June 10, 1941. H. THOMPSON 2,245,020

BALL OPERATED SWITCH

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Fig. 1.

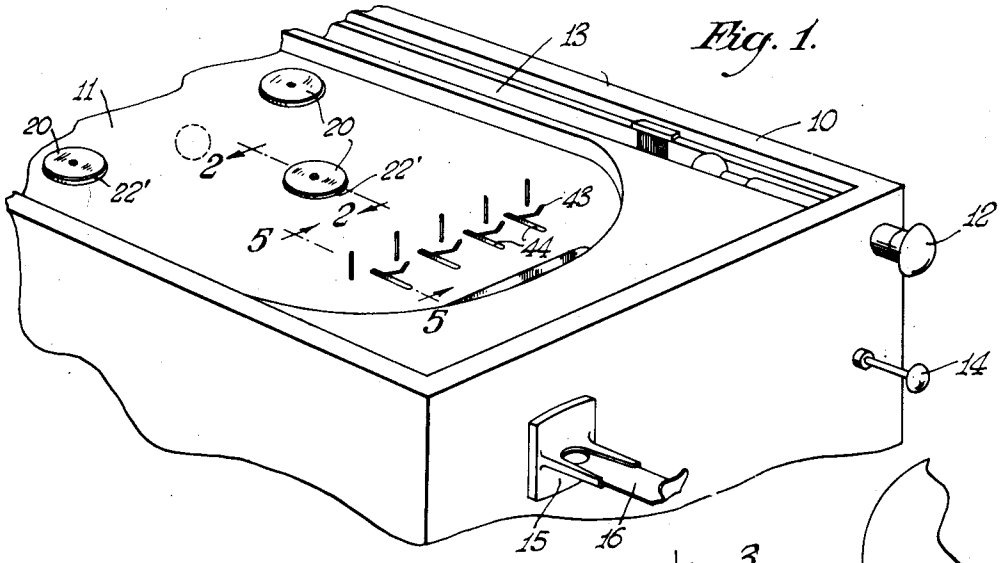


Fig. 2.

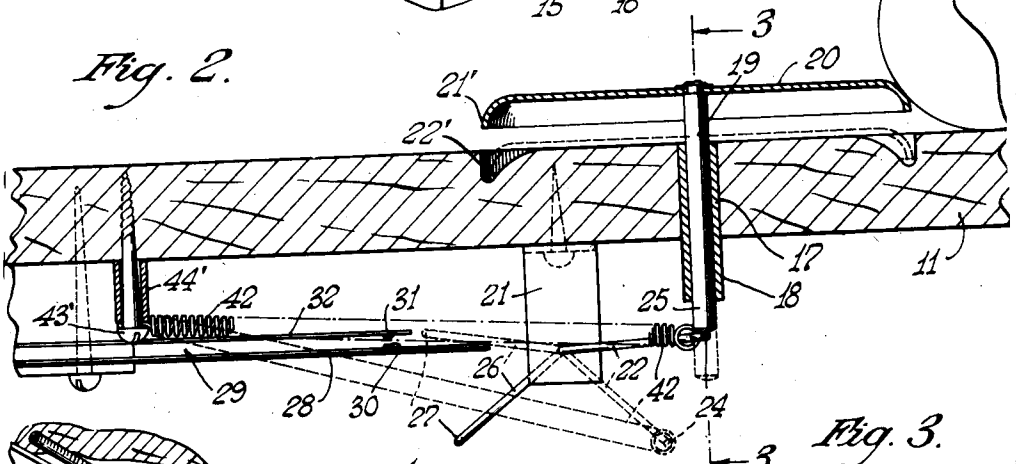


Fig. 4.

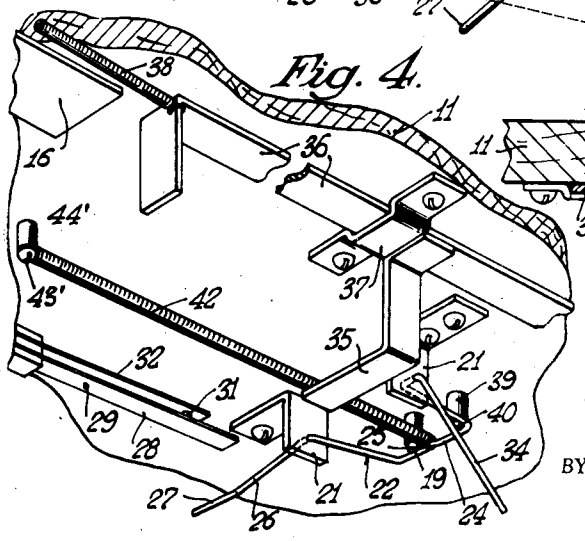
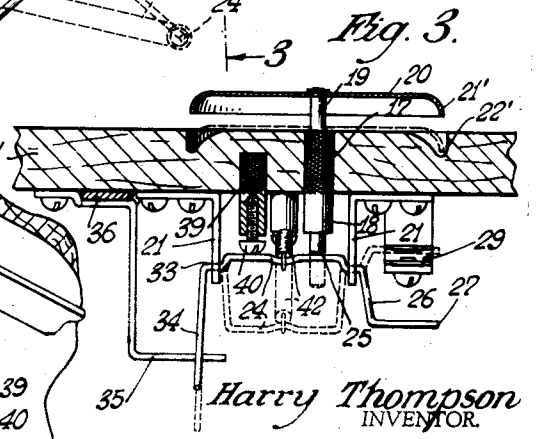


Fig. 3.



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Fig. 5.

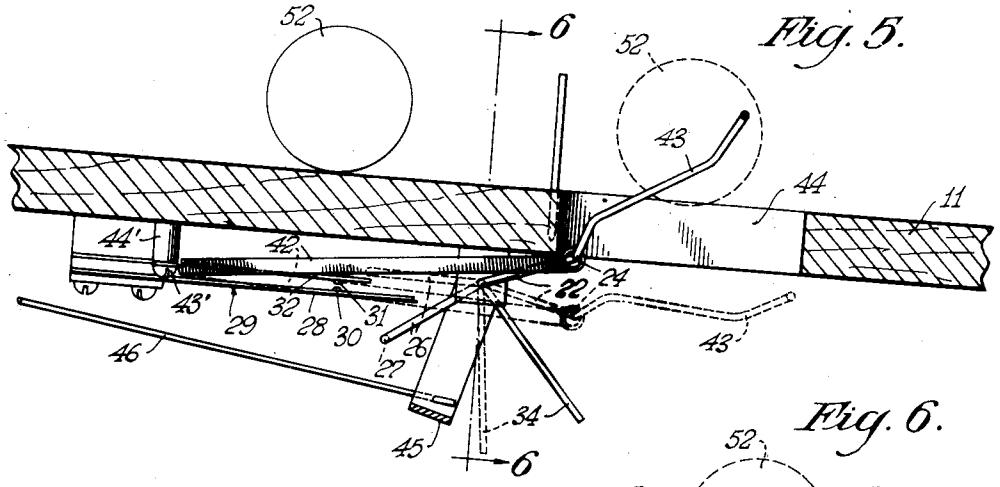


Fig. 6.

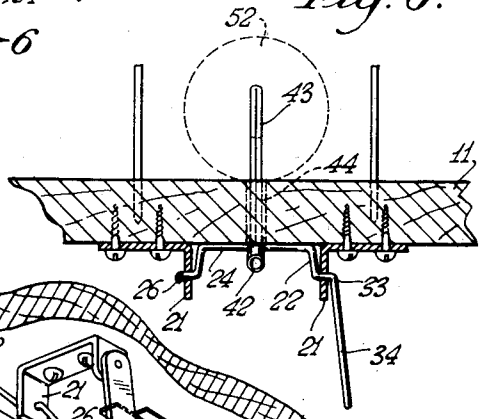


Fig. 7.

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2,245,020

UNITED STATES PATENT OFFICE

2,245,020

BALL OPERATED SWITCH

Harry Thompson, Chicago, Ill., assignor to Genco Company, Chicago, Ill., a corporation of Illinois

Application October 12, 1939, Serial No. 299,048

4 Claims. (Cl. 200—52)

This invention relates to certain novel improvements in a ball actuated switch and has for its principal object the provision of an improved construction which will be highly efficient in use and economical in manufacture.

One of the principal objects of this invention is to provide a simple arrangement and combination of parts for actuating a switch by the action of a ball rolling down an inclined surface.

Other objects will appear hereinafter.

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

Fig. 1 is a fragmentary perspective view of an amusement game apparatus showing my improved invention associated therewith;

Fig. 2 is an enlarged fragmentary sectional detailed view of the same taken substantially on lines 2—2 of Fig. 1;

Fig. 3 is a fragmentary sectional detailed view of the same taken substantially on lines 3—3 of Fig. 2;

Fig. 4 is a fragmentary perspective view of the under side of the device shown in Fig. 2;

Fig. 5 is an enlarged fragmentary sectional detailed view showing a modified form of construction, as seen from line 5—5 in Fig. 1;

Fig. 6 is a fragmentary sectional detailed view of the same taken substantially on line 6—6 of Fig. 5; and

Fig. 7 is a fragmentary perspective view of the under side of the device shown in Fig. 5.

Referring now particularly to the drawings and with particular reference to Figs. 1 to 4 inclusive thereof an amusement game apparatus as indicated at 10 and includes an inclined play board 11 upon which the balls are projected by a projector 12 through a ramp 13 upon the board 11 for gravitation thereover, the balls being elevated to the projector through the medium of an approved type of ball elevating means such as indicated generally at 14.

The present game apparatus shown in Fig. 1 is coin controlled but as the coin controlled mechanism forms no part of the present invention, I have merely illustrated for convenience a coin chute 15 including a slidable coin receiving member 16.

Formed in the play board 11 at predetermined points are openings 17. In each of these openings 17 there is mounted a tube or sleeve member 18. Mounted for reciprocation in this sleeve member 18 is a plunger 19. This plunger at its top end portion carries a substantially circular disc 20 having depending parallel flanges 21' adapted when the disc is depressed to engage in grooves 22' formed in the board 11 as best shown in Fig. 2.

Secured to the under side of the board 11 are spaced brackets 21. Pivotally supported by these brackets 21 is a switch operating lever 22. This switch operating lever includes a bight portion 24 disposed to engage the lower end portion 25 of the plunger 19. One limb portion 26 of the lever 22 constitutes an arm 27 adapted to engage a leaf spring 28 of a switch structure 29 and move the electric contact 30 thereof into contact with the electric contact 31 of the companion leaf spring 32 of the switch structure 29. The other limb 33 of the lever 22 constitutes an arm 34 adapted to be engaged by a depending finger 35 carried by a slidable bar 36 slidably supported on the under side of the play board 11 by brackets 37 and movable against the action of a spring 38 by the coin slide 16 or other mechanism of the amusement game apparatus, as best shown in Fig. 4.

Carried by the under side of the play board 11 through the medium of a bushing 39 is an adjustable screw 40 adapted to be engaged by the bight portion 24 of the lever 22 whereby to limit the pivotal movement of the lever toward the under side of the board 11. This bight portion 24 is connected to one end 41 of a throw spring 42 having its opposite end portion 43' connected to the under side of the board 11 as at 44'.

Operation

The operation of the invention thus far described is as follows:

A ball is projected toward the upper end of the board 11 through the medium of the projecting device 12 and by virtue of the inclined position of the board 11, the ball is caused to gravitate toward the lower end of the board. In this gravitation of the ball, should it engage or strike the disc 20 the weight of the ball will depress the disc 20 upon the board 11. This causes the plunger 19 to bear against the bight portion 24 of the lever, pivot the same beyond the center of its longitudinal axis whereby the throw spring 42, being extended, will cause the lever 22 to pivot in over-center or snap-action in a direction to bring the arm 27 into bearing contact with the leaf spring 28 to close the space between the contacts 30 and 31.

After this has taken place the lever is reset to its full line position as shown in Fig. 2 by the sliding movement of the bar 36 by the action

of the sliding movement of the coin slide 16. This sliding movement of the bar 36 brings the finger 35 into contact with the arm 27 and causes the lever to pivot in an opposite direction to that heretofore described beyond the center of its longitudinal axis in a position whereby the spring 42 being extended will continue the pivotal movement of the lever in this direction resetting the disc 20 in its original operative position as shown in Fig. 2.

Modified form

Figs. 5 to 7 inclusive discloses a modified form of construction of my invention. In describing this structure parts of the modified form of construction which are similar to those set forth in Figs. 1 to 4 inclusive will be designated by the same reference characters.

In this connection the bight portion of the lever 22 is provided with an upstanding obstruction finger 43 extending through an elongated slot 44 formed in the play board 11. The bar 36 employs in the modified form of construction shown in Figs. 5 to 7 a resetting mechanism comprising a U shaped resetting arm 45 adapted to engage the finger 34 for purposes heretofore stated. To this resetting arm 45 is connected link 46 having pivotal connection to a plate 47 as at 48, the plate 47 is pivotally supported by a bracket 49 secured to the under side of the play board as at 50. To the opposite end of the plate 47 is connected a link 51 which in turn is connected to the coin slide 16 in any suitable manner whereby upon operation of the slide 16 the plate 47 will be caused to pivot and in turn pivot the resetting arm 45.

Operation—Modified form

The operation of the construction shown in the modified form is the same as that heretofore described in connection with the invention shown in Figs. 1 to 4, with this exception, instead of the ball engaging a disc similar to the disc 20, the ball 52 engages the trip finger 43 which imparts the necessary pivotal movement to the lever 22 in a proper direction to close the switch structure 29.

Several of these trip arms 43 and switch structures 29 may be used. For example, I have shown the employment of four such trip arms 43 in the game apparatus shown in Fig. 1.

The switch structure 29 may be connected in any electric circuit such, for example, as a score device circuit to indicate the score of the amusement game.

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

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

1. A ball actuated switch device in which the switch comprises cooperating switch contacts normally disposed in spaced relation with respect to each other, a pivoted lever for closing said contacts, spring means adapted to pivot the lever on either side of its longitudinal axis, means operable by a rolling ball and cooperating with said spring means for pivoting the lever in one direction to close said switch contacts, and means cooperating with said spring means for pivoting the lever in an opposite direction to permit the switch contacts to move into normal position of spaced relation with respect to each other.

2. A ball actuated switch device in which the switch comprises cooperating switch contacts normally disposed in spaced relation with respect to each other, a pivoted lever for closing said contacts, spring means adapted to pivot the lever on either side of its longitudinal axis, means operable by a rolling ball and cooperating with said spring means for pivoting the lever in one direction to close said switch contacts, and means cooperating with said spring means for pivoting the lever in an opposite direction to permit the switch contacts to move into normal position of spaced relation with respect to each other, said last named means also serving to return said ball operated means into a position to be engaged by said rolling ball for operation on said lever.

3. A ball actuated switch device in which the switch comprises cooperating electrical contacts normally disposed in spaced relation with respect to each other, a pivoted lever adapted to engage one of said contacts and moving the same into engagement with the other of said contacts, spring means adapted to pivot the lever on either side of its longitudinal axis, and means comprising a plunger engageable with the lever and a disc engageable by a rolling ball whereby said disc and plunger will be moved by said ball into operative contact with said lever to pivot the said lever in one direction to close said contacts, and means cooperating with said spring means for pivoting the lever in an opposite direction to permit the switch contacts to move into normal spaced relation with respect to each other.

4. A ball actuated switch device in which the switch comprises cooperating electrical contacts normally disposed in spaced relation with respect to each other, a pivoted lever adapted to engage one of said contacts and moving the same into engagement with the other of said contacts, spring means adapted to pivot the lever on either side of its longitudinal axis, and means comprising a plunger engageable with the lever and a disc engageable by a rolling ball whereby said disc and plunger will be moved by said ball into operative contact with said lever to pivot the said lever in one direction to close said contacts, and means cooperating with said spring means for pivoting the lever in an opposite direction to permit the switch contacts to move into normal spaced relation with respect to each other, said last named means also serving to return said ball operated means into a position to be engaged by said rolling ball for operation on said lever.

HARRY THOMPSON.