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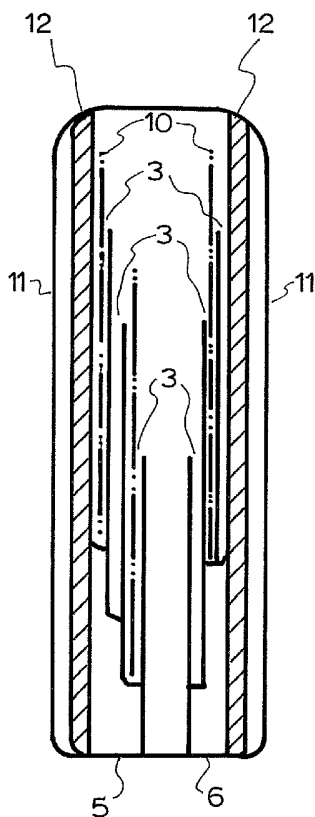
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(54) Title: CARRYING DEVICES FOR RF TOKENS



(57) Abstract: A carrying device adapted to hold one or more RF tokens and incorporates electrically conductive linings to shield said tokens from each other when the device is open or an unshielded compartment containing an individual token is presented to a reader but which shields the tokens from all electromagnetic radiation when the device is closed. The linings are made from a metal foil or other conductive material and a typical device has the general construction of a carrying case or wallet which has compartments to hold sundries, bank notes, cards and visual material and in particular to hold RFID tags and contact-less cards. The wallet or case may also contain one or more panels adapted to hold RFID tags and contact-less cards and to fold out of the wallet when the latter is open allowing individual RF tokens to be presented to a reader.



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CARRYING DEVICES FOR RF TOKENS

FIELD OF INVENTION

5 This invention relates to carrying devices such as a wallet adapted for storing radio frequency tokens such as contact-less radio frequency smart cards and identity tags which in normal use shield the token from electromagnetic radiation but also allow it to be presented to a reader when required.

10 BACKGROUND OF THE INVENTION

Developments in radio frequency (RF) technology are evolving at a rapid pace with contact-less integrated circuit cards (ICCs) and RF identity (RFID) tags now in wide use. These RF devices provide speed and convenience of use since they
15 can be presented to a reader at a distance but this same feature can also be used by unauthorized parties to read the data stored on said tokens.

To date the smart card industry has developed the following technologies which operate without engaging the contact interface:

20 **Close-coupled** (ISO/IEC 10536-0-1mm range), have no metallic contacts but must be physically touched on a reader. These are receiving renewed interest as technological innovations have made them a cost-effective alternative to contact cards for a range of applications.

Proximity (ISO/IEC 14443-1-10cm range, type a, b), typically operate at up to
25 10 centimetres, are currently the focus of industry activity, as they are making headway in replacing magnetic stripe as well as chip cards used for ticketing and payment cards.

Near Field Communication (ISO/IEC standard (ISO/IEC18092) operates in the 13.56 MHz frequency range, over a distance of a few centimetres. Operating at
30 data rates of 106 kbits/s and 212 kbits/s, NFC is compatible with Philips' MIFARE® (ISO 14443 A) and Sony's FeliCa smart card protocols. Higher

transmission speeds up to 424 kbits/s can be achieved between dedicated NFC devices.

Vicinity (ISO/IEC 15693-1-100cm range), operate over a distance of up to one meter, and is used primarily in the domain of access control and materials tracking. Many see vicinity as a potential replacement for various proprietary RFID technologies.

RFID are generally of two types, low frequency 300 KHz and ultra high frequency 902-928 MHz. Both technologies are referred to as RFID as they include a unique identifier for each chip. An international standard ISO/IEC 18000, which describes RFID in the context of supply chain management, is now available, although most current solutions use a number of proprietary specifications.

Contact-less smartcards are credit card sized cards that are being marketed to consumers as a convenient alternative to magnetic strip cards for storing financial, health and other personal data. Because of their ability to store relatively large amounts of data on an embedded microchip, and associated security, it is envisioned that these cards will eventually be used for all banking, transportation, healthcare, insurance, social security, welfare and other personal data.

It is envisaged that the IC's embedded into RFID tags and contact-less smartcards will eventually replace other forms of information cards such as magnetic strip cards and contact smartcards, primarily due to their convenience. Whereas the latter must come into physical engagement with a reader, contact-less smartcards can exchange information with a reader via magnetic, RF, infrared or visible light radiation. In the case of modulated magnetic or RF radiation, a contact-less smartcard does not have to be removed from a persons wallet or carrier for the IC to be powered up for an exchange of information to occur. An international standard has been established which sets a range of one meter between reader and contact-less smartcard. Accordingly while magnetic strip and contact smartcards both deny surreptitious access, a contact-less

smartcard can be powered up and accessed without the card owner's knowledge.

The chips or IC's used in smartcards can be manufactured in a less sophisticated form called an RFID chip. In their simplest form, these chips do nothing more than provide a means to remotely identify an object to which they are attached. They come in several different physical embodiments such as coin or pill shapes and are being installed in key rings, gambling chips and military dog tags for tracking and commercial applications. While RFID chips are generally less sophisticated than smartcards, they are still capable of being powered up and interrogated without the owner's knowledge.

For several reasons, contact-less smartcards do not typically have an embedded power source. First, most battery chemistries contain heavy and toxic metals and since these cards will routinely be lost or discarded, embedding a power source in the card would result in a negative environmental impact. Second, these cards are projected to be manufactured by the billions worldwide and any product that is produced in these numbers is extremely sensitive to manufacturing costs; incorporating a battery into the card is simply too costly. Therefore, the most common approach to providing power to the embedded chip is via a modulated magnetic field. Such a magnetic field induces a current in a loop antenna (see for example US Patent 5,473,323 to Jreft, 1993) which is typically laminated as an internal layer of a smartcard. The embedded chip is usually manufactured with on chip charge pumps and power regulation to provide different voltages to the various parts of the chip. Some RFID chips have the inductive loop built right onto the chip eliminating the need for any external antenna at all.

Commercially produced RF readers typically have a range of one meter. However, it is possible that a reader could be produced or modified to generate a

much greater magnetic field strength and thereby increase the effective range of communication. If such a reader were also equipped with a very sensitive receiver, the range and penetrating ability of the reader could be further enhanced. Since a RF tokens do not need to come into physical contact with the reader to exchange information, the user can no longer take a proactive role in securing the information on the IC. The owner must now rely entirely on software encryption or biometric techniques for security. Accordingly electromagnetic shielding can be used to protect information without requiring proactive measures by the owner.

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There are a number of ways in which shielding can prevent the exchange of information between a RF Token and a reader. The simplest method is to prevent the card from being powered up by the electromagnetic field by shielding the RF token. Another solution is to simply shield or provide a means to disabling the antenna which may employ a pressure sensitive switch or special shielding built into the antenna. The problem with shielding only the antenna is that the antenna can couple capacitively to the shield in such a way that the shield itself becomes an antenna.

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Therefore the best way to prevent unauthorised exchanges is to prevent the magnetic field generated by the reader from powering up the RF token in the first instance. A number of prior art documents disclose this method.

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US Patent 4,647,714 issued to Goto (1987) discloses an inexpensive composite material made of layers of paper or plastic coated with electrodeposited iron to provide magnetic shielding. US Patent 5,288,942 issued to Godfrey and Westfield (1994) teaches a similar invention using two thin sheets of soft ferromagnetic material which act as 'keepers' for the data stored in the form of magnetic patterns on the magnetic strip of magnetic strip cards. The soft ferromagnetic

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material in this invention can take the form of metal foil or powders added to moulded plastic resins.

US Patent 5,360,941 issued to Roes (1994) and assigned to Cubic Automatic
5 Revenue Collection Group describes an electrostatic shield to protect the
microchip embedded in a smartcard while simultaneously allowing
communication to occur between the card and the reader. This shield is an
integral part of the card and its stated purpose is to completely shield the chip
10 from the effects of electrostatic potential accumulations and discharges while
being receptive to alternating magnetic fields. However this shield does not give
the user any control over when a data exchange takes place; it merely protects
the chip from electrostatic damage and maintains communication with the reader.

Another category of prior art includes bankcard holders, which only protect the
15 card from physical damage. US Patent 5,125,505 describes a cardholder that
ejects the card when a button is pushed. US Patent 5,020,255 describes a
cardholder in which the card is inserted and removed manually and is retained by
a snap catch. US Patent 4,674,628 describes a similar holder which is
incorporated into a key ring and is capable of holding several cards. US Patents
20 5,080,223 and 4,697,698 both describe cardholders that hold several cards,
which can be individually removed. What all of these patents have in common is
that their preferred embodiments are made of injection moulded plastic parts
which are incapable of shielding against magnetic fields. US Patent 5,337,813
actually mentions protecting the magnetic strip of the card from physical damage
25 but it is not concerned with protecting the information stored on that strip from the
effects of magnetic fields. None of these are concerned with shielding cards from
electromagnetic radiation.

OBJECT OF THE INVENTION

It is therefore an object of the present invention to provide a carrying device for RF tokens which generally shields tokens from each other and from electromagnetic radiation but which allow individual tokens to be presented to a reader when required, or at least to provide a useful alternative to prior art devices.

STATEMENT OF THE INVENTION

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According to the present invention a carrying device is adapted to hold one or more RF tokens and incorporates electrically conductive linings to shield said tokens from each other, when the carrying device is open or an individual token presented to a reader, but which shields the token or tokens from all electromagnetic radiation when the carrying device is closed.

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Preferably the electrically conductive linings are made from a metal foil that sufficiently surround the RF token and be of adequate thickness as to reduce the electrometric field and thus prevent the RF token from being powered and therefore unable to transfer data.

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Preferably the device has the general construction of a wallet which has compartments to hold bank notes, cards and visual material and in particular is adapted to securely hold RF tokens such as RFID tags and contact-less cards.

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Preferably the device also contains one or more panels adapted to hold RFID tags and contact-less cards and to fold out of the device when the latter is open allowing individual RF tokens to be presented to a reader.

Preferably the device can hold up to eight RF tokens each of which can be individually presented to a reader without interference from the others when the device is open.

5 In an alternative form the device has the general construction of a money purse.

In yet another form the device has the general construction of a passport wallet.

10 In yet another form the device has the general construction of an identification badge or wallet.

In yet another form the device has the general construction of a mobile phone carrying case.

15 In yet another form the device has the general construction of an insert, lining or sleeve which can be used to shield an RF token that is housed in any unshielded carrying device.

20 In yet another form one or more of the RF tokens are not shielded from electromagnetic radiation when the device is closed thus allowing said unshielded token to be presented to a reader without opening the device, whilst at the same time shielding RF tokens contained within said carrying device.

BRIEF DESCRIPTION OF THE DRAWINGS

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Fig 1 shows a contact-less smart card being inserted in a wallet;

Fig 2 is a perspective view of the wallet of Fig 1 fully opened;

Fig 3 is an elevation of the open wallet of Fig 2;

Fig 4 is the cross section view I of Fig 3;

30 Fig 5 is the cross section view II of Fig 3;

Fig 6 is the cross section view III of Fig 4;

DETAILED DESCRIPTION OF THE INVENTION

Figs 1 and 2 illustrate a leather wallet 1 which has multiple compartments for holding bank notes, 2, cards 3, and photographs 4. In addition it has, hinged on the right side, two panels 5, 6 which can fold out when wallet 1 is open. Panels 5, 6 also have slots 3 to hold cards.

Fig 4 shows in cross section the construction of the left hand section of wallet 1. Outer skin 7 forms a compartment with the body of wallet 1 and is zipped to it by zip 8. This compartment is lined with aluminium foil liner 9 which shields the contents of the closed wallet against electromagnetic radiation. This section also has compartment 2 to hold bank notes and compartments 3 to hold cards.

Fig 5 shows in cross section a continuation of this construction in the right hand section of wallet 1 where the continuation of outer skin 7 again forms a compartment with the body of wallet 1 and is zipped to it by zip 8. This compartment is also lined with the continuation of aluminium foil liner 9 which shields the contents of the closed wallet against electromagnetic radiation. This section also has compartment 2 to hold bank notes, compartments 3 to hold cards and compartment 4 which has a transparent window to hold, for example, a photograph.

Fig 6 shows in cross section panels 5, 6 in their closed position with outer transparent windows 11 forming slip in compartments which are lined with aluminium foil liners 12. Panels 5, 6 also have compartments 3 to hold cards and are hinged by a hinging means (not shown) securing the inner edge of panels 5, 6 to the right edge of wallet 1.

Accordingly, in addition to bank notes, cards and visually displayed material, wallet 1 can hold up to eight contact-less cards 10, 20 in compartments which are shielded from each other and which enable them to be presented for scanning

individually when the wallet is open. This shielding from each other is necessary since only one contact-less card can be read by a reader at a time; if two unshielded cards are presented the reader will not register either correctly.

5 Further, when the wallet is fully closed the foil liner 9 forms a Gaussian (sometimes referred to as Faraday) cage which shields the contact-less cards 10 held in the inside compartments of wallet 1 from electromagnetic radiation thus rendering them secure from unauthorized reading. However contact-less cards 20 held in the zipped compartments formed by outer skin 7 are not so shielded
10 and can be scanned at any time. Accordingly these compartments should only be used for RFID tags and other low security RF tags.

VARIATIONS

15 It will be realized that the foregoing has been given by way of illustrative example only and that all other modifications and variations as would be apparent to persons skilled in the art are deemed to fall within the broad scope and ambit of the invention as herein set forth. For example the carrying device could be a purse, wallet, mobile phone case or a device lining, as used in PDA, laptop
20 computer, key fob holder, of simpler construction and of different synthetic materials but still using conductive linings to shield radio frequency tokens such as smart cards and RFID tags from each other and from electromagnetic radiation. All such variations fall within the scope of the present invention.

25 Throughout the description and claims to this specification the word "comprise" and variations of that word such as "comprises" and "comprising" are not intended to exclude other additives components integers or steps.

CLAIMS

1. A carrying device adapted to hold one or more RF tokens which incorporates electrically conductive linings to shield said tokens from each other when the device is open and an individual token is presented to a reader but which shield the token or tokens from all electromagnetic radiation when the device is closed.
2. The device of claim 1 wherein the electrically conductive linings are made from a metal foil.
3. The device of claim 1 having the general construction of a wallet which has compartments to hold bank notes, cards and visual material and in particular to hold RFID tags and contact-less cards.
4. The device of claim 3 which also contains one or more panels adapted to hold RFID tags and contact-less cards as claimed in claim 1 and to fold out of the device when the latter is open allowing individual RF tokens to be presented to a reader.
5. The device of claim 4 which can hold up to eight RF tokens each of which can be individually presented to a reader without interference from the others when the device is open.
6. The device of claim 1 which has the general construction of a money purse.
7. The device of claim 1 which has the general construction of a passport wallet.
8. The device of claim 1 which has the general construction of an identification badge or wallet.
9. The device of claim 1 which has the general construction of a mobile phone carrying case.
10. The device of claim 1 which has the general construction of an insert or sleeve which can be used to shield an RF token that is housed in any non-shielded carrying device.
11. The device of any of the previous claims wherein one or more of the RF tokens are not shielded from electromagnetic radiation when the device is closed thus allowing said unshielded token to be presented to a reader

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without opening the device, whilst at the same time shielding RF tokens contained within said carrying device

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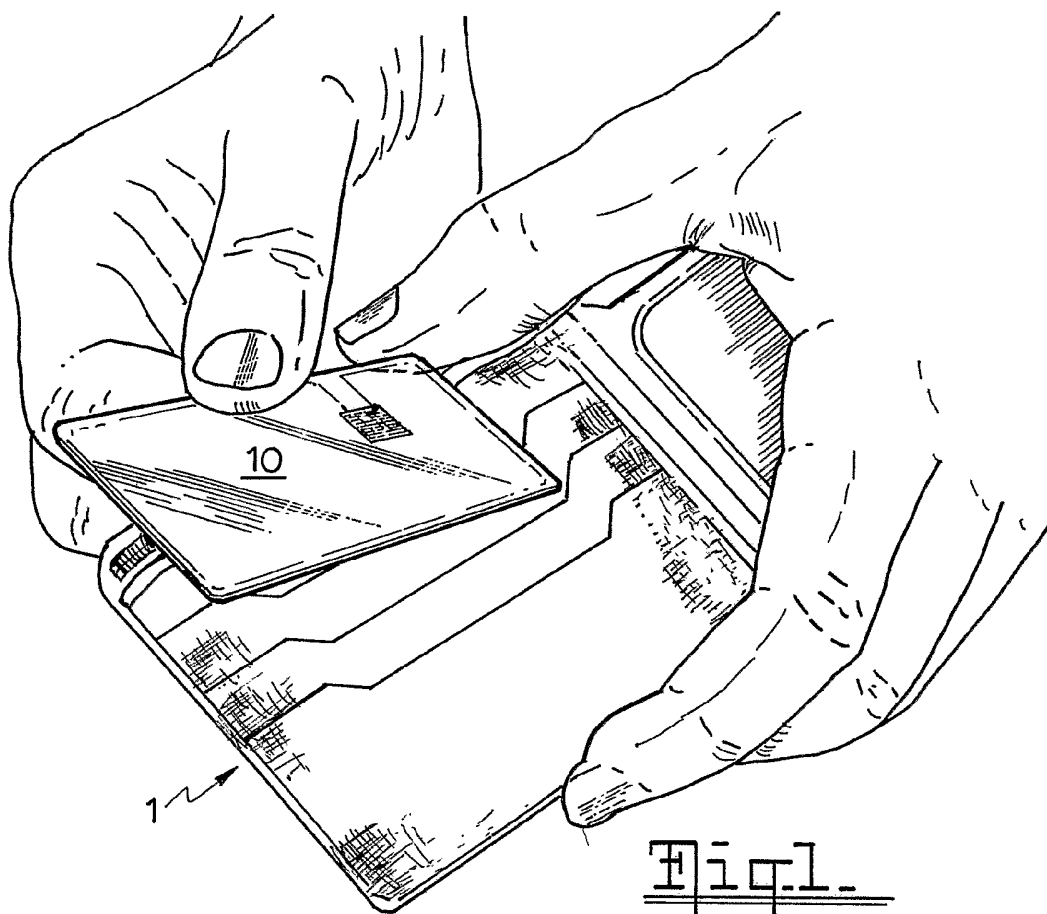


Fig. 1.

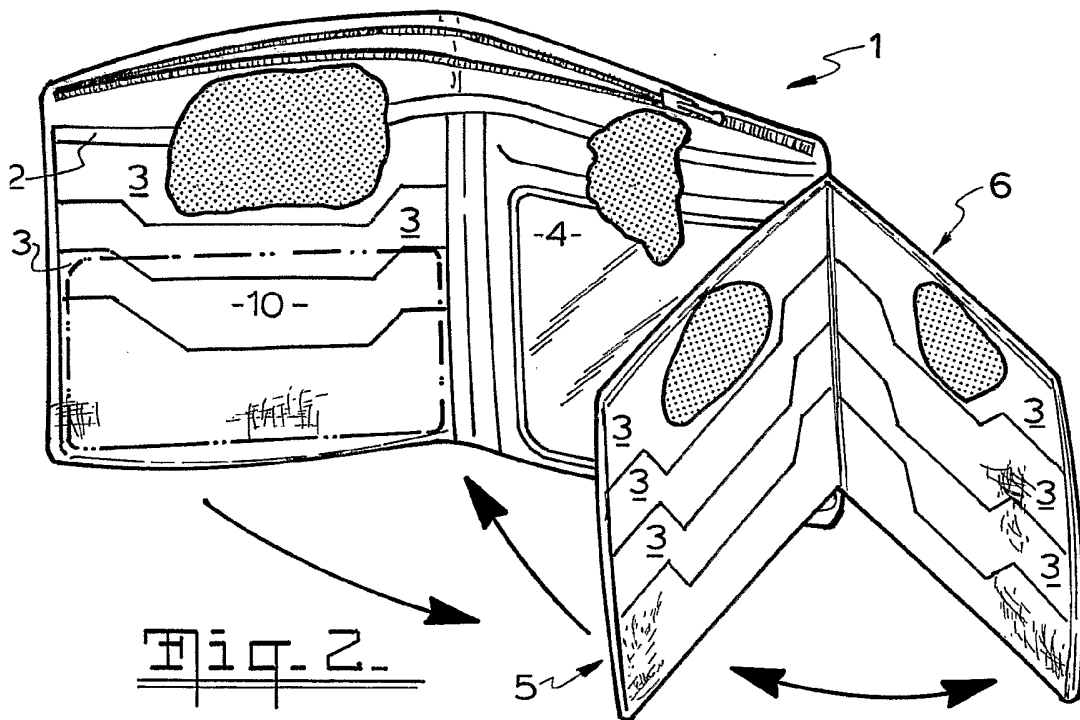


Fig. 2.

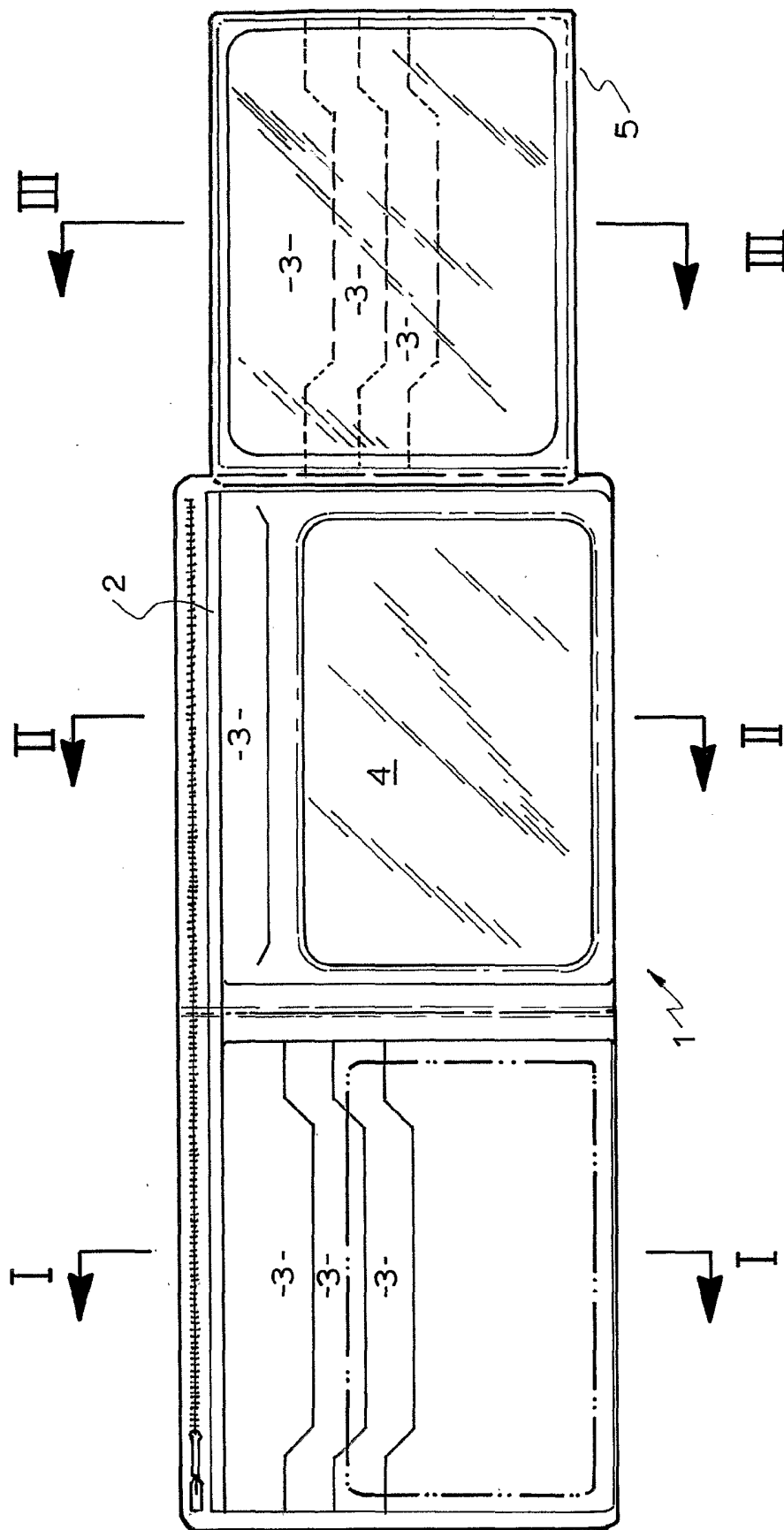


Figure 3

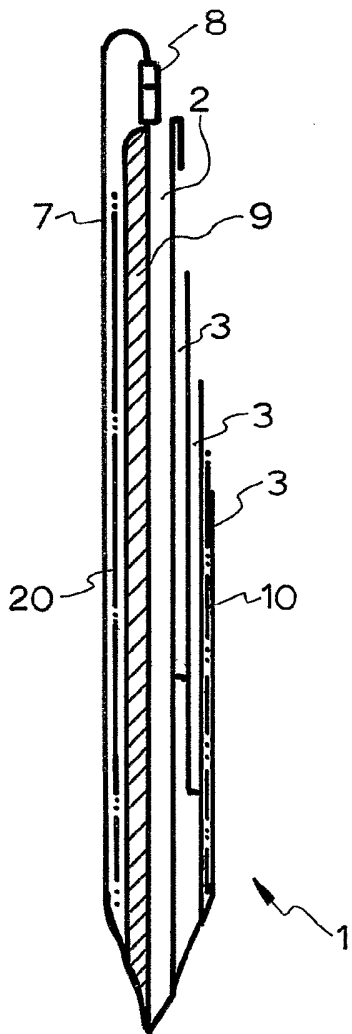


Fig. 4.

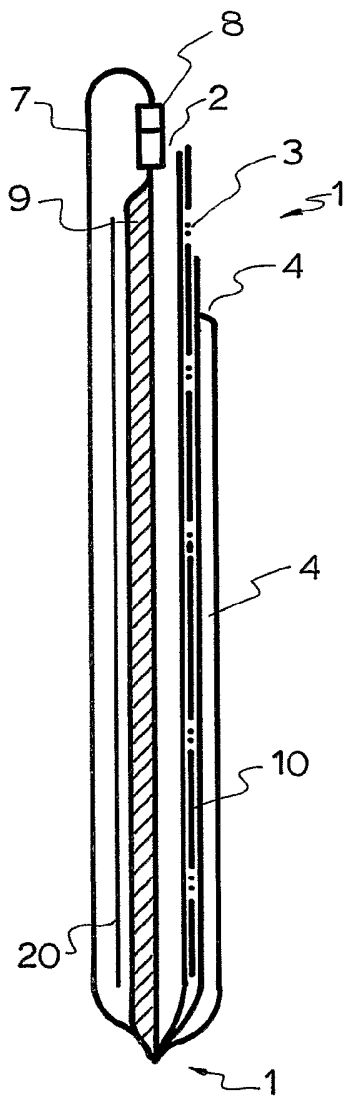


Fig. 5.

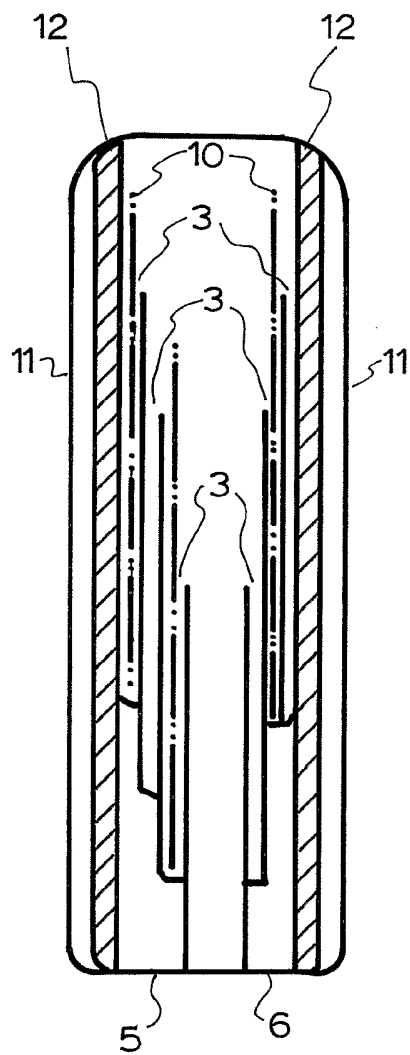


Fig. 6.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2005/000784

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. ⁷: A45 C 1/02, 1/06

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)

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 practicable, search terms used)
DWPI: IPC Marks A45 C 1/-, 11/24 + Keywords (RF, RFID, Radiation, Shield, Scan, Reader, Protect, IC or ICC, Integrated Circuit, Wireless, Smart)

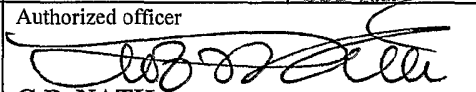
C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2004/034837 A (PERSSON), 29 April 2004	1-11
A	DE 10035363 A (SCHAEFER), 7 February 2002	1-11
A	Derwent Abstract Accession No. 2002-261632/31, Class P24; T04, JP 2001256450A (HITACHI CABLE LTD.), 21 September 2001	1-11
A	Derwent Abstract Accession No. 2003-487299/46, Class P24; T04, JP 2003123037A (KOKEN), 25 April 2003	1-11
A	Derwent Abstract Accession No. 2004-616491/60, Class P24; S01, CN 1502278A (MA), 9 June 2004	1-11
A	Derwent Abstract Accession No. 2004-700491/69, Class P24; V04, CN 1498563A (CHENG), 26 May 2004	1-11

Further documents are listed in the continuation of Box C See patent family annex

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"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)	"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
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

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Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized officer  G.B. NATH Telephone No : (02) 6283 2126

INTERNATIONAL SEARCH REPORT

Information on patent family members.

International application No.

PCT/AU2005/000784

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report	Patent Family Member
WO 2004034837	AU 2003267868
DE 10035363	NONE
JP 2001256450	NONE
JP 2003123037	NONE
CN 1502278	NONE
CN 1498563	NONE

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

END OF ANNEX