June 29, 1954 W. F. HUCK 2,682,407

BELT-TYPE BOWLING BALL RETURN

Filed Feb. 9, 1951

2 Sheets-Sheet 1

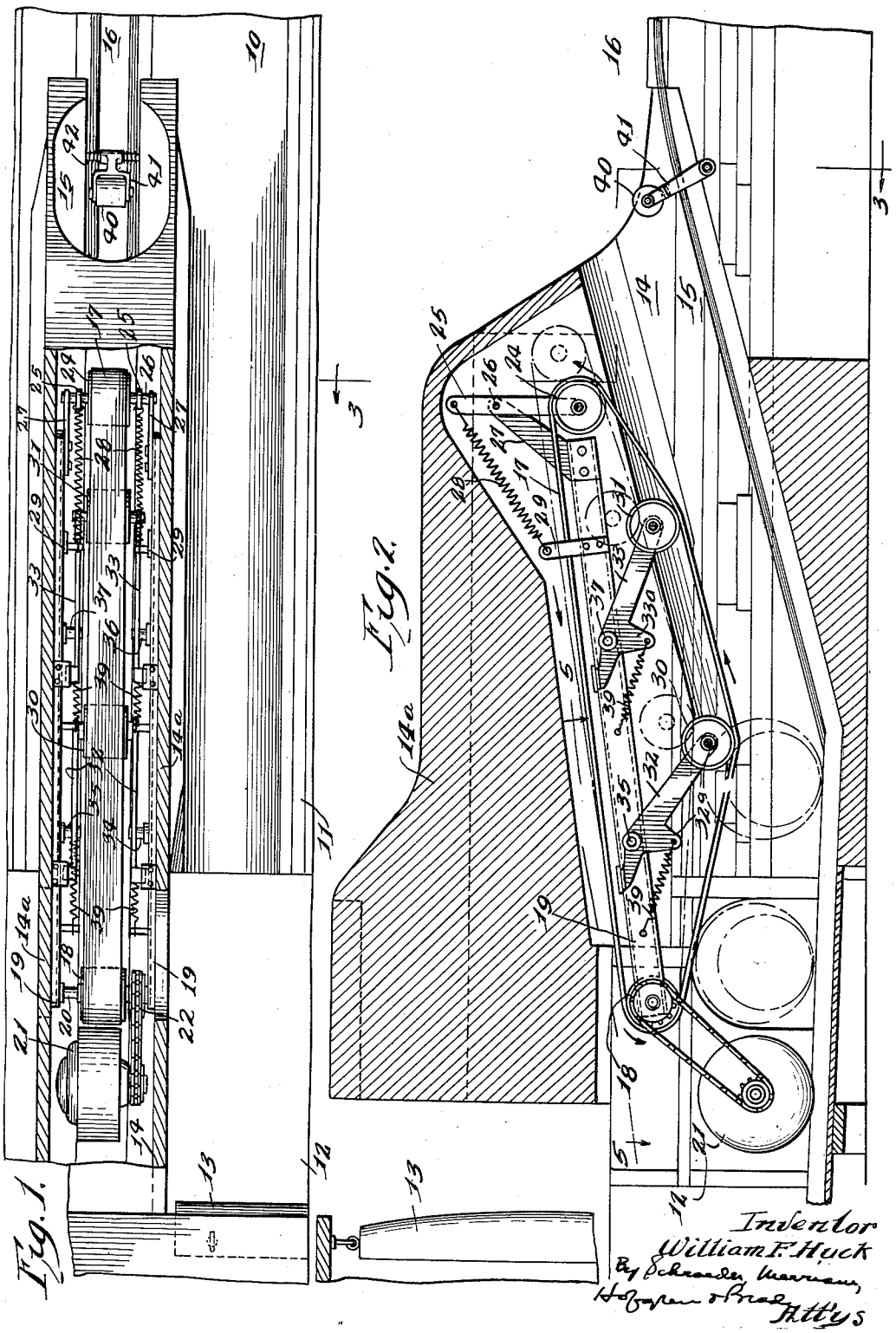


Fig. 1.

Fig. 2.

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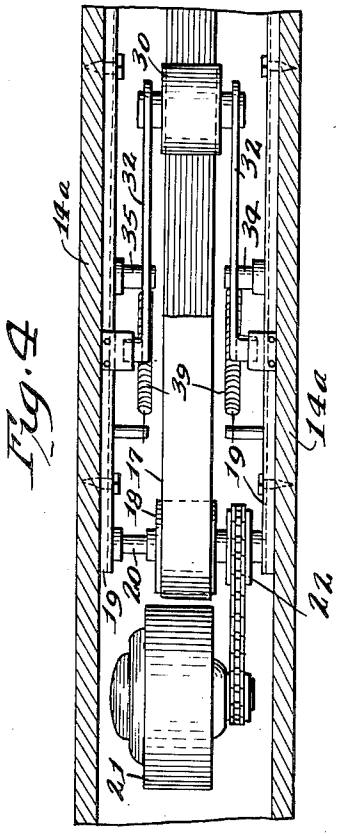


Fig. 4

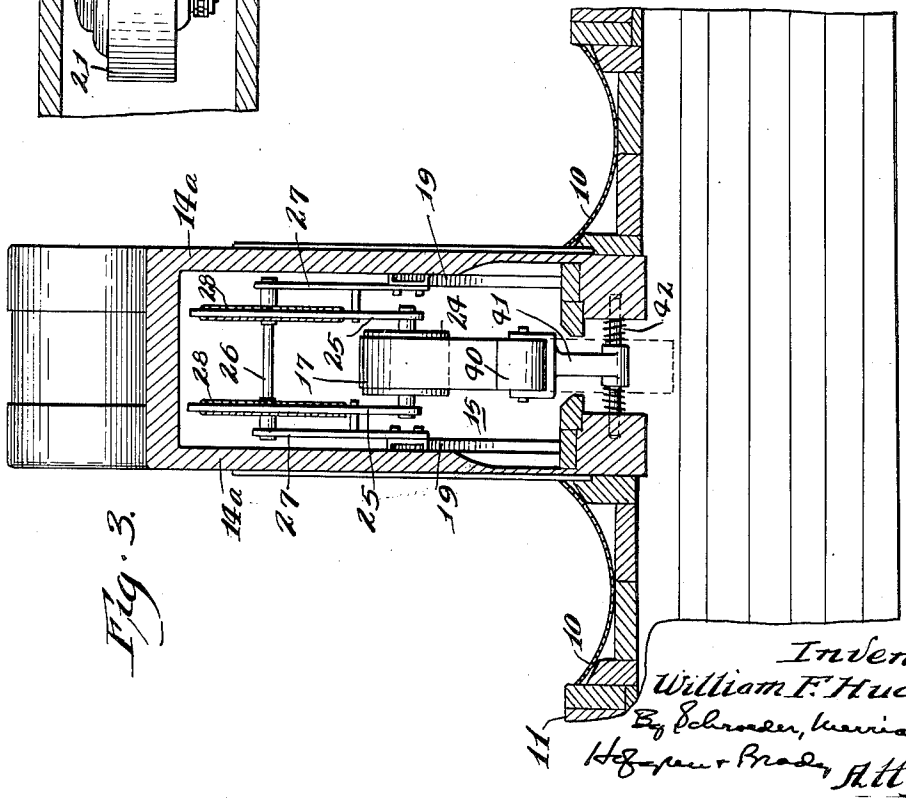


Fig. 3

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BELT-TYPE BOWLING BALL RETURN

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3 Claims. (Cl. 273—49)

1

This invention relates to an apparatus for returning bowling balls from the pit of a bowling alley to the return track, and more particularly to an endless belt which will return bowling balls of various sizes to the ball rack.

It is a general object of this invention to produce an improved automatic bowling ball return.

It is a more specific object of this invention to produce an endless belt in which the contour may be varied to enable the belt to propel bowling balls of various sizes through a return chute.

It is a further object of the invention to produce a bowling ball return mechanism in which a ball is initially propelled by contact with a moving belt to impart sufficient momentum for it to return to the ball return rack.

Another object is to provide a bowling ball return that is readily installed on existing alleys and which operates to return balls with a minimum of delay.

A further object of this invention is to produce a bowling ball return mechanism in which an endless belt has a drive pulley and a plurality of displaceable pulleys which cooperate to maintain the belt in contact with a bowling ball negotiating a return track.

Other and further objects of this invention will be apparent from the accompanying description and drawings in which:

Fig. 1 is a top plan view, partially in section, of a portion of a bowling alley having the ball return device of this invention located at one side thereof;

Fig. 2 is a side elevation, partially in section, illustrating the method of operation of this invention;

Fig. 3 is a sectional view taken along the lines 3—3 of Fig. 2; and,

Fig. 4 is a sectional view taken along the lines 5—5 of Fig. 2.

While my invention is susceptible of embodiment in many different forms, I have shown in the drawings and will herein describe 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.

In a bowling alley having pin boys employed by the alley owner to perform all of the manual operations, the employee retrieves balls from the pit at the end of the alley and places them on a return track over which the balls roll by

2

gravity to a rack. It is highly desirable to avoid this manual labor by having an automatic means by which bowling balls may be returned. The invention disclosed herein will not only place balls on the return track, but will accommodate any of the sizes of bowling balls normally used.

Referring to Fig. 1, an alley has a pin bed 11 located at the end thereof next to a pit 12. An alley ball gutter 10, adjacent the alley and pin bed terminates at one end of the pit. A cushion or back stop 13 arrests the passage of balls which have passed beyond the pin bed 11 and prevents the balls from damaging any of the various parts of the alley. The ball return device of this invention indicated generally at 14 is located along one side of the alley between adjacent spaced kickbacks 14a which are positioned adjacent one side of the alley ball gutter and pit. The ball return device will return a ball along an upwardly inclined portion 15 of a return track 16 leading from one side of the pit 12. The floor of the pit 12 is inclined slightly in the direction of the entrance to the track 16 so that a ball which has settled in the pit will roll into the track entrance.

An endless belt 17 composed of any standard belting material such as rubber or leather is positioned above the bottom of the portion 15 of the track 16 so that it forms a top over it. A driving pulley 18 mounted on a rotatable shaft 20, which is maintained in position between a pair of side plates 19, is rotatable by a motor 21 turning a pulley 22 which is also mounted on the shaft 20. The side plates 19 are mounted by any suitable means to kickbacks 14a. The motor 21 may be located in the pit for convenience. The end of the belt 17 opposite the pulley 18 runs around a pulley 24 rotatably mounted on a pair of lever arms 25 which pivot around a pivot shaft 26 mounted on a pair of supports 27 extending upward from the side plates 19. The lever arms 25 have a pair of biasing springs 28 anchored to extension pieces 29 on the side plates 19. The springs 28 bias the pulley 24 against the pull of the belt 17 and serve to maintain tension on the belt 17.

A pair of idler guide pulleys 30 and 31 are located between the pulleys 18 and 24. The pulleys 30 and 31 are rotatably mounted on the lever arms 32 and 33, respectively, which are in turn pivoted on pivot pins 34, 35, 36 and 37. The pivot pins 34–37 are mounted in the side plates 19. Each of the lever arms 32 and 33 has an offset portion 32a and 33a which is apertured for mounting a biasing spring 39. The biasing

springs 39 force the belt 17 in a downward direction with reference to Fig. 2 and maintain tension on the belt 17. In the absence of the springs 39 gravity alone would enable the pulleys 30 and 31 to maintain some tension on the belt 17.

The pulleys 30 and 31 are lined up with respect to the chute 14 so that the smallest bowling ball normally used would have a greater diameter than the distance separating the bottom of the chute 14 from the belt 17. Thus, no matter how small a ball is used, it would still make contact with the belt 17 and be propelled up the incline of the ball return track 16. If a large ball is used, the motion of the belt turning in the direction indicated by the arrows (Fig. 2) propels the ball forward in the chute and raises the pulleys 30 and 31 in accordance with the diameter of the ball being used. As shown in dotted lines, the pulleys 30, 31 and 24 would assume the positions indicated if a ball of large diameter were to be used. Thus, it may be seen that the three spring biased pulleys 24, 30 and 31 cooperate with one another to maintain tension on the belt 17 at all times and at the same time accommodate any size bowling ball used normally.

At the top of the chute 14 is a check mechanism comprising a roller 40, a mounting 41 and a biasing spring 42 (Figs. 1 and 3). When a ball advances along the track toward the rack the check pivots in the direction of the rack so that it ceases to form an obstacle against the passage of the ball. However, if some mishap occurs and a ball attempts to pass in the reverse direction the check prevents it from doing so.

While a single pulley could replace the two pulleys 30 and 31 it has been found that better control over the ball throughout its entire travel along the track 16 is exercised when both pulleys 30 and 31 are used as shown in the embodiment illustrated.

The device of the present invention may easily be installed in a bowling alley already in existance. The entire belt apparatus is attached to the side plates 19. Once a suitable mounting is constructed to which the side plates 19 may be attached the remainder of the installation is a simple matter consisting only of the attachment of the side plates 19 with the various elements appurtenant thereto and proper positioning of the motor 21 with respect to the pulley 18. Because of its accessibility it is convenient to service and maintain.

I claim:

1. In a bowling alley having an alley bed, and a pit adjoining the rear of said alley bed for receiving pins and balls from said alley bed, a bowling ball gutter having one side adjacent said alley bed, a pair of upwardly extending spaced parallel kickbacks adjacent the other side of said gutter, an automatic ball return for handling different sized bowling balls comprising, a ball return track having a substantially horizontal portion adjacent said pit and an upwardly inclined portion positioned between said kickbacks, a pair of belt-supporting side plates positioned between and secured to the adjacent kickbacks, a driven endless belt positioned between said side plates and above the horizontal and inclined portions of the track for engagement with a bowling ball to advance said ball along said track, a drive pulley for said belt mounted between said side plates at

the pit end of said belt, a tension-maintaining pulley for said belt mounted between said plates at the other end of said belt for movement in a substantially horizontal arcuate path; spring means for biasing said tension-maintaining pulley away from said drive pulley to maintain tension on said belt; a pair of arms positioned between and pivoted intermediate their ends on said plates for free movement between said side plates as determined by various sized bowling balls, a guide pulley mounted between the lower extremities of said arms and in engagement with the lower reach of said belt at a position above the junction between said substantially horizontal and inclined portions of the return track, and spring means connected between said plates and said pivoted arms below the pivot points thereof so as to bias said guide pulley into contact with said belt and urge the belt into contact with various sized bowling balls before they are initially propelled up said inclined track portion by said belt.

2. The apparatus claimed in claim 1 and including at least one other guide pulley to aid in maintaining said belt positioned over the inclined portion of said track in contact with various sized bowling balls as they are propelled along said track.

3. In a bowling alley having an alley bed and a pit adjoining the rear of said alley bed for receiving pins and balls from said alley bed, an automatic ball return for handling different sized bowling balls comprising, a ball return track having a substantially horizontal portion adjacent said pit and a succeeding upwardly inclined portion, a driven endless belt positioned above the horizontal and inclined portions of the track for engagement with a bowling ball to advance said ball along said track, a drive pulley for said belt positioned at the pit end thereof, a pivotally mounted tension-maintaining pulley for said belt positioned at the other end of said belt for movement in a substantially horizontal arcuate path, means for biasing said tension-maintaining pulley away from said drive pulley to maintain tension on the belt, a pivotally mounted guide pulley disposed above and in engagement with the lower reach of said belt at a position above the junction between said horizontal and inclined portions of the return track, and spring means connected to said guide pulley for biasing said pulley into contact with said belt and urging said belt into contact with various sized bowling balls prior to their reaching the inclined portion of said return track, the tension-maintaining and guide pulleys and their biasing means cooperating to maintain tension on said belt and to locate said belt variable distances above the horizontal and inclined portions of the ball return track, said location of said belt depending upon the sizes of the bowling balls propelled along said track.

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