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D. D. LEVITT

2,551,023

BALL TRANSFER MECHANISM FOR BALL GAMES

Filed April 5, 1947

2 Sheets-Sheet 1

Fig. 1.

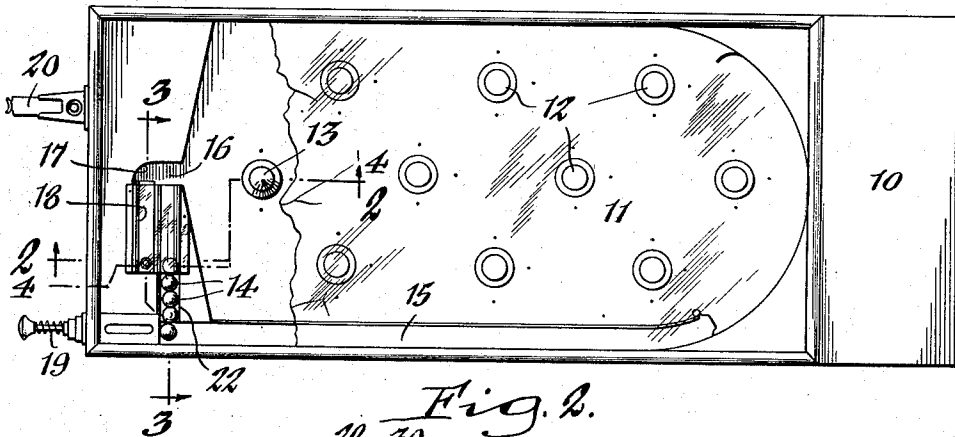


Fig. 2.

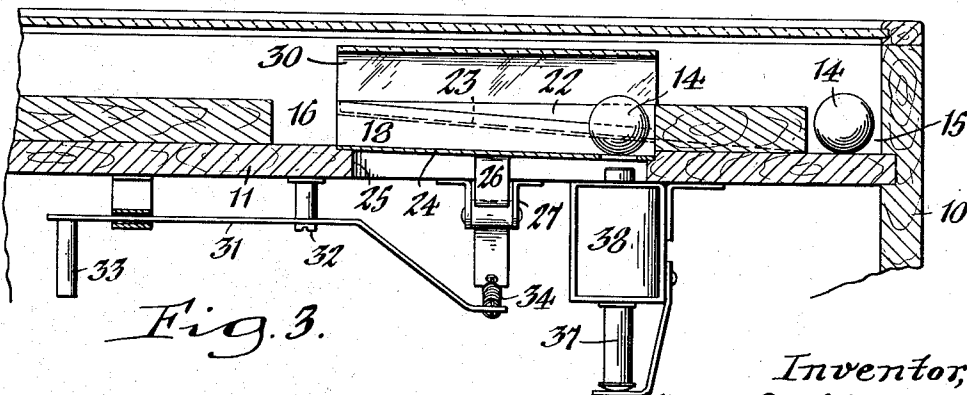
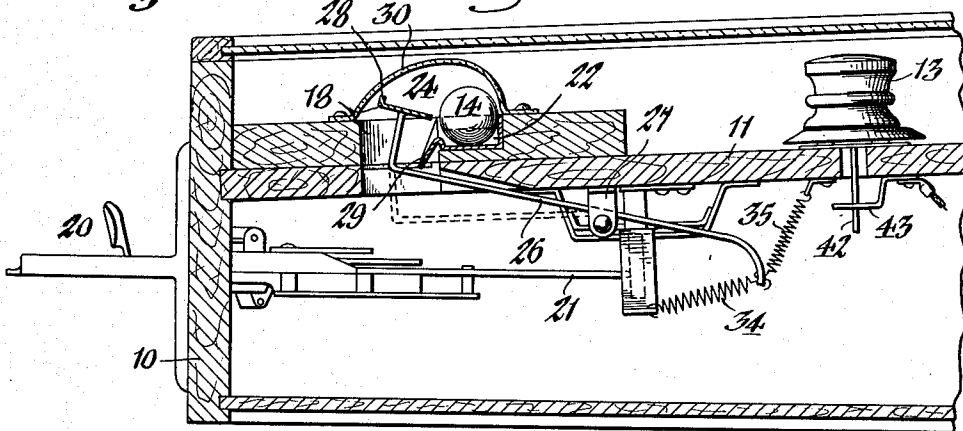


Fig. 3.

Inventor,
by David D. Levitt,
Lawrence P. Geyer
Attorneys.

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Fig. 4.

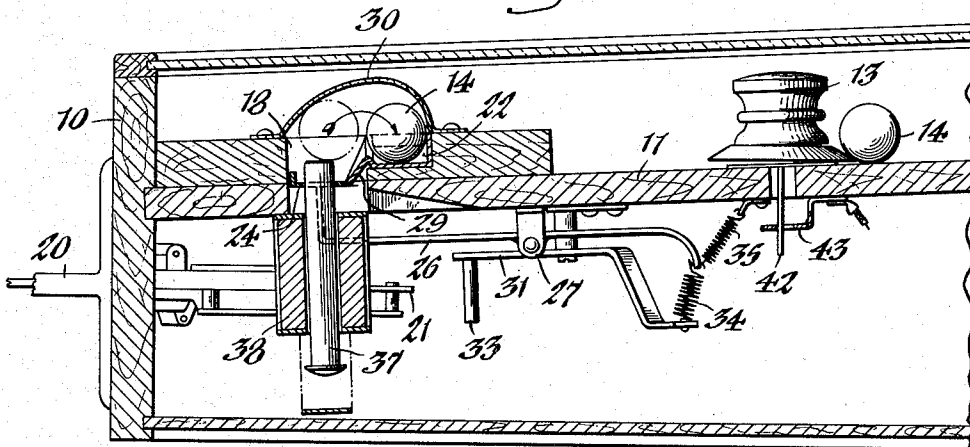
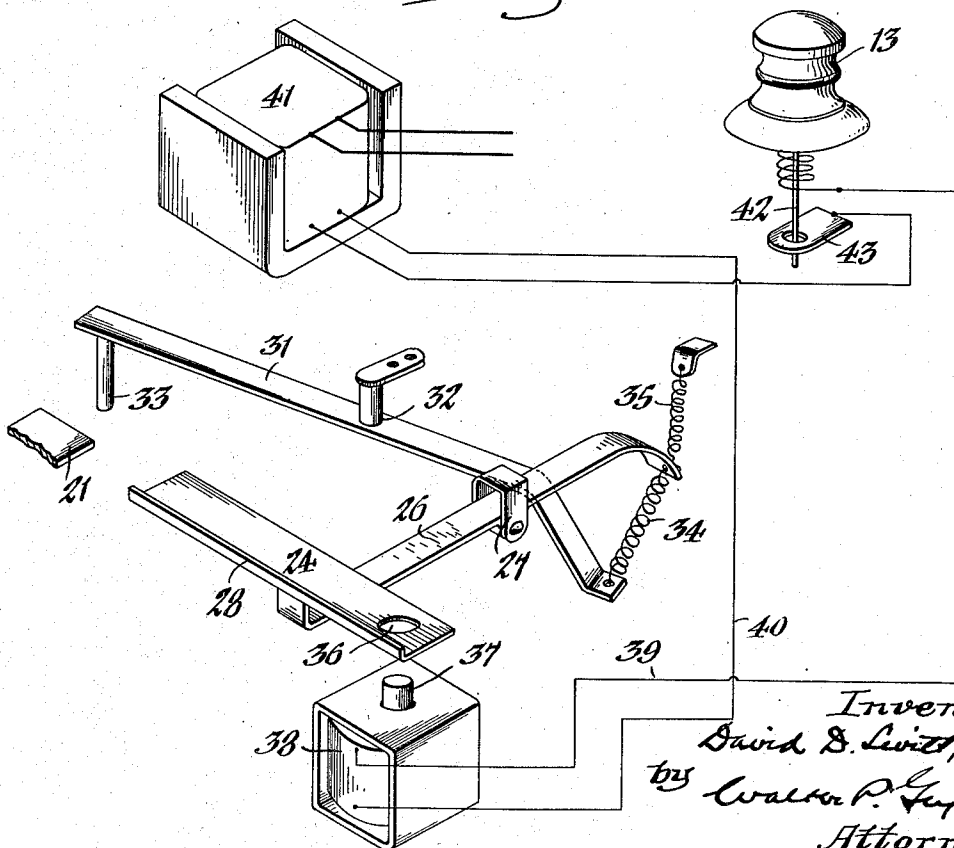


Fig. 5.



Inventor,
David S. Levitt,
by Walter P. Luper
Attorney.

UNITED STATES PATENT OFFICE

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BALL TRANSFER MECHANISM FOR BALL GAMES

David D. Levitt, Buffalo, N. Y.

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9 Claims. (Cl. 273-121)

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This invention relates generally to a game or amusement apparatus and more particularly to a coin-controlled apparatus which employs balls or like elements which are adapted to be projected by the player in the playing of the game.

One of the objects of the invention is to provide novel means for automatically presenting or transferring the playing balls or missiles in position for successive projection by the player simultaneously with the actuation of the coin slide to an operative playing position.

Another object is to provide a ball transfer mechanism under the control of the coin-slide which is simple, compact and inexpensive in construction and which is positive and reliable in operation.

A further object of the invention is to provide an amusement apparatus of this character having, in combination with the ball transfer mechanism, an automatically operated means for giving the player a free ball as the result of his accomplishing a predetermined act in the playing of the game.

Other features of the invention reside in the construction and arrangement of parts hereinafter described and particularly pointed out in the appended claims.

In the accompanying drawings:

Figure 1 is a plan view of an amusement apparatus embodying my improvements. Figure 2 is an enlarged fragmentary longitudinal section taken on line 2-2, Figure 1. Figure 3 is an enlarged cross section taken in the plane of line 3-3, Figure 1. Figure 4 is a fragmentary section similar to Figure 2 but taken in the plane of the free-play actuating assembly on line 4-4, Figure 1. Figure 5 is a perspective diagrammatic view of the governing parts and the electric circuit for automatically actuating them.

Similar characters of reference indicate corresponding parts throughout the several views.

By way of example, my invention has been shown in connection with a conventional type of a ball-projecting game, wherein 10 indicates the frame or cabinet thereof which may be supported on legs (not shown) and which has a glass-covered forwardly-sloping ball playing board 11 including ball impact elements 12 rising therefrom and disposed in any suitable manner. The lowermost impact element, indicated at 13, will be referred to as the free-play impact element and when struck by a ball 14 rolling over the playing board will entitle the player to a free ball and will automatically initiate the presentation of an extra ball in position for operation

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by the player. At one side of the playing board is a ball-projecting runway or channel 15 which opens at its upper or rear end onto such board and from which point the balls gravitate to the lower end of the board centrally thereof from which point they successively enter a pocket or recess 16 and are then deflected laterally by the curved wall 17 of such pocket into a return trough or channel indicated generally by the numeral 18 and whose bottom wall is substantially flush with or on the same plane as the playing surface of the game board. The lower or receiving end of the ball-projecting runway is in operative registering relation with a manually-operated plunger 19 mounted on the front wall of the cabinet 10 and of usual construction, whereby the balls are propelled one by one along the runway and onto the upper end of the playing board. The numeral 20 indicates a coin slide of any well known construction which is mounted at the front end of the cabinet and which sets the game for operation upon the deposit of the proper coin. At its inner or rear end this coin slide has an extension 21, which, as will hereinafter appear, initiates the operation of a mechanism for transferring the returned balls resting in the trough 18 to a position for successive propulsion by the plunger 19 on to the upper or rear end of the playing board 11.

The return trough 18 is so designed that upon the insertion of a coin in the coin slide 20, the latter can be projected from the position shown in Figure 1 to that shown in Figure 2, and simultaneously therewith the balls in such trough are bodily elevated and transferred to an adjoining parallel discharge trough 22 whose bottom 23 slopes laterally toward and intersects the lower or front end of the ball-projecting runway 15 immediately in advance of the plunger 19 to enable the balls to successively gravitate into the operating path of the latter, as shown in Figures 1 and 3. To this end the ball return trough includes a displaceable bottom or ball-support in the form of a tray or platform 24 which spans a companion opening 25 in the playing board 11 and is secured to one end of a rock lever 26 fulcrumed intermediate its ends for vertically-swinging movement on a bracket 27 depending from the board, as shown in Figure 2. Along its front edge this tray has a stop flange 28 against which the balls normally rest in a row while the opposite edge is unflanged to permit the balls to roll laterally therefrom, during the transfer operation, into the adjoining discharge trough 22. The latter includes a depending, sloping flange

29 in opposing relation to the panel-flange 28 for properly guiding the balls into and maintaining them in a row in the return trough. Extending transversely over the latter and the discharge trough is a transparent protective hood or cover 30 which enables the operator to see the balls at all times.

Normally the ball-tray 24 assumes its lowered or trough position shown by full lines in Figure 4 and by dotted lines in Figure 2, and is actuated by the coin slide 20 to its elevated or ball-transferring position through the medium of a horizontally-swinging rock lever 31 pivoted intermediate its ends at 32 to the bottom side of the playing board and having a pin or tappet 33 at the end of one arm thereof in the path of travel of the coin slide extension 21. The other arm of this rock lever has a flexible connection, in the form of a spring 34 or the like, which is joined at its other end to the free end of the tray-attached rock lever 26 to actuate the same to an elevated or ball-transferring position when the coin slide is projected forwardly after the deposit of a coin, and which spring also functions to restore the slide-actuated rock lever 31 to its initial position upon the retraction of the coin slide. Another spring 35 is connected at one end to the underside of the playing board and at its other end to the rear or free end of the tray-attached rock lever 26 to constantly urge the latter to its lowered or ball-receiving position.

Disposed in correlation with the ball-return supporting tray 24 is a means for automatically and independently transferring or projecting a single ball 14, from those returned to the trough 18 during the playing of the game, into the discharge trough 22 should the player have caused a ball in play to strike the impact element 13 on the playing board, which would thereupon entitle the player to a free ball, that is, a ball in addition to those projected in response to the actuation of the coin slide at the start of play of the game. For this purpose, the leading end of the tray is provided with an opening 36 with which the plunger 37 of a vertically-disposed solenoid 38 is aligned, the latter being attached to the underside of the playing board in the manner shown in Figures 3 and 4. This solenoid and the impact element 13 are included in a normally open electric circuit 39, 40 which derives its power from a transformer 41. The impact element 13 is tiltably mounted on the playing board in any suitable manner and includes a depending stem 42 and a companion contact plate 43 which are included in the circuit and constitute the controlling switch thereof. When a ball in play strikes this impact element it is deflected, as shown in Figure 4, and momentarily closes the switch 42, 43 to energize the solenoid. Thereupon, the solenoid-plunger 37 is elevated through the tray-opening 36 and projects the ball 14 resting in the leading end of the return trough into the discharge trough 22, as depicted in Figure 4, where it gravitates into the ball-projecting runway 15.

I claim as my invention:

1. A game of the character described, comprising a playing board including a ball-projecting runway, a transversely-extending return trough at its front end into which the balls gravitate in a group after play, a discharge trough disposed to the rear and alongside of and substantially paralleling said return trough and opening at its leading end into said ball-projecting runway for the gravitation of the balls successively thereto

for a playing operation, said return trough including a displaceable bottom for the balls, and means operatively connected to said displaceable trough-bottom for actuating it to an upwardly-displaced rearwardly tilted position to transfer the balls as a group from the return trough into the discharge trough.

2. A coin-controlled game of the character described, comprising a playing board including a ball-projecting runway and a ball discharge trough extending transversely of the board at its front end and intersecting said runway for feeding the balls thereto one at a time, means for projecting a ball fed into the runway onto the playing board, a return trough disposed forwardly of and alongside and paralleling said discharge trough and into which the balls gravitate in a row after traversing the playing field, said return trough including an elevating tray constituting the bottom thereof and normally disposed in a lowered position substantially flush with the playing board, and means initiated by the player and operatively connected to said tray for elevating it to a position to transfer the balls bodily therefrom into the adjoining discharge trough.

3. A game of the character described, comprising a playing board including a ball-projecting runway, a return trough into which the balls gravitate in a group after play, a discharge trough disposed alongside of and substantially paralleling said return trough and opening at its leading end into said ball-projecting runway for the gravitation of the balls successively thereto for a playing operation, said return trough including a displaceable bottom for the balls, a rock lever fulcrumed on the underside of the playing board and on one arm of which said displaceable bottom of the return trough is attached, means connected to said rock lever for normally urging it in a direction to bring the displaceable bottom into a ball-receiving position, and player-initiated means operatively connected to said rock lever for elevating it to a position to transfer the balls as a unit from such trough-bottom into the discharge trough.

4. A coin-controlled game of the character described, comprising a playing board including a ball-projecting runway and a transverse ball-discharge trough at its front end intersecting said runway for feeding the balls thereto one at a time, means for projecting a ball fed into the runway onto the playing board, a vertically-swinging rock lever fulcrumed on the underside of the playing board and having a ball-receiving tray on one of the arms thereof for receiving the balls after rolling over the board and exposed on the surface of the board alongside and paralleling the discharge trough, a horizontally-swinging lever fulcrumed on the underside of said board in operative engagement with said rock lever, and a coin slide for operative engagement with said horizontally-swinging lever upon an operative stroke being imparted there-
to for actuating said rock lever in a direction to elevate the ball-receiving tray and transfer the balls bodily therefrom into the discharge trough.

5. A game of the character described, comprising a game board including a ball-projecting runway, a transverse return trough at the front end of the board into which the balls gravitate after play, a discharge trough opening into said runway and disposed alongside said return trough for receiving the balls therefrom and directing them one at a time into the runway, displaceable

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means in operative relation to said return trough and engageable with a ball resting therein for transferring such ball into the discharge trough, and ball-engaging means disposed on the playing board and including connecting elements in operative governing relation to said displaceable means for automatically rendering the latter operative to transfer a ball from the return trough into the discharge trough whenever a ball in play makes contact with such ball-engaging means.

6. A coin-controlled game of the character described, comprising a playing board including a ball-projecting runway and a ball discharge trough intersecting said runway for feeding the balls thereto one at a time, means for projecting a ball fed into the runway onto the playing board, a displaceable return trough alongside said discharge trough and into which the balls gravitate after rolling over the playing board, means connected to the return trough and actuated in response to the registering of a coin deposited for playing the game, for shifting said return trough to a position for bodily transferring the balls resting thereon into the discharge trough, and means disposed in correlation with said return trough for movement independent thereof and operatively engageable with a ball resting therein for transferring it into said discharge trough.

7. A coin-controlled game of the character described, comprising a playing board including a ball-projecting runway and a ball discharge trough intersecting said runway for feeding the balls thereto one at a time, means for projecting a ball fed into the runway onto the playing board, a displaceable return trough alongside said discharge trough and into which the balls gravitate after rolling over the playing board, means connected to the return trough and actuated in response to the registering of a coin deposited for playing the game for shifting said return trough to a position for bodily transferring the balls resting thereon into the discharge trough, means disposed in correlation with said return trough for movement independent thereof and operatively engageable with a ball resting therein for transferring it into said discharge trough, and means on the playing board and governed by a ball in play for rendering said last-named means operative to transfer a ball into such discharge trough.

8. A coin-controlled game of the character described, comprising a playing board including a ball-projecting runway and a ball discharge

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trough intersecting said runway for feeding the balls thereto one at a time, means for projecting a ball fed into the runway onto the playing board, a displaceable return trough alongside said discharge trough and into which the balls gravitate after rolling over the playing board, means connected to the return trough and actuated in response to the registering of a coin deposited for playing the game for shifting said return trough to a position for bodily transferring the balls resting thereon into the discharge trough, means disposed in correlation with said return trough for movement independent thereof and operatively engageable with a ball resting therein for transferring it into said discharge trough, said independent ball-transferring means including a solenoid having its plunger in registering relation with the ball to be transferred, an electric circuit including said solenoid, and a ball impact element on the playing board including normally-open switch means in said circuit for governing the actuation of the independent ball-transferring means.

9. In a game board over which balls are adapted to roll, a return trough disposed crosswise at the front end thereof into which the balls gravitate after play, said trough including a displaceable bottom on which the returned balls rest in a group and having a stop flange along its front edge and an opening adjacent one end thereof, means for actuating said displaceable trough-bottom in a direction to discharge the balls bodily therefrom to a play position and other means disposed below and in registering relation to the opening in said return trough and operative independently of the displaceable bottom thereof for projection upwardly through said opening and engageable with the registering ball for discharging it therefrom to a position for play.

DAVID D. LEVITT.

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