

Feb. 14, 1967

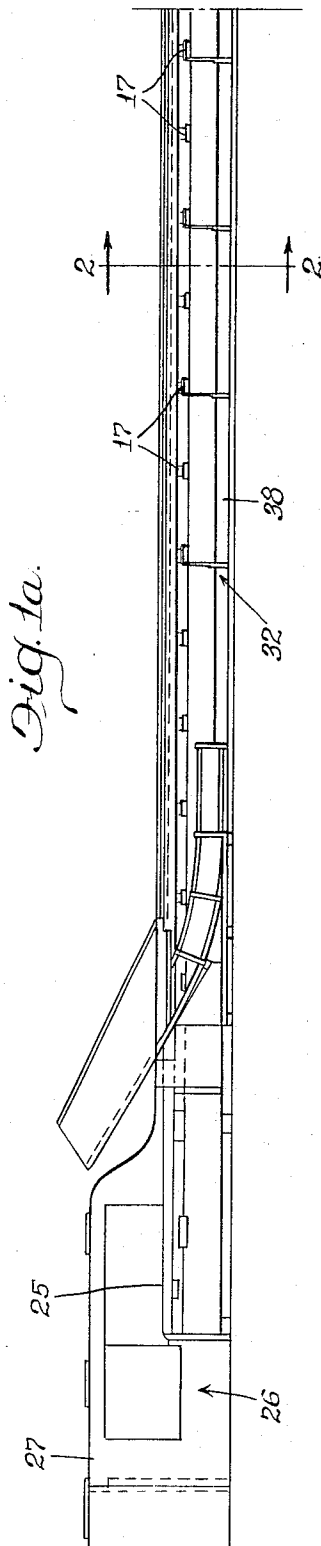
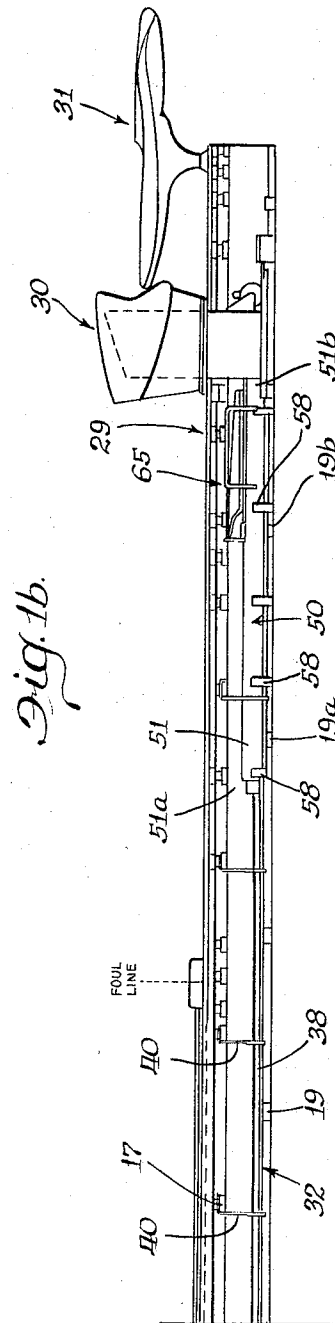
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3,304,087

BALL RETARDER

Filed Jan. 9, 1964

3 Sheets-Sheet 1



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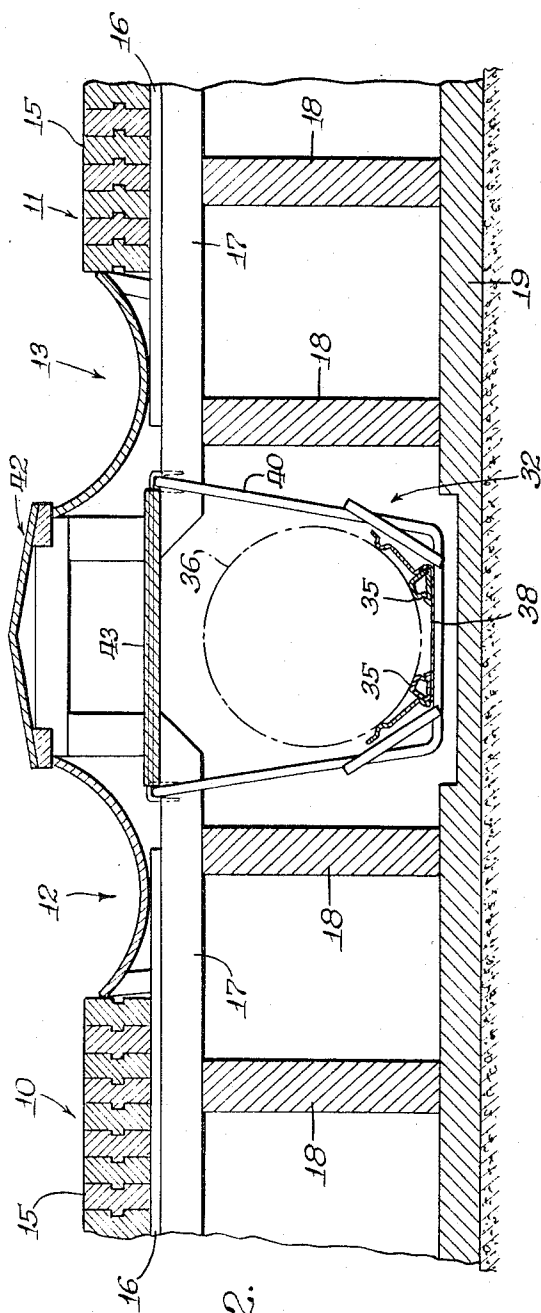


Fig. 2.

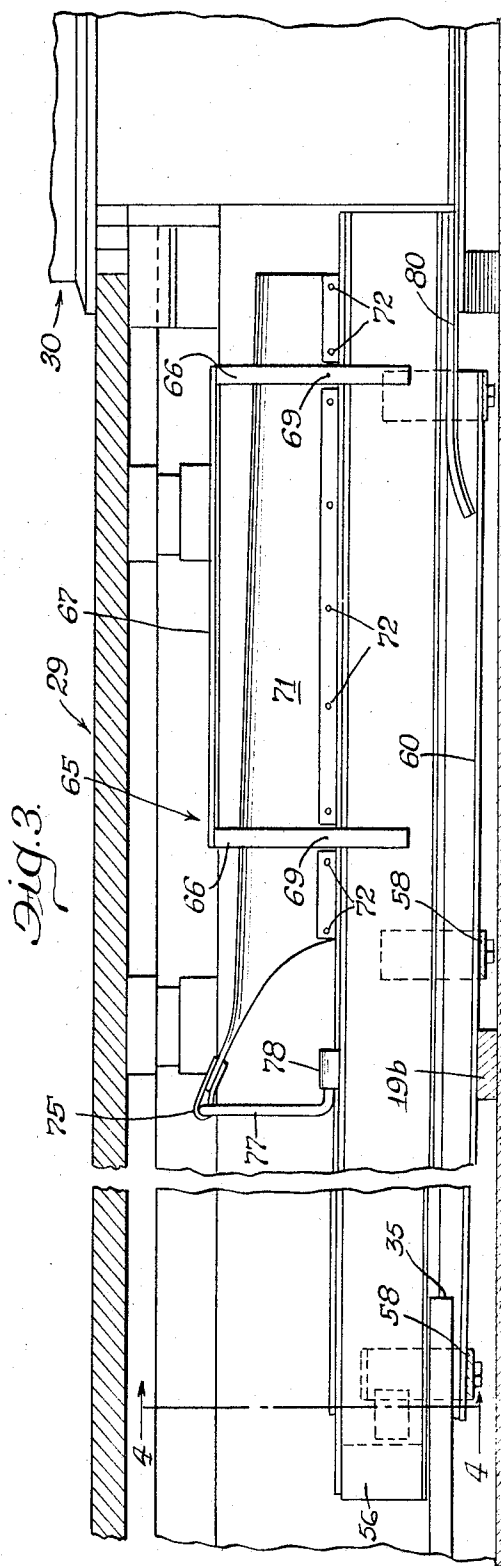


Fig. 3.

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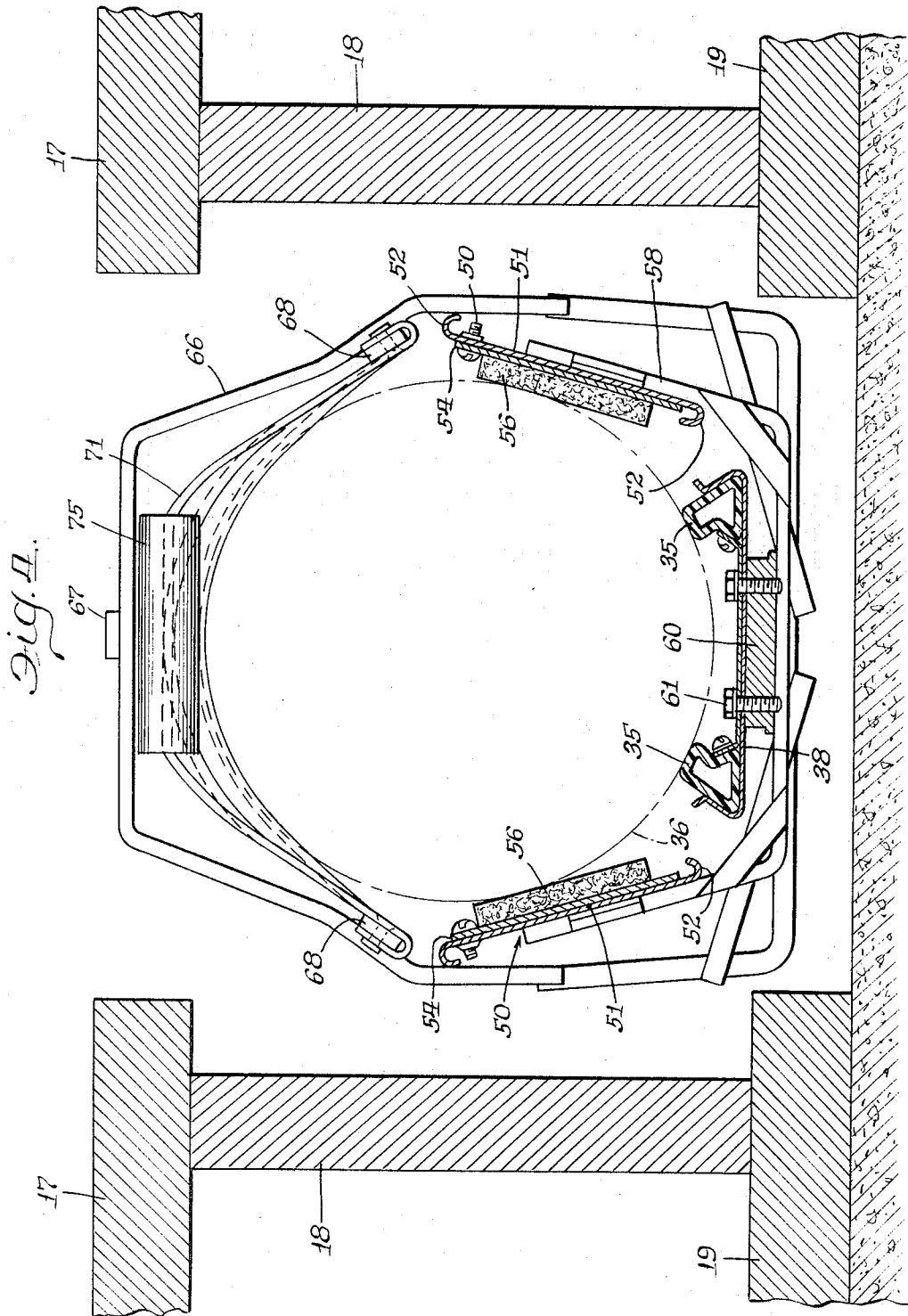
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3,304,087

BALL RETARDER

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6 Claims. (Cl. 273-47)

This invention relates to ball return systems and more particularly to a bowling ball retarder for use in cooperation with a bowling ball return track.

In present-day bowling establishments, it has been found desirable to return the bowling ball from the pit end of a bowling lane to the bowler in the least amount of time possible. Thus, it is the usual custom to accelerate the ball along the ball return track to a rapid return speed. It is, however, desirable that the bowling ball speed be reduced as the ball approaches the ball storage area at the bowler's end of the bowling lane so that there is no danger of injury to bowlers, or to the bowling ball or storage facilities. Accordingly, it is desirable to provide some form of mechanism to gradually reduce the speed of the bowling ball just prior to the storage rack without marking, scuffing or scarring the ball in an undesirable manner.

It is therefore an object of the present invention to provide a new and improved ball retarder which reduces the speed of a ball traveling on a ball return track without marking or scuffing the ball.

Another object of the present invention is to provide a new and improved ball retarder which may be utilized with the existing bowling ball return tracks, either above the lane or below without drastically modifying the lane construction.

A further object of the present invention is to provide a new and improved ball retarder including a leather wiper which contacts the upper surface of the ball thereby cleaning and polishing the ball during the retarding action.

A still further object of the present invention is to provide a new and improved ball retarder having relatively wide, inclined ball-engaging rails and a movable wiper so that the ball retarder will retard and clean different size bowling balls.

Other objects and advantages will become readily apparent from the following detailed description when taken in connection with the accompanying drawings, in which:

FIG. 1a represents a portion of a so-called subway ball return track including a bowling lane pit area;

FIG. 1b represents a second portion of the ball return track including a ball retarder adjacent the ball storage area embodying the principles of the present invention;

FIG. 2 is a sectional view taken in the direction of the arrows along line 2-2 of FIG. 1a;

FIG. 3 is an enlarged side elevation of the retarder; and

FIG. 4 is an enlarged sectional view taken in the direction of the arrows along line 4-4 of FIG. 3.

While an illustrative embodiment of the invention is shown in the drawings and will be described in detail herein, the invention is susceptible of embodiment in many different forms and it should be understood 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 to the drawings in more detail, the invention is shown in an environment including a pair of adjacent bowling lanes as illustrated at 10 and 11 (FIG. 2), each including substantially conventional gutters at opposite sides thereof as illustrated at 12 and 13. The lane proper in each case is comprised of a plurality of individual side-

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by-side laminations as at 15, suitably secured together to provide a smooth upper surface along which a ball may be rolled. The laminations 15 are preferably supported by means which may be described as a subfloor including a sheet as at 16 and transverse leveling strips 17 therebeneath. The subfloor is mounted on a support including parallel longitudinal stringers as at 18 and transverse sleepers as at 19 therebeneath.

Each lane terminates at the rear end of an installation in a surface adapted to support a complement of pins as at 25, set either by hand or by automatic pinsetter, and beyond the end a pit in conventional form as at 26 between kickbacks provided at opposite sides of the pit as at 27. It is contemplated that the rear end of a ball return track would usually be positioned atop a kickback as at 27 where balls may be delivered to the track by suitable means not shown. The track extends forwardly toward the bowler's approach end of the lane to a ball retarder apparatus 29 from which a ball passes to a ball lift mechanism illustrated generally at 30 for elevating balls from the track to a ball storage rack as at 31.

The ball lift mechanism 30 may be similar to that in U.S. Patent 3,109,648, and the rack 31 may be similar to that in Anderson application for U.S. Letters Patent Serial No. 35,002, filed June 9, 1960, now Patent No. 3,119,615, and assigned to the assignee of this application.

Though it is well adapted for use with a surface ball return track, the ball retarder 29 is shown in series with a subway or underlane ball return track portion 32, which may be of the general type shown in U.S. Patent 3,063,717. As illustrated herein, the track is mounted between adjacent gutters 12 and 13 (FIG. 2) of adjacent bowling lanes, beneath the level of the lanes, leads to the retarder 29, and includes a pair of parallel longitudinal track rails 35 spaced apart by a suitable distance less than the diameter of a bowling ball such as that illustrated at 36. Rails 35 are carried on elongate plate means 38 supported at suitable intervals along its length by transverse U-shaped hangers 40 hung from leveling strips 17. In order to provide a finished appearance, the track structure beneath the level of the lane surface is preferably enclosed by a cover structure as at 42 which may be suitably supported on bridge plates as at 43 extending between the leveling strips 17.

At the end of the subway track 32, adjacent to the retarder 29, the track rails 35 deliver the balls onto a pair of ball-supporting rails 50 in the retarder, as best illustrated in cross section in FIG. 4. As shown, each of the rails 50 comprises an elongate plate-like rail member 51 of metal, for example, having oppositely rolled upper and lower edges to provide rigidity as at 52. Attached to each of the members 51 is a carrier plate 54 securely mounted as by screws 55 and having bonded thereon a carpet-like material as at 56 which presents a ball-engaging surface facing toward the oppositely disposed similar surface.

The rails 50 with the rectangular ball-engaging carpets 56 are arranged in spaced parallel relationship longitudinally of the lane, and approximately on edge though tilted slightly from vertical downwardly and toward each other so as to provide a trough-like arrangement for receiving the balls. The rails are suitably secured in position as by means of U-shaped brackets 58 spaced at suitable intervals along the length of the rails and secured to the latter to support the same in the desired positions. As illustrated, the track provided by the rails 50 has a slight inclination downwardly toward the ball lift 30 but it will be understood that in some installations it might be exactly horizontally disposed.

As illustrated herein, bottom portions of the U-shaped brackets 58 are secured together by a longitudinal mem-

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ber as at 60 welded or otherwise secured to the brackets and adapted to rest upon suitable support means such as sleepers 19a and 19b in turn supported by a foundation. The track section of the retarder provided by the rails 50 may be secured against longitudinal movement relative to the ball return track 32 as by securing the member 60 of the retarder to the plate means 38 of the return track as by screws 61.

As will appear on viewing FIG. 4, the ball-engaging surfaces of the carpet-like material 56 are each elongate rectangular in outline, extending from a ball entrance end at 51a to a ball exit end at 51b, and each has a substantial width, approximately three inches in the embodiment shown, and the carpet members are arranged generally on edge, inclined slightly from vertical with upper portions spaced apart a distance approximately equal to the diameter of balls to be handled in the apparatus, or approximately equal to the diameter of the largest ball to be handled, and lower portions are spaced apart a distance slightly less than the diameter of the smallest ball to be handled so that each ball is engaged adjacent its horizontal axis transverse to the rails and ball motion is thereby converted from primarily advancing rolling motion on the rails 35 to primarily spin on the rails 50 so that ball progress is substantially slowed in the retarder, while the inclination and width of the rails in the retarder adapts the apparatus to handle balls of varying dimensions as might be encountered in use. In comparison, it will be noted that the rails 35 in the return track are much more closely spaced so that ball rotation on the track 32 results primarily in ball advance. The carpet-like material 56 on the rails 50 also acts in the nature of a thin cushion such that the ball surface is engaged over a substantially greater area than line contact and the carpet material assists in cleaning the ball. The carpet material also has a low coefficient of friction with the ball so that the latter slips somewhat relative to the material to aid in the retarding action upon initial contact. As the ball settles in the cushion-like material, the ball tends to wedge between the rails and the material imposes a frictional drag.

In order to assist in the retarding action and to aid in cleaning the ball, the retarder 29 includes a wiper apparatus 65 which comprises a skeleton tunnel-like frame including a pair of inverted U-shaped members 66 secured together at the tops by a longitudinal piece 67 welded or otherwise secured to the members 66. Additionally, along the sides, bars 68 are secured to side pieces of the members 66 as by spot welding at 69. The frame thus provided is utilized as a carrier for a bowed leather piece 71 which has a rounded upwardly curved cross section and opposite longitudinally extending lateral edges secured to the bars 68 as at 72. Lower ends of the U-shaped members 66 straddle the upper edges of the rail members 51 to restrain the frame against lateral movement relative to the track. At the same time, the bars 68 are adapted to rest upon the upper edges 52 of the rail members 51 when there is no ball passing under the wiper 71. In this fashion, the frame is adapted to be raised as a ball passes through the wiper, and this will occur by virtue of the wiper providing a passage less than the size of a ball so that contact between the wiper and the ball is assured. It will be understood that the frame constitutes a weight attached to opposite lateral edges of the wiper ensuring adequate pressure of the wiper on the ball to resist ball motion and also clean the ball.

The entrance end of the wiper is formed with a loop as at 75 and the loop is engaged with a yoke 77 having opposite lower ends supported in brackets 78 on the rail members 51, and the arrangement is such that the entrance end of the wiper is held open to facilitate ball entry and at the same time the wiper and its frame are held against longitudinal movement in the direction of ball movement.

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It will be understood that the leather member 71, although flexible, has sufficient inherent strength to support itself at the central portions thereof in the bowed form illustrated. It has been found preferable to position the flesh side of the leather toward the ball, and in operation, the entrance end is sufficiently open to permit ball entry while the height of the wiper gradually diminishes toward the ball lift 30 so that the ball engages the wiper and the latter conforms to the ball surface, cleaning the latter and retarding ball motion. Toward the end of the wiper, the passage is normally insufficient to permit the ball to go through, and the ball raises the wiper, which lifts the frame weighting the wiper.

Upon leaving the retarder 29, the ball engages a transition piece 80 for delivering the ball at a controlled rate to the lift mechanism 30. It will be noted on viewing FIG. 4 that in addition to retarding the ball speed, substantially the entire periphery is engaged by the wiper 71 and the carpet material 56 so that the surface is cleaned of dust and dirt.

In a preferred construction of the device, the retarder rails 50 are inclined from the vertical by approximately 15°, but it will be understood that there may be variations in the degree of inclination within the scope of the invention. In a preferred working embodiment, the carpet material 56 is similar to that sometimes used in bowling lane pits adjacent automatic pinsetters and includes a loop pile, though a cut pile could be used and other forms of carpet material might be usable, as well as other forms of material than carpet, such as some felt materials. Of significance is the provision of a cushion afforded in the preferred embodiment by the plurality of flexible fingers provided by the pile strands with spaces therebetween. Thus another form might employ the use of plastic material with flexible fingers providing a ball-engaging material in the nature of a cushion.

I claim:

1. In a bowling ball return system having a pair of ball-supporting rails providing a ball return track, a ball retarder, comprising, an elongate flexible wiper spanning the ball rails, said wiper being permanently bowed transversely upwardly from end to end to provide a tunnel-like ball passage having an open entrance end sufficiently large to facilitate ball entry and of diminishing cross section from the entrance end toward an exit end so as to engage balls rolling along the rails, means mounting said wiper for vertical movement relative to said ball rails, means restraining longitudinal movement of the wiper, means extending along the length of the wiper restraining lateral movement of the lateral edges of the wiper, and means weighting the wiper at the lateral edges thereof so that the wiper slows balls passing along the rails as the wiper is lifted by balls passing therethrough.

2. In a bowling ball return system having a pair of ball-supporting rails providing a ball return track, a ball retarder and cleaner, comprising, support means along opposite sides of the ball return track, an elongate tunnel-shaped frame spanning the ball rails and having opposite lateral edges resting on said support means in a manner to permit upward movement of the frame, cooperating means on the frame and the support means restraining the frame against lateral movement, a flexible wiper over the rails under the frame transversely upwardly bowed to provide a tunnel-like passage having an open entrance end sufficient to facilitate ball entry and of diminishing height toward an exit end insufficient to pass a ball without elevation of the wiper, means attaching opposite lateral edges of the wiper to opposite lateral edges of the frame, means on said support means for holding open the entrance end of the wiper and restraining the wiper and frame against longitudinal movement, whereby a ball rolling on the rails and entering the tunnel-like passage engages the wiper to be cleaned thereby upon motion of the ball relative to the wiper, and the weight of said frame on said wiper assures

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sufficient pressure of the wiper on the ball to clean the ball and retard its motion.

3. The invention set forth in claim 2 wherein said wiper is leather.

4. A bowling ball retarder track adapted for use in a ball return system in series with a ball return track, comprising, a pair of ball-supporting rails, each of substantial width, arranged on edge inclined slightly toward each other in trough-like fashion, with upper portions of the rails spaced apart a distance approximately equal to the diameter of balls so that each is engaged adjacent its horizontal axis transverse to the rails, and an elongate flexible wiper spanning the ball rails, said wiper being permanently bowed transversely upwardly to provide a tunnel-like ball passage having an open entrance end sufficiently large to facilitate ball entry and of diminishing cross section from the entrance end toward an exit end so as to engage balls rolling along the rails, means mounting said wiper for vertical movement relative to said ball rails, means restraining longitudinal movement of the wiper, means extending along the length of the wiper restraining lateral movement of the lateral edges of the wiper, and means weighting the wiper at the lateral edges thereof so that the wiper slows balls passing along the rails as the wiper is lifted by balls passing therethrough.

5. A bowling ball retarder apparatus adapted for use in a ball return system in series with a ball return track, comprising, a pair of generally horizontally disposed ball-supporting rails, each of substantial width, arranged on edge inclined slightly from vertical downwardly and toward each other, with upper portions of the rails spaced apart a distance approximately equal to the diameter of the largest ball to be handled by the apparatus and lower portions of the rails spaced apart a distance slightly less than the smallest ball to be handled by the apparatus so that each ball is engaged adjacent its horizontal axis transverse to the rails and ball motion on the rails is primarily spin, and the width and inclination of the rails adapt the apparatus to handle balls of varying dimensions while converting motion of each primarily to spin, a cushion-like carpeting material covering the ball-engaging surfaces of said rails, a support, an elongate tunnel-shaped frame

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spanning the ball rails and resting on said support, a flexible wiper extended across the rails under the frame in the path of balls and attached to opposite sides of the frame, means restraining longitudinal and lateral movement of the frame, means holding open the entrance end of the wiper to facilitate ball entry, the exit end of the wiper being smaller than a ball so that the frame weights the wiper when lifted by a ball.

6. In a bowling ball return system having a pair of ball-supporting rails providing a ball return track, a ball cleaner, comprising, a support, an elongate tunnel-shaped frame spanning the ball rails and mounted on the support for vertical movement relative thereto, an elongate unitary and longitudinal continuous sheet of flexible wiper material extended across the rails under the frame in the path of balls and having opposite longitudinally extending edges attached to opposite sides of the frame and the material intermediate the opposite edges free, means restraining longitudinal and lateral movement of the frame and permitting vertical movement of the frame, means holding open the entrance end of the wiper material to define an entrance area greater than the cross section of a ball to facilitate ball entry, the exit end of the wiper material being smaller than a ball so that the frame weights the wiper material when lifted by a ball.

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