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(54) **DIELECTRIC SMART CARD PROTECTOR
SLEEVE**

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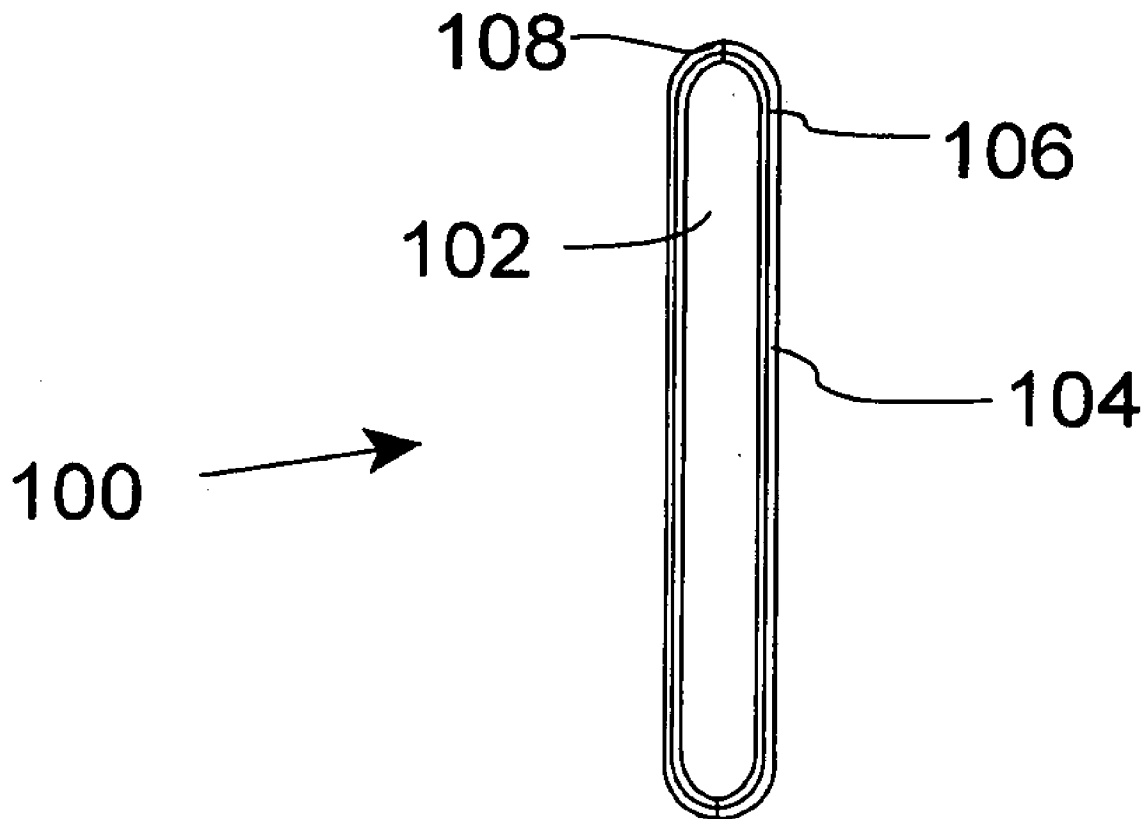
(57) **ABSTRACT**

A smart card holder or passport holder has two sides sealed together at three edges to leave an interior space dimensioned and configured to hold a smart card or passport. The sides have multiple layers: a first layer of dielectric material which substantially covers entirety of both sides, a second layer of structural material to add strength, and a third layer of soft material which protects any magnetic stripe on a card or the like from the dielectric material. The sides may be sealed by means of RF welding in order to minimize gaps between the sides. In use, the device prevents unauthorized RF remote access to the smart card chip or passport chip.

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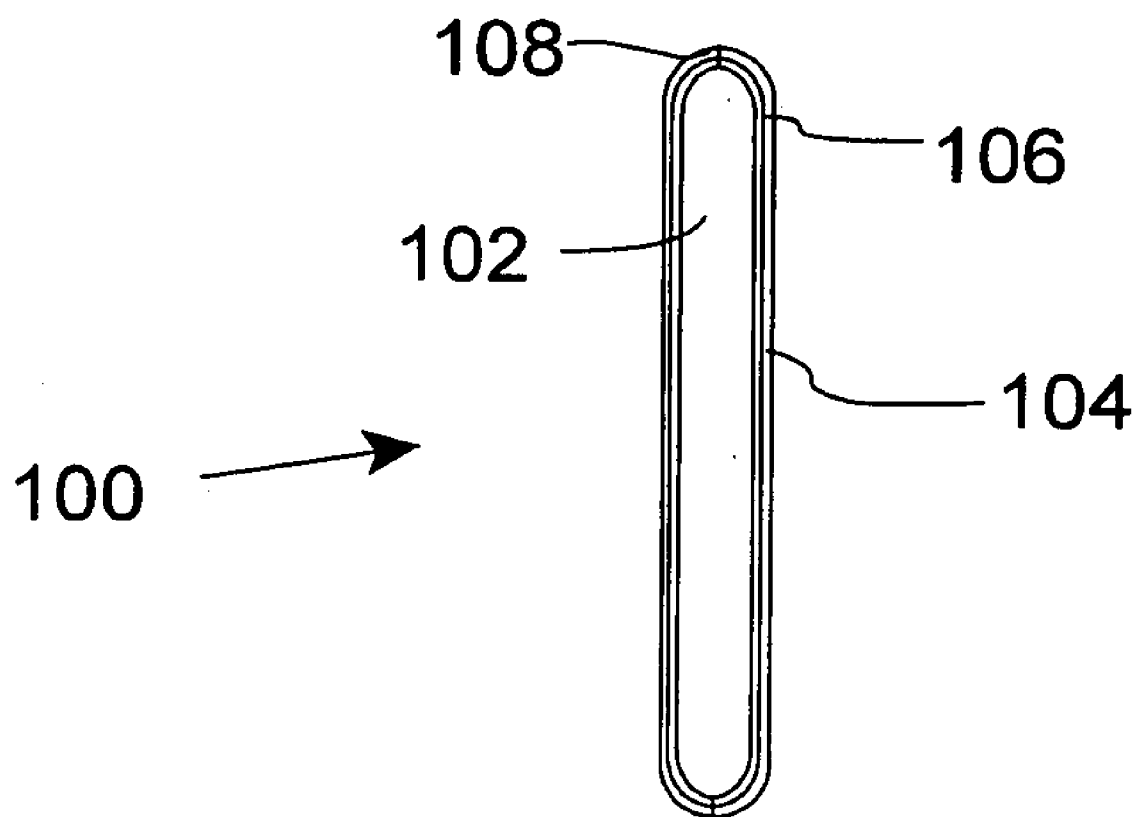


Fig. 1

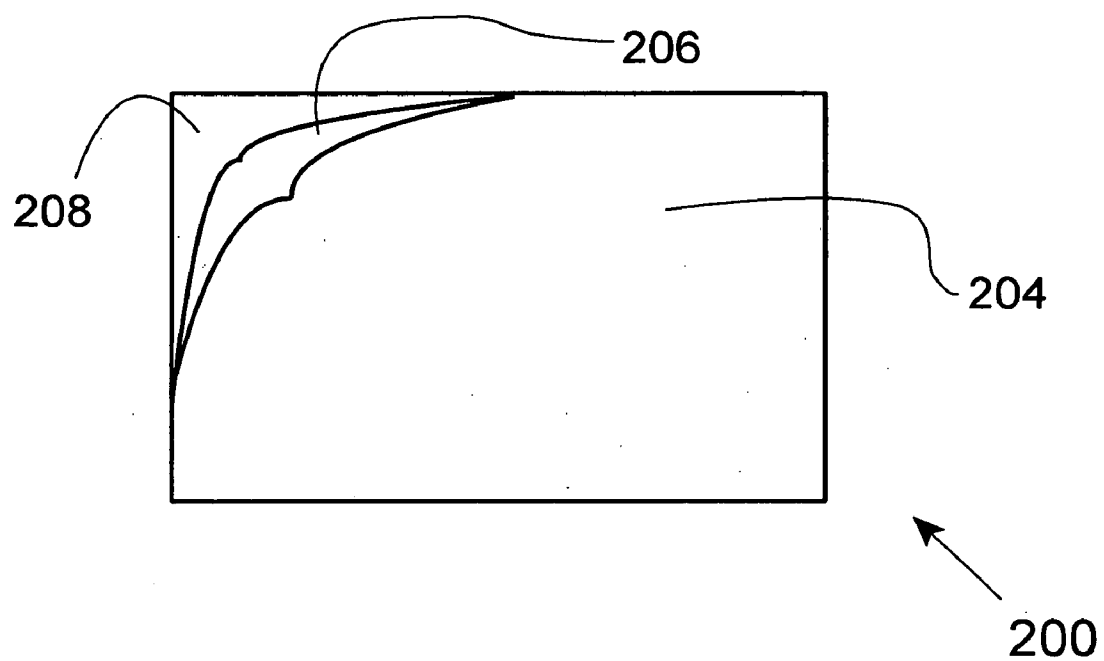
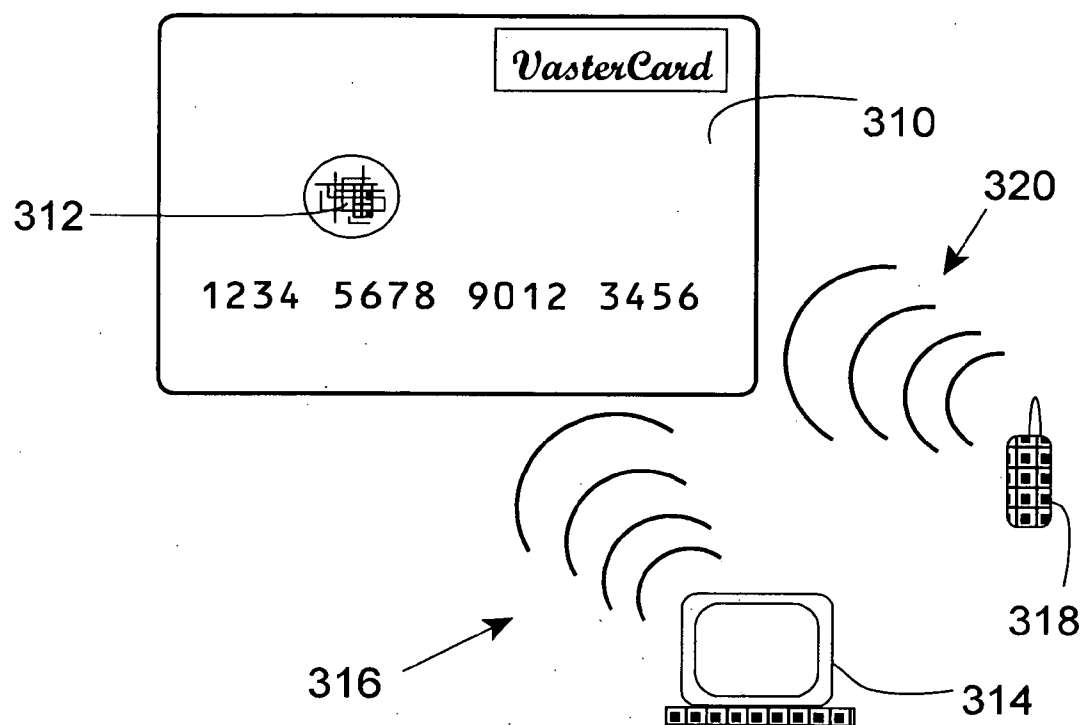


Fig. 2

Fig. 3
PRIOR ART



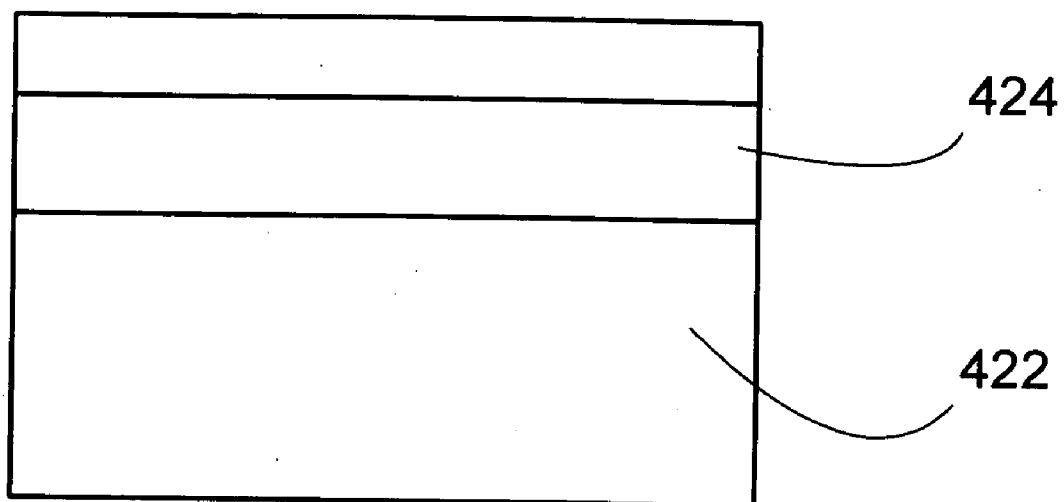


Fig. 4
PRIOR ART

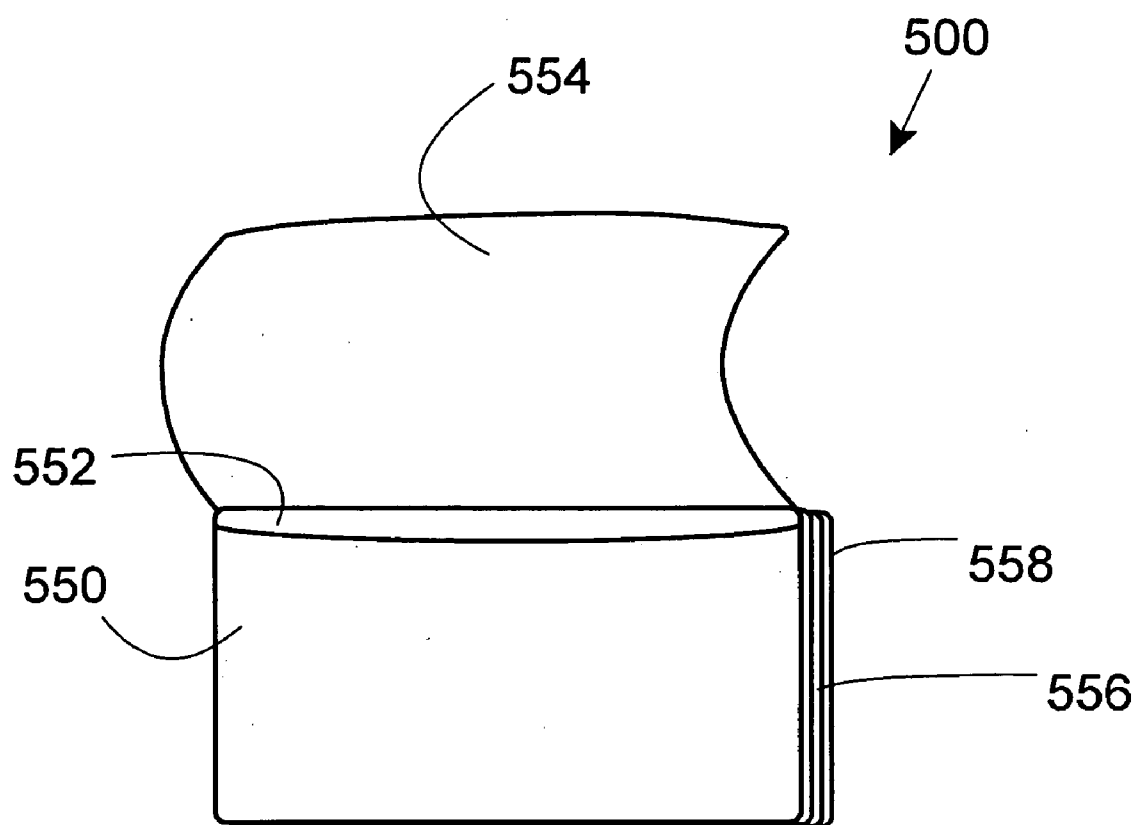


Fig. 5

DIELECTRIC SMART CARD PROTECTOR SLEEVE

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CROSS-REFERENCE TO RELATED APPLICATIONS

[0002] N/A

FIELD OF THE INVENTION

[0003] This invention relates generally to wallets, and specifically to credit card/smart card holders.

STATEMENT REGARDING FEDERALLY FUNDED RESEARCH

[0004] This invention was not made under contract with an agency of the US Government, nor by any agency of the US Government.

BACKGROUND OF THE INVENTION

[0005] Smart cards are credit card sized plastic cards containing embedded integrated circuitry. In general, smart cards are multiplying rapidly, with tens of millions in use in the US, hundreds of millions believed to be in use in Europe and more spreading rapidly in other parts of the world. For example, in Malaysia it is believed that there are already 20 million smart cards in use. Normally, standard credit card sizes are used, such as ISO/IEC 7810 defines a standard size card (ID-1) as 85.6 millimeters by 53.98 millimeters, or a bit more than 3 inches by 2 inches or other popular sizes. Almost as important, the US government and other governments have begun issuing passports with similar chips in them, as well as health insurance cards, driver's licenses and the like.

[0006] In general, the chips may be "contact only" types, or they may be contactless types, which offer greater convenience. The contactless cards use RFID (radio frequency identification) technology: the circuit on the card/passport is a transponder which may receive energy from a radio transmission and then respond, usually at a throughput such as 100 to 800 kbits per second and with a short range, usually a few yards/meters.

[0007] Obviously, these parameters can define an enormous security issue, a fact not lost on manufacturers and users. One response is to limit range. ISO/IEC 14443 defines a maximum range of 10 centimeters (about 4 inches) while ISO/IEC 15693 defines a longer range of about 50 centimeters (about 1/2 yard). In use, unfortunately, the actual ranges vary from cards that won't even respond in contact to times when cards can be accessed from a considerable range, in fact, from ranges which may make users unaware that they are even being targeted.

[0008] Another response has been encryption of the card information. DES, 3DES, RSA and other algorithms have been used for this, however, even with encryption, card con-

tent may still be vulnerable to a determined attack, and not all cards are actually encrypted as yet.

[0009] Normal card holders and passport folders do nothing to present such remote access. In fact, one common sales feature of the cards is that they can make payments without even being removed from the user's handbag or pocket. This is for the obvious reason that most common materials for clothing and accessories are completely transparent to radio waves.

[0010] Various US patents attempt to address security in credit cards, particularly in reference to protecting magnetic stripes on credit cards. U.S. Pat. No. 6,121,544 to Petsinger on Sep. 19, 2000 shows a smart card protector, however, the structure of the device is a hard sided case which uses metal inserts, not soft films. In use, the device would be bulky and hard to retrofit to a wallet. U.S. Pat. No. 7,163,152, Jan. 16, 2007 to Osborn, U.S. Pat. No. 6,845,863 to Riley on Jan. 25, 2005, U.S. Pat. No. 4,851,610 Leblanc et al on Jul. 25, 1989, and U.S. Pat. No. 5,941,375 to Kamens et al on Aug. 24, 1999 all show various attempts to protect credit card magnetic stripes from de-magnetization and the like, but not using structures which would be sufficient to protect a smart card from illicit radio access.

[0011] Thus the references shown do not generally adequately deal with the issue of illicit access by means of a convenient structure for users.

[0012] Searching shows several other items not in patent publication record of the US PTO. Smartcardfocus.com, idstronghold.com, and cardsafeonline.com all teach sleeves for protecting cards from either RF or magnetic influences. However, these sleeves are all apparently made of some sort of single layer, unattractive, opaque, fiber material. These products also serve only a single card with a single pocket and have no structure to cover the open end of the sleeve.

[0013] FIG. 3 is a PRIOR ART block diagram of a smart credit card showing authorized and unauthorized access possibilities. Smart card 310 has RFID capable chip 312, which may have thereon credit card numbers, passport vital information, actual electronic cash values, medical information or the like. Now as legitimately used, an authorized RF device 314 such as a POS (point of sale) station may read the card with the user's knowledge and consent, for example, when boarding a subway or the like. Authorized RF access 316 would consist of broadcasting radio frequency energy and inquiry to the card, which would then "power up", identify the query as legitimate (if the card has security features built in), and respond, also by RF.

[0014] However, illicit/furtive RF device 318 may be further away or disposed in a concealed manner, and it might also engage in illicit/furtive RF access 320, which would, from the perspective of the smart card, follow the exact same sequence: reception of RF energy and signal, security check (if any) and response. This could result in considerable loss of privacy or currency by the unwitting card "user".

[0015] FIG. 4 is a PRIOR ART side view of a limited use of a "window" of material in a credit card holder. Credit card holder 422 is designed to protect a credit card magnetic stripe by means of a window 424 of refractory material over the magnetic stripe. If the dielectric or RF refractory window 424 is transparent in the visible spectrum of light, then the device body must be non-transparent in order to protect the credit card numbers and name printed on the side of the card elsewhere, resulting in the "window" configuration shown.

[0016] Unfortunately, the choice of either refractory window 424 or visible blocking material means that only that which is directly under the window will be protected. Looking at the smart card of FIG. 3, it will be seen that the IC circuit of that card would not be positioned so as to be protected by the material of window 424.

[0017] The card is also weakened by the window section.

[0018] It would be preferable to provide a device not having these deficiencies.

[0019] It would be preferable to provide a device which can protect a card from RF access at all angles and regardless of the location of the IC chip on the card.

[0020] Finally, it would be preferable to provide a device which is simple to manufacture and low cost to produce in quantity.

SUMMARY OF THE INVENTION

[0021] General Summary

[0022] The smart card holder or passport holder of the invention has two sides sealed together at three edges to leave an interior space dimensioned and configured to hold either a smart card or passport. The RF blocking material of the invention may be flexible and transparent film sputtered with silver or indium metal, and the sides may have multiple layers, for example, a first layer of dielectric material which substantially covers both sides and a second layer of structural or decorative material to add strength or a tidy appearance. Either material might be on the outside of the card or inside, although in the case of decorative material, placing outside of the dielectric material is obviously preferable. An optional third layer of soft material might protect any magnetic stripe on a card or the like from the dielectric material, or may protect the IC chip from direct contact with the dielectric material or may merely protect the appearance of the card.

[0023] Flaps on the device may cover the open edge of the body, so that there is no route for RF waves to penetrate, unlike reference designs with open ends, and the device may be manufactured with a "book" configuration having multiple pages, each page being one card holder and the front and back covers being flaps either for covering the edges of the front or back holders or for insertion into a typical slot in a wallet or purse, by which means a normal wallet or purse may be retrofitted to securely hold multiple smart cards with complete RF security.

[0024] The sides may be sealed at the edges by means of RF welding or other secure methods in order to minimize gaps between the sides.

[0025] In use, the device prevents unauthorized RF remote-access to the smart card chip or passport chip.

[0026] Summary in Reference to Claims

[0027] It is therefore another aspect, advantage, objective and embodiment of the invention, in addition to those discussed previously, to provide a smart card holder comprising:

[0028] a body dimensioned and configured to hold a standard size smart card in an interior space, the body having first and second sides having rectangular planforms and four edges, the first and second sides joined at a plurality of the edges;

[0029] the first and second sides having first and second layers of material, the first layer being a flexible transparent dielectric material covering substantially the entire rectangular planform of each side.

[0030] It is therefore another aspect, advantage, objective and embodiment of the invention, in addition to those dis-

cussed previously, to provide a smart card holder wherein the second layer is a decorative material and the first layer is disposed adjacent the interior space.

[0031] It is therefore another aspect, advantage, objective and embodiment of the invention, in addition to those discussed previously, to provide a smart card holder wherein the second layer is a strong structural material and the first layer is disposed adjacent the interior space.

[0032] It is therefore another aspect, advantage, objective and embodiment of the invention to provide a smart card holder further comprising a third layer of material, wherein the third layer is a soft material and the third layer is disposed adjacent the interior space.

[0033] It is therefore another aspect, advantage, objective and embodiment of the invention to provide a smart card holder wherein the first and second layers are joined at a plurality of edges by RF welding.

[0034] It is therefore another aspect, advantage, objective and embodiment of the invention to provide a smart card holder wherein the first layer is a 5 mil thickness of a plastic film sputter sprayed with silver and indium.

[0035] It is therefore another aspect, advantage, objective and embodiment of the invention to provide a smart card holder wherein the first and second sides are joined at three edges.

[0036] It is therefore another aspect, advantage, objective and embodiment of the invention to provide a smart card holder wherein the body is approximately 3.5 inches by 2.25 inches.

[0037] It is therefore yet another aspect, advantage, objective and embodiment of the invention to provide a passport holder comprising:

[0038] a body dimensioned and configured to hold a standard size passport in an interior space, the body having first and second sides having rectangular planforms and four edges, the first and second sides joined at a plurality of the edges;

[0039] the first and second sides having first and second layers of material, the first layer being a flexible transparent dielectric material covering substantially the entire rectangular planform of each side.

[0040] It is therefore yet another aspect, advantage, objective and embodiment of the invention to provide a passport holder wherein the second layer is a decorative material and the first layer is disposed adjacent the interior space.

[0041] It is therefore yet another aspect, advantage, objective and embodiment of the invention to provide a passport holder wherein the second layer is a strong structural material and the first layer is disposed adjacent the interior space.

[0042] It is therefore yet another aspect, advantage, objective and embodiment of the invention to provide a passport holder further comprising a third layer of material, wherein the third layer is a soft material and the third layer is disposed adjacent the interior space.

[0043] It is therefore another aspect, advantage, objective and embodiment of the invention to provide a passport holder wherein the first and second layers are joined at a plurality of edges by RF welding.

[0044] It is therefore yet another aspect, advantage, objective and embodiment of the invention to provide a passport holder wherein the first layer is a 5 mil thickness of a plastic film sputter sprayed with silver and indium.

[0045] It is therefore yet another aspect, advantage, objective and embodiment of the invention to provide a passport holder wherein the first and second sides are joined at three edges.

[0046] It is therefore yet another aspect, advantage, objective and embodiment of the invention to provide a passport holder wherein the body is approximately 5 inches by 3.5 inches.

[0047] It is therefore another aspect, advantage, objective and embodiment of the invention to provide a smart card holder for use with a wallet having a pocket, the holder comprising:

[0048] at least one page dimensioned and configured to hold a standard size smart card in an interior pocket, the page having first and second sides having rectangular planforms and four edges, the first and second sides joined at a plurality of the edges and having at least one unjoined edge;

[0049] the first and second sides having first layers of flexible transparent dielectric material covering substantially the entire rectangular planform of each side; and

[0050] an insert portion attached to the page, the insert portion dimensioned and configured to be inserted into such wallet pocket.

[0051] It is therefore yet another aspect, advantage, objective and embodiment of the invention to provide a smart card holder further comprising:

[0052] at least a second page dimensioned and configured to hold a standard size smart card in an interior pocket, the second page having first and second sides having rectangular planforms and four edges, the first and second sides joined at a plurality of the edges;

[0053] the first and second sides having first layers of flexible dielectric material covering substantially the entire rectangular planform of each side, the second page attached to the first page.

[0054] It is therefore yet another aspect, advantage, objective and embodiment of the invention to provide a smart card holder further comprising:

[0055] a cover sheet attached to the first page, the cover sheet having a first layer of flexible dielectric material, the cover sheet disposed so as to cover the unjoined edge of the first page.

BRIEF DESCRIPTION OF THE DRAWINGS

[0056] FIG. 1 is a cross-sectional view of a first embodiment of the device, showing dual layers of material and RF bonding of the sides.

[0057] FIG. 2 is a side view of a second embodiment of the device, showing a triple layered construction.

[0058] FIG. 3 is a PRIOR ART block diagram of a smart credit card showing authorized and unauthorized access possibilities.

[0059] FIG. 4 is a PRIOR ART side view of a limited use of a "window" of material in a credit card holder.

[0060] FIG. 5 is a frontal perspective view of a preferred embodiment of the invention which may easily be retrofitted to most wallets and which could be used to hold multiple smart cards.

INDEX TO REFERENCE NUMERALS

[0061] 100 Smart card holder
[0062] 102 Interior space

[0063] 104 First structural or decorative layer
[0064] 106 Transparent dielectric layer
[0065] 108 RF weld of layers to form holder
[0066] 200 Smart card holder
[0067] 204 First structural or decorative layer
[0068] 206 Transparent dielectric layer
[0069] 208 Second structural layer
[0070] 310 Smart card
[0071] 312 RF chip
[0072] 314 Authorized RF device
[0073] 316 Authorized RF access
[0074] 318 Illicit/furtive RF device
[0075] 320 Illicit/furtive RF access
[0076] 422 Credit card holder
[0077] 424 Window
[0078] 500 Insert/retrofit smart card protector
[0079] 550 Page
[0080] 552 Opening
[0081] 554 Front cover
[0082] 556 Second page
[0083] 558 Back cover

DETAILED DESCRIPTION

[0084] FIG. 1 is a cross-sectional view of a first embodiment of the device, showing dual layers of material and RF bonding of the sides.

[0085] Smart card holder 100 has interior space 102 which is dimensioned and configured to accept a standard size of credit card. Note that there are various standard credit card sizes, any may be used: ID-1, ID-000, etc. Interior space 102 is entirely surrounded on both sides and three edges out of four by the several layers of the invention. A seal or weld 108 may be used in order to provide a gapless securing of the edges together, or the material of the device may be manufactured in a flat tube or the like. One common method of sealing is "dielectric" or "RF" welding, which coincidentally uses the same terms (dielectric and RF) as those used to describe the material of one of the layers of the invention. The two usages of the terms should not be confused: dielectric or RF welding is merely a convenient way to secure together two sides having therein a dielectric or RF material.

[0086] The first structural or decorative layer 104 may be anything from alligator skin to plastic, as desired. It may be the inner layer or the outer layer. It may be secured to the other layers of the invention, for example by welding or adhesive, or it may be unsecured but contained.

[0087] Transparent dielectric layer 106 may be a material impervious to RF/electrical transmission. One example of such materials is the class of flexible clear plastic films available in various thicknesses from less than one mil to considerably thicker materials. Such plastic films may be coated with silver or iridium or similar materials, metallic or not. A more specific material is CLEAR-SHIELD™ (trademark owner not affiliated with present applicant) brand transparent RF/electric shielding film, which may be used in 5 mil thickness.

[0088] FIG. 2 is a side view of a second embodiment of the device, showing a triple layered construction.

[0089] Smart card holder 200 has three layers: first structural or decorative layer 202, second flexible transparent dielectric layer 206 and a third structural or soft protective layer 208. Note that the numbering convention used may be varied, as may placement of the layers.

[0090] Soft protective layer 208 may be used to protect the appearance or magnetic stripes on a card, and thus should be on the inner side, much like decorative materials should be on the outer side.

[0091] FIG. 5 is a front perspective view of a preferred embodiment and best mode of the invention which may easily be retrofitted to most wallets and which could be used to hold multiple smart cards. Insert/retrofit smart card protector 500 is designed to hold a plurality of smart cards in pages such as page 550 or second page 556, etc. Each page may have an opening 552.

[0092] Security, in particular blocking of all radio frequency (RF) signals from all directions, is enhanced by the fact that each page covers the opening of the page behind it, and front cover 554 in turn covers the opening 552 on the front page 550. Back cover 558 may have a pocket like other pages do, or it may be an insert part for placing the device securely into a wallet having small pockets: back cover 558 may be inserted into a small pocket, thus holding the entire device in a wallet while using up only one pocket of the wallet.

[0093] Note that in this embodiment, the device may be protected by the body of the wallet it is retrofitted to, thus allowing the elimination of a structural layer. In such embodiments, a single layer construction may be used: the layer material may be the film sputter coated with silver/indium/etc to make a flexible dielectric material. Thicker films, such as 5 mil film, may allow a fairly strong construction.

[0094] Use of transparent materials allows a user to SEE the card they are about to remove from the sleeve. This is important as the invention structure allows a user to have multiple protected smartcards, unlike the references cited in the Background, which are individual sleeves structured on the assumption that users have only a single card and sleeve.

[0095] In the presently preferred embodiment and best mode presently contemplated for carrying out the invention, the dimensions and configuration of TABLE I and TABLE II may be used.

TABLE ONE

Length:	3.5 inches
Width:	2.25 inches
Thickness:	0.125 inches
Dielectric material:	5 mil transparent plastic film sputter sprayed with silver and iridium
Layers:	2 or 3
END TABLE ONE	

[0096] Obviously, this embodiment corresponds in planform and size to a presently common standard credit card size and shape, particularly the interior space. It is anticipated that such cards will be more numerous than passports, as many people have no passport while the typical individual has several cards: driver's licenses, medical cards, credit cards and so on. Other sizes of credit cards may also be used merely by changing the dimensions above.

[0097] TABLE TWO shows an alternative embodiment suitable for passport use.

TABLE TWO

Length:	5 inches
Width:	3.5 inches
Thickness:	0.125 inches

TABLE TWO-continued

Dielectric material:	5 mil transparent plastic film sputter sprayed with silver and iridium
Layers:	2 or 3
END TABLE TWO	

[0098] The disclosure is provided to allow practice of the invention by those skilled in the art without undue experimentation, including the best mode presently contemplated and the presently preferred embodiment. Nothing in this disclosure is to be taken to limit the scope of the invention, which is susceptible to numerous alterations, equivalents and substitutions without departing from the scope and spirit of the invention. The scope of the invention is to be understood from the appended claims.

What is claimed is:

1. A smart card holder comprising:

a body dimensioned and configured to hold a standard size smart card in an interior space, the body having first and second sides having rectangular planforms and four edges, the first and second sides joined at a plurality of the edges;

the first and second sides having first and second layers of material, the first layer being a flexible transparent dielectric material covering substantially the entire rectangular planform of each side.

2. The smart card holder of claim 1, wherein the second layer is a decorative material and the first layer is disposed adjacent the interior space.

3. The smart card holder of claim 1, wherein the second layer is a strong structural material and the first layer is disposed adjacent the interior space.

4. The smart card holder of claim 1, further comprising a third layer of material, wherein the third layer is a soft material and the third layer is disposed adjacent the interior space.

5. The smart card holder of claim 1, wherein the first and second layers are joined at a plurality of edges by RF welding.

6. The smart card holder of claim 1, wherein the first layer is a 5 mil thickness of a plastic film sputter sprayed with silver and indium.

7. The smart card holder of claim 1, wherein the first and second sides are joined at three edges.

8. The smart card holder of claim 1, wherein the body is approximately 3.5 inches by 2.25 inches.

9. A passport holder comprising:

a body dimensioned and configured to hold a standard size passport in an interior space, the body having first and second sides having rectangular planforms and four edges, the first and second sides joined at a plurality of the edges;

the first and second sides having first and second layers of material, the first layer being a flexible transparent dielectric material covering substantially the entire rectangular planform of each side.

10. The passport holder of claim 9, wherein the second layer is a decorative material and the first layer is disposed adjacent the interior space.

11. The passport holder of claim 9, wherein the second layer is a strong structural material and the first layer is disposed adjacent the interior space.

12. The passport holder of claim 9, further comprising a third layer of material, wherein the third layer is a soft material and the third layer is disposed adjacent the interior space.

13. The passport holder of claim **9**, wherein the first and second layers are joined at a plurality of edges by RF welding.

14. The passport holder of claim **9**, wherein the first layer is a 5 mil thickness of a plastic film sputter sprayed with silver and indium.

15. The passport holder of claim **9**, wherein the first and second sides are joined at three edges.

16. The passport holder of claim **9**, wherein the body is approximately 5 inches by 3.5 inches.

17. A smart card holder for use with a wallet having a pocket, the holder comprising:

at least one page dimensioned and configured to hold a standard size smart card in an interior pocket, the page having first and second sides having rectangular planforms and four edges, the first and second sides joined at a plurality of the edges and having at least one unjoined edge;

the first and second sides having first layers of flexible dielectric material covering substantially the entire rectangular planform of each side; and

an insert portion attached to the page, the insert portion dimensioned and configured to be inserted into such wallet pocket.

18. The smart card holder of claim **17**, further comprising: at least a second page dimensioned and configured to hold a standard size smart card in an interior pocket, the second page having first and second sides having rectangular planforms and four edges, the first and second sides joined at a plurality of the edges;

the first and second sides having first layers of flexible transparent dielectric material covering substantially the entire rectangular planform of each side, the second page attached to the first page.

19. The smart card holder of claim **18**, further comprising: a cover sheet attached to the first page, the cover sheet having a first layer of flexible dielectric material, the cover sheet disposed so as to cover the unjoined edge of the first page.

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