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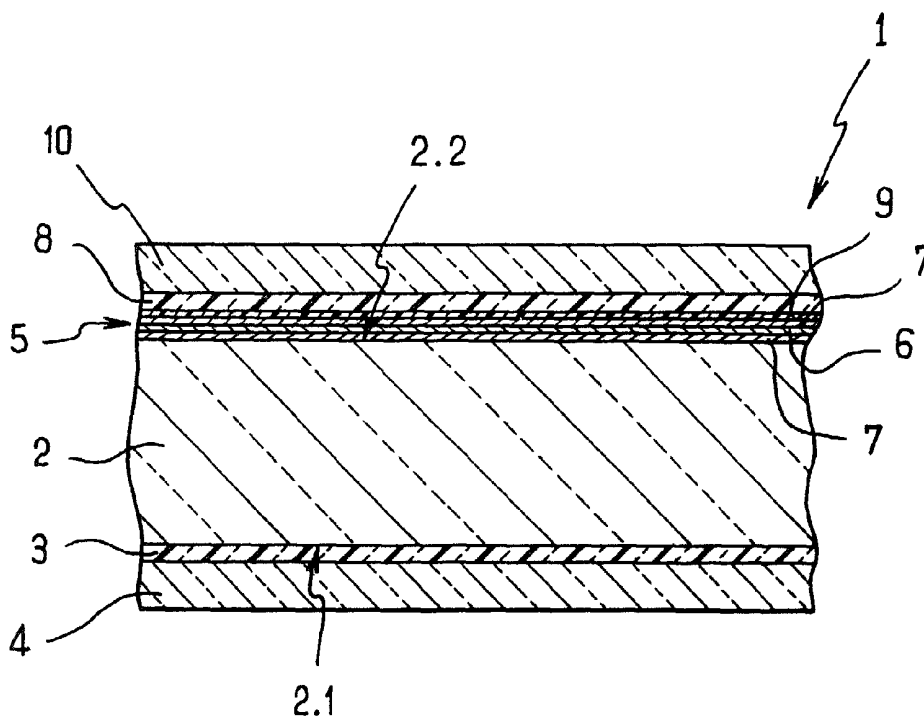
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(54) Title: TRANSPARENT DATA CARD



(57) Abstract: A data card comprises a data storage medium embedded in a card body. The card body comprises a filter layer (5) having substantially the same dimensions in terms of length and width as the card body. The filter layer is substantially transparent to electromagnetic radiation in a wavelength range that comprises electromagnetic radiation perceptible by the human whereas the filter layer is substantially opaque to electromagnetic radiation in another wavelength range.



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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## TRANSPARENT DATA CARD

## FIELD OF THE INVENTION

The present invention relates to a data card, such as a card having a magnetic track or an integrated circuit. Such data cards are used for example, as credit  
5 or phone cards, or else, as identification or access cards, and the like.

## BACKGROUND OF THE INVENTION

Data cards generally comprise a card body made of a  
10 thermoplastic material which is opaque to electromagnetic radiation having wavelengths in the visible range, that is between about 400 and 800 nm. These cards also comprise a data storage medium such as a magnetic track or an integrated circuit in which data  
15 can be recorded or from which data can be read by means of a known type of reader.

## SUMMARY OF THE INVENTION

It is an object of the invention to provide a data  
20 card that is aesthetically appealing and that can be used in a wide range of applications.

To that end, the invention provides a data card as defined in claim 1.

The invention allows a data card that is perceived  
25 by the human eye as being transparent. Transparent data cards may appeal to numerous customers for aesthetic reasons. The transparency of a data card can thus be a selling feature.

However, a reader detects the presence of a card  
30 either mechanically through contact or optically because the card blocks a light beam emitted by the reader.

Cards made of a transparent material can normally only be detected mechanically by means of a feeler pin. Therefore, they are presently unusable in readers with optical detection, so that their use is restricted to small-scale applications only implemented by means of readers of the mechanical detection type.

In accordance with the invention, the card body comprises a filter layer having substantially the same dimensions in terms of length and width as the card body, the filter layer being substantially transparent to electromagnetic radiation in a wavelength range that comprises electromagnetic radiation perceptible by the human eye, the filter layer being substantially opaque to electromagnetic radiation in another wavelength range.

Thus, a data card in accordance with the invention can be detected optically by radiating electromagnetic radiation of the appropriate wavelength towards the card body, which is opaque to such radiation. A further advantage is that a data card in accordance to the invention can be used in a great variety of readers that optically detect the presence of a card. The position of the light beam for detecting the card may vary from one reader to another. In accordance with the invention, the filter layer has dimensions that substantially correspond to those of the card body, in terms of length and width. Consequently, a card in accordance with the invention will be detected irrespective of the position of the light beam in the reader concerned.

Preferably, the filter layer is opaque to electromagnetic radiation of a wavelength substantially ranging from 800 to 1000 nm. Preferably, the filter layer comprises at least one silver-based sub-layer and one antireflection sub-layer for electromagnetic

radiation in the visible range, the antireflection layer being advantageously made from titanium oxide.

Other features and advantages of the invention will become apparent from the following description of a non-limiting particular embodiment of the present invention.

#### DETAILED DESCRIPTION

Reference will be made to the only appended figure, which shows a schematic cross-section of the card body according to the present invention.

Referring to this figure, the card according to the invention comprises a card body generally shown by reference 1, which, herein, includes a plurality of layers made of materials transparent to electromagnetic radiation of a wavelength in the visible range.

Card body 1 thus comprises a core layer 2 made, for example, of polyethylene or polyvinyl chloride and has two opposing faces 2.1 and 2.2.

Over face 2.1 of layer core 2 extends a decorative layer 3 covered with a protection coating 4.

Decorative layer 3 is for example made of polyvinyl chloride, acrylonitrile-butadiene-styrene, or polycarbonate and is deposited in a way known per se, by OFFSET printing or screen-printing.

The protection coating 4 is made, for example, by depositing a resin varnish through an offset or a screen printing, or by laminating a polyvinyl chloride sheet.

On top of face 2.2 of core layer 2, extends a filter layer 5 which is opaque to an electromagnetic radiation having a wavelength outside the visible range and, more specifically, to an electromagnetic radiation having a wavelength within the near infrared range, namely between about 800 and 1000 nm. The filter layer 5 layer has the same dimensions as those of the card body

in terms of length and width. That is, the filter layer has a main surface whose dimensions substantially correspond to those of a main surface of the card body.

Filter layer 5 comprises a silver-based sub-layer 6 provided between two antireflection sub-layers 7 for visible electromagnetic radiation. Here, each antireflection sub-layer is made from titanium oxide. Antireflection sub-layers can also be made from other types of metal oxide. Filter layer 5 is vacuum deposited over core layer 2 by cold sputtering of the various sub-layers 6, 7, one by one. Filter layer 5 has a thickness of the order of 100 nm and silver-based sub-layer 6 has a thickness of the order of 10 nm. The thickness of the various sub-layers are preferably adjusted so that filter layer provides a minimum transmission of the order of 50 to 60 %, or even 70 %, of the electromagnetic radiation in the visible range and a maximum transmission of 10 % of the electromagnetic radiation in the near infrared range.

A decorative layer 8 is affixed to filter layer 5 by means of an adhesive layer 9. Decorative layer 8 is made of the same material and in the same way as decorative layer 3. Adhesive layer 9 improves the fixation strength of adhesive layer 8 to filter layer 5 whose adhesion properties are lower than those of core layer 2.

Decorative layer 8 is covered with a protection coating 10 made of the same material and in the same way as protection coating 4.

Of course, the present invention is not restricted to the above-described embodiment and variations can be made within the scope of the present invention as defined by the appended claims.

In particular, the number of silver-based sub-layers and antireflection sub-layers can be changed in order to increase or decrease the capability of the filter layer to transmit electromagnetic radiation.

5 Generally, the filter layer will comprise  $N$  silver-based sub-layers and  $N+1$  antireflection sub-layers,  $N$  being an integer greater than zero ( $N=1,2,3,4,\dots$ ).

In addition, other materials can be used for making the sub-layers in the filter layer. The choice of such  
10 materials will depend in particular on the desired electromagnetic radiation transmission capability, on the wavelength range to which filter layer 5 should be opaque. In this respect, the card body may comprise a filter layer opaque to electromagnetic radiation in the  
15 ultraviolet and far-infrared ranges, and the like. Another aspect concerns the adhesion properties of the various materials making up the filter layer, both between each other and with adjacent layers in the card body.

20 The filter layer may be transparent to electromagnetic radiation in a wavelength range that covers only a portion of the wavelength range of human vision (between 400 and 800 nm). For example, the filter layer may pass electromagnetic radiation in a range  
25 between 400 and 600 nm, in which case the transparency will have a certain color. The filter layer concerned may block electromagnetic radiation in a range between, for example, 700 and 900 nm. Thus, an electromagnetic radiation having a wavelength of 750 nm, which is  
30 perceptible by the human eye, can be used for optically detecting the presence of a card.

Finally, it should be noted that the filter layer may constitute the card body (a single layer structure). Layers other than the filter layer, if any, can be

composed of materials different from that the materials used in the above-described embodiment. All what matters is that these layers are transparent to a certain extent so that the data card is perceived by the human eye as  
5 transparent with or without a certain coloring.

**CLAIMS**

1. A data card comprising a data storage medium embedded in a card body, characterized in that the card body comprises a filter layer (5) having substantially the same dimensions in terms of length and width as the card body, the filter layer being substantially transparent to electromagnetic radiation in a wavelength range that comprises electromagnetic radiation perceptible by the human eye, the filter layer being substantially opaque to electromagnetic radiation in another wavelength range.

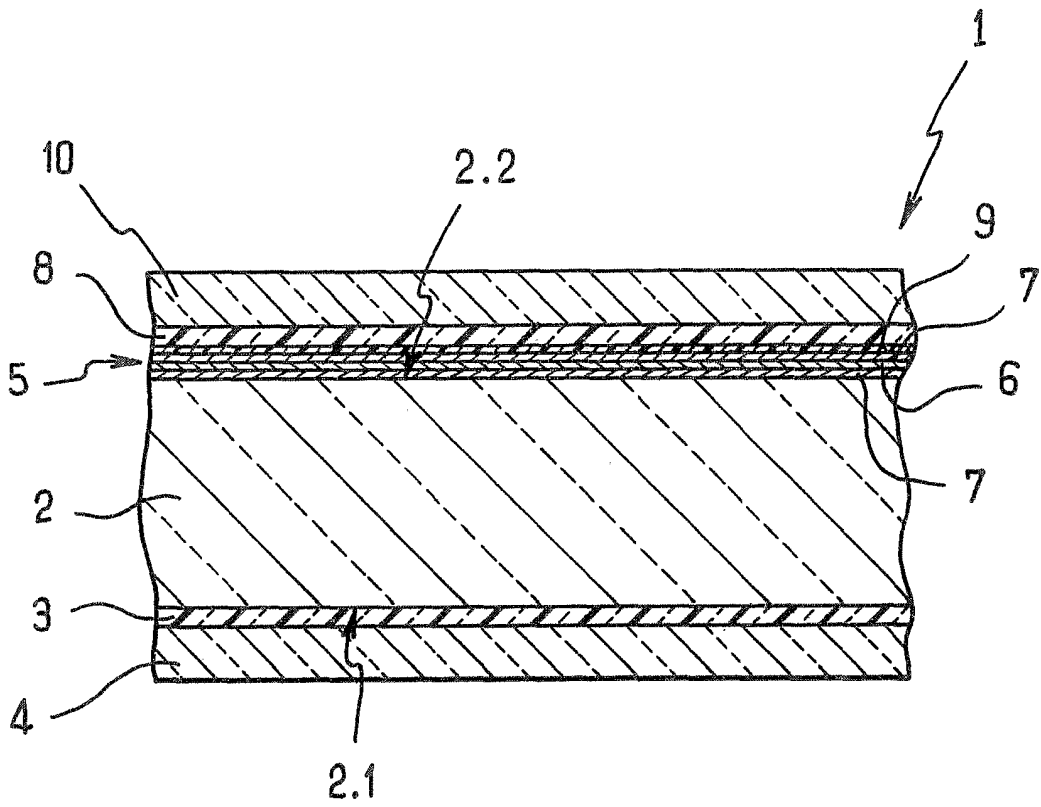
2. A data card according to claim 1, characterized in that filter layer (5) is substantially opaque to electromagnetic radiation in a wavelength range associated with infrared radiation.

3. A data card according to claim 2, characterized in that the filter layer (5) comprises a silver-based sub-layers (6) that is sandwiched between two antireflection sub-layer (7).

4. A card according to claim 3, characterized in that the antireflection sub-layer (7) is made from titanium oxide.

5. A card according to claim 4, characterized in that the filter layer (5) has a thickness comprised in the range between 150 nm and 250 nm.

6. A card according to claim 3, characterized in that said the silver-based sub-layer (6) has a thickness of comprised in a range between 5 and 15 nm.



**INTERNATIONAL SEARCH REPORT**

International Application No  
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<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC 7 G06K19/077 G06K19/04		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols) IPC 7 G06K		
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) WPI Data, PAJ, IBM-TDB, INSPEC, EPO-Internal		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	EP 0 343 829 A (TIME & DATA SYST INT) 29 November 1989 (1989-11-29) column 6, line 51 -column 8, line 4 ---	1,2
A	PATENT ABSTRACTS OF JAPAN vol. 1998, no. 05, 30 April 1998 (1998-04-30) & JP 10 003524 A (DAINIPPON PRINTING CO LTD), 6 January 1998 (1998-01-06) abstract ---	1,2
A	US 5 832 556 A (EYLER STANLEY H) 10 November 1998 (1998-11-10) column 7, line 3 - line 15 -----	1
<input type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.		
* Special categories of cited documents :		
*A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *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) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed *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 *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 *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. *&* document member of the same patent family		
Date of the actual completion of the international search  <p align="center">13 November 2001</p>		Date of mailing of the international search report  <p align="center">20/11/2001</p>
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer  <p align="center">Chiarizia, S</p>

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Information on patent family members

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