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2,858,390

BALL BUMPER SWITCH FOR AMUSEMENT APPARATUSES

Filed April 16, 1956

2 Sheets-Sheet 1

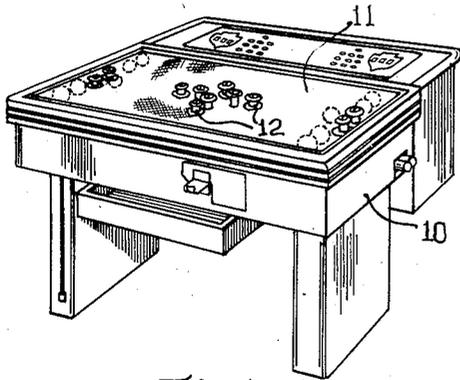


Fig. 1.

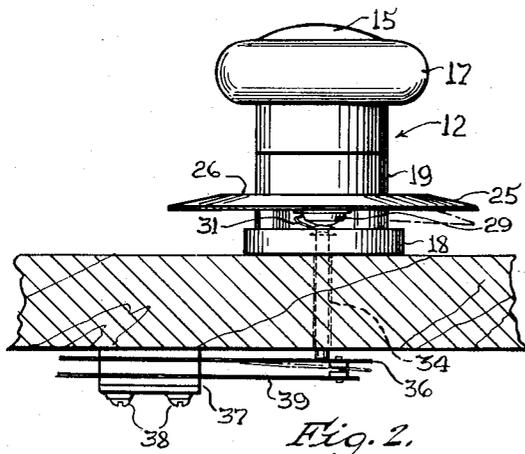


Fig. 2.

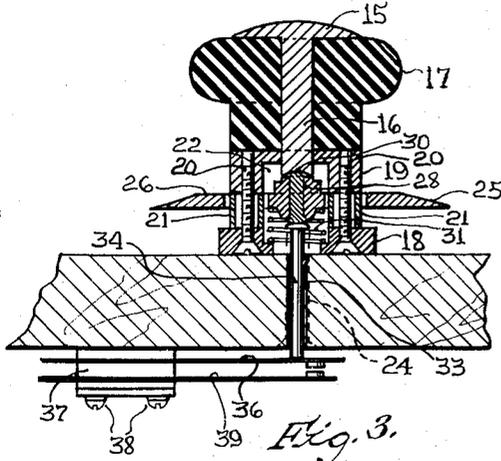


Fig. 3.

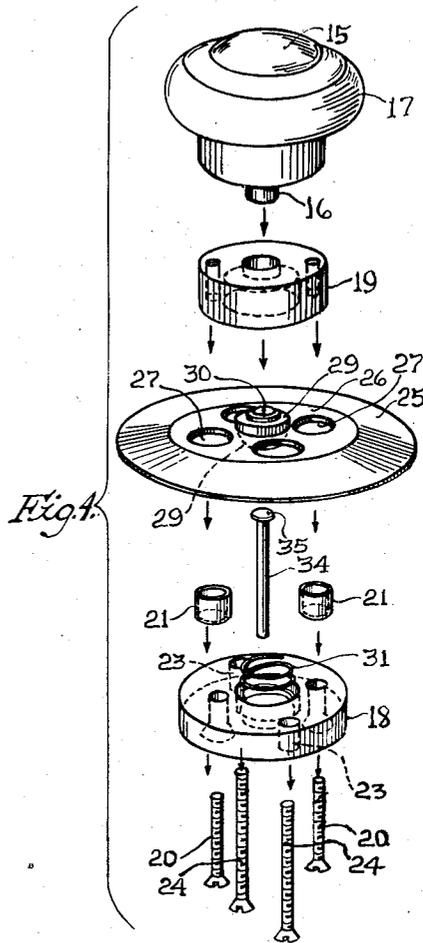


Fig. 4.

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2 Sheets-Sheet 2

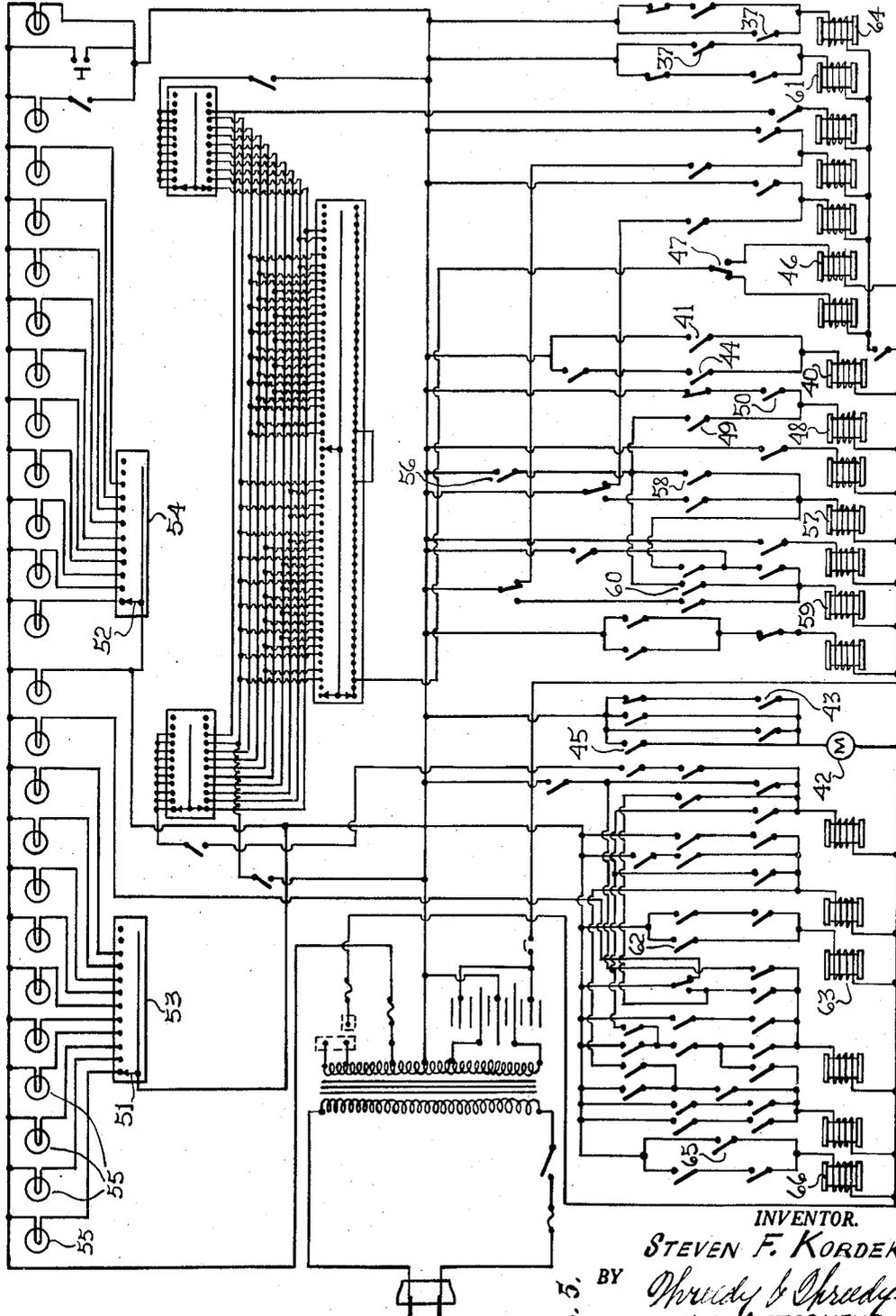


Fig. 5.

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BALL BUMPER SWITCH FOR AMUSEMENT APPARATUSES

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1 Claim. (Cl. 200—61.11)

This invention relates to new and useful improvements in a ball bumper switch for amusement apparatuses and has for its principal object a ball bumper of the character hereinafter described which is adapted for mounting on a playing field as an obstacle or target for the ball or balls rolled thereon.

Another object of my invention is the provision of a device of this character which cooperates with a switch means for completing an electrical scoring circuit.

A still further object of this invention is the provision of a device of this character which has a uniform electrical and mechanical response.

Another object of this invention is the provision of a device of this character which comprises relatively few parts and which is simple in operation and economical in manufacture.

Other objects will appear hereinafter.

The invention consists in the novel combination and arrangement of parts to be hereinafter described and claimed.

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

Fig. 1 is a perspective view of a game in which my improved ball bumper may be incorporated;

Fig. 2 is a side elevational view of my improved ball bumper and switch;

Fig. 3 is a detail sectional view taken on line 3—3 of Fig. 2;

Fig. 4 is an exploded view of my ball bumper, showing the parts in exploded relation;

Fig. 5 is a schematic view of a suggested circuit diagram for scoring a game in which my ball bumper may be associated.

Referring to Fig. 1, there is disclosed a game apparatus 10 having a playing field 11 over which a ball or balls (shown in dotted lines) are adapted to be projected. On the playing field in selected predetermined positions are ball bumpers 12. These bumpers are operatively connected in a manner hereinafter described to a movable switch leaf 36 of a leaf switch 37 located beneath the playing field 11 in substantially vertical alignment with the bumper 12, as shown in Figs. 2 and 3.

The ball bumper 12 comprises a metallic cap 15 having a depending integral stud 16. Surrounding this stud 16 and ballooning out from beneath the cap 15 is a resilient shield 17 of hard rubber or other suitable material which, when struck by a rolling ball, imparts thereto a rebound action.

A base member 18 is connected to a support 19 by screws 20 which pass through apertures formed in the base member 18. These screws or attaching bolts 20 pass through spacing washers 21 and are then threaded into a threaded aperture formed in the support 19 (Fig. 3). The base member 18 as well as the support 19 are provided with confronting centrally located recesses so as to form an opening 22 therebetween.

The base member 18 has formed therein two oppositely

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opposed threaded openings 23 for the reception of screws 24 for connecting the bumper 12 to the playing field 11. These screws or bolts 24 (Fig. 4) are of sufficient length to pass from beneath the playing field 11 into the threaded openings of the base member 18.

A ball contacting disc 25 having a substantially flat medial portion 26 is provided with openings 27 through which are freely journaled the spacing washers 21, as shown in Figs. 2 and 3. The disc 25 is provided with a passage 28 located in the medial portion 26. Surrounding this passage 28 on either side of the disc 25 are enlarged bosses 29. Fixedly journaled in the passage 28 and capping the bosses 29 is a pin 30, the heads of which serve to reduce wear on the bosses 29 (Fig. 3). The bosses 29 with the pin 30 therethrough are so constructed as to be positioned in the opening 22 hereinbefore referred to. The periphery of the disc 25 extends beyond the outer surface of the bumper 12 so as to be contacted by a rolling ball before such ball strikes the resilient shield 17 of the bumper 12. From the flat medial portion 26 the disc 25 tapers in a downward and outward direction to the peripheral edge thereof. Through such design and by reason of the fact that the ball when rolling toward the bumper has its forward circumferential surface moving in a downward direction, i. e. toward the playing field, when the disc 25 is engaged by such ball the movement of the disc 25 will be in a downward direction with respect to the playing field 11 as shown in dotted lines in Fig. 2.

To maintain the disc 25 in raised substantially horizontal position so that it will have its medial portion 26 in confronting relation with the bottom of the support 19 and yet be free to be tilted in a downward direction when engaged by a rolling ball, I provide a spring support 31. One end of the spring 31 embraces an end cap of the pin 30 while the other end of the spring 31 rests on a shoulder provided by the recess cut in the base 18 which provides the opening 22. The base 18 is provided with an opening 32 of a diameter less than that of the opening 22. This opening 32 communicates with an elongated passage 33 formed through the playing field 11.

Positioned for slidable vertical movement in the passage 33 is a contact pin 34. This contact pin 34 is provided with an enlarged head 35 which is held in contact with the bottom of the pin 30 within the opening 22. The opposite end of the pin 34 projects beyond the bottom of the playing field 11 and rests upon the movable leaf 36 of a switch 37. This switch 37 is attached to the bottom of the playing field 11 by means of screws or other suitable attaching means 38. The weight of the pin 34 is not sufficient to overcome the resiliency of the leaf 36 to move the leaf 36 into contact with the leaf 39 of the switch 37 to close such switch.

In operation, when a ball rolling down the playing field 11 engages the disc 25, the disc is rocked in a downward direction by movement of the ball against the tapered edge thereof. The tilting of the disc 25 against the action of the spring 31 will cause the pin 30 to bear upon the head 35 of the contact pin 34. Such added pressure will cause the pin 34 to move in a downward direction in a vertical plane and cause the leaf 36 to be moved into contact with the leaf 39 of the switch 37 to close the same and complete an electrical circuit.

A ball bumper switch such as disclosed herein is one that is positive in action and affords positive contact of the switch leaves when the bumper is engaged by a rolling ball. As the switch leaves are normally spaced apart with respect to each other and are closed by a positive vertical movement of the pin 34, there results a negative amount of arcing between the contact heads of the switch leaves and the life span of the switch is therefore greatly extended.

Fig. 5 shows a schematic diagram of the electric circuit

for scoring a game in which my improved ball bumper switch may be embodied. This circuit has a conventional power source connection and includes the switch 37 as hereinbefore described. Only so much of this circuit will be explained as is necessary for an understanding as to what part the ball bumper and switch plays therein.

In this circuit is included a game reset relay 40. This relay 40 is initially closed by a coin switch 41. Upon closing of the relay 40, the scoring and reset motor 42 is energized, this by reason of the closing of a game reset relay switch 43. The game reset relay 43 is maintained energized by a holding circuit which is established by closing of a second game reset relay switch 44. The scoring and reset motor 42 is maintained energized by a holding circuit established when a motor-driven cam-operated switch 45 is closed.

If through previous play the scoring circuit has registered thereon a score, such score will be removed by the energization of a score reset relay 46 which is energized by the closing of a game reset relay switch 47. A game holding relay 48 is energized when a motor-driven cam-operated switch 49 is closed by the cycling of the energized motor 42. This game holding relay 48 is then held energized by a holding circuit established when a holding relay switch 50 is closed by energization of the holding relay 48.

The scoring of the game is accomplished through step-up units (not shown) which are of common construction and knowledge in the game apparatus field and such as disclosed in Patent No. 2,281,262. These step-up units include step-up wiper arms 51 and 52 which move over a contact field 53 and 54, respectively, which fields have contact heads engageable by the step-up arms 51 and 52 for energizing the score indicating lights 55.

When the game reset relay 40 is energized, it will close a game reset relay switch 56, which switch 56 will cooperate with the game-operated motor switch 49 for holding the game holding relay 48 energized. This switch 56 will also energize a score unit reset coil 57 when a motor-driven cam-operated switch 58 is closed. As this game is played by competitive play, there are two sides to the scoring circuit, designated for convenience the "red" side and the "white" side. The last described circuit was for resetting the "red" side score unit reset coil. The "white" side score unit reset coil 59 is energized by the closing of the switch 56 and the closing of the motor-driven cam-operated switch 60. The game has now been reset and conditioned for play. A score will be indicated by the closing of the switch 37, in the manner hereinbefore described.

As hereinbefore mentioned, the game is played by two players or two sides. The scoring bumpers for each side will for convenience be indicated as "red" or "white" bumper. The closing of the "red" bumper switch 37 will energize a "red" bumper relay 61, which energization of the relay 61 will close a "red" bumper relay switch 62 which in turn will energize a "red" bumper score unit relay 63, in turn operating the score step-up units in that circuit.

The switch 37 is of like construction for both the "red" and "white" sides. Therefore, the closing of a switch 37 carried by a "white" bumper will close the "white" bumper switch 37, energizing a "white" bumper relay 64. This relay in turn will close a "white" bumper relay switch 65, energizing a "white" score unit relay 66, stepping up a score step-up unit in that circuit.

The remaining relays and switches depicted in the circuit diagram pertain to other methods of scoring.

The game apparatus and scoring circuit illustrated herein have been shown for purposes of illustrating the environment of my improved bumper switch and it is not intended to limit the use of this ball bumper switch to any particular type of game or scoring circuit, such as above described.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable 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 claim.

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

A ball bumper for a ball rolling game having a playing field upon which is mounted the ball bumper comprising a hollow base mounted upon and extending upwardly from the playing surface of the game, a hollow bumper support member, spacer members disposed between said base and said support member and cooperating therewith to form a central opening in said bumper, a cap carried by said bumper and having a depending stud extending through said support member and having a free end thereof positioned within said central opening, with the free end of said stud being formed to provide a seat, a ball contacting member freely carried by said spacer members and extending radially and circumferentially therefrom and tiltable out of a horizontal plane by engagement with a ball rolling over said playing field, said ball contacting member having an enlarged center portion within said opening with said portion having oppositely related convexed surfaces, with one of said surfaces in facial abutment with the concaved seat portion of said stud, means cooperating with said spacer members for attaching said bumper support member to said base with said ball contacting member having its enlarged center portion positioned in said central opening, spring means carried by said base and embracing the other of said convexed surfaces of said ball contacting member for releasably maintaining said ball contacting member in a raised horizontal position with respect to said base with said one of said convexed surfaces seated upon the free end of said stud, a contact pin freely journaled through said playing field, said pin having a convexed head portion positioned in said opening and engageable with said other of said convexed surfaces of said ball contacting member, and switch means carried beneath said playing field for maintaining said pin in engagement with said other of said convexed surfaces of said ball contacting member, said contact pin movable through said playing field to close said switch means to energize a scoring circuit for said game when said ball contacting member has its said one of said convexed surfaces pivoted relative to said concaved side of said stud, and means cooperating with said base for connecting said ball bumper upon the playing surface of said game relative to said contact pin journaled therethrough.

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