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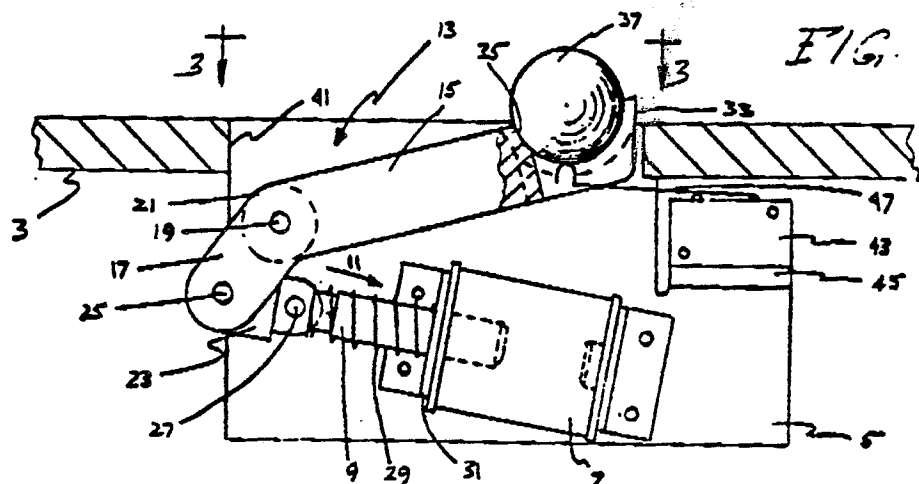
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54 **Catapult play feature for a pinball machine.**

57 A play feature for a flipper-type pinball game consisting of a lever arm having a first end supporting a ball receiving cup and a second end pivotably linked to the plunger of a solenoid. A midpoint of the lever arm is pivotably secured to a bracket supported from the bottom surface of the playfield. A catapult-like device results whereby a ball located in the cup will be hurled across the playfield by the pivoting movement of the lever arm when the solenoid is energised.



CATAPULT PLAY FEATURE FOR A PINBALL MACHINE

This invention relates generally to pinball games and, more particularly, to a play feature for a pinball game. Pinball games, as is well-known, consist generally of a slanted playfield and a plurality of play features arranged on the playfield. A player uses flippers to direct a ball at desired targets thereby scoring points.

The players of pinball machines are selective as to the machines they choose to play and base their selection on the various types of play feature schemes offered. Therefore, the popularity of a manufacturer's line of pinball games resides in its ability to appeal to the players by offering new and different play features.

It is a general object of the invention to provide a new and improved pinball machine play feature.

Another object is to provide a novel play feature that is economical to manufacture in terms of both the cost of the component parts and the ease of assembly.

Still another object of the invention is to provide a novel play feature which is durable enough to withstand the repetitive cycles of play over a sustained period of time.

Yet another objective is to provide a novel game feature that adds an additional skill feature to challenge the player.

Other objects of the invention, in addition to those set forth above, will become apparent to those skilled in the art from the following description.

The invention, in summary, consists of a lever arm having a first end supporting a cup for receiving a ball and a second end pivotably linked to the plunger of a solenoid. A midpoint of the lever arm is pivotably secured to a bracket supported from the bottom surface of the playfield. A catapult-like device results whereby a ball located in the cup will be hurled across the playfield by the pivoting movement of the lever arm when the solenoid is energised.

Figure 1 shows a partially cut-away side view of the play feature of this invention mounted to the playfield on a pinball machine;

Figure 2 shows the same view as Figure 1 with the solenoid energised;

Figure 3 shows a plan view of the play feature through an aperture in the playfield;

Figure 4 shows a diagrammatic view of a first embodiment of a control for energising the solenoid; and

Figure 5 shows a diagrammatic view of a second embodiment of a control for energising the solenoid.

Figure 1 shows the play feature of the inven-

tion generally at 1 and a portion of an inclined playfield 3 of a pinball machine. A support bracket 5 is attached to the bottom surface of the playfield 3 and extends perpendicularly thereto. Fixed to the bracket 5 is a solenoid 7 including a plunger 9, movable in the direction of arrow 11 upon energisation of the solenoid. A lever arm, shown generally at 13, has a first portion 15 angularly offset from a second portion 17 and is pivotably mounted to the bracket 5 by pin 19 at elbow portion 21.

The lever arm 13 is pivotably linked to the plunger 9 by a coupling head 23, through pins 25 and 27, to compensate for the different paths traversed by the arcuately moving lever arm and the linearly moving plunger. Through this linkage, linear movement of the plunger 9 will result in pivoting movement of the lever arm 13 about pin 19.

A compression spring 29 is coaxially arranged with the plunger 9 and is constrained between a flange 31 of the solenoid support bracket and the coupling head 23. The spring 29 functions to restore the lever arm 13 to the retracted position of Figure 1 from the extended position of Figure 2 when the solenoid 7 is de-energised.

The lever arm first portion 15 carries a ball receiving cup 33 at its end remote from the elbow portion 21, see Figure 3. The cup 33 has a semi-spherical cavity 35 with a radius of curvature substantially equal to the radius of the ball 37. The depth of the cavity 35 is less than the radius of the ball 37 so that the ball can freely exit and enter the cup 33. An aperture 39 is formed in the cup 33 such that the ball 37, when nested in the cup, will be exposed through the aperture.

The lever arm first portion 15 is arranged within an opening 41 in the playfield 3. As is evident from Figure 1, the lever arm first portion 15 is disposed below the upper surface of the playfield 3 when the plunger 9 is extended such that a portion of the mouth of the ball receiving cup 33 is substantially flush with the upper surface of the playfield 3. Therefore, a ball, rolling on the surface of the playfield 3, is free to drop through the opening 41 and into the ball receiving cup 33.

In order to control the actuation of the solenoid, it is necessary to indicate to the game's microprocessor that the cup 33 is loaded. To provide this indication, a switch 43 is mounted on a flange 45 offset from the support bracket 5 such that the switch 43 will be aligned with the aperture 39. The switch actuating lever 47 is disposed within the area of the aperture 39, when the lever arm 13 is in the position when in Figure 1, so that a ball entering the cup 33 will contact the lever 47 to close the switch and thereby send a signal to the micropro-

cessor indicating the loaded status of the cup.

Two alternative embodiments are contemplated for controlling the activation of the solenoid 7 after switch 43 has indicated the loaded status of the cup 33. In the preferred embodiment, diagrammatically illustrated in Figure 4, the microprocessor is connected to the solenoid through switches A and B. Switch A corresponds to switch 43 of Figures 1 and 2 and switch B corresponds to a finger button, such as those manipulated by the player to control the flippers of a pinball game, located on the game casing. Therefore, the solenoid 7 is energised only when switch A is closed by the ball entering the cup 33 and switch B is closed by the player's manipulation of the finger button. In this manner a new skill feature is added to the play of the game to challenge the players.

The other embodiment, diagrammatically illustrated in Figure 5, is identical to that of the preferred embodiment except that the switch B and the corresponding finger button are omitted. In this system, the closing of the switch A by the ball will cause the microprocessor to automatically energise the solenoid 7 without any further activity by the player. Regardless of the embodiment used to control the activation of the solenoid 7, it is considered desirable that the microprocessor activates electronic audio/visual signals to inform the player of the loaded status of the catapult.

The operation of the device will now be described with particular reference to Figures 1 and 2. When play of the game begins, the catapult will be in the position of Figure 1. The ball 37, during the course of play, will roll, into the ball receiving cup 33 and will contact the switch actuating lever 47 to close the switch 43. An electronic audio/visual signal will be given by the microprocessor to the player and, depending on the embodiment for the control used, either the microprocessor will automatically activate the solenoid 7, or the player will manipulate a finger button to close the additional switch B to activate the solenoid. When the solenoid 7 is energised, the plunger 9 will retract causing lever arm 13 to pivot about pin 19, in the direction of arrow 49, to the position of Figure 2. The momentum generated by the lever arm 13 as it pivots will cause the ball to be hurled across the playfield when the lever arm reaches the limit of its travel. The compression spring 29 will return the play feature from the position of Figure 2 to the initial position of Figure 1 when the solenoid is de-energised.

It is also contemplated that a score could be registered by switch 43 when the ball nests in cup 33 by switch 43, thus making the catapult play feature more desirable to the player.

Although the invention has been described in its preferred form with a certain degree of particu-

larity, it is to be understood that the present disclosure has been made by way of example only. Numerous changes in the details and construction of the combination and arrangement of parts will be apparent without departing from the spirit and scope of the invention, as defined in the appended claims.

Claims

1. In a flipper-type pinball game machine of the type having an inclined playfield which supports a rolling ball and one or more play features, the improved play feature comprising:

a) a lever arm pivotable between a first position and a second position, said lever arm including a ball receiving means that is substantially flush with the upper surface of the playfield when said lever arm is in its first position;

b) means for pivoting said lever arm from said first to said second positions; and

c) means for controlling the activation of said means for pivoting.

2. The play feature of claim 1, wherein said means for pivoting comprises a solenoid and a linearly reciprocating plunger.

3. The play feature of claim 2, further comprising a coupling head pivotably connected between said lever arm and said plunger.

4. The play feature of claim 3, wherein a spring for returning said lever arm to said first position is constrained between said coupling head and said solenoid.

5. The play feature of claim 1, wherein said means for controlling includes a switch closed when said lever arm is in said first position and a ball is in said ball receiving means.

6. The play feature of claim 5, wherein said means for controlling further includes a second switch whereby said means for pivoting will be activated when both said switch and said second switch are closed.

7. The play feature of claim 6, wherein said second switch is closed by manual manipulation of an associated finger button.

8. The play feature of claim 5, wherein said switch includes an activation lever that extends through an aperture located in said ball receiving means whereby contact by a ball closes said switch.

