Nov. 25, 1941. S. H. GENSBURG 2,263,727

BALL OBJECTIVE

Filed March 23, 1940

Fig. 1.

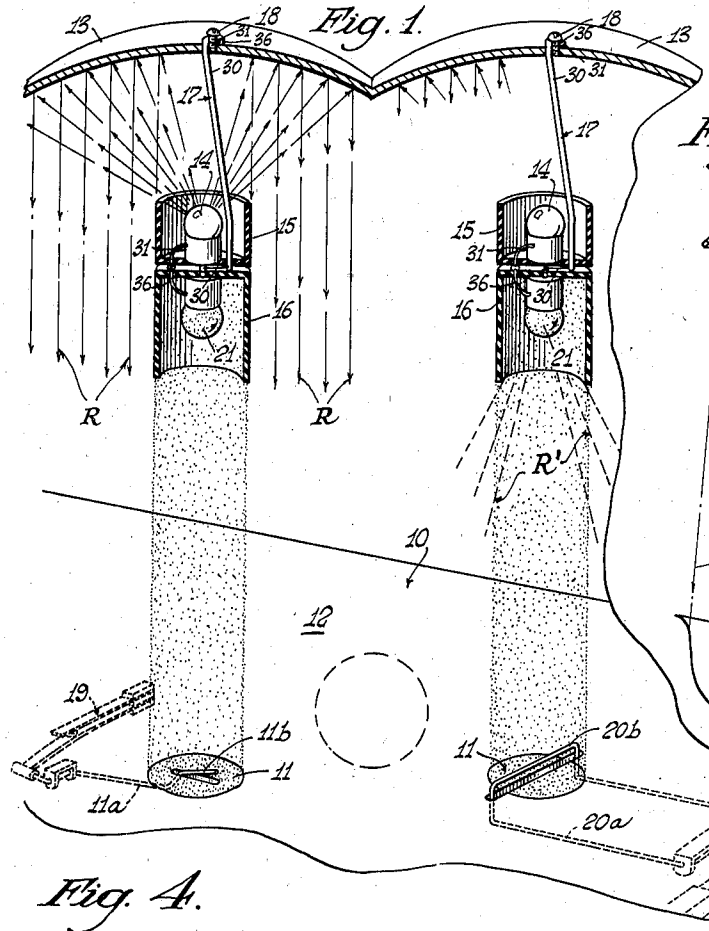


Fig. 3.

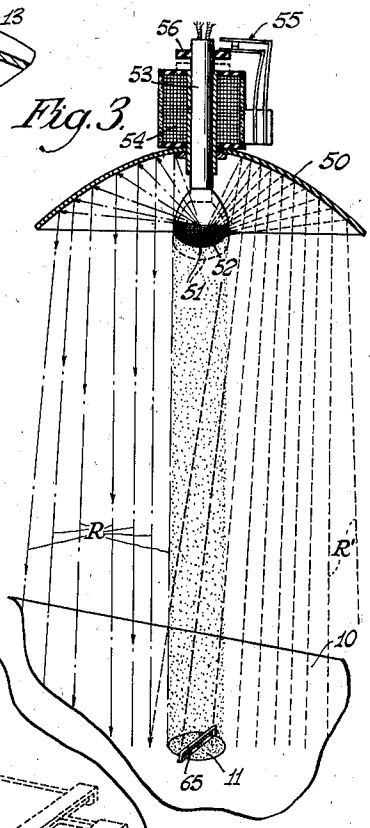


Fig. 4.

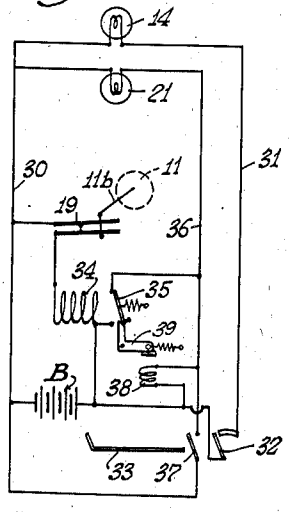


Fig. 2.

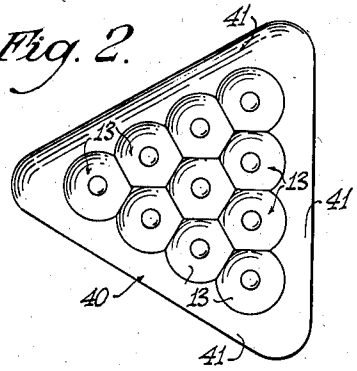
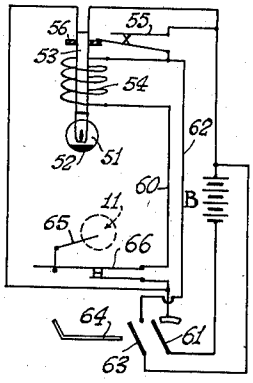


Fig. 5.



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BALL OBJECTIVE

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Application March 23, 1940, Serial No. 325,508

5 Claims. (Cl. 273—118)

This invention relates to amusement apparatus and has as its principal object the provision of means for defining a target or playing objective in a game, particularly a ball rolling game.

More specifically, the invention provides a novel form of objective on the ball rolling board, for example, of a bowling game, the objective being in the nature of a shadow created in a lighted area of the board, and mechanism including an operating element situated in the shadow to cause the obliteration of the shadow when a ball or like projectile enters into the shadowed area to engage and actuate the operating element.

Viewed from another aspect, it is an object of the invention to provide an arrangement of lamps and reflectors to cast shadows in certain areas of a ball rolling board which are to constitute target objectives at which a player may bowl or otherwise project a ball, together with switch means for controlling the lamps and operating elements for the switch means situated in the shadowed portions of the objectives or targets to be engaged and operated by a ball or the like successfully directed at the shadowed area.

Another object is the provision of means for defining shadows in an illuminated portion of the playing board and electric lamps controlled by balls entering the shadowed portions to illuminate the latter and cause their obliteration to give an indication of a successful play.

A still further object is the arrangement of electric lamps and reflecting means to define an illuminated area on a playing board with shadows situated in certain positions to define ball objectives and means for changing the focus of the lamps with respect to the reflecting means to obliterate the shadow when a ball enters the region in which the shadow is defined.

Other objects, advantages and novel aspects of the invention reside in certain details of construction as well as the cooperative relationship of the component parts of the illustrative embodiment described hereinafter in view of the annexed drawing, in which:

Fig. 1 is a fragmentary perspective with parts shown in section of the pin bed and coacting lamp and reflector means for creating shadows to represent the pins;

Fig. 2 is a plan view of the reflector unit used in Fig. 1;

Fig. 3 is a vertical section of a modified shadow-creating and effacing means;

Fig. 4 is a circuit diagram corresponding to the arrangement of Fig. 1;

Fig. 5 is a circuit diagram corresponding to the arrangement of Fig. 3.

The present invention is primarily intended for use in connection with a bowling game, such as shown in U. S. Patent No. 2,194,830, filed January 17, 1940, Serial No. 314,261, wherein there is disclosed an arrangement of electric lamps and means for directing light from those lamps to define localized areas of illumination in the pin bed of a bowling game, the lighted areas being arranged in the positions usually occupied by the tenpins, and there being switch means in certain of the illuminated areas to be engaged by the bowling ball to effect the extinction of lamps to indicate the striking of the various pins. In the present arrangement, the pin bed of the bowling alley may be said to be an illuminated field and the tenpins are represented by appropriately positioned shadows, the striking of the pins being indicated by the obliteration of the corresponding shadows.

In one arrangement, as shown in Fig. 1, the ball rolling board 10 constitutes a portion of a bowling alley, particularly the pin bed or seat thereof, and the ball objectives or targets are designated in certain positions on the board by shadowed areas 11 created in an otherwise illuminated field 12. These shadowed areas are each situated in one of the positions in which a tenpin would be positioned in the customary set-up of bowling pins, that is, approximately in triangular array, apparent in Fig. 2.

The illuminated field on the board is provided through the medium of a plurality of reflector portions 13 secured by any suitable means (not shown) above the pin bed or board and each receiving light from a corresponding source in the nature of an electric lamp 14 mounted within a housing or shell 15 in juxtaposition with an oppositely directed housing or shell 16, the shells or housings of each lamp unit being suspended by a thin but rigid bracket arm 17 attached to the center part of the corresponding reflector as at 18.

The lamps 14 are connected in controlled circuits later to be explained, the corresponding reflectors 13 being constructed and arranged so as to reflect parallel rays, indicated at R, down onto the board around the lamp housings 15 and 16 in such manner that the housings will cast the shadows 11 which indicate the target objective at which it is intended the ball shall be directed.

In order to give an indication or signal that a ball has been successfully directed at one or more of the shadows to enter the shadowed area, there

is provided a control means including switches 19 and 20 mounted beneath the board and each provided with an operating means or arm 11a and 20a, respectively, with a portion 11b and 20b, respectively, projecting through a suitable opening in the corresponding shadowed portion 11 so as to be engaged and moved by a ball successfully directed thereat.

It will be understood in the illustration of Fig. 1 that there are intended to be ten of the shaded areas 11 corresponding to the usual tenpins, and there may therefore be ten of the switches 19 or 20 or a lesser number where it is desired that the shadow effacing means for several of the shaded areas shall be controlled by a single switch and operating member.

Means for obliterating or effacing the shadows in the arrangement of Fig. 1 includes the provision of lamps 21 in the downwardly directed housings or shells 16, these lamps being variously illuminated by operation of the switches 19 or 20 to emit the rays R' and illuminate the corresponding shadowed areas.

In the circuit diagram of Fig. 4, the lamps 14 are normally energized from battery B through circuit connections 30—30 through a master switch 32 which is actuated by means of a slide 33 at the beginning of the game, it being understood that there will be ten of the lamps 14 in such a circuit where the invention is employed in a bowling game, and illumination of all of the foregoing lamps will cause the pin bed of the alley to be illuminated, with a corresponding number of appropriately positioned shadows 11 in each of which may be situated one of the switch operating elements 11b, for example, the corresponding switch means 19 having one of its terminals connected to conductor 30 and battery B, and having its other terminal connected to one terminal of an effacing relay winding 34, the opposite terminal of which is connected to the remaining terminal of the power source or battery.

Assuming that a ball enters the shadowed region 11 and depresses the switch operating element 11b, the resulting closure of switch 19 will energize relay 34 and attract armature 35 to close a power circuit through conductor 36 and conductors 30 to illuminate the effacing lamp 21, with a resultant illumination of shadow 11 and a disappearance of the shadow.

In order to restore the game to initial condition and cause the reappearance of the shadows, lamps 21 are energized by operating the master control slide 33 to close a restoring switch 37 and connect battery to a resetting coil 38 and retract the armature 35 of the effacing relay through the action of a dog leg element 39 of known construction, thus breaking the circuit through lamp 21 so that lamp 14 and its associated reflecting means may again create the necessary illuminated and shadowed regions on the playfield. It is to be understood that whereas in a game of tenpins, ten pairs of lamps 14 and 21 would be employed, it is contemplated that some of the lamp control circuits, such as illustrated in Fig. 4, may be combined for control by less than ten of the switches 19—20, etc.; and while there may be as many obliterating and resetting devices 34—38 as there are lamp groups 14—21, there will be only one master control means 32—33—37.

One form of reflector assembly is illustrated in Fig. 2 wherein a generally triangular stamping 40 is shown to be provided with ten triangularly arranged reflecting concavities, the marginal portions 41 of the stamping being curved appropriately to direct light downwardly onto the board to provide a main illuminated area of substantially triangular extent along the sides of the triangularly arranged illuminated areas resulting from the placement of the reflectors 13.

The concavities or individual reflector portions 13 have a curvature calculated as shown, to reflect light from the source 14 situated in the region of the principal focus in parallelism with the major axis of said focus so as to minimize diffusion and provide a source of parallel rays suitable for defining the shadows 11, the shells 15 operating to confine the light from each individual source 14 within the effective area of the corresponding reflector, and the downturned shells 16 operating similarly to confine the light from the corresponding lamps 21 to the area which would be occupied by the corresponding shadow.

A modified arrangement for creating and effacing the objective-designating shadows is shown in Fig. 3, wherein reflector elements 50, which may be individual stampings or concavities in a common stamping of the type shown in Fig. 2, are provided in number corresponding to the number of targets, in this case ten, for representing the ten bowling pins. With each reflector element 50 is associated an electric lamp 51 having a masked or opaque surface portion 52 and seated in the lower end of an armature element 53 reciprocating vertically in the bore of a solenoid 54 mounted above the axial opening 55 in the corresponding reflector section or concavity.

The arrangement is such that when the plunger 53 of the solenoid is raised to its full line position, the lamp 51 will also be in full line position, in which such of the light rays as are permitted to issue therefrom will be reflected in directions approximately parallel with the major axis of the reflector 50 down onto the board 10, this position of the lamp along the major focal axis with respect to the center of the reflector element 50 being such as to cause a minimum amount of light to be reflected along the major axis toward the board 10, with a resultant blind spot creating a substantial shadow 11.

The adjustment of the lamps 51 with respect to the focal constants of the reflector 50 will vary with the size of the reflectors and lamps and the area of board to be covered, as well as the distance of the units 50—51—54 above the board 10, and since the latter determinants are matters of optional design, the adjustments in each individual case are left to the designer for execution in accordance with principles well known to those skilled in the illuminating arts.

By dropping the lamps 51 into the dotted line position of Fig. 3 from normally raised full line position, the shadowed area 11 will be substantially effaced because the rays reflected by the reflector 50 will, in part, be converged, as indicated by the dash-dot lines, toward the shadowed area 11.

The shifting of the focal relation of lamp 51 with respect to the reflector 50 is accomplished by energizing and deenergizing the solenoid 54 in accordance with one arrangement shown in Fig. 5, wherein the winding of the solenoid 54 has one of its terminals normally connected by a conductor 60 to one terminal of a ball-operated switch 66 whose other terminal is connected through a master switch 61 to one side of the

power source or battery B, the remaining terminal of the winding 54 being connected by conductor 62 through a setting switch 63 to battery By operating a master slide 64, switches 61 and 63 are closed to energize winding 54 and pull up plunger 53, which will effect a closing of a locking switch 55 by engagement therewith of an insulated collar 56 on the plunger (Fig. 3), thereby closing a circuit around conductor 62 to maintain the winding 54 energized as long as switch 66 shall remain closed.

As soon as a ball is projected into the shadowed area 11 to engage and depress the corresponding switch operating element 65, for example, ball switch 66, which is normally closed, will be opened to deenergize winding 54 long enough to permit plunger 53 to drop and open the locking switch 55, thus effacing the shadow 11 by changing the focal relationship of lamp 51 with respect to its reflector 50.

In order to restore the shadow, it is necessary to operate the slide 64 and energize the solenoid 54 through switches 61 and 63 long enough to close the locking switch 55 again.

The various advantages and objects of the invention may be accomplished by modifications of the particular embodiment specifically described herein, and it is intended that the appended claims shall include all equivalent arrangements fairly coming within their call.

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

1. In an amusement apparatus of the class described, means providing a light receiving surface over which balls are rollable, light emitting means and light reflecting means arranged at a point above said surface to illuminate the latter, light impeding means arranged with respect to said light emitting and light reflecting means to define a shadowed area in the illuminated area on said surface, said shadowed area constituting a target objective on said surface and at which a ball employed in using the game apparatus may be directed, auxiliary light emitting means arranged beneath said light impeding means and normally ineffective to emit light, and means including a control element situated in the shadowed area aforesaid to be engaged and actuated by said ball for rendering said auxiliary light emitting means effective for effacing said shadow to indicate a successful play.

2. In an amusement device, in combination, means providing a light receiving surface over which a ball is adapted to be rolled, means for directing light onto said surface, means for impeding light directed as aforesaid to create a shadow in a certain portion of said surface and thereby define an objective at which a ball may be directed over said surface, a lamp arranged in said means for impeding light and normally in non-illuminating condition, and control means arranged with respect to said shadow to be engaged and actuated by a ball entering the shadowed area whereby to effect the direction of light into said shadowed area, said control means arranged in circuit with said lamp to illuminate the latter when a ball enters the shadowed area as aforesaid.

3. In an amusement device, in combination, means providing a light receiving surface over which a ball is adapted to be rolled, means for directing light onto said surface, means for preventing the passage of light onto a certain portion of said surface illuminated as aforesaid to create a shadowed area on said surface, said shadowed area constituting an objective at which a ball may be rolled, and means including a normally unilluminated second light source arranged upon illumination to illuminate said shadowed area, together with control means cooperating with said second light source and including an operating element situated with respect to said shadowed area to be engaged and operated by a ball therein, to cause the illumination by said second light source of said shadowed area and to efface the latter when the operating means is engaged by a ball, whereby to give an indication of a successful play.

4. In an amusement apparatus including a ball playing field, ball objective means comprising a reflector spaced from said field, a light source optically related to said reflector to illuminate a portion of said field, means in the path of light reflected from said reflector to define a shadow in said illuminated portion of the field, said shadow constituting an objective, a normally unilluminated second light source optically related to the shadow portion of said field and adapted upon illumination to illuminate the latter, and means actuated by a ball entering said shadowed portion and thereby attaining said objective, for effecting illumination by said second light source of the shadowed portion to efface the latter and indicate the scoring of a successful play.

5. In a ball game including a ball rolling board, in combination, a plurality of reflectors spaced opposite the ball rolling surface of said board, a light source mounted with respect to each of said reflectors to illuminate adjoining areas on said board, means associated with each light source for limiting the substantial emission of light to an adjoining reflector, said last-mentioned means also preventing substantial emission of light from the corresponding reflector to create a shadowed area on said board within the confines of the area illuminated thereon by the corresponding reflector, a second light source associated with each reflector and arranged for illumination to illuminate the corresponding shadowed area, means for confining the emission of light from said second-mentioned light sources within the area illuminated by the corresponding first-mentioned light sources, and control means including an operating element situated with respect to one of said shadowed areas for engagement and actuation by a ball therein for effecting illumination of the corresponding second-mentioned light sources to efface the corresponding shadow and indicate a successful play.

SAMUEL H. GENSBURG.