A swing training device is disclosed, which comprises a shaft part 14 having a grip part 11 formed as grip on the surface, and a pendulum part 12 extending from the forward end of the shaft part 14 and having flexibility and restoring elasticity for restoration to a substantially straight state. The grip part 11 and the shaft part 14 can be formed as separate parts, and the shaft part 14 may be disposed in the sole inside of the grip part 11.
SWING TRAINING DEVICE

BACKGROUND OF THE INVENTION


The present invention relates to swing training devices for reforming the swing and, more particularly, to swing training devices for reforming the swing by practice swinging.

Heretofore, many training devices for reforming the golf swing have been proposed. Such training devices are roughly classified into an exclusive practice swinging type and a check type for checking the swing in a state mounted on an actual golf club. A swing training device for doing the practice swinging is shown in Japanese Patent Laid-Open No. 9-19524. This device comprises a tubular member, a grip provided on a stem part of the tubular member and a weight provided on a tip part of the tubular member. When practice swinging is done with this device, sound is generated as air passes through the tubular member. A check thus can be made from the heard sound as to whether the swing is good or bad.

A check type swing training device to be mounted on an actual golf club is shown in Japanese Patent Laid-Open No. 7-155416. This device comprises a piezoelectric element for outputting electric power when experiencing a exerted impact, and two LEDs for emitting light in response to the output form the piezoelectric element. This device is mounted on top of a club head such that the two LEDs are parallel to the club face. When hitting a ball with this golf club, the LEDs emit light in response to the impact. Thus, it is possible to confirm the orientation of the face at the time of the impact and the subsequent orbit traced by the head. These swing training devices, however, only permit confirmation of the result of the swing. In other words, these devices do not permit knowing the right orbit of swinging, although they permit judging whether the swing is good or bad.

A further type of swing training device, as disclosed in Japanese Patent Laid-Open No. 7-148298, comprises a hinge mechanism part provided in part of a golf club shaft such that the shaft is broken at the hinge mechanism part when the swinging orbit is bad. Many other swing training devices are also constructed such as to permit actually hitting a ball with deformation of golf club itself. However, the swing training device adapted to cause deformation of a golf club as disclosed in the Japanese Patent Laid-Open No. 7-148298, has a complicated structure. Therefore, this device may pose a durability problem and also lead to high cost. Furthermore, with this device it is impossible to do practice swinging in a room, that is, it is impossible to make a handy swing check.

Japanese Utility Model No. 3044222 discloses a further training device for golf swing reforming. This device comprises a shaft, which extends a predetermined length from the forward end of a grip, and a pendulum part, which extends forward from the forward end of the shaft and such flexible and large in length as to be able to be wound on the user’s body.

In this device disclosed in the Japanese Utility Model No. 3044222, the pendulum part is formed from a material, which is such flexible as to be able to be wound on the body. Also, in order to prevent the winding of the pendulum part on the user's neck when the practice swinging is done, the shaft is provided such that it extends a predetermined length from the forward end of the grip, and the pendulum part is provided to extend forward from the forward end of the shaft. Therefore, when the practice swinging is done with this training device, the neighborhood of the juncture between the shaft and the pendulum part may be locally flexed to result in a deviation from the condition of swinging with an actual golf club. It is thus impossible to reform the swing with the actual golf club under optimum conditions.

Furthermore, since the pendulum part of this training device is made of a material which is such flexible as to be able to be wound on the body, when the device is practice swing, depending on the mode of swinging its tip may strike an unexpected part of the body, resulting in getting injured.

SUMMARY OF THE INVENTION

The present invention was made in view of the above problems inherent in the prior art, and its object is to provide a swing training device, which permits swing reforming under optimum conditions.

Another object of the present invention is to provide a swing training device, which can prevent its forward end from coming to touch an unexpected body portion when practice swinging it.

In an aspect of the present invention, there is provided a swing training device for reforming the swing comprising: a rigid shaft part having a grip part formed as grip on the surface; and a pendulum part extending from the forward end of the shaft and having flexibility and restoring elasticity for restoration to a substantially straight state.

The grip part and the shaft part are formed as separate parts, the shaft being disposed on the sole inside of the grip part.

According to another aspect of the present invention, there is provided a swing training device for reforming the swing, comprising: a grip part serving as grip; a shaft formed at least in the inside of the grip part; and a pendulum part formed such as to extend from the forward end of the shaft and having flexibility and restoring elasticity for restoration to a substantially straight state.

The pendulum part has such flexibility that it can be flexed along the body when swinging the swing training device. The pendulum part has a cylindrical shape. The pendulum part has a solid shape or a hollow shape. The pendulum part is made of thermoplastic elastomer, thermoplastic resin, thermoplastic vulcanizates (TPV) or rubber.

According to other aspect of the present invention, there is provided a swing training device for reforming the swing comprising: a rigid shaft part having a grip part formed as grip on the surface; a pendulum part extending from the forward end of the shaft and having flexibility and restoring elasticity for restoration to a substantially straight state; and a head part secured to the forward end of the pendulum part.
[0016] According to still other aspect of the present invention, there is provided a swing training device for reforming the swing, comprising: a grip part serving as grip; a shaft formed at least in the inside of the grip part; a pendulum part formed such as to extend from the forward end of the shaft and having flexibility and restoring elasticity for restoration to a substantially straight state; and a head part secured to the forward end of the pendulum part.

[0017] The head part is an elastic weight member. The head part has a cylindrical shape or a global shape, is longitudinally substantially perpendicular to the pendulum part, and is longitudinally symmetrically secured to a forward end mounting portion of the pendulum part. The head part is made of urethane foam.

[0018] The swing training device according to the above aspects preferably has a length of about 76 to 117 cm. The swing training device according to the above aspects is used for reforming the golf club swing or for reforming the baseball bat swing.

[0019] Other objects and features will be clarified from the following description with reference to attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] FIGS. 1 and 2 are perspective views showing a first embodiment of the swing training device 10;

[0021] FIG. 3 is a sectional view showing the structure of the grip part 11 of the swing training device 10;

[0022] FIG. 4 is a fragmentary sectional view showing an example of the structure of the head part 10 in the swing training device 10;

[0023] FIG. 5 is a front view showing a user 20 with the swing training device 10 in the addressed state;

[0024] FIG. 6 is a front view showing the user in the right top state attained the back-swinging;

[0025] FIG. 7 is a front view showing the user in the correct finish state;

[0026] FIG. 8 is a sectional view showing the structure of grip part 31 in this embodiment of the swing training device 10;

[0027] FIG. 9 is a perspective view showing this embodiment of the swing training device 40;

[0028] FIG. 10 is a sectional view showing the swing training device 40 on the side of a grip part 41;

[0029] FIG. 11 is a sectional view showing an exemplified structure of the swing training device 40 on the side of the forward end 42b;

[0030] FIG. 12 is a view showing a user 50 starting the swing with the swing training device 40;

[0031] FIG. 13 is a view showing the user 50 at the instant of impact in the swing, and

[0032] FIG. 14 is a view showing the user 50 at the instant of follow-through in the swing.

PREFERRED EMBODIMENTS OF THE INVENTION

[0033] Preferred embodiments of the present invention will now be described with reference to the drawings.

[0034] FIGS. 1 and 2 are perspective views showing a first embodiment of the swing training device 10.

[0035] This embodiment of the swing training device 10 is used for reforming the swinging of a golf club. The device 10 comprises a grip part 11 serving as grip, a shaft to be described later, which is at least inside the grip part 11, a pendulum part 12 extending forward from the forward end of the shaft and having flexibility and restoring elasticity for restoration to a substantially straight state, and a head part 13 secured to the tip of the pendulum part 12.

[0036] The grip part 11 is made of synthetic rubber or like material such as used for a grip of a usual golf club. The shaft is preferably made of, for instance, stainless steel having a certain mechanical strength. For this part, it is possible to use steel, aluminum, stainless steel, carbon, etc. The pendulum part 12 is made of a material having such flexibility as to be able to be flexed along the body at the swinging time and such restoring elasticity as to be able to be restored to a substantially straight state. Examples of this material are thermoplastic elastomer, thermoplastic resin and rubber. The head part 13 is made of urethane foam or like material having certain weight and elasticity. The swing training device 10 preferably has an overall length smaller than the length of an actual driver. Specifically, the swing training device 10 preferably has a length of about 76 to 117 cm (i.e., about 30 to 46 inches), preferably 88 to 112 cm (i.e., about 35 to 44 inches), more preferably 96 to 110 cm (i.e., 38 to 43 inches). By setting the length of the device 10 to be smaller than the length of the actual driver, it is possible to reduce the possibility of the breakage of the head part 13 due to contact thereof with the ground when swinging the device 10, the possibility of strike of the head part 13 against the body at the finish state, and the possibility of winding of the pendulum part 12 around the neck.

[0037] The specific construction of the swing training device 10 will now be described. FIG. 3 is a sectional view showing the structure of the grip part 11 of the swing training device 10. As shown in the Figure, the grip part 11 of the swing training device 10 is constituted by grip part 11, pendulum part 12 and shaft 14.

[0038] The grip part 11 serving as grip is made of synthetic rubber or like material, and has a substantially cylindrical or like hollow shape having a closed grip end 11b. The grip part 11 is desirably formed such that it is tapered forward with its forward end 11a smaller in the outer diameter than that of the grip end 11b. By forming the grip part 11 to have a forwardly tapered outer shape, it is possible to prevent the grip part 11 from slipping off the hand when practice swinging the swing training device 11. As for the size of the grip part 11, it is desirable to set the length L thereof to about 26 cm, the outer diameter r2 of the forward end 11a to about 10 to 25 mm, and the outer diameter r3 of the grip end 11b to about 20 to 35 mm.

[0039] The pendulum part 12, as described before, is made of a material such as flexible as to be able to be flexed along the body when practice swinging and having such restoring elasticity as to be able to be restored to a substantially straight state. The pendulum part 12 is desirably formed such that it has a shape capable of retaining such flexibility as to be able to be flexed along the body when practice swinging and having such restoring elasticity as to be able to be restored to a substantially straight state, for instance a
substantially cylindrical or like solid (i.e., free form any hollow part) shape. By forming the pendulum part 12 having the cylindrical solid shape, it is possible to suppress bending tendency of this part while ensuring sufficient elasticity thereof. As for the size of the pendulum part 12, it is desirable to set the length thereof to about 60 to 100 cm, and the outer diameter r1 to about 10 to 20 mm. The pendulum part 12 may have hollow structure in shape.

[0040] Suitable examples of the material of the pendulum part 12 are thermoplastic polyurethane elastomer, thermoplastic resin, thermoplastic vulcanizes (TPV) and rubber (including natural rubber and synthetic rubber). Varieties of polyurethane elastomer are roughly classified into ester type and ether type. The ether type, although slightly expensive, has merits that it is less prone to hydrolysis, which is desired in view of the outdoor use of the product, and that it is highly resistive to mold generation. Among ester type varieties are azelitic type (readily undergoing hydrolysis and inexpensive), caprolactone type (readily undergoing hydrolysis and reasonable in price) and polycarbonate type (highly hydrophilic but expensive). It is further possible to use such materials for the pendulum part 12 as vinyl chloride type elastomer, olefin type elastomer, ionomer, styrene type elastomer, polyester type elastomer and nylon type elastomer. The pendulum part 12 may also be made of piano wire and the like wire having 3 to 10 mm diameter coated by the resin or vinyl.

[0041] The shaft 14 is preferably made of, for instance, stainless steel having a certain mechanical '4...ngth. For this part, it is possible to use steel, aluminum, stainless steel and carbon. This part may be solid in shape. In this case, a plastic material may be used. The shaft 14 is formed to have, for instance, a cylindrical shape having a uniform outer diameter. As for the size of the shaft 14, it is desirable to set the length L2 thereof to about 12 to 25 cm, preferably 17 to 22 cm, the inner diameter r1 to about 8 to 23 mm and the outer diameter r4 to about 9 to 24 mm. Like the grip part 11, the shaft 14 may be formed to have a forwardly tapered shape with the outer diameter of its forward end smaller than the outer diameter of its end adjacent to the grip end. It is further possible to form the grip part 11 and the shaft 14 as a one-piece member, that is, the grip part serving as grip may be formed on the surface of the shaft. For the shaft 11, the hardness of the material is important. A hardness of JIS A93-A95 degrees is adequate, and JIS A88 to A98 is preferred.

[0042] The centroid of the device 10 is located to be closer to the grip part 11 than in the case of the actual golf club. Thus, by using a material which is light in weight such as aluminum or stainless steel for the shaft 14, it is possible to have light weight on the side of the grip 11 and have the centroid of the device 10 to be closer to the head part 13. It is thus possible to provide a swing condition of the device 10 to be closer to the swing condition of the actual golf club.

[0043] As shown in FIG. 3, an end portion (i.e., mounting portion 12a) of the pendulum part 12 is inserted in and secured to a forward end portion of the shaft 14. The securing is done by using adhesive, adhesive tape, set screw or other setting member (not shown) such as to provide a sufficient mechanical strength to prevent detachment of the pendulum part 12 from the shaft 14 when practice swinging the swing training device 10. As to the mounting portion 12a, the pendulum part 12 and the shaft part 14 may have tapered coupled portions to prevent the detachment of the pendulum part 12 from the shaft 14. The length L3 of the mounting portion 12a inserted in the shaft 14 is desirably about 3 cm. The pendulum part 12 may be inserted up to the position of grip end 116 and may also be up to the halfway thereof.

[0044] The grip part 11 is secured to the shaft 14 and the pendulum part 14 such as to cover the entirety of the shaft 14 and part of the mounting portion 12a of the pendulum part 12. The shaft 14 is thus disposed in the sole inside of the grip part 11. The securing in the case is done by using adhesive, adhesive tape, set screw or other setting member (not shown) such as to provide a sufficient mechanical strength to prevent detachment of the grip part 11 from the shaft 14 when practice swinging the swing training device 10.

[0045] FIG. 4 is a fragmentary sectional view showing an example of the structure of the head part 10 in the swing training device 10. As shown in the Figure, on the side of the head part 13, the device comprises the pendulum part 12, the head part 13 and a reinforcement member 15. The pendulum part 12 has a forward end mounting portion 12b having diametrically opposite depressions 12ba and 12bb.

[0046] The head part 13 is desirably an elastic heavy member, specifically an urethane foam member or a hollow member made of rubber or like material having a weight of 50 to 150 g. By forming the head part 13 itself as an elastic heavy member, it is possible to ensure safety in such case as when the head part 13 is occasionally detached from the pendulum part 13. The head part 13 is desirably formed such that it has a cylindrical shape, for instance. Specifically, as shown in FIG. 2, the head part 13 is desirably formed such that it has a substantially cylindrical shape having a flat side surface (which is located on the ground surface at the time of addressing, hereinafter referred to as bottom surface 13a). It is possible to form the head part 13 such that it has a cylindrical shape, a polygonal shape or any other shape as well. As for the size of the head part 13, formed to have a cylindrical shape, it is desirable to set the length L4 to about 5 to 20 cm and the diameter to about 5 to 10 cm. The head part 13 further has a hole, in which the mounting portion 12b of the pendulum part 12 is inserted. When securing the head part 13 to the pendulum part 12, the mounting portion 12b thereof inserted in this hole is secured by adhesive or like means. The head part 13 may be formed in shape of cylinder, globe or oval.

[0047] The head part 13 is preferably made of polyurethane foam and adequately made of ether type polyurethane foam, and its hardness is suitably in a range of ASKKEE hardness gauge type C 5 to 80 degrees, preferably in a range of ASKKEE hardness gauge type C 25 to 40 degrees. It is further possible to use polyethylene vinyl acetate (EVA) resin foam, polyethylene resin foam, foam rubber, etc. It is also possible to use the hollow shaped materials made of polyethylene, EVA, PVC and various elastomer. The reinforcement member 15 serves to reinforce the securing of the pendulum part 12 and the head part 13 to each other. The member 15 has a frustoconical cross-sectional profile having a central cylindrical through hole perpendicular to the bottom. The reinforcement member 15 may be omitted.

[0048] As shown in FIG. 4, the head part 13 is secured to the forward end mounting portion 12b of the pendulum part
12. This securing is done as follows. The mounting portion 12b of the pendulum part 12 is first inserted in the above hole of the head part 13, and then the two parts are secured to each other with adhesive, adhesive tape, set screw or any other setting means (not shown). The securing is desirably done such that the cylindrical head part 13 is longitudinally perpendicular to the pendulum part 12 and line symmetrical with respect to the mounting portion 12b. Of course, asymmetrical shape may be employed. By providing the depressions 12ba and 12bb in the mounting portion 12b of the pendulum part 12, it is possible to more firmly secure the pendulum part 12 and the head part 13 to each other and suppress detachment of the head part 13 from the pendulum part 12 when practice swinging the swing training device 10.

[0049] As shown in FIG. 4, the pendulum part 12 is inserted through the cylindrical through hole in the reinforcement member 15, and the bottom thereof is disposed to be in contact with the side surface of the head part 13. In this state, the pendulum part 12, the head part 13 and the reinforcement member 15 are secured to one another by adhesive or like means. In this way, reinforced securing of pendulum part 12 and the head part 13 to each other is obtainable.

[0050] The method of using and effects obtainable with the swing training device 10 having the above construction will now be described.

[0051] FIG. 5 is a front view showing a user 20 with the swing training device 10 in the addressed state. When using the swing training device 10, the user 20 grips the grip part 11 of the device 10 just like the ordinary golf club and takes stance as usual. In this state, the user 20 does back-swinging.

[0052] FIG. 6 is a front view showing the user in the right top state attained the back-swinging. The height of the hands 21 and 22 at the top slightly vary with individuals. When the take-back is right, the hands 21 and 22 are raised to be between the user’s face and the upper portion of the right shoulder 23, and the grip part 11 becomes substantially parallel to the ground surface. At this time, the pendulum part 12 of the swing training device 10 is flexed owing to its flexibility, and its forward end portion comes to touch the neighborhood of the left shoulder 24 or the left side 25. By confirming the right top in this way, the user 20 does down-swinging up to the finish.

[0053] FIG. 7 is a front view showing the user in the correct finish state. When the finish is correct, the hands 21 and 22 are raised to be between the user’s face and the upper portion of the left shoulder 24. The pendulum part 12 of the swing training device 10 is flexed owing to its flexibility, and its forward end portion comes to touch a portion of the body, which is symmetrical to the portion touched at the take-back time with respect to the axis of rotation of the body, i.e., the neighborhood of the right shoulder 23 or the right side 27. When the finish is correct, the left elbow 28 is folded, and also the right shoulder is turned to the subject direction. Thus, the top position (root of the head part 13) of the pendulum part 12 comes to touch the right shoulder to the right side. By sensing this with the body, the user 20 can confirm that right finish has been attained.

[0054] To attain the correct finish, the correct swinging orbit should be followed in the down-swinging. When the followed swing orbit is not correct, the finish state as shown in FIG. 7 can not be attained, and the forward end portion of the pendulum 12 fails to touch the proper body portion as noted above. The user thus can note that the swing orbit is not correct. In the swing training device 10, however, the pendulum part 12 is formed such that it is flexible and has restoring elasticity for restoration to a substantially straight state, so that at the finish time it will not be excessively flexed such that the head part 13 secured to its forward end portion would touch an unexpected portion of the body (such as the face).

[0055] Also, since in the swing training device 10 the pendulum part 12 is formed such that it is flexible and has restoring elasticity for restoration to a substantially straight state, local bending of a portion of the device 10 in the neighborhood of the juncture between the shaft 14 and the pendulum part 12 can be suppressed, and it is possible to reform the swinging of the actual golf club under the optimum condition.

[0056] Furthermore, with the head part 13 formed to have a cylindrical shape, by training the take-back and the down-swinging while visually confirming movement of the longitudinal direction of the head part 13 along the plane of swing, it is possible to acquire an ideal swing with club head motion along the plane of swing. Apparently, the above advantages are obtainable for both right-hand user and left-hand user.

[0057] Still further, with the pendulum part 12 made of urethane resin or like material which has appropriate weight and experiences adequate air resistance, by swinging the swing training device 10 in a correct body turn the forward end portion of the pendulum 12 comes to touch the neighborhood of the right shoulder 23 or the right side a slight time after the finish. That is, by swinging the swing training device 10 in the training such that the pendulum part 12 comes to touch the right shoulder 23 or the right side 27 at as late timing as possible, the user will form body turn, become able to correctly turn the body and increase the head speed. In test swing training done by several persons with this embodiment of the swing training device 10, even woman test trainees who were less powerful could increase the flying distance by 20 to 30 yards with a slight amount of training.

[0058] As has been shown above, in this embodiment the pendulum part 12 is formed such that it is flexible and has restoring elasticity for restoration to a substantially straight state, and it is thus possible to suppress local bending of a device portion in the neighborhood of the juncture between the shaft 14 and the pendulum part 12 and reform the swinging of the actual golf club under the optimum condition. In addition, since the pendulum part 12 is formed such that it is flexible and has restoring elasticity for restoration to a substantially straight state, at the finish time excessive flexing of the pendulum part 12 can be prevented to prevent the head part 13 secured to the forward end portion of the pendulum part 12 from striking the user’s face and from the winding of the pendulum part 12.

[0059] The above embodiment of the present invention is by no means limitative. For example, while in the above embodiment the grip part 11 and the pendulum part 12 are formed as separate members and secured together with adhesive or the like, it is also possible to form these parts from the same material as one-piece member.
Also, while in the above embodiments the grip part 11 and the shaft 14 are formed as separate parts, it is also possible to form these two parts from a hard material such as plastics as one-piece member.

Furthermore, while in the above embodiment the pendulum part 12 is formed as a solid member, it is also possible to use a hollow pendulum member. While in the above embodiment the head part 13 is mounted on the end portion of the pendulum member 12, it may not be provided so long as it is possible to obtain a sufficient sense of swing. While in the above embodiment the head part 13 is formed as elastic heavy member of urethane foam or like material, it is also possible to bury a weight of a metal or the like in the head part 13. In this case, it is desirable for the sake of the safety to cover the head part 12 with an elastic material urethane foam package. While in the above embodiment the head part 13 is formed as a cylindrical member, it is also possible to form the head part 13 such as to have a shape resembling the actual golf club head, globe shape or any other shape. For example, it is possible to form a head part in a character form or a can form. While in the above embodiment the cylindrical head part 13 is secured to the end portion of the flexible pendulum part 12, it is also possible to securely a cylindrical head part to the end portion of an actual golf club head which is less flexible.

Further, while in the above embodiment the depressions 12a and 12b are provided in the mounting portion 12b of the pendulum part 12, they may not be provided. Still further, while in the above embodiment the pendulum part 12 and the head part 13 are formed as separate members, it is also possible to form these parts as one-piece molding. In such a case, the surface of the molded head part 13 may be covered with an elastic material such as urethane. While in the above embodiment the length of the swing training device 10 is set to be comparable to the length of 40 inch, the device 10 may be longer or shorter than this length.

A second embodiment of the present invention will now be described. This embodiment is a modification of the first embodiment, and is different therefrom only in that the shaft extends forward by a predetermined length from the forward end of the grip part. This embodiment will now be described mainly in connection with its difference from the first embodiment, and matter common thereto will not be described.

FIG. 8 is a sectional view showing the structure of grip part 31 in this embodiment of the swing training device 10. As shown in FIG. 8, like the first embodiment, this embodiment of the swing training device 30 comprises, on the side of the grip part 31, grip part 31, pendulum part 32 and shaft 34. In this embodiment of the device 31, the shaft 34 extends forward by a predetermined length from the forward end 31a of the grip part 31, that is, it is partly disposed outside the grip part 31. The length 1.5 of the portion of the shaft 34 extending by a predetermined length from the forward end 31a of the grip part 31 (i.e., the length of the portion of the shaft 34 disposed outside the grip part 31) is desirably about 0 to 40 cm.

With this structure, in which the shaft 34 is partly disposed outside the grip 31, it is possible to obtain the same effects as obtainable with the first embodiment. Again this embodiment is by no means limiting.

A third embodiment of the present invention will now be described. This embodiment is an application of the first embodiment, that is, it is an application of the present invention to a swing training device for reforming the baseball bat swing.

FIG. 9 is a perspective view showing this embodiment of the swing training device 40. The device 40, used for reforming the baseball bat swing, comprises a grip part 41 serving as grip, a shaft, to be described later in detail, formed at least in the grip part 41, and a pendulum part 42 extending from the forward end of the shaft and having flexibility and restoring elasticity for restoration to a substantially straight state.

The grip part 41 is made of a grip material such as synthetic rubber for being mounted on a usual metal bat. The shaft is made of a material having a certain mechanical strength and light in weight, such as aluminum, stainless steel and carbon. The pendulum part 42 is made of urethane resin or like material having flexibility and restoring elasticity for restoration to a substantially straight state. The length of the device 40 is desirably substantially the same as the length of the actual baseball bat, specifically about 850 mm. The weight of the device 40 is also desirably substantially the same as the weight of the actual baseball bat, specifically about 800 to 1,100 g.

FIG. 10 is a sectional view showing the swing training device 40 of the side of a grip part 41.

As shown in FIG. 10, on the side of its grip part 41, the swing training device 40 comprises grip part 41, pendulum part 42, shaft 45 and mounting pin 43. The grip part 41 serving as grip is made of, for instance, synthetic rubber, and it has a substantially cylindrical hollow shape. The grip part 41/4 may have a forwardly tapered shape with the outer diameter of it forward end 44b smaller than that of its end adjacent to its grip end portion 44a.

The pendulum part 42, as described above, is made of urethane resin or like synthetic resin material having flexibility and restoring elasticity for restoration to a substantially straight state. The pendulum part 42 desirably has a shape capable of holding the flexibility and the restoring elasticity for restoration to a substantially straight state, specifically a substantially cylindrical or like solid shape. By forming the pendulum part 42 having such a cylindrical solid shape, it is possible to ensure sufficient elasticity of the pendulum part 42 and suppress a bending tendency thereof. As for the size of the pendulum part 42, it is desirable to set the length thereof to about 65 cm and the outer diameter 8 of its mounting portion 42a as an end portion to be inserted in the shaft 44 to about 21 mm.

The shaft 44 is a substantially hollow member made of a material having a certain mechanical strength and light in weight, e.g., aluminum, stainless steel, carbon, etc. As shown in FIG. 10, the shaft 44 has a closed end 44a as grip end portion. The grip end portion 44a is greater in the outer diameter than the rest of the shaft 44. By forming the grip end 44a in this way, it is possible to prevent the grip part 41 from slipping out from the shaft 44 when practicing swinging the swing training device 40. The other portion of the shaft 44 than the grip end 44a has, for instance, a cylindrical shape having a uniform outer diameter. As for the specific size of the shaft 44, it is desirable to set the outer
diameter $r_6$ of the grip end $44a$ to about 50 mm, the outer and inner diameters $r_5$ and $r_7$ of the other portion of the shaft 44 than the grip end portion $44a$ to about 51 mm and 21 mm, respectively, and the length $l_6$ of the shaft 44 to about 300 mm. It is also possible to form the portion of the shaft 44 other than the grip end portion $44a$ such as to have a forwardly tapered shape having a greater outer diameter on the side of the grip end portion $44a$ than the outer diameter on the side of its forward end $44b$.

[0073] As shown in FIG. 10, an end portion (i.e., mounting portion $42a$) of the pendulum part 42 is inserted in and secured to an end portion of the shaft 44. This securing, as shown in FIG. 10, is made with a mounting pin 43 or the like such as to provide sufficient mechanical strength to prevent detachment of the pendulum part 42 from the shaft 44 when practice swinging the swing training device 40. The length $l_7$ of the mounting portion $42a$ as inserted in the shaft 44 is desirably set to about 100 mm.

[0074] The grip part 41 is secured to the shaft 44 such as to cover, for instance the other portion of the shaft 44 than the grip end portion $44a$. This securing is made with adhesive, adhesive tape, set screw or the securing means such as to provide sufficient mechanical strength to prevent the grip part 41 from being detached from the shaft 44 when practice swinging the swing training device 10.

[0075] FIG. 11 is a sectional view showing an exemplified structure of the swing training device 40 on the side of the forward end $42b$. The forward end $42b$ of the swing training device 40 is substantially circular and greater in diameter than the mounting portion $42a$ shown in FIG. 10. Specifically, the outer diameter $r_9$ of the forward end $42b$ is desirably set to about 65 mm.

[0076] Next, usage method and advantages of the above structured swing training device will be described. FIG. 12 is a view showing a user 50 starting the swing with the swing training device 40.

[0077] The user 50 using the swing training device 40 grips the grip part 41 thereof just like the usual baseball bat, and swings the device 40 just like the usual baseball bat swing. The swing here is made as body turn about the body center as turn axis. Specifically, the user 50 first steps forward the left leg 51 (toward the pitcher side), and turns the waist 52 in the swinging direction (from the catcher side to the pitcher side). The user 50 then swings the arms 54 and 55 while turning the shoulder 53 in the swinging direction. The device 40 is thus turned in the swinging direction about the body of the user 50 as turn axis in the order of the grip end portion $44a$ and the forward end $42a$.

[0078] The turning motion of the waist 52, the shoulder 53 and the arms 54 and 55 is started before the turning motion of the swing training device 40. The forces for turning the swing training device 40 are exerted via the arms 54 and 55 of the user 50 to the grip part 41. Thus, as shown in FIG. 12, the forward end $42b$ of the device 40 is flexed owing to its flexibility in the direction opposite to the turning direction of the device 40.

[0079] FIG. 13 is a view showing the user 50 at the instant of impact in the swing. In the actual baseball bat swing, the impact ideally takes place at the moment of reaching the maximum speed of the forward end of the bat. By trying to attain this speed at the moment of the impact, it is possible to hit the ball at the maximum head speed to provide the maximum power.

[0080] When swinging the swing training device 40, the pendulum part 42 is accelerated as it is moved by following the turning motion of the grip part 41. Thus, in the turning motion of the device 40 about the body of the user 50 as turning axis, the pendulum 42 attains the maximum speed at the moment when the pendulum part 42 passes the grip part 41. At this moment, the pendulum part 42 of the device 40 is restored to a substantially straight state as shown in FIG. 13 owing to its flexibility. This timing of restoration of the pendulum part 42 to the substantially straight state is the moment of the ideal impact. The user 50 thus can acquire the ideal swing of the bat by repeating the swinging while confirming the sense of the restoration of the device 40 to the substantially straight state.

[0081] FIG. 14 is a view showing the user 50 at the instant of follow-through in the swing. In the follow-through, the body is turned just like it is pulled by the swing training device 40. Specifically, the device 40 is turned in the swinging direction in the order of the forward end $42b$ and the grip end portion $44a$, and the body is turned in the order of the arms 54 and 55, the shoulder 53 and the waist 52 just like it is pulled by the turning device 40.

[0082] As has been shown, this embodiment of the swing training device 40 comprises the grip part 41 serving as grip, the shaft 44 formed at least in the inside of the grip 41 and the pendulum part 42 extending forward from the forward end of the shaft 44 and having flexibility and restoring elasticity for restoration to a substantially straight state. Thus, by training the swinging with this device 40 it is possible to confirm the moment of the ideal impact with the sense of the restoration of the pendulum part 42 to the substantially straight state and thus readily acquire the optimum swing of the bat.

[0083] The above embodiment of the present invention is by no means limitative. For example, while in the above embodiment the grip part 41 and the pendulum part 42 are formed as separate parts and secured to each other with the mounting pin 43 or like means, it is also possible to form the two parts from the same material as one-piece mounting.

[0084] Also, while in the above embodiment the grip part 41 is secured to the surface of the shaft 44, it is also possible to dispense with the grip part 41 and use the shaft 44 itself as grip part as well. Furthermore, while in the above embodiment the head part is provided on the pendulum part 42 at the forward end thereof, it is also possible to provide a head part at a weight at the forward end of the pendulum part 42. Yet further, it is possible to form the grip part 41 and the shaft 44 from a commercially available metal bat by cutting off the grip part thereof.

[0085] As has been described in the foregoing, according to the present invention the pendulum part is formed such that it is flexible and has restoring elasticity for restoration to a substantially straight state. Thus, it is possible to suppress local bending of the neighborhood of the juncture between the shaft and the pendulum part and attain the
optimum condition for reforming the swing of the actual golf club. Also, since the pendulum part is formed such as to be flexible and have restoring elasticity for restoration to a substantially straight state, it is possible to prevent excessive flexing of the pendulum part so that the forward end thereof comes to touch an unexpected body portion at the time of the finish.

[0086] Changes in construction will occur to those skilled in the art and various apparently different modifications and embodiments may be made without departing from the scope of the present invention. The matter set forth in the foregoing description and accompanying drawings is offered by way of illustration only. It is therefore intended that the foregoing description be regarded as illustrative rather than limiting.

What is claimed is:
1. A swing training device for reforming the swing comprising:
   a rigid shaft part having a grip part formed as grip on the surface; and
   a pendulum part extending from the forward end of the shaft and having flexibility and restoring elasticity for restoration to a substantially straight state.

2. The swing training device according to claim 1, wherein the grip part and the shaft part are formed as separate parts, the shaft being disposed on the sole inside of the grip part.

3. A swing training device for reforming the swing, comprising:
   a grip part serving as grip;
   a shaft formed at least in the inside of the grip part; and
   a pendulum part formed such as to extend from the forward end of the shaft and having flexibility and restoring elasticity for restoration to a substantially straight state.

4. The swing training device according to claim 1 or 3, wherein the pendulum part has such flexibility that it can be flexed along the body when swinging the swing training device.

5. The swing training device according to claim 1 or 3, wherein the pendulum part has a cylindrical shape.

6. The swing training device according to claim 1 or 3, wherein the pendulum part has a solid shape or a hollow shape.

7. The swing training device according to claim 1 or 3, wherein the pendulum part is made of thermoplastic elastomer, thermoplastic resin, thermoplastic vulcanizates (TPV) or rubber.

8. A swing training device for reforming the swing comprising:
   a rigid shaft part having a grip part formed as grip on the surface;
   a pendulum part extending from the forward end of the shaft and having flexibility and restoring elasticity for restoration to a substantially straight state; and
   a head part secured to the forward end of the pendulum part.

9. A swing training device for reforming the swing, comprising:
   a grip part serving as grip;
   a shaft formed at least in the inside of the grip part;
   a pendulum part formed such as to extend from the forward end of the shaft and having flexibility and restoring elasticity for restoration to a substantially straight state; and
   a head part secured to the forward end of the pendulum part.

10. The swing training device according to claim 8 or 9, wherein the head part is an elastic weight member.

11. The swing training device according to claim 8 or 9, wherein the head part has a cylindrical shape or a globular shape, is longitudinally substantially perpendicular to the pendulum part, and is longitudinally symmetrically secured to a forward end mounting portion of the pendulum part.

12. The swing training device according to claim 8 or 9, wherein the head part is made of urethane foam.

13. The swing training device according to one of claims 1, 3, 8 and 9, which has a length of about 76 to 117 cm.

14. The swing training device according to one of claims 1, 3, 8 and 9, which is used for reforming the golf club swing.

15. The swing training device according to one of claims 1, 3, 8 and 9, which is used for reforming the baseball bat swing.

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