3,390,470
HOME BOWLER CONDITIONER
William G. Salo, Sr., 6 Crescent St., Springfield, Vt. 05156
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ABSTRACT OF THE DISCLOSURE
A home bowling device whereby an approach to the foul line may be simulated by means of a tethered ball having a light source attached thereto for directing a beam of light against a target to ascertain the projected pattern of the ball.

Cross references to related applications
This application is a continuation-in-part of applicant's copending application Ser. No. 523,318, filed Jan. 27, 1966, now abandoned.

Background of the invention
This invention relates to a bowling device and in particular to a bowling device capable of being easily set up in the bowler's home and used to develop bowling skills and bowling muscles in a manner simulating official bowling conditions.

The sport of bowling has become a popular game of skill and a way of fulfilling recreational and exercise needs for millions of people of broadly varying ages. The device of this invention, capable of being set up in the bowler's living room, rumpus room or the like or even outdoors, is designed to be used by either beginning or accomplished bowlers. It is often the case that a bowler cannot afford either time or money to visit an official bowling center but, nevertheless, desires to practice his bowling to enhance his game.

To achieve maximum scoring, many different types of bowling motions must be coordinated. Loss of control of any one of these motions is capable of producing significant error in the bowler's game. This invention permits the bowler to observe the necessary motions to learn which motions, if any, require improvement.

After practicing bowling with the bowling device of this invention, the bowler will have perfected his timing and style to such a degree that the acquired confidence and skill can be transferred to his actual bowling game to increase his scoring.

Summary of the invention
Generally outlined, the bowling device includes a standard size bowling ball lighter than the type to be used under actual bowling conditions having a pair of matted hollow ball halves and a light source positioned therein for emitting a light beam outwardly through an opening formed in the forward section of the ball. The bowler can judge the quality and accuracy of his arm swing and other bowling movements merely by keeping his eyes focused on a target and tracking the movement of the beam against the target. The base of the ball is swivelly mounted to a yoke which in turn carries a pulley. The pulley and yoke define a guideway through which passes a rubber cable which is attached at its opposite ends to a platform along which the bowler makes his delivery approach. The cable which can be easily uncoupled from the platform and replaced by other cables of different tension strength to afford resistance to the bowling movements in a manner consistent with the weight of the ball to be used by the bowler under actual official bowling conditions. The ball which is not released at the point in time when it would be under actual bowling conditions rides along the cable during the backswing, delivery and follow-through motions; and during all of these motions, the bowler is evaluating his performance by observing the movement of the light beam against the target. The target may be a rigid upright board having a plurality of parallel lines thereon which will aid the bowler in evaluating the movement of the light beam against the target. An alternative construction of the target enables the trainee to have the impression of looking down a real bowling alley and even though the same approach is used, the illusion given by changing the angular position of the target or alley is the same as that which would be achieved by utilizing different approaches on a regulation bowling alley.

The foregoing and other objects, features and advantages of the invention will be apparent from the following more particular description of preferred embodiments of the invention as illustrated in the accompanying drawings.

Brief description of the drawings
In the drawings:
FIGURE 1 shows a side elevational view of the bowling practice device with the ball in the air as if being held by a bowler;
FIGURE 2 shows a top view of the bowling practice device with a straight line guide tape extending between the center position of the target and the point where the leading end of the cable is coupled to the platform;
FIGURE 3 shows a side elevational view of the bowling ball with a portion removed to show the mounting structure for the light source;
FIGURE 4 is a front view of the bowling ball showing the light source mounted within the ball;
FIGURE 5 shows a perspective view of the target with a series of light responsive devices arranged across the forward section of the baseboard;
FIGURE 6 is an elevation view of a modified form of target construction; and
FIGURE 7 is a flush side view of the construction shown in FIGURE 6.

Detailed description of the invention
Referring now to the drawings in more detail, FIGURES 1 and 2 show the practice bowling device of this invention which can be used either to eliminate existing faults by one with some bowling experience or which can be used to obtain a feel for the sport by a beginner. The device includes a support platform of plywood or the like upon which the bowler can make his approach to the foul line and an imaginary bowling lane. Releasably coupled to platform 10 at its opposite ends is a rubber cable 20 having a predetermined tension strength selected to suit the needs of the particular bowler taking into consideration age, experience and strength. The coupling may be in the form of eye bolts 22 to which the cable may be tied or clipped. A bowling ball 30 is provided having thereon a light source 40, such as a conventional flashlight, and which is capable of emitting a light beam 41 through an opening 37 formed in the forward section of bowling ball 30. Ball 30 is of the same size but lighter than a regulation or standard bowling ball. The cable 20 is used to simulate the weightiness of the ball expected to be used under official conditions and cables having different elasticity may be interchanged.

FIGURES 3 and 4 show ball 30 in greater detail. It is constructed from a pair of substantially hollow hemispheres constituting a leading ball half 32 and a trailing ball half 34 which are mated and secured by screws 31. Ball half 34 is provided with a thumb grip 35 and finger grips 36 enabling the bowler to grasp the ball. Adjustably posi-
tioned inside ball 30 is a light producing source 49 which is shown to be a conventional flashlight. When the flashlight is turned on by way of switch 46, a light beam 41 is emitted in a radial direction from ball 30 through opening 57 formed on the forward face of ball half 32. The opening 37 is of rectangular shape and is large enough whereby the light source may be inserted therethrough and the bowler may reach therethrough to operate the switch.

Flashlight 49 is held in position by way of a clamping assembly designated generally by numeral 50. Clamping assembly 50 is a pair of opposite facing gripping jaws 51 and 52 which may be fabricated from angle bars. The jaws may have rubber strips 56 secured thereto to prevent the flashlight from slipping. Attaching to gripping jaws 52 and 51, respectively, are radially extending bolts 53 and 54 which pass through drilled openings in ball half 32 such that their outward ends project beyond the periphery of the sphere. Bolts 53 and 54 also pass through eight portions of U-shaped mounting plates 38 and 39 which are screwed firmly to ball half 34. At the outer end of bolt 53 a washer 60 is placed over the bolt and secured in place by a cotter pin 61. Positioned between jaw 51 and the inner end of mounting plate 38 is a spring 62 which biases jaw 51 against casing 42. The bolt 54, which is secured to the gripping jaw 52 has a washer 57 thereon. The cotter pin 59 extends through the bolt 54 to prevent movement of the bolt 54 and clamp 52 radially outward through the clamp 59. The knurled nut 60 is threaded on the end of bolt 54 and upon being tightened down against the ball 30 will frictionally secure the bolt 54 against rotation about its axis. Flashlight 40 can be swung through any predetermined arc and clamped in position for use by accomplished or professional bowlers who intend to put "action" on the ball. This is more fully explained below.

Positioned at the base of ball 30 is a yoke 72 which is swivelly mounted to ball half 34 by way of rotatable bolt 76. Positioned between the arms of yoke 72 is a pulley 74 held therebetween by a conventional pin connection 75. The yoke 72 and pulley 74 define a guideway 80 through which passes cable 20. The movement of pulley 74, and therefore ball 30, is confined to a path along cable 20.

Spaced a sufficient distance from platform 10 is a target 60 (FIGURES 1 and 2) having a horizontal baseboard 64 and a vertical backboard 62. As shown by an embodiment of the target in FIGURES 1 and 2, the backboard 62 includes a series of horizontally arranged, equally spaced, light responsive elements 65, 67 hereinafter referred to as spots. These spots are spaced in the same manner as the "spots" on a regulation bowling alley, the spots may be typical light reflectors or may be light responsive photocells adapted to activate a signal, such as a bell or buzzer. The purpose of the spots is to produce visible signals for the bowler enabling him to check the straightness or accuracy of his delivery. To assist the bowler in evaluating the accuracy of his backswing and delivery swing prior to that point at which he would ordinarily release the ball, a straight line guide tape or stick 12 is provided between the end couplings 22 for cable 20 and a centrally positioned spot 67.

FIGURE 5 shows another embodiment of the target 60 with spots 66', 67' aligned in a horizontal plane across the forward section of baseboard 64. It is to be understood that the arrangement of spots may be placed on both the baseboard and the backboard to further assist the bowler in studying and improving his game. A series of vertically extending spaced lines 68 are marked or otherwise placed on backboard 62 to assist the bowler in studying the style of his swing. These lines may be used alone or in conjunction with the spots on the baseboard or backboard or both, in which case the lines would be aligned with the spots.

Assuming that a beginning bowler, for example, has set up the practice bowling device as described above in his home with a cable 20 selected to suit his individual needs, then the device is fully prepared to be used. Standing on platform 10 and holding the ball with flashlight 49 switched on so as to produce light beam 41, the bowler is prepared to simulate the bowling motions of an actual bowling game. With the eyes fixed straight ahead, the bowler begins his approach toward the font line with the feet lined up for the delivery motion. While the bowler continues the necessary approach steps, the ball is swung rearwardly through a pendulum shaped arc which is often popularly known as the backswing. It is important to a skillful game that the ball pass through a vertical plane during the backswing motion. Due to the attitude of ball 30 during the backswing, light beam 41 will be aimed downwardly in the direction of guide tape 12. Should faults prevail in the backswing, the bowler is made aware of this because light beam 41 will not strike guide tape 12. The amount of the error that must be corrected will be proportional to the distance light beam 41 is observed to strike from guide tape 12.

During the delivery motion, it is highly desirable that the bowler's arm swing describe an arc falling in a vertical plane to ensure that when the ball is released, it will follow a line falling in a straight path. If light beam 41 is observed to travel along guide tape 12, then the bowler's swing is accurate. If light beam 41 falls to one side of guide tape 12, then the bowler is made aware that this phase of his bowling style needs to be corrected. As ball 20 nears the point at which, under actual bowling conditions, it would have been released, light beam 41 impinges upon one of the spots 66. If as shown in FIGURE 5 the spots are arranged along the baseboard 64, a visible signal will be given earlier than if the spots are arranged as shown in FIGURES 1 and 2. In either case or in the case where target 60 includes both arrangements of spots, the straightness with which the ball would have been released will be indicated by the spots. If the bowler's style was perfect, then central spot 67 would be impinged by light beam 41 and such could be observed by the bowler. If there has been a fault in the bowler's delivery, then the degree of fault would be proportional to the distance by which light beam 41 strays to either side of spot 67.

A good follow-through motion is usually the result of a good release. Conversely, when the bowler's follow-through motion is faulty, this probably indicates that the release was not properly executed. The bowler by tracing the path of light 41 in regard to vertical lines 68 on backboard 62 can learn whether or not this phase of his style requires improvement.

Thus, by observing the movement of light beam 41, with regard to guide tape 12 and target 60, the bowler is able to pin-point any errors in his style which are impairing the quality of his overall efficiency. To attain a steady high scoring game, the bowler must develop a graceful reliable style. The bowling device of this invention enables the bowler to achieve this graceful style in his leisure time and at a low expense.

Accomplished bowlers frequently have a variety of delivery motions enabling them to put "action" on the ball. In rolling a ball with curve or hook action, the bowler holds the ball with his thumb in a different position from that when the ball is to roll in a straight path throughout the entire length of the lane. These bowlers can loosen adjusting knob 58 and rotate flashlight 40 to a different clamped position such that light beam 41 is directed in a straight line with spot 67 at the point when the ball would be ordinarily released. For example, in tossing a straight ball, the thumb position is approximately on the top of the ball at 12 o'clock as viewed from above. In contrast, a hook ball is released with the thumb at 10 o'clock while the curved ball is thrown with the thumb position at 9 o'clock. Under these circumstances, it can be seen that the bowling device of this invention can still be accurately used by forcing the light beam to be swung through the necessary arc.
The swivel mounting of ball 30 with regard to the pulley 74 and yoke 72 assembly allows the bowler to practice the necessary wrist action in perfecting his game.

FIGURES 6 and 7 are directed to a modified form of the target which will enable the bowler to achieve the effect of different approaches while in fact the bowler uses only one actual approach. The target 82 is comprised of an elongated slab of material, such as plywood or the like, shaped as a trapezoid with the side edges tapering toward the top of the board. This tapered construction is necessary to give the proper perspective of distance which a bowler would perceive when looking the length of a regulation bowling alley. At the narrow end of the board or target 82 a plurality of circles 84 may be painted or otherwise placed upon the board and numbered to represent the ten bowling pins which are arranged at the end of a bowling alley. A plurality of diamond-shaped markers are also placed on the board or target 82 at a distance approximately one-third the length of the board from the end of the board opposite the bowling pin markers. These diamond-shaped markers, designated 91, 92, 93 and 94, are arranged in a V-shaped configuration with the marker 91 located at the apex of the V and centered between the sides of the target. These and other arrangements, which would otherwise appear on a regulation bowling alley, guides for the "spoil bowler." Holes 96 through 100 are formed in the center of the markers 91 through 93, respectively, for the purpose of pivotally mounting the board on a support structure.

The support structure is comprised of a base member 102 of generally rectangular configuration which is adapted to be placed upon the floor. This base member corresponds to the base member 64 shown in FIGURE 5. Secured to the board or base member 102 is a pair of upward standing vertical support members 104 and 106 which are arranged in spaced, parallel relationship to each other. These vertical support members 104 and 106 may be secured to the base member by any convenient means, preferably of the type which would enable the parts to be disassembled for storage purposes. The uppermost ends of the support members 104 and 106 are secured together by means of a bolt 108 extending through openings in each of the support members 104 and 106 and a wing nut 110 threaded thereon. A tubular sleeve 112 may be provided about the bolt 108 to space the vertical members 104 and 106. A second bolt 114 extends through the vertical support members 104 and 106 at approximately one-fourth the distance from the base member 102. The bolt 114 also extends through one of the holes 96 through 100 in the target member 82. A wing nut 116 is threaded on the end of the bolt 114 to hold the target and support members in proper assembled relationship. A pair of washers 118 may be placed on the bolt 114 between the target member 82 and the support members 104 and 106 to space the target member from the support member. Upon loosening of the wing nut 116, the target may be pivoted about the bolt 114 to any desired position and the wing nut subsequently tightened to clamp and hold the target in said desired position.

The vertical support member 106 is shaped as an elongated rectangle from the base 102 to the vicinity of the nut and bolt arrangement 114 and 116. From this nut and bolt arrangement to the vicinity of the head pin, the vertical support member 106 is shaped substantially as a right triangle with the vertical edge of the triangle formed along the support member 106 and the head pin and the diamond marker 91. The hypotenuse of the triangle may be straight as indicated by the edge 120 shown in solid lines. Alternatively, the edge of the hypotenuse may be slightly curved as shown by the dotted line 122 which would indicate the path a ball would travel if a "hook" was thrown by the bowler.

The main object of this target is to give the trainee the feeling that he or she is looking down the alley of a regulation bowling alley and even though using the same approach, the illusion achieved by changing the angular position of the target which represents the bowling alley is that the trainee is actually in a different starting position for his approach. Not all bowlers use the same approach and a bowler would ordinarily use any one of the four diamond-shape markers as his strike line. Therefore, the board may be pivoted through any one of the holes 96 through 100 depending upon the particular style of the bowler using the training device. If a person bows straight down the middle, the target will be arranged as shown in FIGURE 6 with the target 82 pivoted through the hole 96. Whenever anyone bows from left or right of center, the imaginary foul line formed at the base of the target 82 would be angularly disposed, but this will not affect the use of the trainer since the base 102 is the foul line at all times no matter what position the alley is disposed in.

The support member 106 has a pair of stripes 124 and 126 painted thereon of a different color than the color of the target 82. The area of the support member 106 between the stripes 124 and 126 is the same as the color of the target 82. These stripes are used as indicators which show the proper path the ball should follow, and if the light beam from the light source of the training ball follows the desired stripes along its entire length, the bowler will know that his approach was correct and that the ball would hit the pins in the desired location.

The base of the target may be provided with a plurality of markers or raised indicators 128 similar to the markers 91 and 97 shown in FIGURE 5.

Obviously, many modifications and variations of the present invention are possible in the light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. A bowling device comprising: a base member, first guide means secured to said base member, a bowling ball, complementary guide means secured to said ball and adapted to cooperate with said first guide means to guide said ball relative to said base member, and light source means secured to said ball and adapted to provide a relatively narrow light beam to indicate the angular orientation and path of travel of said ball relative to said base member, a target member adapted to intercept the light from said light means as the bowling ball relative to said base member, target member including a horizontal support member, a vertically disposed panel member secured to said support member, indicating means on said support member and panel member and a narrow elongated guide strip extending from said base member to said support member.

2. A bowling device as set forth in claim 1 wherein said indicating means are comprised of a plurality of parallel vertically directed lines on said panel member and a plurality of light responsive indicating elements equally spaced and arranged in a horizontal row.

3. A bowling device according to claim 1 wherein said first guide means is comprised of a flexible resilient cable attached at its opposite ends to said base member.

4. A bowling device according to claim 3 wherein said complementary guide means is comprised of a pulley assembly rotatably secured to the base of said bowling ball with said cable running over said pulley member between the pulley and said ball to restrain said ball for movement along the length of said cable.

5. A bowling device comprising: a base member, first guide means secured to said base member, a bowling ball, complementary guide means secured to said ball and adapted to cooperate with said first guide means to guide said ball relative to said base member, and light source means secured to said ball and adapted to provide a relatively narrow light beam to indicate the angular orientation and path of travel of said ball relative to said base member, said ball being constructed from a pair of hol-
low hemispherical sections detachably secured together and having a pair of adjustably mounted jaws secured therein to clamp said light source means in position and an opening through one of said hemispherical sections whereby the light emitted by said light source means may pass therethrough.

6. A bowling device according to claim 2 wherein said first guide means is comprised of a flexible resilient cable attached at its opposite ends to said base member and said base member is so dimensioned as to enable the bowler to use it as a platform in making his simulated approach to a foul line, said cable, said guide strip and the central most of said parallel lines on said target means are arranged in a straight line.

7. A bowling device as set forth in claim 1 wherein said target member further includes a vertical support member secured to said horizontal support member and extending upwardly therefrom and wherein said vertically disposed panel member is pivotally secured on said vertical support member intermediate the ends of said panel member, means for securing said panel member in any one of a plurality of adjusted positions, and indicating means on said vertical support member and said panel member to indicate the correct path the light from said light means should follow.

8. A bowling device as claimed in claim 7 wherein said panel member is provided with a plurality of openings therein to provide a plurality of pivot points about which the panel may pivot relative to said vertical support member.

9. A bowling device as claimed in claim 7 further comprising additional indicating means on said horizontal support member and a narrow elongated guide strip extending from said base member to said horizontal support member.

10. A bowling device comprising a bowling ball having finger grip holes therein, light source means secured to said ball substantially opposite said finger grip holes and adapted to provide a relatively narrow light beam to indicate the angular orientation and path of travel of said ball, a target member adapted to intercept the light from said light source means including a horizontal support member, a vertically disposed panel member secured to said horizontal support member, a first plurality of light responsive indicating elements being equally spaced and arranged in a horizontal row on said horizontal support member and a second plurality of light responsive indicating means equally spaced and arranged in a horizontal row on said vertical panel member, said first and second indicating means being so related to each other that as said light beam traverses said rows of indicating elements, an indication of the proposed line of travel of the bowling ball will be provided.

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EUGENE R. CAPOZIO, Primary Examiner.
H. S. SKOGQUIST, Assistant Examiner.