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(54) Security documents.

(57) A security document (20,21) is provided with limited areas (17;26,27,28) of pressure-sensitive material the surfaces of which are substantially co-planar with the remainder of the area (25;33,34,35) of the document and the whole area of the document is overlain with a transparent protective cover layer (18;24) so that markings can be applied to the said limited areas (17;26,27,28) and these marks can be neither erased nor removed from the document.

The transparent cover layer (18;24) may be adhesively bonded plastics material or may be a coating applied in a liquid form which subsequently sets, cures or hardens. The limited areas of pressure-sensitive material (17,26,27,28) are made co-planar with the remainder of the document (25;33,34,35) by applying an entirely covering layer of pressure-sensitive material which is subsequently desensitised in the areas (25;33,34,35) where the pressure-sensitive marking is not required.

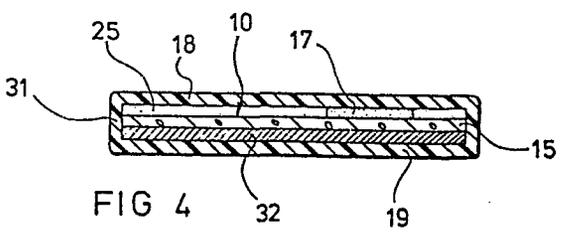

FIG 4

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Security Documents:

The present invention relates generally to security documents, which term will be understood to relate to any laminar element bearing markings or other information which can be read visually or otherwise and which is required to be incorruptible and/or which may indicate or constitute value in the document. The term "document" will specifically include cards such as credit cards and cheque guarantee cards; other examples include driving licences, airline tickets, identity cards, travel passes, letters of credit, bank security documents, equity documents, and the like. From the above it will be seen that the

term "document" is intended to refer not simply to sheets of printed paper, but also to cards or other non-foldable such items which can be marked or otherwise entered with information. It is important that the information on such a "document" shall be reliable in that, in the first place it is difficult (preferably impossible) for it to be altered by tampering with the document after it has been validly produced, and in the second place the possibility of an entirely false document is low. Indeed, there are two main features of a security document as far as incorruptibility of the information is concerned; the first is the nature of the provisions taken to prevent counterfeiting, that is the generation of false documents having the appearance of a genuine one. Measures taken to prevent counterfeiting include the formation of a water mark, intaglio printing, special purpose inks (including inks which are invisible in normal light, but which appear when irradiated by ultra violet or light of a special selected wave length), Hollerith punching and the like. The other main feature of a security document is the nature of the measures taken to prevent forging a genuine document to change its nature, for example to change the signature on a driving licence or the information on an airline ticket.

Credit cards usually have a panel on the reverse face for a signature which constitutes the final validation of the card which makes it possible for a person to whom the card is presented to check that it is presented by its proper owner. As is known, this is

done by the card holder handing over the card to the person requiring to check its validity, and the presenter is asked to sign a cooperating document whilst the signature written by the alleged owner is checked by comparison with the one already on the card. The majority of credit cards are made from a plastics material which does not readily accept a mark from ink and a validating signature panel of different material is therefore adhered to the reverse face, this panel being made from a material which will accept a mark from ink and which can be erased only with difficulty.

It is possible, however, to remove the validating signature panel by lifting or scraping it away from the card, following which a new blank signature panel can be introduced, and a forger may then add a different validating signature which enables the card to be used with the forged signature until other security information about the card, such as its serial number, can be circulated to prevent its further use.

Other problems with security documents involve similar corruption of the information contained thereon. For example, airline tickets are issue in many different locations other than the airline's own offices, particularly in a large number of different travel agencies. Preliminarily printed information on the airline ticket is completed by hand, with the authorised representative writing in the fare, the airline, the date and class of travel, the departure and arrival airports and the like. It has been known

for tickets issued for a relatively short and cheap journey to be changed by forgery to indicate a longer and more expensive journey.

The present invention seeks to provide a security document which can be completed by manuscript or typewritten information, and in which the completing information, once entered, is secure against corruption by any of the techniques outlined above, and in particular secure against corruption by erasure, removal of the layer on which the information is marked, or by overlying the marked area with another layer of material which could then be differently marked.

The present invention achieves these objects by providing a security document (as herein defined) having printed information visible on at least one face thereof and comprising a substrate which is impregnated or coated with a pressure sensitive image-forming material over at least part of the area of a surface of the substrate in such a way that the surface of the said part of the area is substantially exactly coplanar with the remainder of the surface of the substrate, at least the said surface of the substrate being overlain by and bonded or otherwise adhered to a transparent protective cover material.

The provision of the transparent protective cover material over the whole of the surface area of the security document makes it impossible for the se-

cured information to be erased or scraped off the document. Any attempt to remove the cover material bonded to the substrate will result in removal of fibres and printing ink from the substrate and result in damage thereto which can be readily detected. Further, the areas containing the secured information cannot be overlain with a panel of the same area since this will produce a surface step or shoulder detectable by tactile or optical means, and even if the overlain panel were subsequently covered with a further layer of covering material extending over the whole of the area of the document, there would still be a detectable difference in surface level between the original information on the document and the forged information.

Security documents formed in accordance with the principles of the present invention are thus entirely secure against forgery and have the further advantage that the secured information can be entered in manuscript or by typewriting or the like without requiring any special form of writing instrument. Indeed, a pointed but otherwise non-marking instrument can be used to write in the secured information which appears by reaction of the reactant chemicals in the pressure sensitive image-forming material. Such materials are well known and widely used in, for example, carbonless copy paper and will not be discussed in greater detail herein.

It is possible to create a limited area of pressure sensitive material within the overall area of the

substrate because of a particular property of the pressure sensitive image-forming materials, namely the fact that these materials can be rendered insensitive to pressure by various techniques, such as by irradiation with ultra violet light. The limited area within the overall area of the security document is thus masked after the pressure sensitive material has been applied by impregnation or coating, and the document irradiated with ultra violet light to leave only the required area or areas sensitive to pressure. This can be done either before or after the substrate is printed with other value or validating information, and it is to be noted that there is no inherent distinguishing feature identifying the pressure sensitive area unless it is identified with separate printed or other marking.

Printed information can also be applied to the undersurface of the overlying protective cover material should this prove to be advantageous. A composite security document may thus comprise the substrate with an impregnated or coated layer of pressure sensitive material which has been desensitised using any of the known techniques over that area or those areas where it is not required, and a covering layer printed on the underface with security information adhesively bonded thereto. Further protection can be obtained by coating the reverse face of the security document with a similar transparent protective cover material and preferably such materials are water impermeable so that the security document is effectively waterproof and will not be degraded by immersion in water

or, indeed, any other liquid to which the protective cover material may be impermeable.

The transparent protective cover material need not necessarily be applied in solid form, and may indeed with advantage be applied as a liquid coating the surface or both surfaces of the security document and subsequently drying to an impermeable protective layer. Techniques employed, such as spray coating, brush painting or roller application methods must be used in a way such that they do not leave pin holes in the surface through which degrading agents may penetrate into the substrate.

If the security document is in the form of an identity card or credit card the substrate itself may be substantially rigid or may be supported on a stiffening rigid layer of reinforcing material. This material may be card or plastics similar to the plastics material already used for the majority of credit cards.

The protective overlying layer of transparent cover material may extend beyond the boundaries of the substrate to be joined to a corresponding layer on the opposite surface of the document so that the security document is effectively totally enclosed within the protective layer. This is not an essential feature, however, and it is envisaged that credit cards or identity cards may be punched out from a larger sheet of completed and printed composite material so that the edges of the cards are exposed. Attempts at forgery by delamination of the layers will not be possible without visible signs of the tampering, however, due to the adhesive bonding between the

cover layer and the substrate, although it is important that the bonding agent should not be water soluble so that it cannot be removed by immersing it in water.

Suitable materials for the substrate include paper and card which are preferably but not necessarily porous, and capable of receiving the coating or impregnated layer of pressure sensitive image-forming material. A suitable material for the protective cover is polyethylene although other transparent plastics films such as polypropylene, or acetate film, varnish or other coatings may be employed.

The bonding techniques for attaching the protective cover layer to the substrate may be chosen from many which are available. The bonding or laminating may be effected by means of a temperature-sensitive adhesive, a chemically cured adhesive or a pressure sensitive adhesive applied to one or both of the layers to be laminated either prior to or during the lamination step.

The present invention also comprehends a method of making a security document comprising the steps of impregnating or coating at least one face of a layer of paper or like laminar material able to receive such with a pressure sensitive image-forming material which will produce a visible image upon the application of pressure above a predetermined threshold such as with a writing instrument or the like, applying information indicia the integrity of which it is desired to retain uncorrupted, such as by printing to the said one face of the layer and/or by reverse printing the underface of a layer of transparent material intended to overlie

and be adherently bonded to the said substrate, and either before or after such printing and/or before or after such adherent bonding takes place treating the part of the surface area of the said layer whereby to render the pressure sensitive image-forming material no longer capable of forming an image in response to locally applied pressure to leave an area within the boundary still responsive to such pressure.

The primary functions of such pressure sensitive materials are expected to be signature panels and information panels in documents which are completed subsequent to their preliminary formation. Such documents as airline tickets, driving licences and the like can thus be produced with the composition of the present invention and incorruptible information subsequently entered by means of a typewriter or in manuscript.

The pressure sensitive material is preferably a micro-encapsulated reactant which reacts upon rupture of the encapsulation to produce a visible mark on the substrate, The pressure sensitive material may be incorporated in the material of the substrate during the manufacture thereof or applied subsequently.

The substrate may be formed with a water mark during manufacture thereof to constitute an additional security against counterfeitting.

Various embodiments of the present invention will now be more particularly described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a prior art credit card showing the manner in which a validating signature panel is employed;

Figure 2 is a sectional view taken on a line II-II of Figure 1;

Figure 3 is a face view of a credit card formed as an embodiment of the present invention, in which the signature panel is formed in accordance with the principles of the invention;

Figure 4 is a sectional view taken on the line IV-IV of Figure 3;

Figure 5 is a face view of an airline ticket formed in accordance with the principles of the present invention; and

Figure 6 is a sectional view taken on a line VI-VI of Figure 5.

Referring first to Figures 1 and 2 there is shown in Figure 1 the reverse face of a conventional credit card generally indicated 11 comprising a plastics body 12 which has a security strip 13 of magnetic material coated thereon. The magnetic security strip can be read by machine and is relatively difficult to corrupt once the magnetic information has been applied thereto, although with suitable machinery this could be achieved readily. For the further validation of the card, therefore, a signature panel 14 is applied thereto.

Because the base body 12 of the card is made from a hard plastics material which will not accept a permanent mark from a pen or ball point, the signature panel 14 is adherently secured thereto and is made from a mater-

ial which will be marked by a ball point pen and from which the mark can be removed only with difficulty. The signature panel 14 is very thin but it has a distinct step 20 at its edge and it has been known for forgers to find ways of removing the whole signature panel 14 and replacing it with a blank panel allowing a different signature then to be entered and subsequently unauthorised use of the card to take place. Additional validating information is embossed on the card but not shown in the drawings for simplicity.

Referring now to Figures 3 and 4, the card shown constitutes an embodiment of the present invention and is an improvement over the existing prior art card illustrated in Figures 1 and 2 in that the signature panel is entirely incorrputible. The card of the present invention constitutes a substrate 15 of paper or cardboard or other fibrous absorbent material, on one face of which is coated a layer 10 of pressure sensitive image-forming material, which is applied during the manufacturing process of the substrate 15 itself. This material may be the well known material used in "carbonless" copy paper comprising a first reactant micro-encapsulated to isolate it from contact with a second reactant in the mixture. This layer 10 extends over the whole of the surface of the substrate 15. However, it has been rendered inactive over the majority of the area apart from the signature panel 17, for example by exposure to ultra violet light or other technique appropriate to the actual material used.

Other security information may be provided in the

usual way on the card either on the face coated with the layer 10 or on the reverse face, and this may include intaglio printing, the provision of a magnetic strip 16, embossing of the substrate 15, the provision of a water mark in the substrate 15 or any other known technique. The substrate may, as in the embodiment illustrated in Figure 6, be sufficiently rigid for the purpose or may as in the embodiment of Figure 4, be stiffened by the provision of an adjacent reinforcement layer 32 of relatively rigid material such as a hard plastics or other material.

Finally, the whole of the card 20 is encased within a laminated protective film comprising an upper layer 18 and a lower layer 19 which extend beyond the edges of the substrate 15 and join together at an edge region 31. The signature panel 17 is blank when the card is issued and the desensitising of the remaining area of the layer 10 means that the normal knocks and impacts to which the card is subject during its lifetime will not result in marks appearing thereon. The signature panel can be marked by writing over the surface of the layer 18 with a pointed instrument, not necessarily a marking instrument, which will rupture the micro-encapsulated reactant and cause visible images to be formed.

Having entered the signature the panel 17 may itself then be desensitised by exposure to ultra violet light or may be left sensitive in dependence on requirements. The knocks and impacts to which the card is subjected during use may cause unwanted marks

and lines to appear on the signature panel but since this is not otherwise marked with anything other than the signature these soiling or dirtying marks will not corrupt the information on the card and, unless the signature were to be obscured entirely, would not significantly affect the information value of the signature.

Obscuring the signature will only render the card unusable and would not assist any potential forger. The overlying layer 18 cannot be removed without damaging either the bond with the underlying layer 19 of the bond to the substrate 15 coated with the layer 10,17. The signature cannot be erased from the signature panel 17 since this is inaccessible, and any attempt to overlie the signature panel 17 without removing it, by means of a new panel of the same area bearing a different signature, will result in a surface step being introduced which could readily be detected by touch. As can be seen from Figure 4 the signature panel 17 is exactly flush with the surface of the remaining part of the coating 10 and the upper face of the coating 18 is thus entirely smooth and unvarying. This condition can be detected by suitable machinery if the card is used in a machine or by touch when the card is presented for use.

Turning now to Figures 5 and 6 an alternative type of security document is illustrated. In this case the security document illustrated is an airline ticket where some validating information is preliminarily

printed on the ticket, such as the name of the airline and other security printing (not shown) as well as the functional printing identifying the areas where the date and place of issue, the journey etc., are to be entered. The document comprises a substrate 22 having a coating or impregnated layer 23 on its upper face which is made from a pressure sensitive image-forming material as in the embodiment of Figures 3 and 4.

Desensitising of selected areas of this layer 23 by masking and irradiation with ultra violet light is effected so that the areas 26,27,28 remain pressure sensitive, whilst the intervening areas 33,34,35 become desensitised. The document is then overlain with a transparent coating 24 of plastics material such as polyethylene film. The composite laminated structure can then be marked in manuscript by writing in the areas 26,27,28 (usually related to the matter indicated by the printing). Some of these areas are indicated in the cross section of Figure 6, namely the flight and date 26, the date and place of issue of the ticket indicated in the area 27, and the form of payment indicated by the area 28.

Again, as in the embodiment of Figures 3 and 4 and as can be seen in Figure 6, the surfaces of these areas 26,27,28 are substantially flush with the remaining part of the document so that although only these can receive a mark by applying pressure either by a typewriter or by writing with a pointed instrument there is no way in which a forger can gain access to the marked components without destruction of the document. Once the information has been entered in

the areas 26,27,28 etc., it is incorruptible in the sense that it cannot be erased because these areas are inaccessible, and access cannot be gained by removing the overlying film 24 since this will damage the substrate visibly. Further security against additional information being entered can be achieved by further desensitising the whole document by irradiation with ultra violet light after it has been entered, or by other suitable techniques.

CLAIMS

1. A security document as herein defined having printed information visible on at least one face thereof characterised in that it comprises a substrate (15,22) which is impregnated or coated with a layer (10;23) of pressure-sensitive image-forming material over at least a part of the area of a surface of the substrate in such a way that the surface of the said part of the area is substantially exactly coplanar with the remainder of the surface of the substrate, at least the said surface of the substrate being overlain by and bonded or otherwise adhered to a transparent protective cover material (18,24).

2. A security document according to Claim 1, characterised in that the said surface of the substrate (15,22) is impregnated or coated over the whole of its area with the pressure-sensitive image-forming material (10;23) which has been treated over the said remainder (25;33,34,35) of the area (25) to make it no longer pressure-sensitive, that is to make it incapable of forming an image in response to locally applied pressure apart from the said area thereof.

3. A security document according to Claim 1 or Claim 2, characterised in that the substrate (15) is itself supported on a stiffening layer (32) of reinforcing material.

4. A security document accoridng to any of

Claims 1 to 3, characterised in that the protective overlying layer (18) of transparent cover material extends beyond the boundaries of the substrate (15).

5. A security document according to Claim 4, characterised in that a portion (31) of the transparent cover material extending beyond the substrate (15) is bonded to a corresponding layer (19) on the opposite surface of the document.

6. A security document according to any preceding Claim, characterised in that the substrate (15;22) and for the cover layer (18,19;24) bear printed images and/or information indicia on the outer and/or inner faces thereof.

7. A security document according to any preceding Claim, characterised in that the substrate (15,22) is paper and the cover (18,19;24) is a polyethylene film.

8. A security document according to any preceding Claim, characterised in that the document is provided with additional security treatment comprising one or more Hollerith punching printed bar codes or a strip (16) of magnetisable material either over or under the said transparent protective cover layer (18, 19;24).

9. A security document according to any preceding Claim, characterised in that the transparent protective cover layer (18,19;24) is applied as a liquid and sets, cures or hardens in situ.

10. A security document according to any of Claims 1 to 8, characterised in that the transparent protective cover layer (18,19;24) is bonded to the substrate (15;22) by a pressure sensitive adhesive, a temperature sensitive adhesive or a chemically cured adhesive.

11. A security document according to any preceding Claim, characterised in that it is formed as one of the following, namely a driving licence, an airline ticket, a credit card, an identity card, a travel pass, a letter of credit, an equity document or a bank security document.

12. A security document according to any preceding Claim, characterised in that the substrate (15;22) is paper formed with a watermark as an additional security measure.

13. A method of making a security document according to any of Claims 1 to 12, characterised in that it comprises the steps of impregnating or coating at least one face of a sheet (15;22) of absorbent or non-absorbent laminar material with a pressure sensitive image-forming material (10;23) which will produce a visible image upon the application of pressure above a predetermined threshold such as with a writing instrument or the like, applying information indicia the integrity of which it is desired to retain uncorrupted, such as by printing to the said one face of the layer and/or by reverse printing the underface of a layer of transparent

material (18,24) intended to overly and be adherently bonded to the said substrate (15;22) and either before or after such printing and/or before or after such adherent bonding takes place treating a part (25;33,34,35) of the surface area of the said layer whereby to render the pressure sensitive image forming material no longer capable of forming an image in response to locally applied pressure to leave a limited area (17;26,27,28) within the boundary of the document still responsive thereto.

14. A method according to Claim 13, characterised in that the pressure-sensitive image-forming material of the layer (10;23) is a micro-encapsulated reactant the components of which react upon rupture of the encapsulation to produce a visible mark on the substrate.

15. A method according to Claim 13 or Claim 14, characterised in that the substrate (15;22) is formed with a watermark during manufacture thereof.

16. A method according to any of Claims 13 to 15, characterised in that the covering layer is applied as a liquid and sets, cures or hardens to bond adherently to the substrate.

17. A method according to any of Claims 13 to 15, characterised in that the covering layer (18) is laminated to the substrate (15;22) by a laminating process involving pressure-sensitive heat sensitive or chemically reactive adhesive.

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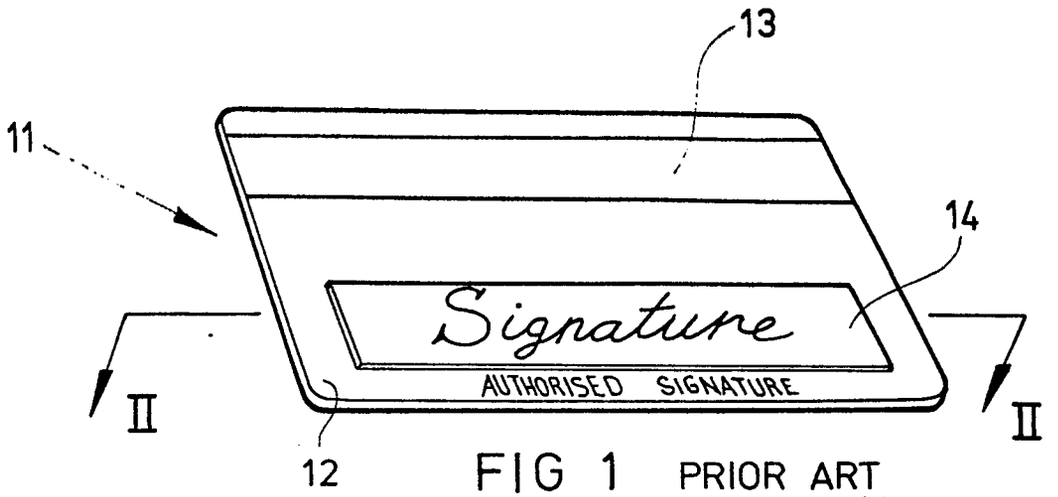

FIG 1 PRIOR ART

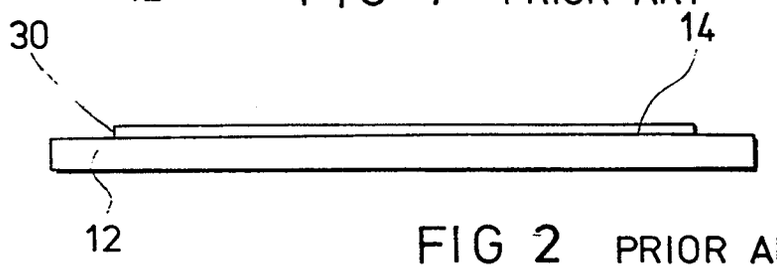

FIG 2 PRIOR ART

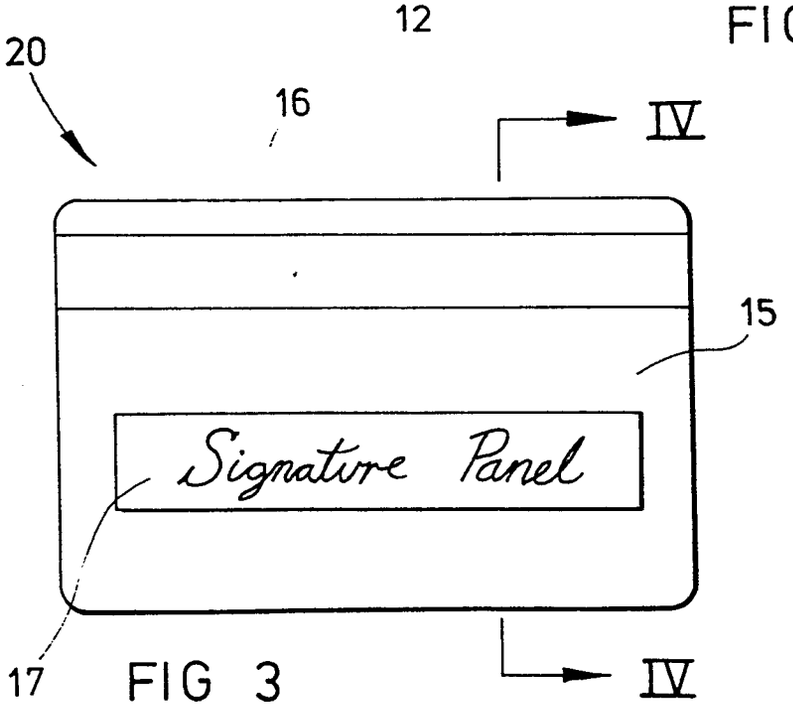

FIG 3

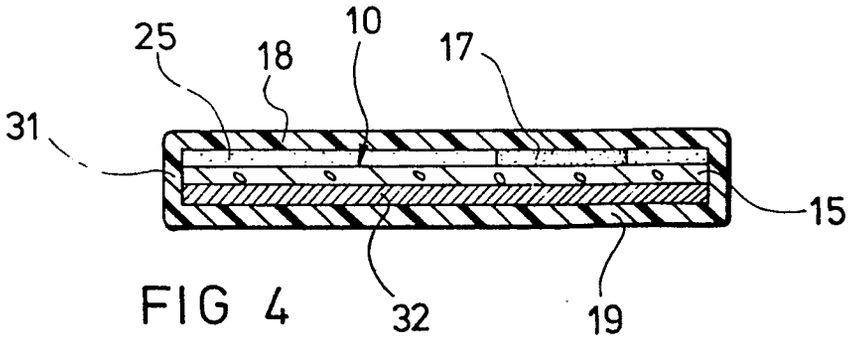

FIG 4

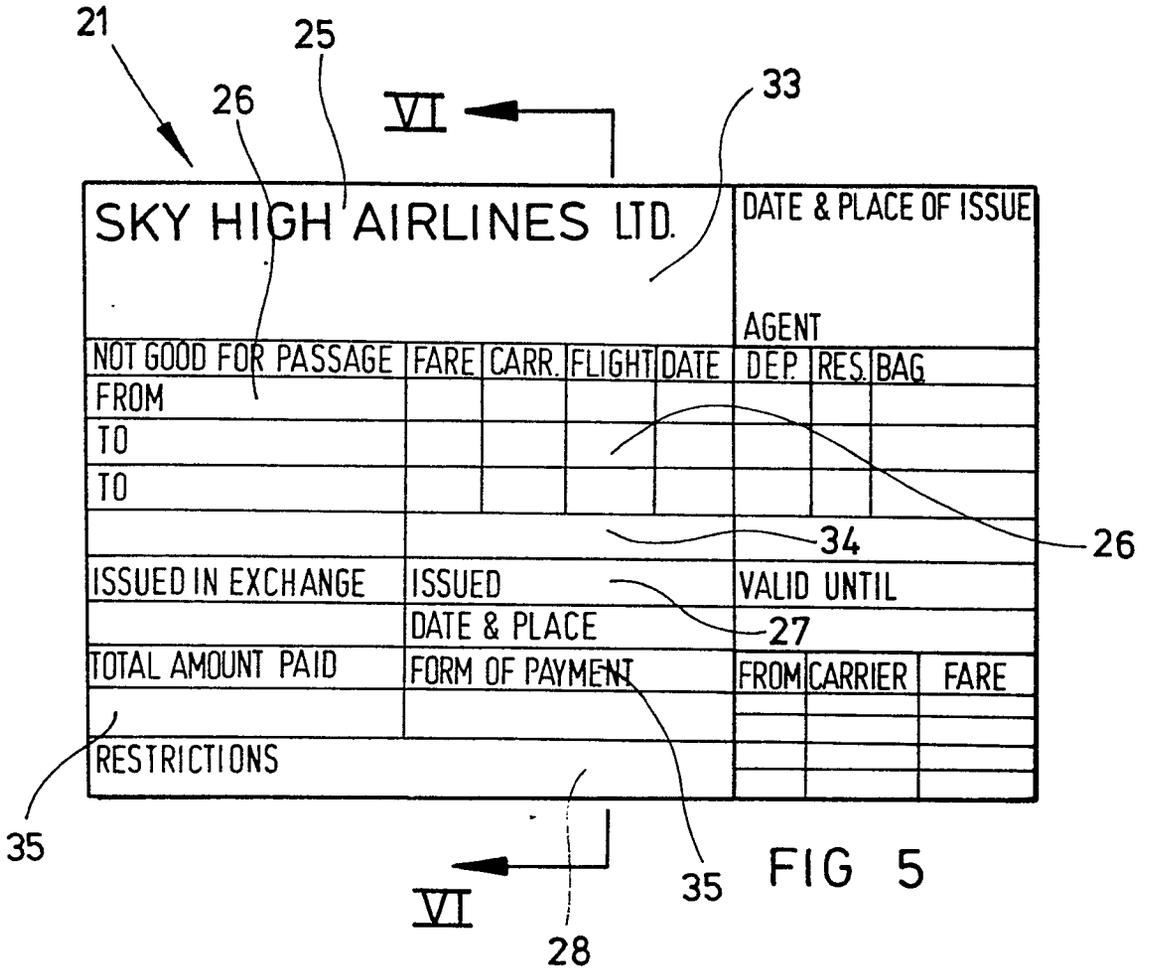
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FIG 5

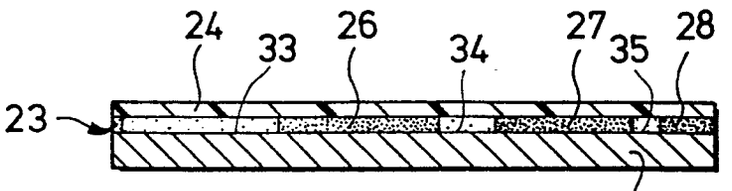
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FIG 6