

UNITED STATES PATENT OFFICE

2,545,252

APPARATUS FOR CHECKING BOWLING
BALLS ON RETURN TRACKS

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Application May 24, 1945, Serial No. 595,553

2 Claims. (Cl. 273-47)

1

This invention relates to means for checking a bowling ball in its approach to the rack and has particular reference to checking means involving an acceleration of the rotation of the ball during its approach to the rack.

Checking means are commonly provided along the return path of bowling balls to prevent damage by impact of a returning ball against the stationary balls on the rack. Various means for accomplishing this end have been used which have however various disadvantages, particularly in requiring fairly complicated and not too reliable elements. For example, it is common to provide an abutment engageable by the ball and so located as to arrest the ball, the ball being freed from the abutment by the delayed dropping of a portion of the track, the delay being provided by a dash pot.

In accordance with the present invention, the checking is accomplished by means associated with a widening of the return track which serves to accelerate the rotation of the returning ball. It has been proposed heretofore to check a returning ball by widening of the track to effect a division of the kinetic energy of the ball in such fashion as to increase the rotational speed with accompanying decrease of its translational velocity. This however has generally involved a fallacy in that absorption of energy does not occur and substantially the same energy exists following the attempted checking so that impact damage may still occur.

In accordance with the present invention, the increase of rotational velocity is accompanied by the application of frictional retardation to the ball in such fashion that a considerable absorption of energy is effected in a relatively small extent of movement of the ball. At the same time, the conditions are such that the ball cannot become completely stalled so as to fail to reach its ultimate position on the rack.

The accomplishment of the foregoing objects of the invention together with other objects, particularly relating to details of construction and operation, will become apparent from the following description read in conjunction with the accompanying drawings, in which:

Figure 1 is a plan view of the portion of a ball return track in the vicinity of the rack embodying one form of the invention;

Figure 2 is a side elevation of the same; and

Figures 3 and 4 are vertical sections taken respectively on the planes indicated at 3-3 and 4-4 in Figure 1.

Referring first to Figures 1 to 4 inclusive, there

2

is indicated at 2 the return track including the usual rise, generally located in the vicinity of the foul line. Just beyond the rise 4, the tracks diverge as indicated at 6 and may then run substantially parallel to each other for a short distance as indicated at 8, these portions 8, being followed by converging portions 10 which lead to the rack 12. The tracks may be formed of metal tubing though it will be understood that the invention is equally applicable to tracks of conventional type.

The portions 6, 8, 10 and 12 of the tracks are desirably given a slight downward slope in the direction of motion so that stalling of the balls will not occur, and even though they are slowed down, they will run upon the rack. The rack is terminated by the usual post 14.

Extending beneath the portion 8 of the track and preferably from a point intermediate the ends of the diverging portion 6 of the track to a point intermediate the ends of the converging portion 10 of the track, there is a belt 16 secured at its rear end to a support 18 and supported at its forward end by springs 20 connected to a support 22. The springs 20 are preferably light springs which permit the belt 16 to sag under the weight of the ball, so that it will not raise the ball off the tracks. These springs may be made adjustable to secure the best results.

In the operation of this device, the ball will rise at 4 and after passing the high point may have a greater or less velocity depending upon the energy applied to it by the pin boy at the beginning of its return movement. As it passes over the hump, its kinetic energy will have two components: one of these will consist of a rotational component and the other of a translational component. The distribution of total energy between these components is fixed by the condition of non-slippage of the ball on the track. At the position of the hump, the tracks are preferably relatively close so that the ball is riding high and the distance between the tracks and a horizontal axis through the ball will be a maximum. As a consequence, there will be a major translational component of energy and a minimum rotational component.

As the ball moves along the diverging portions 6 of the track, assuming only slight slippage with respect to the track, as will usually be the case, a transformation of the distribution of the total energy occurs though the total energy will remain substantially constant. This transformation involves an increase in rotational energy and a decrease in translational energy, inasmuch

as the spacing between the tracks is increased and the distance between the tracks and the horizontal axis through the center of the ball is decreased. The result is that the forward movement of the ball is retarded but its spin is substantially increased. The division of energy existing at the point of maximum divergence of the tracks would remain constant along the parallel portions 8 of the tracks if the belt 16 was absent.

The arrangement is such that the forward end of the belt 16 is located beneath the bottom of the ball as it passes this end of the belt. However, as it moves further along the diverging portions 6 of the track, it will come into contact with the belt and remain in contact throughout the portions 8 of the track and until it is again raised by the converging portions 10 over the rear end of the belt. This insures that no impact occurs on the ball as it enters or leaves the belt.

While in contact with the belt, which is slack as indicated above so as not to raise the ball from the track, the relatively high rotational speed coupled with the frictional contact of the belt results in the performance of substantial frictional work on the ball which will rapidly absorb a considerable amount of its energy, thereby reducing its total kinetic energy. It is to be noted that during contact with the belt, the bottom of the ball is moving rearwardly rather than forwardly because the tracks are above its bottom.

As a consequence of the above, when the ball reaches the portions 10 and 12 of the track, it will have its kinetic energy very much reduced with the net result that as it passes upon the rack, its translational velocity will be very much less than at the instant of passing over the hump; consequently, when it engages either the post 14 or a stationary ball on the rack, it will come to rest with a minimum of impact.

It will be evident from the above that the arrangement is such that the ball cannot possibly

stall after passing the hump, the slope of the tracks being sufficient to prevent this and the belt being unable to prevent movement even if by some accident the ball might be brought to rest on the portion 8 of the track.

It will be evident that the principles of the invention are applicable in fashions other than those described and accordingly the invention is not to be regarded as limited except as required by the following claims.

What is claimed is:

1. In combination a return track for a bowling ball, said track having a portion comprising a pair of diverging rails and a portion comprising a pair of parallel rails immediately following said diverging rails, and a yielding friction member extending below said parallel rail portion of the track constructed and arranged to contact the lower surface of the ball as the ball traverses said parallel rail portion of the track.

2. In combination a return track for a bowling ball, said track having a portion comprising a pair of diverging rails and a portion comprising a pair of parallel rails immediately following said diverging rails, and a spring tensioned flexible belt extending below said diverging rail portion and said parallel rail portion of the track, said belt being constructed and arranged to contact the lower surface of the ball as the ball traverses said parallel rail portion of the track.

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