April 14, 1964 G. A. HARRIS 3,128,627

GOLF PRACTICE DEVICE

Filed Nov. 7, 1962 2 Sheets-Sheet 1

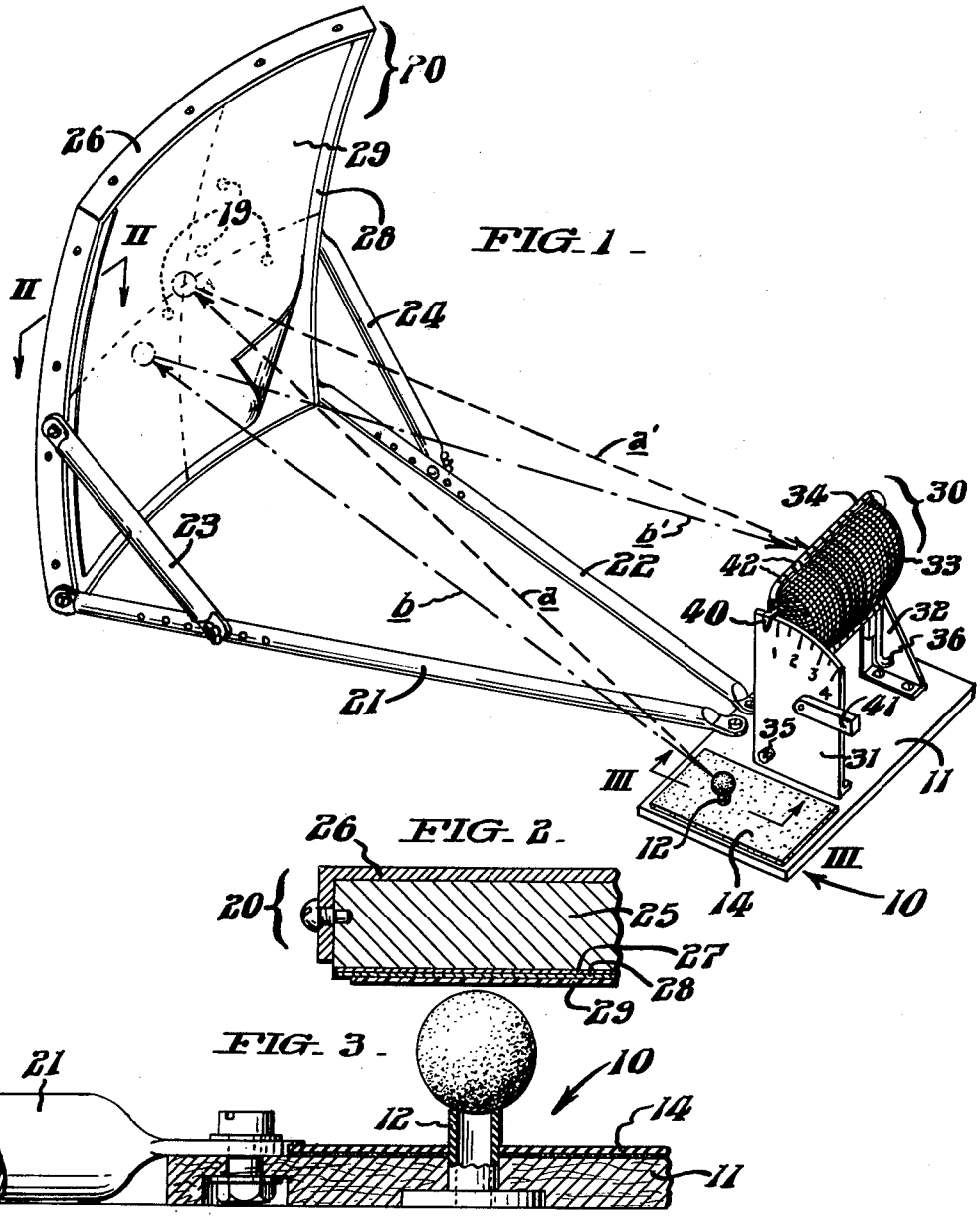


FIG. 1.

FIG. 2.

FIG. 3.

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FIG. 4.

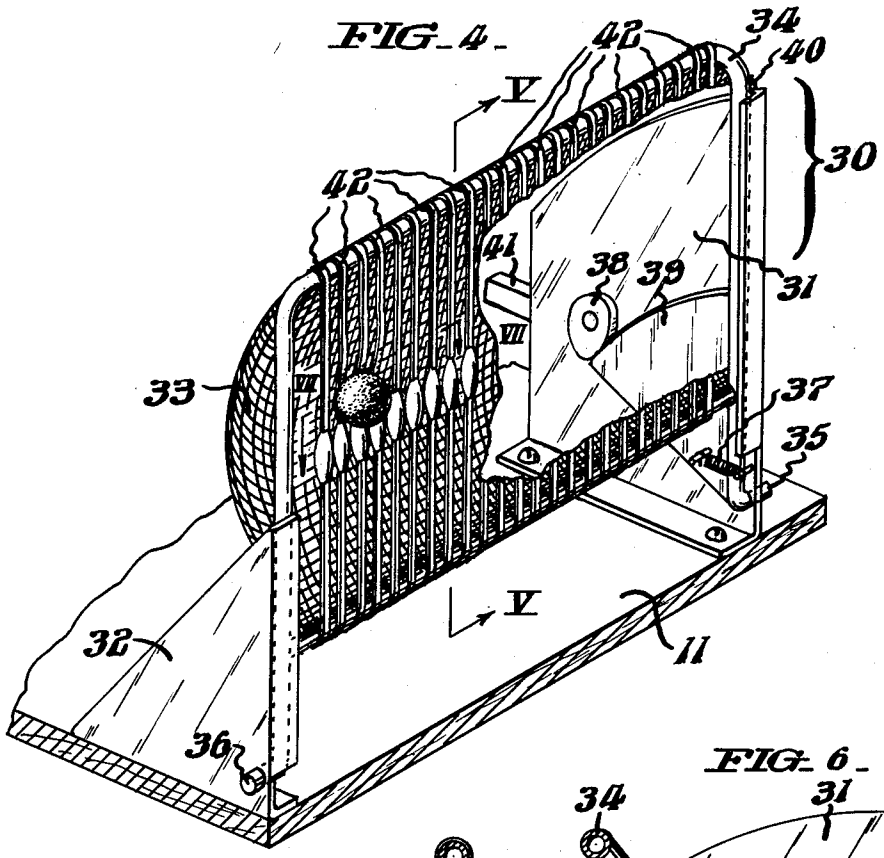


FIG. 5.

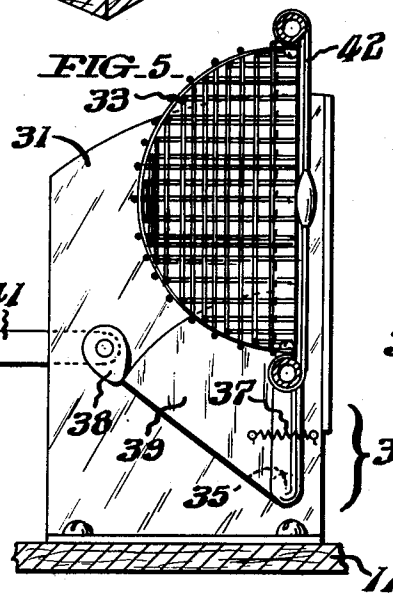


FIG. 6.

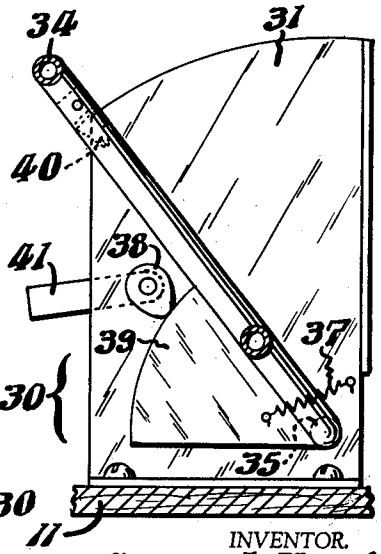
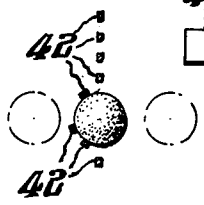


FIG. 7.



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GOLF PRACTICE DEVICE

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12 Claims. (Cl. 73—381)

This invention relates to a golf apparatus which may be used preferably as a golf practice device but which may also be used as an indoor or limited-space golf game.

In accordance with my present invention, a spherical reflector is located a short distance in front of the tee to intercept a flight of the driven ball and to return the ball to a catcher of relatively small area located near the tee position. The catcher is arranged to indicate the approximate or relative distance the ball would have travelled if not intercepted by the reflector, and may also be arranged to indicate whether the ball was hooked or sliced excessively. The surface of the reflector may preferably be arranged to indicate visually the spot which was struck by the ball.

An important and novel feature of the golf apparatus or device of the present invention is the employment of the spherical reflector to intercept the driven ball and to return it to a small area occupied by the catcher-indicator.

My invention will be best understood from a consideration of the following detailed description taken together with the drawings, in which:

FIG. 1 is a perspective view of the golf practice device as seen from behind the tee position used by a right-handed golfer;

FIG. 2 is a sectional view along the line II—II of FIG. 1 showing the cross-section make-up of the spherical reflector;

FIG. 3 is a sectional view along the line III—III of FIG. 1 showing a cross-section of the tee and catcher platform;

FIG. 4 is a perspective view, partly broken away, of the catcher as seen from the reflector position;

FIG. 5 is a section of the catcher along the line V—V of FIG. 4;

FIG. 6 is a detailed showing of the cam and segment arrangement employed in the distance indicating means; and

FIG. 7 is a section along the line VII—VII of FIG. 4 showing the ball passing into the catcher.

In describing the preferred embodiment of the invention illustrated in the drawing, specific terminology has been resorted to for the sake of clarity. However, it is not the intention to be limited to the specific terms so selected, and it is to be understood that each specific term includes all technical equivalents which operate in a similar manner to accomplish a similar purpose.

Referring now to FIG. 1, the golf practice device of the present invention is shown to consist essentially of a fixed tee position, indicated generally by the reference numeral **10**, a spherical reflector **20** located in front of the tee position **10**, and a catcher **30** located at or near the tee position **10**.

At the tee position **10** is provided a platform **11** which may be of wood and on which is mounted a fixed tee **12** and the catcher **30**. In FIG. 1, the tee **12** shown is positioned for a right-handed golfer. Tee **12** may be a conventional type or rubber tee having a base portion and an upstanding tubular portion cut to provide a level top surface. The tee may be mounted in a hole in the catcher support platform **11**, and a rubber pad or mat **14** may be provided for preventing damage to the head of the golf club.

The reflector **20** is located in a precise position in front of the fixed tee **12** by means of the tubular arms **21** and **22** which may be of metal, preferably aluminum. One end

of each of the arms **21**, **22** is pivotally secured to the platform **11**. The other end of each of the arms **21**, **22** is pivotally secured to the base portion of the reflector **20**. The distance between the reflector **20** and the fixed tee **12** may be about 7 feet.

Reflector **20** is adjustably supported in its vertical position by a pair of tubular braces **23** and **24**, the lower ends of which may be secured, as by wing nut and bolt, in any one of a plurality of holes provided in the horizontal arms **21**, **22**. The optimum vertical position of reflector **20** will depend upon the particular club being used by the player. For higher numbered clubs, such as the 7, 8, and 9 iron, which give back-spin to the ball, the support braces **23** and **24** may preferably be moved to holes nearer to the reflector **20**. This tips the reflector outwardly and compensates for the fact that a ball having back-spin will tend to be deflected downwardly from the reflector **20**. Conversely, for such clubs as the driver, which tend to give the ball over-spin, the adjustable support braces **23** and **24** may preferably be moved to holes nearer to the tee to tip the reflector inwardly.

To return to the catcher **30**, a ball which is driven from tee **12** without either appreciable back-spin or over-spin, the reflector **20** is so positioned that a ball following a straight line from the tee **12** to the center of the reflector **20**, as represented by the dashed line *a*, will be reflected to the catcher **30** along the dashed line *a'*. The contour of the spherical reflecting surface of reflector **20** is such that a ball driven from tee **12** along the dot-and-dash line *b* which strikes the reflector at a point which is off center, will nevertheless be reflected to the catcher **30**, as along the line *b'*. In other words, the spherical contour of the reflector **20** is made such that lines drawn to the tee **12** and catcher **30** from any point on the surface of the reflector will form an angle which is bisected by the normal at that point. Thus, the angle of incidence equals the angle of reflection at all points on the surface of reflector **20**.

To accomplish the above, it is necessary that the reflecting surface be reasonably precise. Some latitude is, however, permissible, since the catcher **30** is not a point, but to the contrary occupies a small area. Assuming a catcher whose dimensions are 12" high by 18" wide, the overall surface of reflector **20** may have a gradual variation of approximately one-sixteenth of an inch from the ideal sphere. For catchers of larger area, the gradual variation may be greater. The reflector surface must, however, not contain appreciable small-area elevations, depressions, or ripples.

The body of the spherical reflector **20** may be formed of fiberglass, plastic, metal such as cast aluminum, or other suitable material **25** (FIG. 2). In FIG. 1, the reflector is illustrated as being formed of four rectangular sections or pieces, each of which may measure 18 inches wide and 24 inches high. The four pieces may be secured, as by screws, to a metal frame **26**, which may be an aluminum or zinc die casting.

The front surface of the reflector is preferably covered with a dark color paint **27** (FIG. 2) and then coated with a grease-like substance **28**. A translucent plastic sheet **29**, such as polyethylene or acetate, is then placed over the grease-like substance **28**. This combination of translucent plastic sheet and grease-like base produces a magic slate effect so that the ball impact leaves a clear dark impression, as indicated in FIG. 1 by the small dotted circles **19**. After each shot, or after a group of shots, the impression or impressions may be removed by merely lifting the plastic sheet **29**.

It was stated previously above that the angle of incidence from the tee **12** equals the angle of reflection to the catcher **30** at all points on the reflector **20** surface. This assumes, of course, that the reflector **20** is properly

oriented both horizontally and vertically relative to the tee and catcher positions. In the illustrated embodiments the horizontal orientation of the reflector is controlled by the arms 21 and 22 which are made of proper length so that no adjustment is ordinarily required. The vertical orientation of the reflector 20 is controlled by the positions of the support braces 23 and 24. As previously indicated, these are made adjustable so as to be able to position the reflector to compensate for the back-spin or over-spin given to the driven ball by certain clubs.

While support arms 21 and 22 are preferable, they are not essential. If desired, the reflector 20 may be supported in its proper position by means not connected physically to the catcher 30.

Referring now to FIG. 4, this figure illustrates the catcher 30 as seen from the reflector side. A loose fabric net 33 is supported by a rectangular frame 34, preferably formed of tubular aluminum, which is pivotally mounted, as by the legs 35, 36, in the support brackets 31, 32. If desired, the net 33 may be secured to the frame 34 by an elastic band wrapped in spiral fashion around the tubular arms of the frame. When a ball, which has been reflected from the reflector 20, strikes the catcher 30, the frame 34 swings pivotally rearwardly, pivoting about the turned-out feet portions of the legs 35, 36, against the force of the relatively light tension spring 37.

The extent to which the catcher frame 34 swings rearwardly is, of course, a measure of the speed at which the ball strikes the catcher. Accordingly, means are provided for ascertaining the extent of the rearward movement of the catcher frame 34. In the particular embodiment illustrated in the drawing, the catcher frame 34 is locked, by means of a cam and segment arrangement, in the rearmost position to which it is driven by the ball.

The cam and segment locking arrangement referred to above, comprises the essentric cam 38 so mounted in the side of the support bracket 31 as to be in constant engagement with the arcuate surface of a sector or segment 39 secured to the frame 34 at one side thereof. It will be seen that when the catcher frame 34 moves rearwardly, as when struck by a reflected ball, the cam 38 offers little or no resistance to such rearward movement, but that when the frame 34 starts to return forwardly under the influence of the bias spring 37, the cam 38 rotates in a direction to bring the cam lobe into wedging or locking engagement with the arcuate surface of the segment 39. Thus, return of the frame is arrested, and the frame 34 is locked in substantially the rearmost position to which it was driven by the force of the reflected ball. This position may then be read, as by means of the pointer 40 secured to the frame 34 and the markings on the bracket 31. If desired, the markings may be calibrated in terms of yards, to indicate the approximate distance to which the ball would have been driven if not intercepted by the reflector 20.

The catcher frame may be released from its locked position by merely raising the lever arm 41. This permits the frame to return, under the influence of spring 37, to its normal position.

It is desirable to capture and retain the ball in the cage 30 so that all of its kinetic energy is expended in the cage, thereby to produce an accurate measurement calibrated in terms of length of drive. Also, the captive ball is conveniently retrieved from the cage for further play. For these purposes, the front surface of the frame 34 may be provided with a curtain formed of vertically disposed elastic rubber bands 42 spaced apart on one-half inch centers. A golf ball has a diameter of one and one-half inches. Thus, a golf ball, or other ball the size of a golf ball, necessarily strikes at least two of the rubber bands of the curtain. However, the force of the ball is sufficient to cause it to drive the bands back to the net 33. The bands then slip off the ball and snap back to their forward position. The ball then rebounds from the net toward the rubber band curtain, but its speed is now too low to allow it to pass through the curtain. In this manner, the ball is caught and retained in the net until removed by the player.

FIG. 7 shows the ball in the same position in which it appears in FIG. 4. The bands are being moved rearwardly toward the net 33 and are starting to slip around the surface of the ball.

In FIG. 4, the rubber bands 32 are shown to be weighted at their centers, as by additional rubber. This additional weight causes the bands to vibrate for a time after being struck by a ball. By observing which bands are vibrating, the player can determine whether he hooked or sliced excessively. A ball which is neither hooked nor sliced to any appreciable extent will enter the cage at approximately the center portion thereof. However, a ball which has been sliced will be reflected from the reflector 20 to the side of the catcher nearer to the tee 12, while a ball which has been hooked will be reflected from the reflector to the side of the catcher farther from the tee.

In FIG. 5, a cross-section along the line V—V of FIG. 4 is shown. This view is not entirely true, in that the net 33, being fabric, would sag.

The apparatus shown in FIG. 1 is suitable for a right-hand golfer. If the device is to be used by a left-hand golfer, the positions of the cage 30 and tee 12 would be interchanged. The base 11 may be provided with holes appropriately positioned to receive the tee 12 and the mounting screws of the brackets 31, 32 when such interchange of positions is to be made.

So far as the ball is concerned, any ball which has suitable size and reasonably consistent rebound characteristics may be used.

Throughout this specification and in the appended claims, the reflector is referred to as spherical. Actually, due to the displacement between the tee and the catcher, the ideal reflector should have a very slight elliptical shape, with the long dimension horizontal. The departure from the true spherical shape should, however, be very slight, and can be expected to fall within the manufacturing tolerances of a spherical reflector. Specifically, for a golf device having the dimensions given herein, the departure from a true spherical surface would fall within the $\frac{1}{16}$" variation previously referred to.

While the preferred embodiment of this invention has been described in some detail, it will be obvious to one skilled in the art that various modifications may be made without departing from the invention as hereinafter claimed.

Having described my invention, I claim:

1. A golf practice device which includes a concave spherical surface mounted in a generally upright position for intercepting and reflecting a ball driven toward it from a tee located a short distance in front thereof, and a receiver connected to said spherical surface mounting for receiving the intercepted reflected ball.

2. A golf practice device which includes a concave spherical surface mounted in a generally upright position a short distance in front of a tee for intercepting and reflecting a ball driven toward it from said tee, and a receiving station located in the vicinity of the tee and disposed for receiving a ball reflected from said spherical surface.

3. A golf practice device as claimed in claim 2 characterized in that said receiving station and tee are mounted on a common base.

4. A golf practice device as claimed in claim 3 further characterized in that said receiving station includes a catcher having a net supported by a frame mounted for pivotal rearward movement under the impact force of the ball arriving from the spherical reflector.

5. Apparatus as claimed in claim 4 further characterized in that said catcher includes means for indicating the distance to which said catcher frame is moved rearwardly by the impact of the arriving ball.

6. Apparatus as claimed in claim 5 further characterized in that said catcher also includes means for indicating the lateral point of entry of the ball into the catcher net.

7. A golf practice device comprising a fixed tee, a reflector, and a catcher, and means for mounting said tee, reflector, and catcher in a generally triangular arrangement with the distance from the tee to the catcher being substantially shorter than the distance from either the tee or the catcher to the reflector, said reflector having a vertically disposed concave spherical reflecting surface for intercepting a ball driven toward it from the tee and reflecting the ball to the catcher, said catcher having a net supported by a frame mounted for pivotal rearward movement under the impact force of the arriving ball, and means for indicating the distance to which the catcher frame is moved rearwardly by the force of the arriving ball.

8. A golf practice device as claimed in claim 7 characterized in that said tee and said catcher are mounted on a common base.

9. A golf practice device as claimed in claim 8 further characterized in that means are provided for adjusting the vertical disposition of the spherical reflecting surface.

10. A golf practice device as claimed in claim 9 further characterized in that means are provided for indicating the lateral point of entry of the reflected ball into said catcher net.

11. A golf practice device as claimed in claim 10 further characterized in that means are provided for locking the catcher frame in the rearmost position to which it is moved by the impact force of the arriving ball.

12. In a golf practice device, a concave spherical rebound surface mounted in a generally vertical position a short distance in front of a tee for intercepting and reflecting a ball driven toward it from said tee, a receiving station for receiving a ball reflected from said spherical surface, and means at said receiving station for measuring the impact force of the received ball.

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