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Broomer

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[54] **GAME APPARATUS WITH SWITCHING MATRIX BETWEEN SWITCHES AND LOAD DEVICES**

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[52] **U.S. Cl.** ..... **273/138 A**

[51] **Int. Cl.** **A63b 71/06**

[58] **Field of Search**.... 273/138 A, 141 A, 139, 1 E; 35/22 R, 22 A, 18 R

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[57] **ABSTRACT**

The game apparatus comprises a plurality of load devices. A source of energy is provided for energizing each one of the load devices. A plurality of switches, each one of which is operable from an open to a closed state is included and leads connect the plurality of switches between the source of energy and the plurality of load devices so that movement of the plurality of switches from the open to the closed state connects a first set of preselected ones of the load devices across the source of energy to energize the first set of preselected ones of the load devices. A switching matrix is connected between the plurality of switches and the plurality of load devices and is movable from a first to at least a second position to rearrange the connections between the switches and the load devices so that movement of the plurality of switches from the open to the closed state connects a second set of preselected ones of the plurality of load devices across the source of energy so that a different set of load devices thereby are energized.

1 Claim, 4 Drawing Figures

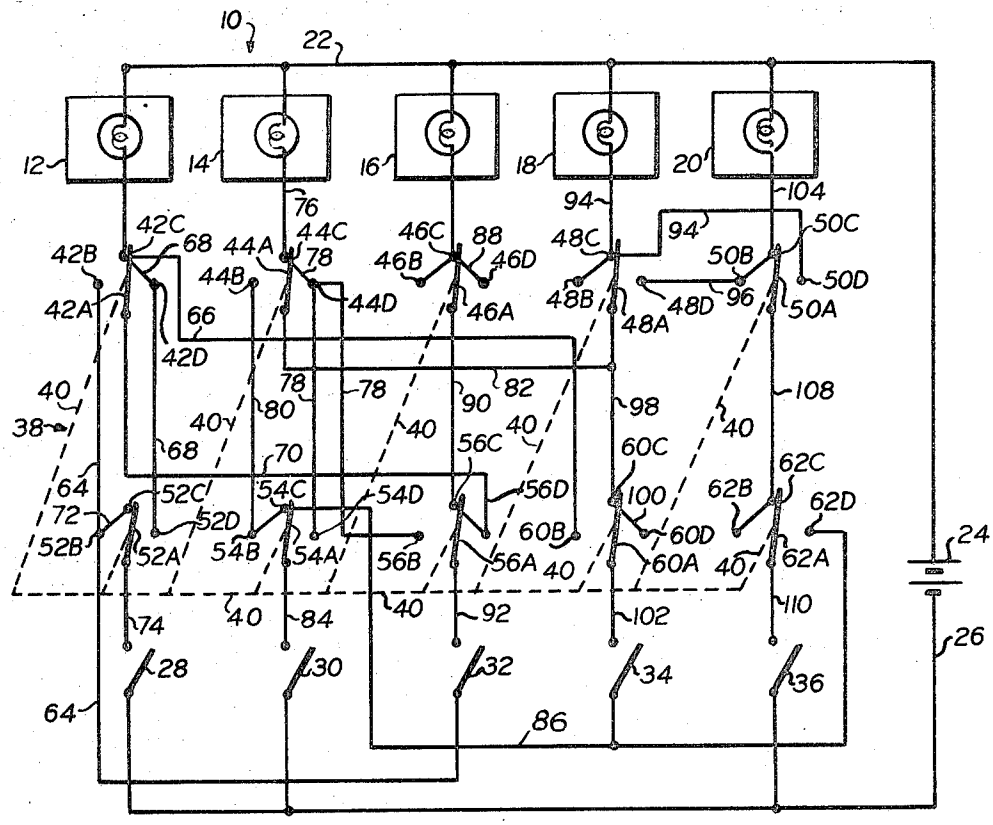


FIG. 1.

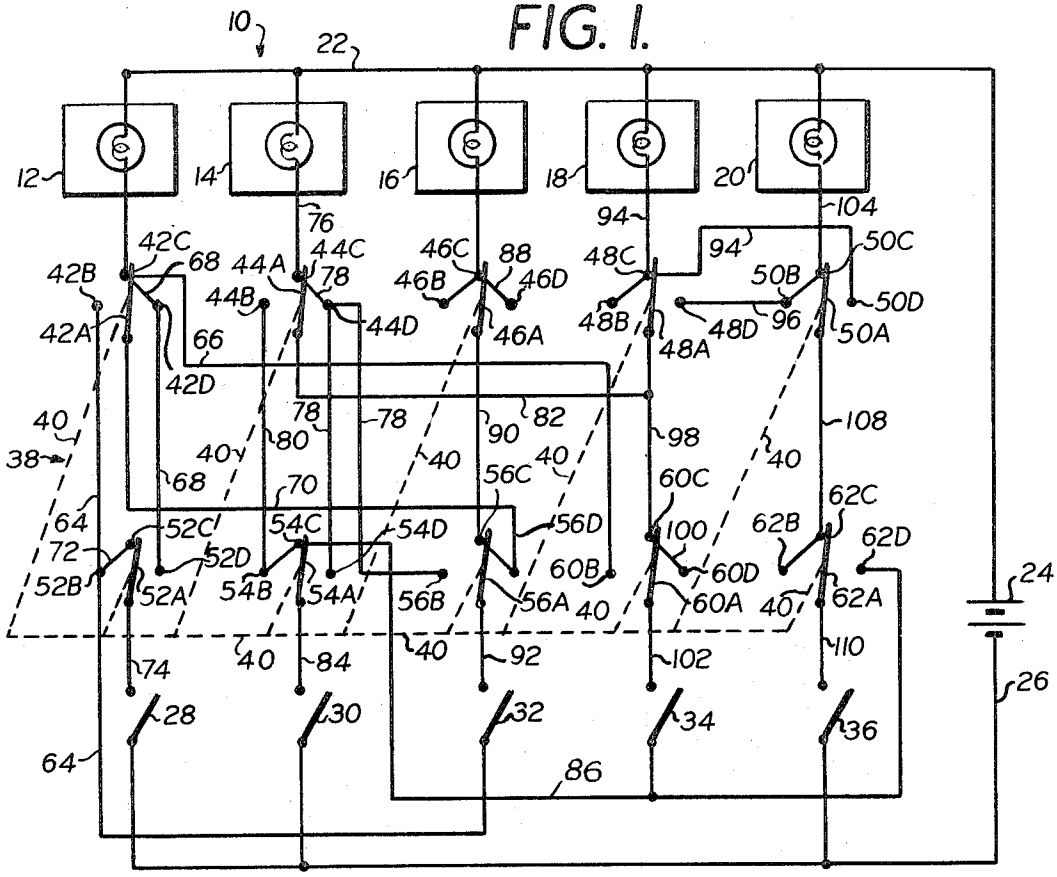
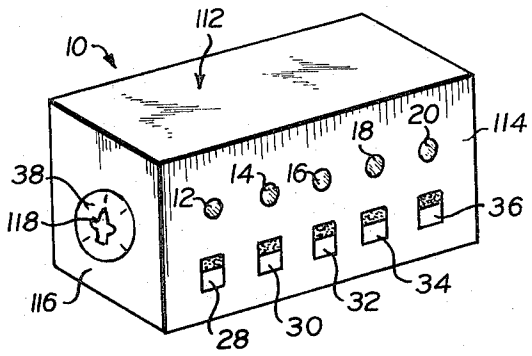


FIG. 2.



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FIG. 3.

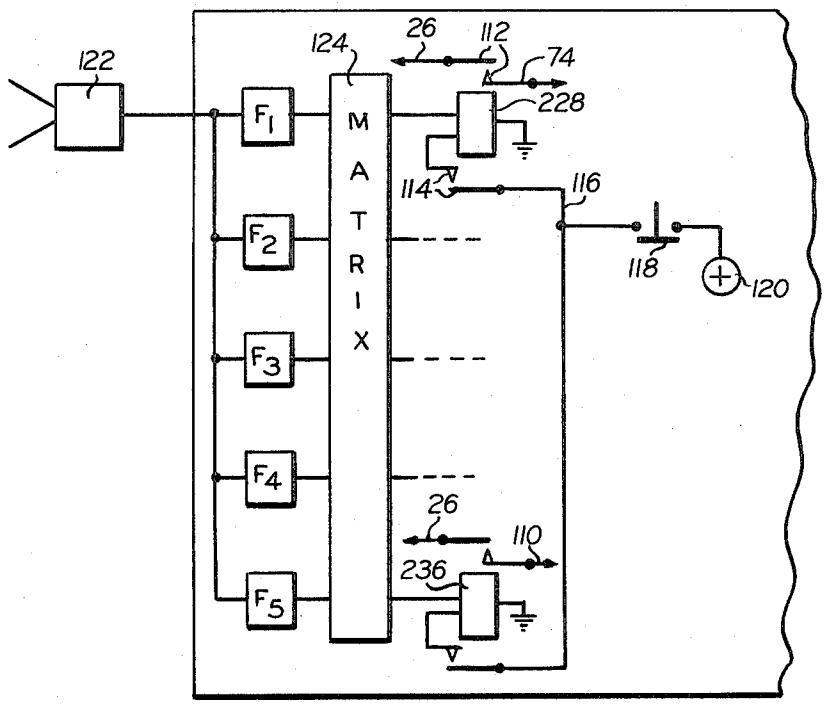
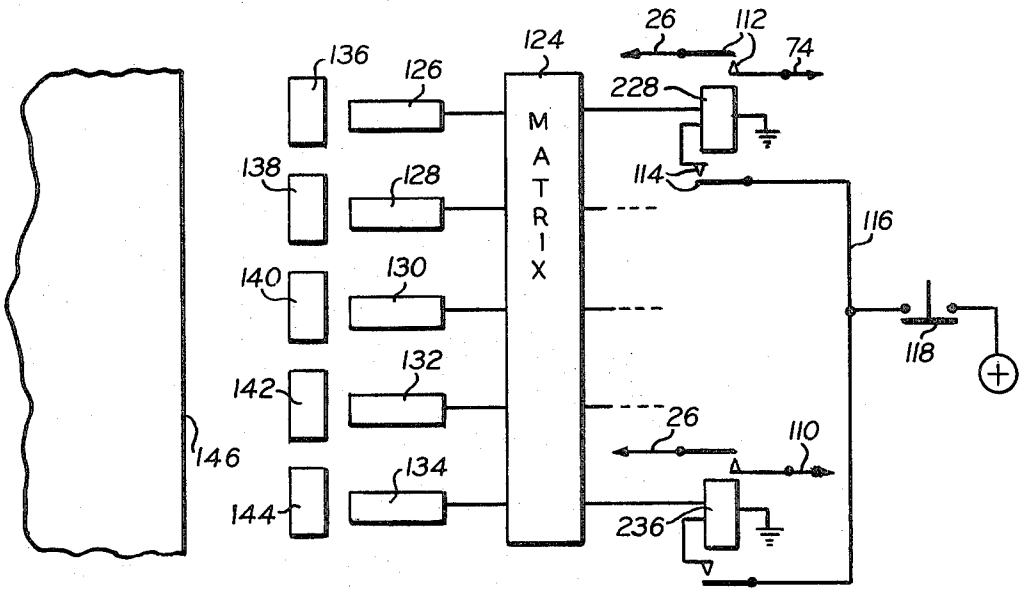


FIG. 4.



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GAME APPARATUS WITH SWITCHING MATRIX BETWEEN SWITCHES AND LOAD DEVICES

This invention relates generally to a game apparatus and, more particularly, pertains to an apparatus in which load devices are selectively energized in accordance with a selected switching code.

There are many so-called game shows on radio and television which pit one contestant against another contestant in competition for a particular prize. However, the contest is usually limited to the live audience. Although some game shows have been extended to the listening audience, such shows usually require no action on the part of the contestant other than to answer a telephone in response to a call from the originating show.

Accordingly, an object of the present invention is to provide an apparatus which may be utilized by home contestants who are competing for prizes awarded in a television or a radio show or the like.

A more specific object of the present invention is to provide an apparatus which contains a multitude of permutations and combinations of operations so that only one of the devices will produce a winning combination.

A further object of the present invention resides in the novel details of construction which provide a game apparatus of the type described wherein the contestant actually operates the apparatus in response to instructions given during a television or radio broadcast thereby permitting the participant to take an active part in the contest and thereby generating added interest on the part of said participant.

Accordingly, a game apparatus constructed in accordance with the present invention includes a plurality of load devices and a source of energy for energizing the plurality of load devices. A plurality of switches each of which is operable from an open to a closed state is provided and lead means connects the plurality of switches between the source of energy and the plurality of load devices so that movement of the plurality of switches from the open to the closed state connects a first set of preselected ones of the plurality of load devices across said source of energy to energize said first set of preselected ones of said plurality of load devices. Matrix means is connected between said plurality of switches and a plurality of load devices and is movable from a first to at least a second position to rearrange the connections between the plurality of switches and the plurality of load devices so that movement of the plurality of switches from the open to the closed state connects a second set of preselected ones of said plurality of load devices across the source of energy to energize the second set of preselected ones of the plurality of load devices.

A feature of the invention is to provide an apparatus which may be actuated by sounds emitted from the radio or television broadcast or by light from a television broadcast thereby to energize the load devices.

A further feature of the present invention is to provide an apparatus which may be actuated by the actual broadcast to produce odors which are related to the subject matter of the broadcast.

Other features and advantages of the present invention will become more apparent from a consideration of the following detailed description when taken in

conjunction with the accompanying drawings, in which:

FIG. 1 is a schematic circuit wiring diagram of an apparatus constructed according to the present invention;

FIG. 2 is a perspective view of a housing enclosing the circuit shown in FIG. 1;

FIG. 3 is a partial schematic circuit wiring diagram of a modified embodiment of an apparatus constructed in accordance with the present invention; and

FIG. 4 is a partial schematic wiring diagram of a further modified embodiment of such apparatus.

In the discussion which follows, the game apparatus will be described as being used in conjunction with a television or radio program. However, it is to be noted that this is a way of illustration only and is not to be interpreted as being a limitation of the present invention. That is, the apparatus may be used as a game device between two people, for example, wherein the person who is able to energize all the load devices will be declared the winner.

The apparatus of the present invention is designated generally by the reference numeral **10** in FIG. 1 and comprises a plurality of load devices respectively designated **12–20.** Although, as shown in FIG. 1, the load devices **12–20** are illustrated as lamps it is to be noted that any type of load devices may be utilized, as noted in greater detail hereinbelow. One terminal of each of the load devices is connected to a common lead **22** which, in turn, is connected to the positive terminal of a battery or source of energy **24.** The other terminal of the battery **24** is connected to a lead **26.**

A plurality of single-pole single-throw switches **28–36** are adapted to connect the load devices **12–20** across the terminals of the battery **24.** However, the switches **28–36** are connected to the load devices in such a manner that only preselected ones of the load devices will be connected to the battery when the switches are operated. Additionally, a matrix designated generally by the reference numeral **38** is connected between the switches **28–36** and the load devices **12–20** and is adapted to rearrange the connections between the load devices and the switches so that when the switches are operated a different set of load devices will be energized.

More specifically, the matrix **38** comprises a wafer switch having at least 10 decks on each of which includes at least three terminals. The terminals on each deck are adapted to be engaged by a wiper arm associated with that particular deck so that corresponding terminals on each deck will be connected to the wiper arm on that deck. Since such wafer switches are conventional in construction it is not described in detail herein although the dashed lines **40** schematically illustrate the connections between the decks of the wafer switches. In other words, the wiper arms of each deck may be considered to be ganged together. Although a wafer switch has been illustrated herein, it is to be noted that this is for illustrative purposes only and is not to be interpreted as being a limitation of the present invention as other type of switching arrangements may be utilized.

For ease of reference, each deck will be designated by a reference character having a numerical prefix associated with the particular deck and a letter suffix which designates the terminals and wiper arm associated with that deck. For example, the reference char-

acter 42A designates the wiper arm of deck 42 of the switch 38 whereas the reference character 46B designates the B terminal of deck 46.

Accordingly, the wafer switch 38 comprises ten decks, as noted above each of which is designated by the respective reference numerals 42–62. More specifically, the other terminal of the load device 12 is connected to terminal 42C of the deck 42. Terminal 42B of the deck 42 is connected to terminal 52B of deck 52 by a lead 64. Additionally, the lead 64 connects the terminal 52B to the armature of switch 32. The terminal 42C is also connected to terminal 60B of the deck 60 by a lead 66. A lead 68 connects terminal 42C and 42D together and to terminal 52D. The wiper arm 42A is connected by a lead 70 to terminal 56D of the deck 56. The terminal 52B is connected to the terminal 52C by a lead 72. The wiper arm 52A is connected to the terminal of the switch 28 by a lead 74.

The other terminal of the load device 14 is connected to the terminal 44C of the deck 44 by a lead 76. A lead 78 connects the terminal 44C with the terminal 44D, 54D and to terminal 56B. The terminal 44B is connected by a lead 80 to the terminals 54B and 54C. The wiper arm 44A of the deck 44 is connected to the wiper arm 48A of the deck 48 by a lead 82.

The wiper arm 54A is connected to the terminal of the switch 30 by a lead 84. The terminal 54C is connected to the armature of the switch 34 and the terminal 62D of the deck 62 by a lead 86. Additionally, the armatures of the switches 28, 30 and 36 are connected to the common lead 26 which is connected to the battery 24.

The terminals 46B, 46C and 46D are connected together by a lead 88. The wiper arm 46A of the deck 46 is connected to the terminal 56C of the deck 56 by a lead 90. The wiper arm 56A is connected to the terminal of the switch 32 by a lead 92. The other terminal of the load device 16 is connected to the terminal 46C.

The other terminal of the load device 18 is connected to the terminal 48C of the switch deck 48 and to the terminals 48B and 50D by a lead 94. The terminal 48D is connected to the terminal 50B by a lead 96. The wiper arm 48A is connected to the terminal 60C of the deck 60 by a lead 98. The terminal 60C is also connected to the terminal 60D by a lead 100. The wiper arm 60A is connected to the terminal of the switch 34 by a lead 102.

The other terminal of the load device 20 is connected to the terminal 50C by a lead 104 which also connects the terminal 50C with the terminal 50B. The wiper arm 50A is connected to the terminal 62C of the deck 62 by a lead 108 which also connects the terminal 62C with the terminal 62B. The wiper arm 62A is connected to the terminal of the switch 36 by a lead 110.

The apparatus illustrated in FIG. 1 may be received in a housing 112 as shown in FIG. 2. The housing 112 is provided with a front wall 114 which supports the load devices 12–20 therein. The switches 28–36 may be supported on the wall 114 below the respective load devices. Additionally, the wafer switch 38 may extend through the side wall 116 of the housing 112 and is provided with a knob 118 to facilitate movement of the central shaft which, in turn, moves the wiper arms on each deck, as is conventional.

In operation, assuming that the device 10 is utilized in conjunction with a television or radio broadcast, the announcer will specify the position of the knob 118 on the wafer switch 38. This will set the wiper arms on each deck in a particular position. The announcer then specifies which one of the switches 28–36 are to be moved to the closed state. To be more specific, the switches 28–36 are closed one at a time in a predetermined sequence. In the example under consideration, the announcer will specify the desired sequence in which the switches will be closed. If used as a game in the home, the sequence may be announced by one of the players. The winner of the contest will be determined by which one of the load devices will be energized in accordance with the switches which have been directed to be closed. That is, a winner of the game may be determined by the specific sequence in which the load devices have been illuminated after each switch has been closed following the desired sequence. Thus, for the arrangement illustrated in FIG. 1 wherein each of the wiper arms on the decks is in engagement with the C terminal of the respective deck the closure of switch 28 will not affect any of the load devices since none of the load devices will be connected across the source of energy 24. Additionally, the same results will be obtained when the switch 30 is closed since none of the load devices will be connected across the battery 24. However, when the switch 32 is closed the load devices 12 and 16 will be energized through the circuits comprising lead 22, load device 12, terminal 42C and wiper arm 42A of deck 42, lead 70, interconnected terminals 56C and D of deck 56, wiper arm 56A, lead 92, closed switch 32, lead 64, connected terminals 52B and 52C of the deck 52, wiper arm 52A, and closed switch 28 to the lead 26. The load device 16 will be energized through the energized lead 22, wafer decks 46 and 56 and the closed switch 32 to the lead 26 via the circuit described above.

Closure of the switch 34 will energize the load device 18 through the circuit including the energized lead 22, load device 18, terminal 48C which is in engagement with wiper arm 48A of the deck 48, lead 98, terminal 60C and wiper arm 60A of the deck 60, lead 102, the closed switch 34, lead 86, and through the contacts of the deck 54 and the closed switch 30 to the lead 26. Additionally, the load device 14 will be energized through the circuit including the energized lead 22, the device 14, lead 76, terminal 44C and wiper arm 44A of the deck 44, and lead 82 to the energized lead 98.

Closure of the last switch 36 will energize the load device 20 through the circuit including the energized lead 22, lead 104, terminal 50C and wiper arm 50A of the deck 50, lead 108, terminal 62C and wiper arm 62A of the deck 62, lead 110 through the closed switch 36 to the energized lead 26.

Accordingly, it will be noted that sequential closure of the switches 28–36 with the wafer switch 38 in the position shown will cause the load devices to be energized in the following manner: For closure of switch 28 — none; for closure of switch 30 — none; for closure of switch 32 — load devices 12 and 16; for closure of switch 34 — load devices 14 and 18; and, for closure of switch 36 — load device 20. Accordingly, the winner of the contest may be declared as that person having an apparatus wherein the load devices are energized in the above-described sequence in accordance with the disclosed sequential closing of the switches. It is obvious that other devices will have different connections so that the load devices will be operated in different se-

quences. That is, another apparatus may have connections to terminals B and C of each deck interchanged so that, for example, connections which are made to terminal 42C in FIG. 1 will be made to terminal 42B in the other apparatus.

As another illustrative example, if the wafer switch is set so that the wiper arm engages the B terminal of each deck, a corresponding analysis of the circuit of FIG. 1 will show that when the switches 28-36 are operated in sequence the load devices will be energized in the following manner: For switch 28 — load device 16; for switch 30 — load device 18; for switch 32 — load device 14; for switch 34 — load device 12; and, for switch 36 — load device 20.

It will be noted, therefore, that the matrix or wafer switch 38 is operable to change the connections between the switches 28–36 and the load devices 12–20 so that different preselected ones of the load devices will be energized in response to the closure of different ones of the switches 28–36.

FIG. 3 illustrates a modified embodiment of the apparatus shown in FIG. 1 wherein only the differing portions of the circuitry has been shown, it being understood that the remaining portions of the circuit are identical.

Accordingly, the manually operable single-pole single-throw switches 28–36 are replaced by respective relays 228-236 (for the sake of clarity, only two of the relays are shown). Each relay is provided with a normally open pair of contacts which are connected in the circuit in the same manner as the respective switch and which are adapted to be closed in response to the energization of the relay. For example, the relay 228 is provided with a pair of contacts 112 which are adapted to connect the lead 26 with the lead 74 when the relay is energized in the same manner that the switch 28 connects the lead 26 with the lead 74 when the switch is closed. Additionally, a holding circuit is provided for maintaining the relay operated after it is initially energized. More specifically, the relay 228, for example, also includes a normally open set of contacts 114 which are adapted to close in response to the energization of the relay. One of the contacts 114 is connected to one end of the winding of the relay 228, the other end of which is connected to ground. The movable contact 114 is connected to a lead 116 which, in turn, is connected to a terminal of a normally-closed push-button switch 118. The other terminal of the switch 118 is connected to the positive terminal of a source of potential 120, the other end of which is grounded. Accordingly, it will be obvious that when the relay 228 is energized in any manner whatsoever, the contacts 14 will close thereby connecting the source of potential 120 across the relay winding to maintain the relay winding energized. When it is desired to disable this holding circuit the push-button 118 is operated to disconnect the source 120 from the relay winding.

In the embodiment of FIG. 3, the relay windings are adapted to be operated in response to different sound frequencies. More specifically, a transducer 122 is provided which is adapted to convert sounds into corresponding electrical signals having the same frequencies as the sounds. The signals are applied to filters F_1–F_5 the output terminals of which are connected to a switching matrix 124. Each one of the filters F_1–F_5 is associated with a different one of the relays and, in practice, each one of the filters passes a different frequency signal. Assuming that the switching matrix 124 is arranged so that the filters are connected directly through to the associated relays (i.e., the filter F_1 is connected with the relay 228, the filter F_2 would be connected with a relay corresponding to the switch 30 of FIG. 1, etc.) then each relay will be energized as the associated signal is passed by that particular filter. In other words, if the signal is of such frequency as to be passed by filter F_1, the relay 228 will be energized. When the relay is energized the holding circuit will take effect to maintain the relay energized thereby connecting the lead 26 with the lead 74. The same comments apply to the remaining portions of the circuit so that the energization of the load devices will be controlled by signals emitted from the television or radio broadcast. It is to be noted that this arrangement substantially increases the permutations and combinations for operating the apparatus of the present invention since the amount of signals for operating the relays can vary anywhere within the audio spectrum of frequencies. Additionally, in order to increase the number of combinations available the switching matrix 124 is operable to connect different ones of the filters to different ones of the relays. For example, for one operation of the switching matrix 124, the filters F_1 and F_5 may be interchanged so that the signal which formerly operated the relay 228 will now operate the relay 236. The switching matrix 124 may comprise a wafer switch of the type described hereinabove.

FIG. 4 illustrates a further embodiment of the present invention wherein the relays 228–236 are operated by light energy rather than by sound energy.

More specifically, the filters F_1–F_5 of FIG. 3 are replaced by light responsive means such as photo electric cells respectively designated 126–134. Each one of the cells 126–134 is connected to the matrix 124. Positioned in front of each one of the photo electric cells 126–134 is a respective optical filter 136–144. The optical filters 136–144 each have a different characteristic whereby each filter passes light energy having different frequencies. Thus, the photo electric cell 126 will only be energized in response to, for example, a red light whereas the photo electric cell 134 will produce a signal only in response to, for example, a blue light. The optical filters 136–144 may be illuminated from the tube 146 of a color television set. Accordingly, the television broadcast may be arranged so that during the course of the program different colors will appear on the face of the tube to energize the photo electric cells in a specific sequence and in a specific manner thereby to cause energization of the relays and to effect consequent energizing of the load devices in the manner noted above.

In this respect, it should be noted that, as specified hereinabove, the load devices may comprise storage containers having solenoid operated valves rather than the lamps illustrated in FIG. 1. Accordingly, during the course of a television broadcast, for example, various sounds or lights may be broadcast to cause the solenoid valves to operate thereby releasing the contents of the storage means which may comprise cans. Gases having selected odors may be stored in these cans so that a composite odor will be produced when the gases are released which are related to the subject matter of the broadcast.

Accordingly, an apparatus has been disclosed which is simple in construction and efficient in operation and

may ideally be utilized as a game apparatus in conjunction with audience participation in a television or radio contest program.

While preferred embodiments of the invention have been shown and described herein, it will become obvious that numerous omissions, changes and additions may be made in such embodiments without departing from the spirit and scope of the present invention.

What is claimed is:

1. In a game apparatus; a plurality of load devices; a source of energy for energizing said plurality of load devices; a plurality of switches in one-to-one correspondence with said plurality of load devices each of which is operable from an open to a closed state; and matrix means for connecting said plurality of switches and said plurality of load devices and being movable from a first position wherein said matrix interconnects a plurality of switches and load devices whereby movement of predetermined ones of said plurality of switches to the closed position connects a first set of preselected ones of said plurality of load devices across said source of energy to energize said first of preselected ones of said plurality of load devices, to at least a second position to rearrange the connections between said plurality of switches and said plurality of load devices whereby movement of predetermined ones of said plurality of switches to the closed state connects a second set of preselected ones of said plurality of load devices across said source of energy to energize said second set of preselected ones of said plurality of load devices; said plurality of switches each comprising a relay having a first pair of contacts adapted to move from the opened to the closed state when the relay is energized, holding means responsive to the operation of said relay for maintaining said relay energized, and selective energizing means for energizing selectively each one of said relays; said selective energizing means comprising a transducer for converting sound frequencies into electrical signals having related frequencies, and a different selective filter connected between said transducer and each one of said relays for passing different predetermined selected ones of said electrical signals of different frequencies whereby each relay is operated by a different selected frequency electrical signal; said matrix means comprising first matrix means between said relays and said load devices for interchanging the connections between said relays and said load devices, and a second matrix means connected between said filters and said relays for intercharging the connections between said filters and said relays.

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