United States Patent

Mason et al.

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[54] GOLF PRACTICE DEVICE AND GAME

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[52] **U.S. Cl.**.....**273/176 FA**, 273/185 R, 273/181 A, 273/182 A

[51] **Int. Cl.**.....**A63b 67/02**, A63b 69/36

[58] **Field of Search**.....273/176, 181, 182, 184, 185

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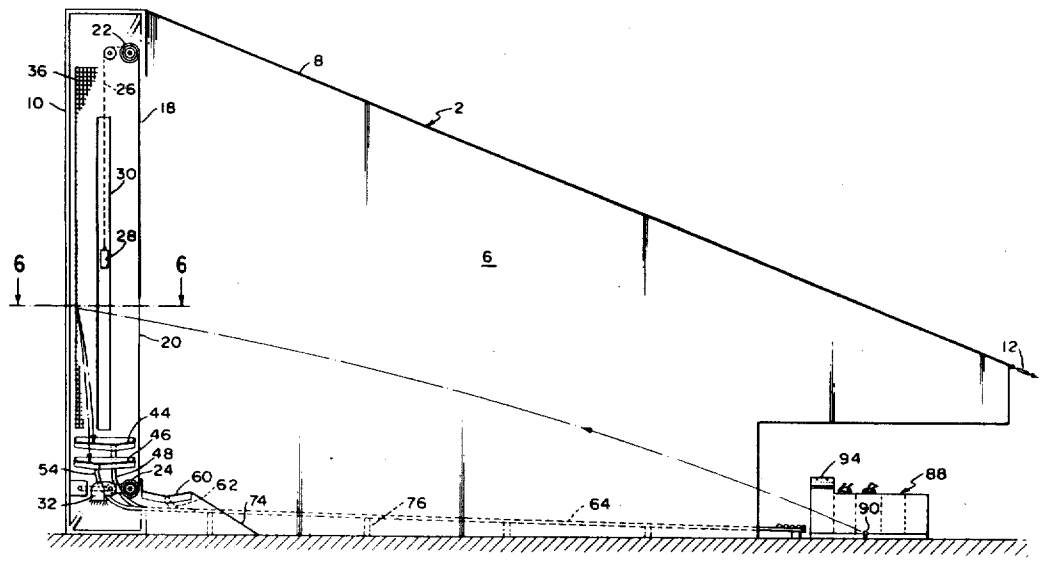
[57] **ABSTRACT**

A golf practice and game apparatus having at one end of an enclosure a vertical movable screen with a hole therein as a target, and a tee at the other end of the enclosure. The target is movable to several predetermined heights above the playing floor and at each position the height subtends an angle at the tee having a predetermined relation to the loft angle of the face of the particular golf club being used for that position. Electrical switches and cams are provided at the tee place for actuating a motor and moving the target to a given height for a particular golf club used, and also return troughs are provided for the golf balls which identify those that pass through a central portion of the hole, as compared to the side portions thereof.

14 Claims, 10 Drawing Figures



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SHEET 1 OF 5

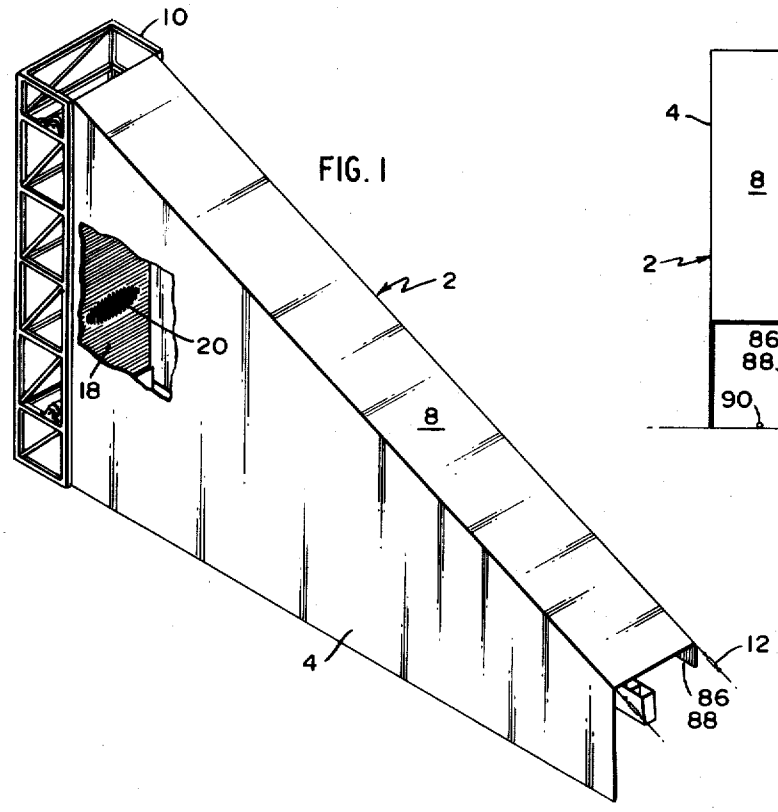


FIG. 1

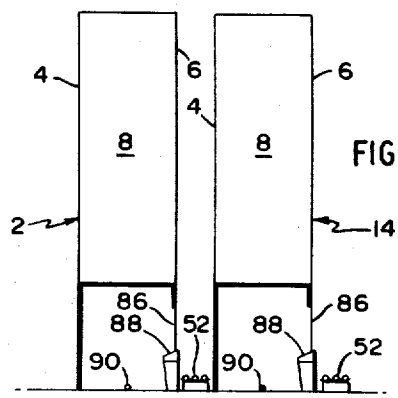


FIG. 2

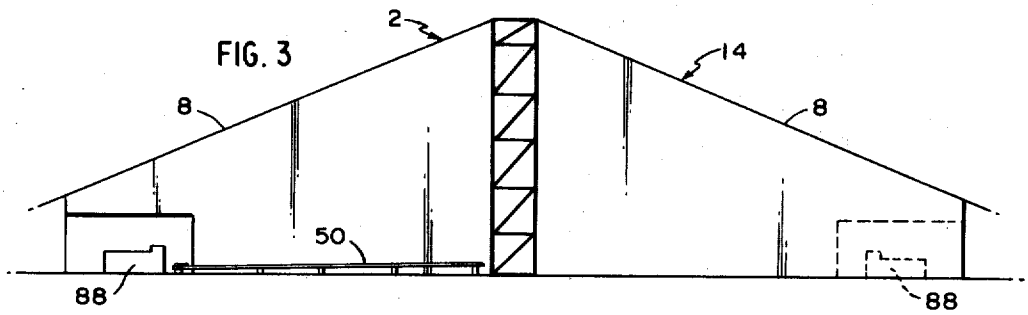
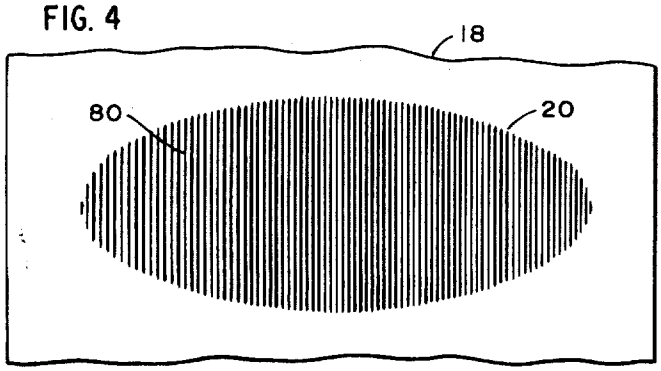


FIG. 3

FIG. 4



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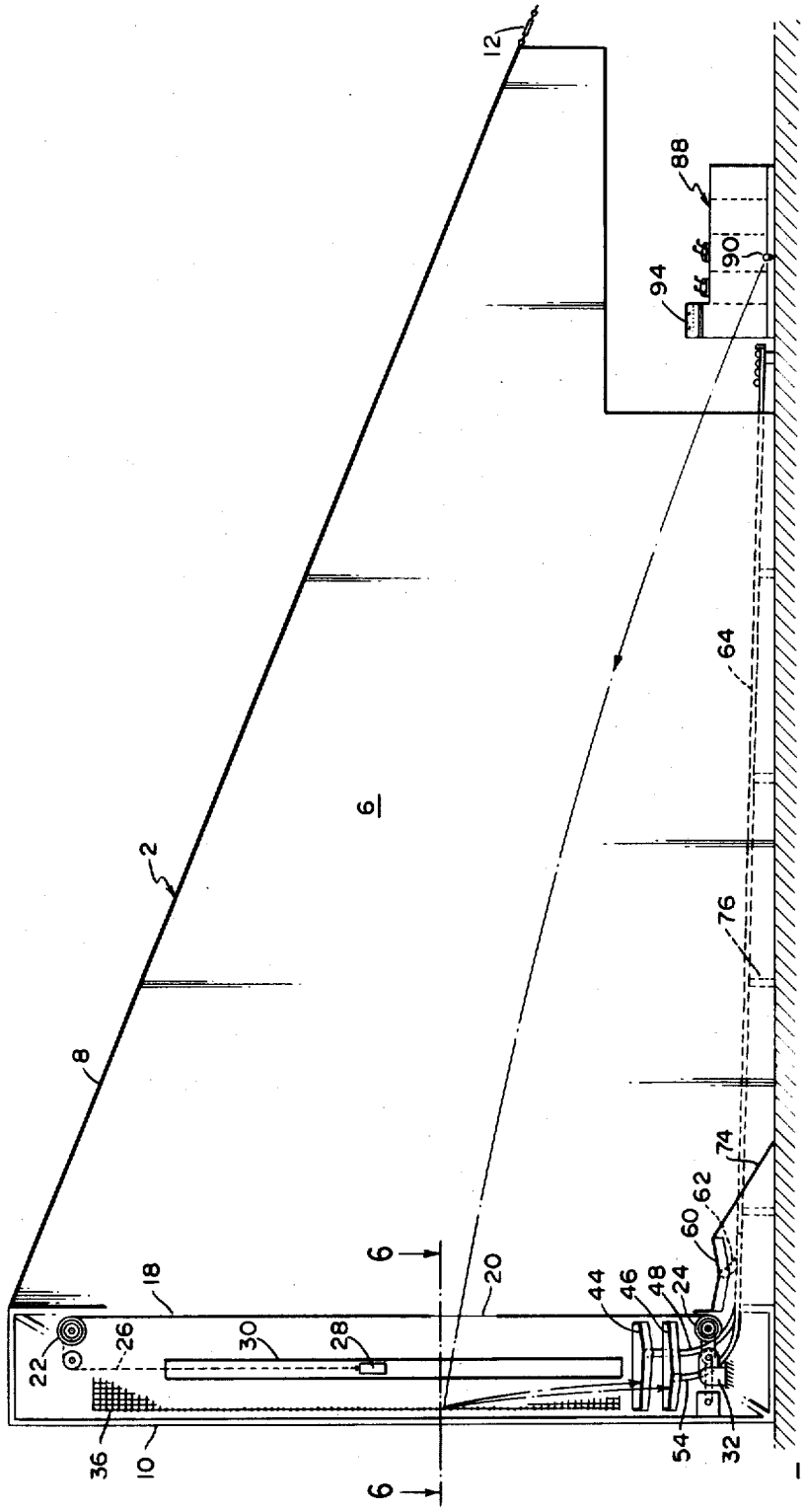

FIG. 5

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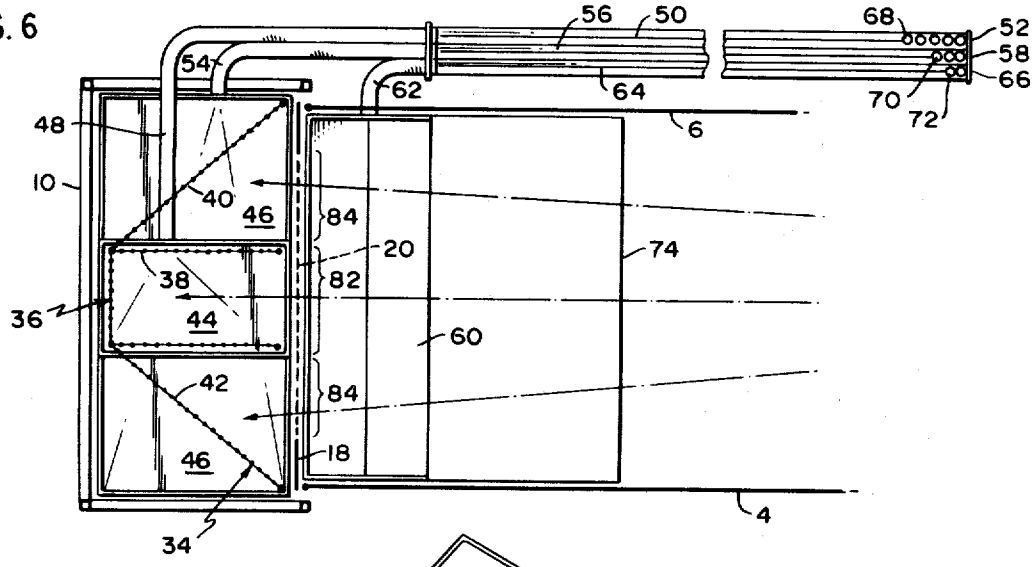
FIG. 6



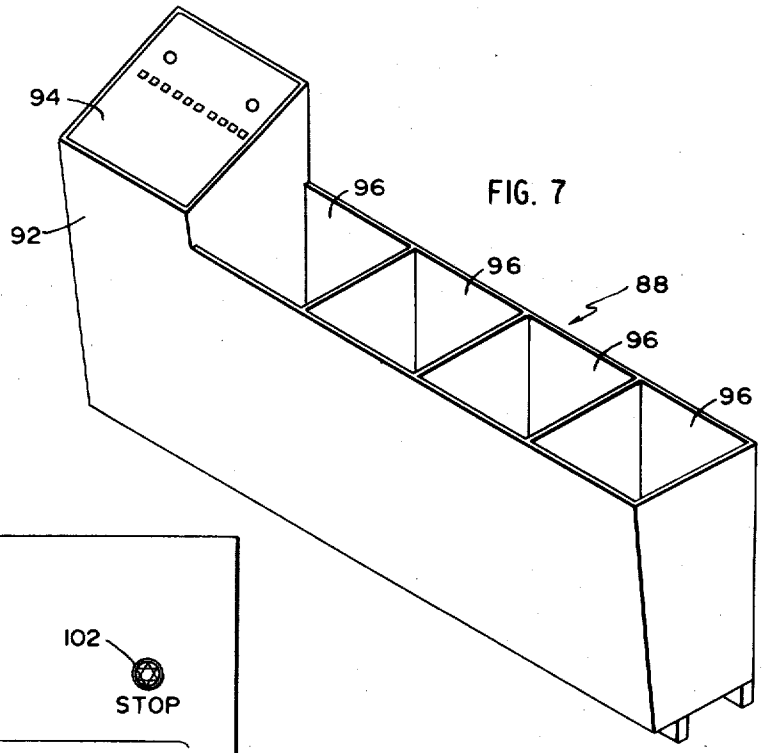
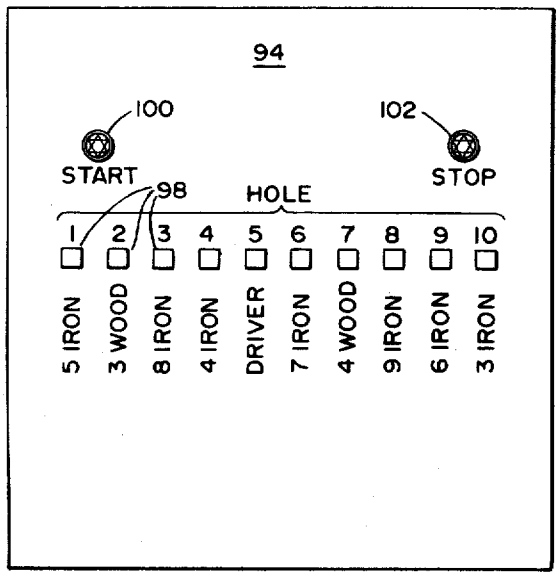


FIG. 7

FIG. 8



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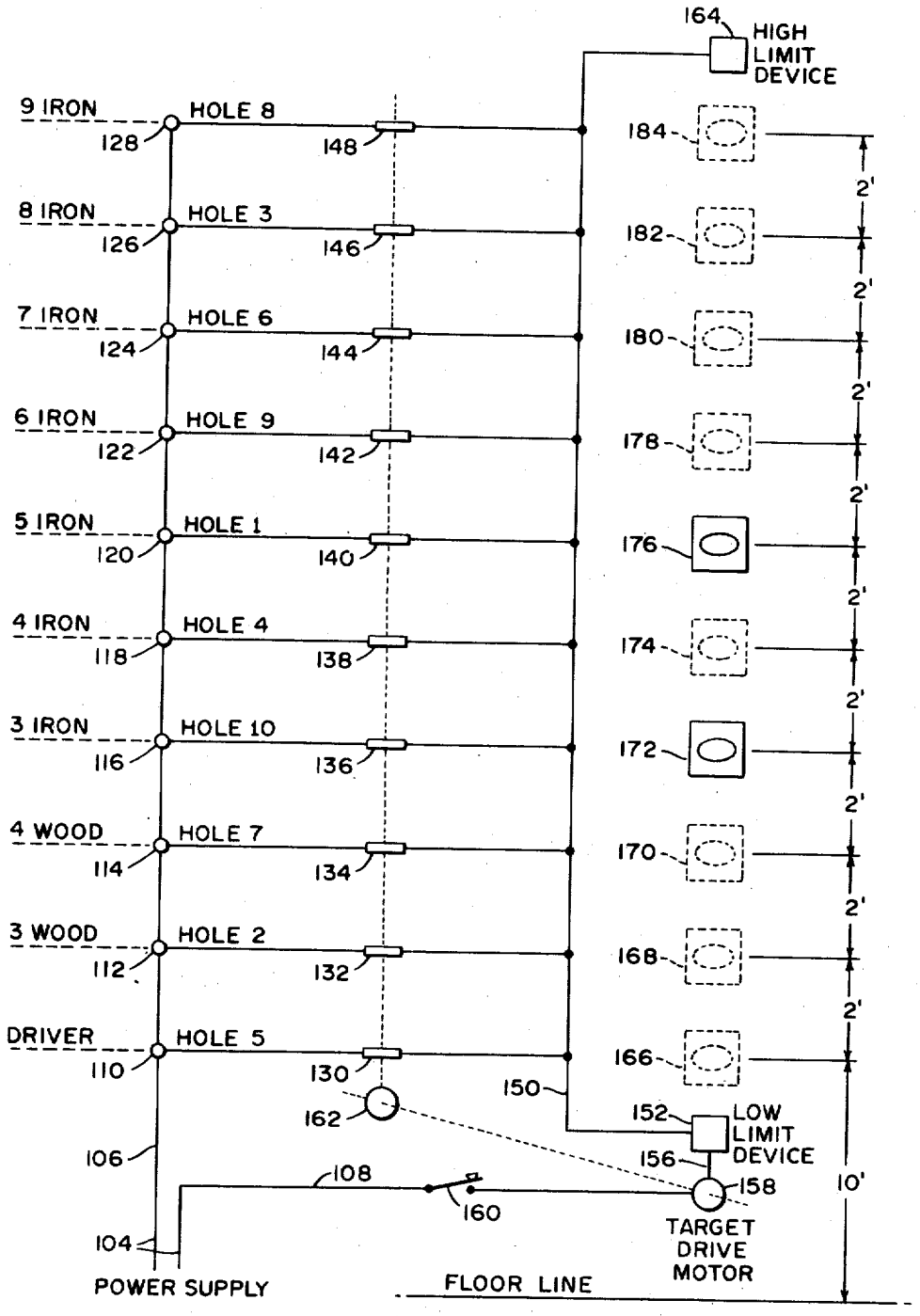

FIG. 9

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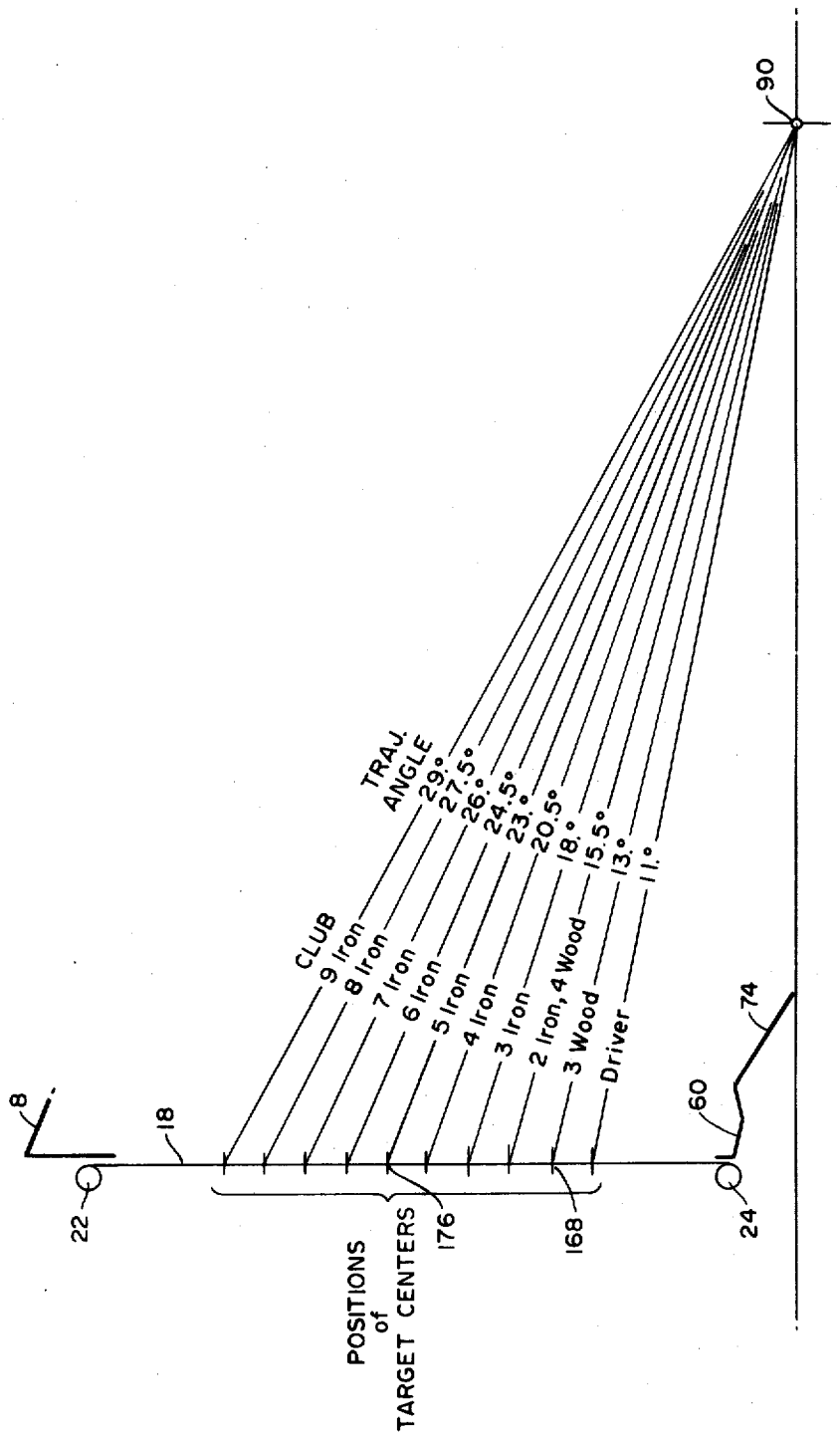

FIG. 10

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GOLF PRACTICE DEVICE AND GAME

BACKGROUND OF THE INVENTION

Many golf practice games or target setups have been made in the past, which provide various ways for measuring the trajectory of the ball, or the speed plus the trajectory, and which have visual means of some kind or another to give an indication of the direction in which the ball is travelling, or the speed and trajectory after being struck by a golf club. In the usual device, the target when struck actuates a switch mechanism which in turn activates some kind of read-out mechanism at the tee place, so that the golfer can see just where his ball would have landed with respect to the green had he been actually on a golf course. The actuation is generally done either by having the ball penetrate the target and strike the switch means; or by having the target itself move backward by the impact of the ball, the backward motion actuating a read-out device.

However, none of the prior art devices provides an apparatus in which the target of the apparatus can be preset so that if the golfer is using a given golf club (such as a number 6 iron) at the tee, then the target position is at such height with respect to the playing floor or the base of the machine that, if the stroke has been made correctly, the ball will pass through or strike the target at the central portion thereof. The dimensions of the apparatus are designed so that even at maximum ball speeds the player may watch the flight of the ball without lifting his head prior to the moment of making contact between the club and the ball. The horizontal limits of the target aperture are such that a ball passing through would have lateral accuracy required to land on average width greens.

SUMMARY OF THE INVENTION

Accordingly, it is the purpose of this invention to provide a golf practice apparatus in which a movable screen is provided with a target area, and the height of the target is settable so that if a ball is hit by a given club correctly the ball will strike the target.

Another object of the invention is the provision of apparatus of the above kind, in which the target area on the screen may be adjusted to several predetermined heights, these heights corresponding to the trajectory of a ball for each of several different golf clubs.

Yet another object of the invention is the provision of apparatus of the above types in which simple means are used to enable the golfer to determine what part of the target has been struck.

A further object of the invention is the provision of apparatus of the above kind, in which the height of the target on the screen is in a predetermined relationship to the trajectory of a ball struck by a given club, the height of the target subtending a predetermined angle at the tee approximately equal to the theoretical trajectory angle for a golf ball struck by the golf club provided the club has been used correctly to strike the ball.

A further object of the invention is the provision of apparatus of the above kinds, in which a relatively simple means is used to determine whether or not the golf club has been used correctly.

Another object of the invention is the provision of apparatus of the above kinds, in which the operating mechanisms used to adjust the screen height, and the visual read-out means, are both located at the tee so that the golfer using the apparatus can readily control the height of the target.

Other objects and advantages will be in part obvious and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, features of construction, arrangements of parts, and manipulation of the apparatus, all of which will be exemplified in the structure hereinafter set forth, and the scope of the application of which will be indicated in the appended claims.

In the accompanying drawings, in which one of the various possible embodiments of the invention is illustrated:

FIG. 1 is an illustration of the embodiment (with a portion thereof broken away to show the interior at one end) illustrating the general arrangement of the apparatus;

FIG. 2 is a view showing two of the devices shown in FIG. 1 placed side by side in, for example, a room;

FIG. 3 is a view showing two of the FIG. 1 devices erected with their rear ends abutting;

FIG. 4 is a view of a portion of the screen of the FIG. 1 apparatus (enlarged as compared with the FIG. 1 drawing) given to show certain details thereof;

FIG. 5 is a side elevation of the FIG. 1 embodiment with a side enclosure thereof removed in order to show details of construction of the apparatus;

FIG. 6 is a plan view of a portion of the FIG. 1 embodiment, taken in the direction of sight line 6—6 on FIG. 5;

FIG. 7 is an illustration of a control panel to be used with the apparatus controlling the target position thereof;

FIG. 8 is a view of the control panel of the FIG. 7 unit, given to illustrate a possible arrangement of control switches thereon;

FIG. 9 is a functional block diagram of an electrical circuit for controlling the apparatus of this invention; and

FIG. 10 is an illustration showing schematically the several positions of the target of this invention, and illustrating in chart form the trajectories of a ball stroked correctly by golf clubs as they relate to the target positions.

Similar reference characters indicate corresponding parts throughout the several views of the drawing, and the dimensions of certain of the parts as shown in the drawing may have been modified and/or exaggerated for the purpose of clarity of illustration.

Referring now to FIG. 1, there is shown a general view of an embodiment of the invention, a part thereof being broken away in order to show certain arrangements inside. The device has an enclosure indicated generally by numeral 2, which may be made, for example, of canvass or a sheet plastic film material. Preferably it is opaque for the privacy of the player. Enclosure consists of side panels 4 and 6, top panel 8, and suitable supports to maintain the enclosure erect as shown. Part of the support for the enclosure is provided at the rear by the framework 10 of conventional construction, as shown. Guy wires support the upper edges of the structure and may be tied by the use of turnbuckles 12 to suitable eye rings in the floor of the room in which the enclosure is erected. If desired, instead of

using the guy wire-turnbuckle-floor arrangement, the guy wires may be supported by suitable drop wires from the ceiling of the room. Regardless of which support means is used, the enclosure should be arranged generally as shown. It is approximately 12 feet wide and 60 to 70 feet long. The rear end is approximately 36 feet high, and the front end is approximately 12 feet high.

Before getting into details of the construction of other features of the invention, reference is directed to FIG. 2, which illustrates a feature of utility of the particular apparatus. There is shown two of the enclosures 2 placed side by side, each being so arranged with side covers 4 and 6 on each side so that the individual golfer has privacy in practicing. FIG. 3 shows two of the enclosures placed with their rear ends together and in line, one enclosure being enclosure 2 and the other being enclosure 14. In FIG. 3 each enclosure is the same, but the end framework 10 is common to both.

Referring now to FIGS. 1 and 5 for further details, at the rear end of the enclosure on framework 10 is mounted a movable screen 18, which, as will be described below, can be moved upwardly and downwardly to position a target area 20 at a plurality of predetermined positions. The screen is wrapped around a pair of rollers 22 and 24, the top roller being driven by a shaft around one end of which is wrapped a cable 26, the end of the cable being attached to a counterweight 28 which is enclosed in a hollow tube 30.

The bottom roller 24 is driven by a motor 32, which is under the control of a suitable electric circuit. When the roller 24 is rotated to release the screen therefrom, the weight 28 will turn the upper roller 22 to wrap up screen thereon so that the screen will remain taut. Contrarywise, when the roller 24 is energized to move the screen downward, then the weight 28 will rise while maintaining the tension on the screen. Rollers 22 and 24 are about 30 feet apart.

Of course, other suitable means for moving the screen up and down can be provided if desired, and will not be detailed here.

As has been indicated above, the framework 10 is of general construction, and is made of structural iron using typical lattice work. The interior of the framework is open, and suspended therein by suitable means is a ball catching apparatus generally indicated by numeral 36. Preferably the catcher is made of netting having a mesh small enough to stop a golf ball. The netting enclosure is divided into three vertical chutes: a central chute 38 and two side chutes 40 and 42. (See FIG. 6.) The chutes can be closed at the top, and at the bottom the open ends of the chutes lie above golf-ball receiving trays 44 and 46. Tray 44 underlies the open end of the central chute 38. Tray 46 is large enough to underlie the open ends of both the side chutes 40 and 42. Thus, a golf ball which is received in chute 38 would fall into tray 44, and golf balls which are received by either chute 40 or 42 will fall into tray 46.

Each of the trays has a bottom which slopes toward an exit so that balls which fall into the trays will move toward the exit of the respective tray by the force of gravity. From the exit of tray 44, there leads a hose or pipe 48 sufficiently large in diameter so that a ball will roll freely therein. Tube 48 slants downwardly, turns, and then runs parallel to the enclosure, as shown in FIG. 6. The other end of tube 48 empties onto a V-shaped collector trough 50, the other end of which terminates adjacent the tee. In similar fashion, a tube 54 leads from the exit of tray 46 and debouches into a trough 56 whose other end 58 ends adjacent the tee.

Referring to FIGS. 5 and 6, it will be noted that in front of the screen 18, there is a third collector tray 60 having an exit from which leads a tube 62 which debouches onto a trough 64, whose end 66 is adjacent the tee. The function of tray 60 is to collect balls which strike the screen and do not pass through the target thereof.

With the above construction, it will be seen that by looking at the balls which eventually roll down the trough from the respective trays and counting them, the golfer can determine instantly those balls 68 which have passed through the central portion of the target, those balls 70 which have passed through the outer portions of the target, and those balls 72 which have struck the front of the screen and not the target.

An inclined ramp 74 leads from the ground floor up to the edge of tray 60 so that if the golfer tops the ball so that it fails to rise in its usual trajectory, it will roll up the ramp 74 and fall into tray 60 for eventual return to end 66.

Of course, the troughs 50, 56 and 64 are suitably supported such as by posts 76 so that at the trough ends, they will be at a convenient height for seeing and for removal therefrom.

As has been indicated above, the screen has a target 20, which comprises an oval area (the outline being indicated in dotted lines) in which the screen is slit as shown. The slits are approximately three-fourths inches apart to form ribbons about three-fourths inches wide. By slitting the screen 18 in the aforesaid manner, it will be found that the balls which strike the target pass readily therethrough. The major axis of the oval forming the target is approximately 7 feet, and the minor axis is approximately 3 feet. On this target, the net chute 44 has its open forward face covering approximately one-third of the width, at the center of the target. That is, the target itself is divided into three approximately equal areas, balls through the central area 82 defined by the chute 44 will fall into that chute, and the balls through the outer areas 84 will fall into the chutes 40 and 42 covering those areas.

It will be noted that a golfer standing at a tee will, in general, see the green in perspective as somewhat elliptical, and this is the reason for a generally elliptical shape of the target 20. Of course, it can be only a simulation of what the green will look like because the elevation of the green with respect to the golfer or vice versa will change the apparent shape of the green, depending on the perspective, and also the actual shapes of the greens.

It has been found that a convenient material for the screen is a polyvinyl chloride sheet material on a nylon scrim support, approximately 0.025 to 0.050 inches thick. Of course, other durable, flexible materials can be used, provided that when slit, the balls can pass through it. The screen is 9 feet wide.

At the front end of the apparatus, a portion of the curtain material is cut away to expose an opening 86 in which may be positioned a control console 88. The

console is located close to a tee **90**, which is 50 feet from screen **18**. Referring to FIGS. **7** and **8**, the console comprises an upright end portion or stand **92** having a sloping panel **94** at a convenient height for the golfer. Extending from the end portion **92** are sides and partitions which form compartments **96** in which golfers can place their golf bags.

The control panel **94** has mounted thereon a plurality of switch push-buttons **98** numbered from No. 1 through No. 10 inclusive, and it will be noted that as an example of the further identification of these switches, push button No. 1 has the legend No. 5 iron adjacent thereto, No. 2 push-button has the legend No. 3 wood, No. 3 push-button has the legend No. 8 iron, and so forth. The numbers of the push-buttons correspond to the numbers of the particular holes being played. As will be explained below, the predetermined positions of the target **20** are such that on hole No. 1 a No. 5 iron should be used at the tee in order for the ball to achieve the proper elevation to penetrate the target area. On hole No. 2 a three wood will be required to achieve the elevation determined by the No. 2 position of the target area. For the No. 3 hole, a No. 8 iron would be required, and so forth through and for any given sequence of target positions.

On the panel there are provided indicator lights **100** and **102** for indicating that the circuitry is on or off, in conventional manner.

Referring now to FIG. **9**, there is shown a functional wiring diagram for operation of the device, the diagram also including certain heights of the target corresponding to the golf club iron or driver that is being used. A power input **104** is shown which is of a suitable voltage for the switches, motor, and relays used to operate the device. (Since these various elements are conventional in nature, an exact detailed description is not given here.) The power supply divides into the line **106** and the line **108**. Line **106** is serially connected to switches **110, 112, 114, 116, 118, 120, 122, 124, 126** and **128**, which are actuated by push-button switches at holes 1 through 10 respectively on the panel **94**. Such switches are the Type 53–PB8–T2 push-button switches manufactured by Micro Switch Division of Honeywell Inc., Freeport, Ill. The switches in turn are individually connected to one side of each of ten motor-driven cam switches **130** through **148**. For example, the motor driven cam switch Type No. 803–A10 manufactured by Allen-Bradley Company, Milwaukee. For example, switch **110** is connected to one side of the cam switch **130**, switch **112** is connected to one side of cam switch **132**, and so forth, up to the point that switch **128** is connected to cam switch **148**. The other side of the cam switches are all connected in parallel to the power line **150**, which connects through a low-limit switch **152** and by lead **156** to the screen drive motor **158**. For example, a Boston Gear Reducing Reversible Three-phase Motor, Type No. FWA–321A–150–EUB made by Boston Gear Division of North American Rockwell Corp., Quincy, Mass., controlled by a Reversing Motor Starter, Type AB–705 AOD, Style RT1, made by Allen Bradley Company, Milwaukee. The other side of the target drive motor is connected to line **108** through the switch **160**. It will be noted that the cam switches **130–148** inclusive are driven by a rotor **162** which is turned, by suitable linkage such as a sprocket wheel and chain drive, by the screen drive motor **158**.

If desired, a high-position limit device **164** may be used to stop the current in the event that the cam switch **148** fails. (The high-limit device **164** is shown wired functionally, since its application and wiring into the circuit are conventional.)

Shown in squares with ovals therein, in some cases with dotted lines and two cases with full lines, are schematic illustrations of targets of the screen **18** in the various specified predetermined positions into which the targets move, and which are correlated with the trajectory of the particular club selected at a distance of 50 feet from the screen, as taught above. The first position represented by number **166** corresponds to the trajectory of the ball when a correctly used driver is used at the aforesaid 50 feet, and therefore is the position to which the target moves when switch **110** is activated for hole No. 5. Position **168** corresponds to switch **112**, that is to hole No. 2 for the No. 3 wood. Position **170** corresponds to hole No. 7 for the No. 4 wood, and switch **114**. Position **172** corresponds to switch **116**, that is, hole No. 10 and No. 3 iron. Position **174** corresponds to switch **118** and hole No. 4 and No. 4 iron. Position **176** corresponds to switch **120**, hole No. 1 and No. 5 iron. Position **178** corresponds to switch **122**, and hole No. 9, and No. 6 iron. Position **180** corresponds to switch **124**, hole No. 6 and No. 7 iron. Position **182** corresponds to switch **126**, hole No. 3 and No. 8 iron. Position **184** corresponds to switch **128**, hole No. 8 and No. 9 iron.

Assuming that the target has been located at position **176**, then because of the cam rotation previously performed, cam switch **140** is open. (All other cam switches are closed.) The opening of cam switch **140** has stopped the flow of current through the target drive motor and thus the cam rotor **162** itself, because all of switches in the series **110–128** inclusive are open, switch **120** having also been opened when cam switch **140** opened previously. Supposing now that one wishes to move the screen and thus the target down to the hole No. 10, that is, by activating push-button No. 10 (switch **116**). When this switch is actuated by its push-button, it automatically locks in due to the hold-in circuit established through the closed cam switch **136** so that switch **116** will stay locked in until the cam switch **136** opens later. As a result of power being connected through leads **106**, switch **116**, cam switch **136**, lead **150**, low limit control **152**, lead **156**, the target motor **158**, and lead **108** to the power supply, the target motor now rotates in such direction as to move the screen downwardly until the target which was located at position **176**, moves down to position **172**. While the target drive motor is moving the screen down, it also rotates the cam rotor **162**, so that when the target reaches position **172**, cam switch **136** opens, and the target drive motor and the cam rotor stop. At the same time, switch **116** opens. The target then remains at position **172**.

When the cam rotor **162** rotated, it also closed the previously open cam switch **140**, but as pointed out above, the opening of a cam switch opens its respective push-button switch. Thus closing of cam switch **140** does not connect power to the motor **158**.

In similar manner, if at any other of the indicated positions (or holes) the switch corresponding to a particular hole is actuated, the motor **158** moves the screen until the target is correctly positioned, and then the switch opens.

In FIG. 9, the height of the lowest position (hole 5) and the distances separating the positions is also given. For a distance of 50 feet from the tee, and for the loft angles of average clubs, the first height is 10 feet and the positions are 2 feet apart.

In regard to the height of the respective target positions above the floor line, the following explanation will be of assistance. Referring to FIG. **10**, there is shown an average set of clubs, the approximate trajectory angle for each club which results when the golf ball is hit properly. For example, the very bottom club set forth in the chart legend, (that is, a driver) will produce a trajectory of close to 11°, all angles being measured with reference to the floor. Another example, is the No. 5 iron, which typically will produce a trajectory angle of close to 23°. The trajectory angle is theoretically less than the actual loft angle of the club face because of the frictional downward force applied when striking the ball to create a desired backspin. The trajectory angle is a resultant of the two forces affecting the ball at impact. (For a full explanation of this, reference is made to the book entitled "The Search for the Perfect Swing" by Alastair Cochran and John Stobbs, published by J. B. Lippencott Company, Philadelphia, Penn., the information (already public) being incorporated herein by reference.)

Assuming a tee distance of 50 feet from the screen **18**, if one computes the height of the target positions above floor level using the trajectory angles indicated on FIG. **10**, one arrives at the following table:

TABLE I

Club	Trajectory	Distance to Floor	Target Separation
Driver	11°	9.72 ft.	
3 Wood	13°	11.55 ft.	1.83 ft.
2 Iron-4 Wood	15.5°	13.87 ft.	2.32 ft.
3 Iron	18°	16.25 ft.	2.38 ft.
4 Iron	20.5°	18.70 ft.	2.45 ft.
5 Iron	23°	21.23 ft.	2.53 ft.
6 Iron	24.5°	22.79 ft.	1.56 ft.
7 Iron	26°	24.39 ft.	1.60 ft.
8 Iron	27.5°	26.03 ft.	1.64 ft.
9 Iron	29°	27.72 ft.	1.69 ft.

The fourth column of the table indicates the distance which should theoretically separate one target position from another, and the third column indicates that at a trajectory angle of 11°, the first distance from floor to center of the target will be approximately 9.72 feet. The separation of the next target position from this first position is 1.83 feet, and so forth. It will be observed that as one gets higher and higher, the separation decreases somewhat. However, for the convenience of setting the cams **130–148**, and in view of the fact that the trajectory angles are not always exactly the same, due to variations in the loft angles of the clubs made by the several manufacturers, the distance of the first target position (ie., the bottom one for the driver) has been set at 10 feet from the floor level, and then the remaining distances are set so that there is a two foot separation of the target centers as one progresses upwardly. It ought to be noted, that in view of the fact that the minor axis of the target ellipse is 3 feet, and the separation of the target centers is only two feet, a target in one position will overlap to some extent its previous position.

Of course, if desired, the cams **130–148** could be set so that the target intervals would be exactly as shown in the fourth column of Table I. For the reasons given above, however, it is felt that in actual practice of the invention, it is better to separate the targets uniformly.

Therefore, if one is going to play the game as set up on the console face shown in FIG. **8**, and has arrived at the tee for hole 5, the push-button indicating hole **5** is pushed and this moves the target down to occupy the lowest position shown on FIG. **10**. If, then, the driver is used correctly, the trajectory of the ball leaving the driver's face will be such as to penetrate the target and be collected in one of the three chutes. If there has been no hook or slice, then the center portion of the target will have been hit, the ball will be collected by the center chute **44**, and will exit into trough **50**. If either of the side sections of the target are hit, (due to a hook or slice), then either chute **40** or chute **42** will collect the ball, with the ball emerging into the trough **56**. Of course, if the target is missed completely and strike the screen, then the tray **60** will collect the ball and the ball will emerge in trough **64**.

Of course, as is apparent from the face of the console **88**, the particular fictional game set up starts with hole 1 and fictitiously this hole is designed for a No. 5 iron. Accordingly, the button indicated for hole 1 is pushed, and the target will be pulled upwardly and stopped at the position indicated by numeral **176** on FIG. **10**. When the target has moved upwardly to this position, then as explained above cam **140** opens and the target stops in this position. The golfer then makes his stroke, and if done expertly, the ball will traverse the center section of the target and be collected by the chute **44**. It then rolls back to the tee in trough **50**. Of course, because of the distance of 50 feet, the golfer can clearly follow the flight of the ball and thus will have an initial visual impression or knowledge of whether the ball traverses the center of the target area or either of the two side sections, and later this will be confirmed by the position of the ball in one of the three troughs **50**, **56** and **64**. These troughs provide the means of scoring in the game. Balls which return in trough **50** count **10** points each. Balls which return in trough **56** count **5** points each. Balls which return in trough **64** count zero. Each player records his score on each hole and totals his points for the ten holes which comprise one game. The player with the most points wins.

After playing hole 1, the golfer then pushes the button for hole 2 and the curtain moves down to position **168**, where it stops. The golfer uses No. 3 wood and again drives a golf ball towards the target. If he is successful, the ball will pass through the center section of the target as above.

In this manner, the remaining holes of the particular game set up on the console **88** are played through, with the target being moved to the position for each hole for that particular game.

Of course, if one wishes to change the game from that shown on FIG. **8**, one can select another sequence in which hole No. 1 would require, for example, a No. 3 wood, hole No. 2 might require a driver, and so forth. In other words, with this particular invention, any number of games can be arranged using the console of FIG. **8**, but by numbering the push-buttons differently.

In such a new game, the numbers of the push-buttons **98** on console **94** would no longer correspond to the ac-

tual holes. Instead the numbered push-buttons would correspond to holes and clubs as follows:

TABLE I

Hole	Club	Button (as numbered in FIG. 8)
1	No. 3 Wood	No. 2
2	Driver	No. 5
3	No. 8 Iron	No. 3
4	No. 5 Iron	No. 1
5	No. 9 Iron	No. 5
6	No. 7 Iron	No. 6
7	No. 4 Iron	No. 4
8	No. 4 Wood	No. 7
9	No. 3 Iron	No. 10
10	No. 6 Iron	No. 9

If desired, a template could be made which would fit over the actual push-buttons on console **94** and which would contain the above information for the new game.

From a teaching point of view, the device makes it very easy for the teachers to determine which of the clubs are most troublesome and the player and the target area can be located specifically for teaching and practice as to the clubs requiring the most attention. For example, if the player has trouble with his No. 9 Iron the target area can be elevated to the hole requiring the No. 9 Iron and the teacher can instruct the player on the use of the No. 9 Iron and the player will have a means of gauging his improvement.

Also, it is to be realized that with the particular game or invention, a person can maintain a given target at any one position and practice with only that particular golf club and target position until he is satisfied with the stroke and the trajectory he gets. Also, if one wishes to practice by using the clubs successively, as is quite often done, the golfer can push button No. 8 first and use No. 9 iron, then button No. 3 and use No. 8 iron, button No. 6 and No. 7 iron, and so forth.

Furthermore, while the apparatus has been described as being adapted for the golf clubs named above, it can be readily adapted for other clubs (having other face loft angles) by the simple expedient of shifting the cams on the cam rotor **162** to stop the target at the proper heights to intercept the balls when struck properly by the chosen golf clubs.

In view of the above description, it will be apparent that while in other devices the emphasis is on distance, velocity and spin, all of which are computed in one way or another and converted electronically for a read-out, this invention is concerned with the proper angle of flight for each individual club according to the manufacturer's loft angle which is built into it. This places the emphasis on accuracy and the location of the target in respect to the USGA requirements and the various manufacturers' data on club design. It also emphasizes the desirable flight of the ball. The altitude of the ball after 50 feet of true flight gives a reliable indication of the correct use of the club.

It is also to be realized, that instead of having a single trough return the ball from both of the two side chutes of the target, that is, sections **84**, a separate tray can be used for each of these two side sections with each tray in turn returning the balls to the tee by a separate trough. One could also have two additional trays for high and low — these to discharge into trough No. 56. That is, if this were to be done, one would have a center chute **44** which would lead to trough **50** as shown above, the forward tray **60** would lead to trough **64** as given above, one side section (for example, the top one as viewed in FIG. **6**) could correspond to the upper chute in the drawing of FIG. **6**, which would lead to a third trough, and the bottom chute (as viewed in FIG. **6**) could pick up balls in the other edge section or portion of the target and return its balls to a fourth trough.

In view of the above it will be seen that the several objects of the invention are achieved and other advantageous results attained.

It is to be understood that the invention is not limited in its application to the details of construction and arrangements of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also, it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

As many changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings, shall be interpreted as illustrative and not in a limiting sense, and it is also intended that the appended claims shall cover all such equivalent variations as come within the true spirit and scope of the invention.

Having described the invention, what is claimed is:

1. A golf practice and game apparatus comprising:

a base;

a tee;

a vertically movable screen mounted on the base at a fixed distance from the tee;

a target area on the screen and movable vertically thereby, the target area being penetrable by a golf ball striking thereon;

collecting means mounted behind the target area for receiving balls passing through the latter;

delivery means for receiving balls from the collecting means and moving them to a position adjacent the tee; and

control means for moving the screen upwardly and downwardly, and thus the target area, to a plurality of predetermined positions above the base level, the height of each of said positions corresponding to the height a golf ball would reach when struck by a particular golf club at the tee.

2. The apparatus of claim **1** in which the vertical distance of each of said target positions above the base level is such as to subtend at the tee an angle approximately equal to the trajectory angle of a golf ball struck by a given golf club.

3. The apparatus of claim **2** in which said target area is an opening and is provided with a plurality of flat strips of flexible material extending across the opening, the edges of the strips being free thereby to provide slits through which balls can pass through the opening.

4. The apparatus of claim **3** in which said opening is generally elliptical in shape with the long axis thereof being horizontal.

5. The apparatus of claim **1** in which the collecting means are a plurality of adjacent chutes mounted behind the target area, the chutes dividing the area into a plurality of smaller areas, and each chute receiving balls passing through only one of the smaller areas.

6. The apparatus of claim 5 in which said delivery means includes a plurality of trays beneath said chutes into which balls collected by the chutes fall.

7. The apparatus of claim 6 in which there are at least three adjacent chutes one of said trays underlies the chute which is positioned to collect balls passing solely through a central area of the target area, and another tray underlies the other two chutes.

8. The apparatus of claim 6 in which the delivery means includes a plurality of tubes each being connected to the trays by one end, a trough connected to the other end of each tube, said troughs leading from approximately the screen to the tee with the balls in said troughs being visible to the player at the tee.

9. The apparatus of claim 5 in which said chutes are mats extending vertically behind the curtain for a distance at least equal to the total distance occupied by the target area from its lowest position to its highest position.

10. The apparatus of claim 9 in which the chutes are three in number, the open side of the middle chute covering approximately one-third of the target area at the central portion thereof and each of the side chutes covering a third of the target area at the side portions thereof.

11. The apparatus of claim 10 in which the central chute is approximately square in cross-section, and the side chutes are approximately triangular in cross-section.

12. The apparatus of claim 1 in which the screen is suspended on rollers, one roller being positioned adjacent the bottom of the apparatus and the other roller being positioned at the top of the apparatus, the screen being adapted to be rolled up on said rollers, rotation of the rollers shifting the position of said target area with respect to said base.

13. The apparatus of claim 1 in which said control means includes mounting means stationed adjacent the tee and a plurality of electrical switches mounted on the mounting means, each switch being marked with an indicium indicating a golf club, and each switch being adapted when actuated to move the screen and thus the target area to bring the latter to the predetermined positions for the golf club indicated by the indicium at said switch.

14. The apparatus of claim 13 including a motor and a rotary cam switch device having a plurality of switches operated by cams, the switches corresponding in number to the positions of the screen, the motor being adapted to raise and lower the screen and simultaneously rotating the cam switch, and said cams being adjustable to change the predetermined positions of the screen.

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