

[54] GOLF GAME

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[58] Field of Search 273/183, 184, 185, 186, 176; 73/379

[56] References Cited

UNITED STATES PATENTS

2,581,738 1/1952 Williams 273/185 B X
 2,174,804 10/1939 Neville 273/186 R

FOREIGN PATENTS OR APPLICATIONS

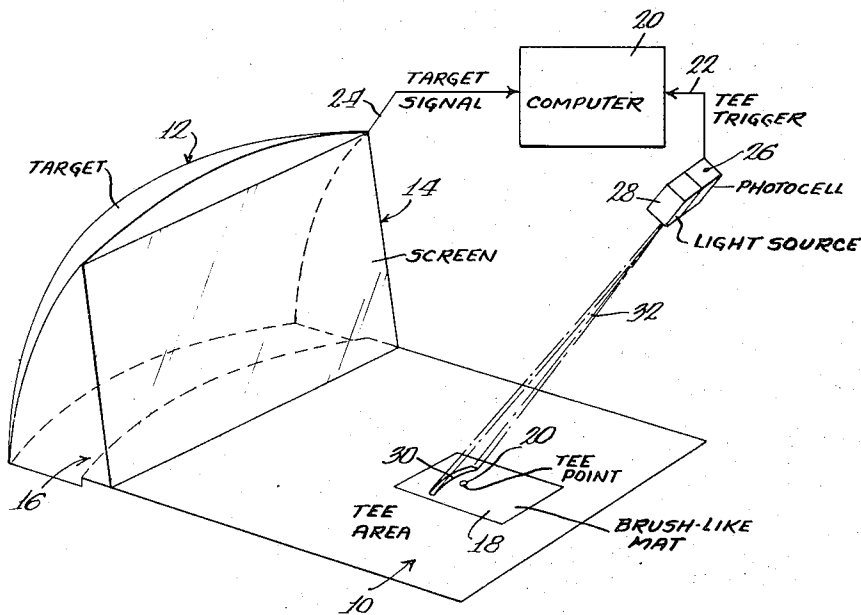
1,111,996 5/1968 Great Britain 273/185 E
 721,170 11/1965 Canada 273/185 A

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[57] ABSTRACT

A tee trigger for use in computerized golf games. There is provided an overhead light source which generates a line of light crossing a tee area in such a way that a ball hit from a line simulating means will break the line of light and reflect light to an overhead photocell to generate a first signal. A second signalling device is spaced from the projected line of light and provides a second signal when the ball reaches that point and the time between the two signals is indicative of the ball's velocity. Through the use of the line of light, the life of the lie simulating means may be increased inasmuch as the ball need not be placed at but a single point thereon for each shot.

6 Claims, 1 Drawing Figure



GOLF GAME

BACKGROUND OF THE INVENTION

The ever increasing popularity of the game of golf has resulted in a number of proposals for golf game devices. Some such devices are in the basic nature of practice apparatus which, by means of a simple computer, indicate to a golfer the distance a shot would have traveled. Some such devices also provide an indication of hook or slice.

Other proposals include extremely complex indoor golf game systems wherein a golfer may play, from tee to green, 18 holes utilizing a free flying ball entirely indoors, observing the play on a computerized display device.

In either case, the prior art has almost universally utilized a pair of sensing devices for sensing a measure of the initial velocity of a ball. Normally, a first sensing device is used to sense when the ball leaves a tee point. A second sensing device is spaced along the line of flight of the ball from the tee point a predetermined distance and will issue a second signal when the ball reaches that point. Depending upon the precise proposal, the second sensing device may measure the impact of the ball against the target or merely sense the presence of the ball in flight without actual contact therewith.

As a result of the two sensing devices, two signals, spaced in time, will be present and assuming that the distance between the tee point and the second sensing device is known, a characteristic of the initial velocity of the ball may be measured. This information may then be used for a variety of purposes depending upon the degree of sophistication of the equipment.

Because such devices require that the distance from the first sensing device to the second sensing device be known, prior proposals have all utilized a so-called "predetermined tee point" at which the ball must be placed prior to hitting the same with the first sensing device ascertaining when the ball has left that point. As a result of this requirement, lie simulating means such as a brush-like mat or carpeting material have experienced a great deal of wear at the predetermined tee point and their life is unduly shortened insofar as they may be worn out at the tee point while other portions thereof are, for all intents and purposes, brand new.

SUMMARY OF THE INVENTION

It is the principal subject of the invention to provide a new and improved tee triggering system which will enable lie simulating means to enjoy an extended life. The exemplary embodiment of the invention contemplates replacing the usual sensor that senses when a ball leaves a predetermined tee point with a light source which projects a line of light across a tee area at a location between the point where a ball would be hit and the customary second signaling means. When the line of light is broken, the usual first signal or tee trigger is generated. As the ball continues in its trajectory and energizes the second sensing means, the second signals previously employed is generated to provide initial velocity related information without the requirement that the ball be hit from the same point time after time. Wear of the lie simulating means can be, therefore, spread out over the entire surface of the same.

In the exemplary embodiment of the invention, the second signalling means comprises a spherical target and the light source providing the line of light is arranged to project the line of light as an arcuate beam and in a direction generally parallel to the vertical dimension of the target. A photocell is arranged in conjunction with the light source to pick up the reflection of a golf ball passing through the line of light to signal the computer.

DESCRIPTION OF THE DRAWING

The FIGURE is a perspective view illustrating a golf game employing a tee trigger made according to the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

An exemplary embodiment of a tee trigger made according to the invention is illustrated in the figure and is seen to comprise an indoor golf game including a tee area, generally designated 10. Of course, it is to be understood that the tee trigger is applicable to golf devices other than indoor games such as practice devices of the type mentioned previously. Located forwardly of the tee area 10 as a target, generally designated 12 which will receive all balls hit from the tee area. According to one embodiment of the invention, the target 12 may be of the type disclosed in the copending application of Conklin et al., Ser. No. 820,558, entitled "Spherical Shell and Spin Detector, filed Apr. 30, 1969, now U.S. Pat. No. 3,591,184, and assigned to the same assignee as the instant application.

Located just forwardly of the target 12 may be a penetrable screen, generally designated 14 of the type known in the art. The screen 14 may receive the projected image of one or more scenes of a hole on a golf course for purposes of illustrating to the golfer the result of each shot in conjunction with a conventional computer operated ball spot projector.

Intermediate the base of the screen 14 and the target 12 may be located a spin determining area generally designated 16 which again may be of the type disclosed in the above identified application of Conklin et al.

Returning now to the tee area 10, the same includes a lie simulating means, generally designated 18, which may be in the form of a brush-like mat or the like having an upper surface on which a ball may be supported and hit towards the target. Additionally, if the target 12 is of the type disclosed in the above-identified application of Conklin et al., a tee point 20 will be located just above the mat 18 with the same being the center of a sphere encompassing the ball receiving surface of the target as disclosed in said application of Conklin et al.

Also employed in the game is a computer 20 which may be of the type disclosed in the copending application of Russell et al., entitled "Golf Game Computing System," filed Oct. 24, 1966, Ser. No. 588,922, now U.S. Pat. No. 3,513,707, and assigned to the same assignee as the instant application. As is disclosed in the Russell et al application, the computer 20 is adapted to receive a first tee trigger signal on a line 22 and the same begins initiation of a counter. When the ball has traveled a predetermined distance, a second signal is provided to the computer 20 on a line 24 by second sensing means. In the Russell et al application, a photocell detecting means is utilized as the second sensing means to provide the second signal on a line 24 but, as disclosed in the above identified application of Conklin et al., the impact on the target 12 may be utilized for the same purpose and the exemplary embodiment contemplates the latter arrangement.

Turning now to the means for generating the first signal on the line 22, the same will be seen to comprise a photocell 26 and appropriate lens system (not shown) which is adapted to receive light reflected from the tee area.

More specifically, the photocell 26 is adapted to receive light reflected by a white golf ball passing through a beam provided by a light source 28. The light source 28 projects a beam of light which defines an arcuate line of light as, for example, at 30 extending across the tee area in a direction generally parallel to the second sensing system, here the target 12, so that when a ball passes through the same, the temporary reflection of light from the source 28 will cause a change in the illumination of the photocell 26. Through conventional means this may be passed along a line 22 to initiate operation of the computer. The use of a light source that defines an arcuate beam is generally preferable, particularly when a target such as the spherical target disclosed, is used. When such is the case, the center of the arcuate beam may be made coincidental with the center of the sphere so that there will be relatively constant distance between all parts of the beam and the target as measured radially from the center of the sphere.

Of course, the arcuate beam might be employed advantageously in non-spherical targets having a curved ball receiving surface. It should further be noted that the nature of the arc may be somewhat varied to compensate for the curve of such targets or to average out possible small inaccuracies due to the variable imposed by permitting the golfer to place the ball at any location on the mat.

In the exemplary embodiment, the light source 28 is disposed so that the beam of light 32 projected thereby is generally parallel to the vertical dimension of the sensing plane of the second sensing means. When a spherical target is used, the beam 32 should be generally parallel to the average vertical dimension.

It is also desirable that the beam 32 be focused so that the line of light 30 will appear just forwardly of the tee point 20. When such is done and the tee point or any point rearwardly thereof is used as the spot from which the ball is hit, virtually as soon as the ball is moved by a club, the same will move into the line of light to reflect a portion of the same to the photocell 26. Thus, the ball may be located at any point rearwardly of the line of light on the mat 18 and when struck, the same will pass through the line of light to trigger the photocell almost immediately after impetus has been added to the same by a club head with there being very little opportunity for the initial velocity of the ball to decay so that the arrangement provides good accuracy. Furthermore, virtually the entire length of the mat 18 may be used thereby evening out the wear on the same.

Another advantage of the system over other photocell tee triggering systems known in the art which rely on the lack of reflection by a ball as a trigger, i.e., when the ball is placed on the tee, a photocell will be illuminated by reflection and when hit, the reflection will cease thereby providing an indication that the ball has been hit, is that the reflection by a club head cannot maintain the photocells in such systems illuminated thereby delaying the tee trigger signal until the club has completely passed through the beam of light projected on the ball. Such systems can provide a large error in that the ball will leave the spot of light significantly before the club head.

We claim:

1. In a golf game having a tee area including means in the area for simulating the lie of a portion of a golf course and from which a golf ball may be hit from the area, a first sensing means for determining when a golf ball has been hit from the lie simulating means, a second sensing means forwardly of the lie simulating means for detecting when a ball hit from the lie simulating means for detecting when a ball hit from the lie simulating means has traveled a predetermined distance therefrom and a computer responsive to both said sensing means for generating trajectory information, the improvement

for maximizing the life of the lie simulating means wherein said first sensing means comprises a light source for projecting a line of light across said tee area in such a position that a ball hit from the lie simulating means will pass through the line of light, and photo-sensitive means responsive to the ball passing through the line of light for providing said first signal, said photo-sensitive means being positioned remote from said lie simulating means and oriented to receive only light which is reflected by an object passing through said line of light, and comprising a photocell having a sensitivity such that it will respond to an amount of light no less than that reflected by a golf ball passing through said line of light.

2. The combination of claim 1 wherein said light providing means projects a beam of light in a direction generally parallel to the sensing plane of said second sensing means, and wherein said photocell is positioned to receive substantially only that light reflected in a direction substantially opposite to the direction of projection of said beam of light.

3. A golf game according to claim 1 wherein said light source is arranged to project said line of light in a direction generally parallel to the sensing plane of said second sensing means.

4. In a golf game having a tee area including means in the area for simulating the lie of a portion of a golf course and from which a golf ball may be hit from the area, a first sensing means for determining when a golf ball has been hit from the lie simulating means, a second sensing means forwardly of the lie simulating means for detecting when a ball hit from the lie simulating means has traveled a predetermined distance therefrom and a computer responsive to both said sensing means for generating trajectory information, the improvement for maximizing the life of the lie simulating means wherein said first sensing means comprises a light source projecting a line of light across said lie simulating means in a first direction generally parallel to the sensing plane of the second sensing means so that a ball hit from any position on the lie simulating means behind the line of light will pass through the line of light, and photosensitive means responsive to the ball passing through the line of light for providing said first signal said photo-sensitive means comprising a photocell positioned to receive only such light as is reflected substantially along the reciprocal of said first direction by a ball passing through the line of light.

5. A golf game according to claim 4 wherein said light source and said photo-sensitive means are mounted above said tee area and behind said lie simulating means with said line of light being projected downwardly from said light source to said tee area and crossing said lie simulating means.

6. A golf game according to claim 5 wherein said light source projects an arcuate line of light.

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