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BUMPER SWITCH UNIT FOR BALL ROLLING GAMES

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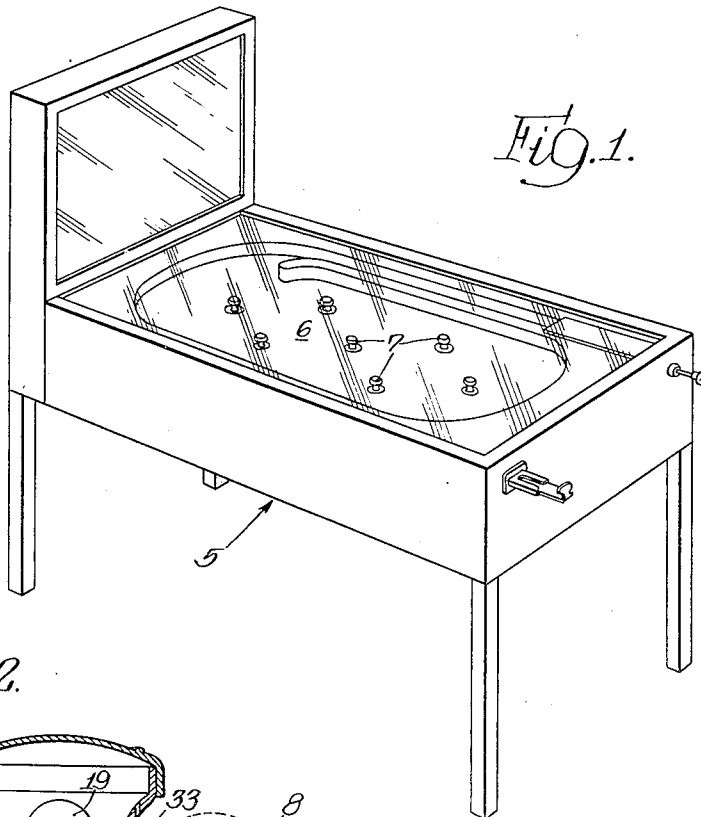


Fig. 2.

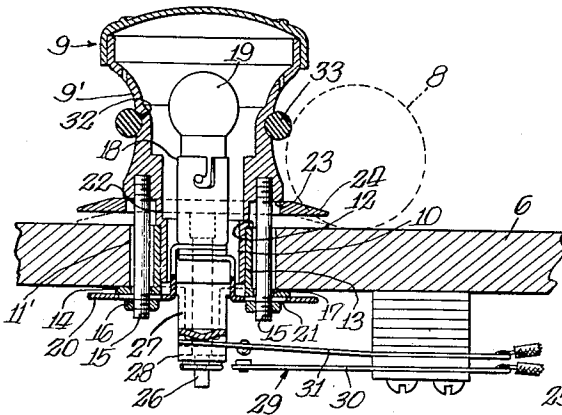


Fig. 3.

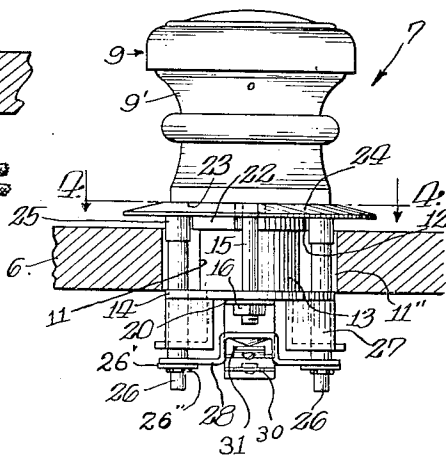
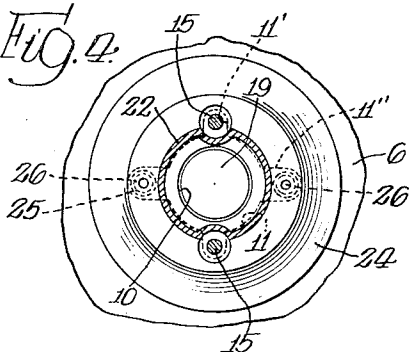


Fig. 4.



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BUMPER SWITCH UNIT FOR BALL ROLLING GAMES

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14 Claims. (Cl. 200—52)

The invention relates to a bumper switch or bumper switch unit for use in a ball rolling game and has as a general object to provide a bumper switch unit of new and improved construction.

A more particular object of the invention is to provide a bumper switch unit which not only is an improvement over prior structures, but one which operates on a new principle.

Another object is to provide a bumper switch unit operable with a longitudinal movement of the contacted element.

Yet another object is to provide a bumper switch unit having a stationary upright standard, an annular ring surrounding said standard mounted for longitudinal movement, and a switch governed by said ring yieldably supporting the same in an upper position in which position the switch is open.

Other objects and advantages will become apparent from the following detailed description taken in connection with the accompanying drawing, in which:

Fig. 1 is a perspective view of a ball rolling game including bumper switches embodying the features of the invention.

Fig. 2 is an enlarged diametrical sectional view of a bumper switch in position on the game board.

Fig. 3 is an elevational view of the bumper switch taken from the left in Fig. 2.

Fig. 4 is a sectional view taken approximately along the line 4—4 of Fig. 3.

While the invention may be susceptible of various modifications and alternative constructions, it is here shown and will be hereinafter described in a preferred embodiment. It is not intended, however, that the invention is thereby to be limited to the specific construction shown. On the contrary it is intended to cover all modifications and alternative constructions falling within the spirit and scope of the invention as defined in the appended claims.

For purposes of disclosure, there is shown in Fig. 1 a ball rolling game 5 of conventional construction having a game board 6 from which project upwardly a plurality of bumper switches 7. The number and location of the bumper switches 7 is, of course, entirely arbitrary. The game board 6 is substantially horizontal though, in conformity with conventional practice, usually it slopes slightly from top to bottom so that a ball, shown in broken outline at 8 in Fig. 2, starting at the top will eventually reach the bottom.

Each of the bumper switches 7 extends both

above and below the game board 6 and comprises a hollow upright standard 9, the major portion of which is disposed above the board. The standard is preferably made of a translucent material and may be given any one of a variety of colors, so that the several bumper switches 7 may vary in appearance. The portion of the standard above the board is here generally cylindrical with a concave intermediate portion 9', though again the shape may vary, but a structure with a circular cross section is preferable.

In order that the standard may be rigidly mounted, it is formed at the lower end with a first reduced portion 10 which is loosely received in a hole 11 in the board 6. An annular shoulder 12 forming one limit of the reduced portion 10 is, however, larger than the hole and thus forms a stop limiting the insertion of the standard to a fixed amount. Inserted into the hole from the underneath side of the board 6 is a sleeve 13 which has a tight fit in the hole and a tight fit around the reduced portion 10. Sleeve 13 has a radial flange 14 which extends outwardly beyond the periphery of the hole in the board 6. Anchored at one end in the standard 9 and extending longitudinally are a pair of diametrically oppositely disposed pins 15 threaded at their free ends to receive nuts 16. The pins 15 extend through ear-like enlargements 11' of the hole 11 and through apertures 17 in flange 14 of sleeve 13. It will be apparent that when the standard is assembled the board 6 is clamped firmly between the shoulder 12 and flange 14.

Disposed within the hollow standard 9 is a socket 18 for a light 19. Fixed to the lower end of the socket 18 in insulated relation to one another are a pair of double brackets 20 extending in diametrically opposite directions and each formed with an aperture 21 enabling the socket to be inserted into the standard 9 with the pins 15 projecting through the apertures 21 in the brackets 20. The socket is inserted before the nuts 16 are applied, and thus the brackets are firmly retained between the flange 14 and the nut 16 so as to become a rigid part of the assembled unit.

The standard 9 is formed with a second reduced portion 22 somewhat larger than the portion 10, and forms a shoulder 23 spaced just a short distance from the shoulder 12, and thus just a short distance above the game board when the standard is mounted thereon. Surrounding this reduced portion for movement longitudinally thereof is an annular ring 24 which forms the

contacted or actuated element. Rigidly anchored in depending and diametrically oppositely disposed nubs 25 on the underneath side of the ring 24 are pins 26 which project loosely through ear-like enlargements 11' of the hole 11 and through apertures formed in U-shaped dependages 27 on the flange 14 of the sleeve 13. The dependages 27 form a guide for the pins 26 at a more remote point than would the flange 14, and thus serve better to maintain the ring 24 in accurate alignment preventing any binding thereof when contacted and actuated by ball 8. Extending between the pins 26 at their protruding ends is a yoke 28. As best seen in Figs. 2 and 4, the ring 24 is cut out to provide for the pins 15 of the standard 9. Near the end each pin 26 is formed with a shoulder preventing relative upward movement of the yoke 28 and the yoke is retained against falling off the pin by a washer 26' and a cotter pin 26''.

Disposed underneath the game board 6 is the switch proper, generally designated 29, and which is intended to be closed whenever the bumper is contacted by a ball 8 rolling over the board 6. Herein the switch is made to serve the additional unique function of yieldably maintaining the ring 24 in its normal position, namely, its uppermost position, determined by engagement with the shoulder 23. To that end, the switch 29 is composed of a first element in the form of a leaf spring 30 and a second upper switch element in the form of a leaf spring 31. This latter element is longer than the element 30 and the switch is so disposed that the extension of the element 31 engages the yoke 28. The element 31, moreover, is so tensioned and is made of such strength that it is capable of yieldably supporting the ring 24 in its normal upper position. Upon contact of a ball with the ring 24, the same will be depressed and shifted longitudinally of the standard 9 against the action of the element 31 a distance sufficient to effect closure of the switch 29.

The concave intermediate portion 9' of the standard 9 is formed with a groove 32 for the partial reception of an annular band 33 of some resilient material, such as rubber. This band forms a rebound means which repels any ball 8 that may strike the same. It is to be understood, of course, that the parts are so proportioned that the ball 8 will first strike and depress the ring 24 and thereafter strike the band 33 to be repelled from the standard 9.

I claim as my invention:

1. In a ball rolling game having a game board with an aperture therein, a bumper switch unit comprising, in combination, an upright standard extending above the board and having a portion adapted to project into the aperture in the board, an annular guide surface on said standard just above the board, means including an element disposed beneath the board for clamping said standard rigidly onto the board, an annular ring loosely surrounding said standard extending beyond the aperture in the board and guided by said guide surface for limited bodily movement longitudinally of said standard, said ring being yieldably urged to the upper limit of its movement, a switch governed by said ring and a rebound element comprising a band of resilient material surrounding said standard in position to be contacted by a ball rolling on the game board after the same has actuated said ring.

2. In a ball rolling game having a game board with an aperture formed therein, a bumper

switch unit comprising, in combination, an upright generally cylindrical standard extending above the board having a first reduced portion forming a shoulder and a second reduced portion receivable in the aperture in the game board and forming a second shoulder limiting the insertion of the reduced portion into the aperture, means including a washer-like element disposed beneath the board for clamping said standard firmly onto the board, an annular ring loosely surrounding the first reduced portion for movement longitudinally of said standard, diametrically oppositely disposed pins rigid with said ring and projecting through the board and through said washer-like element, a yoke connected between the free ends of said pins, and a normally open leaf spring disposed beneath the board one element of which engages said yoke to urge said annular ring into contact with said first shoulder, said switch being overcome and closed by contact of a ball rolling on the game board with said annular ring.

3. In a ball rolling game having a game board with an aperture therein, a bumper switch unit comprising, in combination, a hollow upright and generally cylindrical standard of a translucent material extending above the board, said standard having a first reduced portion at its base forming a first shoulder and a second reduced portion loosely receivable in the aperture in the game board and forming a second shoulder limiting insertion of said second reduced portion, diametrically oppositely disposed pins anchored at one end in said standard and extending parallel with the axis thereof for projection through the game board, a sleeve having a tight fit with said second reduced portion and with the hole in the game board adapted to be inserted into the aperture from underneath the board, said sleeve having a radial flange with diametrically oppositely disposed dependages, said radial flange cooperating with said second shoulder to form a clamping means rigidly securing said standard on the board, an annular ring loosely surrounding said first reduced portion for bodily movement longitudinally of said standard, diametrically oppositely disposed pins rigid at one end in said ring and projecting through the game board and through the dependages of said flange to be guided thereby, a yoke carried by the free ends of said last mentioned pins, a normally open switch disposed underneath the game board including a resilient spring element engaging said yoke to urge said annular ring upwardly into contact with said first shoulder, said resilient spring element being overcome and said switch being closed by engagement of said annular ring by a ball rolling on the game board, and a band of resilient material surrounding said standard and adapted to be contacted by a ball after the same has contacted said annular ring.

4. A bumper switch unit for use in a ball rolling game having a game board comprising, in combination, an upright standard extending above the board, a rigid annular ring of non-conducting material loosely surrounding said standard in a position to be contacted and actuated by a ball rolling on the board, diametrically oppositely disposed pins anchored at one end in said ring and projecting through the board, means through which said pins extend to guide said ring for bodily movement only longitudinally of the standard, said ring being yieldably retained in a normal position, and a switch governed by said ring.

5. A bumper switch unit for use in a ball rolling game having a game board comprising, in combination, an upright standard extending above the board, said standard having a first reduced portion at its base forming a first shoulder and a second reduced portion loosely receivable in an aperture in the game board and forming a second shoulder limiting insertion of said standard into the aperture in the game board, diametrically oppositely disposed pins anchored at one end in said standard and extending parallel with the axis thereof for projection through the game board, a sleeve having a tight fit with said second reduced portion and with the aperture in the game board adapted to be inserted into the aperture from underneath the board, said sleeve having a radial flange with diametrically oppositely disposed dependages, said radial flange cooperating with said second shoulder on the standard to form a clamping means rigidly securing said standard on the board, a rigid annular ring loosely surrounding said first reduced portion for bodily movement longitudinally of said standard, diametrically oppositely disposed pins rigid at one end in said ring and projecting through the game board and through dependages of said flange to be guided thereby, and switch means governed by said annular ring including resilient means yieldably urging said ring upwardly to the extent permitted by said first shoulder.

6. In a ball rolling game having a game board, a bumper switch unit comprising, in combination, an upright standard mounted in an aperture in the board and having a portion extending above the board and providing ball rebound means, ball actuated means associated with said standard and projecting radially above and outwardly of the periphery of the aperture in which the standard is mounted and in position to be contacted and actuated by a ball rolling on the board prior to contact of the ball with said standard, guide means provided by said standard, said ball actuated means engaging said guide means to be guided thereby for bodily movement longitudinally of said standard, means yieldably retaining said ball actuated means in a normal position, and a switch governed by said ball actuated means.

7. In a ball rolling game having a game board, a bumper switch unit comprising, in combination, an upright standard extending above the board and providing ball rebound means, ball actuated means associated with said standard, guide means in the unit slidably engaged by said ball actuated means to guide said ball actuated means for bodily movement longitudinally of said standard, said ball actuated means being positioned to be contacted and actuated by a ball rolling on the board prior to contact of the ball with said standard, means yieldably retaining said ball actuated means in a normal position, and a switch governed by said ball actuating means.

8. In a ball rolling game having a game board, a bumper switch unit comprising, in combination, an upright standard extending above the board, rigid ball actuated means surrounding said standard, means on said standard guiding said ball actuated means for bodily sliding movement longitudinally thereof, said ball actuated means being positioned to be contacted and actuated by a ball rolling on the board prior to engagement of the standard by the ball, means yieldably retaining said ball actuated means in a normal position, and a switch governed by said ball actu-

ated means mounted beneath the game board.

9. In a ball rolling game having a game board, a bumper switch comprising, in combination, an upright standard having a portion extending above the board, guide surfaces on said standard, ball actuated means surrounding said standard and engaging said guide surfaces to be guided thereby for bodily sliding movement longitudinally of the standard and restrained thereby against tilting, said ball actuated means extending outwardly of the standard in position to be contacted and actuated by a ball rolling on the board, and means yieldably urging said first mentioned means to normal position and forming a switch governed by said first mentioned means.

10. In a ball rolling game having a game board, a bumper switch unit comprising, in combination, an upright standard extending above the board, guide means formed by said standard, means slidable on said guide means and mounted for bodily movement longitudinally of said standard, said last mentioned means having a first portion disposed above the board to be contacted and shifted downwardly by a ball rolling on the board and a second portion projecting through the board, and a switch disposed beneath the board, said switch including a spring element engaging the portion of said means projecting beneath the board and urging the first portion of said means to normal raised position.

11. In a ball rolling game having a game board, a bumper switch unit comprising, in combination, an upright standard disposed above the board and having a portion projecting into an aperture formed in the board, a first guide means formed above the board, means including an element disposed beneath the surface of the board for clamping said standard rigidly onto the board, said last mentioned means forming guide means beneath the surface of the board, a rigid electrically non-conducting annular ring slidably surrounding said first guide means and having depending means engaging said second guide means to be guided for bodily movement longitudinally of said standard, said ring extending beyond the aperture in the board, means on said standard limiting the upward movement of said ring, a switch mounted beneath the game board including a spring element operatively associated with said annular ring yieldably to urge said ring to the upper limit of its movement, said spring element being overcome by contact with said annular ring of a ball rolling on the board.

12. In a ball rolling game having a game board, a bumper switch unit comprising, in combination, an upright standard extending above the board, a rigid annular ring surrounding said standard and overlying the game board in a position to be contacted and actuated by a ball rolling on the board, cooperating means on said ring and said standard guiding said ring for only bodily movement longitudinally of the standard, means yieldably retaining said annular ring in a normal position, and a switch governed by said ring.

13. A bumper switch unit for use in a ball rolling game having a game board with an aperture therein comprising, in combination, an upright standard secured in the aperture in the board and having a portion extending above the board and providing ball rebound means, a rigid electrically non-conducting annular ring surrounding said standard and projecting radially outwardly from said standard to overlie the game board in position to be contacted and actuated by a ball rolling on the board prior to engagement

of the ball with said standard, interengageable relatively slidable means on said ring and said standard guiding said ring for bodily movement longitudinally of said standard, said annular ring being yieldably retained in a normal position, and a switch governed by said annual ring.

14. A bumper switch unit for use in a ball rolling game having a game board comprising, in combination, an upright standard extending above the board and providing ball rebound means, said standard being of translucent material and hollow to receive a light bulb therein,

5 rigid electrically non-conducting means guided by said standard for bodily sliding movement longitudinally of said standard and projecting radially outwardly from said standard to overlie the game board in position to be contacted and actuated by a ball rolling on the board prior to engagement of the ball with said standard, said last mentioned means being yieldably retained in a normal position, and a switch governed by said last mentioned means. 10

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