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AUTOMATIC APPARATUS FOR SEGREGATING RETURNED BOWLING BALLS

Filed June 13, 1960

3 Sheets-Sheet 1

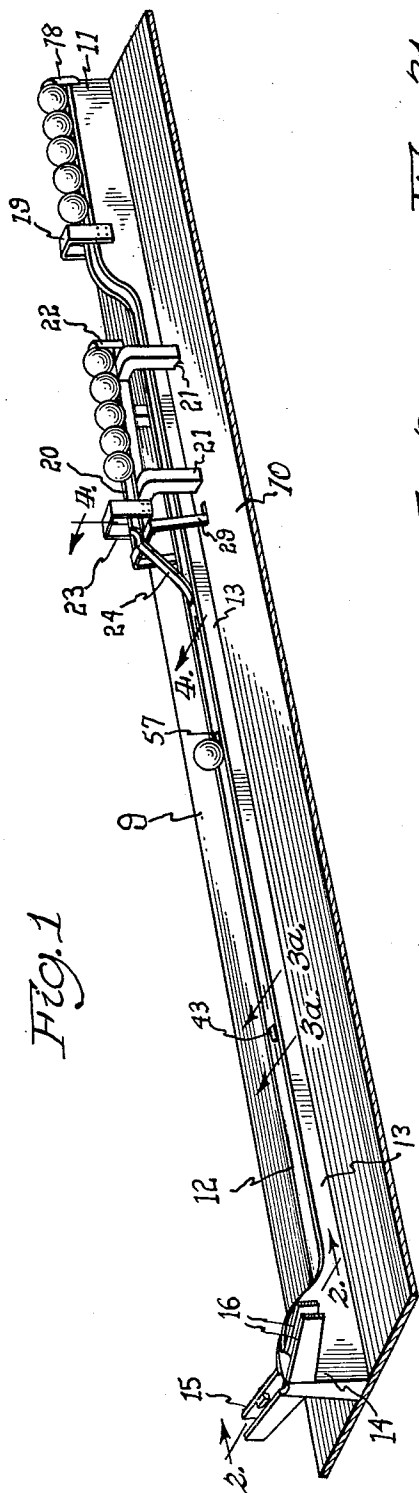


Fig. 3b

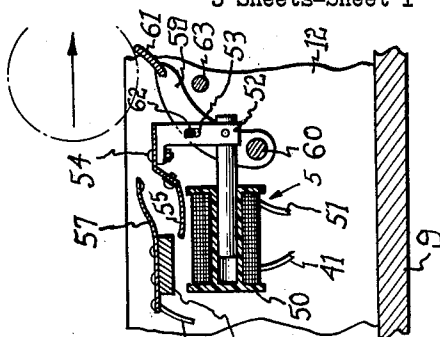


Fig. 3a

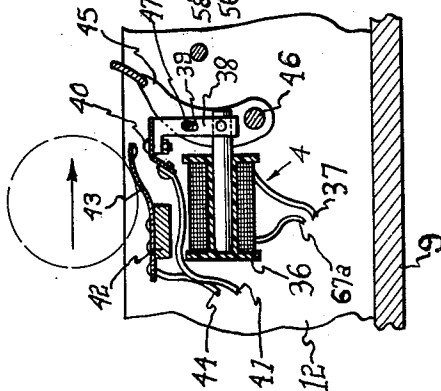
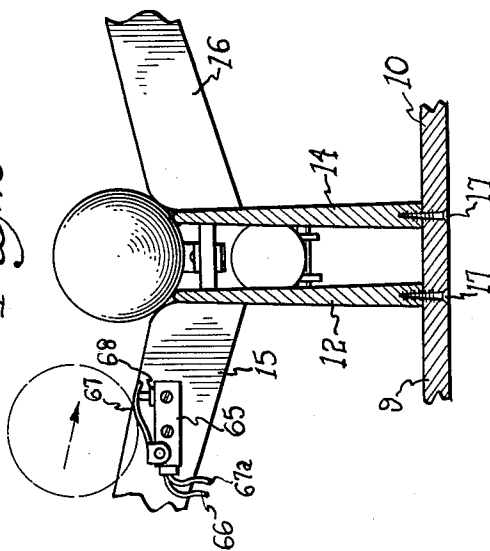


Fig. 2



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Fig. 4

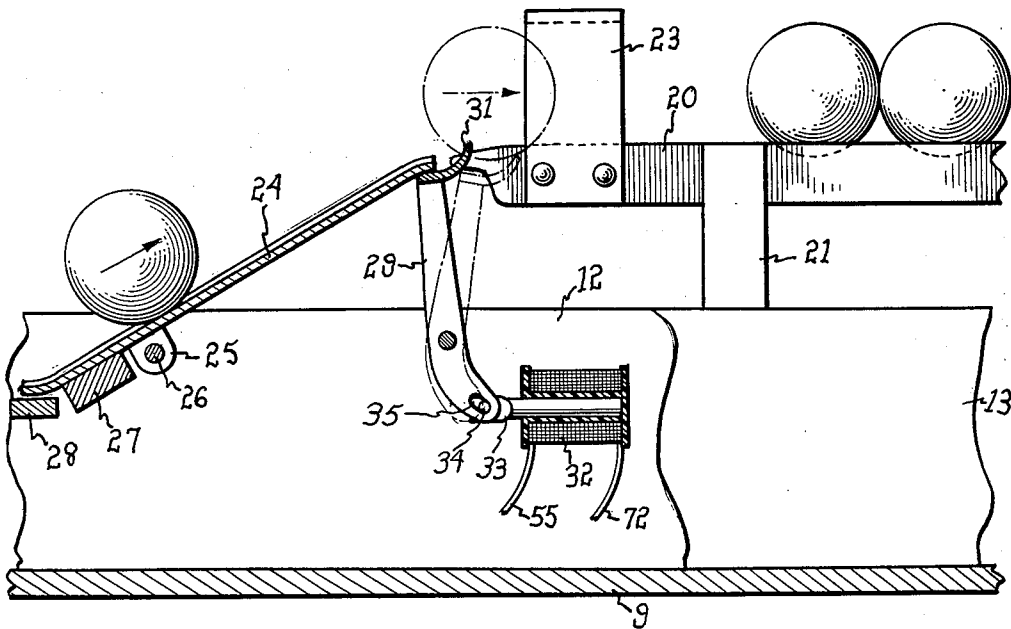
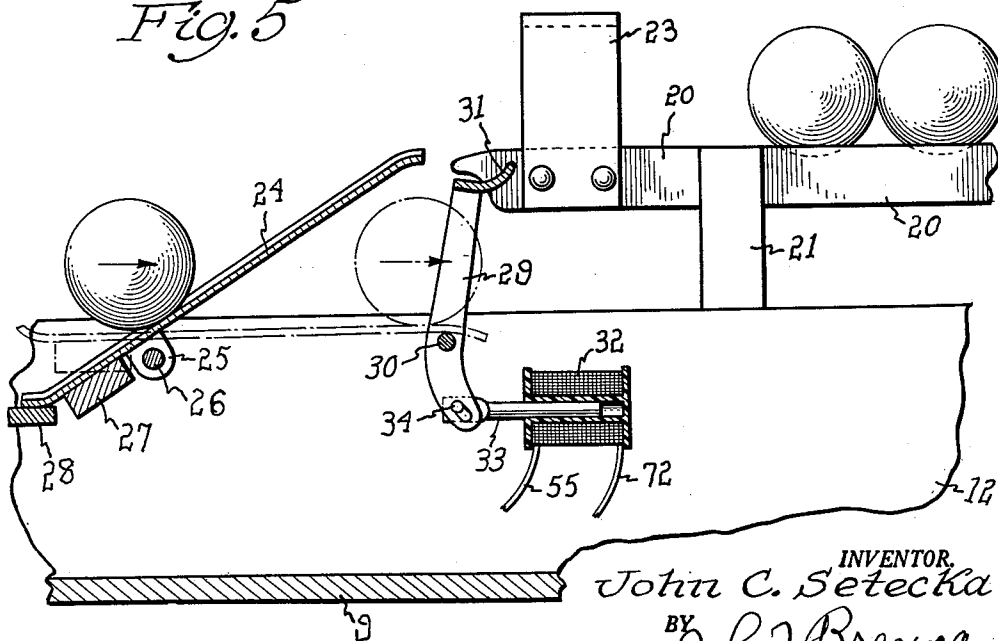


Fig. 5



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FIG. 6

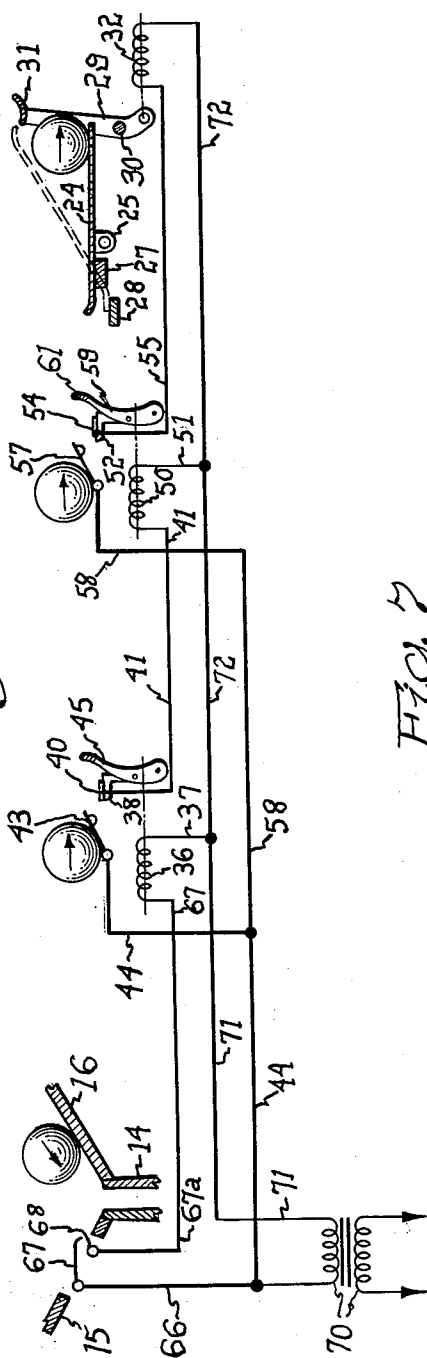
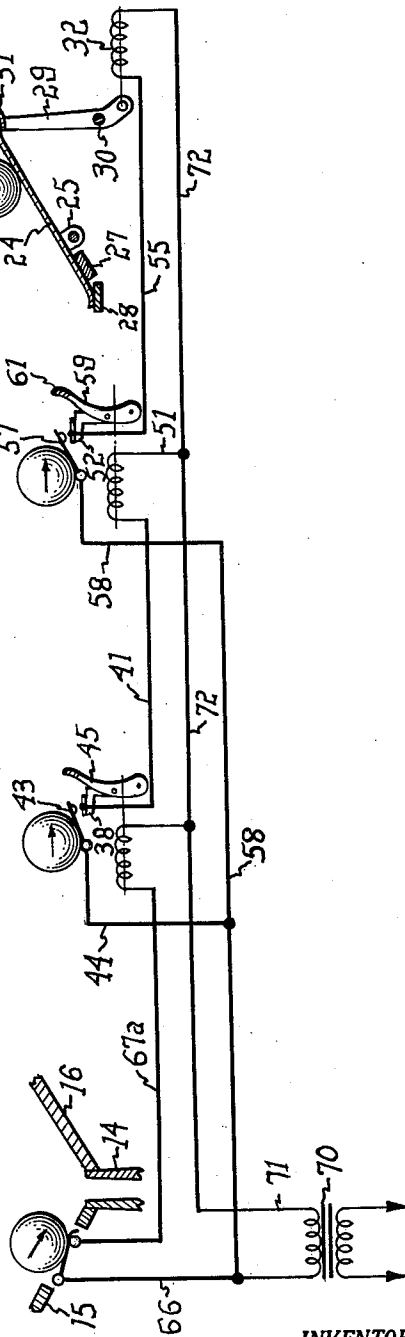


FIG. 7



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AUTOMATIC APPARATUS FOR SEGREGATING RETURNED BOWLING BALLS

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9 Claims. (Cl. 273—49)

This invention is directed to an automatic device having two separate longitudinal spaced apart racks adapted to segregate and separately receive returned bowling balls from the respective alleys on which the balls were played so that the balls played on one alley will be delivered to a separate rack and balls played on an adjacent alley will be delivered to a second and separate rack. More particularly, this invention is directed to an electro-mechanical automatic ball returning and ball segregating device for bowling alleys.

The conventional bowling alley uses one ball return track and one rack for each pair of adjacent alleys. Since the balls played on both alleys are returned to a single rack in no practical order, the balls become mixed up, thus requiring each bowler to examine an indefinite number of balls in order to determine which ball is his.

It is an important object and accomplishment of my invention to provide an automatic device for returning and segregating the respective balls played upon adjacent alleys to mount and position the balls played on one alley on one separate specific rack, and to return and position the balls played on a separate and adjacent alley upon a second and separate rack, so that the balls played upon one particular alley will always be returned to and positioned on a separate rack so that the ball in the last and foremost position on one particular rack is always the ball belonging to the next bowler who is playing on the one specific alley whose balls are returned to the specific positioning rack which receives only the balls played on one alley. For example, the ball returned to the last position on a separate rack 11 is always the ball belonging to the next bowler to play on alley 10.

Where a particular bowler makes a spare, for example on alley 10, his ball to be used by him as his second ball to be thrown will be the first ball positioned on rack 11 where he is playing and the alley designated as No. 10. Similarly, the ball used for the first throw on alley No. 9 and to be used by the same bowler for his second throw to make a spare will be returned to the front position of rack No. 20 where the bowler is using right alley No. 9.

It is an important object and accomplishment of my invention to provide a novel automatic apparatus and mechanism including a ball return track which includes two separate longitudinally spaced apart elevated ball receiving and positioning starting racks, and which includes automatic means and mechanism which will cause the bowling balls played on one particular alley to be returned and positioned upon one of said racks; and which will cause the balls played on another and adjacent alley to be returned and positioned on the other and separate starting rack.

It is a further object and accomplishment of my invention to provide an automatic device for returning and positioning bowling balls played on separate alleys to separate and different ball-receiving racks so that the balls played upon each of said separate alleys will be returned to and positioned on separate spaced apart starting racks, so that the respective players on one of said alleys will be able to easily select and pick up their respective balls from a starting rack separate and apart from the starting rack which receives and positions the bowling balls which are played on the other and normally adjacent alley.

It is a further object of my invention to provide devices

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as described in the preceding paragraphs and which include a pair of separate ball-receiving racks and an electrically actuated normally inclined pivoted chute for causing balls to return to one of said racks, and electrically actuated switches and mechanism for selectively positioning and holding said pivoted chute in supported position to effect return of the balls played on one specific alley to one of said racks.

Other and further important objects of my invention will be apparent from the following description and claims.

On the drawings:

FIG. 1 is a perspective view of a ball return track between two typical adjacent bowling alleys and having two separate forward and rear spaced apart ball return and positioning racks.

FIG. 2 is an enlarged elevation taken on a vertical plane indicated by line 2—2 of FIG. 1 and looking from the left of FIG. 1 and showing the rear part of a pair of oppositely extending chutes or tracks which are adapted to receive balls discharged by two separate ball returning machines and which are adapted to deliver the balls to a single return track.

FIG. 3a is an enlarged fragmentary elevation of a solenoid actuated switch which is adapted to be operated by balls returning on a return track.

FIG. 3b is an enlarged elevation of a second solenoid operated switch which is adapted to be operated by returning balls on a return track.

FIG. 4 is an enlarged fragmentary elevation of one portion of the return track and of a pivoted chute and means for selectively and intermittently holding the same in inclined position to effect return of balls to one of said return racks.

FIG. 5 is an enlarged fragmentary elevation of one portion of the ball return device showing the tiltable chute released for downward movement by a returning ball to cause the ball to roll under the forward rack and onto the rear rack.

FIG. 6 is a diagrammatic view illustrating the electrical wiring and circuits of the respective parts and illustrating switches in open position.

FIG. 7 is a diagrammatic view illustrating the wiring and circuits and the switches in position to be closed by a returning ball.

Referring to FIGS. 1 and 2, numerals 9 and 10 designate right and left bowling alleys respectively, of usual construction. Numerals 12 and 13 designate right and left spaced apart parallel vertically extending boards or rails which form a ball return track and which are suitably secured by screws 17 to said alleys 9 and 10. These are so spaced so that conventional bowling balls will roll thereon.

Numeral 14 designates an upwardly extending inclined end member which forms a continuation of the two track rails 12 and 13 and which forms an inclined trough down which the balls are adapted to roll onto the return track. As shown in FIGS. 1 and 2, numeral 16 is an inclined return chute formed of two strips connected to end member 14 upon which the balls played on left alley 10 are deposited by an automatic pin setting and ball returning machine (not shown).

Numeral 15 designates an inclined right return chute formed of two bars or strips and connected to the end member 14 and on which the balls played on the right alley 9 are adapted to be deposited by an automatic pin setting and ball returning machine (not shown), said delivery being at a different time than the delivery of balls upon the chute 16. Said chutes 16 and 15 are inclined or sloping downwardly to the trough of the end member 14 so

that the balls will roll by gravity into said trough and then downward onto the return track.

Referring to the right side of FIG. 1, numeral 11 designates a ball return and positioning rear rack which is preferably composed of two relatively wider panels or strips which form a continuation of the rear portion of the return track, and which have forwardly curved portions on which the returning balls roll slightly upwardly to then be stopped on the rear rack by either the stop plate 18 or by balls on said rack. Numeral 19 designates a U-shaped ball snubber or saddle whose legs are secured by screws to the opposite faces of the rack 11.

As shown in FIGS. 1, 4 and 5, numeral 20 designates an intermediate or forward ball rack which is supported by four legs 21 upon the floor over the intermediate portion of the ball return track, and which includes a pair of spaced apart bars onto which the balls will roll. A stop plate 22 is suitably secured to the rear end of rack 20 and which will stop the balls rolling on said rack. Numeral 23, in FIG. 1, is a U-shaped snubber secured on the forward end portion of rack 20 and the upper part of which is frictionally engaged by the balls entering said rack to slow the balls.

As shown in FIGS. 4 to 7, numeral 24 designates a trough-like tiltable chute which has a pair of angularly and downwardly extending apertured ears 25. A horizontal pivot pin 26 extends through said ears 25 and its opposite ends are suitably mounted in holes in the lower edge portions of the two track rails 12 and 13 at points below the upper edge of said track. The upper end of said tiltable chute 24 is slightly bent rearwardly, as illustrated in FIGS. 4 and 5, and terminates a short distance forward of the forward end of front rack 20. A counterweight 27 is secured on the lower part of chute 24 to cause it to normally tilt upwardly. Numeral 28 designates a stop block or bracket suitably secured to track rail 13 and which limits the upward tilting of said chute 24.

As shown in FIGS. 4 and 5, a solenoid 32 is suitably mounted to said track rails 13 below its upper edge and it has connected to it circuit wires 55 and 72 hereinafter described. The apertured end of the core 33 of said solenoid is pivotally connected by a cross pin 34 to the lower slotted end of a support lever 29. Support lever 29 is fulcrumed on a horizontal cross pin 30 secured in the track rails 12 and 13. The upper end of lever 29 carries an upwardly curved arcuated dog or plate 31 whose forward edge is adapted to be engaged by the rear end of chute 24 to support said chute when said lever is in forward position, as shown in FIG. 4.

Referring to FIG. 2, numeral 65 designates an electrical switch secured by screws to one of the inclined bars of delivery chute 15. A pivoted flexible metal arm 67 is mounted on said switch which contacts terminal 68 when said spring arm 67 is depressed by a ball rolling down said delivery chute. Circuit wires 66 and 67a are connected to said spring arm 67 and to the terminal 68 of said switch and their other connections are hereinafter described.

It is understood that the presently known pin setting machines which pick up the pins and also pick up the balls each have an automatically closable door or gate mounted on the discharge opening through which the balls are delivered from the machine to inclined delivery chutes such as illustrated by numerals in FIGS. 1 and 2. Further, such discharge gate of each such machine is electrically operated, locked and unlocked and the electrically operated gate control mechanism of one machine is operatively connected to the gate control mechanism of the adjacent machine, which machine picks up balls for delivery to the same return track in such a way that when one of the two machines discharges a ball and opens its outlet gate, the gate of the other adjacent machine will remain locked and prevent the simultaneous discharge of a second ball from the second machine. This prevents two balls from being discharged on the return chute at

the same time and prevents the possibility of two balls closely following each other on the return chute; and thereby keeping the returning balls adequately spaced apart.

In FIG. 3a is illustrated a novel switching device which is mounted below the return track in a position a substantial distance rearward of the inclined delivery chutes 15, 16 to the rack 20, and is generally designated by numeral 4.

The distance of the switch device 4 from the delivery chutes 15 and 16 is such that a ball delivered from chute 16 onto the return track will have passed open switch 4 before another ball rolling upon chute 15 will actuate control switch 65. The balls delivered from said chute 16 will continue rolling along the return track and over open switch device 5 and onto the rear ball rack 11.

Referring to FIG. 3a, numeral 36 designates a solenoid secured on track rail 13 and between track rail 13 and track rail 12. The core of said solenoid 36 has secured to its outer end one end of a vertically extending metal bracket 38 whose upper terminal end has connected to it one end of a circuit wire 41. Said bracket 38 has as slot in its central portion. A curved metal trip lever 45 has its lower end pivoted on a pin 46 so its upper end will project slightly above the upper edges of the return track so it will be engaged by a rolling ball. Trip lever 45 carries an intermediate cross pin or stud 47 which extends through the slot of bracket 38.

A flexible metal spring 43 is mounted on a block 42 secured to track rail 13 and has a circuit wire 44 connected to it and its forward upwardly curved free end is positioned above the terminal 40 of bracket 38. Depression and flexing of said spring 43 by a rolling ball will cause it to contact terminal 40 to close the circuit between wires 44 and 41. In FIG. 3a said circuit is shown open and the core drawn into the solenoid and the bracket 38 pulled to left position in which trip lever 45 is adapted to be pivoted by engagement of a ball.

Another and second switching device, generally designated by numeral 5, which is similar to that shown in FIG. 3a, is illustrated in FIG. 3b and is suitably mounted below the upper edge of the rails 12 and 13 which form the ball return track and intermediate the rack 20 and the previously described switching device 4 shown in FIG. 3a. The switching device 5 is positioned rearward along the return track a sufficient distance so that each ball which has been delivered from chute 16 will have passed said switch device 5 before a following ball from chute 15 has reached and activated switch device 4 and consequently actuated switch device 5.

Switching device 5 comprises a solenoid 50 having circuit wires 41 and 51 connected to it; and a movable core on which is mounted upwardly extending bracket 52 on whose upper end is terminal screw 54. Bracket 52 has a central slot as shown. Lever 59, which carries an upper pawl 61, is pivoted on a pin 60 secured in one of the rails 13, and said lever has a transverse pin 62 which extends through the slot of bracket 52.

Numeral 56 is a block secured on rail 13 and has secured thereon by screws a flexible metal contact spring 57, whose secured end has connected to it circuit wire 58. In FIG. 3b the core and bracket 52 are projected outwardly to a position in which the free end of contact spring 57 will not contact terminal 54 when a rolling ball depresses said contact spring.

Referring to FIG. 3b when solenoid 50 is energized, the core and bracket 61 are pulled inward and to the left from the position shown in FIG. 3b so that when a ball rolls along said track it depresses contact spring 57 to contact it to terminal 54 to close the circuit which energizes solenoid 32 (see FIG. 5), to thereby pull rearwardly the core 33 and lower part of support lever 22. This causes the lever 32 to move counterclockwise to the supporting position shown in FIG. 4 in which position it

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supports the free end of inclined chute 24 to cause the returning ball to roll up chute 24 onto rack 20.

As the ball has rolled past spring 57 in its return travel, it strikes pawl 61 to cause said lever 59 to pull the core and the bracket 62 outward to a non-contact position, as illustrated in FIG. 3b.

Description of Circuits

One terminal of control switch 65 on the delivery chute 15 is connected by wire 66 to a source of electric power, which is preferably a transformer 70, illustrated at the left of FIG. 6. Circuit wire 66 is connected by a wire 44 to the terminal of the contact spring 43 of switch device 4. A wire 58 connects wire 44 and one terminal of contact spring 57 of switch device 5.

The other terminal 68 of control switch 65 is connected by a wire 67a to the solenoid 36. A wire 41 connects terminal 40 of bracket 38 to one terminal of solenoid 50 of switch device 5. Wires 37, 72 and 51 connected together connect one terminal of solenoid 36 to one terminal of solenoid 50.

Wire 71 connects the transformer 70 to wire 37 and to solenoid 36. Wire 72 connects wire 37 and 71 to wire 51 and also connects wire 51 to one terminal of the solenoid 32. Wire 55 connects the other terminal of solenoid 32 to the terminal 54 of the bracket 52 of switch device 5.

When a ball is bowled in the usual manner on the right-hand alley 9, it is then picked up by the pin setting and ball pick-up mechanism and delivered upon the right-hand inclined chute 15. As the ball rolls down said chute it depresses contact spring 67 to close a circuit between said spring 67 and terminal 68 of switch 65, to thereby close the circuit of said switch. As said circuit is connected to the solenoid 36 of switching device 4, shown in FIG. 3a, through wires 67a, 71 and 37, the coil of solenoid 36 is energized to pull inward its core and the bracket 38 and terminal 40. This causes the trip lever 45 to be rocked counter-clockwise or pivoted to the left and to cause its upper end and pawl to project above the upper edges of the rails of the return track. This causes the terminal 40 to be positioned below the free end of the contact spring 43.

When the returning rolling ball moves above the contact spring 43 the ball presses down said contact spring 43 to contact terminal 40, this closing the circuit of the wires 44, 58 and 41 (which circuit controls the coil of solenoid 50). Said closing of said circuit causes the solenoid 50 to be energized to thereby pull inward and to the left the core of said solenoid and the bracket 52 and its upper terminal 54, to thereby position said terminal 54 below the free end of the contact spring 57. At the same time, the trip lever 59 and its upper pawl 61 are moved upwardly and to the left to position the pawl 61 above the edge of the track.

The rolling ball, in its continuing return travel, pushes pawl 61 rearwardly to position switch device 5 in open position and depresses contact spring 57 to cause it to contact terminal 54 and close the circuit thereof and also to strike and move rearwardly and to the right the pawl 61 and lever 59 and to thereby pull outwardly the core and the bracket 52. As the contact spring 57 contacts the terminal 54 the circuit thereof, which is connected to solenoid 32, energizes said solenoid 32 to cause the core 33 to be pulled inwardly to thereby rock the lever 29 counter-clockwise to the full line position illustrated in FIG. 4, and in which position it will temporarily support the free end portion of chute 24 against downward tilting movement. When said chute 24 is supported by lever 29, the ball will roll up the chute onto rack 20 and, as it leaves the chute, it pushes lever 29 rearwardly to move said lever 29 in non-supporting position.

It is to be borne in mind that as the ball approaches the chute 24 counter-weight 27 holds the chute 24 in upwardly tilted position, so that when the lever 29

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is moved counter-clockwise to the position illustrated in FIG. 4, it will be in a position to temporarily support the chute 24 in inclined position as the returning ball continues its return travel, to thereby cause said ball to roll up said chute 24 and onto the ball rack 20.

It will be understood that the returning ball has returned the switch devices 4 and 5 to open position and will strike the curved plate 31 of trip lever 29 as it enters upon the ball rack 20 to also return said lever 29 to non-operating right-hand position, as illustrated in FIG. 5.

If the succeeding ball, which has been played on the left alley 10, is delivered on the left hand chute 16, such ball will continue in its return travel along the return track while both of said switching devices 4 and 5 are open and inoperative and while the trip lever 29 is in retracted inoperative position, so that when the returning ball contacts the middle portion of the tiltable chute 24 it will tilt or pivot said chute downward to a plane below the upper edges of the track rails to cause the ball to continue in its straight return path underneath the rack 20 and to cause it to roll upon the rear ball rack 11.

Accordingly, all balls played on the left alley 10 and deposited for return on the left chute 16 will return to the rear rack 11 without the operation of any of said switching devices, and in what might be called a free uninterrupted ride to said rear rack.

The ball which has been delivered down chute 15 and activated said switches must have passed switch 4 and opened said switch 4 and thereby de-energized the solenoid of switch 4 and moved the lever 45 into rearward non-obstructing position before a ball delivered off of left chute 16 can roll past switch 4 and past the retracted lever 45.

While in the preferred form I have illustrated and described the two separate ball positioning racks as being positioned one in front of the other, I desire to be understood that said separate racks may be in different relative positions, for example transversely spaced from each other or substantially adjacent each other so long as one of said positioning racks is communicatively connected to receive returning balls from the return track and the other thereof is connected to receive returning balls which have been diverted by a movable pivoted chute.

While the foregoing specification sets forth the invention in specific terms, it is to be understood that numerous changes in the shape, size and materials may be resorted to without departing from the spirit and scope of the invention as claimed hereinafter and it is contemplated that various changes may be made in the embodiment of the invention herein specifically described without departing from or sacrificing any of the advantages of the invention or any features thereof, and nothing herein shall be construed as limitations upon the invention, its concept or structural embodiment as to the whole or any part thereof except as defined in the appended claims.

I claim:

1. In combination with a pair of bowling alleys; a first ball delivery chute; a second inclined ball delivery chute extending oppositely to said first chute; a rear ball positioning rack; a return track between and connecting said chutes and said rear ball rack; a second ball rack forward of said rear rack and over a part of said track; a tiltable chute mounted forward of said second ball rack; and having means to permit positioning thereof to provide for discharge of balls to said second ball rack; said means comprising a pivoted trip lever for releasably holding said tiltable chute in upwardly inclined position; electrically operated mechanism for selectively moving said trip lever, a pair of longitudinally spaced apart switching devices mounted on said track between said delivery chutes and said tiltable chute, a ball actuatable control switch on said first ball delivery chute; circuit wires operatively connecting said control switch and said switching devices and said electrically operated mech-

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anism of said trip lever; the ball actuated closing of said control switch being adapted to energize said switching devices; said switching devices being operable by returning balls on said track to actuate said electrically operated mechanism to move said trip lever to support said tiltable chute to thereby cause a ball to roll up said tiltable chute upon said second ball rack.

2. A bowling ball returning and segregating device substantially as recited in claim 1 in which said electrically operated switch devices comprise a plurality of solenoid-actuated movable switches having terminal members and ball engaging and releasing levers pivoted on said return track and connected to said switch terminal members and adapted to be moved into and out of the path of a returning ball, said switch terminal members being adapted to be moved by said ball-engaging levers into open positions.

3. In combination with a supported ball return track for bowling balls;

a rear ball rack at the end of said track and connected to said track to receive balls from said track;

a first ball delivery chute and a second ball delivery chute both connected to the forward end of said track and adapted to receive balls played on opposite sides of said track respectively;

a second ball rack mounted over the intermediate portion of said track and forward of said rear rack;

a tiltable chute mounted adjacent the forward end of said second intermediate ball rack and pivotally connected to said track; and having means adapted to permit the positioning thereof to provide for delivery of a ball on to said second ball rack; said means comprising

electro-mechanical mechanism for releasably holding said tiltable chute in inclined position to cause balls to roll upon said second rack,

a control switch mounted on the first of said ball delivery chutes and adapted to be operated by balls rolling on said chute,

ball actuable electrically operated switch means mounted on said track between said delivery chutes and said tiltable chute,

circuit wires connecting said electro-mechanical mechanism, said control switch and said switch means whereby ball actuated closing of said control switch will cause actuation of said electrically operated switch means and said switch means when ball actuated will cause said electro-mechanical mechanism to move and support said tiltable chute to cause balls delivered to the first delivery chutes to be positioned and segregated on said second intermediate ball rack.

4. In combination with a supported ball return track for bowling balls;

a first ball rack at the end of and connected to said track;

a first and a second ball delivery chutes at the forward end of said track connected to said track and adapted to receive balls played on opposite sides of said track respectively;

a second ball rack mounted adjacent said first ball rack and above the intermediate portion of said track;

a tiltable chute pivotally connected to said track and mounted adjacent the forward end of said second ball rack; and having means adapted to permit the positioning of said chute to provide for delivery of a ball on to said second ball rack;

said means comprising electro-mechanical mechanism operably connected to said first delivery chute and said tiltable chute and adapted when actuated to releasably hold said tiltable chute in inclined position to cause balls to roll upon said second rack,

ball-actuable control switch means mounted on said first ball delivery chute and adapted to be operated by balls rolling on said chute,

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circuit wires connecting said electro-mechanical mechanism, and said control switch means whereby ball actuated closing of said control switch means will actuate said electro-mechanical mechanism to support said tiltable chute to cause balls delivered to said first delivery chute to be positioned and segregated on said second ball rack.

5. In combination with a supported bowling ball return track, having a ball positioning first rack connected to the rear end of said track;

a pair of delivery chutes connected to said track and adapted to receive balls discharged by two separate ball pick-up machines;

a second ball rack mounted adjacent and above said first ball return track;

a tiltable chute mounted adjacent and pivotally connected to said return track and in position to discharge balls upon said second ball rack;

lever means pivoted to said track and adjacent said tiltable chute;

an electrically operated mechanism including a solenoid for selectively moving said lever means to positions to hold said inclined chute in position to cause balls to roll therefrom upon said second ball rack;

a plurality of electrical switch mechanisms, each including a pivoted ball engaging lever, mounted in spaced apart positions along said track forward of said inclined chute;

and a control switch on one of said delivery chutes adapted to be intermittently actuated by balls rolling on said last mentioned delivery chute to energize successively said switch mechanisms and to successively move said ball engaging levers into ball obstructing positions;

said electrically operated mechanism being adapted to move said supporting lever means in response to ball actuation of said switch mechanisms to support said tiltable chute to cause balls to roll upward on said tiltable chute and upon said second rack said ball engaging levers, when moved from the ball obstructing position, being adapted to open said switch mechanisms.

6. In combination with a bowling ball return track, having a rear ball positioning rack connected to said track;

a first delivery chute;

a second delivery chute; said chutes being mounted adjacent one end of said track and adapted to receive balls to be returned;

a second intermediate rack mounted over the intermediate portion of said ball return track;

a tiltable chute mounted adjacent to and connected to said return track forward of said second ball rack;

lever means pivoted adjacent said tiltable chute and adapted to releasably support said chute in upper position;

an electrical mechanism including a solenoid for selectively moving said lever means to positions to hold said inclined chute in position to cause balls to roll upon said second rack;

a plurality of electrical switch mechanisms, each including a pivoted ball engaging lever, mounted along said track forward of said inclined chute;

a control switch on said first delivery chute adapted to be intermittently actuated by balls rolling on said first delivery chute to energize successively said switch mechanisms and to successively move said ball engaging levers into ball engaging positions;

and said switch mechanisms being adapted to move said lever means to support said tiltable chute in inclined position to cause balls to roll upward on said tiltable chute and upon said second rack said ball engaging levers, when moved from the ball obstructing position, being adapted to open said switch mechanisms.

7. In combination, a bowling ball return track;
 a first ball rack mounted adjacent one end of said track;
 a second ball rack superposed over the intermediate portion of said track, both said racks being mounted adjacent to said track to receive balls therefrom;
 a first ball delivery chute;
 a second ball delivery chute; said delivery chutes being mounted at the other end of said track and adapted to discharge balls on said other end of said track;
 a tiltable chute pivotally connected to said track and adjacent said second ball rack;
 electrically operated mechanism operably connected to said tiltable chute and for releasably supporting said tiltable chute in upwardly inclined position;
 and ball actuable electrical switch means mounted on said first delivery chute and connected electrically to said electrically operated mechanism and adapted to operate said mechanism to releasably support said tiltable chute in inclined position to cause balls which actuate said switch means on said first delivery chute to roll on said tiltable chute and on said second ball rack.
 8. In combination with a pair of adjacent bowling alleys and a ball return track between same;
 a pair of longitudinally spaced ball positioning racks; one of said racks being at the rear end portion of said return track and the other rack being positioned intermediate the ends of said track;
 a first delivery chute;
 a second delivery chute at the forward end of said track adapted to receive balls played on said alleys respectively;
 a tiltable chute pivotally connected to said track and mounted in the path of balls rolling on said return track and in position to discharge balls on said intermediate rack;

electro-mechanism mechanism for releasably holding said tiltable chute in inclined position to cause balls to roll upon said intermediate rack;
 a control switch mounted on said second ball delivery chute and adapted to be operated by balls rolling on said chute;
 and circuit wires connecting said control switch and said electro-mechanical mechanism;
 said control switch when closed, being adapted to actuate said mechanism for holding said tiltable chute in upwardly inclined position to cause a returning ball to roll up said tiltable chute and onto said intermediate rack;
 the balls rolling from said first delivery chute being adapted to return along said track and tilt downwardly said tiltable chute to be delivered upon the rack at the rear portion of said track.

9. A ball returning and segregating apparatus substantially as recited in claim 4, and in which said first mentioned electro-mechanical mechanism includes a ball actuable electrical solenoid operated switch means; and lever means adjacent said track and adapted to open and close the circuit of said electro-mechanical mechanism of said tiltable chute; and which said control switch means on said ball delivery chute has a ball-actuable arm pivotally connected thereto and means connecting said last mentioned levers and said solenoid-operated switch means; said levers of said solenoid-operated switch means, when actuated, being adapted to open said switch means.

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