

E. LEE.
BOWLING ALLEY.
APPLICATION FILED JULY 24, 1909.

974,400.

Patented Nov. 1, 1910.

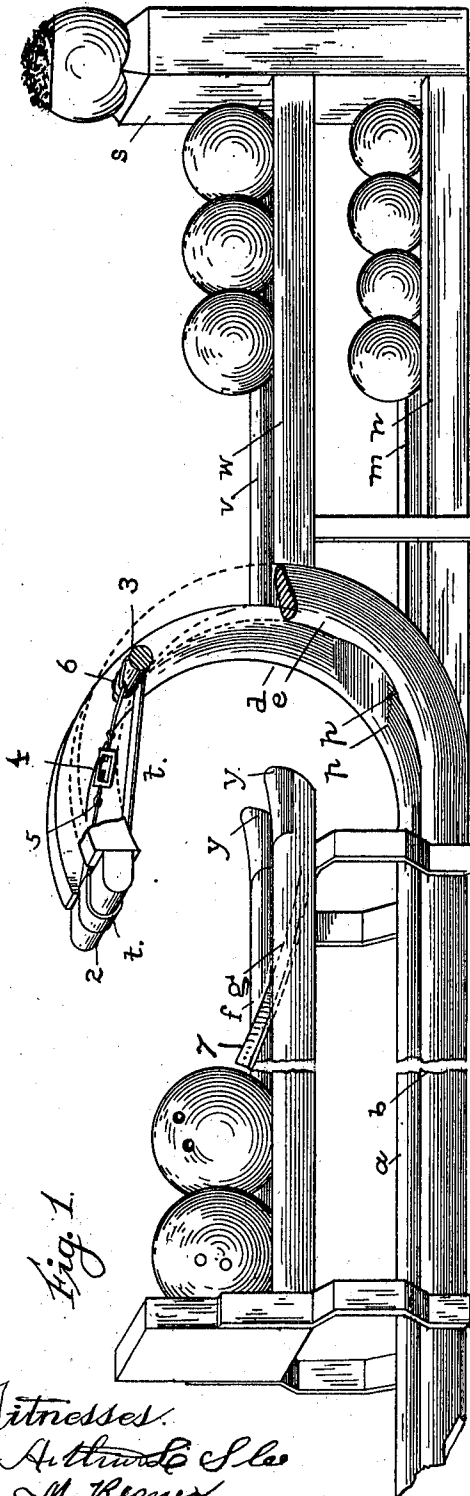


Fig. 1.

Witnesses:
Arthur S. Lee
M. Regner

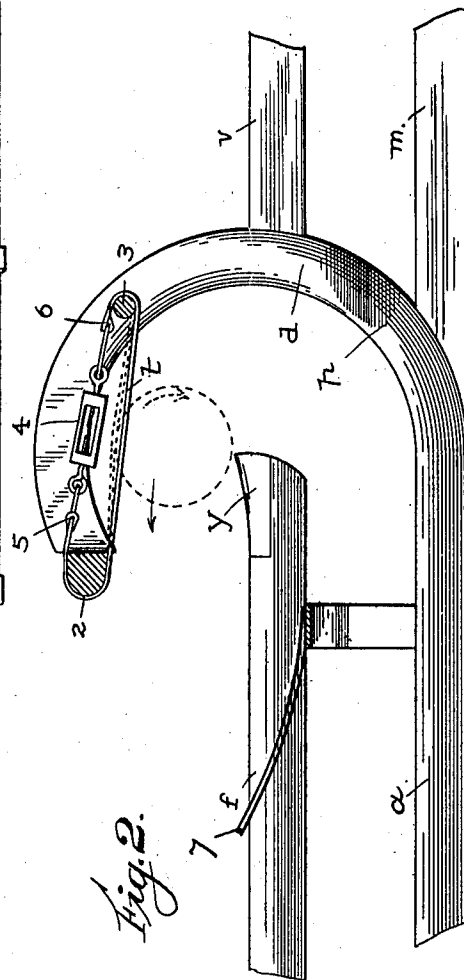


Fig. 2.

Inventor.
Eugene Lee
By E. E. Osborn
his Attorney

UNITED STATES PATENT OFFICE.

EUGENE LEE, OF SAN FRANCISCO, CALIFORNIA.

BOWLING-ALLEY.

974,400.

Specification of Letters Patent.

Patented Nov. 1, 1910.

Application filed July 24, 1909. Serial No. 509,378.

To all whom it may concern:

Be it known that I, EUGENE LEE, a citizen of the United States, and a resident of the city and county of San Francisco, State of California, have invented new and useful Improvements in Bowling-Alleys, of which the following is a specification.

This invention relates to improvements in the means or apparatus provided in a bowling alley for returning the balls by gravity from the pin setting end of the alley to the position from which the balls are bowled.

The object of the invention is to provide means by which the speed of the balls at the end of the return run from the pit to the players' position will be checked and the balls brought under such control that they will come to a state of rest by contact with each other without striking with such force as to chip or injure the surface of the ball around the finger holes.

A further object, is to provide means by which balls of different sizes are automatically separated according to their respective sizes and are assembled or brought together in position within reach of the player behind the balk line.

A further object is to provide ball racks for collecting and holding the balls according to their sizes and means for separating and delivering the balls thereto and for so checking their speed at the end of the return run that they are brought to a state of rest without shock or forcible contact one against another.

A further object is to provide means for preventing recoil of a ball at the time of its delivery on the rack when it strikes the ball previously delivered to the rack.

These and other objects pertinent to the invention I attain and secure in and by the construction, combination and arrangement of parts as hereinafter explained.

The accompanying drawing illustrates the receiving end of a return runway and ball controlling apparatus of my invention; the opposite end of the alley where the pins are set and from which the balls are started on their return being omitted from the drawing.

Figure 1 of the drawing represents in perspective the receiving end or station where the balls in their return run are brought to rest and in position to be taken by the players; a portion of one of the curved guide rails being broken away to disclose

the parts situated behind it. Fig. 2 is a side elevation of the inner one of the curved guide rails and the rack in front on which the large balls are delivered from the re- turn end of the curved guide rails.

The runway for the principal portion of its length and at the ends, is of the usual construction—being composed of two fixed rails *a—b* laid from the pin setting end back to the players' station, with a sufficient pitch or grade to keep the balls in motion after they leave the incline at the head of the runway. The opposite or delivery ends of the rails where the balls leave the runway terminate in curved portions *d—e* that rise vertically or in the same plane with the straight portion in a circle or curve regularly increasing in pitch or upward inclination that brings the terminal ends of the two rails over the point where the balls leave the straight track for the upwardly inclined path. Sufficient room or space vertically is provided between that point and the curved overhanging ends of the rails to afford head room for the large balls to pass under the stationary receiving rack *f g* which is supported clear of the rails *a—b* and is also situated at a sufficient distance below the curved end of the track to receive the balls as they leave the track and allow them to clear the overhanging end. On this stationary rack the balls as they leave the curved end of the runway are brought to a state of rest by coming in contact one with the other, and by virtue also of their velocity being expended in their final run or travel up the constantly increasing inclined path, and the direction of their travel being reversed thereby. A novel part or feature of my invention in connection with this part of a bowling alley runway consists in extending the rails *a—b* of the straight track beyond the return curved rails *d—e* in a relatively short track *m n* and in cutting away the rails *a—b* or otherwise so shaping their inner faces at points *p* directly opposite to each other as to increase the opening between the curved rails sufficiently to let the "duck balls," or small balls, pass between the curved rails and continue their run in the same straight path instead of being carried up and on to the receiving rail *f g* with the large balls. At this point where the large balls leave the straight track they are separated from the small balls, while the latter continue their

run and are brought to rest on the extension $m\ n$ which terminates at the post s . As the momentum of the small balls is more easily checked than that of the larger and heavier balls, they are readily controlled and brought to rest by placing or arranging in the straight track an obstruction in the form of a bumper or an abrupt rise at or in front of the opening p where it can be placed without affecting the large balls, but it will momentarily arrest or check the travel of the small balls sufficiently to cause them to complete the run on the track m and gradually come to rest one against the other.

Between the rails of the curved track and the post s a brace composed of two rails $v\text{---}w$ over the rack m forms a support for the curved rails $d\text{---}e$ and a receptacle for the large balls that are not in active use—to which end the rails $v\text{---}w$ are fixed at suitable distance above the rack $m\ n$ to afford a clear runway for the small balls beneath it. This storage rack for the large balls being on a level with the receiving rack $f\text{---}g$ in front and conveniently near it, permits the large balls to be readily transferred from one to the other, according as they may be brought in use or placed in the storage rack out of use for the time.

A novel feature in that part of the return runway where the large balls and small balls are separated, consists in means for checking the speed of the balls by producing a more or less abrupt change in the direction of the ball while it is still traveling under the centrifugal force and is under control of the curved rails, with the result that the balls are delivered on to the receiving rack without liability of rebounding by impact with the previously deposited ball. As embodied in the present construction such means comprises a strap t of flexible material stretched from a point of attachment 2 near the terminal of the curved ball track to a point 3 below, as shown in Fig. 2, so that the strap stretched between those points will cut or intercept the curved path to which the ball is confined by the rails on a straight line, corresponding to the chord of the arc included between the two points 2—3. By virtue of its angular position, and also of its somewhat resilient quality—it being made of leather or some material sufficiently flexible and somewhat elastic when under tension—this strap deflects or changes the further course of the balls in a direction more nearly in a straight line over the rack below—and also checks and gradually overcomes the momentum of the balls to such a degree that their velocity will be only sufficient to carry them forward over the tail end of the track and from which point gravity and the resiliency of the strap deflects the balls more or less perpendicularly down-

ward on to the track. By varying the tension of the strap t the impact of the ball with the rails of the rack can be regulated and rendered quite noiseless, to which end and for the purpose, also, of effectively preventing injury to the balls, the rails of the rack are provided with cushioned ends y . Pads or facings of elastic or semi-elastic material such as rubber, raw-hide or leather are fixed on the ends of the rails to take the impact of the balls. The ends are usually turned up or inclined rearwardly as seen in Fig. 2, to arrest the backward movement of the ball in case it should strike the ball ahead of it and acquire sufficient backward movement to roll off the end of the rack. As embodied in the present construction the means for keeping the check t in tension and varying the same as conditions require, consists in a turn-buckle 4 to which the ends 5—6 of the strap after being passed around the bars 2—3 are attached from opposite sides, the turn-buckle being so placed that it is accessible from above through the space between the rails. The two points 2—3 are so placed with relation to each other to elevate the rear end of the strap slightly above the front end, and thereby hold the strap inclined at the front downwardly, or toward the rack. The effect of this is to secure an increased resistance to the movement of the belt and which will be the greatest at the end of the deflection.

To check the recoil of the ball when it may strike the ball which is at rest in front of it on the receiving rack $f\text{---}g$ I place a spring tongue or strip 7 in the space between the two rails $f\text{---}g$ in such position and with its free end standing in the path of the ball that it will yield and allow the ball to ride easily over it without being derailed, but at other times the end of the yielding strip standing directly in the path of the ball will offer a rigid stop or check to the recoil, and will stop further backward or return movement of the ball.

I claim:—

1. In a bowling alley, the combination with a return-way having an upwardly and forwardly curved terminal loop, of a ball rack having the receiving end situated within the loop, and means for controlling the delivery of the balls to the rack, comprising a strap held under tension across the curvilinear path of the balls and means for regulating the tension of the strap.

2. In a bowling alley the combination with the return runway, of a terminal loop springing from the runway in an upward and forward curve and composed of parallel rails having a space or opening of sufficient size to let the small balls pass between the rails and to catch and control the large balls, a runway for the small balls situated behind the loop, means on the main runway

at the point of separation where the large balls take the rails of the loop for checking the speed of the small balls, and means for reducing the speed of the large balls comprising the check strap and means for regulating the tension of the strap.

3. In a bowling alley, the single return-way for large and small balls having an upwardly and forwardly curved terminal loop composed of parallel rails having an opening between them of less dimensions than the diameter of the large balls but through which the small balls can pass, a receiving rack for the small balls in line with said opening and extending behind the loop, a receiving rack for the large balls situated over the main runway and extending forward from the loop, and means for controlling the speed of the large balls in their run within the loop, comprising the check strap arranged to intercept the curvilinear path of the balls at an angle and means for maintaining tension on the strap.

4. In a bowling alley, the combination with a return-way having an upwardly and forwardly curved terminal loop, of a receiving rack having one end situated within said loop and extending forwardly therefrom, a cushioning device on the end of said rack, and means on the loop for variably controlling the speed and the direction of travel of the balls from a curvilinear path to one more nearly parallel with the plane of the receiving rack.

5. In a bowling alley, a return-way having an upwardly and forwardly curved terminal loop, a receiving-rack having one end situated within the loop, and means within the field inclosed by the loop operating to abruptly change the direction of travel of the balls as controlled by the loop.

6. In a bowling alley, a return-way having a forwardly curved terminal loop, of a receiving rack having one end situated in the space inclosed by the loop, and means within the loop adapted to abruptly change the course of the ball from a curvilinear into a rectilinear direction while under the control of the loop.

7. In a bowling alley, a return-way having a forwardly curved terminal-loop, of a receiving rack having one end situated in the space inclosed by the loop, means between said rack and the loop adapted to abruptly change the direction of the ball by impact therewith, and means in the path of the balls for checking their recoil after being deposited on the rack.

8. In a bowling alley, the combination with a return-way for the large and small balls, of the upwardly and forwardly curved terminal loop adapted to separate the large balls and raise them to a higher level by changing their course from a straight to a curvilinear path, a receiving rack having one end situated within the loop, a device within the loop adapted to check the speed of the ball by frictional contact therewith, and means for varying such frictional contact.

9. In a bowling alley, the combination of the return-way having an upwardly and forwardly curved terminal loop, a receiving rack having one end situated within the loop, means within the loop adapted to variably check the speed of the ball by frictional contact therewith, and the recoil check on the receiving rack.

EUGENE LEE.

Witnesses:

M. REGNER,
E. E. OSBORN.