

**Sept. 14, 1937.**

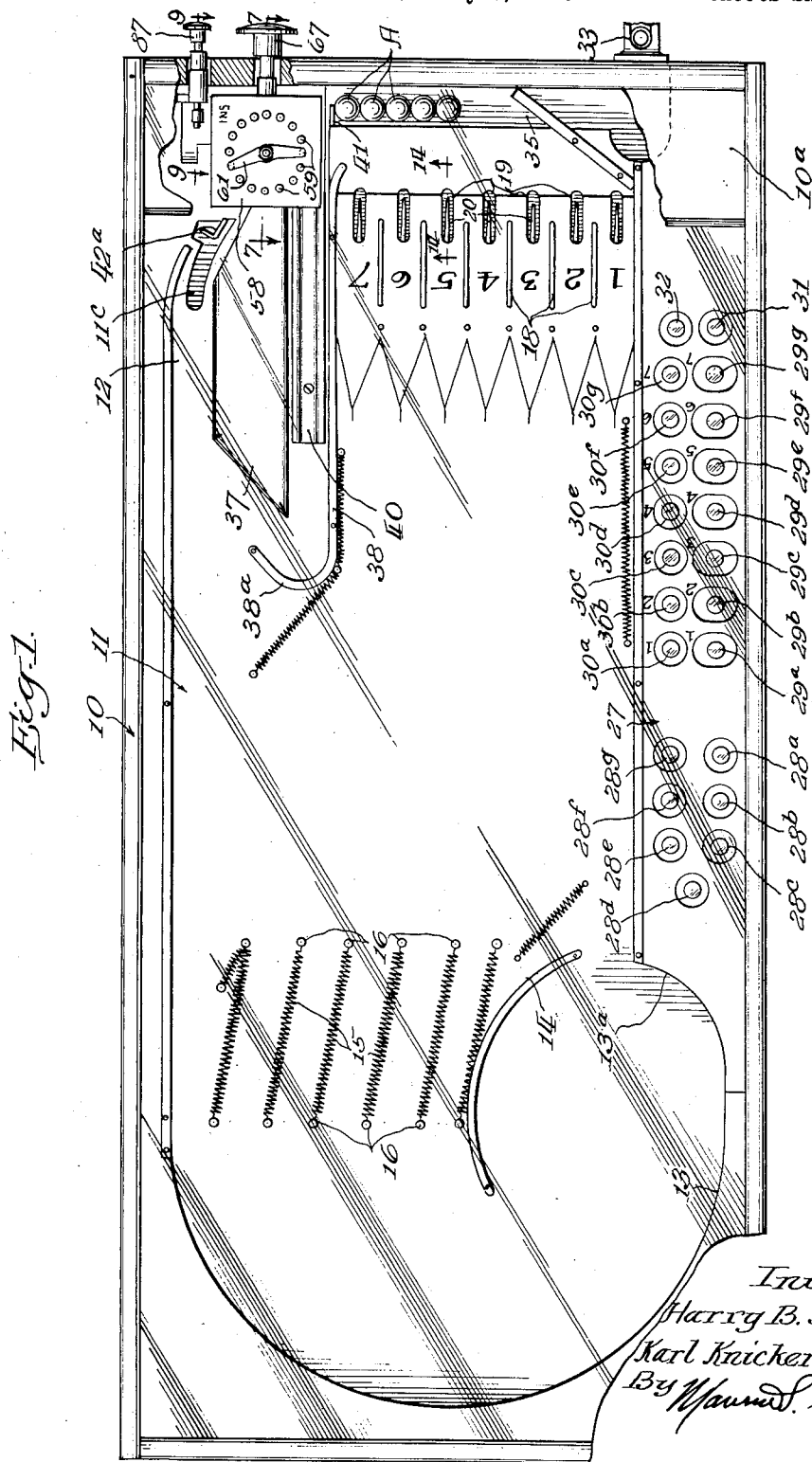
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**2,093,293**

# GAME APPARATUS

Filed July 6, 1936

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Sept. 14, 1937.

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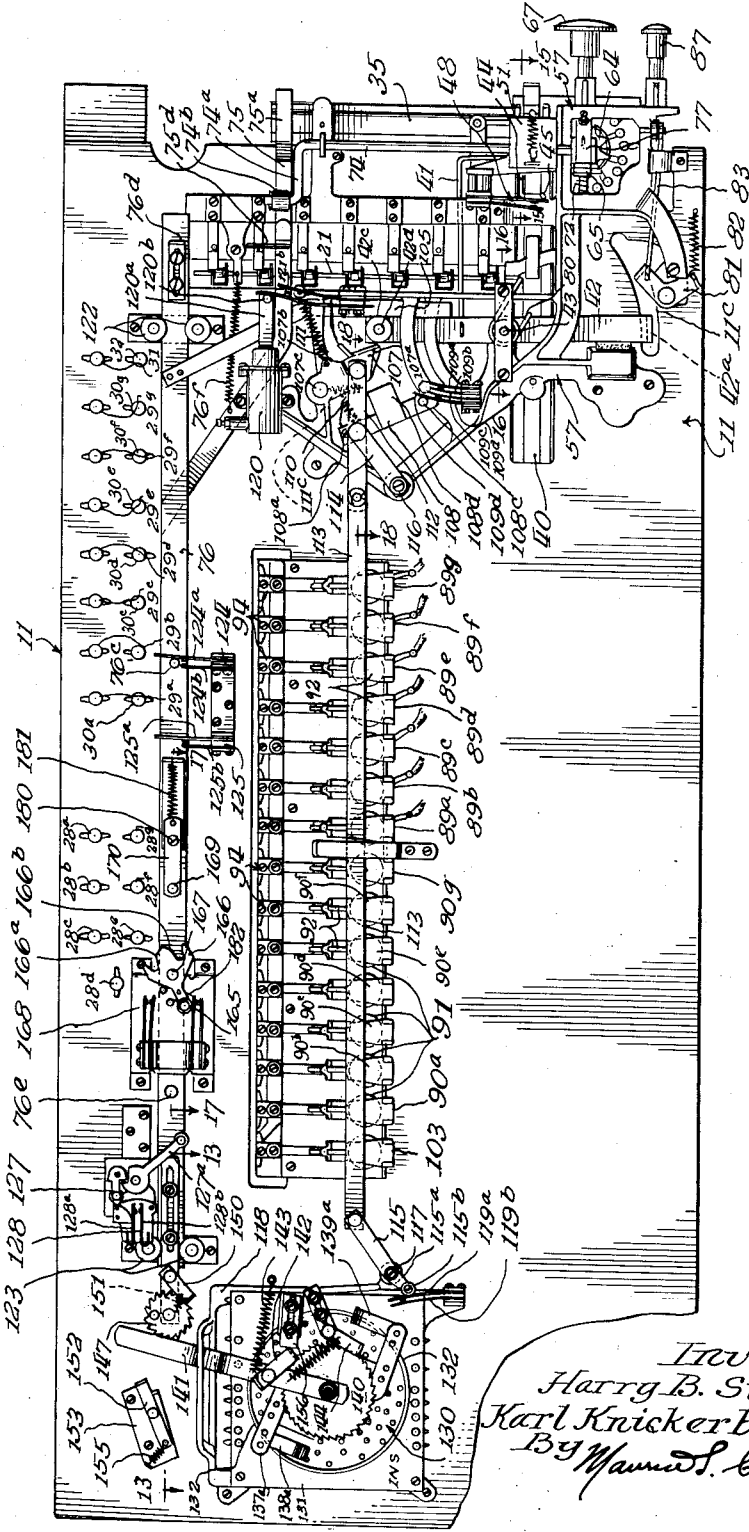
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GAME APPARATUS

Filed July 6, 1936

8 Sheets-Sheet 2

Fig. 2.



GAME APPARATUS

Filed July 6, 1936

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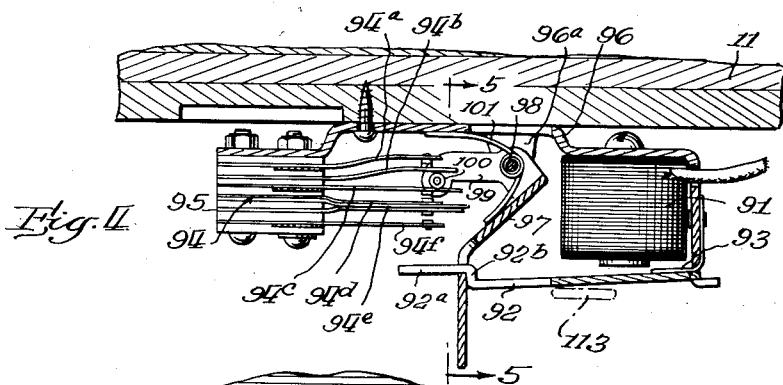


Fig. 2.

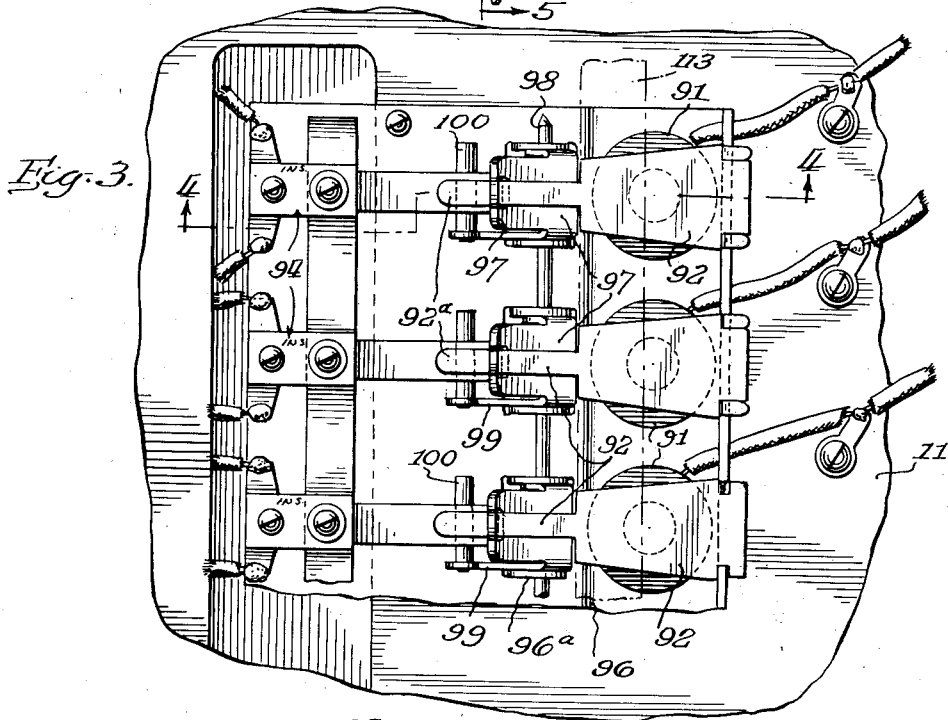


Fig. 3.

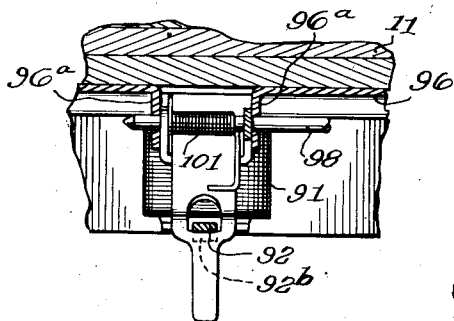


Fig. 8.

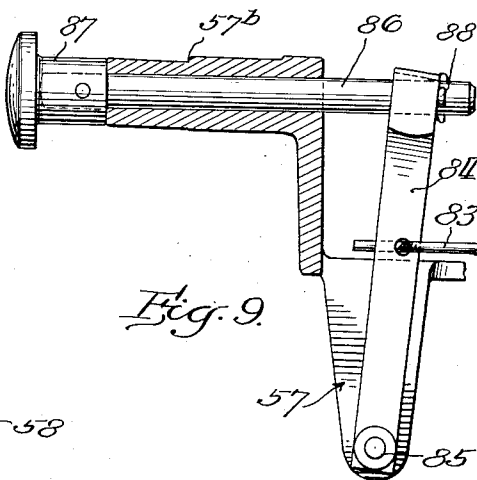
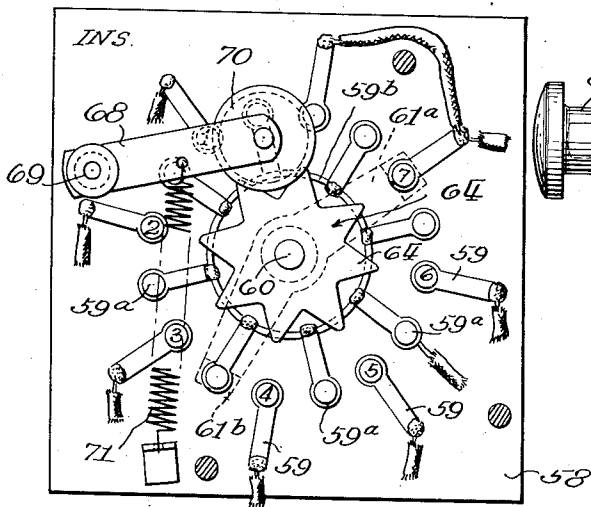
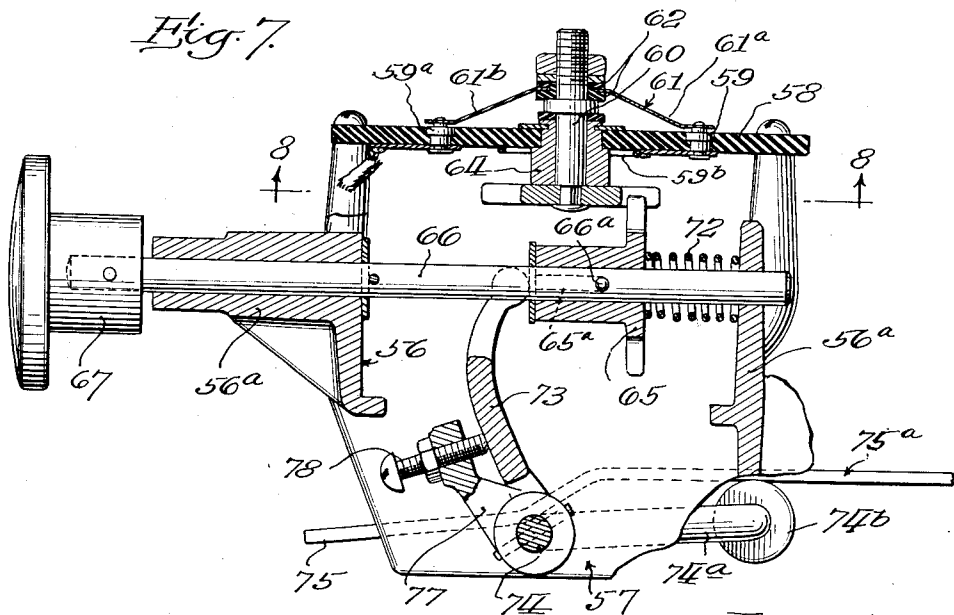


Fig. 7.



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Fig. 10.

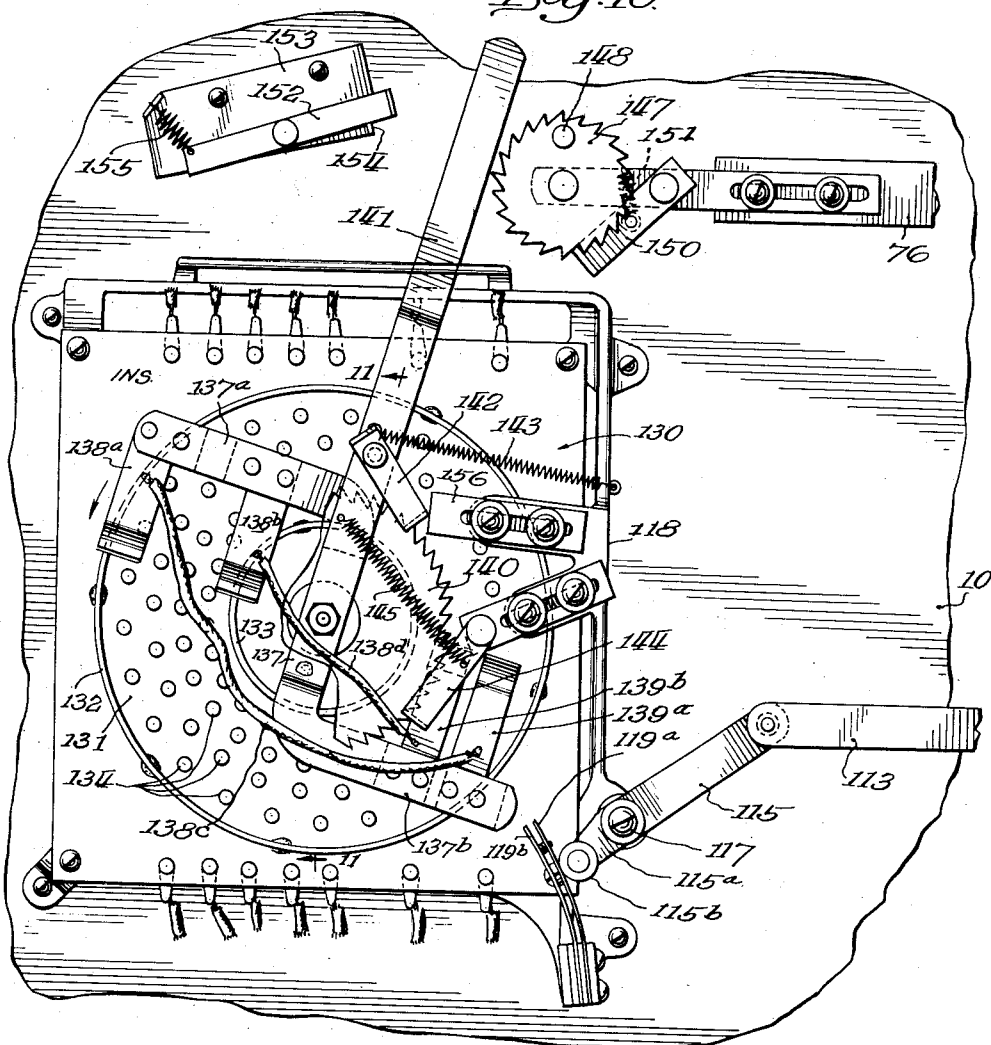
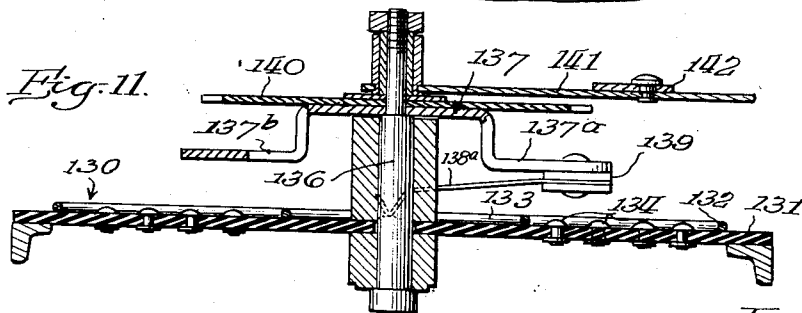


Fig. 11.



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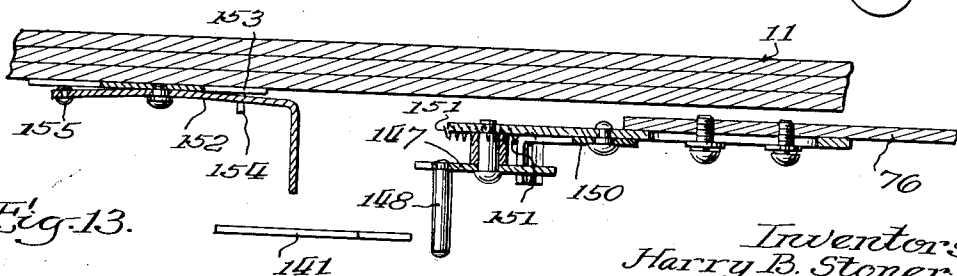
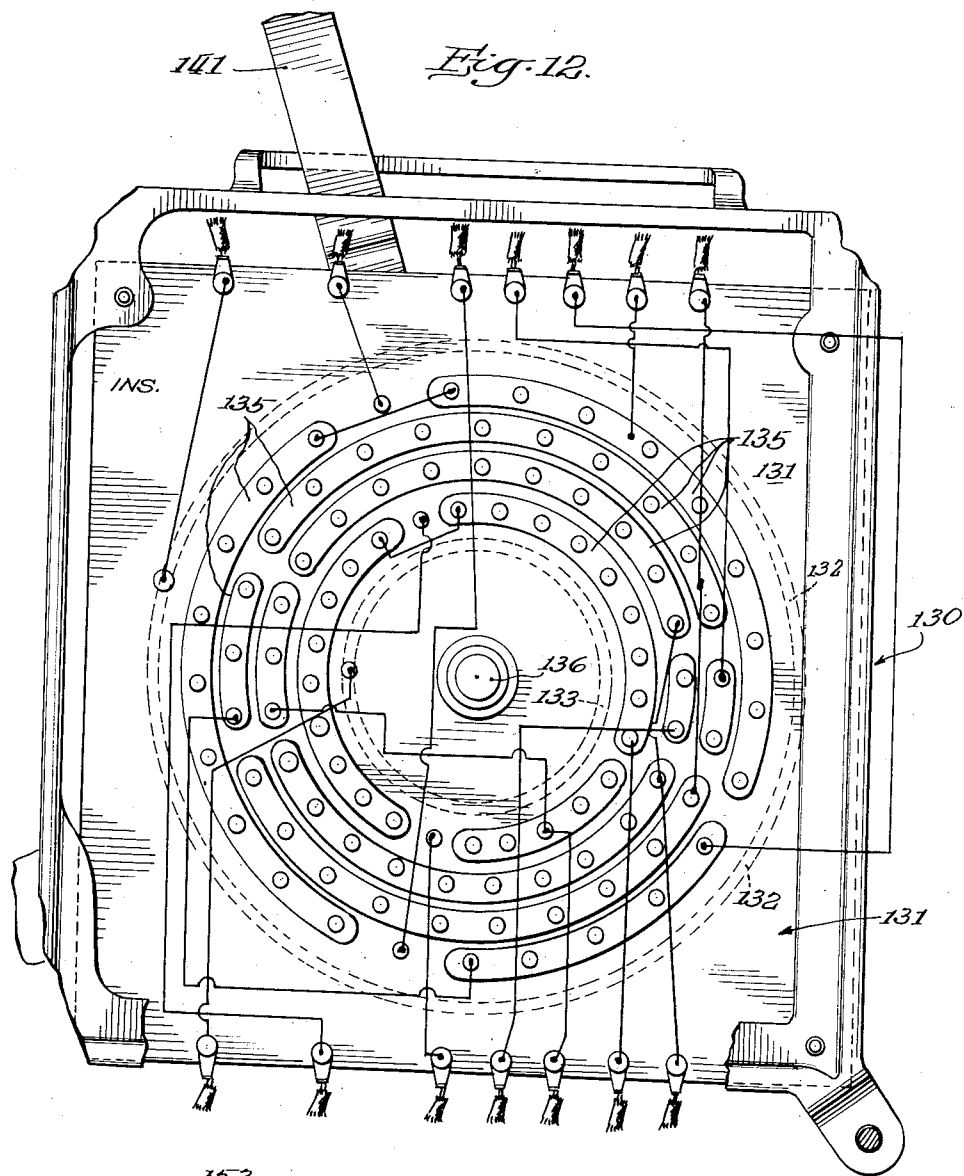
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GAME APPARATUS

Filed July 6, 1936

8 Sheets-Sheet 6



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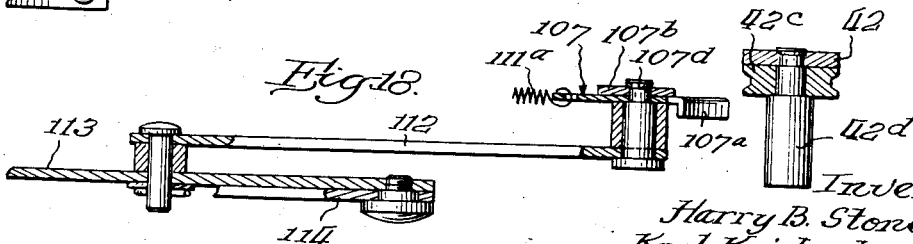
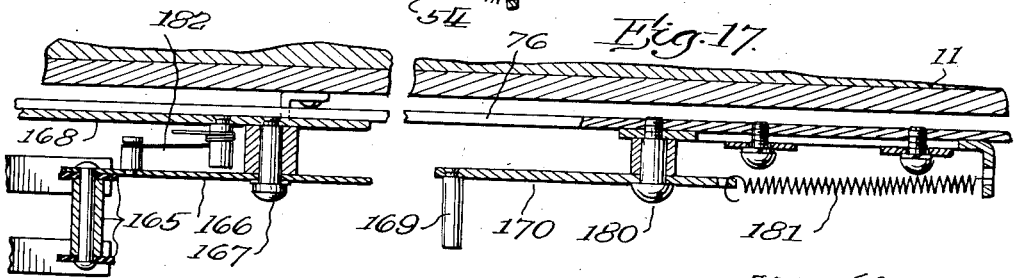
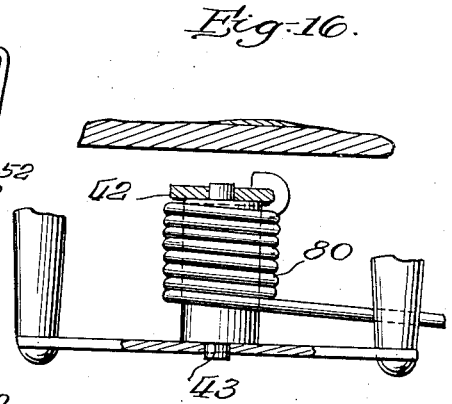
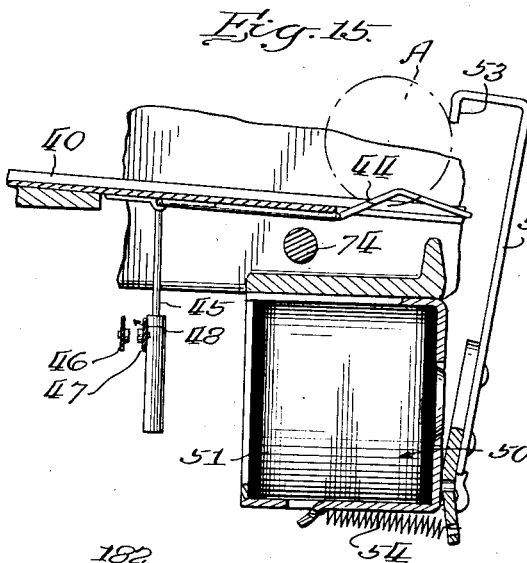
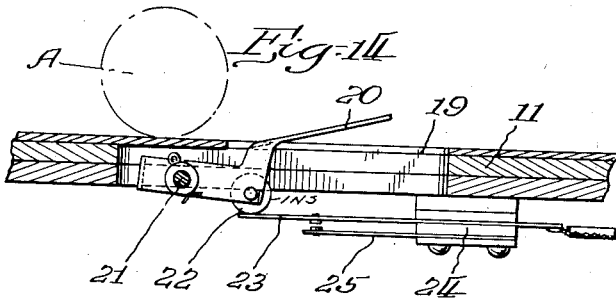
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GAME APPARATUS

Filed July 6, 1936

8 Sheets-Sheet 7



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H. B. STONER ET AL

2,093,293

GAME APPARATUS

Filed July 6, 1936

8 Sheets-Sheet 8

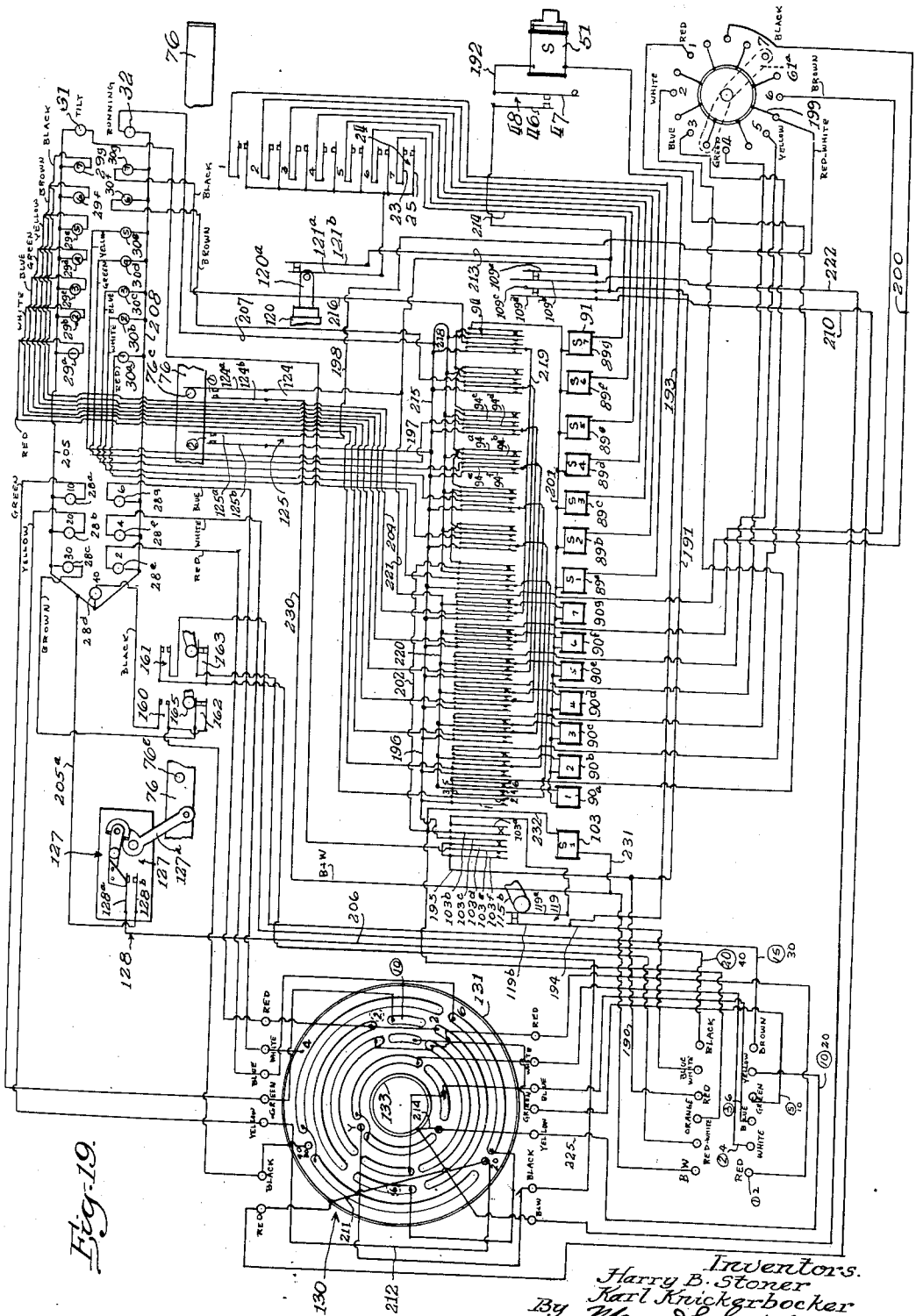


Fig. 19.

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## UNITED STATES PATENT OFFICE

2,093,293

## GAME APPARATUS

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Aurora, Ill.

Application July 6, 1936, Serial No. 89,060

18 Claims. (Cl. 273—121)

This invention relates to amusement or game apparatus of the type in which the player causes an object, such as a ball, to travel or to be projected over a playing surface which is provided with suitable areas or openings over or into which the object or ball may be moved. More particularly, the present invention is directed to that class of game apparatus, the operation of which is controlled by coin operated mechanism.

It has been generally recognized as a prime requisite in game apparatus of this general class that, in order to be commercially successful, the game should possess that characteristic known as "player appeal". In other words, it must be so constructed and arranged as to provide amusement and entertainment and also create or stimulate and maintain interest as an inducement or incentive for the player or players to continue operating or playing the apparatus. Such appeal may be the result of the action of the objects or balls moved over the surface of the playing field, and/or the action required on the part of the player, such as adjustment or manipulation of certain apparatus incident to playing the game.

One of the objects of this invention is to provide in game apparatus of the character indicated novel means adapted to be manipulated by the player prior to actuation of the coin operated mechanism to pre-designate by selection the particular area or objective of the playing field over or into which it is desired to move or lodge the object or ball.

Another object resides in the provision of novel game apparatus wherein a plurality of areas or objections of the playing field over or into which it is desired to move or lodge the object or ball may be pre-designated or selected prior to actually playing the game apparatus; said preselection being separately made prior to one of a plurality of successive actuations of the coin operated mechanism by insertion of a plurality of coins.

A further object resides in the provision of electrically operated visual indicating means corresponding to certain areas or objectives of the playing field, adapted to be pre-selected by the player and rendered visible upon actuation of the coin operated mechanism.

Another object is to provide reward or score indicating means rendered operative and visible upon actuation of coin operated mechanism, after the ball or object has been set in motion on the playing field.

Still another object is to provide variable reward or score indicating means adapted to be

re-adjusted upon each actuation of the coin operated mechanism.

A still further object resides in the provision of an improved game apparatus of the character indicated having means adapted to be manipulated by a player to preselect or designate an area or objective of the playing field over or into which it is desired to move or lodge the object or ball, and wherein said means is rendered visible upon actuation of coin operated mechanism, together with the provision of means for visually indicating the area or objective wherein said movable object or ball has passed or has become lodged.

A still further object resides in the provision of correlated electrical actuated means wherein the player may pre-select or designate an area or objective of the playing field over or into which a ball passes or is lodged, and wherein said selection is visually indicated by actuation of coin operated mechanism, together with the provision of electrically actuated means for visually indicating the area or objective wherein the object or ball has passed or has become lodged.

Still another object of this invention is to provide a novel game apparatus of the character described which is simple to operate and which possesses appeal for creating, stimulating and maintaining interest of the player for inducing play of the apparatus.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists in certain novel features of construction, arrangement and combination of parts hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportion, size and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

For the purpose of facilitating an understanding of our invention, we have illustrated in the accompanying drawings, a preferred embodiment thereof, from an inspection of which when considered in connection with the following description, our invention, its mode of construction, assembly and operation, and many of its advantages should be readily understood and appreciated.

Referring to the drawings in which the same characters of reference are employed to indicate corresponding or similar parts throughout the several figures of the drawings:

Figure 1 is a plan view of game apparatus embodying the present invention, with parts broken away to show details of construction;

Fig. 2 is a plan view of the underside of the playing field with the operating mechanism mounted thereon;

Fig. 3 is an enlarged fragmentary plan view of a portion of a bank of relay devices for controlling the operation of certain electrical circuits;

Fig. 4 is a sectional view through the bank of relays, taken as indicated at line 4—4 on Fig. 3;

Fig. 5 is a sectional view through a relay, taken as indicated at line 5—5 on Fig. 4;

Fig. 6 is a perspective view of the relay armature;

Fig. 7 is a sectional view through pre-selecting mechanism, taken as indicated at line 7—7 on Fig. 1;

Fig. 8 is an underside view of the selector panel and associated mechanism, taken as indicated at line 8—8 of Fig. 7;

Fig. 9 is a sectional view through the control for the ball projecting mechanism, taken as indicated at line 9—9 on Fig. 1;

Fig. 10 is a fragmentary view of the underside of the upper end of the playing field showing the control for the reward or score indicating lights and associated parts;

Fig. 11 is an enlarged sectional view through the control mechanism, taken as indicated at line 11—11 on Fig. 10;

Fig. 12 is a view of the underside of the control mechanism showing the arrangement of electrical contact strips and schematic wiring to said contacts for the various electrical circuits;

Fig. 13 is a sectional view taken as indicated at line 13—13 on Fig. 2;

Fig. 14 is a section taken at line 14—14 on Fig. 1, showing the operating lever projecting through and above the surface of the playing field, and associated switch controlled thereby;

Fig. 15 is a sectional view taken as indicated at line 15—15 on Fig. 2, showing the kicker mechanism for moving the balls into position for projection preparatory to playing the apparatus;

Fig. 16 is a sectional view through the pivot connection of the ball projecting lever, taken at line 16—16 on Fig. 2;

Fig. 17 is a sectional view taken as indicated at line 17—17 on Fig. 2;

Fig. 18 is a fragmentary sectional view taken at line 18—18 on Fig. 2; and

Fig. 19 is a schematic wiring diagram of the various electrical circuits for controlling operation of the game apparatus embodying the present invention.

The specific embodiment of the present invention chosen for the purpose of illustration comprises means for visually indicating a pre-selected or designated area over which it is desired that a ball shall pass, together with a second series of visual indicating means corresponding to various areas of the playing field to designate the particular area of the playing field over which a ball has passed. There is also provided visual indicating means for representing various rewards or scores in the event the pre-selected area of the playing field corresponds to the particular area over which the ball has passed.

Although, the game apparatus embodying the present invention will function entirely satisfactorily if a single ball is employed for projection or movement over the playing field, we desire, however, to employ a plurality of balls for in-

creasing the player appeal of the game, and as will hereinafter appear, the actuation of the pre-selecting means and the means indicating the area over which a ball has passed will function in the same manner as when a single ball is employed, because the mechanism is so constructed and arranged as to function upon the passage of the first ball over one of the areas which control said visual indicating means.

Referring now in detail to the drawings, the game apparatus embodying this invention comprises a cabinet type receptacle 10 provided with a playing field 11 which is preferably inclined slightly to the horizontal, so that the balls, indicated generally at A, when projected towards the upper end of said field will roll either by the action of gravity, or as the result of its impact force, towards the lower end of the field. At the upper right hand corner of the playing field, as seen in Fig. 1 of the drawings, is a projection chute or passageway, indicated at 12, where the ball or balls are initially lodged preparatory to projection onto the playing field.

The upper portion of the playing field is formed with a reversely curved track 13 which terminates in a curved portion 13a and registering therewith is a track portion 14 forming a continuation thereof, so that the balls are redirected in an upward angular direction after which they may roll down over the playing field. The upper portion of the playing field adjacent the track portion 13 is divided into a plurality of passages through which the balls may roll downwardly over the playing field, and the partitions defining the respective passages desirably are formed by coiled springs 15 extending substantially longitudinal of the playing field and connected at opposite ends to pins 16. Said springs are disposed at a slight angle so as to ensure directing the balls in the general direction of the areas which are associated with visual indicating means. Said areas are preferably located at the lower end of the playing field and, as herein shown, are in the form of a plurality of spaced stalls separated by partitions or bars 18. These stalls, for convenience, are herein numerically designated as 1 to 7, inclusive, which numerical designations will correspond to both the visual pre-selecting means and the visual means for indicating the particular stall or area into and over which the first ball passes.

The playing field is provided with elongated apertures 19 in registration with each of said stalls, and through each of which apertures extends a lever arm 20 extending slightly above the surface of the playing field so as to be engaged and depressed by a ball passing through the respective stalls. Said lever arms are pivotally mounted on a transversely extending rod or shaft 21 journaled on the underside of the playing field. Associated with each of said lever arms is an insulated disk or member 22, which, as seen in Fig. 14, rests upon an extension of the switch arm 23 of a switch, indicated generally at 24, and which switches are connected in electrical circuits as hereinafter described. Each of the switches 24 is provided with contact arms 25, and in the normal position of said lever 20, said switch arms 23 and 25 are separated or in operative position. However, when a ball passes over the lever 20 depressing it, the insulating disk 22 moving downwardly swings the switch arm 23 into operative contact with the switch arm 25 to complete a portion of an electric circuit.

At the side of the playing field opposite the pro-

jection chute is a raised panel 27, the inner edge of which serves to define a portion of the playing field. Said panel is provided with a multiplicity of recesses containing sockets for small electric light bulbs which desirably are covered by small panels of translucent or transparent material and serve as visual indicating means. It will be observed that the electric light bulbs are divided up into a plurality of groups. The group adjacent the uppermost portion of the playing field comprises seven light bulbs, herein designated as 28a, 28b, 28c, 28d, 28e, 28f and 28g, may be understood to represent or designate rewards or scores to be accorded the player in the event he is successful in projecting the first ball of the group over the pre-selected area. Associated with each of these light bulbs may be various numerical designations representing a score or reward. For example, if the game apparatus is constructed as a race game, these various light bulbs may be numerically designated by numerals indicating the odds in favor of the player in the event he is successful.

The lower portion of the panel 27 is provided with two parallel rows or series of lights designated as 29a, 29b, 29c, 29d, 29e, 29f, 29g, and 30a, 30b, 30c, 30d, 30e, 30f and 30g, respectively. The series of lights 30a to 30g are connected into electrical circuits that may be completed by the switches 24, actuated by the levers 20 in the respective stalls 1 to 7, inclusive. The other bank of lights 29a to 29g, inclusive, are connected in a series of electrical circuits which corresponds to the respective stalls 1 to 7, inclusive, to the pre-selecting device which is to be manipulated by the player. It is to be understood that only one of the lights 30a to 30g will be illuminated by the balls passing through the respective stalls by virtue of the particular mechanism employed for controlling the electrical circuits, and only the first ball to actuate a lever 20 will be effective to close its respective electric circuit for illuminating its corresponding light of the series 30a to 30g.

Below the two parallel banks of light bulbs above described are two additional light bulbs designated as 31 and 32, respectively. The lights 31, as will hereinafter be described, is connected into the main electrical circuits and is controlled by conventional tilting mechanism (not here shown or described), so as to be set into operation in the event the game apparatus is tilted so as to render the game apparatus inoperative. The light bulb 32 is connected into the main electrical circuit, as will hereinafter be described, and is intended to indicate when the game apparatus is in functioning condition as a result of actuation of the coin operating mechanism, indicated generally at 33, upon the insertion of a coin.

The lower end of the playing field is formed with a trough 35 for receiving the balls as they pass through the respective stalls, and for accumulating them preparatory to re-play of the game apparatus. Said trough is slightly inclined toward the projection chute, so that when released they will roll by gravity.

Located inwardly of the projection chute 12 and defined by the block 37 and the guard bar 38 is a passageway 40 into which the balls roll when they are released, and through which the balls are initially projected for disposing them in the projection chute 12 preparatory to projection onto the playing field. Said balls, however, are normally confined in the trough 35 by a pin or rod 41 which is connected to the ball ejector

bar 42, as seen in Fig. 2, and which is withdrawn upon operation of the coin slide mechanism 33 so as to permit the balls to roll by gravity down the inclined trough 35 into the passage 40. As said balls roll into the passageway 40 they depress a relatively resilient finger or lever arm 44 which is formed with an angular extension 45 which is simultaneously moved, and which serves to complete an electrical circuit through normally spaced apart switch arms 46 and 47 of the switch 48, which is connected in an electric circuit for energizing a kicker mechanism, designated generally at 50. (See Fig. 15.)

The kicker mechanism is of conventional construction comprising a coil 51 which when energized attracts the pivoted armature 52 which is in the form of a lever having a bent over nose portion 53 positioned to strike the ball disposed in the passageway 40 for projecting said ball upwardly therethrough and by virtue of the reversely curved portion 38a of the guard rail 38, the balls are re-directed downwardly into the projection chute 12, preparatory to projection onto the playing field. Manifestly, each time a ball is forcibly struck by the nose of the armature lever 52 for impelling it up the passageway 40, the lever arm 44 is permitted to return to normal position due to the spring action of the switch arm 47 of the switch 48, which movement simultaneously breaks the circuit between the switch arms 46 and 47 and the armature lever 52 is returned to the position seen in Fig. 15, by the coil spring 54. The operation is repeated each time a ball discharges from the trough 35 onto the lever 44 which, as above indicated, completes the electrical circuit for energizing the kicker coil 51 and operates the armature 52. Obviously, when the last ball has been projected up the passageway 40, the resilient lever 44 remains in the position seen in Fig. 15 at which position the electric circuit for the kicker mechanism is open or broken.

Mounted at the lower end of the playing field adjacent the kicker mechanism is a selector device by virtue of which the player may set up by selection electrical circuit connections adapted to be completed upon actuation of the coin mechanism 33, and which circuits energize corresponding light bulbs of the series designated as 29a to 29g, inclusive. It is to be understood that said selector mechanism includes a panel and indicator (not shown) associated with a cover plate 10a which overlies the lower portion of the playing field covering the balls in the collecting trough 35, and it is also to be understood that said indicator and panel are provided with a series of designated positions corresponding to the stalls indicated at 1 to 7, and which adjustments complete certain electrical circuit connections, as above mentioned.

The selector device includes a cast frame 56 which is an integral portion of a main die cast frame, indicated at 57, mounted on the underside of the playing field, as seen in Fig. 2. Secured on said frame 56 is a panel of insulating material 58, the upper surface of which is provided with a circular series of alternating electrical contact points 59 and 59a which extend through said panel and which are connected by electrical conductors into circuits of the respective lights of the series 29a to 29g, inclusive.

Extending upwardly through the insulating panel centrally of the circular series of contact points is a stem or arbor 60 carrying a contact bar 61 which is insulated from said arbor by a

bushing of insulating material, indicated at 62. Said contact bar 61 includes a pair of oppositely extending arms 61a and 61b, the arm 61a being adapted to engage the contact points 59, while the arm 61b engages one of the contacts 59a to complete portions of the circuits for the lights 29a to 29g, inclusive. As may be seen in the drawings, contacts 59 are located at different angular positions corresponding to stall portions 1 to 7, and are connected to corresponding relay devices for the lights 29a to 29g, while contacts 59a are all connected to a common conductor 59b (Fig. 8) to complete the circuit through the contact bar 61.

By virtue of means presently to be described, it will be seen that the respective contact arms 61a and 61b are moved definite angular amounts so that the contact arm 61a will always register with a contact point 59 for one of the circuits of the lights 29a to 29g, inclusive, and the contact arm 61b will simultaneously align with a contact 59a.

Connected to the arbor 60 on the underside of the panel 53 is a gear member 64 in the form of a star wheel, as seen in Fig. 8, which normally is meshed with a co-operating gear 65 mounted on a horizontally extending shaft 66 journaled in bearings 56a of the frame 56. To the outer end of the shaft 66 is rigidly secured an operating handle 67 for rotating said shaft, which in turn through the gearing 64 and 65 rotates the contact bar 61 to a desired position of adjustment at which the indicator above referred to registers with a numerical designation corresponding to one of the light bulbs 29a to 29g, inclusive, and which, as above mentioned, indicates which of the stalls 1 to 7 the player selects, and if the first of the series of balls running down the playing field passes through the stall corresponding to the selector adjustment it will complete a corresponding electrical circuit for the aligned light of the series 29a to 29g, inclusive, which will indicate a winning combination.

To ensure that the contact arms 61a and 61b are moved definite angular positions of adjustment for engaging contacts 59 and 59a, which are connected in the respective electrical circuits of the series of lights 29a and 29g, there is provided a lever 68 pivoted at 69 to the underside of the panel 58 and the free end of which carries a roller 70 adapted to seat between adjacent teeth of the star wheel or gear 64. The roller 70 is urged into operative engagement with the teeth of the star wheel by a coil spring 71 and manifestly as the operating handle 67 is rotated for aligning the indicator with a desired numerical position corresponding to the selected light of the series 29a to 29g, said roller as it passes the crest of the respective teeth of the star wheel will tend to ride down the slope of the tooth so as to seat firmly between adjacent teeth and thus ensure arresting the star wheel at definite positions corresponding to registration of the respective contact arms 61a and 61b with the contact terminals 59 and 59a for completing a portion of the selected circuit. The gear 65 is provided with a slot 65a in its hub which engages a pin 66a of the shaft 66 which provides positive rotation for said gear, but permits axial movement thereof along the shaft 66 so as to disengage it from the gear 64. The purpose of this construction is to render the selecting means inoperative during the period that the coin operated mechanism 33 is being manipulated.

In operating this game apparatus, the selector device must be manipulated or adjusted prior to operation of the coin slide mechanism 33 in order to set up the desired circuit connections which are to be subsequently completed by virtue of the operation of the coin slide mechanism. Therefore, to prevent players from adjusting the selector more than once for each operation of the coin mechanism, the drive connections for the selector device from the knob 67 are broken during the movement of the coin operated mechanism 33.

Mounted on the shaft 66 beyond the gear 65 is a coiled spring 72 normally tending to maintain said gear 65 in operative engagement with the gear 64, but permits axial movement of said gear for disengagement from the gear 64, by the movement of the bifurcated or forked ends of the lever 73 which is rigidly mounted on a transversely extending rock shaft 74 journaled in the main frame 57. As seen in Fig. 2 of the drawings, said shaft is provided with an offset end portion 74a carrying a roller 74b adapted to be engaged by an offset projection 75a which is rigidly connected to the main longitudinal movable operating bar 76 which is actuated in response to movement of the coin slide mechanism 33 upon insertion of a coin, and is returned to normal position by coil spring 76f. Therefore, when the operating bar 76 is moved to the left from the position seen in Fig. 2, the projection 75a will contact the roller 74b and rock the shaft 74, swinging the bifurcated lever 73 in clockwise direction with respect to the illustration in Fig. 7, for moving the gear 65 out of operative engagement with the gear 64, against the action of the coil spring 72, and said gears 64 and 65 will be maintained out of engagement with each other during that portion of the stroke of the main operating lever which sets up the entire mechanism preparatory to the playing of the apparatus. Mounted on the rock shaft 74 in association with the lever 73 is an arm 77 carrying an adjustable set screw 78 adapted to engage the lever 73 and permit accurate adjustment thereof for insuring proper adjustment of the lever 73 with respect to the engagement thereof with the end of the hub of the gear 65.

Extending upwardly through an arcuate slot 11c of the playing field, in registration with the projection chute 12, is an arm 42a of the ejector lever 42 which is pivotally mounted at 43 in the main frame 57. Circumscribing said pivot 43 is a relatively heavy spring 80 which is positioned to react on said lever, so that when it is swung in counterclockwise direction with respect to the position shown in Fig. 2 by virtue of movement of the main operating bar 76 due to actuation of the coin mechanism as will hereinafter be described, said spring will become tensioned for forcibly returning the lever 42 to the position seen in Fig. 2, and during which return movement the upstanding projection 42a extending above the surface of the playing field in the projection passageway 12 will have forcibly impinged against the balls A disposed in said projection chute for impelling them upwardly onto the playing field for play.

In order that the player may have control of the projection of the balls onto the playing field, said lever 42 when swung upwardly from the position shown in Fig. 2 is latched in its upward position by a detent lever 81 normally held in operative position by a coil spring 82, which lever is connected by a rod 83 to a lever arm 84 pivoted

at 85 to the main frame 57. The upper end of said lever 84 extends around a rod 86 which is journaled in a bearing 57b, and the outer end of which is provided with a knob or handle 87. The inner end of said rod is provided with an abutment 88 in the form of a cotter pin or the like, so that upon withdrawal of the rod 86 in an outward direction by grasping of the knob 87, said lever 84 is rocked upon its pivot 85 pulling on the rod 83, thereby rocking the lever 81 in a direction for releasing the ejector lever 42 for impelling the balls through the projection chute 12 onto the playing field. (See Fig. 9.)

Mounted on the underside of the playing field panel 11 is a bank of relay devices and switch mechanism controlled thereby, which devices are connected into electrical circuits for controlling the two series of lights 29a to 29g and 30a to 30g, inclusive, and also for controlling the light 31 connected in the circuit controlled by tilting mechanism of conventional type. The switches and relays, designated generally at 89a to 89g, inclusive, are connected in corresponding circuits with the respective lights of the series 30a to 30g, inclusive, while the group of relay devices, designated generally 90a to 90g, inclusive, are connected in corresponding circuits for the lights 29a to 29g, inclusive. This latter series of lights corresponds to the circuits which the player may preliminarily establish by the selector mechanism, while the former series of lights 30a to 30g, corresponds to lights of the circuits that may be completed by the balls entering the stalls 1 to 7, inclusive, on the playing field. It is to be understood that the relay devices 89a to 89g and 90a to 90g are identical in construction, and as seen in Figs. 3 to 5 of the drawings, each comprises a coil 91 and a pivoted armature 92 which is provided with an offset portion 92a at the outer end to form a stop shoulder 92b. Said armature levers 92 are normally urged toward the coils by flat spring members 93, as seen in Fig. 4 of the drawings.

Associated with each relay device is a triple switch construction, indicated generally at 94, including three pairs of switch arms 94a—94b, 94c—94d and 94e and 94f. It will be understood that these switch arms are assembled and insulated from each other in conventional manner by blocks of insulated material, as indicated at 95, and all of the switch units together with the coils are mounted on a supporting plate or base 96, which in turn is secured to the underside of the panel 11.

Associated with each relay switch device is a latch device comprising a lever 97 pivotally mounted on a rod 98 carried on upstanding ears 95a of the mounting plate 96. Rigidly formed with said latch lever is an angularly extending arm 99 carrying an insulated pin 100 positioned intermediate the switch arms 94b and 94c. Mounted on the rod 98 in association with each lever 97 is a coil spring 101 having leg portions reacting against the mounting plate 96 and the levers 97 tending to normally swing said levers 97 in counterclockwise direction, with respect to the position indicated in Fig. 4. It is to be understood that the switch arms 94a to 94f, inclusive, are of relatively resilient material, and normally when the relays have been set in operative position by operation of the coin chute mechanism, as will presently be described, the levers 97 engage the stop 92b of the armature 92, in which position of adjustment the insulated pin 100 moves the switch arm 94b into circuit

closing with the switch arm 94a and the other two sets of switch members 94c—94d and 94e—94f are maintained in open position. The circuit which is subsequently completed through the closed switch arms 94a and 94b of the relay device corresponding to the adjustment of the selector device, or the closing of the corresponding switch 24, energizes its coil 91 which attracts the armature 92 so as to disengage the abutment 92b with the shoulder adjacent the aperture in the lever 97, so as to permit said lever 97 to swing in clockwise direction which breaks the circuit between the switch arms 94a and 94b and establishes circuit connections between the respective pairs of switches 94c—94d and 94e—94f.

The last relay device of the bank, as indicated at 103, is somewhat similar to the other relay devices above described, and is connected in a circuit including the light bulb 31 which is adapted for actuation by tilting mechanism in the event the game apparatus is tilted, and also is connected in circuit with another switch device to be hereinafter described, so as to ensure a full stroke of the coin operating mechanism and main operating bar 76 in order to complete various circuit connections preparatory to playing the game.

The switches of the unit, designated at 103, differ slightly from the switches represented in Fig. 4, in that the lever 97 when positioned as in Fig. 4 closes contact between the switch arms 103a and 103b and switch arms 103c and 103d, while the switch arms 103e and 103f are normally separated. When the coil of the relay 103 is energized as by actuation of the tilt mechanism, not herein shown, the switch arms 103a—103b and 103c—103d become separated, while arms 103e—103f are moved into contact to complete an electrical circuit for light 31 and simultaneously breaking certain main circuits to temporarily disable the game.

Referring now to the main mechanism actuating mechanism:

Rigidly connected to the main operating bar 76 is a transversely extending arm 105, which is positioned to register with and engage a roller 42c on the end of the lever 42 opposite the ejector arm 42a so that upon longitudinal movement of the main operating bar 76 by movement of the coin slide mechanism 33, said arm 105 acting on the roller 42c will cause said lever 42 to swing in counterclockwise direction with respect to the position seen in Fig. 2, tensioning the spring 80 and causing the ejector end 42a of the lever to be latched in operative position by the detent lever 81. Such movement of the arm 105 also causes the pin 42d, on which said roller 42c is mounted, to engage an abutment 107a of a lever 107 pivoted at 107d on a lever 107b which in turn is pivoted at 107c on the main casting 57, causing said levers 107 and 107b to swing downwardly, and simultaneously, said lever adjacent the end of the stroke of the main operating lever 76 engages a lever 108 pivoted at 108a to the frame 57, swinging it downwardly and moving the pin 108c, carried by the outer end of said lever 108, out of contact with the switch arm 109d, which movement permits the switch arms 109a, 109b, 109c and 109d, respectively, to become separated and break portions of electrical circuits hereinafter described.

During such movement of the parts, the ejector lever 42 becomes latched in operative position by the detent lever 81 and its stud 42d engages an

upstanding abutment 108d of the lever 108 for maintaining said lever out of contact with the switch arms 109a, 109b, 109c and 109d, maintaining said circuit controlled by said switches in open condition during the time that said ejector lever is in latched position preparatory to ejecting the balls onto the playing field. A coil spring 110 is connected to the lever 108 and to the frame 57 for returning said lever 108 to normal position, as seen in Fig. 2, when released by the ejector lever 42. It is to be understood that in the movement of the ejector lever 42 to operative position, the pin 42d during the final portion of such movement disengages from the abutment shoulder 107a of the lever 107 so as to permit said levers 107 and 107b to return to the position shown in Fig. 2 under the influence of a coil spring 111 connected to said lever and to the frame 57. The lever 107 is permitted to swing in a counter-clockwise direction only as viewed in Fig. 2, and is held in the position shown in Fig. 2 by the spring 111a.

Pivotally connected to the lever 107 is a lever 112, the opposite end of which is pivotally connected to a longitudinally extending relay reset bar 113 which extends over all of said relay devices, as seen in Figs. 2 and 4, in close proximity to the armatures 92. Pivotally connected to opposite ends of said reset bar are a pair of substantially parallel links 114 and 115 pivotally connected respectively at 116 to the frame 57 and at 117 to the frame 118 of the control mechanism, to be presently described. It will now be clear that as the main operating lever 76 is moved longitudinally by the coin slide device 33, movement will be imparted to the reset bar 113 swinging it in a parallel transverse direction so as to cause said bar to engage the levers 97 associated with the relays that have been just previously actuated, swinging them about their pivot connection to a position at which the armatures 92 under the influence of the springs 93 moves outwardly to dispose their abutment shoulders 93 in blocking engagement with the corresponding levers 97.

The lever 115 connected to the upper end of the relay reset bar 113 is provided with an extension 115a carrying the insulated disk 115b which normally engages switch arm 119a maintaining it in operative contact with its cooperating switch arm 119b for controlling the main electric circuit. It may be observed, however, that during the movement of the relay reset bar 113, the disk 115b maintains said switch arms 119a and 119b in operative contact except for the final portion of the movement of the reset bar, and it may be well to here mention at the present time that the main function of this switch is to temporarily break the main circuit which controls all the relay devices and thereby prevent fluttering of the armatures due to the establishment of a circuit by the selector mechanism, and which may also be due to the position of the armature 92 and the co-operating latch lever 97 resulting from previous actuation of the game apparatus. Furthermore, the breaking of the main circuit through the relays at this stage of set up of the operating mechanism prevents actuation of any of the relay devices until all of said relay devices have been properly adjusted by the reset bar 113.

Mounted on the main frame 57 is a dash pot 120 of conventional construction, including a control member 120a, the upper end of which is provided with a laterally projecting insulating pin 120b which normally engages a switch arm 121a for maintaining it in operative or closed relation to the switch arm 121b, which switch arms are con-

nected in the circuit for controlling all of the switches 24 associated with the operating levers 20 disposed in the respective stalls 1 to 7 at the lower end of the playing field. When the coin slide mechanism 33 is actuated, a laterally extending upstanding lug 75d carried on the bar 75 rigidly associated with the main operating bar 76 is caused to engage the end of the dash pot member 120a depressing the same, and due to the resilient character of the switch arms 120a and 120b, said arms separate to break the electrical circuit for said switches 24 which are connected respectively in circuits with certain of the relay devices. The dash pot device provides a relatively slow moving element for closing the circuit through the switch arms 120a and 120b for re-establishing the circuit through the switches 24.

The main purpose of this device is to prevent players from taking unfair advantage of the game apparatus, and it will be apparent that because the switch arms 121a and 121b remain separated for breaking the circuit for the group of switches 24, it will not be possible for any balls that may have become lodged in some portion of the playing field above the stalls from passing through the stalls and closing the respective switch 24 which otherwise would establish a circuit and perhaps would indicate a score that the player obviously would not be entitled to. Therefore, the circuits controlling the switches 24 is not re-established through the switch arms 121a and 121b by virtue of the dash pot 120, for a predetermined interval of time during which the coin slide mechanism will have been returned to normal position and all of the balls on the playing field will have passed through the stalls into the trough 35.

The main operating bar 76 is guided in its longitudinal path of movement by two sets of grooved rollers, indicated at 122 and 123, respectively, adjacent opposite ends of said bar. Mounted closely adjacent the main operating bar 76 are two switch devices 124 and 125 provided with contact arms 124a and 124b, 125a and 125b, respectively. Said pairs of contact arms are normally separated and under control of a pin of insulating material 76c carried on the main operating bar 76. As may be seen in Fig. 2 of the drawings, the position of the pin 76c is such as to engage the switch arm 121a normally maintaining it out of operative engagement with its co-operating switch arm 124b while the switch arms 125a and 125b normally are in spaced apart relation.

When the main operating bar 76 is actuated by the coin slide mechanism engaging the downwardly projecting lug 76d adjacent the forward end of said bar, the pin 76c moves out of engagement with the switch arm 124a permitting said arm to move into operative engagement with the switch arm 124b for completing a circuit connection through the tilt light bulb 31 and relay mechanism, designated generally at 103, for purposes hereinafter described. As the operating bar approaches its limit of movement, the pin 76c encounters the switch arm 125a for completing a circuit between the switch arms 125a and 125b, which switch completes an electrical circuit through the selector mechanism to one of a relay device and corresponding light of the series, designated generally at 28a to 29g, respectively.

Mounted adjacent the lower end of the main operating lever 76 is a timing mechanism, indicated generally at 127, which may be understood to be of conventional construction, and which includes a switch 128 comprising switch arms 128a and 128b which are moved into operative



position for completing the main electrical circuit for actuating the apparatus when the bar 76 has been actuated in response to operation of the coin mechanism 33. The timing mechanism includes a laterally extending arm 127a adapted to be engaged by a depressing pin 76e on the operating bar 76 during the final portion of the inward stroke of the bar 76, and which movement energizes the spring motor of the timing mechanism for maintaining the electrical circuit of the game apparatus in operative condition for a predetermined interval of time, which may be understood to be adequately sufficient for complete normal play of the game apparatus. The main purpose of the timing mechanism is, however, to ensure breaking the main circuits and conserving electrical energy while the apparatus remains idle.

Mounted adjacent the upper end and on the underside of the playing field is a control device, indicated generally at 130, as shown in Figs. 10 to 12, carried on the frame 118 which serves to complete electrical circuits to certain of the visual reward or score indicating lights 28a to 28g, respectively. This mechanism is constructed so as to be actuated in response to movement of the main operating bar 76 upon each actuation of the coin operated mechanism 33 for establishing different circuit connections to the respective reward indicating lights.

It may be understood that the game apparatus thus far described would suffice to provide an extremely interesting and entertaining game wherein the rewards in the event a player was successful in selecting a light corresponding to the light energized by the first ball operating one of the switches 24 by passing through one of the stalls. However, to render the same further entertaining and amusing, there may be associated with the apparatus, although not herein shown, conventional mechanism by virtue of which the player may automatically receive a token or tokens corresponding to the reward designated by one of the light bulbs 28a to 28g. Such reward tokens may, for example, be of various forms, such as in the form of a ticket which may be exchanged for suitable tokens which are capable of manipulating the coin mechanism 33 to permit the player to operate the game apparatus. Therefore, the electrical circuits of the game apparatus comprising this invention have been arranged to include such reward mechanism.

The control device 130, which as above indicated, establishes various electrical circuits to the different visual indicating light bulbs 28a to 28g, respectively, also establishes electrical circuits to the reward payout mechanism, above referred to. Said control device includes a panel of insulating material 131 on which is disposed two concentric circular rings 132 and 133, respectively, which are electrical conductors for portions of said electrical circuits.

Intermediate said rings are four circular series of electrical contact points, designated generally at 134, which extend through the panel of insulating material and are integrally connected to a plurality of segmental or arcuate contact strips of conductor material, designated generally at 135. Said contact strips 135 are connected to electrical conductor wires for completing portions of various electrical circuits to the visual reward or score indicating lights and the reward payout mechanism.

Mounted centrally with respect to the contact rings 132 and 133 and the series of contact points 134 is a depending arbor or pin 136 on which is

mounted a carrier 137 including two laterally extending arms 137a and 137b. Carried on the arm 137a are a pair of brushes or contact fingers 138a and 138b which maintain contact with the conductor rings 132 and 133 in any angular position of adjustment of said arm. Mounted on the arm 137 are a pair of brushes or contact fingers 139a and 139b which are positioned to engage the contact buttons 134. It is to be understood that the contact buttons 134 of the respective four circular series are so arranged that only two contact buttons of any two of the respective circular series are in radial registration so as to be engaged by the contact fingers 139a and 139b. The contact fingers 138a, 138b, 139a and 139b are insulated from their respective supporting arms 137a and 137b, by insulating material indicated at 139 and the respective contact fingers 138a and 139a and 138b and 139b are connected by conductors 138c and 138d, respectively, for completing portions of the electrical circuits, as hereinafter described.

Rigidly connected to the carrier 137 is a ratchet wheel 140 which is adapted to be rotated various angular amounts by actuation of the main operating bar 76, as will presently be described. Mounted on the arbor 136 above the ratchet wheel 140 is a motion transmitting lever arm 141 which carries a pawl 142 normally held in operative position with the teeth of the ratchet wheel by a spring 143. Mounted on the frame 118 is a detent pawl 144 normally held in operative position with the teeth of the ratchet wheel by a spring 145 for preventing reverse rotation of the ratchet wheel. Carried on the extreme end of the main operating bar 76 opposite the coin mechanism 33 is a ratchet wheel 147 carrying a depending pin 148 which is adapted, when the bar 76 is actuated in response to actuation of the coin operated mechanism, to engage the motion transmitting lever 141, swinging it about its arbor 136, and through pawl 142 which imparts rotation to the ratchet wheel 140, which movement in turn positions the respective contact fingers 139a and 139b on a different set of contact buttons 134 for completing portions of different electrical circuits for the respective visual reward or score indicating light bulbs 28a to 28g, respectively.

Pivotaly mounted on the lower end of the bar 76 adjacent the ratchet wheel 147 is a detent pawl 150 yieldingly held in engagement with the teeth of the ratchet wheel 147 by a coil spring 151. Mounted on said underside of the playing field 11, adjacent the control mechanism is a pawl 152 pivotaly mounted on a bracket 153 which is normally held against a stop 154 by a spring 155. During the in-stroke of the bar 76 by virtue of which the pin 148 swings the lever 141 for shifting the brushes or fingers 139a and 139b for completing different electrical circuits, the teeth of the ratchet wheel 148 will encounter the pawl 152 and upon return movement of the bar 76, said ratchet wheel 147 is rotated a definite angular amount. Manifestly, each time that the main operating bar 76 is moved in and out in response to operation of the coin mechanism 33, the pin 148 on the ratchet wheel 147 is disposed in a different angular position so as to vary the effective stroke of the operating bar 76 with respect to the motion transmitted to the lever 141. In other words, the lever 141 will be moved through different ranges upon successive strokes of the bar 76. Such an arrangement of motion imparting mechanism will make it almost impossible

for a player to determine the possible sequence of the circuits established to the reward or score mechanism by the successive operation of the operating bar 76 through the coin mechanism 33.

In the construction herein disclosed, the number of teeth of the main ratchet wheel 140 corresponds exactly with the different sets or pairs of contact buttons 134 that may be engaged by the contact fingers 139a and 139b, and to ensure positive registration of these contact fingers with the contact buttons 134, an adjustable stop member 156 is mounted on a lug of the frame 118, and the end of said stop is positioned to serve as an abutment for arresting the pawl 142. The member 156 thus permits minute adjustment of the mechanism so as to ensure accurate registration of the contact fingers with the buttons 134 at any angular position of adjustment. As will be observed in the drawings, the contact fingers 139a and 139b are of sufficient width to register respectively with the two innermost and the two outermost circles of contact buttons 134. The arrangement of the contact points 134 of the respective series is such that contact points of the innermost and outermost circles are in radial registration, and contact points of the two intermediate circles are also disposed in radial registration. Therefore, as the contact fingers 139a and 139b move over the contact points the circuit will be established between contact points of either the two intermediate circles or the outer and inner circles of contact points.

As above mentioned, the visual indicating panel containing light bulbs 28a to 28g, inclusive, may designate certain visual rewards or scores to be accorded the player under certain conditions, and it may be understood that the panel containing these light bulbs may be provided with various reward designations associated with the respective bulbs. By way of illustration, let it be assumed that the highest reward designation of the panel is represented by the light bulb 28d and the next highest designation of the reward panel is represented by the light bulb 28c. As above described, the control mechanism, designated generally at 130, may be re-adjusted by each operation of the coin slide mechanism 33 for establishing connections for the various circuits to the respective light bulbs of the reward or score indicating panel.

To reduce the chances of completing portions of the circuit including the light bulb 28d, which designates the highest reward to be accorded to the player during successive operation of the complete game apparatus, there is provided mechanism actuated by the main operating bar 76 which upon successive strokes of said bar alternately completes portions of electrical circuits to the two highest reward or score designating light bulbs 28d and 28c. Said means comprises two double sets of switches, designated generally at 160—161 and 162—163, and it may be understood that the respective pairs of switches 160—161 and 162—163 are alternately opened and closed by encounter with an insulated pin 165 carried on a lever 166 pivoted at 167 on the frame 168 which is mounted on the underside of the panel 11 and straddles the bar 76. The upper portion of the lever 166 is formed with two oppositely extending cam surfaces 166a and 166b adapted to be alternately engaged by a pin 169 on the lever 170 pivoted at 180 on the main operating bar 76. Connected to the end of said lever opposite the pin 169 is a coil spring 191 the opposite end of which is connected to the bar 76

and serves to yieldingly maintain said lever 170 and its pin 169 in alignment with the bar 76. As the bar 76 is moved longitudinally in response to operation of the coin mechanism 33, the pin 167 engages one of the cams 166a or 166b, rocks the lever 166 about its pivot so as to cause the insulated pin 165 to swing over center to close the opposite pair of switches. Associated with the lever 166 is a spring 182 which is adapted to assist in positively swinging said lever 166 in either direction after said lever has been moved slightly over the central position by encounter with the pin 169. The switch 160 is adapted to complete a portion of the circuit which includes the high reward or score indicating bulb 28d while the switch 162 is adapted to complete a portion of the circuit which includes the next highest reward or score indicating bulb 28c. The corresponding switches 161 and 163 complete respectively portions of circuits to the automatic reward mechanism above referred to.

In order that a clear and complete understanding may be had of the construction and operation of the game apparatus embodying this invention, it is deemed advisable to briefly describe first the general action of the game apparatus as may be observed by a player, and then describe various electrical circuits that may be established as the result of the action of the player setting the game apparatus into play.

Preparatory to playing the game, the player first adjusts the selector mechanism by manipulating the handle 67 so that the indicator (not shown) registers with a numeral which corresponds to the particular stall at the end of the playing field that the player expects and intends the first ball to enter. Then the player inserts a coin in the coin mechanism, designated at 33, for releasing the mechanism and permitting movement of a conventional slide bar which engages the main operating bar 76, and during the final portion of the instroke of the bar 76, the balls, designated generally at A, resting in the trough 35 at the lower end of the playing field, are quickly projected one after the other up the passageway 40 for lodgment into the chute 12 for projection upon the playing field.

During the complete movement of the coin mechanism 33, an electric circuit is completed through the selector mechanism for illuminating one of the lights of the series 29a to 29g which corresponds to the adjustment of the indicator of the selector mechanism. Such movement of the bar 76 has also established certain portions of an electrical circuit through the control device, indicated generally at 130, to one of the light bulbs of the score or reward indicating series, indicated at 28a to 28g, inclusive, and which circuit is completed upon projection of the balls upon the playing field. Said light bulb when illuminated designates the particular reward or score to be accorded the player in the event the first ball entering the stalls operates a switch 24 controlled by a finger 20 in the particular stall which corresponds to the numerical position of adjustment of the indicator of the selector device. If this happens, another electrical circuit is completed which illuminates a corresponding light of the series 30a to 30g, and also completes an electrical circuit to automatic reward mechanism for rewarding the player in the form of a token or tokens corresponding to the reward designated by the illuminated light of the series 28a to 28g.

By virtue of the construction herein shown and described, the player or players may make a mul-



tiplicity of selections for each complete play of the game apparatus. As above described in detail, a multiplicity of circuits to the respective lights 29a to 29g may be set up by adjusting the indicator of the selector mechanism in response to successive actuations of the main operating bar 76 by operation of the coin mechanism 33 prior to the projection of the balls on the playing field.

In order that a clear understanding may be had of the various electrical circuits that may be established upon complete operation of the game, we will now describe the various circuits in connection with a hypothetical illustration. Referring now to the schematic wiring diagram represented in Fig. 19, it will be noted that for convenience, the various selector contacts corresponding to the different stalls of the playing field, as well as the switches 24 associated with the respective stalls, are provided with numerical designations 1 to 7, inclusive, corresponding to the numbers of said stalls. Relay devices of the series 90a to 90g, which are connected in the various circuits with the selector mechanism, likewise are provided with corresponding numerical designations, and the series of relay devices designated as 89a to 89g, which are connected in series with corresponding switches 24, likewise bear similar numerical designations corresponding to the designations of both the selector device and the stalls on the playing field.

For the purpose of illustration, let it be assumed that the indicator of the selector mechanism has been adjusted to a position to complete a circuit through the contact bearing numerical designation 7 (which corresponds to the particular stall of the playing field that the player intends the first ball to enter). During the end stroke of the main operating bar 76, the stop 41 is withdrawn so that the balls A may roll down the trough 35, one at a time, into the lower end of the passageway 40, and as each ball rolls in the said passageway, it depresses the resilient finger 44 which closes the switch contact arms 46 and 47, energizing the coil 51 of the kicker mechanism causing the armature lever or kicker bar to be forcibly attracted to the coil, causing the end of said armature lever to forcibly strike the ball in the passageway 40 and propel it up said passageway, and due to the curved portion 38a of the guard bar 38, the ball is re-directed downwardly into the projection chute 12. Therefore, as each ball rolls in sequence into the passageway 40 and closes the switch 48 for energizing the kicker coil 51, said balls are promptly directed into the projection chute. The circuit including the switch 48 and the kicker coil 51 includes a main conductor wire 190, and a branch conductor wire 191 which is connected directly to the switch arm 46. The circuit is completed through the switch by virtue of the connection of the switch arm 47 by a conductor wire 192 to one end of the coil 51, the opposite end of said coil being connected by a conductor 193 to the returned side of the circuit as represented by its connection to the conductor wire 194. Such inward movement of the coin slide mechanism and operating bar 76 moves the pin 76c downwardly so as to permit the switch arms 124a and 124b to be moved into closed position, in which position they will remain until the complete return movement of the said coin slide. It will be noted that the circuit controlled by the switch 124 includes the tilt relay device, generally designated by the reference character 103, and the tilt light designated at 31, so that the latter will be effective for rendering the game in-

operative for certain purposes unless the coin slide is fully returned to its original position in a manner to be presently more fully described.

The tilt relay device 103 with its associated switches is also arranged so as to function in response to conventional tilt control mechanism which may be in the form of a swinging pendulum adapted when the device is tilted to engage a contact for closing the circuit to the relay device 103 and its associated switches to thus render the device inoperative for certain purposes.

As the operating bar approaches its lower limit of movement, it energizes the spring timer mechanism designated generally at 127, which closes the main control switch 128 for completing the main electrical circuit of the game apparatus, and simultaneously the switch 125 is closed by the pin 76c of the bar 76 for energizing the relay circuit which includes the portion of the circuit established by the adjustment of the selector mechanism. Just as soon as the switch 125 is closed, current flows through the main conductor wire 190 and branch wire 195, through the switch unit, designated generally at 103, the current passing through the switch arm 103d to switch arm 103c and thence through a conductor wire 196 to branch conductor wire 197, through the closed switch 125 and thence through branch conductor 198 to the ground connection, designated at 199, of the selector device. The current then flows through the contact arms 61b and 61a, completing the circuit through the contact 59 (at position 7 of the selector mechanism) through the conductor wire 200, which is connected to the switch arm 94a of the switch associated with relay 90g (number 7) and through the switch arm 94b to the coil of said relay 90g. Said relay coil is also connected to a main ground conductor 201 which connects all of the relay coils of the two series through the closed switch arms 94a and 94b associated with the relay 89g, and the current then flows through corresponding switch arms associated with all of the relays 89f to 89a, and thence through conductor 202, through the closed switch composed of arms 103a and 103b and thence through conductor 203 to switch 119 and back through the conductor 194.

As above mentioned, the switch 119 is closed substantially at all times except during a brief interval adjacent the inward limit of movement of the bar 76. The completion of the circuit through the relay 90g (number 7) energizes its coil for attracting its armature 92 which breaks the circuit between corresponding switch arms 94a and 94b, and completes portions of electrical circuits through its respective switch arms 94c, 94d, and 94e—94f, as above described in detail. The switches associated with the relays 90a to 90g are identical in construction, and it may be understood that the switch arms 94e and 94f when closed control a corresponding light circuit for the bulbs 29a to 29g, while the arms 94c and 94d when closed control electrical circuits to the reward mechanism.

As soon as the electrical circuit just described has been broken by opening of the switch composed of the arms 94a and 94b, the current will flow from the conductor 196 through the switch arms 94f and 94e of relay device 90 and through a conductor 204 to the light bulb (number 7) designated at 29g, to the return side of the circuit through the conductors 205a and 205, through the main switch 128, and the conduc-

tor wire 205 to the return side of the circuit connected to the source of energy. Thus when said circuit is completed, a light bulb 7 which corresponds to the indicated position of adjustment of the selector mechanism is illuminated. To indicate that the game is functioning properly upon actuation of the coin mechanism, the light 32 is connected at one side by a conductor 207 to the conductor 196, the opposite side of the light being connected by a conductor 208 to the conductor 205a through the conductor 206 to the return side of the circuit. Said light 29g remains illuminated during the normal period of operation of the game until the current supply is broken by opening of the switch 128 by the timer mechanism 127 notwithstanding the fact that the switch 125 has been opened by return of the bar 76.

Simultaneously with the establishment of the foregoing circuits by the operation of the bar 76 through the coin mechanism 33, the control device, indicated generally at 130, sets up one of a plurality of different circuit connections to reward or score indicating lights 28a to 28g. As above mentioned, the lights 28a to 28g do not become illuminated until the balls are projected onto the playing field. The balls are projected onto the playing field by pulling on the knob or handle 87 which releases the detent lever 81 and permits the ejector bar 42 under the influence of the spring 80 to impinge against said balls which are disposed in line in the projection chute 12 and propel them onto the playing field. As the ejector bar 42 is released, it releases the lever 108 which returns to the position seen in Fig. 2 for closing electrical circuits through the respective switch arms 109a, 109b and 109c, said switches being connected respectively in electrical circuits to the reward payout mechanism through the control device 130 for completing a circuit to one of the lights 28a to 28g, designating the reward or score to be accorded the player.

For the purpose of illustration, we have selected a circuit including reward or score indicating light 28b with corresponding contact terminals of the control device, and the circuit through said control device and said light is completed by a branch conductor wire 209 from the main conductor wire 191 through the closed switch composed of switch arms 109c and 109d, thence through conductor wire 210 to the terminal contact ring 132, of the control device. The current then flows from said ring through a conductor 211 to one of the aligned contact terminals 134 which, it is to be understood, is the terminal engaged by the finger 139a of the control mechanism. The current then passes through a conductor 212 to the light 28b and returns through the conductor 205, 205a and 206 to the return side of the electrical source of energy.

Now, if it be assumed that the first ball rolling down the playing field enters stall 7, which corresponds to the adjusted position of the selector mechanism, said ball will depress the lever 20 closing the corresponding switch 24. As above pointed out, the switches 24 associated with the respective stalls are connected in series with the relay devices 91a to 91g. Thus when said switch 24 associated with stall 7 is closed, it illuminates the corresponding light 30g (number 7) and completes an electrical circuit to the reward mechanism for causing its actuation and paying to the player tokens corresponding to the reward designated in connection with the light 28b.

Thus by closing the switch 24 associated with the stall 7, current flows from the conductor 191 through a conductor 213 through the closed switch composed of switch arms 121a and 121b through the temporarily closed switch 24 actuated by the first ball and through conductor 214 to relay device (number 7) designated at 89g. The opposite end of said relay coil is connected to the ground conductor 201 and the current flows through the normally closed switch composed of arms 94a and 94b of said relay through correspondingly closed switches associated with the other relays of the series 89a and 89g, and thence returns through conductor 202 and switch arms 103a and 103b to conductor 203 and switch 119 to the return conductor 194. This circuit when complete energizes the coil of relay 89g, breaking the circuit between the switch arms 94a and 94b and completing portions of electrical circuits by closing of the switch arms 94c, 94d and 94e, 94f, respectively. The circuit established by closing the switch composed of arms 94c and 94d illuminates the corresponding light (number 7) designated 30g, while the switch arms 94e and 94f complete a circuit through the switch arms 94c and 94d of the corresponding relay device (number 7) designates 90g to the reward mechanism.

The electrical circuit for the light 30g includes a conductor 215 connected to the main conductor 196 from whence current flows through the switch arm 94c to the switch arm 94d associated with the relay device 89g (number 7) through the conductor 216 to the light bulb 39g, the circuit being completed through the conductor 208 and conductors 205a, switch 128 and conductor 206 to the return side of the circuit of electrical source of energy. Thus, illumination of the light 30g (number 7) visibly indicates that the first ball to roll down the playing field has passed into stall 7, corresponding to the indicated position of adjustment of the selector mechanism which resulted in previously illuminating the corresponding light (number 7) designated as 29g.

Simultaneously with completing the circuit including the light 30g, a circuit is completed to the reward mechanism, and in this connection it is to be noted that each of the switches composed of arms 94c and 94d of the respective relay devices, designated at 89a to 89g, are connected in series with the switches composed of arms 94c and 94f of the corresponding relay devices, designated as 90a to 90g. The circuit to the reward mechanism in the present instance is completed from the main current conductor wire 196 to branch conductor wires 215, 218 through the switch arm 94f associated with the relay device 89g through the cooperating switch arm 94e, which in turn is connected in series by a conductor 219 with the switch arm 94d associated with relay device 90g, and current passes from said arm to the switch arm 94c to conductors 220 and 221 (which is also included in a circuit with the switch 124) through the switch arm 109a to the switch arm 109b and thence through a conductor 222 to contact ring 133 of the control device. The conductor 224 completes the circuit from the contact finger 138b to the aligned terminal 134 with which the finger 139b is in engagement, and from which terminal the circuit is completed through the conductor 225 to the reward mechanism, which thereby becomes actuated to reward the player in accordance with the adjustment of the control device 130, as indicated by the reward designating light 28b.

Should the balls be projected onto the playing

field after a selection has been made and before the complete returned movement of the coin slide has been had a ball passing over the selected area or stall would be ineffective for actuating the payout mechanism by reason of the fact that the switch 124 would still be in closed position and, therefore, the circuit which would be completed upon the passing of the ball over the switch 24 would be to energize the tilt relay 103, thereby preventing a closing of the circuit to the payout mechanism or to any of the relays 89a to 89g. The circuit that will be closed under those circumstances will be if we assume that the stall selected over which the ball is intended to pass is stall No. 7, and that a ball has passed through said stall, the current will flow from the energized wire 220 by reason of the closing of the switch 94c—94d of the coil 90g to the conductor 221, then through the switch arms 124a to 124b through conductor 230, branch conductor 231 to tilt relay 103. The other end of the relay, it will be noted, is connected to the live wire 194 through the switch 119, conductor 207, switches 103a and 103b and conductor 232. The result of the energizing of the tilt relay 103 will be to break the contacts 103a—103d and 103c—103d and in turn complete the circuit through contacts 103e—103f. The result of this will be to illuminate the tilt light 31 and at the same time prevent the closing of a circuit to the payout mechanism, which circuit can only be closed when the switch 103a—103b is in closed position. Thus it will be noted that unless the coin slide is fully returned to its original position in which position it will break engagement between the contacts 124a—124b, it will be impossible to complete a circuit to the payout mechanism.

If it happens that the first ball passing into one of the stalls enters one other than that selected by the player, that particular light of the series 30a to 30g, corresponding to the stall through which the ball passed, will be illuminated, but manifestly because the switch composed of arms 94e and 94f associated with the relay switches of the series 89a and 89b will not then be connected in series with the corresponding pair of switch arms of the series of relay switch devices 90a to 90b, the reward mechanism will not function.

If the control mechanism 130 becomes adjusted for completing circuits through the higher reward indicating light bulbs 28c and 28d, the contact fingers 139a and 139b of the control device will engage the terminals designated respectively at X and Y, in Fig. 19, and if the respective switches 162 and 163 are closed, as indicated in the wiring diagram, circuit is established through the light 28c and the corresponding contact of the reward mechanism. Whereas if the switches 160 and 161 are closed instead by operation of the bar 76, current will flow through the light bulb 28d which is the highest reward designating light bulb and will also complete a corresponding electrical circuit to the reward mechanism subject, of course, to the final completion of the circuits controlled by the relay devices actuated by the proper switch 24 associated with the stall through which the first ball passes, and which corresponds to proper adjustment of the selector mechanism prior to playing the game.

It is believed that our invention, its mode of construction and assembly, and many of its advantages should be readily understood from the foregoing without further description, and

it should also be manifest that while a preferred embodiment of the invention has been shown and described for illustrative purposes, the structural details are nevertheless capable of wide variation within the purview of our invention as defined in the appended claims.

What we claim and desire to secure by Letters Patent of the United States is:

1. Game apparatus of the character described, comprising a playing field having a plurality of defined areas over or into which a playing object may move, each of said areas being provided with a contact which is adapted to be actuated when a playing object passes over or into said area, electrically actuated visual indicating means each operable by a contact disposed in an area of the playing field, and selector means adapted to be adjusted by the player for selecting a certain area of the field over or into which it is intended that the object shall move, said adjustment of the selector means completing a portion of an electrical circuit for subsequently actuating the indicating means controlled by the contact located in the particular area selected.

2. Game apparatus of the character described, comprising a playing field having a plurality of defined areas over or into which a playing object may move, each of said areas being provided with a contact which is adapted to be actuated when a playing object passes over or into said area, electrically actuated visual indicating means each operable by a contact disposed in an area of the playing field, selector means adapted to be adjusted by the player for selecting a certain area of the field over or into which it is intended that the object shall move, and coin operated mechanism adapted when actuated for completing an electric circuit for the indicating means controlled by the contact located in the particular area designated by the adjustment of the selector means.

3. Game apparatus of the character described comprising a playing field having a plurality of defined areas over or into which a playing object may move, each of said areas being provided with a contact which is adapted to be actuated when a playing object passes over or into said area, electrically actuated visual indicating means each operable by a contact disposed in an area of the playing field, and a single coin operated means adapted when actuated for completing an electric circuit for the indicating means controlled by the contact located in a particular area of the playing field, said coin operated means being adapted for a plurality of successive actuations prior to playing movement of said object for completing electrical circuits for the indicating means corresponding to other areas of the playing field.

4. Game apparatus for the character described comprising a playing field having a plurality of defined areas over or into which a playing object may move, each of said areas being provided with a contact which is adapted to be actuated when a playing object passes over or into said area, electrically actuated visual indicating means each operable by a contact disposed in an area of the playing field, selector means adapted to be adjusted by the player for selecting a certain area over or into which it is intended that the object move, and coin operated mechanism adapted when actuated for completing an electric circuit for the indicating means controlled by the contact located in the particular area designated by the position of ad-

justment of the selector means, said selector means being adjustable prior to each actuation of the coin operated mechanism to register at different positions corresponding to different areas of the playing field for completing circuits to the corresponding indicating means by a plurality of actuations of the coin mechanism prior to the playing movement of said object.

5 5. Game apparatus of the character described, comprising a playing field having a plurality of defined areas over or into which a playing object may move, each of said areas being provided with a contact which is adapted to be actuated when a playing object passes over or into said area, electrically actuated visual indicating means, each operable by a contact disposed in an area of the playing field, selector means adapted to be adjusted by the player for selecting a certain area of the field over or into which it is intended that the object shall move, and coin operated mechanism adapted when actuated for completing an electric circuit for the indicating means controlled by the contact located in the particular area designated by the adjustment of the selector means, said selector means being rendered non-adjustable during each actuation of the coin operated mechanism to preclude manipulation by the player during such period.

30 6. Game apparatus of the character described comprising a playing field having a plurality of defined areas over or into which a ball may move, each of said areas being provided with a contact which is adapted to be actuated when a playing object passes over or into said area, two series of electrically actuated visual indicating means, one series of indicating means designating the selection of one of said areas by the player while the other series of indicating means designating the area over or into which the ball has passed, selector means connected in circuits with the first series of indicating means and adapted to be adjusted by a player for designating a certain selected area over or into which it is desired that the ball shall move, coin operated mechanism adapted when actuated for completing an electric circuit through the indicating means of the first series corresponding to the particular area designated by the position of adjustment of the selector means, and normally open switch means arranged for control by the contacts disposed within said areas and connected in circuit with said second series of indicating means, whereby the ball which passes over or enters one of said areas closes the switch controlled by the contact located in the particular area over or into which the ball has passed for completing an electric circuit through the indicating means of the second series corresponding to the area passed over or entered by said ball.

60 7. Game apparatus of the character described comprising a playing field having a plurality of defined areas over or into which a ball may move, each of said areas being provided with a contact which is adapted to be actuated when a playing object passes over or into said area, two series of indicating means, one series of indicating means designating the selection of one of said areas by the player while the other series of indicating means designating the area over or into which a ball has passed, means for selectively placing in operative position one or more of the said first series of indicating means, means adapted when actuated for rendering completely operative the selected indicating means of the first series, and normally inoperative means for controlling the

operation of said second series of indicating means, whereby the ball which passes over or enters one of said areas actuates the last mentioned means through the contacts located in said areas for rendering completely operative the indicating means of the second series corresponding to the area passed over or entered by said ball.

8. Game apparatus of the character described comprising a playing field having a plurality of defined areas over or into which a ball may move, each of said areas being provided with a contact which is adapted to be actuated when a playing object passes over or into said area, two series of electrically actuated visual indicating means, one series of indicating means designating the selection of one of said areas by the player while the other series of indicating means designating the area over or into which the ball has passed, selector means connected in circuits with the first series of indicating means and adapted to be adjusted by a player for designating a certain selected area over or into which it is desired that the ball shall move, means adapted when actuated for completing an electric circuit through the indicating means of the first series corresponding to the particular area designated by the position of adjustment of the selector means, and normally open switch means arranged for actuation by the contacts located in said areas and connected in circuit with said second series of indicating means, whereby the ball which passes over or enters one of said areas closes the switch controlled by the contact within the area over which the ball passes for completing an electric circuit through the indicating means of the second series corresponding to the area passed over or entered by said ball, said second series of indicating means being so connected that the actuation of one will render all of the remaining indicating means in said series inoperative.

9. Game apparatus of the character described comprising a playing field having a plurality of defined areas over or into which a ball may move, each of said areas being provided with a contact which is adapted to be actuated when a playing object passes over or into said area, two series of indicating means, one series of indicating means designating the selection of one of said areas by the player while the other series of indicating means designating the area over or into which a ball has passed, means for selectively placing in operative position one or more of the said first series of indicating means, means adapted when actuated for rendering completely operative the selected indicating means of the first series, and normally inoperative means for controlling the operation of said second series of indicating means, said last mentioned means being adapted for actuation by the contacts located in said areas, whereby the ball which passes over or enters one of said areas actuates the last mentioned means controlled by the contact in the particular area over which the ball passes or enters for rendering completely operative the indicating means of the second series corresponding to the area passed over or entered by said ball, said second series of indicating means being so connected that the actuation of one will render all of the remaining indicating means in said series inoperative.

10. Game apparatus of the character described comprising a playing field having a plurality of defined areas over or into which a ball may move, each of said areas being provided with a contact which is adapted to be actuated when a playing object passes over or into said area, two series of

electrically actuated visual indicating means, one series of indicating means designating the selection of one of said areas by the player while the other series of indicating means designating the area over or into which the ball has passed, each series of indicating means including separate relay devices for each of the respective areas of the playing field, selector means connected in circuits with the first series of indicating means and adapted to be adjusted by a player for designating a certain selected area over or into which it is desired that the ball shall move, coin operated mechanism adapted when actuated for completing an electric circuit through the indicating means of the first series corresponding to the particular area designated by the position of adjustment of the selector means, and normally open switch means arranged for actuation by the contacts located within said areas and connected in circuit with said second series of indicating means, whereby the ball which passes over or enters one of said areas closes the switch actuated by the contact in the particular area over which the ball passes or enters for completing an electric circuit through the indicating means of the second series corresponding to the area passed over or entered by said ball.

11. Game apparatus of the character described comprising a playing field having a plurality of defined areas over or into which a ball may move, each of said areas being provided with a contact which is adapted to be actuated when a playing object passes over or into said area, two series of electrically actuated visual indicating means, one series of indicating means designating the selection of one of said areas by the player while the other series of indicating means designating the area over or into which the ball has passed, each series of indicating means including separate relay devices for each of the respective areas of the playing field, selector means connected in circuits with the first series of indicating means and adapted to be adjusted by a player for designating a certain selected area over or into which it is desired that the ball shall move, coin operated mechanism adapted when actuated for completing an electric circuit through the indicating means of the first series corresponding to the particular area designated by the position of adjustment of the selector means, normally open switch means arranged for actuation by the contacts located within said areas and connected in circuit with said second series of indicating means, whereby the ball which passes over or enters one of said areas closes the switch actuated by the contact in the particular area over which the ball passes or enters for completing an electric circuit through the indicating means of the second series corresponding to the area passed over or entered by said ball, means actuated by the coin operated mechanism for resetting said relay devices, and a main normally closed switch adapted to be actuated by said last mentioned means for temporarily breaking the circuit including said relay devices.

12. Game apparatus of the character described comprising a playing field having a plurality of defined areas over or into which a ball may move, each of said areas being provided with a contact which is adapted to be actuated when a playing object passes over or into said area, two series of electrically actuated visual indicating means, one series of indicating means designating the selection of one of said areas by the player while the other series of indicating means designating the

areas over or into which the ball has passed, selector means connected in circuits with the first series of indicating means and adapted to be adjusted by a player for designating a certain selected area over or into which it is desired that the ball shall move, coin operated mechanism adapted when actuated for completing an electric circuit through the indicating means of the first series corresponding to the particular area designated by the position of adjustment of the selector means, normally open switch means arranged for control by the contacts located within said areas and connected in circuit with said second series of indicating means, whereby the ball which passes over or enters one of said areas closes the switch controlled by the contact located in the particular area over which the ball passes or enters for completing an electric circuit through the indicating means of the second series corresponding to the area passed over or entered by said ball, a normally closed control switch connected in circuit with said switches operable by the contacts of the respective areas, and a dash pot connected with said control switch and actuated by said coin operated mechanism for precluding the possibility of completing an electrical circuit including indicating means of the second series for a predetermined time by the passage of a ball over or into one of said areas of the playing field.

13. Game apparatus of the character described comprising a playing field having a plurality of defined areas over or into which a ball may move, each of said areas being provided with a contact which is adapted to be actuated when a playing object passes over or into said area, two series of electrically actuated visual indicating means, one series of indicating means designating the selection of one of said areas by the player while the other series of indicating means designating the area over or into which the ball has passed, each series of indicating means including separate relay devices for each of the respective areas of the playing field, selector means connected in circuits with the first series of indicating means and adapted to be adjusted by a player for designating a certain selected area over or into which it is desired that the ball shall move, coin operated mechanism adapted when actuated for completing an electric circuit through the indicating means of the first series corresponding to the particular area designated by the position of adjustment of the selector means, a normally open switch connected in circuit with the relay devices for said first series of indicating means, means actuated by the coin operated mechanism for closing said switch for completing portions of the circuits of said relay devices, and normally open switch means arranged for actuation by the contacts located within said areas and connected in circuit with said second series of indicating means, whereby the ball which passes over or enters one of said areas closes the switch actuated by the contact within the particular area over which the ball passes or enters for completing an electric circuit through the indicating means of the second series corresponding to the area passed over or entered by said ball.

14. Game apparatus of the character described comprising a playing field having a plurality of defined areas over or into which a ball may move, means for projecting a ball onto the playing field, score indicating means, and means controlled by said ball projecting means for rendering said

indicating means inoperative until said ball has been projected onto the playing field.

15. Game apparatus of the character described comprising a playing field having a plurality of defined areas over or into which a ball may move, coin operated mechanism, a main operating bar on the underside of the playing field and movable in response to actuation of the coin operated mechanism, score indicating means, and means actuated by the movement of said bar for readjusting said indicating means.

16. Game apparatus of the character described comprising a playing field having a plurality of defined areas over or into which a ball may move, coin operated mechanism, a main operating bar on the underside of the playing field and movable in response to actuation of the coin operated mechanism, electrically operated score indicating means connected in electric circuits with the playing field, control mechanism adapted to be adjusted for completing a plurality of different electrical circuits to said indicating means, said control mechanism including a multiplicity of electrical contacts arranged in circular form, rotatably mounted contact fingers for engaging sets of said contacts to complete an electrical circuit to said indicating means, means actuated by the operating bar for shifting said fingers into

engagement with different sets of contacts to complete different electrical circuits to said indicating means, and means responsive to the movement of the operating bar for shifting said contact fingers different angular amounts upon successive movements of the operating bar.

17. Game apparatus of the character described comprising a playing field having a plurality of defined areas over or into which a ball may be projected, means for projecting a ball on to the playing field, electrically operated score indicating means, and a switch connected in circuit with said indicating means and controlled by said ball projecting means for rendering said indicating means inoperative until the ball has been projected onto the playing field.

18. In a game apparatus, a playing field over which an object may be moved, coin operated mechanism, a movable operating bar actuated thereby and connected to the underside of said playing field, electrically operated indicating means, two separate circuits for said means, a switch for each circuit disposed adjacent said bar, and means actuated by successive movements of said bar for alternately closing said switches.

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