Sept. 4, 1951 G. HUMBER 2,566,987

MEANS FOR RESETTING BOWLING PINS

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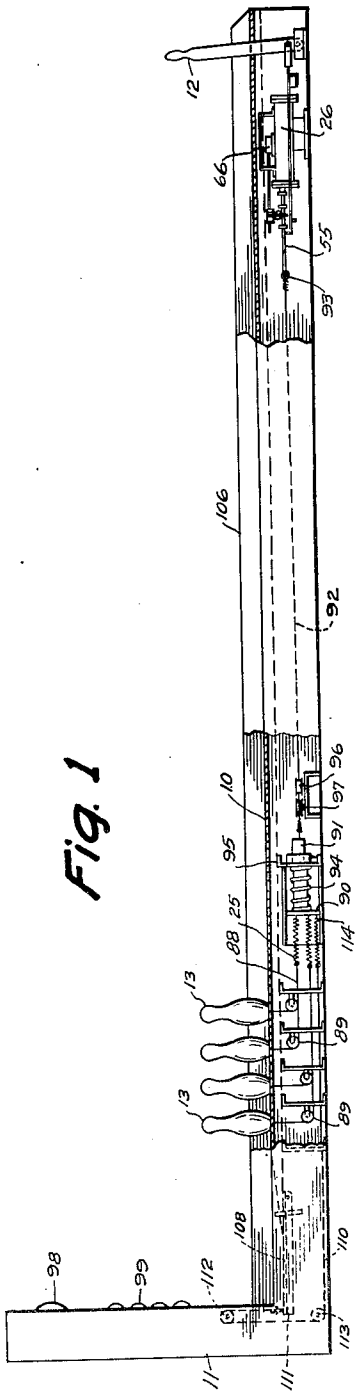


Fig. 1

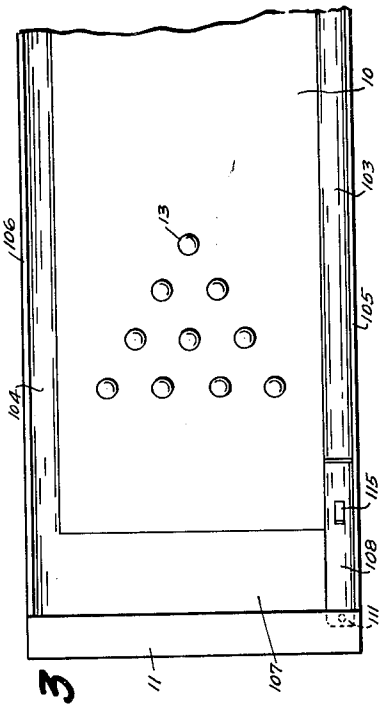


Fig. 3

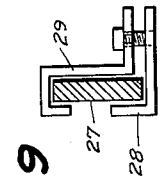


Fig. 9

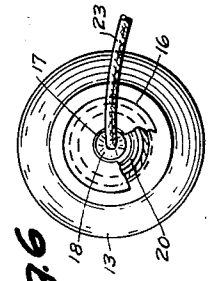


Fig. 6

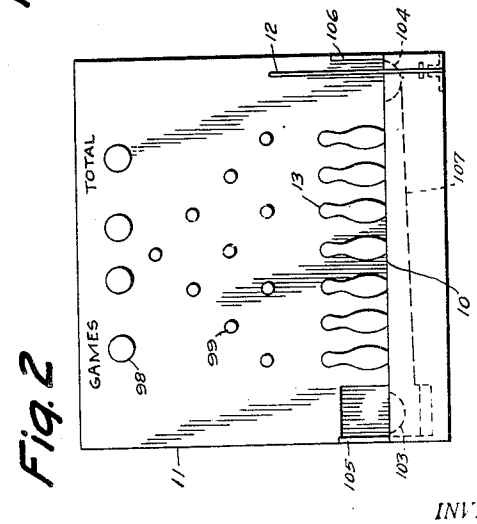


Fig. 2

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MEANS FOR RESETTING BOWLING PINS

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Fig. 4

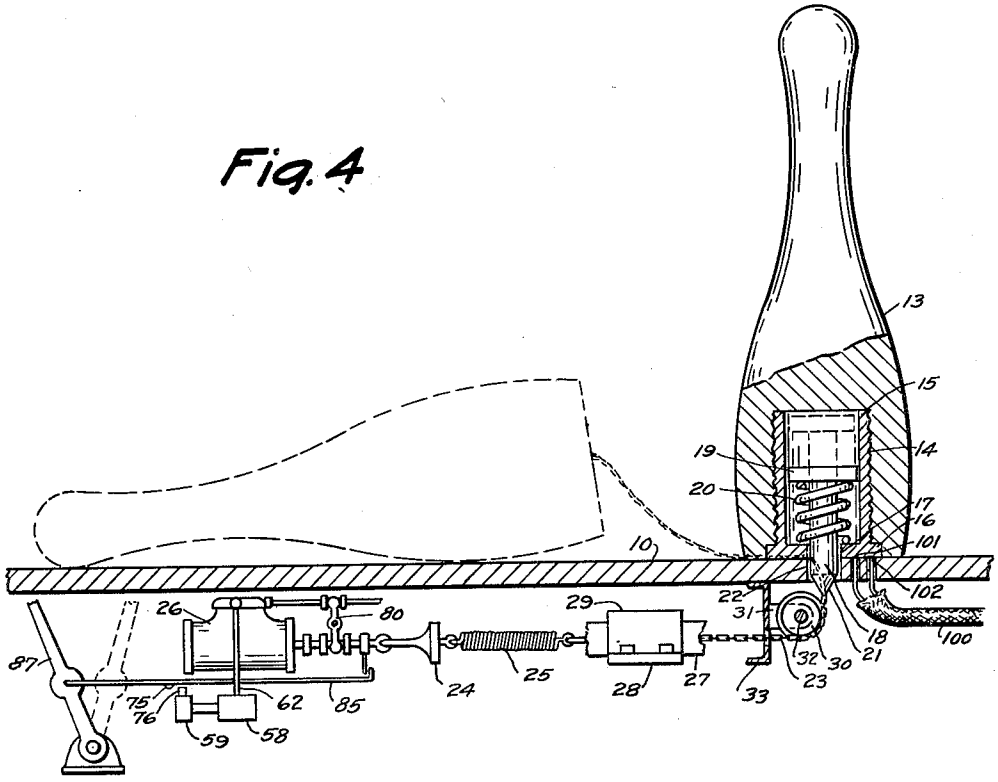


Fig. 5

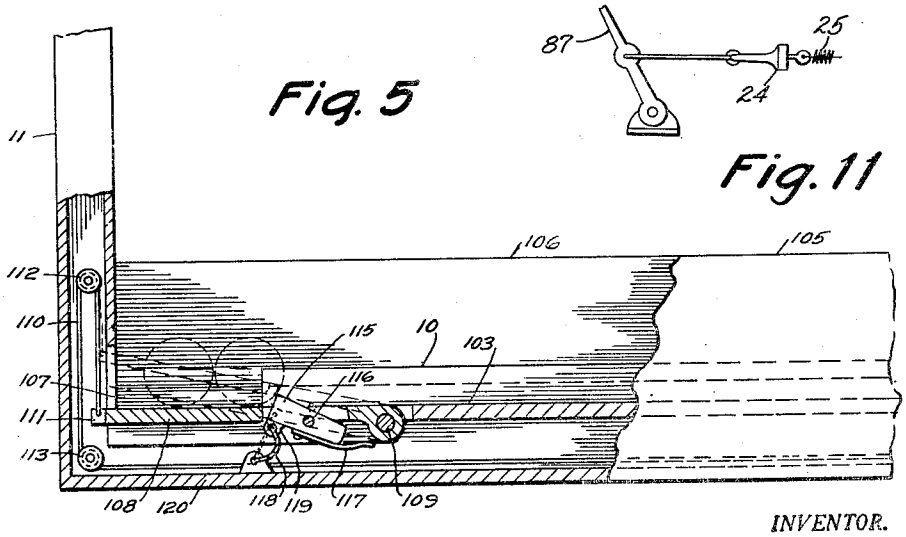


Fig. 11

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Fig. 7

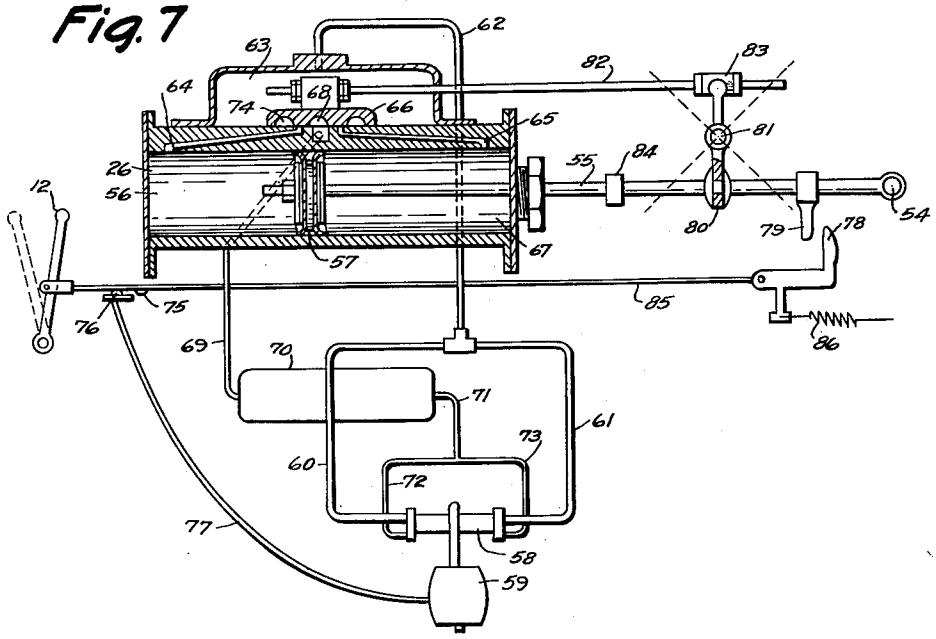
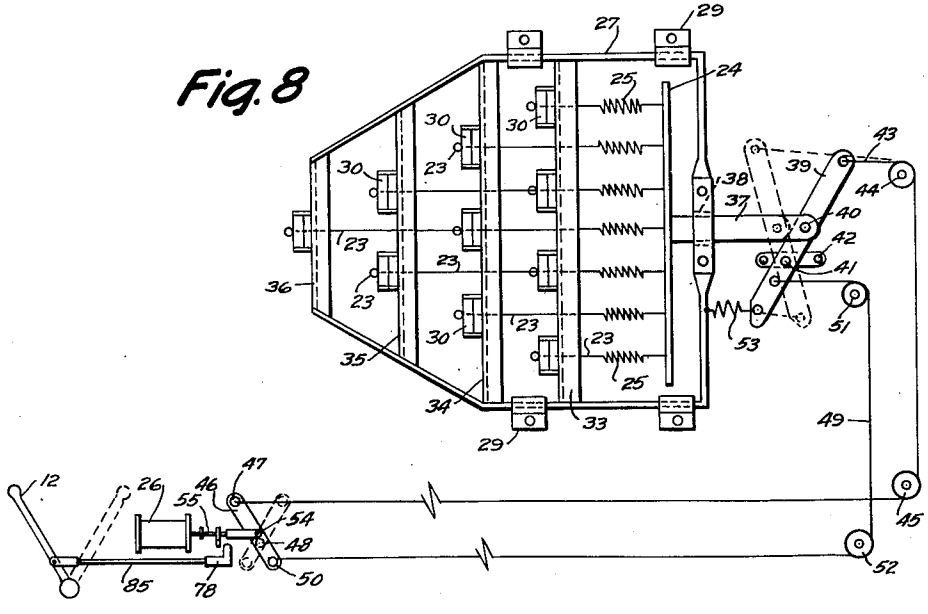


Fig. 8



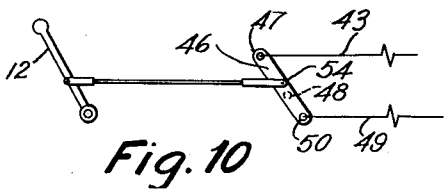


Fig. 10

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MEANS FOR RESETTING BOWLING PINS

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Application February 19, 1946, Serial No. 648,607

5 Claims. (Cl. 273—45)

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This invention relates to a game device and particularly to a bowling alley wherein, after the balls are rolled, the bowling pins knocked over may be accurately stationed with respect to each other and set in an upright position by the player from the playing end of the alley.

A bowling alley requires a player and an accomplice, known as a pin boy, as it requires time and is inconvenient to travel to the far end of the alley to set up the pins. This invention therefore contemplates the use of instrumentalities whereby the pins may be returned to their upright positions.

For accurate or skillful playing, it is also required that the pins be exactly positioned, and to accomplish this purpose, the device of this invention includes pilot pins in the tenpins that may readily be drawn outward to extend for a snug fit in openings in the floor of the alley whereby, with the openings in their correct positions, the pins will be returned to their exact positions.

In bowling, it is desired that the pins have considerable freedom of movement so that they may not only be knocked over but may roll freely and therefore, where the pins are attached to cables, it is essential that considerable slack be provided in the cables and also that means must be provided for taking up the slack when the cables draw the pins to their upright positions.

Tenpins are comparatively heavy and as all of the pins may be knocked down at one time, considerable force is required to return the pins to their upright positions. For this reason the invention includes a pressure cylinder whereby fluid under pressure is applied to a piston for operating the pin returning means.

Various devices have been provided for mechanically returning tenpins to their upright positions, both from above and below the alley, but any device that holds the pins from above causes interference with the movement of the pins and devices now in use that operate through holes in the floor of the alley do not return the pins to their exact positions or do not provide freedom of movement of the pins.

The object of this invention is to definitely locate the pins by drawing locating devices from the interior of the pins through receiving openings in the floor and then releasing these devices so that they may be returned by resilient means to positions inside of the pins.

Another object is to provide a frame which may be connected through cables or the like to each pin so that all of the pins may be returned in unison to their upright positions.

With these and other objects in view, the invention embodies a bowling alley having a floor provided with openings adjacent one end thereof, and bowling pins positioned adjacent each of

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the openings in the floor, means resiliently held in the pins adapted to register with the said openings, means drawing the pins to the openings and their upright positions with the locating means extending through the openings, and means releasing the pin returning means.

For a full and more complete understanding of the invention, reference may be had to the following description and accompanying drawings, wherein:

Figure 1 is a view showing a side elevation of the bowling alley with parts broken away showing the interior construction.

Figure 2 is an end elevation looking towards the far end of the bowling alley.

Figure 3 is a plan view showing the far or rear end of the bowling alley with the forward or playing end broken away.

Figure 4 is an enlarged detail illustrating the interior construction of the pins and showing a modified form in which an operating lever is positioned at the back of the alley.

Figure 5 is a detail showing a side view of the far end of the alley illustrating the construction of the ball returning means.

Figure 6 is a detail showing the bottom of one of the pins with part broken away.

Figure 7 illustrates a compression cylinder for operating the pin set up and ball return means.

Figure 8 is a diagrammatic view illustrating a typical layout of the pin return and set up mechanism.

Figure 9 is a detail showing a section through the frame illustrated in Figure 8, showing a clamp for holding the frame.

Fig. 10 is a diagrammatic view, similar to Fig. 8 and showing manually operable means for operating the pin return and set-up mechanism;

Fig. 11 is a view similar to Fig. 10 and showing the manual operation of the mechanism depicted in Fig. 4.

Referring now to the drawings wherein like reference characters denote corresponding parts, the bowling alley is provided with a floor 10, having a panel 11 at the far end, an operating lever 12 at the playing end, and pins 13 that may be positioned on the floor a convenient distance from the playing end or from the panel 11.

The pins 13, as illustrated in Figure 4, are provided with metal inserts 14 adapted to be held in recesses 15 in the large or lower ends, and the outer ends of the inserts are formed with flanged heads 16 having central openings 17, for slidably holding inner pilot pins 18. The pilot pins 18 have heads 19 that are slidable in the inserts, and these are resiliently held inward in the position indicated by the dotted lines in Figure 4, by springs 20. The outer ends 21 of the pilot pins are pointed to facilitate entrance thereof into openings 22 in the floor 10 of the bowling alley.

The openings 22 are only slightly larger than the pins so that as the pilot pins are drawn downward into the openings, as shown in Figure 4, they will definitely locate the pins 13 over the openings and therefore, in their correct positions on the floor of the bowling alley. After the pins are in position, the pilot pins are released so that the springs 20 may draw the pins upward to the position indicated in dotted lines, and the points 21 will be above the surface of the floor of the alley. With the holding means released, the pins are free to be knocked over to the position indicated by the dotted lines.

Cables 23 are connected to the points 21 of the pilot pins of each of the tenpins, and these cables are connected to a common element 24 through springs 25. The element 24 may be directly connected to a pressure cylinder 26, shown in detail in Figure 7, or this may be directly connected to an operating lever or any means by which it may be manually drawn away from the pin openings in the floor of the alley, as shown in Fig. 11. The means secured to each of the cables 23 for exerting a force to pull each of the pilot pins 18 into the adjacent opening in the floor 10 to accurately station each of the bowling pins in an upright position over the adjacent openings comprises springs 25, element 24, rod 85, and lever 87. This means may also include the pressure cylinder 26.

In the designs shown in Figures 4 and 8, the member 24 is positioned in a stationary frame 27 that is supported in clamps formed by a base plate 28 and a clip 29, as shown in Figure 9, and the cables 23 pass over rollers 30 mounted in brackets 31 through shafts 32, with the brackets on cross members 33, 34, 35, and 36.

In the design shown in Figure 8, the member 24 is formed with an extending tongue 37 slidably mounted at the point 38 in the frame 27, and the outer end of the tongue is pivotally connected to a lever 39 at the point 40. The lever 39 is pivotally mounted on a bracket 42 at the point 41, and the long end is connected by a cable 43, which extends around pulleys 44 and 45 to a lever 46 at the point 47, and the lever is pivotally mounted at the point 48. The lever 46 is illustrated in full lines in the position wherein the cables and springs are in tension, at which time the pins have been drawn from their knocked over positions to their upright positions and are standing over the openings, as shown by the full lines in Figure 4. When the lever 46 is released and moves to the position indicated in dotted lines, the cables 23 and 43 will be slack so that the pilot pins 18 may move upward in the pins 13 to free the pins for the next play. In this movement, the lever 39 moves to the position indicated in dotted lines with the cable 49 connected to the opposite end thereof, and also to the opposite end 50 of the lever 46 through pulleys 51 and 52, permitting the lever 46 to assume the same position. The cable 49 is held in tension by a spring 53 connected to the short end of the lever 39 and to the stationary frame 27.

The lever 46 is pivotally attached at the point 54 to the piston rod 55 of the pressure cylinder 26, shown in detail in Figure 7, and, as pressure is applied to the end 56 of the cylinder, the piston 57 will move toward the opposite end, thereby moving the piston rod 55 and lever 46 from the dotted line position of the lever 46 to the position indicated in full lines. The lever 12 upon being pulled from the full line position to the dotted line position shown in Figure 7 causes the piston

57 to go to the end 56 of the cylinder 26. In this position the pilot pins 18 are in the openings in the floor 10 as shown in Figure 4 and the bowling pins have been drawn to an upright position and the cables 23 are taut. Upon the lever 12 being moved from the dotted line position to the full line position shown in Figure 7 the piston 57 goes to the end 67 of the cylinder 26. In this position the pilot pins 18 have been withdrawn from the openings in the floor 10 and by reason of the springs 20 said pilot pins have been drawn to a position completely within the respective bowling pins and the cables 23 are slack.

The pressure cylinder 26 is controlled by a pump 58 operated by a motor 59 with the discharge end of the pump connected by pipes 60, 61 and 62 to a distributing chamber 63, and from the chamber 63, the fluid under pressure, passes to the opposite ends of the cylinder 26 through passages 64 and 65, which are opened and closed by a slide valve 66. The slide valve is illustrated as being in the neutral position, and it will be noted that as it moves toward the end 67 of the cylinder the passage 65 will communicate through a central opening 68 to a return connection 69 and thereby through a reservoir 70 to the suction of the pump 58 through pipes 71, 72, and 73. At the same time, the opening 74 in the slide valve will connect the passage 64 to the pressure chamber 63, so that pressure will be admitted to the end 56 of the cylinder, thereby causing the piston 57 to move toward the opposite end. The pressure cylinder is controlled by the operating lever 12, and it will be noted that as the lever is drawn backward or from the full line position to the position indicated by dotted lines in Figure 7 a button 75 will engage a contact 76 closing a circuit to the motor 59 through wire 77, whereby pressure will build up in the system. As the lever 12 continues to move, a trip 78 will engage a stop 79 on the piston rod 55 drawing the stop against a shift lever 80 pivoted at the point 81, and the opposite end thereof will draw a valve rod 82 of the slide valve 66 backward through a member 83, thereby opening the end 67 of the cylinder to the discharge and admitting pressure to the opposite end, which will return the piston and operate the lever 46 as described. As the lever 46 reaches the position indicated in dotted lines, a stop 84 on the piston rod, which will be in engagement with the end of the lever 80, will have moved the lever a sufficient distance to return the slide valve 66 to the position shown in the drawing or neutral position, and during this movement, the stop 79 will engage the trip 78, and, through the rod 85, draw the lever 12 to the position in full lines in Figure 7. The trip 78 is engaged by a spring 86 to hold the lever 12 in the full line position shown in Figure 7. In the design shown in Figure 4, the operating instrumentalities are illustrated as positioned at the pin end of the bowling alley with the control lever 87 corresponding to the lever 12 connected to the rod 85, and by this means, the pins may be set up by an accomplice or pin boy. In this design, the pressure cylinder 26 is controlled by a pump 58 operated by a motor 59 similar to corresponding parts in the design shown in Figure 7.

In the design shown in Figure 1, the pilot pins 18 of the pins 13 are connected to cables 88 which pass over rollers 89, and the cables are connected through springs similar to the springs 25 to a member 90 similar to the member 24. The member 90 is provided with an extension 91 that is

connected to a cable 92, and the opposite end of the cable is connected at the point 93 to the piston rod 55. In this design, a spring 94 is positioned between the member 90 and a stationary member 95, and as the pins are drawn to the upright position, this spring will be compressed. As the pressure is released, the spring will return the member 90 to the position shown. The cable 92 passes over pulleys 96 and 97 to the side of the alley so that the lever may be positioned at the side as shown in Figure 2. The panel 11 at the end of the alley is provided with lights 98 and suitable switches therefor (not shown), to indicate the scores, and lights 99 corresponding to the positions of the tenpins may also be provided on the panel, and connected by suitable wires to their respective pins. Cables 100 with wires therein connected to contacts 101 and 102 in the floor of the alley, as shown in Figure 4, extend from each pin through a suitable source of electric current to the lights 99, and with the pins in position, the member 16 will contact the points 101 and 102, completing circuits to the lights, whereas, as the pins are knocked over, the circuits will be broken and the lights will be extinguished. After a ball is rolled so that it knocks over some of the pins, the pins remaining will complete circuits to light their corresponding lights, whereas the lights of the pins knocked over will be extinguished.

Troughs 103 and 104 are provided at the sides of the alley, and the alley may also be provided with sides 105 and 106 so that balls that roll to the side may continue down the troughs to the far end, and at the far end is an inclined surface 107, down which the balls will roll to an elevator 108 at the far end of the trough 103.

The elevator 108 is pivotally mounted on a pin 109, and this may be drawn upward by a cable 110 connected to a projection 111 at the far end. The cable passes upward over a pulley 112, and then downward and backward, passing around a pulley 113 so that it may be connected to the member 90 through a spring 114 as shown in Figure 1. As the member 90 is drawn backward to return the pins to their upright positions, it will also draw the elevator upward through cable 110, and return the balls to the playing end of the alley. The elevator 108 is provided with a stop 115 pivotally mounted on a pin 116 and resiliently held upward by a spring 117 which, as shown in Figure 5, holds the balls at the far end of the alley until a play has been completed. As the elevator is drawn upward by the cable 110, a strap 118 attached to the stop through a lug 119, and also to the floor 120 of the alley, stops the upward movement of the stop so that, as the elevator reaches the upward position, the stop will be flush with the floor thereof, permitting the balls to roll downward into the trough 103 in which they will roll back to the playing end of the alley.

The construction of the device will be readily understood from the foregoing description. The bowling alley may be provided as illustrated with the operating lever positioned at either end of the alley, and with the pins set up in their normal positions, a player may roll the balls down the alley, and as pins are knocked down, they will be indicated by the extinguished lights on the panel 11. When a player has completed his play and the number of pins knocked down noted, the lever 12 may be operated to either set up the pins direct or operate the pressure cylinder to draw the pins to their respective upright positions. When the pins are in their upright positions, all of the lights are again lighted, and as the lever 12 is released, the holding cables will be slack so that the pilot pins 18 may be moved upward in the pins and the pins released ready for play.

While preferred specific embodiments of the invention are hereinbefore set forth, it is to be clearly understood that the invention is not to be limited to the exact constructions illustrated and described because various modifications of these details may be provided in putting the invention into practice within the purview of the appended claims.

What is claimed is:

1. In a means for resetting fallen bowling pins in a bowling alley having a floor provided with openings adjacent one end thereof and fallen bowling pins positioned adjacent each of said openings upon said floor, each of said bowling pins being provided with a recess extending inwardly from one end thereof, a pilot pin positioned in the recess in each of said bowling pins for longitudinal slidable movement therein and having one end positioned adjacent said one end of said bowling pin, a plurality of cables positioned below said floor and having one of their ends secured to said one end of the adjacent one of said pilot pins, the other end of each of said cables extending toward the other end of said floor, means secured to said other end of each of said cables for exerting a force to pull said one end of each of said pilot pins into the adjacent opening in said floor to accurately station each of said bowling pins in an upright position over its adjacent opening, and resilient means circumposed about each of said pilot pins and urging the latter toward the other end of the adjacent bowling pin to pull the pilot pins out of the adjacent openings in said floor and into a position within the adjacent bowling pin.

2. In a means for resetting fallen bowling pins in a bowling alley having a floor provided with openings adjacent one end thereof and fallen bowling pins positioned adjacent each of said openings upon said floor, each of said bowling pins being provided with a recess extending inwardly from one end thereof, a pilot pin positioned in the recess in each of said bowling pins for longitudinal slidable movement therein and having one end pointed, said one end being positioned adjacent said one end of said bowling pin, a plurality of cables positioned below said floor and having one of their ends secured to said one end of the adjacent one of said pilot pins, the other end of each of said cables extending toward the other end of said floor, means secured to said other end of each of said cables for exerting a force to pull said one end of each of said pilot pins into the adjacent opening in said floor to accurately station each of said bowling pins in an upright position over its adjacent opening, and resilient means circumposed about each of said pilot pins and urging the latter toward the other end of the adjacent bowling pin to pull the pilot pins out of the adjacent openings in said floor and into a position within the adjacent bowling pin.

3. In a means for resetting fallen bowling pins in a bowling alley having a floor provided with openings adjacent one end thereof and fallen bowling pins positioned adjacent each of said openings upon said floor, each of said bowling pins being provided with a recess extending inwardly from one end thereof, a pilot pin posi-

tioned in the recess in each of said bowling pins for longitudinal slidable movement therein and having one end positioned adjacent said one end of said bowling pin, a plurality of cables positioned below said floor and having one of their ends secured to said one end of the adjacent one of said pilot pins, the other end of each of said cables extending toward the other end of said floor, a roller element dependingly supported from said floor adjacent each of said openings and adapted for bearing engagement with the adjacent one of said cables, means secured to said other end of each of said cables for exerting a force to pull said one end of each of said pilot pins into the adjacent opening in said floor to accurately station each of said bowling pins in an upright position over its adjacent openings, and resilient means circumposed about each of said pilot pins and urging the latter toward the other end of the adjacent bowling pin to pull the pilot pins out of the adjacent openings in said floor and into a position within the adjacent bowling pin.

4. In a means for resetting fallen bowling pins in a bowling alley having a floor provided with openings adjacent one end thereof and fallen bowling pins positioned adjacent each of said openings upon said floor, each of said bowling pins being provided with a recess extending inwardly from one end thereof, an insert positioned in the recess in each of said bowling pins and secured to the adjacent bowling pin, a pilot pin positioned in each of said inserts for slidable movement longitudinally in the adjacent bowling pin and having one end positioned adjacent said one end of the adjacent bowling pin, a plurality of cables positioned below said floor and having one of their ends secured to said one end of the adjacent one of said pilot pins, the other end of each of said cables extending toward the other end of said floor, means secured to said other end of each of said cables for exerting a force to pull said one end of each of said pilot pins into the adjacent opening in said floor to accurately station each of said bowling pins in an upright position over its adjacent opening, and resilient means circumposed about each of said pilot pins and urging the latter toward the other end of the adjacent bowling pin to pull the pilot pins out of the adjacent openings in said floor and into a position within the adjacent bowling pin.

5. In a means for resetting fallen bowling pins in a bowling alley having a floor provided with openings adjacent one end thereof and fallen bowling pins positioned adjacent each of said openings upon said floor, each of said bowling pins being provided with a recess extending inwardly from one end thereof, an insert positioned in the recess in each of said bowling pins and

secured to the adjacent bowling pin, one end of said insert being provided with a flanged head having a central opening, said one end of said insert being positioned adjacent said one end of the adjacent bowling pin, a pilot pin positioned in each insert for slidable movement longitudinally in the adjacent bowling pin and having one end positioned adjacent said one end of said bowling pin, each of said pilot pins being provided with a head on the other end thereof, a plurality of cables positioned below said floor and having one of their ends secured to said one end of the adjacent one of said pilot pins, the other end of each of said cables extending toward the other end of said floor, means secured to said other end of each of said cables for exerting a force to pull said one end of each of said pilot pins into the adjacent opening in said floor to accurately station each of said bowling pins in an upright position over its adjacent opening, and resilient means circumposed about each of said pilot pins and having one end bearing against the head of each of said pilot pins and having its other end bearing against the flanged head on the adjacent insert, said resilient means urging the adjacent pilot pin toward the other end of the adjacent bowling pin to pull the pilot pins out of the adjacent openings in said floor and into a position within the adjacent bowling pin.

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