March 30, 1954 E. J. COLLINS ET AL 2,673,637

GAME DEVICE

Filed May 27, 1949

4 Sheets-Sheet 1

FIG. 1.

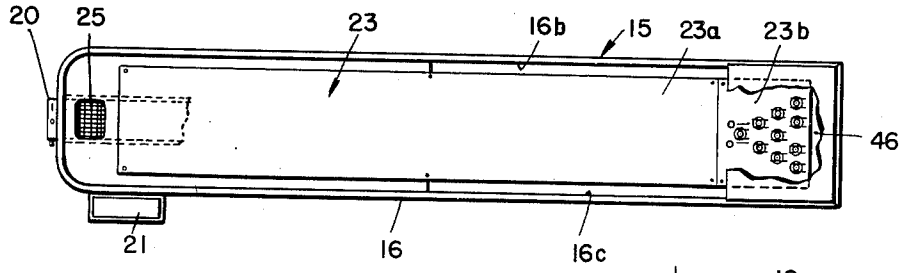



FIG. 2.

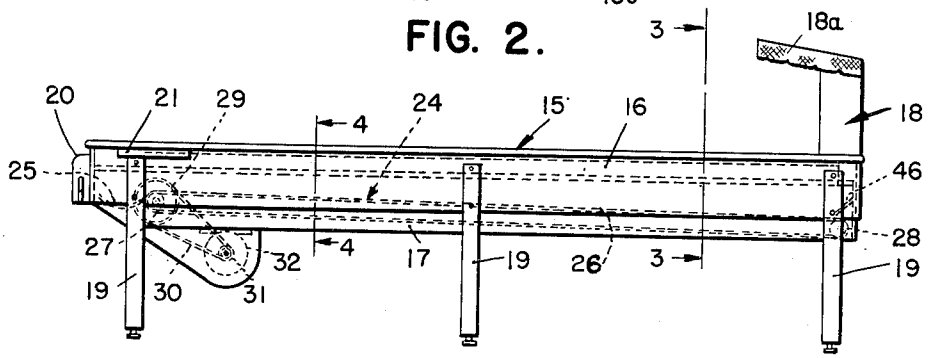



FIG. 3.

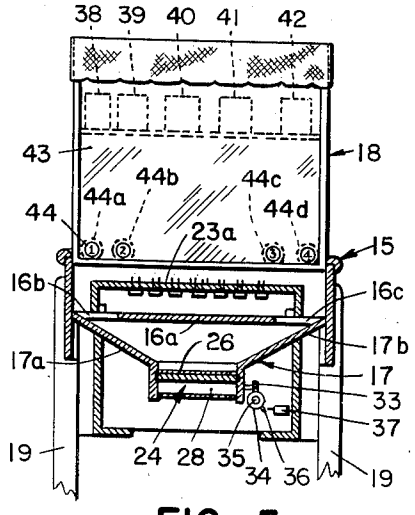



FIG. 4.

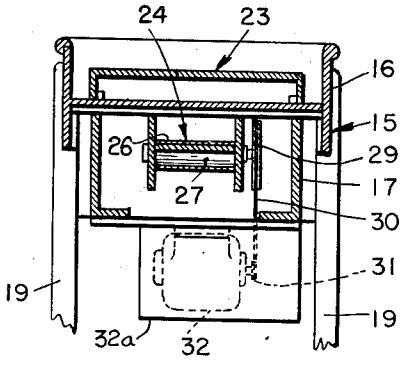
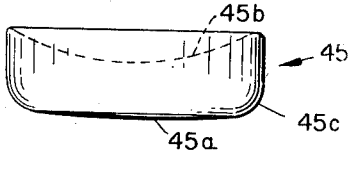



FIG. 5.




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FIG. 6.

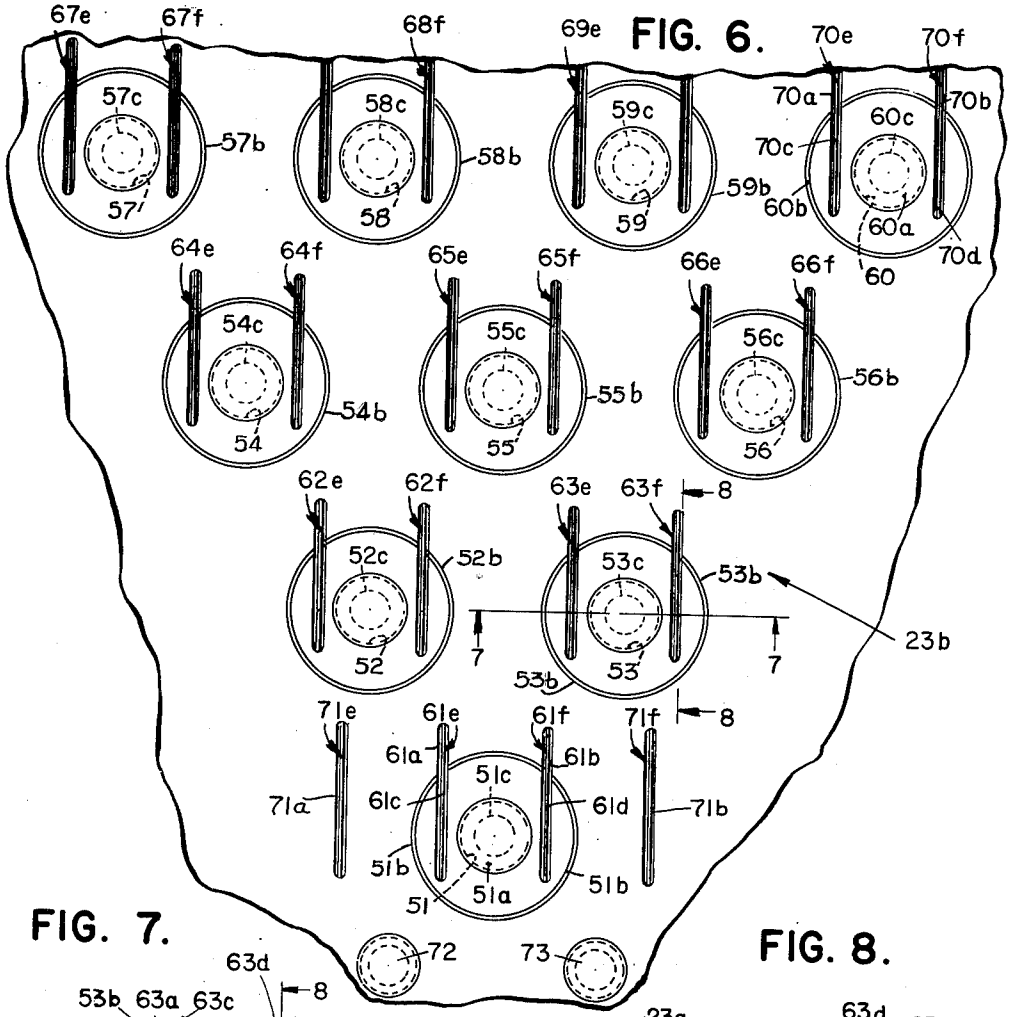



FIG. 7.

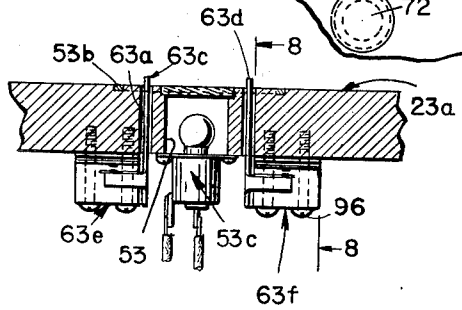
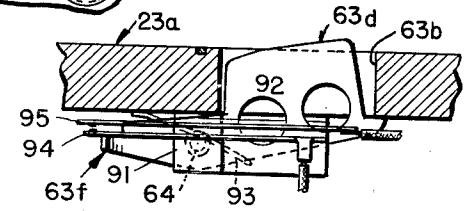



FIG. 8.




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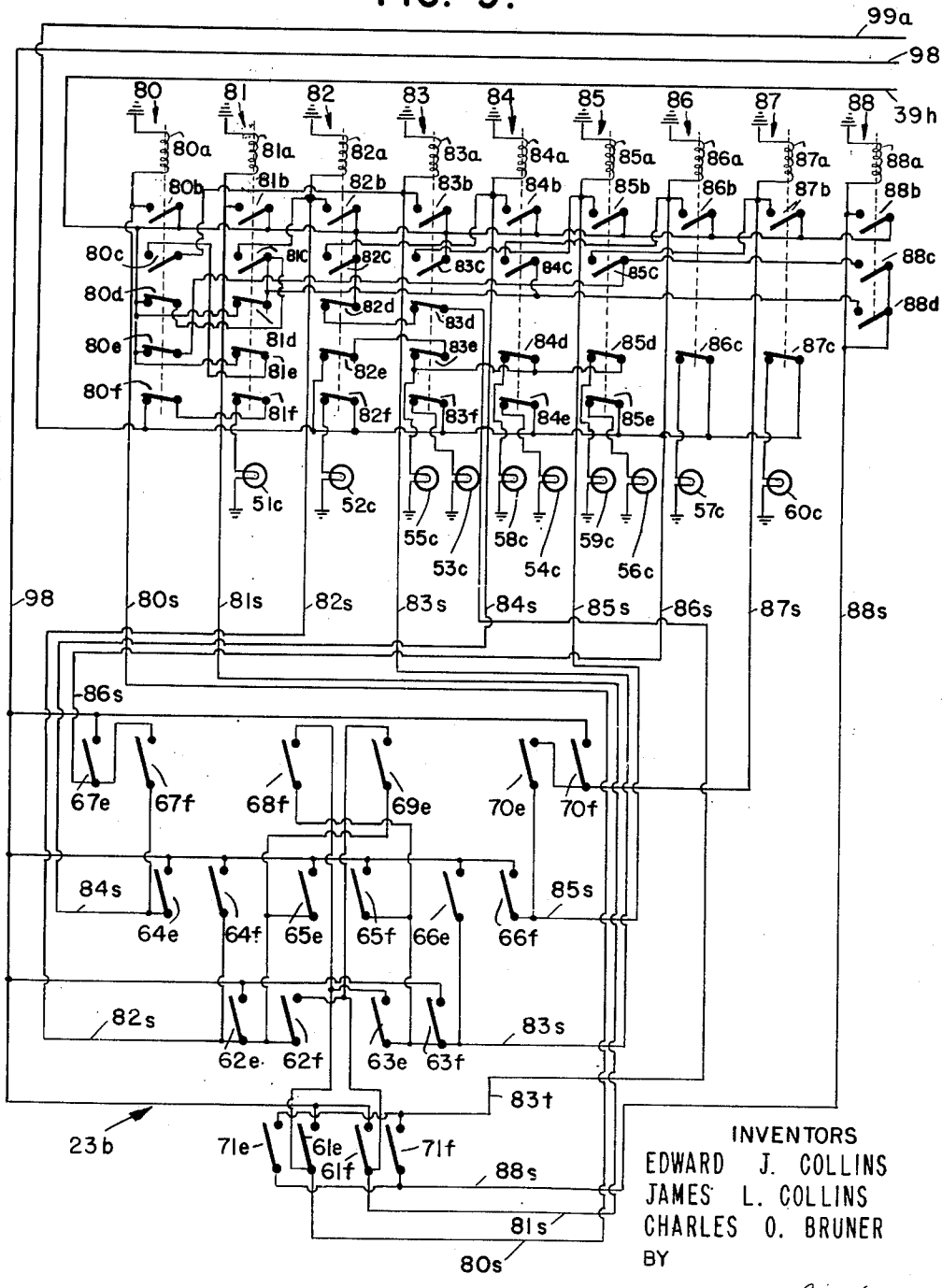
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FIG. 9.



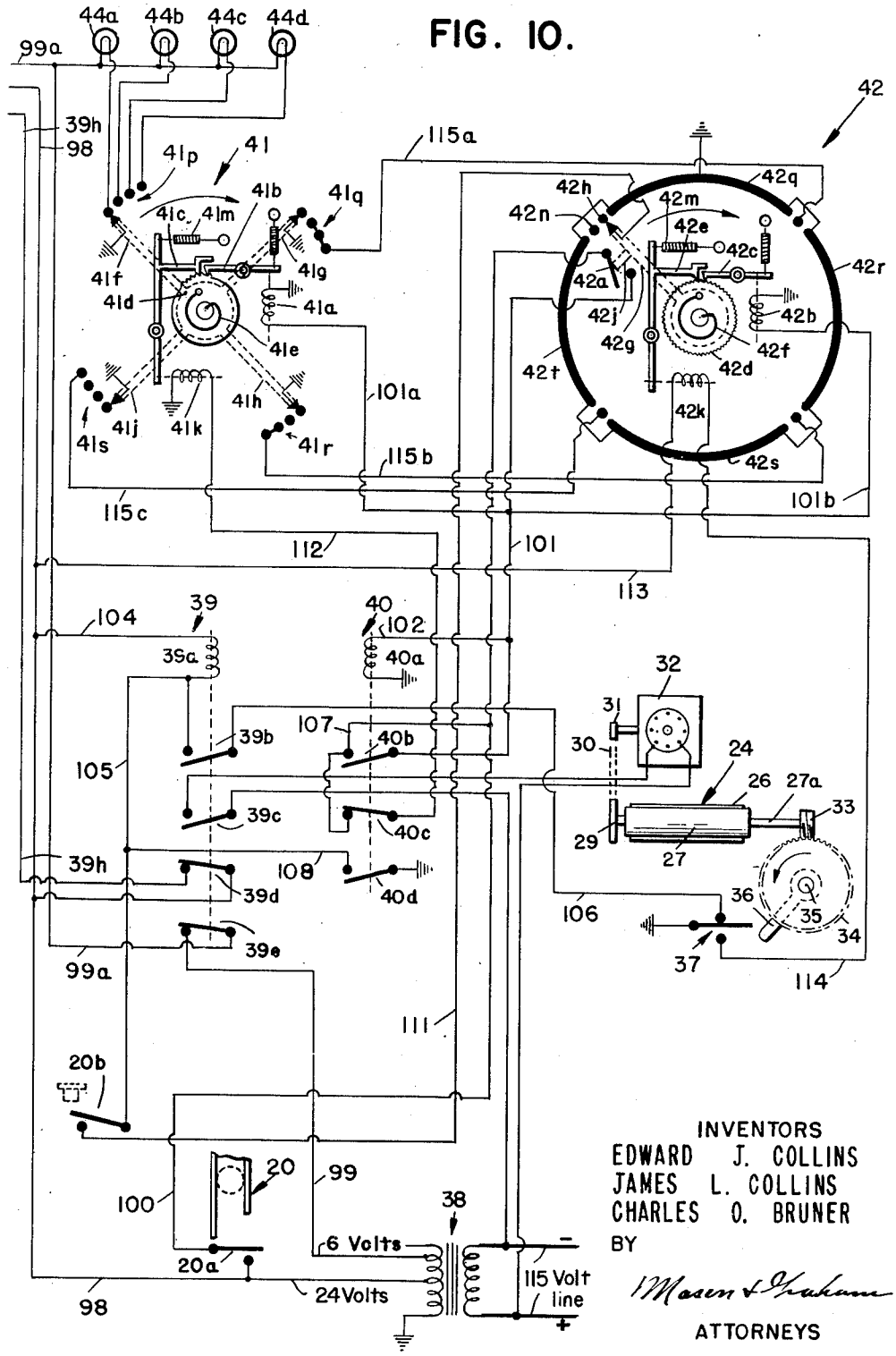

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FIG. 10.




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# UNITED STATES PATENT OFFICE

2,673,637

## GAME DEVICE

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Application May 27, 1949, Serial No. 95,736

4 Claims. (Cl. 194—9)

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This invention has to do generally with game devices of a type providing a playing surface over which a player propels a playing object, a target means toward which to direct the object, and means for giving a visible indication apart from the targets of the targets struck.

An object of the invention is to provide a novel game device for playing, on a relatively small scale, games which ordinarily are played over large playing surfaces. In this connection an object is to provide a game device which is particularly adapted for playing a simulated ten-pin bowling game.

A further object is to provide a novel target means and an electrical indicator means wherein the target means takes the place of ordinary ten pins and, in conjunction with the electrical means, gives results substantially the same as would be obtained in a regular full-sized bowling game.

A particular object of the invention is to provide a novel target switch which can be readily actuated by a playing object contacting the same and which is not subject to being damaged by being struck by the playing object.

A further object of the invention is to provide a game device providing a plane playing surface over which to slide a playing object or disk together with novel electrical target switch means projecting through the playing surface adapted to be actuated by the sliding disk.

Another object of the invention is to provide a target member including a lever having a portion projecting through a slot in a playing surface which portion is adapted to be struck by a playing object sliding over the surface and including electrical switch means actuated by pivotal movement of the lever.

Another object is to provide in a game device of the type indicated a target area having spots or areas which can be illuminated and arranged in an equilateral triangle in the manner of ten pins, a plurality of target members disposed in the target area, and electrical means operatively connected to the target members in such a way and so arranged that the electrical means will respond to actuation of the targets by a playing object in a manner to darken (or illuminate) the areas corresponding to the ten pins that would be knocked down by a bowling ball traveling the same path as the path traveled by a playing object of the game on a given play.

These and other objects will be apparent from the drawings and the following description thereof.

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Referring to the drawings:

Fig. 1 is a plan view of the game device;

Fig. 2 is a side elevational view of the game device;

Fig. 3 is a section on line 3—3 of Fig. 2;

Fig. 4 is a section on line 4—4 of Fig. 2;

Fig. 5 is a side elevational view of a playing object or weight;

Fig. 6 is an enlarged plan view of the target area of the game device showing the arrangement of the targets;

Fig. 7 is a section on line 7—7 of Fig. 6;

Fig. 8 is a section on line 8—8 of Fig. 6; and

Figs. 9 and 10 are wiring diagrams showing the electrical circuits.

More particularly describing the invention, reference numeral 15 indicates the game device as a whole. This is generally in the form of a table and includes a box-like frame 16 to which is dependently attached a conveyor housing 17. At one end of the device is an upright hollow electrical equipment cabinet 18 and a canopy 18a supported thereby. Suitable legs 19, which may be attached in any ordinary manner, serve to support the frame 16, housing 17, and various parts.

At the forward end of the device there is mounted a coin box 20, which may be secured to the frame 16. A scoring pad support 21 may also be provided at this end of the device.

A horizontal partition 16a extending between the elements of the frame 16 supports a playing table 23, which has a smooth, plane playing surface 23a over which the playing objects or disks, later to be described, are manually propelled by the players. The partition 16a is apertured along its sides at 16b and 16c to provide a passage for a playing object should the same leave the playing surface 23a over the lateral margins thereof. Playing objects falling through these apertures are directed to a conveyor 24 by means of inclined walls 17a and 17b of the conveyor housing 17.

The conveyor includes an endless belt 26 which is adapted to be driven in a direction to move playing objects from the rear of the game device to the front where they are delivered into a pocket 25. The conveyor includes a drive pulley 27, a driven pulley 28, and a sheave 29. The latter is connected by a belt 30 to a motor sheave 31 of a motor 32 which is supported in any suitable way and enclosed within a motor housing, indicated by 32a.

Shaft 28a, on which is mounted pulley 28, carries a worm 33 (Figs. 3 and 10) which meshes

with a gear wheel 34 mounted on a shaft 35. Arm 36 is mounted on the shaft 35 and rotates therewith being constructed and arranged to actuate a switch 37, the function of which will be explained later.

The cabinet 18 houses the major portion of the electrical means, including a transformer 38, a motor relay 39, a reset relay 40, a player light step-switch 41, a frame counter step-switch 42, and target lamp relays 80—88, the functions of which will be described later. The cabinet is provided with a window 43, which is preferably transparent or translucent, the window being provided with suitable markings 44 to indicate the number of coins deposited. Directly behind the indicia 44 are lamps 44*a*, 44*b*, 44*c*, and 44*d*, respectively, which are illuminated one for each coin deposited in the coin box 20 in a manner to be described.

The end of the playing table 23 nearest the cabinet 18 is provided with a target area 23*b* which terminates short of the rear wall of the frame 16 to provide a space for the playing objects to drop to the conveyor below after passing over the playing surface of the table. The target area 23*b* of the table is provided with openings 51—60 (Figs. 6 and 7) which are arranged to form an equilateral triangle. Each opening is closed by a translucent plug which is flush with the playing surface of the table, the plugs being indicated by numerals 51*a*—60*a*. Each opening is provided with a target lamp or pin light (Fig. 7) and these lights have been indicated by numerals 51*c*—60*c*. For the purpose of accentuating the pattern of the target area, the openings 51—60 are surrounded with concentric recesses 51*b*—60*b* which are preferably filled with a colored material that is readily visible in contrast to the playing surface.

The target area is provided with a pair of slots for each opening 51—60, the slots of each pair being positioned one on each side of the opening and being indicated by the numerals 61*a*—70*a* and 61*b*—70*b*. Additionally, two extra slots are provided one on each side of the first opening 51. These extra slots are indicated by numerals 71*a* and 71*b*. The slots are designed to receive upwardly projecting ends of levers 61*c*—71*c* and 61*d*—71*d* forming part of target switches 61*e*—71*e* and 61*f*—71*f*, respectively.

Each target switch lever is pivotally mounted at 64 on a bracket 91 and includes a plate-like end portion 92 which extends upwardly through the slot and is normally yieldably held by spring 93 positioned as shown in Fig. 8 wherein the switch lever presents an inclined upper edge for engagement by a playing object. As the playing object passes over the lever it depresses the same and the pivotal movement thereof raises the opposite end of the lever which engages the bottom blade of a switch 94. The other switch blade 95 is supported on bracket 91 which is adapted to be secured to the undersurface of the playing table, as by screws 96.

In addition to the above-described openings or lighted areas of the target area of the playing surface, the target area may be provided with a pair of colored or lighted guide spots 72 and 73.

As previously indicated, the table 23 is adapted to provide a playing surface 23*a* over which a suitable type of playing object or weight can be manually propelled by a player from the front end of the table toward the rear end thereof with a view of passing through the target area. In Fig. 5 there is shown a playing object or weight, which is generally indicated by numeral 45. The object may be made of any suitable material and is preferably in the shape of a disk. The lower surface 45*a* of the object may be slightly convex and the upper surface 45*b* is preferably recessed. Near its periphery the intersection of the bottom surface and the peripheral surface may consist of a rounded portion 45*c*. It will be apparent that this object may be readily slid over the playing surface and will serve to depress any target switch over which it passes, thereby actuating the same.

The electrical system of the game device is shown in Figs. 9 and 10. The purpose of the system is to permit a given number of plays for each coin deposited and to provide means to give a visible indication of the targets hit each time the playing object is propelled over the target area. As previously described, the game device, in the form illustrated is designed to simulate a ten-pin bowling game and for that reason ten target lamps 51*c*—60*c* are illuminated at the start of each "frame." The target lamps are included in an electrical circuit which is normally closed once the device has been initially energized by the insertion of a coin in coin box 20. The individual lamps are controlled by target lamp relays 80—88. These are included in normally open circuits which are closed by actuation of the target switches previously described. Certain target switches control a single lamp relay, while others control a plurality of the relays through interconnecting circuits of certain of the relays. The relays have self-establishing holding circuits to maintain them energized after initial energization by closing of a target switch.

A coin switch 20*a* is provided for initially establishing credit in the system for a limited number of plays and actuation thereof serves to actuate a frame counter step-switch or play-limiting means 42 and give an indication of the deposit of the coin through what will be termed a player light step-switch 41. The system also includes a motor 32 for the conveyor, a motor relay 39, and a reset relay 40. The motor relay controls the motor circuit, a lamp circuit, and a hold circuit which runs to the target lamp relays. It is initially energized by the coin switch 20*a* through the reset relay, also thereby energized, and subsequently during play, or between "frames" by a reset switch 20*b*.

The component parts and typical exemplary operations of the electrical apparatus embodied in the game device will now be described simultaneously. Referring to Figs. 9 and 10 and disregarding the relation or position of the controlling elements of the device as they may have been left by a previous player, it will be assumed that a coin is inserted in coin box 20. This closes switch 20*a* and establishes a circuit from the 24 v. line of transformer 38 through the coil of reset relay 40, the current passing through conductor 100, normally closed (shown open) switch 42*a* of the frame counter step-switch 42, and through conductors 101 and 102. Energization of coil 40*a* of relay 40 closes switches 40*b* and 40*d* and opens switch 40*c*.

The closing of switch 40*d* completes a circuit from line 98 through coil 39*a* of motor relay 39 through the medium of conductors 104, 105, and 108, thereby closing switches 39*b* and 39*c* and opening switches 39*d* and 39*e*. Closing of switch 39*b* establishes a holding circuit from line 98 through conductor 104, coil 39*a*, and conductor 106 to ground through normally closed switch 37.

The closing of switch 39c completes a circuit from the 115-volt line through conveyor motor 32. This provides a means of driving the conveyor belt 26, and through the medium of the worm 33, gear wheel 34, and lever 36 there is provided means for actuating switch 37 to control the advancing operation of the frame counter step-switch 42. The insertion of the coin starts the resetting cycle and the lever 36 makes one revolution to open switch 37. The momentum of the motor is such as to carry the lever past the switch to allow it to close again.

The closing of switch 40b by energization of relay 40 completes a circuit from line 98 through reset solenoid 41a of player light step-switch 41 through conductors 100, 107, 101, and 101a. Energization of solenoid 41a causes a holding pawl 41b to be moved out of engagement with teeth on a ratchet wheel 41d and simultaneously releases advancing pawl 41c so that a torsional spring 41e acts to rotate the wheel counterclockwise to the "zero" or first position. Wheel 41d has fixed to it four arms 41f, 41g, 41h, and 41j, each arm carrying a contact point which is grounded electrically. In the zero position, the contact on arm 41f completes a circuit from the 6-volt line 99 through conductor 99a and player lamp 44a by a conductor terminating in the first contact button 44p, thereby indicating that one coin has been inserted in the coin box and that the player is entitled to a given number of plays.

We will assume, for the present, that only one coin is inserted at this time. Closing of switch 40b also energizes solenoid 42b through conductors 101b, 101, and 100 causing pawl 42c to be released from engagement with the teeth of ratchet wheel 42d, and simultaneously releasing an advancing pawl 42e so that torsional spring 42f will rotate the wheel 42d counterclockwise to the position shown on the drawing. An arm 42g is fixed to the wheel 42d, the end of the arm carrying a contact shown as being in registration with a button 42h. The arm 42g has a projection 42j which serves to mechanically open the switch 42a when the arm reaches the position shown.

This reset action is very rapid and takes place before the coin switch 20a opens, the coin switch being of the type wherein the coin holds the switch closed for a short period of time. To prevent relay 40 from immediately being dropped when switch 42a opens, a temporary holding circuit is established through the relay by the closed switch 40b, one side of which is connected to conductor 100 and the other side to conductor 101. Thus, when switch 20a finally opens, the circuit is opened through reset relay 40 and consequently through the reset solenoids 41a and 42b.

With the dropping of relay 40 switches 40b and 40d are thereby opened and switch 40c closes. Despite the fact that switch 40d has opened, motor relay 39 remains energized through the holding circuit previously completed through the closing of switch 39b. The motor thus continues to rotate until lever 36 advances sufficiently to break the holding circuit by opening switch 37. Immediately after breaking this circuit, the lever moves the leaf of the switch 37 to make contact with the opposite button and thus establishes a circuit from line 98 to ground through solenoid 42k of step-switch 42, the current passing through conductors 113 and 114. As a result, advancing-pawl 42e is retracted a distance equal to one tooth of the wheel 42d and upon deenergizing of solenoid 42k (as lever 36 passes beyond switch 37) a spring 42m pulls the pawl and advances the wheel and consequently the arm 42g one step. This moves the contact of arm 42g onto the arcuate strip 42q. However, the arm does not move far enough to permit switch 42a to close. The energizing and deenergizing of coil 39a, having opened and again closed switches 39d and 39e, has thus broken and closed a holding circuit through conductor 39h running to all of the target lamp relays 80—88, thereby allowing all previously extinguished target lamps to again be illuminated, setting the entire machine ready for play.

*The initial play*

Assume that the player so directs a playing object that it passes over target switch 70f, thereby closing the same. This completes a circuit from the line 98 to coil 87a of the target lamp relay 87 through conductor 87s, thus closing switch 87b and opening switch 87c. In this connection, each target lamp relay is connected to ground on one side and each target switch is connected to the 24-volt current supply line 98. The closing of switch 87b establishes a holding circuit from conductor 39h through the relay. Opening of switch 87c opens the circuit to target light 69c, extinguishing it. The light remains out until resetting of the machine for the next play. Thus the player has scored the tenpin or one point for the first try of the play.

Assume now that the player directs the next playing object so that it passes over switches 64e and 67f. The closing of switch 64e completes a circuit through conductor 84s and coil 84a of relay 84 which closes switches 84b and 84c and opens switches 84d and 84e. The closing of switch 67f completes a circuit through relay 86, closing switch 86b and opening switch 86c. As in the case of coil 87a, the holding circuit is again established and target lights 54c, 57c and 58c are extinguished, the player having scored the number four, seven, and eight pins, making a total score of four points for the first frame.

*The reset*

The player then pushes the reset button on the coin box and switch 20b is closed to energize motor relay 39 by way of conductors 104 (connected to supply line 98) and 111 through arcuate contact strip 42q to ground. This closes switches 39b and 39c but opens switches 39d and 39e. Closing switch 39b again establishes the holding circuit for coil 39a as previously described. Switch 39c again establishes the motor circuit and hence the arm 36 makes its revolution and breaks the circuit to the coil 39a, deenergizing the coil, breaking the circuit to the motor and re-establishing the hold line 39h and lamp line 99a. Switch 37, being moved sufficiently to complete the circuit through solenoid 42k as previously explained, the advancing-pawl rotates wheel 42d and arm 42g one step. This impluse now allows the switch 42a to completely close. The device is now ready for the playing of the second frame.

*The play, second frame*

Assume that the player so directs a playing object that it passes over target switches 61e, 61f, 65e, 65f, that is, right down the center of the playing field. In this case, relays 80, 81, 82, and 83 would be energized. Relay 80 would close switches 80b, 80c and open switches 80d, 80e, and 80f. Relay 81 would close switches 81b, 81c but open switches 81d, 81e, and 81f. Corre-

sponding switches associated with relays 82 and 83 would be similarly actuated. Switches 80*b*, 81*b*, 82*b*, and 83*b* would establish holding circuits for the relay coils 80*a*, 81*a*, 82*a*, and 83*a*, respectively. Thus, lamps 51*c*, 52*c*, 53*c*, 54*c*, 55*c*, 56*c*, 58*c*, and 59*c* are extinguished, making a perfect Split, leaving the number seven and the number ten-pin lights illuminated. The player on his second try might hit either one of these. The reset button is again pushed to energize the motor relay and the reset cycle carried through as before to light the target lamp.

*The play, third frame*

Assume now that a player directs the playing object so that it passes over the switches 61*f*, 71*f*, 65*f*, also obviously passing over 63*e*, but the latter in this case is inactive. Switch 61*f* controls relay 81, switch 71*f* controls relay 83, and switch 65*f* controls relay 83. Coil 81*a* of the relay 81 closes switches 81*b*, 81*c* but opens switches 81*d*, 81*e*, 81*f*. Relay 83 closes switches 83*b*, 83*c*, and 83*d*. Coil 83*a* of the relay 83 closes switches 83*b*, 83*c* but opens switches 83*d*, 83*e*, 83*f*.

With switches 83*d* and 81*c* closed, coil 82*a* of the relay 82 is supplied current and hence closes switches 82*b*, 82*c* but opens switches 82*d*, 82*e*, and 82*f*. With switch 82*c* closed, current from the holding circuit is supplied to the coil 84*a* of the relay 84 and thus closes switches 84*b*, 84*c* but opens switches 84*d* and 84*e*. With switch 83*c* closed, current from the holding circuit is supplied to coil 85*a* of the relay 85, closing switches 85*b*, 85*c* but opening switches 85*d* and 85*e*. With switches 88*c* and 85*c* closed, current is supplied to the coil 87*a* of the relay 87 and thus opens switch 87*c*. All lamps are thus extinguished and so the player has scored a Strike.

The device is reset as before.

*The play, fourth frame*

Assume that the player directs a weight so that it passes over 71*f*, 63*f*, and over 66*e*. Switch 71*f* controls relay 83. Switches 63*f* and 66*e* are both coupled to complete the circuit to coil 83*a* of the relay 83. Coil 85*a* of the relay 85 is supplied current from switch 83*c* of the relay 83. Coil 87*a* of the relay 87 is supplied current from switch 85*c* of the relay 85 and through the switch 88*c* of the relay 88. Thus the circuits to the lamps 53*c*, 55*c*, 56*c*, 58*c*, 59*c*, and 60*c* are opened, scoring the numbers three, five, six, eight, nine, and ten pins.

The game may continue until a total of ten frames or, if the player makes a strike in the tenth frame, he would then be entitled under rules of bowling to the two free throws, making a total of twelve frames. The length of the contact strip 42*q* of the frame-counter step-switch 42 is such that a total of twelve resets may be made before the contact point on the arm 42*g* would leave the strip 42*q* and come to rest on the button at the end of conductor 115*a*. When arm 42*g* is on this button (and only one coin has been deposited) the reset circuit has no ground connection. However, if the player had deposited an additional coin before starting to play, the second coin would have closed switch 20*a*, completing a circuit through switch 40*b* to the solenoid 41*k*, advancing the arms 41*f*, 41*g*, 41*h*, and 41*j* a distance equal to another button of the player-light step-switch. The contact on the arm 41*g* would then have made contact with the second button 41*q* so that when the contact on the arm 42*g* of the frame-counter step-switch 42 reached the button between strips 42*q* and 42*r*, a ground for the reset circuit would be re-established and the play could continue. This condition is also true when the third and fourth coin is deposited, the arcuate strips 42*r*, 42*s*, and 42*t* being provided on the step-switch 42 for this purpose. In this manner, two, three, or four players may play in much the same sequence as in the regular game of bowling.

Provision is also made for plays where seemingly the player had directed the playing object so that it came within the area defined by one of the circular markings 51*b*—60*b* on the surface of the target field 23*b* but did not actually depress the switch. For instance, an object passing over the extreme right side of the area defined for the number six pin, misses the number 66f switch but passes over the number 70*e* switch. In reality, the number six pin would have been scored and so, switch 70*e* is coupled to 66*f* with a jumper wire to make the play realistic.

In the description so far by way of example we have originated the plays on the right-hand side of the target field. It is understood, however, that similar plays might just as readily originate on the left-hand side. Also it will be apparent that there are many more plays possible than those described thus far.

In the description above we have assumed only one coin was deposited. Had a second coin been deposited immediately following the first, this would again close switch 20*a* thereby energizing the circuit through the solenoid 41*k*, such circuit including switch 40*c* which is closed. In this connection it may be pointed out that the arm 42*g* of the play-limiting step-switch is in a position at the end of the contact member 42*q* adjacent a button 42*h* and that in this position it still holds switch 42*a* open. With this latter switch open the reset relay is not energized and solenoids 41*a* and 42*b* are not energized. Hence, the only function of a second and succeeding coins is to advance the player light step-switch 41. The result of this is that the play can go on, depending upon the number of coins inserted as the arm 42*g* of the play-limiting switch reaches the ends of the segments 42*q*, 42*r*, 42*s*, and 42*t* as the case may be, since the contact buttons between these segments are connected to ground through the player light step-switch.

Although the invention has been particularly shown and described, it is contemplated that various changes and modifications can be made without departing from the scope thereof as set forth in the following claims.

We claim:

1. In a game device having a target area, electrical means adapted to be connected to a source of current supply comprising a plurality of play-registering lamps, a plurality of play-registering lamp relays controlling said lamps, means for energizing said relays including a current supply for said relays, a plurality of target switches connected between the current supply and the individual relays for initially selectively energizing said relays, self-establishing holding circuits for said relays, a coin-controlled step-switch, a play-limiting step-switch, coin-controlled means for returning both said step-switch means to a starting position and for initially advancing said play-limiting step-switch one unit, said coin-controlled means including means for advancing said coin-controlled step switch one unit for each coin inserted after return of same to starting position, and manually controlled play-registering reset means for momentarily breaking said hold-

ing circuits and advancing said play-limiting step-switch one unit, said reset means being connected in series with said play-limiting step-switch and, in certain positions of same, in series with said coin-controlled step-switch, and said play-limiting switch whereby the reset means is deenergized when the play-limiting step-switch reaches a predetermined position dependent upon the position of the coin-controlled step-switch.

2. In a game device having a target area and target switches therein adapted to be actuated selectively by a playing object, play-registering lamps, lamp relay means controlling said lamps connected for selective initial energization by said target switches, and self-establishing holding circuits for said relays connected to a supply conductor for the holding circuits, control means for the conductor, comprising a motor, a motor relay controlling a normally closed switch in said supply conductor and controlling said motor, a manually controlled normally open reset switch for initially energizing said motor relay, a self-establishing holding circuit for said motor relay, switch means operated by said motor for opening the motor relay holding circuit after a predetermined number of revolutions of said motor, a play-limiting step-switch including a solenoid operated switch advancing means, and additional switch means operated by said motor for energizing the solenoid operated switch advancing means, said play-limiting switch being connected in series with said reset switch.

3. In a game device having a target area and target switches therein adapted to be actuated selectively by a playing object, play-registering lamps, lamp relay means controlling said lamps connected for selective initial energization by said target switches, self-establishing holding circuits for said relays connected to a supply conductor for the holding circuits, control means for the conductor, comprising a motor, a motor relay controlling a normally closed switch in said supply conductor and controlling said motor, a manually controlled normally open reset switch for initially energizing said motor relay, a self-establishing holding circuit for said motor relay, switch means operated by said motor for opening the motor relay holding circuit after a predetermined number of revolutions of said motor, a play-limiting step-switch including a solenoid operated switch advancing means, and additional switch means operated by said motor for energizing the solenoid operated switch advancing means, said play-limiting switch being connected in series with said reset switch, and coin-controlled means for initially closing said play-limiting switch.

4. In a game device having a target area and target switches therein adapted to be actuated selectively by a playing object, play-registering lamps, lamp relay means controlling said lamps connected for selective initial energization by said target switches, and self-establishing holding circuits for said relays connected to a supply conductor for the holding circuits, control means for the conductor, comprising a relay controlling a normally closed switch in said supply conductor, a manually controlled normally open reset switch connected for initially energizing said relay, a self-establishing holding circuit for said relay, a timing means operable upon energization of said relay for opening said relay holding circuit after a predetermined lapse of time, a play-limiting step-switch in series with said reset switch, step-switch advancing means, said timing means being operable, when actuated, to energize said step-switch advancing means, and a coin-controlled switch and circuit means for initially closing said play-limiting switch.

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