The present invention relates to an elevating mechanism for bowling alleys of the type wherein bowling balls and bowling pins are elevated so that they can be discharged or deposited into a ball chute or magazine for the pins whereby the balls and pins are returned to their proper places.

The object of the invention is to provide a pin and ball channeller for a bowling alley ball and pin elevator, wherein certain important advantages are achieved or provided which are not found in prior devices of this nature, and wherein according to the present invention an adjusting mechanism is provided which permits parts to be set or adjusted to the desired position as desired. Another specific object of the present invention is to provide a pin and ball channeller for bowling alley elevating devices wherein the parts are constructed in a simple and efficient manner so that there will be less break-down and adjustment required, and wherein also there will be a considerable reduction in pin and ball damage, and since there will be less time out for repairs and adjustment, the bowling alleys will be in greater use so that they will be more profitable to the operator of the alleys.

A still further object of the invention is to provide a pin and ball channeller which is constructed so that cost of maintenance and repairs will be minimized, and the function of the present invention being to move the pin from the elevator into the magazine to be channeled to its proper place in the pin setting machine, and wherein the present invention also includes a means for moving the ball from the elevator into the ball chute so that the ball will be channeled back to the bowler, and wherein there is also provided a novel adjusting means for the mechanism.

Another object is to provide a pin and ball channeller which is simple and rugged in construction and economical to manufacture.

Other objects and advantages of the present invention will become apparent from the following description taken in conjunction with the accompanying drawings, wherein:

FIGURE 1 is an elevational view of the pin and ball channeller of the present invention, and with parts broken away and in section.

FIGURE 2 is a sectional view taken on the line 2--2 of FIGURE 1.

FIGURE 3 is an enlarged elevational view of the pin and ball channeller per se, and with parts broken away and in section.

FIGURE 4 is a sectional view taken on the line 4--4 of FIGURE 3.

FIGURE 5 is a sectional view taken on the line 5--5 of FIGURE 3.

FIGURE 6 is a horizontal sectional view illustrating certain constructional details of the present invention.

FIGURE 7 is a fragmentary elevational view illustrating a portion of the present invention.

Reverting in detail to the drawings, the numeral 20 indicates an elevator mechanism for a bowling alley which is shown to comprise a frame 21, and the frame 21 embodies spaced parallel vertically disposed back sub-frame members 22 and front sub-frame members 23. The numeral 25 indicates a converter or actuating the pins such as the bowling pins 26 and bowling balls 27 to the elevator 20, FIGURE 1. There is further provided vertically dis-
set portions 63 and a connecting web portion 64. The numeral 65 indicates an adjustable threaded rod or cap screw which extends through the web portion 64, and the rod 65 has a head 65' on one end thereof, there being nuts 66 and 66' threadedly engaging the rod 65, and the numeral 68 indicates a cylindrical bearing member on an end of the rod 65, the bearing member 68 being arranged in engagement with a portion of the bar 46.

There is further provided a means for insuring that the bowling pins are in their proper position as they are carried upwardly by the elevator, and this means comprises a pair of similar spaced apart body members 70, FIGURES 6 and 7, and each of the body members 70 includes a main straight section 71 which has a lower curved end 72 whereby securing elements can extend through the portion 72 and into engagement with the front sub-frame members 23. Each body member 70 further includes an off-set upper end 74. Clamps 75 are connected to the section 71, and the clamps 75 have apertures 76 for the projection therethrough of securing elements 77.

From the foregoing, it is apparent that there has been provided a pin and ball channeller for use with a bowling alley ball and bowling pin elevating mechanism, and, in use with the parts arranged as shown in the drawings, it will be seen that the bowling balls 27 and bowling pins 26 will be conveyed by the convey 25 into the elevator 29, as shown in FIGURE 1. The chains 33 are actuated by any suitable mechanism and the carriers 34 are suitably affixed to the chains 33, so that the balls 27 will be picked up by the opposed pairs of carriers 34, and similarly the bowling pins 26 will be picked up by the moving carriers 34 and the bowling pins 26 will travel upward in such a manner that the enlarged portions of the pins 26 are in a raised position as for example as shown in FIGURE 1. When the balls 27 reach the point indicated by the numeral 29, the upper end portion 53 of the elevator bar 50 will engage the ball 27 so as to discharge the ball 27 from the elevator into the chute 31.

When the pin 26 reaches a point as indicated by the numeral 39, the pin 26 will engage the top of the pin ejector bar 46 so that the pin 26 will be discharged from the carriers 34 and this pin 26 will drop into the magazine 32 to be conveyed away by the magazine.

It is to be noted that there is provided a bracket 60 which has its ends 61 fastened by means of securing elements to the members 22, and the adjustable rod 65 has the nuts 66 and 66' thereon, as shown in FIGURE 4. The bearing member 68 is secured to or formed integral with an end of the rod 65, and by rotating the rod 65 as for example by engaging a suitable tool such as a wrench in engagement with the head 66, the position of the bearing member 68 can be varied or changed as desired so that the position of the portion 48 of the bar 46 can be varied in order to regulate the tension as desired by the position 48 on the pins 26.

A further adjustment can be effected due to the provision of the adjustable base 35 as later described in this application.

Furthermore, a means is provided for insuring that the pins 26 travel upwardly on the elevator in their proper fashion or manner and this means includes a pair of spaced apart body members 70. The body members 70 are adapted to be secured to the front sub-frame members 23 by securing elements or bolts 73 and 77, and the body members include upper off-set or angular portions 74. Thus, in the event a pin is being moved upward in the wrong position, instead of in the proper manner with the smaller end portion of the pin downward, then the off-set portion 74 of the body members 70 will engage the pin to cause the pin to be positioned in the proper manner, that is with the smaller portion of the pin downward and the larger portion of the pin at the top.

The parts can be made of any suitable material and in different shapes or sizes.

Thus, it will be seen that there has been provided an improvement in an automatic duck pin setter for use in bowling alleys. The present invention includes the bar 50 which is adapted to be placed or positioned in the small end of the shaft to provide a large aperture for the ball 27 to be channeled from the shaft into the pin setting mechanism for return to the player as the ball is raised on the elevator. The bar 46 is longer than the bar 50, and the bar 46 consists of a spring steel member which is positioned in the same elevator shaft to provide a more narrow aperture to be channeled to direct in the small circumferenced bowling pin 26 into its separate channel or magazine 32, the bowling pin passing through the larger aperture therebelow which is defined by the portion 53 and the adjacent wall portions of the frame. The entire mechanism of the present invention includes only a few parts and embodies or has a simple operation so that repairs and maintenance and adjustments will be minimized, and also there will be less likelihood of the pins and balls getting stuck in the elevator. The spring 59 and bolt 57 and nut 58 provide a means for adjusting the aperture which is governed by the top section 53 of the bar 28. The bracket 60 is used to adjust the apertures governed by the top of the bar 46.

Some of the further advantages of the present invention are as follows. There is a far greater simplicity of operation provided by the present invention as compared to presently used devices, there is less breakage and adjustment required, a considerable reduction in pin and ball damage will be provided for due to the fact that the old or prior mechanism propel both objects with greater force and often cause them to come in contact with grease. Also, the cost of maintenance and repairs is far less due to the fact that one man, for example, can service more machines than has been possible before.

The pin and ball return assembly of the present invention is adapted to replace the existing pin and ball kick assembly which is powered by gears, shafts, slide bars, cams, rollers, bell crank assemblies and the like. This prior construction consists of approximately 97 parts which are costly to replace or repair, and the prior devices have been costly in time as far as maintenance and adjustment is concerned and also as far as damaging to the balls and pins.

The function of the pin and ball return assembly of the present invention is to move the pin such as the pin 26 from the elevator 29 into the magazine 32 to be channeled to the proper place in the pin setting machine. If, and each time, the machine also moves the ball such as the ball 27 from the elevator into the ball chute 31 to be channeled back to the bowler by means of the two spring steel bars, and the adjustable base 35 which consists of the adjustable blocks 36 and 37 and their associated parts, and these blocks 36 and 37 may be made of a suitable material such as aluminum. This device is mounted on the existing cross-piece 24 across the back of the pin setter by a suitable securing element. The adjustment bracket 60 and set screw or rod 65 are mounted on the sub-frame of the elevator to adjust the pin ejector 46 by two studs. The adjustment bracket 60 is shaped as shown in FIGURE 5 so that it has maximum strength, and the screw or rod 65 has lock nuts 66 and 66' on both sides of the web portion 64 of the bracket. The small round rod or bearing member 68 on the end of the member 65 serves to protect the bar 46 from abrasion at any time.

The pin ejector 46, and the blocks 36 of the adjustable base, are securely mounted to the existing cross bracket of the pin setter, and the ejector bar 46 is left free at the top to spring each pin into the magazine as it passes up the elevator.

The ball ejector 50 is mounted or fastened to the block 37 of the adjustable block or base, and is adjusted to
spring the balls into the chute 31 with the aid of the existing deflector which is located under the ball chute at an angle to press the ball against the ejector 50, and this causes much stress on the ejector 50. To relieve this stress on the ejector, the adjustable block was designed to give ejector 50 its full length of flexibility and will provide means for adjustment of the ejector 50, and wherein there is insured easy assembly, flexibility, and adjustment. The blocks 36 and 37 are recessed or cut away so as to provide sufficient clearance for the spring 59 and adjacent parts. The pin or bolt 44 serves to lock the blocks 36 and 37 together and the adjustment spring 59 is held in place by means of the bolt 57 and the parts are constructed so as to permit convenient adjustment thereof.

The present invention will eliminate substantially all of the jamming of elevators and the present invention embodies a rugged and simple construction which utilizes only a very few parts, and also, damage to the pins and balls will be minimized or prevented. Less time for maintenance and repair is required and wear and tear on the equipment is reduced. The ejector bars are adapted to be made of a suitable material such as spring steel which is properly tempered to give proper flexibility. Due to the fact that there will be less damage to the pins, the bowling pins will last longer and this is an important saving in the operation of bowling alleys. The adjustable features of the present invention are also an important advantage over prior devices which have been utilized. Minor changes in shape, size and rearrangement of details coming within the field of invention claimed may be resorted to in actual practice if desired.

What is claimed is:

1. In a device of the character described, a bowling alley elevator, a conveyor for conveying bowling balls and pins to said elevator, a chute for receiving the bowling balls, a magazine for receiving the bowling pins, movable chains having carriers connected thereto, means for causing the balls and pins to be discharged from the carriers into said chute and magazine, said last named means embodying a pair of body members positioned contiguous to the front sub-frame members of the framework, each of said body members comprising a main straight section having a curved lower end, an off-set upper end, apertured clamps connected to said main straight sections, and securing elements connecting said clamps and curved lower ends to the front sub-frame members of said framework.

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