United States Patent

[11] **3,563,553**

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[73] Assignee **Brunswick Corporation**

[54] **AUTOMATIC INDEXING OF INDEXIBLE TEE FOR AUTOMATIC LIE SELECTION**
18 Claims, 8 Drawing Figs.

[52] **U.S. Cl.** **273/176,** 273/195, 273/183, 273/203
[51] **Int. Cl.** **A63b 67/02,** A63b 69/36
[50] **Field of Search** 273/176, 195, 184, 185, 183, 203; 73/379

[56] **References Cited**
UNITED STATES PATENTS

3,143,350	8/1964	Lester	273/195(A)
3,501,152	3/1970	Conklin et al.	273/176(F)
3,513,707	5/1970	Russell et al.	73/379

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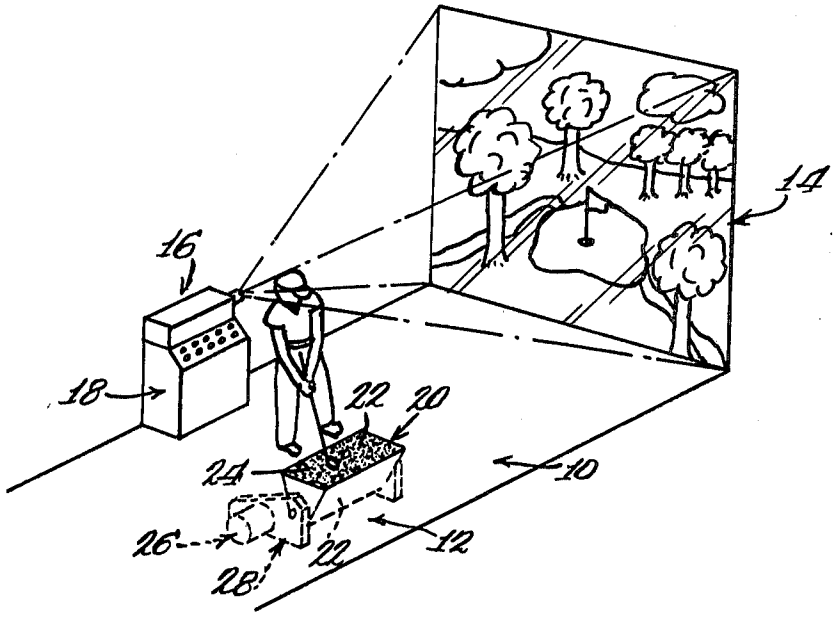
ABSTRACT: An automatic lie selection control for indexible tee constructions which are adapted to dispose any one of a plurality of different lie simulating mats at a predetermined location in a tee area of an indoor golf game. In one embodiment, lie material information is derived from scene selection switches of a projector that projects scenes of different portions of holes on a golf course to a screen for display purposes for a golfer playing the game. In another embodiment, lie selection information is derived from a coding associated with each frame on a film illustrating various scenes from a golf course so that projection of a selected scene results in the disposition of a corresponding lie material at a predetermined location at the tee area.



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SHEET 1 OF 5

Fig. 1.

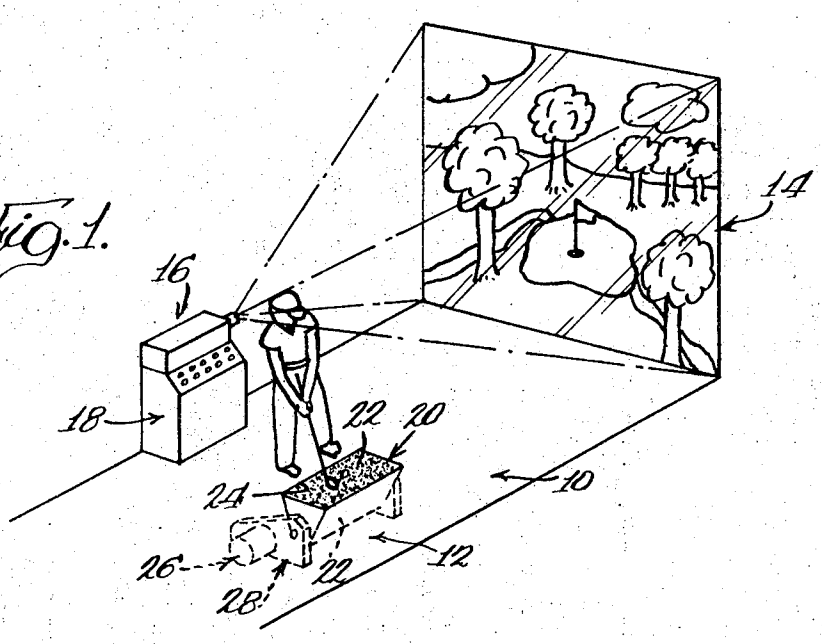
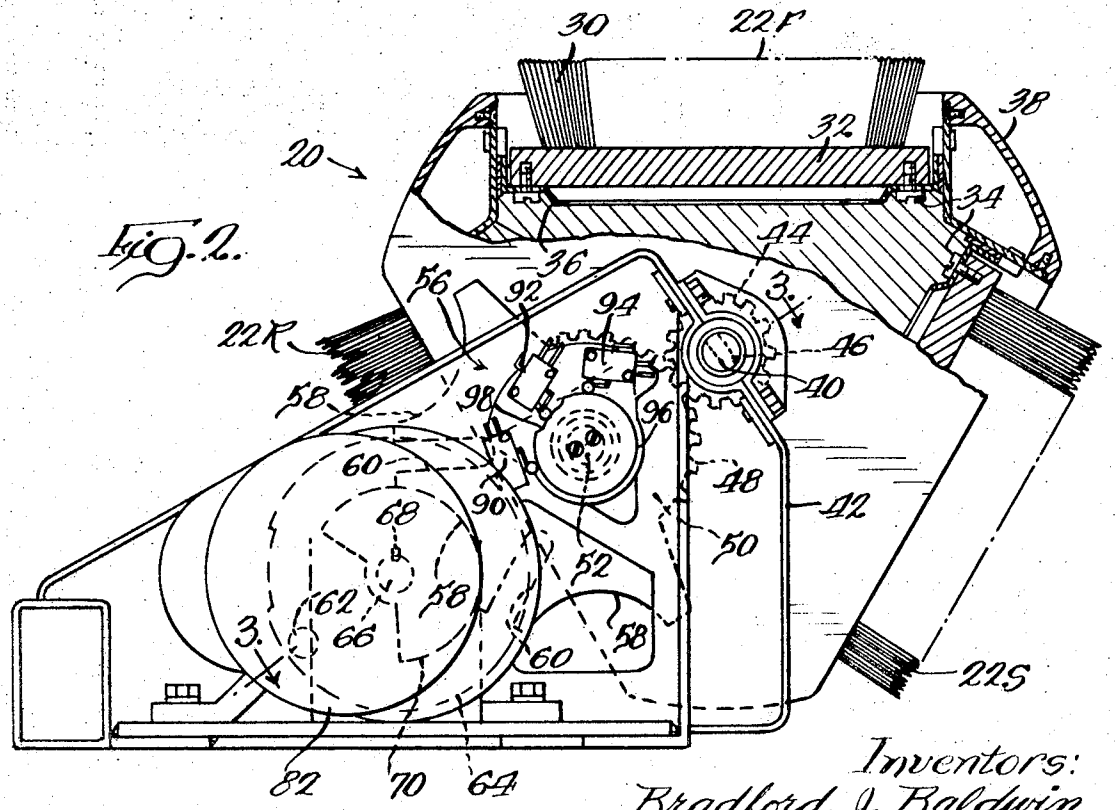


Fig. 2.



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Atty's

Fig. 3.

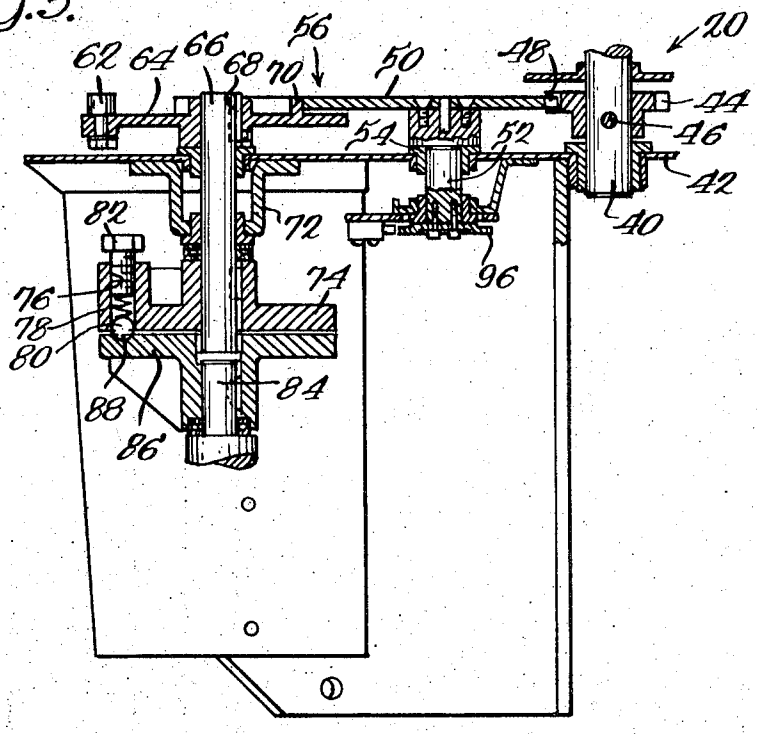

62
64
66
68
70
56
50
48
20
44
46
42
40
54
52
72
82
74
96
76
78
80
84
88
86

Fig. 4.

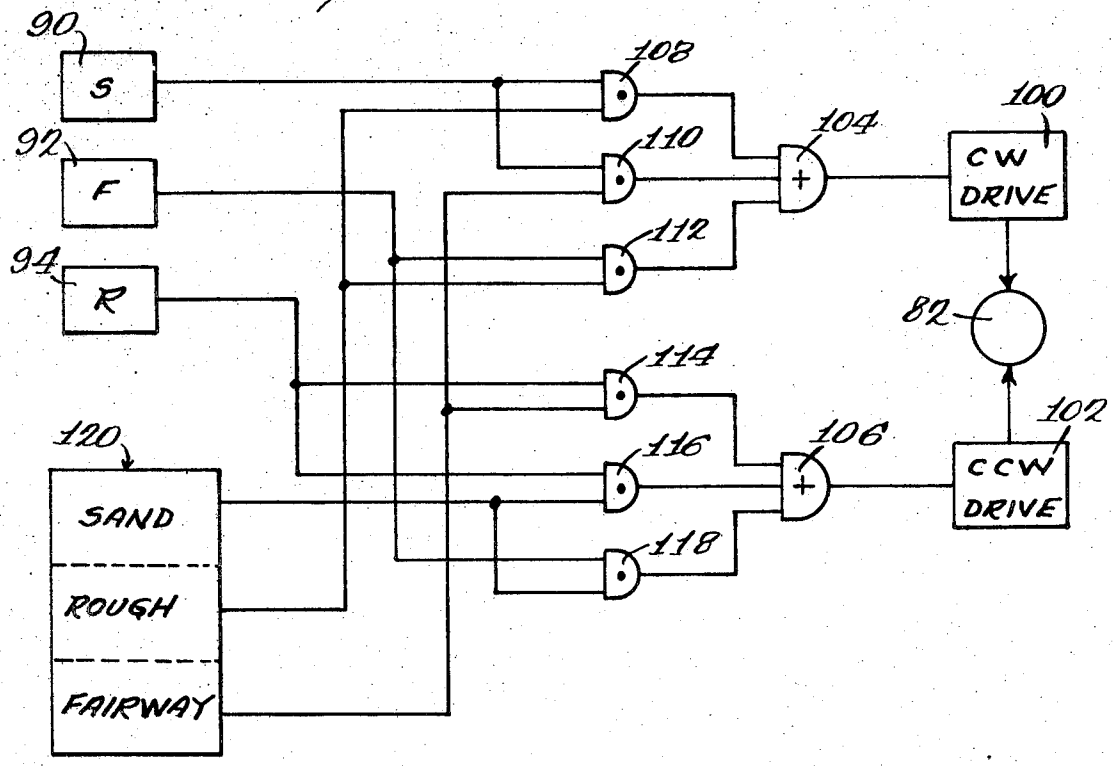
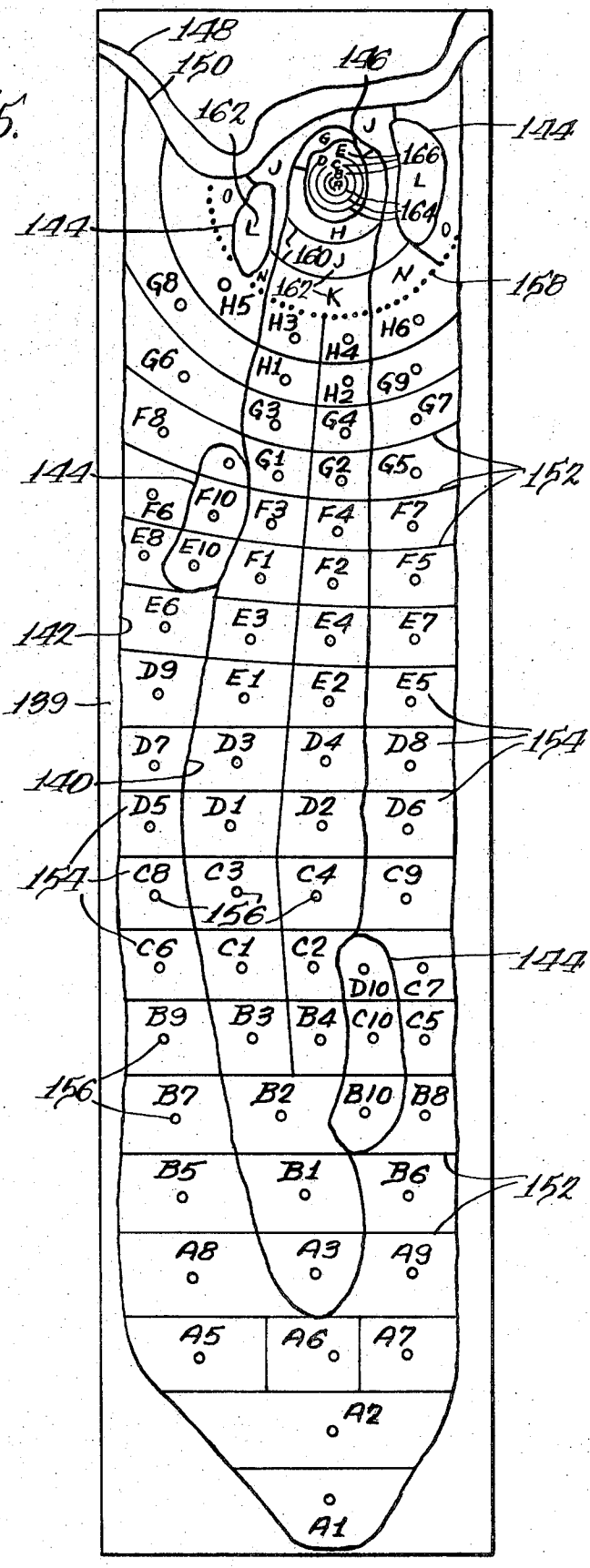

90
S
92
F
94
R
120
SAND
ROUGH
FAIRWAY
108
110
112
114
116
118
104
106
100
CW DRIVE
102
CCW DRIVE
82

Fig. 5.


148
150
146
162
144
166
164
160
168
152
142
139
154
140
156
A8
A3
A9
A5
A6
A7
A2
A1

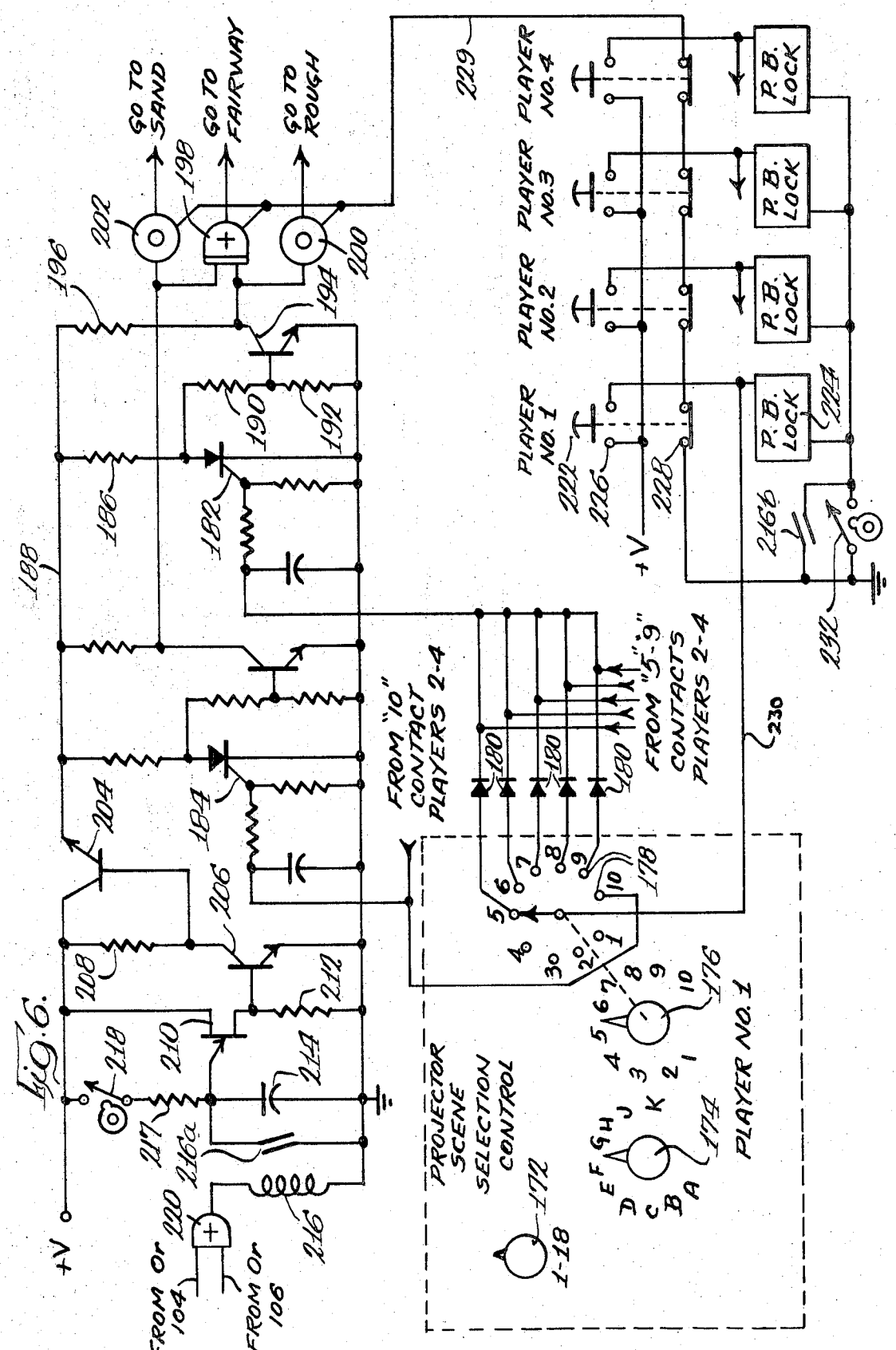

GO TO SAND
GO TO FAIRWAY
GO TO ROUGH
PLAYER NO. 1
PLAYER NO. 2
PLAYER NO. 3
PLAYER NO. 4
P.B. LOCK
FROM "10" CONTACT PLAYERS 2-4
FROM "5-9" CONTACTS PLAYERS 2-4
PROJECTOR SCENE SELECTION CONTROL
PLAYER NO. 1
FROM OR 104
FROM OR 106
+V

Fig. 6.

Fig. 7.

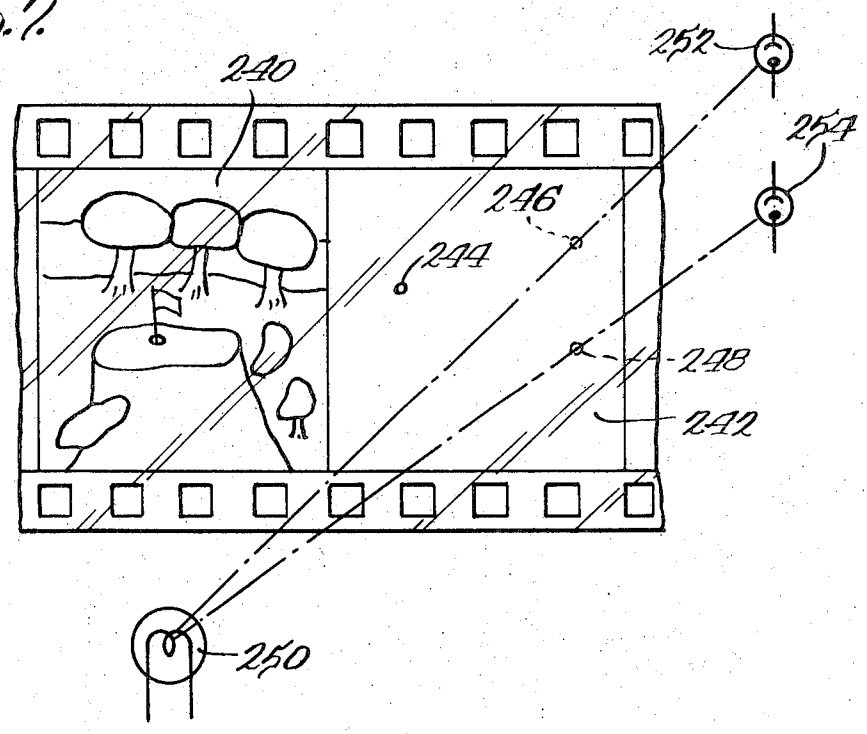
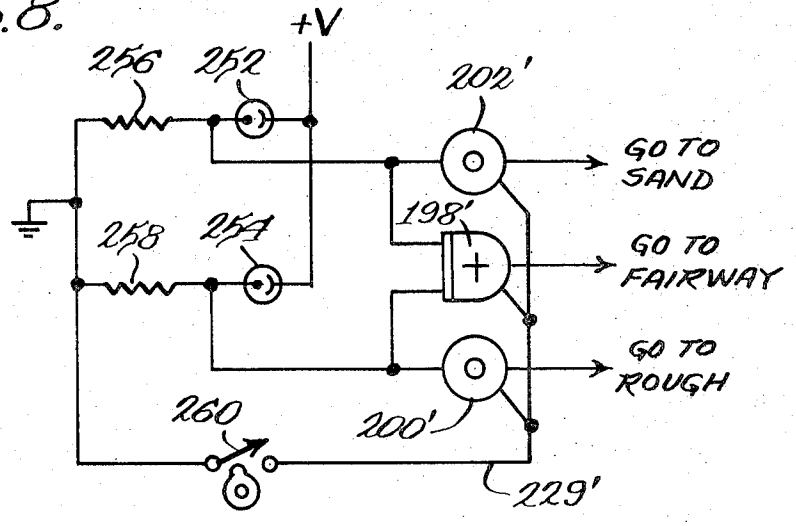

252
240
254
246
244
248
242
250

Fig. 8.


+V
256
252
202'
GO TO SAND
198'
258
254
GO TO FAIRWAY
GO TO ROUGH
260
200'
229'

AUTOMATIC INDEXING OF INDEXIBLE TEE FOR AUTOMATIC LIE SELECTION

BACKGROUND OF THE INVENTION

In the copending application of Anderson, Ser. No. 545,411, filed Apr. 26, 1966, entitled "Golf Tee" and assigned to the same assignee as the instant application, there is disclosed an indexible tee device for use in indoor golf games. The tee device includes a turret mounted for rotation about a generally horizontal axis, which turret bears about its periphery three different mats, each simulating the lie on a different portion of a golf hole. Typically, one mat simulates the lie on the fairway, another simulates the lie in the rough, and a third simulates the lie in the sand trap. Control means are provided for the turret so that upon appropriate manipulation of manually operable lie selection switches the turret may be rotated to dispose any one of the three mats at a location whereat the golfer may place a ball thereon and hit the same with a golf club.

The Anderson construction has proved to be quite successful in that the mats used thereon provide very realistic simulation of the varying lies and the device is easy to operate. However, in order to select the appropriate lie simulating mat, a distinct physical act on the part of the golfer, namely, manipulation of lie selection switches, is required.

In indoor golf games, time is of great importance to the owner of an establishment housing such a game. Specifically, the proprietor's income depends upon the number of golfers who can play the game in a given period of time and as a result, it is highly desirable that the time required for the golfer to perform a given act be minimized so that more golfers may play the game in a given time period.

Furthermore, because not all golfers playing the game will follow the instructions to the desired extent, it is also desirable that the game be fabricated to present as little opportunity for a golfer to fail to follow instructions as possible.

When the Anderson device is used in a golf game, a certain amount of time is required for a golfer, prior to each shot, to manipulate the manually operable lie selection switches to select a suitable lie. Furthermore, there is the possibility that the golfer will fail to operate such switches and thus not obey the rules of the game. The latter situation could result in a golfer, quite unfairly, hitting a ball from an easy lie such as the lie on the fairway when a shot from a more difficult lie such as the rough simulating lie or the sand simulating lie is required.

SUMMARY OF THE INVENTION

The invention, in its broadest sense, automatically indicates within a tee area, to a golfer, which of at least two different lie simulating mats should be used by a golfer in playing a shot, in response to the receipt of information relative to a particular location on a simulated golf hole in an indoor golf game from which a particular shot is to be played. In the exemplary embodiment of the invention, the indicating means are in the form of an indexible tee structure wherein a plurality of different lie simulating mats are mounted about the periphery of a turret.

In the exemplary embodiment of the invention, the means for receiving information relative to a particular location on a hole from which a shot is to be played comprise alternatively, either scene selection means for causing a projector to project a scene from the location on a screen at the tee area or means responsive to the disposition of a particular scene for projection on the screen after scene selection has been accomplished. While the exemplary embodiment of the invention is described in conjunction with a projector having manually operable scene selection means, the invention is not limited to the use of such manually operable means and it is contemplated that the same may be readily used in such indoor golf game systems previously proposed or considered in the future that use automatic scene selection means.

In the case of the first embodiment mentioned generally in the preceding paragraph, each hole to be played on the indoor

game is divided into a plurality of zones with each zone having the same lie condition throughout. That is, each zone will consist entirely of the rough, entirely of the sand or entirely of the fairway if three corresponding lie simulating means are used. There is also provided a scene for each zone with the scene representing the view of the hole from the particular zone with which it is associated. Furthermore, each zone and each corresponding scene are provided with identification numbers for use in manual scene control and each number for each scene is chosen so that each number indicates a fairway zone, other numbers indicate rough zones and still other numbers indicate sand zones. Therefore, when the manual scene selection means are operated by programming the scene with a particular identification number for a particular scene, the same information provides an indication of the particular lie simulating means to be used in playing the shot from that zone and means are provided for automatically indexing the tee turret accordingly.

In the case of the second embodiment, each hole is again zoned so that each zone has the same lie throughout but there is no necessary correlation between zone identification numbers and the particular lie within that zone. Rather, on a film strip used by the projector and containing images of the various scenes that may be projected, each scene, which depicts the view from a particular zone, is provided with a code which indicates the lie for the zone corresponding to the scene. Thus, disposition of the selected scene for projection on the screen provides lie information which may be sensed for controlling the tee turret.

Other features and advantages will become apparent from the following specification taken in conjunction with the accompanying drawings.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view illustrating one environment in which the indexible tee structure may be used;

FIG. 2 is a side elevation of an exemplary embodiment of the invention with parts broken away for clarity;

FIG. 3 is a sectional view taken approximately along the line 3–3 of FIG. 2;

FIG. 4 is a logic diagram illustrating a control system for the indexible tee structure;

FIG. 5 illustrates a map divided into a plurality of zones, each having distinct codes which is utilized in the golf game to simplify automatic lie selection in one embodiment of the invention;

FIG. 6 is a schematic illustrating control circuitry for automatically selecting the required lie in one embodiment;

FIG. 7 illustrates a portion of a film strip adapted for lie selection purposes according to a second embodiment of the invention; and

FIG. 8 is a schematic illustrating control circuitry for automatic lie selection according to the second embodiment of the invention;

GENERAL DESCRIPTION OF AN INDOOR GOLF GAME

The automatic lie selection control means of the instant invention is primarily intended for use with the more sophisticated types of indoor golf games currently known wherein a direction parameter as well as a distance parameter of a ball hit from an indoor golf game tee is computed. This is in contrast to those games wherein only a distance parameter is computed although, in some instances, the instant invention will have significant utility in the latter type of game also.

The foregoing distinction is based on the fact that, for the most part, the games computing distance assume that the golfer's shot will always terminate on the fairway and there is, therefore, no need to provide the golfer with a lie simulating the rough or the sand. On the other hand, where the direction of a golfer's shot is determined as well as the distance thereof, the shot may terminate to the right or the left of the fairway and therefore be in the rough; or may have a point of termina-

tion that causes the same to come to rest in a sand trap which occupies merely a portion of the fairway and/or the rough.

A number of such relatively sophisticated indoor golf games have been proposed from time to time and are well-known to those skilled in the art and the instant invention is capable of use with any of such indoor golf games. However, preferred embodiments to be described hereafter are particularly well suited for the type of indoor golf game made according to the teachings of the copending applications of Russell et al., Ser. No. 588,922, filed Oct. 24, 1966, entitled "Golf Game Computing System" now U.S. Pat. No. 3,513,707; Conklin et al., Ser. No. 588,856, filed Oct. 24, 1966, entitled "Golf Game," now U.S. Pat. No. 3,501,152; and Pratt et al., Ser. No. 574,218, filed Aug. 22, 1966, entitled "Visual Display System"; all of which are assigned to the same assignee as the instant application. The details of said Russell et al., Conklin et al., and Pratt et al. applications are herein incorporated by reference.

An indoor golf game made according to the teachings of the aforementioned Russell et al., Conklin et al., and Pratt et al. applications firstly utilizes a data acquisition system associated with a tee point at which a golfer may hit a ball for acquiring data relative to the initial trajectory of a shot. Such data is then utilized by the computer of the Russell et al. application which, in turn, generates three outputs relative to the location of the ball with respect to three, mutually perpendicular coordinates, during the theoretical flight of the ball.

The information thus computed is then used to control a so-called "ball spot projector" which projects a spot of light on a scene which is projected on a screen by the projector system of the Pratt et al. application in such a way as to indicate to the golfer the trajectory of the golf ball. When the computer has determined that the flight of the ball has ended, two of the informational outputs thereof are then fed to a so-called "map spot projector" which utilizes the information to project a spot of light on a map of the golf hole being played to indicate the point of termination, both in terms of distance and direction of the shot. The golfer playing the game then observes the point of termination of the map and utilizes coded information in the point of termination to select the scene to be displayed for the next shot. Such a scene will correspond to the view of the hole being played from the point of termination of the preceding shot. The manner in which the foregoing is accomplished is described in the above-mentioned application of Conklin et al.

Thereafter, when the golfer is to make a succeeding shot, the Pratt et al. system is manually programmed to provide the desired scene that corresponds to the point of termination of the preceding shot.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Indexible Tee Structure

An exemplary embodiment of an indexible tee structure made according to the invention is shown in FIG. 1 in the environment of an indoor golf game. The indoor golf game includes a tee area, generally designated **10**, in which the indexible tee structure, generally designated **12**, is disposed. At the front of the tee area **10** and in the general direction of flight of a ball hit from the indexible tee **12** there is disposed a screen, generally designated **14**, which receives the projected image of a scene on a golf course from a projector, generally designated **16**. To one side of the tee area **10** there may be disposed a console, generally designated **18**, which may provide for control of the projector **16** and/or control of the indexible tee **12** as well as such other elements of the indoor golf game as might be manually operated.

The indexible tee **12** includes a support in the form of a turret, generally designated **20**, which is arranged to dispose a mat **22** in an opening **24** in the tee area. Appropriate drive means, generally designated **26** are arranged in conjunction with a drive train, generally designated **28** to rotate the turret **20** so that any selected mat **22** about the periphery of the turret may be disposed in the opening **24**.

As seen in FIG. **2**, the turret **20** is generally triangular in shape and supports three mats which, in the exemplary embodiment, are constructed and arranged to simulate the lie on three different portions of a golf hole. One mat **22F** is constructed in any suitable manner to simulate the fairway on a golf course while a second mat **22S** is constructed to simulate the lie in a sand trap. The manner in which the mat **22S** is constructed may be ascertained by reference to the copending application of Anderson et al., Ser. No. 587,839, filed Oct. 19, 1966, entitled "Method and Means for Simulating a Sand Trap" now U.S. Pat. No 3,466,048 and assigned to the same assignee as the instant application.

Finally, there is provided a third mat **22R** which is constructed to simulate the rough on a golf hole. The details of construction of the mat **22R** may be ascertained by reference to the copending application of Anderson et al., Ser. No. 588,919, filed Oct. 24, 1966, entitled "Method and Means for Simulating the Rough on a Golf Course," now U.S. Pat. No. 3,459,107 and assigned to the same assignee as the instant application.

In general, each of the mats **22F**, **22S** and **22R** comprise a plurality of bristles **30** which are mounted on a backing member **32**. The backing member **32** is secured by means of screws **34** to a metal shell **36** forming part of the turret **20**. Interposed between adjacent ones of the mats are suitable moldings **38**.

The turret **20** is mounted for rotation about its longitudinal axis defined by means of a shaft **40** journaled in a pair of support brackets **42** (only one of which is shown) and which may be secured to any suitable support frame located below the upper surface of the tee area **10**.

As viewed in FIGS. **2** and **3**, a gear **44** is secured to the shaft **40** by means of a pin **46** so that driving movement of the gear **44** will cause rotation of the turret **20**. The gear **44** is, in turn, in engagement with a sector gear **48** formed on part of a disc **50**.

The disc **50** is mounted for rotation with a shaft **52** which is journaled in a bearing **54** (FIG. **3**) supported by the bracket **42**.

A portion, generally designated **56**, of the disc **50** is formed to provide a Geneva movement. The Geneva movement portion **56** includes three circular concave recesses **58** with the center recess **58** being separated from the two side recesses by radially extending slots **60**. The slots **60** are adapted to receive an operating tooth **62** which is mounted on a disc **64** near the periphery thereof.

The disc **64** is mounted on a shaft **66** and secured thereto by means of a key **68** so that when the shaft **66** is rotated, the tooth **62** will move therewith. The disc **64**, at a point opposite the tooth **62**, also includes a circular segment **70** having a concave outer surface of the same radius as the circular recesses **58**. As best seen in FIG. **3**, the circular segment **70** and the Geneva motion portion **56** are disposed in essentially the same vertical plane and as will be apparent from FIG. **2**, the segment **70** may be received in any one of the circular recesses **58** in abutting relationship with virtually the entire arcuate extent of the latter. When such is the case, it will be appreciated that the disc **50** is blocked from movement so that the turret **20** cannot be rotated.

Turning now to FIG. **3**, it will be seen that the shaft **66** is journaled in bearing means **72** mounted on the bracket **42**. The end of the shaft **66** opposite that to which the disc **64** is secured mounts a platelike casting **74** which includes a threaded bore **76** at one point near its outer periphery. Received within the threaded bore **76** is a spring **78** and a ball **80** and a bolt **82**.

The driving means **26** include a bidirectional or reversible gear motor **82** (FIG. **2**) which is arranged to have a rotary output shaft **84** (FIG. **3**) driven at a relatively low rate of about approximately 30 r.p.m. when the motor **82** is energized. The shaft **84** is coaxially aligned with the shaft **66** and the end of

the former mounts a second plate which has a small recess **88** in its periphery at a radial location corresponding to that of the ball **80** with respect to the plate **74**.

As a result of the just-described construction, the bolt **82** and the spring **78** will normally urge the ball **80** into the recess **88** to establish a driving connection between the plates **86** and **74** so that when the motor **82** is energized and the output shaft **84** thereof is rotated, the shaft **68** will rotate and, in a manner to be seen hereinafter, ultimately rotate the turret **20**. The purpose of the spring **78**, the ball **80**, the bolt **82** and the recess **88** is to establish a releasable drive connection to preclude damage to the indexible tee should, for one reason or another, the turret **20** become jammed or if the control circuitry to be described hereinafter should malfunction and cause improper energization of the motor **82**. In such a case, continued rotation of the plate **86** will merely cause the ball **80** to be cammed out of the recess **88** against the bias of the spring **78** so that plate **74** will not rotate with plate **86**.

The manner by which the turret **20** is indexed is as follows. When the gear motor **82** is energized, the shaft **84** will rotate at a relatively low speed and by means of the ball **80** in the recess **88**, the rotation of the shaft **84** will be imparted to the shaft **66**. As a result, the disc **64** will be rotated thereby rotating the tooth **62** and the circular segment **70**. At some point in the rotation of the circular segment **70**, the same will emerge from the recess **58** so that the turret **20** will be free to move. At approximately the same time as the segment **70** is moved out of contact with the recess **58** in which it is received, the tooth **62** will enter one of the slots **60** and continued rotation of the shaft **66** will cause the tooth now in the slot **60** to rotate the disc **50**. Rotation of the disc **50** will cause rotation of the sector gear **86** on the disc and by virtue of the engagement between the gear **44** and the sector gear **48**, the turret **20** will rotate.

During the initial portion of such rotation, the tooth **62** will be moving deeper into the slot **60**. However, at some point, the tooth **62** will begin to emerge from the slot **60** and at the time when it completely emerges from the slot **60**, the continued rotation of the shaft **66** will cause the circular segment **70** to enter into a recess **58** that is adjacent to the recess **58** in which the circular segment **70** was originally disposed.

If the circular segment **70** was in either of the endmost recesses **58**, the foregoing procedure may be repeated twice. On the other hand, if the circular segment **70** was originally in the central recess **58**, the foregoing procedure will occur but once. Of course, the above-described action can take place in either direction.

From the foregoing, it will be apparent that some suitable control means be provided for controlling the direction of rotation of the motor **82** as well as for programming the number of revolutions of the disc **64** in each operational sequence. The mechanical elements of the control system are seen in FIGS. **2** and **3** and comprise three microswitches **90**, **92** and **94** clustered about the shaft **52**. As seen in both FIGS. **2** and **3**, a cam **96** having a recess **98** is mounted on the end of the shaft **52** and the periphery of the same is adapted to engage the actuators of the respective microswitches **90**, **92** and **94**. The recess **98** is such that only the actuator of but one of the switches **90**, **92** and **94** may be received therein at any given time.

By suitable selection of the gear ratio between the gear **44** and the sector gear **48** as well as the construction of the entire Geneva motion, all of which is shown approximately in scale in FIGS. **2** and **3**, the actuation of a given one of the microswitches **90**, **92** and **94** will be indicative of the fact that a particular one of the mats **22** is disposed in the opening **24** at the tee area **10**.

The information provided by the actuation of the microswitches **90**, **92** and **94** is utilized by a control circuit which then controls the amount and direction of rotation of the output shaft **84** of the gear motor **82** and the control circuit for the same is illustrated in FIG. **4**.

As mentioned previously, the gear motor **82** is bidirectional and conventionally includes a clockwise drive control circuit **100** as well as a counterclockwise drive circuit **102**. The clockwise drive circuit **100** is adapted to be energized whenever an OR gate **104** is conducting while the counterclockwise drive circuit **102** is arranged to be energized whenever an OR gate **106** is conducting.

The OR gate **104** will, in turn conduct, whenever any one of three AND gates **108**, **110** and **112** is conducting while the OR gate **106** will conduct whenever any one of three AND gates **114**, **116** or **118** is conducting.

Each of the three microswitches **90**, **92** and **94** is adapted to provide a signal whenever its respective actuator is in the recess **98** on the cam **96**. When the microswitch **90** provides a signal, the same indicates that the mat **22S** is disposed within the opening **24**. Similarly, when the microswitch **92** provides a signal, it indicates that the mat **22F** is in the opening **24**. Finally, when the microswitch **94** provides a signal, it is indicative of the fact that the mat **22R** is in the opening **24**.

There is also provided any suitable source of control signals. The source is generally designated **120** and is arranged to provide any one of three control signals to indicate that the sand, rough, or the fairway simulating mats **22S**, **22R** and **22F**, respectively, are to be disposed within the opening **24**. Typically, the source of signals **120** may comprise manually operable switch means operated by the golfer. However, the instant invention is not limited to the use of manually operable switches to provide the control signals and may be used with any means capable of providing such signals.

The output from the microswitch **90** is utilized as an input by both the AND gates **108** and **110** while the output of the microswitch **92** is utilized as an input by the AND gates **112** and **118**. The output of the microswitch **94** is used as inputs by the AND gates **114** and **116**.

An output from the source of signals **120** which will be energized when the sand mat **22S** is to be disposed within the opening **24** is utilized as an input by the AND gate **116** and **118** while a similar line for generating a rough command signal is utilized as an input by the AND gates **108** and **112**. Finally, a fairway command line from the source **120** is utilized as an input by the AND gates **110** and **114**.

The foregoing described logic makes use of the fact that the mechanical construction of the indexible tee is such that whenever the sand simulating mat **22S** is not disposed in the opening **24** but its presence is commanded, counterclockwise rotation of the shaft **84** of the motor **82** is required. Similarly, whenever the rough simulating mat **22R** is not within the opening **24**, clockwise rotation will be required. However, when the fairway simulating mat **22F** is not within the opening **24** and its presence is commanded, rotation of the motor may either be counterclockwise or clockwise depending upon whether the mat **22R** or the mat **22S** is currently disposed in the opening **24** when the command is issued.

The manner in which the control circuitry acts to cause a selected mat to be disposed within the opening **24** will become apparent from the following example. If it be assumed that the rough simulating mat **22R** is currently disposed in the opening **24** and it is desired that the sand simulating mat **22S** be moved to the opening **24**, then it will be apparent that the following Boolean expression indicates the conditions that exist when the sand command is issued:

$$\text{In rough} \cdot \overline{\text{go to fairway}} + \text{In rough} \cdot \text{go to sand} + \text{In fairway} \cdot \overline{\text{go to sand}}$$

In the foregoing Boolean expression, the first term represents the condition at the AND gate **114**; the second term represents the condition at the AND gate **116**; and the third term represents the condition at the AND gate **118**. As a result, it will be apparent that the AND gate **116** will conduct which in turn will cause the OR gate **106** to conduct energized

in the counterclockwise drive circuit **102**. The motor **82** will then be energized to rotate in the counterclockwise direction thereby rotating the turret **20** in the counterclockwise direction.

After one revolution of the output shaft of the motor **82**, the fairway simulating mat **22F** will be disposed within the opening **24**. At this time, the conditions of the microswitches **90, 92** and **94** will have changed due to the movement of the cam **98** and the conditions at the gates **114, 116** and **118** are represented by the following Boolean expression.

$$\overline{\text{In rough}} \cdot \overline{\text{go to fairway}} + \overline{\text{In rough}} \cdot \text{go to sand} + \text{In fairway} \cdot \text{go to sand}$$

Again, the first, second and third terms of the above expression represent the conditions at the AND gates **114, 116** and **118** respectively and it will be apparent that at this time, the AND gate **116** is no longer conducting. However, the AND gate **118** is now conducting and it will continue to maintain the counterclockwise drive circuit **102** energized so that rotation of the motor **82** will continue through another revolution.

Upon completion of the second revolution of the output shaft of the motor **82**, the conditions at the AND gates **114, 116** and **118** will be as follows.

$$\overline{\text{In rough}} \cdot \overline{\text{go to fairway}} + \text{In rough} \cdot \text{go to sand} + \overline{\text{In fairway}} \cdot \text{go to sand}$$

It will therefore be apparent that at this point, none of the AND gates **114, 116** and **118** are conducting and as a result, the counterclockwise drive circuit **102** will be deenergized and the motor **82** will be at rest. It will also be recognized that the second revolution of the motor **102** moved the turret **20** from a position wherein the fairway simulating mat **22F** was disposed within the opening **24** to a position wherein the sand simulating mat **22S** was disposed within the opening **24**. As a result, the command to dispose the sand simulating mat **22S** within the opening **24** has been met.

Those skilled in the art will recognize that a substantially similar operation occurs for each set of command inputs and each current turret position and in the interest of brevity, it is not believed necessary to describe the operation of the control circuit for all such conditions.

Automatic Lie Selection Control

In order to provide, automatically, any one of the three signals emanating in the command source **120** to control the operation of the turret, it is necessary that there be a source of memorized information relating to the particular lie found at a particular point on each hole of the golf course being played on the indoor game. One possible source of such information could be a memory bank which, when provided with information as to the hole being played, and the distance and direction of the point of termination of each shot on the hole, would generate a signal to be fed to the circuitry in FIG. **4** and would indicate the type of lie at that point on that particular hole to cause automatic indexing of the turret. While such an approach is feasible from the technological standpoint, in most cases, it is economically unfeasible because of the tremendous cost of a memory bank of sufficient size to contain the required information for each such point on each of at least 18 holes on a golf course.

A more satisfactory approach resides in taking advantage of the ability to design an indoor golf game wherein each hole to be played is zoned into a plurality of zones with each scene to be displayed corresponding to the view of that hole from the zone. If the zoning of the hole, which normally can be done quite arbitrarily, is done with one criteria, advantage may be taken of the inherent memory capability of the scenes of the hole to be displayed.

More particularly, if each of the zones of the hole is configured to lie wholly within the rough, wholly within the fairway or wholly within the sand, the identity of each scene, which represents the view from the corresponding zone, may be used as an indication of the lie in that particular zone. Thus, if a particular scene depicts the lie from a zone which lies wholly within the rough, the commanding of the display of that particular scene can also be used to automatically command the disposition of the rough simulating mat at the tee area. Similarly, the commanding of a scene representing the view from the fairway or the tee of the hole can be used to command the presence of the fairway simulating mat. Finally, a scene depicting the view from a zone wholly within a sand trap, when displayed, can be utilized to command the disposition of the sand simulating mat at the indoor golf game tee area.

The manner in which such scenes and/or the display of the same may be used as memory means to command the disposition of a particular one of the simulating mats at the tee area will now be described according to two different embodiments.

A map of a golf hole, generally designated **139**, is indicated in FIG. **5** and includes a first continuous line **140** which defines the boundaries of the fairway. In order to distinguish the fairway from other portions of the course as shown on the map, the area enclosed by line **140** may be colored a medium green. A second line **142** surrounds the line **140** and the area between the lines **140** and **142** is considered to be the area of the rough on the golf hole. In order to distinguish the rough from the fairway, the area between the lines **140** and **142** may be colored a dark green. Any area outside the line **142** may be considered to be out of bounds.

A number of continuous lines **144** enclose areas which are sand traps on a golf hole and may be colored a sand color. Another continuous line **146** lies wholly within the line **140** and defines the green on the hole. In order to distinguish the green from the fairway and the rough, it may be colored a light green. There are also provided a pair of lines **148** and **150** which define a water hazard behind the green and the area between the lines **148** and **150** may be colored blue.

The lines **140, 142** and certain of the lines **144** together with other lines **152** divide the map into a plurality of zones, some of the zones being in the fairway, some in the rough and some in certain of the sand traps. It is to be noted that each of the zones defined by the aforementioned lines lies wholly within either the rough, the sand or the fairway. Each such zone is given a code number **154** as indicated and at some point in the zone, there may be provided a small circle **156** for use with the map spot projection system of the Conklin et al. application previously identified.

There are also provided a plurality of zones on and around the green defined by the line **146**, all of which are within the area defined by a dotted line **158** and one of the lines **150** defining the water hazard. The zones within the dotted line **158** and not on the green defined by the line **146** are defined by the line **140**, certain of the lines **144** and other lines **160**. Each such zone has a code number **162** associated therewith.

The green defined by the line **146** is also divided into a plurality of zones by continuous lines **164**, each line having a code number **166** associated therewith. In actuality, the lines **164** are drawn in the form of concentric circles about a center zone identified by the code number "A" in FIG. **5**, the center of which is considered to be the location of the cup on the hole.

The zones within the dotted line **158** and those on the green are utilized in an indoor golf game to indicate to a golfer where a ball should be placed relative to a putting surface when holding out. Inasmuch as they do not relate to automatic indexing of the tee turret, they will not be discussed further herein.

It is to be noted that, with the exception of a men's tee zone labeled "A1" and a woman's tee zone labeled "A2", all of the fairway zones are identified with an alphabetical letter which is used for scene selection purposes as described in the Conklin et al. application and a numerical figure similarly used. However, it is to be additionally noted that the numeri-

cal figure of each code number **154** of the fairway zones is in the range of **1—4**, inclusive.

Like the fairway zones, the rough and sand zones are identified by a letter in the alphabet and a numerical figure which similarly serve to identify the zone for scene selection purposes. In the case of the zones in the rough, it is to be noted that each numerical figure comprising each zone number **154** consists of a number from **5—9** inclusive. In the case of the sand zones, the numerical figure utilized is always a **10**.

Turning now to FIG. **6** there may be seen in schematic form, a portion of a projector scene selection control, generally designated **170** which controls the projector **16** to dispose a selected scene on the screen **14**. Manual operators for the scene selection control **170** may be disposed on the console **18** and, as viewed in FIG. **6**, are seen to comprise a first rotary switch **172** which is set by the golfer to designate the hole that is being played. Since all golfers playing the game at a given time will be playing the same hole, only one such rotary switch **172** is provided.

To further provide scene selection information, there is provided a second rotary switch **174** which has ten positions and alphabetic indicia corresponding to each such position. In the exemplary embodiment there is a rotary switch **174** for each golfer up to a maximum of four golfers. Finally, there is provided a third rotary switch **176** which is of the ten position type and includes numerical indicia **1—10**, each corresponding to the particular position of the switch.

When the point of termination of a shot is indicated on the map **139** to indicate that the next shot is to be played from a particular zone, if the hole is not to be changed, each player will adjust his rotary switches **174** and **176** to designate the particular code number. Thus, a shot indicated as terminating in zone D4 requires that the golfer adjust the rotary switch **174** to indicate the letter "D" and the rotary switch **176** to indicate the number "**4**". Thereafter, when operation of the projector **16** is initiated according to the teachings of the Pratt et al. application, the scene for zone D4 on the hole being played will be projected on the screen **14**.

From the foregoing description of the map **139**, it will be recalled that by design, each zone having a numerical figure from **1** to **4** lies in the fairway, each zone having a numerical figure from **5** to **9** lies in the rough and each zone having a numerical figure **10** lies in the sand. Thus, when the golfer sets the switch **176**, its position is an indication of whether the next shot is to be played from the fairway, rough or sand.

The rotary switch **176** has a single deck of ten contacts **178**, all of which are connected to the projector for controlling scene selection. Additionally, the fifth through ninth contacts are connected through isolating diodes **180** to a common line which is connected to the gate of a silicon controlled rectifier **182**. The tenth contact **178** is connected as an input to the gate of a silicon controlled rectifier **184**. Additionally, the fifth through ninth contacts for the rotary switches **176** for the remaining players are connected to the gate of the silicon controlled rectifier **182** while the tenth contacts of the player switches **176** for the remaining players are also connected to the gate of the silicon controlled rectifier **184**.

The silicon controlled rectifiers **182** and **184** are in identical circuits and accordingly, only one will be described, it being understood that the other is similarly constructed. Referring specifically to the silicon controlled rectifier **182**, the same has its anode connected through a resistor **186** to a line **188** which may be provided with positive source of power as will appear hereinafter. The cathode of the silicon controlled rectifier **182** is connected to ground. The common junction of the silicon controlled rectifier **182** and the resistor **186** is connected to a first resistor **190** and then to a second resistor **192** which is also connected to ground. The common junction of the resistors **190** and **192** is connected to the base of a transistor **194** which additionally has its emitter connected to ground and its collector connected through a resistor **196** to the line **188**. The common junction of the transistor **194** and the resistor **196** is connected as an input to a conventional NOR gate **198** and to an electronic switch **200** of conventional construction.

Similar connections from the output of the circuit utilizing the silicon controlled rectifier **184** are made as inputs to the NOR gate **198** and a second electronic switch **202**. The just-described arrangement is such that whenever the silicon controlled rectifier **182** is not conducting, the transistor **194** will be. As a result, there is a voltage drop across the resistor **196** and the collector of the transistor **194** is essentially at ground potential. When such is the case, the NOR gate **198** will lack at least one input and the electronic switch **200** will lack an input. As a result, the latter will not generate a positive output and the NOR gate **198** may not, depending upon an additional factor considered hereinafter.

Because of the identity of construction of the circuits involving the silicon controlled rectifiers **182** and **184**, it will be appreciated that when the silicon controlled rectifier **184** is not conducting, essentially ground potential will be applied as an input to the electronic switch **202** and the same will not provide a positive voltage at its output. Similarly, ground potential will be applied as the second input to the NOR gate **198**. Only when both inputs to the NOR gate **198** are at ground potential, will the output thereof swing positive.

If the silicon controlled rectifier **182** is conducting, the transistor **194** will be turned off and as a result, there will be no voltage drop across the resistor **196**. Thus, the input to the electronic switch **200** will swing positive and the latter will then have a positive output. Similarly, a positive input will be applied to the NOR gate **198** and the latter will therefore have an output corresponding to ground potential.

Again, due to the similarity in circuits, it will be appreciated that when the silicon controlled **184** is conducting, a positive potential will be applied as an input to both the NOR gate **198** and the electronic switch **202** resulting in the NOR gate having an output corresponding to ground potential and the electronic switch **202** having a positive output.

As will be seen hereinafter, when the NOR gate **198** has a positive output, such dictates that the fairway simulating mat **22F** should be disposed within the opening of the tee area; when the electronic switch **200** has a positive output, the same commands that the rough simulating mat **22R** be disposed within the opening; and when the electronic switch **202** has a positive output, the presence of the sand simulating mat **22S** in the opening is commanded.

The foregoing presupposes that positive power is applied to the line **188**. However, such is not always the case. Specifically, there is provided a switching transistor **204** having its emitter connected to the line **188** and its collector connected to a positive source of power. Thus, the line **188** will have power applied thereto only when the transistor **204** is conducting. To control the conduction of the transistor **204** there is provided a driving transistor **206** which has its emitter connected to ground and its collector connected to the positive source of power through a biasing resistor **208**. The common junction of the resistor **208** and the transistor **206** is connected to the base of the transistor **204** and as a result, whenever the transistor **206** is conducting, the transistor **204** will be turned off. Conversely, when the transistor **206** is not conducting, the transistor **204** will be conducting.

The transistor **206** has its base connected to the common junction of a unijunction transistor **210** and a resistor **212**, the latter being connected to ground and the former being connected to the source of power. The emitter of the unijunction transistor **210** is connected to ground through a parallel circuit of a capacitor **214** and the normally open contacts **216*a*** of a reed relay **216**. The emitter of the unijunction transistor **210** is also connected to the positive source of power through the serial combination of a resistor **217** and a cam operated switch **218**.

The relay **216** is interposed between ground and the output of an OR gate **220** which receives two inputs. The first input is received from the output of the OR gate **104** (FIG. **4**) while the second input is received from the output of the OR gate **106** (FIG. **4**).

Returning momentarily to the cam operated switch **218**, the same is normally open and forms part of the Pratt et al. projecting system. Specifically, it corresponds to the microswitch

246 in the Pratt et al. application and may merely form a second set of contacts thereon so that the microswitch 246 in the Pratt et al. application will not only perform the function therein stated but additionally, a control function in the automatic lie selection as will be described hereinafter.

As the nature of operation of the switch 246 of Pratt et al. is completely disclosed therein, it is not believed necessary to specify in detail its mode of operation. Rather, it is believed sufficient to note that the operation is such that switch 218 will be closed whenever the film transport mechanism has located a selected scene in the projection station. Stated another way, the switch 218 will be opened whenever the film transport mechanism of the projector is in operation.

As mentioned previously, there is provided a rotary switch 174 and a rotary switch 176 for each of four different players. Obviously, only one set of the switches 174 and 176 may be operative at any given time and accordingly, means are provided to energize but a single set of switches at any given time. Such means include a plurality of player push buttons 222, one for each player, which have associated therewith a conventional magnetic latch that is operative once a push button is depressed to hold the push button depressed until such time as a release signal is provided. Such a magnetic latch or lock is indicated schematically at 224.

Each of the push button switches include a set of normally open contacts 226 and a set of normally closed contacts 228. A positive source of power is connected to one side of the contacts 226 and the other side thereof is connected to the push button latch 224 and to appropriate circuitry described in the Pratt et al. application for initiating operation of the projector. For purposes of the instant application, it is sufficient to note that such a connection includes a line 230 to the wiper of the rotary switch 176.

The push button latches 224 include a connection to ground through the parallel combination of normally open contacts 216*b* of the reed relay 216 and a normally open cam operated switch 232. The cam operated switch 232, like the cam operated switch 218 corresponds to the switch 246 in the Pratt et al. application except that its arrangement is such that it will be open at all times when the film transport mechanism is not operative. Stated another way, the switch 232 will be closed only when the film transport mechanism is in operation.

The normally closed contacts 228 of the push button switches 222 are connected in series with each other and have one connection to ground and a second connection to the NOR gate 198 and the electronic switches 200 and 202. The arrangement is such that whenever no player push button 222 is depressed, because all of the normally closed contacts 228 will then be closed, ground potential applied to the NOR gate 198 as on INHIBIT signal and the electronic switches 210, 202 are constructed in such a way that they are incapable of providing any output whether the same be ground potential or a positive potential. In other words, when all of the contacts 228 are closed, the output circuit of each of the electronic switches 200 and 202 and the NOR gate 198 is broken.

Techniques for totally disabling logic gates such as electronic switches and NOR gates are well known in the data processing arts and need not be reiterated in detail herein.

The mode of operation of the circuit will now be described. Let us first assume that player one had previously hit a shot which terminated in zone F5. He therefore will set the rotary switch 174 to the "F" setting and the rotary switch 176 to the "5" setting. At this time, it is to be noted that the OR gates 104 and 106 (FIG. 4) will have their outputs at ground potential because the previous operation of the turret will have resulted in the input command being satisfied. As a result, the reed switch 216 will be deenergized and contacts 216*a* and 216*b* thereof will be open. Similarly, because all players' push buttons 222 will have been previously released, the contacts 226 of the player number one's push button 222 will be opened so that the wiper of the rotary switch 176 will be deenergized. Additionally, switch 218 will be closed because the selected scene of the previous player will be displayed and the film transport mechanism will not be operative. By the same token, the switch 232 will be opened because the film transport mechanism is inoperative.

With the switch 218 closed, the capacitor 214 will be charged and the unijunction transistor 210 will be conducting. As a result, the transistor 206 will be conducting but the switching transistor 204 will be in a nonconducting state.

When the player depresses his push button 222 thereby closing contacts 226 and opening contacts 228, the closing of contacts 226 will energize the push button latch mechanism 224 to hold down the depressed player push button. Simultaneously, the projector 16 will be energized and the film transport mechanism thereof set into operation. This will result in the closing of switch 232 to hold in the push button latch mechanism 224 and the opening of the switch 218. The contacts 216*b* will also close if the turret is not already at the desired position as will be seen hereinafter.

Simultaneously, power will be applied to the wiper of the rotary switch 176 and the disconnection of the inhibit line to the NOR gate 198 and the electronic switches 200 and 202 by the opening of contacts 228 will then permit the same to issue a ground potential or positive potential output as the condition may exist.

The opening of the switch 218 removes power from the emitter of the unijunction transistor 210 and after the capacitor 214 has discharged through the unijunction transistor 210, the latter will stop conducting thereby turning off the driving transistor 206. The latter's reversion to its nonconducting state will then cause the switching transistor 204 to conduct applying positive power to line 188.

With the application of power to the wiper of the rotary switch 176, power will be applied through the line connected to the number 5 contact thereof to the gate of the silicon controlled rectifier 182 causing the same to fire. This will, in turn, cause the transistor 194 to be turned off so that a positive input will be present at one input of the NOR gate 198 and the electronic switch 200. As a result, the output of the NOR gate 198 will go to ground potential while the output of the electronic switch 200 will be positive issuing a Go To Rough command. This will be applied to the AND gate in FIG. 4 as described previously and if the rough mat is not currently disposed in the opening, the turret will be indexed to dispose the rough simulating mat therein. In the latter instance, the OR gate 104 will then have a positive output to cause clockwise rotation of the motor and as a result, the OR gate 220 in FIG. 6 will have an output thereby energizing the reed switch 216 to close contacts 216*a*, thereby shunting capacitor 214 and rendering it impossible for the unijunction transistor 210 to conduct even when the switch 218 is reclosed, and to close contacts 216*b* to hold in the push button latch 224.

It will be recognized at this time that the silicon controlled rectifier 184 will not be conducting and as a result, the electronic switch 202 will have an output of ground potential. This is due to the fact that positive power will not be applied to the number 10 contact of the rotary switch 176 inasmuch as the wiper of the latter is in contact only with the number 5 contact.

The indexible tee will respond to the given command in the manner set forth previously and simultaneously therewith, the projector will be disposing the commanded scene at the projection station thereof for projection onto the screen. When the selected scene is in the proper location, the film transport mechanism will be deenergized thereby causing switch 232 to open to release the depressed push button by deenergizing the push button latch 224 if contacts 216*b* of the reed relay 216 have opened. Simultaneously, switch 218 will be closed and if the tee had already completely responded to the commanded position so that the OR gate 104 does not have a positive output to energize the reed switch 216, the unijunction transistor 210 will be rendered conducting to cause driving transistor 206 to conduct and switching transistor 204 to be turned off thereby turning off the silicon controlled rectifier 182 to reset the same in readiness for a succeeding cycle.

If, on the other hand, the tee has not completely responded to the command, the positive output from the OR gate **104** will be applied to the OR gate **220** to maintain the reed switch **216** energized. The resultant closing of the shunting contacts **216***a* will then preclude the unijunction transistor **210** from conducting to ultimately turn off the switching transistor **204** with the result that power will remain applied to line **188** until such time as the reed relay **216** is deenergized corresponding to the disposition of the selected mat within the opening. Similarly, contacts **216***b* will remain closed to preclude premature release of the push button latch **224** which would inhibit gates **198**, **200** and **202** thereby removing the required command signal.

When both the tee and the projector have fully responded to the commands so that both switch **232** and contacts **216***b* have opened, the release of the push button latch **224** will occur, the contacts **228** will revert to their normally closed state thereby placing the INHIBIT signal on the NOR gate **198** and the electronic switches **200** and **202**.

In the event the golfer had selected a scene representing a zone in the sand trap, it will be appreciated that the wiper of the rotary switch **176** would have been disposed on the **10** contact thereof so that the circuit including the silicon controlled rectifier **184** would have been fired rather than the circuit including the silicon controlled **182**. In such a case, the firing of the silicon controlled rectifier **184** would have ultimately resulted in a positive input being placed on the electronic switch **202** thereby causing the same to issue a positive output corresponding to "Go to Sand" condition. The same positive input would be applied as an input to the NOR gate **198** to cause the same to provide a ground potential output and, since the circuit including the silicon controlled rectifier **182** was not fired, the electronic switch **200** would have a ground potential output.

Finally, had the golfer been instructed to dispose a scene corresponding to the view from the fairway, it will be apparent that the wiper of the rotary switch **176** would have been on one of the 1—4 contacts thereof and neither of the circuits including silicon controlled rectifiers **182** and **184** would be energized. As a result, the two inputs of the NOR gate **198** would be at ground potential and as a result, the output would swing positive to issue a "Go to Fairway" command.

A modified embodiment of scene selection circuitry will now be described in conjunction with FIGS. **7** and **8**. As described in the previously cited Pratt et al. application, a film strip bearing the scenes to be projected on the screen is utilized and the film strip includes a scene portion **240** bearing the image of the scene to be projected and an opaque portion **242** adjacent thereto. On the opaque portion **242** is an optical discontinuity **244** which permits light to pass therethrough for the purpose of causing operation of a means for accurately aligning the projected image at a predetermined location on the screen.

The opaque portion **242** may also be used for automatic lie selection purposes. Specifically, at different locations thereon such as at **246** and **248** optical discontinuities similar to the optical discontinuity **244** may be provided to permit light to pass through the opaque portion **242** from the projected light source **250**, although it is to be noted that this embodiment of the invention contemplates only that one optical discontinuity **246** or **248** will be present on the opaque portion **242** of any particular frame on the film strip and that, in some cases, neither will be present.

Appropriately physically aligned with the light passed through the optical discontinuities **246** and **248** may be respective photocells **252** and **254**.

Turning now to FIG. **8**, the photocell **252** is seen to be interposed between a source of positive voltage and a resistor **256** connected to ground. The common junction of the photocell **252** in the resistor **257** is connected as an input to an electronic switch **202'** which corresponds to the electronic switch **202** in FIG. **6**. Additionally, a similar output is provided to a NOR gate **198'** which corresponds to the NOR gate **198**.

The photocell **254** is similarly connected between the positive source of power and a resistor **258** which is connected to ground. The common junction of the photocell **254** (the resistor **258**) is utilized as an input to the NOR gate **198'** and as an input to an electronic switch **200'** which corresponds to the electronic switch **200** in FIG. **6**.

The photocells **252** are chosen with respect to their respective resistors **256** and **258** such that, when not illuminated, their resistance is extremely high with respect to the resistance offered by the associated resistor and yet, when illuminated, their resistance will be significantly less than that offered by the resistors **256** and **258**. As a result, when the photocell **252** is not illuminated, the common junction of the same with the resistor **256** will be very close to ground potential so that electronic switch **202'** will have a ground potential output and the NOR gate **198'** will have a ground potential input. Similarly, when the photocell **254** is not illuminated, the potential at the common junction of the same and the resistor **258** will be very nearly equal to ground potential so that a second ground potential input is applied to the NOR gate **198'** and the electronic switch **200'** will have a ground potential output.

It will be recalled from the description of FIG. **6** that two ground potential inputs to the NOR gate **198** will result in a positive output corresponding to a "Go to Fairway" command. The NOR gate **198'** in FIG. **8** behaves in the same manner and as a result, when neither of the photocells **252** and **254** are illuminated, a "Go to Fairway" command will be issued.

When the photocell **252** is illuminated, because in such a condition its resistance will be significantly less than that presented by the resistor **256**, the common junction of the two will be very nearly equal to the positive voltage of the source and as a result, the electronic switch **202'** will issue a positive "Go to Sand" command. Similarly, when the photocell **254** is illuminated, the electronic switch **200'** will issue a positive "Go to Rough" command.

In any of the foregoing cases, the signals from the gates **198'**, **200'** and **202'** are utilized as the source of signals in FIG. **4** and cause operation of the indexible tee in the manner described in conjunction with that figure.

From the foregoing, it will be apparent that the presence of an optical discontinuity **246** in the opaque portion **242** will result in the illumination of the photocell **252** to issue a "Go to Sand" command. Therefore, an optical discontinuity **246** will be present on the opaque portion **242** of only those scenes that depict the view from a sand trap. Similarly, inasmuch as the presence of the optical discontinuity **248** results in the illuminating of the photocell **254** to issue a "Go to Rough" command, the optical discontinuity **248** will be present on the opaque portion **242** of only those scenes depicting the view from the rough. Since the presence of neither optical discontinuity results in a "Go to Fairway" command, it will be appreciated that those scenes representing the view from zones on the fairway will have only the optical discontinuity **244** used for accurate alignment purposes and neither optical discontinuity **246** nor **248** will be present.

Because operation of the foregoing circuit depends upon the disposition of the selected scene with its corresponding opaque portion **242** in readiness for projection at a projection station before the appropriate commands to cause indexing the tee can be issued, it is desirable to inhibit the circuit shown in FIG. **8** providing such commands until such time as the selected scene is disposed at projection station. Accordingly, each of the gates **198'**, **200'** and **202'** include an inhibit input from a line **229'** which corresponds to the inhibit line **229** in FIG. **6**. The inhibit **229'** is returned through a cam operated switch **260** to ground. The cam operated switch **260** is similar to the switch **232** described in conjunction with FIG. **6** and is operated by the projector in the same manner, namely, it is opened whenever the film transport mechanism is not energized. Thus, whenever the film transport mechanism is in operation, which will be the case only when the selected scene is not at the projection station, switch **260** will be closed to inhibit the gates **198'**, **200'** and **202'**.

Of the two embodiments, that illustrated in FIGS. 5 and 6 is generally preferred in that it enables indexing of the tee to take place during operation of the projector film transport mechanism and thereby provides a small time saving over the embodiment illustrated in FIGS. 7 and 8 which cannot go into operation until the selected scene is ready for display.

It is also noted that both circuits are arranged such that for most types of circuit failure, a "Go to Fairway" command will be issued. That is, because the NOR gate 198 or the NOR gate 198' will issue the "Go to Fairway" command in the situation when neither input is present, malfunction of a circuit will almost always result in the fairway simulating mat 22F being disposed within the opening thereby enabling the game to be played with reasonable accuracy as would not be the case if all shots had to be played from the sand simulating mat sand or the rough simulating mat 22R if they were maintained in the opening due to circuit malfunction.

From the foregoing, it will be appreciated that the invention provides for automatic lie selection by utilizing scenes to be projected on the screen as the memory means. And while, in the exemplary embodiment, scene selection is achieved manually, it will be appreciated that the invention is not limited to use with manually operable scene selection means in indoor golf games. That is, the principle of operation is equally applicable to games such as have been proposed wherein scenes are selected automatically as a result of computation by a golf game computer.

It will also be recognized that whether automatic or manual scene selection is used, there are means provided for receiving information as to a particular location on a hole of a golf course which the golfer is playing from which he should hit a shot. In the case of manual scene selection means, manually operable switches or their equivalents constitutes the receiving means. On the other hand, should automatic scene selection be used, any appropriate means such as electronic switches or their equivalents corresponding approximately in function to the manual scene selection switches but operated automatically in response to position information provided by a computer or by memories constitute such a receiving means.

It will be further appreciated that the operation of the indexible tee disclosed herein in disposing a selected mat in an opening within a tee area also constitutes an indicating means which indicates, in the tee area, to the golfer which lie simulating means should be used for a shot from a particular location on a golf hole. That is, while the exemplary embodiment contemplates an indexible tee construction wherein any one of a plurality of lie simulating mats is disposed at the tee area, it is also contemplated that the invention will find use by indicating to a golfer which of a plurality of lie simulating mats should be used whether or not the mats are arranged on an indexible tee such as that disclosed.

Having described specific embodiments of our invention, we do not wish to be limited to the details set forth, but rather, to have the invention construed according to its true spirit set forth in the following claims.

We claim:

1. A tee construction for use in an indoor golf game comprising: means defining a tee area from which a golfer may hit balls in playing an indoor golf game; at least two different mat means disposable in said tee area for supporting a golf ball to be hit by a golfer and simulating at least two different lie conditions found at different locations on a golf hole; means for receiving information identifying a particular location on a hole on a golf course from which a golfer is to hit a shot in playing an indoor golf game; and means responsive to said receiving means for indicating within said tee area, to the golfer, the one of said mat means simulating the lie condition at said particular location so that the golfer will be advised to hit the shot from said one mat means simulating the lie condition at said particular location.

2. A tee construction according to claim 1 wherein said indicating means comprise a movable support means mounting said different mat means, and means for moving said support means to dispose the one of said mat means simulating the lie condition at said particular location in said tee area.

3. A tee construction according to claim 1 wherein said means for receiving information identifying a particular location comprise a plurality of selectively operable switch means arranged so that various combinations of operated ones of said switch means represent various locations on the hole.

4. A tee area according to claim 3 wherein said switch means are manually operable.

5. A golf tee according to claim 3 further including a screen adjacent to said tee area, a projector for projecting any of a plurality of scenes representing the views of various locations on the hole on a golf course on said screen, said switch means further being operative to control said projection means to cause the same to dispose the scene corresponding to said particular location on said screen.

6. An indexible tee construction for use in indoor golf games comprising a tee area from which balls are hit by a golfer; movable support means at said tee area; at least two different mat means mounted on said movable support for supporting golf balls in said tee area to be hit by a golfer and simulating at least two different lie conditions found at different locations on a golf hole; motor means for moving said support means to dispose a selected mat at a predetermined position within said tee area; means for receiving information identifying a particular location on a hole of a golf course from which golfer is to hit a shot in playing an indoor golf game; and means responsive to said receiving means for operating said motor means to cause said support means to be moved to locate the one of said mat means simulating the lie condition at said particular location at said predetermined position.

7. An indexible tee construction according to claim 6 and particularly suited for use in an indoor golf game having a screen, a projector for projecting on the screen any one of a plurality of scenes, each representing the view from a different location on a golf hole, and means for selecting a particular scene, said receiving means being associated with said projector and receiving information relative to the selection of a particular scene for projection on the screen, and said operating means being responsive to said receiving means for operating said motor means to cause said support means to be moved to locate, at said predetermined position, the one of the mat means simulating the lie condition at the location on the golf hole corresponding to the location represented by the view on said selected scene.

8. An indexible tee construction according to claim 6 wherein said means for receiving information comprise memory means for correlating information identifying a particular location on a hole on a golf course with the lie condition at said particular location, and means for identifying the lie condition operative in response to the receipt of information identifying a particular location by said memory means to operate said motor means.

9. An indexible tee construction according to claim 8 further including a screen, a projector including a plurality of scenes representing the views from various locations on a hole on a golf course for projecting a selected scene on said screen; said memory means comprising code means associated with each of said scenes for providing an indication of the lie condition at the location corresponding to the scene, and means for sensing said code.

10. A golf game according to claim 8 further including a screen, a projector adapted to project any one of a plurality of scenes from different locations on the hole of a golf course on said screen, and switch means for operating said projector; said memory means comprising means associated with said switch means for memorizing the lie condition at certain locations on a golf hole represented by certain ones of said switch means, and means responsive to operation of said switch means for operating said motor means.

11. A tee construction for use in an indoor golf game comprising: means defining a tee area from which a golfer may hit balls in playing an indoor golf game; at least two different mat means disposable in said tee area for supporting a golf ball to be hit by a golfer and simulating at least two different lie conditions found at different locations on a golf hole; signaling

means for providing information identifying the lie condition at a particular location on a hole on a golf course from which a golfer is to hit a shot in playing an indoor golf game; and means responsive to said signaling means for indicating within said tee area, to the golfer, the one of said mat means simulating the lie condition at said particular location so that the golfer will be advised to hit the shot from said one mat means simulating the lie condition at said particular location.

12. A tee construction according to claim 11 wherein said indicating means comprise a movable support means mounting said different mat means, and means for moving said support means to dispose the one of said mat means simulating the lie condition at said particular location in said tee area.

13. A tee construction according to claim 11 further including a screen adjacent said tee area; a projector for projecting any one of a plurality of scenes on said screen to depict the view from various locations on a hole on a golf course; said signaling means including code means associated with each of said scenes.

14. A tee construction according to claim 11 further including a screen adjacent said tee area; a projector for projecting any one of a plurality of scenes on said screen to depict the view from various locations on a hole on a golf course; and manually operable switch means for controlling said projector; said signaling means including said manually operable switch means.

15. A tee construction according to claim 11 further including a screen adjacent said tee area; a projector for projecting any one of a plurality of scenes on said screen to depict the view from various locations on a hole on a golf course; and switch means adapted to receive information identifying a particular location on a hole on a golf course to cause said projector to project the corresponding scene on said screen; said signaling means including means responsive to the receipt of information identifying a location on a hole on a golf course by said switch means to provide said information identifying a lie condition at a particular location on a hole on a golf course.

16. A tee construction according to claim 11 further including a screen adjacent said tee area, a projector for projecting any one of a plurality of scenes representing the views from various locations on a hole on a golf course on said screen, and means for operating said projector to cause the projection of a particular scene on said screen; said signaling means being operative in response to the operation of said scene selecting means.

17. A tee construction according to claim 11 further including a screen adjacent said tee area, a projector for projecting any one of a plurality of scenes representing the views from various locations on a hole on a golf course on said screen; said signaling means being operative in response to the projection of a selected scene on said screen.

18. A tee construction according to claim 11 wherein said indicating means comprises a rotatable turret having said different mat means disposed about its periphery, motor means for rotating said turret, and control means for said motor means connected to said signaling means to receive information identifying the lie condition at a particular location on a hole on a golf course and for energizing said motor means until said turret has been rotated to dispose the particular location in said tee area to support a golf ball to be hit by the golfer.