Aug. 16, 1938. E. KRAMER ET AL 2,127,261

GAME APPARATUS

Filed July 18, 1936 2 Sheets-Sheet 1

Fig. 1.

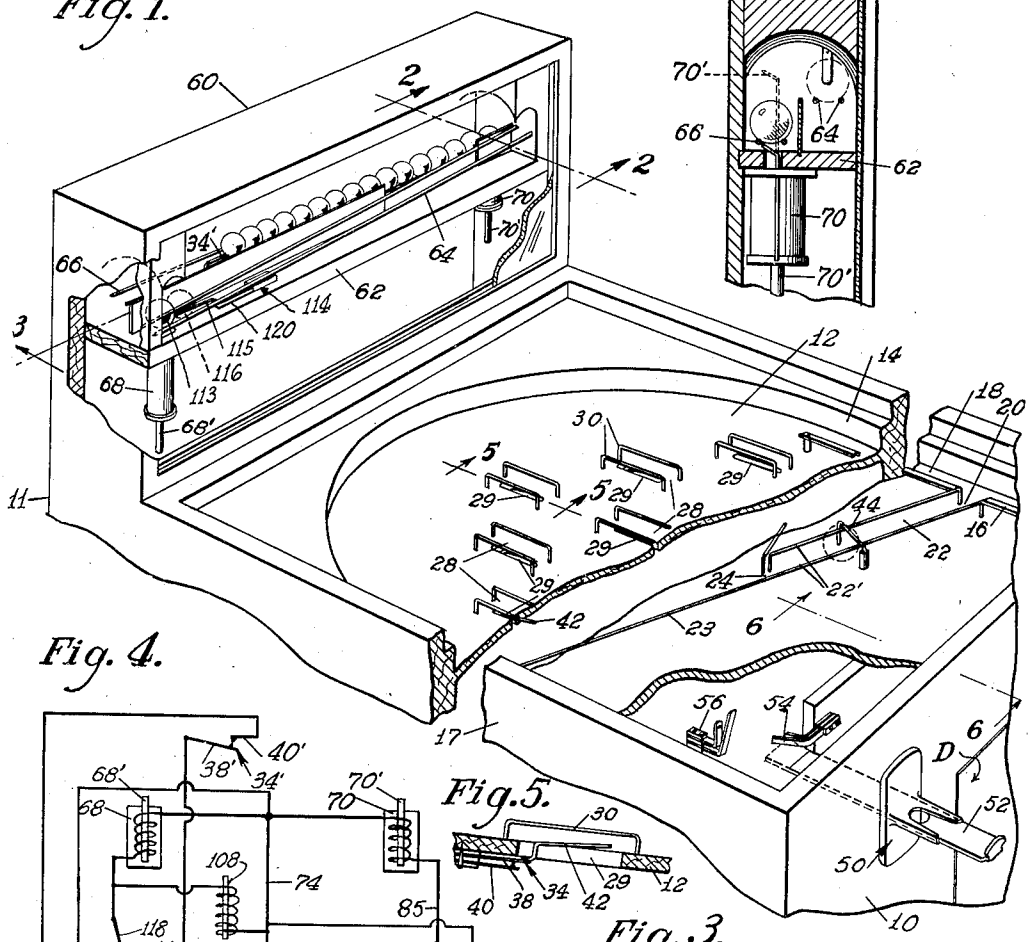

Fig. 2.

Fig. 4.

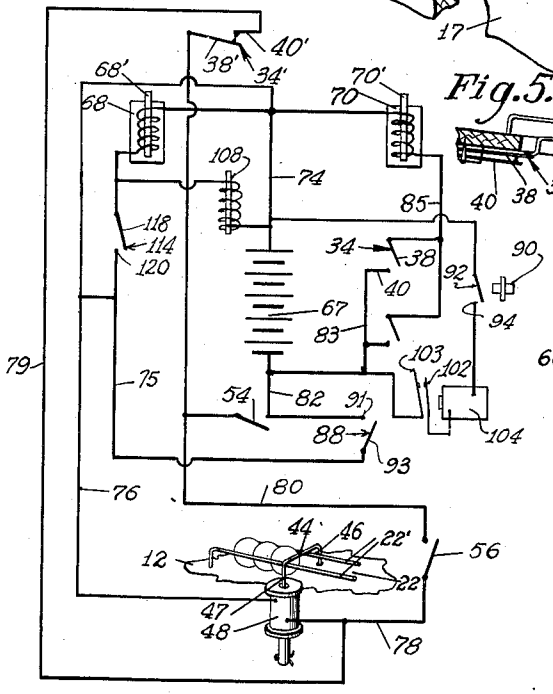

Fig. 5.

Fig. 3.

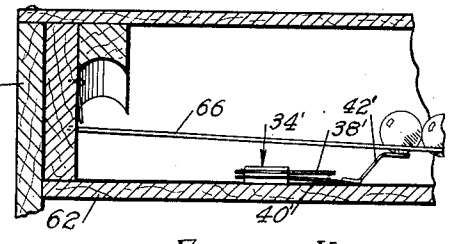

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Fig. 6.

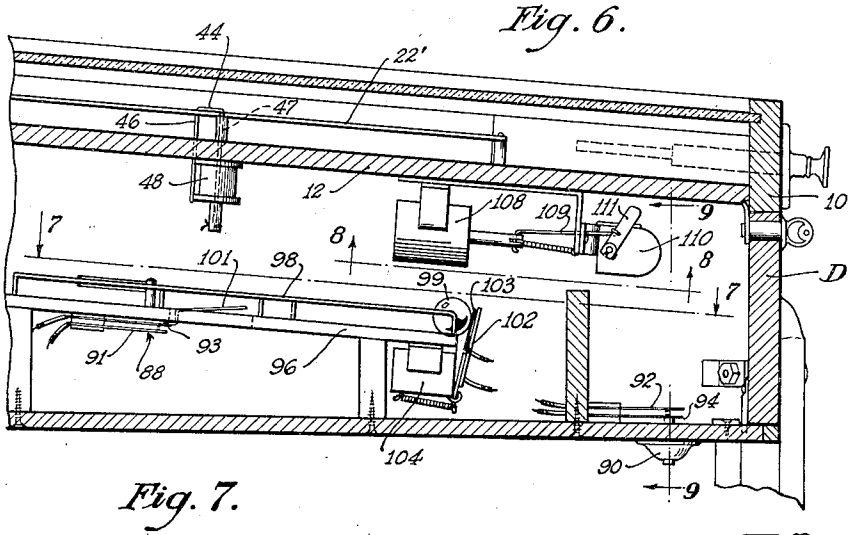


Fig. 7.

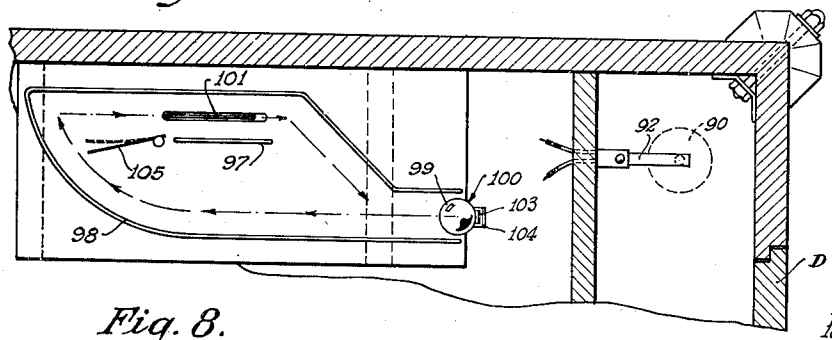
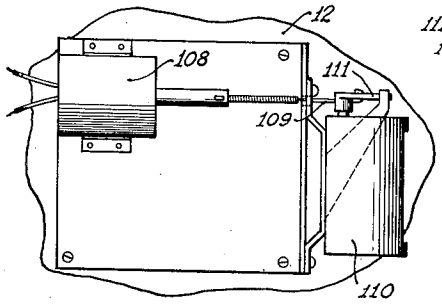


Fig. 8.

Fig. 9.



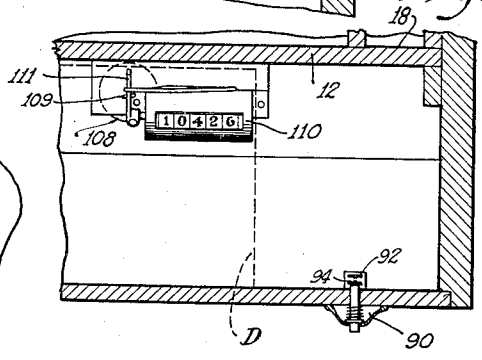
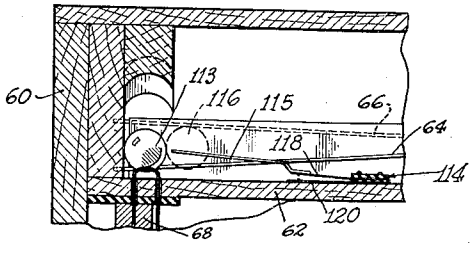


Fig. 10.



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UNITED STATES PATENT OFFICE

2,127,261

GAME APPARATUS

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Application July 18, 1936, Serial No. 91,354

11 Claims. (Cl. 273—121)

This invention relates to coin-controlled game apparatus of the projected ball type and has for one principal object the provision of a novel "free play" control means for releasing balls for play responsive to mechanism operated by played balls.

The invention further provides a novel score indicating means co-operable with the aforementioned free play control.

Still another novel provision is a master switch and a ball operated switch mechanism for resetting the aforesaid score indicating means independently of the free play control means.

Additional objects and novel features of the invention will appear as the following detailed description proceeds in view of the annexed drawings in which:

Fig. 1 is a perspective view of our improved game apparatus;

Fig. 2 is an enlarged sectional detail taken along line 2—2 of Fig. 1;

Fig. 3 is an enlarged sectional detail taken along line 3—3 of Fig. 1;

Fig. 4 is a schematic diagram of the electrical circuits and mechanism of the device;

Fig. 5 is a sectional detail taken along line 5—5 in Fig. 1;

Fig. 6 is a sectional side view of the cabinet showing the master reset and counter mechanism, and is taken along line 6—6 of Fig. 1;

Fig. 7 is a plan detail of the master reset ball device, taken along line 7—7 of Fig. 6;

Fig. 8 is a bottom plan detail of the counter and operating solenoid therefor, taken along line 8—8 of Fig. 6;

Fig. 9 is a detail of the front of the open cabinet showing the counter and master switch, and is taken along line 9—9 of Fig. 6; and

Fig. 10 is a fragmentary detail in section of a master roll over switch.

A preferred form of our novel game apparatus is shown in Fig. 1, and includes a horizontally extensive housing member having a front wall 10 and a ball playing surface member 12 sloped slightly from the horizontal.

Adjacent the juncture of the ball playing member 12 and the side wall 14 is a rail 16 forming a raceway 18 for projected balls, and having a side opening 20 communicating with a ball guideway 22 formed by parallel side rails 22' having an entrance opening or end 24 and a portion 23 of one of the side rails 22' being continued to extend diagonally on across to the side wall 17, thus preventing movement of balls therebeyond to the region of front wall 10.

Disposed according to a desired scheme or pattern on the upper part of the ball field 12, are a plurality of scoring aisles 28, each comprising a pair of short parallel side rails 30 spaced apart a distance approximating the diameter of the ball used in play.

In the ball surface portion 12 of each of the scoring aisles 28 is a slot 29 extended with the axis of this aisle and communicating with the interior of the housing beneath the surface or panel 12. On the underside of the latter panel 12 are secured a plurality of roll-over switches 34 of the general type shown in Fig. 5, and having a pair of superposed normally open contact springs 38—40 and an offset actuating finger 42 (respectively 34', 38', 40', 42' in Fig. 3), the finger or roll-over extension 42 being adapted to protrude slightly through the slots 29 so as to be depressed to close switches 34 when a ball rolls over this finger portion 42.

Disposed across the guide 22 in Figs. 1 and 4 is a gate 44 in the form of an inverted U-shaped member having a bar portion normally extended laterally across the side rails 22' and resting thereon, and having its side legs 46, 47 extended through the ball surface or panel 12 to the underside thereof where one leg 47 extends into the core portion of a gate-lifting solenoid 48 (Fig. 4) such that when the solenoid is energized gate 44 will be raised to permit balls to pass to the lower exit end of guide 22.

On the front wall 19 of the housing is a coin slide mechanism 50 having a slide 52 movable inwardly to operate a free-play switch 54 during the initial state of the inward movement, and a full stroke or game release switch 56 at the end of its inward stroke, this being for the purpose of releasing gate 44 to permit restrained or stored balls to move by gravity toward exit 18 and into playing position.

The coin slide mechanism may be of any suitable type having a sufficient amount of lost or ineffective motion to permit inward movement of the slide bar a distance far enough to operate the switch 54 but not the switch 56 in Fig. 1, the switch 56 being operable only when a coin is inserted in the slide.

A novel score indicating device forming part of the free play control mechanism is shown in Fig. 1 and comprises a vertical cabinet 60 extended from the rear wall 11 of the housing, and having a horizontal shelf part 62 with a pair of oppositely descending ball ramps 64, 66 thereon (see also Figs. 2 and 3). At the lowermost end of each ramp 64, 66, is a ball-lifting solenoid 68,

70, each having a plunger 68', 70' movable upwardly to raise a ball so that it will fall onto the opposite ramp when the solenoid winding is energized. This action is best understood by reference to Fig. 2, the plunger or lift 70' being shown in dotted lines and a ball lifted thereby being shown in dotted lines in the adjoining ramp 64.

Provided at the higher end of ramp 66 is a pass-over switch 34' (see Fig. 3) having its operating finger 42' disposed in the path of balls moving in this ramp, and this switch is normally closed but a ball resting on finger 42' would hold this switch open. A plurality of balls, suitably colored or marked, are normally disposed in ramp 66, as shown in Fig. 1, so that switch 34' is normally held open. Its function along with that of the rest of the mechanism will appear from the description of operation which appears hereinafter.

At the lower (left) end of the front ramp 64 is another pass-over switch 114, the contacts 118, 120 of which are normally open unless a ball (such as 116 in Figs. 1 and 10) rests thereon. A ball 113 normally rests over the lift plunger 68', and if a player has left one or more free-play balls (transferred from the rear ramp by scoring), the switch 114 will be closed, and as this switch is in circuit with the solenoids 68 and 108, being the ball restoring and counter solenoids, respectively, the operation of push button 90 or switch 54 by either the player or proprietor will be ineffective to actuate these latter solenoids unless a free play ball 116 is positioned in front ramp 64 in addition to the spacing or waiting ball 113 normally resting over lift plunger 68' therein.

Where the player does not desire to avail himself of the free plays he may have set up and he leaves the machine with indicating balls resting in the front ramp 64, it will be necessary for the proprietor to reset the machine, and for this purpose we have provided a novel master switch and reset control mechanism.

On the underside of the cabinet wall is a switch 90 having a pair of normally open contacts 92, 94 of the push-button type, and mounted on the inner surface of the bottom wall is an inclined master ball surface member 96 (Figs. 6 and 7) having on its upper surface a ball guide rail 98 which curves back on itself to form an open lower end 100, at which end normally rests a master ball 99 against a projecting arm 102, the latter being pivotally mounted for operation by electromagnet 104. The projecting arm 102 has a flexible contact member 103 adapted to be held in closed contacting relation to armature 102 by the weight of ball 99 resting thereagainst.

A roll-over switch 88 with normally open contacts 91, 93 is mounted on the bottom of board 96 and has its roll-over finger 101 protruded onto the upper surface of board 96 in the usual manner, parallel with a straight side of rail 98 and also with a short aisle rail 97. Positioned at the upper end of rail 97 is a movable rebound gate 105 adapted to prevent ball 99 from bounding back to normal position once it has been projected by arm 102, and thus to assure that the master ball will roll over switch finger 101.

Mounted on the underside of the main play board 12 is a counter solenoid 108 and a suitable form of tally or counter 110 having a crank arm 111 linked by arm 109 to the plunger of the solenoid 108. This counter confronts the locked door D in the front cabinet wall so as to be readily accessible to the proprietor.

Operation

Assuming the parts to be in the condition of Fig. 1, and referring conveniently between the several figures, particularly the circuit diagram of Fig. 4, the operation of the device may be initiated by insertion of a coin in the slide 52 and pushing the latter inwardly to the end of its stroke in the usual manner. This will close the two switches 54 and 56, closing a circuit for the gate solenoid 48 from battery 67 via conductor 82, through switch 54, conductor 80, the winding of solenoid 48, conductor 76 and conductor 74, back to battery.

The energization of solenoid 48 raises gate 44 and balls, as indicated in dotted lines, resting thereagainst will descend toward opening 20 into the raceway 18 and the projecting-raceway, whereupon the operator, having released coin slide 52, operates a usual form of ball projecting plunger (not shown) to propel balls out onto the field 12. By skillful manipulation of the projector, the balls may variously pass through the several scoring aisles 28, operating their respective roll-over switches 34.

Assuming that the switch 34 in Fig. 5 is operated, the ball lifting solenoid 70 will be energized from battery via conductor 83, closed switch 34, conductor 85, the winding of solenoid 70, back to battery by conductor 74. Since at this time a ball is resting at the lower right-hand end of the rear ramp 66, the lift or plunger 70' of the solenoid will raise a ball over onto the upper right-hand end of the front ramp 64, to descend to the bottom thereof at the lower left-hand end in Fig. 1 where it rests next to the spacing ball 113 which overlies the lift or plunger 68' of the solenoid 68. In this manner a number of balls may be passed onto the front ramp to indicate the player's score and to condition the apparatus for further free play.

When the player has finished, he may again push the slide 52 inwardly a limited distance without depositing another coin, and in so doing he will close the free play switch 54, and since the balls in the rear ramp 66 have descended by a distance of at least one ball, switch 34' will be closed and switch 114 in the front ramp will also be closed, and solenoid 68 will be operated to lift balls from ramp 64 back onto ramp 66; such balls will descend in the latter over switch 34', making the circuit once for the passage or transfer of every ball from the front ramp to the back until there are no more balls for transfer—in other words, until the player's previous score has been cleared from the ramp and switch 114 again opens, leaving only the spacing ball 113 in ramp 64.

If desired, the free play switch may be operated by a control separate from the coin slide, or a push button switch may be installed on the cabinet to replace the switch 54 as it is represented in Fig. 1. Such modifications are optional, as is the proprietary switch 88 and associated operating and counting mechanism, described below.

Meanwhile, the gate solenoid 48 has also been actuated to release waiting or played balls into the lower guideway 22 for a further "free play" in like manner as was done when the coin slide was initially operated.

The circuits established in the foregoing sequence of operations are as follows: Slide 52 closes switch 54 which connects battery through the now closed switch 34' over conductors 80 and 79 to 78 and through the solenoid 48 via conduc-

tors 76, 74 back to battery, thus raising gate 44 releasing balls for play.

Switches 34' and 114 being closed by the score set up, current from conductor 79 also flows to conductor 75 through switch 114 and divides through solenoid windings 68 and 108 to return to 74 and battery, thus simultaneously operating the restoring lift 68' and free play counter 110.

If there are more than one extra or free play balls in the scoring ramp (in addition to spacing ball 113), the aforesaid circuit through restoring solenoid 68 will be broken each time a restored ball passes over switch 34' until only one ball is left in front ramp 64, thus opening switch 114 therein, and the counter mechanism will operate correspondingly.

In the event that a player scores but leaves the machine without clearing the score ramp 64 of balls, the auxiliary or master push button switch 90 (see also Fig. 6) may be operated by the proprietor who will hold the latter switch in depressed condition, whereupon solenoid 104 will attract its projecting armature 102 to project ball 99 past gate 105 and over switch 101; each time the ball operates switch 101, the lift solenoid 68' will operate to clear ramp 64 of balls; at the same time counter 110 will step one digit for each ball cleared. The master ball 99 will be reprojected each time it returns against the contact 103 on armature 102, which closes a circuit through the winding of its own magnet 104, master switch 90 being meanwhile depressed or closed.

The purpose of the master ball mechanism for operating lift solenoid 68 lies in the relatively long period of time during which the switch 88 will remain closed while ball 99 is passing over finger 101 thereof. In the absence of such a provision, the tally mechanism could be stepped up indefinitely without operating lift plunger 68' by rapidly operating the push button 90, because the work to be done by solenoid 68 makes the latter sluggish when compared with the easier working solenoid 108. There is, of course, a certain entertainment element in this arrangement also, in so far as observers of the resetting operation will hear the movements of the master ball within the cabinet and at the same time see the external effects of its operation.

The tally device 110 is a necessary proprietary adjunct of the machine for the purpose of determining the relative number of free plays which the machine has given, as compared with the moneys deposited in the coin chute. It is also a form of check on the "playing qualities" of a given arrangement of hazards and aisles on the play board.

The foregoing resetting operation by the master switch 90 is effected by establishing a circuit (Fig. 4) from conductor 74 and battery 67 through closed contacts 92, 94 of switch 90 and through the winding of the projector magnet 104, armature 102 and contact 103 thereof and thence back to conductor 82 of battery 67. This operates the ball projector magnet 104 and ball 99 passes out onto the board 96 and over switch finger 101 closing switch 88 to establish a circuit for lift solenoid 68 from battery 67 via conductor 82, contacts 91, 93 of switch 88, conductor 75 through the winding 68 and conductor 74 back to battery.

Simultaneously with the establishment of the foregoing circuit through solenoid 68, a circuit is established through counter solenoid 108 from battery conductor 74, through winding 108, conductor 75, contacts 91, 93 of switch 88, and conductor 82 back to battery. Thus solenoid 108 is energized each time ball 99 passes over switch finger 101 and steps the counter 110 accordingly.

It will be apparent that the game elements and mechanisms, described in detail herein for purposes of illustration, are susceptible of variation without departing from the scope of the invention, and we do not intend to be limited to the precise details recited except as may be hereinafter provided by the appended claims.

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

1. A game apparatus having switch mechanism operable by means involved in the operation of the game apparatus, a manual control, score indicating means comprising a pair of ball retaining members positioned side by side and tilted in opposite directions, a plurality of balls normally distributed in a predetermined manner in said members, means for transferring one of said balls in one said retaining member to the other thereof responsive to the actuation of said switch mechanism, and means controlled by said manual control mechanism for restoring balls transferred as aforesaid one at a time back to the said retaining member from which they were removed.

2. A score-indicating and control device for use in a game apparatus having an inclined ball playing board with ball operated switches thereon and a manually operable control, said device comprising a pair of adjacently positioned and oppositely tilted ball retaining members both arranged in view of the player and one of which normally retains a plurality of indicating balls, electrically operable means for transferring balls from one of said retaining members to the other thereof, ball-operated switch means in each of said retaining members, one of the said transferring means being operable by one of said ball-operated switches in said playing board and the other said transferring means being controlled by said manually operable control cooperably with the said ball-operated switches in said retaining members.

3. A device for game apparatus, said device comprising a pair of adjacent inclined ball ramps and a determined number of balls therein, electrical means for transferring balls from one ramp to another, switch means operated by an instrumentality employed in the playing of the game to actuate said electrical means to transfer balls one at a time from one particular ramp to the other, and a selectively operable switch arranged for manual control and ball operated switch means in said ramps and actuated by a predetermined disposition of said balls in said ramps cooperably with said selectively operable switch to operate said electrical means and effect return of balls transferred as first above set forth, back to the ramp from which they were received.

4. A device for use in game apparatus of the type having ball playing means, said device comprising a plurality of inclined ball retaining members arranged in close proximity, a determined number of indicating balls arranged in said retaining members, transfer means operably controlled by a ball played in the game to transfer balls one at a time from one of said retaining members to another of the same, together with means for restoring transferred balls one at a time back to the retaining member from which they were transferred as aforesaid, said last-mentioned means being operably controlled by a

selectively actuated device co-operable with ball-operated means actuated by a predetermined arrangement of balls in said retaining members.

5. Ball-indicating mechanism for use with game apparatus and the like and comprising a pair of elongated ball-retaining ramps positioned in close proximity one to the other and inclined in opposite directions, electrically operable means at the lower end of each of said ramps and effective when energized to raise a ball out of its respective ramp into the upper end of the other said ramp, means including an electric circuit for each of said electrical means to energize the latter, and switch means in said ramps and connected in said electrical circuits for controlling the operation of said electrical means when balls are disposed in said ramps in a predetermined manner.

6. A game apparatus having master control means for releasing the game for limited play, a game switch operated by an instrumentality employed in playing the game, a "free play" switch for releasing said instrumentality for repeated play without the necessity of having to actuate said master control in its normal releasing function, indicating mechanism in the form of a pair of ramps each constructed to hold a plurality of balls in serial arrangement therein in sight of the player, said ramps being disposed in side by side relation and inclined in opposite directions each with respect to the other, a solenoid arranged at the lower end of each said ramp and each said solenoid having a plunger attractable thereby to engage a ball at the lower end of its respective ramp and move said ball over into the upper end of the adjoining ramp, an electric circuit including said game switch and one of said solenoids whereby the latter may be operated by the former in the playing of the game, a second circuit including the other one of said solenoids and said "free play" switch together with control switch means arranged in said ramps for operation by balls therein and arranged in circuit with the aforesaid solenoid circuits to control the operation of the latter in accordance with a predetermined arrangement of balls in said ramps.

7. Indicating mechanism including oppositely inclined ball storage members arranged in close proximity, electrical transferring means at the lower end of each storage member for moving a ball over into the neighboring storage member, means operably controlled by mechanism the operation of which is to be indicated for operating said transferring means in one of said storage members, selectively operable means for operating the transferring means in an adjoining storage member, and switch mechanism operated by balls disposed in said storage members in a predetermined manner for operably controlling said selectively operable means.

8. Tally means including a pair of oppositely inclined ball storage runways in side by side relation, electrical means at the lower end of each runway for moving balls one at a time into the other runway, a first switch for operating one of said electrical means and operably controlled by means employed in a mechanism the operation of which is to be tallied, a second switch means for operating the other said electrical means, together with control switch means arranged for operation by balls disposed in a predetermined manner in said runways as a result of transfer as aforesaid, said control switch being arranged when operated as aforesaid to control the subsequent operation of said mechanism.

9. Game apparatus having a ball playing surface with ball operated switches and coin control mechanism to release the game for play, a "free-play" and score-indicating mechanism comprising: an inclined runway in which are stored balls for play and having a gate operable to release balls for play therefrom; electrical means controlled by said coin control to open said gate; a first rack normally retaining a determined number of balls, and a second ball rack positioned near said first rack, both said racks being arranged in view for observation of the balls therein; switch means in said racks; electrical transferring means for transferring a ball from said first to said second rack, and said transferring means being operably controlled by the aforesaid ball operated switches in said game, and a second electrical transferring means operably controlled by said switch means in the racks cooperably with manually operable switch means for the purpose of restoring transferred balls from said second rack back to said first rack.

10. An indicating mechanism including oppositely inclined ramps arranged side by side and each having article transferring means near its lower end and operable to transfer an article from the lower end of one ramp over into the upper end of a neighboring ramp, a first means for controlling the operation of one of said transferring means whereby articles may be transferred from one particular ramp to a second adjoining ramp, a manually operable control, and control means provided in said ramps for operation by articles therein and so arranged and operatively associated with said manually operable control as to effect repeated automatic operation of the transferring means in said second ramp to restore articles previously transferred into the latter back to said first or particular ramp from which the articles originally were transferred.

11. An indicating mechanism for use with amusement apparatus and the like, said mechanism including a pair of oppositely inclined adjacent ramps adapted to retain articles of a nature such that they will gravitate to the lower end of the several ramps, transferring means near the lower end of each of said ramps and operable to transfer an article from the lower end of one ramp over into the upper end of an adjacent ramp, there normally being a predetermined number of articles in a particular one of said ramps and at least one article in the other said ramp, control means in each ramp and operated by articles therein, and the control means in said other ramp being arranged near the lower end thereof for operative engagement by said one article normally therein, a first control means arranged apart from said ramps for operation by an agency other than said articles for effecting operation of the transferring means in said particular ramp so as to transfer articles into said other ramp, and a second control means also arranged apart from said ramps for control by an agency rather than said articles and arranged for cooperation with said control means in the ramps whereby to effect repeated automatic operation of the transferring means in said other ramp to return all articles save one therein back to said particular ramp.

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