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Wolff et al.(10) **Pub. No.: US 2011/0117320 A1**(43) **Pub. Date: May 19, 2011**(54) **FITTING PART, IN PARTICULAR FOR A
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PROCESS**(75) Inventors: **Martin Wolff**, Hattingen (DE);
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Company, Holland, MI (US)(21) Appl. No.: **12/918,048**(22) PCT Filed: **Feb. 26, 2009**(86) PCT No.: **PCT/US2009/001195**§ 371 (c)(1),
(2), (4) Date:**Dec. 13, 2010****Related U.S. Application Data**(63) Continuation of application No. 12/364,802, filed on
Feb. 3, 2009.(60) Provisional application No. 61/032,653, filed on Feb.
29, 2008.**Publication Classification**(51) **Int. Cl.****B32B 3/00** (2006.01)**B29C 45/14** (2006.01)**B29C 67/20** (2006.01)(52) **U.S. Cl.** **428/142**; 264/46.4; 428/141(57) **ABSTRACT**

A grained vehicle interior fitting part comprises a smooth or pre-grained film on a physically foamed support layer. The film may be multi-layered, such as of polypropylenes. The structure may be made by placing a film in a die with a surface structure and film insert molded with a foaming support material which subsequently hardens.

FITTING PART, IN PARTICULAR FOR A MOTOR VEHICLE, AND PRODUCTION PROCESS

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority from and the benefit of PCT Application No. PCT/EP2009/001195, filed on Feb. 19, 2009 and German Patent DE 10 2008 010 594.5, filed on Feb. 22, 2008; all entitled "Fitting Part, In Particular for a Motor Vehicle, and Production Process", which are herein incorporated by reference.

BACKGROUND

[0002] The invention relates to a fitting part, in particular for a motor vehicle, and to a process for the production thereof.

[0003] Vehicle interior fitting parts which are composed of a plastic material and which have a grained surface structure, and the production of said vehicle interior fitting parts, are known from the prior art, for example DE 10 2005 005 576, DE 103 56 665, DE 10 2004 059 773 and DE 197 20 474. The vehicle interior fitting parts described therein have the disadvantage, however, that the production process is comparatively complex, the support layer is comparatively thick, it is not possible to realize a complex structure, and/or the graining is complex or unappealing.

DETAILED DESCRIPTION

[0004] The object on which the invention is based is that of producing a visually appealing fitting part with a complex geometry and/or low weight, which fitting part does not have the disadvantages of the prior art.

[0005] The object is achieved by means of a process for producing a grained vehicle interior fitting part, in which process a smooth or pre-grained film is placed into a die provided with a surface structure and is film insert molded with a foaming support material which subsequently hardens.

[0006] The present invention relates to a process in which a film, which itself is smooth or pre-grained, is film insert molded with a foamed support material in an injection-molding die provided with a surface structure, whereby the surface structure is imparted, as graining, to the film. Here, a closed-cell space with a compact skin is preferably formed. On account of the lower thermal conductivity of the foamed support material, the fitting part remains warm for longer in the die, as a result of which the surface structure of the die is imparted more effectively to the surface of the film, and the adhesion between the film and the support material is improved.

[0007] A further, or preferred, subject matter of the present invention is a process in which the film is pre-structured with a fine grain structure and is additionally provided with a coarser grain structure during the film insert molding with a support material.

[0008] According to the invention, a fine grain is already imparted to the film for example by the deep-drawing tool during a deep-drawing process. The film which is pre-structured in this way is placed into an injection-molding die provided with a coarser surface, and is film insert molded with a plastic melt, which is preferably but not imperatively physically foamed. It is alternatively conceivable that the support material cannot be foamed, or can be chemically foamed.

Surprisingly, the fine graining is not eliminated by the coarser graining, such that a component is formed which has a particularly appealing appearance, for example a matted leather structure.

[0009] The following statements apply equally to both processes.

[0010] The film is preferably three-dimensionally shaped before being placed in.

[0011] According to a further preferred embodiment of the present invention, the support material is introduced into the die as a melt. The melt is cast in preferably via hot ducts which open into the injection-molding die for example in the region of the ribs or other projecting, film-free regions of the fitting part. The injection point is preferably situated at that point of the rib or film which is furthest remote from the film.

[0012] The melt is preferably charged with a propellant fluid, preferably a propellant gas, very particularly preferably CO₂ and/or N₂. By using a propellant fluid, the foam structure is distributed more uniformly than when using the chemical foaming process, as a result of which an impairment of the appearance is avoided, in particular in the case of very thin films. Furthermore, the mechanical properties of the fitting part are homogenized. As a result of the good flowability of the gas-charged melt, it is possible to form particularly thin structures. The charging of the melt with the propellant gas preferably takes place under pressure, for example in an extruder worm which has a corresponding pressure chamber. The propellant gas is preferably introduced, for example injected, into the melt and then for example processed in an extruder worm to form a single-phase mixture/solution. In the die, for example an injection-molding die, the charged support material is then preferably expanded. A nucleation of gas cells with subsequent growth preferably takes place here.

[0013] By means of the foaming, it is possible to obtain a weight reduction of the support layer, with it being possible for the magnitude of the reduction to be controlled by means of the ratio of support material mass to propellant gas.

[0014] A further subject matter of the present invention is a vehicle interior fitting part that can be produced as claimed in one of the preceding claims.

[0015] Yet another subject matter of the present invention is a vehicle interior fitting part having a grained film which has a physically foamed support layer on its rear side.

[0016] The statements made regarding the process according to the invention apply equally to the vehicle interior fitting parts according to the invention, and vice versa.

[0017] The following statements apply equally to both vehicle interior fitting parts according to the invention.

[0018] The film preferably has a thickness of less than 0.5 mm, in particular less than 0.4 mm, and is advantageously composed of a plurality of layers of different PP copolymers. On the visible side, that is to say on the side facing towards the vehicle interior space, the film may be provided with a PUR lacquer. It is possible for the film to be three-dimensionally shaped before being placed into the die.

[0019] The thickness of the support layer at its thickest point is preferably <2.3 mm, particularly preferably <1 mm.

[0020] The support material is preferably composed of PP copolymer, the melt of which is charged with a propellant fluid in the injection-molding machine and is foamed in the injection-molding die.

1. A process for producing a grained vehicle interior fitting part, wherein a smooth or pre-grained film is placed into a die

provided with a surface structure and is film insert molded with a foaming support material which subsequently hardens.

2. The process as claimed in claim 1, wherein the film is pre-structured with a fine grain structure.

3. The process as claimed in claim 1, wherein the film is three-dimensionally shaped before being placed in.

4. The process as claimed in claim 1, wherein the support material is introduced into the die as a melt.

5. The process as claimed in claim 4, wherein the melt is charged with a propellant fluid.

6. The process as claimed in claim 5, wherein charging of the melt takes place under pressure.

7. The process as claimed in claim 5, wherein the support material expands in the die.

8. The process as claimed in claim 1, wherein a point as remote from the film as possible is selected as an injection point.

9. A vehicle interior fitting part that can be produced as claimed in claim 1.

10. A vehicle interior fitting part having a grained film, wherein the film has a physically foamed support layer on its rear side.

11. The vehicle interior fitting part as claimed in claim 10, wherein a visible side of the film has a lacquer coat.

12. The vehicle interior fitting part as claimed in claim 10, wherein the film is of multi-layer form.

13. The vehicle interior fitting part as claimed in claim 10, wherein the thickest point of the support layer is less than approximately 2.3 mm.

14. The vehicle interior fitting part as claimed in claim 1, wherein the support layer is made from a polypropylene copolymer.

15. The process as claimed in claim 1, wherein the film is pre-structured with a coarser grain structure formed during the film insert molding with a support material.

16. The process as claimed in claim 5, wherein the propellant fluid is a propellant gas.

17. The process as claimed in claim 16, wherein the propellant gas is CO₂ and/or N₂.

18. The vehicle interior fitting part as claimed in claim 11, wherein the visible side of the film has a PUR lacquer coat.

19. The vehicle interior fitting part as claimed in claim 12, wherein the film comprises a plurality of layers of polypropylene.

20. The vehicle interior fitting part as claimed in claim 13, wherein the thickest point of the support layer is less than approximately 1 mm.

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