US 20090069123A1

(19) **United States**

(12) **Patent Application Publication**

Nugent

(10) **Pub. No.: US 2009/0069123 A1**

(43) **Pub. Date: Mar. 12, 2009**

(54) **SPORTS APPARATUS**

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(21) Appl. No.: **11/887,093**

(22) PCT Filed: **Mar. 29, 2006**

(86) PCT No.: **PCT/GB2006/001141**

§ 371 (c)(1),
(2), (4) Date: **Sep. 24, 2007**

(30) **Foreign Application Priority Data**

Mar. 29, 2005 (GB) 0506297.1
Apr. 13, 2005 (GB) 0507461.2

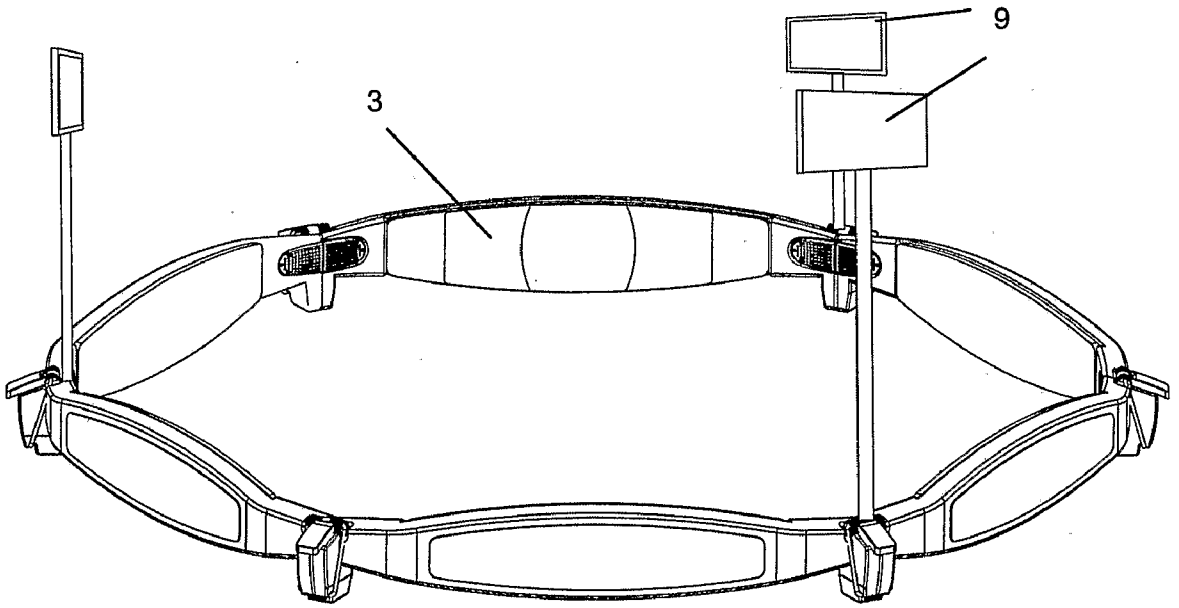
Publication Classification

(51) **Int. Cl.**
A63B 69/00 (2006.01)

(52) **U.S. Cl.** **473/422**

(57) **ABSTRACT**

Sports practising apparatus **1** for practising close ball control, includes a plurality of generally planar elements **2** arranged in a generally circular array, each planar element **2** having thereon an impact face **3** having at least one target area **8** facing in a generally inward direction. The apparatus **1** includes means to selectively activate individual target areas **8** sequentially in a predetermined or random manner, the target areas **8** being responsive to being hit by a ball impacting on the target to de-activate the target area **8** and to activate the next individual target area **8** in the sequence.



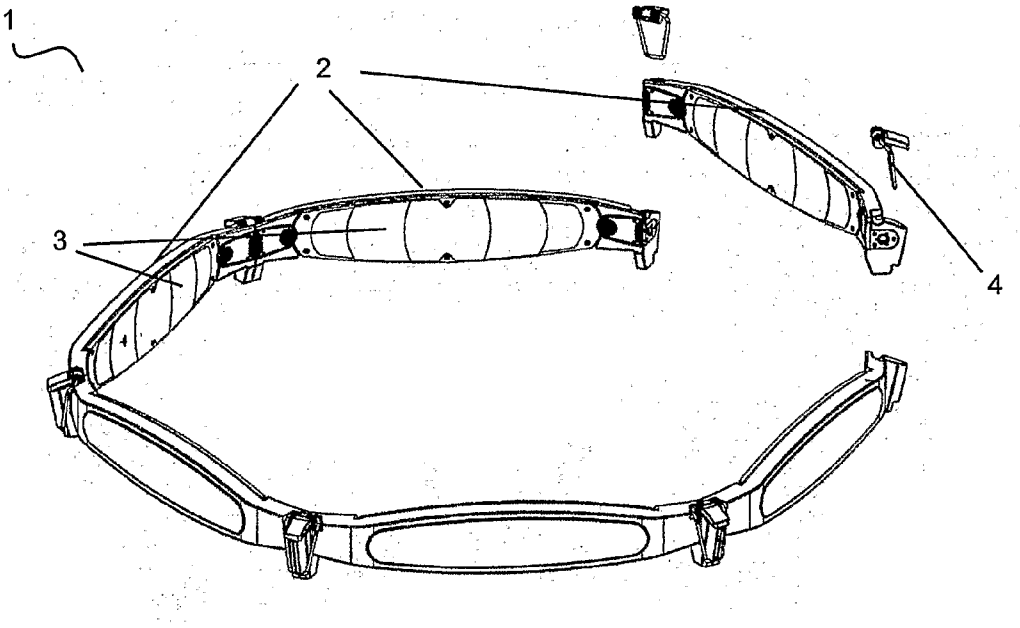


Figure 1

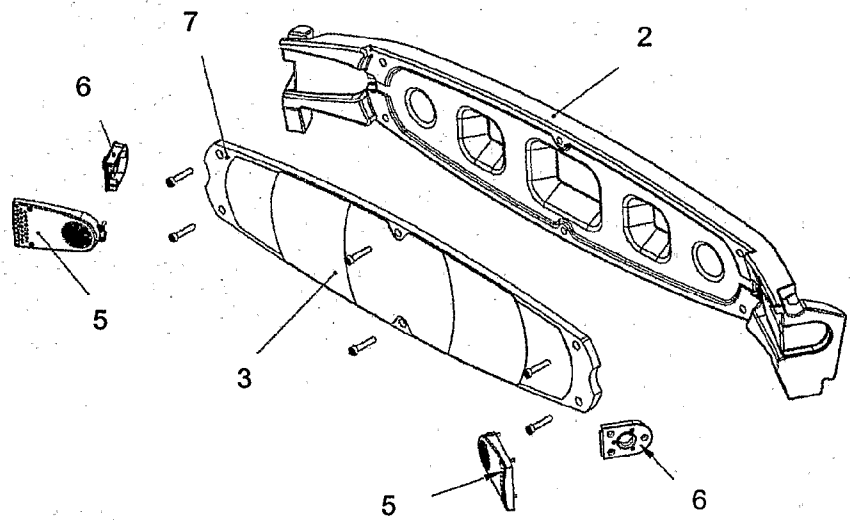
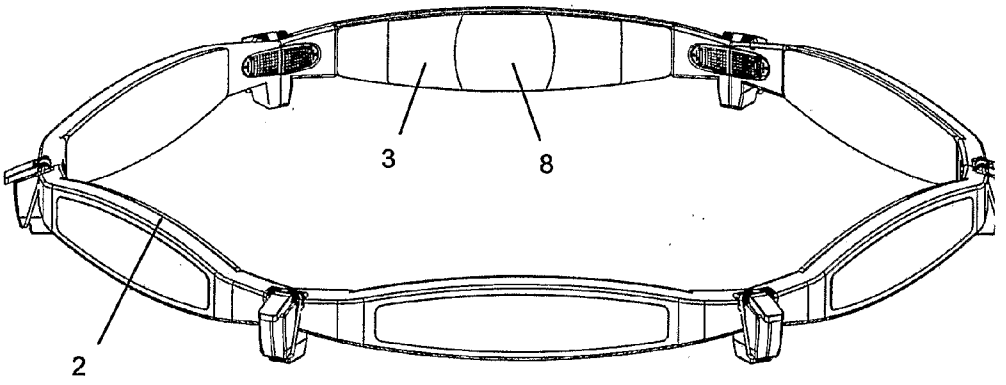


Figure 2



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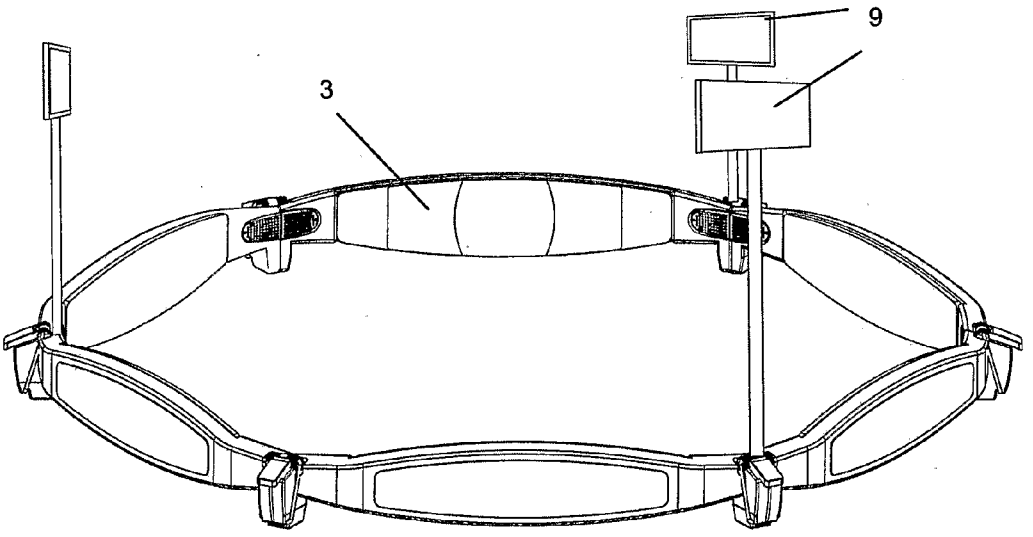

Figure 4

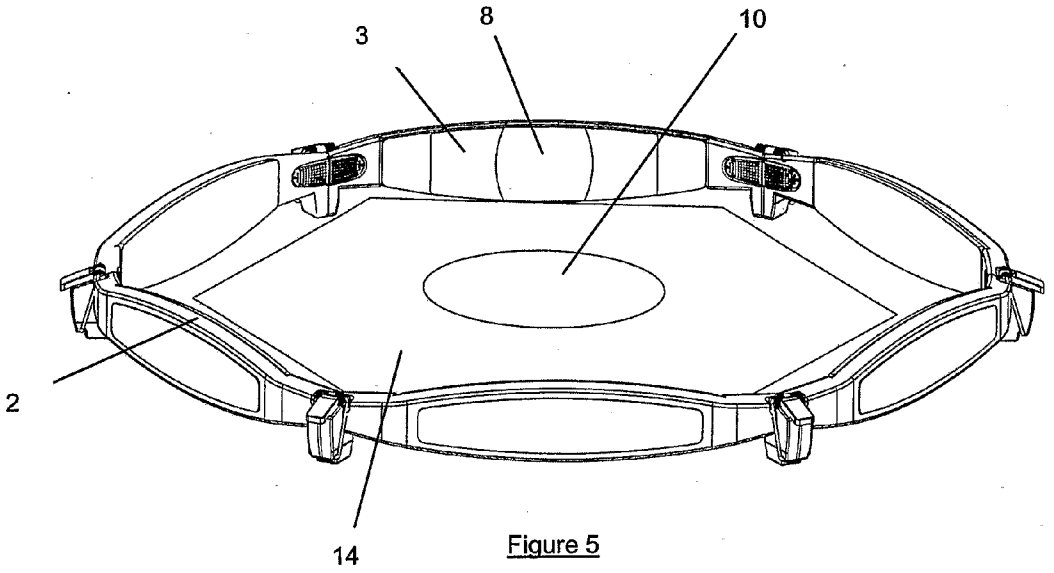

Figure 5

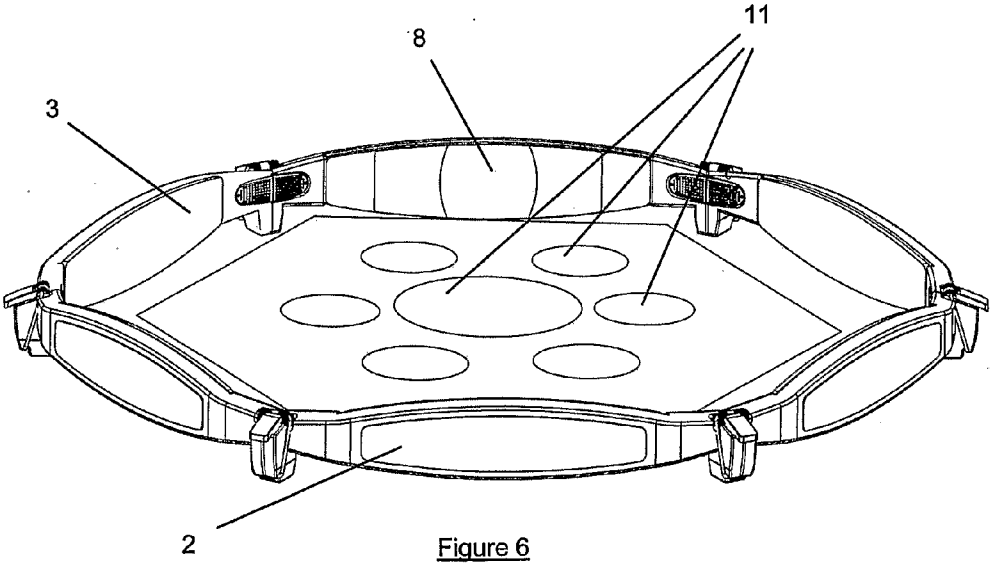

Figure 6

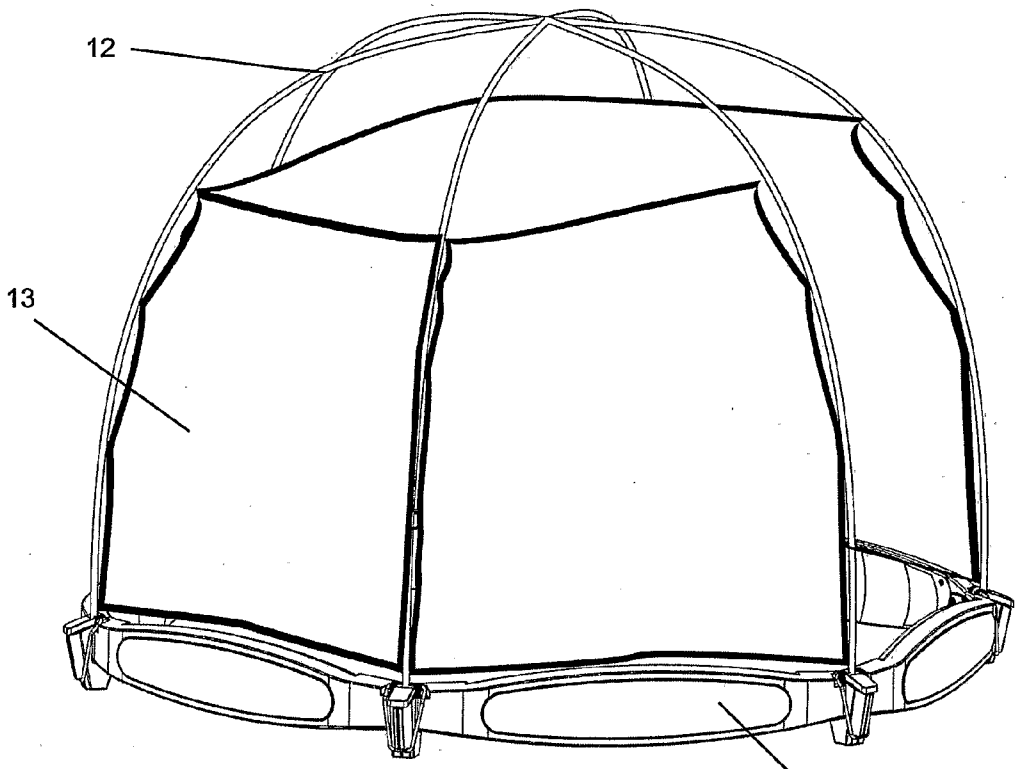

Figure 7

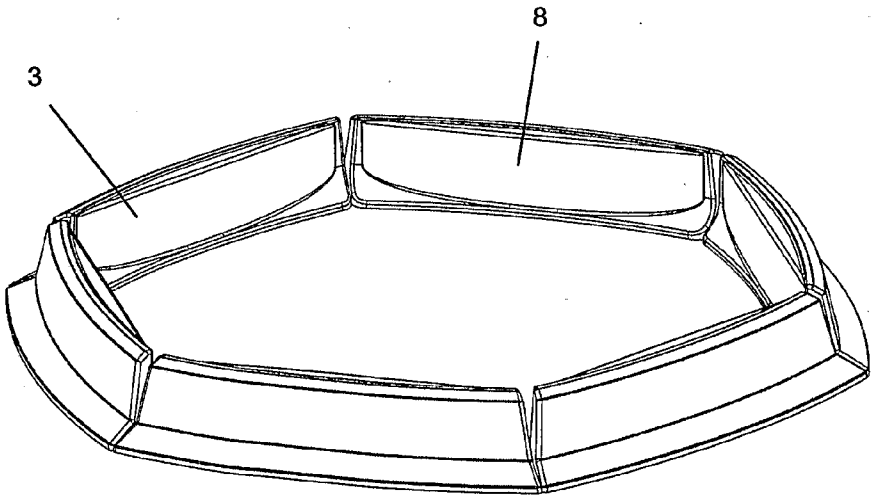

Figure 8

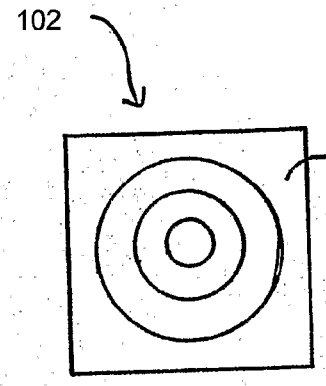

Figure 9

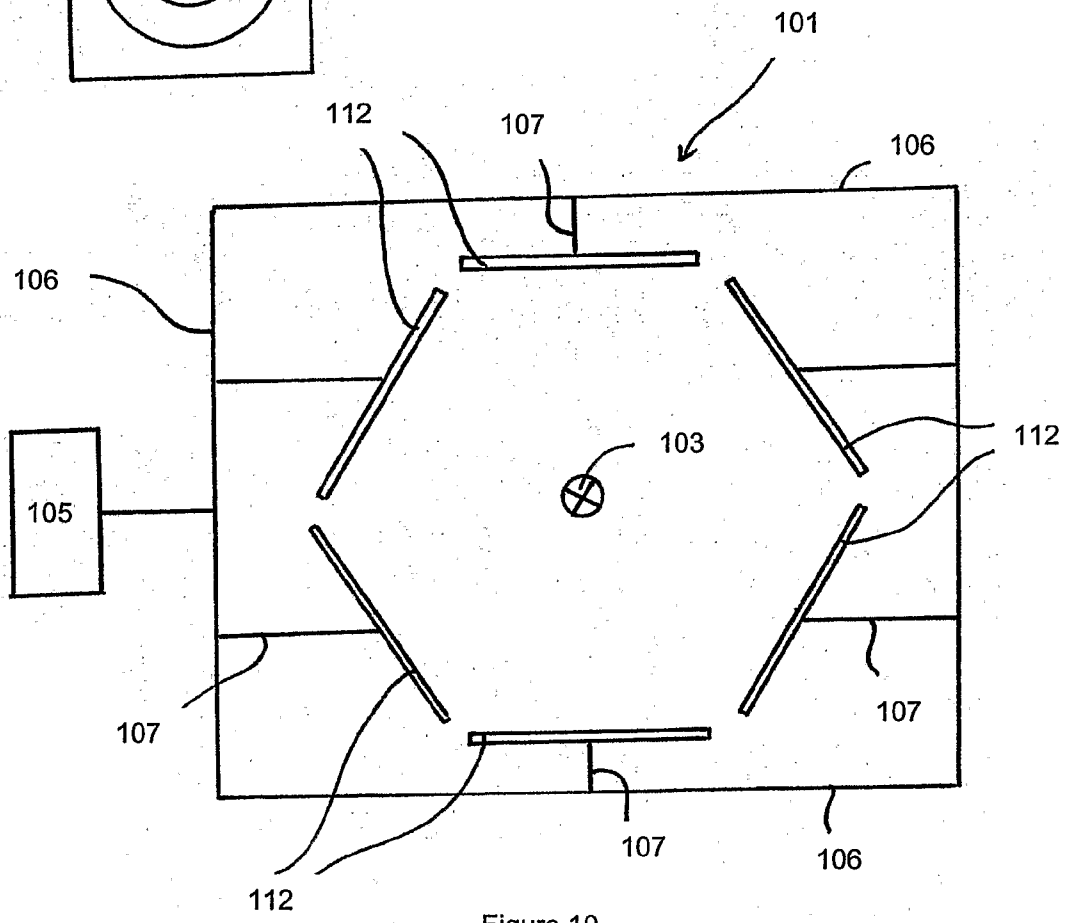

Figure 10

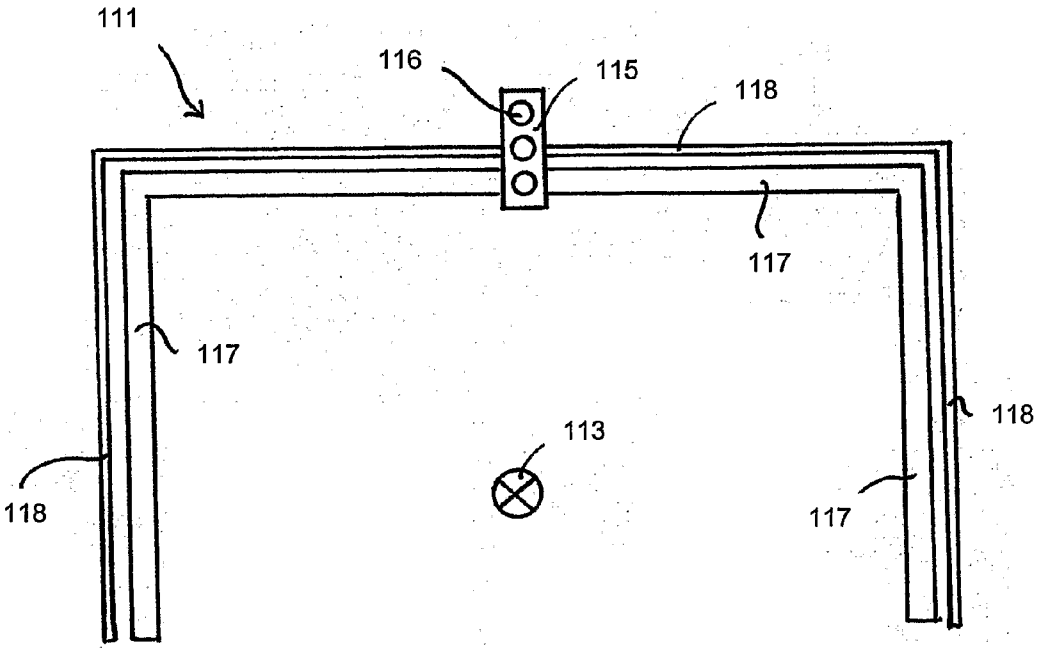

Figure 11

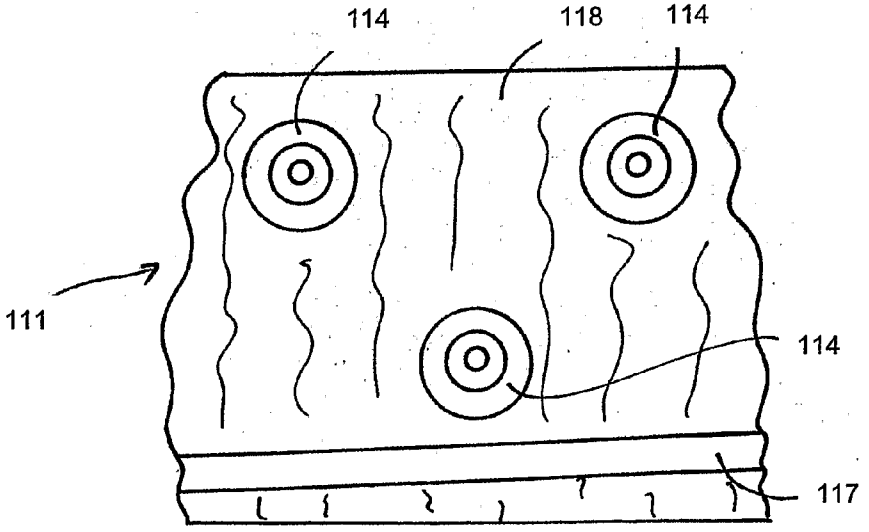

Figure 12

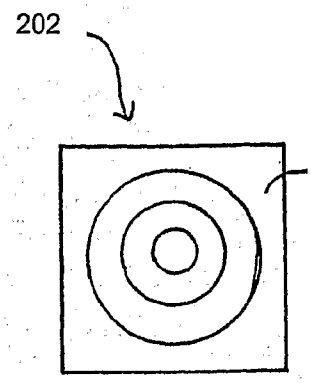

Figure 13

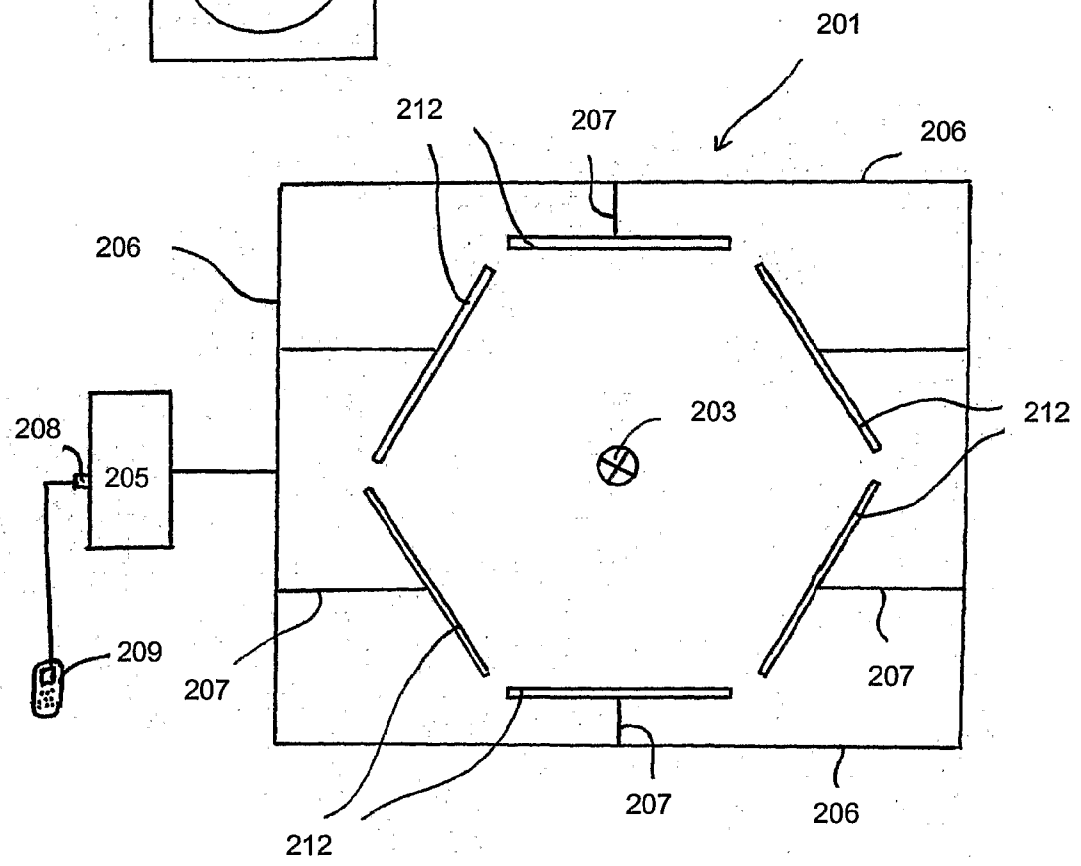

Figure 14

SPORTS APPARATUS

[0001] This invention relates to a sports apparatus and is particularly, but not exclusively, related to such apparatus for improving the skills, particularly close ball control, coordination, and agility of soccer players.

[0002] Sports training apparatus is known, for example from GB Patent Application No. 2332630A, in which a player must successively touch or kick a plurality of spaced targets. This apparatus is therefore essentially a training aid for improving general fitness since it does not require the presence of a ball. Another known form of apparatus consists of an array of targets on a vertical wall which is intended for use by soccer players for shooting practice to improve the accuracy of shooting. None of the known arrangements are designed to improve close ball control. One of the most important skills in soccer is close control of the ball and the speed at which this is achieved, to enable a player with the ball to pass opponents to get into a shooting or passing position. The present invention seeks to provide apparatus for improving ball skills, particularly close ball control, and generally improving the coordination and agility of the player.

[0003] According to the present invention there is provided a sports practising apparatus for practising close ball control, including a plurality of generally planar elements arranged in a generally circular array, each planar element having thereon an impact face having at least one target area facing in a generally inward direction, the apparatus including means to selectively activate individual target areas sequentially in a predetermined or random manner, the target areas being responsive to being hit by a ball impacting on the target to de-activate the impacted target area and to activate the next individual target area in the sequence.

[0004] Each target may comprise a rebound board whose coefficient of restitution between a ball impacting the board and the impact surface of the board is comparatively high to provide a rapid rebound.

[0005] Each target may be activatable by an alert signal, such as an acoustic and/or visual signal, generated at the target to attract the attention of a ball player who is then required by kicking a ball, to impact the activated target.

[0006] Each target may also comprise means arranged to detect ball impacts) and to record such impact(s) as a score.

[0007] The time between consecutive alert signals from different activated targets can be altered, to change the difficulty of the activity.

[0008] In a preferred embodiment of sports apparatus in accordance with the invention to be described in more detail hereinbelow, the plurality of targets, preferably in the range of four to six, is arranged in a circle, with the ball player being positioned generally at the centre of the circle. Alternatively, targets may be in a continuous array about a centre but at varying distances from said centre.

[0009] The radius of that circle and shape of the array, that is to say, the distance between the ball player at its centre and each target can be varied, again to alter the difficulty of the activity.

[0010] The targets may be free-standing and may be provided as a kit which is portable.

[0011] Preferably the apparatus is controlled using a control unit. The control unit may be a computer in the form of a hand-held computer or PDA.

[0012] Preferably the apparatus further includes one or more sensors located in the floor area. These sensors may be located in a floor mat which is connected to a control unit of the apparatus.

[0013] Preferably the apparatus includes visual display means. The display means may include LCD monitors positioned above the head height of the player.

[0014] Preferably the apparatus includes a canopy. The canopy may be supported with a frame and surrounds the circular array. The canopy may be a net.

[0015] A second aspect of the invention resides in sports apparatus comprising a plurality of targets arranged in an array in a generally vertical plane, ball delivery means arranged to deliver balls to a player spaced in front of the target array, and ball returning means arranged to collect used balls and return them to the ball delivery means, wherein the targets have zero or at least substantially zero coefficients of restitution, so that after impacting a target, a ball will not rebound to any great extent, if at all, and merely fall under gravity to the ball collecting and returning means.

[0016] In a preferred embodiment of sports apparatus in accordance with this second aspect of the invention to be described in more detail hereinbelow, the targets are mounted to one or more vertical screens, or curtains, for example, three curtains arranged on three sides of a rectangle, with a ball player positioned generally centrally thereof.

[0017] The curtains and associated components may be packed into a kit which is preferably portable.

[0018] The ball delivery means may comprise equipment similar to a tennis ball server but for use with larger balls, such as soccer balls, being delivered to the player at a lower velocity than tennis balls.

[0019] The ball delivery means may be located at any suitable position with respect to the target array and the means for collecting and returning used balls back to the ball delivery means may comprise a channel or other similar arrangement. If the target array is in a generally vertical plane, then such means may be at the lower region of or below the target array.

[0020] As in the case of the first aspect of sports apparatus defined above, each target may be activatable, to attract the attention of the ball player, whilst each target may also have ball impact detecting means for recording impacts on each target as a score.

[0021] Each target may be activatable, to attract the attention of the ball player, whilst each target may also have ball impact detecting means for recording impacts on each target as a score.

[0022] Preferably, means are provided for taking a player's score. Also those scores may be recorded and displayed to other players over the Internet via a suitable computer link, such as a PC, and software.

[0023] In a preferred embodiment, a connection for a mobile telephone or other telecommunications apparatus for transmitting and/or receiving data, audio and/or video signals is provided.

[0024] The mobile telephone or other such telecommunications apparatus, when connected to the sports apparatus, for example, a control unit thereof, can be used to activate the or each target of the sports apparatus, to generate an alert signal thereat, thereby attracting the attention of a player who then has to cause the ball to impact the activated target. The mobile telephone or other telecommunications can then be used to record the score of a player which, optionally, could be accessed by other remote players, possibly worldwide.

[0025] In order to eliminate, or at least substantially reduce the possibility of players cheating, the mobile telephone or other telecommunications apparatus could include a video facility for recording images of each player using the sports apparatus and recording a score.

[0026] In that regard, the apparatus may be provided with a suitable means for physically supporting such a mobile telephone or other telecommunications apparatus with a video facility in the region of the sports apparatus during play, so that a player's game can be fully recorded on video. Such may also be available to other, remote players.

[0027] In order that the invention may be more fully understood, various aspects of sports apparatus in accordance therewith will now be described by way of example and with reference to the accompanying drawings in which:

[0028] FIG. **1** is a view of apparatus according to the present invention;

[0029] FIG. **2** is a exploded view of a panel of the apparatus;

[0030] FIG. **3** is a view of the apparatus showing a target;

[0031] FIG. **4** is a view of the apparatus including further visual display means;

[0032] FIG. **5** is a view of the apparatus comprising a floor mat sensor;

[0033] FIG. **6** is a view of the apparatus comprising a plurality of floor sensors;

[0034] FIG. **7** is a view of the apparatus including a canopy;

[0035] FIG. **8** is a view of the apparatus suitable for a computer video game;

[0036] FIG. **9** is an elevation of one of a plurality of targets of sporting apparatus in accordance with the first aspect of the invention;

[0037] FIG. **10** is a diagrammatic plan of six targets, as shown in FIG. **9**, in an array;

[0038] FIG. **11** is a diagrammatic plan of sporting apparatus in accordance with a second aspect of the invention; and

[0039] FIG. **12** is a side elevation of part of the apparatus shown in FIG. **11**.

[0040] FIG. **13** is an elevation of one of a plurality of targets of sporting apparatus in accordance with a modification to a first aspect of the invention;

[0041] FIG. **14** is a diagrammatic plan of six targets, as shown in FIG. **13**, in an array;

[0042] FIG. **1** shows a preferred embodiment of the present invention. The apparatus **1** comprises an array of six interlocking planar elements or panels **2**, which are arranged in the form of a closed hexagon. The planar elements **2** are generally rectangular in form. It is envisaged that further panels **2** may be provided such that the form of the interlocking panels is substantially circular. In an alternative arrangement, the panels may be secured together in an adjustable manner so that the shape of the array can be non-uniform. The panels **2** may be formed of a rigid material such as plastic. The panels **2** are joined together using coupling or connecting means which in this embodiment is a cam activated clamp **4**, which comprises a substantially U-shaped loop formed of, for example wire, which engages with two adjacent panels, and an over centre level such as a clamp which draws the adjacent panels together such that the panels are releasably secured together. The player stands in the middle of the hexagon during a game played with the apparatus. The panels **2** comprise a impact face or rebound board **3** which includes a sensor. The apparatus may also include ball delivery means. Balls with varying rebound characteristics may be provided to vary the difficulty of a training session using the apparatus **1**.

[0043] FIG. **2** shows an exploded view of a planar element or panel **2** as shown in FIG. **1**. Each of the panels **2** comprises a rebound board **3** which has a sensor such as a membrane switch to the detect the impact of a football hitting the panel **2**. The panels **2** are provided with male and female electrical connectors **6** at each end to facilitate quick and simple assembly. The panels **2** may have a number of sensors forming a number of target areas which may vary in size so that the precise point of impact of a ball may be determined. Speakers **5** are provided on either side of the panel **2**, which may be used to communicate instructions to the player.

[0044] Referring to FIG. **3**, each planar element or panel **2** is marked with a central target or target area **8** in the central portion of the rebound board **3**. The panels may also further comprise lights or other indicators such as light emitting diodes (LEDs) to convey instruction to the player or indicate the operating status of the apparatus.

[0045] The apparatus **1** may be controlled by a control unit and software. This software may be run on a separate hand-held computer such as a PDA or a control unit incorporated into a panel **2** of the apparatus. The apparatus may be used by one player or a plurality of players. The basic aim of a game will be to kick a football at a target **8** on rebound board **3** of a panel **2**. The software will control aspects of a game such as the number of targets **8** to hit, and the delay between successive targets **8** that the player must hit. The targets **8** to be hit may be in a random or predetermined sequence. A target area **8** to be hit, may be indicated using a visual indicator or by verbal instruction through a 5 speaker of the apparatus **1**. The software may be used to provide a score for a player using the apparatus. A variety of game formats or training routines may be provided with varying levels of difficulty.

[0046] Details of players and their scores may be uploaded to a central database so that statistics may be calculated. It may also be possible to interpret the results to determine particular areas of weakness or strength in a player's skill. The results may be held on a network or internet or web-based database and players may be able to view details of other players' scores.

[0047] The sensors in the panels **2** of the apparatus **1** may be pressure sensitive such that the force of the impact may be measured and such that the weight and distance of a player's pass may be determined.

[0048] Sensors may be provided in the ball and in the shoes of the player. These sensors may be used to monitor which foot a player uses to strike a ball and the point of impact of a player's foot on the ball. The shoes may also be sold with an electronic chip or tag which may hold data such as a unique player ID. The chips in the shoes may also be used to store data such as the scores and statistics for a player, and should a player then use a different apparatus, this data and may be transferred to the new apparatus.

[0049] Referring to FIG. **4**, visual display means **9** such as an LCD monitors or screens are provided such that images or words are displayed on the screens during a game, which a player must describe or call out, before continuing with the game. The display means may also display general knowledge questions to serve as a learning aid. The apparatus may also include a voice recognition system so that a player's responses to the words or questions may be monitored. The display screens therefore seek to encourage a player to look up during or between passes. The display means **9** may also be used to display information about a player such as a player's current score or statistics.

[0050] Referring to FIGS. **5** and **6**, the apparatus **1** is provided with one or more further sensors **10**, **11** within the closed form of panels **2**. These sensors **10**, **11** may be located in a floor mat **14** which covers a floor area defined by the closed form of the panels **2**. Using the sensors **10**, **11** located in the floor mat **14**, a chip or sensor in the ball may be used to determine where the ball is located within the closed form of the panels **2**. A game may be provided whereby the ball must pass over or across certain areas on the floor mat **14**. The floor sensors **10**, **11** may also be used with sensors or chips in a player's boots such that the player must stand in or move between specified zones within the floor area.

[0051] The panels **2** may be provided with wireless network capability such as Bluetooth, zigbee or WiFi, such that the panels **2** may be physically separated from one another to form alternative training areas. The wireless capability would then allow the sensors in the panels **2** to communicate with a controlling computer.

[0052] Referring to FIG. **7**, the apparatus **1** includes a canopy **13** supported by a frame **12** which seeks to maintain the ball within the area defined by the panels **2**. In this embodiment, the canopy **13** is a net. A ball feeder may be provided to project balls into the game at different heights and speeds for players to practice volleying and heading. The canopy **13** may also comprise further target areas or sensors.

[0053] Referring to FIG. **8**, the apparatus **1** is adapted for use with a computer video game, with the rebound board **3** comprising the targets **2** serving as an input means for the computer video game.

[0054] Referring to FIGS. **9** and **10** of the accompanying drawings, sporting apparatus, indicated generally at **101**, comprises a plurality of, in this case six, generally planar targets **102** arranged in a generally circular array in respective vertical planes.

[0055] Each target **102** comprises a free-standing rebound board **112** whose coefficient of restitution between a ball impacting the surface of the board **112** and the impact surface itself is comparatively high, so that a ball player **103** standing in the middle of the generally circular array of rebound boards **112** who kicks a ball against one of the rebound boards **112** will usually find that the ball will rebound back or close to the player **103**.

[0056] Each target **102** can be activated electrically from a control unit **105** to generate an alert signal, in this case, an audible bleep, to attract the attention of the player **103** who then has to cause the ball to impact the rebound board **112** of that activated target **102**.

[0057] The targets **102** are activated to generate respect bleeps, as alert signs, randomly. Each target **102** also comprises means (not shown) arranged to detect a ball impact thereon and to record such impact(s) via the control unit **105** as a score. Each target **102** is connected electrically to the control unit **105** by respective wiring **106**, **107**.

[0058] The time between consecutive alert signals generated at different individual targets can be altered at the control unit **105**, to increase or decrease the difficulty of the activity.

[0059] In use of the sports apparatus **101**, the player **103** stands at the centre of the circular array of targets **102**. The targets **102** bleep randomly, so that the player **103** then has a given number of seconds to impact the corresponding rebound board **112** with the ball. Each time the player **103** achieves this, a score is registered at the control unit **105**.

[0060] As indicated above, the difficulty level of the activity can be altered by increasing or decreasing the time between bleeps and, also, the radius of the generally circular array of targets **102**.

[0061] Referring now to FIGS. **11** and **12** of the drawings, sporting apparatus indicated generally at **111** and in accordance with the second aspect of the invention, comprises three vertical curtains **118** defining three sides of a rectangle, the curtains **118** having an array of targets **114** mounted thereon.

[0062] A soccer ball delivery device **115** is provided through the longer central curtain **118**, for delivering soccer balls **116** to a player **113** positioned generally centrally of the curtains **118**.

[0063] A channel **117** extends around the lower regions of the curtains **118**, for collecting and returning used balls **116** back to the delivery device **115** for subsequent delivery to the player **113**.

[0064] The coefficient of restitution between the balls **116** and curtains **118** is substantially zero, which means that a ball **116** kicked against a curtain **118** merely drops under gravity to the collecting and returning channel **117** without rebounding.

[0065] In use of the apparatus **111**, a curtain **118** or a specific target **114** of one of the curtains **118** is activated to generate an alert signal, such as a bleep, similar to that described above in relation to the sporting apparatus **1**, of the first aspect of the invention, so that the player **113** can aim a soccer ball **116** at the curtain **118** or target **114** when receiving a ball **116** from the delivery means **115**.

[0066] Similar arrangements are made for scoring when the player **113** impacts the actuated curtain **118** of target **114** with a ball **116**.

[0067] The delivery device **115** can be adjusted to deliver balls **116** at head height to the player **113**, above ground for volleying purposes and along the ground for passing purposes.

[0068] When a football **116** strikes a curtain **118**, the zero coefficient of friction between the ball **116** and the curtain **118** prevents the football **116** from rebounding and it merely drops under gravity into the channel **117** for returning the ball **116** to the delivery device **115**.

[0069] Targets **114** can be mounted strategically on the curtain, to improve heading, volleying and passing techniques of the player **113**.

[0070] The components of the two sports apparatus **1**, **101**, **111** in accordance with the invention, as described in detail above in conjunction with the accompanying drawings, may be packed into a portable kit arrangement.

[0071] Referring to FIGS. **13** and **14** a control unit **205** may be connected to the internet via a suitable computer link, such as PC, and software, whereby players worldwide can be networked together to play against each other and have their scores recorded and displayed to other players.

[0072] Alternatively, they may be activated to generate respective bleeps, as alert signals, in a given sequence, particularly when the sports apparatus is being played by several players remove from each other whose scores are being recorded, to provide a level playing field.

[0073] Each target **202** also comprises means (not shown) arranged to detect a ball impact thereon and record such impact(s) via the control unit **205** as a score.

[0074] Each target **202** is connected electrically to the control unit **205** by respective wiring **206**, **207**.

[0075] The time between consecutive alert signals generated at different individual target **202** can be altered at the control unit **205**, to increase or decrease the difficulty of the activity.

[0076] In use of the sports apparatus **201**, the player **203** stands at the centre of the circular array of targets **202**. The targets **202** bleep randomly, as described above, so that the player **203** then has a given number of seconds to impact the corresponding rebound board **212** with the ball. Each time the player **203** achieves this, a score is registered at the control unit **205**.

[0077] As indicated above, the difficulty level of the activity can be altered by increasing or decreasing the timing between bleeps, and, also, the radius of the generally circular array of targets **202**.

[0078] In the modification proposed, the control unit **205** is provided with an input connection **208** with an input connection **208** for a mobile telephone **209** which, then connected to the unit **205**, can be used to activate each target **202**, to generate the alert signal. The mobile telephone **209** can also be used to record the score of a player which, optionally, could be accessed by other remote players, possibly worldwide.

[0079] In order to eliminate or at least substantially reduce the possibility of players cheating, the mobile telephone **209** could include a video facility for recording images of each player using the sports apparatus and recorded a score.

[0080] Suitable means, such as a stand or other similar device, can be provided for supporting the mobile telephone **209** with a video facility in the region of the sports apparatus during play, so that a player's game can be fully recorded on video. Such recordings may be made available to other remote players of the particular game in question.

[0081] A worldwide network of players can be charged for the privilege of playing the game over the mobile telephone or internet network.

[0082] It is to be appreciated that the mobile telephone **209** could be replaced by any other suitable telecommunications apparatus for transmitting and/or receiving data, audio and/or video signals.

1. A sports practicing apparatus for practicing close ball control, including a plurality of generally planar elements arranged in a generally circular array, each planar element having thereon an impact face having at least one target area facing in a generally inward direction, the apparatus including means to selectively activate individual target areas sequentially in a predetermined or random manner, the target areas being responsive to being hit by a ball impacting on the target area to de-activate the impacted target area and to activate the next individual target area in the sequence.

2. An apparatus according to claim **1**, wherein a predetermined delay is generated in the time between a target area being deactivated and the next individual target area in the sequence being activated.

3. An apparatus according to claim **2**, wherein said predetermined delay is adjustable.

4. An apparatus according to claim **2**, wherein said predetermined delay is variable at each step in the sequence.

5. An apparatus according to claim **1**, wherein each planar element includes indicia indicative of the or each target area being activated, the planar element being impacted by a ball but the target area missed, a predetermined time delay being exceeded, and/or the sequence being completed.

6. An apparatus according to claim **1**, wherein the planar elements are generally rectangular and adapted to be releasably secured together linearly by coupling means which includes an electrical connection.

7. An apparatus according to claim **6**, wherein the electrical connections on each planar element include on one end of the element a male electrical connection with a female electrical connection on the other end, adapted to engage with a male electrical connection on an adjacent element.

8. An apparatus according to claim **1**, wherein each target area comprises a rebound board whose coefficient of restitution between a ball impacting the board and the impact surface of the board is comparatively high.

9. An apparatus according to claim **1**, wherein the means to selectively activate individual target areas is an acoustic and/or visual signal.

10. An apparatus according to claim **1**, wherein means is provided to record ball impact(s) as a score.

11. An apparatus according to claim **1**, wherein the planar elements are provided as a kit which is portable.

12. An apparatus according to claim **1**, wherein the apparatus comprises one or more floor sensors.

13. An apparatus according to claim **1**, wherein the apparatus comprises visual display means.

14. An apparatus according to claim **1**, wherein the apparatus comprises a canopy.

15. An apparatus according to claim **1**, wherein the apparatus is controlled using a control unit such as a computer in the form of a hand-held computer or PDA

16. An apparatus according to claim **1**, wherein a control unit is adapted to be connected to the internet via a suitable computer link, such as PC, and software, whereby players worldwide can be networked together to play against each other and have their scores recorded and displayed to other players.

17. A sports apparatus comprising a plurality of targets arranged in an array in a generally vertical plane, ball delivery means arranged to deliver balls to a player spaced in front of the target array, and ball returning means arranged to collect used balls and return them to the ball delivery means, wherein the targets have zero or at least substantially zero coefficients of restitution, so that after impacting a target, a ball will not rebound to any great extent, if at all, and merely fall under gravity to the ball collecting and returning means.

18. An apparatus according to claim **1**, wherein sensors may be provided in a ball and in shoes of a player.

19. An apparatus according to claim **1**, wherein the shoes of a player include an electronic chip or tag.

20. An apparatus according to claim **1**, wherein the planar elements are provided with wireless network capability such as Bluetooth, zigbee or WiFi.

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