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[54] **BUMPER POOL GAME WITH IMPACT RESPONSIVE ACTUATION-DEACTUATION STRUCTURE FOR MARKING AND UNMARKING OF SELECTED BUMPER ELEMENTS**

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[51] **Int. Cl.** **A63f 7/00,** H01h 3/16

[58] **Field of Search** ..... 273/2, 3 R, 3 C, 11 R, 273/11 C, 12, 14, 123 A, 127 R, 118 A, 118 D, 119 A, 120 A, 121 A, 122 A, 124 A, 126 A, 127 C; 200/61.1, 61.11, 6 BB, 33 R, 33 B, 35 R, 37 A, 38 C, 153 LB; 307/132 EA

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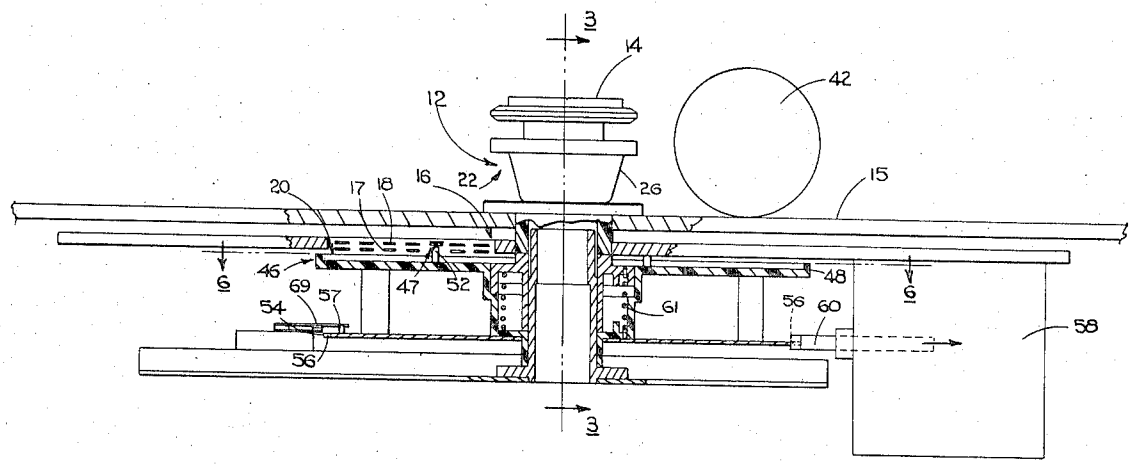
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[57] **ABSTRACT**

Game apparatus comprises a plurality of targets, disposed on a playing surface, and marking circuitry coupled to light bulbs associated with the targets. The marking circuitry is actuable upon the closing of normally open switches to mark at least one target to be distinguishable from other targets, until that target is struck by a striking element movable upon the playing surface. Marking selection structure in the form of a movable programmer member controls the sequence of marking of targets and includes an array of cam elements for closing the marking circuit switches. The position of each cam element on the programmer member determines to which target marking circuit the cam relates and at what point in the target marking sequence such relating occurs. Each target includes a flexible contact member which, upon collision of a striking element with the target, flexes to connect electrically with a selection circuit contact, thereby closing a switch in a selection circuit. The selection circuit is coupled to a solenoid having a movable armature biased to engage a ratchet mechanism, associated with the programmer member, to prevent motion of the latter member. Closing of the selection circuit switch after collision of a striking element with a marked target results in a disengagement of the armature from the ratchet mechanism, thus permitting incremental motion of the programmer member under the influence of a power source coupled thereto, until a cam element on the programmer member causes closing of a marker circuit; a contact associated with the programmer member cam element concurrently disengages to open a solenoid switch in the selection circuit and deactivates the solenoid, thereby engaging the solenoid armature with the ratchet mechanism. The cycle is repeated until the game is over. In apparatus with depletable power source, such as a windable power spring coupled to the programmer member, a warning indicator coupled to a warning circuit is actuated by a warning circuit cam element, disposed upon the programmer member, which closes a warning switch.

21 Claims, 9 Drawing Figures



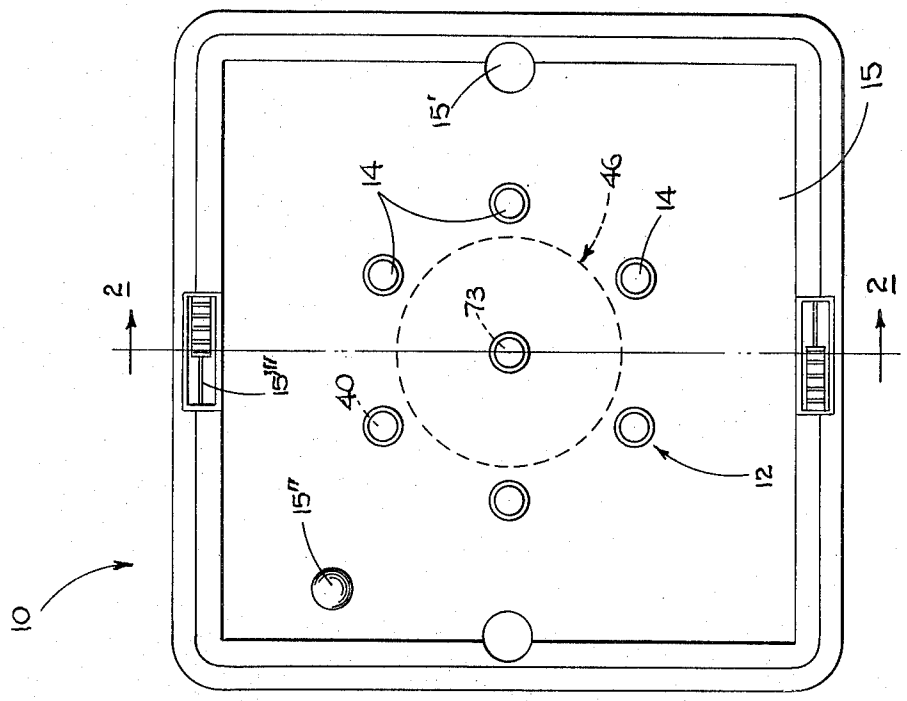


FIG. 1

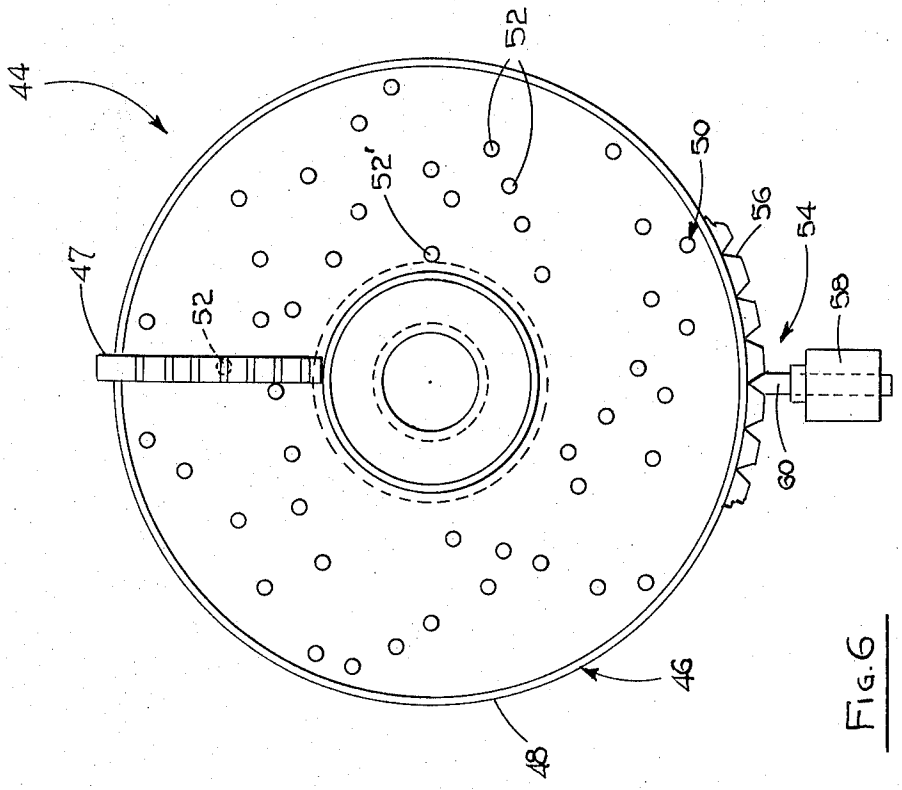


FIG. 6

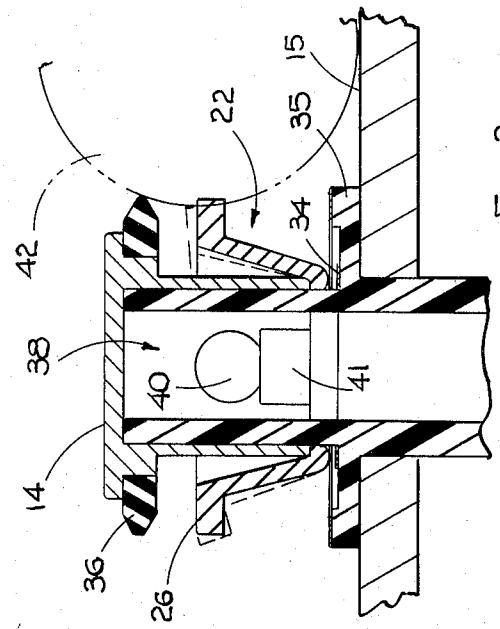


FIG. 3

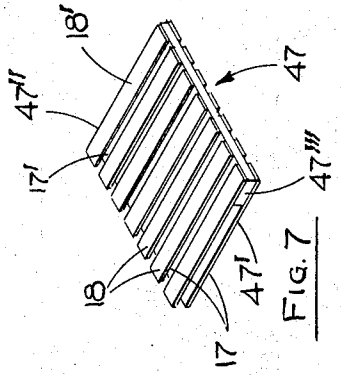


FIG. 7

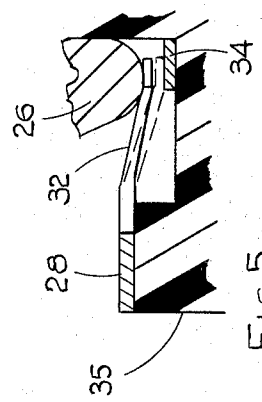


FIG. 5

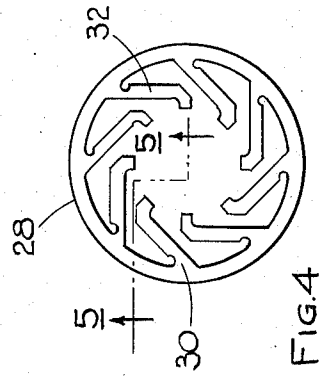


FIG. 4

FIG. 2

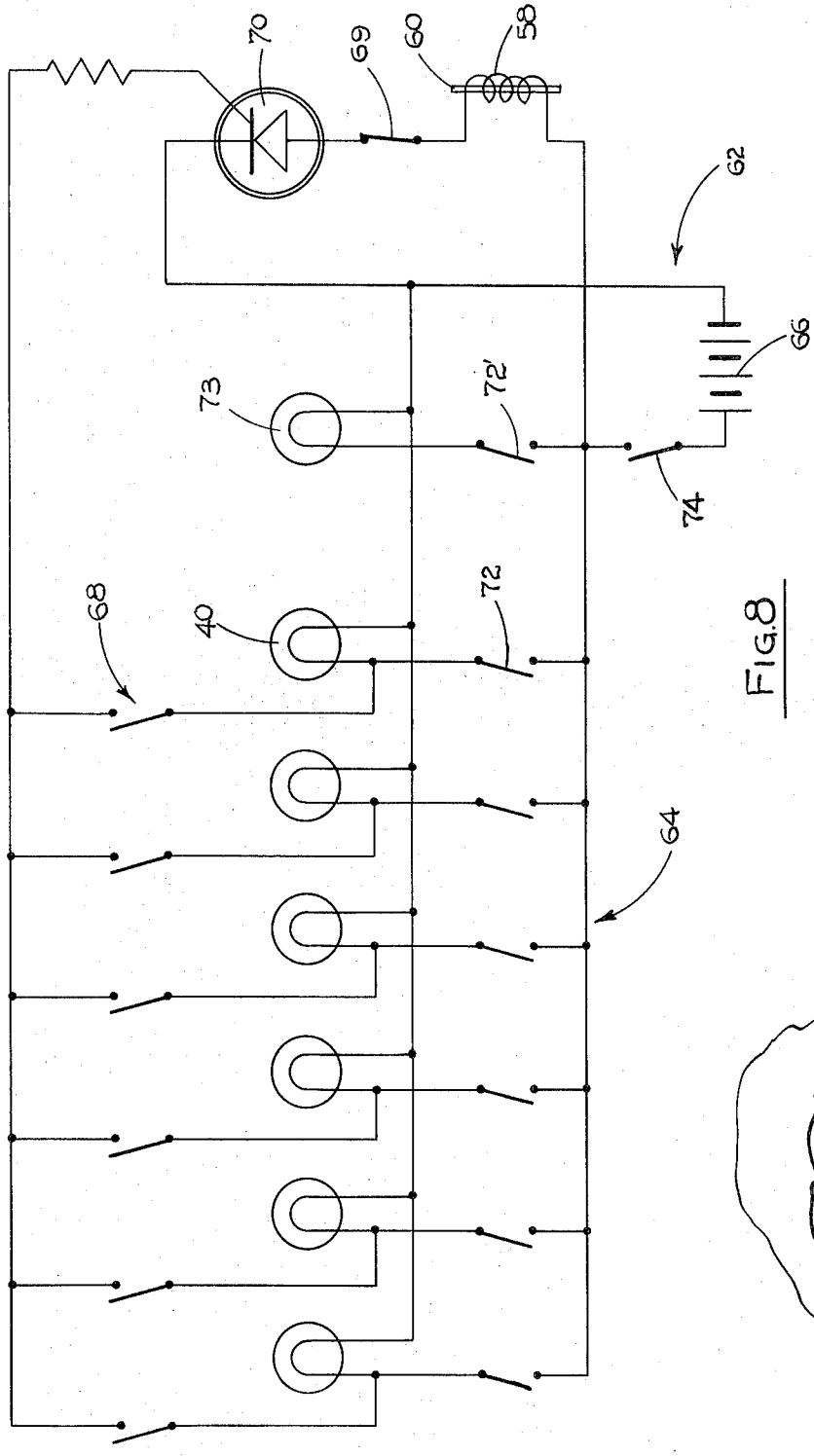


FIG. 8

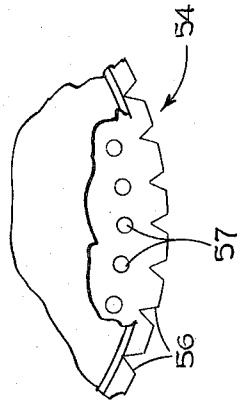


FIG. 6A

BUMPER POOL GAME WITH IMPACT RESPONSIVE ACTUATION-DEACTUATION STRUCTURE FOR MARKING AND UNMARKING OF SELECTED BUMPER ELEMENTS

A game method includes disposing a plurality of targets upon a playing surface and marking the targets for striking by a striking element, which may take the form of a ball rollable upon the surface. After a target is struck, the next target for striking is marked. Marking may be in a sequence which is calculated to give the impression of randomness, thus preventing a player from calculating his shot at a marked target so that the striking element will be appropriately positioned for striking the next marked target.

BACKGROUND OF THE INVENTION

The invention relates to apparatus and methods for games in which an objective is to strike targets.

One of the most popular recreational activities for young and old has comprised striking a ball or other movable object with hand held means to cause the movable object to strike a target. Games such as pool, billiards, and snooker are examples of this activity. A particular form of this game concept has been in the game of bumper pool, which comprises a plurality of targets disposed on a table top surface, the rules requiring the targets to be struck in a predetermined sequence by a ball struck by a pool cue. Means included in the bumpers provide a highly elastic collision with the striking ball so that an element of unpredictability of positioning of the ball for the next stroke, aimed at the next bumper, is introduced.

In such bumper pool games, however, players possessing a reasonable degree of inherent coordination and having the opportunity for reasonable practice of the game soon become so adept at the game that they, in effect, master the game so that they readily complete an entire sequence of impacts with the bumpers without interruption due to missing a bumper or being out of position to strike a bumper after striking the prior bumper in the sequence, thus denying the other player a chance to compete. This strongly diminishes the competitive aspect of the game.

Therefore, there has been a recognized, but unfulfilled need for a billiard type game including bumpers in which a substantial element of unpredictability regarding the sequence of bumpers to be struck is present.

A game apparatus includes game objective means, which may comprise target means, markable in a predetermined sequence to be distinguishable from other target means by marking means coupled to the target means. In a preferred embodiment, the marking means comprises circuit means including marking circuit switch means closable to effect marking of target means. Marking selection or programmer means comprises movable means positionable to close marking circuit switch means. Collision of a striking element with a marked target means displaces an impact responsive contact means to close switch means coupled in selection circuit means operatively associated with the movable means. The selection circuit means is operatively associated with the movable means to control motion thereof and, in a preferred embodiment, includes means for permitting motion thereof upon closing of the selection circuit means after impact of a striking element with a marked target means. Means

coupled with the movable means are provided to open the selection circuit means upon motion of the movable means into position to close a marking circuit means. Drive means coupled to drive the movable means may comprise a depletable power source, and means may be provided to indicate the imminent depletion of the source.

In the drawings:

FIG. 1 comprises a top plan view of a game apparatus in accordance with the invention;

FIG. 2 comprises a perspective view, partly broken away through a line 2—2 in FIG. 1, and partly in cross-section of a game objective means in the form of a target means in a game apparatus in accordance with the invention;

FIG. 3 comprises an enlarged fragmentary sectional view, along the line 3—3 of FIG. 2;

FIG. 4 comprises a plan view of mounting elements of the target means of FIG. 2;

FIG. 5 comprises a simplified view of operation of the element of FIG. 4;

FIG. 6 comprises a schematic view of selection means for variably marking target means, in a game apparatus in accordance with the invention;

FIG. 6A comprises a fragmentary view of an element of the structure of FIG. 6;

FIG. 7 comprises a simplified view of means coacting with the means of FIG. 6; and

FIG. 8 comprises a schematic diagram of electrical circuit means for sequentially marking targets in accordance with the invention.

In a presently preferred embodiment of the invention, game apparatus 10 includes game objective means 12 in the form of target means 14. Preferably, as depicted, several target means 14 are employed though any number of target means may be employed in accordance with the invention. Target means 14 are disposed to protrude above a playing surface 15, which may be planar as shown. As depicted, the surface 15 may define holes or pockets 15′ into which a ball 15″ may be directed. Scoring means 15‴ may be disposed as shown at the periphery of the playing surface 15.

As shown in FIGS. 2 and 3, target means 14 includes means 16 for marking the target means 14 as distinguishable from other target means 14. The marking may be, in the embodiment depicted, to designate a target as the next target to be struck, but in accordance with the invention may comprise means for designating game objects as objectives of game activity of a general type. For example, the marking means may be utilized to single out a particular element of a game for special attention or for special scoring potential.

Preferably, as depicted, marking is effected through electrical means (discussed in detail in conjunction with FIG. 8) mounted in conjunction with a target means 14; however, marking may be also effected by mechanical or electromechanical means and other mounting arrangements may be employed, in accordance with the invention. As described in detail below, marking means 16 comprises electrical circuit means including switch means closable by coupling of first contact means 17 and second contact means 18, as described in detail below. The means 17, 18 are, as depicted, preferably mounted on target means 14.

Marking selection or programmer means 20 includes game-event responsive means in the form of impact responsive means 22 including a contact ring 24, and a

flexible member 26 at least partially supported by the contact ring 24.

Referring also to FIG. 4, the contact ring 24 preferably, as depicted, comprises a peripheral element 28 flexibly connected at flex points 30 to a plurality of contact fingers 32. The contact ring 24 is disposed about an axial member 33 of the target 14. Fixed contact means 34 is mounted adjacent fingers 32 upon a mounting element 35 resting upon surface 15. A resilient member 36 is mounted upon target 14 to extend substantially as far outward of the member 33 as the member 26. Disposed in the axial member 33 of target 14 is a marker 38 in the form of a bulb 40. Other markers, such as flags or other devices focusing attention, may be employed in accordance with the invention. As described below in detail, the marker 40 is supported on an internal member 41 and is coupled to marking circuit means for actuating the marker to designate the target as an objective in the game.

As depicted in FIGS. 3 and 5, in operation, the striking element which may take the form of a ball 42 (shown in phantom) such as a billiard ball, collides with impact responsive means 22 causing flexible member 26 to deform. As shown, deformation or flexing of the member 26 (shown in dotted lines) is in the direction of axial member 33 of the target 14, at the impact point and in the vicinity thereof. Opposite to the area of impact, flexing is directed outwardly and downwardly, toward fixed contact 34. This motion produces flexing (shown in dotted lines) of fingers 32 to contact the fixed contact 34. As described in detail below, this contact actuates selection means 20 for varying the marking of the target means 14 so that after the impact, another target becomes marked, or the struck target becomes remarked, in a preselected pattern which may be calculated to convey the impression of randomness in selection of marking. Concurrently with impact of the ball 42 with the means 26, the ball strikes resilient means 36 and is deflected away from the target 14. Because of the apparent randomness of the marking pattern referred to above, the next target to be designated is not known prior to striking of the marked target and thus players cannot calculate their stroke to position the rebounded ball for accessibility to the next marked target. Thus, an interesting element of uncertainty is added to the game and produces substantially greater demands on the skill of the players than a conventional game in which the sequence of targets to be struck is known in advance.

The placement and configuration of the resilient element 36 and the impact responsive means 22 are such as will permit a soft impact to cause the responsive means 22 to flex appropriately and will protect the means 26 from damage due to excessively hard impacts.

As depicted in FIGS. 1, 2, 6, 6A, and 7, marking relation means 20 comprises movable marking selector or programmer member 46 disposed adjacent a contact assembly 47, including separate banks 47′, 47″ of contact means 17, 18, respectively, mounted upon an insulator member 47‴ attached to target means 14. Programmer member 46 comprises a wheel 48 mounted on target means 14. Wheel 48 need not be mounted on target 14 and is so depicted for clarity and because the depicted arrangement is advantageous with regard to manufacturing convenience. Programmer member 46 includes an array 50 of cam means 52 extending above the surface of the wheel 48 for engaging cam follower means (not shown) upon individual contact means 17 to urge the latter means into electrical contact with individual contact means 18. A warning indicator cam means 52′ may be disposed at a central region of the wheel 48 for engaging a suitably positioned pair of contacts 17′, 18′ in conjunction with activating a warning indicator. The connection of the contact means to appropriate circuitry is described in detail in conjunction with FIG. 8 below.

Means 52 are arrayed in different angular and radial locations. In the depicted arrangement, different radial positions correspond to different pairs of contacts in the assembly 47 and thus to marking of different target means. Different angular positions correspond to different positions in the sequence of target marking. Rotational motion of wheel 48 thus serves to implement a sequence of marking of target means. In accordance with the invention, the function of radial and angular placement may be reversed and non-rotational motion or a non-circular programmer may be utilized. Also, as explained in detail below, an element of true randomness in target selection may be introduced under certain circumstances thus providing an alternative to an entirely predetermined sequence of marked targets.

Wheel 48 is coupled to stepping means in the form of ratchet means 54 including teeth 56 arrayed so that there is, for every cam means 52, a tooth disposed on a radial line of the ratchet mechanism corresponding in angular orientation to the angular orientation of the radial line of the wheel 48 through the cam means 52. Brake or interruptor cam means 57 are disposed at the underside of wheel 48 so that a means 57 corresponds in angular position to every cam means 52. Means 57 is engagable to close a normally open switch in a circuit, described in detail below, coupled to brake or interruptor means which may take the form, as depicted, of a solenoid 58 having a movable armature 60. Armature 60 is biased outwardly to engage with ratchet teeth 56 to prevent motion of the wheel 48. Other arrangements, such as an escapement incorporating the solenoid armature 60 may be employed in accordance with the invention. An element of actual randomness may be introduced into the sequence of target of target marking by suitably varying the flight time of the armature 60.

Motive power means shown in the form of mechanical tension means comprising a spring 61 is coupled to the wheel 48 to provide motive power thereto. Other means comprising electrical or other types of motive means may be employed in accordance with the invention.

As shown in FIG. 8, circuit means in accordance with the invention includes selection loop means 62 coupled to the solenoid 58 and marking loop means 64 coupling to markers 40. Loop 62 comprises a source of EMF 66 and includes selection varying switch means 68 coupled to a gate of an SCR 70 in series with solenoid 58. Finger means 32 and contact means 34 comprise the elements of switch means 68. Normally closed solenoid switch 69 is connected in series at the input of SCR 70. Cam means 57 engage with switch means 69 to open the normally closed switch means. Loop 64 comprises marker means 40 coupled with power source 66 via switch means 72. Contacts 17, 18 comprise switch means 72. For each separate target means there are a loop 62 and a loop 64. Warning indicator means 73

comprises a loop of the type of loop **64** and includes switch means **72'** including warning marker contacts **17', 18'**. The switch **73** is shown as spaced slightly apart from the circuit elements corresponding to marker **40** for clarity. In series with power means **66** is system on/-off switch **74.**

In operation, when a particular target **14** is marked, its switch **72** is closed by contact between contact means **17, 18** corresponding to that particular target, and current appears in the marker **40** associated with that target. Upon collision of a striking element **42** with impact responsive means **22** of the marked target, finger means **32** contact contact means **34** and switch **68** is closed. As a result, the gate of SCR **70** is biased, and the SCR fires, conducting current through the solenoid **58.** Consequently, the shaft **60** of the solenoid is retracted and the wheel **48** is permitted to turn until a cam means **57** opens the switch **69** and the SCR **70** resumes the "off" condition, causing the armature **60** to engage a tooth **56** of the wheel **48.** In this position, contacts **17, 18** are coupled and switch **72** is closed illuminating the marker **40** of the target involved. This sequence continues until the end of the game or, in the embodiment depicted having a depletable power source, until wheel **48** reaches the point at which cam **52'** couples contacts **17', 18',** to activate warning marker **73** indicating that the spring **61** has little or no mechanical energy remaining. In one embodiment, the spring **61** is configured to produce sufficient energy for one total rotation of the wheel **48** and thus after a 360° rotation contacts **17', 18'** connect at the point of the motion cycle of wheel **48** at which remaining spring tension is small.

A method of playing a game may provide that the winner is the player who first strikes a prescribed number of marked targets, and that a player may continue his turn until he fails to strike a marked target. Other methods of play relating to marked targets may be employed in accordance with the invention.

Though specific embodiments of the invention have been described above, the invention is not to be defined or limited thereby, but is to be defined only by the following claims.

What is claimed is:

1. Bumper pool game apparatus comprising:

a rollable striking element;

a substantially horizontal playing surface for the striking element to roll upon, the playing surface having a periphery;

wall means disposed at the periphery of the playing surface and comprising a boundary therefor to confine the striking element, the wall means being configured to provide access to the playing surface from above the surface for permitting play thereon;

a plurality of bumper means for being struck by the striking element, the bumper means being disposed in an arrangement at the playing surface and extending thereabove;

marker means on the bumper means, the marker means being actuable to mark the bumper means to distinguish the latter means from unmarked bumper means and thereby indicate the next bumper means to be struck by the striking element; and

control and selection means coupled to the bumper means and to the marker means, and being responsive to impact of the striking element upon a marked bumper means to:

a. deactuate the marker means of that bumper means,

b. select the next bumper means to be struck by the striking element, and

c. actuate the marker means on the selected bumper means.

2. The invention as set forth in claim **1** wherein said control means comprises marking termination means for deactuating the marker means of the struck bumper means; and

selection means for selecting the next bumper means to be struck by the striking element, and for actuating the marker means on said selected bumper means.

3. The invention as set forth in claim **2** wherein the selection means comprises actuating means, the actuating means being movable to actuate the marker means.

4. The invention as set forth in claim **3** further including marking circuit means, the marking circuit means being coupled to the marker means to actuate the latter means in the presence of electric current in the marking circuit means, and further including contact means, the contact means being coupled to the marking circuit means and being movable to close the marking circuit means, and wherein the actuating means of said selection means are engageable with the first contact means to close the marking circuit means.

5. The invention as set forth in claim **3** further including motive means coupled to the selection means for moving the latter means.

6. The invention as set forth in claim **2** wherein the selection means actuate the marker means in a predetermined sequence unrelated to said arrangement of bumper means.

7. The invention as set forth in claim **2** wherein the marking termination means includes marking termination circuit means and further includes electromechanical means connected to the marking termination circuit means, the electromechanical means being actuable to engage the selection means to control motion thereof, and further including marking termination switch means coupled to the marking termination circuit means and closeable to permit current in the latter means to actuate the electromechanical means.

8. The invention as set forth in claim **7,** further including displaceable means disposed upon the bumper means, the displaceable means being displaceable upon impact of the striking element with the bumper means, and wherein the marking termination switch means comprises contact pair means, including first marking termination contact means and second marking termination contact means movable with respect to each other, the first marking termination contact means being connected to the displaceable means, the displaceable means being positioned so that the first marking termination contact means contacts the second marking termination contact means upon displacement of the displaceable means due to the impact of the striking element with the bumper means.

9. The invention as set forth in claim **8** wherein the marking termination means includes switch means besides said first mentioned marking termination switch means, the second mentioned switch means being coupled to the input of the electromechanical means and

being normally closed, and further including switch opening means for opening the second mentioned switch means, the switch opening means being movable to engage the second mentioned switch means and to open the latter means prior to actuation of said marking circuit means by said actuating means of said selection means.

10. The invention as set forth in claim **8** wherein the bumper means includes resilient means disposed on said housing and configured to rebound the striking element away from the bumper means for preventing the displaceable means from excessively absorbing momentum from the striking element.

11. The invention as set forth in claim **8** wherein said marking termination circuit means includes SCR means coupled to the output of said electromechanical means, the gate of the SCR means being connected to the output of said first mentioned switch means.

12. The invention as set forth in claim **1** wherein said bumper means comprises housing means and the marker means comprises bulb means disposed in the housing means, the housing means being translucent, and wherein actuation of the marker means comprises illumination of the bulb means.

13. The invention as set forth in claim **1** further including hand held cue means for impelling the striking element to roll upon the playing surface.

14. Bumper pool game apparatus comprising:

a horizontal playing surface for accommodating motion of a striking element;

resilient wall means bounding the playing surface to confine the striking element and being configured to provide access to the playing surface from above the surface for permitting play thereon;

a plurality of bumper means for being struck by a striking element, the bumper means being disposed at the playing surface in an arrangement such that for each bumper means at least three paths leading thereto are obstructed by others of said bumper means;

marker means coupled to the bumper means, the marker means being actuable to mark the bumper means to distinguish marked bumper means from unmarked bumper means;

marking termination means for deactuating marked marker means, the marking termination means being coupled to the marker means, and being responsive to impact of a striking element upon a marked bumper means to deactuate the marker means of the marked bumper means; and

selection means coupled to the marker means and being responsive to said impact for selecting a bumper means to be marked and for actuating the marker means on said selected bumper means, said selection being in a sequence having no readily discernible relation to the arrangement of the bumper means.

15. The invention as set forth in claim **14** wherein said sequence provides that a bumper means marked by said marker means successive to the previously marked bumper means is substantially frequently other than a bumper means closest to the previously marked bumper means.

16. The invention as set forth in claim **15** wherein the marking termination means includes marking termination circuit means and further includes electromechanical means connected to said marking termination circuit means and being actuable to engage the selection means to control motion thereof, and further including marking termination switch means coupled to the marking termination circuit means and closeable to permit current in the latter means to actuate the electromechanical means.

17. The invention as set forth in claim **14** further including marking circuit means coupled to the marker means, the marking circuit means actuating the marker means when electric current is present in the marking circuit means.

18. The invention as set forth in claim **17** wherein the marking circuit means includes marking circuit switch means closeable to close the marking circuit means and wherein the selection means comprises actuating means, the actuating means being movable to reach actuation positions to close the marking circuit switch means.

19. The invention as set forth in claim **18** wherein the actuating means comprise an array of index means, and wherein the index means and said switch means are relatively positioned so that the position of an index means determines the sequence of closing of the switch means.

20. The invention as set forth in claim **18** wherein the selection means comprises a movable support means having a generally circular surface and wherein the index means are mounted upon the surface of the support means.

21. The invention as set forth in claim **14** wherein said bumper means are disposed in an array including a centrally disposed bumper means and a plurality of peripherally disposed bumper means.

* * * * *