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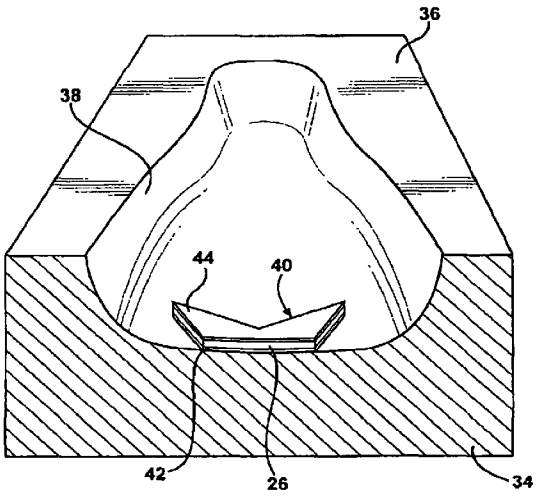

Fig. 7

(57) Abstract: A method of forming a composite article having a decal occurs in a mold. The mold includes a surface that defines a mold cavity. A decal is introduced to the surface of the mold. A polyurethane elastomer composition is applied into the mold cavity to form an elastomeric layer over the decal. The composite article including the elastomeric layer and the decal may then be demolded from the mold. Alternatively, a paint composition is applied into the mold cavity to form a paint layer over the decal. The polyurethane elastomer composition is applied into the mold cavity to form an elastomeric backing layer over the paint layer. The composite article including the paint layer, the decal, and the elastomeric backing layer may then be demolded from the mold. The composite article may be a seat for an all-terrain vehicle.

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AMENDED CLAIMS
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What is claimed is:

1. A method of forming a composite article in a mold including a surface defining a mold cavity, said method comprising the steps of:

introducing a decal to the surface of the mold, the decal including a backing paper layer disposed adjacent the surface of the mold and a decal layer overlaying the backing paper layer;

applying a paint composition into the mold cavity to form a paint layer;

applying a polyurethane elastomer composition into the mold cavity to form an elastomeric backing layer; and

demolding the composite article from the mold.

2. The method as set forth in claim 1 further comprising the step of applying a polyurethane foam composition onto the elastomeric backing layer to form a foam backing layer.

3. The method as set forth in claim 2 further comprising the step of applying a substrate to the foam backing layer.

4. The method as set forth in claim 3 wherein the substrate is applied to the foam backing layer prior to the step of demolding the composite article from the mold.

5. The method as set forth in claim 3 wherein the substrate is applied to the foam backing layer after the step of demolding the composite article from the mold.

6. The method as set forth in claim 2 further comprising the step of introducing a substrate prior to the step of applying the polyurethane foam composition to the elastomeric backing layer such that the substrate is embedded within the foam backing layer formed by the polyurethane foam composition.

7. The method as set forth in claim 2 further comprising the step of partially curing the elastomeric backing layer prior to the step of applying the polyurethane foam composition onto the elastomeric backing layer to form the foam backing layer.

8. The method as set forth in claim 7 further comprising the step of heating the mold to partially cure the elastomeric backing layer.

9. The method as set forth in claim 2 wherein the step of applying the polyurethane foam composition onto the elastomeric backing layer is further defined as pouring the polyurethane foam composition onto the elastomeric backing layer.

10. The method as set forth in claim 2 wherein the step of applying the polyurethane foam composition onto the elastomeric backing layer is further defined as reactive injecting the polyurethane foam composition onto the elastomeric backing layer.

11. The method as set forth in claim 2 wherein the step of applying the polyurethane foam composition onto the elastomeric backing layer is further defined as spraying the polyurethane foam composition onto the elastomeric backing layer.

12. The method as set forth in claim 1 further comprising the step of introducing a mold release agent to the surface of the mold prior to the step of applying the paint composition into the mold cavity.

13. The method as set forth in claim 12 wherein the surface of the mold defines a hole extending through the surface into the mold cavity for supplying fluid to and from the mold cavity and further comprising the step of supplying fluid through the hole into the mold cavity.

14. The method as set forth in claim 13 wherein the step of supplying fluid through the hole into the mold cavity is conducted simultaneous with the step of introducing the mold release agent to the surface of the mold for preventing the mold release agent from entering the hole.

15. The method as set forth in claim 13 further comprising the step of applying vacuum through the hole in the surface to retain the decal adjacent the surface of the mold.

16. The method as set forth in claim 1 wherein the mold defines a hole extending through the surface into the mold cavity for supplying fluid to and from the mold cavity and further comprising the step of applying vacuum through the hole in the surface to retain the decal adjacent the surface of the mold.

17. The method as set forth in claim 1 wherein the decal layer is formed from a coating composition.

18. The method as set forth in claim 17 wherein the coating composition is selected from the group of ink compositions, lacquer compositions, paint compositions, and combinations thereof.

19. The method as set forth in claim 17 wherein the decal layer is introduced into the mold cavity adjacent the surface of the mold by applying the coating composition.

20. The method as set forth in claim 19 further comprising the step of introducing a mold release agent to the surface of the mold prior to the step of introducing the decal to the surface of the mold such that the decal layer is applied to a backside of the mold release agent.

21. The method as set forth in claim 1 wherein the decal further includes a protective paper layer disposed adjacent the backing paper layer with the decal layer disposed between the backing paper layer and the protective paper layer.

22. The method as set forth in claim 21 wherein the protective paper layer is removed from the decal prior to the step of applying the paint composition into the mold cavity.

23. The method as set forth in claim 21 wherein the decal further includes an adhesive layer disposed between the backing paper layer and the surface of the mold.

24. The method as set forth in claim 21 wherein the decal layer is formed from a lacquer composition.

25. The method as set forth in claim 21 wherein the decal layer is formed from a polyurethane composition.

26. The method as set forth in claim 25 wherein the paint composition is selected from the group of polyurethane-based paint compositions, acrylic-based paint compositions, polyester-based paint compositions, and combinations thereof.

27. The method as set forth in claim 21 further comprising the step of introducing a mold release agent to the surface of the mold after the step of demolding the composite article from the mold.

28. The method as set forth in claim 27 further comprising the step of removing the backing paper layer from the surface of the mold after the step of introducing the mold release agent to the surface of the mold.

29. The method as set forth in claim 28 further comprising the step of introducing a second decal to the surface of the mold after the step of removing the backing paper layer from the surface of the mold, wherein the second decal includes a backing paper layer disposed adjacent the surface of the mold and a decal layer overlaying the backing paper layer.

30. The method as set forth in claim 29 wherein the second decal further includes a protective paper layer disposed adjacent the backing paper layer with the decal layer disposed between the backing paper layer and the protective paper layer.

31. The method as set forth in claim 30 further comprising the step of removing the protective paper layer from the second decal after the step of introducing the second decal to the surface of the mold.

32. The method as set forth in claim 21 further comprising the step of removing the backing paper from the surface of the mold after the step of demolding the composite article from the mold.

33. The method as set forth in claim 32 further comprising the step of introducing a second decal to the surface of the mold after the step of removing the backing paper layer from the surface of the mold, wherein the second decal includes a backing paper layer disposed adjacent the surface of the mold and a decal layer overlaying the backing paper layer.

34. The method as set forth in claim 1 wherein the paint composition is selected from the group of polyurethane-based paint compositions, acrylic-based paint compositions, polyester-based paint compositions, and combinations thereof.

35. The method as set forth in claim 1 further comprising the step of partially curing the paint layer prior to the step of applying the polyurethane elastomer composition into the mold cavity to form the elastomeric backing layer.

36. The method as set forth in claim 1 wherein the steps of applying the paint composition and the polyurethane elastomer composition are further defined as spraying the paint composition and the polyurethane elastomer composition.

37. A method of forming a composite article in a mold including a surface defining a mold cavity, said method comprising the steps of:

introducing a decal to the surface of the mold, the decal including a backing paper layer disposed adjacent the surface of the mold and a decal layer overlaying the backing paper layer;

applying a polyurethane elastomer composition into the mold cavity to form an elastomeric layer; and

demolding the composite article from the mold.

38. The method as set forth in claim 37 further comprising the step of applying a polyurethane foam composition onto the elastomeric layer to form a foam backing layer.

39. The method as set forth in claim 38 further comprising the step of applying a substrate to the foam backing layer.

40. The method as set forth in claim 37 further comprising the step of applying a second polyurethane elastomer composition onto the elastomeric layer to form an elastomeric backing layer.

41. The method as set forth in claim 40 further comprising the step of applying a polyurethane foam composition onto the elastomeric backing layer to form a foam backing layer.

42. The method as set forth in claim 41 further comprising the step of applying a substrate to the foam backing layer.

43. The method as set forth in claim 37 wherein the polyurethane elastomer composition includes an aliphatic isocyanate and a polyol.

44. The method as set forth in claim 37 wherein the polyurethane elastomer composition includes a UV package selected from the group of ultra violet absorbers, hindered amine light stabilizers, and combinations thereof.

45. The method as set forth in claim 1 wherein the decal further includes an ink layer disposed adjacent a side of the decal layer.

46. The method as set forth in claim 45 wherein the decal layer is formed from a polyurethane composition.

47. The method as set forth in claim 45 wherein the decal layer is formed from a lacquer composition.

48. The method as set forth in claim 37 wherein the decal layer is formed from a coating composition.

49. The method as set forth in claim 48 wherein the coating composition is selected from the group of ink compositions, lacquer compositions, paint compositions, and combinations thereof.

50. The method as set forth in claim 37 wherein the decal further includes an ink layer disposed adjacent a side of the decal layer.

51. The method as set forth in claim 50 wherein the decal layer is formed from a polyurethane composition.

52. The method as set forth in claim 50 wherein the decal layer is formed from a lacquer composition.

STATEMENT UNDER ARTICLE 19(1)

In this Article 19 Amendment, claims 1, 17, 19-21, 29, 30, 33, and 37 have been amended to clarify the scope of the invention being claimed. Claim 34 has been amended to simply correct an omitted period. Claims 45-52 have been added to further clarify the scope of the invention being claimed. The Applicant respectfully submits that none of the amendments introduce new matter.

Independent claims 1 and 37 have been amended to clarify structure and orientation of the decal employed in the present invention. The decal includes a decal layer and a backing paper layer, as claimed and taught in the present Application (see, e.g., original dependent claim 21 and paragraph 30 of the Application as filed). The decal is introduced to the surface of the mold such that the backing paper layer is disposed adjacent the surface of the mold and the decal layer is overlaying the backing paper layer. Referring to Figure 7 of the Application as filed, such structure and orientation of the decal can be readily appreciated.

Dependent claim 17 has been amended to clarify what the decal layer is formed from in certain embodiments. New dependent claims 46 through 48, 51, and 52 are also added to clarify what the decal layer is formed from in certain embodiments (see, e.g., paragraph [0033] of the Application as filed). New dependent claims 45 and 50 have been added to describe one embodiment of the decal, which includes an ink layer disposed on a side the decal layer (see, e.g., paragraph [0034] of the Application as filed). Dependent claim 21 has been amended to further clarify structure and orientation of the decal in certain embodiments. Dependent claims 29, 30, and 33 have been amended to clarify structure and orientation of a second decal employed in certain embodiments.

With regard to the novelty and the inventive step of the claimed invention in view of: US 2003/0180498, US 6,620,371, US 6,654,449, and US 7,005,091, which were each cited in the International Search Report (ISR), the Applicant respectfully submits that none of these documents disclose, teach, or suggest all of the features of the present invention as now claimed. In particular, none of the aforementioned references disclose, teach, or suggest using decals including a decal layer and a backing paper layer. Clear benefits attributable to the structure and orientation of the decal can be appreciated, as set forth in the Application as filed. Generally, the backing paper layer of the decal is useful for protecting the decal layer from contamination, such as possible contamination caused during application of the paint composition and/or the polyurethane elastomer composition into the mold cavity. The backing paper layer is also useful for subsequent repetition of the method.

The Applicant respectfully submits that the claimed invention, as amended, is novel and involves an inventive step over the documents cited in the ISR and described in the Written Opinion. Further and favorable reconsideration of the present Application is hereby requested.