United States Patent

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[54] **ELECTRIC PING-PONG GAME AND THE LIKE**
23 Claims, 7 Drawing Figs.

[52] **U.S. Cl.** **194/9, 273/85**
[51] **Int. Cl.** **G07f 5/10**
[50] **Field of Search** ..... 273/85 (G); 194/6, 9, 12, 16

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ABSTRACT: A remote control coin-operated amusement game, including a wall-hung display panel. The display panel is arranged so that a game can be simulated wherein two players appear to hit a game object back and forth as, for example, in a ping-pong game. The control technique includes initiating a serve in response to a first player actuation and initiating a return volley in response to subsequent player actuations until a miss is detected. When a miss is detected, the course of the game object continues beyond the player that has missed and a point is added to the opposing player's score.

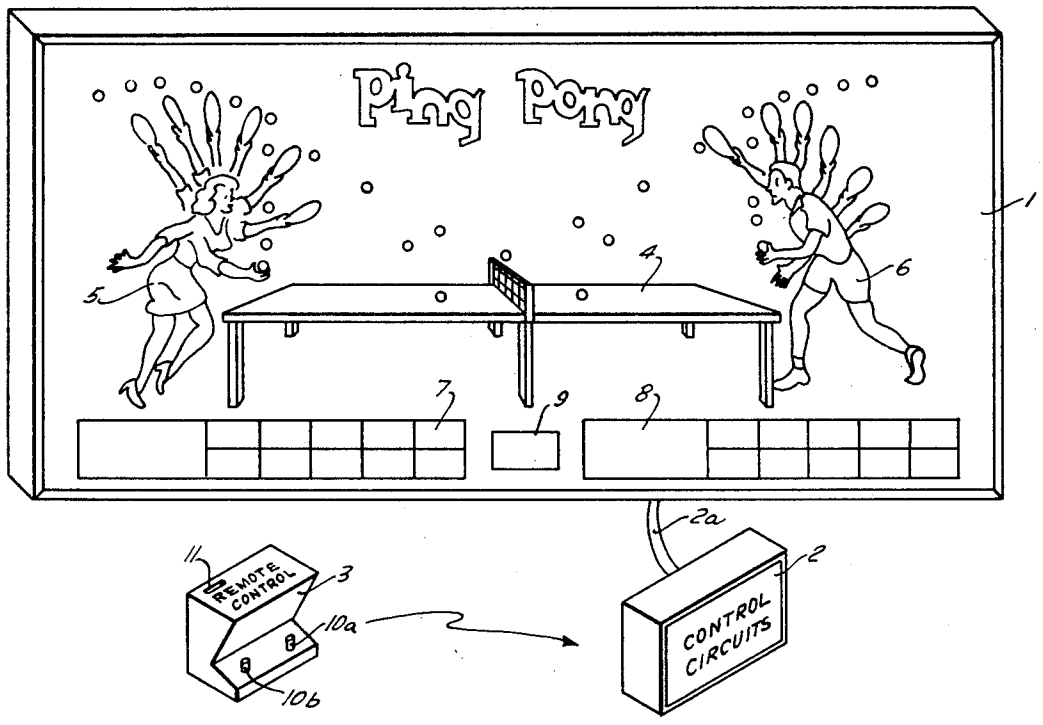
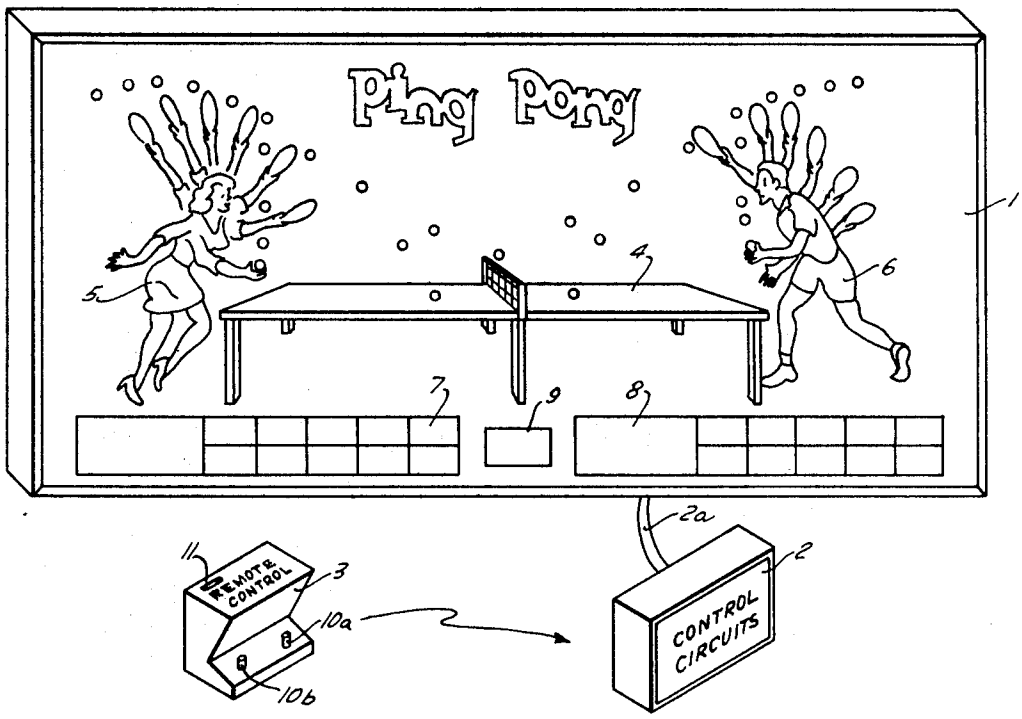


FIG. 1



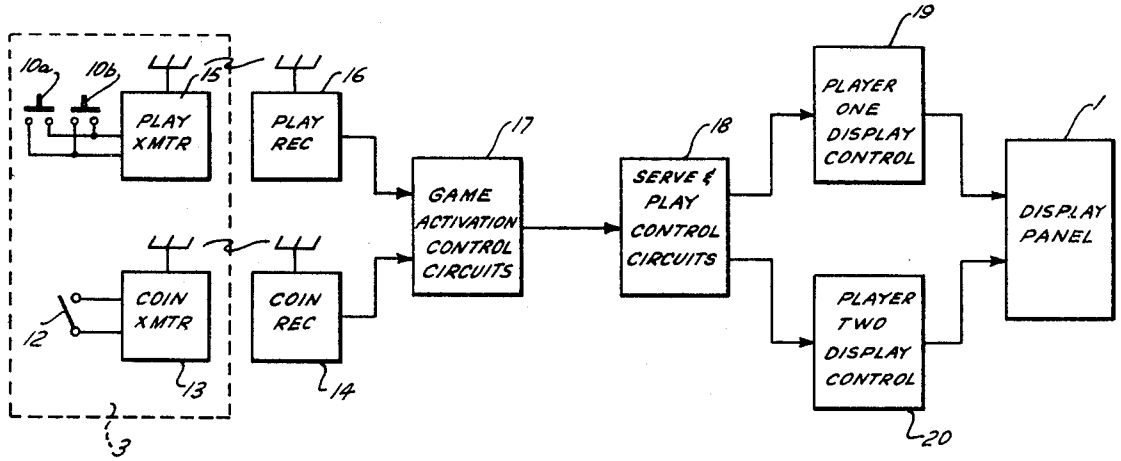


FIG. 2

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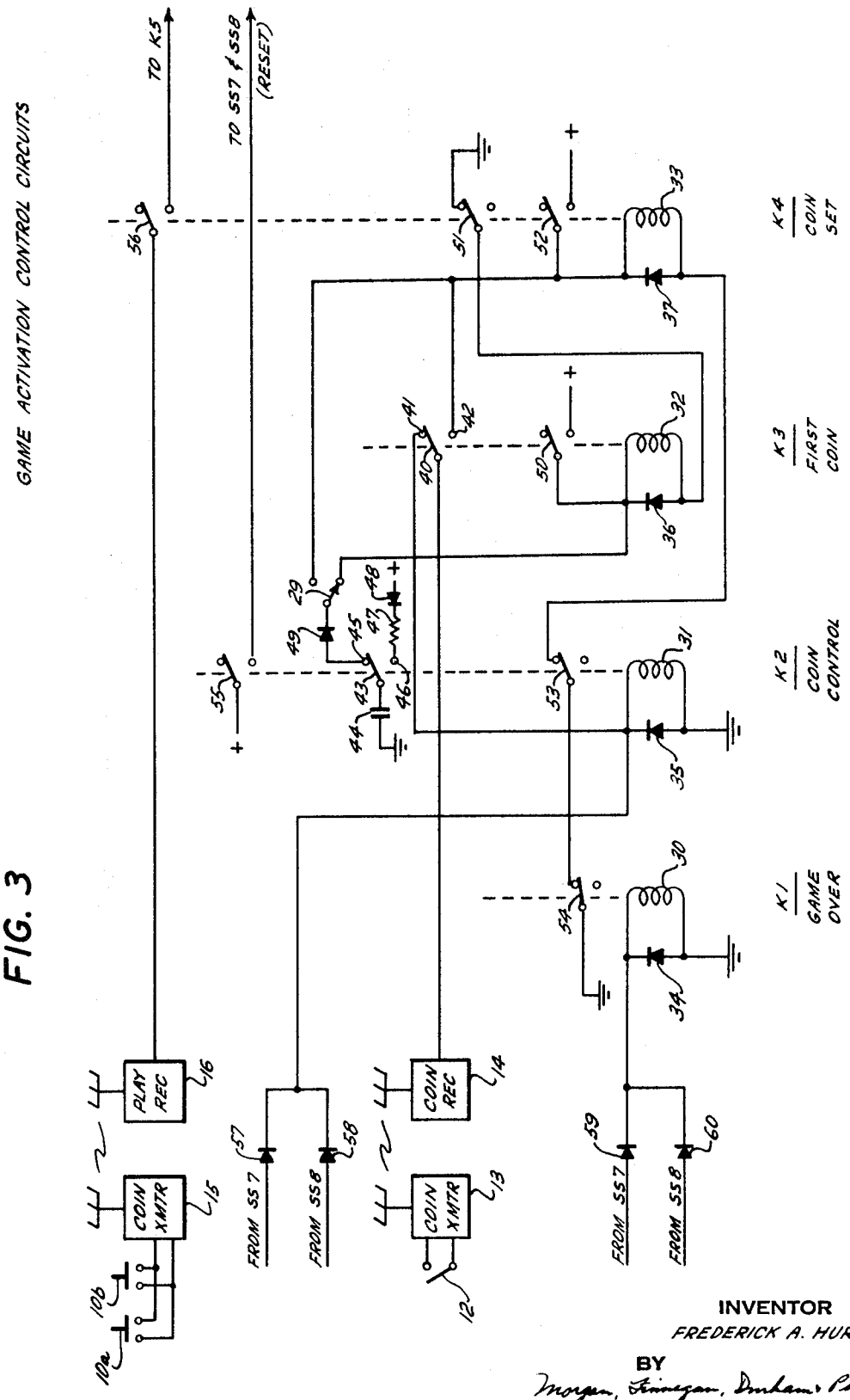
FIG. 3



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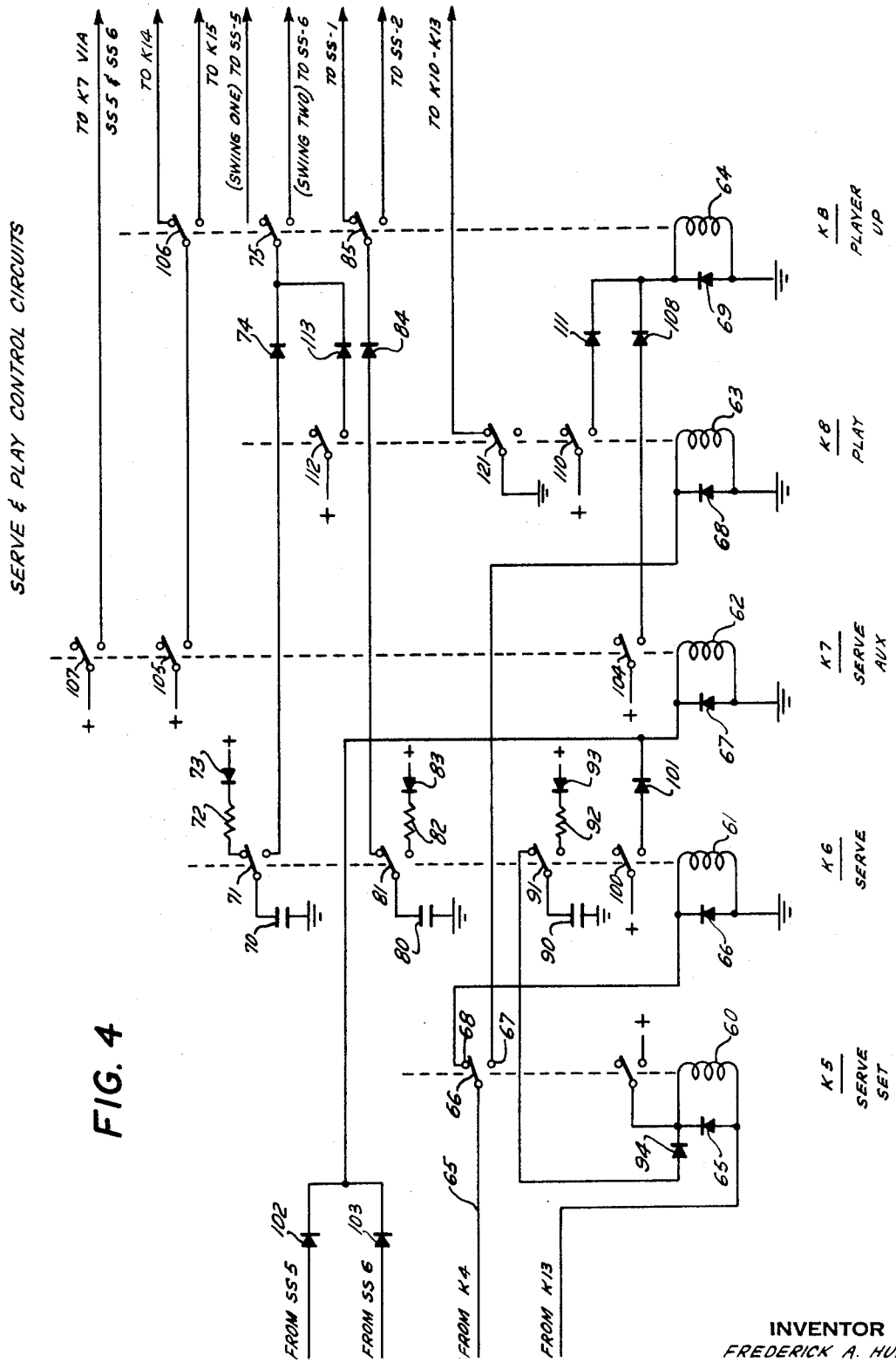

FIG. 4

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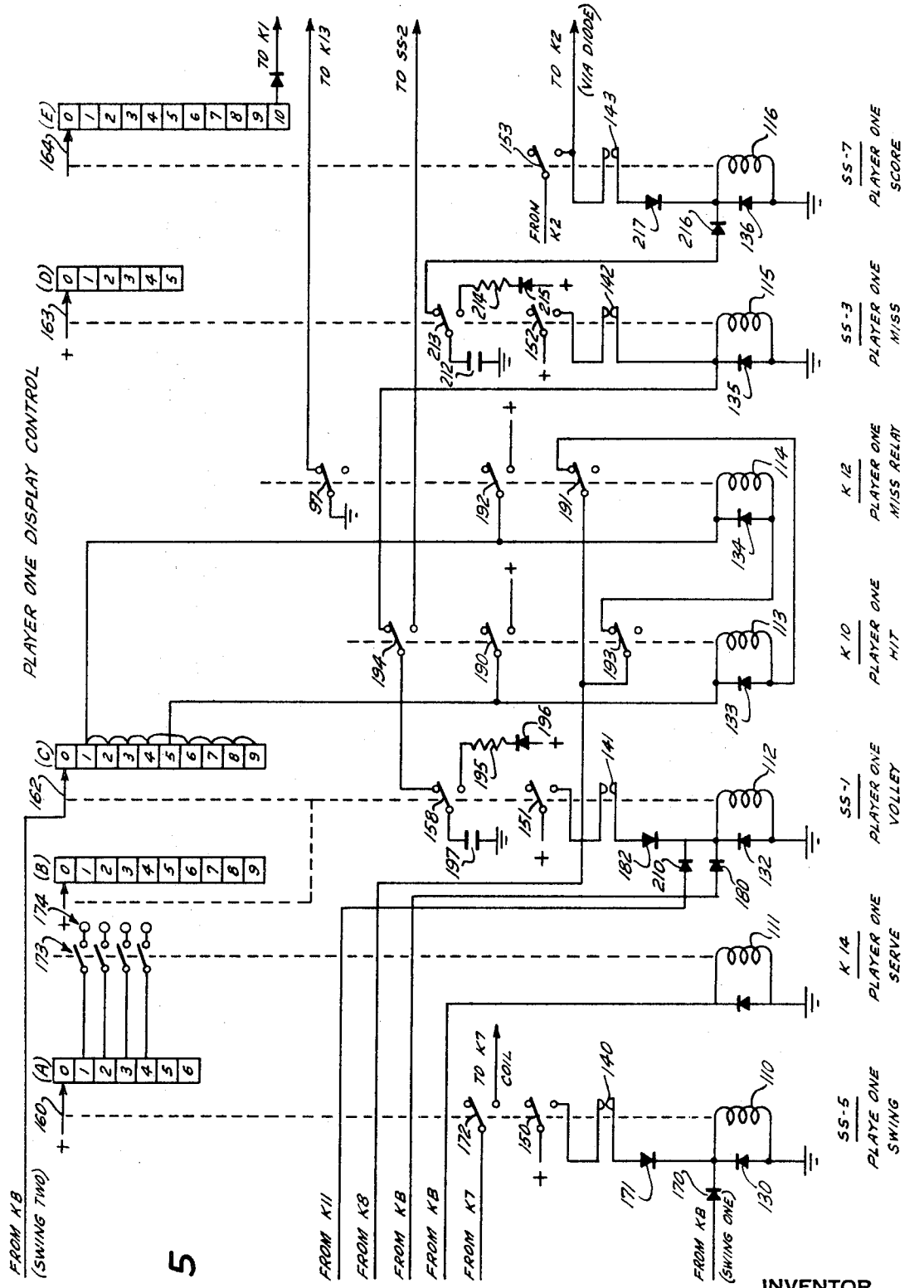

FIG. 5

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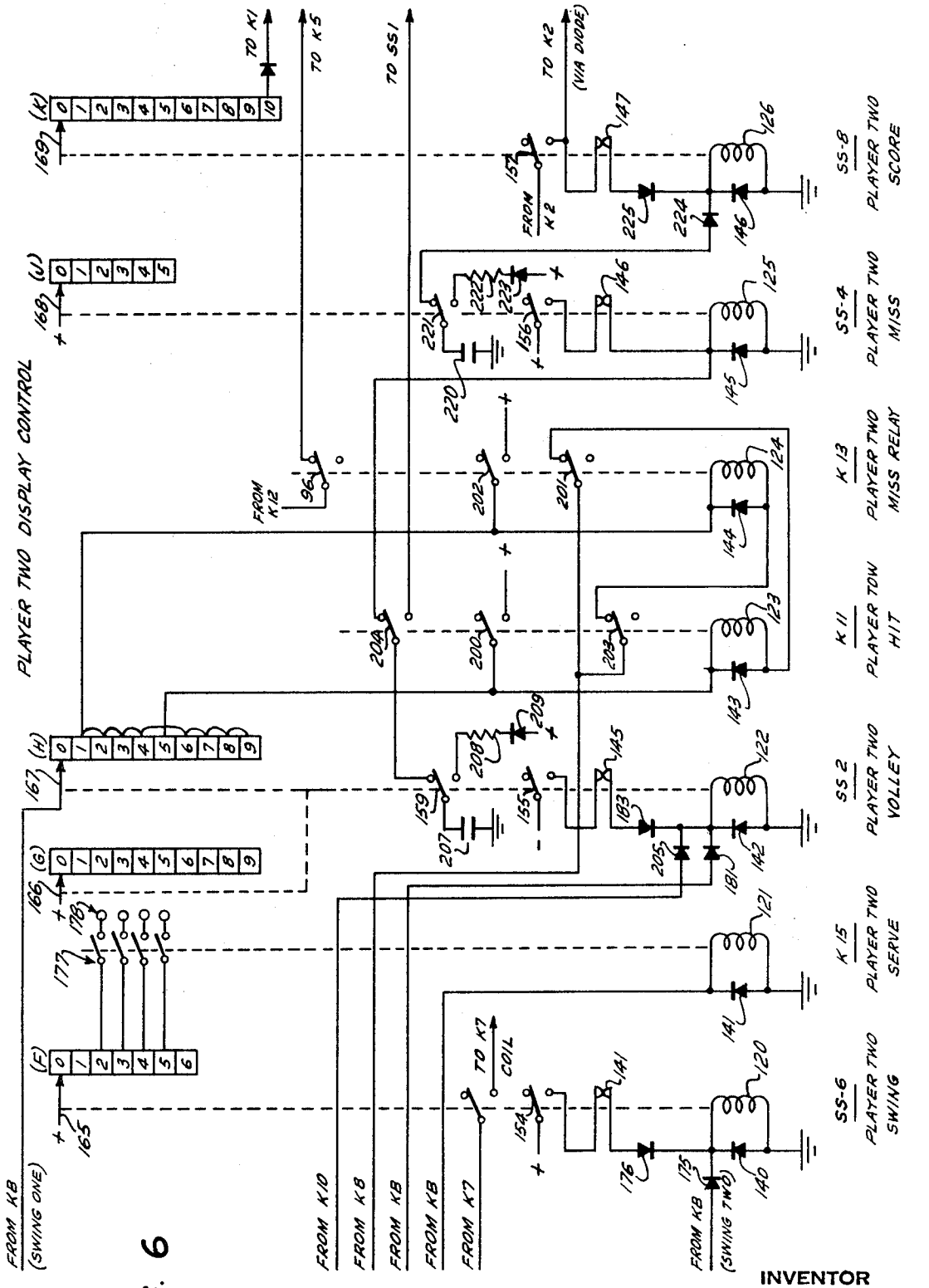

FIG. 6

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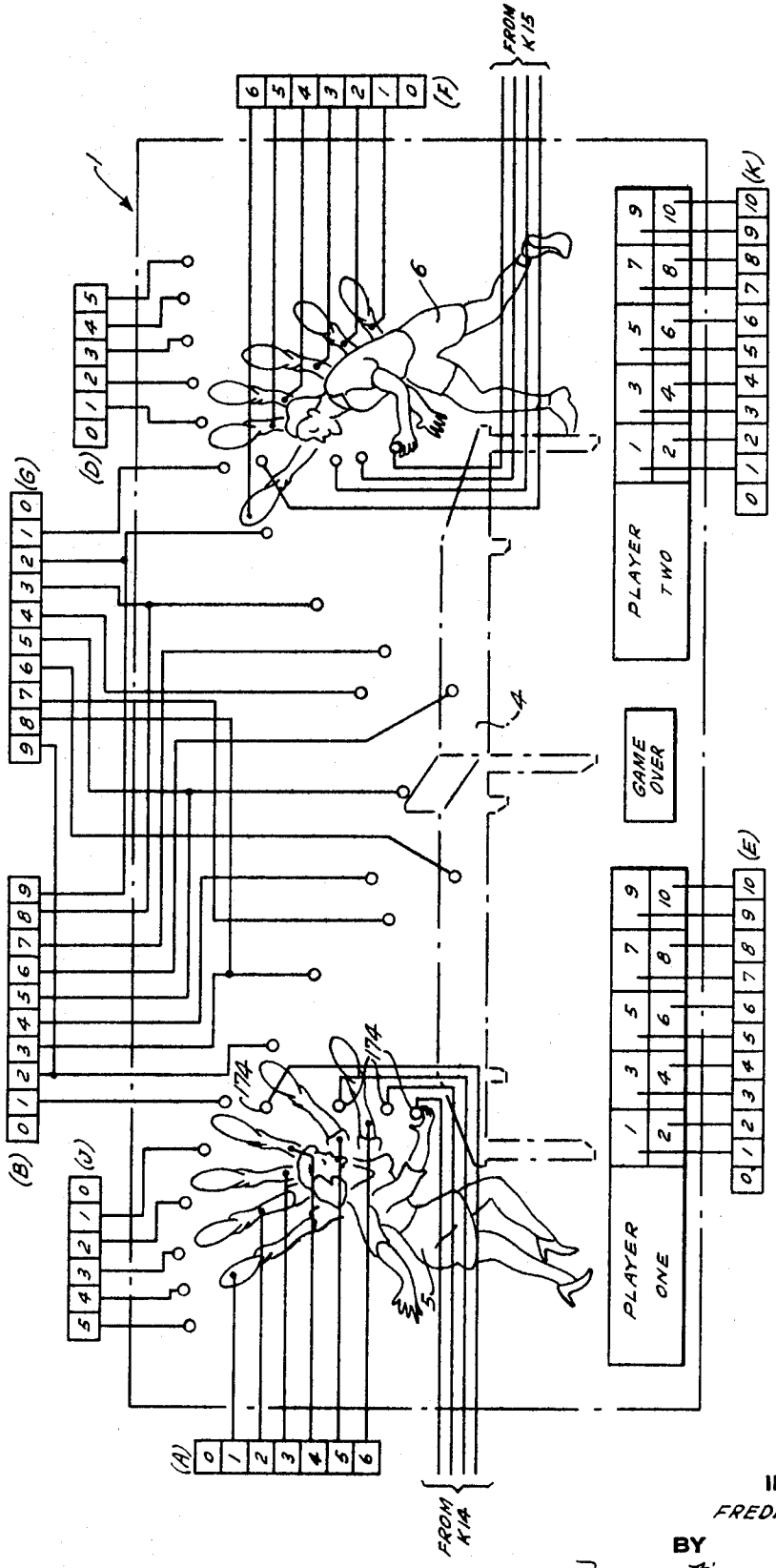

FIG. 7

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ELECTRIC PING-PONG GAME AND THE LIKE

BACKGROUND OF THE INVENTION

This invention relates to electric apparatus wherein a game is simulated on a display panel and, more particularly, to apparatus which simulates a game of the type wherein a game object appears to be hit back and forth between two or more players.

In the past, most coin-operated amusement devices were of a general mechanical nature known as pinball machines which usually require a horizontal playing surface. Because of the horizontal playing surface, substantial floorspace would be required and, hence, these units could only be installed in establishments where the money taken in is sufficient to justify the loss of player space. Also it would be necessary for the players to go to the physical location of the amusement device which, in some cases, would disrupt the normal business operation of the establishment.

An object of this invention is to provide an amusement device which can be coin operated, remotely controlled and wall hung.

Another object of the invention is to provide an amusement device which is a game of skill and which retains the continuing interest of the players.

BRIEF DESCRIPTION OF THE INVENTION

There are many games of the type wherein two or more players hit a game object back and forth. In the illustrative embodiment, the apparatus is shown for simulating a ping-pong game. Other known games which could be simulated by a similar apparatus would include, for example, tennis, handball, squash, volleyball and badminton.

The apparatus includes a remote control unit, including a coin receiver and a player-actuated pushbutton, this remote control unit being coupled to the remainder of the apparatus by means of a radio transmitter receiver. The simulated game appears on a display panel which can be wall hung. After the game has been activated by depositing coins of the proper monetary value, the first player actuation initiates a simulated serve by one of the cartoon characters on the display panel and the game ball appears to travel toward the opposing player on the display panel. Upon the next player actuation, the other player swings at the ball and, if the swing is properly timed, the game ball appears to be returned. The ball may be volleyed back and forth between the cartoon characters on the display panel until one of the players misses. When a miss is detected, the game ball appears to travel beyond the player that has missed and a point is scored for the opposing player.

BRIEF DESCRIPTION OF THE DRAWINGS

The manner in which the foregoing and other objects are achieved according to the invention is described more fully in the following specification which sets forth an illustrative embodiment of the invention. The drawings form a part of the specification, wherein:

FIG. **1** is a perspective view illustrating the display panel for a ping-pong game along with the associated remote control unit and control circuits;

FIG. **2** is a block diagram illustrating the basic layout for the control circuits;

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

FIG. **4** is a schematic diagram of the serve and play control circuits;

FIG. **5** is a schematic diagram of the player one display control;

FIG. **6** is a schematic diagram of the player two display control; and

FIG. **7** is a schematic diagram of the display panel and connections thereto.

DESCRIPTION OF INVENTION

The electric amusement game according to this invention includes three basic subassemblies which are the display panel **1**, the unit **2** housing the control circuits, and a remote control unit **3**.

Display panel **1** includes a generally opaque front panel which is designed according to the game being simulated. FIG. **1** shows a display panel for a ping-pong game and therefore a pair of cartoon characters **5** and **6** are shown at opposite ends of a ping-pong table **4**. The display panel also includes a number of translucent areas which can be selectively illuminated to simulate the moving game object which, in this case, is a ping-pong ball, and the game-playing objects which, in this case, are the ping-pong paddles in the hands of the cartoon characters **5** and **6**. The display panel also includes translucent areas **7** and **8** which are selectively illuminated to provide the score indications and area **9** which can be illuminated to provide a "game over" indication.

Remote control unit **3** includes a slot **11** through which coins are deposited in order to activate the game. The remote control unit also includes a pair of player-operated pushbuttons **10***a* and **10***b* which permit the players to control the game on the display panel. Remote control unit **3** is coupled to the control circuits in unit **2** by means of a radio transmitter-receiver link.

The control circuits are shown in block diagram form in FIG. **2**. Switch **12** is associated with coin slot **11**. A conventional coin-receiving unit is located within the remote control unit and includes the switch **12** which is closed momentarily when a coin of the proper denomination has been received. "-Coin" transmitter **13** transmits a signal to "coin" receiver **14** whenever coin switch **12** is closed. The pushbutton switches **10***a* and **10***b* are connected in parallel to a "play" transmitter **15** within remote control unit **3** which transmits a signal to a "-play" receiver **16** when either of the switches is actuated. The "play" and "coin" receivers are coupled to the game activation control circuits **17**. Although separate "play" and "coin" transmitter-receivers are illustrated in FIG. **2**, it is possible to utilize a two channel transmitter-reciever system.

The game activation control circuits are illustrated schematically in FIG. **3**. These circuits respond to the coin actuations and determine when coins of the proper monetary amount have been deposited for activating the game. When this is accomplished, the game activation control circuits couple the signal developed by "play" receiver **16** into the serve and play control circuits **18**. The game activation control circuits **17** also include the end of game detection circuitry which deactivates the game when one of the players reaches a full score.

The serve and play control circuits are illustrated schematically in FIG. **4**. The serve and play control circuits receive a signal each time one of the pushbutton switches **10***a* or **10***b* is actuated. In response to these actuating signals, other signals are developed as required for controlling the display. In response to the first such actuation, a simulated serve of the ping-pong ball by one of the cartoon players is provided on the display panel as well as the simulated movement of the ping-pong ball toward the other player. The next player actuation causes the ping-pong paddle in the hands of the other cartoon player to swing in the hopes that the paddle will intercept the simulated ping-pong ball. If the player is successful and the ball is returned, upon the next player actuation the first player again controls the swing of his corresponding cartoon character.

The player one display control circuits **19** include a number of stepping switches and are illustrated in detail in FIG. **5**. These stepping switches control the animated displays corresponding to the first player, that is, player one's movement of the paddle and serve of the ball, movement of the ping-pong ball toward the other player, and movement of the ball beyond the other player if the other player misses on his attempt at hitting the ball. The player two display control circuits **20** are

illustrated in detail in FIG. 6 and are basically the same as player one display control circuits 19. The player display control circuits are connected to appropriate selected areas on display panel 1 to achieve the animated displays as is illustrated schematically in FIG. 7.

GAME ACTIVATION CONTROL CIRCUITS

The function of the game activation control circuits is to activate the game when the proper coins have been deposited, and to deactivate the game when one of the players reaches the full score. The game can be activated in response to one deposited coin, or, since there are two players, the game can be set to require two deposited coins for activation. The number of required coins is determined by switch 29 which, in the position shown in FIG. 3, would require two coins.

The game activation control circuits include four electromagnetic relays K1—K4 referred to, respectively, as the "-game over" relay, the "coin control" relay, the "first coin" relay and the "coin set" relay. The relays K1—K4 include the energizing windings 30—33, respectively, with diodes 34—37 connected in parallel with the winding to absorb inductive voltage surges.

"Coin control" relay K2 is momentarily energized when the first coin is deposited via the coin slot and at the termination of this momentary energization, a pulse is produced which, in turn, energizes either relays K3 or K4 depending upon the position of switch 29. The contacts (not shown) at the output of "coin" receiver 14 are coupled between a positive source and movable contact 40 of relay K3. The normally open stationary contact 42 is coupled to winding 33 of "coin set" relay K4 and the normally closed stationary contact 41 is connected to winding 31 of "coin control" relay K2. The other end of the winding 31 is connected to ground. A capacitor 44 is coupled between ground and movable contact 43. The associated normally open stationary contact 46 is coupled to a positive source via a charging resistor 47 and a diode 48. The normally closed stationary contact 45 is coupled to the movable contact of switch 29 via a diode 49. One of the stationary contacts of switch 29 is connected to energizing winding 32, and the other stationary contact is connected to energizing winding 33.

When switch 12 is momentarily closed in response to deposited coins, a signal is developed which passes through movable contact 40 to energize winding 31 of the "coin control" relay. When the relay is energized capacitor 44 is charged via resistor 47 and diode 48. Subsequently, when relay K2 returns to the deenergized state, capacitor 44 discharges via movable contact 43, diode 49, switch 29 which, if switch 29 is in the position shown, will lead to the energization of winding 32 of the "first coin" relay.

A holding circuit for relay K3 is completed through its normally open contacts 50 which couple one end of winding 32 to the positive supply, and through the normally closed contacts 51 of the K4 relay which couples the other end of winding 32 to ground. Therefore, when a pulse is developed by the discharge of capacitor 44 via contacts 43 momentarily energize the K3 relay, the relay thereafter remains in the energized state because of the holding circuit completed through contacts 50 and 51. Relay K3 remains in the energized state until such time as relay K4 is energized to break the holding circuit by momentarily opening contacts 51.

When relay K3 is energized, such as occurs upon depositing of the first coin, the pulses developed by coin receiver 14 pass through movable contact 40 and stationary contact 42 to energize winding 33 of the K4 "coin set" relay. This relay is then maintained in the energized state by means of a holding circuit completed by means of its normally open contacts 52 which connect one end of winding 33 to the positive source, and by means of normally closed contacts 53 and 54 which couple the other end of winding 33 to ground. "Coin set" relay K4 returns to the deenergized state either when contacts 54 of "game over" relay K1 open upon completion of the game or when contacts 53 of "coin control" relay K2 open in response to the deposit of additional coins.

It is desirable that the score indications remain on the display panel after completion of the game and, therefore, the scoring circuitry is not reset at the end of the game but, instead, is reset when the first coin is deposited at the commencement of a new game. Normally open contacts 55 of "-coin control" relay K2 are connected between the positive source and the reset circuitry of the score-stepping switches SS7 and SS8 (FIGS. 5 and 6, respectively) to reset the score circuits when the first coin is deposited.

When "coin set" relay K4 is energized, the game is activated. This is achieved by means of normally open contacts 56 of relay K4 which are connected to couple "play" receiver 16 to the serve and play control circuits in FIG. 4 when relay K4 is in the energized state.

SERVE AND PLAY CONTROL CIRCUITS

The serve and play control circuits are shown schematically in FIG. 4 and are arranged so that the first player actuation initiates a simulated serve of the ping-pong ball of one of the players on the display panel and the simulated movement of the ball toward the other players. Subsequent actuations of the player pushbutton switch cause the players to alternately swing at the ball until one of the players miss.

The serve and play circuits include four electromagnetic relays K5—K8 designated, respectively, as the "serve set" relay, the "serve" relay, the "serve auxiliary" relay and the "-play" relay. A bistable relay KB is also included and is designated the "player up" relay. The relays include respective energizing the windings 60—64, with diodes 65—69 connected across the windings to absorb inductive voltage surges. The electromagnetic relays K5—K8 each include movable contacts which are shown in their normal positions in FIG. 4, but which move to the alternate positions when the respective windings are energized. Bistable relay KB is of the type wherein the movable contacts have two stable positions and move to an alternate one of the positions upon each successive energization of the energizing winding.

When the proper number of coins have been deposited and the game is activated through the energization of "coin set" relay K4 (FIG. 3), "play" receiver 16 is coupled to the movable contact 66 of relay K5 via contacts 56 and conductor 65. The normally closed stationary contact 68 of relay K5 is connected to winding 61, the other end of the winding being connected to ground. The normally open stationary contact 67 of relay K5 is coupled to one end of energizing winding 63 of the K8 "play" relay, the other end of this winding also being connected to ground. As a result, a player actuation, i.e. depressing of either of the pushbutton switches 10*a* or 10*b*, develops a signal via "play" receiver 16 which will energize either "serve" relay K6 or "play" relay K8 depending upon the state of relay K5.

Upon energization of relay K6, pulses are developed which actuate either stepping switch SS4 or stepping switch SS5 (FIGS. 5 and 6 respectively), depending upon the state of "-player up" relay KB, to thereby initiate a simulated paddle swing by one of the cartoon characters 5 or 6 upon display panel 1 (FIG. 1). Relay K6 remains energized as long as the player pushbutton switch is depressed. As relay K6 returns to the deenergized state, pulses are developed which actuate either stepping switch SS1 or stepping switch SS2 (FIGS. 5 and 6 respectively) to initiate the simulated movement of a ping-pong ball toward the other player on the display panel. Thus, while the pushbutton switch is actuated by one of the players the serve of a ping-pong ball is simulated, whereas upon release of the pushbutton switch by the player the simulated movement of the ball toward the other player is initiated.

Capacitor 70 is utilized to develop the pulse for initial energization of one or the other of stepping switches SS5 or SS6 to provide the paddle movement for the simulated serve. Capacitor 70 is connected between ground and movable contact 71 of relay K6, the associated normally closed stationary contact being coupled to the positive source via a charging resistor 72 and a diode 73. The normally open contact associated with

movable contact 71 is coupled to a movable contact 75 of "player up" relay KB via a diode 74. One of the stationary contacts associated with movable contact 75 is coupled to the energizing winding of stepping switch SS5, whereas the other stationary contact is coupled to the energizing winding of stepping switch SS6. When relay K6 is in the deenergized state, capacitor 70 is charged via resistor 74 and diode 73. Upon energization of relay K6, charged capacitor 70 is coupled via movable contacts 71 to one or the other of stepping switches SS5 or SS6 so that the capacitor discharges to thereby momentarily energize the appropriate one of the stepping switches.

Capacitor 80 is utilized to develop the pulse for energizing one or the other of stepping switches SS1 of SS2 to initiate the movement of the simulated ping-pong ball from one player toward the other. Capacitor 80 is coupled between a movable contact 81 of relay K6 and ground. The associated normally open stationary contact is coupled to a positive source via a charging resistor 82 and a diode 83 whereas the associated normally closed stationary contact is coupled to movable contact 85 of relay KB via a diode 84. One of the stationary contacts associated with movable contact 85 is connected to the energizing winding of stepping switch SS1 whereas the other stationary contact is connected to the energizing winding of stepping switch SS2. When relay K6 is in the energized state, capacitor 80 is charged via resistor 82 and diode 83. Thereafter, when relay K6 returns to the deenergized state, capacitor 80 discharges via movable contacts 81 and 85 to momentarily energize the appropriate winding of one or the other of stepping switches SS1 and SS2.

Capacitor 90 is utilized to develop a pulse for momentarily energizing "serve set" relay K5. The K5 relay, once momentarily energized, thereafter remains energized during successive volleys until a miss is detected. Capacitor 90 is coupled between a movable contact 91 of relay K6 and ground. The associated normally open contact is coupled to the positive source via a charging resistor 92 and a diode 93 whereas the normally closed stationary contact is coupled to one end of winding 60 of relay K5 via a diode 94. A holding circuit for relay K5 is provided through its normally open contacts 95 which can couple one end of the winding to the positive source, the other end of the winding being coupled to ground via normally closed contacts 96 of of a relay K13 (FIG. 6) in series with the normally closed contacts 97 of a relay K12 (FIG. 5). As will be explained hereinafter, either relay K12 or relay K13 becomes energized when a miss is detected, and as a result, one of the associated contacts 96 or 97 open to thereby return relay K5 to the deenergized state to condition the serve and play control circuits for initiation of a new serve upon the next player actuation.

The "serve auxiliary" relay K7 is also energized upon receipt of a "play" signal which initiates a simulated player's serve, but instead of being momentarily energized as was the case with relay K6, "serve auxiliary" relay K7 remains energized until the simulated serve has been completed. Normally open contacts 100 of relay K6 are connected between the positive source and winding 61 of relay K7, this connection being completed via diode 101. The normally open contacts 107 of relay K7 are coupled between a positive source and the off-normal contacts of stepping switches SS5 and SS6 (FIGS. 5 and 6, respectively). The circuit through the off-normal contacts is completed back to energizing winding 62 via diodes 102 and 103. Therefore, once relay K7 is initially energized by the closure of contacts 100, "serve auxiliary" relay K7 is energized and thereafter remains energized as long as one of the stepping switches SS5 or SS6 is in motion simulating the serve.

Normally open contacts 104 of relay K7 are connected between the positive source and energizing winding 64 of bistable relay KB, this connection being completed via diode 108. As a result, when the player pushbutton switch is actuated, "player up" relay KB is energized and changes state.

After the serve has been simulated " serve set" relay K5 is energized and is retained in the energized state through its holding circuit. The next "play" signal is therefore routed via movable contact 66 to energize "play" relay K8 which develops signals to initiate the return volley. Normally open contacts 110 are connected between the positive source and winding 64 of "player up" relay KB through isolating diode 111 to change the state of the "player up" relay with each player actuation. Normally closed contacts 121 are connected between ground and relays K10—K13 in the holding circuits for the relays to return the "hit" and "miss" relays to the deenergized state prior to each volley. Normally open contacts 112 are coupled between the positive source and movable contact 75 of relay KB, this connection being completed via isolating diode 113. When relay K8 is momentarily energized in response to a player actuation, a pulse is developed by the momentary closure of contacts 112 and is designated either "swing one" or "swing two" depending upon the state of "player up" relay KB.

Normally open contacts 105 of relay K7 are connected between the positive source and movable contact 106 of bistable relay KB. The associated stationary contacts are connected, respectively, to the energizing windings of relays K14 and K15 shown on FIGS. 5 and 6 respectively. The one of relays K14 and K15 selected by the state of "player up" relay KB energized for the duration of the serve to simulate the movement of the ball prior to being hit by the paddle, this movement being coordinated with the paddle movement as controlled either by stepping switch SS5 or stepping switch SS6. To insure that the entire serve ball simulation is presented, relay K7 is maintained in the energized state for the duration of the simulated serve, this being achieved by the previously explained circuit connection via the off-normal contacts of stepping switches SS5 and SS6.

THE DISPLAY CONTROL CIRCUITS

The display control circuits are shown schematically in FIGS. 5 and 6, the circuits shown in FIG. 5 being those associated with "player one" and the circuits shown in FIG. 6 being those associated with "player two." The display control circuits include eight separate stepping switches designated SS1 through SS8 as well as six electromagnetic relays designated K10—K15. The stepping switches and relays include energizing windings 110—116 in FIG. 5 and energizing windings 120—126 in FIG. 6. Diodes 130—136 are connected in parallel with windings 110—116 to absorb inductive voltage surges, and diodes 140—146 are similarly connected in parallel with windings 120—126.

Stepping switches SS1 and SS2, shown in FIGS. 5 and 6 respectively, are designated the "player one volley" stepping switch and the "player to volley" stepping switch. Stepping switch SS1 controls the simulated movement of the ping-pong ball from player number one toward player number two on the display panel, whereas stepping switch SS2 controls the simulated movement from player number two toward player number one. Stepping switches SS3 and SS4 are designated the "player one miss" stepping switch and the "player two miss" stepping switch. When a miss has been detected, the simulated movement of the ping-pong ball travelling past the players on the display panel is controlled by the stepping switches SS3 and SS4, stepping switch SS3 providing the simulated movement when player two fails to hit the ball and stepping switch SS4 providing the simulated movement when player one fails to hit the ball. Stepping switches SS5 and SS6 are designated "player one swing" and "player two swing," these stepping switches being utilized to control the simulated paddle movement of the respective players on the display panel. Stepping switches SS7 and SS8 are designated the "player one score" and "player two score" stepping switches and are utilized to accumulate and control display of the respective players scores.

The relays K10 and K11 shown in FIGS. 5 and 6, respectively, are designated "player one hit" and "player two hit," these relays being utilized to detect when a player has initiated his

paddle movement at the appropriate time for hitting the moving pingepong ball. Relays K12 and K13 are designated "-player one miss" and "player two miss," these relays providing the complementary indications whenever a player fails to initiate the paddle movement at the appropriate time for hitting the ball. Relays K14 and K15 are designated "player one serve" and "player two serve," these relays being energized only during the serve simulation. Relays K14 and K15 complete connections to the display panel which will provide the simulated movement of the ball as thrown up by the player during the serve.

The various stepping switches shown in FIGS. 5 and 6 are all generally of the same construction except for the number of contacts in the stationary contact banks designated A through K. The associated movable contacts 160—169 move one step upon each successive energization of the associated windings. The stepping switches also include interruptor contacts 140-—143 and 144—147 which open momentarily each time the movable contact of the stepping switch is advanced one step as well as off-normal contacts 150—157. In the home or zero position of the stepping switch, the off-normal contacts are in the position shown in FIGS. 5 and 6, but at any other position of the stepping switch the contacts are in the alternate position.

Since stepping switch SS5 controls the simulated swing of player one, it should receive an actuation pulse on every other player actuation. This is achieved by connecting one of the stationary contacts associated with the movable contact 75 of bistable relay KB to energizing winding 110 of stepping switch SS5 via an isolating diode 170. As a result, the stepping switch receives the "swing one" pulses which are developed when either "serve" relay K6 is energized to initiate the serve of the ball, or on a subsequent play when "play" relay K8 is momentarily energized. The "player up" relay KB alternates position on each successive player actuation and therefore stepping switch SS5 will receive a "swing one" pulse on every other player actuation.

The positive source is connected to off-normal contact 150 of stepping switch SS5, and the associated stationary contact is coupled to winding 110, via interruptor contacts 140 and diode 171. Therefore, once an initial pulse has been applied to winding 110 to advance the stepping switch away from the home position, off-normal contacts 150 and interruptor contacts 140 provide successive pulses to winding 110 causing the stepping switch to advance through the entire stepping sequence eventually returning to the home position.

Relay K14 is utilized to provide the successive illuminations which simulate the ball being thrown into the air during a serve. To accomplish this, relay K14 is energized while player one serves and is maintained in the energized state for the duration of the stepping sequence of stepping switch SS5. Stationary contacts 1 through 4 of contact bank A are connected to separate normally open contacts 173 of relay K14 to thereby separately illuminate the light bulbs 174. Light bulbs 174 are located on the display panel to provide the successive illuminations which simulate the thrown ball during the serve sequence. Contacts 105 of "serve auxiliary" relay K7 are connected to energizing winding 111 of relay K14 via movable contact 106 of the "player up" relay. Normally open contacts 107 of "serve auxiliary" relay K7 are connected to off-normal contacts 172 of stepping relay SS5 and back to energizing winding 62 (FIG. 4) of relay K7 via diode 102. The combination of contacts 107 and off-normal contacts 172 provide a holding circuit for the K7 relay, such that when relay K7 is momentarily energized and the stepping sequence of SS5 has been initiated, relay K7 will remain in the energized state until the stepping sequence is completed as signified by the opening of off-normal contacts 172.

Stepping switch SS6 and associated relay K15, as shown in FIG. 6, are interconnected in essentially the same fashion as stepping switches SS5 and relay K14 except that stepping switch SS6 operates in response to the "swing two" pulse developed by relays K8 and KB. The "swing two" pulse for initiating action of stepping switch SS6 is applied to energizing winding 120 by virtue of the connection to one of the stationary contacts associated with movable contact 75 (FIG. 4), this connection being completed via an isolating diode 175. The connection between the positive source, off-normal contacts 154 and interrupter contacts 144 is completed via a diode 176. The energizing signal for winding 121 of relay K15 is developed via contacts 105 of "serve auxiliary" relay K7 which are coupled to the energizing winding via movable contact 106 of "player up" relay KB. Stationary contacts F2—F5 of stepping switch SS6 are coupled to light bulbs 178 via individual movable contacts 177 of the K15 relay. As will be described later, the light bulbs 178 are positioned on the display panel to provide the simulation of the ball being thrown up during the serve sequence for the second player on the display panel.

As previously mentioned stepping switches SS1 and SS2 control the simulated volley of the ping-pong ball back and forth between the players. Following the serve by one of the players, capacitor 80 in FIG. 4 develops a pulse which initiates the movement of stepping sequence for one or the other of stepping switches SS1 and SS2. Capacitor 80 is connected to movable contacts 81 of relay K6 which couples capacitor 80 to movable contacts 85 of relay KB via diode 84. The stationary contacts associated with movable contacts 85 are connected respectively to energizing windings 112 and 122 of stepping switches SS1 and SS2, (FIGS. 5 and 6 respectively), these connections being completed via diodes 180 and 181 respectively. The positive source is connected to off-normal contacts 151 and the associated stationary contact is coupled to one end of energizing winding 112 via interruptor contacts 141 and a diode 182. A positive source is similarly connected to off-normal contacts 155 with the associated stationary contact connected to one end of winding 122 via interruptor contacts 145 and a diode 183. With this arrangement, once the energizing windings of stepping switches SS1 and SS2 are provided with initial energization to advance the stepping switch one position, the associated off-normal contacts are closed and, therefore, the circuit completed through the off-normal contacts and the interruptor contacts provides successive energization pulses to the windings of the stepping switches causing them to proceed through an entire stepping sequence and return to the home position.

The positive source is connected to movable contact 161 of stepping switch SS1 and the stationary contacts of associated bank of contacts B are connected to provide the successive illuminations on the display panel which will be described later in connection with FIG. 7. The positive source is also connected to movable contact 166 of stepping switch SS2 and the associated stationary contacts of contact bank G are likewise connected to provide successive illuminations on the display panel.

After a simulated serve of the ping-pong ball and simulated movement of the ball toward the other player, the ping-pong ball will be returned provided that the opposing player actuates the player pushbutton switch at the appropriate time for causing the paddle to intercept the simulated moving ping-pong ball. Contact banks C and H (FIGS. 5 and 6 respectively) are utilized to detect the "hit" or "miss" on each player actuation subsequent to the first actuation which initiates the serve. The circuitry is arranged so that if the player pushbutton switch is actuated when the active one of stepping switches SS1 and SS2 is in the fifth position a "hit" will be detected whereas if the player pushbutton switch is actuated in any other position of the stepping switches a "miss" will be detected.

The "swing two" signal developed via movable contacts 75 of player up relay KB (FIG. 4) is coupled to movable contact 162 of stepping switch SS1 whereas the "swing one" signal is connected to movable contact 167 of stepping switch SS2. Stationary contact C5 of stepping switch SS1 is connected to energizing winding 113 of relay K10 and contacts C1—C4 and C6—C9 of stepping switch SS1 are connected together and

are also connected to energizing winding 114 of relay K12. A holding circuit for relay K10 is completed through its normally open contacts 190, which are connected between the positive source and one end of winding 113, and normally closed contacts 191 of relay K12 and normally closed contacts 121 of relay K8 which connect the other end of the winding to ground. A holding circuit for relay K12 is provided through its normally open contacts 192 which are connected between the positive source and one end of winding 114, the other end of the winding being connected to ground via normally closed contacts 193 of relay K10 and normally closed contacts 121 of relay K8 (FIG. 4). Thus, if the "swing two" pulse is applied to movable contact 162 when stepping switch SS1 is in the fifth position, the signal will pass via stationary contact C5 to energize winding 113 of the "player one hit" relay which remains energized until a subsequent energization of "play" relay K8 opens contacts 121 to release the holding circuit for relay K10. If the "swing two" pulse is applied to movable contact 162 in any other position of stepping switch SS1, the pulse passes through one of the stationary contacts to energize winding 114 of "player one miss" relay K12. This "miss" relay thereafter is maintained in the energized state through its holding circuit until "play" relay K8 is energized upon initiation of a new play sequence.

It should be noted that contacts 191 and 193 located in the respective holding circuits, provide an interlock between the "miss" and "hit" relays K10 and K12. In other words, if "miss" relay K12 is energized on the second position of stepping switch SS1, for example, it not be possible to subsequently register a "hit" by means of a second actuation when stepping switch SS1 is in the fifth position since relay K10 cannot be energized if K12 has previously been energized. This is because the signal which would pass to relay K10 via contact C5 could momentarily energize relay K10, but the relay could not thereafter be maintained in the energized state because the holding circuit could not be completed through contacts 191 which would be in the open position if relay K12 were previously energized. Similarly, energization of relay K10 prevents a subsequent energization of relay K12.

Relays K11 and K13, which are associated with stepping switch SS2, are interconnected in similar fashion. Stationary contact H5 is connected to winding 123 of "player one hit" relay K11 and contacts H1 through H4 and H6 through H9 are connected together and also connected to energizing winding 124 of "player two miss" relay K13. A holding circuit is provided for relay K11 through its normally open contacts 200 which connect one end of the relay to the positive source, and through the contacts 201 and 121 which connect the other end of the relay windings to ground. The holding circuit for relay K13 is completed through its normally open contacts 202 coupling one end of the winding to the positive source and via normally closed contacts 203 and 121 which connect the other end of the winding to ground.

When stepping switch SS1 reaches the end of its stepping sequence, which coincides with the end of the simulated ball movement, a pulse is developed by an associated capacitor 197 which will either initiate operation of stepping switch SS2 to provide a return volley or energize stepping switch SS3 which provides the simulated sequence of a missed ball travelling beyond the opposing player on the display panel. Capacitor 197 is connected between movable off-normal contact 158 and ground. The associated normally open stationary contact is connected to a positive source via a charging resistor 195 and a diode 196. The associated normally closed stationary contact is coupled to movable contact 194 of "player one hit" relay K10. The normally closed stationary contact associated with movable contact 194 is coupled to energizing winding 115 of stepping switch SS3 whereas the associated normally open stationary contact is coupled to energizing winding 122 of stepping switch SS2 via an isolating diode 205. Therefore, if a "hit" is detected during the stepping sequence of stepping switch SS1, relay K10 is energized. Also, during the stepping sequence off-normal contacts 158 move to the position which permits capacitor 197 to charge via resistor 198. At the end of the stepping sequence, off-normal contacts 158 return to the position shown in FIG. 5 and, therefore, capacitor 197 is connected to winding 122 of stepping switch SS2 to provide the initial energization for winding 122. Thereafter stepping switch SS2 proceeds through its stepping sequence providing the return volley.

In similar fashion a capacitor 207 (FIG. 6) is utilized to develop a pulse at the end of the stepping sequence for stepping switch SS2. Capacitor 207 is connected between off-normal movable contact 159 and ground. The associated normally open contact is connected to the positive source via a resistor 208 and a diode 209 whereas the normally closed contact is connected to movable contact 244 of "player two hit" relay K11. The associated normally open contact of relay K11 is connected to winding 112 of stepping switch SS1 via a diode 210 whereas the normally closed contact is connected to winding 125 of "player two miss" stepping switch SS4. Accordingly, if a hit is detected during the stepping sequence of stepping switch SS2, relay K11 is energized and, therefore, at the end of the stepping sequence when a pulse is developed by capacitor 207 the movement of stepping switch SS1 is initiated. If the successive player actuations arrive at the appropriate time, the stepping switches SS1 and SS2 are placed in operation alternately and therefore a simulation is provided wherein the ping-pong ball is volleyed back and forth between the players.

Stepping switch SS3 in FIG. 5 provides the missed ball sequence with respect to a ball initially hit by player one whereas stepping switch SS5 provides a similar missed ball sequence with respect to balls initially hit by player two. The positive source is connectable to one end of winding 115 of stepping switch SS3 via its off-normal contacts 152 and interrupter contacts 142, the other end of winding 115 being connected to ground. Once the stepping sequence is initiated by momentary energization of winding 115, as a result of a pulse generated by discharge of capacitor 197, stepping switch SS3 continues through its stepping sequence until returning to the home position to thereby open off-normal contacts 152. The stationary contacts of contact bank D are associated with movable contact 163 which is connected to a positive source of potential. The connections of the stationary contacts will be described more fully in connection with FIG. 7.

In similar fashion the positive source is connectable to one end of winding 125 of stepping switch SS4 (FIG. 6) via its off-normal contacts 156 which are in series with interruptor contacts 146, the other end of winding 125 being connected to ground. A pulse developed by the discharge of capacitor 207 at the end of the stepping sequence for stepping switch SS2 provides the pulse which initially energizes winding 125. The stepping switch thereafter progresses through its stepping sequence because of the successive pulses generated via off-normal contacts 156 and interruptor contacts 146.

Stepping switch SS7 (FIG. 5) is used to accumulate the score for player one and to control the corresponding display on the display panel. Whenever a moving ping-pong ball initiated by player one is missed by failure of player two to initiate the paddle swing at the appropriate time, a point is added to the score for player one. This is accomplished at the end of the stepping sequence of stepping switch SS3 which provides the missed ball simulation under these circumstances. The necessary pulse is generated by a capacitor coupled to off-normal contacts 213 of stepping switch SS3, the other end of the capacitor being connected to ground. The associated normally open contacts are coupled to a resistor 214 which, in turn, is connected to the positive source via a diode 215. The associated normally closed contacts are connected to winding 116 of stepping switch SS7 via a diode 216. Therefore, during the stepping sequence of stepping switch SS3, off-normal contacts 213 move to the alternate position from that shown in FIG. 5 and, therefore, capacitor 212 is charged via resistor 214. When the stepping switch returns to the home position capacitor 212 is coupled to energizing winding 116 of

stepping switch SS7 to provide one energizing pulse to, in turn, cause stepping switch SS7 to advance one step.

It is desired that the player's scores remain on the display panel after completion of the game and, therefore, the score-stepping switches are not reset until the first coin is deposited indicating commencement of a new game. Relay K2 (FIG. 3) becomes energized in response to the first-deposited coin and, therefore, normally open contacts 55 associated with relay K2 are utilized to initiate the signal which resets "player one score" stepping switch SS7. Contacts 55 are connected between the positive source and off-normal contacts 153 of the stepping switch. The associated normally open stationary contact of the stepping switch is coupled to one end of winding 116 via interruptor contacts 143 and a diode 217. The normally open stationary contact associated with off-normal movable contact 153 is also connected back to energizing winding 31 of "coin control" relay K2 via a diode 57. Therefore, when coin control relay K2 is energized in response to a deposited coin, contacts 55 are closed and winding 116 is energized via off-normal contacts 153 and interruptor contacts 143 to provide a stepping sequence causing the stepping switch to return to its home position. As long as the stepping switch is in other than the home position, off-normal contacts 153 are in the position opposite that shown in FIG. 5 and, therefore, relay K2 is maintained in the energized state via the signal passing through diode 57 to thereby maintain relay K2 in the energized state until the stepping sequence is completed.

Stepping switch SS8 in FIG. 6, which accumulates the score for the other player, is interconnected with the "player two miss" stepping switch SS4 in similar fashion. A capacitor 220 is connected between off-normal contacts 221 and ground. The associated normally open contacts are connected to the positive source via a charging resistor 222 and a diode 223. The normally closed contact associated with movable contact 221 is coupled to energizing winding 126 of stepping switch SS8 via a diode 224. Thus, when stepping switch SS4 reaches the end of its sequence, capacitor 220 is connected to discharge via diode 224 to thereby energize winding 126 and advance stepping switch SS8 by one step.

Normally open contacts 55 of relay K2 are also connected to off-normal contacts 157 of stepping switch SS8 in order to provide the reset for the "player two score" stepping switch. The associated normally open stationary contact is connected back to winding 31 of the K2 relay via a diode 58 to provide a holding circuit for "coin control" relay K2 to maintain this relay in the energized state until the reset stepping sequence is completed. The normally open stationary contact is also connected to one end of energizing winding 126 via interruptor contact 147 and a diode 225, the other end of the winding being connected to ground. The combination of off-normal contacts 157 and interruptor contacts 157 provides the successive pulses which cause stepping switch SS8 to eventually return to the home position, these pulses being applied so long as relay K2 is in the energized state.

The end of the game is detected when either of the stepping switches SS7 and SS8 reaches a full score. In the particular example shown the game has a maximum score of 10 but the scoring sequence may be extended as desired by including stepping switches with a larger number of stationary contacts. The last scoring contacts, in this case the 10th contact for stepping switch SS8 and contact E10 for stepping switch SS7, are connected to "game over" relay K1 (FIG. 3). Stationary contact E10 is connected to energizing winding 30 of relay K1 via a diode 59 whereas stationary contact K10 is connected to energizing winding 30 via a diode 60. Accordingly, when either one of the stepping switches reaches a score corresponding to 10, a signal is developed via either one of contacts E10 or K10 to energize "game over" relay K1. As a result contacts 54 open to, in turn, deenergize "coin set" relay K4. When relay K4 returns to the deenergized state its contacts 56 open and, therefore, "play" receiver 16 is disconnected from the remaining circuitry. Under these circumstances the game is deactivated.

DISPLAY PANEL

Display panel 1 is shown in FIG. 7 with the various selectively illuminated areas indicated. The display panel is constructed with a generally opaque front panel having transluscent areas which can be illuminated from behind either by electroluminescent panels or by means of light bulbs in separately compartmented areas. For the illustrative embodiment it is assumed that light bulbs are used and that each light bulb behind a transluscent area is surrounded by a compartmenting structure which acts as a light shield. The connections between the light bulbs and the stepping switches in FIG. 7 is shown by means of the lines going to the selectively illuminated areas.

Assume that the player at the left represented by cartoon character 5 is player one and the player on the right represented by cartoon character 6 is player two.

Contact bank A is connected to provide the simulated paddle movement for player one. Six paddle positions are shown in FIG. 7 beginning with a paddle position up and behind the cartoon character and progressing toward a position almost directly in front of the character. Contacts A1 through A6 are connected to successively illuminate these paddle positions as the associated stepping switch SS5 progresses through its stepping sequence.

During a serve, relay K14 is energized so that stepping switch SS5 also controls the coordinated movement of the serve ball. Contacts A1—A4 are connected to lamp bulbs 174 via the contacts of relay K14 to provide the four successive illuminations indicated on FIG. 7 simulating the movement of the ball upwardly so as to intercept the simulated moving paddle just after illumination of the paddle via contact A4.

Contact bank F is connected in similar fashion to provide the simulated paddle movement for player two by direct connection to light bulbs associated with the paddle in the successive positions and to also provide the simulated serve ball indications via contacts of relay K15. As stepping switch SS6 associated with contact bank F progresses through its stepping sequence the player's paddle appears to move from a position behind the player upwardly and over to a position somewhat in front of cartoon character 6. The display is arranged so that the serve ball intercepts the paddle just after being illuminated via contact F5.

Contact bank B controls the simulated movement of the ping-pong ball from player one toward player two. Contacts B1—B4 are arranged to provide successive illuminations which simulate the movement of the ball from player one toward the net, contact B5 is arranged to provide the illumination of the ping-pong ball just over the net, contact B6 provides the indication showing the ball bouncing on the table after crossing the net, and contacts B7 through B9 illuminate the areas simulating the ball after the bounce progressing toward player two. Contact bank G controls successive illuminations simulating the return volley. Contacts G1 through G4 illuminate the areas showing the ping-pong ball progressing from player two toward the net, contact G5 shows the ping-pong ball illuminated just as it passes over the net, contact G6 illuminates an area showing the ball just after crossing the net as it bounces on the table, and contacts G7—G9 illuminate selective areas showing the simulated ping-pong ball after it bounces on the table progressing toward player one. It should be noted that the illuminations provided by contacts B5 and G5 is the ping-pong ball just as it passes over the net. As was previously mentioned, a player scores a "-hit" if he initiates the simulated swing when stepping switches SS1 or SS2 are in the fifth position.

If player two misses, contact bank D of stepping switch SS3 illuminates selective areas which simulate the movement of the ping-pong ball up and beyond the player two. In similar fashion, if player one misses the ball contact bank J of stepping switch SS4 is connected to illuminate successive areas simulating the movement of the ping-pong ball up and over player one.

Contact bank E associated with stepping switch SS7 is connected to illuminate various numerically designated areas on the display panel to indicate the score for player one. Similarly, contact bank J of stepping switch SS8 is connected in like fashion for selectively illuminating numerical areas on the display panel to indicate the score for player two.

SUMMARY DESCRIPTION OF GAME OPERATION

The game is activated by depositing coins of the proper denomination via coin slot **11** of the remote control unit (FIG. **1**) which closes contacts **12** (FIG. **3**) to transmit a signal to "coin" receiver **14**. After either one or two coins have been deposited (depending upon the position of switch **29**) "coin set" relay K4 is actuated to close contacts **56** which, in turn, couples "play" receiver **16** to the serve and play control circuits shown in FIG. **4**. Under these circumstances the game is activated.

After the game is activated, depressing of one or the other of pushbutton switches **10***a* or **10***b* causes "play" receiver **16** (FIG. **3**) to provide a pulse which passes via movable contact **66** to momentarily energize "serve" relay K6. Energization of the "serve" relay causes capacitor **70** to provide a pulse which, assuming the "player up" relay KB is in the position shown in FIG. **4**, provides an energizing pulse to winding **110** of "player one swing" stepping switch SS5 (FIG. **5**). This causes stepping switch SS5 to advance through its stepping sequence and, as a result, a simulated paddle swing for cartoon character **5** is provided via bank A (FIG. **7**). When relay K6 is energized, it in turn energizes "serve auxiliary" K7 which energizes "player one serve" relay K14 in FIG. **5**. Therefore, the serve ball simulation will also be controlled by contact bank A via contacts of relay K14.

The serve sequence takes place during the first actuation of one of the pushbutton switches **10***a* or **10***b*. When the pushbutton switch is released "serve" relay K6 (FIG. **4**) returns to the deenergized state and thereby initiates the simulated movement of the ping-pong ball from player one toward player two. This is achieved by means of capacitor **80** (FIG. **4**) which provides a pulse to stepping switch SS1 (FIG. **5**) when relay K6 returns to the deenergized state. The pulse initiates movement of stepping switch SS1 which then advances through its stepping sequence to provide the moving ball simulation on the display panel via contact bank B (FIG. **7**).

The next actuation of a pushbutton switch would represent the opposing player's attempt at hitting the moving ball. In response to the first actuation, relay K5 has been maintained in the energized state, and, therefore, the subsequent signals developed by "play" receiver **16** (FIG. **3**) pass via movable contact **66** to momentarily energize "play" relay K8. When this occurs the "play" relay closes movable contact **112** to provide a signal which initiates movement of stepping switch SS6 (FIG. **6**) to begin the simulated paddle movement for player two. Energization of relay K8 also advances "player up" relay KB so that it is in the opposite position to that shown in FIG. **4**. The "swing two" pulse developed by movable contacts **112** therefore passes to movable contact **162** (FIG. **5**) of stepping switch SS1. This occurs while the stepping switch SS1 is progressing through its stepping sequence. If the "swing two" pulse occurs when the stepping switch is in the fifth position, a "hit" is detected and relay K10 (FIG. **6**) becomes energized. However, if the "swing two" pulse arrives when stepping switch SS1 is in any other position, a "miss" is detected and relay K12 becomes energized.

Thereafter, when stepping switch SS1 reaches the end of its stepping sequence, a pulse is developed by means of capacitor **197** which will proceed to energize either stepping switch SS2 for a return volley or stepping switch SS3 to provide the miss ball simulated sequence.

Stepping switches SS1 and SS2 will be activated alternatively simulating the volley of the ping-pong ball back and forth between players until a "miss" is detected. Hence, the length of the volley depends upon the skill of the players. Ultimately, when a "miss" is detected a capacitor (either capacitor **212** in FIG. **5** or capacitor **220** in FIG. **6**) associated with one of the "player miss" stepping switches SS3 or SS4 provides a pulse to one of stepping switches SS7 or SS8 to add a point to the appropriate player's score.

When one of the players reaches a full score, as indicated by either of stepping switches SS7 or SS8 reaching the 10th position, a signal is developed which energizes "game over" relay K1 (FIG. **3**). When this occurs, the "coin set" relay K4 is deenergized to open contacts **56** thereby disconnecting "play" receiver **16** from the serve and play control circuits in FIG. **5**. Under these circumstances, the game can no longer be played. It is desirable that the score indications remain on the display panel even after the game is completed and, therefore, the score-stepping switches SS7 and SS8 are not reset at this time. Subsequently, when additional coins are deposited to energize "coin control" relay K2, reset signals for stepping switches SS7 and SS8 are developed via contacts **55**.

On some occasions it may be desirable to reset the game apparatus before the came has been completed. It should be noted that whenever a coin is deposited, "coin control" relay K2 is energized. When this occurs normally closed contacts **53** open to break the holding circuit for "coin set" relay K4. Energization of the "coin control" relay also closes contacts **55** to reset the score-stepping switches.

While only one illustrative embodiment of the invention has been described in detail, it should be apparent that there are numerous other games and circuit variations within the scope of the invention. By way of example, it should be noted that the same or similar control circuitry could be utilized to simulate handball, volleyball, tennis or the like by modifying the display panel accordingly and, perhaps, the scoring and display sequence to some extent. The control circuits could also vary as, for example, by utilizing a single reversible add-subtract stepping switch in place of stepping switches SS1, SS2, SS3 and SS4, such an add-subtract stepping switch being connected to move between two intermediate positions during a volley and to move toward a home position when a miss is detected. Furthermore, the control circuits can be constructed using solid-state logic where transistor or integrated circuit switches and AND/OR logic replaces the relays, ring counters replace the stepping switches and flip-flop circuits replace the bistable relays. The invention is more particularly defined in the appended claims.

I claim:

1. In an electric amusement game wherein a simulated game object is hit back and forth between simulated players, the combination of:

a display panel disposed for view by the players;

first circuit means coupled to said display panel to simulate thereon when actuated the movement of a game object toward a simulated player on said display panel;

second circuit means coupled to said display panel to simulate thereon the movement of a game-playing object along a path which intercepts the path of said simulated game object;

third circuit means connected to said first and second circuit means to detect when said game object and said game-playing object intercept to alter the simulated movement of said game object; and

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

2. An electric amusement game according to claim 1 further including a radio transmitter-receiver coupled between said player-operated means and said first and second circuit means.

3. An electric amusement game according to claim 1 further including means for receiving coins and detecting when coins of a predetermined amount have been deposited, said means being connected to complete the coupling between said player-operated means and said first and second circuit means when deposited coins of said predetermined amount have been received.

4. An electric amusement device according to claim 3 wherein said player-operated means and said mans for receiving coins are located remotely, and further comprising radio transmitter-receiver means for coupling said player-operated means and said means for receiving coins to said first and second circuit means.

5. An electric amusement game according to claim 1 wherein said game object is a simulated ping-pong ball and said game-playing object is a simulated ping-pong paddle.

6. An electric amusement game according to claim 1 wherein said third circuit means alters the simulated movement of said game object so that it appears to return to another player on said display panel when said game object and game-playing object intercept.

7. An electric amusement game according to claim 6 wherein the movement of said game object is not altered when said game-playing object fails to intercept said game object and appears to move past the simulated player on said display panel.

8. In an electric amusement game, comprising

a display panel disposed for view by the players;

first circuit means coupled to said display panel to simulate thereon the movement of a game object back and forth between two players, said first circuit means being operative

to simulate the movement of said game object from one player toward the other in response to an initial actuation, and

to reverse the direction of movement of said game object in response to each subsequent actuation;

second circuit means coupled to said display panel to simulate thereon, when actuated, the movement of game-playing objects along paths which intercept the path of said simulated game object;

player-operated means coupled to said first and second circuit means to provide said initial actuation for said first circuit means and to provide actuations for said second circuit means;

third circuit means connected to said first and second circuit means to detect when said game object and said game-playing object intercept and to provide a subsequent actuation for said first circuit means each time an interception is detected.

9. An electric amusement game according to claim 8 further including circuit means coupled between said player-operated means and said first and second circuit means so that a first player actuation of said player-operated means provides said initial actuation for said first circuit means and said first and subsequent actuations of said player-operated means provide actuations for said second circuit means.

10. An electric amusement game according to claim 8 wherein said game object continues on a path extending beyond said game-playing object when an intercept is not detected by said third circuit means.

11. An electric amusement game according to claim 8 wherein said second circuit means is actuated prior to the initial actuation of said first circuit means to simulate the serve of said game object.

12. An electric amusement game according to claim 8 further including score-accumulating and display means, and wherein said third circuit means is coupled to said score means to add to a player's score when an intercept is not detected.

13. An electric amusement game according to claim 8 wherein said game object is a ping-pong ball and said game-playing object is a ping-pong paddle.

14. An electric amusement game according to claim 8 further including a radio transmitter-receiver coupled between said player-operated means and said first and second circuit means.

15. An electric amusement game according to claim 8 further including means for receiving coins and detecting when coins of a predetermined amount have been deposited, said means being connected to complete the coupling between said player-operated means and said first and second circuit means when deposited coins of said predetermined amount have been received.

16. An electric amusement device according to claim 15 wherein said player-operated means and said means for receiving coins are located remotely, and further comprising radio transmitter-receiver means for coupling said player-operated means and said means for receiving coins to said first and second circuit means.

17. In an electric amusement game, the combination of

a display panel disposed for view by the players having areas thereon which can be selectively illuminated;

first switching means coupled to said display panel for selectively illuminating selected areas of said display panel for simulation of a game ball movement back and forth between two players;

second switching means coupled to said display panel for selectively illuminating selected areas of said display panel for simulation of game-playing object movements which intercept the path of said simulated game ball movements;

player-operated means;

first circuit means coupled between said player-operated means and said first and second switching means to provide a simulated serve of the game ball in response to a first player actuation;

second circuit means coupled between said player-operated means and second switching means to provide simulation of a game-playing object movement in response to subsequent player actuations; and

third circuit means coupled to said second circuit means for detecting when said simulated game playing object and said simulated game ball intercept, said third circuit means being connected to said first switching means to alter the direction of the simulated game ball movement when an interception is detected.

18. An electric amusement game according to claim 17 wherein said first and second switching means each comprise stepping switches.

19. An electric amusement game according to claim 17 wherein said first switching means comprises

a first stepping switch for controlling simulation of the game ball movement from a first simulated player toward a second simulated player on said display panel and

a second stepping switch for controlling simulation of the game ball movement from said second simulated player toward said first simulated player.

20. An electric amusement game according to claim 19 wherein said first switching means further comprises a pair of stepping switches coupled to said display panel to control simulation of the game ball movements when said game-playing object fails to intercept said simulated game ball.

21. An electric amusement game according to claim 17 wherein said second switching means comprises a separate stepping switch for controlling the simulated game-playing object movement for each of two simulated players on said display panel.

22. An electric amusement game according to claim 17 wherein said third circuit means is also operative to detect when a simulated moving playing object fails to intercept said moving ball game, and further including switching means connected to said third circuit means for accumulating the players' scores.

23. An electric amusement game according to claim 17 wherein said third circuit means detects an interception by detecting when said subsequent player actuations occur when said switching means is in a predetermined condition.