J. C. McFARLAND.

TENPIN SETTING DEVICE.

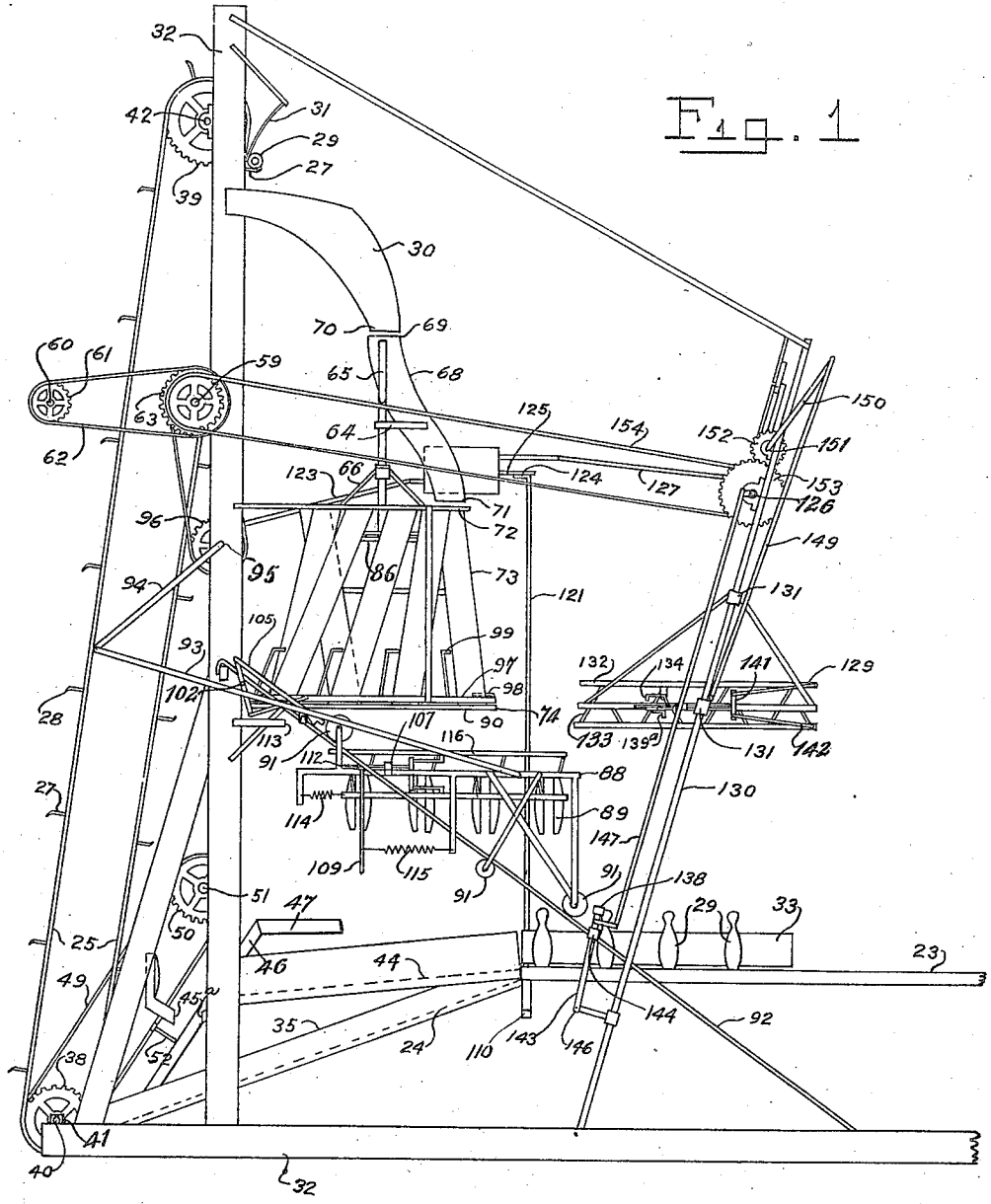
APPLICATION FILED OCT. 13, 1913.

1,203,216.

Patented Oct. 31, 1916.

9 SHEETS—SHEET 1.

Fig. 1



WITNESSES

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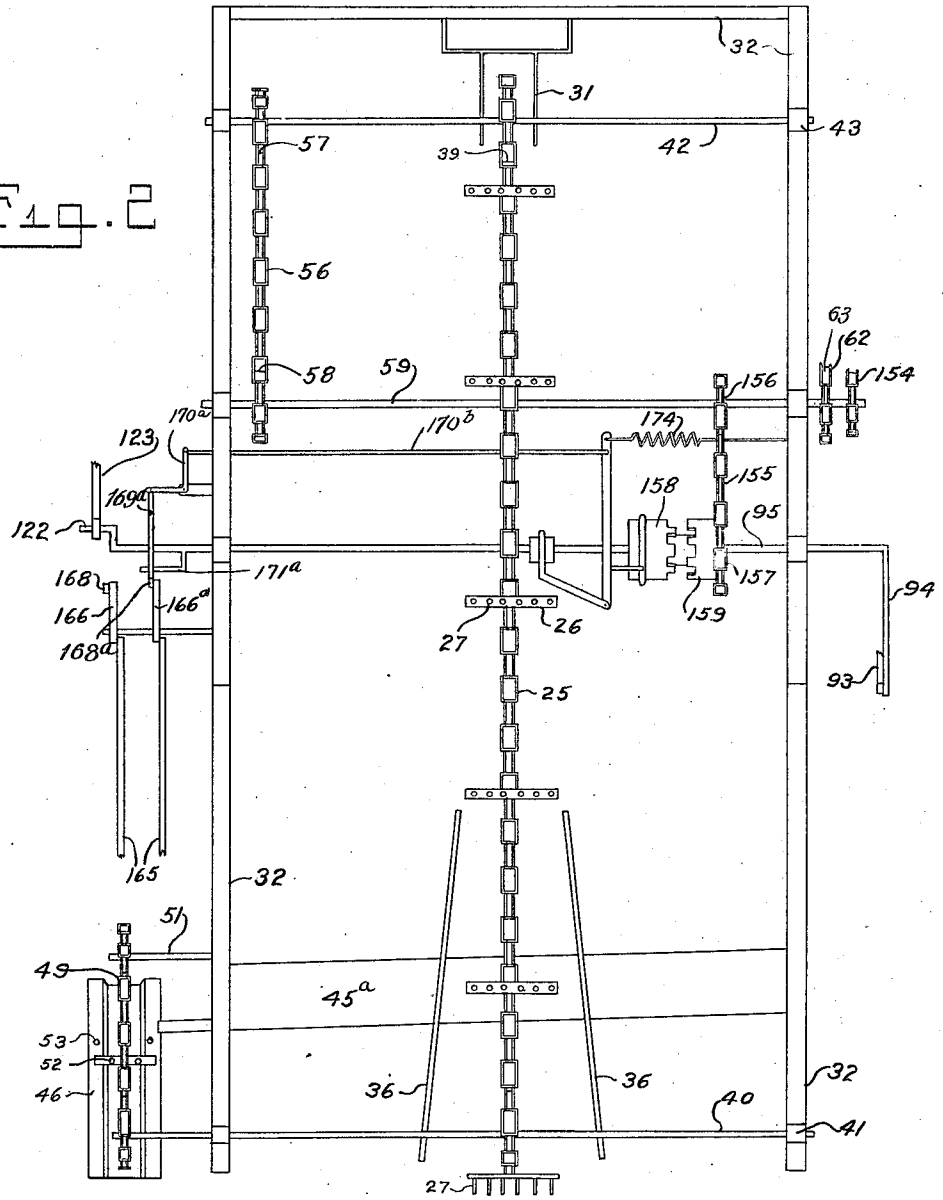
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9 SHEETS—SHEET 2.

Fig. 2



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9 SHEETS—SHEET 3.

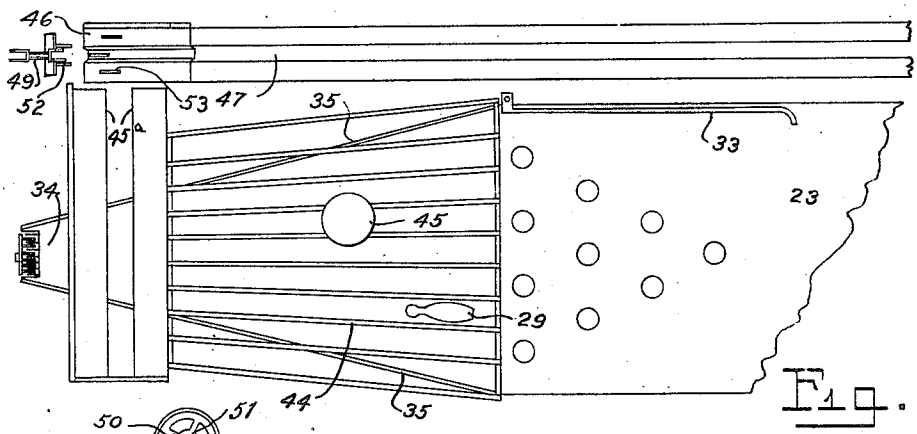


Fig. 3

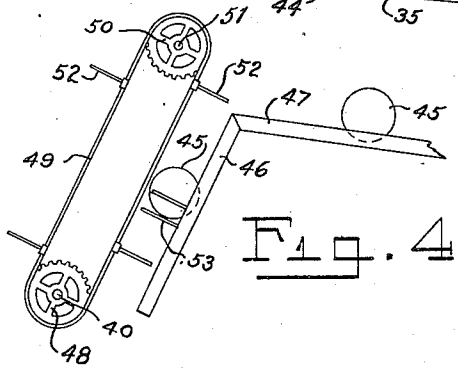


Fig. 4

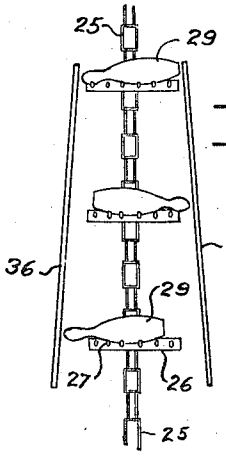


Fig. 5

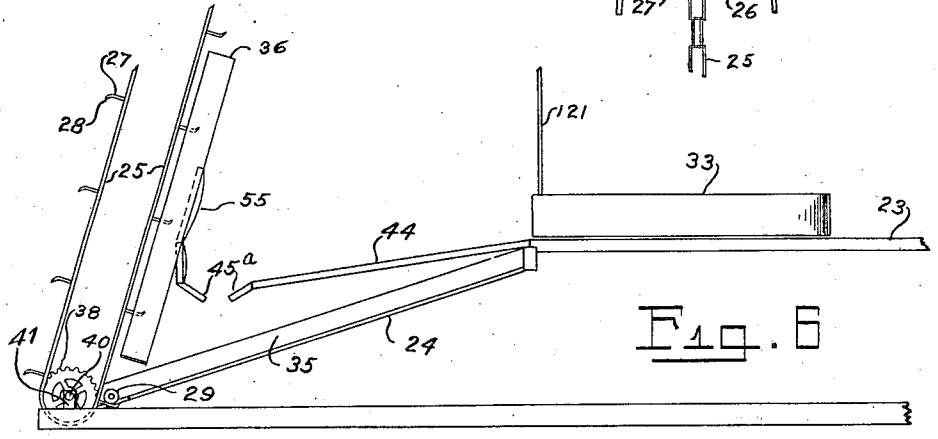


Fig. 6

WITNESSES

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9 SHEETS—SHEET 4.

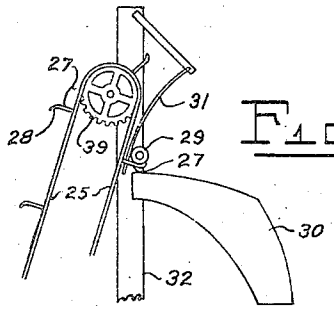


Fig. 7

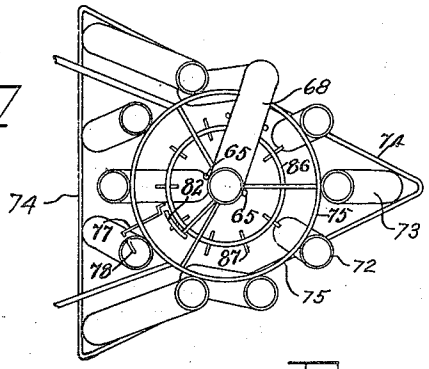
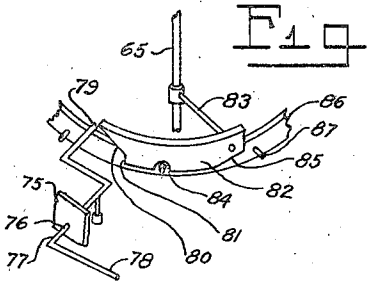


Fig. 8

Fig. 10



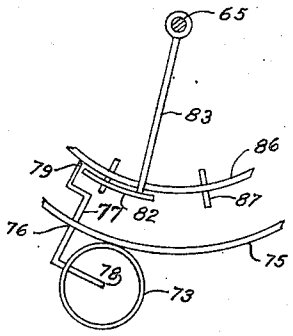


Fig. 11

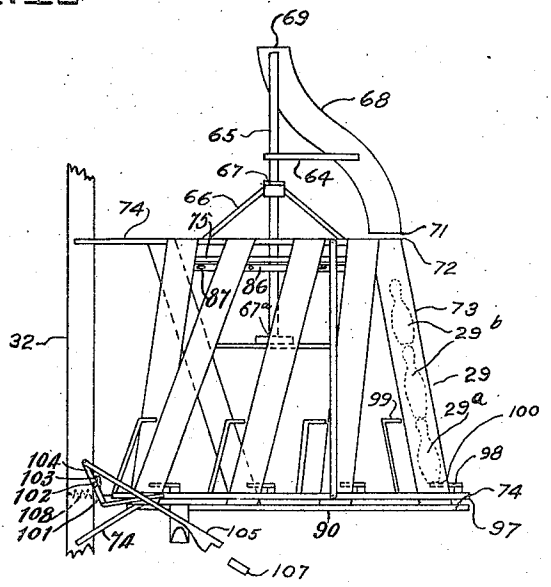


Fig. 9

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Patented Oct. 31, 1916.

9 SHEETS—SHEET 5.

Fig. 13

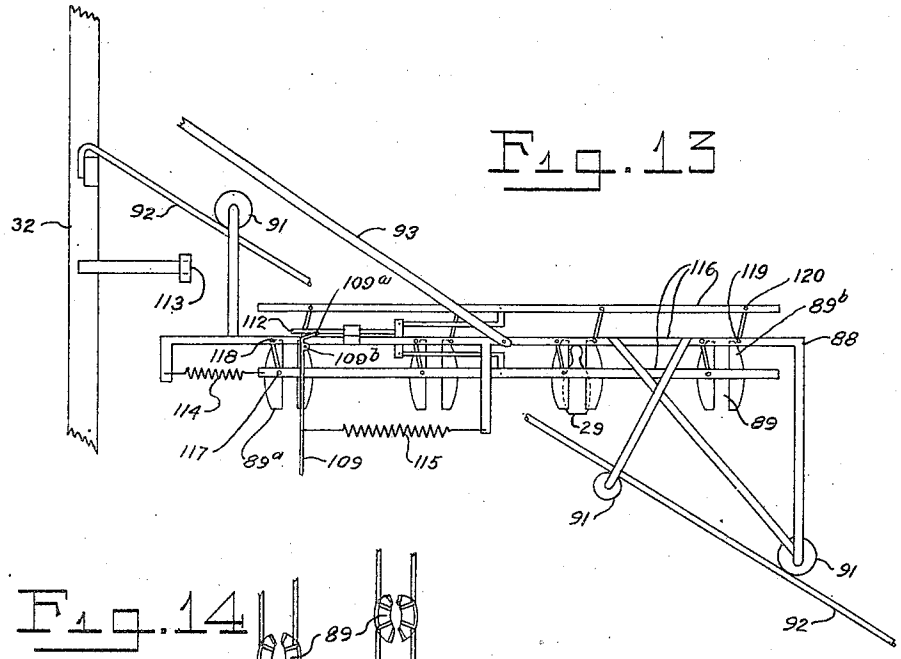


Fig. 14

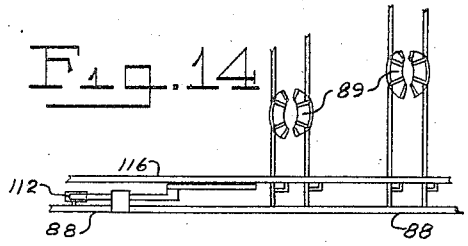


Fig. 15

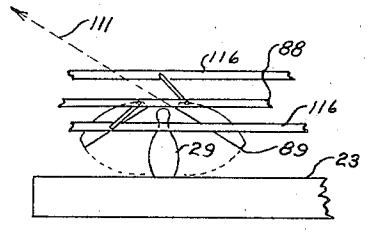
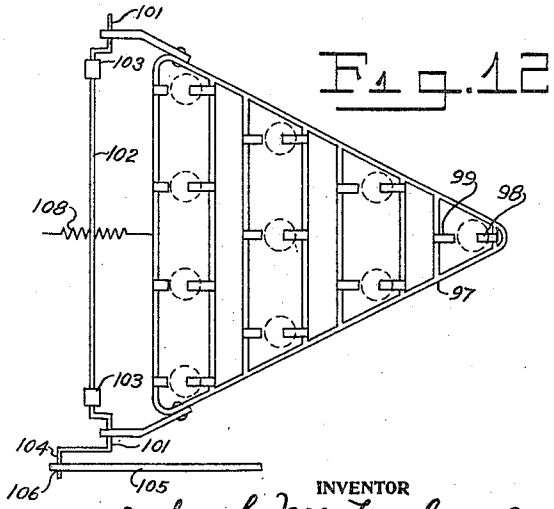


Fig. 12



WITNESSES

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9 SHEETS—SHEET 6.

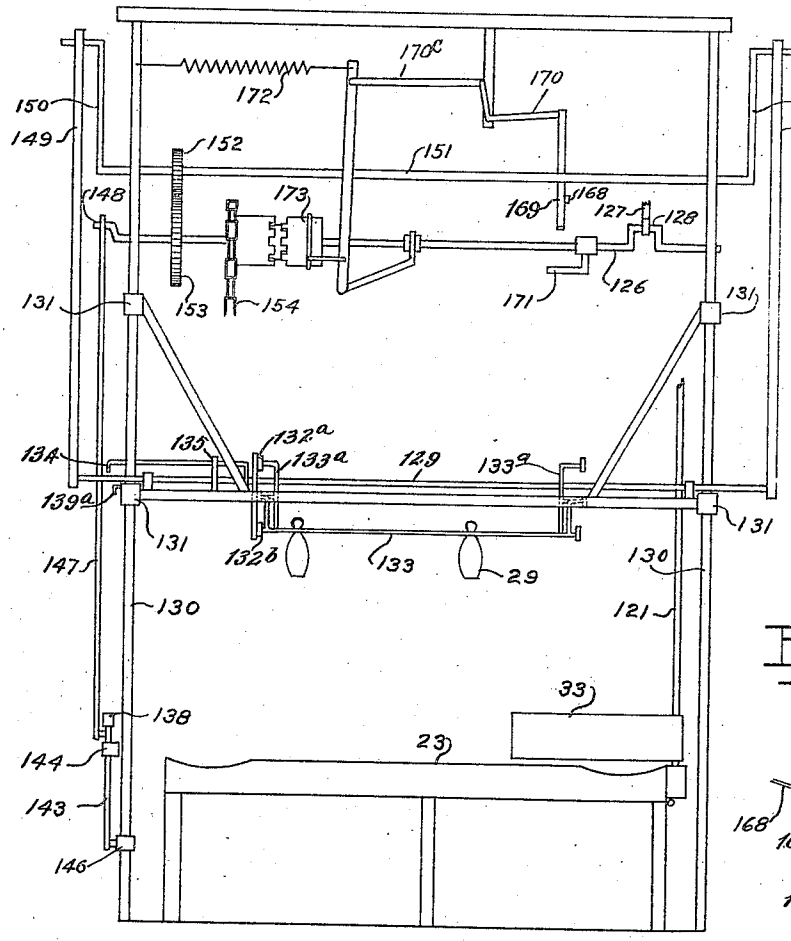


Fig. 16

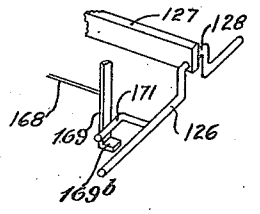


Fig. 18

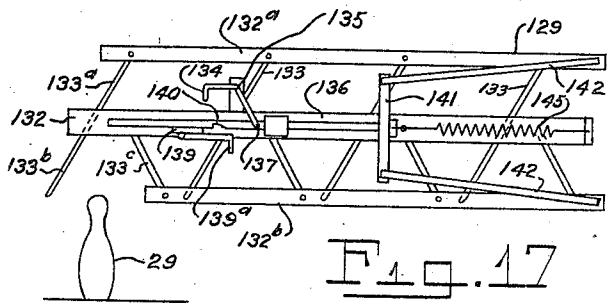


Fig. 17

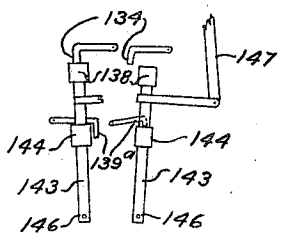


Fig. 19

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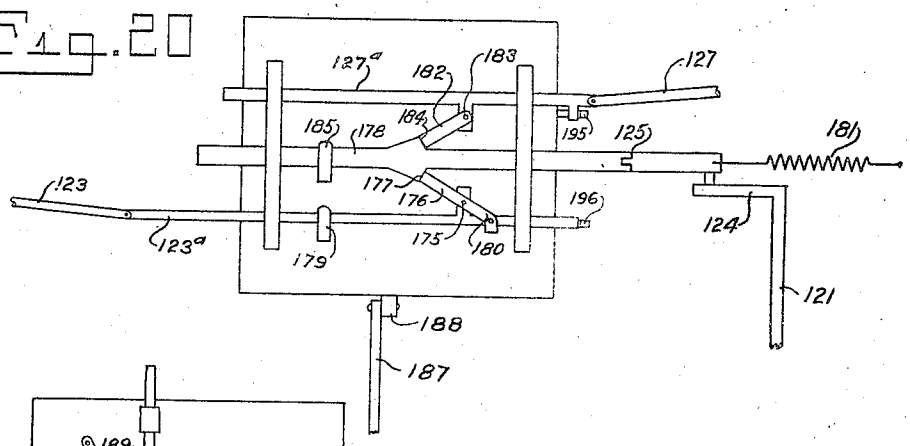
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Patented Oct. 31, 1916.

9 SHEETS—SHEET 7.

Fig. 20



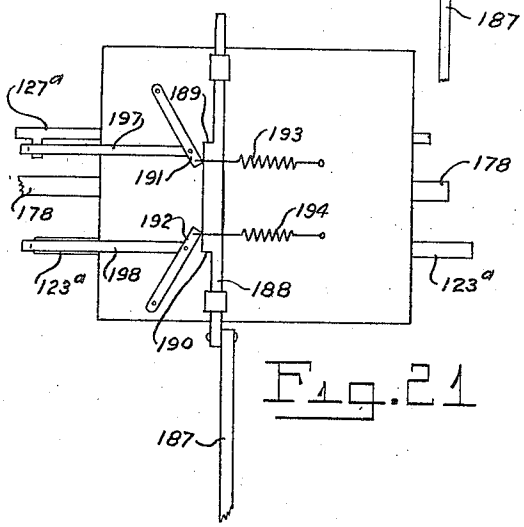


Fig. 21

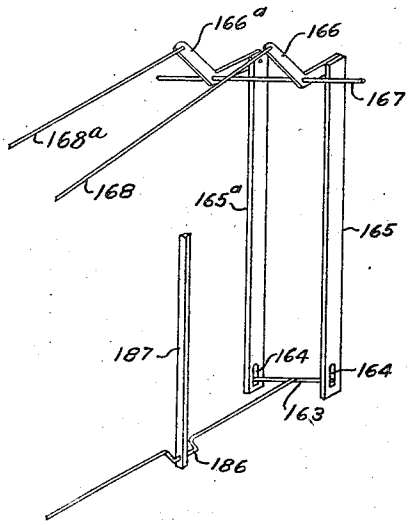
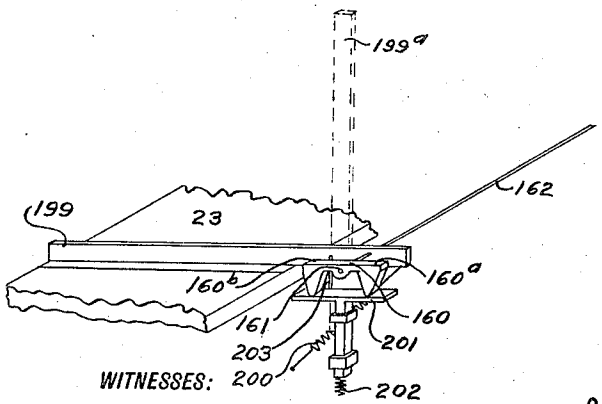


Fig. 22



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TENPIN SETTING DEVICE.

APPLICATION FILED OCT. 13, 1913.

1,203,216.

Patented Oct. 31, 1916.

9 SHEETS—SHEET 8.

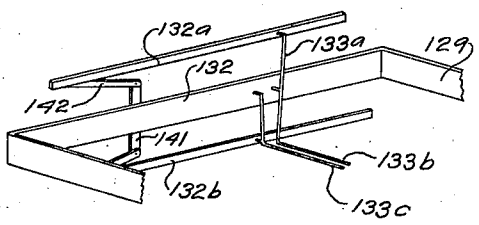


Fig. 23

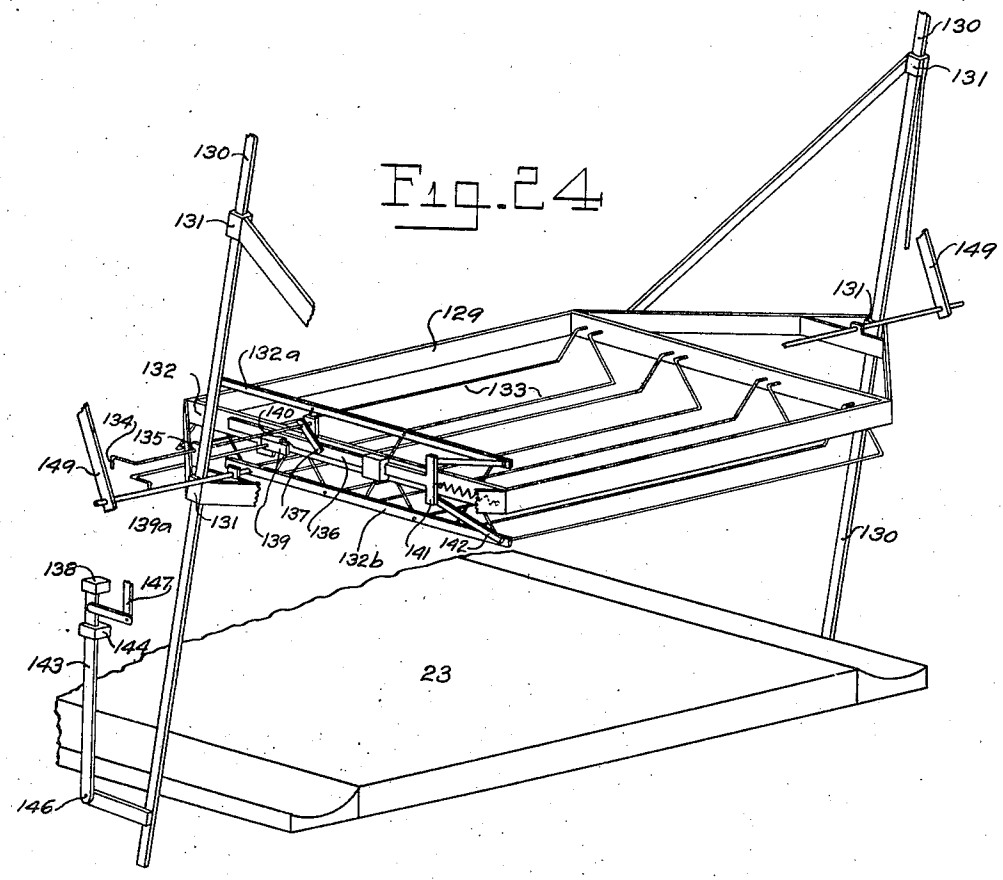


Fig. 24

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TENPIN SETTING DEVICE.

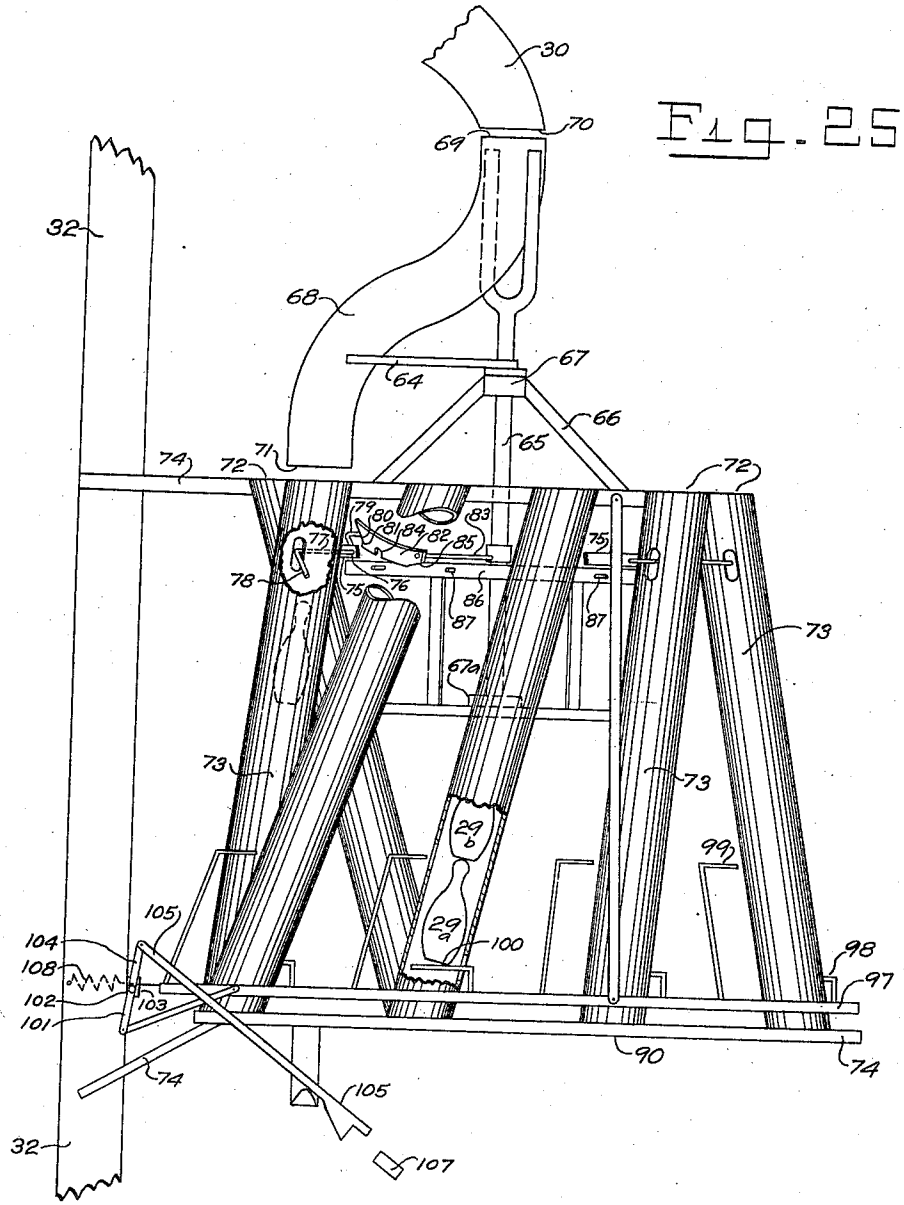
APPLICATION FILED OCT. 13, 1913.

1,203,216.

Patented Oct. 31, 1916.

9 SHEETS—SHEET 9.

Fig. 25



WITNESS

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UNITED STATES PATENT OFFICE.

JOHN C. McFARLAND, OF LA GRANDE, OREGON.

TENPIN-SETTING DEVICE.

1,203,216. Specification of Letters Patent. Patented Oct. 31, 1916.

Application filed October 13, 1913. Serial No. 794,765.

To all whom it may concern:

Be it known that I, JOHN C. McFARLAND, a citizen of the United States of America, residing at La Grande, in the county of Union and State of Oregon, have invented certain new and useful Improvements in Tenpin-Setting Devices, of which the following is a specification.

This invention pertains to apparatus for mechanically setting ten-pins in a bowling alley, for clearing off fallen pins, for clearing the alley of the pins and re-setting the same: for locking the apparatus against conflicting movements and for guarding the apparatus against balls being rolled while the mechanical movements of the apparatus are in action.

Other objects and purposes will be hereinafter disclosed and illustrated in the accompanying drawings.

Most of the work is done by mechanical means manually thrown in and out of operation with continuous moving machinery at the will of the operator by means of levers or other appliances adapted to be operated with the hands or feet.

The alley is cleared of down pins by means of a rotating arm adjusted to sweep across the surface of the alley floor in such a manner as to remove all of the pins in its path, sweeping to an incline at the rear of the alley, from whence they are re-conveyed by an elevator to a hopper, passed from the hopper to a tubular crane and from there distributed to tubular carriers from which they are taken by a conveyer and transported to the alley floor.

A clutching device is provided for gripping and elevating standing pins when it is desired that they should retain their positions upon the alley floor, when the rotating sweeper arm may be brought into use to clear the down pins from the alley floor, then the clutching device is lowered and the pins held thereby are released to their original positions on the alley floor. Means are provided for separately sweeping the alley floor of all pins and for elevating the standing pins, sweeping the down pins from the alley and again replacing the standing pins. Means are also provided for locking one of the operating means when the other is in process of operation, in order to prevent conflicting movements. Means are also provided for blocking the alley floor to prevent the rolling of balls while the machinery is in course of operation. Means are also provided for returning the balls to the front end of the alley floor.

In the drawings, Figure 1, is a side elevation of the device, Fig. 2, is a view of the rear of the device with portions of the arms and rotating mechanism broken away, Fig. 3, is a broken away view of the alley floor showing the pins in place thereon together with a pin and ball in transit to the elevating mechanism, also showing the sweeper arm, Fig. 4, is a side elevation of the ball elevating mechanism for returning the balls to the front end of the alley, Fig. 5, is a broken away rear view of the pin elevating mechanism illustrating the manner of alining the pins to position for proper reception at the hopper, Fig. 6, is a broken away side view of the alley floor and of the pin elevating mechanism together with the ball and pin separating mechanism, Fig. 7, is a side view of the upper end of the pin elevating device showing a pin in the process of being removed from the elevator to the hopper, Fig. 8, is a top view of the crane and pin retainer mechanism, Fig. 9, is a side view of the crane and pin retainer mechanism, Fig. 10, is a perspective view of the crane escapement mechanism, Fig. 11, is a plan view of the same, Fig. 12, is a plan view of the pin tripping device adapted for releasing one set of pins at a time from the pin retainer, Fig. 13, is a side view of the pin carriage together with a broken away view of the track, Fig. 14, is a broken away plan view of Fig. 13, Fig. 15, is a broken away view of the pin conveyer in the position the same is in after the pin has been released upon the alley floor and is on its upward journey, together with a view of the released pin and a broken away view of the alley floor, Fig. 16, is a view of the front of the device showing the pin clutching mechanism, Fig. 17, is an enlarged side or end view of the pin clutching mechanism, together with a view of a standing pin, Fig. 18, is a broken away view of the

device for releasing the clutch to throw into operation the pin clutching device, Fig. 19, is a broken away view showing two positions of the clutch tripping mechanism, Fig. 20, is a front view of the mechanism for operating the sweeper arm, Fig. 21, is a view of a locking mechanism for preventing operation of the pin conveyer and pin clutching device at the same time, Fig. 22, is a broken away view of the front end of the alley floor together with mechanism for controlling the operation of the pin conveyer and pin clutching device. Fig. 23 is an enlarged broken-away view of Fig. 17. Fig. 24 is a view of the pin-lifting mechanism in close proximity to the alley floor together with a broken-away view of the connections, and Fig. 25 is an assembled view showing the mechanism illustrated in Figs. 8 to 11 inclusive.

Directing attention to Figs. 1 and 2, the alley floor 23 is of usual construction and connects with a downwardly and rearwardly extending portion 24 reaching to the foot of an elevator 25 consisting of an endless chain provided at intervals with horizontally arranged plates 26 set with horizontally arranged pins 27, curved at their outer ends, however, as at 28, and adapted to retain the pins 29 in their upward ascent to a hopper 30 into which they are dropped from the elevator 25 big end downward. The pins 29 are forced from the elevator pins 27 by angularly set guides 31 attached to the frame 32 at a position above the hopper 30, the larger ends of the pins 29 being forced from their support upon the elevator first by reason of their greater diameter and consequently dropping into the hopper with the larger end downward. Pins from the alley floor 23 are swept to the incline 24 by the arm 33 (Fig. 3) as hereinafter explained, and are guided to the point 34 at the foot of the elevator 25 by the vertical walls 35 following the incline 24 from whence they are picked up by the elevator pins 27. The pins 29 are centered in their positions on the pins 27 in their ascent by the upright angular guides 36, as shown in Fig. 5, following the line of the elevator 25 for a distance. The elevator chain 25 is rotated by sprocket wheels 38 and 39 (Fig. 1) connected therewith, the former being carried by the shaft 40 journaled to the frame 32 as at 41 (Fig. 2), and the latter by the shaft 42 journaled to the frame 32 as at 43. Extending rearwardly from the alley floor 23 (Fig. 3) and above the incline 24 (Fig. 1) is a screen 44 of a mesh sufficient to carry the balls 45 but to permit of the lengthwise dropping through of the pins 29, the said screen being downwardly and rearwardly inclined and connected with a transversely arranged ball-way 45^a setting on an angle as shown in Fig. 2 and conected with the end 46 of a ball-way 47 extending longitudinally of the alley floor 23 the full length thereof.

The shaft 40 (Fig. 2) carries a sprocket wheel 48 (Fig. 4) to which is rotably attached a chain 49 also rotatably attached to the sprocket wheel 50 supported by the shaft 51 (Fig. 2) attached to the frame 32. The chain 49 is set at intervals with carriers 52 (Fig. 4), and the end 46 of the longitudinally arranged ball-way 47 is set with supports 53. Balls 45 caught by the screen 44 are carried by gravity to the transversely arranged ball-way 45^a (Fig. 1) from whence they are carried also by gravity to the end 46 of the longitudinally arranged ball-way 47, caught by the supports 53, carried upwardly by the carriers 52 and deposited on the ball-way 47 as shown in Fig. 4 and returned by gravity to the front of the alley floor 23. A cushion 55 takes up the jar of the balls 45 reaching as far back as the guide 36 (Fig. 6).

A chain 56 operates over a sprocket wheel 57 attached to the shaft 42 (Fig. 2) and over a sprocket wheel 58 attached to the shaft 59. A shaft 60 (Fig. 1) reaches to a source of power and carries a sprocket wheel 61 over which operates a chain 62 operating also over a sprocket wheel 63 mounted on the shaft 59.

A crane 64 (Fig. 9) is connected with a vertical shaft 65 forked at the top supported by the brackets 66 and adapted to rotate in bearings 67 and 67^a carries a tube 68 with its upper end 69 directly underneath and adjacent the base 70 of the hopper 30 (Fig. 1) and its lower end 71 adapted for connection with the upper ends 72 of carrier tubes 73. The carrier tubes 73, ten in number, are borne by the supports 74 attached to the frame 32 and have their upper ends 72 arranged in a circle and their lower ends arranged in the positions corresponding to the required positions of the pins upon the alley floor, as shown in Fig. 8, and the crane 64 is adapted to rotate to carry the end 71 of the tube 68 directly over the ends 72 of the tubes 73 as shown in Fig. 8. The carrier tubes 73 are adapted for holding several sets of pins 29. The tube 68 is rotated in regular order in its position above the tubes 73, from one to the other by the pins 29 received from the hopper 30 after being carried upwardly by the elevator, as follows:—Supported in a prominent position between the tubes 73 (Fig. 8) is a horizontally arranged collar 75 furnishing bearings 76 for levers 77 (Fig. 10) having ends 78 passing through the walls of and into the tubes 73 (Fig. 11) and ends 79 adapted for engagement with the angular walls 80 and vertical shoulders 81 of the block 82 secured to the crane shaft 65 (Fig. 10) by the rod 83 on which the block is pivoted. In the bottom edge of the block 82 is a cut-out 84 and at the front end

of the bottom thereof is an incline surface 85.

Adjacent to the block 82 and secured in a permanent position is a collar 86 having outwardly extending pins 87, one corresponding to each of the tubes 73 (Fig. 8), such pins 87 adapted for engagement with the cut-out 84 in the block 82. When a pin 29 drops from the hopper 30 to and through the tube 68 and into one of the tubes 73 the same strikes against the end 78 of the lever 77 forcing the same downwardly out of its path, and forcing the end 79 of the lever 77 forward along the inclined surface 80 of the block 82, elevating the block 82 clear of the pins 87, then striking against the vertical shoulder 81 of the block 82, carrying the block 82 forward so that the cut-out 84 in the block engages the next pin 87 immediately in front of the pin 87 previously engaged. The inclined or beveled surface 85 of the block 82 helps to clear the same of the succeeding pin 87. This rotation carries the crane 64 around a sufficient distance to throw the tube 68 directly above the succeeding tube 73 and the operation is repeated from one tube 73 to the other, distributing the pins 29 in regular order in all of the tubes 73. A pin conveyer frame 88 (Fig. 1) carries a pair of jaws 89 for each of the tubes 73, such jaws being adapted to receive the pins 29 from the base 90 of the tubes 73. The conveyer frame 88 is mounted on wheels 91: the wheels 91 engaging the inclined track 92 upon which the conveyer frame 88 is elevated to a position directly underneath the carrier tubes 73 and lowered to a position above the alley floor 23 directly above the field for the pins 29. The said conveyer frame is moved from one of said positions to another by means of a lever 93 attached thereto and connected with a crank arm 94 (Fig. 1) joined to the end of the shaft 95, the rotation of the shaft 95 by means of the gear 96 connected with the moving mechanism serving to provide the movements thereof. Directly underneath the carrier frame 74 is a horizontally arranged movable frame 97 (Figs. 9 and 12) having two pins 98 and 99 one at a higher level than the other for each of the tubes 73, the former adapted for passing through the walls of the tubes 73 near the base thereof, as at 100, and for retaining the pins 29 in the tubes 73 the latter adapted for passing through the walls of the tubes 73 above the pins 98 at a distance equal to the lengths of a pin. The movable frame 97 is adapted for forward and rearward adjustment whereby the forward adjustment thereof the pins 98 clear the tubes 73 allowing the lower tier 29^a (Fig. 9) of pins 29 to drop out of the tubes 73 and throwing the pins 99 into the tubes 73 through the side walls thereof to retain the upper tiers 29^b of pins 29, and by the rearward adjustment thereof the pins 98 are drawn back into the tubes 73 and the pins 99 out again to the positions shown in Fig. 9 whereby a new set of pins 29 again rests upon the pins 98.

The movable frame 97 is pivoted to the levers 101 at the ends of the shaft 102 (Fig. 12) journaled in the bearings 103: at one end of the shaft 102 is a lever 104 pivoted to an arm 105 as at 106. When the conveyer frame 88 arrives at a point directly underneath the carrier frame 74, a point 107 (Figs. 1 and 9) on the conveyer frame 97 strikes against the arm 105 rotating the shaft 102 and causing the crank lever 101 to change the position of the movable frame 97 so as to change the position of the pins 98 and 99 as above described by thrusting the pins 99 into and removing the pins 98 from the tubes 73 thereby releasing the lower tier of pins 29^a whereby they drop into the jaws 89 (Fig. 1) of the conveyer frame for transportation to the alley floor 23. After the conveyer frame 88 is removed from said position beneath the tubes 73 the coil spring 108 (Fig. 12) returns the movable frame to the position shown in Fig. 9. After the pins 29 (Fig. 13) have been received by the jaws 89 on the conveyer frame 88 and the frame 88 has been transported to a position above the alley floor 23, an arm 109 strikes against a block 110 (Figs. 1 and 13) opening the jaws 89 to the position shown in Fig. 15 thereby releasing the pins to their positions on the alley floor 23, the conveyer frame 88 and jaws 89 then being elevated on the angle of the dotted line 111 (Fig. 15) clearing the pins 29. When the conveyer frame 88 is being elevated for reloading and when it gets to a point near the loading position underneath the tubes 73 an arm 112 (Fig. 13) on the conveyer frame 88 strikes against a block 113 closing the jaws 89 for the reception of the pins 29. The pawl 109^a at the end of the rod 109 fulcrumed at 109^b bearing against the portion 112 holds the jaws closed until released, the coil spring 115 serving to hold the pawl in place. The coil spring 114 normally hold the bars 116 in such a position as to maintain the positions of the jaws 89 in such a manner as they will retain the pins 29. Each jaw 89^a and 89^b is secured to two of the bars 116 as at 117 and 118 and at 119 and 120 so that in the shifting of the bars 116 to open and to close the jaws 89 a positive action is assured.

The sweeper arm 33 is attached to the vertical shaft 121 and is used to clear the alley floor 23 of all pins before setting the pins anew. The movement of the arm 33 is effected by the rotation of the shaft 95 (Fig. 2), to an offset 122 of which is attached an arm 123 connected to a lever 124 (Fig. 1) at the top of the shaft 121, such

arm 123 being hinged as at 125 to effect the movement when the shaft 95 is rotated. The alley floor 23 is cleared of the down pins in the course of a game by the same sweeper arm 33 operated from another shaft 126 and by a different arm 127 secured to an offset 128 in said shaft and connected to the arm 123. But in order to save the standing pins 29 the same are elevated by means of a clamping device 129 operating on guide rods 130 by means of the sliding bearings 131 (Fig. 1). This clamping device 129 consists of three parallel bars 132, 132[a] and 132[b] (Fig. 24), the outer ones being movable and the center one fixed and carrying pairs of rods 133 of sufficient horizontal length to reach all of the pins 29 on the alley floor 23 and bent upwardly as at 133[a] (Fig. 23), the rods 133[b] being pivoted to the bars 132 and 132[a] and the rods 133[c] pivoted to the bars 132 and 132[b]. When the clamping device 129 is lowered on the shaft 130, the parts being normally as shown in Fig. 17, the lever 134 pivoted at 135 and to the sliding bar 136 as at 137 strikes against the bumper 138 (Fig. 1) throwing the sliding bar 136 forward until a gravity pawl 139[a] pivoted to the center rod 132 at 13[a] (Fig. 17) engages the notch 140 in the sliding bar 136. The sliding bar 136 is attached to the cross head 141 and the cross head is attached to the rods 142 which in turn are attached to the bars 132[a] and 132[b] which closes the parts 133 grasping the pins 29. The clamping device is then elevated and while elevated the sweeper arm 33 operates to clear the down pins from the alley floor 23, sweeping them to the inclined surface 24 at the rear thereof, then the clamping device is lowered: in the meantime the bumper rod 143 (Fig. 1) has been shifted as hereinafter described so that after the clamping device has reached its position above the alley floor 23 the end 139[a] of the gravity pawl 139 strikes the bumper 144 releasing the sliding rod 136 and the coil springs returns the respective parts to the positions shown in Fig. 17, and the pins 29 are released and the clamping device 129 again raised, leaving the standing pins 29 upon the alley floor 23.

The bumper rod 143 is pivoted at 146 (Fig. 1) and is shifted in its position to meet the requirements by the rod 147 attached thereto and to a crank 148 on the shaft 126 (Fig. 16), the rotation of the shaft 126 serving to make the shift. The clamping device 129 is lowered and raised by means of an arm 149 attached thereto and to an arm 150 attached to the shaft 151 (Fig. 16). The arm 150 (Fig. 1) is operated by the rotation of the shaft 151 which is rotated by means of a gear 152 attached thereto and in mesh with a gear 153 attached to the shaft 126. The shaft 126 is rotated by a chain 154 operating over a gear on said shaft and connected with a gear 63 on the shaft 59. The gear 152 is half the diameter of the gear 153 so that the connecting mechanism is operated accordingly, the clamping device 129 being thrown down and elevated with the standing pins 29 and returned for depositing the pins 29 before and after the sweeper arm 33 has been operated forward and back to clear the alley floor 23 of the down pins. The parts of course are relatively timed so that the sweeper arm 33 operates while the clamping device 129 is elevated with the standing pins 29. The shaft 59 being connected with the power shaft 60 is continuously rotating carrying the shaft 42 connected therewith by the chain gear 56 with it, also shaft 40 connected with the shaft 42 by the chain 25 and the chain 49 connected with the shaft 40. A chain 155 connects the shafts 95 and 59 by means of the gears 156 and 157 attached to the respective shafts. The shaft 95 carries a clutching mechanism comprising a pair of jaws 158 and 159, 158 being keyed to the shaft and 159 being loose upon the same and being integral with the gear 157.

The last named parts not connected up with the continuously moving machinery are manually operated by the player from the front end of the alley floor as follows:— A foot lever 160 is rigidly joined at its center as at 161 to a rod 162 rigidly joined at its other end to a cross rod 163 extending into the vertical slots 164 of the uprights 165 and 165[a], the uprights 165 being secured to the bell-cranks 166 and 166[a] fulcrumed to the horizontally arranged shaft 167. Cables 168 and 169 connect respectively to the rod 170 (Fig. 16) and to the rod 171 (Fig. 18).

When it is desired to clear the alley floor 23 of the down pins and to preserve the standing pins, the foot is pressed on the end 160[a] of the lever 160 (Fig. 22), tilting the rod 162 to the right throwing down the upright 165 and operating the bell-crank 166 drawing the cable 168 which draws the lug 170[a] (Fig. 18) at the end of the rod 170 out of the path of the projection 171 on the shaft 126 permitting the spring 172 connected by the lever 17[a] and upright 170[b] (Fig. 16) to throw into locking engagement the jaws of the clutch 173, which is of the same construction as the clutch shown in Fig. 2, which rotates the shaft 126 giving the mechanical movements to the parts connected therewith hereinbefore described.

When it is desired to clear the alley floor 23 of down pins and set a new set of pins thereon, the foot is pressed upon the end 160[b] of the lever 160 (Fig. 22) which tilts the rod 162 in the opposite direction drawing the cable 169 with the bell-crank 166[a] which

releases the projection 171 permitting the coil spring 174 (Fig. 2) to throw together the jaws 159ª and 159ᵇ of the clutch 159 thereby causing the shaft 95 (Fig. 2) to rotate, and which controls the movements of the parts governing the elevation and lowering of the pin conveyer 88 and the arm 123 operating the sweeper arm 33. It is understood that the movements are all timed to sweep the floor 23 of the down pins before the new set is deposited.

In Fig. 20 I have shown the connecting mechanism whereby the two sources of power for reaching the shaft 121 to rotate the same and operate the sweeper arm 33 are brought together, the extension 123ª of the rod 123 having pivoted thereto as at 175 a block 176 adapted for engagement with a shoulder 177 on the connecting bar 178, so that when the rod 123 is drawn the bar 178 is carried with it rotating the shaft 121 by means of the connecting levers 124. When the block 176 in the movement of the arm extension 123ª has reached a lug 179 secured to a permanent position, the contact of the two at the point 180 causes the block 176 to be released from the shoulder 177 and the coil spring 181 returns the shaft 121 to its former position thereby returning the sweeper arm 33 to its normal position. When the rod 127 is drawn to operate the sweeper arm the block 182 pivoted to the extension 127ª as at 183 operates the bar 178 and is released from the shoulder 184 by its contact with the lug 185. As a precaution to prevent the two operations hereinbefore described germinating at the same time from the operation of the foot lever 160 an offset 186 is provided in the rod 162 in which offset a rod 187 is pivoted and connected at its upper end to a plate 188 having shoulders 189 and 190. The tilting of the rod 162 slides the plate 188 either up or down according to which operation is first instigated, causing one of the pawls 191 or 192 to engage the corresponding offset 189 or 190, thereby locking the mechanism, the pawls 191 and 192 being operated by the coil springs 193 and 194 respectively. At the end of the return stroke of either the rods 127ª or 123ª, the pawls 191 or 192 are released by the contact of the said rods with the ends 195 or 196 of the rods 197 or 198 connected with the pawls 191 and 192 respectively.

As a guard against any one bowling while the mechanical adjustments are going on I have provided an arm 199 pivoted to the rod 162 and having attached to the bottom thereof a coil spring 200.

The foot lever 160 rests upon a pedestal 201 supported by a spring 202. A rod 203 connects the arm 199 to the pedestal 201. When either side of the lever 160 is pressed down, the rod 203 pulls the arm 199 downward across the alley floor 23. After the mechanical operation mentioned has taken place, the coil spring 200 returns the arm 199 to a vertical position and to the normal position indicated by the dotted lines 199ª.

Referring again to the filling of the tubes 73 (Figs. 9 and 25), when it is desired to play a game where less than ten pins are used, the desired number of tubes 73 may be filled, leaving the others empty, by removing the pins 87 (Figs. 10 and 25) corresponding with the tubes 73 that it is desired to leave empty. In such case the block 82 will rotate until it comes to a pin 87 which of course will correspond with the tube 73 that it is desired to fill.

The momentum given the block 82 by the force of the pin 29 against the shaft 76 will cause the block 82 to rotate until one of the pins 87 is reached.

What I claim is—

1. A ten pin setter comprising a set of tubular carriers with their bottom ends in positions relative to each other corresponding to the proper positions of pins upon an alley floor and adapted to contain one or more sets of pins, a conveyer with sets of jaws corresponding in relative positions to the bottom of the tubes of the carrier and adapted for adjustment at the bottom of said carrier tubes and for being conveyed to a position above the alley floor, means for tripping the pins from said carrier tubes and dropping them in the sets of jaws in said conveyer, means for transporting said conveyer from a position beneath the carrier tubes to a position above the alley floor, means for operating the sets of jaws when the conveyer is in a position above the alley floor and releasing the pins thereon and means for closing said sets of jaws.

2. A ten pin setter comprising a set of tubular carriers with their bottom ends in positions relative to each other corresponding to the proper positions of pins upon an alley floor and adapted to contain one or more sets of pins, a conveyer with sets of jaws corresponding in relative positions to the bottom of the tubes of the carrier and adapted for adjustment at the bottom of said carrier tubes and for being conveyed to a position above the alley floor, means for tripping the pins from said carrier tubes and dropping them in the sets of jaws in said conveyer, means for transporting said conveyer from a position beneath the carrier tubes to a position above the alley floor, means for operating the sets of jaws when the conveyer is in a position above the alley floor and releasing the pins thereon and means for closing the said sets of jaws, together with a movable clutching device adapted for being lowered to the alley floor, gripping the standing pins thereon, elevating the same, then lowering the same and

releasing them to their positions above the alley floor and means for clearing the alley floor of the down pins while said standing pins are elevated.

3. A ten pin setter comprising a set of tubular carriers with their bottom ends in positions relative to each other corresponding to the proper positions of pins upon an alley floor and adapted to contain one or more sets of pins, a conveyer with sets of jaws corresponding in relative positions to the bottom of the tubes of the carrier and adapted for adjustment at the bottom of said carrier tubes and for being conveyed to a position above the alley floor, means for tripping the pins from said carrier tubes and dropping them in the sets of jaws in said conveyer, means for transporting said conveyer from a position beneath the carrier tubes to a position above the alley floor, means for operating the sets of jaws when the conveyer is in a position above the alley floor and releasing the pins thereon and means for closing said sets of jaws, together with means for sweeping the pins to an incline to the rear of the alley floor, means for elevating said pins and for distributing them, big end downward, into the carrier tubes.

4. A ten pin setter comprising a set of tubular carriers with their bottom ends in positions relative to each other corresponding to the proper positions of pins upon an alley floor and adapted to contain one or more sets of pins, a conveyer with sets of jaws corresponding in relative positions to the bottom of the tubes of the carrier and adapted for adjustment at the bottom of said carrier tubes and for being conveyed to a position above the alley floor, means for tripping the pins from said carrier tubes and dropping them in the sets of jaws in said conveyer, means for transporting said conveyer from a position beneath the carrier tubes to a position above the alley floor, means for operating the sets of jaws when the conveyer is in a position above the alley floor and releasing the pins thereon and means for closing said sets of jaws, together with means for directing the balls to an elevator at the rear of the alley floor, elevating them and depositing them on a forward incline for return by gravity to the front of the alley floor.

5. A ten pin setter comprising a set of tubular carriers with their bottom ends in positions relative to each other corresponding to the proper positions of pins upon an alley floor and adapted to contain one or more sets of pins, a conveyer with sets of jaws corresponding in relative positions to the bottom of the tubes of the carrier and adapted for adjustment at the bottom of said carrier tubes and for being conveyed to a position above the alley floor, means for tripping the pins from said carrier tubes and dropping them in the sets of jaws in said conveyer, means for transporting said conveyer from a position beneath the carrier tubes to a position above the alley floor, means for operating the sets of jaws when the conveyer is in a position above the alley floor and releasing the pins thereon and means for closing said sets of jaws, together with means for sweeping the pins to an incline to the rear of the alley floor, means for elevating said pins and for distributing them, big end downward, into the carrier tubes, and means for selecting the tubes, less than the whole number, into which the pins are distributed.

6. A ten pin setter comprising a set of tubular carriers with their bottom ends in positions relative to each other corresponding to the proper positions of pins upon an alley floor and adapted to contain one or more sets of pins, a conveyer with sets of jaws corresponding in relative positions to the bottom of the tubes of the carrier and adapted for adjustment at the bottom of said carrier tubes and for being conveyed to a position above the alley floor, means for tripping the pins from said carrier tubes and dropping them in the sets of jaws in said conveyer, means for transporting said conveyer from a position beneath the carrier tubes to a position above the alley floor, means for operating the sets of jaws when the conveyer is in a position above the alley floor and releasing the pins thereon and means for closing the said sets of jaws, together with a movable clutching device adapted for being lowered to the alley floor, gripping the standing pins thereon, elevating the same, then lowering the same and releasing them to their positions on the alley floor and means for clearing the alley floor of the down pins while said standing pins are elevated, and for sweeping the pins to an incline to the rear of the alley floor, and means for locking the conveyer mechanism against movement while the pin clutching mechanism is in motion, and means for locking the clutching mechanism against movement while the conveyer mechanism is in motion.

7. A ten pin setter comprising a set of tubular carriers with their bottom ends in positions relative to each other corresponding to the proper positions of pins upon an alley floor and adapted to contain one or more sets of pins, a conveyer with sets of jaws corresponding in relative positions to the bottom of the tubes of the carrier and adapted for adjustment at the bottom of said carrier tubes and for being conveyed to a position above the alley floor, means for tripping the pins from said carrier tubes and dropping them in the sets of jaws in said conveyer, means for transporting said

conveyer from a position beneath the carrier tubes to a position above the alley floor, means for operating the sets of jaws when the conveyer is in a position above the alley floor and releasing the pins thereon and means for closing said sets of jaws, together with means for blocking the passage of balls from the front end of the alley to the ten pin field while the pin adjustment mechanism is in motion.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN C. McFARLAND.

Witnesses:
O. E. Haussen,
Geo. B. Baker.