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(54) **METHOD, SYSTEM AND APPARATUS FOR CAPTURING THE CRITICAL PARAMETERS OF A GOLF BALL IN FLIGHT AND DISPLAYING THOSE PARAMETERS TO THE INDIVIDUAL GOLFERS**

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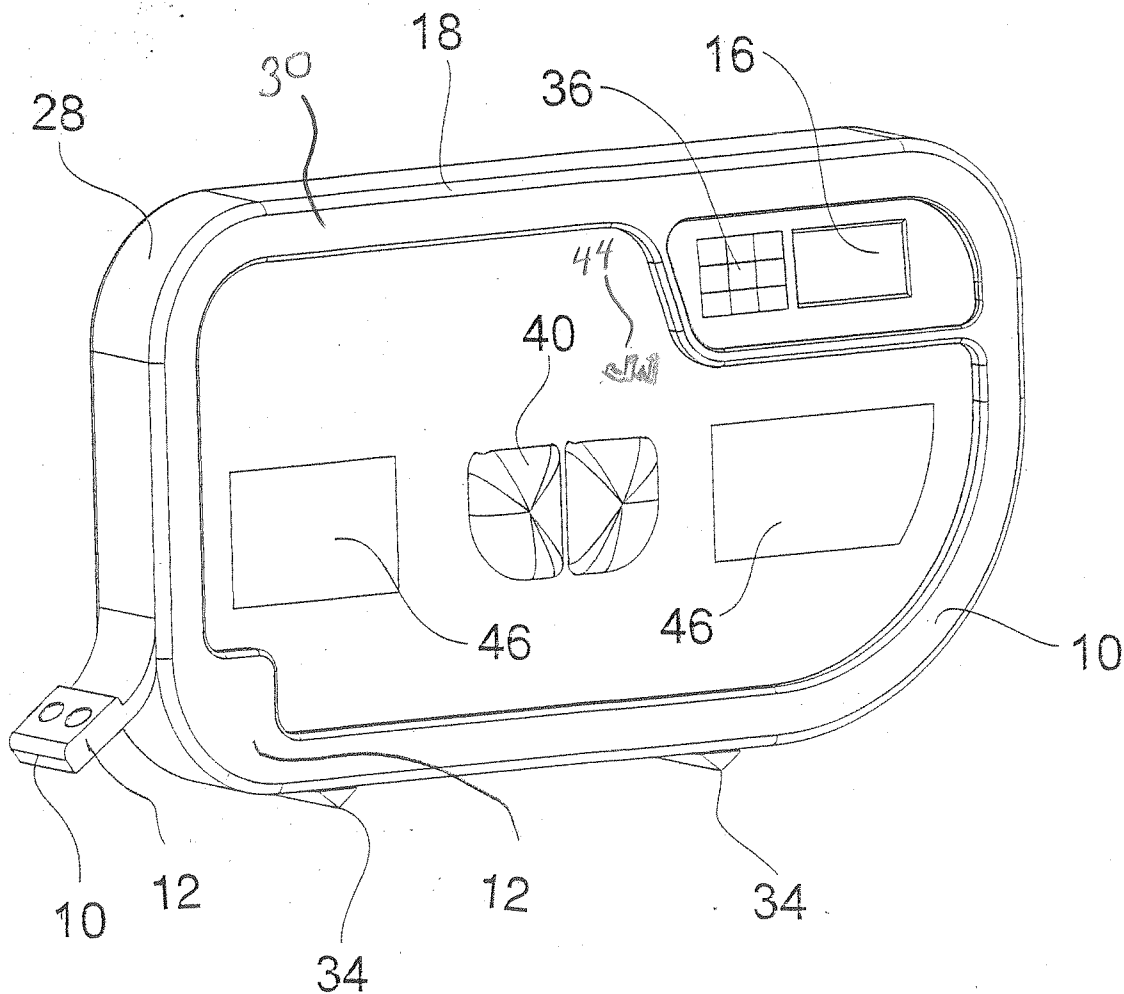
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(57) **ABSTRACT**

A method, system and apparatus is disclosed for utilizing the ability to capture the essential parameters of a golf ball in flight and to generate immediate feedback to the golfer regarding the drive. The apparatus can also pair the golf ball flight information with advertising in order to increase revenue to the golf course that employs the system.



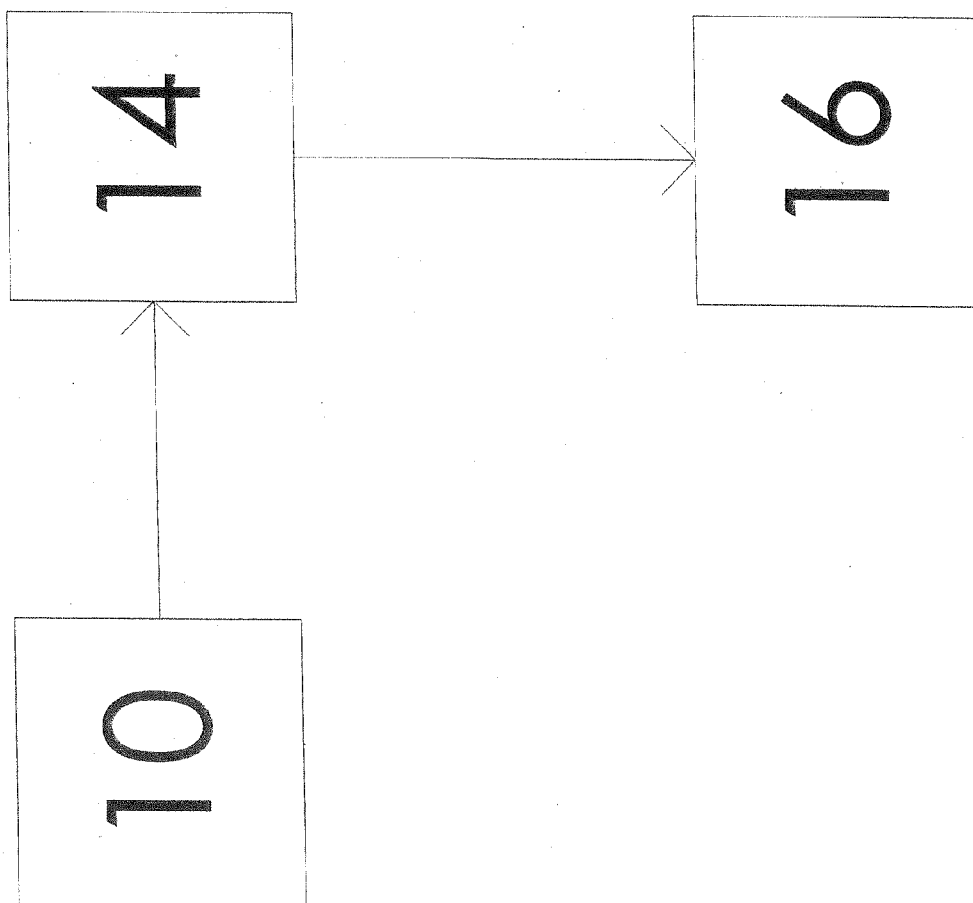


FIG. 1

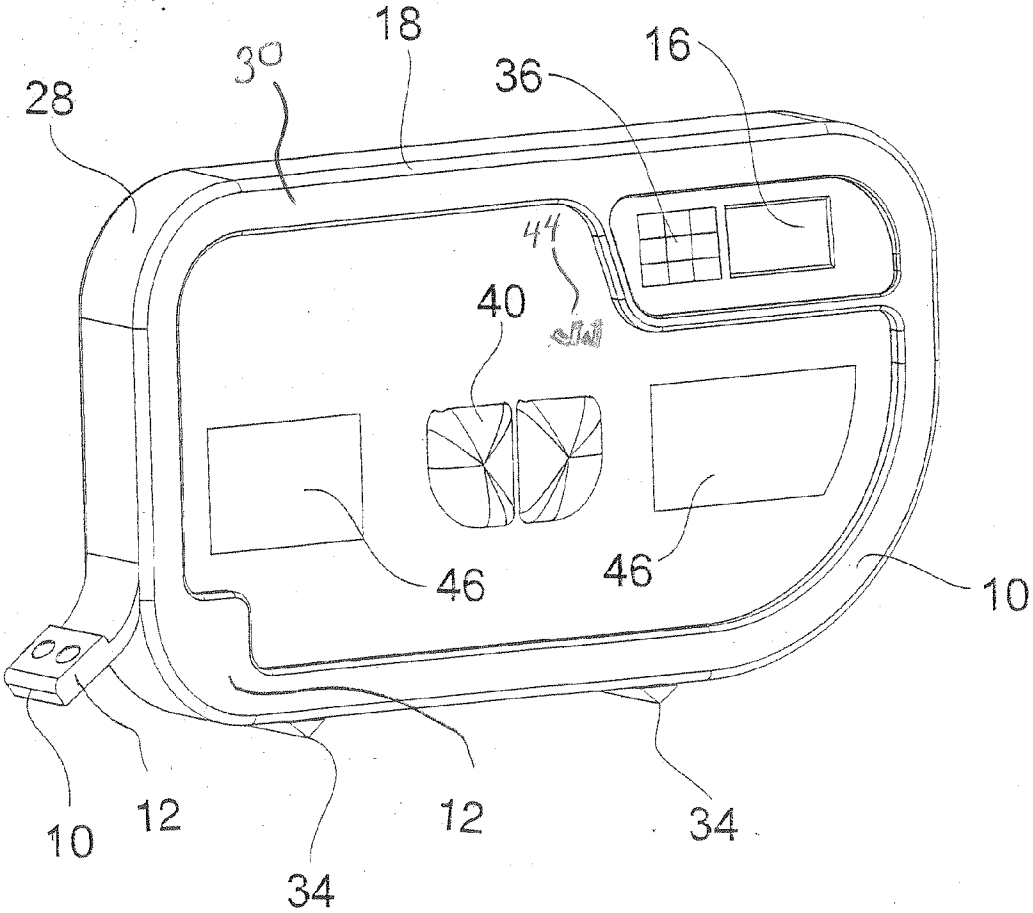


FIG. 2

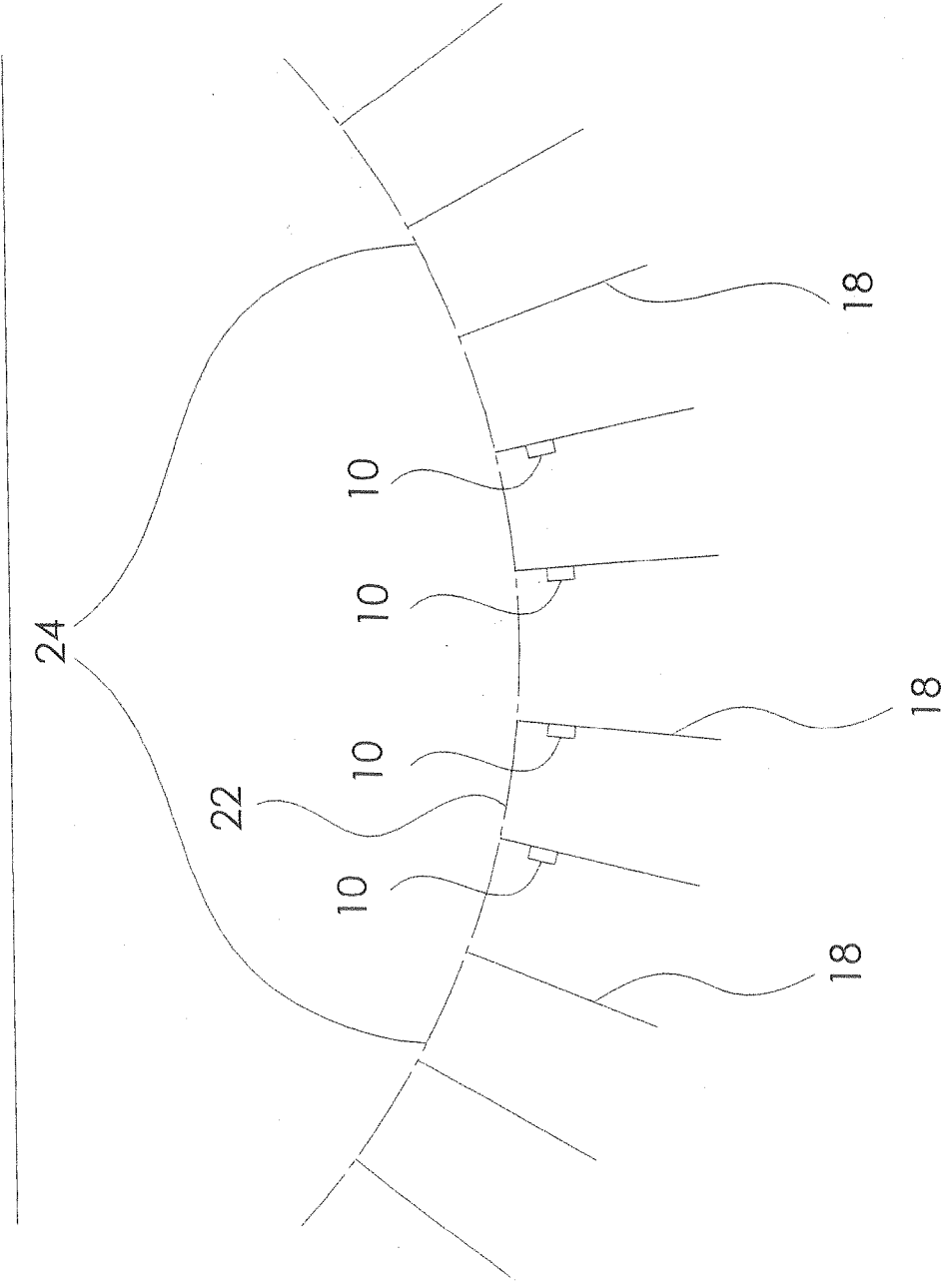


FIG. 3

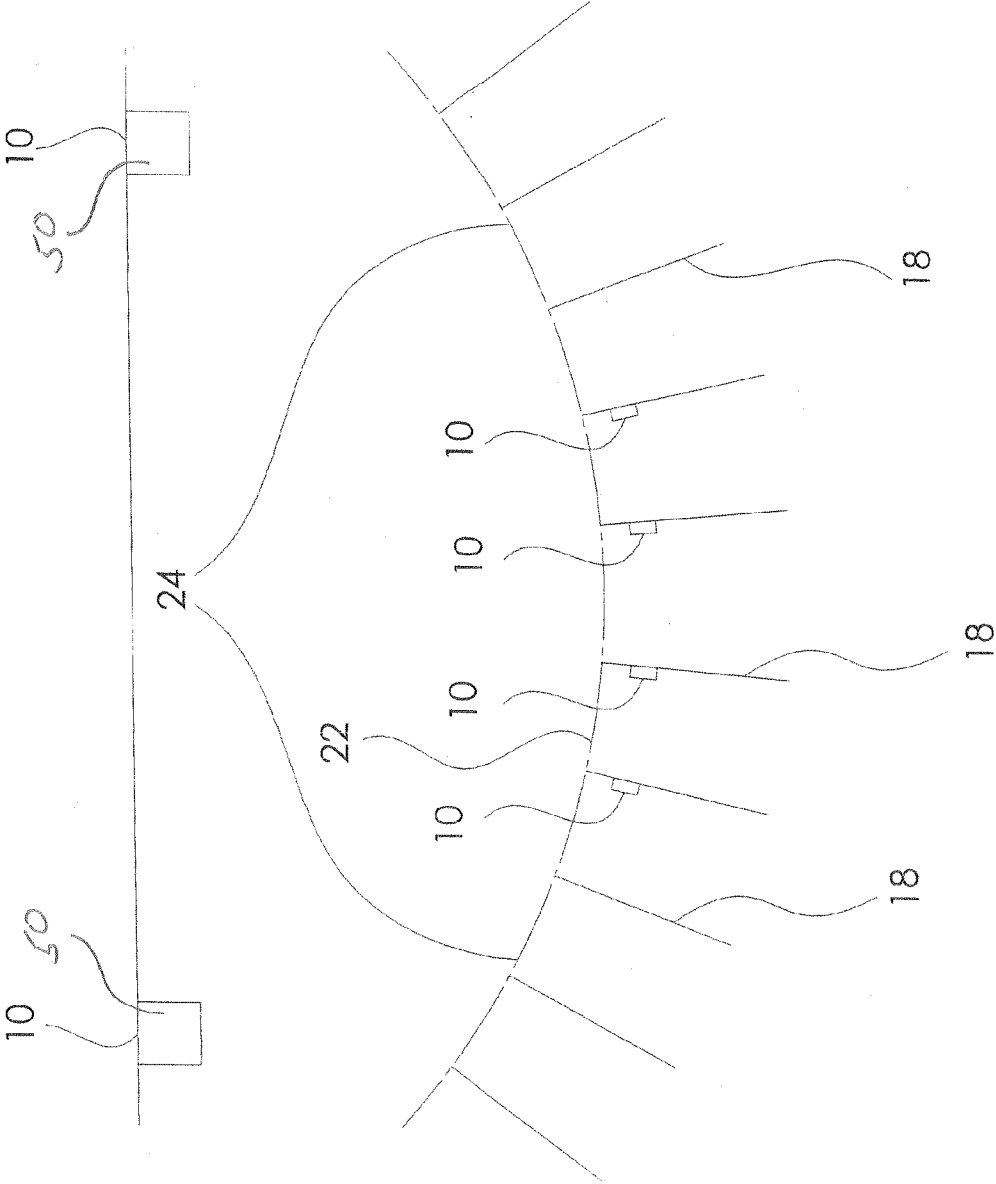


FIG. 4

METHOD, SYSTEM AND APPARATUS FOR CAPTURING THE CRITICAL PARAMETERS OF A GOLF BALL IN FLIGHT AND DISPLAYING THOSE PARAMETERS TO THE INDIVIDUAL GOLFERS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application No. 61/597,646 filed Feb. 10, 2012 in the United States Patent and Trademark Office which is hereby incorporated by reference herein in its entirety, including but not limited to those portions that specifically appear hereinafter, the incorporation by reference being made with the following exception: In the event that any portion of the above-referenced application is inconsistent with this application, this application supercedes said above-referenced application.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Not Applicable.

BACKGROUND

[0003] 1. The Field of the Invention

[0004] This disclosure relates generally to the use of an automated golf ball range calculator to act as a medium to enhance the golfing experience at a driving range and thereby increase driving range fees and advertising revenues for a golf course. More particularly, this invention relates to a system, method and apparatus to capture certain parameters of a golf ball in flight in order to calculate the relative success of the golfer's drive, such as carry distance and direction of the ball and to display electronically the calculated results to the golfer in order to enhance the golfer's driving range experience. This invention also presents the opportunity for advertising to be presented in conjunction with the display.

[0005] 2. Description of Related Art

[0006] Golf course driving ranges are very popular with golfers. They bring in extra revenue to the golf course as golfers pay for range balls to practice with and otherwise warm up prior to playing around on the actual course. Other golfers come to the course just to practice on the driving range. This latter group represents customers for the golf course who would otherwise not be patronizing the course that day. In any event, the driving range represents an additional revenue source for a golf course. The profitability of the driving range could be increased by 1) enhancing the experience for the driving range customer by providing immediate feedback regarding the relative success of each drive, and 2) providing a useful advertising medium by displaying advertising along with the feedback regarding the relative success of each drive.

[0007] On a traditional driving range, the golfer stands in a designated area at the edge of the range and drives the ball down range. A series of markers set at varying distances from the area designated for driving contain numbers representing the distance of each marker from the driving area provides the golfer a rough approximation of the distance of the drive. This method can give the golfer only a rough approximation of the distance the golf ball has been driven, especially as one moves farther from the center of the driving range.

[0008] More sophisticated ball tracking systems exist that electronically track the ball in flight and generate a set of data points that reflect the flight of the ball through the air. They then use that set of data points to extrapolate the direction and ultimate distance of the ball.

[0009] In addition, some driving ranges employ tee dividers separating the golfers from one another. However, as currently employed, these tee dividers provide little in the way of useful information or profitable advertising options.

[0010] Thus, it would be useful to pair the more sophisticated ball tracking systems with tee dividers to provide for the generated results of the tracking system to be displayed on an electronic display device located on the tee divider in order to give the golfer instant feedback on the relative success of his or her drive. Because this system causes the golfer to divert his or her attention to the display device after each drive, this feature also presents the opportunity to provide increased revenues from the driving range.

SUMMARY

[0011] The current disclosure teaches an effective way to pair automatic range finder technology with current display technology to enhance the golfing experience. As a consequence of the enhanced golfing experience, it provides an opportunity to increase revenues from the driving range.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The features and advantages of the disclosure will become apparent from a consideration the subsequent detailed description presented in connection with the accompanying drawings in which:

[0013] FIG. 1 depicts a block diagram of a ball tacking system;

[0014] FIG. 2 is a perspective view of a golf tee divider;

[0015] FIG. 3 depicts the placement of multiple tee dividers on a driving range;

[0016] FIG. 4 depicts the orientation of a ball tracking system.

DETAILED DESCRIPTION

[0017] For the purposes of promoting an understanding of the principles in accordance with the disclosure, reference will now be made to the embodiments illustrated in the drawings and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the disclosure is thereby intended. Any alterations and further modifications of the inventive features illustrated herein, and any additional applications of the principles of the disclosure as illustrated herein, which would normally occur to one skilled in the relevant art and having possession of this disclosure, are to be considered within the scope of the disclosure claimed.

[0018] Before the present Method, System and Apparatus for Capturing the Critical Parameters of a Golf Ball in Flight and Displaying Those Parameters to the Individual Golfers is disclosed and described, it is to be understood that this disclosure is not limited to the particular configurations, process steps, and materials disclosed herein as such configurations, process steps, and material may vary somewhat. It is also to be understood that the terminology employed herein is used for the purpose of describing particular embodiments only and is

not intended to be limiting since the scope of the present disclosure will be limited only by the appended claims and equivalents thereof.

[0019] The publications and other reference materials referred to herein to describe the background of the disclosure, and to provide additional detail regarding its practice, are hereby incorporated by reference herein in their entireties, with the following exception: In the event that any portion of said reference materials is inconsistent with this application, this application supercedes said reference materials. The reference materials discussed herein are provided solely for their disclosure prior to the filing date of the present application. Nothing herein is to be construed as a suggestion or admission that the inventors are not entitled to antedate such disclosure by virtue of prior disclosure, or to distinguish the present disclosure from the subject matter disclosed in the reference materials.

[0020] Unless defined otherwise, all technical and scientific terms used herein have the same meaning as commonly understood to one of ordinary skill in the art to which this disclosure belongs. Although any methods, devices or materials similar or equivalent to those described herein can be used in the practice or testing of the disclosure, the preferred methods, devices, and materials are now described.

[0021] It must be noted that, as used in this specification and the appended claims, the singular forms “a,” “an,” and “the” include plural referents unless the context clearly dictates otherwise.

[0022] In describing and claiming the present disclosure, the following terminology will be used in accordance with the definitions set out below.

[0023] As used herein, the terms “comprising,” “including,” “containing,” “characterized by,” and grammatical equivalents thereof are inclusive or open-ended terms that do not exclude additional, un-recited elements or method steps.

[0024] As used herein, the phrase “consisting of” and grammatical equivalents thereof exclude any element, step, or ingredient not specified in the claim.

[0025] As used herein, the phrase “consisting essentially of” and grammatical equivalents thereof limit the scope of a claim to the specified materials or steps and those that do not materially affect the basic and novel characteristic or characteristics of the claimed disclosure.

[0026] As used herein, the term “proximal” shall refer broadly to the concept of a nearest portion.

[0027] As used herein, the term “distal” shall generally refer to the opposite of proximal, and thus to the concept of a further portion, or a furthest portion, depending upon the context.

[0028] As used herein, the phrase “in an at least partially proximal-to-distal direction” shall refer generally to a two-dimensional concept of direction in which the “proximal-to-distal” direction defines one direction or dimension. An item that extends in a non-parallel direction with respect to the “proximal-to-distal” direction, that is, at a non-straight angle thereto, thereby involves two components of direction, one of which is in the “proximal-to-distal” direction and the other being in a direction orthogonal to the “proximal-to-distal” direction.

[0029] Turning now to FIG. 1, there is depicted a block diagram of the system. The system includes a golf tee range finder module 10 capable of capturing one or more parameters useful in calculating the trajectory of a golf ball in flight. These parameters can include, but are not limited to: the golf

head speed at the time of impact with the golf ball; the velocity of the golf ball after impact; the launch angle of the ball; and, the ball spin. The system further includes a calculating module 14 in communication with the golf tee range finder module 10 and capable of receiving the data captured by the golf tee range finder module and using that data to calculate, among other things the total carry distance, the estimated roll distance and the power transfer ratio. The system further includes a display module 16 in communication with the calculating module 14 and capable of receiving information from the calculating module 14 and displaying all the parameters captured by the golf tee range finder module 10 and calculated by the calculating module 14. The various components may communicate via hard wiring, electromagnetic signaling such as blue tooth, or any other means known to those of ordinary skill in the art.

[0030] In another embodiment, the calculating module is in communication with a transmitting device capable of transmitting the an electromagnetic signal. The display module may comprise a mobile phone, tablet computer, laptop computer or other mobile device capable of receiving an electromagnetic signal from the transmitting device and containing the parameters captured by the golf tee range finder module 10 and calculated by the calculating module 14. The display module then displaying one or more of the parameters captured by the golf tee range finder module 10 and calculated by the calculating module 14.

[0031] In one embodiment, the display module 16 may be located proximate to where the golfer stands to drive his or her golf balls and may be positioned so that it is viewable by the golfer. When the golfer hits the golf ball, the golf tee range finder module 10 captures one or more parameters useful in calculating the trajectory of a golf ball in flight. The golf tee range finder 10 may be activated by a motion sensor, sound detector or by any other means known in the art.

[0032] Once the golf tee range finder 10 captures the desired parameters of the golf ball, it transmits the data to the calculating module 14. The calculating module 14 uses that data to calculate one or more of the following: the total carry distance, the estimated roll distance and the power transfer ratio. The calculating module 14 then transmits its results to the display module 16. The display module displays in digital or graphic form the results transmitted to it by the calculating module 14.

[0033] FIG. 2 depicts a golf tee divider 18. The golf tee divider 18 is designed so that it may be placed on the driving range between the areas that define the space allocated for each golfer on the driving range. Multiple golf tee dividers 18 may be placed on the driving range so that each golfer may be situated between two golf tee dividers 18 with the area allocated for each golfer defined by the space between the two proximate golf tee dividers 18.

[0034] FIG. 3 depicts one embodiment of the placement of the golf tee dividers wherein the golf tee dividers are arranged along a hypothetical line 22 that describes a slight arc 24, with the concave side of the arc 24 proximate to the driving range, so that each golfer hits his or her shot in the direction of the concave side of the arc 24 to drive the ball down range. Each space allocated for a golfer possesses a golf tee range finder 10 capable of tracking the desired parameters of each struck ball. Returning to FIG. 2, in this embodiment, a golf tee range finder module 10 and a display module 16 are located on each golf tee divider 18 so that each golfer has access to a display of designated parameters of his or her shot. In this embodi-

ment, Doppler chips **12**, that provide information to the range finder module, are located at two locations in the golf tee divider **18**. The divider **18** may be constructed of plastic, metal wood, or any other material known in the art. The divider **18** also may possess a housing **28** comprising a frame **30** used to house one or more system components such as the display module **16** and mounting supports **34**. The mounting supports **34** can take the form of anchor devices for use in anchoring to concrete or grass. Divider **18** may be of any size or shape sufficient to contain the display module **16**.

[0035] In one embodiment, the golfer can select, from a predefined set of inputs, the parameters he or she wants to be displayed on the display module **16**. These parameters can include, but are not limited to the golf head speed at the time of impact with the golf ball; the velocity of the golf ball after impact; the launch angle of the ball; the ball spin; the estimated carry distance the estimated roll distance; and, and the power transfer ratio. The selection of the desired facilitated by and input device **36** located on the divider **18**.

[0036] Where the display module **16** is located on or near the golf tee divider, the golfer will have an incentive to look at the display after each shot. In the depicted embodiment, the display module **16** possesses the ability to stream audio and video. This provides the ability to display advertisements on the display module **16** along with the desired parameters of each shot. The advertisements can be provided between each display of the desired parameters of the most recent shot. This allows the golf course owner to sell advertising and thus generate additional revenue.

[0037] In this embodiment, the dividers **18** also possess a storage area **40** for the golfer's valuables such as cell phones or beverages, golf bag or golf club support **44** and advertising panels for the purpose of affixing static advertising.

[0038] In one embodiment of this system, the audio and video advertisements are streamed in a random manner. In another embodiment, the audio and video advertisements are stored as a continuous loop that is continuously replayed. In yet another embodiment, a set of advertisements for golf related products is stored in the memory of the display module. The display module possesses a processor capable of receiving one or more parameters of the most recent golf shot and selecting for display the advertisement most relevant to those parameters. For example, if the most recent shot is revealed to have an undesirable amount of spin, one or more advertisements for products or services that address the problem of excess spin can be selected for display. In this way the advertising can be targeted to the specific concerns of the golfer. This type of targeted advertising is especially valuable to advertisers and allows the entity that controls the advertising medium or venue to charge a premium for the advertising. The golf tee dividers **18** can also possess means to affix stationary advertising or fliers **46** along with the audio and video display.

[0039] In one embodiment, the golf tee range finder module **10** captures the at least one of the parameters of the golf ball in flight by reflecting electromagnetic radiation from the golf ball in flight and comparing the frequency of the outgoing electromagnetic radiation with the frequency of the incoming electromagnetic radiation. This ability can be provided by employing Doppler radar technology to capture the at least one parameter of the golf ball in flight. The radar may be triggered by either the sound of the ball being struck or by an

electric eye type device or motion sensor that is triggered either by the swing of the club or by the movement of the golf ball.

[0040] In another embodiment, the golf tee range finder utilizes a camera to capture multiple images of the ball in flight and employs a computer program to analyze those images in terms of their image size and position in relation to one another over time to generate the parameters of the golf ball in flight.

[0041] In yet another embodiment depicted in FIG. 4, the golf tee range finder module **10** comprises at least two receiver units capable of receiving electromagnetic signals. These receiver units are placed strategically on the driving range. In this embodiment, golf balls are used that are capable of transmitting electromagnetic signals received by the receiver units and wherein the signals are then used by the calculating module to triangulate the positions of the golf ball as it is in flight.

[0042] The electronics in this device may be powered by a hard wired electrical source such as 110 or 220 volt alternating current, battery power, solar power, or a combination of two or more of the three.

What is claimed is:

1. A golf tee range finder system comprising:
 - a golf tee range finder module capable of capturing certain parameters of the ball in flight;
 - a calculating module in communication with the range finder module, said calculating module being capable of receiving the data captured by the range finder module and calculating one or more of the following: the total carry distance, the estimated roll distance and the power transfer ratio;
 - a tee divider; and,
 - a display module located on the tee divider and in communication with the calculating module capable of receiving the data generated by the range finder module and the calculating module and displaying that information on a display screen.
2. The golf tee range finder system of claim 1 wherein the display module comprises a video and audio display.
3. The golf tee range finder system of claim 2 wherein the tee divider possesses at least one storage area, at least one golf bag support and at least one golf club support.
4. The golf tee range finder system of claim 2, wherein the range finder module uses electromagnetic radiation to capture at least one of the parameters of the golf ball in flight.
5. The golf tee range finder system of claim 2 wherein the range finder module captures the at least one of the parameters of the golf ball in flight by reflecting electromagnetic radiation from the golf ball in flight and comparing the frequency of the outgoing electromagnetic radiation with the frequency of the incoming electromagnetic radiation.
6. The golf tee range finder system of claim 2 wherein the range finder module employs a Doppler radar to capture the at least one parameter of the golf ball in flight.
7. The golf tee range finder system of claim 2 wherein the range finder module utilizes a camera to capture multiple images of the ball in flight and employs a computer program to analyze those images in terms of their image size and position in relation to one another over time to generate the parameters of the golf ball in flight.
8. The golf tee range finding system of claim 2 wherein range finder module comprises at least two receiver units capable of receiving electromagnetic signals, which receiver

units are placed strategically on the driving range, and further comprising golf balls capable of transmitting electromagnetic signals received by the receiver units and wherein the signals are then used by the calculating module to triangulate the positions of the golf ball as it is in flight.

9. The golf tee range finding system of claim **3** wherein the video display displays advertising as well as the parameters of the golf balls in flight.

10. An advertising system to employ at a golf course driving range comprising:

a golf tee range finder module capable of capturing certain parameters of the ball in flight;

a calculating module in communication with the range finder module, said calculating module being capable of receiving the data captured by the range finder module and calculating one or more of the following: the total carry distance, the estimated roll distance and the power transfer ratio;

a tee divider; and,

a display module located on the tee divider and in communication with the calculating module capable of receiving the data generated by the range finder module and the calculating module and displaying that information on a display screen along with audio and video advertisements.

11. The advertising system of claim **10** wherein the display module possesses a processor capable of determining which of one or more stored advertisements are most relevant to the displayed parameters and displaying those advertisements.

12. The golf tee range finder of claim **10** wherein the display module comprises a video and audio display.

13. The advertising system of claim **11** wherein the tee divider possesses at least one storage area, at least one golf bag support and at least one golf club support.

14. The advertising system of claim **11** wherein the range finder module uses electromagnetic radiation to capture at least one of the parameters of the golf ball in flight.

15. The advertising system of claim **11** wherein the range finder module captures the at least one of the parameters of the golf ball in flight by reflecting electromagnetic radiation

from the golf ball in flight and comparing the frequency of the outgoing electromagnetic radiation with the frequency of the incoming electromagnetic radiation.

16. The advertising system of claim **11** wherein the range finder module employs a Doppler radar to capture the at least one parameter of the golf ball in flight.

17. The advertising system of claim **11** wherein the range finder module utilizes a camera to capture multiple images of the ball in flight and employs a computer program to analyze those images in terms of their image size and position in relation to one another over time to generate the parameters of the golf ball in flight.

18. The advertising system of claim **11** wherein range finder module comprises at least two receiver units capable of receiving electromagnetic signals, which receiver units are placed strategically on the driving range, and further comprising golf balls capable of transmitting electromagnetic signals received by the receiver units and wherein the signals are then used by the calculating module to triangulate the positions of the golf ball as it is in flight.

19. A golf tee range finder system comprising:

a golf tee range finder module capable of capturing certain parameters of the ball in flight;

a calculating module in communication with the range finder module, said calculating module being capable of receiving the data captured by the range finder module and calculating one or more of the following: the total carry distance, the estimated roll distance and the power transfer ratio; and,

a display module in communication with the calculating module and capable of receiving the data generated by the range finder module and the calculating module and displaying that information on a display screen.

20. The golf tee range finder of claim **19** wherein the video display displays advertising as well as the parameters of the golf balls in flight.

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