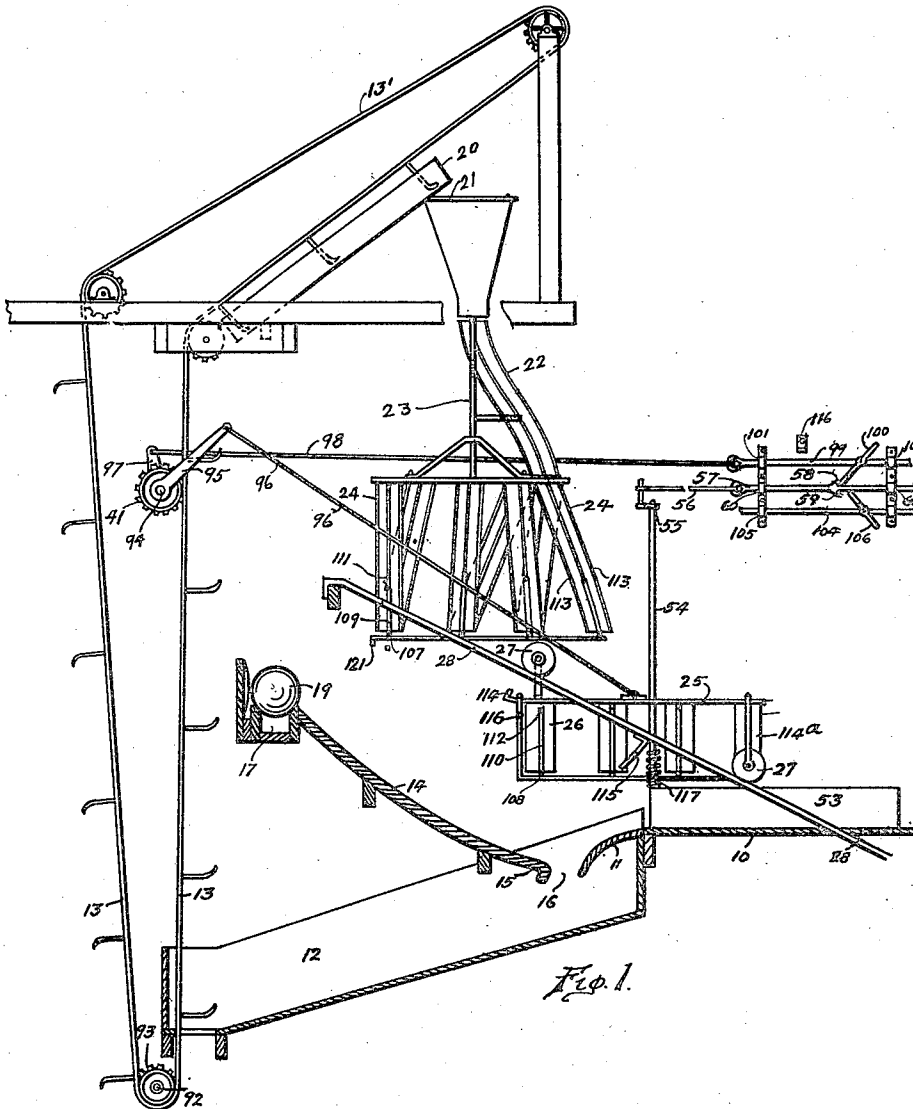


J. C. McFARLAND.
TENPIN SETTER.
APPLICATION FILED AUG. 16, 1911.

1,122,622.

Patented Dec. 29, 1914.

3 SHEETS—SHEET 1.



WITNESSES:

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M. F. Mendenhall

John C. McFarland INVENTOR

BY

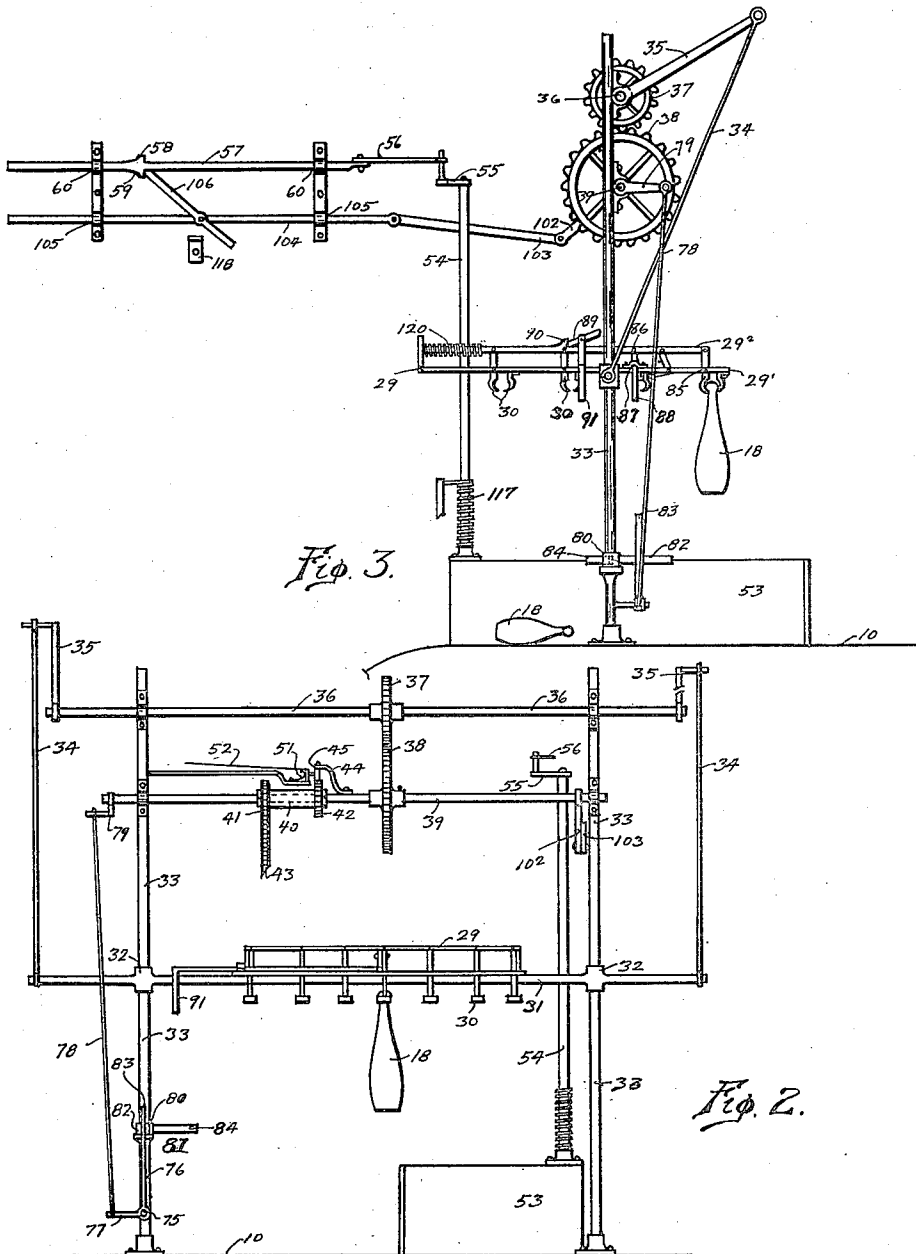
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3 SHEETS-SHEET 3.

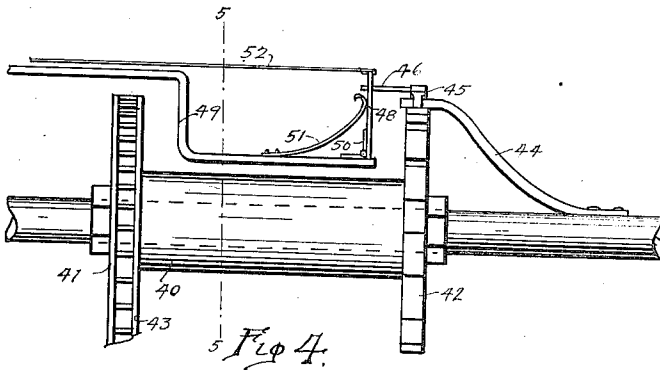


Fig. 4.

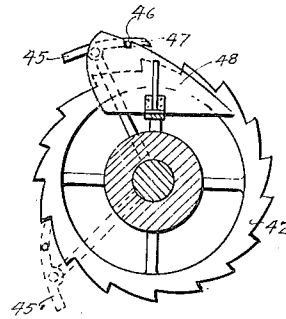


Fig. 5.

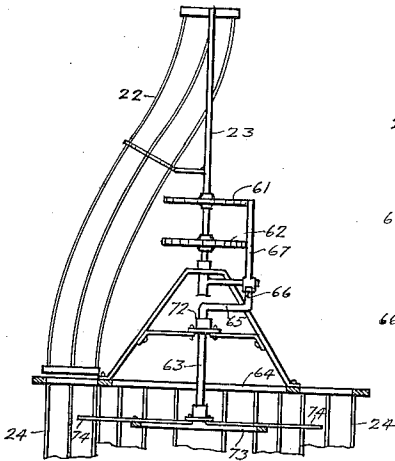


Fig. 7.

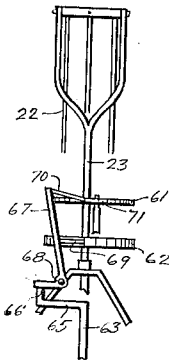


Fig. 6.

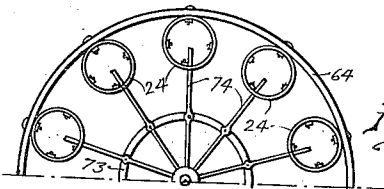


Fig. 8.

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UNITED STATES PATENT OFFICE.

JOHN C. McFARLAND, OF SPOKANE, WASHINGTON.

TENPIN-SETTER.

1,122,622.

Specification of Letters Patent.

Patented Dec. 29, 1914.

Application filed August 18, 1911. Serial No. 644,464.

To all whom it may concern:

Be it known that I, JOHN C. McFARLAND, citizen of the United States of America, residing at Spokane, in the county of Spokane and State of Washington, have invented certain new and useful Improvements in Tenpin-Setters, 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, clearing the alley of the pins and re-setting the same.

Other objects and purposes will appear in the drawings and will be hereinafter explained.

Most of the work is done by mechanical means thrown in and out of operation with continuously 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 remainder of the work being manual but operating with mechanical parts. The alley is cleared of down pins by means of a rotating arm adjusted to sweep across the surface of the alley in such a manner as to remove all of the pins therefrom, sweeping them to a valley at the rear of the alley from whence they are conveyed for re-adjustment upon the alley floor. The pins are re-set by being elevated to a position above the alley floor and above a system of carriers and conveyers surmounted by a funnel shaped hopper into which hopper the ten-pins are dropped one at a time, and by means not claimed herein operating with the law of gravity the pins pass downward through the bottom of the hopper in an upright position, thence into a system of carriers and conveyers from whence they are set in due position upon 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 arm may again be brought into use to clear the down pins from the alley, then the clutching device is lowered and the pins held by it released in their original positions. Means are also provided for the returning of the balls to the front end of the alley.

I hereby refer to Letters Patent Number 975,445 of date November 15th, 1910, issued to me for a ten-pin setter which includes some of the fundamental mechanism that will be used to carry to a complete success

the objects and purposes of this invention, but which I will not aim to definitely describe herein, nor to claim.

In the drawings Figure 1 is a side elevation of the carriers, conveyers, hopper and elevator together with a portion of the detail parts coacting therewith and a sectional view of portions of the alley floor and valley to the rear of the same. Fig. 2 is a front view of the clutching device for elevating and lowering standing pins together with portions of the connecting mechanism. Fig. 3 is a side view of the said clutching device together with portions of the connecting mechanism. Fig. 4 is a view of a sleeve carrying a gear adapted for connection with continuously moving machinery, together with a broken-away view of a shaft and means of binding and releasing the sleeve to and from the shaft respectively. Fig. 5 is a sectional view taken on the line 5-5 of Fig. 4. Fig. 6 is a detail view of the hopper together with means of operating a crane connected therewith. Fig. 7 is an enlarged detail view of the crane, of a broken-away view of the carriers operating in conjunction therewith together with connecting parts, and Fig. 8 is a broken-away plan view of the carriers.

The alley floor 10 is of usual construction and connects with a downwardly inclined portion 11 to the rear of the same. A downwardly and rearwardly extending valley 12 at the rear of the alley floor 10 extends from a position underneath the downwardly inclined portion 11 to the elevator 13 at the rear of the same. An upwardly and rearwardly inclined floor 14 with its lower end portion 15 stationed approximately horizontal with the portion 11 and beyond the gulley 16 is provided with a trough 17 arranged transversely of the alley floor 10 and inclines downwardly each way from the center thereof and connects with the valleys usually constructed along the sides of and longitudinally with the alley floor 10, reaching to the front thereof. The gulley 16 is calculated to be of a size to pass therethrough ten-pins 18, but to be too small to pass the balls 19, which by force of the momentum given them by the thrust of the player will be carried along the alley floor to the rear thereof, across the gulley 16, up the incline 14 and into the trough 17 from whence they will be returned by gravity along the

longitudinally arranged valleys to the front of the alley floor 10.

The upper end 13' of the elevator sets at an angle and underneath the same is secured a chute 20 opening into a hopper 21; connected with the lower end of the hopper 21 is a tubular crane 22 supported by the shaft 23 around which the crane is adapted to rotate with its lower end swinging directly over the openings into the tubular carriers 24 arranged with their top ends in a circle and the lower ends in the shape of a triangle, or the shape ten-pins are required to set relatively upon an alley floor, there being as many tubes as there are pins in the game. A conveyer consisting of a frame 25 and as many tubes 26 as there are pins in the game arranged relatively to connect with the lower ends of the carriers 24 and to correspond with the required positions of the pins upon an alley floor is equipped with wheels 27 adapted to follow a track 28 arranged on an incline at the sides of the alley floor 10 and extending backward along the sides of the carriers 24 in such a way that the conveyer tubes 26 may be shifted from a position directly underneath the carrier tubes 24 to the position above the alley floor 10 that pins are required to be set for a game, by a process of running the conveyer car along the track 28 and returning the same to a position underneath the carrier tubes 24 by running the same up the tracks. In Fig. 1 of the drawings the conveyer car (consisting of the frame 25 and tubes 26) is shown in an intermediate position.

A clutching device consisting of a frame 29 and as many pairs of jaws 30 as it requires pins to play the game and relatively arranged to correspond with the proper positions of the pins upon the alley floor 10 is secured to a horizontal rod 31 slidably adjusted by means of the bearings 32 to the upright supports 33.

The horizontal rod 31 is connected by the vertical rods 34 to the arms 35 which in turn are rigidly secured to the shaft 36 carrying the gear 37. The gear 37 meshes with a gear 38 of twice its size, the latter being rigidly secured to the shaft 39 journaled to the uprights 33 and carrying a sleeve 40 loosely adjusted thereto and which sleeve carries two gears, 41 and 42, the former being connected up with continuously moving machinery by means of the chain 43. A brace 44 has pivoted thereto a gravity pawl 45 and attached to the pawl 45 is a pin 46 adapted for engagement with a notch 47 in a plate 48 secured to the end of the frame 49 by a hinge 50 and held in a vertical position by a tension spring 51. By means of this last described mechanism the pawl 45 is held from engagement with the gear 42, but may be brought into en-

gagement therewith as shown by the dotted line 45', by the manual drawing of the cable 52 which reaches to the front end of the alley floor 10. The drawing of the cable 52 releases the pin 46 connected with the pawl 45 from the notch 47 in the plate 48, the plate being drawn away from the pin which plate is returned to its normal position by the tension spring 51 when the cable 52 is released. Horizontally arranged above the alley floor 10 and in proximity therewith is an arm 53 radiating from the shaft 54 to which the same is attached. The top of the shaft 54 is connected by means of a lever 55 to a horizontal arm 56 which in turn is pivoted to a pin 57 having shoulders 58 and 59 and adapted to glide through the bearings 60.

Attached horizontally to the shaft 23 are two ratchet wheels 61 and 62.

A shaft 63 reaching downwardly into the cage 64 holding the tubular carriers 24, at the center thereof and to a position below the tops of the carriers 24, has near its upper end a horizontal portion 65 and the extreme upper end 66 bent to a vertical position. Connected to the vertical end 66 of the said shaft 63 is a lever 67 pivoted at 68. Reaching from the lever 67 are two arms 69 and 70, the former engaging the ratchet wheel 62 and the latter a spring pawl 71 on the ratchet wheel 61. The shaft 63 is journaled in the bearing 72. Pivotaly secured to the bottom of the shaft 63 and to the ring 73 of the cage 64 are normally horizontal arms 74, one reaching into each of the carriers 24.

Pivoted to one of the uprights 33 as at 75 is a lever 76 with a horizontal arm 77 secured to a rod 78, which in turn is secured to a lever 79 connected to the shaft 39. Secured also to one of the uprights 33 as at 80 is a lever 81 having one arm 82 engaging the upwardly extending arm 83 of the lever 76, the other arm 84 being free. The lever 81 has a bearing upon the shaft 33 and is adapted to rock horizontally thereon. The frame 29 of the clutching device has two sets of bars 29' and 29² each carrying one of the jaws constituting the pairs 30. The half jaw connected to the bars 29² are pivoted to the bars 29' as at 85. Pivoted to the bars 29² as at 86 and passing through a bearing as at 87 on the bars 29' is a pin 88. Secured to the bars 29² is a pawl 89 adapted for engagement with a lug 90 on said bars 29², the said pawl 89 having an outwardly and downwardly extending arm 91. At the base of the elevator 13 arranged transversely of the mechanism is a shaft 92 carrying a sprocket wheel 93 adapted for engagement with the elevator 13 for its rotation with the shaft 92 at the rear of the mechanism and arranged transversely thereof is a shaft 94 carrying an arm 95 attached

to a rod 96 which in turn is attached to the frame 25 of the conveyers 26. Also attached to the shaft 94 is an arm 97 connected by the rod 98 to the pin 99. The pin 99 carries a pawl 100 and is slidably adjusted in the bearings 101. Attached to the shaft 39 is an arm 102 which is attached to the rod 103, and the rod 103 is attached to the pin 104 slidably adjusted in the bearing 105. The pin 104 carries a pawl 106. The tubes 24 and 26 are provided with rods 107 and 108 respectively extending across their openings at the bottom, which are secured to rods 109 and 110 respectively, pivoted to the sides of the tubes 24 and 26 respectively as at 111 and 112 respectively.

The shaft 92 and the gears 41 are connected up with continuously moving machinery. The carrier tubes 24 and conveyer tubes 26 are constructed of wires 113 and are calculated to carry the pins 18. The front sides 114^a of the tubes 26 are open in order to permit of the prearranged dropping out of the pins 18 as will be hereinafter described. In the use of the apparatus the machinery is set in operation, the pins 18 are dropped through the gulley 16 into the rearwardly extending valley 12 from where they are carried by gravity to the elevator 13 where they are picked up and elevated through the chute 20 to and through the hopper 21 to the crane 22, through which they pass by gravity to the carrier tubes 24, one of which always connects with the bottom of the crane 22. When the pin enters the top of the carrier 24, it strikes the end of one of the levers 74 and by the force of its momentum tilts the lever to let the pin pass into the tube 24. The tilting of the lever 74 throws upward the shaft 63, causing the upright end 66 thereof to force upwardly the horizontal arm of the lever 67, which in turn causes the upright portion of said lever to bear inwardly against the pin 70 forcing the pawl 71 out of engagement with the ratchet wheel 61 and permitting the pressure from the same source to bear against the pin 69 engaging the ratchet wheel 62 and forcing the ratchets 61 and 62 around a distance horizontally carrying the shaft 23 and consequently the crane 22 with them, the crane traveling in a circular manner until it reaches a position over the top of another of the tubes 24. This process continues as long as it is necessary to fill all of the tubes 24. When all of the tubes 24 are filled, the cable 52 connected to the mechanism shown in Fig. 4 and being attached to the shaft 39, is manually drawn, releasing the pin 46 from the notch 47 in the plate 48 thereby permitting the pawl 45 to engage the ratchet 42 tying the shaft 94 to the moving mechanism of the sleeve 40 and the gear 41 by means of the brace 44, whereby the shaft is rotated, the

arm 95 connected to the conveyer frame 25 bringing the conveyer tubes upwardly to a position directly underneath the carrier tubes 24, the lug 114 at the top of the conveyer frame 25 pressing rearward the projection 121 attached to the rods 107 taking away the supports for the pins whereby the pins in the carrier tubes 24 are released and precipitated into the conveyer tubes 26. The continued rotation of the arm 95 carries the conveyer tubes 26 forward to a position above the alley floor 10 when the lug 115 strikes against the projection 116 carrying rearwardly the cross rods 108 at the bottoms of the tubes 26 taking away the supports for the pins and permitting the pins to be dropped upon the alley floor 10 at their respectively proper positions. The above process of course is capable of constant repetition. While the last above process has been going on the arm 97 attached to the shaft 94 and connected to the pin 99 has drawn the pin 99 rearward and the pawl 100 attached thereto bearing against the shoulder 58 has forced the rod 56 rearward and by means of the lever 55 has rotated the upright 54 one fourth way around carrying the arm 53 with it, whereby the alley floor is swept of any down pins thereon, the same being swept to the rear where they pass through the gulley 16 to the rearwardly inclined alley 12 for reconveyance by means of the elevator 13 and other parts. It must be understood that several sets of pins are necessary to operate this device, as one set is being arranged for setting while another set is in use and that the apparatus is so timed that the alley floor is swept of down pins at the proper time. When the top of the pawl 100 strikes the lug 116 the pawl 100 is released from the shoulder 58 on the pin 57 whereby by the force of the spring 117 the arm 53 and upright 54 are rotated back to the position shown in Fig. 1.

In case it is desired to remove down pins after a ball has been thrown the cable 52 is manually drawn releasing the pawl 45 thereby connecting the shaft 39 with the moving mechanism by means of the gears 41 and 42 and the chain 43, whereby through the rotation of the arms 35 connected to the shaft 39 by means of the gears 37 and 38 and the shaft 36 the clutching device carrying the jaws 30 is lowered to the tops of the standing pins 18.

In the lowering process above mentioned, the pin 88 strikes against the arm 82 closing the jaws 30 over the tops of the pins 18, the pawl 89 drops down behind the shoulder 90 locking the jaws whereby by the continued rotation of the arm 35 the frame 29 and jaws 30 are elevated as shown in Fig. 3 carrying the standing pins with them. While the pins 18 are elevated the arm 102 by its rotation with the shaft 39 by means

of the rod 103, pins 104 and 57, the pawl 106, rod 56 and lever 55 has rotated the upright 54 rotating the arm 53 across the alley floor 10 whereby the down pins are swept therefrom as hereinbefore described. When the arm of the pawl 106 has struck the lug 118 the pawl 106 is released from the shoulder 59 and the spring 117 rotates back the upright 54 and the arm 53 to the position shown in Fig. 2. The continued rotation of the arm 35 returns the frame 29 and jaws 30 downward so as to deliver the standing pins 18 to their proper positions upon the alley floor 10. The rotation of the arm 79 with the shaft 39 causes the lever 77 to throw the arm 84 in the path of the pawl pin 91 whereby the pawl 89 is forced from its connection behind the shoulder 90 and the jaws 30 are forced open by the spring 120. The continued rotation of the arm 35 again carries the frame 29 and jaws 30 upward and the process of removing down pins is complete. In the process the frame 29 has to be lowered twice while the arm 53 is swung forward and back but once, consequently the gear 37 on the shaft 36 carrying the arm 35 must be one half the size of the gear 38 on the shaft 39 carrying the arm 102.

It is apparent that the relative parts must be properly timed to perform the various functions in proper order.

In playing a game requiring less than ten pins ratchet wheels 61 and 62 can be substituted with longer and less notches to rotate the crane 22 past the tubes 24 that it is desired should not be filled.

Balls tossed across the alley floor 10 by the force of their momentum will be carried up the incline 14 to the trough 17 from whence they will be conveyed by gravity to the valleys at the sides of the alley floor 10 and then to the front of the alley. The gulley 16 is made wide enough for the passage of ten pins 18 but too narrow for the passage of balls 19, therefore the balls will pass over the same.

Having thus described my invention what I claim as new and useful and desire to secure by Letters-Patent, is—

1. In a ten pin setter, two sets of tubes one set permanently adjusted above and near an alley floor, the other set adapted for adjustment by mechanical means from a position directly underneath the former set to a position on the alley floor and to change from one position to the other, a tubular crane mounted above the first named set of tubes connected at its upper end with a hopper and adapted for horizontal rotation to connect alternately at its lower end with the tops of the individual tubes composing said first set of tubes, means for rotating said crane and means for changing the po-

sition of the second mentioned set of tubes from a position directly underneath the former set of tubes to a position on the alley floor and vice versa.

2. In a ten pin setter, two sets of tubes one set permanently adjusted above and near an alley floor, the other set adapted for adjustment by mechanical means from a position directly underneath the former set to a position on the alley floor and to change from one position to the other, a tubular crane mounted above the first named set of tubes connected at its upper end with a hopper and adapted for horizontal rotation to connect alternately at its lower end with the tops of the individual tubes composing said first set of tubes, means for rotating said crane and means for changing the position of the second mentioned set of tubes from a position directly underneath the former set of tubes to a position on the alley floor and vice versa, together with a frame carrying as many sets of jaws as there are ten pins in the game adjusted above the alley floor and adapted for adjustment downward to engage the standing ten pins in the jaws thereof, elevate the same, return the same to the alley floor and release the pins and return to an elevated position, an arm adjusted horizontally above the alley floor adjacent thereto adapted to rotate and sweep across the same and means for rotating the same across the floor and back while the standing pins are being held in an elevated position.

3. In a ten pin setter, two sets of tubes one set permanently adjusted above and near an alley floor, the other set adapted for adjustment by mechanical means from a position directly underneath the former set to a position on the alley floor and to change from one position to the other, a tubular crane mounted above the first named set of tubes connected at its upper end with a hopper and adapted for horizontal rotation to connect alternately at its lower end with the tops of the individual tubes composing said first set of tubes, means for rotating said crane and means for changing the position of the second mentioned set of tubes from a position directly underneath the former set of tubes to a position on the alley floor and vice versa, together with a passage at the rear of the alley floor to a downwardly and rearwardly inclined alley reaching to an elevator for the conveying of ten pins to the said hopper.

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

JOHN C. McFARLAND.

Witnesses:

GEO. E. CANFIELD,
WILLIAM H. KAYE.