Oct. 14, 1969 J. OPPENHEIMER 3,472,075

GOLF SIMULATION SYSTEM

Filed Sept. 27, 1965 4 Sheets-Sheet 1

FIG-1

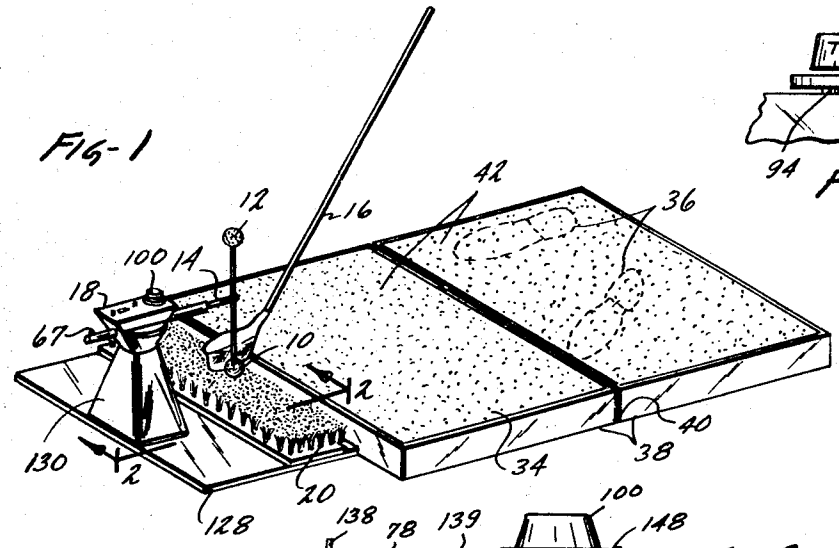


FIG-8

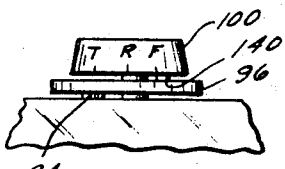


FIG-2

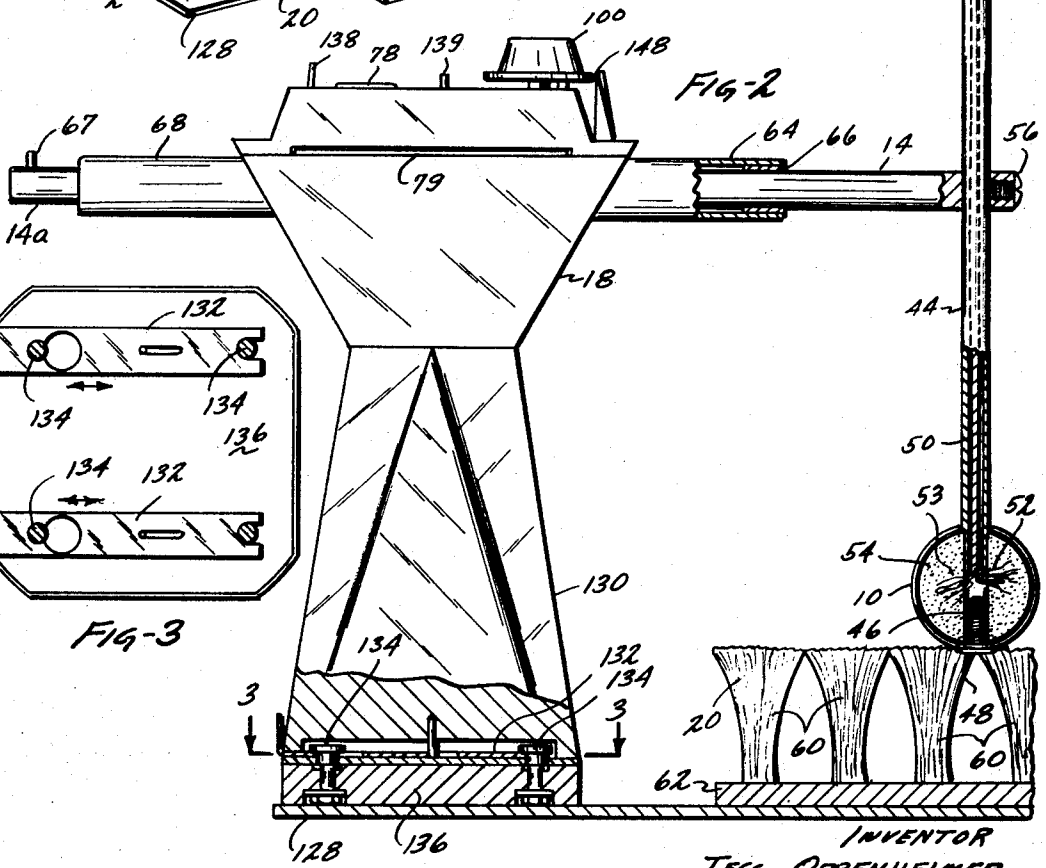


FIG-3




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GgolF SIMULATION SYSTEM

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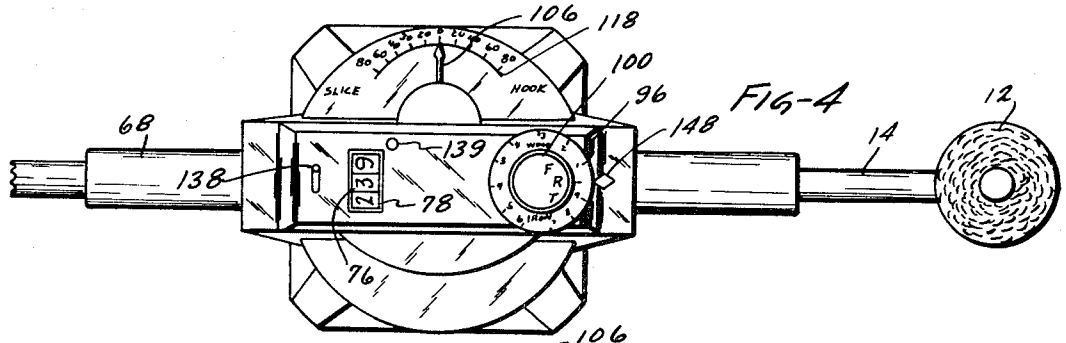


FIG-4

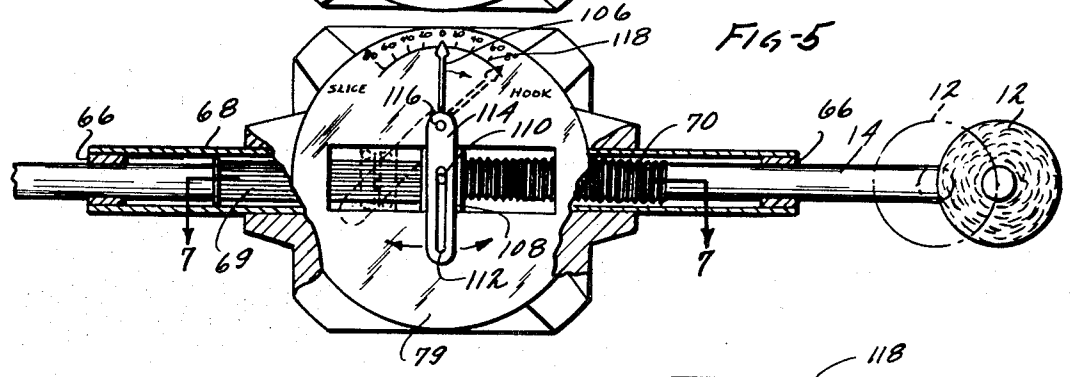


FIG-5

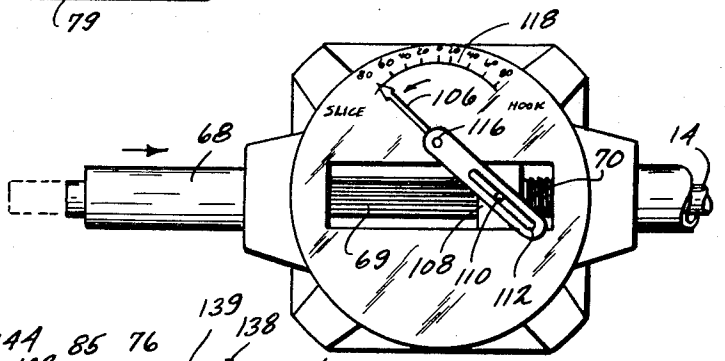


FIG-6

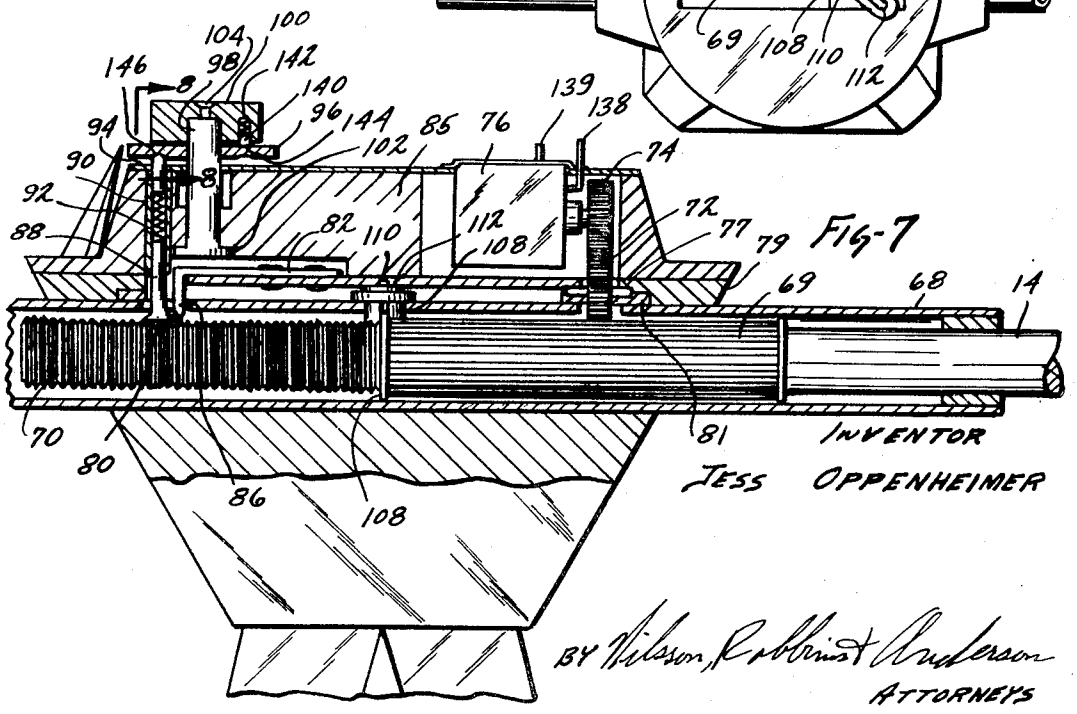


FIG-7

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GOLF SIMULATION SYSTEM

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FIG-9

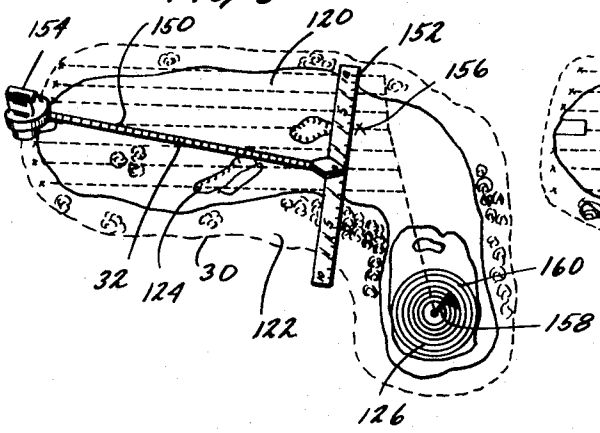



FIG-10

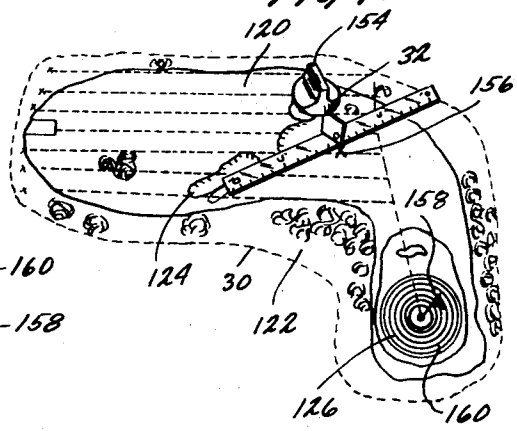
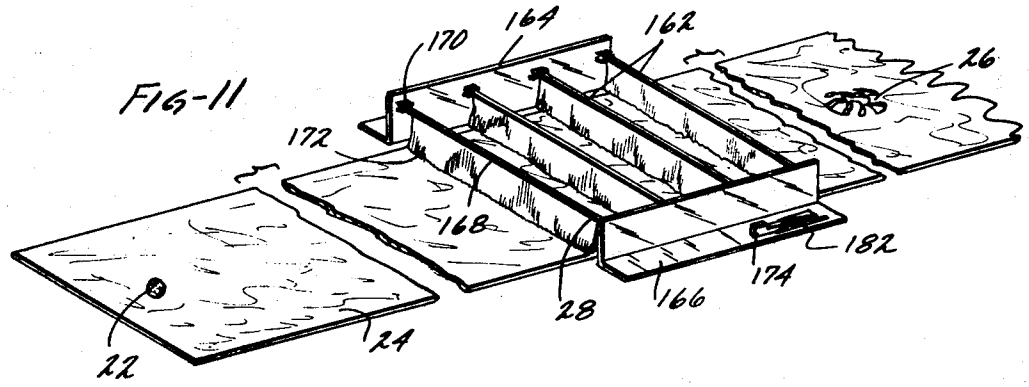



FIG-11



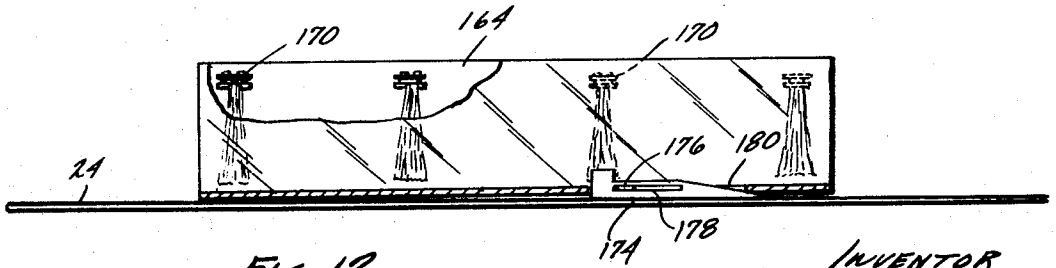




FIG-12

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GOLF SIMULATION SYSTEM

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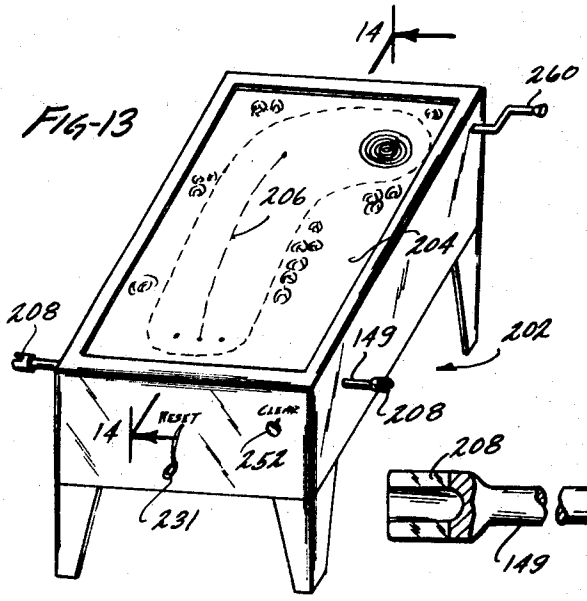
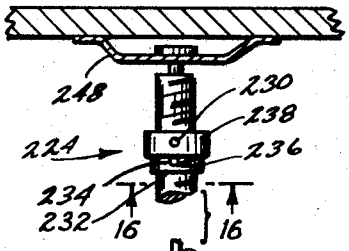



FIG-13



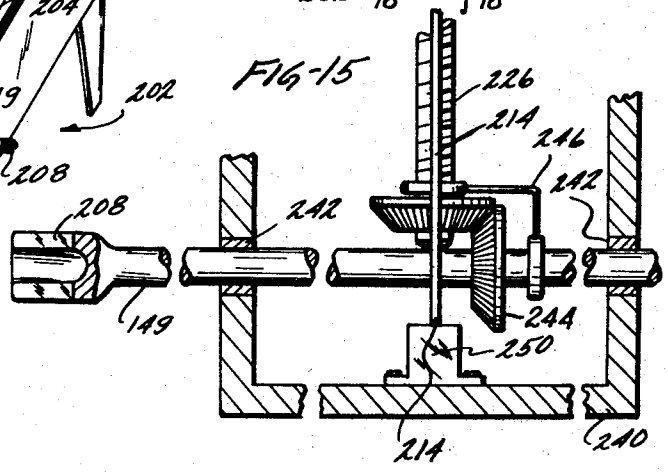
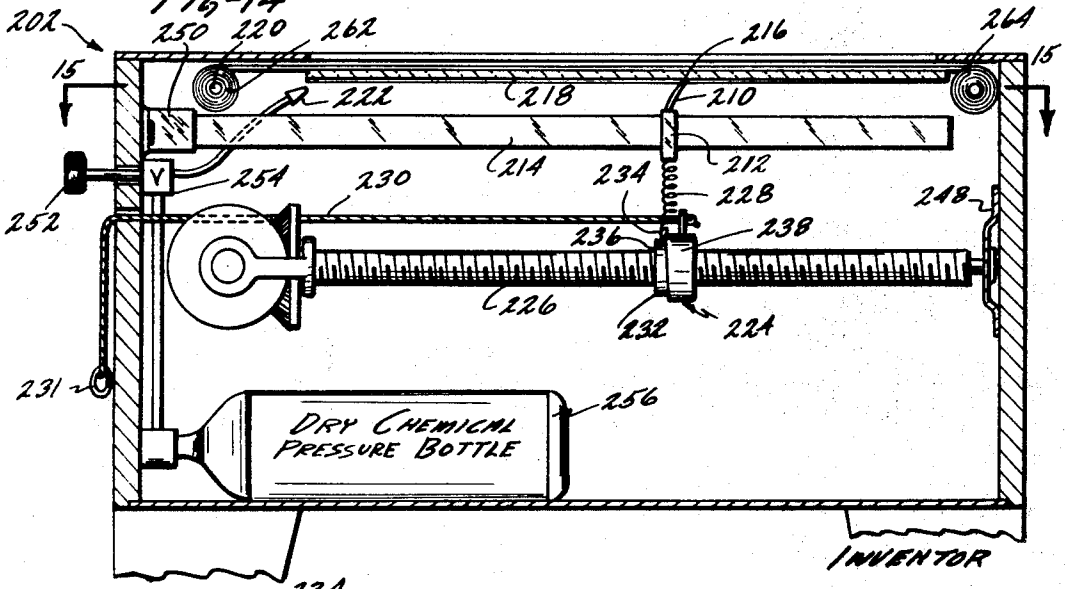




FIG-15

FIG-14



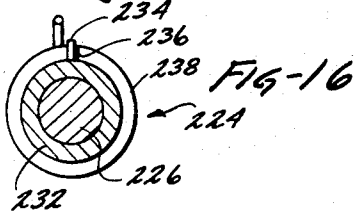




FIG-16

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United States Patent Office

3,472,075
Patented Oct. 14, 1969



3,472,075

# GOLF SIMULATION SYSTEM

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Int. Cl. G01l 5/06; A63b 69/36
U.S. Cl. 73—379 8 Claims

## ABSTRACT OF THE DISCLOSURE

A golf simulation system is disclosed in which stroke results are manifested by a moving display. Counterbalancing balls are fixed at the ends of a tube which is carried on a horiozntal rotatably mounted shaft. A ground simulation structure is provided beneath the horizontal shaft so that the balls pass contiguously thereabove. The horizontal shaft is mounted for axial displacement as well as rotation and such motions are applied to a display structure. Specifically, in the disclosed embodiment, a stylus or marker is driven over a display medium indicating the trajectory of the ball on a reduced-scale representation. Short shots, e.g. putts, are performed on a surface, above which drag members are suspended to dissipate the kinetic energy of a ball in motion according to a distance relationship.

The present invention relates to an apparatus for simulating the play of golf and more particularly to a structure for use in cooperation with golf clubs for realistically simulating the play of an entire game of golf.

The popularity of golf has resulted in a large number of prior structures that may be variously used in a limited space to simulate different phase of the game. In general, these prior devices have been developed for use in a limited space, with the primary objective of giving the user a realistic feeling that he is actually hitting a golf ball. Some of these prior structures have attained that objective.

Certain of the structures and devices proposed in the past to simulate various aspects of golf also have purported to provide the user an indication of the manner in which he has hit the ball. Frequently, however, such apparatus have compromised to a considerable extent, any realistic feeling of hitting a golf ball, or have required a large space for use.

In addition to the features considered above, another desirable characteristic of a golf practice apparatus, is the ability to simulate conditions appropriate the use of different golf clubs. This characteristic may be further refined to the desirability of a structure which may be embodied for use to simulate the play of a complete game of golf using various golf clubs under different simulated conditions indicated by the progress of play.

Accordingly, it is an object of the present invention to provide an improved golfing apparatus which is not subject to the disadvantages of the prior structures, and with which a full game of golf may be simulated using indications of ball travel made by the apparatus.

Another object of the present invention is to provide a golf simulator for effective practice, exercise, or enjoyment, which may be used in a relatively small space, while providing the user the realistic feeling of hitting a golf ball.

Still another object of the present invention is to provide a structure for realistically simulating various aspects of the game of golf, which accommodates different players in the use of various golf clubs in various situations, and provides a relatively accurate and realistic indication of the displacement of a golf ball upon being struck as in the simulation apparatus.



A further object of the present invention is to provide an apparatus for simulating an entire game of golf, which apparatus may be used in a relatively small space, and which affords the user the somewhat realistic experience of playing a particular golf course and observing his shots thereon.

One further object of the present invention is to provide an improved golfing apparatus which may be relatively inexpensively manufactured, and which may be conveniently employed either to afford the user practice in a particular golfing situation, or to afford the user the simulated experience of playing an entire game of golf on a particular golf course.

Briefly, these and other objects and advantages of the present invention are achieved in accordance with the structural features of an exemplary embodiment of the system which includes a simulated golf ball (an actual golf ball may be employed) supported either upon a rotary structure incorporating means to resolve applied forces and thereby manifest the travel of the ball after impact, or alternatively used on a surface with an attenuating means to indicate the path of the ball by its actual movement. Further details of the exemplary embodiment hereof along with additional objects and advantages of the invention will become apparent from a consideration of the following description taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is a perspective view of a portion of an apparatus incorporating the present invention;

FIG. 2 is a sectional view along line **2—2** of FIG. 1;

FIG. 3 is a sectional view along line **3—3** of FIG. 2;

FIG. 4 is a plan view of a portion of the structure shown in FIG. 1;

FIG. 5 is a sectional view of the structure of FIG. 4;

FIG. 6 is a view similar to FIG. 5 showing the components of the structure in a different position;

FIG. 7 is a sectional view taken along line **7—7** of FIG. 5;

FIG. 8 is a fragmentary elevation of a portion of the structure shown in FIG. 7;

FIG. 9 is a plan view of another portion of the apparatus of the present invention;

FIG. 10 is a view similar to FIG. 9, showing the components of the structure in a different position;

FIG. 11 is a perspective view of still another portion of the apparatus of the present invention;

FIG. 12 is a fragmentary vertical sectional view of the structure of FIG. 11;

FIG. 13 is a perspective view of still another portion of an apparatus incorporating the present invention;

FIG. 14 is a sectional vew along line **14—14** of FIG. 13;

FIG. 15 is a sectional view along line **15—15** of FIG. 14; and

FIG. 16 is a sectional view along line **16—16** of FIG. 15.

The structure shown in the figures is illustrative of the features and advantages of the present invention. However, no attempt has been made to show structural apparatus in greater detail than is necessary for a fundamental

understanding of the invention, the description taken with the drawings making apparent to those skilled in the art of golf simulators, golf games and golf equipment, the principles of the present invention which could be readily incorporated in several different structural embodiments thereof. The detailed showing herein is not to be taken as a limitation upon the scope of the invention which is defined by the appended claims, forming along with the drawings a part of this specification.

Considering the illustrative system, as shown in FIG. 1, simulated balls **10** and **12** are carried at one end of a rotative shaft **14**. These balls may be hit by a golf club, as the club **16** to impart a force to the shaft **14** which is resolved by one mechanism that is located within a support **18** and also by a structure as shown in FIG. 13, to provide an indication of the course and distance an actual golf ball would have traveled.

The balls **10** and **12** are spaced differently relative the shaft **14** (FIG. 1) so as to simulate different ball positions on a turf-like brush **20**. Thus, the structure may simulate either an elevated ball on a tee or a ball supported on grass as in a fairway position. Furthermore, as considered below, the force resolving mechanism in the support **18** which indicates the ball's displacement, may be set for use of various clubs and for various conditions encountered on a golf course, for example, a ball in play that is lying in the fairway, in a sand trap, or in the "rough." Thus, the structure as shown in FIG. 1 accommodates various golf shots from the driving tee to the putting green.

The system hereof, providing an integrated apparatus for simulating an entire game of golf, also incorporates structure for use in simulating play on a putting green as shown in FIG. 11. In using this structure a ball **22** is putted over a mat **24** (having a green-like surface) toward a simulated cup **26**. Positioned immediately above the mat **24** are a plurality of yieldable obstructions **28**, as hanging fibers which are adjustable relative the mat. These obstructions dissipate the energy of the ball **22** as it passes through them, thereby limiting the ball's travel proportionate the adjustment. Thus, rather lengthy putts may be simulated in a relatively small space using the apparatus hereof.

One structure by which the apparatus of FIG. 1 and that of FIG. 11 are integrated to simulate a full game of golf is shown in FIGS. 9 and 10. A diagrammatic and pictorial representation is carried upon a sheet **30** of plastic, paper or other material to portray one hole of a golf course. An actual embodiment of the invention might include many sheets **30** to simulate several full golf courses to that a user could experience the actual play of various world-famous courses. Thus, before actually playing a particular course, a player could experience the course by using an embodiment of the present invention.

In general, the strokes taken by the user with the structures of FIGS. 1 and 11 are correlated to actual play upon the sheet **30** (FIG. 9). That is, the user of the system performs in cooperation with the structures of FIGS. 1 and 11. His performance may then be guided and recorded with relation to the structure of FIGS. 9 and 10.

Considering the illustrative structure in greater detail, the platform **34** (FIG. 1) supporting the golfer (as indicated by phantom foot prints **36**) comprises the open mating halves **38** connected by hinges **40** to provide an enclosure for certain of the apparatus during periods of storage. The platform **34** may be formed of metal or plastic and the upper surfaces thereof are covered with composition **42** to provide a non-skid surface upon which the user may stand to swing the club **16**.

In swinging the club **16**, the user strikes one of the balls **10** or **12** depending upon the golf shot to be simulated. In either event, the forces applied to the ball are transmitted through the shaft **14** for resolution and manifestation by the mechanism within the support **18** and for display by the structure of FIGS. 13–16, as described below.

The balls **10** and **12** are fixed to the ends of an elongate hollow tube **44**. Specifically, the ends **46** of the tube **44** extend through the balls **10** and **12** and threadably receive studs **48** the heads of which hold the balls **10** and **12** on the tube **44**. Furthermore, a cable **50** extends through the tube **44**, and out of ports **52** in the tube **44** for molded attachment of cable fibers **53** to the interiors **54** of the balls. Therefore, if one of the studs **48** supporting one of the balls **10** or **12** should fail, the ball remains held on the tube **44** by the cable **50** so that the energy thereof is safely dissipated through the shaft **14**.

The tube **44** is held within the shaft **14** by a set screw **56** which passes through the tube **44** to clamp the cable **50** therein. The set screw **56**, axially received in the end of the shaft **14**, dwells within a bore in the tube **44** offset from center to lock the tube so that the distance from the shaft **14** to the ball **10** is somewhat greater than the disance from the shaft to the ball **12**. In this regard, the structure of the balls **10** and **12** along with the shaft **14** and the tube **44** may be dynamically balanced for smooth motion, as well known in the prior art.

When either of the balls **10** or **12** is positioned above the brush **20** (which may comprise a plurality of tufts **60** (FIG. 2) mounted in a holder **62**), and is struck by a golf club, the forces applied to the ball depend upon the manner in which the club impacts upon the ball. For example, if the ball is struck squarely by the head of the club moving in an arc aligned with the rotation pattern of the balls **10** and **12**, the direct impact will serve primarily to revolve the balls and the shaft **14**. However, if the head of the club is moving across the ball upon impact, and strikes the ball in a manner which would normally produce a "slice" or a "hook" shot, as the terms are used in golfing parlance, other forces are applied. The mechanism contained in the support **18** resolves these forces to indicate the distance and course an actual ball would travel when so hit. Additionally, a path describing the movement of the ball is presented on the display of FIG. 13. In general, the component of the impact urging the ball in a straight line is dissipated by the rotative shaft **14** and is proportionate the revolutions of the shaft **14**. The transverse forces axially displace the shaft **14** proportionate their magnitude to provide an indication thereof.

The portion of the shaft **14** as shown in FIG. 1 is telescopically received in a tubular member **64** that is held concentric by end bushings **66** (FIG. 2). The coupling end **67** of the shaft serves to connect the shaft to other structure as described below. Between the bushings **66** (FIG. 5) at the ends of the tubular member **64**, the shaft is formed into a toothed section **69** and a ringed section **70**. The section **69** carries shallow elongate radial teeth which engage a gear wheel **72** (FIG. 7) that is in turn meshed with a gear wheel **74** to drive reversible rotary counter **76**. The gear wheel **72** is carried on a pin **77** fixed in a circular path **79** by a retainer **81**. The counter **76** is housed in a cavity **83** formed in a block **85** affixed above the plate **79**.

As the shaft **14** revolves, the rotary counter **76** advances to eventually indicate the direct energy imparted to the ball. The turning ratio of the shaft **14** to the counter **76** is such that each revolution of the shaft **14** advances the counter **76** to indicate a distance that the dissipated energy would have carried a golf ball. The total distance is then displayed by the counter **76** through a window **78** (FIG. 4) fixed on the cap block **85**.

The elongate teeth of the toothed section **69** of the shaft **14** are rather loosely coupled to the gear wheel **72** permitting axial movement of the shaft **14** while preserving the shaft coupled to the gear wheel **72** (FIG. 7). The axial movement of the shaft **14** is resisted by an index **80** (FIG. 7) the point of which dwells in grooves between the annular rings formed in section **70**. The index **80** is gen-

erally L-shaped with a length 82 thereof riveted to the plate 79 above the shaft 14. The shorter vertical leg 86 of the index then terminates in a point which dwells in a groove in the ringed section 70. The index 80 is formed of resilient metal for example whereby the length 82 serves as a leaf spring urging the point of the leg 86 against the shaft 14, to restrain it against axial movement. Axial movement of the shaft 14 (as well as rotary movement) is also restrained by a brake including a shoe 88 urged against the ringed section 70 of the shaft, by a coil spring 90 contained in a bore 92 extending through the plate 79 and the block 85. An adjustment slug 94 is also contained in the bore 92 with the spring 90 and is engaged by a flat ring 96 held concentrically on a stub shaft 98 to which a knob 100 is affixed. The shaft 98 is rotatively locked into the body block 85 by an inverted head 102 held positioned in the block 85 by a screw 104 extending through the knob 100 to be threadably received within the shaft 98.

Generally, the brake including the shoe 88 is appropriately set prior to striking the ball, depending upon the conditions to be simulated and the club to be used. Then, if the shaft 14 is displaced axially when the ball is struck, the axial displacement is manifest by an indicator 106 (FIG. 5). The indicator 106 is driven by a yoke 108 (FIG. 7) mating with an annular groove formed between the sections 69 and 70 of the shaft 14. The yoke 108 riding on the shaft 14 carries a stud 110 (FIG. 5) that is matingly received in a slot 112 defined in an arm 114 mounted at a pivot point 116 to which the indicator 106 is affixed. Thus, as the shaft 14 is axially displaced the yoke 108 is similarly displaced, pivotally moving the arm 114 and the indicator 106 about the pivot point 116 to manifest the axial displacement on a scale 118 on the plate 79, which is calibrated in yards. The scale 118 indicates displacement of the shaft 14 in either direction to thereby manifest either a hook or a slice as shown in FIGS. 5 and 6.

The distances indicated by the mechanism in the support may be precisely recorded and accounted on a sheet 30 as shown in FIGS. 9 and 10, or alternatively, the path of the ball can be visually followed by observing the display of the structure shown in FIGS. 13–16, as will now be described.

The display structure 202 (FIG. 13) has a face 204 which portrays one hole of a golf course. The path of a ball is indicated on the face 204 by a line 206 which is drawn as the applied forces are being resolved, to give the player a somewhat realistic feeling of having hit a ball and observing its travel.

The display structure 202 is connected to the shaft 14 by an extension 14*a* of that shaft, both ends of which carry a coupling 208 for matingly receiving the coupling end 67 of the shaft 14 as shown in FIG. 2. The particular coupling 208 engaged to the shaft coupling end 67, depends on whether the player is left or right handed. Once coupled, the shaft extension 14*a* is revolved directly by the shaft 14 to scribe the line 206 perpendicular the shaft, and is similarly displaced axially to develop a similar component in the path of the line 206.

The line 206 is formed by a marker 210 (FIG. 14) carried on a slider block 212 matingly received on a cantilevered leaf spring 214. The marker 210 is formed of resilient material as steel spring metal and urges a pointer 216 against the lower surface of a glass plate 218 affixed in the upper surface of the display structure. A roll of transparent material 220 is pulled section-by-section over the glass plate 218 to provide the face 204 representative of various holes of a golf course.

The lower surface of the plate 218 is covered by a fine powder dry sprayed from a nozzle 222 to present a uniform appearance through the glass plate 218 and the transparent material 220. The marker 210, moving beneath the glass plate 218 then removes a narrow width of the powder to scribe the line 206 representing the path of a golf ball.

The marker 210 is driven to slide along the leaf spring 214 by a traveler 224 threadably received on a screw drive 226. The traveler 224 is connected to the slider block 212 (carrying the marker 210) by a coil spring 228. A coupling to the traveler 224 is also provided through a cable 230 to a pull ring 232. The threadable engagement of the traveler 224 to the screw drive 226 is to an internal portion of the traveler 224 so that it can be freely moved over the screw drive 226 in one direction. Specifically, as shown in FIG. 16, the screw drive 226 is threaded into an internal coupler 232 having a radial pin 234 extending therefrom to engage a shoulder 236 in the edge of the external ring 238. Therefore, when the screw drive 226 revolves clockwise, for example, the coupler 232 is revolved until the pin 234 engages the shoulder 236, at which point the revolvable coupler 232 is engaged with the ring 238 (which does not revolve). As a result, the screw drive 226 moves the entire traveler 224 along its length. However, when the screw drive 226 has stopped, the traveler can be slidably returned to its starting position as the internal coupling revolves, the pin 234 dropping over the shoulder 236 each revolution of the coupler 232.

Considering the movement of the traveler 224 to pull the slider block 212 (and the marker 210) the shaft 14*a* (FIG. 15) is rotatively mounted in a housing 240, by bearings 242. Furthermore, the shaft 14*a* is slidable axially, in the same manner as the shaft 14. A bevel gear 244 couples the shaft 14*a* to the perpendicular screw drive 226 which is mounted between a bracket 246 supported by the shaft 14*a*, and a transverse slotted member 248 affixed to the housing 240. Thus, the screw drive 226 is rotatively driven by rotation of the shaft 14 through the bevel gear 224, and is displaced laterally, by axial displacement of the shaft 14.

Movement of the drive screw 226 displaces the traveler 224 which in turn pulls the slider block 212 along the leaf spring 214, which is fixed to a base 250 that is mounted on the housing 240. The action of the leaf spring 214 combined with that of the coil spring 228 (FIG. 14) causes the marker 210 to move in a path somewhat more realistic the travel pattern of a golf ball. That is, when a golf ball is struck in such a manner as to produce a slice, for example, the sideways movement of the ball is most pronounced in the final movement. The structure of FIGS. 13–16 simulates that natural pattern of movement in scribing the line 206 representative of the ball's path of travel.

Considering a specific example, assume the ball 12 (FIG. 2) is struck, revolving the shaft 14 and moving it axially to the left, for example. The shaft 14*a* (FIG. 15) is similarly motivated as a result of direct coupling. The rotary movement of the shaft 14*a* revolves the screw drive 226 moving the traveler 224 which in turn pulls the slider block 212 along the cantilevered leaf spring 214. Thus, the marker 210 moves in contact with the glass plate 218, removing dust to scribe the line 206 (FIG. 13) that clearly appears on the face 204. However, the lateral motion of the screw drive 226 (FIGS. 14 and 15) is applied through the coil spring 228 to the leaf spring 214 initially near the fixed end of the leaf spring 214 which is relatively inflexible. As a result, the leaf spring is not initially displaced laterally, but rather the energy of lateral movement is stored in the coil spring 228 for later release. As the marker 210 moves outward on the cantilevered leaf spring 214, the spring 214 is more easily displaced so that the energy stored in the coil spring is then released, bending the leaf spring to the left in accordance with the assumed displacement, and similarly moving the marker 210. Although the two components of motion have been described somewhat separately, it is to be understood that the combined movement is a smooth pattern very much like the movement of an actual golf ball.

After the ball has been hit, and the line 206 (FIG. 13) has been scribed another shot may be taken to further advance the line 206, or the indicator can be reset for

another tee shot. In the latter instance, the cable **230** (FIG. 14) is pulled by the reset ring **231** to draw the traveler **224**, the slider block **212** and the marker **210** back to a starting position. Then a clear button **252** is pressed to momentarily open a valve **254** through which the nozzle **222** is coupled to a pressurized bottle **256** containing dry powder. As a result, a fresh coat of dry powder is applied to the bottom surface of the glass plate **218** as well known in the art. The structure is thus prepared to display the ball pattern resulting from a golf shot. In this regard, a spool drive carrying the transparent material **220** may be motivated by a crank **260** (FIG. 13) to advance the medium from a roller **262** to a roller **264** (FIG. 14) so that the next hole of a golf course is portrayed on the face **204**.

In addition to the actual tracing indication of the ball pattern provided by the structure of FIGS. 13–16, the progress of a simulated game can be accounted on the sheets of FIGS. 9 and 10. A complete and detailed understanding of the system used in that manner may now best be served by considering the simulation of a full game of golf, and explaining the operation thereof somewhat concurrently with further physical description. As indicated, the system of the present invention may be employed to simulate the play of various real or fictitious golf courses. For example, a library of famous courses of the world can be provided the user so that he may not only experience the courses but may also receive an indication of how he would score on such courses. Of course, select holes from various famous golf courses might be combined into a partly ficticious course representative of such consideration as player interest, course difficulty, and so on.

A golf course is portrayed hole by hole on the medium **220** (FIG. 14) and on sheets **30** (FIG. 9) pictorially representing the fairway **120**, the rough **122**, traps **124**, and the green **126**. Several of the representative sheets **30** may be conveniently stored in the case formed by the platform **34**, along with other components of the system. In using this part of the equipment to simulate and score a round of golf, the representative sheet **30** is placed before the structure as shown in FIG. 1 so that the player may clearly observe the hole and determine the manner in which he will attempt to hit the ball.

In setting up the structure for use, as shown in FIG. 1, a base platform **128** carrying the brush **20**, which may be hinge mounted into the platform **36**, is placed to extend as shown. Thereafter, the support **18** having a base section **130** is fixed onto the platform **128**. Specifically, the base **130** (FIG. 2) has horizontal flanges **132** therein which slidably lock onto the heads of studs **134** as shown in FIG. 3, affixing the metal stand or base section **130** onto the platform **128**. The studs **134** extend through a support base plate **136** (FIG. 2) which is welded or otherwise affixed to the platform **128**. Also, as part of the setting up operation, the structure of FIGS. 13–16 is attached as described, cleared and reset ready for use.

Assuming the initial golf shot will be a right-handed user, off the tee, on the hole as shown on the sheet **30**, several adjustments are necessary. First, the gear lever **138** (FIG. 4) is set to engage the counter **76** for clockwise rotation of the shaft **14** as observed by a right-handed golfer. Next, the ball **12** is set to be hit, positioned above the tufts **60** of the brush **20** thereby simulating a ball on a tee. The counter **76** is reset to zero by a resent knob **139** (FIG. 4) and the indicator **106** is also set to zero by direct movement.

Very little braking force is to be applied to the shaft **14** during the assumed shot because the driver normally accomplishes the greatest distance of any golf club. Therefore, the ring **96** and the knob **100** (FIG. 7) are indexed to substantially release a brake shoe **88**. Specifically the knob **100** is set to indicate the conditions under which the ball is to be hit. That is, the "lie" of the ball may be either on the fairway, the rough, or in a sand trap. Normally, the ball will travel farthest when struck from the fairway, and will travel the shortest distance when struck from a trap. As shown in FIGURE 7, the knob **100** carries a freely movable latch ball **140** dwelling in a bore along with a coil spring **142**. The spring **142** forces the ball against the flat upper surface of the ring **96** which in turn engages the braking slug **94**. The force transfer ring **96** has various detents **144** in its upper surface which receive the ball **140** to variously compress the spring **142** to thereby vary the force applied by the knob **100** through the ring **96**, and in turn through the slug **94** to the brake shoe **88**. The position of the knob **100** is indicated by the letters T and R and F, as shown in FIGURE 8, to represent respectively, trap, rough, and fairway. The setting for the tee shot, F for fairway, applies little braking force to the shaft **14**.

As suggested, the braking force applied to the shaft **14** must also be related to the type of club employed. In this regard, the force transfer ring **96** (FIGURE 7) has a plurality of detents **146** which receive the slug **94** to variously release the spring **90**. In using the driven (No. 1 wood) the slug **94** is to be raised to substantially release the brake; therefore, the ring **96** (FIG. 4) is set with the indicator **148** indicating the "No. 1 wood." As a result, the slug **94** dwells in a very deep detent **146** and only slight braking is applied to the shaft **14**.

With the structure set for play, the user may study the sheet **30** (FIGURE 9) and determine the path along which he would attempt to hit the ball in actual play. Next, the player assumes the platform **34** and uses the golf club **16** in the conventional manner to strike the ball **12**. The impact of the club on the ball may impart different forces. For example, one of the forces will act to propel the rotary shaft **14**. That force is registered by the counter **76** tallying the revolutions of the shaft **14**.

The club may also impart a force to the ball **12** parallel the shaft **14**. In this regard, the club may be moving across the ball to impart a so-called slice or hook movement to the ball. Such a force causes the shaft **14** to be axially displaced by overcoming the retaining force of the index **80** dwelling in one of the grooves in the ringed section **70** of the shaft. For example, if the ball is hooked, the shaft **14** will be pulled toward the user displacing the shaft proportionate the force of the hooking golf stroke. The extent of the displacement is manifest by the indicator **106** (FIGURE 4).

As the energy imparted to the system is dissipated, the player can observe the results of his stroke on the face **204**. Then afterward, the counter **76** registers a number of yards through the window **78** (FIGURE 4) to indicate the travel of the ball. A tape **150**, having its free end attached to a scale **152** may then be withdrawn from the spool **154** extending to the desired destination for the ball. The length of the tape **150** withdrawn from the spool **154** is then adjusted to a length coinciding to the yards indicated through the window **78**. The indication of a hook or slice by the indicator **106** on the scale **118** is also read and the destination of the ball is marked, as by a marker **156**, or otherwise registered on the representative sheet **30**. For example, if the indicator **106** indicates "20" on the scale **118**, a slice accounting for a total of 20 yards would have been imparted to the ball. As a result, 20 yards' displacement from the desired path of travel is established by the scale **152** (FIGURE 9) to locate the resting place of the ball on the sheet **30**.

Additional players may reset the unit and simulate tee shots just as described above, each of the players employing a marker to identify the position of his ball. In this regard, if any of the players are left-handed, certain adjustments are required, as the gear lever **139** is reversed to engage the counter for counterclockwise rotation of the shaft **14** as it will be propelled by such a player.

When all the players have shot their balls, the structure is sequentially set to simulate their next individual shots.

For example, the next player to shoot may be on the fairway as indicated by the marker **156** and after studying the situation, he may have decided to employ a No. 4 iron for hitting the ball to the green **126**. Therefore, the knob **100** (FIG. 7) is set to indicate F for fairway, and the force transfer ring **96** is set to indicate the "No. 4 iron" as the club to be used. These settings result in the application of an appropriate braking force through the slug **94** (FIG. 7) and the spring **90** to the brake shoe **88** which force is in turn applied to the shaft **14**. If the player had elected to use a club with less distance capability, e.g. a higher numbered iron, the ring **96** would have been set to impart an increased braking force to the shaft **14** thereby restraining the motion of the shaft to drive the counter **76**. Also, if the player had been located in the rough or in a trap, the knob **100** would have been set to additionally brake the shaft **14** to reflect such conditions.

The indicating apparatus **32** (FIGS. 9 and 10) is then moved to the position as shown in FIG. 10 behind the marker **156**. The tape **150** is then withdrawn, again to represent the desired distance between the marker **156** and the final resting place indicated for the ball after it has been hit. The player then again assumes the platform **34** and in this instance strikes the ball **10** which now lies closely to the tufts **60** simulating the fairway grass. The destination of the ball is again manifest by the structure, indicating total distance in terms of yards on the counter **76** (FIG. 4) and displacement, e.g. slice or hook, on the indicator **106**. Assuming the player is successful in hitting the ball onto the green **126**, the position thereon again is located by use of the appartus **32** (FIGS. 9 and 10) with the result that a specified number of feet is indicated between his ball and the flag **158** by metering rings **160**. To determine the number of strokes taken by the player on the putting green, the putting structure as shown in FIGS. 11 and 12 is used.

The player places the ball **22** on the mat **24** and adjusts the obstructions **28** to impede the travel of the ball so that for proper travel, the ball will require an amount of energy coinciding to that carrying it through the obstructions **28** to the cup **26**. Considering the obstructions **28** in greater detail, a set of four vertically-depending drags **162** are held positioned between stands **164** and **166** in spaced apart relationship. The drags **162** each comprise an elongate cross piece **168** extending between brackets **170** affixed inside the stands **164** and **166**. The cross pieces **168** each carry long fibers **172** which may take the form of nylon or other synthetic materials hanging vertically above the mat **24**. Affixed to the horizontal portion of the stands **164** and **166** are linear cam slides **174** (FIG. 12) extending through the stands and held in position by a pin **176** engaging a slot **178** within the slide **174**. The end **180** of the slides **174** are tapered to variously lift the stands **164** and **166** above the mat **24** depending upon the position of the cam end **180** of the slides **174**. A scale **182** at the side of the slides **174** indicates a translation between the position of the obstructions **28** and the distance in ball travel reduction which will be accomplished. Therefore, the slides **174** are appropriately set to attenuate the ball by the desired amount as it is putted through the obstructions **28** to the cup **26**.

In using this structure, the player actually putts the ball **22** into the cup **26** using the necessary number of strokes and putting through the obstructions **28** if indicated by his distance from the cup. The play of a hole is thus concluded and the game may progress to the next hole which is played in a manner similar to that described above. An entire course may be played and scored, affording the players a realistic experience of watching a ball's path, as well as seeing the results of the forces applied in each stroke. The players are not limited and may take a full swing at the ball when desired. Equally significant, an indication is provided of both the ball's path and its position after being struck. In this regard, it is readily apparent that if desired, a player may practice a particular stroke repeatedly using various structures of the present system; however, an important feature of the system resides in the capability of affording a player a simulated experience of playing a full game of golf. Thus, it is apparent that the structures hereof may be embodied in an integrated golf simulation apparatus usable for simulating a full game of golf. As a result, it may be seen that there is disclosed above an example of such a structure which achieves the objects and exhibits the advantages as set forth above.

What is claimed is:

**1.** A golf game apparatus for use in cooperation with golf clubs, comprising:

a rotary means, having a horizontal axis of rotation;

a holder means attached to said rotary means and extending substantially perpendicularly to the end thereof from said horizontal axis of rotation;

ball means mounted at said end of said holder means, and thereby displaced from said horizontal axis of rotation, whereby to rotate said rotary means about said horizontal axis of rotation, rotating said holder in a vertical plane to move said ball means in a circular path upon being struck with a golf club;

a turf-like means supported to define a turf surface;

stand means for supporting said rotary means above said turf-like means, and similarly supporting said ball means contiguous to said turf means prior to being struck by said club, and

register means coupled to said rotary means for indicating the motion of said rotary means when said ball means is struck with a golf club.

**2.** A golf game according to claim **1** wherein said holder means includes opposed first and second perpendicular extensions from said rotary means with said ball means including a first ball affixed on said first of said extensions of a length to pass contiguous to the turf-like surface in traversing said circular path, and a second ball affixed to said second of said extensions at a length shorter than that of said first extension, to position said first and second balls in differently spaced relationship to said turf-like means.

**3.** A golf game according to claim **2** further including adjustable braking means.

**4.** A golf game according to claim **3** wherein said braking means includes a first adjustment means for setting said braking means in accordance with a selected one of said golf clubs which is to be used and second adjustment means for setting said braking means in accordance with a selected course condition to be simulated.

**5.** A golf game for use in cooperation with golf clubs comprising:

a rotary means;

a holder, extending perpendicular from said rotary means;

a ball means affixed on said holder, displaced from said rotary means whereby to be struck with a golf club to actuate said rotary means;

a surface representative of at least a portion of a golf course; and marking means coupled to said rotary means, for marking said surface to indicate the manner in which said ball means has been struck.

**6.** A golf game according to claim **5** wherein said surface comprises, a member and a coating, on said member; and said marking means comprises a stylus in marking engagement with said member for removing a portion of said coating to provide a visual display.

**7.** A golf game according to claim **5** further including adjustable braking means, for braking said rotary means.

**8.** A golf game according to claim **5** wherein said rotary means is supported for axial displacement, and including further means for coupling said rotary means to said marking means to indicate said axial displacement.

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