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(54) **WEIGHT ADJUSTABLE GOLF CLUB HEAD**

(57)

ABSTRACT

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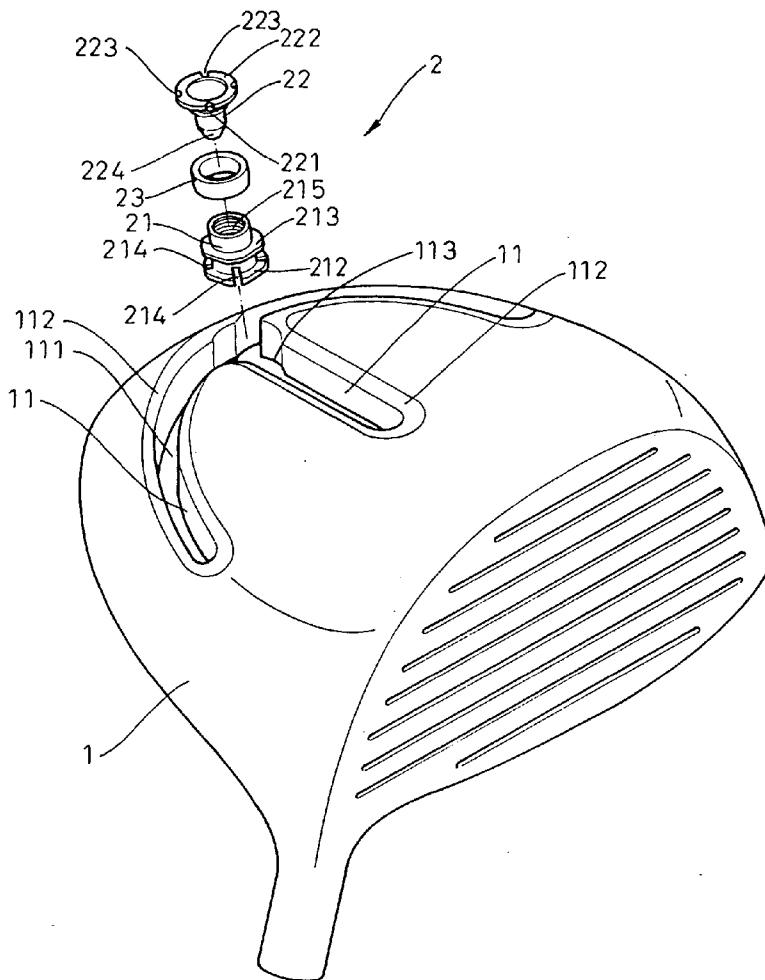
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A weight adjustable golf club head is provided. The club head has a trough at a lower part of the club head's back and a weight positioned inside the trough. The trough is arranged to follow the curvature of the club head's bottom. The trough has a tapered mouth along the surface of the club head and a base. There is an insertion hole at a position along the trough. The weight could be inserted into the trough through the insertion hole, and then slid along the trough. The weight contains a seat, a bolt, and a loading ring. The seat has a locking rim and the positioning rim which are inside the trough's base and mouth respectively when the weight is slid into the trough. The seat's body and the locking rim have a number of breaks so that the locking rim could be stretched. When the bolt is screwed into or out of the seat, the locking rim would be stretched or retracted, so that the weight could be locked or un-locked in the trough. The loading ring is put around the seat and could be made of various types of material. By adjusting the position of the weight along the trough and changing the loading ring, the club head's center of gravity could be adjusted to suit a golfer's specific stance, habit, and the specific trajectory required.



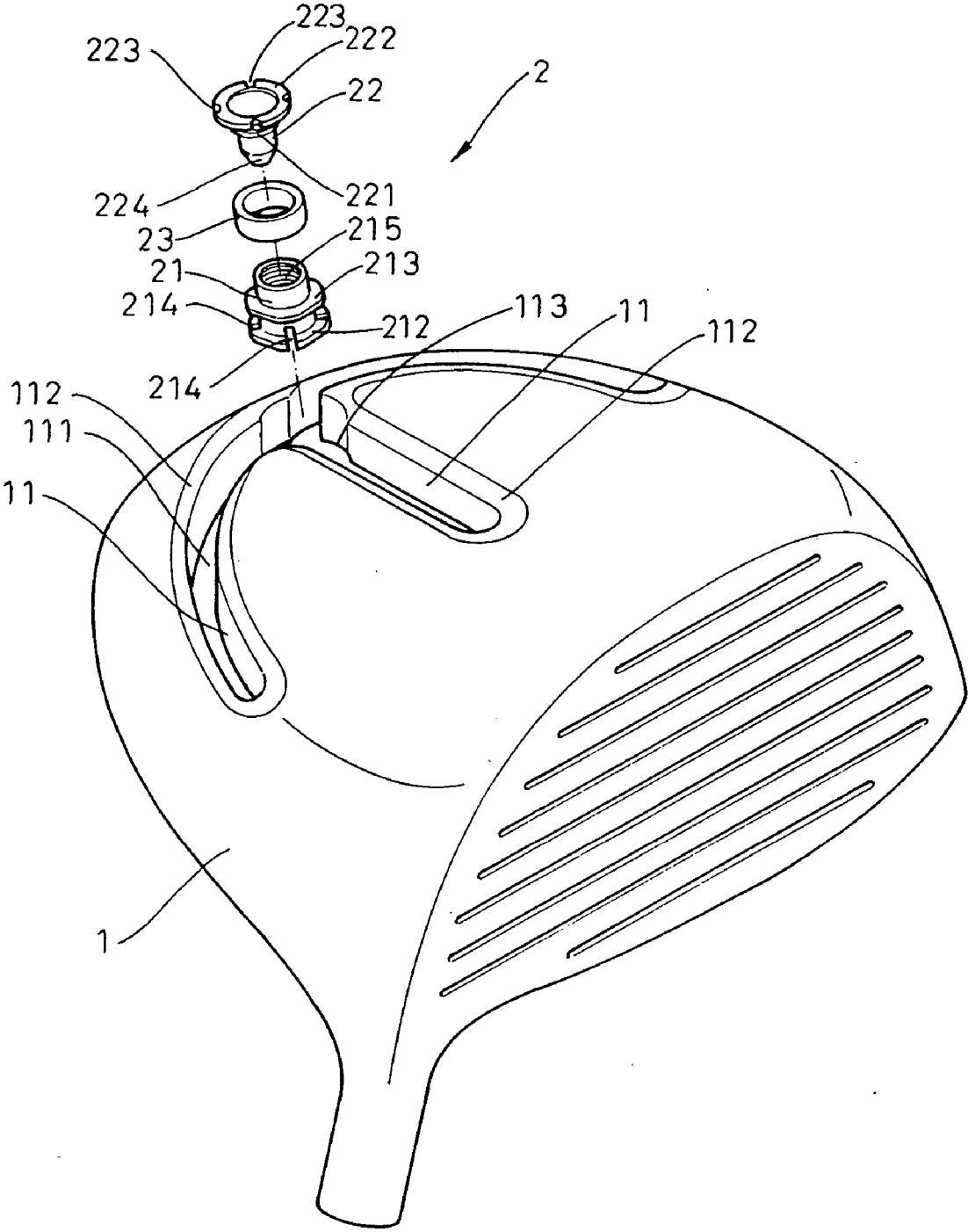


FIG. 1

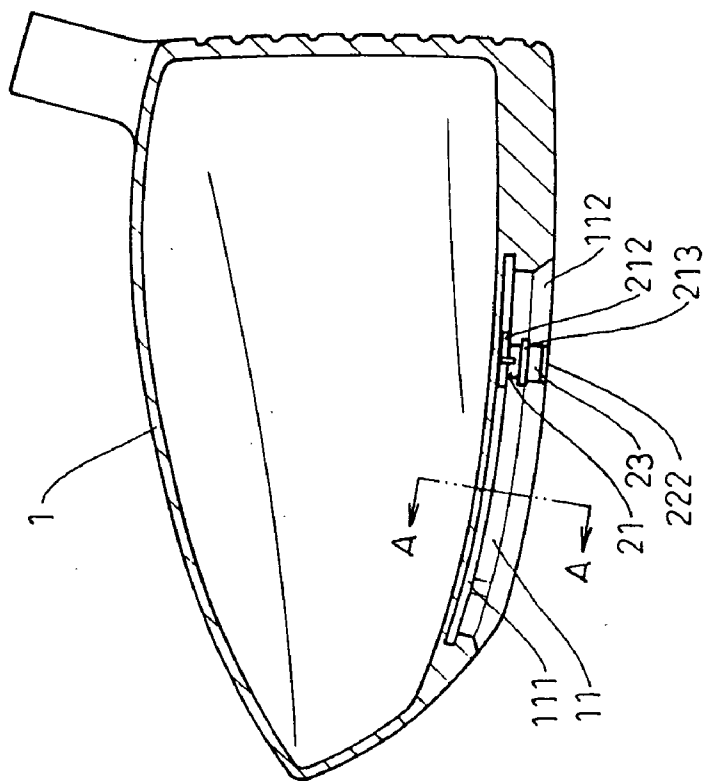


FIG. 2

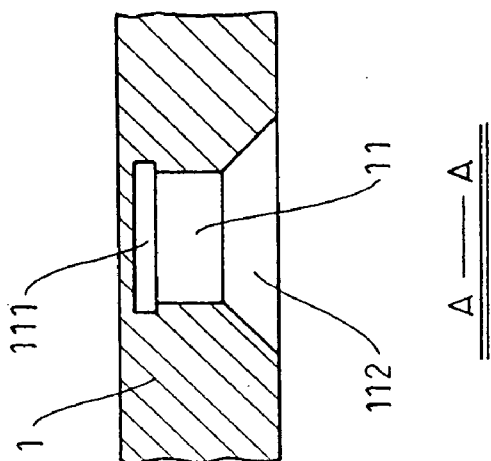


FIG. 3

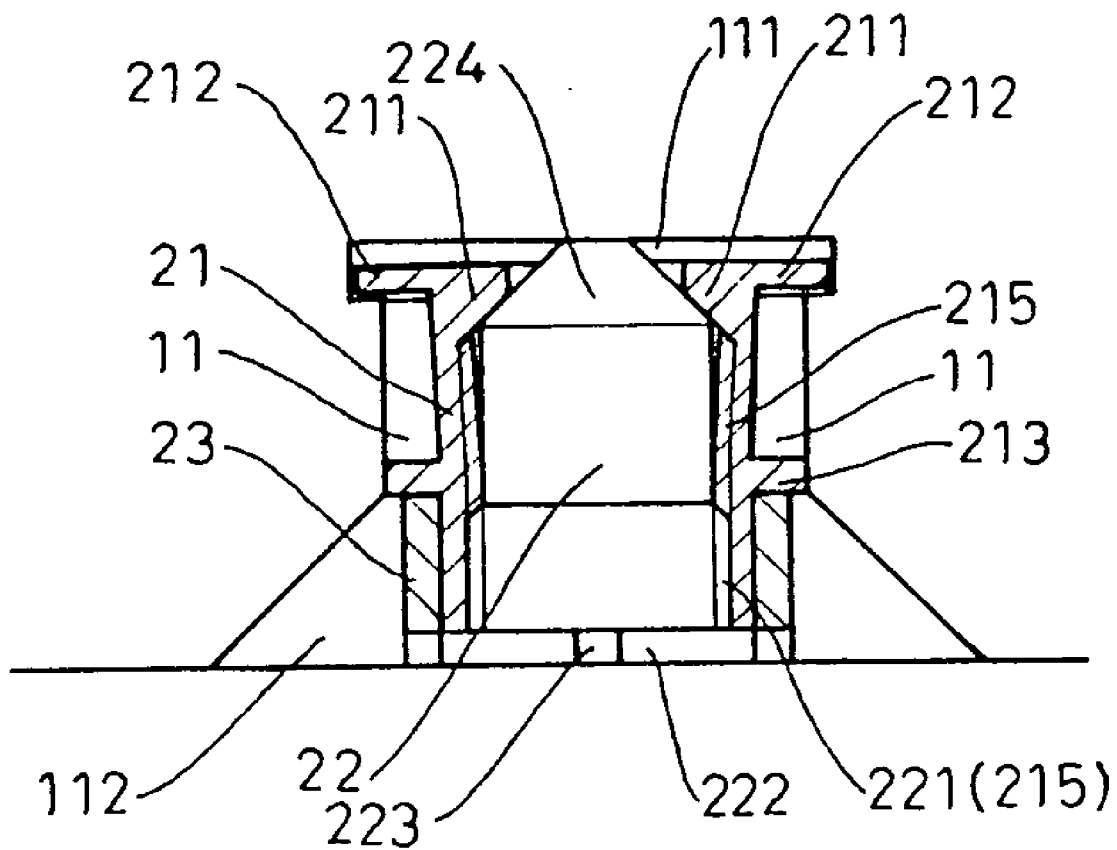


FIG. 4

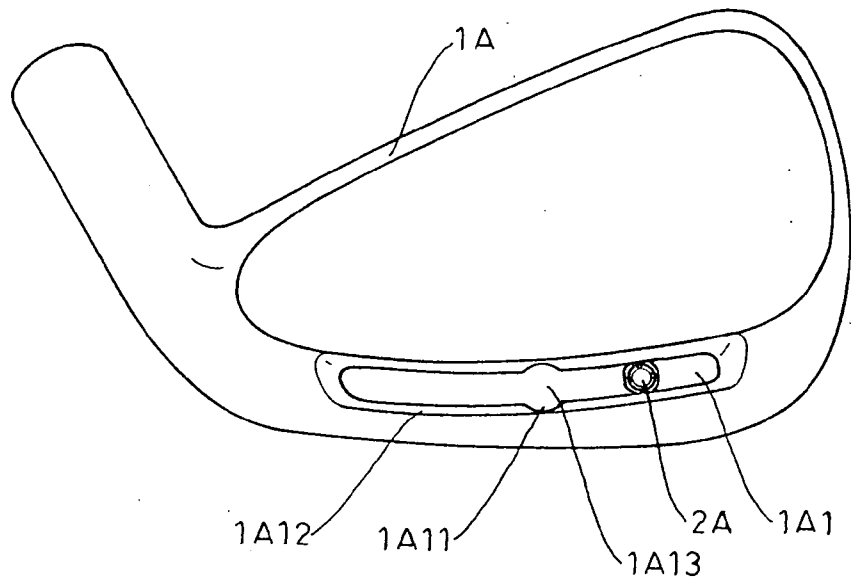


FIG. 5

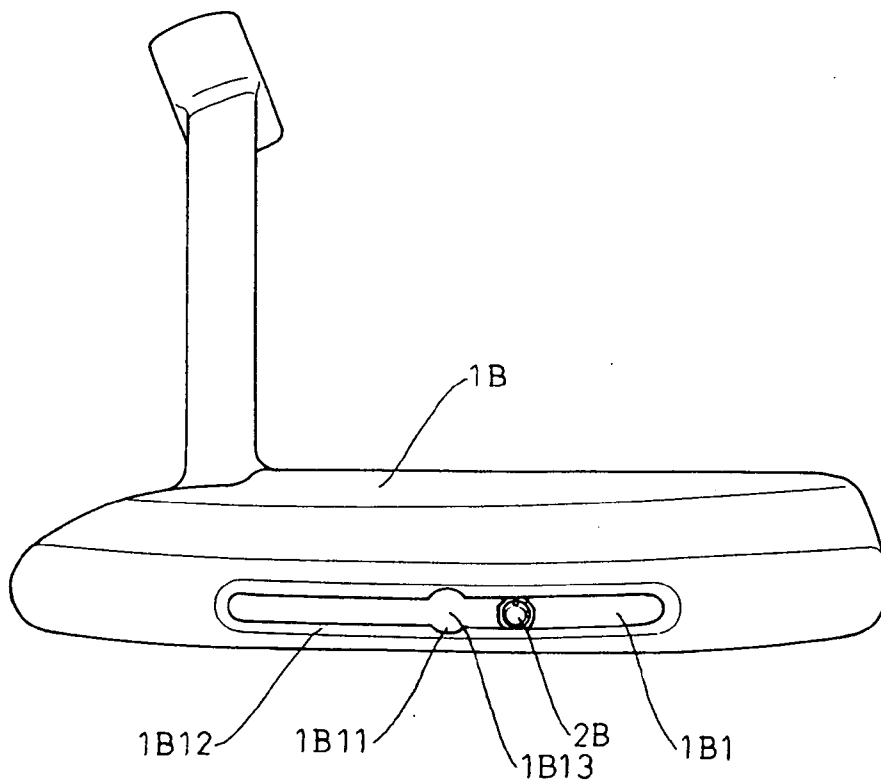


FIG. 6

WEIGHT ADJUSTABLE GOLF CLUB HEAD

BACKGROUND OF THE INVENTION

[0001] (a) Technical Field of the Invention

[0002] The present invention generally relates to a golf club head, and more particularly to a golf club head whose center of gravity is adjustable.

[0003] (b) Description of the Prior Art

[0004] In recent years, as the manufacturing technologies for golf club heads are continuously advancing, large varieties of club heads of various forms and specifications are proposed. The only purpose of all these new club head designs is nothing but to help golfers to hit the balls farther and more accurately. However, a golfer's performance still has a very large part related to the golfer's stance and habit.

[0005] Therefore, so-called "weight tunable club heads" are developed and claimed to be able to adjust the club head's center of gravity to best suit a golfer's stance and habit. These "weight tunable club heads" generally have a number of fixed positions arranged on the club head and weights could be inserted or taken out so as to adjust the club head's center of gravity. There are also some "weight tunable club heads" allowing different weights to be placed in a fixed position on the club head. As can be imagined, these approaches based on fixed arrangements could only offer limited choices for positioning the center of gravity and trajectories, and cannot fit the needs of golfers of various skill levels. In addition, changing the weights of these "weight tunable club heads" is not convenient, and usually cannot be conducted easily based on the previous ball's point of fall. Accordingly, there is a need for a better club head design so that the change of club head's center of gravity could be achieved easily and conveniently.

SUMMARY OF THE INVENTION

[0006] The primary purpose of the present invention is to obviate the shortcomings of conventional "weight tunable club heads," the club head according to the present invention has a trough at the club head's back. A weight could be placed in and slid along the trough. The weight is an assembly containing a seat, a bolt, and a loading ring. When the weight is moved to a position, the bolt is screwed into the seat so as to lock the weight to that position. The club head's center of gravity is thereby adjusted. The club head according to the present invention is very easy to use as, when changing the weight's position, only the bolt has to be screwed loosed and the seat does not have to be taken out.

[0007] After a user use a club according to the present invention to hit a golf ball, based on the ball's trajectory, flying angle, and point of fall, the user could adjust the club head's center of gravity accordingly. To adjust the club head's center of gravity, the bolt is screwed loosed, and the weight is moved freely along the trough to a position so that the club head's center of gravity best suits the user's stance and habit. Then, the bolt is screwed in again to fixedly lock the weight to that specific position. In this process, if required, the loading ring could also be replaced to change the weight, making the adjustment of the club head's center of gravity and the choice of trajectories even more flexible.

[0008] The foregoing object and summary provide only a brief introduction to the present invention. To fully appreciate these and other objects of the present invention as well as the invention itself, all of which will become apparent to those skilled in the art, the following detailed description of the invention and the claims should be read in conjunction with the accompanying drawings. Throughout the specification and drawings identical reference numerals refer to identical or similar parts.

[0009] Many other advantages and features of the present invention will become manifest to those versed in the art upon making reference to the detailed description and the accompanying sheets of drawings in which a preferred structural embodiment incorporating the principles of the present invention is shown by way of illustrative example.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] FIG. 1 is a perspective explosion view showing the assembly of the present invention on a wood head.

[0011] FIG. 2 is a sectional view of a wood head as depicted in FIG. 1 after the assembly of the present invention.

[0012] FIG. 3 is an enlarged schematic view showing the cross-section of the trough along the A-A line of FIG. 2 according to the present invention.

[0013] FIG. 4 is an enlarged schematic view showing the weight locked inside the trough according to the present invention.

[0014] FIG. 5 is a rear view showing an iron head according to an embodiment of the present invention.

[0015] FIG. 6 is a rear view showing a putter head according to an embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0016] The following descriptions are of exemplary embodiments only, and are not intended to limit the scope, applicability or configuration of the invention in any way. Rather, the following description provides a convenient illustration for implementing exemplary embodiments of the invention. Various changes to the described embodiments may be made in the function and arrangement of the elements described without departing from the scope of the invention as set forth in the appended claims.

[0017] In the following, detailed description along with the accompanied drawings is given to better explain preferred embodiments of the present invention.

[0018] Please refer to FIGS. 1 and 2. The club head 1 according to the present invention mainly contains troughs 11 in the back of the club head 1, and a weight 2 whose position is adjustable along the troughs 11. The troughs 11 are arranged so that they follow the curvature of the club head 1 and cover the various positions for adjusting the center of gravity of club head 1. Please also see FIG. 3. The cross-section of the troughs 11 has an inverted T shape (when the club is held with the club on top of the club head). The troughs 11 have a tapered mouth 112 along the surface of the club head 1, a narrow neck (not numbered), and a base 111 with a larger width. There is an insertion hole 113 at a position along the troughs 11. The insertion hole 113 has an aperture allowing the weight 2 to pass through. The weigh

2, after being inserted into the insertion hole 113, could be slid into and moved freely along the troughs 11.

[0019] As shown in FIG. 4, the weight 2 contains a seat 21, a bolt 22, and a loading ring 23. The seat 21 has a hollow cylindrical body. On the curved surface of the seat 21, there are a locking rim 212 at one end and a positioning rim 213 in the middle of the seat 21. When the weight 2 is slide into the troughs 11, the locking rim 212, having an identical dimension as that of the trough base 111, enters the trough base 111 and keeps the weight 2 from falling apart from the troughs 11. The positioning rim 213, on the other hand, would be around the narrow end of the trough mouth 112. The positioning rim 213, having a roughly identical dimension as that of the locking rim 212, helps the weight 2 to slide smoothly along the troughs 11 by preventing the weight 2 from tilting and getting stuck. The circumference of the locking rim 212 and the positioning rim 213 is trimmed to have a number of straight edges and thereby some corners. These corners could hold against the trough base 111 and the narrow end of the trough mouth 112 so as to prevent the seat 21 from spinning. Starting from the end opposite to the locking rim 212, there are female threads on the inner surface of the seat 21 up to a certain length toward the end with the locking rim 212 for screwing in the bolt 22. Also inside the seat 21, the inner surface gradually shrinks from where the female threads stop toward the end with the locking rim 212 and, thereby, forms a tapered bulge 211. At the half of the seat 21 where the bulge 211 and locking rim 212 are located, the cylindrical body and the locking rim 212 have a number of breaks 214. These breaks 214 allow the locking rim 212 to stretch outward when the bolt 22 is screwed in and pressure is exerted on the bulge 211. When the bolt 22 is screwed loosed from the seat 21, the locking rim 212 would return to its un-stretched position.

[0020] The bolt 22 has a length slightly longer than that of the seat 21. The bolt 22 has a circular head 222 slightly larger than the diameter of the seat 21 on one end and male threads 221 on the other end's surface up to a certain length. Along the circumference of the bolt head 222, there are a number of gaps 223 so that a tool with a number of teeth at corresponding positions could be used to screw the bolt 22 into or out of the seat 21. The bolt 22 has a pointed end 224 below the male threads whose slope matches that of the bulge 211. When the bolt 22 is screwed into the seat 21 for a certain distance, the pointed end 224 would touch the bulge 211. As the bolt 22 is screwed further, the pointed end 224 would push the bulge 211 and the locking rim 212 to stretch outward. When the bolt head 222 reaches the seat 21 and the bolt 22 cannot be screwed in further, the bolt head 222 would be completely inside the trough mouth 112, the pointed end 224 would extend out of the seat 21. Both the pointed end 224 and the stretched locking rim 212 would, thereby, lock the weight 2 in the troughs 11. In this way, to adjust the center of gravity of the club head 1, the bolt 22 is screwed loosed, the pressure on the bulge 211 is released, the locking rim 212 returns to its un-stretched position, the weight 2 is moved freely along the troughs 11 to an appropriate position, the bolt 22 is then screwed in again so as to lock the weight 2 tightly at that specific position.

[0021] The loading ring 23 is put around the seat 21's cylindrical body and is fixed between the bolt head 222 and the positioning rim 213 when the bolt 22 is screwed into the seat 21. The loading ring 23 could be replaced easily and

could be made of various kinds of material. By changing the loading ring 23, the weight 2 could have various weights for adjusting the club head 1's center of gravity.

[0022] In addition to the wood head 1 depicted in FIG. 1 and described above, the present invention could also be applied to iron head 1a as shown in FIG. 5 and putter head 1b as shown in FIG. 6. The club heads 1a and 1b both have troughs 1a1 and 1b1 at a lower part of the club head's back. The troughs 1a1 and 1b1 are arranged so that they follow the curvature of the club head's bottom edge. The troughs 1a1 and 1b1 have tapered mouths 1a12 and 1b12 along the surface of the club heads 1a and 1b and bases 1a11 and 1b11 with a larger width. There are insertion holes 1a13 and 1b13 at a position along the troughs 1a1 and 1b1. The weights 2a and 2b could be inserted into the troughs 1a1 and 1b1 through the insertion holes 1a13 and 1b13, and then slid along the troughs 1a1 and 1b1. The weights 2a and 2b also contain a seat, a bolt, and a loading ring (all of them not numbered in FIGS. 5 and 6), which are implemented identically to the previous embodiment so as to achieve the same adjusting function. In other embodiments, multiple weights could be inserted into the troughs if required.

[0023] It will be understood that each of the elements described above, or two or more together may also find a useful application in other types of methods differing from the type described above.

[0024] While certain novel features of this invention have been shown and described and are pointed out in the annexed claim, it is not intended to be limited to the details above, since it will be understood that various omissions, modifications, substitutions and changes in the forms and details of the device illustrated and in its operation can be made by those skilled in the art without departing in any way from the spirit of the present invention.

I claim:

1. A weight adjustable golf club head comprising:

a trough located at a lower part in the back of said club head; and

a weight positioned inside said trough,

wherein said trough is arranged to follow the curvature of said club head's bottom edge, said trough has an inverted T cross-sectional shape with a tapered trough mouth, a narrow neck, and a trough base having a width larger than said neck, an insertion hole having an aperture larger than the diameter of said weight is at a position on said trough through which said weight could be inserted into said trough, said weight comprises a seat, a bolt, and a loading ring, said seat has a locking rim at one end and a positioning rim around the middle of said seat, said locking rim and said positioning rim are inside said trough base and said trough mouth respectively when said weight is slid into said trough, said seat has its inner surface shrinks to form a tapered bulge at an end where said locking rim is located, said locking rim and said seat's body between said locking rim and said positioning rim have a plurality of breaks so as to allow said locking rim to stretch outward and retract inward, said seat has female threads along the inner surface at another end opposite to said locking rim, said bolt has a circular bolt head at one end and male threads at the other half of the bolt

opposite to said bolt head, said bolt is screwed into said seat, said bolt has a pointed end pushing against said bulge and stretching said locking rim outward so as to lock said weight to said trough, said loading rim is put around said seat and is fixed between said positioning rim and said bolt head.

2. The weight adjustable golf club head according to claim 1, wherein said bolt has a length longer than that of said seat so that, when said bolt is screwed into said seat,

said bolt's pointed end extends out of said seat and pushes against said trough base's bottom, which locks said weight in said trough.

3. The weight adjustable golf club head according to claim 1, wherein a plurality of weights are inserted in said trough.

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