METHOD OF MAKING FLEXIBLE IMPLEMENT GRIP WITH SURFACE TEXTURE AND PRINTING

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ABSTRACT

In one version of the method of making a flexible grip, a thin film carrier with negative of desired colored image is laminated to an uncured skin sheet and flat cured in a mold to heat transfer the image to the skin sheet and concurrently form a textured surface. The carrier is peeled away and the skin sheet wrapped and adhesively bonded to a cured underlist. In another version, the thin film carrier with negative of desired image is laminated on an uncured skin sheet which is wrapped on a cured underlist. The wrapped underlist is cured in a textured mold cavity to concurrently, in a single molding operation, heat transfer the image of the skin sheet from a textured surface and cure the skin sheet in place on the underlist.
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BACKGROUND

[0001] The present disclosure relates to flexible rubber or elastomeric grips employed for the handle of implements such as hammers, tennis rackets and golf clubs and more particularly relates to golf club grips. Currently, it is important in the marketing of golf club grips to provide for multi-colorant designs and logos on the outer surface of the grip for the manufacturers product enhancement. Furthermore, it has been desirable for the manufacturer to display their trademark or logo on the surface of the grip for distinguishing their product from those of other manufacturers.

[0002] In providing logos and designs, particularly multi-colored designs, printed on the flexible grip, it has required a multi-step process in the manufacturing which has added significant cost heretofore to the completed product. The printed design has been painted on the surface of the grip and has exhibited a propensity to wear off rapidly where the implement is subject to repeated use, and particularly this has been found true in the case of golf club grips. Additionally, it has been a popular marketable feature of golf club grips to provide a textured surface to enhance gripability; and, this has further complicated the manufacture of the grip and has required post cure buffing or debossing to create the textured surface. This has created problems in maintaining the printed design on the surface of the golf club grip.

[0003] Thus, it has been desired to provide a way or means of imprinting colorful designs or logos which remain robust on a textured surface of a flexible implement grip in a manner which provides robustness of the design, simplification of the manufacturing process for the grip and reduced manufacturing cost.

BRIEF DESCRIPTION

[0004] The present disclosure describes a flexible implement grip for assembly over the handle of an implement intended for manual gripping use such as that employed for a golf club, tennis racket, hammer or other implement forcibly swung by the user. For improved marketability, the grip is desired to be provided with a multi-colored design which may include a logo or trademark printed on the surface thereof and which is robust and resistant to repeated cycles of gripping by the user on the surface. In addition, the grip of the present disclosure is provided with a textured surface to enhance gripability. The flexible grip of the present disclosure simplifies manufacturing by eliminating various steps in the fabrication and curing thereby reducing the complexity and cost of manufacturing.

[0005] In one version, the flexible grip of the present disclosure is formed by molding and curing a hollow tubular underlist. A relatively thin carrier film, having a negative image of the desired design thereon, is prepared and laminated on an uncured skin sheet cut to a pattern shape. The skin sheet with the carrier is inserted in a flat configuration in a mold with a textured molding surface and concurrently the skin sheet is cured, the image heat transferred thereon and the textured surface formed on the skin sheet. The cured skin sheet is then removed from the mold, the carrier is released or peeled off to expose the cured colored design imposed on the textured surface of the cured skin sheet. An adhesive is then applied to at least one of the outer surface of the underlist or the back side of the skin sheet and the skin sheet is wrapped about the underlist and the adhesive allowed to cure so as to maintain the skin sheet on the underlist to form a finished grip with the textured outer surface having a robust colored design provided thereon.

[0006] In another version of the flexible implement grip of the present disclosure, a hollow flexible underlist is molded and cured. A thin film carrier with a negative image of the desired colored design on one surface thereof is provided; and, the carrier is laminated or applied to a surface of an uncured elastomeric skin sheet cut to a pattern which is then wrapped about the underlist and the wrapped underlist inserted in a mold having a textured molding surface formed therein. The wrapped skin sheet is then cured on the underlist concurrently with heat transfer of the image to the outer surface of the skin sheet and the concurrent forming of the textured surface on the skin sheet. Upon removal of the cured grip from the mold, the carrier layer is peeled from the grip exposing the finished design on the textured surface of the grip. The present disclosure thus describes the simplified manner of fabricating a textured surface flexible implement handle grip, such as a golf club grip, which provides a colored design which is cured on the outer surface to provide robustness and wearability when exposed to repeated gripping by the user in service.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. 1 is a perspective view of a cured underlist for the flexible implement grip of the present disclosure;
[0008] FIG. 2a is a perspective view of a relatively thin skin sheet for the grip of the present disclosure;
[0009] FIG. 2b is a perspective view of the carrier film with negative image thereon;
[0010] FIG. 2c is a perspective view of the carrier film of FIG. 2b laminated on the skin sheet of FIG. 2a;
[0011] FIG. 3 is a view of the laminated skin sheet of FIG. 2c positioned in a mold for curing;
[0012] FIG. 4 is an exploded view of the end region of the laminated skin sheet of FIG. 2c to show the image thereon in greater detail;
[0013] FIG. 5 is a perspective view of an underlist of FIG. 1;
[0014] FIG. 5b is a perspective view of the cured skin sheet after removal from the mold;
[0015] FIG. 5c is a perspective view showing the cured skin sheet with adhesive applied thereto;
[0016] FIG. 5d is a perspective view of the completed grip with the skin sheet of FIG. 5 being wrapped and adhesively bonded thereto;
[0017] FIG. 6 is a view similar to FIG. 1 of a cured underlist for another version of the grip of the present disclosure;
[0018] FIG. 7a is a perspective view of an uncured skin sheet;
[0019] FIG. 7b is a perspective view of a carrier film with a negative image provided thereon;
[0020] FIG. 7c is a perspective view of the skin sheet of FIG. 7a with the carrier film of FIG. 7b laminated thereon;
[0021] FIG. 8 is a perspective view of the underlist of FIG. 6 with the skin sheet of FIG. 7 wrapped thereon and an end cap for assembly thereto;
[0022] FIG. 9 is a view of a mold for the grip of FIG. 8 with a textured surface in the cavities thereof;
FIG. 10a is a view of the completed cured grip after the removal from the mold of FIG. 9; and,

FIG. 10b is an enlarged view of a portion of the end of the grip of FIG. 10a showing the textured surface and design thereon.

DETAILED DESCRIPTION

Referring to FIG. 1, an underlist having a generally hollow tubular configuration is indicated at 10 and is configured internally to conform to the handle of the implement to which it is to be attached such as, for example, the shaft of a golf club. The underlist 10 is molded, extruded or cured from a suitable flexible or rigid thermoplastic polymer or thermosetting polymer material such as rubber or other elastomeric materials such as, for example, polyurethane, or ethylene vinyl acetate (EVA). Where the underlist is formed of rubber such as natural rubber or styrene butadiene rubber, the underlist 10 is typically Vulcanized in a mold under compression.

Referring to FIGS. 2a, 2b and 2c, a skin sheet is formed to a suitable pattern shape so as to enable wrapping about the underlist 10 and conforming thereto. The skin sheet 14 may be formed of a thermosetting plastic or thermoplastic material so as to be suitable, when cured, to provide the desired surface flexibility for gripping of the particular implement to which the grip is to be applied. The skin sheet 14 in FIG. 2a is cut to the desired pattern from a relatively thin sheet of uncured material. With reference to FIG. 2b, a thin film carrier 16 is formed of thermoplastic material such as, for example, polyethylene terephthalate (PET) material or coated paper and has applied thereto a heat transferable negative image indicated generally at 18 which may be multi-colored and may include a manufacturer’s logo or trademark. In the present practice, the image may be satisfactorily formed of one of printing ink, metallic ink, color change ink, heat transfer ink, rubberbased ink, acrylic ink or polyurethane ink or other suitable imposition material capable of heat transfer.

In the present practice, it has been found satisfactory to form the underlist of one of styrene butadiene rubber (SBR), natural rubber, ethylene propylene diene monomer (EPDM) or a combination of any of the foregoing materials.

The carrier 12 is then laminated onto a surface of the skin sheet 14 with the heat transfer image material 18 exposed as shown in FIG. 2c.

Referring to FIGS. 3 and 4, the skin sheet 14 with carrier 16 laminated thereon is inserted in a compression mold indicated generally at 20 which has the inner surface of the mold containing the carrier 16 formed with a textured surface as indicated. In the present practice, it has been found satisfactory to cure the skin sheet in the range of about 2-7 minutes at a temperature in the range of about 330-370 degrees Fahrenheit. The skin sheet is then removed from the mold and the carrier is removed such as by peeling away from the surface of the skin sheet, leaving the image heat transferred and imposed upon the surface of the skin sheet. Concurrently, the textured surface provided on the inner face of the mold is formed on the surface of the cured skin sheet. An enlarged view of a sample molded skin sheet with a design and textured surface 16 formed thereon is shown in FIG. 4.

Referring to FIGS. 5a-5d, the underlist 10 has a coating of adhesive 24 applied thereto; and, an end cap 26 is adhesively secured to the end of the grip. It will be understood that, alternatively, adhesive may be applied to either the surface of the underlist or the back side of the skin sheet 16 or a combination of both. The cured skin sheet 16 is then wrapped about the outer surface of the underlist 10 with the textured surface of the skin sheet exposed. The adhesive, upon setting or self-curing, provides the finished grip denoted generally at 30 in FIG. 5d. The method described with respect to the fabrication of the grip 30 thus provides for heat transfer of the image paint or ink onto the surface of the skin sheet during molding and thus, provides a simpler method of manufacturing inasmuch as the image is applied to the skin sheet as a flat surface. The heat transfer of the ink or paint to the skin sheet thus produces a more robust image and concurrent formation of the textured surface without the need for external buffing or debossing.

Referring to FIGS. 6 and 7a-7c, another version of the method of the present disclosure is illustrated wherein a cured underlist 100 is formed in a mold, having a generally hollow tubular configuration with the inner surface 102 thereof configured to conform to the handle of the implement for which the grip is intended such as, for example, the shaft of a golf club. The underlist 100 may be formed in the same manner and of the same materials as the underlist 10 of the version of FIG. 1.

With reference to FIGS. 7a-7c, a skin sheet 104 is formed to a suitable pattern to cover the underlist 100 and is typically cut from a relatively thin sheet of uncured material similar to that of the underlist 14 of the version of FIG. 2a.

A thin film carrier 106 as shown in FIG. 7b, is cut to overlay the skin sheet 104; and, the carrier 106 has imposed on one surface thereof, the desired negative colored image indicated generally at 108 and which may include a logo or trademark. The image 108 is imposed with suitable material which may be similar to that of the image 18 of the version of FIG. 2b. The carrier 106 is then laminated onto the skin sheet 104 as shown in FIG. 7c.

Referring to FIG. 8, the underlist 100 has the uncured skin sheet 104 wrapped thereabout with the carrier 106 remaining thereon and disposed about the exterior surface thereof. A suitable end cap 110 may then be attached or assembled to the end of the grip as indicated in dashed line in FIG. 8. The assembly of FIG. 8, indicated generally at 112, is then assembled into a mold 114 as shown in FIG. 9, which has the cavities thereof formed with a textured surface 116. The assembly 112 of FIG. 8 is then loaded into the cavity of mold 114 and the mold closed and the grip cured by heat and compression. The molding of the assembly 112 thus accomplishes, in a single step, the curing of the skin sheet 104 and bonding the skin sheet to the underlist, the heat transferring of the image 108 onto the surface of the skin sheet and the forming of the textured surface onto the exterior of the skin sheet. The cured grip is then removed from the mold and the carrier 106 removed or peeled therefrom the leave the exterior surface of the grip with the heat transferred image and the textured surface 116 as shown in FIGS. 10a and 10b. The version shown in FIGS. 6-10b, thus, enables the formation of a flexible grip with a robust multi-colored design and textured surface on the exterior thereof in a single step molding operation, thereby eliminating multi-step operations for application of the colored design and eliminating the need for buffing or debossing after curing to form the desired textured surface.

Obviously, modifications and alterations will occur to others upon reading and understanding the preceding detailed description. It is intended that the exemplary ver-
sions described be construed as including all such modifications and alterations insofar as they come within the scope of the appended claims.

1-9. (canceled)

10. A method of making a flexible grip for an implement handle comprising:
   (a) forming a hollow underlist of cured elastomeric material;
   (b) forming a skin sheet of uncured material selected from one of (i) thermosetting polymer and (ii) thermoplastic polymer;
   (c) providing a thin film carrier of one of (i) thermoplastic material and (ii) coated paper and imposing a negative image of heat transferrable material on a surface of the carrier;
   (d) disposing the imaged surface of the carrier on a surface of the skin sheet and wrapping the skin sheet on the underlist;
   (e) providing a mold with a grip forming cavity having a textured surface and disposing the wrapped underlist in the cavity; and, (f) concurrently curing the skin sheet on the underlist, heat transferring the image to the skin sheet, forming the textured surface on the skin sheet and bonding the skin to the underlist.

11. The method defined in claim 10, wherein providing a carrier includes providing a layer of polyethylene terephthalate (PET) material.

12. The method defined in claim 10, wherein curing the skin sheet on the underlist includes heat and compression curing.

13. The method defined in claim 10, wherein forming an underlist includes forming of one of (i) styrene butadiene rubber (SBR) material, (ii) EPDM material, (ii) natural rubber and (iv) a combination from (i), (ii) and (iii).

14. The method defined in claim 10, wherein imposing an image includes imposing with material selected from one of (i) ink and (ii) paint.

15. The method of claim 10, wherein imposing an image includes imposing of material selected from (i) printing ink, (ii) metallic ink, (iii) color change ink, (iv) heat transfer ink, (v) rubber based ink, (vi) acrylic ink, (vii) polyurethane (PU) ink.

16. The method of claim 10, wherein imposing an image includes imposing a multi-colored image.