



US 20110028234A1

(19) **United States**

(12) **Patent Application Publication**
Jasan et al.

(10) **Pub. No.: US 2011/0028234 A1**

(43) **Pub. Date: Feb. 3, 2011**

(54) **GOLF CLUB HEAD HAVING SCORE LINE STRUCTURE**

(30) **Foreign Application Priority Data**

Jul. 31, 2009 (TW) 98126002

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Publication Classification

(51) **Int. Cl.**
A63B 53/04 (2006.01)
(52) **U.S. Cl.** **473/331; 473/342; 473/350**

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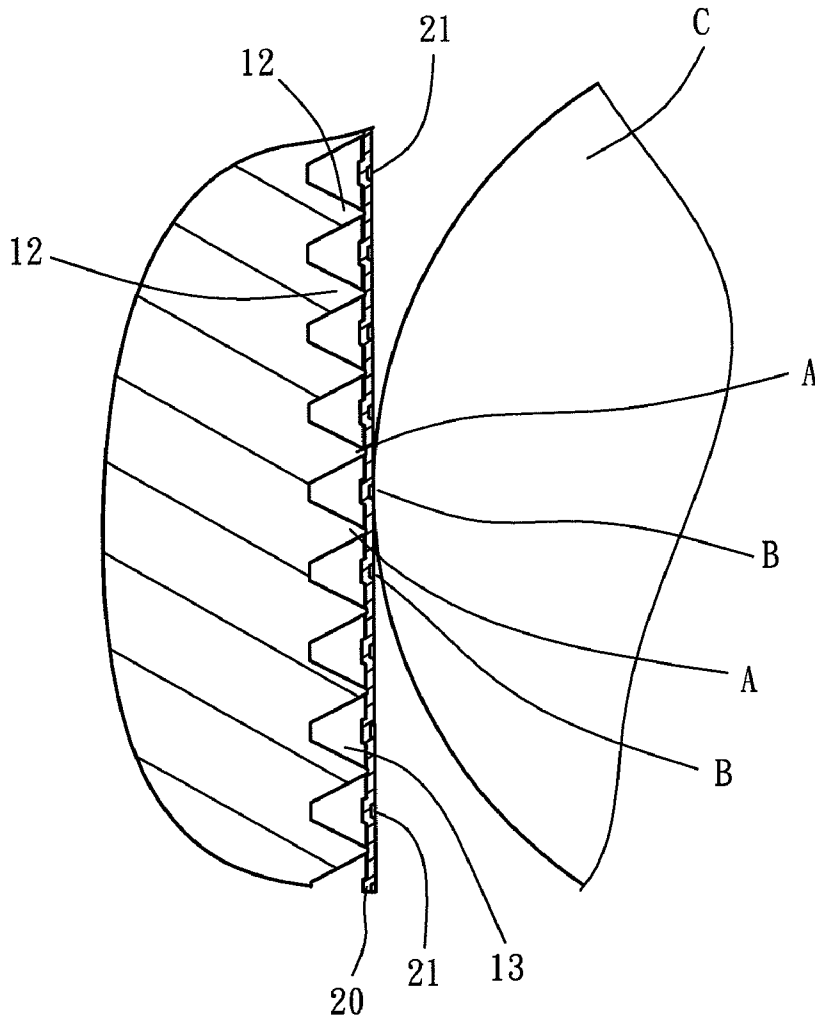
(57) **ABSTRACT**

A golf club head having score line structure is disclosed to include a club head body that has a recessed portion located on the ball-striking face thereof and supporting ribs and internal grooves alternatively arranged in the recessed portion, and a ball-striking face plate supported on the topmost edges of the supporting ribs in the recessed portion of the club head body and having external score lines arranged on the front face.

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(21) Appl. No.: **12/780,515**

(22) Filed: **May 14, 2010**



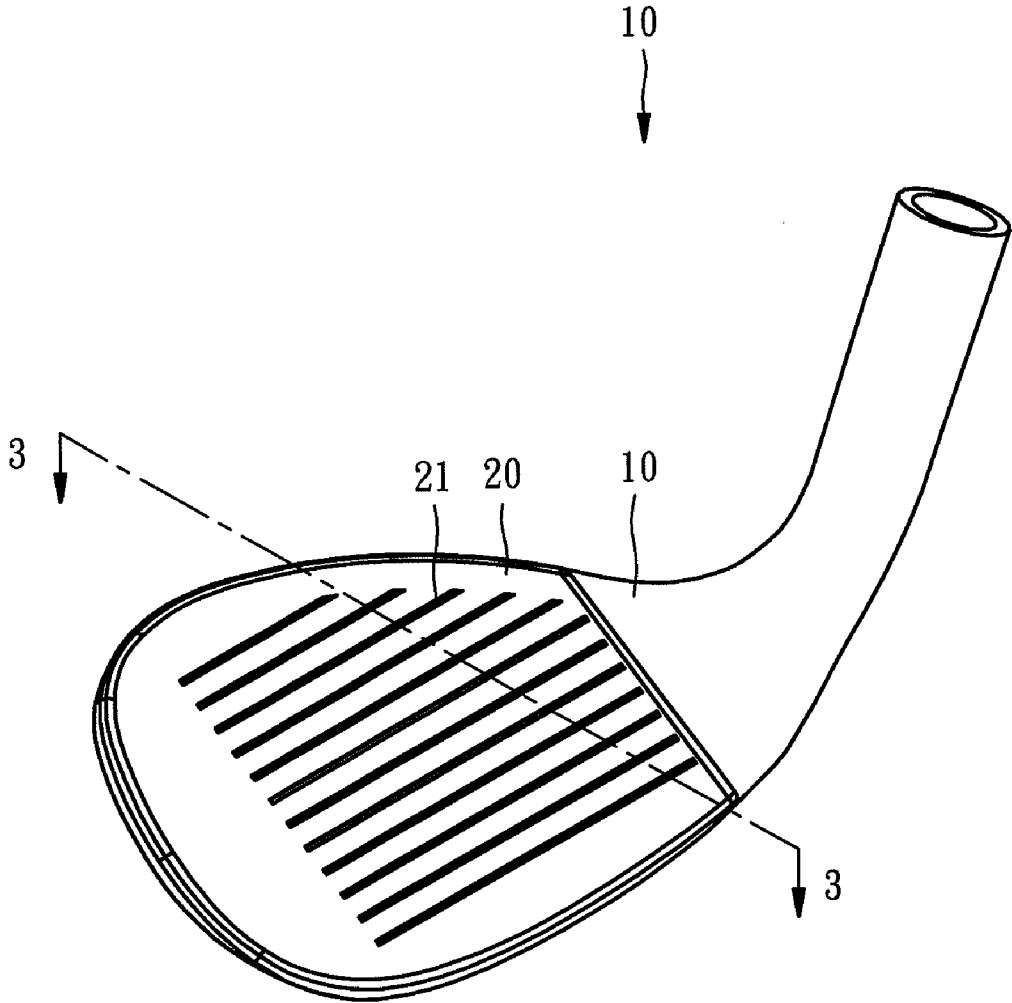


FIG. 1

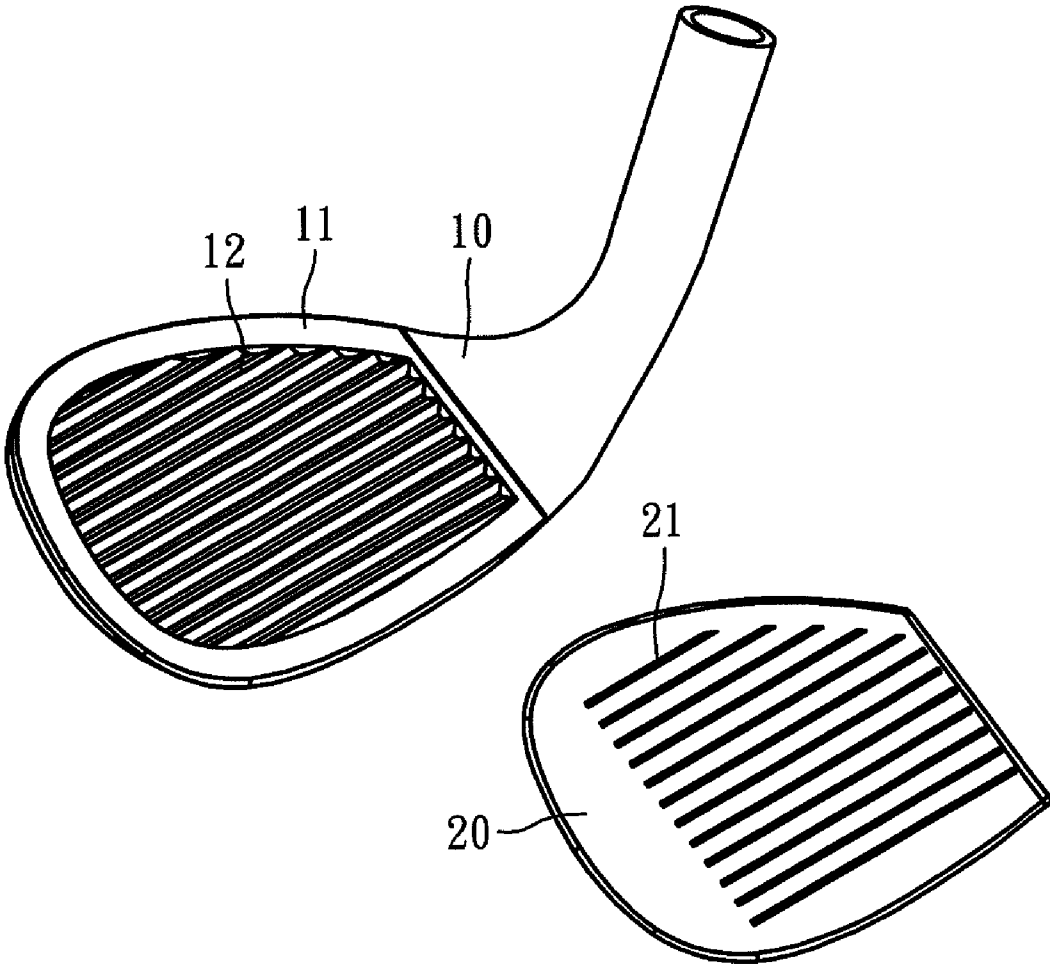


FIG. 2

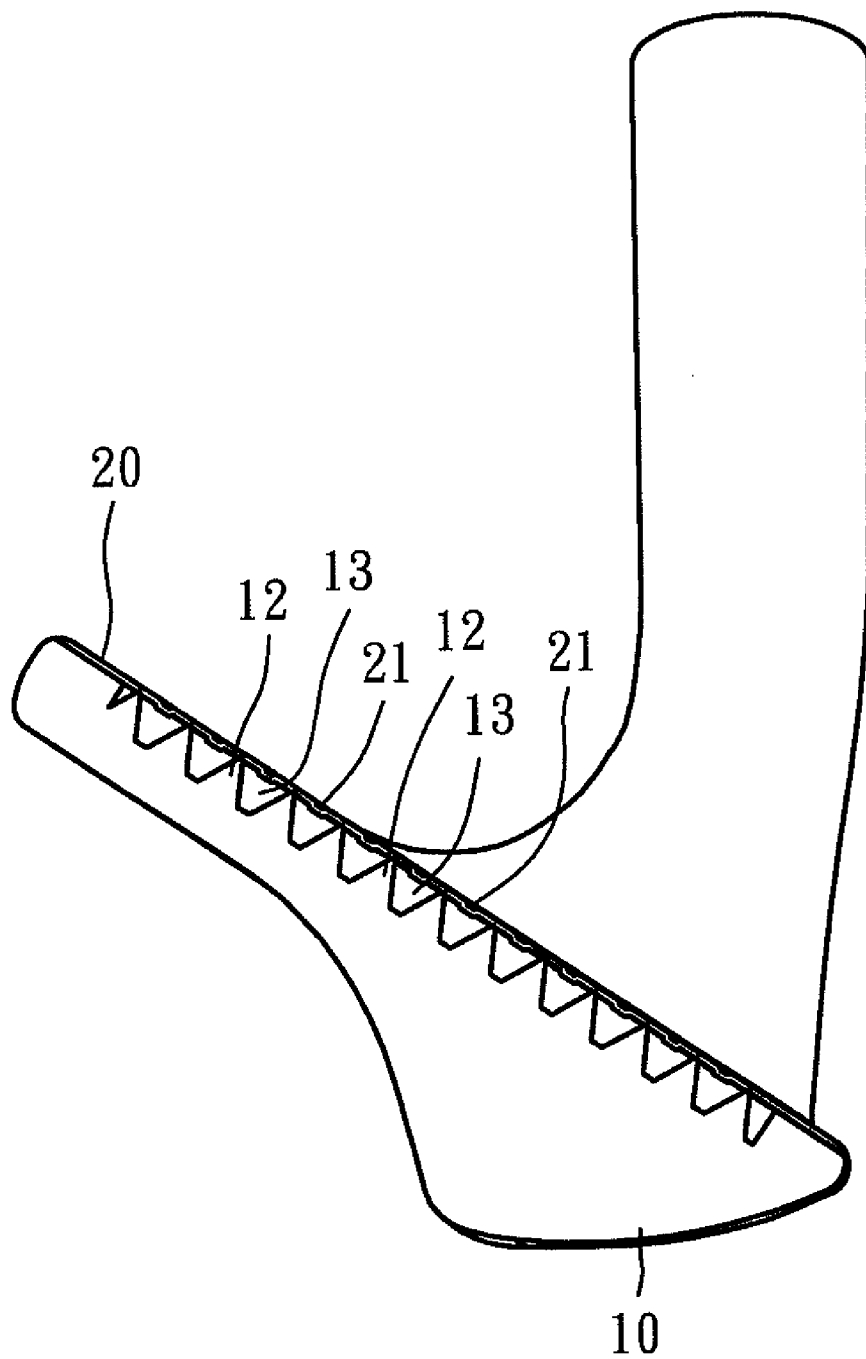


FIG. 3

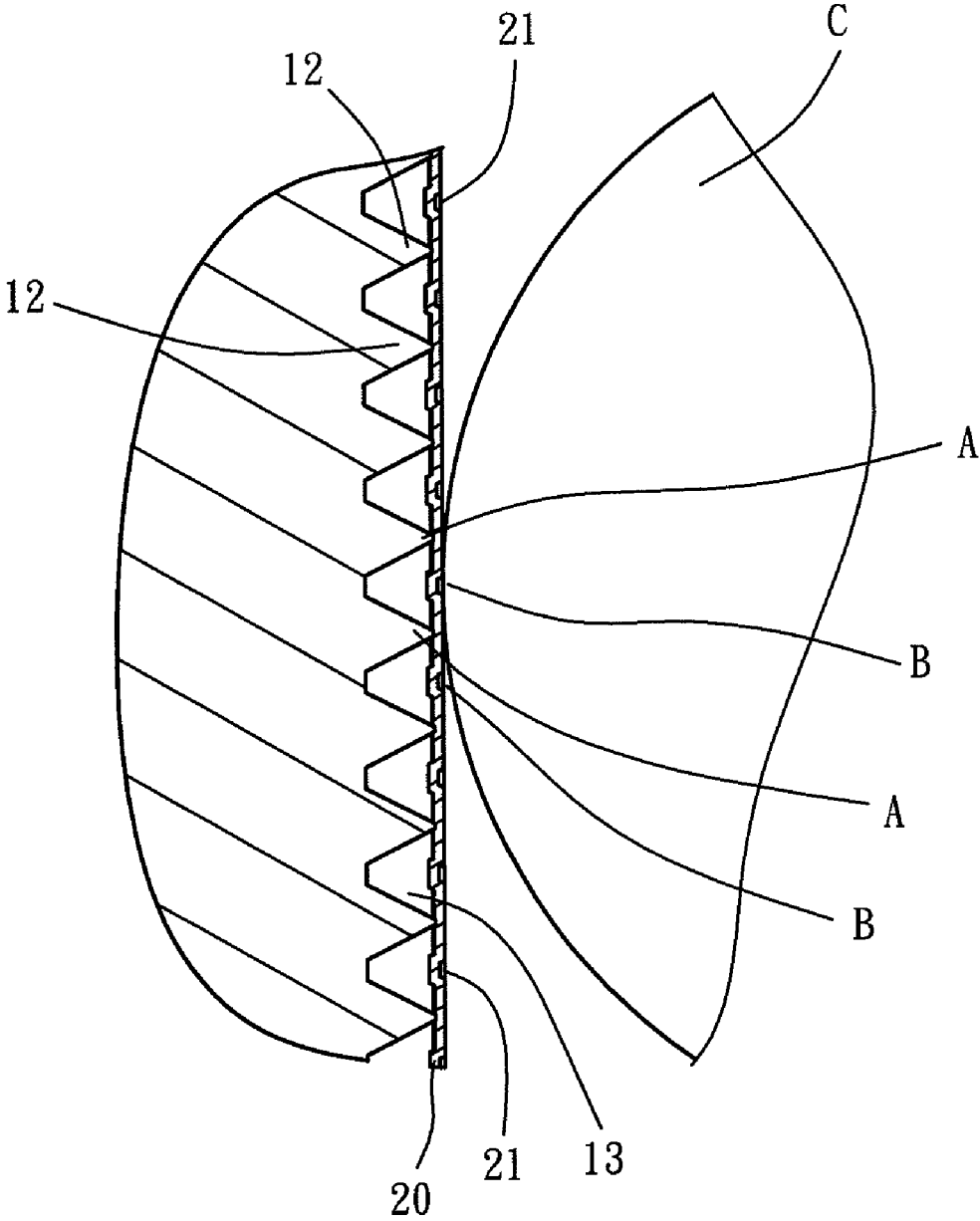


FIG. 4

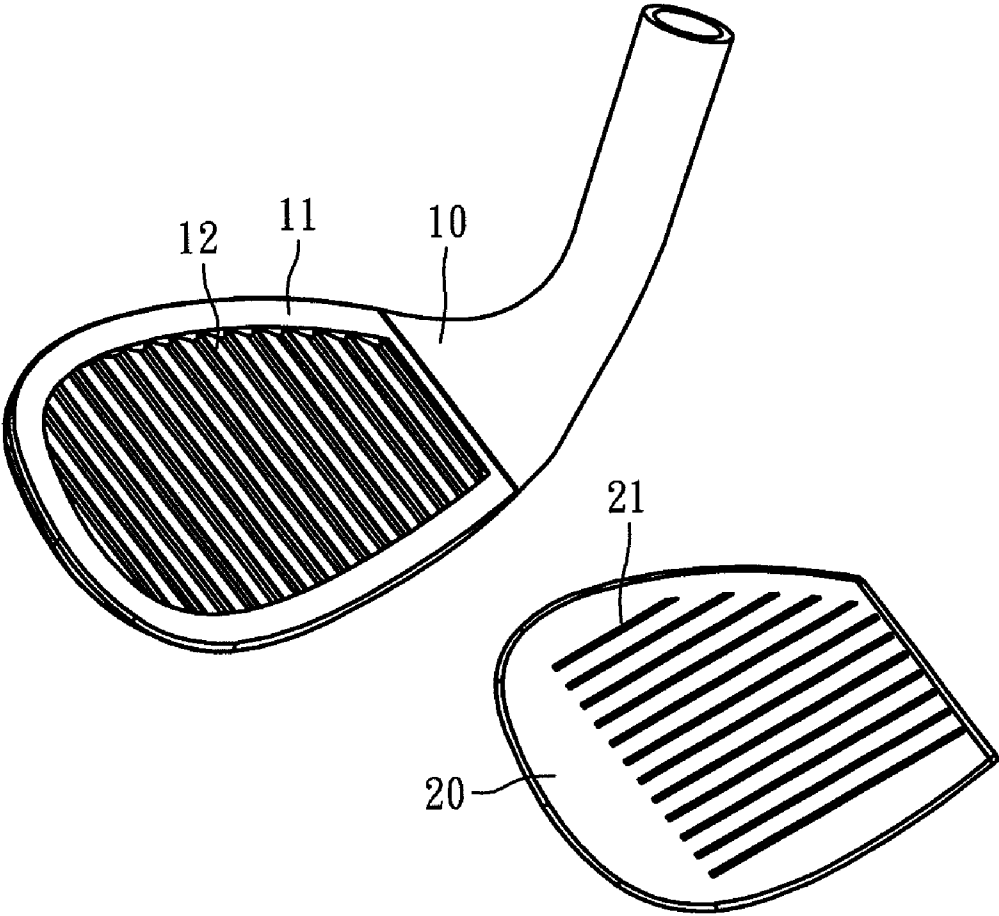


FIG. 5

GOLF CLUB HEAD HAVING SCORE LINE STRUCTURE

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to golf clubs and more particularly, to a golf club head that has score line structure.

[0003] 2. Description of the Related Art

[0004] A regular golf club head has straight grooves or the so-called score lines formed in parallel on the face plate thereof in the toe-and-heel direction and adapted for providing an effect of increasing the back spin amount of a shot or suppressing a decrease in the back spin amount of a shot from the rough.

[0005] However, because the face plate of a conventional golf club head is not deformable, the time in which the ball touches the face plate is quite short, and the force that causes the ball to spin backwards comes from direct friction between the score lines and the ball. When operating a mechanical arm to strike the ball with a 5 iron at a speed of 75 mph, the back spin amount will be about 5000 rpm, the carry distance will be about 184 yards, and the rolling distance will be about 9 yards. This result is acceptable, however the ball control effect is still cannot perfect.

[0006] U.S. Pat. No. 6,368,231 discloses an improved golf club head design, entitled "Stealth grooves of ball-striking face of golf club head". This design discloses a hidden grooves concept for allowing deformation of the ball-striking face plate to increase the standing time of the ball on the ball-striking face plate. However, the ball-striking face plate does not provide any means to match the hidden grooves structure for enabling the return force to be utilized to enhance the friction between the ball-striking face plate and the ball for a better ball control.

SUMMARY OF THE INVENTION

[0007] The present invention has been accomplished under the circumstances in view. It is one object of the present invention to provide a golf club head having score line structure, which enables the ball-striking face plate thereof to be slightly deformed when hitting the ball, thereby maximizing the amount of backspin.

[0008] To achieve this and other objects of the present invention, a golf club head having score line structure comprises a club head body and a ball-striking face plate. The club head body comprises a recessed portion thereof, and supporting ribs and internal grooves alternatively arranged in the recessed portion. The ball-striking face plate is fixedly mounted in the recessed portion of the club head body and supported on the topmost edges of the supporting ribs, having external score lines arranged on the front face thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. 1 is an elevational view of a golf club head having score line structure in accordance with the present invention.

[0010] FIG. 2 is an exploded view of the golf club head in accordance with the present invention.

[0011] FIG. 3 is a sectional view taken along line 3-3 of FIG. 1.

[0012] FIG. 4 is an enlarged view of a part of FIG. 3 with a golf ball added thereto for explanation.

[0013] FIG. 5 is an exploded view of an alternate form of the golf club head in accordance with the present invention, showing the internal grooves arranged in the longitudinal direction.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0014] Referring to FIGS. 1-5, a golf club head having score line structure in accordance with the preferred embodiment of the present invention is an iron head for iron club. However, it is to be understood that the invention can also be applied to a wood head for wood club or other golf club material design. As illustrated, the golf club head comprises a club head body 10 and a ball-striking face plate 20.

[0015] The club head body 10 has a recessed portion 11 thereof, a plurality of supporting ribs 12 and a plurality of internal grooves 13 alternatively arranged in parallel in the recessed portion 11 and extending in the transverse direction, i.e., the toe-and-heel direction. It is to be understood that the toe-and-heel direction of the supporting ribs 12 and the internal grooves 13 is not a limitation. In an alternate form of the present invention, as shown in FIG. 5, the supporting ribs 12 and the internal grooves 13 extend in the longitudinal direction. Further, the distance between each two adjacent supporting ribs 12 can be the same. Alternatively, the distance between each two adjacent supporting ribs 12 can be different.

[0016] The ball-striking face plate 20 can be prepared from ceramics, stainless steel, maraging steel or titanium alloy. The ball-striking face plate 20 has a plurality of external score lines 21 arranged in parallel on the front face thereof in a predetermined direction. The external score lines 21 can be arranged to extend in the transverse direction, longitudinal direction, or any of a variety of other directions. According to the present preferred embodiment, the external score lines 21 are arranged to extend in the transverse direction. The ball-striking face plate 20 is fixedly mounted in the recessed portion 11 of the club head body 10 in such a manner that the back wall of the ball-striking face plate 20 is stopped against the topmost edges of the supporting ribs 12 and the external score lines 21 are respectively suspending above the internal grooves 13 between each two adjacent supporting ribs 12. Thus, the part of the ball-striking face plate 20 that is supported on the supporting ribs 12 is not deformable, and the other part of the ball-striking face plate 20 that is not supported on the supporting ribs 12 is deformable. The ball-striking face plate 20 can be fastened to the club head body 10 fixedly by fusion welding, brazing, scarf joint or glue-bonding, or two or three of the aforesaid techniques at the same time.

[0017] According to the aforesaid structure, as shown in FIG. 4, the ball-striking face plate 20 has the external score lines 21 arranged on the front face thereof, like the arrangement of the face plate of a conventional golf club head, to enhance friction between the ball-striking face plate 20 and the ball. However, when hitting the ball (referenced by C), the part of the ball-striking face plate 20 that is not supported on the supporting ribs 12 will be temporarily deformed to get the ball control. Further, the pressure applied by the player to the club head body 10 is transferred through the supporting ribs 12 to the ball-striking face plate 20, and the ball-striking face plate 20 causes the ball to spin backwards by means of the external score lines 21. The point of force application A of the supporting ribs 12 at the ball-striking face plate 20 and the

contact point B between the external score lines **21** and the ball are different and not overlapped, therefore a torque is produced between the point of force application A and the contact point B during the time period the ball-striking face plate **20** is caused to deform and then returns to its former shape, thereby increasing the back spin amount. In a test where a mechanical arm was operated to strike the ball with a machine made according to the present invention at a speed of 75 mph, the test result shows a back spin amount 8000 rpm, a carry distance 155 yards, and a rolling distance 3 yards. Subject to the aforesaid test, the structure of the present invention provides better ball control when compared to conventional golf club head designs that have only one layer of score lines on the face. This characteristic satisfies the requirement for precision ball control.

[0018] Although a particular embodiment of the invention has been described in detail for purposes of illustration, various modifications and enhancements may be made without departing from the spirit and scope of the invention. Accordingly, the invention is not to be limited except as by the appended claims.

What the invention claimed is:

1. A golf club head, comprising:
 - a club head body, said club head body comprising a recessed portion thereof, a plurality of supporting ribs and a plurality of internal grooves alternatively arranged in said recessed portion; and
 - a ball-striking face plate fixedly mounted in said recessed portion of said club head body, said ball-striking face plate comprising a back wall supported on said supporting ribs of said club head body, a front face opposing said back wall and adapted for striking a golf ball and a plurality of external score lines arranged on said front face.
2. The golf club head as claimed in claim 1, wherein said external score lines are respectively suspending above said internal grooves between each two adjacent supporting ribs so that the part of said ball-striking face plate that is supported on said supporting ribs is not deformable, and the other part of said ball-striking face plate that is not supported on said supporting ribs is deformable.
3. The golf club head as claimed in claim 1, wherein said internal grooves extend in a transverse direction.
4. The golf club head as claimed in claim 3, wherein said internal grooves are spaced from one another at an equal distance.

5. The golf club head as claimed in claim 3, wherein said internal grooves are spaced from one another at different distances.
6. The golf club head as claimed in claim 3, wherein said external score lines extend in a transverse direction.
7. The golf club head as claimed in claim 6, wherein said internal grooves are spaced from one another at an equal distance.
8. The golf club head as claimed in claim 6, wherein said internal grooves are spaced from one another at different distances.
9. The golf club head as claimed in claim 3, wherein said external score lines extend in a predetermined direction deviated from a transverse direction at a predetermined angle.
10. The golf club head as claimed in claim 9, wherein said internal grooves are spaced from one another at an equal distance.
11. The golf club head as claimed in claim 9, wherein said internal grooves are spaced from one another at different distances.
12. The golf club head as claimed in claim 1, wherein said internal grooves extend in a predetermined direction deviated from a transverse direction at a predetermined angle.
13. The golf club head as claimed in claim 12, wherein said internal grooves are spaced from one another at an equal distance.
14. The golf club head as claimed in claim 12, wherein said internal grooves are spaced from one another at different distances.
15. The golf club head as claimed in claim 12, wherein said external score lines extend in a transverse direction.
16. The golf club head as claimed in claim 15, wherein said internal grooves are spaced from one another at an equal distance.
17. The golf club head as claimed in claim 15, wherein said internal grooves are spaced from one another at different distances.
18. The golf club head as claimed in claim 12, wherein said external score lines extend in a predetermined direction deviated from a transverse direction at a predetermined angle.
19. The golf club head as claimed in claim 18, wherein said internal grooves are spaced from one another at an equal distance.
20. The golf club head as claimed in claim 18, wherein said internal grooves are spaced from one another at different distances.

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