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2,642,290

ANGULARLY ADJUSTABLE BALL BUMPER

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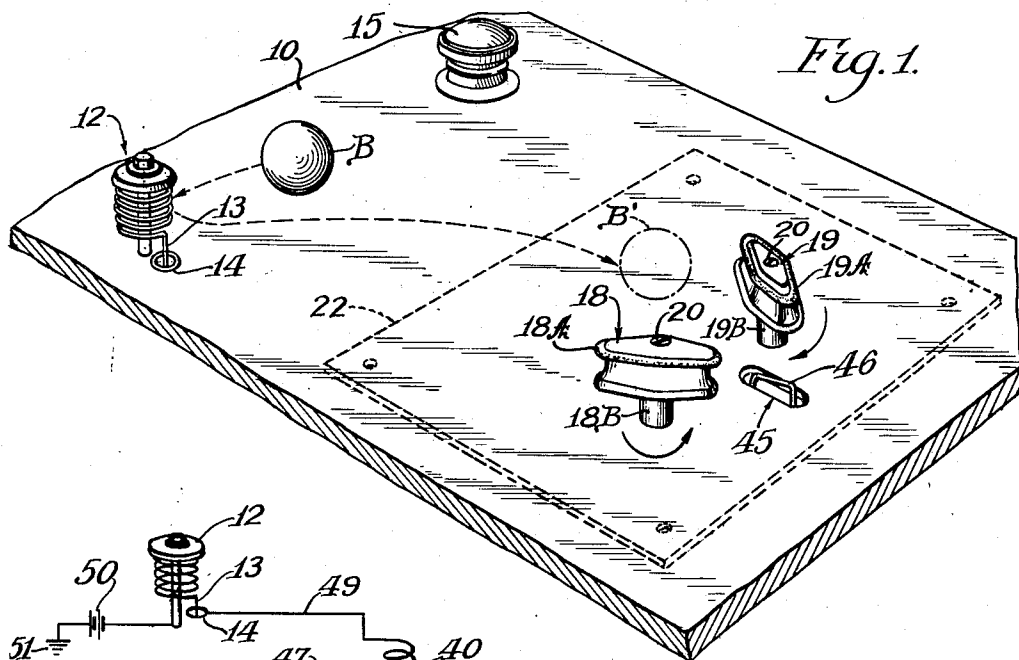


Fig. 1.

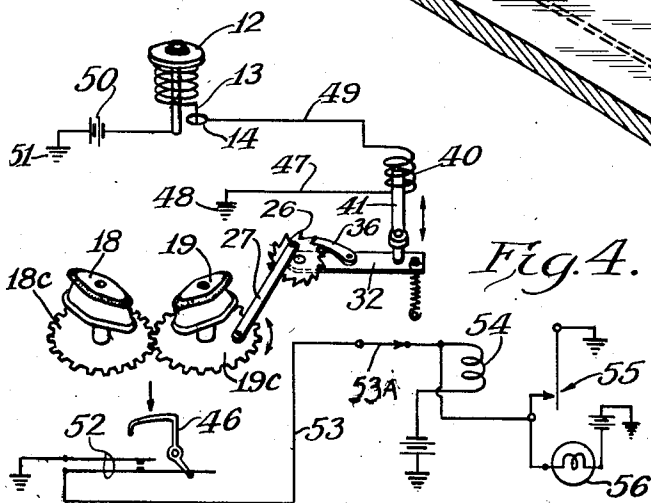


Fig. 4.

Fig. 2

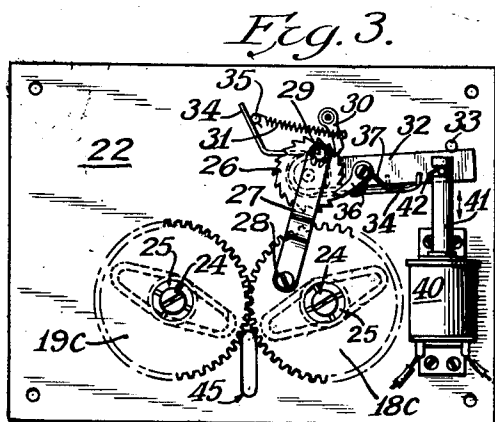
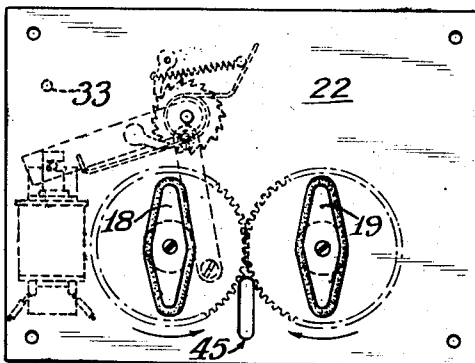


Fig. 3.



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ANGULARLY ADJUSTABLE BALL BUMPER

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This invention pertains to ball rolling games and has as its principal object the provision of a controlled ball bumper mechanism and actuating means therefor adapted to regulate the facility with which a ball directed thereat may negotiate a pre-determined scoring passage or be blocked from said passage altogether.

Viewed from another aspect, it is an object of the invention to provide what is termed for convenience a percentage bumper, including one or more pivoted bumper elements and mechanism controlled by playing of the game for periodically shifting the angular relation of the bumpers in such manner as to open and close a ball passage with intermediate degrees of closure which predetermines the relative facility with which a ball may pass between the bumpers to operate a scoring switch or the like, and in that sense regulate the percentage or frequency of probable operations of the scoring switch by a ball striking or approaching said percentage bumpers in various manners.

More particularly, it is an object to provide in a ball rolling game a percentage bumper mechanism including a pair of pivoted bumpers guarding the approach to a ball switch, together with electro-magnetic mechanism for pivoting the bumpers in such manner as to open, narrow, or close altogether the approach to the scoring switch; and further, to provide an operating circuit controlled by some other ball scoring switch or instrumentality, such as another bumper, situated in the ball playing field in which the aforesaid percentage bumper is utilized.

Additional objects and aspects of novelty and utility characterizing the invention pertain to details of the construction and operation of the preferred embodiment hereinafter described in view of the annexed drawing, in which:

Fig. 1 is a fragmentary, isometric view of a ball playing field, or board, with the novel bumper means shown thereon;

Fig. 2 is a top plan view of the percentage bumper unit removed from the game;

Fig. 3 is a bottom plan view of the unit of Fig. 2;

Fig. 4 is a circuit diagram with parts of the percentage bumper shown schematically.

Referring to Fig. 1, the board 10 has mounted thereon a conventional ball bumper 12 including switch contacts 13 and 14 for connection in a control circuit to be described hereinafter, and it is to be understood that in the usual game a plurality of additional ball bumpers of the conventional type indicated at 15 will be disposed

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strategically over the surface of the board 10 and have switches connected in various scoring circuits (not shown) in a manner well-known in the art.

The novel percentage bumper means, as shown in Fig. 1, includes a pair of elongated bumper elements 18 and 19, each having a rubber rebound band 18A and 19A, respectively. Each of said bumpers is mounted on a pivot post 18B and 19B, respectively, as by screw means 20.

The pivot posts 18B and 19B pass through the board 10 and rest on a mounting plate 22, which is screwed to the underside of the board 10.

The mounting plate 22 and the percentage bumpers, along with the actuating mechanism, are constructed as a unit of the type illustrated in Figs. 2 and 3.

The posts 18B and 19B each have reduced key portions (not seen) which pass through the plate 22 and respectively engage in key slots in corresponding, meshed, gear disks 18C and 19C on the under side of the mounting plate 22, as in Fig. 3, the assembly being completed by mounting screws 24 turned home against spring washers 25.

Actuating mechanism for the bumpers includes a unidirectional ratchet means 26 fixed for rotation on the under side of plate 22 and drivingly connected with one of the gears 18C (Fig. 3) by means of a crank link 27 eccentrically attached to the gear disk as at 28 and to the ratchet wheel as at 29. A holding pawl 30 is staked into the plate and yieldably urged into the ratchet teeth by spring 31.

Mounted coaxially with the ratchet wheel 26 is a lever 32 yieldingly urged against a stop pin 33 by spring 34 hooked at one end on lever 32 and working against pin 35 at its opposite end.

A ratchet pawl 36 is pivoted on lever 32 and urged into the ratchet teeth by spring 37.

Means for oscillating the lever 32 includes a solenoid 40 mounted on the plate and having plunger 41 engaged by pin and slot means 42 with lever 32, so that when the solenoid is energized plunger 41 is drawn downwardly (in Fig. 3) thereby rotating the ratchet wheel 26 and turning the gear 18C through the described crank connection, with the result that gear 19C is turned simultaneously a like amount, and the two bumpers 18 and 19 are rotated, in a sense toward each other, as indicated by the arrows in Figs. 1 and 2.

An elongated slot 45 is provided in the plate 22 (Fig. 1) through which projects the operating arm 46 of a roll-over switch.

An illustrative control circuit for the percent-

age bumper means is shown in Fig. 4 in which the bumper actuating solenoid 40 is connected by conductor 47 grounded at 48 and conductor 49 through normally open ball switch contacts 13 and 14 to battery 50 (representing any suitable power source) grounded at 51. Should a ball strike the bumper 12 contacts 13 and 14 would thereby be closed to energized solenoid 40 and rock the lever arm 32 and thereby rotate gears 18C and 19C through ratchet means 26, 27, 36.

Assuming that the ball B shown in full lines in Fig. 1 were to strike bumper 12 along the dotted line of travel indicated, to close contacts 13 and 14 as aforesaid, and that said ball should then rebound from the bumper 12 to approach the percentage bumpers 18 and 19 in the manner of the ball indicated at B', said ball, by reason of the illustrative, angularly-adjusted position of said bumpers, 18 and 19, shown in Fig. 1, would tend to travel through the opening between the said bumpers and engage the roll-over switch arm 46 to operate some desired scoring circuit; for example, the roll-over switch arm 46 would close contacts 52 to complete an energizing circuit via conductor 53 for a relay coil 54 the switch 55 of which, in turn, would light a score lamp 56 or actuate any of a number of conventional scoring instrumentalities commonly used in the art. As shown in Fig. 4, relay switch 55 applies holding ground to the relay coil and the lamp, for score-indication purposes, the holding circuit being broken by any master-switch means 53A, it being noted that the power supply or battery means is symbolic and poled in opposition for illustrative purposes.

The scoring instrumentality which is controlled by the ball switch 52 and which is simply illustrated as the score lamp 56, herein, will ordinarily be a special or high-score device in the game, and it is desired that it be made relatively difficult for a ball to engage the switch operating arm 46, or at times to block passage between the bumpers and prevent the ball at B₁ from engaging the switch arm 46 at all. Or, at still other times, it will be desirable to change the relative ease or difficulty with which a player may succeed in causing a ball to operate the high-score switch means 46, and to this end it will be apparent that the percentage bumpers 18 and 19 will assume intermediate, angular positions in which the approach or passage therebetween toward arm 46 is either fully open (with bumpers 18 and 19 parallel) or constricted to such an extent that there is great likelihood of the ball rebounding out of the passage altogether and continuing its meander elsewhere on the board.

It will thus be apparent that the novel angular bumper means changes the hazard or skill element from time to time to afford variety in interest and stimulation for the player; and, in addition, it controls the frequency of, or percentage for, scoring at different times.

It will be understood that a plurality of the percentage bumper units may be employed in a single game and that means other than the bumper switch 12-13-14 may be utilized for effecting a periodic or random energization of the actuating solenoid 40. For example, contacts 13 and 14 might be operated by a coin slide in the coin-controlled variety of game, or supplemented by additional ball-bumper or roll-over contacts in parallel therewith.

We claim:

1. In a ball rolling game, a first ball operated switch, a second ball operated switch and score means controlled thereby, at least two pivoted ball bumpers guarding said second switch to deflect balls moving relative thereto, electrically actuated pivoting means controlled by said first switch for jointly pivoting said bumpers in steps of determined magnitude, said bumpers being pivotable in steps as aforesaid between limits in one of which said bumpers are turned substantially together to block approach of a ball to said second switch from a certain direction, and in another of which said bumpers are turned away from each other to open said approach.

2. A percentage ball bumper structure comprising a pair of elongated bumpers both pivotally mounted near their centers for motion about parallel axes, electromagnetic means for oscillating one of said bumpers, and a driving connection between said one bumper and the other bumper such that the two bumpers pivot relatively to turn their respective long axes toward and away from each other responsive to oscillation of said one bumper, each bumper having an end portion spaced from its pivot and from the like end portion of the other bumper when the bumpers are pivoted a certain amount toward each other to block passage of a ball therebetween.

3. A ball bumper structure comprising a pair of bumpers spaced and pivoted for convergent and divergent movement to open and close a ball passage, mechanism for pivoting one of said bumpers, and means drivingly interconnecting said one bumper with the other for simultaneous but reverse motion relative thereto to effect convergent and divergent movement as aforesaid.

4. A bumper structure in accordance with claim 3 in which said interconnecting means comprises meshed gears coaxially rotatable with said bumpers, and said pivoting mechanism comprises an electromagnetically and intermittently stepped pawl and ratchet means linked with one of said gears to oscillate the latter through a predetermined range.

5. In a ball rolling game, the combination with a playing field having a ball-operated roll-over switch member therein, of percentage bumper means comprising at least two elongated bumpers pivoted near their centers on opposite sides of said switch member for motion about parallel axes spaced farther apart than the diameter of a ball used in said game and approximately normal to the plane of said field, each said bumper having an eccentric portion movable, responsive to pivoting of the bumpers, toward and away from the corresponding eccentric portion of the other and said switch member to narrow or widen the passageway therebetween for a ball approaching said switch member, and mechanism for moving said bumpers in intermittent steps, convergently and divergently in passageway widening and narrowing action as aforesaid.

6. The combination of claim 5 further characterized in that said moving mechanism includes an electromagnetic driving device and drive mechanism actuated thereby for moving said bumpers as set forth, and in that there is provided an energizing circuit for said driving device including a ball-operated switch situated for actuation by a ball moving in said field and relative to said bumpers.

7. In a ball-rolling game including a ball-operated switch member situated in a playing field, adjustable bumper means disposed in said field

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in a path of approach of a ball relative to said switch member comprising a pair of elongated bumpers each pivoted near its center for rotative movement about an axis parallel to the axis of the other, said axes being spaced apart a distance greater than the diameter of a ball intended for use therewith such that when said bumpers are pivoted into relative parallelism they define a passage through which said ball can pass freely, said bumpers being of a length such that corresponding end portions thereof can be convergently positioned by pivoting of the bumpers for

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completely as well as partially closing said passage, and mechanism jointly pivoting said bumpers for positioning as aforesaid.

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