

Description

The present invention relates to a process and a mold for producing a multilayer molded article comprising a resin body and at least one sheet of a skin material which covers a part of the surface of the resin body.

A multilayer molded article comprising a resin body and a skin material laminated on the resin body has good appearance due to its high quality and warm feeling. The multilayer molded article greatly improves textures of a resin molded article such as cool feeling and provides an article with high value and beauty.

In fact, the multilayer molded articles are widely used as automobile interior materials or furnishing materials.

To improve an ornamental effect of the multilayer molded article comprising the skin material, it is desired to laminate the skin material on a part of the surface of the resin body. However, the conventional processes or molds for producing the multilayer molded article cannot produce such improved multilayer molded article. The free edge of the skin material covering a part of the surface of the resin body cannot be beautifully finished. WO-A-8808364 and GB-A-2214860 disclose a process and a mold for producing a multi-layer molded article in which a groove is formed on the lower mold and a small wall is provided on the upper mold for pushing the edge of skin material in the groove on the lower mold.

An object of the present invention is to provide a process and a mold for producing a multilayer molded article comprising a resin body and a skin material which covers a part of the surface of the resin body, the molded article having good appearance and the edge of the skin material being neatly finished.

This object is achieved by the process and mold according to independent claims 1 and 2.

Particular embodiments of the invention are described in dependent claims 3 and 4.

The invention will be described in detail in connection with the drawings in which

Fig. 1 is a cross section of the multilayer molded article having the skin material which covers a part of the surface of the resin body,

Fig. 2 is a perspective view of the multilayer molded article of Fig. 1,

Figs. 3 and 4 schematically show the process for producing the multilayer molded article according to the present invention,

Figs. 5A, 5B and 5C are a cross section of the upper mold, a plane view of the lower mold and a cross section of the lower mold, respectively, of a first embodiment of the mold of the present invention,

Fig. 6 is a cross section of the multilayer molded article produced by means of the mold shown in Figs. 5A, 5B and 5C,

Figs. 7A, 7B and 7C are a cross section of the upper mold, a plane view of the lower mold and a cross section of the lower mold, respectively, of a second embodiment of the mold of the present invention,

Fig. 8 is a cross section of the multilayer molded article produced by means of the mold shown in Figs. 7A, 7B and 7C.

In the present invention, the skin material may be any of conventionally used materials. Specific examples of the skin material are woven or non-woven fabric, nets made of metals, fibers or thermoplastic resins, paper, metal foils, and a sheet or a film of a thermoplastic resin or elastomer. The skin material may be decorated with uneven patterns such as grain patterns, printing, dying and the like. In addition, the skin material may be made of foamed materials of thermoplastic resins or rubbers. Also, a laminate comprising at least two layers each made of the same material or different materials which are bonded to each other with an adhesive can be used as the skin material. Before the skin material is supplied in the mold, a part or whole of the skin material may be preheated to adjust tensile stress and elongation.

As the resin to be molded by the process of the present invention, any of the conventional resins used in compression molding, injection molding and extrusion molding can be used. Specific examples of the resin are non-expandable or expandable resins of thermoplastic resins (e.g. polypropylene, polyethylene, polystyrene, acrylonitrile-styrene-butadiene copolymer, nylon, etc.), and thermoplastic elastomers (e.g. ethylene-propylene copolymer, styrene-butadiene copolymer, etc.). The resin may contain at least one additive such as fillers (e.g. inorganic fillers and glass fibers), pigments, lubricants, antistatic agents and the like.

Figs. 1 and 2 show a cross section and a perspective view, respectively, of the multilayer molded article 6 produced in one embodiment of the present invention, which has a skin material 1 covering a part 5 of a surface of a resin body 2 with leaving a surface area 4 uncovered. An edge part 1a is placed in a groove 3 which is formed on the surface of the resin body 2.

The groove 3 has a width and a depth sufficient for receiving the edge part 1a of the skin material 1, and the sizes of the groove 3 depend on a material, a thickness and a width of the edge part of the skin material.

One example of the mold to be used in the process according to the present invention is shown in Fig. 3.

The mold comprises an upper mold 7 and a lower mold 8. The lower mold 8 has means for fixing the edge part 1a of the skin material 1. In one embodiment, one or more pins are retained on one or more discretely formed protrusions as shown in Fig. 3.

The number of the pin depends on the length of the edge part 1a to be fixed. Further, the protrusions and the pins may be movable in a direction in which the molds are closed, although they may be fixed to the lower mold 8.

When the pin is vertically movable, it is lifted up to a level at which the edge portion 1a is easily fixed with the pin 13, and it is lowered to a desired level during molding.

The upper mold 7 has a kick 11 at a position which the edge part 1a contacts. The kick may be movable in a direction in which the molds are closed.

Edge parts other than the edge part 1a can be fixed with a clamping frame 9 surrounding the mold.

The multilayer molded article can be produced by using the mold of Fig. 3 as follows:

The edge part 1a of the skin material 1 is fixed to the fixing section 10 with the pin 13. Then, other edge is fixed to the clamping frame with other pin 13.

A mass of resin melt 12 is supplied between the skin material 1 and the lower mold 8. Since the edge part 1a is fixed with the pin to the fixing section 10, there are free gaps between the protrusions as shown in Fig. 5B, so that the resin melt can flow through such gaps and spreads all over the inner surface of the lower mold 8 when the molds 7 and 8 are closed and the resin melt is compressed.

By the above process, the multilayer molded article 6 shown in Fig. 6 is produced.

In the embodiment of Fig. 7A, 7B and 7C, the pins 13 are directly attached to the bottom of groove 14. Then, the edge part 1a of the skin material is fixed at the upper part of each pin 13, so that a gap is formed between the skin material and the groove bottom.

With using such mold, the multilayer molded article 6 shown in Fig. 8 can be produced by substantially the same procedures as described above.

In the multilayer molded article produced by the process of the present invention, the boundary is clearly formed between the covered surface area 5 and the uncovered surface area 4.

Claims

1. A process for producing a multi-layer molded article (6) comprising a resin body (2) and a

skin material (1) which covers a part (5) of the surface of the resin body and an edge part (1a) of which present on the surface of the resin mold is placed in a groove (3; 14) formed on the surface of the resin body, which process comprises the steps of:

providing an unclosed mold comprising a lower mold (8) and upper mold (7),

placing the skin material (1) on the lower mold (8),

supplying a mass of resin melt (12) between the skin material (1) and the lower mold (8), and

closing the upper and lower molds (7,8) to form the multi-layer molded article (6),

characterized in that the edge part (1a) of the skin material (1) is fixed by means of at least one pin (13) at a position where the edge part of the skin material is placed, the at least one fixing pin (13) being retained on at least one protrusion on the lower mold (8), and the groove is formed by means of a kick (11) provided on the upper mold (7).

2. A mold for producing a multi-layer molded article (6) comprising a resin body (2) and a skin material (1) which covers a part of the surface of the resin body, which mold comprises a lower mold (8) and an upper mold (7), characterized in that the lower mold (8) comprises at least one pin (13) being retained on at least one protrusion on the lower mold (8) for fixing an edge part (1a) of the skin material (1) at a position where the edge part of the skin material is placed in a groove (3; 14) formed on a surface of the resin body, and the upper mold has a kick (11) for forming the groove (3;14) on the surface of the resin body.

3. The mold according to claim 2, wherein the protrusions are movable in a direction in which the upper and lower molds (7,8) are closed.

4. The mold according to claim 2 or 3, wherein the fixing pins (13) are formed in a groove which is formed in the lower mold (8).

Patentansprüche

1. Verfahren zur Herstellung eines mehrschichtigen Formgegenstands (6) mit einem Harzkörper (2) und einem Hautmaterial (1), das einen Teil (5) der Oberfläche des Harzkörpers bedeckt und von dem ein an der Oberfläche der Harzform auftretender Randteil (1a) in einer Nut (3; 14) angeordnet wird, die an der Oberfläche des Harzkörpers ausgebildet ist, wobei das Verfahren die folgenden Schritte aufweist:



The mold comprises an upper mold 7 and a lower mold 8. The lower mold 8 has means for fixing the edge part 1a of the skin material 1. In one embodiment, one or more pins are retained on one or more discretely formed protrusions as shown in Fig. 3.

The number of the pin depends on the length of the edge part 1a to be fixed. Further, the protrusions and the pins may be movable in a direction in which the molds are closed, although they may be fixed to the lower mold 8.

When the pin is vertically movable, it is lifted up to a level at which the edge portion 1a is easily fixed with the pin 13, and it is lowered to a desired level during molding.

The upper mold 7 has a kick 11 at a position which the edge part 1a contacts. The kick may be movable in a direction in which the molds are closed.

Edge parts other than the edge part 1a can be fixed with a clamping frame 9 surrounding the mold.

The multilayer molded article can be produced by using the mold of Fig. 3 as follows:

The edge part 1a of the skin material 1 is fixed to the fixing section 10 with the pin 13. Then, other edge is fixed to the clamping frame with other pin 13.

A mass of resin melt 12 is supplied between the skin material 1 and the lower mold 8. Since the edge part 1a is fixed with the pin to the fixing section 10, there are free gaps between the protrusions as shown in Fig. 5B, so that the resin melt can flow through such gaps and spreads all over the inner surface of the lower mold 8 when the molds 7 and 8 are closed and the resin melt is compressed.

By the above process, the multilayer molded article 6 shown in Fig. 6 is produced.

In the embodiment of Fig. 7A, 7B and 7C, the pins 13 are directly attached to the bottom of groove 14. Then, the edge part 1a of the skin material is fixed at the upper part of each pin 13, so that a gap is formed between the skin material and the groove bottom.

With using such mold, the multilayer molded article 6 shown in Fig. 8 can be produced by substantially the same procedures as described above.

In the multilayer molded article produced by the process of the present invention, the boundary is clearly formed between the covered surface area 5 and the uncovered surface area 4.

Claims

1. A process for producing a multi-layer molded article (6) comprising a resin body (2) and a

skin material (1) which covers a part (5) of the surface of the resin body and an edge part (1a) of which present on the surface of the resin mold is placed in a groove (3; 14) formed on the surface of the resin body, which process comprises the steps of:

providing an unclosed mold comprising a lower mold (8) and upper mold (7),

placing the skin material (1) on the lower mold (8),

supplying a mass of resin melt (12) between the skin material (1) and the lower mold (8), and

closing the upper and lower molds (7,8) to form the multi-layer molded article (6),

characterized in that the edge part (1a) of the skin material (1) is fixed by means of at least one pin (13) at a position where the edge part of the skin material is placed, the at least one fixing pin (13) being retained on at least one protrusion on the lower mold (8), and the groove is formed by means of a kick (11) provided on the upper mold (7).

2. A mold for producing a multi-layer molded article (6) comprising a resin body (2) and a skin material (1) which covers a part of the surface of the resin body, which mold comprises a lower mold (8) and an upper mold (7), characterized in that the lower mold (8) comprises at least one pin (13) being retained on at least one protrusion on the lower mold (8) for fixing an edge part (1a) of the skin material (1) at a position where the edge part of the skin material is placed in a groove (3; 14) formed on a surface of the resin body, and the upper mold has a kick (11) for forming the groove (3;14) on the surface of the resin body.
3. The mold according to claim 2, wherein the protrusions are movable in a direction in which the upper and lower molds (7,8) are closed.
4. The mold according to claim 2 or 3, wherein the fixing pins (13) are formed in a groove which is formed in the lower mold (8).

Patentansprüche

1. Verfahren zur Herstellung eines mehrschichtigen Formgegenstands (6) mit einem Harzkörper (2) und einem Hautmaterial (1), das einen Teil (5) der Oberfläche des Harzkörpers bedeckt und von dem ein an der Oberfläche der Harzform auftretender Randteil (1a) in einer Nut (3; 14) angeordnet wird, die an der Oberfläche des Harzkörpers ausgebildet ist, wobei das Verfahren die folgenden Schritte aufweist:



Bereitstellen einer nicht geschlossenen Form mit einer unteren Form (8) und einer oberen Form (7);

Aufliegen des Hautmaterials (1) auf die untere Form (8);

Einbringen einer Harzschmelzmasse (12) zwischen dem Hautmaterial (1) und der unteren Form (8); und

Schließen der oberen und der unteren Form (7, 8) zum Formen des mehrschichtigen Formgegenstands (6),

dadurch gekennzeichnet, daß der Randteil (1a) des Hautmaterials (1) mit Hilfe mindestens eines Stifts (13) in einer Position fixiert wird, wo der Randteil des Hautmaterials angeordnet ist, wobei der mindestens eine Fixierstift (13) an mindestens einem Vorsprung der unteren Form (8) festgehalten wird, und wobei die Nut mit Hilfe eines an der oberen Form (7) vorgesehenen Vorsprungs (11) geformt wird.

2. Form zum Herstellen eines mehrschichtigen Formgegenstands (6) mit einem Harzkörper (2) und einem Hautmaterial (1), das einen Teil der Oberfläche des Harzkörpers bedeckt, wobei die Form eine untere Form (8) und eine obere Form (7) aufweist,

dadurch gekennzeichnet, daß die untere Form (8) mindestens einen Stift (13) aufweist, der an mindestens einem Vorsprung an der unteren Form (8) festgehalten wird, um einen Randteil (1a) des Hautmaterials (1) in einer Position zu fixieren, wo der Randteil des Hautmaterials in einer Nut (3; 14) angeordnet ist, die an einer Oberfläche des Harzkörpers ausgebildet ist, und daß die obere Form einen Vorsprung (11) zum Ausbilden der Nut (3; 14) an der Oberfläche des Harzkörpers aufweist.

3. Form nach Anspruch 2, wobei die Vorsprünge in einer Richtung beweglich sind, in welcher die obere und die untere Form (7, 8) geschlossen werden.
4. Form nach Anspruch 2 oder 3, wobei die Fixierstifte (13) in einer Nut ausgebildet sind, die in der unteren Form (8) ausgebildet ist.

Revendications

1. Procédé pour produire un article moulé multicouches (6) comprenant un corps en résine (2) et un matériau de peau (1) qui couvre une partie (5) de la surface du corps en résine, et une partie de bordure (1a) de ladite peau présente sur la surface du corps en résine est placée dans une rainure (3 ; 14) formée sur la surface du corps de résine, ledit procédé com-

prenant les étapes consistant à :

- procurer un moule non fermé comprenant un mode inférieur (8) et un mode supérieur (7),
- placer le matériau de peau (1) sur le moule inférieur (8),
- alimenter une masse de résine fondue (12) entre le matériau de peau (1) et le mode inférieur (8), et
- fermer le moule supérieur et le moule inférieur (7, 8) pour former l'article moulé multicouches (6), caractérisé en ce que la partie de bordure (1a) du matériau de peau (1) est fixée au moyen d'au moins une tige (13) à une position ou la partie de bordure du matériau de peau est placée, ladite au moins une tige de fixation (13) étant retenue sur au moins une saillie sur le mode inférieur (8), et en ce que la rainure est formée au moyen d'un pli (11) prévu sur le moule supérieur (7).

2. Moule pour produire un article moulé multicouches (6) comprenant un corps de résine (2) et un matériau de peau (1) qui couvre une partie de la surface du corps de résine, ledit moule comprenant un moule inférieur (8) et un moule supérieur (7), caractérisé en ce que le moule inférieur (8) comprend au moins une tige (13) qui est retenue sur au moins une saillie sur le moule inférieur (8) pour fixer une partie de bordure (1a) du matériau de peau (1) à une position où la partie de bordure du matériau de peau est placée dans une rainure (3 ; 14) formée sur une surface du corps de résine, et le moule supérieur présente un pli (11) pour former la rainure (3 ; 14) sur la surface du corps de résine.
3. Moule selon la revendication 2, dans lequel les saillies sont mobiles dans une direction dans laquelle le moule supérieur et le moule inférieur (7, 8) sont fermés.
4. Moule selon l'une ou l'autre des revendications 2 et 3, dans lequel les tiges de fixation (13) sont formées dans une rainure qui est formée dans le moule inférieur (8).