

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 having its edge part in the surface area 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 two or more sheets of the skin materials on one surface of the resin body or to laminate one sheet of 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 mating edges of two sheet of the skin materials or the free edge of the skin material covering a part or the surface of the resin body cannot be beautifully finished.

JP-A-60-244522 discloses a process for producing a multilayer molded article comprising a resin body and skin materials, the edges of which are mated. The process of JP-A-60-244522 uses a fibrous layered body as resin body, and the molding machine comprises an upper press mold and a lower mold split into two sections. The edges of the skin materials are held between the two sections of the lower mold by pressing the two sections together.

One object of the present invention is to provide a process for producing a multilayer molded article comprising a resin body and at least two sheets of skin materials which are laminated on one surface of the resin body.

Another object of the present invention is to provide a process for producing a multilayer molded article comprising a resin body and one sheet of a skin material laminated on a part of a surface of the resin body.

A further object of the present invention is to provide a mold for producing a multilayer molded article comprising a resin body and at least two sheets of skin materials which are laminated on one surface of the resin body.

A yet further object of the present invention is to provide a mold for producing a multilayer molded article comprising a resin body and one sheet of a skin material laminated on a part of a surface

of the resin body.

The above objects are achieved by the process and mold according to the independent claims.

The invention will be described in detail in connection with the drawings in which Fig. 1 shows a cross section of a multilayer molded article comprising a resin body and two sheets of skin materials which are laminated on one surface of the resin body,

Fig. 2 shows a cross section of a multilayer molded article comprising a resin body and one sheet of a skin material which is laminated on a part of a surface of the resin body,

Figs. 3, 4 and 5 schematically show the process for producing a multilayer molded article comprising a resin body and at least two sheets of skin materials which are laminated on one surface of the resin body according to the present invention,

Fig. 6A shows a plane view of the clamping means for clamping the edge parts of the skin materials,

Figs. 6B and 6C show cross sections of the clamping means of Fig. 6A along the lines A-A and B-B, respectively,

Fig. 7 shows a plane view of the clamped skin materials placed on the male mold.

Fig. 1 shows a cross section of a multilayer molded article 6 which comprises a resin body 2 and a skin material 1 consisting of two sheets of skin materials 1a and 1b the edge parts 4 of which are piled together.

Fig. 2 shows a cross section of a multilayer molded article 6 which comprises a resin body 3 and one sheet of a skin material 1 laminated on a part of a surface of the resin body 2.

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.

When two or more sheets of the skin materials are used, the piled edge parts may be bonded together with an adhesive or by welding. Since the bonding strength with the adhesive or by welding is not sufficient to resist a pulling force during the molding of the multilayer molded article, and the piled edge parts are ruptured, torn or displaced. Therefore, the piled edge parts should be clamped.

The mold for producing the multilayer molded article according to the present invention will be illustrated by making reference to Figs. 3 through 7.

The mold comprises a female mold 7, a male mold 8, clamping means P for holding the piled edge parts 4 of the skin materials 1a and 1b or the free edge part 4 of the skin material, and an engaging groove 11 for receiving the clamping means.

The clamping means P has a part Pa for clamping the skin material edge part(s), and consists of alternately positioned wide parts Ph and narrow parts Pn. In the wide parts, conduits Pl for passing the resin melt (cf. Figs. 6A, 6B and 6C).

Around the mold, a clamping frame 9 is provided to hold the skin material.

In the embodiment of Figs. 5 and 6, the male mold 8 has an mechanism 10 for fixing the clamping means P. The mechanism 10 consists of the engaging groove 11 and the part Pa for clamping the skin material edge part(s), and the part Pa is inserted in the groove 11 to fix the clamping means P to the mold 8.

By using the mold shown in Figs. 5 and 6, the multilayer molded article having two sheets of the skin materials 1a and 1b is produced as follows:

First, the edge parts of the skin materials 1a and 1b are piled each other and optionally bonded together. The piled edge parts are held in the parts Pa with pins Pp. Then, the clamping means P is inserted in the groove 11.

The periphery of the skin materials is placed on the clamping frame 9 and fixed with pins 13 (see Fig. 4).

The resin melt is supplied between the skin materials 1 and the mold 8. When the molds are closed, the supplied resin melt flows and spreads over the inner surface of the mold 8 through the conduits Pl.

Finally, the molds 7 and 8 are completely closed to finish the molding of the multilayer mol-

ded article.

Fig. 7 shows a plane view of the skin materials placed on the male mold 8. The broken line 15 indicates the periphery of the cavity. If necessary, marginal parts are cut out with a mold edge along the broken line 15.

Claims

1. A process for producing a multilayer molded article (6) in a mold comprising a male (8) and a female mold (7), said article comprising a resin body (2) and at least two sheets of skin materials (1a, 1b) which are laminated adjacent to one another on one surface of the resin body (2), which process comprises the steps of:
 - piling the edge parts (4) of the adjacent skin materials (1a, 1b) on each other,
 - clamping the piled edge parts (4) with clamping means (P),
 - introducing said clamping means (P) holding the edges (4) of the skin materials (1a, 1b) in a groove (11) provided in one of the molds, spreading the skin materials (1a, 1b) between the male mold (8) and the female mold (7),
 - supplying a mass of resin melt between the skin materials (1a, 1b) and the mold (7, 8) having said groove (11), which is thus located on the side on which the clamped edge parts (4) are present, and
 - closing the male and female molds (7, 8) to form the multilayer molded article.
2. A process for producing a multilayer molded article (6) in a mold comprising a male mold (8) and a female mold (7), said article comprising a resin body (2) and one sheet of a skin material (1) laminated on a part of a surface of the resin body (2), which process comprises the steps of:
 - clamping the edge part (4) of the skin material (1) with clamping means (P), which is adjacent to that part of the resin body (2) that is not to be laminated with the skin materials (1),
 - introducing said clamping means (P) which holds the edge (4) of the skin material (1) in a groove (11) provided in one of the molds, spreading the rest of the skin material (1) between the male mold (8) and the female mold (7),
 - supplying a mass of resin melt between the skin material (1) and the mold having the groove (11), which is thus located on the side on which the clamped edge part (4) is present, and
 - closing the male and female molds (7, 8) to form the multilayer molded article.



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.

When two or more sheets of the skin materials are used, the piled edge parts may be bonded together with an adhesive or by welding. Since the bonding strength with the adhesive or by welding is not sufficient to resist a pulling force during the molding of the multilayer molded article, and the piled edge parts are ruptured, torn or displaced. Therefore, the piled edge parts should be clamped.

The mold for producing the multilayer molded article according to the present invention will be illustrated by making reference to Figs. 3 through 7.

The mold comprises a female mold 7, a male mold 8, clamping means P for holding the piled edge parts 4 of the skin materials 1a and 1b or the free edge part 4 of the skin material, and an engaging groove 11 for receiving the clamping means.

The clamping means P has a part Pa for clamping the skin material edge part(s), and consists of alternately positioned wide parts Ph and narrow parts Pn. In the wide parts, conduits Pl for passing the resin melt (cf. Figs. 6A, 6B and 6C).

Around the mold, a clamping frame 9 is provided to hold the skin material.

In the embodiment of Figs. 5 and 6, the male mold 8 has an mechanism 10 for fixing the clamping means P. The mechanism 10 consists of the engaging groove 11 and the part Pa for clamping the skin material edge part(s), and the part Pa is inserted in the groove 11 to fix the clamping means P to the mold 8.

By using the mold shown in Figs. 5 and 6, the multilayer molded article having two sheets of the skin materials 1a and 1b is produced as follows:

First, the edge parts of the skin materials 1a and 1b are piled each other and optionally bonded together. The piled edge parts are held in the parts Pa with pins Pp. Then, the clamping means P is inserted in the groove 11.

The periphery of the skin materials is placed on the clamping frame 9 and fixed with pins 13 (see Fig. 4).

The resin melt is supplied between the skin materials 1 and the mold 8. When the molds are closed, the supplied resin melt flows and spreads over the inner surface of the mold 8 through the conduits Pl.

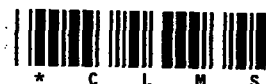
Finally, the molds 7 and 8 are completely closed to finish the molding of the multilayer mol-

ded article.

Fig. 7 shows a plane view of the skin materials placed on the male mold 8. The broken line 15 indicates the periphery of the cavity. If necessary, marginal parts are cut out with a mold edge along the broken line 15.

Claims

1. A process for producing a multilayer molded article (6) in a mold comprising a male (8) and a female mold (7), said article comprising a resin body (2) and at least two sheets of skin materials (1a, 1b) which are laminated adjacent to one another on one surface of the resin body (2), which process comprises the steps of:
 - 10 piling the edge parts (4) of the adjacent skin materials (1a, 1b) on each other,
 - 15 clamping the piled edge parts (4) with clamping means (P),
 - 20 introducing said clamping means (P) holding the edges (4) of the skin materials (1a, 1b) in a groove (11) provided in one of the molds,
 - 25 spreading the skin materials (1a, 1b) between the male mold (8) and the female mold (7),
 - 30 supplying a mass of resin melt between the skin materials (1a, 1b) and the mold (7, 8) having said groove (11), which is thus located on the side on which the clamped edge parts (4) are present, and
 - 35 closing the male and female molds (7, 8) to form the multilayer molded article.
2. A process for producing a multilayer molded article (6) in a mold comprising a male mold (8) and a female mold (7), said article comprising a resin body (2) and one sheet of a skin material (1) laminated on a part of a surface of the resin body (2), which process comprises the steps of:
 - 40 clamping the edge part (4) of the skin material (1) with clamping means (P), which is adjacent to that part of the resin body (2) that is not to be laminated with the skin materials (1),
 - 45 introducing said clamping means (P) which holds the edge (4) of the skin material (1) in a groove (11) provided in one of the molds,
 - 50 spreading the rest of the skin material (1) between the male mold (8) and the female mold (7),
 - 55 supplying a mass of resin melt between the skin material (1) and the mold having the groove (11), which is thus located on the side on which the clamped edge part (4) is present, and
 - closing the male and female molds (7, 8) to form the multilayer molded article.



3. A mold for producing a multilayer molded article (6) comprising a resin body (2) and at least one skin material (1) an edge part (4) of which is present within a surface area of the resin body (2), which mold comprises a male mold (8), a female mold (7), characterized in that the mold further comprises clamping means (P) for clamping said edge part (4) of the skin material (1) or piled edge parts of adjacent skin materials and a groove (11) provided on the male mold (8) or the female mold (7) for receiving said clamping means (P).
4. The mold according to claim 3, which further comprises a clamping frame (9) for holding a periphery of the skin material (1).

Patentansprüche

1. Verfahren zum Herstellen eines mehrschichtigen Formgegenstands (6) in einer Form, die eine Patrice (8) und eine Matrize (7) aufweist, wobei der Gegenstand einen Harzkörper (2) und mindestens zwei Lagen eines Außenschichtmaterials (1a, 1b) aufweist, die einander benachbart auf einer Fläche des Harzkörpers (2) auflaminiert sind, wobei das Verfahren die Schritte aufweist:
 Aufeinanderschichten der Randabschnitte (4) der benachbarten Außenschichtmaterialien (1a, 1b),
 Festklemmen der aufeinandergeschichteten Randabschnitte (4) durch eine Klemmeinrichtung (P),
 Einführen der Klemmeinrichtung (P), durch die die Ränder (4) der Außenschichtmaterialien (1a, 1b) gehalten werden, in eine in der Patrice oder in der Matrize ausgebildete Vertiefung (11),
 Ausbreiten der Außenschichtmaterialien (1a, 1b) zwischen der Patrice (8) und der Matrize (7),
 Zuführen einer Masse einer Harzschmelze zwischen die Außenschichtmaterialien (1a, 1b) und das Formteil (7, 8), in dem die Vertiefung (11) ausgebildet ist, so daß die Harzschmelzmasse auf der Seite angeordnet ist, auf der die festgeklebten Randabschnitte (4) angeordnet sind, und
 Schließen der Patrice und der Matrize (7, 8), um den mehrschichtigen Formgegenstand zu formen.
2. Verfahren zum Herstellen eines mehrschichtigen Formgegenstands (6) in einer Form, die eine Patrice (8) und eine Matrize (7) aufweist, wobei der Gegenstand einen Harzkörper (2) und eine auf einem Teil der Oberfläche des

Harzkörpers (2) auflaminierte Lage aus einem Außenschichtmaterial (1) aufweist, wobei das Verfahren die Schritte aufweist:

Festklemmen eines Randabschnitts (4) des Außenschichtmaterials (1) durch eine Klemmeinrichtung (P), die demjenigen Abschnitt des Harzkörpers (2) benachbart ist, auf dem das Außenschichtmaterial (1) nicht auflaminiert wird,

Einführen der Klemmeinrichtung (P), durch die der Rand (4) des Außenschichtmaterials (1) gehalten wird, in eine in der Patrice oder in der Matrize ausgebildete Vertiefung (11),

Ausbreiten des übrigen Außenschichtmaterials (1) zwischen der Patrice (8) und der Matrize (7),

Zuführen einer Masse einer Harzschmelze zwischen das Außenschichtmaterial (1) und das Formteil, in dem die Vertiefung (11) ausgebildet ist, so daß die Harzschmelzmasse auf der Seite angeordnet ist, auf der der festgeklebte Randabschnitt (4) angeordnet ist, und

Schließen der Patrice und der Matrize (7, 8), um den mehrschichtigen Formgegenstand zu formen.

3. Form zum Herstellen eines mehrschichtigen Formgegenstands (6) mit einem Harzkörper (2) und mindestens einem Außenschichtmaterial (1), wobei ein Randabschnitt (4) des Außenschichtmaterials in einem Oberflächenbereich des Harzkörpers (2) angeordnet ist, wobei die Form eine Patrice (8) und eine Matrize (7) aufweist, **dadurch gekennzeichnet, daß**
 die Form ferner eine Klemmeinrichtung (P) zum Festklemmen des Randabschnitts (4) des Außenschichtmaterials (1) oder aufeinandergeschichteter Randabschnitte benachbarter Außenschichtmaterialien und eine in der Patrice (8) oder in der Matrize (7) ausgebildete Vertiefung (11) zum Aufnehmen der Klemmeinrichtung (P) aufweist.
4. Form nach Anspruch 3, welche ferner einen Klemmrahmen (9) zum Halten eines Umfangs des Außenschichtmaterials (1) aufweist.

Revendications

1. Procédé de production d'un article moulé multicouche (6) dans un moule comportant une partie mâle (8) et une partie femelle (7) du moule, ledit article comportant un corps de résine (2) et au moins deux feuilles de matériaux formant une peau (1a, 1b) qui sont stratifiées, adjacentes l'une à l'autre, sur une unique surface du corps de résine (2), procédé comportant les étapes consistant à:



replier l'une contre l'autre les portions de bordure (4) des matériaux adjacents (1a, 1b) formant une peau,

brider avec des moyens de bridage (P) les portions de bordure (4), repliées l'une contre l'autre,

introduire lesdits moyens de bridage (P), maintenant les bordures (4) des matériaux formant une peau (1a, 1b), dans une rainure (11) prévue dans l'une des parties du moule,

étaler les matériaux formant une peau (1a, 1b) entre la partie mâle (8) et la partie femelle (7) du moule,

envoyer, entre les matériaux formant une peau (1a, 1b) et le moule (7, 8) présentant ladite rainure (11) une masse de résine en fusion qui se place ainsi du côté où sont présentes les portions de bordure (4) bridées et

fermer la partie mâle et la partie femelle (7, 8) du moule pour mouler l'article moulé multicouche.

(8) et une partie femelle (7) et se caractérise par le fait que

le moule comporte en outre des moyens de bridage (P) pour brider ladite portion de bordure (4) du matériau formant une peau (1) ou les portions de bordure, repliées l'une contre l'autre, de matériaux formant une peau, adjacents, ainsi qu'une rainure (11) prévue sur la partie mâle (8) du moule ou la partie femelle (7) du moule pour recevoir lesdits moyens de bridage (P).

4. Moule selon la revendication 3, comportant en outre un cadre de bridage (9) pour maintenir une périphérie du matériau formant une peau (1).

2. Procédé de production d'un article moulé multicouche (6) dans un moule comportant une partie mâle (8) et une partie femelle (7) du moule, ledit article comportant un corps de résine (2) et une unique feuille d'un matériau formant une peau (1) stratifiée sur une partie d'une surface du corps de résine (2), procédé comportant les étapes consistant à:

brider la portion de bordure (4) du matériau formant une peau (1) avec des moyens de bridage (P) adjacents à la partie du corps de résine (2) qu'il ne faut pas stratifier avec le

introduire lesdits moyens de bridage (P), qui maintiennent la bordure (4) du matériau formant une peau (1), dans une rainure (11) prévue dans l'une des parties du moule,

étaler le reste du matériau formant une peau (1) entre la partie mâle (8) et la partie femelle (7) du moule,

envoyer, entre le matériau formant une peau (1) et le moule présentant la rainure (11), une masse de résine en fusion qui se place ainsi du côté où est présente la portion de bordure (4) bridée, et

fermer la partie mâle et la partie femelle (7, 8) du moule pour mouler l'article moulé multicouche.

3. Moule pour produire un article moulé multicouche (6) comportant un corps de résine (2) et au moins un matériau (1), formant une peau, dont une portion de bordure (4) est présente à l'intérieur d'une zone de surface du corps de résine (2), moule qui comporte une partie mâle