This invention relates to a bowling device. More particularly, it relates to a bowling device which includes mechanical pin and ball handling arrangements.

In recent years there has been a tremendous increase in family interest in the game commonly referred to as bowling. Consequently more children have been introduced to the game and accordingly toy games simulating the adult game in action and appearance have become increasingly popular. However, none of the prior art toy games have proved lastingly interesting to many children because most of them require tedious manual effort to first set up and spot the pins and then to clear away those pins knocked down by the action of the ball. After a short while many children simply tire of the effort required to keep the game progressing.

Accordingly it is an object of the present invention to provide a new and improved bowling device. It is another object of the invention to provide a toy bowling device more closely simulating the action of equipment normally used by adults in actual bowling competition.

Another object is the provision of a bowling device including means for mechanically handling the pins and balls utilized in playing the game.

More specific objects of the invention is the provision of a bowling device including operating means for spotting and handling bowling pins, and for handling bowling balls used to knock down the pins in the normal conduct of the game.

Further objects of the invention are to provide bowling devices which are relatively simple and economical to manufacture and which are capable of satisfactory operation over prolonged periods of time even when subjected to extreme misuse as, for example, by children. These and various other objects of this invention, as well as many specific advantages of the invention, will be more fully apparent from a detailed consideration of the remainder of this specification, the appended claims and the accompanying drawings in which:

FIG. 2 is a side view of the device of the invention taken from the bottom of FIG. 1;

FIG. 3 is a front view of the device of the invention taken from the left hand side of FIG. 1;

FIG. 4 is a rear view of the device of the invention taken from the right hand side of FIG. 1;

FIG. 5 is a cross-sectional view of the portion of the device in FIG. 1 along line 5—5 showing the pin handling mechanism in the position permitting a player to roll a ball toward the pins;

FIG. 6 is a view similar to that of FIG. 5 showing the position of the pin handling mechanism immediately prior to the raising of the standing pins from the bowling alley surface to permit the mechanism to clear fallen pins from the alley surface;

FIG. 7 is a view similar to that of FIG. 5 showing the position of the pin handling mechanism during the pin clearing operation;

FIG. 8 is an enlarged view of a portion of FIG. 5;

FIG. 9 is a cross-sectional view of the portion of the device in FIG. 1 along line 9—9 showing the ball return mechanism;

FIG. 10 is a cross-sectional view taken along line 10—10 in FIG. 9; and

FIG. 11 is a cross-sectional view of the pin handling rack showing its cooperation with the pin gripping slide of the device shown in FIG. 1.

The accompanying drawings are primarily intended so as to illustrate a presently preferred means of constructing a toy bowling device falling within the scope of this disclosure. It is to be understood that those skilled in the art to which the invention pertains may effect alterations in the embodiment of the bowling device disclosed by use of routine, normal ordinary engineering skills without departing from the inventive concepts of the device. Also, further equivalent means can be employed in order to accomplish any and all of the operations and structural advantages of the invention.

As an aid to understanding this invention it can be stated, in essentially summary form, that it involves a toy bowling device comprising a novel arrangement of a bowling alley including a conventionally proportioned elongated ball rolling surface, having an approach area at one of its ends from which balls are directed by a player to movable pins situated in the usual array at the other end of the alley surface, which other end communicates with a retaining pit for receiving the balls rolled by the player and the pins knocked down thereby. The device includes the usual ball guiding gutters which are disposed adjacent each of the long sides of the alley surface and are directed toward the ball and pin receiving pit to guide missed aimed balls to the pin; a ball return runway extending from the pin to the player approach area; and a pin and ball handling means for spotting pins on the alley in said usual array, clearing knocked down pins from the pin array area, and returning rolled balls from the retaining pit to the player approach area.

The toy embodiment of the bowling device as shown in the accompanying drawings also includes a simulated player figure, control means whereby an operator can control the operation of the pin and ball handling means and the player figure.

The invention can be more fully understood by referring to the accompanying drawings wherein FIGS. 1—4 show a plan view of a preferred toy embodiment of the bowling device on the invention. The bowling device is generally designated by the reference character 20 and includes a hollow support housing 22 generally formed by sawdust pans 24 and 25, front end panel 28 and rear end panel 30 which is provided with a pin access opening 31. In the present embodiment it is contemplated that the housing be formed from a suitable plastic material either as a single piece or as a plurality of assembled sections as indicated by the joints 32. In this form the molded configuration of the housing is such as to define a rectangular top 34 including a pair of longitudinal depressions defining ball guiding gutters 36 and 38 extending on opposite sides of an elongated flat alley bed or ball rolling surface 40, a ball return runway 42, player approach area 44, pin position area 46, and a depressed pin and ball retaining pit 48. The alley bed may be integrally formed with the housing or may comprise a flat laminated surface simulating in appearance and color a conventional alley bed which is recessed in the housing top and suitably attached thereto to form a contiguous surface with the player approach area 44 and pin position area 46. As may be seen in FIGS. 1 and 2 the ball return runway is shaped to provide an elongated track defined by ball guiding rails 50 on both sides of the runway as the elevated end 52 adjacent the ball and pin retaining pit which by gravity provides motion to the balls placed thereon to cause them to run along the track toward and up a slope 54 to a ball storage rack 56 at the front end of the housing adjacent the player approach area.
In its toy embodiment shown in the drawings, the balls 58 are propelled in a rolling action toward the pins 60 by means of a figure 62 having the appearance of a bowling pin which is pivotally mounted on a turning mechanism housed in a box suitably situated in a compartment of the housing 22. The bowling figure 62 is disclosed in detail in U.S. patent application Serial Number 198,998, filed May 31, 1962, by Eric V. Pulkin, now Patent No. 3,172,401, granted March 1965.

The general structure of the bowling device shown in FIGS. 1–4 comprises a pin loading rack 74 which includes a transversely positionable pin gripping slide 76, a rake 77 utilized to clear fallen pins from the pin location area of the alley bed and adjacent gutter, a retaining pin located immediately to the rear of the pin location area, a ball return paddle-wheel arrangement 78 operable to deposit balls received in the retaining pin on the ball return runway on which the balls are conducted by gravity and momentum to the ball storage rack adjacent the player approach area, a drive system 80, operable by the crank 72, comprising a gear driven shaft 82 and a plurality of cams for operating the various parts of the mechanism 68, and support members 84 for positioning the various parts of the mechanism 68 with respect to the housing 22.

As can be seen in FIGS. 1, 2, and 10, the support members 84 are positioned on each side of the retaining pit 48 in parallel confronting relation each slightly beyond the outer edges of the gutters 56 and 38. The inner faces of the support members are suitably provided with cooperating contacting surfaces of journal bearings for pivotally supporting the drive shaft 82 and various support and cam follower linkages to be described. Adjacent the lower edges of the support members the members are interconnected in fixed relation by means of a ball and pin separator rack 86 which is spaced at rearwardly and sidewardly sloping angles from the recessed bottom portion of the housing 22 defining the bottom of a collection pit 88 which receives pins falling through the rack 86 in a manner to be described. Referring to FIG. 10 it can be seen that the recessed bottom 88 of housing 22 further defines confronting side walls 90 having a peripheral recess 92 for positioning the lower edge of the covering cowling 70 and ledges 94 and 96 raised from the bottom for supporting the bottom edges of the support members 84. The wall area between the ledge 94 and the recess 92 seen at the left hand side of FIG. 10 forms the bottom part of a ball retaining compartment 98. The upper part of the compartment 98 is defined by a portion of the side wall 100 of the cowling 70 adjacent the paddle-wheel 78 and is contiguous with the bottom part. As may be seen in FIG. 10, the cowling 70 is provided with additional support means by means of two downwardly directed pins 102 having slot forming lugs 104 which engage the top edge of support members 84.

As previously mentioned, the drive system for the pin and ball handling mechanism 68 is actuated by the crank 72. This system comprises a main driving gear 106 suitably fixed to the drive shaft 82. A hub 108 is integrally formed with the main drive gear 106 and is rotatably mounted on a turntable 110 to permit rotation of the shaft. The other side of the shaft 82 is similarly supported for rotation in the hub 112 of a follower gear 114 which drives the ball return paddle wheel in a manner to be described.

The pin drive gear 106 is caused to rotate in a counter clockwise direction, as seen in FIG. 2, in response to clockwise turning of the crank 72 by an operating player by means of an interengaging worm gear 116 fixed to a rotate shaft 118 which is coupled by a simple universal joint 120 formed by the bent ends of shaft 118 and a rotate shaft 122 fixed to crank 72. The two shafts 118 and 122 are rotatively supported in bearing housings 124 in depending fins located beneath the frames 126 in a manner represented by the side walls of the universal joint housing 124 shown in FIG. 5. The drive shaft further mounts a plurality ofcams which rotate with the shaft to control the movements of the pin rack 74, pin gripping slide 76 and the clear rake 77. Two similar cam wheels 126 and 128 are keyed to the shaft 82 by elongated hubs 130 and 132, respectively. Each of the cam wheels 126 and 128 are provided on their inner faces with cam surfaces 134 for controlling the movement of the pin loading rack and with cam surfaces 136 on the outside surface for controlling the movement of the pin clear rake 77. The shaft also supports in rotational relation a central cam 138, which is keyed to the shaft by laterally extending sleeves or hubs 140 which substantially fill the space between hubs 130 and 132. This latter cam 138 is utilized to control the movement of the pin gripping slide 76.

The structure of the pin loading rack 74 and its operating pin gripping slide is best seen with reference to FIGS. 1, 5, 6, 7 and 11. The rack comprises a hollow housing defined by top and bottom walls 145 and 144, respectively, which are suitably joined by an upstanding peripheral side wall 146 to form a generally rectangularly shaped box having pointed front end 148. Both the top and bottom walls are provided with a plurality of aligned holes 149 arranged in the conventional bowling pin array and which are slightly larger in diameter than the pins 60 to permit free passage of the pins through the holes.

A pair of U-shaped frames 150 and 152 having Y-shaped reinforcement members 154 extending between the side arms and rear cross member of each frame are utilized to pivotally support the rack with respect to the support members and permit the rack to move towards and away from the alley bed. The forward or free ends of the side arms 156 and 158 of frames 150 and 152, respectively are provided with confronting journal pins 159 which are pivotally received in bearings in the side wall of the rack as indicated at 160 and 162 in FIG. 9. At the rear ends each of the frames includes outwardly extending journal pins which are similarly received in bearings in the support members as indicated at 164 and 166 in FIG. 7. Each of the side arms of the top frame 152 is provided with a rigidly connected arcuate cam follower 168 each of which engages respective cam surfaces 134 on the cam wheels 126 and 128. By virtue of this arrangement upon rotation of the cam wheels the configuration of the cam surface causes the rack assembly 74 to move vertically back and forth between a position adjacent the alley bed as shown in FIG. 6 and an elevated position above the alley bed as shown in FIGS. 5 and 7.

At various points during the operating cycle of the mechanism 68 the rack is utilized to provide a setting template for the pins to pass over or away from the pins without gripping them, or to grip the pins so they may be raised away from the alley bed. In order to effect these operations the rack is provided with the movable pin gripping slide 75 whose area configuration is similar to that of the top and bottom of the rack but slightly smaller in dimension to permit a sliding fit within the rack housing as seen in FIG. 11. The slide is slidingly supported on an entry received in the top wall of the side wall 146 and on surfaces afforded by the lock pins 172 within the housing and the mounting studs 174 for securing a position lock spring 176 within the housing.

Additionally, rounded guide members 178 are provided in the rack housing to prevent the slide from moving off or beyond its intended path of travel. Extent of movement of the slide is further restricted by a pair of guide slots.
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180 which engage pins 182 extending through the slide from the top wall of the rack. As best seen in FIGS. 7 and 11 the slide is provided with a pair of spaced upright standing lugs 184 at the central portion of the rear edge of the slide. A pin 185 is positioned through the lugs to pivotally attach the end of a cam follower linkage 186 to the slide. The upper end of linkage 188 is engaged by a cam following slot 190 whose peripheral configuration cooperates with the rotating central cam 138 to control the position of the slide with respect to the rack. As may be seen in FIGS. 7 and 11 the slide is provided with a set of holes 191 identical in size and registry with those in the top and bottom of the rack housing. When the slide cam follower position is determined by the action of the central cam 138 and cam follower 188 to the position shown in FIG. 11, the three sets of holes in the slide, and top and bottom of the rack are in register thereby permitting the rack to be lowered over the pins or raised from over the pins without gripping them. However, when the slide is moved by the central cam 138, as shown in FIG. 7, the holes will not be in register and the pins will be tightly gripped by the rack assembly whereby the pins may be retained in the rack while it is raised and held in the raised position of FIG. 7. It is to be noted that the lock or clip spring 176 is provided with a pair of gripping fingers which slide in the forward or rear gripping position by engagement with a lug 193 fixed to the slide as shown in FIG. 11, until the slide is positively moved from this position by the action of the central cam. This prevents accidental gripping of the pins during certain stages of the operating cycle to be described resulting from vibratory or other type movement of the slide.

Referring to FIGS. 1, 5 and 7, the rack 77 may be seen to comprise a front bar 194 whose lower surface is shaped to conform to the shape of the alley bed and adjacent gutters. A pair of arms 196 extend rearwardly from the sides of the front bar which are pivotally connected at their rearward ends to the forward ends of a pair of arms 198 of respective cam follower linkages 200. As shown in FIG. 7, the arms 198 of the linkages extend in an arcuate direction toward central portions which are pivotally connected at 202 to the support members. An arm 204 having a right angled socket 206 extends rearwardly from the central portion of each of the linkages 200. The sockets are arranged in confronting relation and are utilized to support a heavy counter balance weight 208 in the form of a rounded rod fitting at its ends into the sockets. In the wide part of the linkages 200 cam follower surfaces 210 are provided which are contacted by the cam surfaces 136. By this arrangement of the rack and counter balance 208 the weight of the counter balance 208 will cause the arms and linkages to assume the position shown in FIGS. 5 and 6 when the cam follower surfaces 210 are out of contact with the cams 136.

As shown in FIG. 7, the rear end of arms 196 are each provided with projecting tips 209 which engage pins 211 located on the back surface of arms 198 as shown in FIG. 7, when the arms 196 and 198 are in the extended position best shown in FIG. 5. This arrangement will limit the downward pivotal movement of arms 196 to permit the counter balance to cause the rack member 194 to lift to its retracted position above the alley bed thus not obstructing the path of balls rolled toward the pins.

When the cam 136 engages the cam followers 200 the rack front bar 194 will move downwardly until it contacts the alley after which it will move rearwardly to the position shown in FIG. 7. During this latter motion the bar 194 will sweep all fallen pins resting on the alley bed into the retainer pit. When the cam passes beyond contact 192 which locks the cam follower linkage to the counter balance 208 will cause arms 204 to pivot downwardly and arms 198 to pivot forwardly and upwardly thereby raising the front bar 194 to the position shown in FIGS. 5 and 6 where it will remain until the cam 136 again rotates into contact with the cam follower surfaces 210.

As previously described a pin and ball separator rack 86 is located in a downwardly sloping direction away from the rear end of the alley bed and is spaced above the bottom wall 88 of the pin retainer pit. The separator rack comprises a plurality of spaced parallel bars 212 which are supported on cross members 214 attached to the support members 84. The rearmost cross member 214 is spaced slightly from the front edge of the ball guide channel 216 which extends between the support members parallel to the rearmost cross member 214 to form a downwardly sloping track 218 directed toward the left support member as seen in FIGS. 4 and 10. The spacing between the parallel bars 212 is such as to permit pins to fall between the bars to the pit bottom 88 but not to pass the balls. By this arrangement all pins entering the pit will fall through the bars while the balls will roll down the bars to the sloping track 218 and be directed to an opening 220 to a sloping runway 222 defined by the wall configuration of the housing.

A paddle wheel 78 is rotatably disposed on a shaft means 224 rotatably retained in support member 84 and wall 90. The paddle wheel is driven by a gear 226 which is in driven engagement with gear 214 fixed to the paddle wheel and coaxial with the shaft means 224. The direction of rotation of the drive shaft 82 is such that the paddle wheel will move counter clockwise as viewed in FIG. 9. The side of the paddle wheel away from the support member is provided with a plurality of equally spaced compartments 230 each defined by an outer arcuate wall 232, an inner sloping wall 234 and a rear connecting wall 236 as shown in FIG. 9. As the paddle wheel rotates it can be seen from FIG. 9 that the outer wall 232 will scoop up any ball 58 resting on the runway 222. The ball will then be conducted with further rotation of the paddle wheel to a point near the top of the wheel's path of rotation which will align the downwardly sloping walls 234 flush with the downwardly sloping end 52 of the ball return runway 42. At this point the ball will roll by gravity off of the wall 234 onto the runway section 52 where it will gain sufficient speed to roll up the runway slope 54 onto the ball storage rack 56 adjacent the player approach area.

In addition to the above structure, the device includes a signal bell 238 which is attached by means of a bracket and fastening means 240 to the housing 22. The bell is caused to ring when struck by a resiliently mounted hammer 242 which is cammed to a tensioned position away from the ball by pin cams 244 on the inside surface of the gear 228. The positions of the pin cams are such that the hammer will be released so that it may strike the bell to provide signals to the player operator at the time certain stages of the game are to be started.

The operational sequence of the above described device and procedure followed by a player operator to bowl a game with the device are as follows. FIG. 5 shows the position of the pin and ball handling mechanism when the device is in condition for the start of a game or the starting of a new bowling frame. It will be noted that the rack 74 is raised to its highest position, the pin gripping slide 76 is in its forward position in which it will not grip the pins, the rack 77 is up, and also, the paddle wheel will be loaded with the last ball from the previous bowling frame. The operator then manipulates the bowling figure control knob to first aim the ball toward the most forward pin by pivoting the figure until the desired aim is attained. The player then releases the knob causing the arm of the figure to snap forward and roll the ball along the selected path toward the pins. After the ball strikes the pins some pins will be knocked down either on the alley bed or in the retaining pit, and according to the player's aim, some pins will remain standing.

After the pins all have come to rest, the player operator
will then turn the crank 72 in a clockwise direction to cause the drive shaft and attached cams to rotate. During this rotation the pin loading rack will descend to its lowest point immediately above the alley bed. If pins have remained standing the top part of the pins will then project through the pin receiving holes in the rack and the mechanism will be in the condition shown in FIG. 6. The operator will continue turning the crank to permit the action of the central cam 138 to move the slide 76 rearward to grip the pins in a home position in the rack. As the crank is continued in its rotation the rack 74 will move again to its highest position firmly holding the pins that were left standing after the first ball was thrown. As the player continues turning the crank the cam 136 on cam wheels 126 and 128 will contact the cam follower surface 210 on the linkage 200 causing the pin rack to descend to the level of the alley bed and then to sweep rearward to push the fallen pins into the retainer pit. FIG. 6 shows the position of the parts of the mechanism at this time. Upon further continuous rotation of the crank the rack will retract its path to the raised position and the loading rack will again be in contact with the alley bed and in their correctly spotted positions in the pin array. The central cam 138 will then actuate the cam follower 188 to move the pin gripping slide 76 forwardly releasing the remaining pins with respect to the loading rack. Upon further rotation of the crank the rack 74 will return to its elevated position leaving the pins missed by the first ball correctly spotted. The operator will cease turning the crank at this point and again aim the player figure prior to causing the figure to roll the second ball. This will conclude the rolling action for a frame.

In order to establish the condition to start the above cycle again for the next scoring frame, the operator will again turn the crank until the rack is lowered to its lowest point at which time the rack 74 will be elevated and the slide will be forward in the pin release position. The bell will again be sounded signaling the player to collect the pins from the retainer pit through the rear opening 31 and fill the holes in the loading rack. This will accurately spot the pins in their correct positions in the array. After this loading has been accomplished the player will again turn the crank to elevate the rack to the position where it once again corresponds to that shown in FIG. 5. The bell will again be sounded signaling the player to roll the first ball. This will start a new cycle of operation identical to that just described. Such cycles will be repeated until a full game, requiring ten frames, has been completed.

From the foregoing it is apparent that a new and improved bowling device has been provided requiring various operational manipulations which along with normal procedures of conduct of a bowling game will provide a great source of entertainment to an operating player.

While the preferred embodiment of the invention has been described in terms of its adaptation as a toy it is to be understood that various concepts of construction, such as the pin and ball handling mechanism are suitable for use in non-toy devices. And it will be realized by those skilled in the art upon which the simulation is based that by ordinary skills a variety of differently appearing bowling devices may be designed and built utilizing the features of the invention as embodied in the above described example. Accordingly, since the structures of this invention are susceptible to such modification and other uses, the invention is to be considered as being limited only by the appended claims.

We claim:

1. A bowling device comprising, a housing including an elongated flat alley bed having an operating position at one end and a pin position area at the other end of said elongated alley bed, pin and ball handling means adjacent said other end of said alley bed for removing fallen pins knocked down by the first rolled ball and presenting the remaining pins not knocked down in their correct position in said array to permit a player to roll a second ball toward said remaining pins, control means for operating said ball and pin handling means, said ball and pin handling means including a pin rack having pin openings of greater diameter than said pins and arranged in said array, slide means having openings corresponding to said rack openings positionable in alignment and out of alignment with respect to said openings whereby pins extending through said openings may be gripped by said rack and slide when said openings are out of alignment, said ball and pin handling means including rack means for clearing fallen pins from said alley bed, said ball and pin handling means including drive means operated by said control means for first positioning said rack and rack free from pins positioned in said array prior to said first ball being rolled, said drive means then moving said rack and said slide with said openings in alignment to a first position with said pins extending through said openings in response to said first means, after said rack and slide are in said first position said drive means operating said openings of said slide out of alignment with said rack openings whereby said standing pins extending through said openings are gripped by said rack and slide, after pins are gripped by said rack and slide said drive means positioning said rack, slide and gripped pins in a second position remote from said alley bed, while said rack is in said second position said drive means being operable to cause said rack to clear the fallen pins from said alley bed, said drive means being further operable to return said rack and slide to said first position and release said standing pins from said rack and then remove said rack and slide from said first position to said second position with said standing pins disposed on said alley bed in correct position in said array, said drive means including cam surfaces for actuating cam follower linkages controlling the movement of said rack and said rack.

2. A bowling device as defined in claim 1, wherein said ball and pin handling device includes a pin and ball separator, ball return means operable by said drive means, and said pin and ball separator including means for delivering rolled balls to said ball return means.

3. A bowling device as defined in claim 1, wherein said drive means comprises a crank driven linkage.

4. A bowling alley device for use in combination with the pin array position of a bowling alley, said device comprising: a first pivoted cam follower linkage, a pin clearing member actuated along a path closely overlying said pin array position by said first pivoted cam follower linkage between a retracted position remote from said pin array position and a second position wherein said standing pins in said array position extend through said openings in said rack coaxial with respect to pins in said pin array position, a third cam follower linkage, said rack comprising a slide member actuated by said third cam follower linkage in a manner in which said rack and pins is held in said rack in a first slide position of said slide member and extend freely through said openings in said second position of said slide member, cam means in said device, said cam means being adapted to be moved, cam surfaces on said cam means, said first, second and third cam follower linkages being in engagement with said cam means, said cam surfaces being so disposed that when said cam means is moved said first, second and third cam follower linkages are moved in such a manner that said pin clearing member moves from its retracted po-
position through a pin sweeping stroke and returns to the retracted position and while the pin sweeping member is away from its retracted position said rack is held in its retracted position and said slide member is held in its pin holding position, said cam surfaces being arranged so that said rack is moved from its retracted position to its second position and from its second position to its retracted position for the management of pins, said surfaces being arranged so that said slide selectively moves from its holding position to its second position for the selective control of pins.

5. A bowling alley device as defined in claim 4, wherein said cam means comprises a first rotating cam including separate cam surfaces for operating said first and second cam follower linkages and a separate cam for actuating said slide member.

6. A bowling alley device as defined in claim 5, wherein said first cam follower linkage comprises a counter weight for positioning said pin clearing member in said retracted position.

7. A bowling alley device for use in cooperating relation with the pin array position of the bowling alley, a cam shaft in said device, manual means for actuation of said cam shaft, first cam means on said cam shaft connected to be actuated thereby, a pin clearing member actuated along a path closely overlying said pin array position by said first cam means between a retracted position remote from said array position to a second position whereby said pin clearing member clears away any fallen pins from said array position, second cam means on said cam shaft, a pin rack, pin receiving openings in said pin rack, said pin rack being actuated by said second cam means between a retracted position remote from said pin array position and a position adjacent said array position extend through said openings in said rack, third cam means on said cam shaft, said rack comprising a slide member actuated by said third cam means, openings in said slide member, said third cam means actuating said slide member so that said slide openings are moved from a coaxial position relative to said pin rack openings to another position whereby pins are gripped in said rack by said slide member, said first, second and third cam means being arranged so that said pin clearing member moves along its path from its retracted position to its second position and back to its retracted position while said pin rack is retained in its retracted position remote from said pin array position and said slide member is actuated by said third cam means when said pin rack is positioned adjacent said array position.

8. A bowling alley device as defined in claim 7 wherein said pin rack comprises a housing having a top wall and a bottom wall structurally joined together, said rack openings being in said top and said bottom wall and being coaxially arranged in a bowling pin array, said slide member being positioned between said top wall and said bottom wall and being positioned adjacent to said top wall, the openings in said slide member corresponding to said openings in said top wall and said bottom wall so that in one position of said slide member, said opening in said top wall, said slide member and in said bottom wall are coaxially aligned, cam linkage means connected to be actuated by said third cam means to move said openings in said slide member out of coaxial alignment with said openings in said top wall and said bottom wall whereby pins in said rack are gripped adjacent their necks by said slide member.

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