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(54) Title: LAMINATES (57) Abstract A laminate comprises a layer of plastics material having self-stick properties adhered to a layer of a plastics material which does not have self-stick properties but is dimensionally stable so that the laminate has dimensional stability and self-stick properties.		

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LAMINATES

This invention relates to laminates for use in a variety of purposes such as for reducing transmission of light and/or heat and/or sound through window or other glazed units comprising glass or transparent plastic, e.g. conservatory roofs, car windscreens, etc. The effects of solar heat and glare, and of winter heat loss, through windows or other glazed units are intermittent, depending on prevailing weather conditions.

I have now discovered that a laminate may be formed of two layers of plastics material each having different properties, the two layers being united by an adhesive. In particular, it is possible to combine the softness of a plastics material such as plasticised polyvinylchloride with the dimensional stability of a polyester. For this invention the layers and the adhesive should be transparent or semi-transparent.

In one aspect of the invention there is provided a substantially transparent laminate comprising:

- a layer of a plastics material, the layer having self-stick properties but being substantially devoid of dimensional stability,
- a layer of plastics material having dimensional stability and being substantially devoid of self-stick properties,

the two layers being adhered together so that the laminate has self stick properties and dimensional stability.

Preferably the layer of plastics material is a layer of plasticised or unplasticised polyvinylchloride, polyester, polycarbonate, polystyrene, polyethylene, polypropylene,

Tedlar (a trade name of Du Pont) or the like. Preferably the layer of plastics material is a plasticised polyvinylchloride or the like. Because the plasticised polyvinylchloride and the like are soft and have self stick properties they may be difficult to handle without damage. The dimensional stable plastics such as polyesters and polycarbonates are also prone to damage. A laminate of this invention is not.

The plastics material may be transparent or may be tinted, e.g. by the presence of suitable agents introduced during manufacture or at a later stage. Other additives may be present in the plastics material, examples being a UV stabiliser and/or filter.

Preferably the two layers are adhered together by means of a pressure sensitive adhesive, such as an acrylic adhesive. In another version the two layers are adhered together by means of a cross-linked adhesive. Preferably the cross-linked adhesive is a polyurethane. Preferably, the adhesive is applied between the two layers to a density of between about 4 and about 35 g/m², most preferably the density is between about 6 g/m² and about 20 g/m². Additives, e.g. tinting agents and UV stabilisers and/or filters may be present in the adhesive.

In one specific aspect the invention provides a substantially transparent laminate comprising:

- a layer of plasticised polyvinylchloride as the layer of plastics material having self-stick properties;
- a layer of polyester or polycarbonate as the layer of plastics material having dimensional stability, and
- an intervening layer securing the first two layers together, the intervening layer being an acrylic adhesive or a cross-linked polyurethane.

Preferably one surface of the layer of the plastics material having dimensional stability is metallised: most advantageously the surface in question is that facing the other layer.

A laminate of the invention may be used as a window blind or film. The window film is preferably adapted to a window or the like prone to physical attack or abuse, such as a security screen, car window or the like. One other advantage of the use of polyvinylchloride is its resistance to fire which means that a laminate of the invention can satisfy the fire retardancy regulations for commercial buildings.

In addition because of its softness and strength the laminate has drape and may be used as a curtain.

The laminate may be modified. For example, another layer (or layers) of plastics material, optionally metallised, may be present on one or both outer surfaces of the defined laminate, the layer or layers optionally being secured to the laminate and to each other by adhesive.

The invention includes a window to the inner surface of which has been applied a laminate as defined. The invention extends also to such a window in which either the layer of metallised plastics material is applied to the window surface or the layer of plastics material of dimensional stability is applied to the window surface, preferably with adhesive present between the window surface and the facing applied layer.

In my co-pending Application for Letters Patent No. 90.24007.8 published under No. GB2249284A (Agent's Ref 2959GB), there is described and claimed a method of reducing transmission through a window or other glazed unit, comprising applying a layer of metallised plastics material to the material with which the window or other is glazed, by means of an intermediate layer of self-stick laminate having self-stick properties on both sides. The metallised layer reduces transmission through the window, and can be removed

when not required.

In order that the invention may be well understood it will now be described, by way of example, with reference to the accompanying diagrammatic drawings, which illustrate sections through different embodiments of the invention. In the drawings, S represents the layer of plasticised polyvinylchloride or like soft plastics film, and D represents the layer of polyester or like dimensionally stable film; A represents the layer of pressure sensitive or set or cured adhesive; M represents the layer of metal particles and G the glass; P represents a pressure sensitive adhesive.

Figures 1 and 2 illustrate a structure of a laminate useful as a window blind. Figure 1 shows an enclosed laminate or sandwich and Figure 2 illustrates an open laminate or sandwich.

The advantage of the embodiment of Figure 1 is that the metallised layer is protected by the layer on each side thereof. It does not come into direct contact with the adhesive/plasticisers associated with the soft plastic. In the construction of Figure 2 the adhesive interface bonds directly to the metallised surface and may be prone to damage because of leakage of the plasticisers from the soft plastic.

The embodiments of Figures 3 to 6 illustrates use of the invention as a laminate applied to the inner surface of a conventional window. These laminates employ pressure sensitive adhesive. The construction, use a soft plastic for softness and ease of handling, and polyester and other rigid type plastics for dimensional stability. A pressure sensitive adhesive may be used to bond the laminate to the glazing. The benefit of the laminate construction is that the laminate has excellent tear strength and is ideal for all security situations where it is necessary for the glazing to withstand violent physical attack or impact, bomb blast, attack by bullets, etc., e.g. security screens, vehicle windows and the like.

The laminate could be supplied either with or without a metallised layer. In the case of a clear laminate the soft plastic would be bonded directly to the polyester or polycarbonate and either self stick properties could be used for adhesion to the window or preferably an additional pressure sensitive adhesive would be added to fix the material to the glazing. The adhesive would preferably be on the polyester or polycarbonate layer although it could be in the soft plastic if necessary.

The embodiments of Figures 7 to 10 illustrate the laminate in a form suitable for self sticking to a glass surface. Figures 10 and 11 illustrate other embodiments of the invention. Figures 3,5,7,8 illustrate so-called closed structures whereas Figures 2,4,6 and 10 are so-called open laminates.

CLAIMS

1. A substantially transparent laminate comprising:
 - a layer of a plastics material, the layer having self-stick properties but being substantially devoid of dimensional stability,
 - a layer of plastics material having dimensional stability and being substantially devoid of self-stick properties,

the two layers being adhered together so that the laminate has both self-stick properties and dimensional stability.
2. A laminate according to Claim 1, wherein the layer of plastics material is a layer of plasticised polyvinylchloride, polyethylene, polystyrene; or the like.
3. A laminate according to Claim 1 or 2, wherein the layer of plastics material of dimensional stability is a polyester, polypropylene, polyethylene or a polycarbonate; or the like.
4. A laminate according to any preceding Claim, wherein the two layers are adhered together by means of a pressure sensitive adhesive.
5. A laminate according to Claim 4, wherein the adhesive is an acrylic adhesive.
6. A laminate according to any of Claims 1 to 3, wherein the two layers are adhered together by means of a cross-linked adhesive.
7. A laminate according to Claim 6, wherein the cross-linked adhesive is a polyurethane.

8. A laminate according to Claim 6 or 7, wherein before cross linking the adhesive is applied between the two layers to a density of between about 2 and about 35 g/m², preferably between about 6 g/m² and about 20 g/m².
9. A laminate according to any preceding Claim, wherein one surface of the layer of the plastics material having dimensional stability has been metallised.
10. A laminate according to Claim 9, wherein the metallised surface faces the other layer.
- 11.. A laminate according to any preceding Claim, including tinting agents and/or a UV stabiliser and/or filters in any of layers and adhesive.
12. A laminate according to any preceding Claim, wherein another layer or layers of plastics material, optionally metallised, is present on one or both outer surfaces of the defined laminate, the layer or layers optionally being secured to the laminate and to each other by adhesive.
13. A laminate according to any preceding Claim in the form of a window blind or curtain.
14. A laminate according to any of Claims 1 to 12, comprising a window film to be applied to the inside surface of the window.
15. A laminate according to Claim 13 or 14, wherein the window is a security screen, car window or the like.
16. A window having a laminate according to any of Claims 1 to 12 applied to the inner

surface thereof.

17. A window according to Claim 16, wherein a layer of metallised plastics material is applied to the window inner surface.
18. A window according to Claim 16, wherein the layer of plastics material of dimensional stability is applied to the window inner surface.
19. A window according to Claim 17 or 18, wherein adhesive is present between the window surface and the applied layer.
20. A window according to Claim 19, wherein the adhesive is a pressure sensitive adhesive.
21. A window according to Claim 19, wherein the adhesive is a curable adhesive.

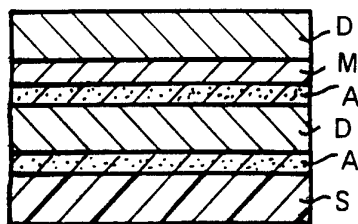


FIG. 1

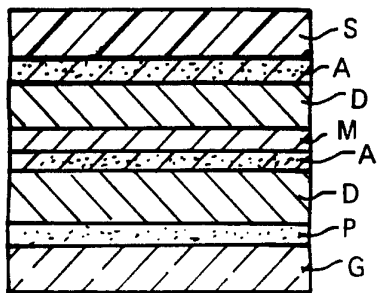


FIG. 3

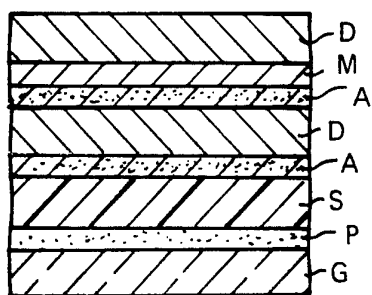


FIG. 5

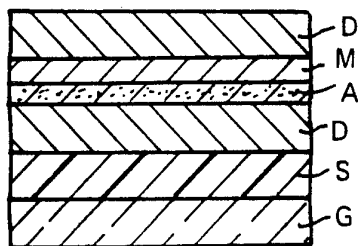


FIG. 7

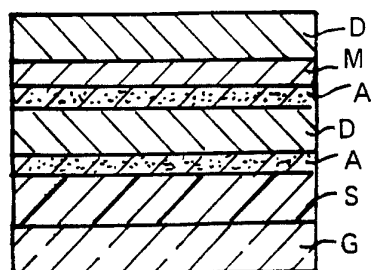


FIG. 9

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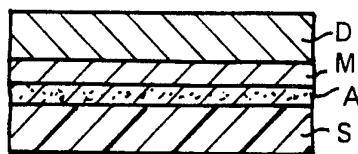


FIG. 2

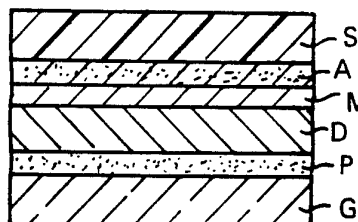


FIG. 4

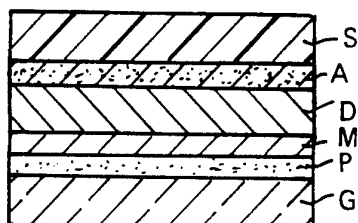


FIG. 6

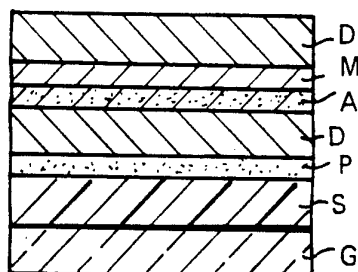


FIG. 8

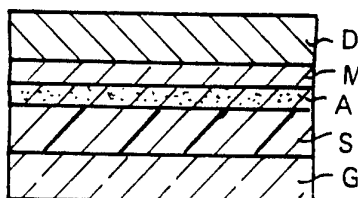


FIG. 10

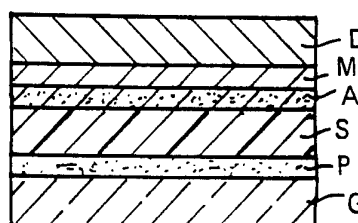


FIG. 11

INTERNATIONAL SEARCH REPORT

Inter: nal Application No
PCT/GB 93/01908

A. CLASSIFICATION OF SUBJECT MATTER
IPC 5 B32B27/08 B32B17/10

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)
IPC 5 B32B

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB,A,2 217 256 (WALLACE BUSINESS SERVICES LIMITED) 25 October 1989 see the whole document ---	1-3,14, 16
Y	GB,A,2 249 284 (DAVID JOHN ANDERSON) 6 May 1992 cited in the application see the whole document ---	1-5,9-19
Y	US,A,4 081 300 (MATERIAL DISTRIBUTORS CORPORATION) 28 March 1978 see the whole document ---	1-5,9-19
A		7
Y	US,A,4 952 459 (J.D. THATCHER) 28 August 1990 see claims 1-6 ---	4,5
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Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	FR,A,2 414 114 (MINNESOTA MINING AND MANUFACTURING COMPANY) 3 August 1979 see page 1, line 1 - line 9; figure 1 see page 5, line 17 - page 6, line 30 ---	17,19
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INTERNATIONAL SEARCH REPORT

information on patent family members

International Application No

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