United States Patent

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[54] BIRD SHOOT GAME AND THE LIKE

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[52] **U.S. Cl.** .....**273/85 R**, 273/101.2, 273/1 E

[51] **Int. Cl.** **A63f 9/02**

[58] **Field of Search**.....273/1 E, 85 G, 101.2, 101.1, 273/105.2

[56] **References Cited**

UNITED STATES PATENTS

2,300,132	10/1942	New	273/101.2
2,458,892	1/1949	Burdick	273/1 E
3,269,731	8/1966	Koci et al.	273/85 G
3,337,218	8/1967	Hurley	273/85 G

FOREIGN PATENTS OR APPLICATIONS

900,104	7/1962	Great Britain	273/1 E

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[57] **ABSTRACT**

An electric amusement game is provided having a panel with a plurality of rows of lights which when illuminated in sequence simulate the flight path of a bird. A different stepping switch is connected to the lights in each row to cause sequential illumination to indicate the flight of a bird and to simulate the path of a bullet in response to actuation of the stepping switches by players of the amusement game. When the bullet intercepts the path of a bird, the panel provides indication of a falling bird and scores the number of birds which are brought down by each player of the amusement game.

4 Claims, 6 Drawing Figures

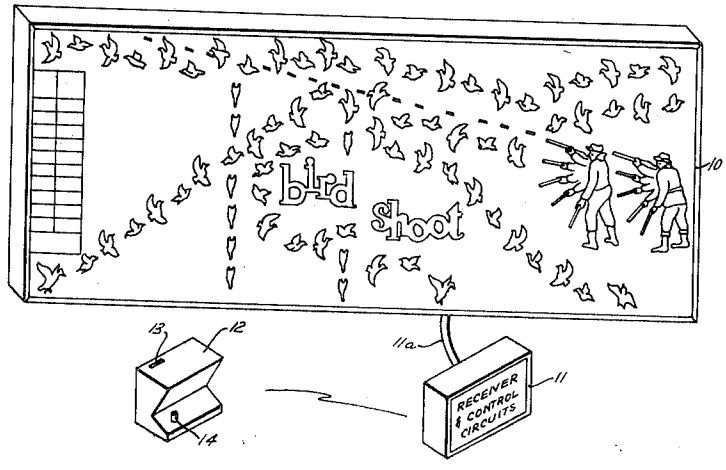


FIG. 1

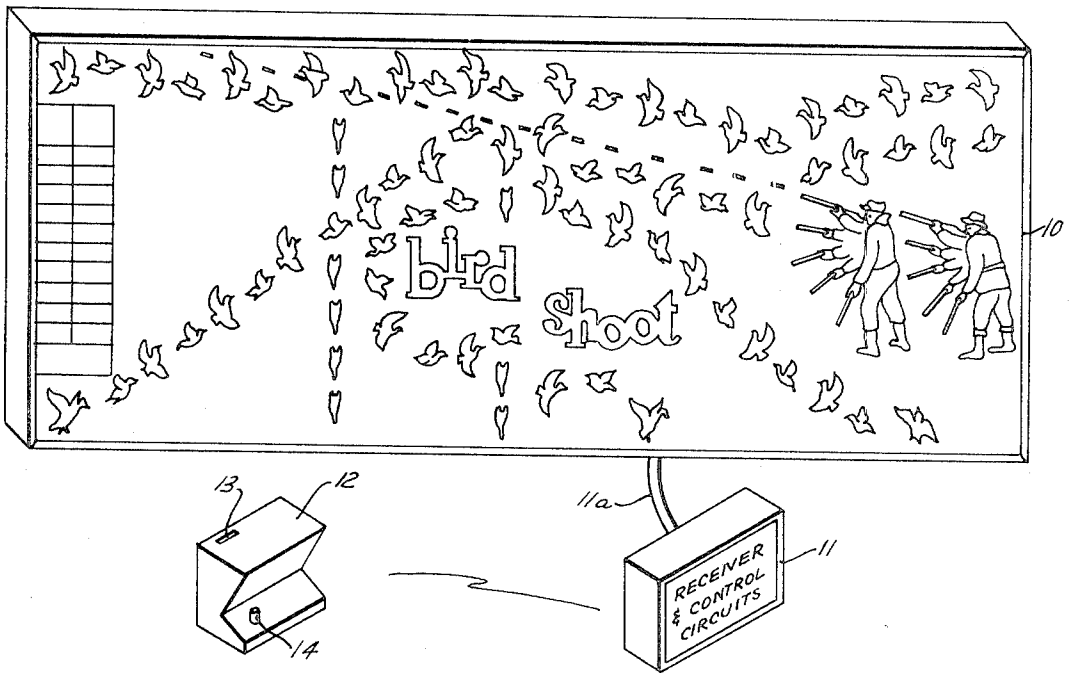
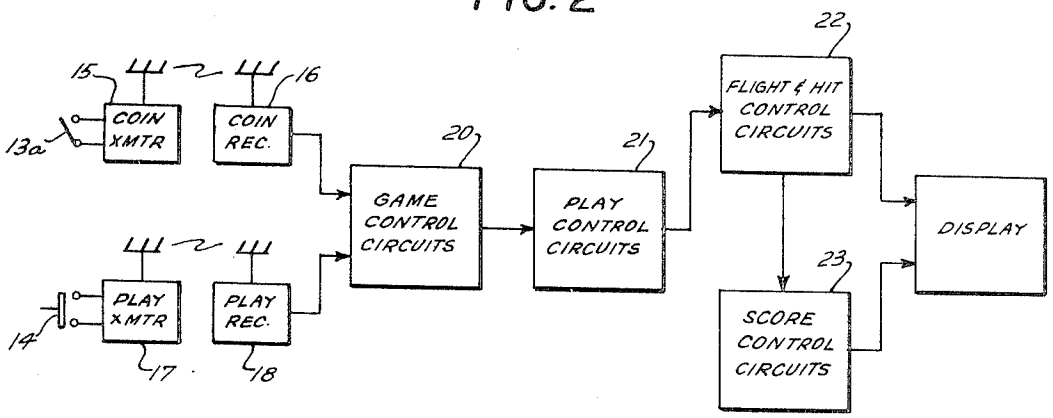


FIG. 2



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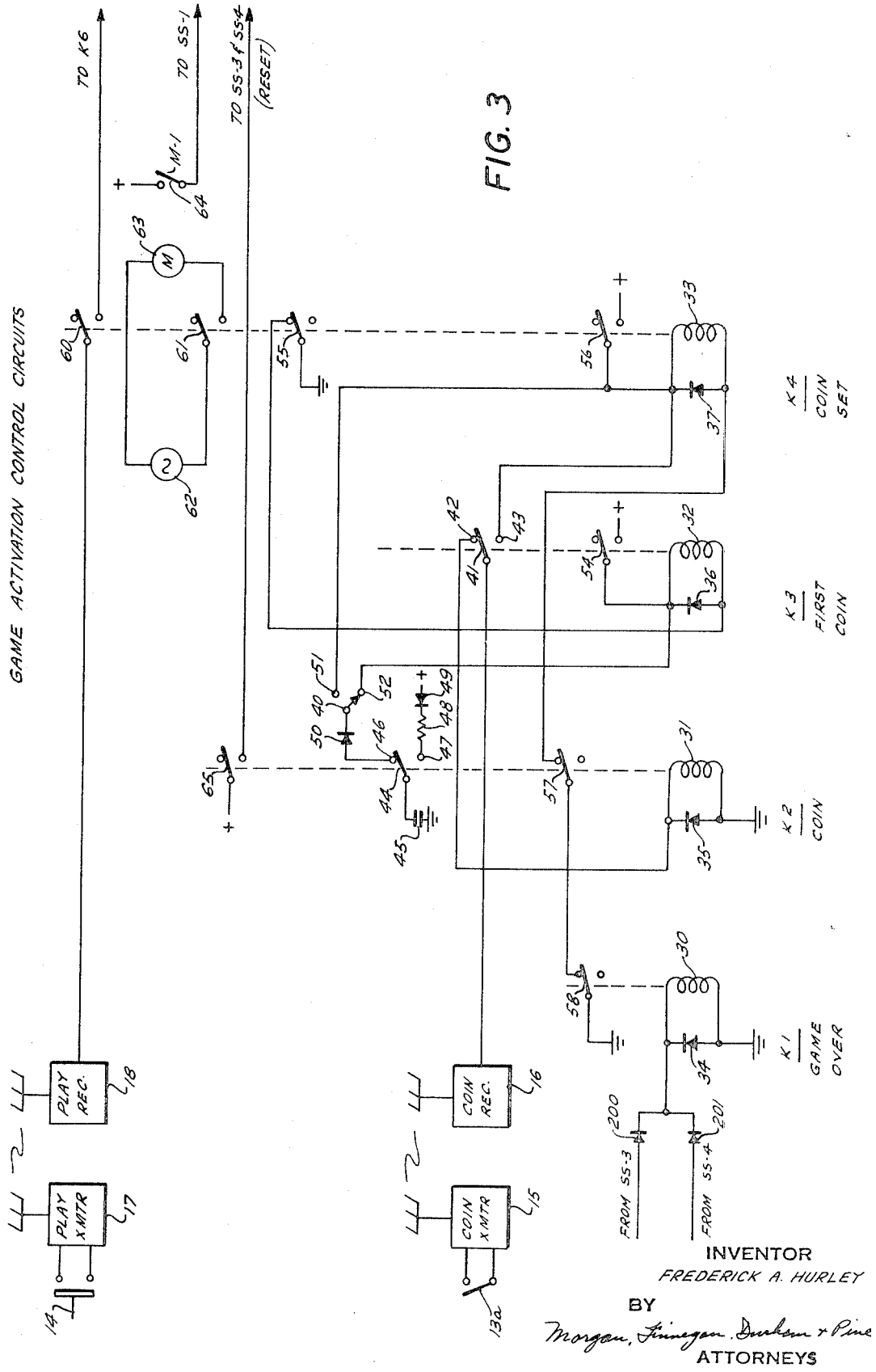
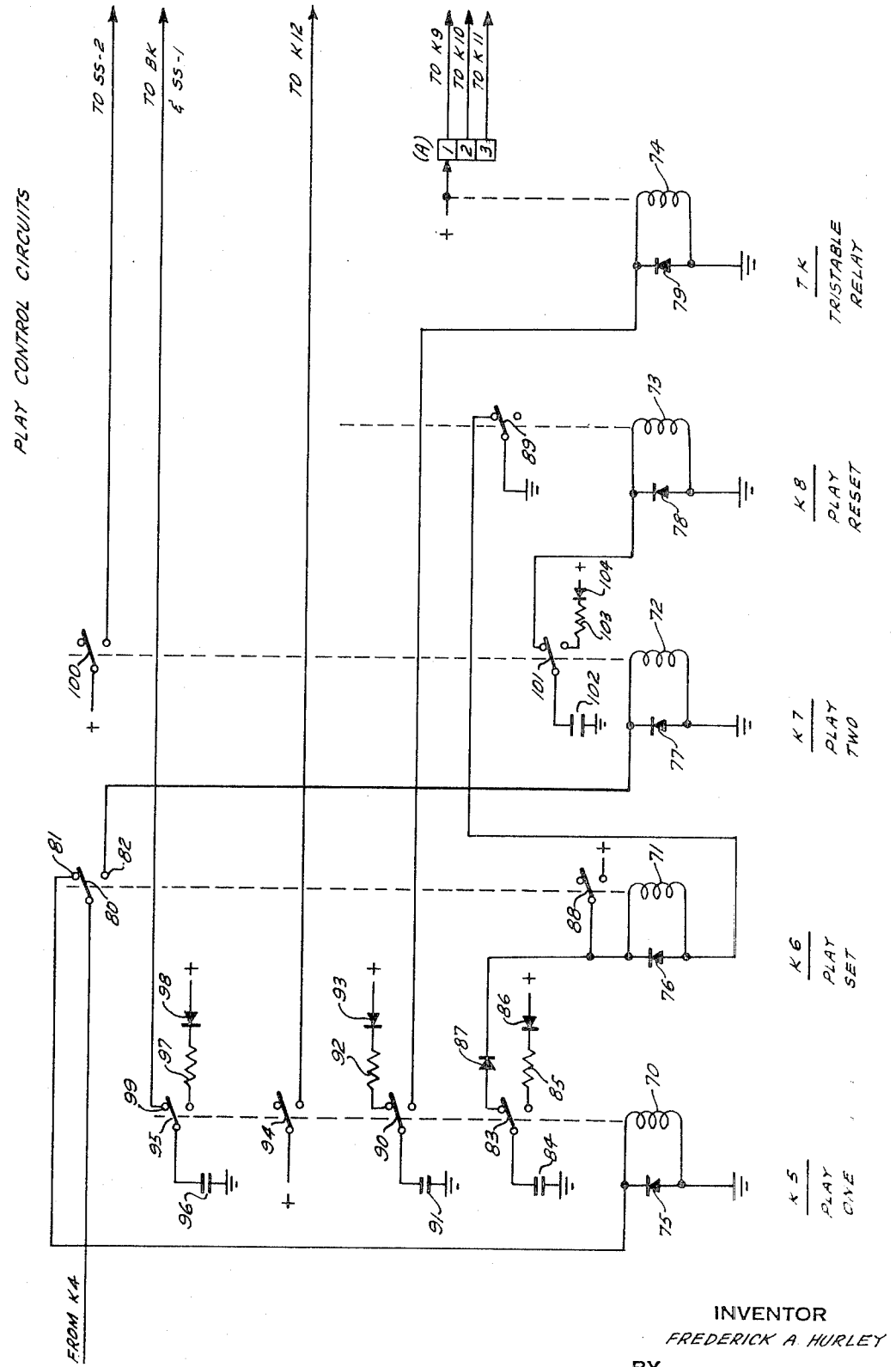


FIG. 3

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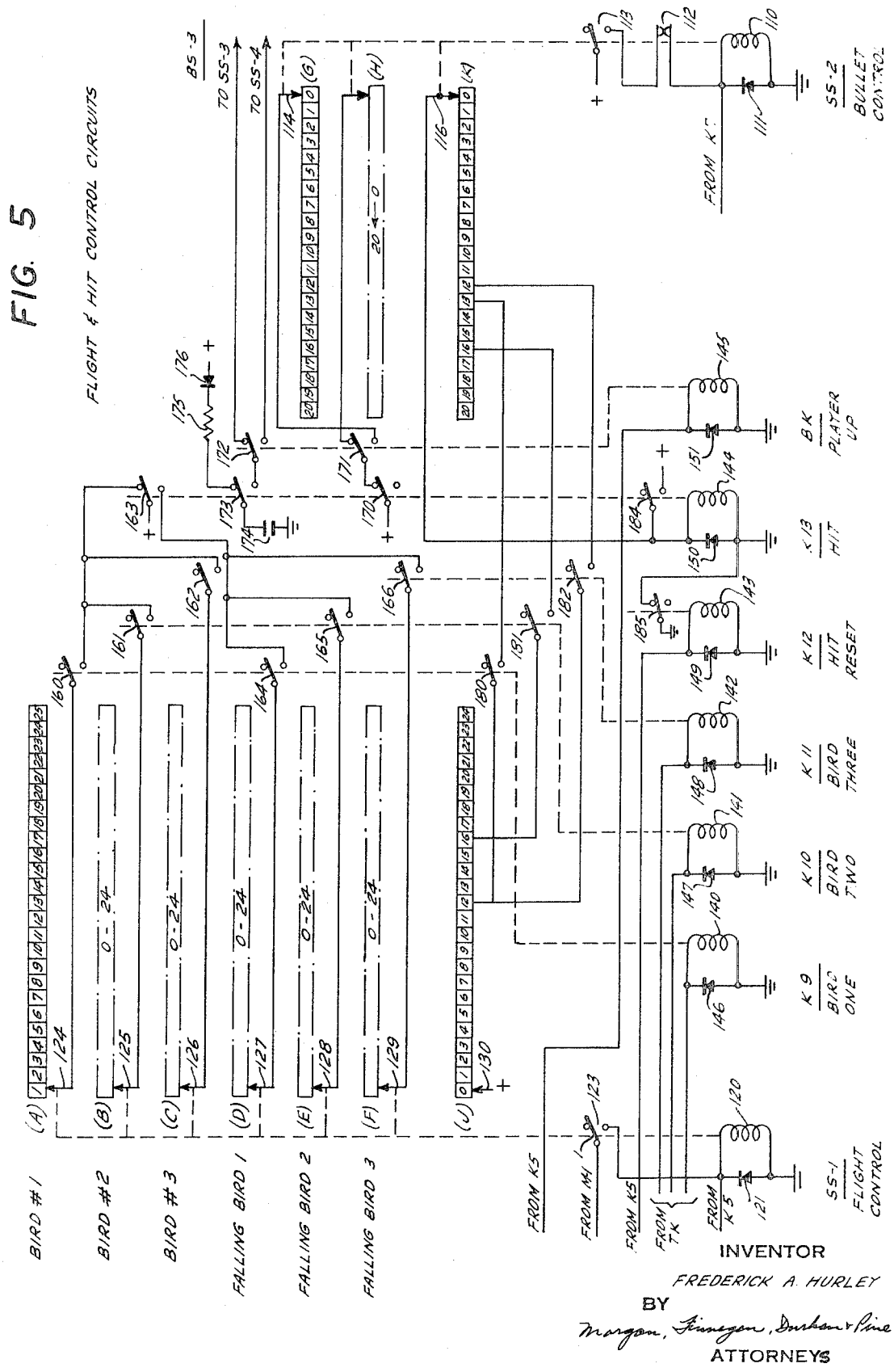
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FIG. 4



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FIG. 5



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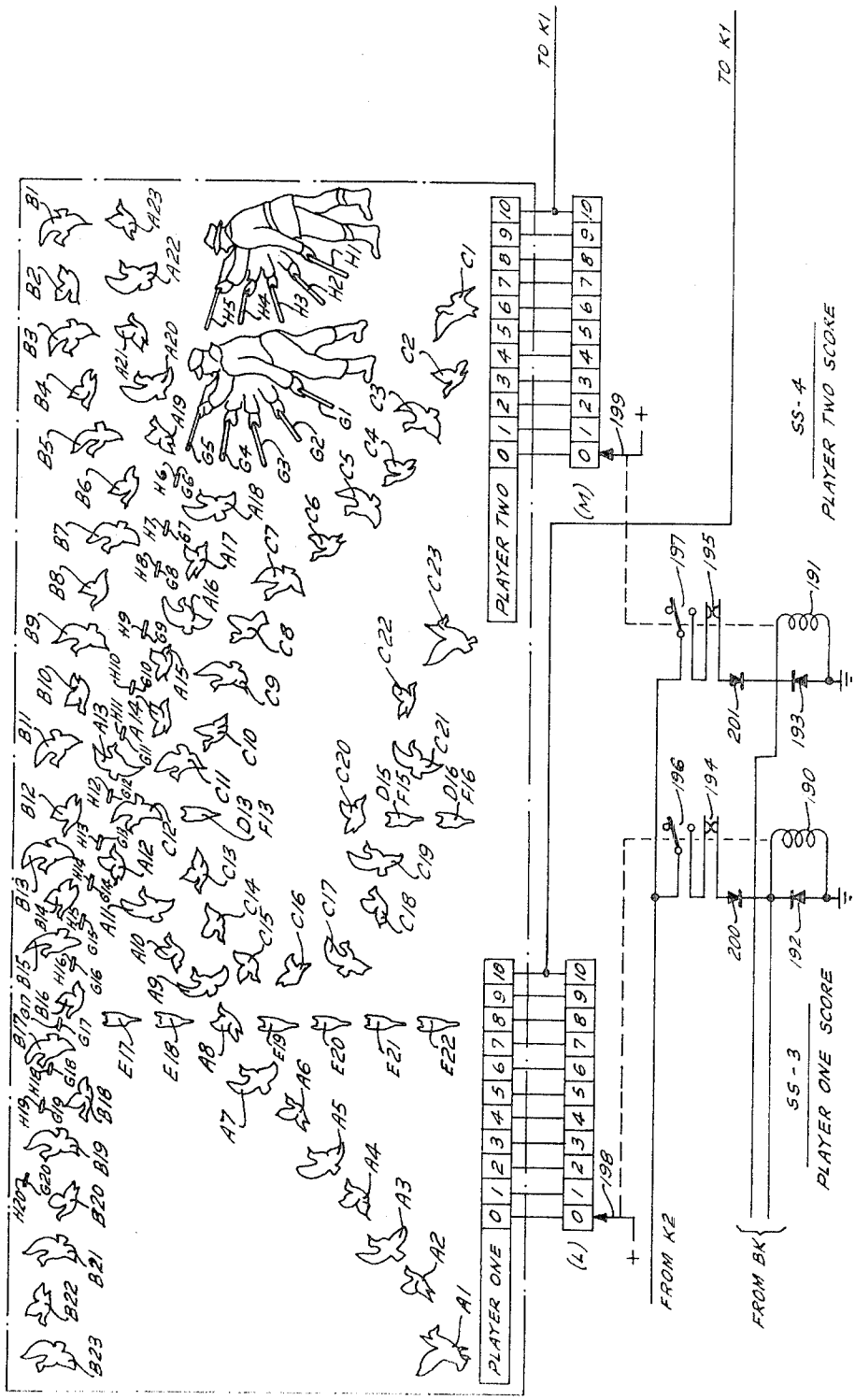


FIG. 6

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BIRD SHOOT GAME AND THE LIKE

THE BACKGROUND OF THE INVENTION

This invention relates to amusement devices, and more particularly, to such devices adapted to be coin-operated, wall-hung, and remote controlled.

Most of the prior coin-operated amusement devices are of a mechanical nature, referred to generally as pinball machines, which require a generally horizontal playing surface. As a result, these prior devices require substantial floor space and can be installed only in a limited number of establishments where the money taken in is sufficient to compensate the owner for the loss of floor space. Another disadvantage associated with prior coin-operated amusement devices is a requirement that the player go to the physical location of the device, thereby tending to disrupt normal business operation. Also, the noise associated with the use of the prior coin-operated games would often tend to annoy other customers.

BRIEF SUMMARY OF THE INVENTION

The display panel of the amusement device according to the invention is arranged so that certain selected areas can be illuminated in succession to simulate the movement of a first object such as a flying bird. The display panel also provides selected illumination for simulation of a second moving object such as a bullet fired by a hunter on the display panel. The paths of the bullet and the bird are arranged so that they intercept on the display panel. The associated control circuits provide for the successive illuminations which provide for the animated movement of the objects and the hunter, and also detect when the bullet intercepts the bird. When this occurs the bird flight path is altered so that the bird appears to fall, and the scoring circuitry registers a hit.

The method of controlling the game in accordance with the invention includes the steps of initiating movement of the first object in response to a first player actuation, initiating the movement of the second object in response to the next player actuation and detecting when one of the objects intercepts the other. When such an intercept is detected, the moving path for one of the objects can be altered accordingly and a score registered for the player then controlling the game.

BRIEF DESCRIPTION OF THE DRAWINGS

The manner in which the foregoing and other objects are achieved in accordance with this invention is described more fully in the following specification which sets forth an illustrative embodiment. The drawings are part of the specification wherein:

FIG. **1** is a prospective view of the display unit along with its associated control circuits and remote control unit;

FIG. **2** is a block diagram illustrating the overall control system for the game;

FIG. **3** is a schematic diagram illustrating the game activation control circuits;

FIG. **4** is a schematic diagram illustrating the play control circuits;

FIG. **5** is a schematic diagram illustrating the flight and hit control circuits; and

FIG. **6** is a schematic diagram illustrating the score control circuits and details of the display panel.

GENERAL DESCRIPTION OF THE GAME

The game apparatus in accordance with the invention includes three principal subassemblies namely the display panel **10**, the control circuits **11** which are housed in a separate enclosure and connected to control the display panel via a cable **11***a*, and a remote control unit **12** which is coupled to control circuits **11** by means of a radio link.

Display panel **10** is adapted to be wall-hung and is basically a compartmented structure which can be selectively illuminated. The front portion of the display panel includes a generally opaque panel with translucent areas which can be of different colors and shapes to provide the desired simulation. For the particular game being described, the translucent areas are arranged so that by successive selective illuminations the flights of several birds can be simulated as well as the flight of the hunter's bullet toward the birds.

Remote control unit **12** includes a coin slot **13** through which coins are deposited to activate the game. A conventional coin receiving unit is housed within unit **12** to detect when coins of the proper monetary amount have been deposited. This coin-receiving unit is coupled to a corresponding transmitter unit. Also included is a player-actuated pushbutton **14** which the players use to remotely control the game. This pushbutton is likewise coupled to a transmitter for transmitting corresponding signals. The associated receivers and control circuits are located in unit **11**.

The block diagram layout for the receiver and control circuits **11** are shown in FIG. **2**. Switch **13***a* is the switch actuated by the coin-receiving unit which, in turn, is coupled to a "coin" transmitter **14** to transmit a signal to a "coin" receiver within unit **11**. Similarly, pushbutton switch **14** is connected to control a "play" transmitter **16** which, when activated, transmits a signal to a "play" receiver **17** within unit **11**. Although two separate transmitter and receiver systems are shown in FIG. **2**, it may in some cases be desirable to use a two-channel transmitter-receiver system rather than separate transmitters and receivers.

The game activation control circuits **20** shown schematically in FIG. **3**, receive signals from the "coin" receiver **15** and the "play" receiver **17**. When coins are deposited, signals are applied to the game activation control circuits which, in turn, activate the game and permit player actuation signals from "play" receiver **17** to pass into the play control circuits **21**. Game control circuits **20** also sense when the game has ended to deactivate the game apparatus by preventing further "play" signals from passing from "play" receiver **17** to play control circuits **21**.

Play control circuits **21** are shown schematically in FIG. **4** and receive the play signals via game activation control circuits **20** whenever the game is activated. In response to a first player actuation, circuits **21** develop various signals which initiate the simulated flight of a bird. In response to the next player actuation, circuits **21** develop signals which animate one of the hunter figures on the display panel and initiate the movement of the bullet along its trajectory. The game is designed for two players and the display panel is arranged to simulate three different bird flights. The different bird flight paths are activated selectively so that the first player first shoots at the bird in the first flight path, the second player then shoots at the bird in the second flight path, the first player then shoots at the bird in the third flight path, the second player then shoots at the bird in the first flight path, the first player then shoots at the bird in the second flight path and finally, the second player shoots at the bird in the third flight path. As a result, there are six player-bird combinations and both players receive an equal challenge.

Flight and hit control circuits **22** are shown schematically in FIG. **5** and control the simulated displays in response to signals from play control circuits **21**. A first stepping switch controls the simulated bird flights by means of three separate banks of contacts which are selectively activated in accordance with the selected simulated bird flight. Three additional banks of contacts on the first stepping switch are utilized to control simulation of the falling birds when a hit is detected. A second stepping switch controls animation of the hunters as well as the flight of the bullet along its trajectory. An additional bank of contacts on the first and second stepping switches are interconnected to detect when the bullet intercepts the bird to thereby detect a hit.

The score control circuits **23** are shown schematically in FIG. **6** together with the display panel. The score control circuits add a point to the appropriate player's score each time a hit is detected.

GAME ACTIVATION CONTROL CIRCUITS

The game activation control circuits shown in FIG. 3, include four electromagnetic relays namely the "game over" relay K1, the "coin" relay K2, the "first coin" relay K3, and the "coin set" relay K4. The relays K1–K4 include energizing windings 30–33 with diodes 34–37, respectively, connected across the energizing windings to absorb the inductive surge which occurs when energization of the winding is terminated. The relays also include associated sets of movable contacts each of which are shown in their normal deenergized position. When the winding is energized, the movable contacts move from the normally closed position, as shown in the schematic diagram, to the other position referred to as the open position.

Since there are two players for the game it is desirable that the control circuits be adjusted to require either one coin for both players or two coins, one coin for each player. The selection as to the number of coins required for activating the game is achieved through a two-position switch 40 which will be described in more detail hereinafter.

The contacts (not shown) of coin receiver 16 are coupled between a positive source and the movable contact 41 of relay K3. Movable contact 41 routes the signal from coin receiver 16 to either energizing winding 31 or energizing winding 33 depending upon whether it is the first or second received "coin" signal. Accordingly, the normally closed stationary contact 42 of relay K3 is coupled to one end of energizing winding 31 of "coin" relay K2, the other end of the winding being connected to ground. The normally open stationary contact 43 is coupled to energizing winding 33 of the "coin set" relay K4. Therefore, when the first coin is deposited a signal passes through movable contact 41 to momentarily energize the K2 "coin" relay.

The K2 "coin" relay provides a pulse when it returns to the deenergized state, this pulse being utilized to energize either the "first coin" relay K3 or the "coin set" relay K4 depending upon the position of switch 40 which determines whether one or two coins are required for activating the game. The pulse is developed by a capacitor 45 coupled between movable contact 44 and ground. The associated normally open stationary contact 47 is coupled to a positive source via a resistor 48 and a diode 49. The normally closed stationary contact 46 is coupled to the movable contact of switch 40 via a diode 50. Stationary contact 52 of switch 40 is coupled to one end of energizing winding 32 of relay K3 and the other stationary contact 51 is coupled to energizing winding 33 of relay K4. Accordingly, when "coin" relay K2 is momentarily energized by a coin actuation, capacitor 45 is charged via resistor 48 and diode 49. Thereafter, when the "coin" relay returns to its deenergized state, capacitor 45 discharges via diode 50 to momentarily energize either winding 32 or winding 33.

A holding circuit for "first coin" relay K3 is completed through a pair of its own normally open contacts 54 coupled between one end of the winding and the positive source, and by means of normally closed contacts 55 of the K4 relay which normally connect the other end of winding 32 to ground. Thus, when the "first coin" relay is momentarily energized, it is thereafter maintained in the energized state until the "coin set" relay is energized. A holding circuit is also provided for the K4 relay, this being achieved by means of its normally open contacts 56 which couple one end of winding 33 to the positive source, and by means of normally closed contacts 57 and 58 of relays K2 and K1, respectively, which are connected in series and normally connect the other end of winding 33 and ground. Therefore, once the "coin set" relay has been momentarily energized it will remain in the energized state until either the "game over" relay is energized at the end of the game or the "coin" relay K2 is energized indicating that additional coins are being deposited to reset the game even though the previous game may not have been completed.

Therefore, if switch 40 is in the position shown, the depositing of the first coin sends a signal via movable contact 41 to momentarily energize the "coin" relay which, in turn, develops a pulse via capacitor 45 which is utilized to momentarily energize "first coin" relay K3. The first coin relay is then maintained in its energized state because of its holding circuit and, therefore, movable contacts 41 are in the position opposite to that shown in FIG. 3. The next deposited coin causes a signal to pass via movable contact 41 to momentarily energize "coin set" relay K4. This relay is thereafter maintained in the energized state because of its holding circuit and remains energized for the duration of the game. The "coin set" relay is returned to the deenergized state only when the game over indication is detected or additional coins are deposited.

The contacts (not shown) in play receiver 18 are coupled between the positive source and normally open contacts 60 of "coin set" relay K4. The contacts 60 are coupled to a "play" relay K6 in FIG. 4. It is the closure of contacts 60 which activate the game since it is only when contacts 60 are closed that play receiver 18 is coupled to the play control circuitry.

Normally open contacts 61 on "coin set" relay K4 complete a circuit between the 60-cycle alternating source 62 and a small synchronous motor 63 which controls the opening and closing of M–1 contacts 64. The opening and closing of contacts 64 are utilized to control the stepping rate of one of the display control stepping switches as will be described later in detail.

Normally open contacts 65 of "coin" relay K2 are coupled between the positive source and stepping switches SS3 and SS4 to be described later in connection with FIG. 6. Stepping switches SS3 and SS4 control the player score indications. It is desirable that these score indications remain on the display panel after completion of the game so that players may compare scores and the like. The score stepping switches, therefore, are not reset upon completion of the game but instead are reset upon initiation of a new game. Since "coin" relay K2 is energized upon receipt of the first deposited coin, its normally open contacts 65 are utilized to reset the score stepping switches.

PLAY CONTROL CIRCUITS

The play control circuits shown in FIG. 4 include four electromagnetic relays K5–K8 and a tristable relay TK.

The electromagnetic relays are designated "play one" relay K5, "play set" relay K6, "play two" relay K7, and "play reset" relay K8. The electromagnetic relays include energizing windings 70–73, respectively, with diodes 75–78 connected across them.

The tristable relay TK includes an energizing winding 74 with a diode 79 connected across the winding. The tristable relay can be described as a three-position relay similar in operation to a three-position stepping switch. The movable contact of the tristable relay advances one step upon each successive energization of winding 74 and, therefore, contact is made with the stationary contacts A1, A2 and A3 in succession.

As was previously mentioned, it is necessary for the control apparatus to distinguish between the first and second player actuations by a particular player since the first player actuation should initiate the flight of the bird whereas the next actuation should initiate movement of the hunter's bullet. This selection function is accomplished by "play set" relay K6. The signal from "play" receiver 18 (FIG. 3) passes via contacts 60 of "coin set" relay K4 to movable contact 80 of relay K6. The associated normally closed stationary contact 81 is coupled to one end of winding 70 of relay K5, the other end of this winding being connected to ground. The normally open stationary contact 82 of relay K6 is coupled to one end of energizing winding 72 of relay K7, the other end of winding 72 also being connected to ground.

Movable contact 83 of relay K5 is coupled to ground via a capacitor 84 which develops a pulse for momentary energization of "play set" relay K6 whenever relay K5 returns to the deenergized state. The associated normally open stationary

contacts are coupled to a positive source via a resistor 85 and a diode 86. The normally closed stationary contacts are coupled to one end of winding 71 of relay K6 via a diode 87. A holding circuit for winding 71 is completed through its normally open contacts 88 which couple one end of the winding to the positive source, the other end of the winding being coupled to ground via normally closed contacts 89 of "play set" relay K8.

Accordingly, upon the first play actuation, a signal from play receiver 18 in FIG. 3 passes via movable contact 80 to momentarily energize "play one" relay K5. When the K5 relay is energized, capacitor 84 is charged via resistor 85 and diode 86. Thereafter, when relay K5 returns to the deenergized state, capacitor 84 discharges to momentarily energize winding 71 of relay K6. Once energized, relay K6 remains in the energized state because of its holding circuit completed via contacts 88 and 89. The next pulse from the "play" receiver therefore passes through movable contact 80 to energize "play two" relay K7 instead of the "play one" relay.

The energizing signal for the winding of tristable relay TK is developed by a capacitor 91 which is connected between movable contact 90 of "play one" relay K5 and ground. The normally closed contact associated with movable contact 90 is coupled to a positive source via a resistor 92 and a diode 93. The associated normally open contact is coupled to one end of energizing winding 74 of the tristable relay, the other end of the winding being connected to ground. When the K5 relay is in the normal deenergized state, capacitor 91 is charged via resistor 92 and diode 93. Thereafter, when the "play one" relay is energized, charged capacitor 91 is coupled to winding 74 of the tristable relay and, therefore, the capacitor discharges to momentarily energize the winding. Each time winding 74 is energized the tristable relay advances one step.

Capacitor 96 associated with "play one" relay K5 develops the pulse which initiates operation of a stepping switch SS1 (FIG. 5) utilized to control the bird flight display. Capacitor 96 is coupled between movable contact 95 and ground and the associated normally opened contacts are coupled to a positive source via a resistor 97 and a diode 98. The normally closed contact 99 is coupled to the energizing winding of stepping switch SS1 to be described in more detail later in connection with FIG. 5. Normally closed contact 99 is also coupled to a bistable relay BK (FIG. 5) which alternates position on each successive play so that the score relays will add to the score for the appropriate player. Accordingly, when relay K5 is energized, capacitor 96 is charged, and thereafter, at the termination of the applied "play" signal, relay K5 returns to the deenergized state and capacitor 96 discharges to energize the windings of the stepping switch SS1 and the bistable relay BK.

Normally open contacts 94 of relay K5 are coupled between the positive source and a "hit reset" relay K12 shown in FIG. 5. The "hit reset" relay resets the hit detection circuitry prior to the flight of each bird as will be described in more detail later.

The "play two" relay K7 includes a pair of normally open contacts 100 which are connected between the positive source and the energizing winding of a second stepping switch SS2 (FIG. 5), this second stepping switch being utilized to control the display of the moving bullet. Thus, when "play two" relay K7 is momentarily energized by a signal passing via movable contact 80 in response to a second actuation by a player, the energizing winding of stepping switch SS2 is energized.

Relay K6 is energized in response to a first "play" signal, and thereafter maintained in the energized state by virtue of its holding circuit. Thereafter, the next "play" signal is routed to the "play two" relay K7, and at this point it is necessary to deenergize relay K6 so that the next subsequent "play" signal will again be routed to "play one" relay K5. This function is performed by "play reset" relay K8. The pulse for energizing winding 73 of relay K8 is developed by a capacitor 102 connected between ground and movable contact 101 of relay K7. The associated normally open stationary contact is connected to a positive source via a resistor 103 and a diode 104. The normally closed contact is connected to one end of winding 73, the other end being connected to ground. Accordingly, when relay K7 is energized, capacitor 102 is charged via resistor 103. Thereafter, upon termination of the "play" signal, relay K7 returns to the deenergized state and therefore capacitor 102 discharges via movable contact 101 to energize winding 73. When winding 73 is energized, the associated contacts 89 open to thereby break the holding circuit and deenergize relay K6.

FLIGHT AND HIT CONTROL CIRCUITS

The flight and hit control circuits are shown schematically in FIG. 5 and include two stepping switches SS1 and SS2, five electromagnetic relays K9–K13, and a bistable relay BK. One of the stepping switches is designated "flight control" stepping switch SS1 and is utilized to control the flight of the various birds on the display panel. The other stepping switch is designated "bullet control" stepping switch SS2, this switch being utilized to control the animation of the hunters on the display panel and the movement of the bullet toward the moving bird target. The relays are designated "bird one" relay K9, "bird two" relay K10, "bird three" relay K11, "hit reset" relay K12, and "hit relay" K13. The three "bird" relays K9–K11 cooperate with stepping switch SS1 to cause the simulated bird flight to follow a selected one of three different bird paths. "Hit" relay K13 is utilized to detect the interception between the simulated bullet and the simulated bird. "Hit reset" relay K12 is utilized to deenergize "hit" relay K13 upon commencement of a new bird flight. The bistable "player up" relay BK is used to indicate which player is up and changes position subsequent to each play consisting of two player actuations.

Stepping switch SS1 includes seven banks of stationary contacts designated A–F and J, each bank of stationary contacts including 25 contacts numbered 0 through 24. The movable contacts 124–129 are associated with stationary contact banks A–F, respectively, and movable contact 130 is associated with stationary contact bank J. The associated energizing winding 120 advances the movable contacts one step upon each successive energization. The off-normal contacts 123 are in the position shown in FIG. 5 in the zero or home position of the stepping switch but, at any other position of the stepping switch, the off-normal contacts move to the alternate position.

Stepping switch SS2 includes three banks of stationary contacts G, H and K with associated movable contacts 114, 115 and 116 respectively. Each of the stationary contact banks include 21 stationary contacts, these contacts being numbered 0 through 20 in FIG. 5. The associated energizing winding 110 moves the movable contacts one step upon each successive energization. Associated interruptor contacts 112 open momentarily during each successive energization of the energizing winding. Off-normal contacts 113 function in a manner similar to off-normal contacts 123.

Relays K9–K13 include energizing windings 140–144 respectively with diodes 146–150 connected in parallel. The relays have movable contacts associated therewith, these movable contacts being shown in their normal positions corresponding to the condition when the respective relay is not energized.

Bistable relay BK has two stable contact positions. Each time energizing winding 145 is energized the contacts move to the alternate position and remain in that position until the next energization of the winding.

Contact bank A of stepping switch SS1 controls one of the simulated bird flights on the display panel in FIG. 6. In particular, contact bank A controls the successive illumination of the areas A1–A23 in FIG. 6 by the successive energization of light bulbs behind the designated display panel areas. These light bulbs are energized via contacts A1–A23 of stepping switch SS1. Accordingly, if movable contact 124 of the stepping switch is energized and the stepping switch moves to the first position to thereby energize contact A1, contact A1

would be connected to a light bulb located behind bird A1 on the display panel of FIG. 6 to thereby illuminate this bird indicia. Upon the next energization of winding 120, the stepping switch moves to the next position and contact A2 (FIG. 5) is energized to in turn energize a light bulb behind the bird area A2 (FIG. 6) on the display panel. In following this sequence, it can be seen that the first bird flight path originates in the lower left corner of the display panel, then rises and moves across the display panel toward the upper right corner.

Stationary contact bank B (FIG. 5) is similarly interconnected with light bulbs associated with the bird areas designated, respectively, B1–B23 on the display panel. If movable contact 125 is energized when the stepping switch moves through a complete stepping sequence, a simulated bird flight path is created wherein the bird begins in the upper right corner of the display panel, and flies across the upper portion of the panel to the upper left corner. Contact bank C has its contacts similarly connected to light bulbs associated with birds C1–C23 on the display panel. If movable contact 126 associated with stationary contact bank C is energized, a full stepping sequence of the stepping switch SS1 will create a simulated bird flight wherein the bird starts in the lower right corner and flies up, around, and back toward the lower center portion of the display panel.

When a bird is hit the simulated flight should change so that the bird appears to fall. For the flight path A1–A23 (FIG. 6), a hit can occur when a bird is in position A12. Therefore, the bird should begin to fall on the 13th position of the stepping switch when a hit occurs. Contact bank D is utilized to control the falling bird simulation associated with the first flight path, and, therefore, contacts D–13, D–15 and D–16 of stationary contact bank D (FIG. 5) are connected to light bulbs associated with the areas D13, D15 and D16 (FIG. 6). For the second flight path B1–B23, a hit can occur in position B16 and, therefore, the associated falling bird simulation should commence on the 17th step of the stepping switch. Contact bank E is utilized for this control and, therefore, contacts E17–E22 are connected to light bulbs associated with the areas E17–E22 on the display panel. For the third flight path C1–C23, a hit can occur at position C12 and, therefore, contacts F13, F15 and F16 are connected to light bulbs associated with the similarly designated areas on the display panel in FIG. 6.

Stepping switch SS1 begins its stepping sequence when a pulse is applied to energizing winding 120 which causes the stepping switch to take the initial step. This initial energization is achieved by connecting normally closed stationary contact 99 associated with movable contact 95 of "play one" relay K5 to one end of winding 120, the other end of the winding being connected to ground. When relay K5 returns to the deenergized state, capacitor 96 discharges to apply an initial pulse to energizing winding 120. The contacts M1 associated with motor 63 (FIG. 3) are coupled to the energizing winding 120 via off-normal contacts 123. Therefore, after the first pulse has been applied to the energizing winding, off-normal contacts 123 are closed and succeeding pulses developed by contacts M1 are applied to the energizing winding. The stepping switch, therefore, continues to advance until it reaches the home or zero position which opens the off-normal contacts 123. It should be noted that the stepping switch rate is controlled by the motor 63 which controls the closure repetition rate for contacts M1. The stepping rate of switch SS1 determines how fast the birds will fly across the display panel, and accordingly, this flight speed can be controlled as desired by a proper selection of motor 63 and associated contacts M1. Normally pulses would be supplied to stepping switch SS1 at a lower rate than that at which pulses are applied to stepping switch SS2.

Movable contacts 124–126 of stepping switch SS1 are connected to movable contacts 160–162 of relays K9–K11, respectively. The normally open stationary contacts associated with movable contacts 160–162 are each connected to the normally closed stationary contact associated with movable contact 163 of "hit" relay K13. Movable contacts 127–129 of the stepping switch are coupled to movable contacts 164–166, respectively, of relays K9–K11 and the associated normally open stationary contacts are coupled to the normally open stationary contact associated with movable contact 163 of "hit" relay K13. Movable contact 163 is connected to the positive source. In operation, if the "bird one" relay K9 is energized, then movable contact 124 is energized via movable contacts 163 and 160. Accordingly, the simulated bird would take the path controlled by contact bank A which would be the flight path A1–A23 in FIG. 6. If a hit is detected, "hit" relay K13 is energized and, as a result, movable contact 163 changes position so that movable contact 127 associated with contact bank D is energized via movable contact 164. As a result, a falling bird simulation is provided. In similar fashion, if "bird two" relay K10 is energized, contact bank B is energized to simulate flight path B1–B23 and upon a hit being detected contact bank E is energized. If the K11 "bird three" relay is energized, the flight path is controlled by contact bank C and the falling bird is controlled by contact bank F when a hit is detected.

Energization of the "bird one," "bird two," and "bird three" relays K9–K11 is controlled by the tristable relay TK (FIG. 4). Stationary contact A1 of the tristable relay is connected to one end of winding 140 of the "bird one" relay, stationary contact A2 is connected to one end of winding 141 of the "bird two" relay, stationary contact A3 is connected to one end of winding 142 of the "bird three" relay, the other ends of these windings being connected to ground. As previously described, tristable relay TK advances one step upon each energization of "play one" relay K5, that is, just prior to a simulated bird flight which commences when relay K5 returns to the deenergized state.

Contact bank G of stepping switch SS2 controls the hunter animation and bullet movement for one of the players whereas contact bank H controls the animation and bullet movement for the other player. More specifically, contacts G1–G5 (FIG. 5) are located to energize light bulbs associated with positions G1–G5 (FIG. 6) on the display panel to control simulation of the raising hunter's gun for one of the players. Contacts G6–G20 (FIG. 5) are connected to light bulbs associated with the bullet positions designated G6–G20 (FIG. 6). In similar fashion contacts H1–H5 are connected to simulate the raising gun for the other hunter and contacts H6–H20 are connected to the light bulbs associated with the bullet movement.

The initial pulse for stepping switch SS2 is derived from "play two" relay K7 in FIG. 4. When relay K7 is energized, normally open contacts 100 are momentarily closed to supply a positive potential to winding 110 of stepping switch SS2. This momentary energization causes the stepping switch to advance one step. Thereafter, off-normal contacts 113 are closed and therefore successive pulses are applied to winding 110 via its interruptor contacts 112. The stepping switch then automatically steps through an entire stepping sequence at a rate determined by operation of its interruptor contacts. The stepping sequence continues until the stepping switch reaches the home or zero position at which time off-normal contacts 113 return to the open position. The positive source is connected to movable contact 171 of "player up" bistable relay BK via the normally closed contacts 170 of "hit" relay K13. When "player up" relay BK is in the position shown in FIG. 5, the positive potential is coupled to movable contact 114 of stepping switch SS2 whereas, if relay BK is in the alternate position, the positive potential is applied to movable contact 115. Winding 145 of the "player up" relay receives its energization from "play one" relay K5 (FIG. 4). Therefore, each time a bird flight commences as a result of relay K5 being energized, a pulse from capacitor 96 is supplied to the energizing winding of relay BK to change the state thereof. As a result, the animated characters on the display panel alternate in shooting at the birds.

Relay BK is also utilized to route scoring pulses so that hits are registered for the proper players, this being accomplished

by means of movable contact 172 of the BK relay. The score pulses are developed by a capacitor 174 which is connected between a movable contact 178 of "hit" relay K13 and ground. The associated normally closed contacts are coupled to the positive source via a resistor 175 and a diode 176. The associated normally open contacts are coupled to movable contact 172 of relay BK and the stationary contacts associated with movable contact 172 are coupled to the energizing windings of stepping switches SS3 and SS4 in FIG. 6. These stepping switches will be described in more detail hereinafter, but it should be noted that when a hit is detected, relay K13 is momentarily energized and, therefore, capacitor 174 is discharged to supply a pulse and thereby add a point to the proper player's score as determined by the condition of the BK relay.

Contact bank J of stepping switch SS1 and contact bank K of stepping switch SS2 are part of the hit detection circuitry which detects a hit when the bullet intercepts the simulated bird. For the first bird path, which occurs when "bird one" relay K9 is in the energized state, a hit can occur when the bird is in position A12 (FIG. 6) if the bullet is then in either position H13 or G13. Accordingly, contact J12 of stepping switch SS1 is connected to stationary contact K13 of stepping relay SS2 via normally open contacts 180 of "bird one" relay K9. Movable contact 130 associated with contact bank J is connected to a positive source of supply, and movable contact 116 associated with contact bank K is connected to one end of energizing winding 144 of "hit" relay K13. A holding circuit for relay K13 is provided through its own normally open contacts 184 which couple one end of winding 144 to the positive source, and through normally closed contacts 185 of "hit reset" relay K12 which connects the other end of the winding to ground. Therefore, if the "bird one" relay K9 is energized and if stepping switch SS1 is in the 12th position at the same time that stepping switch SS2 is in the 13th position (these circumstances corresponding to a display whereby the bird is in position A12 and the bullet is in position H13, G13), current flows from the positive source through movable contact 130, stationary contact J12 of stepping switch SS1, contacts 180 of "bird one" relay K9, stationary contact K13 of stepping switch SS2, and movable contact 116 to energize winding 144 of "hit" relay K13.

When the "bird two" relay K13 is energized, a hit can occur at bird position B16 (FIG. 6) and bullet position G16, H16 and therefore contact J16 of stepping switch SS1 is coupled to contact K16 of stepping switch SS2 via normally open contacts 181 of "bird two" relay K10 to thereby detect a hit when it occurs in the second bird flight path. When the "bird three" relay K11 is energized, a hit can occur when the bird is in position C12 and the bullet is in the position E12, H12 and, therefore, contacts J12 and K12 are interconnected via normally open contacts 182 of "bird three" relay K11 to detect a hit when it occurs in the third simulated bird flight path. The "hit" relay is reset each time a new bird flight commences. To accomplish this, normally open contacts 94 of "play" relay K5 (FIG. 4) are connected between the positive source and winding 143 of the "hit reset" relay K12. When relay K5 is energized to initiate a bird flight, "hit reset" relay K12 is energized to momentarily open contacts 185 and permit "hit" relay K13 to return to the deenergized state.

SCORE CONTROL CIRCUITS

The score control circuits are shown, schematically in FIG. 6 together with the display panel details. The score control circuits include two stepping switches SS3 and SS4 designated as the "player one score" stepping switch and the "player two score" stepping switch, respectively.

The stepping switches are similar including energizing windings 190 and 191 and shunting diodes 192 and 193 connected in parallel with the windings. The associated interrupter contacts 194, 195, open upon each successive movement of the stepping switch. The off-normal contacts 196 and 197 are in the positions shown in FIG. 6 when the stepping switches are in the zero or home position, but these contacts move to the alternate position when the stepping switch is in any other position. The associated rotary contacts 198 and 199 move one step each time the associated energizing winding is energized.

The stationary contact bank L associated with movable contact 98 includes 12 stationary contacts designated 0 through 11. These stationary contacts are connected to light bulbs behind the score indications for "player one" as shown in FIG. 6. When stepping switch SS3 is in the position shown, a zero score indication appears for player one. If the stepping switch advances one step a score of "1" is indicated, etc. Similarly, contact bank M associated with movable contact 199 of stepping switch SS4 is connected to light bulbs which selectively illuminate the score indications for "player two."

The stationary contacts associated with movable contact 172 of the bistable relay BK (FIG. 5) is connected to energize windings 190 and 191 of stepping switches SS3 and SS4 respectively. Each time a hit is detected, thereby energizing "hit" relay K13, movable contacts 163 connect charged capacitor 174 to an appropriate one of windings 190 and 191 as selected by "player up" relay BK. The discharge of capacitor 174 applies one pulse to the appropriate switch causing the stepping switch to advance one step thereby adding one point to the player's score.

As was previously mentioned, the score relays SS3 and SS4 are not reset at the end of the game, but instead are reset when a new game commences. Therefore, when a coin is deposited to begin a new game, "coin" relay K2 is energized and closes its associated normally open contacts 65. Contacts 65 supply a positive potential to off-normal contacts 196 and 197 of stepping switches SS3 and SS4. The off-normal contacts 196 and 197 in turn are coupled to windings 190 and 191, respectively, via the associated interrupter contacts 194 and 195 and diodes 200 and 201. Accordingly, when relay K2 is energized, the positive potential is applied to the windings through the off-normal contacts and interrupter contacts to repetitively apply pulses causing the stepping switches to advance until they reach the home position at which time contacts 196 and 197 open.

The game ends when either of the players achieves a score of 10. Contacts L10 and M10 are connected to winding 30 via diodes 200 and 201 (FIG. 3) respectively to energize "game over" relay K1 when either of stepping switches SS3 or SS4 are in the 11th position. Relay K1 in turn opens the holding circuit for "coin set" relay K4 to deactivate the game.

SUMMARY OF OPERATION

The operation of the game commences when coins of the proper denomination are deposited via the coin slot in the remote control unit. If the game is set to require two coins, deposit of the first coin causes a signal to be routed via relay K3 (FIG. 3) to momentarily energize "coin" relay K2. The coin relay, in turn, develops a pulse when it returns to the deenergized state and this pulse it utilized to energize relay K3 which is thereafter maintained in the energized state by its holding circuit. When relay K3 is in the energized state the subsequent signal developed by deposit of another coin is routed to relay K4 instead of relay K2. "Coin set" relay K4 is therefore energized and thereafter maintained in the energized state by its holding circuit.

Energization of "coin" relay K2 closes contacts 65 which reset the score control circuits from the previous game. Energization of "coin set" relay K4, which remains energized for the duration of the game, couples "play" receiver 18 to the "play set" relay K6 to thereby activate the game.

After the game is activated, a first player actuation, achieved by depressing pushbutton 14 (FIG. 2) in the remote control unit, causes a "play" signal to pass via movable contact 80 of "play set" relay K6 (FIG. 4) which routes the pulse to momentarily energize "play one" relay K5. Energization of

the "play one" relay (a) develops a pulse which energizes "play set" relay K6, (b) develops a pulse which advances the bistable relay BK (FIG. 5) so that a different player up indication is provided for each bird flight and also advances the tristable relay TK so that a different bird flight will commence on each subsequent player actuation, (c) resets the "hit" relay K13 and (d), upon deenergization of the K5 relay, provides a pulse which is sent to the stepping switch SS1 to commence the flight of the bird on the display panel.

Since "play set" relay K6 is held in its energized state by its holding circuit the next "play" pulse resulting from a player actuation is routed to "play two" relay K7 via movable contact 80. Energization of the "play two" relay momentarily energizes winding 110 of stepping switch SS2 to initiate the movement of the bullet. Energization of relay K7 also activates the "player reset" K8 which, in turn, deenergizes "play set" relay K6 by opening its holding circuit so that the next "play pulse" will be routed to relay K5.

The object of the game is for the player to time his second player actuation so that the bullet fired by the hunter on the display panel will intercept the simulated bird. The hits are detected by the interconnections between contact banks J and K of stepping switches SS1 and SS2 respectively. Whenever a hit occurs, "hit" relay K13 is energized. When a hit occurs, relay K13 energizes the contact banks D through F which simulate the falling birds instead of contact banks A through C which control simulation of the flying birds. The hit relay also develops a score pulse which is passed on to the appropriate one of score stepping switches SS3 or SS4 to add one point to a player's score.

When one of the players reaches a full score, a signal is developed which energizes "game over" relay K1 (FIG. 3). Energization of relay K1 opens the holding circuit for "coin set" relay K4 and, therefore, relay K4 returns to the deenergized state to open contacts 60 and prevent further "play" signals from passing to the play control circuits.

Although only one illustrative embodiment has been described in detail, it should be obvious that there are numerous variations within the scope of the invention. The concepts of the invention are not limited to a bird shoot game as described, but could be utilized to simulate any hunting or shooting type game or other games which require the player's skill in having a controllable moving object intercept a moving target object. Also, the control circuits could be constructed using other components such as integrated circuits wherein, for example, ring counters replace the stepping switches and tristable relay, flip-flop circuits replace the bistable relays and logic circuits replace the other relays. The invention is more particularly defined in the appended claims.

I claim:

1. An electric bird shoot game comprising

a display panel disposed for view by players of said game,

first circuit means coupled to said display panel for simulating the flight of a bird across said panel when actuated;

second circuit means coupled to said display panel for selectively simulating a moving bullet on a path which intercepts the simulated flight of said bird,

player-operated means coupled to separately actuate said first and second circuit means,

third circuit means coupled to said first and second circuit means for detecting when said simulated bullet intercepts said simulated bird, and

fourth circuit means coupled to said display panel for simulating a falling bird when activated, said fourth circuit means being connected to said third circuit means for activation when said simulated bullet intercepts said simulated bird.

2. An electric amusement game comprising

a display panel disposed for view by the players;

a first and second multistep switching means operative to sequentially advance through successive steps in response to applied energizing pulses, said first multistep switching means including a first plurality of banks of stationary contacts, each of said banks of said first plurality being coupled to said display panel to display a simulated movement of a target object along a different path, said second multistep switching means being coupled to said display panel to sequentially illuminate selected areas of said display panel to display a simulated movement of the bullet of a hunter along a path which intercepts the path of said simulated movement of a target object;

player-actuated switch means adapted for player actuations;

first circuit means coupled to said player-actuated switch means and to said first multistep switching means, said first circuit means being operative in response to a first player actuation to apply energizing pulses to said first multistep switching means to thereby initiate the simulated movement of said target object;

second circuit means coupled to said player-actuated switch means and to said second multistep switching means, said second circuit means being operative in response to a second player actuation to apply energizing pulses to said second multistep switching means to thereby initiate the simulated movement of said bullet of a hunter; and

third circuit means coupled to said first and second multistep switching means, said third circuit means being operative to detect when said bullet of a hunter appears to intercept said target object on said display panel.

3. An electric amusement game according to claim 2 wherein said first multistep switching means includes a second plurality of banks of stationary contacts, each of said banks of said second plurality being coupled to said display panel to simulate a movement of said target object after occurrence of an interception, and

circuit means coupled to said first and third circuit means to deactivate the then activated one of said banks of said first plurality and to activate one of said banks of said second plurality when an interception is detected by said third circuit means.

4. An electric amusement game comprising

a display panel disposed for view by the players;

a first and second multistep switching means operative to sequentially advance through successive steps in response to applied energizing pulses, said first multistep switching means including a first plurality of banks of stationary contacts, each of said banks of said first plurality being coupled to said display panel to display a simulated movement of a target object along a different path, said second multistep switching means being coupled to said display panel to sequentially illuminate selected areas of said display panel to display a simulated movement of the bullet of a hunter along a path which intercepts the path of said simulated movement of a target object;

player-actuated switch means adapted for player actuations;

first circuit means coupled to said player-actuated switch means and to said first multistep switching means, said first circuit means including means for activating a different one of said banks of stationary contacts of said first plurality upon each successive first player actuation to thereby initiate the simulated movement of said target object;

second circuit means coupled to said player-actuated switch means and to said second multistep switching means, said second circuit means being operative in response to a second player actuation to apply energizing pulses to said second multistep switching means to thereby initiate the simulated movement of said bullet of a hunter; and

third circuit means coupled to said first and second multistep switching means, said third circuit means being operative to detect when said bullet of a hunter appears to intercept said target object on said display panel.

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