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(54) Material in sheet form, particularly for producing items for household, gifts, interior decoration, or the like, and process for manufacturing said material

(57) A material in sheet form, particularly for manufacturing items for household, gifts, interior and lighting decoration, and the like, and to a process for manufacturing it. The material in sheet form is constituted by at least one first layer made of transparent material and by at least one second layer made of colored transparent or semitransparent material, between which a decorative intermediate layer is interposed, the intermediate layer being provided with openings and allowing to view, through the first layer, the color of the second layer through the openings of the intermediate layer.

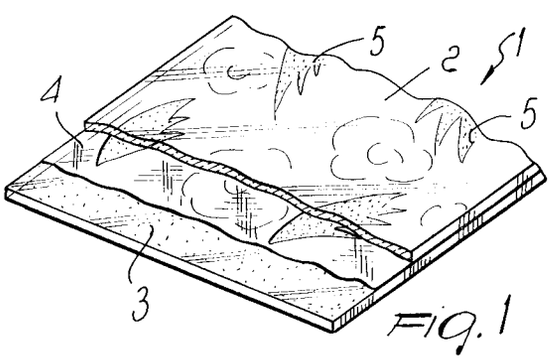

Fig. 1

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The present invention relates to a material in sheet form, particularly for producing items for household, gifts, interior and lighting decoration, or the like, and to a process for manufacturing said material.

Materials in sheet form are known which are used to manufacture household items, such as dishes, trays, lamps or others, and are constituted by two layers of transparent polymethyl methacrylate between which a fabric, printed with colored ornamental patterns or drawings, is interposed.

The fabric embedded in the two layers of polymethyl methacrylate constitutes the ornamental element of the material in sheet form and gives a particular aesthetic quality to the items manufactured using said material.

Although this kind of material allows to achieve highly appreciated aesthetic effects, it does not fully exploit the transparency of the polymethyl methacrylate layers, since one of the two layers is inevitably covered by the fabric.

The aim of the present invention is to provide a material in sheet form that allows to achieve particular aesthetic effects mainly based on the combination of the transparency of the materials employed and of the colors used.

Within the scope of this aim, an object of the invention is to provide a material in sheet form that particularly enhances the transparency effect.

Another object of the invention is to provide a material in sheet form in which it is possible to give particular evidence to certain areas, so as to achieve a depth effect in the decorations.

Another object of the invention is to provide a material in sheet form that can be manufactured with production costs comparable with those required to produce conventional materials in sheet form.

Another object of the invention is to provide an easily executable process for producing the material in sheet form according to the invention.

This aim, these objects, and others which will become apparent hereinafter are achieved by a material in sheet form, particularly for manufacturing items for household, gifts, interior decoration, or the like, characterized in that it comprises at least one first layer made of transparent material and at least one second layer made of colored transparent or semitransparent material, between which an intermediate decorative layer is interposed, said layer being provided with openings to allow to view, through said first layer, the color of said second layer through the openings of said intermediate layer.

Further characteristics and advantages of the material in sheet form according to the invention will become apparent from the following description of two preferred but not exclusive embodiments thereof, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a partially cutout perspective view of the material in sheet form according to the invention, in a first embodiment, showing the various layers composing it and wherein the intermediate layer is constituted by a fabric;

figure 2 is a perspective view of a tray obtained with the material in sheet form shown in figure 1;

figure 3 is a partially cutout perspective view of the material in sheet form according to the invention, in the first embodiment, showing the various layers composing it and wherein the intermediate layer is constituted by a metal sheet;

figure 4 is a perspective view of a tray obtained with the material in sheet form shown in figure 3;

figure 5 is a transversal sectional view of the material in sheet form of figure 1 or figure 3;

figure 6 is a perspective view of the preparation of a mold for producing the material in sheet form according to the invention, in the first embodiment;

figures 7 to 9 are views of the various steps of the process for producing the material in sheet form according to the invention, in the first embodiment, with the mold shown in a transverse cross-section;

figure 10 is a partially cutout perspective view of a second embodiment of the material in sheet form according to the invention;

figure 11 is a transverse sectional view of the material in sheet form of figure 10;

figure 12 is a transverse sectional view of the production of the material in sheet form shown in figures 10 and 11 inside a mold, shown in cross-section.

With reference to figures 1 to 4, the material in sheet form according to the invention comprises at least one first layer 2 made of transparent material and at least one second layer 3 made of transparent or semitransparent colored material, between which an intermediate layer 4, 14 is interposed, said layer being provided for decorative purposes and having openings, so that it is possible to view, from the first layer 2 and through the openings 5 formed in the intermediate layer 4, 14, the second layer 3, the color and transparency effect whereof achieve for the material in sheet form a particular aesthetic effect deriving from a combination of color, transparency and tridimensional depht effects.

The first layer 2 is preferably constituted by transparent polymethyl methacrylate, whereas the second layer 3 is preferably constituted by transparent or semitransparent colored polymethyl

methacrylate.

Conveniently, the second layer 3 can have, on its side directed towards the intermediate layer 4, 14, a smooth or embossed surface which makes its viewing through the openings 5 even more effective, thus further increasing the color and depth effects.

The intermediate layer, as shown in figures 1 and 2, can be constituted by a fabric 4 and the openings 5, which can be formed in a manner known per se by means of conventional fabric cutting machines or by weaving the fabric so that it has openings that reproduce ornamental patterns, such as floral, geometric, or other patterns.

The side of the fabric 4 directed towards the first layer 2 is preferably printed with ornamental patterns in different colors, which can be provided according to the color in which the second layer 3 is produced.

The fabric 4 can be made of natural threads or of synthetic-fiber threads, preferably acrylic-fiber ones, or of mixed natural and synthetic fibers.

The intermediate layer, as shown in particular in figures 3 and 4, can be constituted by a metallic material, such as a metal sheet 14, or by a fabric or mesh composed of metal wires. If the intermediate layer is constituted by a metallic fabric or mesh, the openings 5 can be constituted by the gaps between the weft and warp of the metallic fabric.

The metallic material of the intermediate layer is preferably constituted by silver, but it can also be constituted by other precious metallic materials, such as for example gold, or non-precious metallic materials, such as for example brass.

The openings 5, which can be formed in a manner known per se, preferably have shapes reproducing ornamental patterns, such as floral, geometric, or other patterns.

The side of the intermediate layer 14 directed towards the first layer 2, can also have shapes reproducing ornamental patterns of various configurations, depending on the aesthetic effect which is sought.

According to the embodiment shown in figures 10 and 11, in which the material in sheet form is generally designated by the reference numeral 1a, the second layer, designated in this case by the reference numeral 3a, can be constituted by a layer of transparent or semitransparent colored paint instead of by a polymethyl methacrylate layer. The other layers composing the material in sheet form 1a are in practice the same layers described with reference to the first embodiment and they are designated by the same reference numerals.

The paint layer 3a can have, on its side directed towards the intermediate layer 4, 14, a rough or smooth surface.

The intermediate layer 4, 14, also in this second embodiment, is constituted by a metallic fabric or mesh, as already described with reference to the first embodiment.

The material in sheet form, shown in figures 1 to 5, can be produced, as shown in figures 6 to 9, by arranging the intermediate layer 4, 14 which is provided with openings beforehand, onto a layer of transparent or semitransparent colored material, preferably made of polymethyl methacrylate, which has been prepared beforehand, is optionally smooth or embossed and constitutes the second layer 3, and by arranging the layer 3 and the layer 4, 14 onto the face of a first molding plate 7, made for example of glass, so that the layer 4, 14 is arranged on the face of the layer 3 that lies opposite to the first molding plate 7.

The layer 4, 14 can be fixed to the layer 3 for example by means of strips of adhesive tape 8 that also rigidly couple the layer 3 to the first molding plate 7.

A gasket 9 is arranged around the layer 3 and the layer 4, 14 and is thicker than the unit constituted by the layer 3 and by the layer 4, 14.

A second molding plate 10 is arranged on the gasket 9 so as to face the first molding plate 7 and be parallel thereto; together with said first molding plate and with the gasket 9, said second molding plate forms a gap 11 containing the layer 3 and the layer 4, 14. The gasket 9 delimits said gap 11, with the exception of one side having an opening 12, through which a transparent synthetic material in the liquid state is poured inside the gap, filling it completely. Said synthetic material in the liquid state is preferably constituted by polymethyl methacrylate which adheres to the layer 3 by seeping through the layer 4, 14.

The material that has filled the gap between the two molding plates 7 and 10 is then cooled in water or heated in furnace, so as to cure or polymerize, consequently embedding the layer 4, 14 between the layer constituted by the cured synthetic material, which constitutes the first layer 2, and the second layer 3.

Once the first layer 2 has cured, the unit constituted by the first layer 2, by the second layer 3, and by the intermediate layer 4, 14 is removed from the molding plates 7 and 10, obtaining the material in sheet form according to the invention.

If the second layer of transparent or semitransparent colored synthetic material is constituted by a layer of transparent or semitransparent colored paint 3a, as shown in particular in figure 8, said layer of paint is applied directly to the face of the first molding plate 7 directed towards the second molding plate 10.

The intermediate layer 4, 14, previously provided with openings, is applied to said layer of paint 3a and is rigidly coupled to the first molding plate 7 for example by means of strips of adhesive tape. A gasket 9, thicker than the layer of paint 3a and than the layer 4, 14 is arranged on the face of the first molding plate 7 that bears the paint 3a and the layer 4, 14 and the second molding plate 10 is arranged on said gasket. The transparent synthetic material in the liquid state is then poured inside the gap 11 delimited by the molding plates 7 and 10 and by the gasket 9; by passing through the layer 4, 14 said material firmly adheres to the layer of paint 3a.

The curing or polymerization of the transparent synthetic material in the liquid state traps the layer 4, 14 between the cured transparent synthetic material that constitutes the first layer 2 and the layer of paint 3a.

After curing, the unit constituted by the first layer 2, by the intermediate layer 4, 14 and by the layer of transparent or semitransparent colored paint 3a is removed from the molding plates 7 and 10. It should be noted that the layer of transparent colored paint 3a remains firmly anchored to the intermediate layer 4, 14 as a consequence of the seepage of the transparent synthetic material in the liquid state through the openings and /or the gaps between the weft and warp of the intermediate layer.

In this manner, the material in sheet form according to the embodiment shown in figures 10 and 11 is obtained.

The material in sheet form according to the invention can then be used directly as a flat sheet, optionally by simply applying additional parts to obtain flat trays or other flat items, or can be subjected to thermoforming to obtain variously shaped items according to the requirements, such as for example the trays 20 and 30 shown in figures 2 and 4.

If deep-drawn items are manufactured, it is preferred to use, for the intermediate layer 4, an acrylic fabric whose softening point is close to the softening point of polymethyl methacrylate and therefore does not hinder the deformability of the material in sheet form during thermoforming.

In practice it has been observed that the material in sheet form according to the invention fully achieves the intended aim, since it allows to achieve particular innovative aesthetic effects that arise from viewing, through the layer of transparent material, the layer of transparent or semitransparent colored material arranged below the intermediate layer through the openings provided in said intermediate layer. This effect is particularly pleasant, since it allows to combine the color of the transparent or semitransparent colored layer with the colors used to print the fabric or with the aesthetic effect of the metal layer, at the same time giving a feeling of depth to the combination of layers constituting the plate.

Furthermore, if the intermediate layer is made of metallic material, said material is preserved from oxidation.

The material in sheet form and the process for producing it thus conceived are susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept; all the details may furthermore be replaced with other technically equivalent elements.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. Material in sheet form, particularly for manufacturing items for household, gifts, interior and lighting decoration, or the like, characterized in that it comprises at least one first layer (2) made of transparent material and at least one second layer (3) made of colored transparent or semitransparent material, between which an intermediate decorative layer (4,14) is interposed, said intermediate layer (4,14) being provided with openings (5) to allow to view, through said first layer (2), the color of said second layer (3) through the openings (5) of said intermediate layer (4,14).

2. Material in sheet form according to claim 1, characterized in that said first layer (2) is constituted by transparent polymethyl methacrylate.

3. Material in sheet form according to claims 1 and 2, characterized in that said second layer (3) is constituted by transparent or semitransparent colored polymethyl methacrylate.

4. Material in sheet form according to claims 1 and 2, characterized in that said second layer (3) is constituted by transparent or semitransparent colored paint.

5. Material in sheet form according to one or more of the preceding claims, characterized in that the side of said second layer (3) directed towards said intermediate layer (4,14) has a smooth surface.

6. Material in sheet form according to one or more of the preceding claims, characterized in that the side of said second layer (3) directed towards said intermediate layer (4,14) has an embossed surface.

7. Material in sheet form according to one or more of the preceding claims, characterized in that said intermediate layer (4,14) is constituted by a fabric.

8. Material in sheet form according to one or more of the preceding claims, characterized in that said fabric is constituted by a fabric made of natural fiber.

9. Material in sheet form according to one or more of the preceding claims, characterized in that said fabric is constituted by a fabric made of synthetic fiber.

10. Material in sheet form according to one or more of the preceding claims, characterized in that said fabric is constituted by a fabric made of acrylic fiber.

11. Material in sheet form according to one or more of the preceding claims, characterized in that said fabric is constituted by a fabric made of mixed natural and synthetic fibers.

12. Material in sheet form according to one or more of the preceding claims, characterized in that said fabric is provided with ornamental patterns on its side directed towards said first layer (2).

13. Material in sheet form according to one or more of the preceding claims, characterized in that said intermediate layer (4,14) is constituted by a layer (14) made of metallic material.

14. Material in sheet form according to one or more of the preceding claims, characterized in that said layer (14) of metallic material is constituted by a metallic sheet.

15. Material in sheet form according to one or more of the preceding claims, characterized in that said layer (14) of metallic material is constituted by a fabric woven with metal wires.

16. Material in sheet form according to one or more of the preceding claims, characterized in that said layer (14) of metallic material is constituted by a metallic mesh.

17. Material in sheet form according to one or more of the preceding claims, characterized in that said layer (14) of metallic material is made of a precious metal.

18. Material in sheet form according to one or more of the preceding claims, characterized in that said layer (14) of metallic material is made of silver.

19. Material in sheet form according to one or more of the preceding claims, characterized in that said openings (5) of said intermediate layer (4,14) reproduce ornamental patterns.

20. Material in sheet form according to one or more of the preceding claims, characterized in that said intermediate layer (4,14) is provided with ornamental patterns on its side directed towards said first layer (2).

21. Process for manufacturing a material in sheet form, particularly for producing items for household, gifts, interior and lighting decoration, or the like, according to one or more of the preceding claims, characterized in that it consists: in arranging, onto a first molding plate (7), a layer (3) of transparent or semitransparent colored material to which an intermediate layer (4,14) provided with openings (5) is applied on the side that lies opposite with respect to said first molding plate (7); in arranging a second molding plate (10) so that it faces said first molding plate (7) and is spaced therefrom on the side that bears said intermediate layer (4,14); in interposing, between said two molding plates, sealing means (9) that delimit a gap (11) containing said intermediate layer and said layer of transparent or semitransparent colored material, said gap (11) having at least one opening (12); in pouring, through said opening, a transparent synthetic material in the liquid state which passes through said intermediate layer (4,14) to rigidly couple to said layer (3) of transparent or semitransparent colored material; in allowing said transparent synthetic material to cure or polymerize; and in removing said molding plates (7,10) and said sealing means (9).

22. Process according to claim 21, characterized in that said transparent synthetic material is constituted by polymethyl methacrylate.

23. Process according to claims 21 and 22, characterized in that said layer of transparent or semitransparent colored material is constituted by a sheet of transparent or semitransparent

colored polymethyl methacrylate.

24. Process according to claims 21 and 22, characterized in that said layer of transparent or semitransparent colored material is constituted by a layer of transparent or semitransparent colored paint (3a) that is applied to the side of said first molding plate (7) directed towards said second molding plate (10).

25. Process according to one or more of the preceding claims, characterized in that said intermediate layer is constituted by a fabric.

26. Process according to one or more of the preceding claims, characterized in that said fabric is constituted by a fabric made of natural fiber.

27. Process according to one or more of the preceding claims, characterized in that said fabric is constituted by a fabric made of synthetic fiber.

28. Process according to one or more of the preceding claims, characterized in that said fabric is constituted by a fabric made of acrylic fiber.

29. Process according to one or more of the preceding claims, characterized in that said fabric is constituted by a fabric made of mixed natural and synthetic fibers.

30. Process according to one or more of the preceding claims, characterized in that said fabric is printed with ornamental patterns on its side directed opposite to said layer made of transparent or semitransparent colored material.

31. Process according to one or more of the preceding claims, characterized in that said intermediate layer is constituted by a layer of metallic material (14).

32. Process according to one or more of the preceding claims, characterized in that said layer of metallic material is constituted by a metallic sheet.

33. Process according to one or more of the preceding claims, characterized in that said layer of metallic material is constituted by a fabric woven with metal wires.

34. Process according to one or more of the preceding claims, characterized in that said layer of metallic material is constituted by a metallic mesh.

35. Process according to one or more of the preceding claims, characterized in that said layer of metallic material is made of a precious metal.

36. Process according to one or more of the preceding claims, characterized in that said layer of metallic material is provided with ornamental patterns on its side directed opposite to said layer made of transparent or semitransparent colored material.

37. Process according to one or more of the preceding claims, characterized in that said openings reproduce ornamental patterns.

38. Process according to one or more of the preceding claims, characterized in that the side of said layer made of transparent or semitransparent colored material, that is directed towards said intermediate layer, has a smooth surface.

39. Process according to one or more of the preceding claims, characterized in that the side of said layer made of transparent or semitransparent colored material, that is directed towards said intermediate layer, has an embossed surface.

40. Process according to one or more of the preceding claims, characterized in that said transparent synthetic material is allowed to cure or polymerize by cooling in water or heating in furnace.

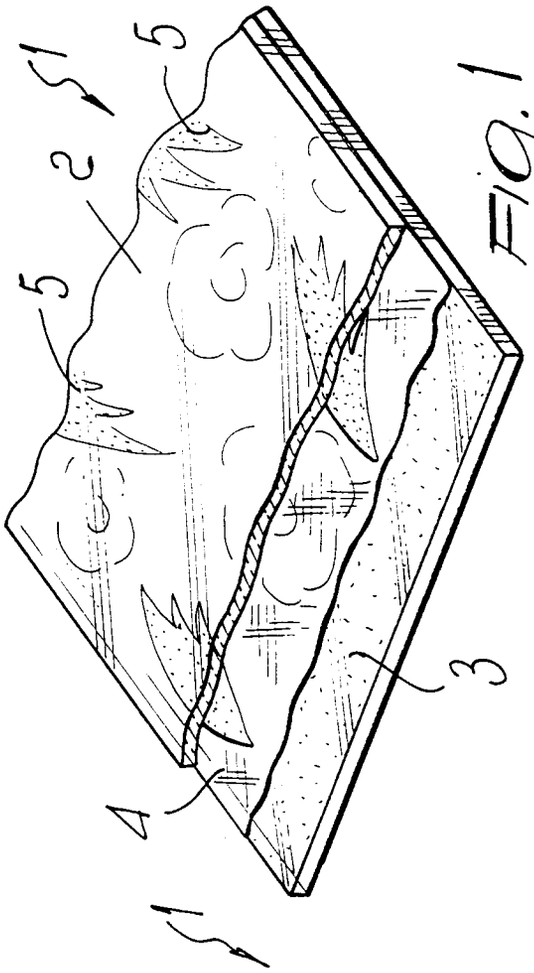

Fig. 1

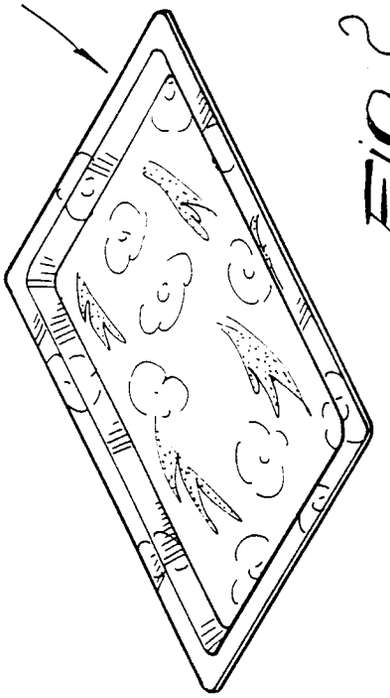

Fig. 2

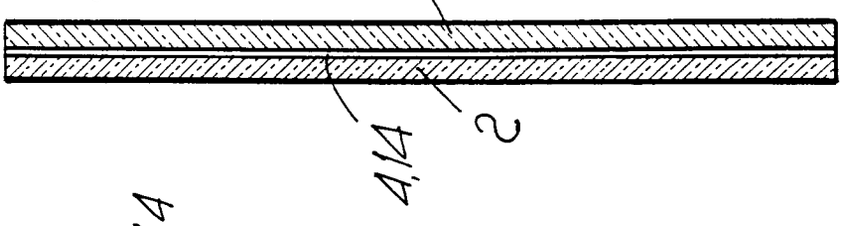

Fig. 5

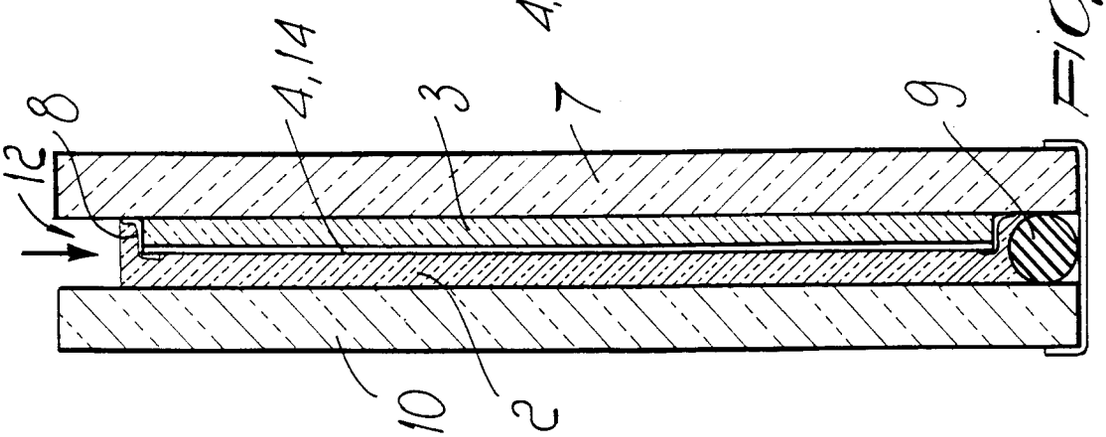

Fig. 9

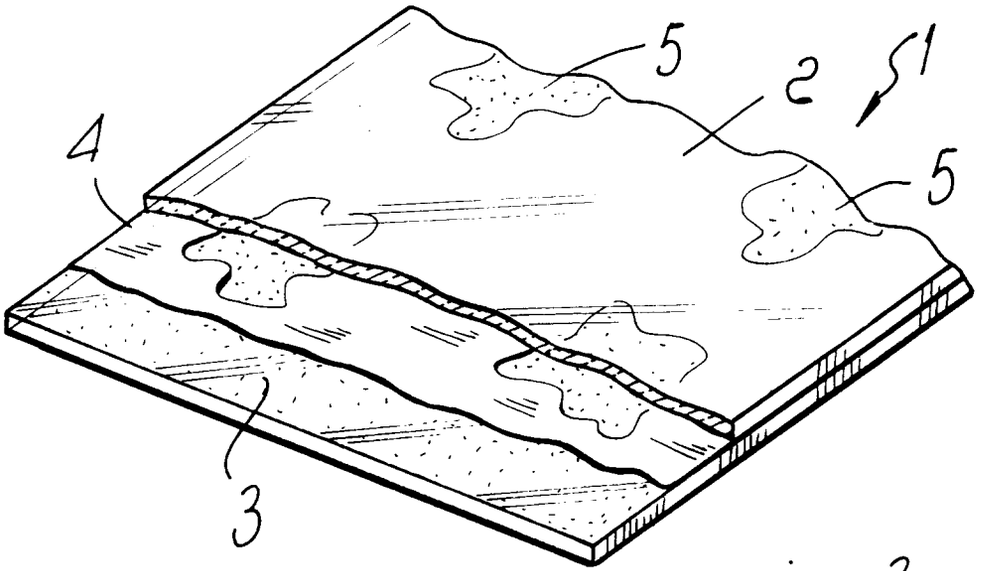

Fig. 3

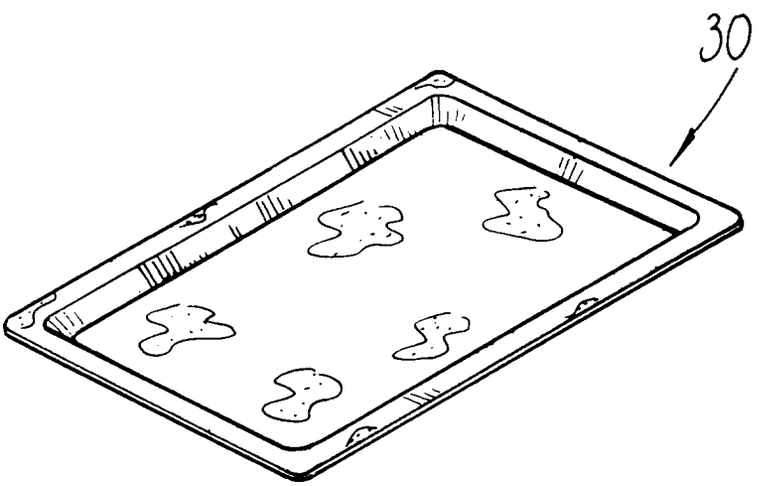

Fig. 4

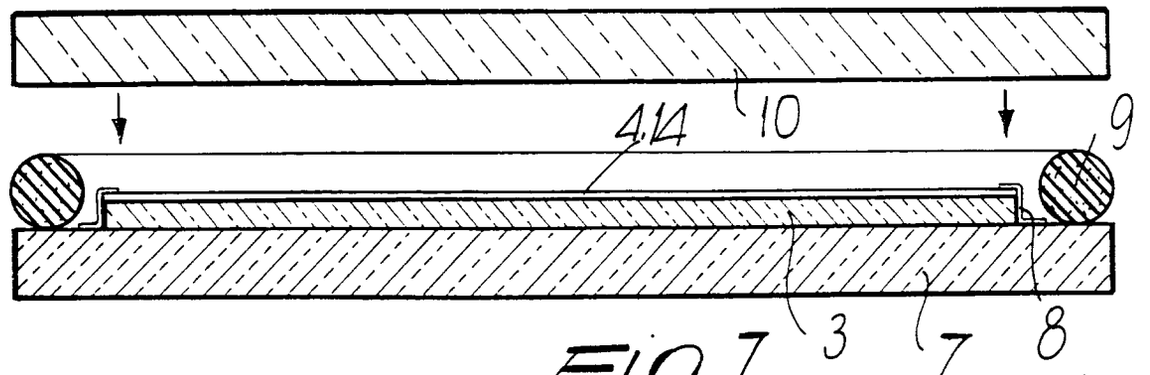

FIG. 7

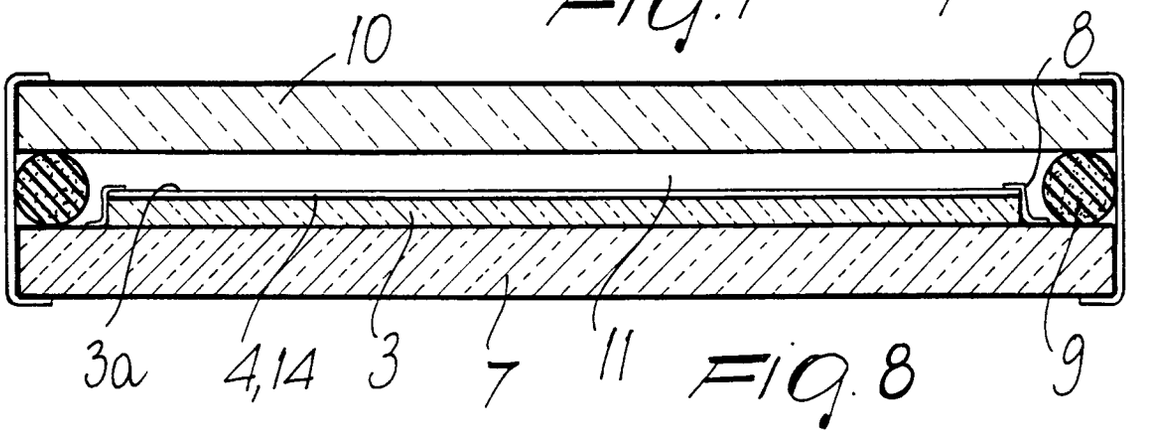

FIG. 8

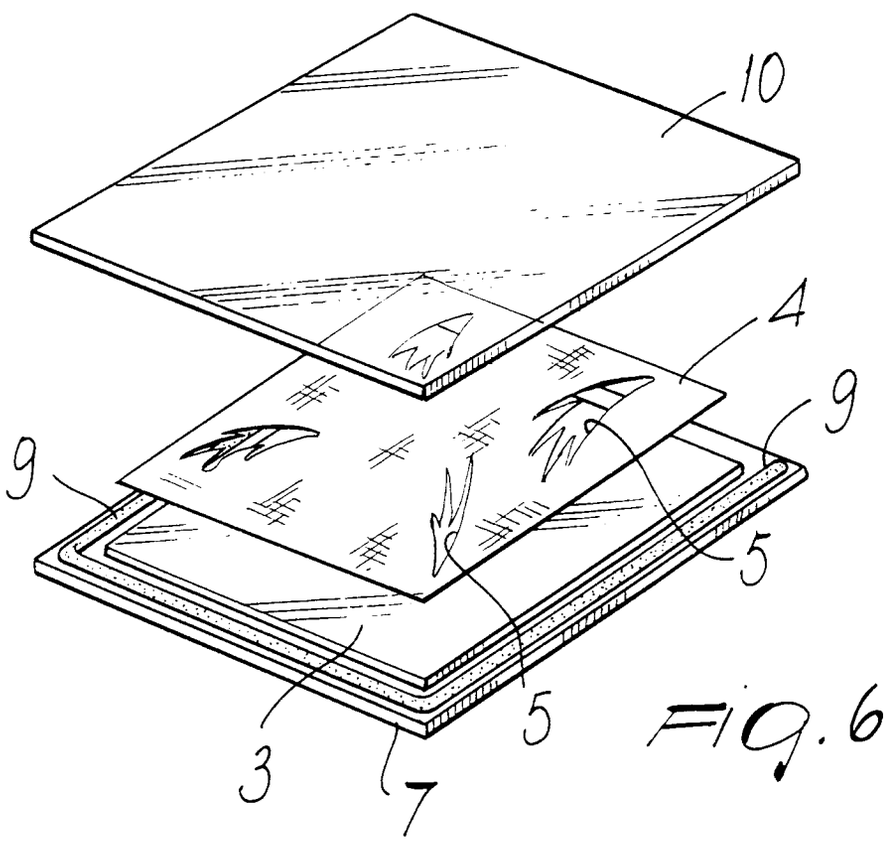

FIG. 6

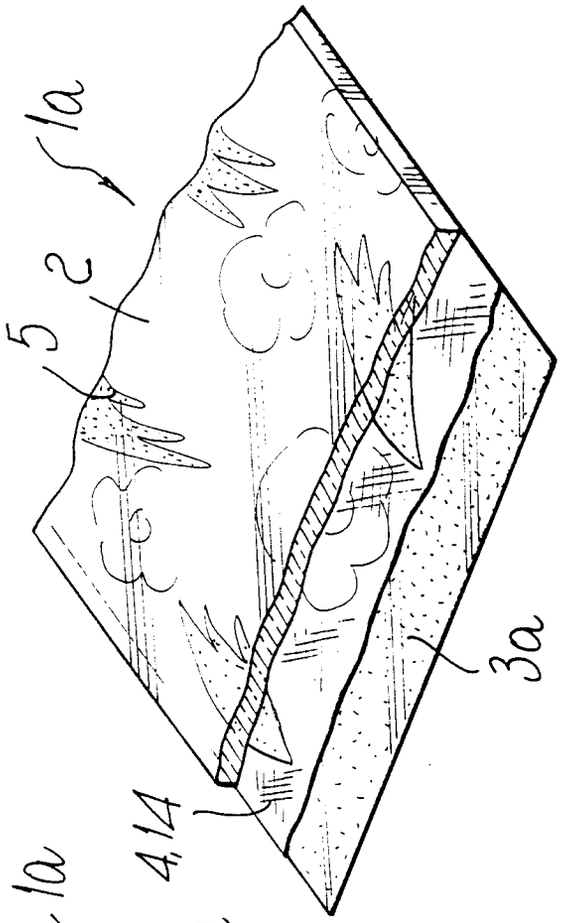

Fig. 10

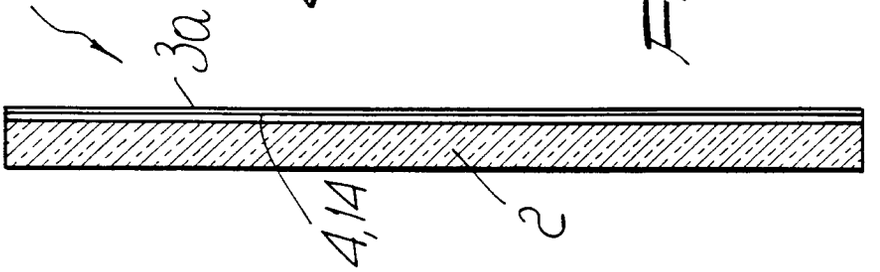

Fig. 11

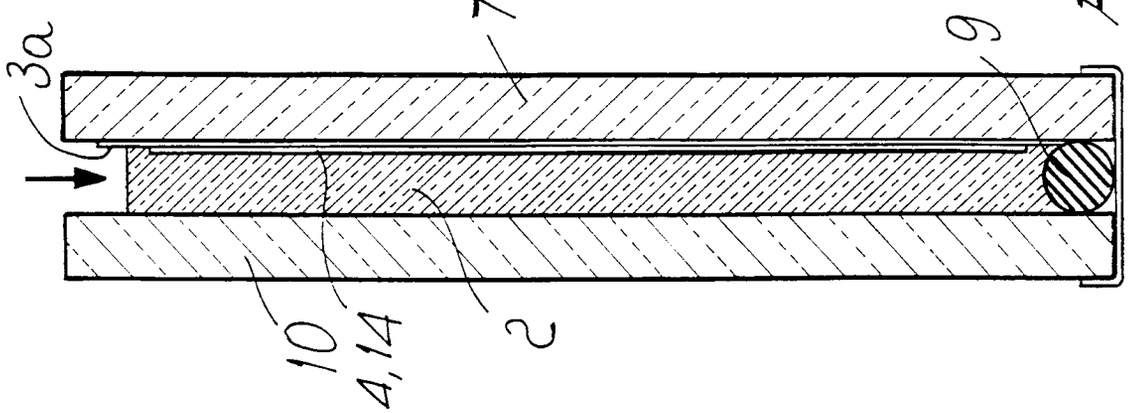

Fig. 12