

F. N. LAWRENCE.
 AUTOMATIC PIN BOY.
 APPLICATION FILED JAN. 19, 1912.

1,063,983.

Patented June 10, 1913.

2 SHEETS—SHEET 1.

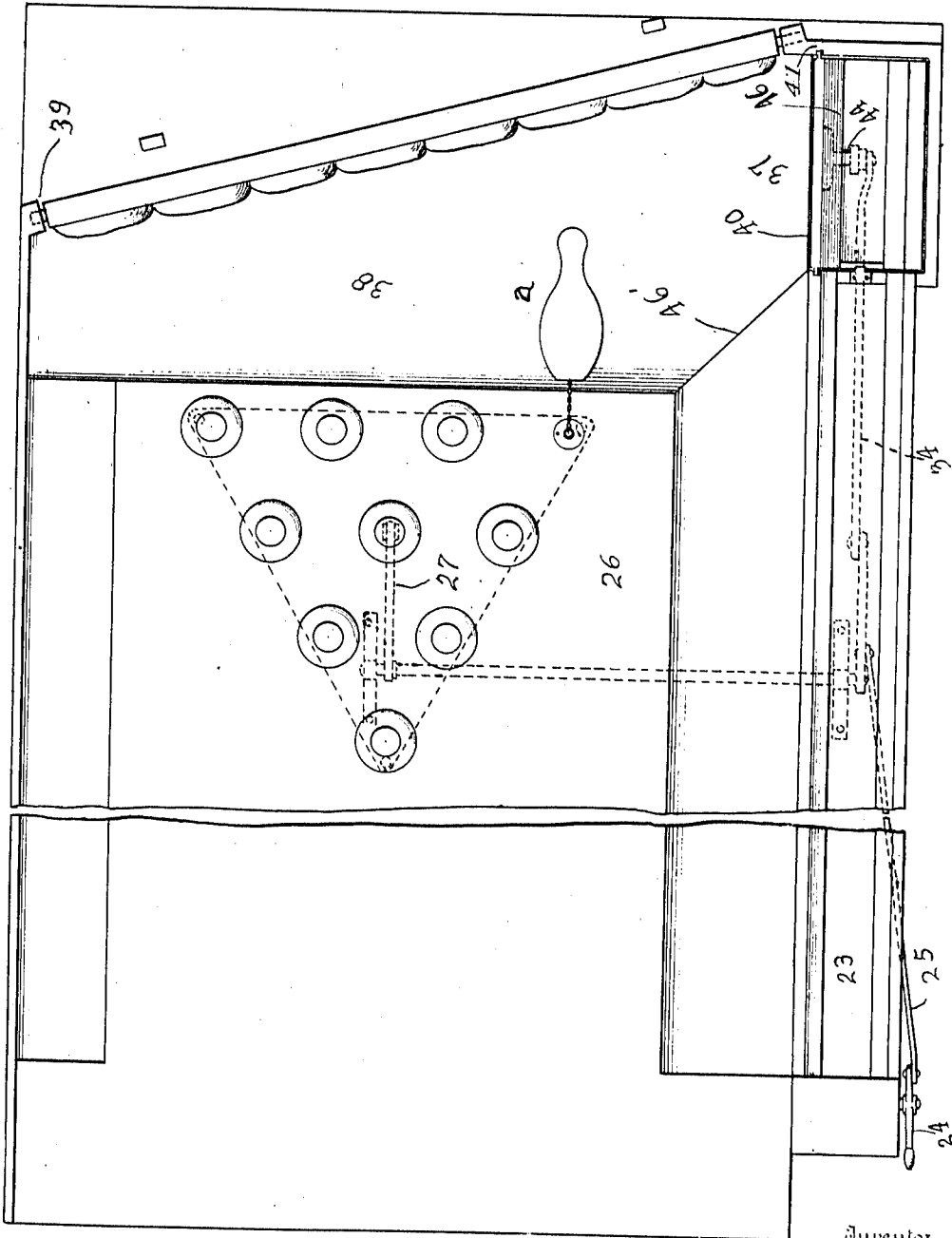


Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 2.

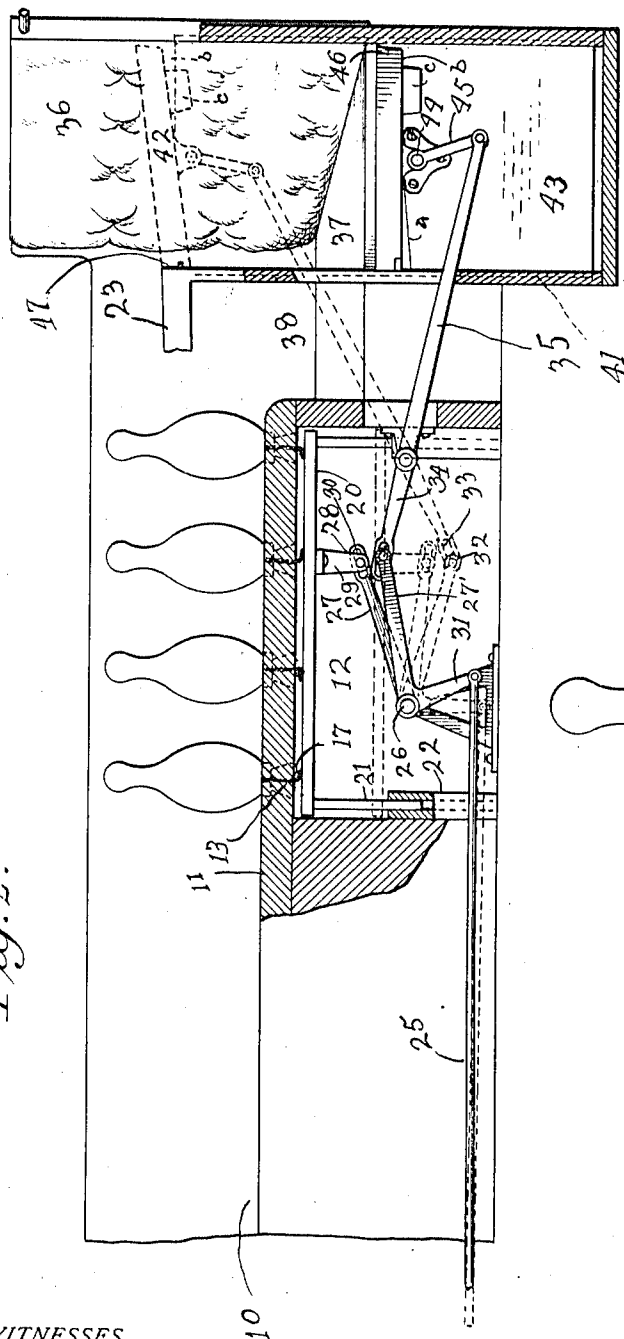
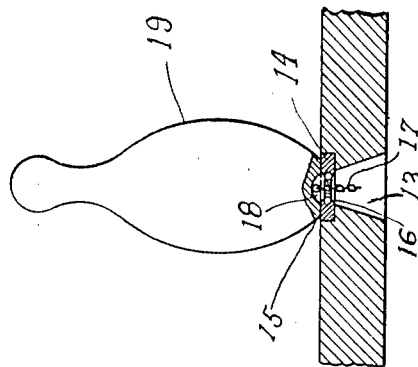


Fig. 3.



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FRED NEWTON LAWRENCE, OF BRIMFIELD, MASSACHUSETTS.

AUTOMATIC PIN-BOY.

1,063,983.

Specification of Letters Patent.

Patented June 10, 1913.

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To all whom it may concern:

Be it known that I, FRED NEWTON LAWRENCE, a citizen of the United States, residing at Brimfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Automatic Pin-Boys, of which the following is a specification.

This invention relates to means for erecting ten-pins, and has for its object to provide a mechanical device operable by a bowler or other person adjacent the bowling line to erect a set of pins in their proper places and at the same time return any balls that may have been previously projected along the alley.

An important object is to provide a mechanism of simple and durable construction adapted to be installed at a low cost.

Another object is to provide a novel and efficient construction for elevating a ball and projecting it along the usual run-way provided in bowling alleys for conducting balls to a point convenient to the hand of the bowler.

A further object is to provide an efficient connection with the pins together with a co-operating device reducing the friction between the sides of the spot openings and flexible members attached to the bottoms of respective pins.

Other objects and advantages will be apparent from the following description and the drawings, in which,

Figure 1 is a top plan view of a bowling alley equipped with my invention, Fig. 2 is a fragmentary section thereof at the rear end, Fig. 3 is a detail of a pin and the connection therewith.

There is illustrated a bowling alley 10 which may be of any suitable construction ordinarily followed. Adjacent the rear end of the floor 11 a chamber 12 is formed, communicating with which there are spot passages 13 centrally of the respective "spots", these openings having rabbets therearound at their upper parts in which are set respective annuli 14, each of which carries removably a cage 15 having closely spaced balls 16 projecting therefrom and into the opening 13 for slidable engagement thereagainst of a chain 17 attached at its upper end concentrically to the bottom of the pin 19, a suitable recess 18 is formed in the bottom of the pin wherein the attaching means may be accommodated without dis-

turbing the footing of the pin. The annuli 14 are preferably of metal and slightly greater in diameter than the bases of the pins, whereby in the setting-up operation to be described wear of the floor will be minimized.

A horizontal triangular anchor plate 20 is mounted in the chamber 12 for vertical movement, being adapted to lie closely adjacent the floor 11 at times, and carrying guide standards 21 at each corner engaging respective guideways 22 to maintain the plate in horizontal position. The chains 17 are all attached to the anchor plate beneath the respective spot openings 13, the chains having a suitable amount of slack therein when the pins are on the spots and the anchor plate is at the upper limit of its movement to allow the pins to be upset readily and permit suitable movement of the pins outwardly from the spots more or less, as at *a* in Fig. 1. At the side of the floor 11 there is shown the usual run-way or race 23 outwardly of which adjacent the bowling line there is shown a suitable lever 24 pivoted upon the support of the race 23 and connected to a link rod 25 extending rearwardly into the chamber 12. Mounted revolvably in the chamber transversely of the alley there is a shaft 26, one end being disposed adjacent the medial line of the bowling floor and having an arm 27 projected therefrom longitudinally of the alley, the outer end of this arm falling beneath the central spot and pivotally connected to the anchor plate by means of a pintle 28 carried by a fork 29 and engaged in a suitable slot 30 extending longitudinally of the arm. Attached to the shaft 26 adjacent its outer end beneath the race 23, there is a bell crank 31 having a downwardly extending arm connected to the link 25 and a rearwardly extending arm 27' having a trunnion bolt 32 engaged slidably in a slot 33 in one end of a lever 34 pivoted at the rear side of the chamber 12 and having a lift arm 35 projected outwardly and rearwardly of the chamber adjacent the back stop 36 extending across the rear end of the alley and beyond the adjacent end of the race 23.

It will be noted that the floor 37 of the ball-pit 38 is inclined upwardly from the side adjacent the ball race and the backstop extends obliquely forwardly from a point rearwardly of the outer end of the arm 35. The backstop may be swung upon pivots 39

as shown, if desired. Adjacent its rearward edge there is formed an elevator shaft 40 having grooved guides 41 at its forward and rearward sides. This shaft is immediately adjacent the rear end of the race and has a ball lift 42 vertically movable therein including a vertical side board or gate 43 engaged in the grooves of the guides immediately adjacent the edge of the floor 37 disposed close to the edge of the floor 37, to close access to the shaft when the lift is at its upper limit of movement, and to hold the device properly in the shaft during operation. The board has secured thereto a rigid horizontal shaft or trunnion 44 projecting inwardly therefrom and connected by means of a link 45 to the extremity of the lever arm 35. A cradle 46 is pivoted upon the trunnion 44 for rocking movement as will be described, the cradle being shaped to form a continuation of the race 23 when at the upper limit of its movement, its forward edge, being adapted to abut snugly against the rear end of the race 23. At the lower limit of its movement it falls just below the adjacent edge of the floor 37.

After any or all of the ten-pins have been upset operation of the lever 24 to draw upon the link 25 will cause depression of the anchor plate 20, the chains 17 drawing the pins to their places and erecting them as will be readily understood, the arm 27' being at the same time depressed, which will raise the arm 35 of the lever 34, raising the cradle 42. By reason of the inclination of the floor 37 and the backstop, any balls projected along the alley will have been delivered upon the cradle. It will be noted that the shaft 40 is spaced rearwardly of the rear edge of the bowling floor a short distance, and in order to prevent balls from hanging forwardly of the shaft 40 the adjacent gutter is extended rearwardly to the forward side of the shaft and cut off diagonally and a fending surface provided at 46' to guide the balls toward the shaft. The upper edge of the board 43 is inclined downwardly from adjacent its central part toward the front, as at *a*, in Fig. 2 the cradle normally resting upon the rear horizontal portion *b* of this edge. Adjacent the upper end of the forward guide 41 there is a lug 47 arranged to strike the cradle and tilt it until it rests upon the inclined forward upper edge of the board 43, when the cradle is moved to its upper limit, as dotted in Fig. 2, so that the movement of any balls thereon will be properly initiated for delivery upon the ball race. The rear portion of the cradle may be weighted as at *c* in any suitable way to in-

sure its return to normal loading position. The board 43, in addition to serving as a guide for the cradle in its vertical movement, also acts as a gate preventing any balls from falling into the shaft 40 after the raising of the cradle.

The length of the connecting chains between the ten-pins and the anchor plate may be varied as may be found desirable, and other changes in the construction shown and described made within the scope of the claims hereto appended.

What is claimed is:

1. A device of the class described, comprising a bowling floor, spot passages there-through, ten-pins thereover, an anchor member vertically movable beneath the floor, connections between the anchor member and the pins, a ball race-way above the floor, a transverse shaft beneath the floor, connections between the shaft and anchor member for vertical movement of the anchor member upon rotation of the shaft, a bell-crank carried by the shaft, an elevator member adjacent the rear end of the raceway and movable from below said floor to the raceway, connections between said bell-crank and the elevator, and operative connections with the bell-crank for rotation of the shaft and movement of the elevator, for the purposes described.

2. In a device of the class described, a pin erecting device, an operating mechanism therefor, a ball delivery device including a ball raceway, a pit floor rearwardly of the bowling floor and inclined downwardly toward the raceway, an elevator guideway at the rear end of the raceway an elevator member movable therein and comprising a gate-board, a cradle device pivoted thereover for movement from a position below said inclined floor into registry with the raceway at times, means to engage and incline the cradle toward the raceway when at the upper limit of its movement, means to return the cradle to initial position when in normal position, and connections between the elevator and said operating mechanism for raising of the elevator coincident with erection of pins, said gate board being arranged and adapted to close access to the space beneath the elevator from the inclined floor throughout movement of the elevator.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FRED NEWTON LAWRENCE.

Witnesses:

KATHERINE A. SUGRUE,
ERNEST E. HOBSON.