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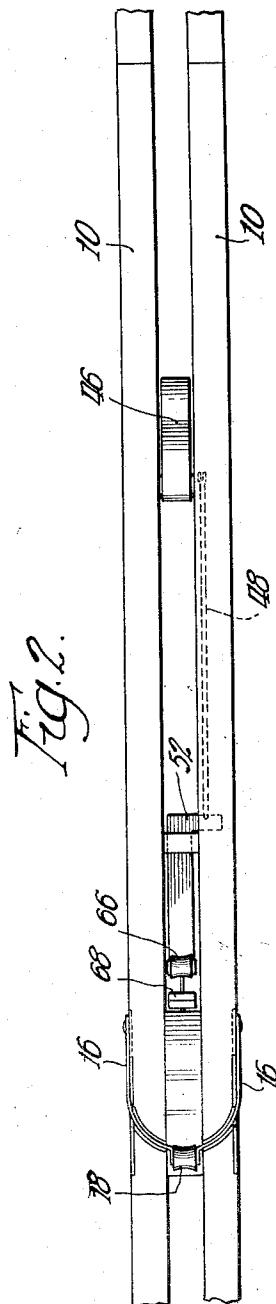
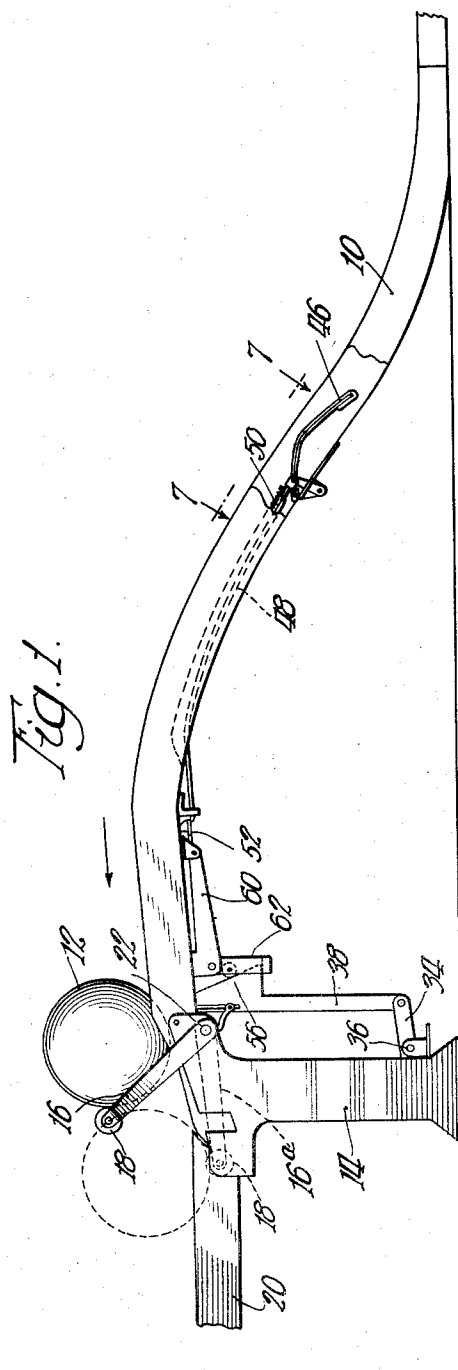
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1,979,466

BOWLING BALL BRAKE OR RETARDER

Filed June 30, 1930

3 Sheets-Sheet 1



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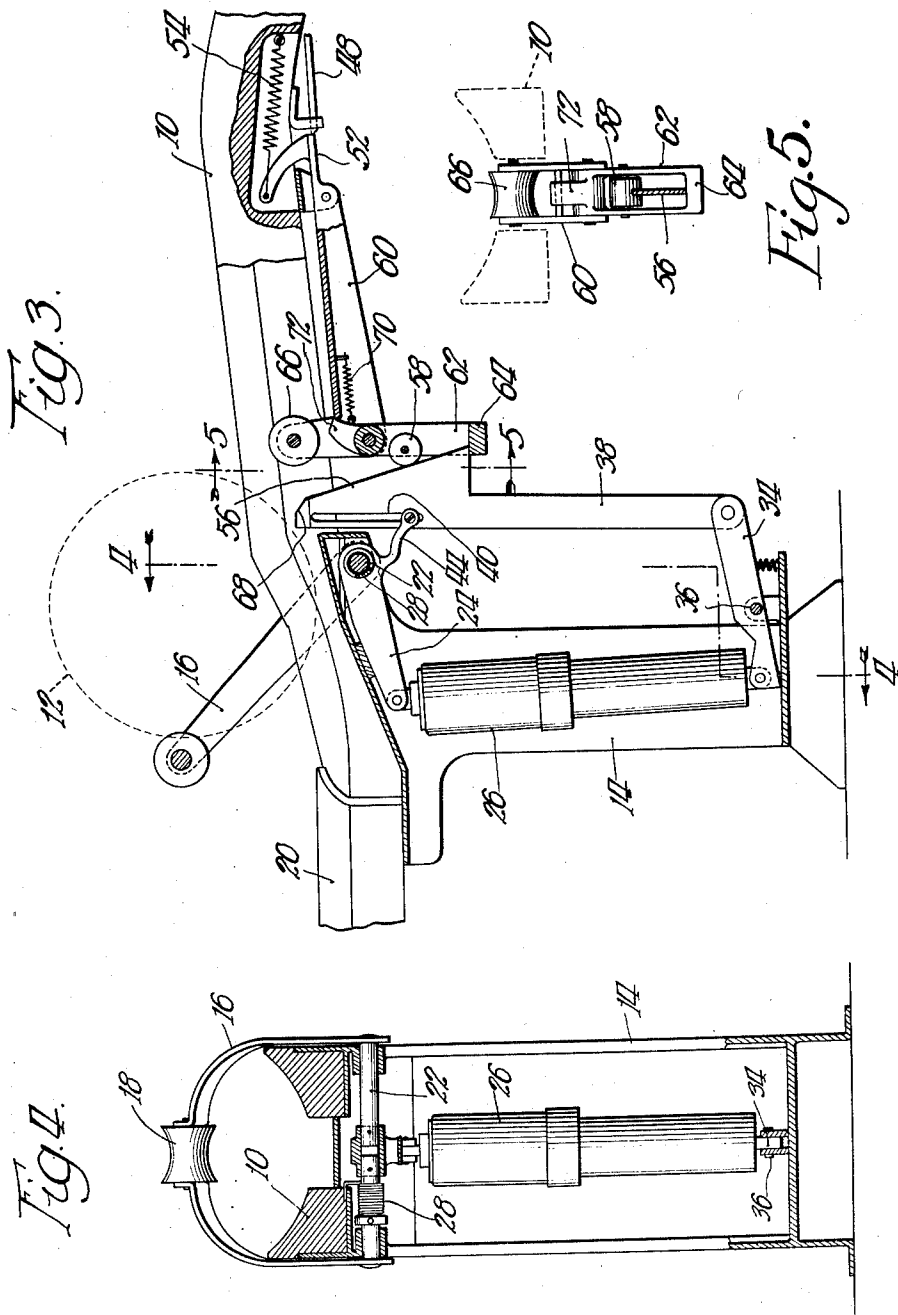
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3 Sheets-Sheet 2



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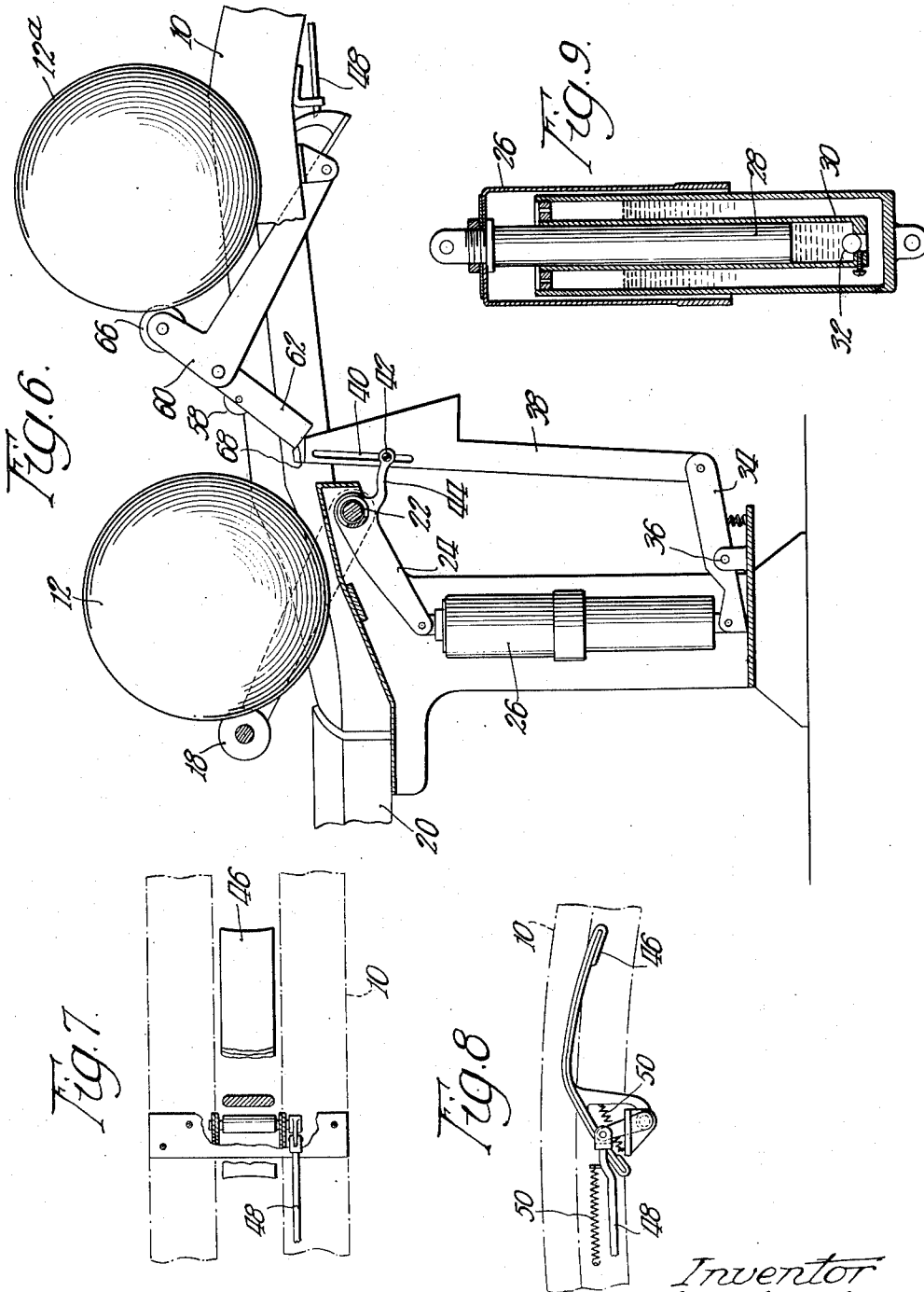
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BOWLING BALL BRAKE OR RETARDER

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

1,979,466

BOWLING BALL BRAKE OR RETARDER

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Chicago, Ill., a corporation of Delaware

Application June 30, 1930, Serial No. 464,802

21 Claims. (Cl. 273—47)

This invention relates to improvements in bowling ball brakes or retarders and has for one of its principal objects the provision of means for retarding the motion of a bowling ball or the like when the same is being returned to the player or rack, as in the usual bowling alley construction.

One of the important objects of this invention is the provision, in bowling alley construction, of means providing braking elements for the balls when being returned, whereby an undesired relatively swift motion of the balls toward the end of their journey is eliminated.

Still another and further important object of the invention is the provision, in combination with a brake for bowling balls and the like, of means for automatically handling a plurality of balls, and especially under circumstances where two of the returned balls follow each other in such close relation that a single braking element is inadequate.

Other and further important objects of the invention will be apparent from the disclosures in the accompanying drawings and following specification.

The invention, in a preferred form, is illustrated in the drawings and hereinafter more fully described.

In the drawings:

Fig. 1 is a side elevation of the improved bowling ball brake in this invention, showing certain operating elements and the final delivered position of the ball in dotted lines.

Fig. 2 is a top plan view of the device shown in Fig. 1.

Fig. 3 is an enlarged detail view, partly in section and with parts broken away, of the improved ball brake construction, showing the same as operating on a single ball.

Fig. 4 is a vertical sectional view on the broken line 4—4 of Fig. 3.

Fig. 5 is a sectional view on the line 5—5 of Fig. 3 looking in the direction indicated by the arrows.

Fig. 6 is a view similar to Fig. 3 but showing the device in operation on two balls.

Fig. 7 is an enlarged detail view, partly in section and parts broken away, showing a portion of the apparatus illustrated in Fig. 1 and viewed from the line 7—7.

Fig. 8 is a side elevation of the device of that portion of the apparatus shown in Fig. 7.

Fig. 9 is a vertical sectional view of the dash-pot used for absorbing the shock of the ball.

As shown in the drawings:

The reference numeral 10 indicates, generally,

the return-way upon which the balls travel to the rack and comprises essentially a pair of rails, as shown in Fig. 2, upon which a ball 12 travels.

A standard 14 supports the raised portion of the return-way, as illustrated, and is also available for the installation of the retarding apparatus. This comprises essentially a pair of arms 16 formed as shown in Fig. 2 and having mounted adjacent their central meeting point a roller or the like 18, which is shaped to receive the ball and also to allow the same to roll thereover when the arms have been moved to their lowermost position, as shown in the dotted lines at 16—A in Fig. 1, whereupon the ball is allowed to move onto a rack or the like 20.

The arms 16 are mounted upon a rotatable shaft 22 mounted in suitable bearings beneath the rails 10, and upon this shaft is affixed an arm or the like 24, the end of which is connected to the upper end of a dash-pot casing 26. This casing includes a piston which moves downwardly in a cylinder 30 and forces liquid out of the cylinder past a ball valve or the like 32 in an ordinary manner. The dash-pot is pivotally connected at its lower end to a lever 34 mounted on a fulcrum point 36, the outer end of the lever being connected to an upwardly extending trip arm 38 shaped as best shown in Figures 3 and 6.

A slot 40 is formed in the upper end of the trip arm 38 and in this slot moves a pin or the like 42, fixed in the end of an extension 44 which is integral with the arm 24.

When the ball 12 contacts with the bumper or roller 18 in the arms 16, the arms are forced downward by the weight and momentum of the ball, the action of the dash-pot rendering this downward motion slow enough to efficiently retard the ball. A coiled spring 28 surrounds the shaft 22, thereby tending to return the arms 16 to normal upward position after the ball has rolled over the same. The return movement is similarly retarded by the dashpot, thereby providing a very quiet operation. In the event that a single ball is traveling down the runway at this time the delivery of the ball to the rack 20 is accordingly accomplished. But in the event that another ball 12—A is following closely upon the first ball, a second retarding element will be released, this releasing movement being instigated by the initial rolling of the ball over a trip element or the like 46, which is mounted between the rails 10 and at a suitable distance before the retarded installation. A latch, in the shape of a rod, 48 extends forwardly from the trip element 46 and is operated thereby, suitable springs 50 being

provided for returning the latch and the trip to normal position. The end of the latch 48 is normally in locking relation with the extending end 52 of a corresponding trip element which is thrown upwardly into ball retarding position by means of a spring 54 when properly released. Withdrawal of the latch 48 will not, however, release this ball retarder for action unless a ball 12 is in the first retarder 16. In this event the retarding action taking place at 16 will cause the extension 44 of the arm 24 to move upwardly and slightly rearwardly in the slot 40, forcing the upper end of the lever 38 correspondingly rearward. This upper end of the lever 38 is provided with a cam face, as illustrated at 56, which operates against a roller 58 mounted on the second retarder 60, and forces the lower end 62 of the pivoted arm of the retarder element 60 rearwardly and, hence, out of locking contact with the lower end of the cam face 56, which acts as a locking element in conjunction with a cross-piece 64. Release of this member allows the spring 54 to pull the retarder 60 into the position shown in Figure 6 so as to exert a proper braking action on the ball 12—A.

When the ball 12—A contacts with the retarder 60—66 it forces the same downwardly and the pivoted end 62—64 of the retarder will contact with a corresponding shoulder 68 formed on the upper end of the arm 38. (Figure 6.) This contact action is insured by means of a spring 70 mounted in the arm 60 and connected to an extension 72 of the lower pivoted member 62—64, whereby this lower end is normally maintained in alignment with the arm 60 as best shown in Figures 3 and 6. This contact with the shoulder 68 will cause a reverse movement of the arm 38 against the action of the dash-pot 26, thereby properly slowing the motion of the retarder 60—62 and affording a suitable braking action so far as the momentum of the ball 12—A is concerned. The arm 62, after forcing the link 38 downwardly for some distance, will then slide over the cam face 56, allowing the retarder to move downwardly for final free passage of the ball 12—A.

After the ball 12—A has passed over the roller 66 mounted in the retarder arms 60, the latching member 38 will have been returned to normal position after the passage of the ball over the retarder 16, the arms 16 being returned to normal position by means of the action of the coiled spring 28 which is wound about the shaft 22. At the same time the lower cross-piece 64 of the arms 62 will be returned to position under the projecting end of the cam face 66 of the lever 38, thereby resetting the first retarder for further operation.

It will be seen that in the event of balls passing over the rails spaced sufficiently distant from each other, the retarder 16 will be the only one to come into operation, as illustrated in Figure 1. The retarder 16 is normally in an upright position, held so by means of a spring 22, and when a ball strikes the same, it will be slowly depressed against the action of the dashpot 26, eventually delivering the ball to the rack 20. The action of the arm 44 in the slot 40 always moves the link 36 rearwardly, but inasmuch as the latch element 48 is normally in position beneath the end 52 of the second retarder 60, no movement of this retarder will ordinarily take place. However, in the event that another ball strikes the trip 46 while the first ball is still in the retarder 16, the second retarder 60 will be immediately snapped

into an upright position, as shown in Figure 6, thereby retarding the second ball 12—A, the dash-pot operating through the link 38 and lever 34 in a reverse direction to its operation with the arm 24 of the first retarder. The two automatically operated latch means for the second retarder provide a device which is instant in operation whenever the occasion or necessity arises and which is automatically returned to and retained in inoperative position as soon as it has served its purpose.

I am aware that many changes may be made and numerous details of construction varied throughout a wide range, without departing from the principles of this invention, and I therefore do not purpose limiting the patent granted hereon otherwise than as necessitated by the prior art.

I claim as my invention—

1. A bowling ball brake, including a fixed runway for the balls, a retarder pivoted on said runway, engageable by a ball on the runway, for retarding the movement of the ball and later releasing the same, a dash-pot for controlling the retarder, and an auxiliary retarder, also on the runway, positioned in advance of the first retarder, controlled by the same dash-pot and a combined link and latch connecting the auxiliary retarder with the first retarder.

2. A bowling ball brake, including a fixed runway for the balls, a retarder pivoted on said runway, engageable by a ball on the runway, for retarding the movement of the ball and later releasing the same, and an auxiliary retarder, also on the runway, positioned in advance of the first-named retarder and a combined link and latch connecting the auxiliary retarder with the first retarder, said auxiliary retarder operable only upon the appearance of a second ball closely adjacent the first ball, and two latches for operatively releasing the second retarder, the first of said latches comprising a trip in the runway operable whenever a ball passes over the runway, and the second latch selectively operable with the first latch to release the second retarder into ball-retarding position.

3. A bowling ball brake, including a fixed runway for the balls, a retarder pivoted on said runway for engaging each ball passing over the runway, to initially retard the movement of the ball and later release the same, and an auxiliary retarder, also on the runway, positioned in advance of the first retarder and adapted for cooperation with the first retarder, each of said retarders comprising a pair of arms adapted to extend above the runway, in the path of a ball, and capable of being deflected to the level of the runway upon the passage of the ball, and a pair of releasing latches for the second retarder, and a connection between the latches and the first retarder to release the second retarder only when a ball is in the first retarder.

4. A bowling ball brake, including a runway, a pair of retarders pivoted on said runway, one of said retarders engageable by each ball passing over the runway, for arresting the movement thereof, the second of said retarders adapted for cooperation with the first retarder and positioned in advance of the first retarder, and a single dash-pot for controlling both of said retarders, the main retarder normally extending above the runway, in the path of a ball, and adapted to be deflected to the level of the runway upon the passage of the ball, and two latches for controlling the operation of the second re-

tarder, the first of said latches comprising a trip in the runway, operable whenever a ball passes over the runway, and a connection between the first retarder and the second latch operable with the first latch to release the auxiliary retarder into ball retarding position only when a ball is in the first retarder.

5. A bowling ball brake, including a runway, a retarder pivoted on said runway, engageable by a ball, for arresting the movement thereof, a dash-pot for controlling the retarder, an auxiliary retarder, also on the runway, positioned in advance of the first retarder, controlled by the same dash-pot and adapted for cooperation with the first retarder, said first retarder comprising a pair of arms normally extending above the runway, in the path of each ball, and adapted to be deflected to the level of the runway upon the passage of each ball, connections from the auxiliary retarder to the dash-pot, and two latches for the auxiliary retarder, the first of said latches comprising a trip in the runway, operable whenever a ball passes over the runway, the second latch operable with the first latch to release the second retarder into ball-retarding position only when a ball is in the first retarder, the second latch including a trip integral with the second retarder.

6. A bowling ball brake, including a runway, a retarder pivoted on said runway, engageable by a ball, for arresting the movement thereof, a dash-pot for controlling the action of the retarder, an auxiliary retarder adapted for cooperation with the first retarder, and a pair of trip means, one of said trip means operated by a ball passing thereover, and the other of said trip means connecting the two retarders, whereby said auxiliary retarder is operable only upon the appearance of a second ball closely adjacent the first ball, each of said retarders comprising a pair of arms adapted to be projected above the runway, in the path of the ball, and means for allowing the arms to be deflected to the level of the runway upon the passage of the ball, said means including springs for returning the arms to normal raised position, and connections from each of said retarders to the dash-pot.

7. A bowling ball brake, including a runway, a retarder pivoted on said runway, engageable by a ball, for arresting the movement thereof, a dash-pot for controlling the action of said retarder, an auxiliary retarder adapted for cooperation with the first retarder, and a pair of trip means for actuating the auxiliary retarder, one of said trip means mounted in the runway and operated by each ball passing thereover, the other of said trip means connecting the two retarders, for release only upon the appearance of a second ball closely adjacent the first ball, each of said retarders comprising a pair of arms extending above the runway, in the path of the ball, and adapted to be deflected to the level of the runway upon the passage of the ball.

8. A bowling ball brake, including a runway, a retarder pivoted on said runway, engageable by a ball, for arresting the movement thereof, an auxiliary retarder for cooperation with the first retarder, and a pair of trip means for releasing the auxiliary retarder, one of said trip means operated by a ball passing thereover, the other of said trip means connecting the two retarders, for releasing the auxiliary retarder only upon the appearance of a second ball closely adjacent the first ball, each of said retarders comprising a pair of arms adapted to extend above the runway, in the path of the ball, and to be deflected to the level

of the runway upon the passage of the ball, and a single dash-pot for controlling the downward motion of both retarders, links connecting the dash-pot to the retarders, together with means for returning one of said retarders to normal raised position after the passage of a ball thereover.

9. A bowling ball brake, including a runway, a retarder pivoted on said runway engageable by a ball for arresting the movement of the ball and an auxiliary retarder adapted for cooperation with the first retarder, each of said retarders comprising a pair of arms adapted to extend above the runway, in the path of a ball, and to be deflected to the level of the runway upon the passage of a ball, and a double-ended dash-pot for controlling the downward motion of both retarders, latches and links connecting the retarders to the dash-pot, said dash pot operable at one end for the first of said retarders and operable at the other end for the second retarder.

10. A bowling ball brake, including a runway, a retarder pivoted on said runway engageable by a ball for retarding the movement thereof, and an auxiliary retarder adapted for cooperation with the first retarder, said first retarder comprising a pair of arms normally extending above the runway, in the path of a ball, and adapted to be deflected to the level of the runway upon the passage of a ball, a double-action dash-pot connected with said arms for controlling the downward motion thereof, said dash-pot operable in one direction for the first retarder and link and latch connections from the dash-pot to the auxiliary retarder for operation of the dash-pot in another direction for the auxiliary retarder, said last-named connection including a pivoted lever connected at one end to the dash-pot, and an additional lever mounted on the other end of said pivoted lever, against which said auxiliary retarder acts when being depressed.

11. A bowling ball brake, including a runway, a retarder pivoted on said runway engageable by a ball for retarding the movement thereof, an auxiliary retarder adapted for cooperation with the first retarder, said first-mentioned retarder comprising a pair of arms normally extending above the runway, in the path of a ball, and adapted to be deflected to the level of the runway upon the passage of a ball thereover, a dash-pot connected with said arms for controlling the downward motion thereof, operating connections between the dash-pot and both retarders, said dash-pot operable in one direction for the first retarder and in another direction for the second retarder, the connection between the dash-pot and the second retarder comprising a latch, a lever connected at one end to the dash-pot, a slotted link mounted at the other end of the pivoted lever, and a cam face on said link, against which the auxiliary retarder acts during a ball-retarding operation.

12. A bowling ball brake, including a runway, a retarder pivoted on said runway engageable by a ball for retarding the movement thereof, an auxiliary retarder adapted for cooperation with the first retarder, said first-mentioned retarder comprising a pair of arms normally extending above the runway, in the path of a ball, and adapted to be deflected to the level of the runway upon the passage of a ball thereover, a dash-pot connected with said arms for controlling the downward motion thereof, operating connections between the dash-pot and both retarders, said dash-pot operable in one direction

for the first retarder and in another direction for the second retarder, the connection between the dash-pot and the second retarder comprising a latch, a lever connected at one end to the dash-pot, a slotted link mounted at the other end of the pivoted lever, and a cam face on said link, against which the auxiliary retarder acts during a ball-retarding operation, an extension on the first retarder arms and a pin on the end of said extension operating in the slot in said link.

13. A bowling ball brake, including a runway, a retarder pivoted on said runway engageable by a ball for arresting the movement thereof, an auxiliary retarder adapted for cooperation with the first retarder for arresting a ball when another ball is still in the first retarder, each of said retarders comprising a pair of arms adapted to extend above the runway, in the path of a ball, a single double-ended dash-pot for controlling the downward motion of both retarders, said dash-pot operable at one end for the first of said retarders and operable at the other end for the auxiliary retarder, connections between the dash-pot and each retarder, the connection to the auxiliary retarder including a latch, a link, a cam face on said link, and a lever for moving said link into operative position for the second retarder, said lever comprising an extension of the first retarder and a pin on the end of said lever operating in a slot in the link.

14. A bowling ball brake, including a runway, a retarder pivoted on said runway engageable by a ball for arresting the movement thereof, an auxiliary retarder adapted for cooperation with the first retarder for arresting a ball when another ball is still in the first retarder, each of said retarders comprising a pair of arms adapted to extend above the runway, in the path of a ball, a single double-ended dash-pot for controlling the downward motion of both retarders, said dash-pot operable at one end for the first of said retarders and operable at the other end for the auxiliary retarder, connections between the dash-pot and each retarder, the connection to the auxiliary retarder including a latch, a link, a cam face on said link, and a lever for moving said link into operative position for the second retarder, said lever comprising an extension of the first retarder and a pin on the end of said lever operating in a slot in the link, together with a roller and pivoted arm connection on the second retarder adapted to cooperate with said cam link.

15. A bowling ball brake, including a runway, a retarder pivoted on said runway engageable by a ball for arresting the movement thereof, an auxiliary retarder adapted for cooperation with the first retarder for arresting a ball when another ball is still in the first retarder, each of said retarders comprising a pair of arms adapted to extend above the runway, in the path of a ball, a single double-ended dash-pot for controlling the downward motion of both retarders, said dash-pot operable at one end for the first of said retarders and operable at the other end for the auxiliary retarder, connections between the dash-pot and each retarder, the connection to the auxiliary retarder including a latch, a link, a cam face on said link, and a lever for moving said link into operative position for the second retarder, said lever comprising an extension of the first retarder and a pin on the end of said lever operating in a slot in the link, together with a roller and pivoted arm connection on the second retarder adapted to cooperate with said

cam link, and a releasable latch for allowing the operation of said roller and pivoted arm connection.

16. A bowling ball brake, including a runway, a retarder pivoted on said runway engageable by a ball for arresting the movement thereof, an auxiliary retarder adapted for cooperation with the first retarder for arresting a ball when another ball is still in the first retarder, each of said retarders comprising a pair of arms adapted to extend above the runway, in the path of a ball, a single double-ended dash-pot for controlling the downward motion of both retarders, said dash-pot operable at one end for the first of said retarders and operable at the other end for the auxiliary retarder, connections between the dash-pot and each retarder, the connection to the auxiliary retarder including a link, a cam face on said link, and a lever for moving said link into operative position for the second retarder, said lever comprising an extension of the first retarder and a pin on the end of said lever operating in a slot in the link, together with a roller and pivoted arm connection on the second retarder adapted to cooperate with said cam link, and a releasable latch for allowing the operation of said roller and pivoted arm connection, and means whereby said releasable latch is operable only when there is a ball in the first retarder and another ball closely approaching the same.

17. A bowling ball brake, including a runway, a retarder pivoted on said runway engageable by a ball for arresting the movement thereof, an auxiliary retarder adapted for cooperation with the first retarder for arresting a ball when another ball is still in the first retarder, each of said retarders comprising a pair of arms adapted to extend above the runway, in the path of a ball, a single double-ended dash-pot for controlling the downward motion of both retarders, said dash-pot operable at one end for the first of said retarders and operable at the other end for the auxiliary retarder, connections between the dash-pot and each retarder, the connection to the auxiliary retarder including a link, a cam face on said link, and a lever for moving said link into operative position for the second retarder, said lever comprising an extension of the first retarder and a pin on the end of said lever operating in a slot in the link, together with a roller and pivoted arm connection on the second retarder adapted to cooperate with said cam link, and a releasable latch for allowing the operation of said roller and pivoted arm connection, and means whereby said releasable latch is operable only when there is a ball in the first retarder and another ball closely approaching the same, and an auxiliary trip operable by each ball on the runway for releasing the second retarder when a ball is in the first retarder.

18. A bowling ball brake, including a pair of rails comprising a fixed runway and a plurality of retarders pivotally mounted on the runway, a single dash-pot for the retarders, one of said retarders operable upon the passage of every ball over the runway, and connections between both retarders and the dash-pot for operating the other retarder whenever a second ball closely follows a first ball over the runway, a ball operated trip and latch for the other retarder.

19. A bowling ball brake, including a pair of rails comprising a fixed runway and a plurality of retarders pivotally mounted on the runway, one of said retarders operable upon the passage of each ball over the runway, and automatic trip

means in the runway together with a latch and linkage inter-connecting the retarders whereby another of said retarders is operable by a second ball only when a first ball is in the first retarder.

- 5 20. A bowling ball brake, including a pair of rails comprising a fixed runway and a plurality of retarders pivotally mounted on the runway, one of said retarders operable upon the passage of every ball over the runway, a single dash-pot for all of the retarders, a plurality of retarding means in the dash-pot connected to each of said retarders, together with a ball operated latch and a set of links and trip means connecting the retarders to each other and to the dash-pot, where-
15 by a second retarder is brought into action by

said trip means only when a ball is in another retarder.

21. A bowling ball brake, including a pair of rails comprising a fixed runway and a plurality of retarders pivotally mounted on the runway, one of said retarders operable upon each ball passing through the runway, a single dash-pot for all the retarders, said dash-pot operable in more than one direction, together with links and cam elements connecting the retarders and the dash-pot and a trip means connected to said link and cam elements, whereby a second retarder is moved into ball-retarding position upon the passage of a second ball over the runway closely adjacent a first ball.

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