United States Patent [19]

Melton

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[54] **MAGNETIC SWITCH FOR GAME BOARDS WITH MOVABLE MAGNET CONTACT**

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[52] **U.S. Cl.**..... **200/61.1,** 335/205, 273/131 AD, 200/61.11

[51] **Int. Cl.**..... **H01h 3/16,** H01h 36/02

[58] **Field of Search**..... 200/61.1, 61.11; 335/205; 273/131 AD

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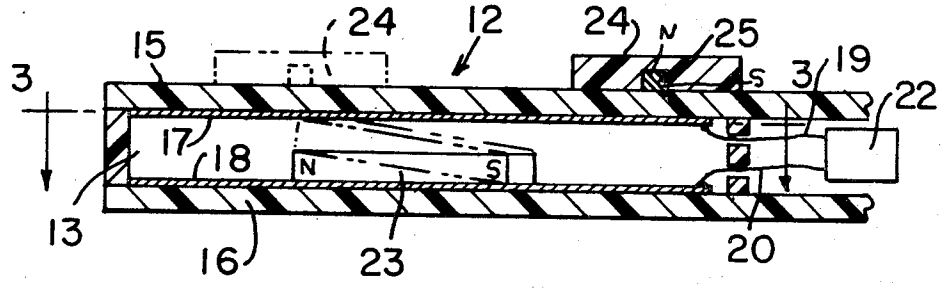
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Primary Examiner—J. R. Scott
Attorney—Zabel, Baker, York and Jones

[57] **ABSTRACT**

The magnetic switch comprises a plastic enclosure located beneath the playing surface of a game board. A sheet or strip of copper foil is secured to the underside of the top wall of the enclosure and a second sheet or strip is secured to the upper surface of the bottom wall. These sheets are connected into a signal circuit by leads. A bar magnet rests on the lower conductive sheet. A playing piece has a magnet embedded in it. When the playing piece is moved over the proper pole of the bar magnet, one end will be elevated into contact with the upper conductive sheet, thus closing the electric signal circuit. A paramagnetic cup may be substituted for the bar magnet, or a steel ball may be substituted for the playing piece.

12 Claims, 11 Drawing Figures



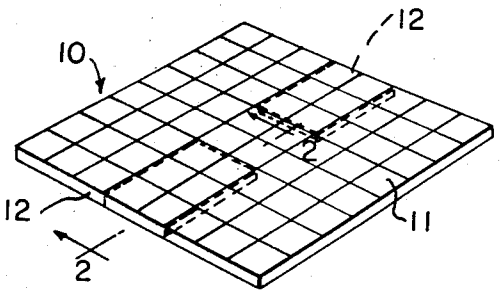


FIG. 1.

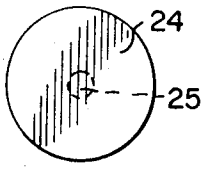


FIG. 4.

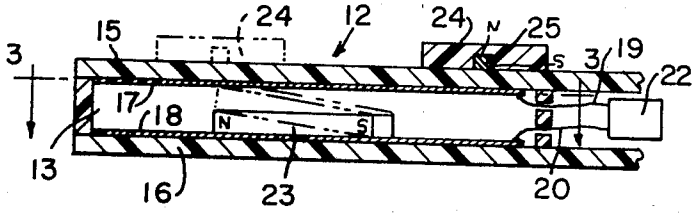


FIG. 2.

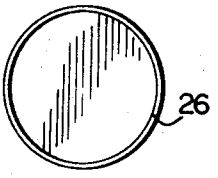


FIG. 5.

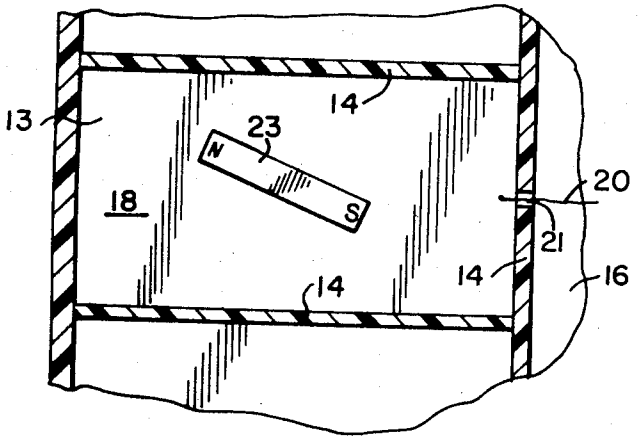


FIG. 3.

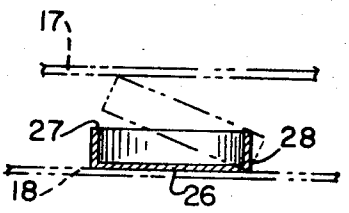


FIG. 6.

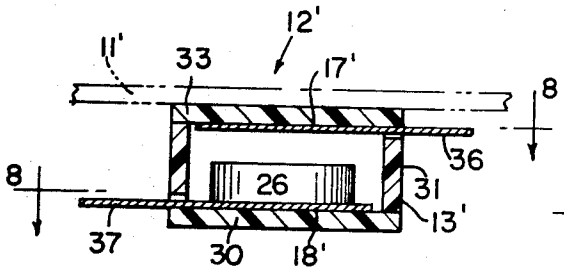


FIG. 7

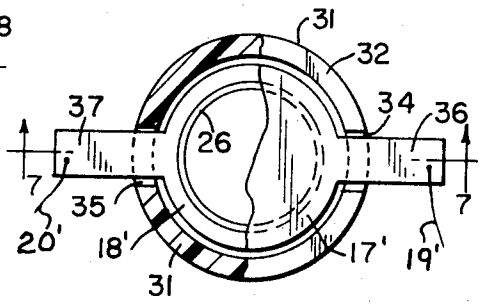


FIG. 8

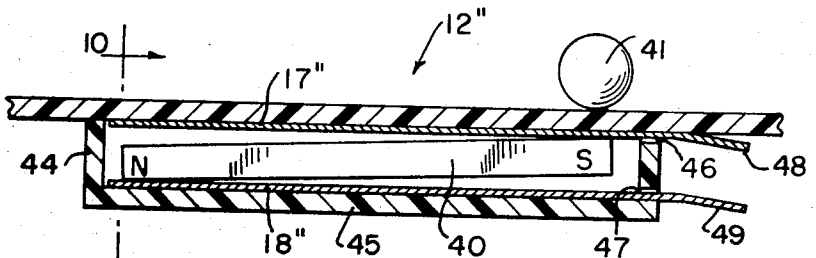


FIG. 9

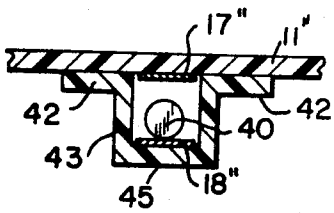


FIG. 10

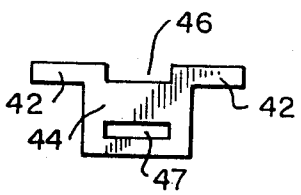


FIG. 11

MAGNETIC SWITCH FOR GAME BOARDS WITH MOVABLE MAGNET CONTACT

This invention relates to a magnetic switch for use on those types of games having a playing surface on which a playing piece moves or is moved, the switch being intended to impart an additional element of suspense or chance to the game.

Some types of games, such as a pin ball game, are provided with an area over which a playing piece, such as a ball or puck is directed in order to actuate a magnetic switch to give a signal or a scoring pulse.

The present invention provides an improved magnetic switch for games of this type and for analogous games. More particularly, an element of mystery or suspense can be imparted to certain playing board types of games by providing a magnetic switch beneath the playing surface in such a manner that the player does not know where the switch is located. Thus, if he moves a playing piece over the switch, a visual or audible signal may be actuated which may be used to affect the play or the scoring of the game.

An object of the present invention is to provide a magnetic switch for such games which is simple and of inexpensive construction. Thus, it is possible to take a standard game board, such as a checkerboard, and by the use of my switch to incorporate in it a battery operated signal circuit embodying my improved switch at a comparatively low cost.

According to my invention, a magnetic element, such as a small bar magnet, is loosely disposed in an enclosure secured to the under side of the playing surface. A nonmagnetic conductor strip is secured to the top wall of the enclosure, and a second non-magnetic conductor strip overlies the bottom wall thereof. A lead extends from each of the conductor strips, the gap between the upper and lower conductor strips constituting a break in an electric circuit which includes said leads.

When the playing piece, which is also magnetic, passes over a point above the magnetic element, one end of same will be elevated into contact with the upper conductor strip while the other will remain in contact with the lower conductor strip. Thus the magnetic element constitutes both the armature and the conductive switch element which bridges the gap and closes the circuit.

The invention is illustrated as applied to two different types of games, but it will be understood that the particular game is shown only by way of example, the invention being of utility in other playing board types of games.

In the drawings:

FIG. 1 is a perspective view of one type of game board embodying my invention;

FIG. 2 is a vertical section taken along line 2—2 of FIG. 1 showing the switch, and showing the operated position of the switch element in dotted lines;

FIG. 3 is a plan view taken along line 3—3 of FIG. 2;

FIG. 4 is a plan view of the playing piece shown in FIG. 2;

FIG. 5 is a plan view of a modified form of switch element;

FIG. 6 is a sectional elevation of FIG. 5 showing a changed position in dotted lines;

FIG. 7 is a sectional elevation of a modified switch construction, taken along line 7—7 of FIG. 8;

FIG. 8 is a horizontal section taken along line 8—8 of FIG. 7;

FIG. 9 is a sectional elevation of a further modification for use in a different type of game, showing the switch element in its operated position;

FIG. 10 is a section taken along line 10—10 of FIG. 9; and

FIG. 11 is a left end view of just the enclosure element shown in FIGS. 9 and 10.

FIG. 1 shows a game device 10 having an opaque playing surface 11 with a design imprinted thereon, the particular game embodiment shown being a checkerboard. Mounted beneath the playing surface 11 are two magnetic switches 12 which are substantially identical to each other, one being shown in FIGS. 2 and 3.

Magnetic switch 12 comprises an enclosure 13 of plastic material having a substantial horizontal area, covering for example six checker squares. The enclosure comprises side walls 14, a top wall 15 which may be the same as the underside of the playing surface 11, and a bottom wall 16 which may be a portion of the base of the game device 10.

A sheet of non-magnetic conducting material, such as copper or aluminum foil 17, is secured to the undersurface of the top wall 15, and a second sheet 18 of similar material is secured to the bottom wall 16, both being co-extensive with the entire horizontal area of enclosure 13. Insulated conductor wires 19 and 20 are electrically connected to the conductor sheets 17 and 18 respectively, and pass through openings 21 in one of the walls 14 and are connected into a suitable signal circuit 22.

Disposed within the enclosure 13 is a bar magnet 23, preferably of rectangular cross section, the length of which is substantially greater than the vertical distance between conductor sheets 17 and 18.

The checker game may have the usual number of playing pieces or "men" of which one playing piece 24 is shown in FIGS. 2 and 4. This comprises a body of non-metallic material, such as plastic, having a small magnet 25 embedded therein with the lower end of it exposed, and the upper end preferably concealed.

In operation, as the game progresses, a playing piece will move over the area overlying one or the other of the magnetic switches 12. If it so happens that the magnet 25, assuming that the exposed pole of magnet 25 is a south pole, moves on to a point which overlies the north pole of magnet 23, then that end of the magnet 23 will be elevated into contact with the conductor sheet 17 closing the circuit through conductor sheets 17 and 18 to actuate the signal circuit 22. Otherwise, the playing piece may traverse the area without actuating the switch. Thus, there is an element of chance or uncertainty, and the actuation of the signal circuit 22 may be used to affect the play of the game, as by forfeiting a man or a turn. The location of the concealed magnet 23 may be changed from time to time by shaking the device 10.

The elements 23 and 25 are referred herein as a "magnetic couple" only one of which need be a magnet, and the other may be either a magnet or formed of a paramagnetic material, and the paramagnetic element may be either the playing piece or the switch element.

An especially suitable paramagnetic switch element for a checker game is a small cup-shaped stamping 26 of sheet steel or copper plated sheet steel, as shown in

FIGS. 5 and 6. One advantage of this modification is that it weighs very little and hence is readily attracted by the magnet. Another advantage is that when the playing piece 24, containing the magnet 25 is moved over the switch element 26, only that portion of the rim 27 of the cup which is directly under the magnet 25 will be elevated into electrical contact with the upper conductive sheet 17, thus leaving a base edge portion 28 in electrical contact with the lower conductive sheet 18. It is practically impossible with this configuration to elevate the paramagnetic switch element in its entirety when only a single small pole of the playing piece 24 is adjacent to the playing surface.

A modified switch 12' is shown in FIGS. 7 and 8 which is suitable for games such as Parcheesi where extensive shifting of the switch element is not desired. Here the non-magnetic enclosure 13' is cylindrical in shape and comprises a bottom wall 30 and vertical wall means 31 terminating in a rim 32. The top wall 33 is separate and may be adhesively secured to the rim 32. The upper conductive sheet 17' is secured to the under side of the top wall 33 and the lower sheet 18' is secured to the bottom wall 30. The rim 32 has a recess 34 formed therein, and a vertical wall 31 has a slot 35 formed therein. The upper and lower conductive sheets are each formed with extensions which extend through the openings 34 and 35 to provide pigtails 36 and 37 to which the insulated conductor wires 19' and 20' can be connected. Here the switch element can be in the form of the cup 26, shown in FIGS. 5 and 6. After the switch 12' has been assembled and the leads connected, it may be adhesively secured to the underside of the playing surface 11' in the desired position. The playing piece is the same as the playing piece 24 in FIGS. 2 and 4.

FIGS. 9 to 11 show a further modification which can be used in a rolling ball type of game, such as pin ball, bowling or pool. Here the switch element is in the form of a bar magnet 40 and the playing piece is a steel ball 41. The enclosure 13'' may be a plastic molded part having flanges 42 for adhesively securing same to the underside of the playing surface 11''. The enclosure 13'' has side walls 43, end walls 44 and a bottom wall 45. One of the end walls 44 has a recess 46 at the top and a slot 47 at the bottom which is flush with the upper surface of the bottom wall 45. Here the conductive sheets 17'' and 18'' are in the form of narrow strips having end portions which can be brought out through the openings 46 and 47 to provide pigtails 48 and 49 for connection to the insulated conductor wires, as described in connection with FIGS. 7 and 8.

In will be understood that the conductive sheets or strips 17–18, 17'–18', and 17''–18'' need not necessarily be of copper or aluminum foil, but may also be cut from copper sheet or aluminum sheet, especially in those instances where the stiffer sheet stock is easier to handle and assemble than foil.

Although only preferred embodiments of the present invention have been described herein, it will be understood that various modifications and changes may be made in the constructions shown without departing from the scope of the invention, as pointed out in the appended claims.

I claim:

1. A switch for a game having a playing surface and a movable playing piece comprising a substantially horizontal support surface located beneath said playing surface and being substantially parallel thereto, a first conductive sheet secured to the underside of said playing surface, a second conductive sheet secured to the top side of said support surface, two elements forming a magnetic couple, said playing piece constituting one of said elements, the other of said elements resting on said support surface and normally spaced beneath said first conductive sheet, the distance between said conductive sheets being less than the longest dimension of said other element whereby when said playing piece is moved into a location on said playing surface above one edge of said other element, said edge will be elevated into electrical contact with said first mentioned conductive sheet while another edge of said other element remains in electrical contact with said second conductive sheet to close an electric circuit including said first and second conductive sheets.

2. A switch as claimed in claim 1 in which said playing piece includes a permanent magnet in which the poles are vertically spaced from each other, said other element being a bar magnet in which said poles are horizontally spaced from each other.

3. A switch as claimed in claim 1 in which said playing piece includes a permanent magnet in which the poles are vertically spaced from each other, said other element being formed from a paramagnetic material.

4. A switch as claimed in claim 3 in which said paramagnetic other element is a cup-shaped member having a circular bottom wall and a cylindrical side wall.

5. A switch as claimed in claim 1 in which said playing piece comprises a steel ball, said other element being a bar magnet.

6. A switch for a game having a substantially horizontal playing surface and a movable playing piece comprising an enclosure located beneath said playing surface and comprising a top wall, a bottom wall, and vertical wall means, said top and bottom walls being substantially parallel to said playing surface, an upper conductive sheet secured to the underside of said top wall, a lower conductive sheet secured to the top side of said bottom wall, said playing piece having at least a portion made of a magnetic material, and a switch element of magnetic material loosely resting on said lower conductive sheet and normally spaced beneath said upper conductive sheet, at least one of the group comprising the magnetic portion of said playing piece and said switch element comprising a permanent magnet, the distance between said conductive sheets being less than the longest dimension of said switch element whereby when said playing piece is moved into a location on said playing surface above one edge of said switch element, said edge will be elevated into electrical contact with said upper conductive sheet while another edge of said other element remains in electrical contact with said lower conductive sheet to close an electric circuit including said upper and lower conductive sheets.

7. A switch as claimed in claim 6 in which the horizontal area bounded by said vertical wall means is large as compared with the horizontal dimensions of said switch element so that the location of said switch element within said enclosure can be shifted in a random manner, there being only a single switch element within said enclosure.

8. A switch as claimed in claim 6 in which said conductive sheets each have an extension passing through openings in said vertical wall means to provide pigtails located externally of said enclosure, said electric circuit including conductors secured to said pigtails.

9. A switch for a game having a playing surface and a movable playing piece comprising a substantially horizontal support surface located beneath said playing surface and being substantially parallel thereto, a lower conductive sheet secured to the top side of said support surface, an upper conductive sheet spaced above said lower conductive sheet and beneath said playing surface, said playing piece including a permanent magnet in which the poles are vertically spaced from each other, and a switch element resting on said lower conductive sheet and normally spaced beneath said upper conductive sheet, said switch element comprising a cup-shaped element of a paramagnetic sheet metal having a bottom wall and a side wall arranged with its bottom wall down and the edge of said side wall extending upwardly toward said upper conductive sheet, the distance between said conductive sheets being less than the longest dimension of said bottom wall, whereby when said playing piece is moved into a location on said playing surface above said side wall edge of said switch element, said switch element will be tilted so that a portion of said edge will make electrical contact with said upper conductive sheet while another portion of said switch element remains in electrical contact with said lower conductive sheet to close an electric circuit including said upper and lower conductive sheets.

10. A switch for a game having a playing surface and a movable playing piece comprising a substantially horizontal support surface located beneath said playing surface and being substantially parallel thereto, a lower conductive sheet secured to the top side of said support surface, an upper conductive sheet spaced above said support surface and beneath said playing surface, said playing piece having at least a portion made of magnetic material, and a switch element resting on said lower conductive sheet and normally spaced beneath said upper conductive sheet, said switch element comprising a bar magnet, the distance between said conductive sheets being less than the length of said bar magnet, whereby when said playing piece on said playing surface moves over one of the poles of said bar magnet, said bar magnet will be tilted so that one end of said bar magnet will make electrical contact with said upper conductive sheet while the other pole remains in electrical contact with said lower conductive sheet to close an electric circuit including said upper and lower conductive sheets.

11. A switch as claimed in claim 10 in which said playing piece includes a permanent magnet in which the poles are vertically spaced from each other.

12. A switch as claimed in claim 10 in which said playing piece comprises a paramagnetic member.

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