The invention relates to a mechanism for returning a bowling ball from the pit of a bowling alley to the players' end of the alley.

An object of the invention is to provide a particularly simple and effective apparatus for delivering a bowling ball from the pit of a bowling alley to a return runway in a manner requiring a minimum amount of attention and effort by an attendant of the alley.

Another object is to provide a bowling ball return mechanism of the character described in which each operative cycle thereof is automatically initiated by a ball delivered to it from the alley pit and is automatically terminated by action of the mechanism.

An added object is to provide for a ball return mechanism having the timing and/or scopes of operation of its operative parts independently adjustable to adapt it to various bowling alley installations.

A further object is to provide a ball return mechanism of the character described which may serve two adjacent bowling alleys.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth or be apparent in the following description of a typical embodiment thereof, and in the accompanying drawings, in which:

Figure 1 is a side elevation of an installation of the present ball return mechanism at the pit portion of a bowling alley, an elevator cage of the mechanism being shown in ball-receiving position in a sectionally-shown portion of the alley structure.

Figure 2 is an enlarged sectional and fragmentary view of a cage-support means of the mechanism.

Figure 3 is an enlarged sectional view of an electromagnet shown in Figure 1.

Figure 4 is an enlarged fragmentary and partly sectional view of a portion of the mechanism shown in Figure 1.

Figure 5 shows the installation of Figure 1, but is taken from the opposite side of the mechanism and discloses the cage in raised ball-discharging position, certain elements being shown in section or broken away.

Figure 6 is an enlarged perspective view of the device which ejects the ball from the raised cage.

Figure 7 is a perspective view of the elevator cage.

Figure 8 is an enlarged rear elevation of the mechanism taken on the broken line 8——8 in Figure 1.

Figure 9 is an enlarged front view of the mechanism.

Figure 10 is a plan view taken below line 10——10 in Figure 1.

Figure 11 is a sectional elevation taken at the line 11——11 in Figure 1.

Figure 12 is a section taken at the line 12——12 in Figure 8.

Figures 13 and 14 are diagrammatic showings of the control mechanism and its electric circuit.

For purposes of illustration, I have shown my invention as applied to a pair of mutually adjacent bowling alleys 15 comprising alley beds 16' bounded by alley troughs 15' for receiving balls rolling from the beds before they reach the zones of the bowling pins, said alleys having a common ball-return runway 16' between them and terminating at usual alley pit depressions 17 having more-or-less horizontal floors 17'. A dividing wall or pickback 18 separates the pits 17 and extends forwardly therefrom as a support for the elevated ball-receiving end portion 16' of the ball-return runway, it being noted that a descending reverse-curve portion 16'' of the runway connects the portion 16' with the runway floor-level portion (not shown). The runway portions 16' and 16'' may comprise mutually spaced rails which cooperatively provide the equivalent of a trough for guiding and retaining a ball 19 rolling therealong, it being understood that the momentum acquired by a ball rolling down the runway portion 16'' is arranged to effect its rolling delivery to the players' end of the alley. Near its rear end, the wall 18 has a lower portion 18' over which a pin-setting attendant may step in passing between the pits of the alleys 15 for serving both.

As is usual, the thickness of the wall 18 slightly exceeds the diameter of a bowling ball, and the elevator means of my ball-return mechanism is installed in said wall opposite the forward pit corners thereat. As particularly shown, a ball-conveying cage 21 is provided for receiving a ball 19 and for its subsequent guided raising in an upright guideway which in the present instance comprises the bore 22' of a tubular member 22. The forward side of the bore 22' is substantially coplanar with the forward pit sides, and the member 22 is provided at opposite sides thereof with openings 22'' extending from the pit floor level and registering with circular wall openings 17'' for freely receiving balls which may be rolled thereunto from either pit.

It will now be noted that the cage 21 comprises bottom and top parts 23 and 24 which are of cir-
cular outline and are connected by relatively narrow side members 25 whereby the generally cylindrical cage has open sides and is arranged for rectilinear motion within the guide blocks 22'. At its upper side, the ball-supporting platform comprising the cage bottom 23 provides a centering seat for a bowling ball 19 in the cage, said seat, in the present case, being provided by the bevilled-off corners of blocks 25' fixed upon its bottom 23. The cage 21 is arranged for constant support by a rod 26 extending from its top 24, said rod being of rectangular section. The cage connection for the rod 26 is presently provided by its extension through a complementary opening 24' provided centrally in the cage top, with a crosspin 26' engaged through the rod beneath the top 24. The present supporting connection of the cage with the rod permits a full return stroke of the rod if a ball falls into the guideway while the cage is raised, the bottom of the cage being padded to avoid damage to the ball.

Since the line of delivery of a ball 19 from a pit floor 17' is perpendicular to the line of the railway 16, it is necessary that the cage 21 be rotated through a ninety degree angle before the ball may be delivered thereto via the support rod 26 passing through a complementary hole of a guide-block member 21 which is fixedly disposed sufficiently above the railway to permit a ball-delivering positioning of the cage with respect to the ball-receiving portion 16'. As particularly shown, the guide-block 27 is fixed within the bottom end of a fixedly-supported tubular member 28, and the rod 26 extends through said stuffing box 28' provided below the guide-block 27 whereby it sealed in the guideway opening of the block and the lower tube portion may contain a lubricant for the rod. It will be understood that the present provision for rotating the cage 21 during its lifting is generally required for single alleys as well as for alley pairs.

The support rod is arranged to constantly extend above the guide block 27, and its upper end is connected to a flexible support member 25 by means of a suitable swivel connection 31 whereby the member 29 need not be twisted as the rod 26 is rotated by reason of its reciprocation through the block 27. Near its upper end, the tubular member 28 mounts a pulley wheel 32 which extends radially from the axis thereof through an axial slot 28' at the forward side of the member, and has the flexible member 29 extending over it to a mechanism by which it may be actuated in pulling and return strokes to reciprocate the cage 21 in whirling cycles thereof. As shown, ears 32 provided on the member 28 at the sides of the slot rotavely support the pulley wheel 32 on a spindle 33' connecting them.

Means are provided whereby a ball 19 is arranged to be automatically and positively ejected from the cage 21 when the latter is raised to its delivery position with respect to the upper railway portion 16'. As particularly shown, an upstanding arm 34' of a standard 34, which is fixed to the top of the wall 18 rearwardly of the cage guideway, mounts a member 35 in the form of a bellcrank lever having arms 36 and 37 which are angularly related. The arm 37 of the member 35 is arranged for swinging outwardly from a normal position in which it is gravitationally held parallel to the standard 34' for swinging into the cage space, and carries a suitable ball-engaging head block 31' at its bottom end.

The arm 35 of the member 35 extends over the cage guideway in a direction parallel to the top 24 of the cage as the latter reaches its limiting raised position as controlled by the support rod 26. The arm 36 of the present member 35 mounts a head 36' for contact with the rising cage top 24 for rocking the member to push or kick a ball 19 from the cage as a rising movement of the cage ends; preferably, and as shown, the contact head 36' comprises the head of a T-headed screw threadedly engaged through the arm 36 and held in said adjusted position by means of lock-nuts 36' engaging it and the arm. The arrangement is essentially such that a ball in the cage 21 will be positively forced therefrom onto the railway portion 16' as the cage reaches its upper limit of travel.

It will be noted that the mechanism for controlling the position of the cage 21 is carried by and beneath a frame 38 which is arranged for mounting on a fixed overhead support which might comprise a ceiling, or ceiling joists, and is indicated by the numeral 39. As particularly shown, along the upper railway portion 16' are arranged horizontal guide members, 38' supported upon mutually spaced horizontal hanger bars 39' suitably carried by and beneath the support 38, and vibration-absorbing blocks 39' are preferably interposed between the bars 38' and 39'. Near one end thereof, the frame 39 mounts a flanged socket 39" in which the upper end of the tube 28 is threadedly engaged for mounting the tube in coaxial relation to the guideway of the cage 21.

Hanger bars 41 depend rigidly from the support frame 38 in laterally spaced relation to the tube member 28 and are fixedly connected at their bottom by a member 42 comprising an upright base plate portion 42' carrying a horizontal bearing sleeve 42' opposite its forward side in integral relation to it. A shaft 43 is journaled in the bearing sleeve 42", and carries at one extending end thereof a relatively large gear 44, said gear being particularly shown as of the spoke type. An arm 45 is fixed to and along a spoke 44' of the gear 44 at the gear side which is opposite the bearing sleeve 42" for its mounting shaft 43, and carries at its outer end a pulley 46 which is arranged to have the flexible control member 29 pass around it from the pulley 32 to a suitable terminal anchorage 47.

As is particularly shown in Figures 1 and 5, the flexible pull member 29 comprises a chain of fixed length, and the anchorage 47 and the pulley 46 and the pulley 32 and the axis of the tubular member 28 are mutually coplanar in the assembly; the relation is essentially such that a rotation of the arm 45 with the shaft 43 is arranged to actuate the chain 29 to effect a lifting and return movement of the cage 21 in a complete cycle of operations thereof for each complete rotation of the gear 44. It is important to note that the pulley 46 is mounted on the arm 45 for adjustment thereon whereby it may be disposed to provide the required lift distance for the cage 21 for installations of the mechanisms at different bowling alleys having the ball-receiving ends of their ball-return rollways at different heights.

When a player has rolled a ball along the alley with the idea of striking bowling pins (not shown) which have been set up by an attendant near the pin end of the alley, and the ball has fallen into a pit 17, the attendant may apply his foot or a hand to the ball for rolling it over the pit floor.
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17' pass through a wall opening 18' into the normally lowered cage 21, and the added weight of the ball in the case is arranged to automatically cause a cycle of operations of the cage by reason of an actuation of the arm 45 by the gear 44. In the present arrangement, a starting of a cycle of operations is arranged to be effected through having the pull chain 29 effect a permitted limited displacement of a member 48 which provides the terminal anchorage 47 for the chain by and upon the addition of the weight of a bowling ball to its load.

As is particularly brought out in Figure 4, the member 48 depends as a pendulum from a horizontal pivot pin 48 provided through the free, and forked, end of a bracket arm 51 which is adjustably fixed to the tubular member 28 in a suitable manner, as by a U-bolt 51', to extend forwardly therefrom. At a point of the member 48 below the pin 49, the member 48 provides a pair of arms 52 which extend forwardly and from and rotationally mounted a roller 52' on a spindle 52'' extending between them, and the terminal portion of the cage 29 is clamped about the roller 52' to provide the anchorage 47 for the chain.

At its bottom, the member 48 provides laterally-spaced ears 53 which cooperatively provide a slot 53' for receiving a stem 54' extending from a weight member 54, and a nut 54'' is threadedly mounted at the free stem end for clamping the ears 53 between it and the weight member 54 for fixing the weight in adjusted position on the ears. The arrangement is essentially such that the cage 21 is normally held in ball-receiving position opposite the wall openings 15' and above a lower position which it might assume if the normal balance of the movable assembly from the cage 21 to the member 48 is disturbed by the added weight of a ball in the case.

A panel 55 depends from the arm 51 between the member 28 and the member 48 in the general plane thereof, and is provided with projections 55' and 55'' extending to the member 28 and toward the member 48, the projection 55' backing the panel against the member 28 and projection 55'' serving as a stop to limit the swinging of the member 48 toward the member 28 when the cage is in its normal ball-receiving position, as shown in Figure 1. Preferably, and as shown, the bracket arm 51 threadedly mounts a stop screw 56 having an end operative against the upper end of the member 48 above its pivot 49 to limit the swinging displacement thereof by a pull on the chain 29 which is caused by the presence of a ball 19 in the cage 21. It will thus be understood that the stop 55'' and the stop screw 56 act to permit an adjusted-angle swinging of the member between limiting positions thereof, and that the described cycle of operations of the cage may be effected in the disclosed manner by reason of the anchored connection of the chain to the member 48.

The panel 55 mounts a switch 57 of the snap-action type having setting buttons 57' and 57'' respectively extending upwardly and downwardly from its housing, the button 57' being displaceable downwardly to close the switch, and the button 57'' being alternatingly movable upwardly to open the switch. In the present structure, a swinging displacement of the member 48 by reason of the presence of a ball in the cage 21 is arranged to actuate the switch 57 for closing the same; accordingly, an arm 58 extending rearwardly from the member 48 at a point below its hinge pin 49 is arranged to engage with the button 57' for closing the switch when the member 48 is swung forwardly from its normal position to engage the stop 55 which is operative to prevent damage to the switch. At the end of a ball-delivering cycle of the cage 21, the movable core 59' of an electromagnet 59 mounted on the panel 55 is arranged to displace the button 57'' for reopening the switch when its solenoid 59'' is energized. It will thus be understood that a displacement rocking of the member 48 is operative to close the switch 57, and that a subsequent energizing of the electromagnet solenoid 59'' is arranged to reopen the switch.

It will now be noted that an elongated tilt-frame 61 mounts an electric motor 62 on one end thereof, mounts a counterbalance weight 63 at its other end, and is immediately hinged to the depending hanger arms 41 on a horizontal hinge pin 66' for its limited rocking on the pin. The weight 63 is adjustable along the frame for its disposal at a frame point at which the motor is normally disposed at a limited lowered position therefor. Complementary bracket arms 64 extending horizontally from the hanger bars 41 at points beneath the counterweight end of the frame 61 mount the solenoid 65' of an electromagnet 66 having its core 65'' within the solenoid for tilting the frame 61 from its normal position shown in Figure 1 to a limiting tilted position shown in Figure 5. While the core 65'' is held magnetically within the solenoid 65' of the electromagnet 66, the motor 62 is arranged to actuate the gear wheel 64 for operating the cage 21 in tilt-and-return strokes thereof, and a suitable clutch connection is provided between the motor shaft 62' and the gear wheel 46 for the purpose; the motor is arranged to be constantly operating while the mechanism is in use.

In the present structure, the motor shaft 62' mounts a belt pulley 62'' carrying a belt 61 which is arranged to effect a rotary driving of the gear 44 through a pulley 59 carried on a shaft 63 which is journaled on a sub-frame 11 carried by and extending rearwardly from the hanger bars 41, an extending end of said shaft mounting a spur gear 72 in constant meshing engagement with the gear 44. When the motor 62 is in its lowered position of Figure 1, the belt 61 is arranged to be loose with respect to the pulleys 62'' and 63 whereby the belt is then inoperative to rotate the gear from the operating motor and the raising of the motor resulting from an energizing of the electromagnet 66, is arranged to tighten the belt against the pulleys for causing an actuation of the elevator cage 21. It is understood to provide a particularly simple and effective clutch connection between the motor shaft 62' and the shaft 63.

A releasable brake means is provided for securing the mechanism in its normal inactive condition in which the cage 21 is disposed for receiving a ball from either alley pin; in the present structure, said brake means comprises a brake shoe 73 disposed beneath and operative against the periphery of the pulley 65 while the mechanism is stopping and is quiescent. As particularly shown, a lever 74 mounts the brake shoe
and is intermediately pivoted to an arm 75 depending from the sub-frame 74 adjacent the pulley 68, and the other lever end is engaged by a thrust rod 76 of adjustable length constantly engaged between a socket 77 provided on and beneath the motor support frame 61 and an opposed socket 78 provided in the said lever end. The arrangement is essentially such that the brake shoe 73 is operatively applied while and after the motor 52 is lowered for rendering the belt 61 inoperative, it being noted that the thrust rod 76 then functions to limit the gravity lowering of the motor to a degree determined by the adjusted rod length.

Since the drive belt 61 is loose most of the time, means are preferably provided whereby its upper loop is then kept clear of the pulley 62' on the motor shaft 62' whereby the inoperative belt may not be engaged by said pulley for turning it or fractionally damaging it. Accordingly, the belt portions between the pulleys 62' and 68 may extend through fixed guideway members 79 and 80 of rectangular U-shaped cross-section which so closely receive the belt portions thereat that said belt portions are maintained in a generally straight condition when the belt is loose. The guideway members 79 and 80 so control the shape of the free belt that its bottom loop is supported upon the brake shoe 73 beneath the pulley 68 while its top loop is clear of the pulley 62' in coaxial relation to it; see Figure 12. It will be understood that the present arrangement for holding the belt 61 clear of both pulleys while the mechanism is in its normally inoperative condition not only protects the belt, but insures a proper operative engagement of the belt with the pulley 68 when the motor is raised to operatively engage the belt.

Recalling that the deposit of a ball in the cage 21 is arranged to automatically cause the movement of the cage to initiate the described lift-and-return cycle of the cage, means are provided for automatically stopping the various movements of the mechanism at the end of each cycle when the cage is positioned in ball-receiving position. In the present mechanism, the cycle-terminating means comprises a normally open switch in the circuit of the electromagnet 58 for closing to energize the latter to open the snap switch 83 and thereby break the energizing circuit for the electromagnet 65, thus permitting a gravity lowering of the motor to simultaneously release the belt and operatively engage the brake shoe 73 with the pulley 68.

By reference to the diagrams of Figures 13 and 14, it will be noted that operating power for the present mechanism is derived from a suitable electric current source represented by conductor wires 82 and 83 having the circuits for the motor 62 and for the control mechanism connected in parallel thereto. The motor circuit comprises conductor wires 84 and 85 connecting the motor with the wires 82 and 83 respectively through a switch 86. A wire 88 connects the wire 82 with one terminal of the snap switch 87 through the solenoid 65', and a wire 89 connects the wire 85 with the other terminal of the snap switch 87 whereby a closing of the snap switch 87 places the switch 86 in the energized condition shown in Figures 13 and 14.

A wire 90 in parallel connection with the wire 85 includes the solenoid of the switch-opening electromagnet 58 and also a normally open single-pole switch 91 for closing by the action of a cam 92 for energizing the solenoid 58. The cam 92 is so arranged on the shaft 43 in a rotatively adjusted relation thereto, and is operative against an operating arm 91' of the switch 91 which is shown as mounted on the corresponding end of the plate 42 which provides the bearing sleeve 42'. The cam 92 is so disposed on the shaft 43 that it is arranged to momentarily close the switch 91 just as the end of an operative cycle is reached, it being understood that the solenoid 58' of the electromagnet 58 thus energized is operative to displace the core 68' to engage the switch button 67' for opening the switch 67 to stop the elevator-operating mechanism while the motor continues to operate. The rotative adjustment of the cam 92 permits a setting of the cam which provides a stopping of the mechanism with the cage 11 restored to its ball-receiving position.

From the foregoing description taken in connection with the accompanying drawings, the advantages of the present bowling ball return device may be readily understood by those skilled in the art to which the invention appertains. While I have described a form of my invention which I now consider to comprise a preferred embodiment thereof, I desire to have it understood that the showings are primarily illustrative, and that such changes and developments may be made, when desired, as fall within the scope of the following claims.

Claim:

1. In combination with a ball-return rollaway of a bowling alley having an elevated ball-receiving portion disposed entirely longitudinally of the alley and above a side of the alley pit, an elevator alternately disposable for the rolling delivery thereofonto of a ball laterally from the pit floor and for the rolling delivery of the ball therefrom upon the ball-receiving portion of the rollaway when the elevator is in its elevated position behind and in direct longitudinal alignment with the elevated portion of the rollaway, a member supporting said elevator in an upright axis of rotation therefrom, and means directly cooperative with said support member whereby the elevator is rotated about said axis between receiving and delivery positions during its raising and lowering.

2. In combination with a ball-return rollaway of a bowling alley having an elevated ball-receiving portion extending entirely longitudinally of the alley and above a side of the alley pit, an elevator cage alternately disposable for the rolling delivery thereofonto of a ball laterally from the pit floor and for the rolling delivery of the ball therefrom upon the ball-receiving portion of the rollaway when the elevator is in its elevated position behind and in direct longitudinal alignment with the elevated portion of the rollaway, a member supporting said cage from its top in an upright axis of rotation therefrom, and means cooperative with said support member whereby the cage is rotated about said axis between its receiving and delivery positions during its raising and lowering.

3. In combination with a ball-return rollaway of a bowling alley having an elevated ball-receiving portion, an elevator cage arranged to rollingly receive a bowling ball from the pit of the alley, a flexible member extending from said cage to a fixed anchorage and supporting the cage for its alternate disposal in ball-
receiving and ball-delivering positions with respect to the pit and rollway respectively, and means operative upon the flexible member intermediately thereof to vary the effective length of a portion thereof between values in which the cage is disposed in its ball-receiving and ball-delivering positions.

4. In combination with a bowling alley pit and an elevated portion of a ball-return rollway for use therewith, an elevator arranged to receive a bowling ball from the floor of the pit for its delivery upon the elevated rollway portion, a flexible support member for the elevator extending upwardly therefrom and over a support pulley to a fixed anchorage, a pulley engaging said flexible member at a point between the first pulley and the anchorage for the member and means to move said second pulley against the support member to successively increase and decrease the length of the portion of the support member between the first pulley and the anchorage for effecting lift-and-return strokes of the elevator to move the elevator between the level of the pit floor and the elevated portion of the rollway.

5. In combination with a bowling alley pit and an elevated portion of a ball-return rollway for use therewith, an elevator arranged to receive a bowling ball from the floor of the pit for its delivery upon the elevated rollway portion, a flexible support member for the elevator extending upwardly therefrom to an anchorage member therefor, means mounting said anchorage member for its limited displacement from a normal position by reason of the loading of the elevator, means for effecting lift-and-return movements of the elevator, and means whereby a displacement of the anchor member by reason of the displacement of a load on the elevator is automatically operative to actuate the support member for a lift-and-return movement of the elevator between the level of the pit floor and the level of the elevated portion of the rollway.

6. In combination with a bowling alley pit and an elevated portion of a ball-return rollway for use therewith, an elevator arranged to receive a bowling ball from the floor of the pit for its delivery upon the elevated rollway portion, a flexible support member extending upwardly from the elevator, a counter-balanced anchorage member to which the support member is fixed and arranged for its displacement from a normal position thereof when the elevator is loaded, and an elevator-actuating means controlled by the anchorage member, whereby the displacement thereof by reason of the loading of the elevator is operative to actuate the support member for a lift-and-return movement of the elevator between the level of the pit floor and the level of the elevated portion of the rollway.

7. In combination with a bowling alley pit and an elevated portion of a ball-return rollway for use therewith, an elevator arranged to receive a bowling ball from the floor of the pit for its delivery upon the elevated rollway portion, a support member for the elevator normally disposing the same in load-receiving position adjacent the floor of the pit, a rotary means for effecting lift and return movements of the support member to move the elevator between the level of the pit floor and the elevated portion of the rollway, this means including a driven shaft, a rotary electric motor arranged for a constant one-way rotation of its drive shaft, a normally inoperative clutch means for connecting said drive and driven shafts, and a means whereby the loading of the elevator is automatically operative to render the clutch means operative for an actuation of the support member in lift and return movements thereof.
displacement to tighten the belt with respect to the pulleys for rendering the motor operative for actuating the driven shaft, electro-magnetic means automatically operative to rock the tilt-frame to tighten the belt against and between the said pulleys for an actuation of the support member in lift and return movements thereof, means automatically operative to unload the elevator while it is lifted, and electro-magnetic means automatically operative to render the first electro-magnetic means inoperative by and upon the return of the unloaded elevator to its load-receiving position.

11. A structure in accordance with claim 10 provided with a brake means normally fixing the elevator in load-receiving position, and means automatically releasing the brake means only while the tilt-frame is displaced from its normal position.

12. In combination with the pit of a bowling alley disposed to the rear of an alley bed and an elevated portion of a ball-return rollway disposed entirely laterally and longitudinally of the pit and extending longitudinally of the alley, an elevator cage arranged to receive a bowling ball rolling laterally from the front of the pit adjacent the rear of the alley bed, means automatically operative by reason of the deposit of a ball in the cage to successively elevate the cage to a position behind the pit end of the upper rollway portion and to return the cage to its ball receiving position, means for turning said cage through a 90° angle while it is being elevated, and means to automatically deliver the ball from the cage onto the upper rollway portion upon said cage being elevated to a position behind the pit end of the upper rollway portion.

13. In combination with the pits of a pair of mutually adjacent and parallel bowling alleys positioned to the rear of their alley beds and a common ball-return rollway for the alleys having an elevated portion adjacent and extending entirely longitudinally of the pits, an elevator cage normally disposed to rollingly receive a bowling ball from the front of either pit adjacent the rear of the alley beds, means automatically operative by reason of a deposit of a ball in the cage to successively elevate the cage to a position behind the elevated portion of the rollway and to return the cage to its ball receiving position, means for turning said cage through a 90° angle while it is being elevated, and means to automatically deliver the ball from the cage onto the upper rollway portion upon said cage being elevated to a position behind the pit end of the upper rollway portion.

14. In combination with a ball-return rollway of a bowling alley having an elevated ball-receiving portion, an elevator cage arranged to rollingly receive a bowling ball directly from the pit of the alley, a flexible member extending from said cage to a fixed anchorage and supporting the cage for its alternate disposal in ball-receiving and ball-delivering positions with respect to the pit and rollway, respectively, means operative upon the flexible member intermediately thereof to vary the effective length of a portion thereof between values in which the cage is disposed in its ball-receiving and ball-delivering positions, and means responsive to the rolling of a ball onto said cage to initiate operation of said first-mentioned means.

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