The present invention provides a putting surface testing apparatus which incorporates a curved guideway shaped and dimensioned to direct a golf ball therealong, and secured to a stand for raising the guideway into an inclined orientation such that a golf ball will roll down the guideway and onto a putting surface to be tested, the apparatus further comprising a receiver slidably mounted on the guideway, and operable to receive and release a golf ball from a desired position along the guideway, from which the condition or other operating parameters of the putting surface may be calculated.
A Putting Surface Testing Apparatus

Field of the invention

This invention relates to a putting surface testing apparatus, and in particular a testing apparatus adapted to release a golf ball in a controlled and repeatable manner in order to allow an assessment as to the reliability/quality of a putting surface such as a golf green.

Background of the invention

In the game of golf, arguably the most important part of the course is the putting green at the end of each hole, and as such the quality and reliability of putting greens is of utmost importance. As a result, the "Holing Out Test" has been developed by the R&A, a body formed in 2004 and taking its name from the Royal and Ancient Golf Club based in St Andrews. The Holing Out Test is a method for assessing the reliability of putting surfaces, for example at distances of 3 to 9 feet from the hole.

The test allows golf clubs a straightforward, affordable and repeatable way in which to monitor the quality and reliability of putting greens throughout the year. The test uses an inclined surface to deliver a golf ball onto the green, and aimed at the hole, allowing a series of ten consecutive tests to be performed. On a surface that is said to be in good condition, 10/10 balls will be holed from preset distances, which may be varied according to the growing season. The worse condition of the surface being tested, the fewer of the ten balls will be holed.

It is an object of the present invention to provide an improved apparatus for performing the above-mentioned Holing Out Test.

Summary of the invention

According to the present invention there is provided a putting surface testing apparatus comprising a curved guideway shaped and dimensioned to direct a golf ball therealong; a stand for raising the guideway into an inclined orientation; and a receiver for releasing a golf ball from a desired position along the guideway.

Preferably, the guideway defines a substantially V shaped longitudinally extending channel.
Preferably, the receiver is slibably mounted to the guideway.

Preferably, the apparatus comprises an immobiliser operable to releasbly secure the receiver at a desired position along the guideway.

Preferably, the stand comprises a pair of legs spaced from one another and a cross member extending therebetween, the guideway being mounted to the cross member.

Preferably, the pair of legs are pivotally mounted to the cross member.

Preferably, the stand comprises a pair of ground engaging feet.

Preferably, the feet each comprise a curved ground contacting surface.

Preferably, the feet are each substantially spherical.

Preferably, the guideway comprises a tapered ground contacting end.

Preferably, the guideway comprises a pair of opposed faces which define the channel, the opposed faces describing an angle of between 120 and 170 degrees, more preferably between 130 and 160 degrees, and most preferably 144 degrees.

Preferably, the guideway has a radius of curvature of between 1m and 2m, more preferably between 1.3m and 1.8m, and most preferably 1.6m.

Preferably, the receiver defines a recess arranged to receive a golf ball and to allow the golf ball to travel from the recess down the guideway.

Preferably, the receiver comprises a release mechanism displaceable between a ball retaining position and a ball release position.

Preferably, the release mechanism is biased towards the ball retaining position.

Preferably, the recess is a substantially semi-circular recess formed in a front wall of the receiver.

Preferably, the recess comprises a through aperture extending from an upper surface of the receiver to the guideway.
Preferably, the receiver comprises an internal passage in communication with the recess at one end and an opening in a front wall of the receiver at an opposed end, the passage being shaped and dimensioned to enable a golf ball to pass from the recess out of the opening.

5 Preferably, the stand is adapted to enable the orientation of the guideway to be adjusted.

Brief description of the drawings

10 The present invention will now be described with reference to the accompanying drawings, in which:

Fig. 1 illustrates a perspective view of a putting surface testing apparatus according to an embodiment of the present invention;

15 Fig. 2 illustrates a rear perspective view of the apparatus shown in Figure 1;

Fig. 3 illustrates a front perspective view of the apparatus of Figure 1 and 2;

Fig. 4 illustrates an enlarged view of a receiver forming part of the apparatus of the present invention;

Fig. 5 illustrates a perspective view of a ground contacting end of a guideway forming part of the apparatus;

20 Fig. 6 illustrates a cross section of the guideway shown in Fig. 5;

Fig. 7 illustrates a side elevation of the receiver shown in Fig. 4;

25 Fig. 8 illustrates an end view of the receiver shown in Figs. 4 and 7;

Fig. 9 illustrates a perspective view of an alternative embodiment of a putting surface testing apparatus according to the present invention;

30 Fig. 10 illustrates an enlarged perspective view of a portion of a guideway and a receiver forming part of the apparatus of the present invention;

35 Fig. 11 illustrates an alternative perspective view of the receiver shown in Fig. 10, in isolation from the guide way;

40 Fig. 12 illustrates a rear perspective view of the receiver as shown in Fig. 11;
Fig. 13 illustrates an end view of the receiver of Figs. 11 and 12;

Fig. 14 illustrates an enlarged perspective view of a free end or ground contacting end of the guide way;

Fig. 15 illustrates a front elevation of the free end of the guide way as shown in Fig. 14;

Fig. 16 illustrates an enlarged perspective view of an upper portion of the apparatus as illustrated in Fig. 9; and

Fig. 17 illustrates an enlarged view of a spirit level as shown in Fig. 16.

15 Detailed description of the drawings.

Referring now to Figures 1 to 8 of the accompanying drawings there is illustrated a putting surface testing apparatus according to a first embodiment of the present invention, generally indicated as 10, for use in testing the quality and reliability of a putting surface such as a golfing green. The apparatus 10 comprises a curved guideway 12 mounted to a stand 14 such as to position the guideway 12 in an inclined orientation between a first ground contacting end 16 and a second elevated end 18. In this way a golf ball (not shown) can be released down the guideway 12 and onto the putting surface at a reproducible speed in order to test the putting surface.

25 Referring in particular to Figs. 4, 7 and 8, the apparatus 10 further comprises a receiver 20 mounted to the guideway 12, displaceable along the guideway 12, and releasably lockable at any desired position therealong for the reasons set out hereinafter. The receiver 20 comprises a carriage 22 which is shaped and dimensioned for a complementary fit on the face of the guideway 12, the carriage 22 defining a recess 24 at a downstream end or front wall of the carriage 22, which is semicircular in shape in order to receive a golf ball B therein.

The receiver 20 further comprises a release mechanism 26 comprised of an arm 28 pivotally mounted to the carriage 22, a spring 30 or other biasing means being disclosed between one side of the arm 28 and the carriage 22. At the other end of the arm 28 is a stop 32, for example formed from rubber or the like, and located along the arm 28 such as to engage and therefore retain a golf ball located in the recess 24. It will thus be appreciated that the sprung side of the arm 28 can be depressed against the carriage 22, thereby raising the stop 32 out of engagement with the golf ball in order to allow the golf ball to be released away from the receiver 20. It will of course be understood that the release mechanism 26 may be varied as desired in order to achieve the above-mentioned
functionality. For example, the release mechanism 26 could be substituted for some form of electronically and/or remotely operated mechanism.

The carriage 22 further comprises a pair of rails 34 located beneath the main body of the carriage 22, and which are seated in a correspondingly shaped pair of slots 36, one formed in either edge of the guideway 12 as clearly seen in Fig. 6. In this way the carriage 22 can be displaced along the length of the guideway 12 without separating therefrom. It will of course be understood that any other suitable arrangement may be employed in order to capture the receiver 20 on the guideway 12. In order to lock the carriage 22 at any desired position along the guideway 12, the receiver 20 comprises an immobiliser in the form of a pair of clamp wheels 38 which when tightened engage against the slots 36 in order to clamp the carriage 22 in position. The clamp wheels 38 can then be opened when necessary in order to allow the receiver 20 to be repositioned along the guideway 12.

The guideway 12 is curved along the longitudinal direction, and is preferably arcuate in shape and has an optimum radius of curvature of 1.6 meters, although it will be appreciated that this can be varied significantly. It has however been found that this arc provides the smoothest transition of the golf ball from the first end 16 of the guideway 12 onto the putting surface, in order to avoid bounce or other disturbances during the transition. In order to further improve the transition from the first end 26 to the putting surface, and as clearly shown in Figs. 3 and 5, the underside of the first end 16 is tapered towards the front edge in order to minimise the thickness of the tip of the guideway 12, thereby further reducing the possibility of bounce as the ball passes from the guideway 12 to the putting surface.

The upper surface of the guideway 12, referring in particular to Fig. 6, comprises a pair of sidewalls 40 between which is defined a V-shaped channel 42, the pair of sidewalls 40 preferably describing an angle of 144 degrees as the optimum angle for use with a conventional golf ball. The use of the V-shaped channel 42 ensures that the golf ball remains centred on the guideway 12 as it rolls downwardly towards the first end 16, again ensuring the accuracy and reproducibility of the test performed with the apparatus 10.

The stand 14, in the embodiment illustrated, comprises a pair of legs 44 spaced from one another and connected via a cross member 46 to which the guideway 12 is affixed, at or adjacent the second end 18. A pair of wheel clamps 48 lock the legs 44 in position relative to the cross member 46. By loosening the clamps 48 the legs 44 can be hinged on the cross member 46, in order to vary the angle between the legs 44 and the guideway 12, thereby allowing the angle or inclination of the guideway 12 to be varied as desired. Each leg 44 is terminated in a spherical or ball shaped foot 50, although any other suitable foot may be used. However, the use of the spherical shape ensures that the stand 14 will have a steady footing on an uneven or non-uniform surface such as the grass of a golf green. The stand 14 is also preferably provided with one or more spirit levels (not shown) which
can then be used in order to ensure the correct horizontal and/or vertical level and orientation of the apparatus 10 before testing is initialised.

Turning then to the operation, the apparatus 10 is positioned on the putting surface to be tested, with the legs 44 and ball feet 50 adjusted until the apparatus 10 is sitting in a suitable orientation. Then, depending on the distance to the hole from the first end 16, the receiver 20 is displaced along the guideway 12 to the correct position. The further towards the second end 18, the greater the distance the golf ball will travel when released from the receiver 20. A golf ball is then positioned within the recess 24 of the carriage 22, and held in this position by the release mechanism 26. The arm 28 can then be depressed against the bias of the spring 30 in order to release the golf ball, which then rolls down the centre of the guideway 12 in the channel 42 formed therein. The golf ball will then leave the first end 16 of the guideway 12, and due to the tapered underside thereof, will have a smooth transition onto the putting surface. The golf ball will then roll across the putting surface, eventually coming to a stop, or dropping into the hole on the putting surface, the result being indicative of the quality of the putting surface. The test can then be repeated a number of times as required by the holing out test.

The apparatus 10 of the present invention thus provides a relatively simple yet reliable means of performing the above-mentioned holing out test, in order to aid in monitoring the reliability of a putting surface.

Referring now to Figures 9-17 there is illustrated a second embodiment of a putting surface testing apparatus according to the present invention, generally indicated as 110. In this second embodiment like components have been accorded like reference numerals and unless otherwise stated before a like function.

The testing apparatus 110 comprises a curved guideway 112 mounted to a stand 114 such as to allow the guideway 112 to be placed into an inclined orientation between a first ground contacting end 116 and a second elevated end 118. As with apparatus of the first embodiment, this allows a golf ball (not shown) to be released down the guideway 112, from any position therewith, and onto the putting surface at a reproducible speed in order to test the putting surface.

The apparatus 110 additionally comprises a receiver 120 mounted for sliding displacement along the guideway 112, which receiver 120 may be fixed at any desired position along the guideway 112 in order to receive a golf ball and allow the golf ball (not shown) to be released from the particular position on the guideway 112, as with the first embodiment. The receiver 120 comprises a carriage 122 which is again shaped and dimensioned for a complementary fit on the face of the guideway 112, the carriage 122 including a recess or through aperture 124 which passes entirely through the carriage 122 from an upper face thereof, thus providing direct access to the upper surface of the guideway 112 via the through aperture 124. The aperture 124 is dimensioned to allow a golf ball to
pass therethrough, and in the embodiment illustrated has a chamfered upper edge or mouth in order to assist in directing a golf ball into the aperture 124.

The carriage 122 comprises a pair of rails 134 located in opposition on either side of a lower surface or underside of the carriage 122, as can be clearly seen in Figures 12 and 13. In use the pair of rails 34 are seated in a correspondingly shaped and dimensioned pair of slots 136 formed in the opposed lateral edges of the guideway 112, as clearly visible in Figure 14, while Figure 10 illustrates the carriage 122 mounted to the guideway 112 by means of the rails 134 and slots 136. Thus it will be appreciated that the carriage 122 is captured on the guideway 112 and can be slidingly displaced along the guideway 122 in order to vary the vertical height from which a golf ball may be released down the guideway 112 for performing the holing out testing of a putting surface.

In order to allow the carriage 122 to be secured at any desired position along the guideway 112 the receiver 120 is provided with an immobiliser in the form of a plunger 138 which is carried by the carriage 122 and in use is captured between an underside of the carriage 122 and the upper surface of the guideway 112, as shown in Figure 10. The plunger is spring or otherwise biased into contact with the upper surface of the guideway 112, thus lightly clamping the carriage 122 at any position along the guideway 112 at which it is located. The clamping action and frictional force exerted by the plunger 138 can be easily overcome by manual displacement of the carriage 122. Thus it will be appreciated that the spring biased plunger 138 facilitates the immediate immobilisation of the carriage 122 once it is positioned at any point along the guideway 112. Similarly when it is desired to reposition the carriage 122 there is no requirement to open or undo any catches, locks or other retaining mechanisms prior to displacing the carriage 122 to the desired new position along the guideway 112, where the receiver 120 will be again immediately secured by the action of the plunger 138. The plunger 138 is positioned in use, upstream of the through aperture 124 with respect to the guideway 112. In this way the plunger 138 will not form an impediment to the path of a golf ball passed through the recess 124 to travel down the guideway 112, as described hereinafter.

As with the first embodiment, the guideway 112 is preferably curved along the longitudinal direction, and is preferably arcuate in shape and having an optimum radius of curvature of 1.6m. Referring in particular to Figures 14 and 15 it can be seen that the lower free end 116 of the guideway 112 is formed such as to minimise the thickness of the tip to reduce the possibility of bounce as a golf ball transitions from the end 116 of the guideway 112 onto the putting surface.

The upper surface or face of the guideway 112 comprises a pair of sidewalls 140 which define a V shaped channel 142. The optimum but not essential angle defined between the pair of sidewalls 140 is an angle of 144° in order to best suit the dimensions of a standard golf ball. The stand 114 comprises a pair of legs 144 connected via a cross member 146 to which the guide way 112 is suitably secured. The cross member 146 is hingedly mounted between the pair of legs 144 in order to allow the angle between the legs 144 and the guide way 112 to be varied, and thus allowing the
angle or inclination of the guide way 112 to be varied as desired or required. A pair of conventional clamp levers 148 are employed to lock the legs 144 and cross member 146 relative to one another.

Each leg 144 terminates in the spherical or ball shaped foot 150 which again allows the apparatus 110 to have a steady footing on uneven or non uniform surfaces such as grass. The stand 114 further comprises, as illustrated in Figures 16 and 17, a spirit level 152 which in the embodiment illustrated is mounted at the centre of the cross member 146 directly above the upper end 118 of the guideway 112. The height of the legs can be individually varied by adjusting the position of each of the spherical feet 150, until the apparatus 110 has been correctly levelled as indicated by the spirit level 152.

Turning then to the operation of the apparatus 110 of the second embodiment, once positioned on the putting surface the legs 144 and ball feet 150 are adjusted until the apparatus 110 is sitting at the desired orientation and/or position. The carriage 122 is then displaced along the guideway 112 to the desired position. A golf ball is then simply allowed to drop through the aperture 124, thereby landing on the guideway 112, the golf ball then being free to roll downwardly along the guideway 112, initially through the hollow interior of the carriage 122 and out of an opening in the front wall of the carriage 122, before continuing down the guideway 112 to traverse the putting surface until coming to rest or dropping into the hole on the green.

If the golf ball is allowed to come to rest on the putting surface the distance the golf ball has travelled from the first end 116 of the guide way 112 can then be measured. In addition to this measurement, the vertical distance between the putting surface and the position at which the golf ball was initially dropped onto the guideway 112 is also measured. In order to allow this measurement to be quickly and easily taken, a mark or indicia 152 is provided on the side wall of the carriage 122, at a position which corresponds to the centre of a golf ball seated on the guideway 112 immediately after having been passed through the aperture 124. Thus this vertical distance, and the distant travelled by the golf ball along the putting surface, may be used to calculate various values in connection with the quality of the putting surface, by using existing methods of calculation.
Claims

1. A putting surface testing apparatus comprising a curved guideway shaped and dimensioned to direct a golf ball therealong; a stand for raising the guideway into an inclined orientation; and a receiver for releasing a golf ball from a desired position along the guideway.

2. A putting surface testing apparatus according to claim 1 in which the guideway defines a substantially V shaped longitudinally extending channel.

3. A putting surface testing apparatus according to claim 1 or 2 in which the receiver is slibably mounted to the guideway.

4. A putting surface testing apparatus according to any preceding claim comprising an immobiliser operable to releasbly secure the receiver at a desired position along the guideway.

5. A putting surface testing apparatus according to any preceding claim in which the stand comprises a pair of legs spaced from one another and a cross member extending therebetween, the guideway being mounted to the cross member.

6. A putting surface testing apparatus according to claim 5 in which the pair of legs are pivotally mounted to the cross member.

7. A putting surface testing apparatus according to any preceding claim in which the stand comprises a pair of ground engaging feet.

8. A putting surface testing apparatus according to claim 7 in which the feet each comprise a curved ground contacting surface.

9. A putting surface testing apparatus according to claim 7 or 8 in which the feet are each substantially spherical.

10. A putting surface testing apparatus according to any preceding claim in which the guideway comprises a tapered ground contacting end.

11. A putting surface testing apparatus according to any of claims 2 to 10 in which the guideway comprises a pair of opposed faces which define the channel, the opposed faces describing an angle of between 120 and 170 degrees, more preferably between 130 and 160 degrees, and most preferably 144 degrees.
12. A putting surface testing apparatus according to any preceding claim in which the guideway has a radius of curvature of between 1m and 2m, more preferably between 1.3m and 1.8m, and most preferably 1.6m.

13. A putting surface testing apparatus according to any preceding claim in which the receiver defines a recess arranged to receive a golf ball and to allow the golf ball to travel from the recess down the guideway.

14. A putting surface testing apparatus according to any preceding claim in which the receiver comprises a release mechanism displaceable between a ball retaining position and a ball release position.

15. A putting surface testing apparatus according to claim 14 in which the release mechanism is biased towards the ball retaining position.

17. A putting surface testing apparatus according to claim 13 in which the recess is a substantially semi-circular recess formed in a front wall of the receiver.

18. A putting surface testing apparatus according to claim 13 in which the recess comprises a through aperture extending from an upper surface of the receiver to the guideway.

19. A putting surface testing apparatus according to claim 18 in which the receiver comprises an internal passage in communication with the recess at one end and an opening in a front wall of the receiver at another end, the passage being shaped and dimensioned to enable a golf ball to pass from the recess out of the opening.

20. A putting surface testing apparatus according to any preceding claim in which the stand is adapted to enable the orientation of the guideway to be adjusted.
**INTERNATIONAL SEARCH REPORT**

A. CLASSIFICATION OF SUBJECT MATTER

INV. A63B69/36 A63B57/00

ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A63B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

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