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(54) COLORED, TRANSPARENT COATING LAYER FOR GOLF CLUB HEAD AND GOLF CLUB HEAD MEMBERS

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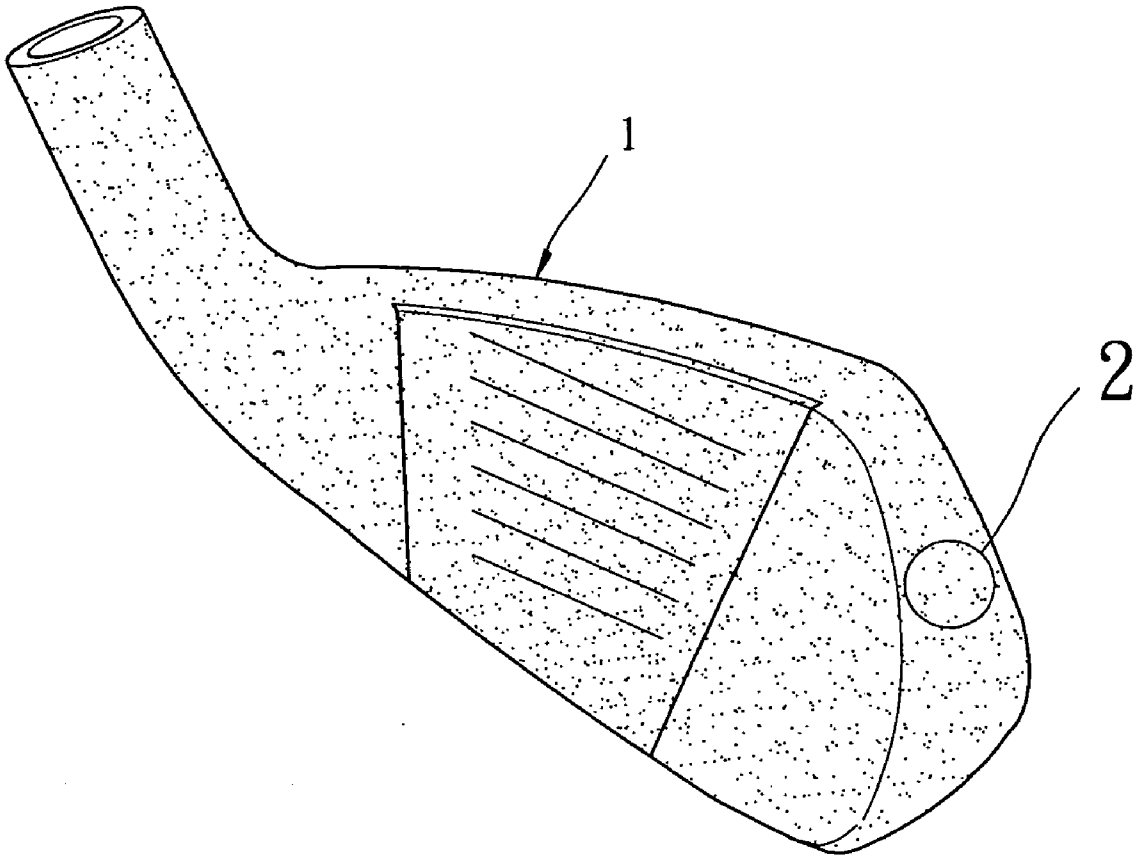
(57) **ABSTRACT**

A golf club head includes a metal surface and at least one colored, transparent coating layer formed thereon. The colored, transparent coating layer contains a resin material and a coloring material. The colored, transparent coating layer exposes the metal surface of the golf club head in the coloring material that enhances the appearance of the golf club head. In an embodiment, the colored, transparent coating layer includes a first colored layer and a second colored layer. The first colored layer and the second colored layer vary in colors, or the colors of the first colored layer and the second colored layer vary in depth.



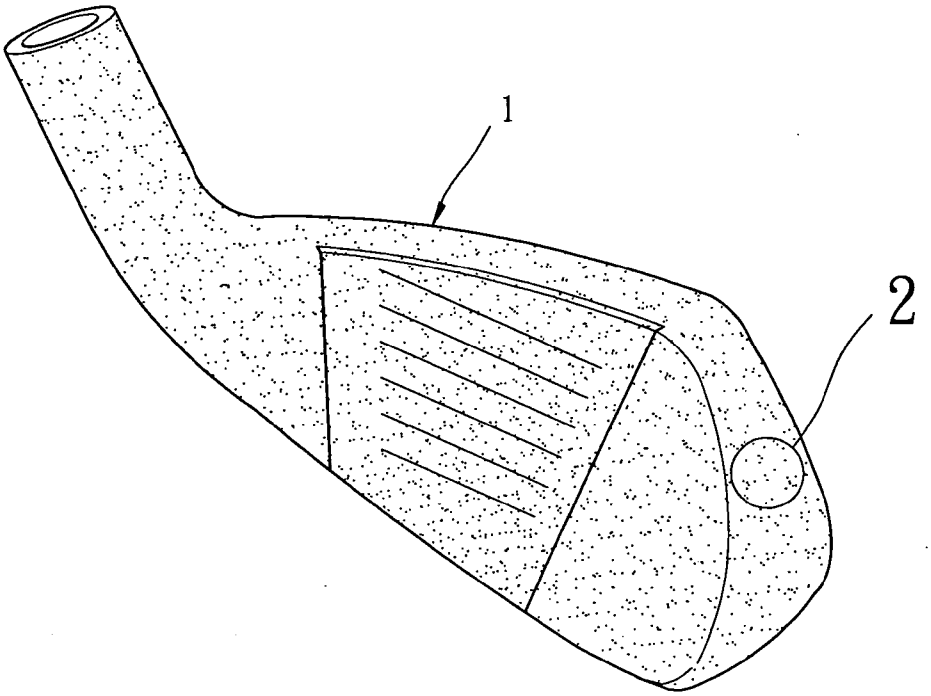


FIG. 1

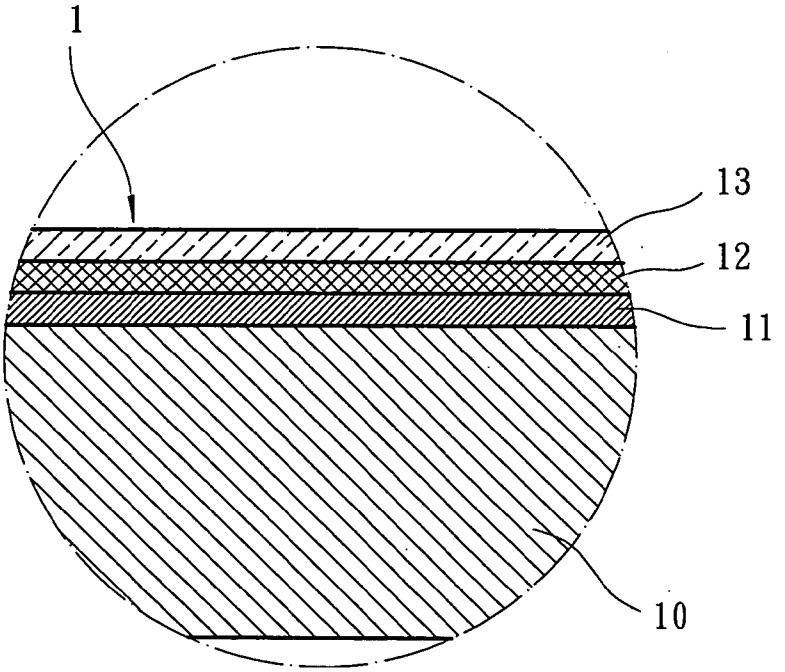


FIG. 2

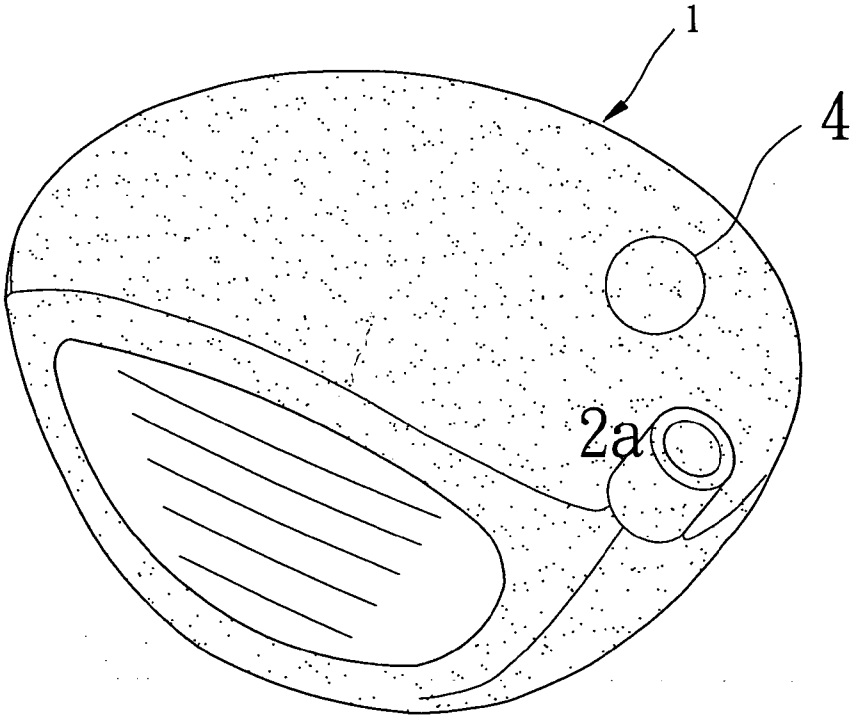


FIG. 3

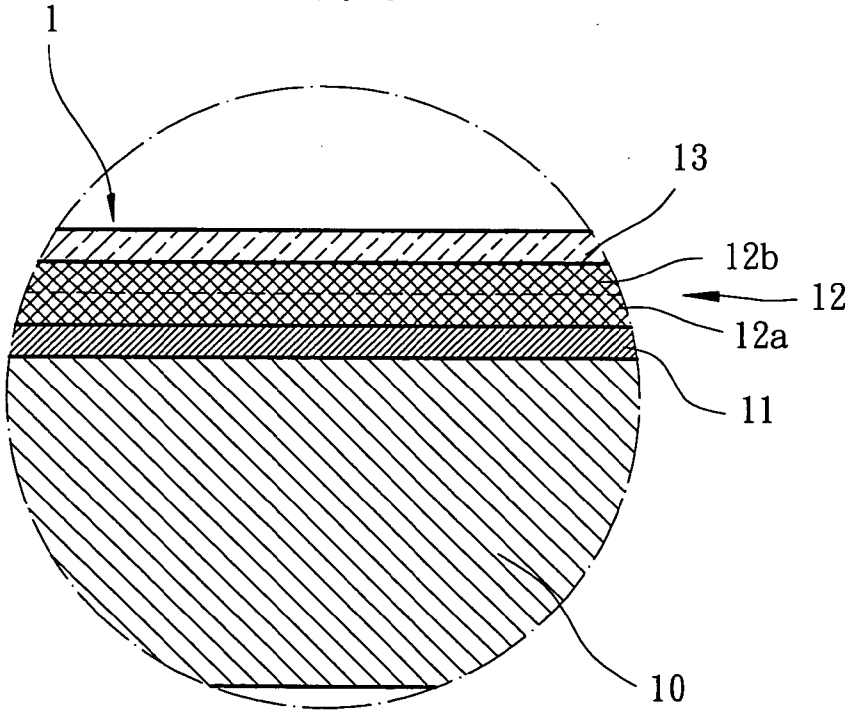


FIG. 4

COLORED, TRANSPARENT COATING LAYER FOR GOLF CLUB HEAD AND GOLF CLUB HEAD MEMBERS

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to a colored, transparent coating layer for a golf club head and golf club head members. Particularly, the present invention relates to the colored, transparent coating layer formed on a pretreated metal surface of the golf club head and golf club head members. More particularly, the present invention also relates to the colored, transparent coating layer for enhancing metallic luster of the golf club head and golf club head members.

[0003] 2. Description of the Related Art

[0004] A conventional golf club head, as described in Japanese Patent Publication No. 2002-325868, entitled "Wood Type Golf Club Head," generally includes a multi-coating layer formed on an exterior surface. The multi-coating layer consists of a covering layer and a polarizing surface layer. Comprised of the covering layer are a primer paint layer, a coloring layer, a color-polarizing layer and a transparent layer arranged in order. Typically, the primer paint layer is located on a position on the exterior surface of the golf club head. Formed on the primer paint layer is the coloring layer containing at least one color material. Similarly, formed on the coloring layer is the color-polarizing layer containing a resin material, a color material and a polarizing material which are mixed. The transparent layer is formed on the color-polarizing layer such that colors of the coloring layer can appear on the transparent layer via the color-polarizing layer. Finally, the polarizing surface layer is formed on the transparent layer to form an outermost layer of the multi-coating layer. The polarizing surface layer also contains a resin material, a color material and a polarizing material for enhancing the appearance of the golf club head. Accordingly, the multi-coating layer determines the appearance of the final product of golf club head.

[0005] In the multi-coating layer, light may successively penetrate the polarizing surface layer, the transparent layer and the color-polarizing layer, and then the coloring layer and the primer paint layer may reflect the incident lights. Although it would be advantage to reflect colors of the multi-coating layer, no original metallic luster of the golf club head may appear through the multi-coating layer. In addition, although the polarizing surface layer and the color-polarizing layer can refract the incident lights, they cannot reflect transparent and visual effects on the metal surface of the golf club head.

[0006] Another problem with the contained-contents and multi-layers of the multi-coating layer is complicated that may increase the difficulty in manufacture and the production cost, and lower the efficiency in manufacture. Hence, there is a need for improving the coating layer of the golf club head or the golf club head member.

[0007] As is described in greater detail below, the present invention intends to provide at least one colored, transparent coating layer formed on a metal surface of a golf club head or a golf club head member. The colored, transparent coating layer contains a resin material and a coloring material. The colored, transparent coating layer exposes the metal surface of the golf club head or golf club head member in the coloring material in such a way as to mitigate and overcome the above problem. In the present invention, the colored, transparent coating layer has replaced the conventional multi-coating layer of the golf club head or the golf club head member.

SUMMARY OF THE INVENTION

[0008] The primary objective of this invention is to provide a colored, transparent coating layer formed on a metal surface of a golf club head or a golf club head member. Accordingly, the colored, transparent coating layer can expose a high-degree of metallic luster of the golf club head or the golf club head member.

[0009] The golf club head in accordance with an aspect of the present invention includes a metal surface and at least one colored, transparent coating layer formed thereon. The colored, transparent coating layer contains at least one resin material and at least one coloring material. The colored, transparent coating layer exposes the metal surface of the golf club head in the coloring material that enhances the appearance of the golf club head.

[0010] In a separate aspect of the present invention, the resin material of the colored, transparent coating layer is selected from a transparent resin or a translucent resin.

[0011] In a further separate aspect of the present invention, the colored, transparent coating layer is formed on a bottom primer layer provided on the metal surface of the golf club head.

[0012] In a yet further separate aspect of the present invention, the bottom primer layer is made from a transparent resin or a translucent resin.

[0013] In a yet further separate aspect of the present invention, a protective layer is formed on the colored, transparent coating layer.

[0014] In a yet further separate aspect of the present invention, the protective layer is made from a transparent resin or a translucent resin.

[0015] In a yet further separate aspect of the present invention, the colored, transparent coating layer includes a first colored layer and a second colored layer attached thereto.

[0016] In a yet further separate aspect of the present invention, the first colored layer and the second colored layer vary in colors, or the colors of the first colored layer and the second colored layer vary in depth.

[0017] In a yet further separate aspect of the present invention, the first colored layer and the second colored layer possess different transparencies.

[0018] Further scope of the applicability of the present invention will become apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various will become apparent to those skilled in the art from this detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] The present invention will become more fully understood from the detailed description given hereinbelow and the accompanying drawings which are given by way of illustration only, and thus are not limitative of the present invention, and wherein:

[0020] FIG. **1** is a perspective view illustrating a colored, transparent coating layer formed on an iron-typed golf club head in accordance with a first embodiment of the present invention;

[0021] FIG. **2** is an isolated cross-sectional view, in the circle of FIG. **1**, illustrating the colored, transparent coating

layer formed on a metal surface of the iron-typed golf club head in accordance with the first embodiment of the present invention;

[0022] FIG. **3** is a perspective view illustrating the colored, transparent coating layer formed on a wood-typed golf club head in accordance with a second embodiment of the present invention; and

[0023] FIG. **4** is an isolated cross-sectional view, in the circle of FIG. **3**, illustrating the colored, transparent coating layer formed on a metal surface of the wood-typed golf club head in accordance with the second embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0024] Referring initially to FIGS. **1** and **2**, views of an iron-type golf club head, designated numeral **1**, in accordance with the first embodiment of the present invention are illustrated. Preferably, the golf club head **1** is constructed from a metal material, an alloy material or a non-metal material. For instance, suitable materials utilized in practicing the golf club head **1** are carbon steel, low-carbon steel, maraging steel, alloyed steel, low-alloy steel, stainless steel, Fe—Mn—Al alloy, cast iron, nickel-based alloy, structural alloy, titanium alloy and carbon fibers etc. In the first embodiment, the golf club head **1** has at least one metal surface **10** which is selectively provided on one of a golf club head body, a striking plate, a hosel portion, a blade portion or other golf club head member. By referring to FIG. **2**, formed on a partial or entire portion the metal surface **10** are a series of a bottom primer layer **1** **1**, a colored, transparent coating layer **12** and a protective layer **13**. The bottom primer layer **11**, the colored, transparent coating layer **12** and the protective layer **13** are stacked on the metal surface **10** in order so as to form a colored, transparent coating structure.

[0025] By referring to FIG. **1**, the bottom primer layer **11** functions as a desired surface for adhering the colored, transparent coating layer **12**. The bottom primer layer **11** is made from a paint selected from the group consisting of acrylic painting, polyurethane painting, nitro-lacquer painting, polyester painting, epoxy painting, phenolic aldehyde painting and alkyd resin painting. Preferably, the bottom primer layer **11** is formed on the metal surface **10** by means of painting, spraying or immersion. Furthermore, the bottom primer layer **11** has a thickness preferably in the range of 10 μm to 100 μm, more preferably in the range of 20 μm to 40 μm. However, the thickness of the bottom primer layer **11** is designed for providing a desired degree of strength on the metal surface **10** for the following procedures. In a preferred embodiment, the bottom primer layer **11** can be made from a painting material that possesses a desired color which can be changed according to the design needs. Preferably, the bottom primer layer **11** is made from a transparent resin or a translucent resin. The bottom primer layer **11** functions to enhance the ability of antirust and the smoothness of the metal surface **10**.

[0026] Referring again to FIG. **2**, the colored, transparent coating layer **12** functions to expose metallic luster of the metal surface **10** penetrated from the bottom primer layer **11**, and to further, add at least one color on the metal surface **10**. The colored, transparent coating layer **12** contains at least one resin material and at least one coloring material which are added in the resin material. Preferably, the resin material is made from a transparent resin or a translucent resin which is selected from the group consisting of polyurethane elastomer (PU), epoxy, acrylic resin, polyurethane resin, nitro-lacquer resin, polyester resin, phenolic aldehyde resin and alkyd resin. In a preferred embodiment, the coloring material of the colored, transparent coating layer **12** possesses a desired color which can be changed according to the design needs. In preparation, the material of the colored, transparent coating layer **12** further contains a lacquer thinner (not shown) which is selected from an active thinner such as a solvent of glycidyl ethers. In an alternative embodiment, the lacquer thinner may be selected from a non-active thinner. For instance, the lacquer thinner may be preferably made from a solvent selected from the group consisting of methylbenzene, ethanol, acetone, butanol and di-butyl group. The lacquer thinner can enhance the ability of flowage of the resin material in coating operation. Once cured, the contained lacquer thinner can enhance the ability of transparency of the colored, transparent coating layer **12** for lights. The cured coating layer **12** possesses a high degree of chemical resistance and mechanical strength. The colored, transparent coating layer **12** can expose the metal surface **10** of the golf club head **1** in the coloring material that enhances the appearance of the golf club head **1**. In a preferred embodiment, the colored, transparent coating layer **12** varies in colors for enhancing the appearance of the golf club head **1**. In another preferred embodiment, the color of the colored, transparent coating layer **12** varies in depth.

[0027] Still referring to FIG. **2**, the protective layer **13** functions as a decorative or protective shell of the colored, transparent coating layer **12**. The protective layer **13** has a degree of hardness to withstand normal usage of the golf club head **1**. The materials of the bottom primer layer **11** and the protective layer **13** are made from similar or dissimilar materials. Preferably, the protective layer **13** is made from a transparent resin or a translucent resin. Finally, the protective layer **13** exposes the metal surface **10** of the golf club head **1** and the color of the colored, transparent coating layer **12** that enhance the appearance of the golf club head **1**. In an embodiment, the protective layer **13** may be omitted so as to simplify the entire procedure.

[0028] Still referring to FIG. **2**, prior to painting operation, the rough metal surface **10** of the golf club head **1** is processed by a finishing procedure, a polishing procedure or both so as to form a perfect degree of the smoothness of the metal surface **10**. Subsequently, the material of the bottom primer layer **11** is uniformly coated and cured by means of a heater or the like such that the bottom primer layer **11** is formed on the finished metal surface **10**. Subsequent to the formation of the bottom primer layer **11** the material of the colored, transparent coating layer **12** is uniformly coated and cured by means of a heater or the like such that the colored, transparent coating layer **12** is formed on the bottom primer layer **11**. Finally, the material of the protective layer **13** is uniformly coated and cured by means of a heater or the like such that the protective layer **13** is formed on the colored, transparent coating layer **12**.

[0029] Still referring to FIG. **2**, since the materials of the bottom primer layer **11**, the colored, transparent coating layer **12** and the protective layer **13** are made from transparent resins or translucent resins, the metallic luster of the metal surface **10** is capable of penetrating through the entire colored, transparent coating structure. It would be advantageous that the color of the colored, transparent coating layer **12** and the metallic luster of the metal surface **10** mingle on the golf club head **1** for enhancing the appearance. Advantageously, the bottom primer layer **11** and the protective layer **13** can protect the metal surface **10** of the golf club head **1**. Turning now to FIGS. **3** and **4**, views of a wood-type golf club head in accordance with the second embodiment of

the present invention are illustrated. In comparison with the first embodiment, the colored, transparent coating layer **12** of the second embodiment includes a first colored layer **12***a* and a second colored layer **12***b* formed on the first colored layer **12**a. In a preferred embodiment, the first colored layer **12***a* and the second colored layer **12***b* vary in colors, or the colors of the first colored layer **12***a* and the second colored layer **12***b* vary in depth. In another preferred embodiment, the first colored layer **12***a* and the second colored layer **12***b* possess different transparencies.

[0030] In a preferred embodiment, the colored, transparent coating layer **12** is formed on a predetermined portion selected from a striking plate, a crown plate, a skirt wall, a rear wall, a sole plate, a neck section and a hosel of the wood-type club head **1**. It will be understood that the colored, transparent coating layer **12** in accordance with the present invention may be further applied to the utility-type or putter-type club head.

[0031] It will be apparent from the aforementioned discussions that the golf club head body disclosed in Japanese Patent Publication No. 2002-325868 has a multi-coating layer including a polarizing surface layer, a primer paint layer, a coloring layer, a color-polarizing layer and a transparent layer. Accordingly, the multi-coating layer is complicated in manufacture even though it may enhance the appearance of the golf club head. Conversely, the colored, transparent coating layer **12** of the present invention can simplify the entire procedure in manufacture, and also enhance the appearance and quality of the golf club head **1**. Advantageously, the protective layer **13** is further provided on the golf club head **1** so as to protect the colored, transparent coating layer **12**.

[0032] Although the invention has been described in detail with reference to its presently preferred embodiment, it will be understood by one of ordinary skill in the art that various modifications can be made without departing from the spirit and the scope of the invention, as set forth in the appended claims.

What is claimed is:

1. A golf club head comprising:
- a metal surface provided on the golf club head, said metal surface having a predetermined portion; and
- at least one colored, transparent coating layer formed on the predetermined portion of the metal surface;
- wherein the colored, transparent coating layer exposes a metallic luster from the metal surface in color.

2. The golf club head as defined in claim **1**, wherein the colored, transparent coating layer contains at least one resin material and at least one coloring material.

3. The golf club head as defined in claim **2**, wherein the resin material of the colored, transparent coating layer is selected from the group consisting of polyurethane elastomer, epoxy, acrylic resin, polyurethane resin, nitro-lacquer resin, polyester resin, phenolic aldehyde resin and alkyd resin.

4. The golf club head as defined in claim **2**, wherein the resin material of the colored, transparent coating layer is selected from a transparent resin or a translucent resin.

5. The golf club head as defined in claim **2**, wherein a lacquer thinner is contained in the colored, transparent coating layer.

6. The golf club head as defined in claim **5**, wherein the lacquer thinner is selected from an active thinner or a non-active thinner.

7. The golf club head as defined in claim **1**, wherein the colored, transparent coating layer is formed on a bottom primer layer provided on the metal surface of the golf club head.

8. The golf club head as defined in claim **7**, wherein the bottom primer layer is made from a transparent resin or a translucent resin.

9. The golf club head as defined in claim **1**, wherein a protective layer is formed on the colored, transparent coating layer.

10. The golf club head as defined in claim **9**, wherein the protective layer is made from a transparent resin or a translucent resin.

11. The golf club head as defined in claim **1**, wherein the colored, transparent coating layer includes a first colored layer and a second colored layer.

12. A golf club head member, said golf club head member selected from one of a striking plate, a crown plate, a blade portion, a skirt wall, a rear wall, a sole plate, a neck section and a hosel of a golf club head, comprising:
- a metal surface provided on the golf club head member, said metal surface having a predetermined portion; and
- at least one colored, transparent coating layer formed on the predetermined portion of the metal surface, said colored, transparent coating layer containing at least one resin material and at least one coloring material;
- wherein the colored, transparent coating layer exposes a metallic luster from the metal surface in color.

13. The golf club head member as defined in claim **12**, wherein the resin material of the colored, transparent coating layer is selected from the group consisting of polyurethane elastomer, epoxy, acrylic resin, polyurethane resin, nitro-lacquer resin, polyester resin, phenolic aldehyde resin and alkyd resin.

14. The golf club head member as defined in claim **12**, wherein the resin material of the colored, transparent coating layer is selected from a transparent resin or a translucent resin.

15. The golf club head member as defined in claim **12**, wherein a lacquer thinner is contained in the colored, transparent coating layer.

16. The golf club head member as defined in claim **15**, wherein the lacquer thinner is selected from an active thinner or a non-active thinner.

17. The golf club head member as defined in claim **12**, wherein the colored, transparent coating layer is formed on a bottom primer layer provided on the metal surface of the golf club head member.

18. The golf club head member as defined in claim **17**, wherein the bottom primer layer is made from a transparent resin or a translucent resin.

19. The golf club head member as defined in claim **12**, wherein a protective layer is formed on the colored, transparent coating layer.

20. The golf club head member as defined in claim **19**, wherein the protective layer is made from a transparent resin or a translucent resin.

21. The golf club head member as defined in claim **12**, wherein the colored, transparent coating layer includes a first colored layer and a second colored layer.

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