

May 4, 1943.

D. E. HOOKER

2,318,394

GAME APPARATUS

Filed Aug. 22, 1941

Fig. 1.

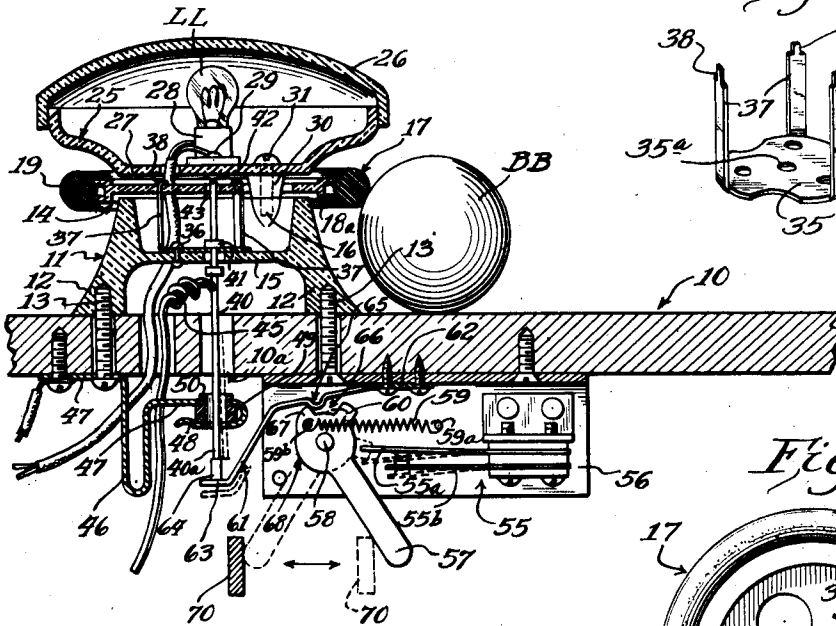


Fig. 5.

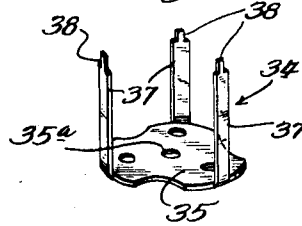


Fig. 3.

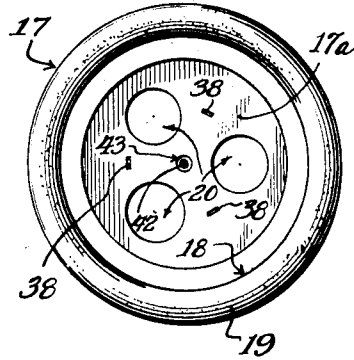


Fig. 4.

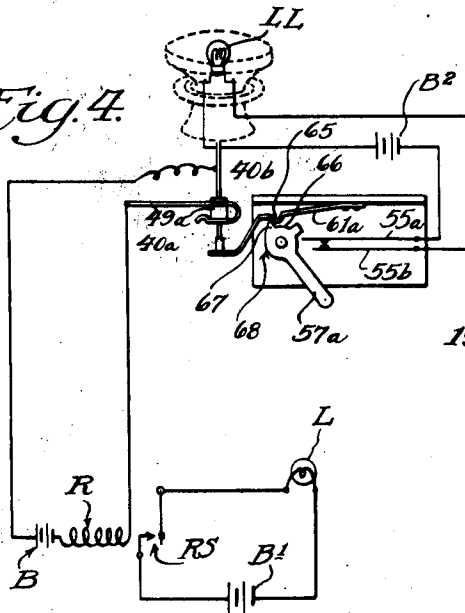


Fig. 2.

Inventor
Donald E. Hooker

By *William L. Livingston*
Attorney

UNITED STATES PATENT OFFICE

2,318,394

GAME APPARATUS

Donald E. Hooker, Chicago, Ill., assignor to Raymond T. Moloney, Chicago, Ill.

Application August 22, 1941, Serial No. 407,848

6 Claims. (Cl. 200—52)

This invention pertains broadly to electrical switching devices of special application, and more specifically to a target or bumper switch for use in amusement apparatus, such as a bagatelle or other ball rolling game.

An important object of the invention is the provision of a bumper adapted to be struck by a ball or other playing piece, which will be deflected or rebounded therefrom.

A further object is the provision of improvements in the bumper structure by virtue of which a bumper element is disposed on a mounting post to shift in a horizontal sense relative to the post, to rock and cause operation of a circuit closing arrangement.

A further object is the provision of a bumper having circuit control means which will be set, and maintained in set condition until reset, by action of a ball striking the bumper; said control means nevertheless being in part also operable for repeated actuation by subsequent engagements of a ball with the bumper, for controlling action notwithstanding the set condition of other portions of the control means.

Viewed from another aspect, the invention aims to provide a bumper so constructed as to dispense with the necessity of the materials and expenses involved in supplying relays and analogous switching and operating equipment heretofore commonly used in games of the class described, and controlled by bumper switches of the type heretofore used.

Still another aspect of the invention relates to the provision of a bumper or analogous target device, having a movable element adapted to be struck by a ball or the like; to provide circuit-closing means actuated by such a movable element each time the latter is struck; to provide further circuit-closing means adapted to be set in a given condition, as at the start of each game, together with trip mechanism actuated by a ball striking the movable element to trip the aforesaid mechanism and cause the associated circuit-closing means to remain in a tripped condition until reset.

Additional objects, advantages, and novel aspects of the invention reside in details of the construction, function, and combination of parts of the preferred embodiment described herein-after in view of the annexed drawing in which:

Fig. 1 is a vertical cross section through the novel bumper switch structure mounted on a fragment of a ball rolling board;

Fig. 2 is a vertical sectional detail of the bumper wafer or disc;

Fig. 3 is a top plan view of the wafer disc of Fig. 2;

Fig. 4 is a circuit diagram;

Fig. 5 is a perspective detail of the spider spring.

As shown in Fig. 1, the novel bumper structure is adapted for mounting on the surface 10 of a ball-rolling game, and one form of the device includes a standard or post or base structure 11, preferably made in hollow form of a suitable plastic molding material, with thread parts 12 in the bottom portion in which attaching bolts 13 are engaged.

At a desired level above the surface 10, the base portion terminates as at 14, and below this upper terminus is an integral plastic cross web 15, adjoining which are tapped bosses 16.

Disposed freely above the upper terminus of the base or post is a movable bumper element 17 in the form of a disc or wafer of plastic shown in detail in Fig. 2 and including a central portion 17a, there shown, surrounded by a grooved or channeled rim 18 in which is seated a resilient bumper element in the nature of a small rubber tyre 19 stretched thereabout.

In the central portion 17 (Fig. 3) there are arranged three fairly large clearance holes 20, through which pass attaching screws for mounting a top portion or dome on the base portion.

Referring again to Fig. 1 the main bumper structure is completed by a hollow dome structure 25 provided at the top with a removable cap 26. Interiorly of the dome is an integral cross web constituting a floor 27 upon which is mounted a lamp socket 28 by means of rivets 29. Two bosses 30 and screws 31 pass from the floor of the dome through the oversize clearance holes 20 in the bumper disc to engage with the bosses 16 and hold the dome in position.

Sufficient clearance is provided between the dome and base to permit the bumper element or disc 17 to shift in a horizontal direction or to rock from a horizontal plane. Such shifting and rocking movement is limited by engagement of the rim portions at 18a with the adjoining parts of the body of the base and dome.

The bumper disc is normally centered by resilient means in the preferred form of a spring spider 34, such as is shown in detail in Fig. 5. The central part 35 of this spider is riveted as at 36 on the web 15 at the top of the base portion, and has springy fingers 37 projecting upwardly with shouldered tabs 38 at their upper ends passing supportably through the bumper disc and turned over to hold in the latter.

The yieldability of the spring fingers is such that the bumper disc may be shifted or translated in a horizontal sense between the limits afforded by the clearance between the disc and standard portions.

Circuit control means is associated with the wafer disc to be actuated thereby upon translating or shifting movement of the latter when struck by a ball. There is a dual aspect to this circuit controlling action, and the means for effecting one phase of such action includes the provision of a vertical conductor stem 40 of metal rockably seated and centered within the bumper by means of vertically spaced brass collars 41 forced onto the rod, one on each side of the central portion 35 of the spider with the stem passing through a central, oversize hole 35a in the latter. Thus, the upper collar 41 normally rests on the spider with the stem pendantly hung therefrom.

An upper end portion 42 of the contact stem projects into an oversize hole 43 in the center of the wafer disc, and the arrangement is such that when the wafer shifts horizontally, as when struck by a ball, the marginal portions of the central hole 43 bear against the upper end 42 of the rod and rock the latter, with the uppermost brass collar 41 serving as a fulcrum.

Electrical connection to the rod or stem is effected by means of a flexible pig-tail connection 45 soldered or otherwise affixed thereto just below the lowermost collar 41; and a companion stationary contact means for the stem includes an offset metal arm or strip 46 having one end secured as at 47 to the underside of the surface 10, adjacent a hole 10a in which the stem passes downwardly. An opposite end portion of the metal strip is looped back to provide opposite portions 47 and 48 in which are aligned holes. A carbon ring 49 is forcibly held between the portions 47 and 48 in alignment with said holes, and is provided at its upper end with a reduced collar and shoulder portion 50 which projects through the hole in the upper opposite portion of the metal strip, whereby the carbon ring is secured in position.

As will appear in conjunction with the description of the circuit diagram of Fig. 4 hereinafter, electrical circuit is completed between the rod 40 and carbon ring 49 by rocking of the rod upon displacement of the bumper disc. Normally, however, the rod 40 is maintained out of electrical or circuit-closing contact with carbon ring 49 by action of the spider fingers 36 in centering the bumper disc as aforesaid.

Another phase of the circuit-controlled aspect, includes additional switch and mechanical means in the form of a leaf-spring or other suitable switch 55 mounted on a bracket 56 secured to the underside of the game board surface 10 adjacent the bumper. Associated with this switch is a trip-action mechanism including an operating lever 57 pivoted on the bracket at 58, and normally urged to pivot in a clockwise direction, by action of a spring 59 secured at one end 59a to the bracket and at its opposite end 59b to a projection 67 on the lever. Spring 58 tends to rock the lever 57 so as to cause the projection 60 to bear against contact 55a on the switch and cause it to engage and close circuit with its companion contact 55b, as shown in dotted lines, Fig. 1.

Switch 55 remains open when the lever 57 is in full line position, in which position it is normally and releasably held by action of a trip mecha-

nism including a catch 61 in the form of an elongated strip of springy metal anchored at one end 62 to the underside of surface 10, and offset at an opposite end 63 so as to underlie the lower end of the contact rod 40. Riveted to the trip offset 63 is a rod-engaging stud 64, preferably of slightly larger diameter than the rod 40 and providing a stump which bears against the lower end of the contact rod 40 to prevent upward movement of the catch or trip arm 61.

Intermediate the ends of the catch member is an offset catch portion 65 disposed to engage in a notch 66 formed adjacent the projection 60 on the switch-operating lever, and into which notch the catch portion 65 fits when the lever is rocked into full line position from tripped or dotted line position.

Ordinarily, the lever 57 tends, under urgency of spring 59 to cam the catch or trip arm upwardly by virtue of the fact that the surface portions on the catch offset 65 and on the projection 67 of the lever are rounded for cam action, thus to urge the catch portion 65 out of the notch 66 to free the lever.

However, centering action of the spring means or spider upon the rod 40 places the lower end 40a of the latter in alignment with the stud 64, which prevents upward movement of the catch arm 61, thus preventing catch portion 65 from being cammed out of the notch as aforesaid.

When a ball BB strikes the bumper disc, the contact stem is rocked so that the lower end 40a thereof shifts out of alignment with stud 64 into the dotted line portion, thus freeing the catch arm 61 for upward movement, whereupon the turning effort in lever 57 causes part 67 to cam the catch portion 65 out of notch 66, so that the lever may be snapped into tripped, dotted-line position to actuate switch 55. When such action has occurred, the normal or predetermined bias in the spring catch arm 61 causes the latter to descend into the dotted line position so that the end 40a of the contact rod will not thereafter be obstructed, and the bumper may close circuit repeatedly by engagement of rod 40 with the carbon ring 49 each time a ball strikes the bumper. To this end the surface 68 on the catch-end of the lever is relieved so as not to interfere with the downward movement of catch part 65.

It is contemplated that a plurality of the novel bumpers shall be used in various games; and means is provided which is common to all or a group of such bumpers for resetting the trip switches for each whenever the game is operated for a round of play.

In Fig. 1, a bail bar 70 is shown in section as movable toward the right and back to the left. In moving toward the right, this bail or reset means engages the stem of trip lever 57 and pivots the same in an anticlockwise direction into set or full line position. Any form of construction which is suitable may be utilized for the reset means or bail bar 70, and since the same may vary in different types of games, no detailed form is prescribed. Any other means for pivoting the trip levers may be employed.

In order to illustrate one of the numerous circuit arrangements in which the bumper may be used, there are shown merely, by way of example, in Fig. 4, connections including the stem 40a of the bumper switch connected to a battery or other suitable power source B, the carbon ring or stationary contact 49a being

connected in said circuit with a score or hit indicating means including a relay R or other instrumentality to be controlled and actuated by battery B when bumper switch contacts 40a-49a are closed as by a ball striking the disc 17a.

Assuming that a ball should strike the bumper disc 17, the latter would be displaced momentarily to rock the contact stem 40a into circuit closing engagement with its companion contact 49a to cause momentary actuation or energization of the relay R, which in turn closes its switch RS to energize some device such as the indicating lamp L, from a suitable power source B¹. Each time the bumper is struck lamp L will be illuminated. Relay R being used to insure good prolonged contact so that lamp L may assume full brilliance, since the contact established between the stem 40 and carbon ring 49 is only momentary. The ball B will be rebounded by the combined resiliency of the tyre 19 and restorative effort of the spider.

Meanwhile it is to be assumed that the trip switch has been set, as heretofore described, in which case, the movement of the contact stem, just alluded to, would displace the lower or blocking end 40a of the stem from holding position relative to the stud portion 64a, thus releasing the catch arm 61a for upward movement so that the operating lever 57a may be snapped over by its spring to close trip switch 55 as heretofore described.

Contact 55a of the trip switch is connected to a suitable power source, such as battery B², while the companion trip contact 55b is connected to an indicating lamp LL or other score device or instrumentality to be energized by battery B² when contacts 55a-55b are closed by the tripped or released lever 57a, and lamp LL remains illuminated until the game is concluded, or the lever 57 or 57a is reset, as by the bail 70.

One of the advantageous features of the novel apparatus is the fact that the necessity of a relay (like the relay R for example) to maintain the indicator or lamp LL in operated condition, is avoided, along with the relative greater expense involved, as well as the additional electric power needed to hold such a relay in locked or energized condition, together with the added wiring and installation labour and expenses.

A further advantage and feature of novelty resides in the fact that even though the trip switch has been tripped, the bumper still remains active for circuit-controlling purposes owing to the continued availability of contacts 40-49 for repeated operation as often as the bumper is struck.

The mechanical action of the bumper is also advantageously improved and changed, owing to the substantially horizontal shift or displacement of the wafer disc, and the easy action and leverage resulting from the pendant mounting of the stem 40 as by collars 41, and the slightly loose or impositive driving connection between the upper end 42 of the stem and the hole 43 in the bumper wafer or disc.

In consequence of the foregoing novel aspects of the invention, the game apparatus with which it is combined, operates in a new and improved manner, for it is believed to be unknown in this art, prior to this disclosure, that a ball bumper continued to be active for circuit-controlling purposes and repeated actuation, while at the same time having circuit-controlling features which remained operated after the first hit.

The specific construction shown and described

may be changed to realize the various advantages and objects inherent in the invention without departing from the scope thereof. No limitations are to be placed upon the structural or functional aspects of invention except as may be required by the appended claims.

I claim:

1. A device of the class described comprising a movable contact, a co-operating stationary contact, a trip switch, including trip mechanism coacting with said movable contact, and means adapted to be engaged and moved by a playing piece for moving said movable contact to effect circuit closing action thereof with said stationary contact and actuation of said trip switch.

2. A bumper switch comprising a bumper element and means for mounting the same with respect to a playing surface yieldably for displacement in an approximately horizontal plane from a normal position by action of a playing piece engaging said element, a pendant member moved by said element by displacement thereof as aforesaid, and electrical circuit control means coacting mechanically and electrically with said pendant member for effecting and maintaining a closed control circuit and also a momentary control circuit.

3. In a ball game bumper, a pendant contact and a companion stationary contact therefor, bumper means adapted to be actuated by a ball for moving said pendant member to close a first circuit through said companion contact, a trip device adapted to be set in a non-tripped condition and to be releasably maintained in set condition by said pendant member, said pendant member moving to trip said trip device upon closure of said first circuit, and switch means actuated by said trip mechanism when tripped as aforesaid, for closing a second circuit until the trip mechanism is set.

4. In a bumper switch a disc-like bumper element, a spring spider mounting said element for resilient motion from a normally centered position in a plane approximately parallel to a playing surface for engagement and translation substantially in said plane when struck by a playing piece moving on said surface, a pendant contact arranged to be rocked from a normally centralized position by translation of the bumper element, a stationary companion contact surrounding said pendant contact to be engaged by the latter upon predetermined movement thereof by translation of the bumper element in any direction as aforesaid, a switch operatively associated with said bumper switch actuating mechanism adapted to be set for release from set condition to actuate said switch, and catch means automatically disposed to underlie an end of said pendant contact in central position, upon setting of said switch actuating mechanism to maintain the latter in set condition, said catch means being released to effect actuating the switch upon movement of the pendant contact a predetermined amount from said centralized position by action of a playing piece engaging said bumper element for translation as aforesaid.

5. In the broadest aspect, the bumper disc 17 mounted by spider means 34 to shift in a plane, the contact stem 40 pendantly mounted by collar means 41 to be oscillated by shifting movement of the disc, the stationary contact means 49 engaged by oscillatory motion in any direction of the stem for closing a first circuit, the switch 55, the spring pivoted lever 57 for operat-

ing said switch, the catch 61 coacting with said lever to hold the latter in spring-tensioned, set condition, and the trigger arrangement including the means 64 underlying said stem to maintain said lever in set condition until the stem is oscillated or displaced as by a ball shifting said bumper disc, whereby to control a second circuit.

6. In a ball bumper switch, relatively stationary means adapted to be mounted in a ball playing area, relatively moveable means supportably associated with said stationary means and adapted to be engaged and moved by a ball, switch means having at least two operating positions, means operatively associated with said relative-

ly movable means for effecting actuation of said switch means from one of the said operating positions thereof to another responsive to predetermined movement of said relatively movable means, and a second switch means actuated by said movable means responsive to movement of the latter as aforesaid, the several switch means aforesaid being adapted for connection to control circuit means in an amusement apparatus or the like, and means in addition to said movable means for actuating said first switch means to one of said two operating positions to condition said first switch means for actuation by said movable means, as aforesaid.

DONALD E. HOOKER.