

J. C. McFARLAND.

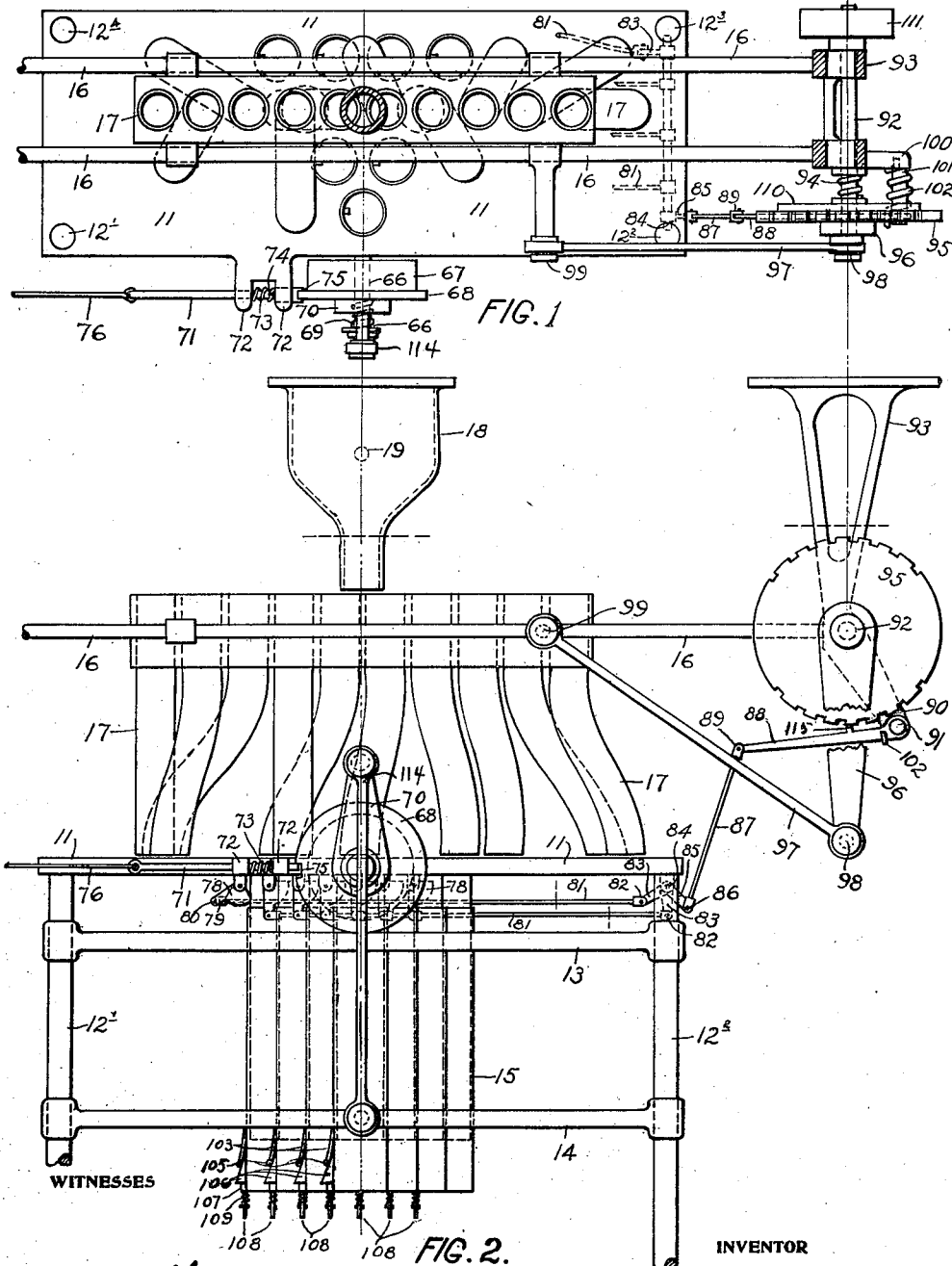
TENPIN SETTER.

APPLICATION FILED DEC. 29, 1909.

Patented Nov. 15, 1910.

975,445.

4 SHEETS-SHEET 1.



WITNESSES
Mary Sholderer
E. W. Denton

FIG. 2.

John C. McFarland
BY

INVENTOR

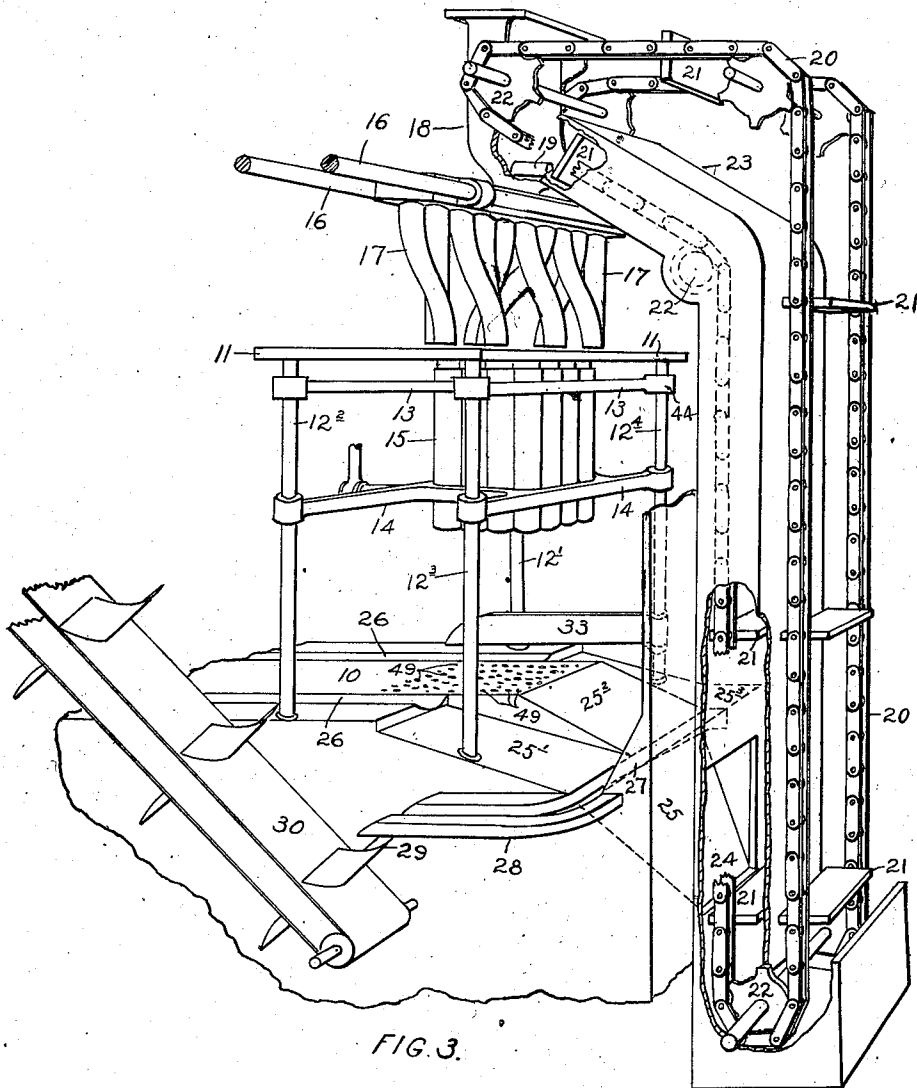
L. L. Westfall his ATTORNEY

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WITNESSES
Mary Sholderer
E. W. Winton

John C. McFarland INVENTOR

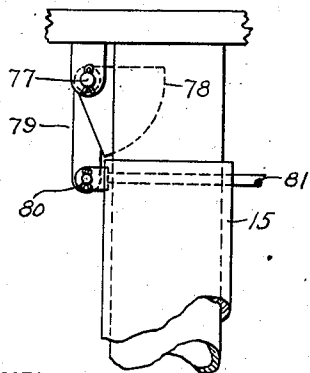
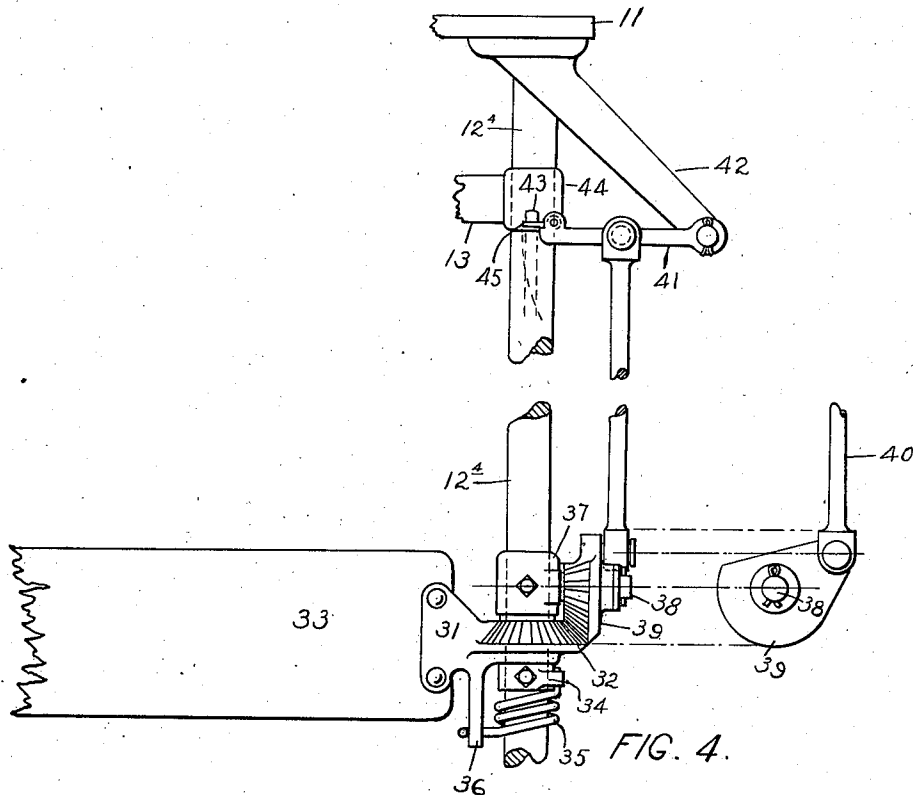
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4 SHEETS—SHEET 3.



WITNESSES

FIG. 5.

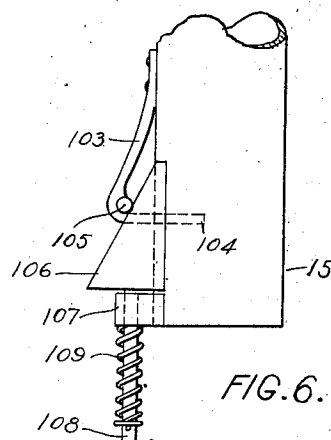


FIG. 6.

Mary Sholderer
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John C. McFarland INVENTOR

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UNITED STATES PATENT OFFICE.

JOHN C. McFARLAND, OF SPOKANE, WASHINGTON.

TENPIN-SETTER.

975,445.

Specification of Letters Patent. Patented Nov. 15, 1910.

Application filed December 29, 1909. Serial No. 535,507.

To all whom it may concern:

Be it known that I, JOHN C. McFARLAND, a citizen of the United States, 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 the bowling alley, for clearing off fallen pins, clearing the alley of the pins and re-setting the same. 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 cooperating with mechanical parts. Down pins are removed by means of rods reaching through openings in the floor of the alley underneath the same, the rods being longest in the center of the alley floor and each tier thereof made shorter as the sides of the alley are approached, thereby forming an incline each way from the center of the alley toward the sides thereof down which the pins being removed will glide and be dropped into the valley at the sides of the alley and thence conveyed to their proper place for re-adjustment. The alley is finally cleared of all pins by 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 into the valleys at the sides 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 two systems of pipes surmounted by a funnel shaped hopper across the center of which is a rod and into which hopper the ten-pins are dropped one at a time, the pin dropping into the hopper in a horizontal position, and crosswise of the rod and in falling across the rod, the large end of the pin by means of the law of gravity is drawn downward, thereby causing the ten-pin to pass through the bottom of the hopper in an upright position, thence into one of the tubes of the upper tier and from thence into a tube of the lower tier. Within each of the tubes of the lower tier and near the top thereof is a lug attached to a lever which in turn is attached to a cross-arm connected by mesne levers to the arm of a ratchet wheel by

means of which and other mechanism hereinafter described the upper tier of tubes are automatically adjusted so as to drop the ten-pins in each of the lower tubes which are anchored directly above the places on the alley floor where it is desired to set the pins. The lower tier of tubes are anchored to a slidable frame adapted to slide up and down on a set of standards and are provided with a trip at the bottom whereby the ten-pins are released from the tubes just as the tubes strike the floor of the alley, the tubes are then raised to an elevated position, and the pins are left standing in the positions desired, and the bowling alley is ready for a game. Means are also provided for mechanically returning the balls to the front end of the alley, the same being a process whereby the balls are picked up by crescent shaped cups secured to a canvas rotating upon rollers, elevated to a higher position than the front end of the alley, dropped into valleys and returned by gravity to the front end of the alley.

In the drawings, Figure 1, is a top plan view of the systems of pipes used to adjust the ten-pins together with the mechanical means adapted for their proper adjustment and regulation, Fig. 2, is a front elevation of the same, Fig. 3, is a perspective view of the systems of tubes together with the framework for their proper adjustment and showing their application to a bowling alley together with means for elevating the ten-pins to a position above the systems of tubes for readjustment and means for elevating the balls for return to the front of the alley, Fig. 4, is a view of the gearing and appliances for sweeping the alley of the ten-pins, Fig. 5, is a view of the upper end of one of the lower tubes, Fig. 6, is a view of the lower end of one of the tubes, Fig. 7, is a top plan view of the alley floor upon which the ten-pins are to be set, together with mechanical means for clearing the same of the ten-pins, and Fig. 8, is a side elevation of the same.

Directly above the alley 10 is anchored a frame 11, supported by the standards 12¹, 12², 12³ and 12⁴. Slidably connected with the said standards are the frames 13 and 14, carrying the lower set of tubes 15. Directly above the lower set of tubes 15 and slidably adjusted to the horizontal rods 16 is the upper set of tubes 17. Suspended above the upper set of tubes 17 is a hopper 18 across

the center of which and horizontally arranged is a rod 19. To the rear of the alley 10 and extending from a point below the same upwardly, thence forwardly and connecting with the hopper 18 is a chain elevator 20 provided at intervals with horizontally arranged cups or plates 21, the chains 20 being endless and rotating over sprocket wheels 22, the said chains in their upward journey being inclosed within the box 23, excepting that a small opening 24 is left on the inner side and near the bottom of an inclined plane 25 leading from the alley 10 and the longitudinally arranged valleys 26.

Transversely arranged at the foot of the inclined planes 25¹, 25² and 25³ is a valley 27, connecting with the inclined plane 28 reaching to a point above the cups 29 upon the elevator 30. Loosely encircling the standard 12⁴ is a combined hinge 31 and a horizontal beveled gear 32. Secured to the hinge 31 and horizontally arranged is an arm 33. Encircling the standard 12⁴ directly underneath the beveled gear 32 is a collar 34 and a coil spring 35, the said coil spring being secured at one end to the collar 34 and at the other end to the downwardly projecting arm 36 of the hinge 31. Directly above the beveled gear 32 and encircling the standard 12⁴ is a casing 37 provided with a stud 38 carrying a mutilated beveled gear 39. Pivoted to the mutilated gear 39 is the perpendicular arm 40 which is also pivoted at its upper end to the horizontal lever 41. Secured to the underside of the frame 11 and extending obliquely downward is an arm 42 to which is pivoted the horizontal lever 41. A lug 43 is secured to the outer surface of the collar 44 of the frame 13 against the underside of which is adapted to rest the end 45 of the lever 41.

Directly underneath the alley floor 10 is a platform 46 slidably adjusted to the standards 47. Extending vertically upward from the platform 46 are rods 48, directly above which and extending through the alley floor 10 are small openings 49. Attached to one side of the platform 46 and horizontally arranged therewith is an oblong slotted arm 50 within which is adapted to slide back and forth a cross head 51 attached to the lever 52. The lever 52 is attached to a disk 53 and together they are loosely adjusted to the horizontal shaft 54, the disk 53 bearing against a pulley 55. A coil spring 56 encircles the shaft 54 between the pulley 55 and the standard 57. A horizontal arm 58 is secured at one end by a pin 59 to the top of the standard 57, with the other end adapted to rest in a notch 60 in the peripheral surface of the disk 53. A coil spring 61 is secured at one end to the standard 57 as at 62 and at the other end to the lever 58 as at 63. A cable 64 is also secured to the

lever 58, passes over the pulley 65 and passes to a source of power. A horizontally arranged shaft 66 carries a pulley 67, a disk 68, a coil spring 69 and an arm 70, the pulley 67 being rigidly secured to the shaft 66, and the disk 68 and the coil spring 69 being loose upon the same. A horizontally arranged arm 71 loosely adjusted through the guides 72 is encircled by a coil spring 73 between the guides 72, the said coil spring 73 being rigidly secured to the arm 71 at one end thereof as at 74, and being loose at the other end. A notch 75 is provided in the peripheral surface of the disk 68 within which one end of the arm 71 is adapted to rest, the other end of the arm 71 is connected to a cable 76 which reaches to a source of power.

Rigidly secured to the pins 77 are lugs 78 and levers 79, the former extending into the tubes 15, and the latter being secured by the pins 80 to the horizontal arms 81. The horizontal arms 81 are secured by pins 82 loosely to one end of the short levers 83, while the other end of the short levers 83 are rigidly secured to the pin 84. One end of the short lever 85 is also rigidly secured to the pin 84, while the other end is loosely secured by the pin 86 to the lever 87. One end of the lever 88 is loosely secured to the lever 87 by the pin 89, while the other end thereof is loosely secured to the arm 90 by the pin 91. A horizontal shaft 92 supported by the standard 93 carries a coil spring 94, a ratchet 95 a disk 110 and a pulley 111, two arms 90 and 96, the shorter one 90 of which is loose upon the shaft, and the longer one 96 of which is rigidly secured to the shaft. One end of the arm 97 is loosely secured to the end of the arm 96 by the pin 98 and the other end is loosely secured to a frame carrying the upper set of tubes 17 and slidably mounted on the rods 16. An arm 100 reaching from the standard 93 carries a stud 101 encircled by a coil spring 102 rigidly secured at one end to the arm 100 and at the other end to the lever 88.

Secured to the bottom ends of the tubes 15 on the outside thereof are L shaped springs 103 with the ends thereof 104 projecting through openings in the walls of the tubes 15 and extending into the cavities thereof. Within the elbow of the said L shaped springs 103 are loosely secured rollers 105 between which and the outer walls of the tubes 15, beveled lugs 106 are adapted to glide upward and downward. Underneath the lugs 106 and secured to the bottom ends of the tubes 15 are bearings 107 for shafts 108, the said shafts 108 being encircled by coil springs 109, the said shafts 108 adapted to glide upward and downward through the bearings 107 and come in contact with the bottoms of the lugs 106. It is intended that the tubes 15 shall be long enough for each

to contain two or three pins one above the other.

In the practical operation of the apparatus, the ten-pins would be set in their proper places upon the alley floor 10, the player would roll the ball and the down pins would be removed by means of a lever or other mechanism operated by the foot or hand and connected with the cable 64 whereby the said cable would draw upward the lever 58 releasing the same from the notch in the disk 53 and permitting the disk 53 to rotate with the pulley 55 thereby carrying the cross-head 51 at the end of the lever 52 upward and elevating the platform 46 by means of which the pins 48 are forced through the openings 49 in the alley floor 10 and raising the down pins 112 from the alley floor 10 and causing them to be dropped to the sides of the alley floor 10, striking the inclined planes 25¹ and 25² from whence they would be conveyed by gravity on to and across the inclined plane 25 and deposited at the bottom of the opening 24 from whence they would be picked up by the buckets 21 upon the chain elevator, conveyed upward through the box 23 and be deposited across the bolt 19 where by means of gravity the heavy end would be turned downward and the pins dropped into the upper tier of tubes 17 and from thence into the lower tier of tubes 15 and there retained for future settings of the pins upon the alley floor 10. The pins 113 remaining standing would then be in condition for the second ball of the player. When it is desired to clear the alley floor 10 for a re-setting of the pins, the cable 76 is drawn by the application of the foot upon a lever attached thereto or otherwise, thereby drawing the arm 71 from the notch 75 in the disk 68 thereby permitting the disk 68 and the short arm 70 to rotate with the pulley 67, the short arm 70 carrying with it the long arm 114, which is connected at its lower end with the frame 14 and the frame 14 being connected with the frame 13 by means of the tubes 15, both the frames 14 and 13 and tubes are forced downward. The end of the lever 41 resting underneath the lug 43 of the collar 44 of the end of the frame 13 causes the lever 41 to be carried downward also with the frames 13 and 14, which in turn presses downward the arm 40 connected with the beveled gear 39, causing the same to rotate and the same being connected with the horizontal beveled gear 32 connected with the horizontal arm 33, causes the arm 33 to rotate horizontally. The horizontal rotation of the arm 33 sweeps all of the remaining down pins backward to and down the inclined plane 25² thence over the inclined plane 25 to the foot of the opening 24 to be there picked up by the cups 21 and elevated to the hopper 18 and there be

conveyed back to the tubes 15 as heretofore described. The coil spring 35 encircling the standard 12¹ and connected with the arm 33 will assist in carrying the arm 33 back to its original position for a repeated operation. As the tubes 15 are lowered, the shafts 108 strike the alley floor 10 and are forced upward through the bearings 107 and against the lugs 106, which in turn are forced upward thereby crowding outward the L shaped springs 103 which clears the obstruction in the tubes 15 and permits a set of ten-pins to drop to the alley floor 10. The continued rotation of the short arm 70 and the disk 68 causes the long arm 114 to return the frames 13 and 14 and the tubes 15 to their former elevated position. The arm 71 with the assistance of the coil spring 73 will be forced back into the notch 75 in the disk 68 and the mechanism will then be held in position until future operation is desired. The filling of the tubes 15 with the ten-pins is done automatically as follows: A pin is dropped across the rod 19 in the hopper 18 and is brought to an upright position by the law of gravity with the big end downward, the same passes into one of the tubes 17 and from thence into one of the tubes 15, and as it enters the top of one of the tubes 15, it strikes the lug 78 connected with the lever 79, the weight of the pin is sufficient to drive the lug 78 out of its way thereby driving the lever 79 backward and drawing the rod 81, this in turn draws the lever 83 which in turn draws downward the lever 85, which in turn draws downward the levers 87 and 88, thereby releasing the latch 115 from the ratchet in the wheel 95 and permitting the same to rotate to the next notch in the ratchet carrying with it the long arm 96 connected by an oblique arm 97 to the upper tier of tubes 17, the latch 115 engages another ratchet in the wheel 95 and the next pin dropped through the hopper 18 will fall into a separate tube in the tier 17 and be conveyed to a different tube in the tier 15 and so on until all of the tubes are filled and the arm 97 in its process of rotation on its return trip will convey tubes 17 in the opposite direction, so that the process may be made continuous. The pulleys 55, 67 and 111 are connected by bands with continuously moving machinery and the coil springs 56, 69 and 94 are calculated to be strong enough to force the respective drums against the disks 53, 68 and 110 with sufficient force to cause the disks named to rotate with the drums and operate the mechanism connected therewith. The respective coil springs throughout the apparatus are calculated to return the parts connected therewith to the normal positions shown in the drawings. The elevators 30 and 20 are connected with continuously moving machinery, the former being adapted to

receive upon its cups 29 from the inclined planes 28 the balls to be returned to the front end of the bowling alley. I do not wish to be limited to the detailed mechanical means described for adjusting the systems of tubes or operating the other devices employed in accomplishing the results obtained inasmuch as I deem the valuable features of my invention consist in the application of the main and more important parts to be specified in the claims.

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, the combination of two sets of tubes adjustably anchored above an alley floor, one above the other, the tubes of the lower set being arranged directly above the places designed for the setting of the pins; a hopper above the upper set of tubes having a rod horizontally arranged across the same, horizontal and vertical sets of rods, means for adjusting the upper set of tubes horizontally and means for adjusting the lower set of tubes vertically upon the horizontal and vertical rods, respectively, a horizontally rotating arm underneath the tubes and above the alley floor, an elevator at the rear of the alley floor, inclined planes reaching from the alley floor to the elevator, such elevator adapted to carry pins from the lower ends of the inclined planes below the level of the alley floor to a position above the hopper, all operated by continuously moving machinery and self-adjusting parts.

2. In a ten pin setter, the combination of two sets of tubes adjustably anchored above an alley floor, one above the other, the tubes of the lower set being arranged directly above the places designed for the setting of the pins, a hopper above the upper set of tubes having a rod horizontally arranged across the same, horizontal and vertical sets of rods, means for adjusting the upper set

of tubes horizontally and means for adjusting the lower set of tubes vertically upon the horizontal and vertical rods, respectively, a horizontally rotating arm underneath the tubes and above the alley floor, an elevator at the rear of the alley floor, inclined planes reaching from the alley floor to the elevator, such elevator adapted to carry pins from the lower ends of the inclined planes below the level of the alley floor to a position above the hopper, all operated by continuously moving machinery and self-adjusting parts, together with a subjacent arranged platform provided with perpendicular rods adapted to penetrate openings through the alley floor, continuously moving machinery for raising and lowering the same, and means for bringing said machinery into operative relation with said platform.

3. In a ten pin setter, the combination of two sets of tubes adjustably anchored above an alley floor, one above the other, the tubes of the lower set being arranged directly above the places designed for the setting of the pins, a hopper above the upper set of tubes having a rod horizontally arranged across the same, horizontal and vertical sets of rods, means for adjusting the upper set of tubes horizontally and means for adjusting the lower set of tubes vertically upon the horizontal and vertical rods, respectively, the said lower set of tubes provided at their upper ends with lug and lever tripping device cooperating with means for adjusting the upper set of tubes and provided at their lower ends with the lug and spring tripping device as means for dropping a set of pins therefrom to the alley floor.

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

JOHN C. McFARLAND.

Witnesses:

C. B. BRADFORD,
MARY SHOLDERER.