterior back side 412 that is exposed to visual perception when the smart card 400 is assembled. The back layer may provide information or serve as an aesthetic medium.

In some embodiments, a magnetic strip 413 may be provided on the back side 412 of the base layer 410. However, care should be taken so that the magnetic strip 413 does not interfere with the encoded non-visible information. For example, if the non-visible
information is read by exposing the smart card 400 to a magnetic field, the magnetic field may erase the information present on the magnetic strip 413.

The base layer 410 also has an internal front side 414 that faces the top layer 420 when the smart card is assembled. In this way, the internal front side 414 is obscured when the smart card 400 is assembled.

The top layer 420 serves as an obscuring layer. The top layer 420 is the example of a smart card 400 is a card face, which may provide information or serve as an aesthetic medium. The top layer 420 may present visually perceptible identifying information 422, such as the name of the card holder, the origin, source, or issuer of the card, or the origin date of the card.

Non-visible information 430 is provided on the bottom layer 410. In some embodiments, the non-visible information is provided directly on the bottom layer 410. The non-visible information 430 may encode information that identifies the issuer or source of the smart card 400. The information encoded by the non-visible information 430 may correspond to the identifying information 422 present on the card face. In this way, the card may be identified as genuine if the information encoded by the variable magnetic code 430 matches the identifying information 422 on the face of the card.

In some embodiments, the smart card serves as a smart credit card. If the smart card serves as a smart credit card, the non-visible information may encode the issuer of the card. During the manufacturing process, the non-visible information may be checked to determine whether the card is being correctly manufactured. For example, the if a backing is manufactured for a VISA card having a VISA magnetic stripe, the non-visible information on the card backing may identify the card as a VISA card. When the card front is added later in the manufacturing process, the non-visible information may be checked by the manufacturing equipment to ensure that the correct card front is applied to the backing. This may prevent, for example, a MASTERCARD front from being applied to a VISA backing.

FIG. 4B is an exploded view of an assembled smart card 400 incorporating non-visible information, according to an exemplary embodiment. As depicted in FIG. 4B,
when the smart card 400 is assembled, the non-visible information is sandwiched between the base layer 410 and the top layer 420.

FIG. 5A depicts another example of a product incorporating non-visible information. Specifically, FIG. 5A depicts a prize ticket 500, such as a lottery ticket, according to an exemplary embodiment. The prize ticket 500 is printed on a base layer 510 having a front side 512 and a back side 514. Non-visible information 520, such as variable magnetic code, is provided on one side of the base layer 510. As depicted in FIG. 5A, the non-visible information 520 may be provided on the front side 512 of the base layer 510. Alternatively, the non-visible information 520 may be provided on the back side 514 of the base layer 510.

When the non-visible information is integrated into a prize ticket, the non-visible information may be obscured by an obscuring layer 530. The obscuring layer 530 may obscure a portion, but not all, of the front side 512 of the base layer 510. In this way, the remaining unobscured portion of the base layer 510 may serve other functions, such as aesthetic functions or identifying functions.

The non-visible information 520 integrated into a prize ticket 500 typically encodes identifying information related to the ticket, or to a prize that is redeemable using the ticket. For example, the non-visible information 530 may be read by a prize machine 540, as depicted in FIG. 5B. A user may purchase a ticket 500 and insert the ticket 500 into a ticket slot 550 including a reader, such as a magnetic reader. The reader may decode the information encoded by the non-visible information to determine either the identity of the ticket 500, or a prize granted by the ticket 500. If the non-visible information identifies the ticket, for example by an identification number, the prize machine 540 may consult a database to determine whether the ticket 500 having the encoded identification number grants a prize. Alternatively, the prize machine 540 may read prize information directly from the non-visible information. The prize machine 540 may display what prize, if any, is granted by the ticket 500 on a display 560.

Another application of a product incorporating non-visible information is the security document 600 depicted in FIG. 6. As shown in FIG. 6, the security document 600 serves as the base layer on which non-visible information 610, such as variable
magnetic code, may be printed. Once present on the security document 600, the non-visible information 610 may be obscured by printing over the non-visible information 610 using one or more layers of opaque ink overprinting 620. The opaque ink overprinting 620 may be any form of opaque ink capable of obscuring the non-visible information 610.

For example, special-purpose security inks may be employed. The opaque ink overprinting 620 may entirely obscure the non-visible information 610, or may partially obscure the non-visible information 610 so that the patterns embodied by the non-visible information 610 cannot be readily discerned or recreated.

A method for applying the non-visible information 610 and the opaque ink overprinting 620 is described in relation to FIGS. 7A-7D below.

FIG. 7A depicts a first step in producing a security document in accordance with an exemplary embodiment. In FIG. 7A, the base layer 700 is provided. The base layer 700 may be blank, so that a user can later add content to the security document, or may be pre-printed so that the base layer 700 provides a framework for the security document.

For example, if the security document is a contract, the base layer 700 may include boilerplate language with blank slots for party names.

In FIG. 7B, the non-visible information 710 is applied to the base layer. The non-visible information may be applied using any of a variety of means, including a printer, custom applicator, by hand, sprayed, or using templates.

In FIGS. 7C and 7D, layers of opaque ink overprinting 720, 730 are applied to obscure the non-visible information 710. Although the Figures depict two layers of opaque ink 720, 730 applied to the base layer 700, more or fewer layers may be employed depending on the application. The layers of opaque ink overprinting 720, 730 may be provided using the same types of ink, or different types of ink. For example, the first layer of opaque ink overprinting 720 may be provided in a color that matches the color of the base layer 700, and the second layer of opaque ink overprinting 730 may be provided in another color to match text provided on the base layer 700.

The product incorporating non-visible information may also be packaging for an asset. Such configurations may be useful for brand protection applications. For instance,
FIG. 8A depicts unassembled packaging 800 incorporating non-visible information according to an exemplary embodiment.

As shown in FIG. 8A, the unassembled packaging 800 includes an interior surface 802, which will be provided on the interior of the packaging, once assembled. Accordingly, the interior surface 802 will be obscured from view. The unassembled packaging may include a number of surfaces, such as first flap 810. Non-visible information 820, such as variable magnetic code, may be provided on any of the interior surfaces. Typically, it will be desirable to place the non-visible information in a predetermined or known location, so that a user will be able to apply a reader to the location of the non-visible information when the packaging is assembled.

FIG. 8B depicts partially assembled packaging 830 incorporating non-visible information, according to an exemplary embodiment. At this stage, an asset may be placed in the packaging 830, and the asset may be, for example, a brand-name item. When the packaging is used to hold an asset, the non-visible information 820 may encode brand information for the asset, such as the source or originator of the asset. By reading the non-visible information, a user may be able to determine that the asset contained in the packaging is genuine without having to open the packaging.

FIG. 8C depicts an alternative embodiment of the partially assembled packaging 830 with an additional obscuring layer 840. In one exemplary embodiment, the obscuring layer 840 is a thin material film. Once the packaging is opened, the non-visible information 820 may be exposed to view. This may allow the non-visible information 820 to be copied. In order to prevent unscrupulous copying, the non-visible information 820 may be obscured using an obscuring layer 840.

FIG. 8D depicts the fully assembled packaging 850 in a sealed in-use condition. As shown in FIG. 8D, when the package is assembled, the non-visible information is obscured by the first flap 810, which serves as a base layer.

A similar concept to the packaging depicted in FIG. 8A-8D is the affixable label 900 depicted in FIGs. 9A-9C. FIG. 9A depicts the front side of a label 900 having a base layer 910 that incorporates non-visible information 920, such as a variable magnetic code.
When in use, the front side 912 of the label 900 remains visible, but the back side 914 of the label 900 is hidden from sight.

The label 900 may be attached to an asset, and the non-visible information 920 may uniquely identify the asset. In some embodiments, the non-visible information 920 identifies the asset using a tracking number, and the tracking number is associated with an entry in an asset-tracking database. When the non-visible information 920 is read, a user may retrieve the entry from the database based on the tracking number. Alternatively, the non-visible information 920 may be read in a number of situations, such as when the asset is moved, and the database may be updated automatically.

The label 900 may be affixed to the asset using any means. In some exemplary embodiments, as depicted in FIGs. 9B and 9C, the back side 914 of the label 900 may be provided with a layer of adhesive 940. The adhesive 940 may be applied over the non-visible information 930 directly on the base layer 910. Typically, the adhesive is applied to an interior-facing back surface 914 of the label 900.

A method of producing an affixable label in accordance with exemplary embodiments is described in relation to FIGs. 10A-10D. FIG. 10A depicts a first step in producing a label incorporating non-visible information in accordance with an exemplary embodiment. In FIG. 10A, the front of the label has been prepared, for example by printing information on the front side 1002 of the base layer 1000. The back side 1004 of the base layer is then provided with non-visible information 1010, such as a variable magnetic code, as depicted in FIG. 10B. The non-visible information 1010 may be applied, for example, using an applicator 1020, which may be, for example, a printer-head.

Once the non-visible information 1010 is provided on the back side 1004 of the base layer 1000, a layer of adhesive 1030 is applied, as depicted in FIG. 10C. The adhesive 1030 may be any adhesive suitable for use with an affixed label, such as a glue, thermoplastic, bioadhesive, laminate, and UV-light curing adhesives, among others. Care should be taken to select an adhesive that does not interfere with the non-visible information encoded on the base layer. For example, if the base layer employs UV-sensitive coding, it may be inadvisable to use a UV-light curing adhesive. The particular
adhesive used may be selected based on the application. For example, if the label is to be attached to an animate object, a non-toxic adhesive may be selected.

The adhesive 1030 may be applied using any suitable means. In FIG. IOC, the adhesive is applied using a spray applicator 1040. One of ordinary skill in the art will understand that other methods to apply adhesives may also be employed, such as dipping or brushing.

Although the above description has been given with specific examples, for example examples using a variable magnetic code, one having ordinary skill in the art will recognize that the present invention is not so limited. Numerous modifications and alternative embodiments of the present invention will be apparent to those skilled in the art in view of the foregoing description. Accordingly, this description is to be construed as illustrative only and is for the purpose of teaching those skilled in the art the best mode for carrying out the present invention. Details of the structure may vary substantially without departing from the spirit of the invention, and exclusive use of all modifications that come within the scope of the appended claims is reserved. It is intended that the present invention be limited only to the extent required by the appended claims and the applicable rules of law.
CLAIMS

1. A product incorporating non-visible information for identification, the product comprising:
   a base layer;
   a non-visible information encoding provided on the base layer, wherein the non-visible information encoding encodes information that identifies one of a source of the product and an identity of the product; and
   an obscuring layer provided separately from the base layer, the obscuring layer provided on the base layer and obscuring the non-visible information encoding from view, wherein at least a portion of the base layer remains unobscured when the product is assembled or in use.

2. The product of claim 1, wherein the obscuring layer is one of a card face, a thin material film, a latex sheet, foil, varnish, or opaque ink printed over the non-visible information encoding.

3. The product of claim 1, wherein the product comprises a card, the obscuring layer is a card face, and the non-visible information encoding is sandwiched between the base layer and the card face and encodes information that identifies the issuer or source of the card.

4. The product of claim 1, wherein the product is a ticket and the non-visible information encoding encodes identifying information related to a prize that is redeemable using the ticket.

5. The product of claim 1, wherein the product is a security document, the obscuring layer comprises opaque ink printed over the non-visible information encoding, and the non-visible information encoding uniquely identifies the document.

6. A product incorporating non-visible information for identification, the product comprising:
a base layer comprising an interior surface and an exterior surface, wherein the exterior surface is not obscured when the product is assembled or in use; and

a non-visible information encoding provided directly on the interior surface of the base layer, wherein the non-visible information encoding encodes information that identifies one of an identity of an asset to which the product is affixed or an identity of an asset for which the product serves as packaging.

7. The product of claim 6, further comprising an obscuring layer provided separately from the base layer, the obscuring layer provided on the base layer and obscuring the non-visible information encoding from view.

8. The product of claim 6, wherein the product comprises an attachable label and further comprises a layer of adhesive provided over the non-visible information encoding on the interior surface of the base layer.

9. The product of claim 6, wherein the product comprises packaging for an asset and the non-visible information encoding encodes brand information related to the asset.

10. A method for incorporating non-visible information into a product, comprising:

   providing a base layer, wherein at least a portion of the base layer is unobscured when the product is assembled or in use;

   encoding information on a surface of the base layer using a non-visible information encoding; and

   providing an obscuring medium so that the non-visible information encoding is obscured when the product is assembled or in use, wherein

   the obscuring medium is an obscuring layer separate from the base layer and the non-visible information encoding encodes information that identifies one of a source of the product or an identity of the product, or

   the obscuring medium is an exterior surface of the base layer and the non-visible information encoding encodes information that identifies an identity of an asset to which the product is affixed or an identity of an asset for which the product serves as packaging.
11. The method of claim 10, wherein the obscuring medium is an obscuring layer affixed to the base layer and covering a portion but not all a surface of the base layer.

12. The method of claim 11, wherein the obscuring medium is an obscuring layer and the obscuring layer is one of a card face, a thin material film, a latex sheet, foil, varnish, or opaque ink printed over the variable magnetic code.

13. The method of claim 12, wherein the product comprises a card, the obscuring layer is a card face, and the non-visible information encoding is sandwiched between an interior surface of the base layer and the card face and encodes information that identifies the issuer or source of the card.

14. The method of claim 12, wherein the product is a security document, the obscuring layer comprises opaque ink printed over the variable magnetic code, and the non-visible information encoding identifies the document.

15. The method of claim 10, wherein the product is a ticket and the non-visible information encoding encodes identifying information related to a prize that is redeemable using the ticket.

16. The method of claim 10, wherein the product comprises an attachable label for an asset and the non-visible information encoding identifies the asset.

17. The method of claim 16, wherein the variable magnetic code identifies the asset using a tracking number and the tracking number is associated with an entry in an asset-tracking database.

18. The method of claim 16, further comprising providing a layer of adhesive over the non-visible information encoding on the interior surface of the base layer.

19. The method of claim 10, wherein the product comprises packaging for an asset and non-visible information encoding is provided on an interior surface of the packaging and encodes brand information for the asset.
20. The method of claim 19, further comprising obscuring the non-visible information encoding with a thin film provided on the interior surface of the packaging.
Fig. 1A

Fig. 1B

Fig. 2

Provide base layer 210

Encode information onto base layer 220

Obsure base layer 230
**Fig. 4A**

Smart Card

JOHN DOE
Member since: 01/01/2000
Issuer: Smart Card Corp.

**Fig. 4B**
Fig. 5A

Fig. 5B
Fig. 6
**INTERNATIONAL SEARCH REPORT**

International application No

PCT/EP2010/000580

A. CLASSIFICATION OF SUBJECT MATTER

INV. G07D7/04, G07D7/00

ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G07D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<td>US 4 925 215 A (KLAIBER MARTIN S [US]) 15 May 1990 (1990-05-15) column 1, lines 1-13, 31-60 column 2, lines 6-55 figures 1-4</td>
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</tr>
<tr>
<td>X</td>
<td>FR 2 762 545 AI (FRANCOIS CHARLES OBERTHUR FIDU [FR]) 30 October 1998 (1998-10-30) page 1, line 24 - page 2, line 26 page 3, lines 1-29 page 4, lines 4-32 figures 1-3B</td>
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Further documents are listed in the continuation of Box C. See patent family annex.

Date of the actual completion of the international search

29 October 2010

Date of mailing of the international search report

12/11/2010

Name and mailing address of the ISA/

Espuela, Vicente
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<td>US 4 455 039 A (WEITZEN EDWARD H [US] ET AL) 19 June 1984 (1984-06-19) column 1, lines 30-64 column 3, lines 3-26 column 4, line 64 - column 5, line 48 column 6, lines 11-31, 43-68 column 7, lines 39-45 figures 1-3,5,7,9,12,16</td>
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<td>US 4925215</td>
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<td>US 4455039</td>
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