Nov. 2, 1954 R. I. ANDERSON 2,693,359

BOWLING BALL RETARDER

Filed July 25, 1951 2 Sheets-Sheet 1

Fig. 1.

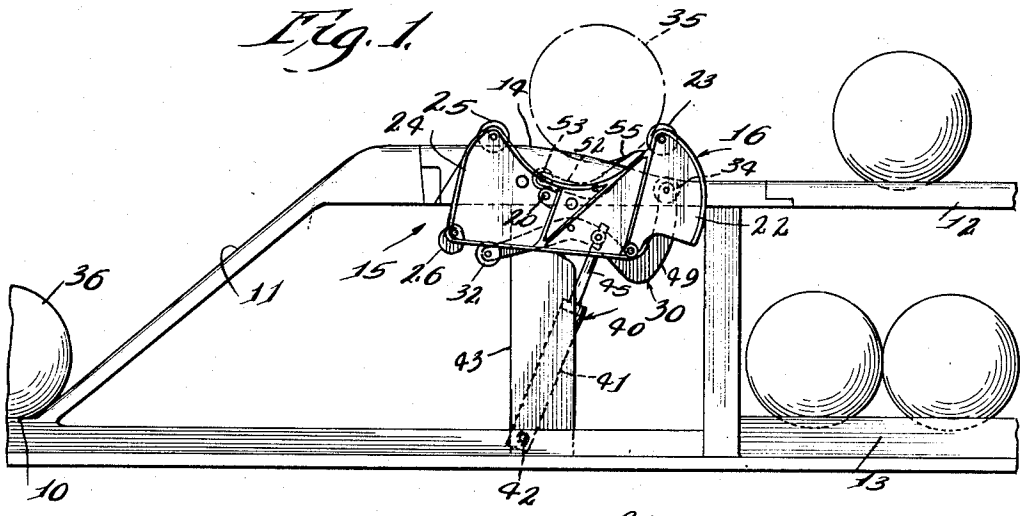
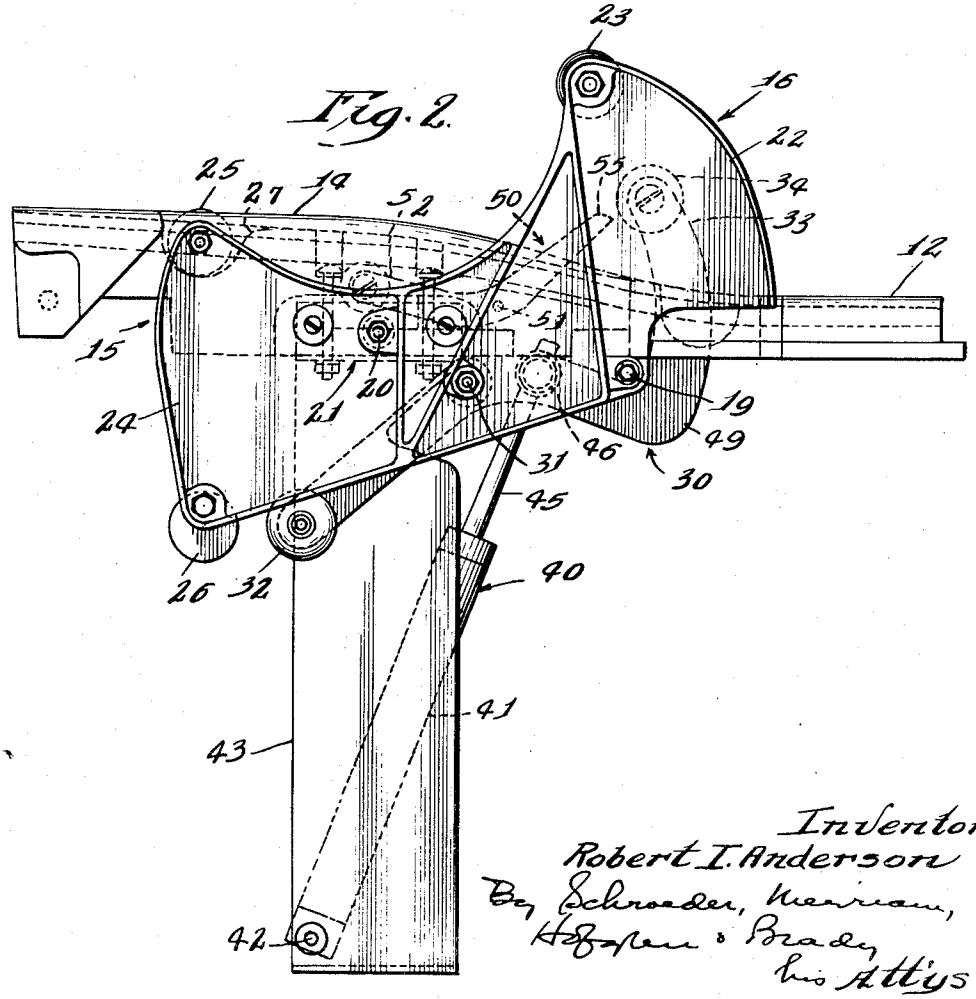


Fig. 2.



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Fig. 3.

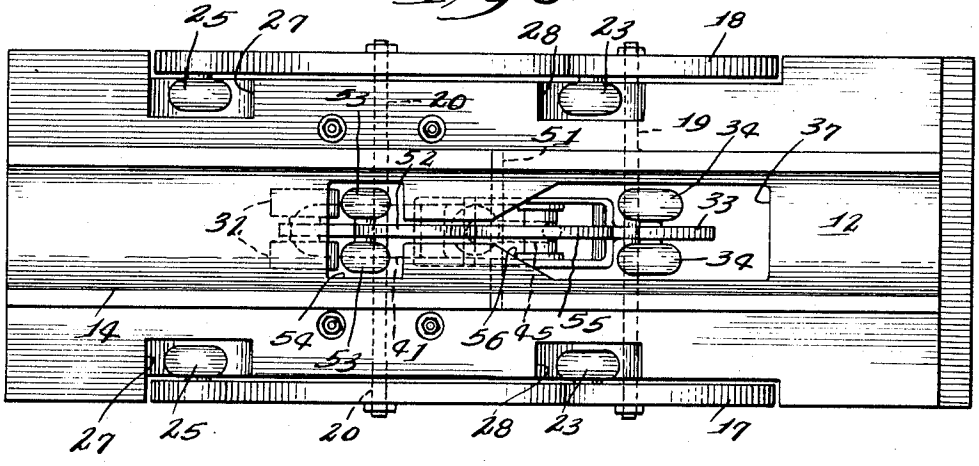
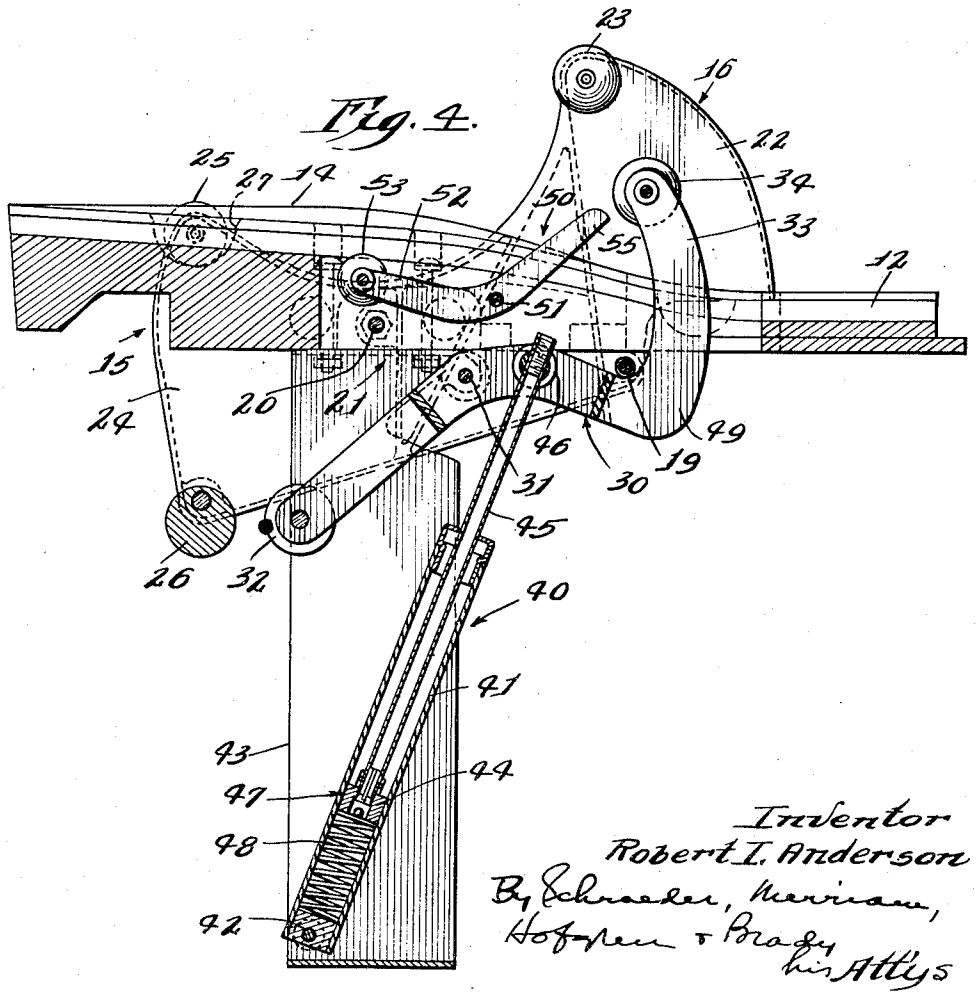


Fig. 4.



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BOWLING BALL RETARDER

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6 Claims. (Cl. 273—47)

This invention relates to a ball retarder and more particularly to a ball retarder capable of intercepting and then subsequently releasing bowling balls of various sizes.

It is the general object of this invention to produce a new and improved ball retarder.

It is common in bowling alleys to provide a single main return track for bowling balls which serves two adjacent alleys. Accordingly it is not unusual to have two bowling balls returned simultaneously along the track, one closely following the other. While it is customary to provide some sort of ball retarder on the ball storage rack to reduce the velocity of a returned ball to practically zero before permitting it to enter the storage rack, such devices normally are designed to retard only a single ball; and should a ball in such a device be struck by a closely following ball, the first ball is projected with some force into the storage rack, giving rise to the possibility of injury to players who might at that moment be selecting a ball from the rack.

Accordingly it is a more specific object of this invention to produce a ball retarder capable of retarding all of a plurality of balls following each other in close sequence along a return track, and thus preventing the possibility of any ball in the retarder being projected onto the storage rack in a manner to cause injury.

The normal bowling alley is quite adaptable for use in playing tenpins, fivepins or duckpins. Inasmuch as the balls used for various bowling games are of unequal size, those for tenpins being the largest and those for duckpins being smaller, it often occurs that returned balls are either of the large size, the small size or of mixed sizes. This creates the additional problem of providing a device not only capable of retarding a plurality of balls but also capable of handling balls of both the large and the small size in any sequence.

It is therefore another object of this invention to produce a ball retarding device which is capable of retarding a plurality of balls of both the large and small size, and in all cases serving to prevent collision between retarded balls in such a manner as to propel any ball with force onto the storage rack.

Another object of the invention is to produce a ball retarder which is provided with a pivotally mounted cradle carrying means at each end for intercepting a large ball, with the means at the rear end of the cradle being normally located in intercepting position relative to a large ball traveling from the return track to the storage rack and the cradle being pivotable under the weight of the ball retarded by the rear intercepting means to a position raising the front intercepting means into blocking or intercepting relationship to a following large ball traveling along the track, the device including additional means for retarding a small ball together with means moved upon the retardation of a small ball into intercepting relationship to a following small ball and also a following large ball.

Yet another object of the invention is to produce a ball retarding device of the type described in the preceding paragraph which includes a small-ball stop arm normally positioned in intercepting relationship to the track to intercept a small ball in combination with a rocker arm having means for intercepting a following large or small ball and moved by the interception of a small ball into intercepting relationship to a following ball.

A further object of the invention is to produce a ball retarding device as described in the preceding paragraphs having means biasing the cradle and the small-ball stop arm toward their normal position in which the intercepting means on the small-ball stop arm and the intercepting means on the rear portion of the cradle are both located in intercepting position relative to balls moving along the track, together with means dampening movement of the small-ball stop arm and the cradle out of their normal positions under the influence of a ball intercepted thereby.

Other and further objects of the invention will be readily apparent from the following description and drawings, in which:

Figure 1 is a side elevation showing the ball retarder of this invention as installed in a bowling alley return track; Figure 2 is an enlarged detailed view of the retarder shown in Figure 1; Figure 3 is a top plan view of the retarder of Figure 2; and Figure 4 is a vertical section through substantially the center of the retarder shown in Figure 3.

While this invention is susceptible of embodiment in many different forms, there is shown in the drawings and will herein be described in detail one specific embodiment, with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiment illustrated. The scope of the invention will be pointed out in the appended claims.

Referring now to the drawings, there is shown a portion of the inclined return track **10** along which returned balls travel, the return track terminating at a portion **11** sharply inclined upwardly so as to decrease the speed of a returned ball. The track terminates in a main storage rack **12**, upon which balls roll after passing through the retarding device, and beneath the main storage rack is a secondary storage rack **13** upon which additional balls may be stored. Connecting the portion **11** of the track with the storage rack **12** is a portion **14** inclined gently downwardly to impart sufficient energy to a ball thereon to enable it to pass through the retarding device, generally indicated at **15**, of this invention.

The retarder includes a cradle **16** comprising two side plates **17** and **18** secured together by rods **19** and **20**. Bracket members, generally indicated at **21**, rotatably carry the rod **20** so as to provide for a pivotal mounting for the cradle about the rod **20** as its axis. The rear portion **22** of the cradle is provided with means for intercepting and retarding a large ball rolling along the track portion **14**, the means taking the form of a pair of resilient rollers **23** secured near the top of the rear portion **22**. The front portion **24** of the cradle is also provided with intercepting and blocking means for a large ball taking the form of a second pair of resilient rollers **25** secured near the top of that portion. At the bottom of the front portion there is located a counterweight **26** which is normally sufficient to rock the cradle about the axis **20** to its normal operating position illustrated in Figures 2 and 4. In the normal position the rollers **23** are located in intercepting relationship with regard to a large bowling ball rolling along the track **14**, while the rollers **25** on the front portion are located in recesses **27** in the track and out of intercepting position to permit a ball freely to pass thereover. A second pair of recesses **28** is provided in the track to receive the rollers **23** when the cradle is pivoted about its axis to release a large ball intercepted thereby.

In order to arrest small balls rolling along the track, there is provided a small-ball stop arm **30** which is pivoted at **31** to the side plates **17** and **18** and carries at one end a counterweight **32** sufficiently heavy to tilt the other end **33** of the stop arm to the normal position shown in Figures 2 and 4 in which resilient rollers **34**, carried by the end **33**, are positioned to intercept a small ball, such as a fivepin ball or duckpin ball, rolling along the track.

It is believed to be clear from the foregoing that should a large ball, such as the ball **35** shown in Figure 1, roll along the track **14**, its progress will be arrested by the intercepting rollers **23** on the cradle to halt the ball. The weight of the ball is sufficient to tilt the cradle about its axis until the rear portion **22** has been rotated to a position where the intercepting rollers **23**

are received in the recesses 28 and no longer serve to arrest progress of the ball, whereupon the ball 35 may roll gently out onto the storage rack 12. Coincidental with the downward movement of the rear portion 22 of the cradle, the front portion 24 is pivoted upwardly to bring the intercepting rollers 25 thereon above the track 14 and in position to intercept a second large ball, such as the ball 36, closely following the ball 35. After the ball 35 has been released, the cradle then rotates to its normal position, releasing the ball 36 from the rollers 25 and permitting it to roll into contact with the rollers 23 whereupon the process of retarding the ball and then releasing it is repeated.

A small ball, following a large ball which is intercepted by the rollers 23, will be intercepted by a rocker arm 50 hereinafter more fully described.

Similarly, a small ball rolling along the track 14, while passing over the rollers 25 and under the rollers 23, is arrested by the rollers 34 on the small-ball stop arm 30 and held thereby until its weight rotates the arm 30 about its pivot to a position where the rollers 34 are received in an opening 37 in the track and no longer interfere with progress of the ball so that it may then roll out upon the storage rack.

In order to dampen movement of the cradle and the stop arm, means are provided which resiliently resist pivotal movement of either of those devices in response to the weight of a ball retarded thereby. In the specific embodiment chosen for illustration, the means for damping movement of those devices is in the form of a dashpot 40 including a cylinder 41 having its lower end pivotally mounted at 42 to a bracing member 43 for the retarding device. Reciprocable within the cylinder 41 is a piston 44 provided with a piston rod 45 pivotally connected at 46 to the small-ball stop arm intermediate the pivot point 31 of that arm and the intercepting rollers 34. The cylinder 41 may be filled with fluid, preferably oil, and the piston is provided with the usual check valve arrangement 47 to permit rapid upward movement of the piston in the cylinder, but to permit only slow downward movement of the piston therein. In order to assist in the upward movement of the piston and to assist in the restoration of both the cradle and the stop arm to their normal positions, a compression spring 48 is located in the lower end of the cylinder and bears against the bottom of the piston 44 therein, constantly urging the piston upwardly within the cylinder.

It will be noted that the stop arm 30 is provided with an angular portion 49, the interior side of which engages the tie rod 19, thus connecting the dashpot arrangement 40 to the cradle 16. Thus, as the rear portion 22 of the cradle is pivoted downwardly under the weight of a large ball, the small-ball stop arm 30 is moved downwardly with it by contact of the tie rod 19 with the inside of the angular portion 49, and thus downward movement of the rear portion 22 of the cradle is dampened by the action of the dashpot. It is, of course, necessary that both the rear portion of the cradle and the stop arm be pivoted downwardly to permit a large ball to pass from the retarding device onto the storage rack 12. It is unnecessary for the rear portion 22 of the cradle to be pivoted in order that a small ball be allowed to pass onto the storage rack, and it will be noted that the small-ball stop arm may pivot downwardly under the influence of a small ball arrested thereby and against the damping action of the dashpot without necessitating or causing simultaneous pivotal movement of the cradle.

In order to prevent a second large or small ball from striking a first small ball held in the retarding device, a rocker arm 50 is provided along the center section of the track 14. The rocker arm is pivoted to the track framework at 51 and is provided with a front portion 52 carrying intercepting means in the form of a pair of rollers 53 normally positioned in a recess 54 formed in the center section of the track. The rear portion 55 of the rocker arm is angularly displaced relative to the front portion so as to extend upwardly through an opening 56 in the track in position to be contacted by a small ball as it is intercepted by the rollers 34 or a large ball as it is intercepted by the rollers 23. Contact of a ball with the portion 55 of the rocker arm rotates the arm about its pivot 51 to raise the rollers 53 above the track and in position to intercept a following ball rolling along the track 14. The rollers 53, being positioned in the center of the track, not only serve to stop a following small ball, but will also arrest a following large ball so as to prevent a ball of any size from striking a small ball which has been intercepted by the small ball intercepting means 34. When a small ball has been released by the intercepting means, the rocker arm 50 is pivoted, by virtue of the heavier weight of the forward portion 52, to its normal position, allowing a following ball to roll rearwardly and be retarded either by the means 23 on the cradle should it be a large ball, or by the means 34 on the stop arm should it be a small ball.

I claim:

1. In a bowling alley structure including a ball return track, a bowling ball retarder for individual balls of different sizes, comprising, a cradle mounted adjacent said track for rotation about a horizontal axis substantially at right angles to the track, said cradle having a rear portion and a front portion on opposite sides of said axis, means on each portion for intercepting a large ball with the means on the rear portion being in intercepting position and the means on the front portion being in non-intercepting position when the cradle is in normal position, a small-ball stop arm mounted for rotation about an axis parallel to the first mentioned axis, means on said arm for intercepting a small ball when the arm is in normal position, means including interengaging parts on the cradle and stop arm and dampening means connected to the stop arm for dampening movement of the cradle when said cradle is engaged by a large ball, means for urging the cradle and the arm into normal position, said last named means being of insufficient strength to hold the cradle or the arm in normal position when a ball has been intercepted thereby, whereby to permit a large ball to rock the cradle about its axis to release the same while simultaneously moving the intercepting means on the front portion into a position to intercept a following large ball, and to permit a small ball to rock the arm about its axis to release the same, and a rocker arm pivotally movable about an axis parallel to the other axes and having an actuating portion at one end thereof normally positioned along the track and just ahead of the intercepting means on said small-ball stop arm to be contacted by a small ball or large ball moving along the track to pivot the other end of the rocker arm from a non-intercepting position to a position to intercept a following large or small ball while the first said ball is substantially simultaneously being intercepted by said small-ball stop arm if a small ball or by the cradle if a large ball.

2. In a bowling alley structure including a ball return track, a bowling ball retarder for individual balls of different sizes, comprising, a cradle mounted adjacent said track for rotation about a horizontal axis substantially at right angles to the track, said cradle having a rear portion and a front portion on opposite sides of said axis, means on each portion for intercepting a large ball with the means on the rear portion being in intercepting position when the cradle is in normal position, a small-ball stop arm mounted for rotation about an axis parallel to the first mentioned axis, means on said arm for intercepting a small ball when the arm is in normal position, means on the rear portion of the cradle for engaging the arm to pivot the arm to non-intercepting position with pivotal movement of the rear portion of the cradle to non-intercepting position, means for dampening movement of the arm away from normal position and also the cradle through said arm engaging means, means for urging the cradle and the arm into normal position, both of said last two named means being of insufficient strength to hold the cradle or the arm in normal position when a ball has been intercepted thereby, whereby to permit a large ball to rock the cradle about its axis to release the same while simultaneously moving the intercepting means on the front portion into a position to intercept a following large ball, and to permit a small ball to rock the arm about its axis to release the same.

3. In a bowling alley structure including a ball return track, a bowling ball retarder for individual balls of different sizes, comprising, a cradle mounted adjacent said track for rotation about a horizontal axis substantially at right angles to the track, said cradle having a rear portion and a front portion on opposite sides of said axis, means on each portion for intercepting a large ball with the means on the rear portion being in intercepting position

when the cradle is in normal position, a small-ball stop arm mounted for rotation about an axis parallel to the first mentioned axis, means on said arm for intercepting a small ball when the arm is in normal position, means on the rear portion of the cradle for engaging the arm to pivot the arm to non-intercepting position with pivotal movement of the rear portion of the cradle to non-intercepting position, a dashpot connected to the stop arm to dampen movement of the cradle and the arm away from normal position, means for urging the cradle and the arm into normal position, said dashpot and said last named means being of insufficient strength to hold the cradle or the arm in normal position when a ball has been intercepted thereby, whereby to permit a large ball to rock the cradle about its axis to release the same while simultaneously moving the intercepting means on the front portion into a position to intercept a following large ball, and to permit a small ball to rock the arm about its axis to release the same.

4. In a bowling alley structure including a ball return track, a bowling ball retarder for individual balls of different sizes, comprising, a cradle mounted adjacent said track for rotation about a horizontal axis substantially at right angles to the track, said cradle having a rear portion and a front portion on opposite sides of said axis, a pair of resilient rollers on each portion for intercepting a large ball with the rollers on the rear portion being in intercepting position and the rollers on the front portion being in non-intercepting position when the cradle is in normal position, a weight on the front portion to bias the cradle toward its normal position, a small-ball stop arm mounted intermediate its ends for rotation about an axis parallel to the first mentioned axis, a pair of resilient rollers mounted on one end of said arm and positioned to intercept a small ball when the stop arm is in normal position, a weight on the other end of the stop arm to bias the arm toward its normal position, means on the rear portion of the cradle for engaging the arm to pivot the arm out of normal position with pivotal movement of the cradle out of normal position, a dashpot connected to the stop arm to dampen movement of the cradle and the stop arm, with the dashpot and the biasing weights being insufficient to hold the cradle or the arm in normal position when a ball has been intercepted thereby, whereby to permit a large ball to rock the cradle about its axis to release the same while simultaneously moving the intercepting means on the front portion into a position to intercept a following large ball, and to permit a small ball to rock the arm about its axis to release the same.

5. In a bowling alley structure including a ball return track, a bowling ball retarder for individual balls of different sizes, comprising, a cradle mounted adjacent said track for rotation about a horizontal axis substantially at right angles to the track, said cradle having a front portion and a rear portion on opposite sides of said axis, a pair of resilient rollers on each portion for intercepting a large ball with the rollers on the rear portion being in intercepting position and the rollers on the front portion being in non-intercepting position when the cradle is in normal position, a weight on the front portion to bias the cradle toward its normal position, a small-ball stop arm mounted intermediate its ends for rotation about an axis parallel to the first mentioned axis, a pair of resilient rollers mounted on one end of said arm and positioned to intercept a small ball when the stop arm is in normal position, a weight on the other end of the stop arm to bias the arm toward its normal position, means on the rear portion of the cradle for engaging the arm to pivot the arm out of normal position with pivotal movement of the cradle out of normal position, a dashpot connected to the stop arm to dampen movement of the cradle and the stop arm, with the dashpot and the biasing weights being insufficient to hold the cradle or the arm in normal position when a ball has been intercepted thereby, whereby to permit a large ball to rock the cradle about its axis to release the same while simultaneously moving the intercepting means on the front portion into a position to intercept a following large ball, and to permit a small ball to rock the arm about its axis to release the same, and a rocker arm mounted intermediate its ends for pivotal movement about an axis parallel to said other axes, said rocker arm having a front portion extending forwardly of its axis and a rear portion extending rearwardly of said axis, with the front portion carrying a roller adapted to intercept a large or small ball and being heavier than the rear portion to pivot the rocker arm to its normal position with the roller on the front portion thereof in non-intercepting position and with the rear portion positioned along the track just ahead of the rollers on the small-ball stop arm to be contacted by a large or small ball moving therealong, such large or small ball serving upon contact with the rear portion of the rocker arm to pivot said rocker arm out of normal position to locate the rollers on the front portion thereof in position to intercept a following large or small ball and such large or small ball serving to maintain the rocker arm out of normal position until release of the small ball by the small-ball stop arm or release of the large ball by the cradle.

6. In a bowling alley structure including a ball return track, a bowling ball retarder for individual balls of different sizes, comprising, a rotatable cradle mounted adjacent the track and having a large-ball retarding portion and a large-ball blocking portion, a rotatable small-ball stop arm pivotally mounted independently of said cradle and adjacent the track for retarding a small ball, said cradle and stop arm being rotatable about parallel axes, means including disengageable parts on the cradle and arm connecting said cradle and arm for movement of said arm with the cradle by engagement of said parts and for movement of said arm independently of said cradle, and means connected to the arm for dampening movement of said arm and cradle.

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