Sept. 27, 1938. M. J. BINKS 2,131,091

GAME APPARATUS

Filed Jan. 4, 1936 4 Sheets-Sheet 1

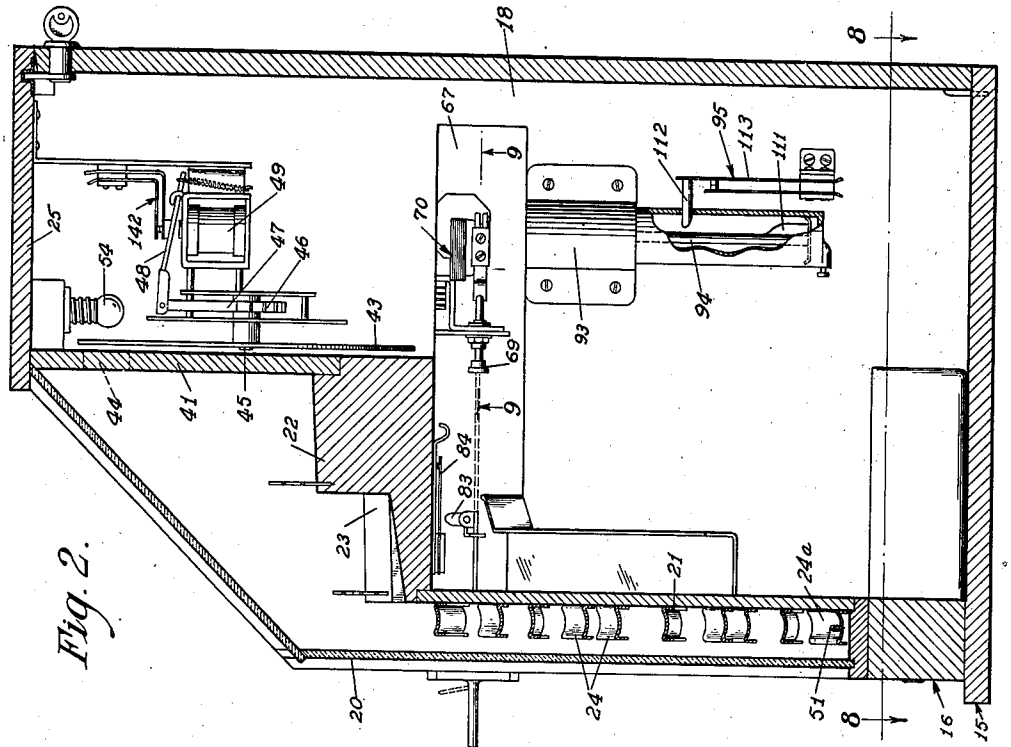

Fig. 2.

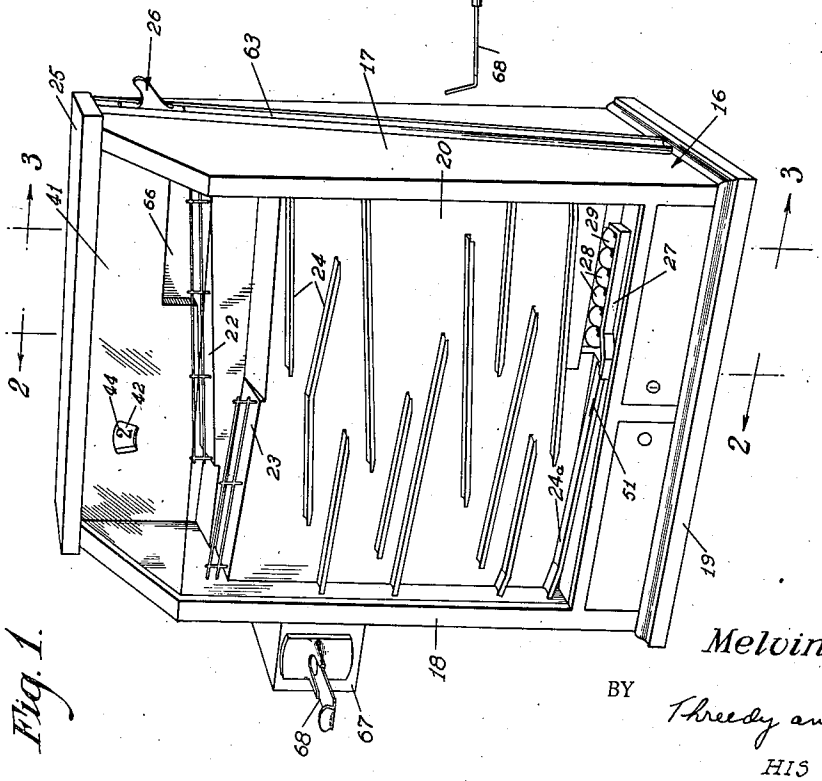

Fig. 1.

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GAME APPARATUS

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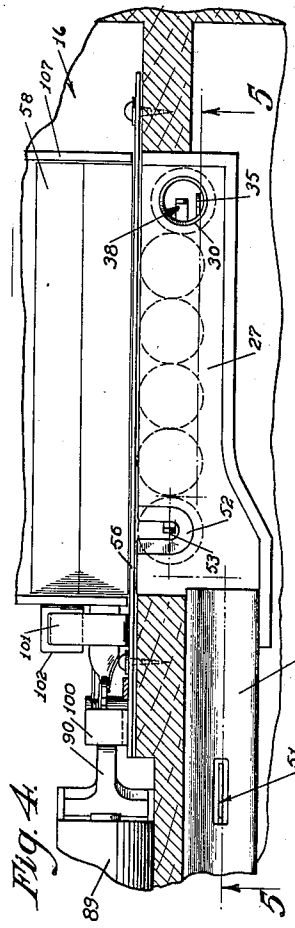

Fig. 4.

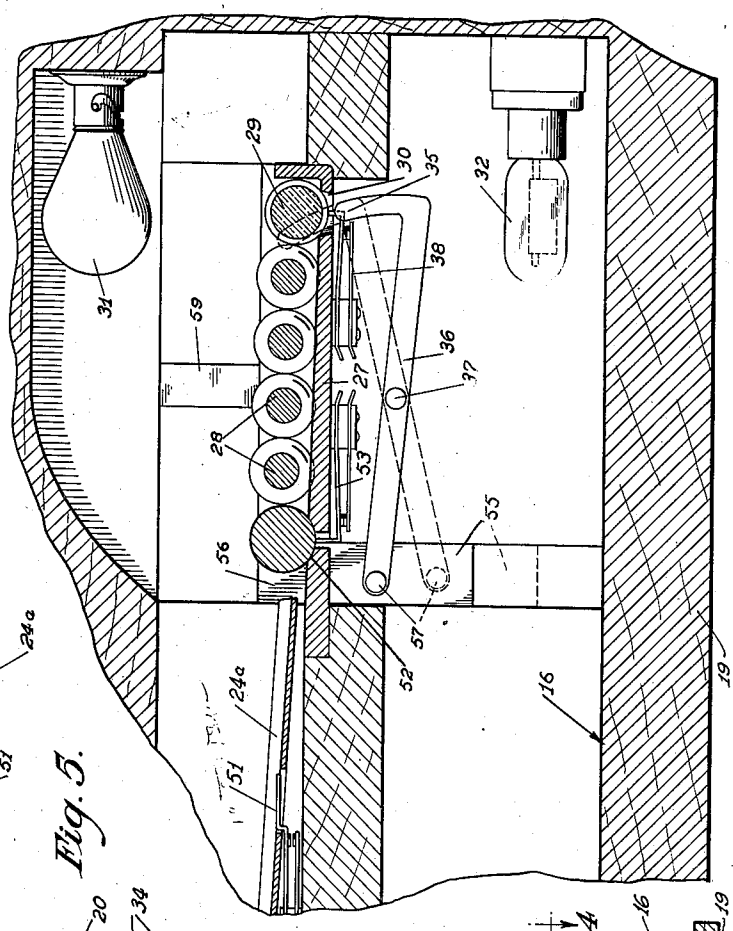

Fig. 5.

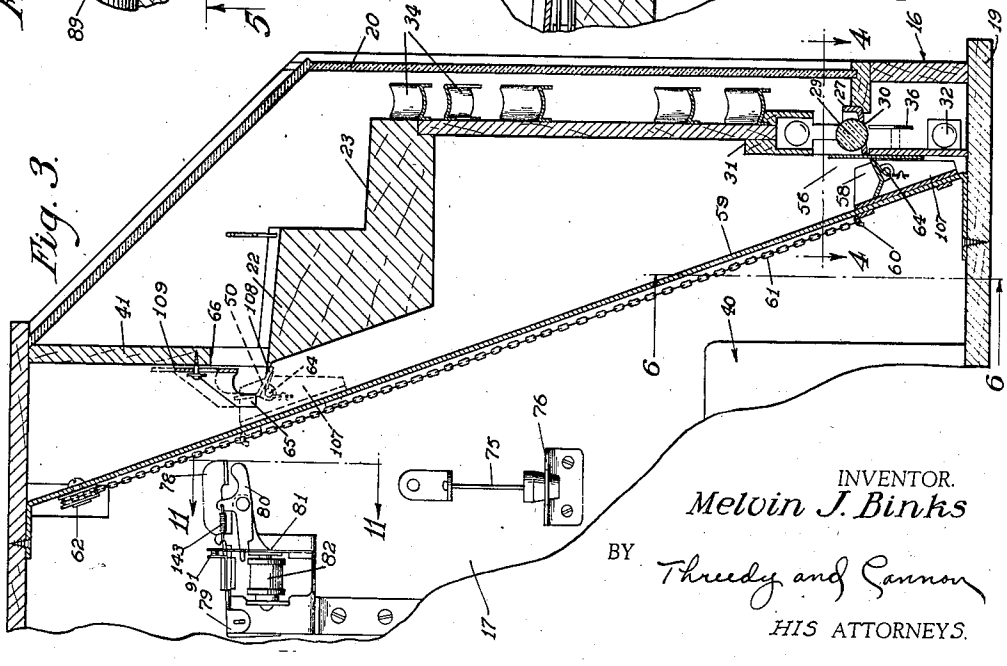

Fig. 3.

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Fig. 6.

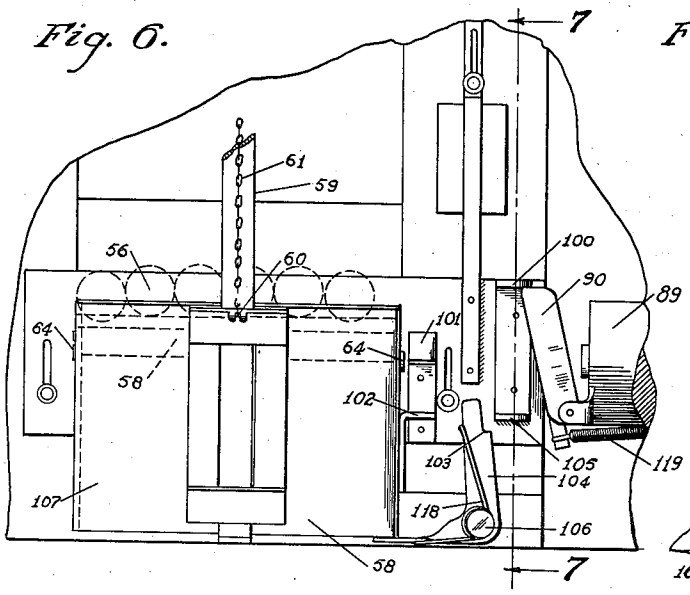


Fig. 7.

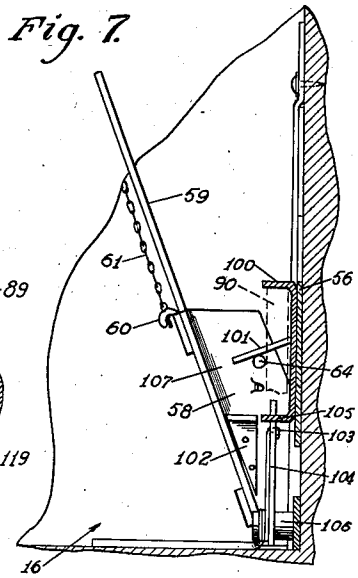


Fig. 9.

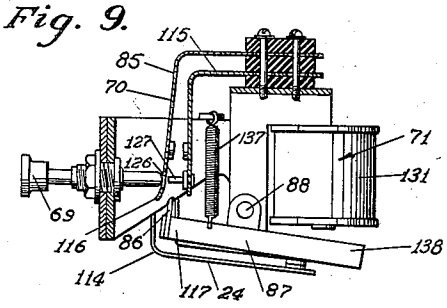


Fig. 8.

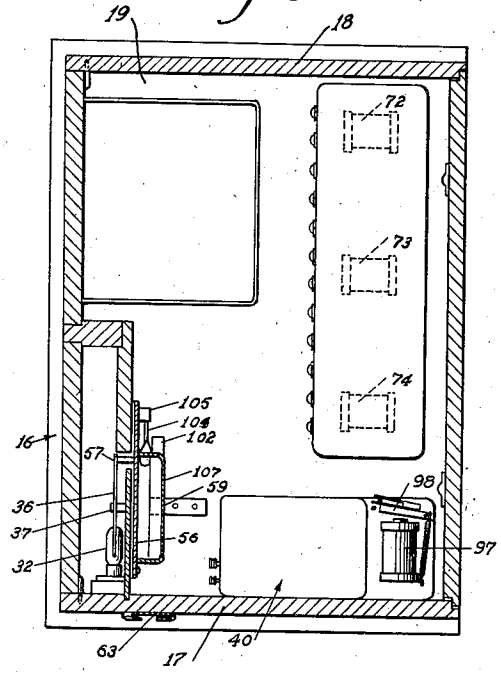


Fig. 10.

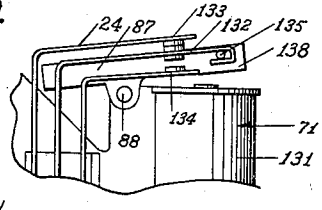
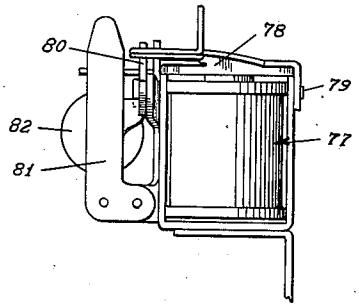


Fig. 11.



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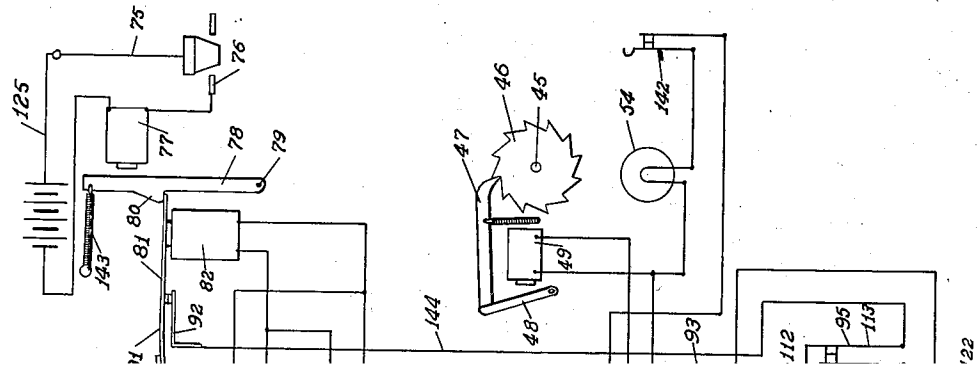
GAME APPARATUS

Filed Jan. 4, 1936 4 Sheets-Sheet 4



Patented Sept. 27, 1938

2,131,091

UNITED STATES PATENT OFFICE

2,131,091

GAME APPARATUS

Melvin J. Binks, Chicago, Ill., assignor, by mesne assignments, to Exhibit Supply Company, Chicago, Ill., a corporation of Illinois

Application January 4, 1936, Serial No. 57,471

9 Claims. (Cl. 273—138)

This invention relates to game apparatus.

It is an object of this invention to provide an improved game apparatus which is relatively simple and inexpensive in construction and efficient in use.

Another object of the present invention is to provide in an amusement apparatus, of the type which employs balls or marbles or analogous counters or missiles, the combination of a cabinet including a ball-playing surface provided with a ball seat; a source of light arranged in said cabinet on one side of said ball seat; a photo-sensitive cell in said cabinet adapted to be actuated by a beam of light from the said source of light; said beam of light being rendered effective to energize said photo-sensitive cell by the action of a ball disposed upon said seat.

An additional object of the invention, related to the foregoing object, is to construct the device in such a manner that the beam of light is rendered effective to energize the said photo-sensitive cell by the action of a transparent or translucent ball arranged upon the said ball seat.

Other objects of the present invention are: to construct the device in such a manner that the photo-sensitive cell may be energized only after the last of a predetermined number of balls has been played; to construct the apparatus in such a manner that the energization of the photo-sensitive cell may be utilized to actuate an instrumentality of an amusement apparatus; to provide novel means, associated with the coin control of the apparatus, for controlling the operation of the photo-sensitive cell and the source of light for the same; and to construct the apparatus in such a manner that the ball about to enter into the said ball seat will close a switch to operate a revolving disc having score-indicating indicia thereon.

Other objects will appear hereinafter.

The invention consists in the novel combination and arrangement of parts to be hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings showing the preferred form of construction, and in which:

Fig. 1 is a perspective view of an amusement apparatus embodying a preferred form of the present invention;

Fig. 2 is a vertical sectional view of the same on line 2—2 in Fig. 1;

Fig. 3 is a fragmentary vertical sectional view on line 3—3 in Fig. 1;

Fig. 4 is a top plan view, partly in section, on line 4—4 in Fig. 3, showing the ball seats and gate;

Fig. 5 is a sectional view on line 5—5 in Fig. 4;

Fig. 6 is a view on line 6—6 in Fig. 3, partly in section and partly in elevation, showing part of the ball-elevating device embodied in the invention;

Fig. 7 is a sectional view on line 7—7 in Fig. 6;

Fig. 8 is a top plan view, partly in section, on line 8—8 in Fig. 2;

Fig. 9 is a sectional detail view on line 9—9 in Fig. 2, showing a coin-operated switch embodied in the invention;

Fig. 10 is a fragmentary view of the switch shown in Fig. 9 and is a view of the side opposite to that which is shown in Fig. 9;

Fig. 11 is an elevational view, on line 11—11 in Fig. 3, showing certain parts of a tilt-indicating device embodied in the invention;

Fig. 12 is a diagrammatic view of an electrical circuit embodied in the invention.

An amusement apparatus embodying a preferred form of the present invention is shown in the drawings, is therein generally indicated at 15, and comprises an upright cabinet 16 which includes side walls 17 and 18, a bottom wall 19, a transparent front wall 20, and a vertical partition or wall 21 which is arranged in the cabinet 16 behind the transparent front wall 20 (Fig. 2).

Arranged in the cabinet 16 are oppositely inclined ball runways 22 and 23 (Figs. 1 and 2) which are adapted to conduct balls by gravity from a point adjacent the top wall 25 of the cabinet onto a vertical series of staggered and inclined baffles or ball runways 24 which are arranged upon the partition 21 between the latter and the transparent front wall 20 (Figs. 1 and 2), and extending exteriorly of the cabinet 16 on the side wall 17 thereof is a handle 26 which is adapted to elevate played balls from the lowermost ball runway 27 in the cabinet, up onto the uppermost ball runway 22, by means of an elevating device, which will be described hereinafter; it being noted that the general design of the cabinet 16 having the ball runways and baffles 22—23—24 arranged therein forms the subject matter of Design Patent No. 87,840 granted to Claude R. Kirk.

Provided at the lower end of the lowermost one of the ball runways 24, which is indicated at 24a, is a ball-receiving trough or support 27 which is adapted to support a plurality of balls or marbles 28 and 29 (Figs. 1 and 3), the ball 29 being transparent for a reason to be explained present-

ly and being adapted to be disposed in a ball seat or opening 30 which is provided in the ball support or trough 27, (Figs. 3 and 5); and the balls 28 being opaque, for a reason to be explained hereinafter.

Arranged in the cabinet 16 above the ball-receiving trough or support 27 and ball seat 30 (Fig. 5) is a source of light in the form of an electric lamp 31, and arranged in the cabinet 16 below the ball seat or opening 30, and in direct vertical alignment with the latter and with the source of light 31, is a photo-sensitive cell which is generally indicated at 32, the photo-sensitive cell 32 and the source of light or lamp 31 being arranged, together with other devices presently to be described, in an electrical circuit which is generally indicated at 33 (Fig. 12).

The present invention includes a plurality of electrical circuits which are shown in Fig. 12, and which are generally referred to as the circuit 33. This circuit 33 includes a suitable source of energy 99 which, in the present invention, may be a conventional 110 volt power line, and it also includes an auxiliary or control circuit 33' which is formed as a part of the general circuit 33. The general circuit 33 also includes an auxiliary circuit 120 which includes a suitable source of energy 34, and this circuit 120 embodies a secondary circuit 120'. Likewise embodied in the circuit 33 is an auxiliary circuit 125 which has a suitable source of energy, which may be, for example, a battery of dry cells arranged in the cabinet 16.

The circuit to an amplifier unit 40 of the photo-electric cell 32 is preferably connected directly to the power intake 99 of an ordinary 110 volt A. C. circuit for the reason that the amplifier tube may not always heat to its operating temperature in the short time it takes the balls 28—29 to travel down the runways 22—23—24.

Associated with the ball seat 30 and engageable by a ball disposed therein is a switch 38 which is associated with a relay 74 (Fig. 12), this switch 38 being adapted to be closed by the action of a ball disposed in the ball seat or opening 30. This switch 38 when closed, under certain conditions hereinafter set forth, actuates the relay 74 and the latter, in turn, illuminates the lamp 31.

Likewise provided in the ball support or trough 27 (Fig. 5) is a second ball seat or opening 52 and associated with this ball seat 52 is a switch 53, this switch 53 being adapted, when closed, by a ball disposed upon the seat 52, to actuate a relay 73 which is arranged in the circuit 33 (Fig. 12).

Also arranged in the lowermost ball runway 24a is a switch 51 which is adapted, when closed by a ball passing thereover, to actuate a relay 72 which is arranged in the circuit 33 (Fig. 12), for reasons to be hereinafter set forth.

Arranged in the upper portion of the cabinet 16 (Fig. 2) is a vertical partition 41 and provided in this partition 41 is a sight opening 42 (Fig. 1). Rotatably mounted in the cabinet 16, behind the partition 41, and upon a horizontal shaft 45 (Figs. 2 and 12), is a disc 43 on which are provided score-indicating indicia 44 (Fig. 1). Carried by the shaft 45 is a ratchet 46 and engageable with this ratchet 46 is a pawl 47 which, in turn, is actuated by the movable element or armature 48 of an electromagnet 49 (Figs. 2 and 12), this electromagnet 49 being arranged in the circuit 33 (Fig. 12) and being energized by the closing of the so-called roll over switch 51 which is arranged in the lowermost runway 24a, (Figs. 1, 5 and 12). When the switch 51 is thus closed, by the action of a ball passing over the lowermost runway 24a, it energizes the relay 72 thereby attracting the two sides of the switch 96, embodied in the circuit 120', into engagement with each other; this in turn energies the electromagnet 49 and the latter acts, through the medium of the member 48, pawl 47, ratchet 46, and shaft 45 to rotate the disc 43, and when the disc 43 is thus rotated it will come to rest with one of the score-indicating numerical indicia 42 thereon visible through the sight opening 44, thereby indicating a score made by the ball passing over the switch 51. The ball passing over the lowermost runway 24a to actuate the switch 51, energizes the relay 72 so as to close the switch 121, embodied in the circuit 33, and this completes the circuit to the relays 73 and 74. It will therefore be seen that the switch 51 controls the relay 72 in order to set up an electrical circuit through the relays 73 and 74.

The arrangement of the switch 53 in the circuit 33 is such that a ball must be disposed upon the same, and another ball disposed upon the seat 30, in order to close the circuit 33 and thereby actuate a score-indicating instrumentality which is shown as having the form of an electric lamp 54 which is arranged in the cabinet 16 behind the partition 41 and sight opening 42.

Slidably mounted in the cabinet 16, adjacent the ball seats 30 and 52 is a gate 56 (Fig. 5) and pivotally connected, as at 57, to the gate 56 is a ball-ejecting member 36 which is pivotally mounted, between its ends, as at 37, in the cabinet 16, this ball-ejecting member 36 having an end portion 35 which is adapted to be projected into the ball seat or opening 30 so as to eject or dislodge a ball 29 therefrom (Fig. 5).

The gate 56 has a laterally extending latch arm 100 (Fig. 6) and engageable with this latch arm 100 is the movable element 90 of an electromagnet 89 which is arranged in the circuit 33'. Likewise carried by the gate 56 is an arm 101 (Fig. 6) and engageable with this arm 101 is a laterally extending arm 102 of a ball-receptacle or carrier 58, and engageable under the lower end portion 105 of the member 100 (Fig. 6) is a notched portion 103 of a spring-urged latch member 104 which is pivotally mounted in the cabinet 16, as at 106 (Fig. 6).

The ball carrier or receptacle 58 is slidably mounted upon an inclined guideway or rail 59 which is arranged in the cabinet 16 (Fig. 3). Attached to the ball-carrier or receptacle 58, as at 60, is the lower end portion of a flexible element or chain 61 which is extended around a guide roller 62 (Fig. 3), the normally upper and outer end portion of this chain 61 being attached to a handle or finger grip 26 (Fig. 1) which is slidably mounted in a slot or guideway 63 which is provided in the side wall 17 of the cabinet 16 so as to be accessible from outside the cabinet 16.

The ball receptacle or carrier 58 is pivotally or swingingly mounted, as at 64, (Fig. 3), upon a supporting frame 107, which, in turn, is slidably mounted upon the guideway 59, and when the carrier 58 is raised up, by the action of pulling down upon the handle 26 of the chain 61, it engages a trip 108, which is formed on the wall 22 (Fig. 3), thereby causing the carrier 58 to be pivoted so as to drop the balls therefrom into an opening 66, which is provided in the partition 41, whereupon the balls will run by gravity into the inclined runway 22; it being noted that the opening 66 is normally closed by a gate 109 which is slidably mounted upon the partition 41 and which is lifted by the carrier 58 when the latter is raised.

Mounted in an extension 67 of the side wall 18 of the cabinet 16 is a coin slide 68 (Figs. 1, 2 and 12) which is engageable with a movable element 69 of a switch 70 (Figs. 2, 9 and 12) which is arranged in the cabinet 16 and in an auxiliary or control circuit 33' (Fig. 12). Associated with this switch 70 is a second switch 124 and an electromagnet 131 (Figs. 9, 10 and 12) which constitute a main control relay 131 which, in turn, controls the circuit 33 (Fig. 12), in a manner which will be explained presently. The switch 70 is composed of two resilient arms 85 and 115 which are normally disposed out of engagement with each other. The arm 85 is provided with an opening 126 to allow passage for a non-conductive pin 127 which projects laterally from the arm 115.

The present invention embodies a tilt-indicating or tell-tale device and the latter comprises a pendulum 75 which is swingingly mounted in the cabinet 16 and which is engageable with a stationary contact 76 (Figs. 3 and 12). Associated with this pendulum 75 is a relay or electromagnet 77 and associated with the latter is a movable element or latch member 78 which is pivotally mounted at its lower end, as at 79, (Fig. 12), this latch member 78 having an angled latch portion 80 which is latchingly engageable with the movable element or armature 81 of an electromagnet or relay 82 (Fig. 12).

Arranged in the circuit 33 is a timing device which comprises a solenoid 93 having a movable element or armature 94 (Fig. 2), the free end of which carries a piston 122 which is disposed within the cylinder of a dash pot 123. Carried by the movable element 94 is a cam 111 which is engageable with an arm 112 of the movable element 113 of a switch 95 which is arranged in the circuit 33.

A switch 84 is disposed in the auxiliary or control circuit 33', and one resilient arm of the said switch 84 is engageable with a lug 83 which is pivotally mounted upon the coin slide 68.

Operation

When the coin slide 68 is pushed in, the inner end of the same engages the movable element 69 of the switch 70 (Figs. 9 and 12) thereby causing the switch member 85 to move from left to right, and also causing the switch member 115 to move from left to right by the engagement of the pin 127 (through the opening 126 in the member 85) with the movable element 69. This movement of the switch member 85 causes the end portion 116 of the latter to engage and move past the latch portion 86, which is formed as a part of the armature 87, which is pivotally mounted as at 88 upon the supporting frame of the switch 70 and is normally held in full line position by the spring 137. It is to be noted that the switch members 85 and 115 have not as yet, as shown in the drawings, been moved into engagement with each other. However, when the coin slide 68 is withdrawn (dotted to full line position, (Fig. 12) the switch members 85 and 115 will likewise return toward initial position by their own resiliency. The end portion 116 of the switch member 85 will thereupon engage the latch portion 86 of the armature 87 (right side, Figs. 9 and 12). The switch member 115, however, will continue to move toward its initial position and the pin 127 carried thereby will extend through the opening 126 in the member 85 until the member 115 comes into engagement with the member 85.

When the switch 70 is closed current will flow from the source of current 99 through the conductor 128, through the switch members 85 and 115, and conductor 129, into one side of the electromagnet 131, through the latter, and from the opposite side of the same back into the source of current 99 by way of the conductor 130, thus energizing the relay 71, whereupon the free end portion 138 of the armature 87 will be attracted toward the core of the electromagnet 131 (clockwise, Figs. 10 and 12, counterclockwise, (Fig. 9). This movement of the armature 87 clockwise, (Figs. 10 and 12), about its pivotal mounting 88, and against the action of its resetting spring 137, actuates the switch 124, that is to say, the center switch member 132 is urged from its normal position, in engagement with the switch member 133, into a momentary engagement with the switch member 134 by action of the pin 135 which is disposed within the bight portion of the member 132 (Fig. 10).

When the switch 124 is in the position last mentioned, current will then flow from the source of energy 99 along the conductor 128, through the switch 70, and the conductor 129, and into the switch 124, thence by way of the member 132 into the portion 134 thereof, and along the conductor 136 into one side of the electromagnet 89, and from the opposite side of the latter through the conductor 130 to the source of energy 99. The electromagnet 89 will then attract the armature 90 and release the gate 56 so that the latter may drop by gravity into dotted line position, Fig. 5. The foregoing operation thereupon releases the played balls which are disposed in the trough 27 and allows them to gravitate into the ball carrier 58, whereby they may be elevated to the starting point, at the opening 66, by operating the handle 26 which rides in the guideway 63 and projects exteriorly of the cabinet 16.

At the same time, that is, when the switch 124 is positioned with the member 132 in engagement with the member 134, current will likewise flow from the source of energy 99 along the conductor 128, through the switch 70, conductor 129, members 132 and 134 of the switch 124, through the conductor 136, and into one side of the electromagnet 82, thence from the opposite side of the latter, back into the source of energy 99 by way of the conductor 130, thus energizing the electromagnet 82. The electromagnet 82, upon being thus energized, will attract its movable element or armature 81 into its initial position (as in full lines, Fig. 12), against the action of the resiliency of the member 81, which tends to urge the latter away from or out of engagement with the electromagnet 82. It is to be noted that the armature 81 is latched in its normal position by the angled extension 80, which is a part of the movable armature 78, and that said armature 78 is normally urged into engagement with the armature 81 by a spring 143.

It is to be noted, further, regarding the momentary attraction of the armature 87 by the electromagnet 131, that when the armature 87 is attracted the circuit 33 is broken between the switch members 132 and 133 of the switch 124, whereupon the relays 72, 73 and 74 will be restored into their initial or ineffective positions, as shown in Fig. 12.

Upon the attraction of the armature 87, toward the electromagnet 131, (clockwise, Fig. 12, counterclockwise, Fig. 9) the latch portion 86 of the

armature 87 will move out of engagement with the end portion 116 of the switch member 85 and allow the latter and the switch member 115 to return to their initial positions (as in full lines, Figs. 9 and 12).

When the balls 28—29 are elevated to the opening 66, by means of the elevating device 58—59—60—61—62—63 and 26, the carrier 58 will assume the position shown in dotted lines (Fig. 3), and the balls 28—29 will roll through the opening 66 in the partition 41 onto the runway 22 whereupon they will gravitate over the latter and the runways 23—24 which are arranged in the cabinet 16.

It is to be noted that the arrangement of the runways 22—23—24 is such that they change the positions of the balls relative to each other as the balls travel down the same.

The first ball to reach the lowermost runway 24*a* will, upon running down the latter, engage and close the switch 51, thereby energizing the relay 72 and closing the corresponding switch 96 which is in the circuit 120' whereupon the electromagnet 49 will be energized and the latter, acting through the medium of the link 48 and pawl 47 will spin the ratchet 46, shaft 45, and disc 43, and when the disc 43 comes to rest one of the score-indicating numerals 44 thereon will be visible through the sight opening 42 (Fig. 1), thus indicating to the player a score made by the ball engaging the switch 51.

When the switch 51 is thus closed, by the action of the first ball traveling down the lowermost runway 24*a*, it also completes the circuit 33 through the switch 121 so that the relays 73 and 74 may be energized when balls come to rest in the ball seats 30 and 52, wherein said balls are disposed upon the switches 38 and 53, respectively.

When the first ball comes to rest in the ball seat 30, it engages and closes the switch 38, thereby energizing the relay 74 and thus closing circuit to the light source or lamp 31 and the relay 73, and at the same time opening the circuit to the relay 49 so as to stop the rotation of the disc 43 by breaking the circuit 120' at the relay switch 141; and when the last of a predetermined number of balls employed comes to rest upon the ball seat 52 it will engage and close the switch 53, thereby energizing the relay 73 and thereby completing the circuit 120, whereupon current will flow through the solenoid 93 to energize the latter and thereupon attract the member 94, and when the latter reaches a predetermined position the arm 111 thereof engages the member 112, thus opening the switch 95 and thereby opening the main circuit 33 which controls the relays 72—73 and 74, the device 93—94—111—95 thus timing the operation of the game apparatus. In the event that the ball disposed on the ball seat 30 is a transparent or translucent ball, such as the ball 29, the beam of light from the lamp 31 will be directed through the ball 29 and through the ball seat or opening 30 against the photo-sensitive cell 32, thereby energizing the latter, whereupon photo-electric current will, in passing through the unit 40, be amplified to energize the relay 97 and close the switch 98, thereby completing the circuit to the score-indicating lamp 54 or other instrumentality which may be employed in place of the lamp 54.

An example of the flow of current for the foregoing operation will now be given in order that the device may be better understood.

When the first ball rolls over the switch 51, closing the latter momentarily, current will flow from the source of energy 99 along the conductor 128 through the switch elements 91, 92 and by way of the conductor 144 into the switch 95, thence through the conductor 145, switch 84 and conductor 146 into the contact 133 of the switch 124 which is normally disposed in engagement with the center switch member 132; thence through the latter into the conductors 129 and 147 into one side of the electromagnet of the relay 72, through the latter, thence through the switch 51 and back into the opposite side of the source of energy 99 by way of the conductor 149.

The foregoing flow of current closes the switches 96 and 121 of the relay 72 so that when all the balls 28 and 29 have come to rest in the trough 27 the first and last balls will close the switches 38 and 53 respectively and current will then flow from the source of energy 99 along the conductor 128, through the switch elements 91, 92 and by way of the conductor 144 into the switch 95, thence through the conductor 145, switch 84, conductor 146, into the contact 133, which is normally disposed in engagement with the switch element 132; thence by way of the conductor 129 into the conductor 147, which is common to the relays 72, 73 and 74. The switch 38 being the first to be closed, current will flow from the opposite side of the electro-magnet in the relay 74 through the switch 38 and by way of the conductors 150 and 148 through the switch 121 of the relay 72 (which is at this time disposed in closed position); thence back into the source of energy 99 by way of the conductor 149. The switch 53 being closed subsequent to the switch 38 will thereupon cause current to flow from the opposite side of the electromagnet in the relay 73 into the switch 53, through the end by way of the conductors 150 and 148 into the switch 121 of the relay 72 and back into the source of energy 99 by way of the conductor 149.

It is to be noted that the circuit 33 to the relays 72, 73 and 74 may be broken in any one of several ways, namely:

(*a*) When the coin slide 68 is pushed in (left to right, Figs. 2 and 12), the lug 83, carried thereby, will engage the cam end of one resilient arm of the switch 84 and cause the same to be moved out of engagement with the opposite arm of the said switch 84 and open the circuit 33.

(*b*) When the cabinet 16 is tilted from its normal and proper operating position: whereupon the pendulum 75 will engage the contact 76 and thereby close the auxiliary circuit 125 to the relay 77 (Fig. 12), thus energizing the latter and causing the same to attract its movable armature 78, thereby pivoting the latter at 79 (clockwise, Fig. 12). This movement of the armature 78 moves the angled extension 80 thereof out of engagement with the movable arm 81 of the switch 91, whereupon the said arm 81 will move, by its own resiliency, out of engagement with the contact 92 and thus open the switch 91 and the circuit 33 (Fig. 12);

(*c*) When play is completed the solenoid 93, which forms part of the timing device 93—112—95—113—94, will act upon the member 94 to attract the latter whereupon the cam 94 will engage the extension 112 of the switch member 113 and thus move the latter into position to open the switch 95 which, in turn, will open the circuit 33.

While in the preferred embodiment of the invention shown in the drawings the same has been illustrated as employing one transparent ball 29, and five opaque balls 28, this arrangement may be varied considerably and the same results ob-

tained, that is, instead of employing five opaque balls and one transparent ball, six transparent balls may be employed with a color screen of the same shade as the desired first ball (29) placed between the ball which is disposed upon the seat 30 and the photo-sensitive cell 32; or, if desired, five transparent balls and one opaque ball may be employed, the opaque ball, when disposed upon the seat 30, obstructing the beam of light from the source or lamp 31 to the photo-sensitive cell 32.

When the ball carrier or elevator 58 is raised, by means of the handle 26 and chain 61, the arm 102 thereof engages the arm 101 of the gate 56, thereby raising the gate 56 into its normal position, and during this operation the spring 118 urges the member 104 (clockwise, Fig. 6), thereby moving the notched portion 103 of the member 104 under the arm 105 of the gate 56 and thus latching the latter in raised position and as the gate 56 is lifted further upwardly the spring 119 urges the latch member 90 under the arm 100 of the gate 56, thereby latching the latter in raised position.

It is to be noted that a switch 142 is embodied in the circuit 120 (Fig. 12) and that this switch 142 is normally closed, that is so that current may flow through the latter (Fig. 2). However, when the armature 48 is attracted by the electromagnet 49 (down, Fig. 2) the switch 142 will become severed in order to prevent the lamp 54 or other instrumentality from operating while the disc 43 is in motion (rotating).

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification, without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to protect by Letters Patent is:

1. In an amusement apparatus, a cabinet including a member providing a ball-playing surface provided with a light-penetrable ball seat; a photo-sensitive cell arranged in the said cabinet at one side of said ball seat and a source of light arranged in the said cabinet upon the opposite side of the said ball seat from said cell and adapted when energized to direct a beam of light through said ball seat and against said cell; said beam of light being rendered effective to energize said cell by a light penetrable ball disposed upon said seat; and said apparatus including an instrumentality operated by said cell when the latter is energized by said beam of light.

2. In an amusement apparatus, a cabinet including a member providing a ball-playing surface provided with a ball receptacle having a ball-receiving opening; a photo-sensitive cell arranged in the said cabinet upon one side of said opening and a source of light arranged in the said cabinet upon the opposite side of said opening and in alignment with the said opening and cell and adapted when energized to direct a beam of light through the said opening against the said cell; said beam of light being rendered effective to energize said cell by a ball disposed in said opening; and said apparatus including an instrumentality operated by said cell when the latter is energized, and circuit control means operably connected with said light source and with ball-operated switch means arranged for operation by balls in said receptacle for rendering said light source active when a determined number of balls are disposed in a predetermined manner in said receptacle, one of said balls being disposed in said opening therein in the path of light from said source to said photo-cell.

3. In an amusement apparatus of the type having: an upright cabinet including a vertically extending series of inclined ball runways, control means comprising a pair of spaced light-penetrable ball seats provided in the lowermost of said runways; a photo-sensitive cell in the said cabinet on one side of said ball seats and a source of light in the said cabinet on the other side of said ball seats and adapted when energized to direct a beam of light through one of said ball seats and against said cell; said beam of light being rendered effective to energize said cell by a light penetrable ball disposed upon the said one of said seats; and means actuated by a ball disposed upon the other of said seats, and coacting with said cell when the latter is energized, for operating an instrumentality of the said apparatus.

4. In combination with an amusement apparatus, of the kind having: an upright cabinet including a vertically extending series of inclined ball runways and means for releasing balls to descend over said runways, ball-operated mechanism comprising a pair of spaced ball seats in a said runway and one of which is translucent; a photo-sensitive cell in the said cabinet on one side of said ball seats and a source of light in the said cabinet on the other side of said ball seats and adapted when energized to direct a beam of light through the translucent one of said ball seats against said cell; said beam of light being rendered effective to energize said cell by a translucent ball disposed upon the translucent one of said seats; a controlled device; and means including a device actuated by a ball disposed upon the other of said seats, and coacting with said cell when the latter is energized, for operating said controlled device.

5. In an amusement apparatus including: a cabinet with a member providing a ball-playing surface provided with a pair of spaced seating openings; a photo-sensitive cell in the said cabinet on one side of a particular one of said ball openings and a source of light in the said cabinet on the other side of said particular ball opening and adapted when energized to direct a beam of light through said particular ball opening at said cell; said beam of light being rendered effective to energize said cell by the action of a transparent ball disposed upon said particular ball-seat opening; and means including a device actuated by a ball disposed upon the other of said ball-seating openings, and coacting with said cell when the latter is energized, for operating an instrumentality of said apparatus.

6. Control means for use with a ball-playing apparatus having a determined number of balls at least one of which is translucent, and a ball receptacle provided with a ball seat through which light may pass, and means for effecting the movement of said balls into said receptacle in different serial arrangements, said control means including an electric light source for projecting light through said ball seat, a photo-cell positioned to receive light from said source through said seat, an instrumentality operably controlled by said photo-cell, ball-operated switch means arranged in said receptacle and in circuit with said light source to control an energizing circuit

therefor, a power source, said ball-operated switch means being connected in circuit with said power source in such manner that said determined number of balls must be disposed in said receptacle in a predetermined manner to effect actuation of said controlled instrumentality.

7. In an amusement apparatus including a plurality of balls, at least one of which is translucent, the combination of: a member providing a ball playing surface having a ball receiving seat through which light may pass, a photo-sensitive device arranged at one side of said seat and a source of light arranged at the opposite side of said seat from said photo-sensitive device and effective when energized to direct light through said seat and a translucent ball thereon onto said device, said light source being arranged to be energized by switch means controlled by a ball disposed on another ball receiving seat arranged in said playing surface, and means for effecting movement of said balls to change their relative positions with respect to said ball receiving seats.

8. In combination, a ball runway having opposite ends and means for effecting movement of a plurality of balls into and out of said runway to change their relative positions therein in serial alignment, a certain one of said balls having a predetermined relative translucency, a light source arranged to project light across one of said ends of the runway, means arranged to be operated by the first ball to enter said runway for energizing said light source, photo-electric means arranged for actuation by light projected across the runway as aforesaid, and an instrumentality controlled by said photo-electric device and actuated by the same when said certain ball is in a predetermined position to intercept said light projected toward the photo-electric device, and means arranged at a distance from said predetermined position in the runway for actuation by another ball entering the runway subsequently to said first ball to control the actuation of said instrumentality cooperably with said photo-electric device.

9. In a device of the class described including a plurality of balls, a ball runway having ends spaced from each other, and means for moving said balls into and out of the runway to change their relative positions in said runway, photo-electric control means arranged to be actuated by light projected across said runway, said projected light being operably controlled by the presence of a relatively translucent control ball at a particular end of said runway in the path of said projected light, said control means including a light source arranged for energization to project light as aforesaid, a first switch means arranged at said particular end of the runway for actuation by said control ball to energize said light source, an instrumentality operably controlled by said photo-electric control means, a second switch means arranged for operation by another ball in said runway other than said control ball and cooperable with said photo-electric means to control said instrumentality.

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