Sept. 4, 1956 G. W. GRAY 2,761,925

GAMES

Filed Sept. 17, 1953

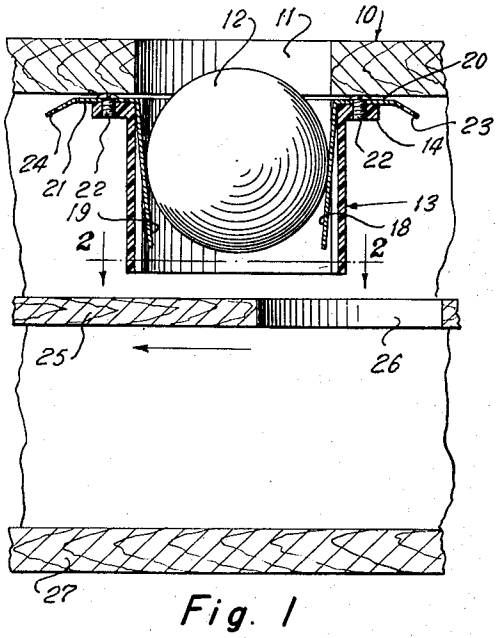


Fig. 1

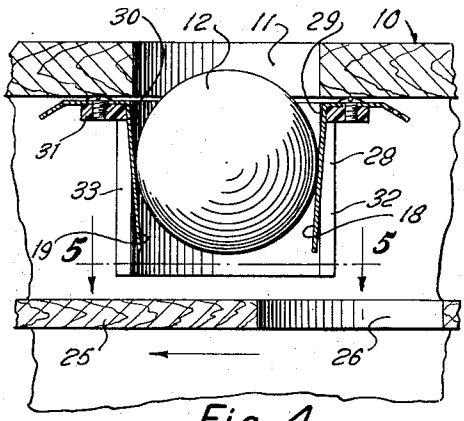


Fig. 4

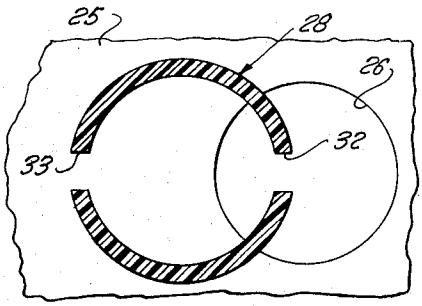


Fig. 5

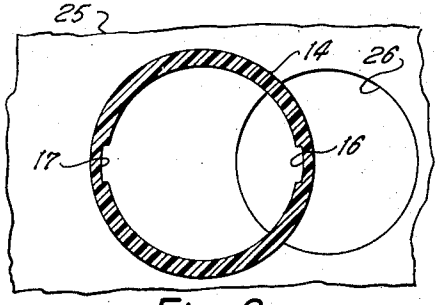


Fig. 2

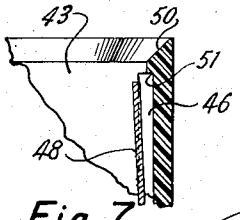


Fig. 7

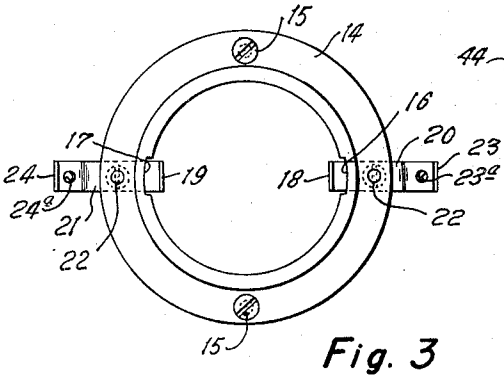


Fig. 3

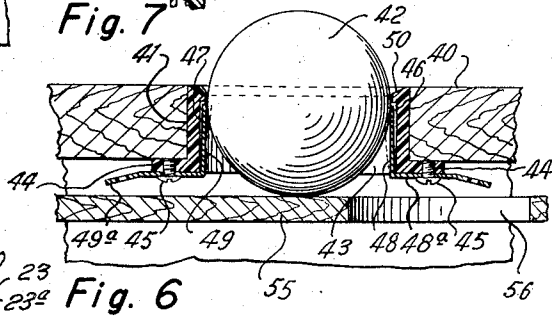


Fig. 6

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2,761,925

Patented Sept. 4, 1956

2,761,925

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Application September 17, 1953, Serial No. 380,657

11 Claims. (Cl. 200—61.11)

This invention relates to games and more particularly to games employing movable balls for closing an electric circuit.

Games of the "pin ball" type often employ balls which must drop through selected apertures in a tilted board, the score of the player depending on the particular aperture through which the ball drops. The score is usually computed and indicated by means of electric circuits which are individually closed when a ball drops through a particular aperture in the board. It is of course desirable that the mechanism for closing the associated electric circuit be of simple and enduring construction and that it be protected against tampering by unscrupulous players who may attempt to make a high score by actuating the closing mechanism in other ways than by dropping a ball through the aperture.

Accordingly an object of this invention is to provide a new and improved electric circuit closing device.

Another object of the invention is to provide a device of the type described, which is protected against tampering.

Still another object of the invention is to provide a new and improved device for closing an electric circuit when a metal ball passes therethrough.

Additional objects and advantages of the invention will be readily apparent from the reading of the following description of devices constructed in accordance with the invention and reference to the accompanying drawings thereof, wherein:

Figure 1 is a vertical sectional view of the device for closing an electric circuit showing a ball passing therethrough;

Figure 2 is a horizontal sectional view taken on the line 2—2 of Figure 1;

Figure 3 is a bottom view of the device shown in Figures 1 and 2;

Figure 4 is a vertical sectional view of a modified form of the device for closing an electric circuit and showing a ball passing therethrough;

Figure 5 is a horizontal sectional view taken on the line 5—5 of Figure 4;

Figure 6 is a vertical sectional view of another modified form of the invention; and

Figure 7 is an enlarged fragmentary sectional view of the upper end of the body of the device of Figure 6.

Referring now particularly to Figures 1 to 3 of the drawings, the reference number 10 designates a board or table surface of a pin ball machine which is provided with a plurality of apertures 11 through which may fall balls 12 made of an electrical conducting substance. The device for closing an electric circuit includes a cylindrical body 13 made of electrically non-conductive substance, such as a suitable plastic. The cylindrical body is provided with an integral annular external flange 14 having suitable apertures through which extend upwardly the screws 15 by which the cylindrical body is secured to the underside of the board 10. The central bore of the cylindrical body is aligned with the associated aperture 11.

The body 13 is provided with a pair of opposed internal longitudinal grooves 16 and 17 which are adapted to receive the resilient contact strips 18 and 19, respectively, made of a suitable resilient electrical conducting substance.

The contact strips 18 and 19 are provided with lateral extensions 20 and 21 respectively, which extend angularly from the contact strips outwardly in grooves formed in the upper surface of the flange 14 of the body and are secured therein by screws 22. The extensions 20 and 21 have downwardly extending end portions 23 and 24, respectively, provided with apertures 23*a* and 24*a* by means of which electrical conductors, such as copper wires, may be secured or connected to the contact strips.

It will be noted that the extensions 20 and 21 are confined between the body flange 14 and the board 10, and that the downturning of the end portions 23 and 24 provides room for the connection of conductors to the end portions which thus serve as terminal lugs.

Beneath the board 10 and the lower end of the body 13 is disposed the usual slidable panel 25 provided with apertures 26 associated with the apertures 11 in the board. The panel 25 prevents the ball from passing out of the lower open end of the cylindrical body until the panel is moved to the left, Figure 1, to place the aperture 26 in registry with the aperture 11 and the body 13. The ball then falls through the aperture 26 to a base or bottom board 27 of the pin ball machine, whence it may roll to a collecting point to be raised by a suitable mechanism to the board 10 to be played again.

In use, the ball 12 is rolled over the board 10, which may be provided with a plurality of the apertures 11 in the usual manner. A body 13 is secured to the board 10 beneath and about each of the apertures 11. When the ball rolls into one of the apertures 11, it falls down therethrough and into the body 13 between the contact strips 18 and 19. The contact springs bend outwardly into the slots 16 and 17 as the ball passes through the body and comes to rest on the slidable panel 25. The ball contacts both contact strips and, since it is of an electrically conducting substance, it electrically connects the contact strips so that current may flow between the terminal lugs 23 and 24. This closes an electric circuit for conductors, not shown, which are connected to the terminal lugs. This electric circuit when closed initiates the operation of an electrical score computing and indicating means. When the score is indicated, the panel 25 is moved to bring the aperture 26 under the body 13 and permit the ball 12 to drop down. The above described circuit is then open since the ball no longer contacts the contact strips 18 and 19.

It will be seen that the contact strips establish good electric contact with the ball 12 for they extend angularly into the path of movement of the ball. At the same time, the grooves or slots 16 and 17 permit the contact strips to flex outwardly but prevent lateral movement of the contact strips so the latter cannot be displaced from proper operative position. The provision of the groove also permits the bore of the cylindrical body to be of substantially the same diameter as the ball, thus insuring that the ball will be properly positioned while passing through the cylindrical body. Moreover, it will be seen that the cylindrical body 13 acts as a shield about the contact strips, so that an unscrupulous player may not bridge between the contact strips with a wire inserted through a hole in the wall of the machine.

In Figures 4 and 5 the board 10 is shown provided with a modified form of the device. In this form, the cylindrical body 28 is provided with a pair of grooves 29 and 30 adjacent the annular external flange 31 which communicate with a pair of slots 32 and 33, respectively, which extend downwardly from the flange to the

end of the body. The contact strips 18 and 19 are adapted to flex outwardly into these slots 32 and 33, respectively, when a ball 12 passes downwardly through the body 28.

A further modification of the invention is shown in Figures 6 and 7, wherein the cylindrical body 43 extends upwardly in the aperture 41 in the board 40, the external annular flange 44 on the lower end of the body engaging the underside of the board and positioning the upper end of the body 43 flush with the upper surface of the board. Resilient contact strips 48 and 49 are positioned in vertically extending grooves 46 and 47, respectively, formed on opposite sides of the bore wall of the body, the lateral extensions 48*a* and 49*a* of such contact strips being secured to the underside of the flange 44 by screws 45 extending through said extensions and threaded into the flange. The contact strips extend upwardly and inwardly into the bore of the body.

The grooves 46 and 47 terminate short of a downwardly and inwardly beveled surface 50 at the upper end of the bore of the body, so that there is an overhanging downwardly facing shoulder 51 at the upper end of each groove. These shoulders protect the upper free ends of the resilient contact strips 48 and 49 as the ball 42 passes through the body, and assure that the ball must be in the bore of the body to contact the contact strips.

The slidable panel 55 having the apertures 56 therein, similar to the panel 25 previously described, may in this form be positioned much closer to the underside of the board 40 than in the forms previously described.

It will be apparent now that a device has been provided for closing an electric circuit which includes a pair of resilient contact strips mounted on a cylindrical body and extending convergently inwardly into the central bore of the cylindrical body so that a ball passing through the body will contact both strips simultaneously and thus complete or close the electric circuit by closing the gap between the contact strips. Moreover, it will be seen that the cylindrical body is provided with longitudinal grooves or slots into which the contact strips are pressed by the ball so it passes through the body. It will be seen that the grooves or slots prevent lateral displacement of the contact strips so that the latter are always maintained in proper operative position. Furthermore, the grooves provide for reception of the contact strips so that the bore through the body may be held very close in diameter to the diameter of the ball, whereby the ball is properly positioned with respect to the contact strips as it passes through the body of the device.

It will also be seen that the cylindrical body of the forms shown in Figures 1, 3 and 6 completely shields the contact strips while the body 28 of the form shown in Figure 4 shields the strips on both side edges thereof so that tampering with the contact strips or bridging thereof by a wire inserted in the pin ball machine is rendered impossible in the former case and extremely difficult in the latter case since in both cases the free ends of the contact strips are disposed well within the cylindrical body.

The foregoing description of the invention is explanatory only, and changes in the details of the construction illustrated may be made by those skilled in the art, within the scope of the appended claims, without departing from the spirit of the invention.

What I claim and desire to secure by Letters Patent is:

1. A device for use with a machine having a flat member provided with an aperture including: a cylindrical body of non-conductive substance having an external annular flange at the upper end thereof, said body being adapted to be secured to said flat member by means passing through said flange, said body extending downwardly whereby an object rolling over said flat member and into said aperture will pass downwardly through said aperture into said cylindrical body, said body having a pair of opposed longitudinal slots; and a pair of contact strips each having a laterally extending portion at its upper end connected to the upper surface of the flange on opposite sides of the body and having longitudinally extending portions extending convergently downwardly in one of said slots to project into the bore of the body near the lower end of said body, said contact strips being adapted to be moved simultaneously outwardly into said slots by an object passing downwardly through said body.

2. A device for use with a machine having a flat member provided with an aperture including: a cylindrical body of non-conductive substance having an external annular flange at the upper end thereof, said body being adapted to be secured to said flat member by means passing through said flange, said body extending downwardly whereby an object rolling over said flat member and into said aperture will pass downwardly through said aperture into said cylindrical body, said body having a pair of opposed internal longitudinal grooves; and a pair of contact strips each having a laterally extending portion at its upper end connected to the upper surface of the flange on opposite sides of the body and having longitudinally extending portions extending convergently downwardly in one of said grooves to project into the bore of the body near the lower end of said body, said contact strips being adapted to be moved simultaneously outwardly into said grooves by an object passing downwardly through said body.

3. A device for use with a machine having a flat member provided with an aperture including: a cylindrical body of non-conductive substance having an external annular flange at the upper end thereof, said body being adapted to be secured to said flat member by means passing through said flange, said body extending downwardly whereby an object rolling over said flat member and into said aperture will pass downwardly through said aperture into said cylindrical body, said body having a pair of opposed longitudinal slots; and a pair of contact strips each having a laterally extending portion at its upper end connected to the upper surface of the flange on opposite sides of the body and having longitudinally extending portions extending convergently downwardly in one of said slots to project into the bore of the body near the lower end of said body, said contact strips being adapted to be moved simultaneously outwardly into said slots by an object passing downwardly through said body, said laterally extending portions of said contact strips having terminal lugs projecting beyond the edge of the flange to which conductors may be connected whereby said conductors are electrically connected by the object as it passes through said body.

4. A device for use with a machine having a planar member provided with an aperture therethrough including: a cylindrical body having a bore therethrough and having an external annular flange at one end thereon; means for securing said flange to the underside of said planar member with the cylindrical body aligned with the aperture in said member; said body having a pair of opposed longitudinally extending grooves in its bore; and a pair of resilient contact strips carried by said body and each having a laterally extending portion disposed on and connected to the surface of the flange adjacent the end of the body and having a longitudinally extending portion positioned in one of the grooves adjacent the flange and extending therefrom convergently inwardly into the bore of the body adjacent the end of said body opposite the flange, said convergent ends of said contact strips being movable outwardly into said grooves by an object passing through said body.

5. The device of claim 4, wherein the grooves terminate short of the end of the body opposite the flange, and the ends of the contact strips terminate short of such ends of the grooves.

6. The device of claim 4, wherein the grooves terminate short of the end of the body opposite the flange, and the ends of the contact strips terminate short of such ends of the grooves; and the end of the body opposite the

flange is formed with an inwardly sloping surface terminating short of the grooves.

7. The device of claim 4, wherein the grooves extend throughout the length of the bore of the body.

8. In a game table: a member providing a flat playing surface having a cylindrical aperture therethrough, said aperture being adapted to have a ball pass therethrough freely and without interruption; a pair of resilient contact strips being secured at one end at said cylindrical opening and projecting inwardly into said opening, said contact strips being mounted on opposite sides of the cylindrical opening and having their free ends inclined inwardly toward the axis of said opening and disposed to be engaged by the ball passing freely through said cylindrical aperture; and electric conductors connected to said contact strips and to an electrical circuit whereby said ball passing through said cylindrical aperture contacts said strips to establish an electrical circuit therebetween during the time of contact.

9. A device of the character described in claim 8 and including: terminal lugs on the contact strips at the ends secured at the cylindrical opening and extending laterally away from the cylindrical aperture and to which conductors may be connected.

10. In a game table: a member providing a flat playing surface having a cylindrical aperture therethrough, said aperture being adapted to have an electrically conductive ball pass therethrough; a pair of resilient electrical contact strips secured at one end at said cylindrical opening and projecting into and disposed within the cylindrical opening, said strips having their free ends within

said cylindrical opening and inclined toward the axis of said cylindrical opening, said free ends of said strips being disposed to be engaged by the ball passing through said cylindrical aperture whereby said strips are electrically connected during the time of contact by said ball as said ball passes through said aperture; said aperture being free of obstruction to passage of the ball therethrough.

11. A device for use with a machine having a planar member provided with an aperture therethrough including: a cylindrical body having a bore therethrough and having an external annular flange at one end thereon; said flange being adapted to be secured to the under side of said planar member with its cylindrical body disposed in the aperture through said member; and a pair of resilient contact strips carried by said body and secured at one end to the flange end of said body projecting upwardly and inwardly with the bore of said body and disposed to be engaged by an electrically conductive ball passing through said bore to establish electrical connection between said contact strips, said contact strips having laterally extending terminal members at the ends connected to the body to which electrical conductors may be connected.

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