W. F. BARRETT.

PIN SETTING MECHANISM.

APPLICATION FILED FEB. 20, 1919.

1,320,370.

Patented Nov. 4, 1919.

4 SHEETS—SHEET 1.

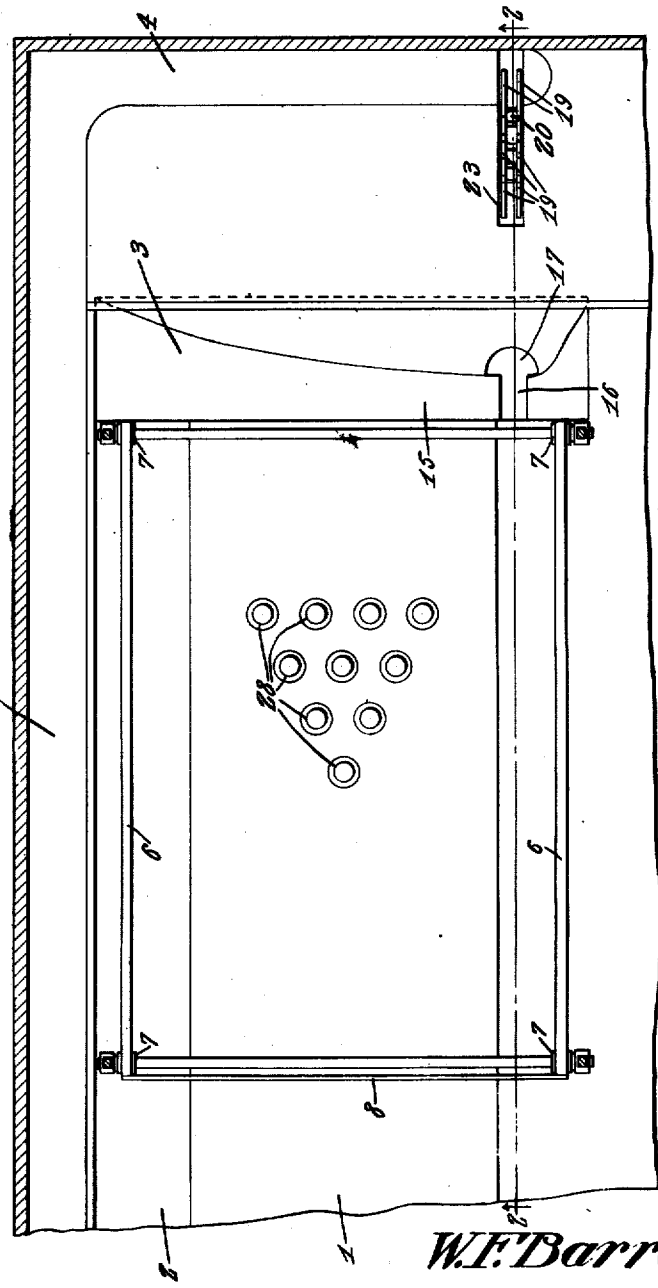


Fig. 1.

Witness

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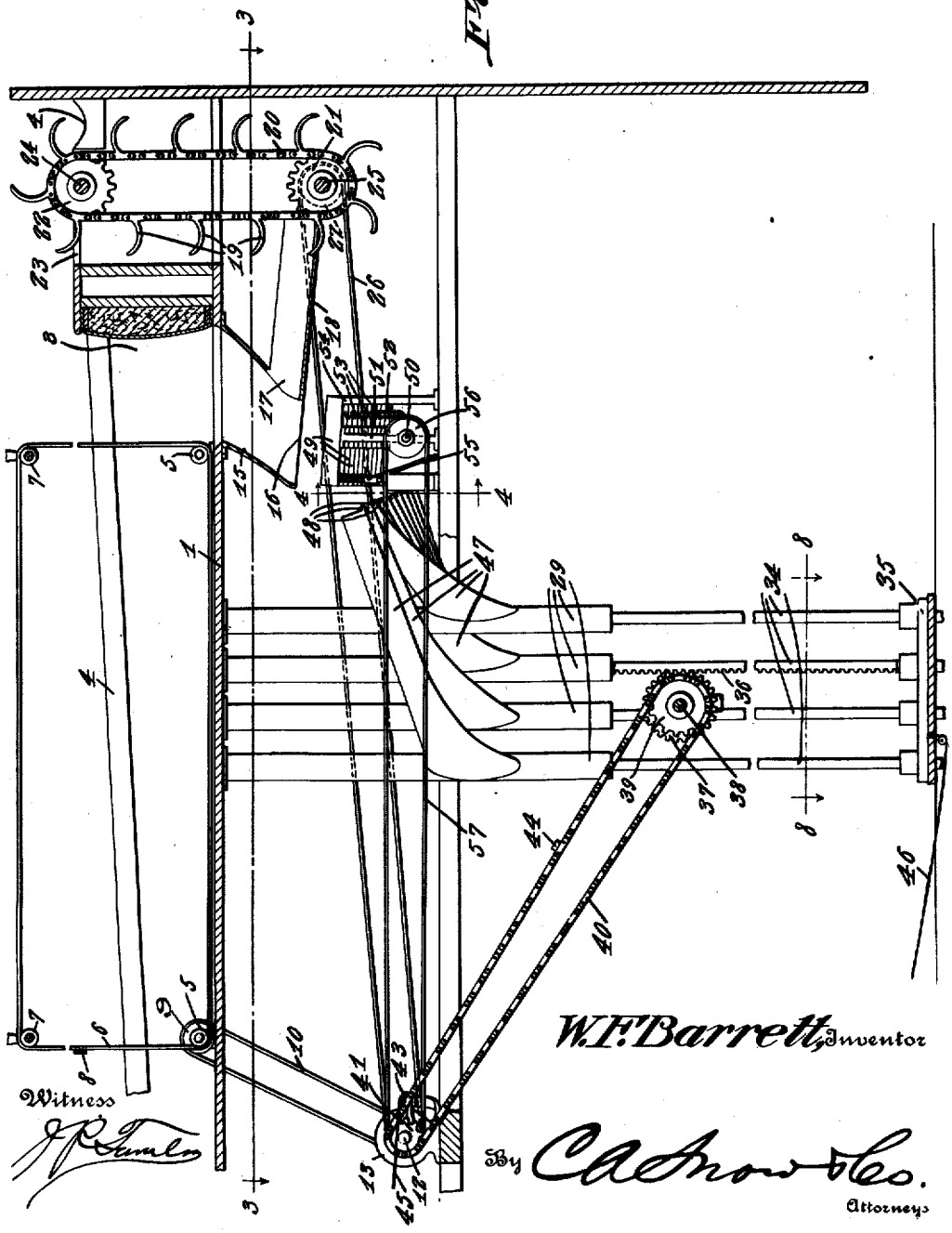
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4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

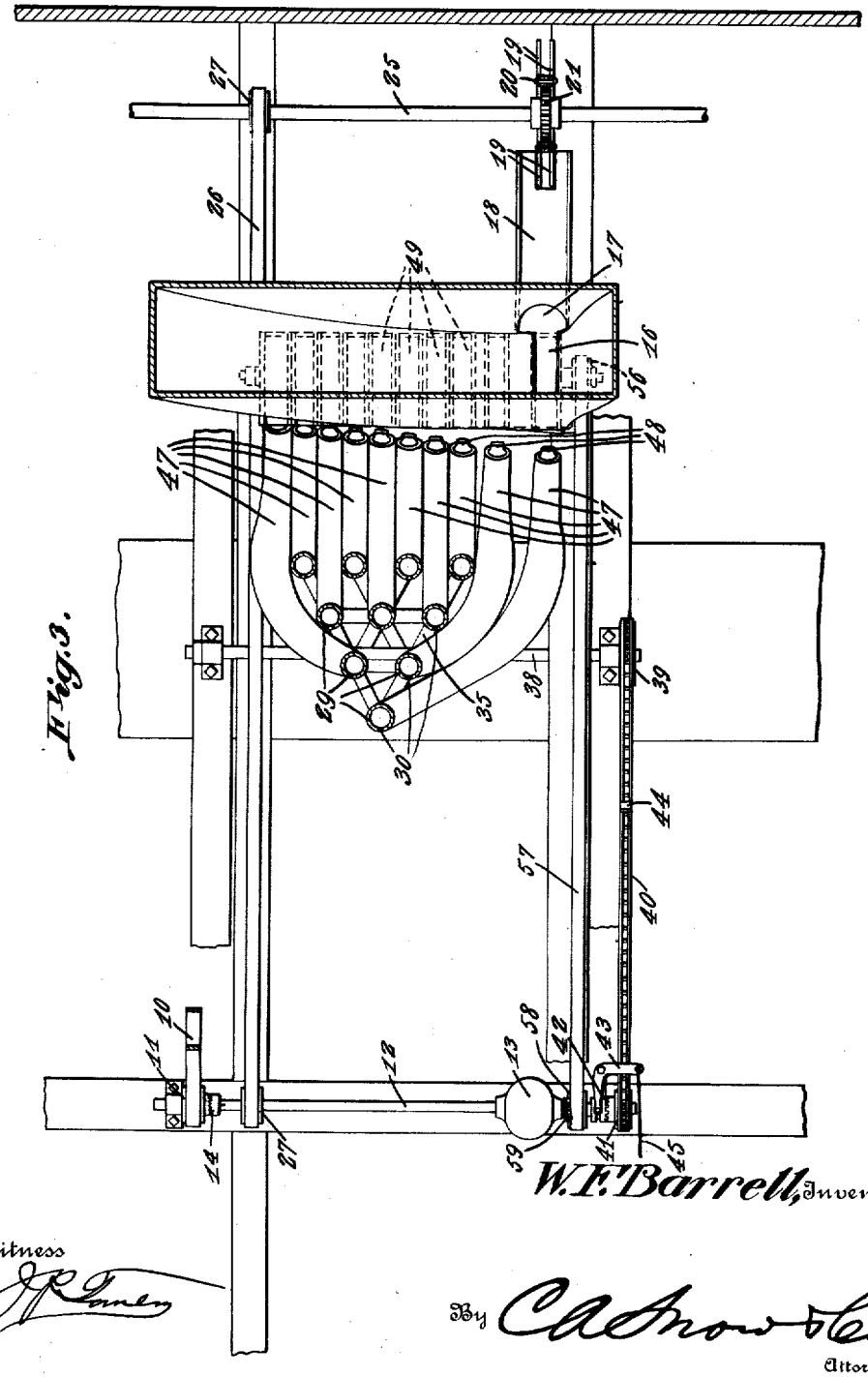


Fig. 3.

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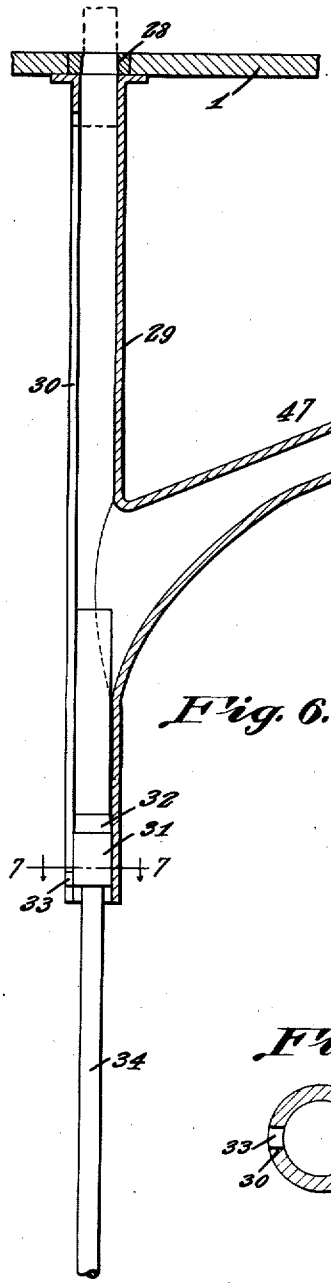


Fig. 6.

Fig. 4.

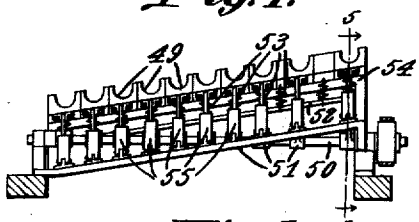


Fig. 5.

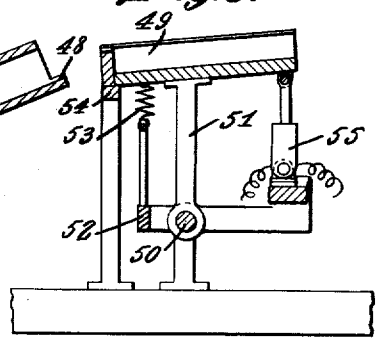


Fig. 8.

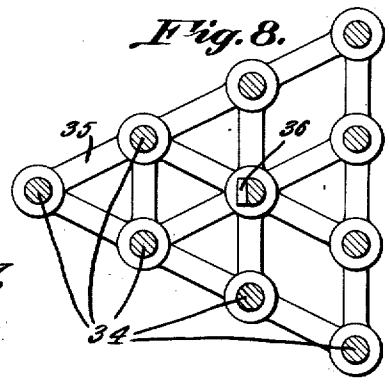


Fig. 7.

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UNITED STATES PATENT OFFICE.

WILBERT F. BARRETT, OF BRADFORD, MASSACHUSETTS.

PIN-SETTING MECHANISM.

1,320,370. Specification of Letters Patent. Patented Nov. 4, 1919.

Application filed February 20, 1919. Serial No. 278,112.

To all whom it may concern:

Be it known that I, WILBERT F. BARRETT, a citizen of the United States, residing at Bradford, in the county of Essex and State of Massachusetts, have invented a new and useful Pin-Setting Mechanism, of which the following is a specification.

This invention relates to apparatus for use in setting pins such as used on bowling alleys and while it is especially adapted for use in setting candle pins it can, with some modifications in design, be also used in setting ordinary duck pins and ten pins.

One of the objects of the invention is to provide means whereby the pins are directed automatically to a setting box after which they are arranged mechanically so that, upon the operation of certain parts of the apparatus, the pins will be elevated to position at the respective "spots" on the alley.

Another object is to provide means for separating the balls from the pins and elevating the balls to the return which can be of the usual construction.

Another object is to provide means whereby the setting of the pins can be controlled and any selected pin or pins can be placed on its "spot" or "spots" when desired.

A still further object is to provide simple and efficient means for collecting the pins or "dead wood" and the balls from the alley and gutters and directing them into the separating trough of the apparatus.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel details of construction and combinations of parts which will be hereinafter more fully described and pointed out in the claims, it being understood that various changes may be made in the construction and arrangement of the parts without departing from the spirit or sacrificing any of the advantages of the invention as set forth in the appended claims.

In the accompanying drawings the preferred form of the invention has been shown.

In said drawings

Figure 1 is a plan view of the rear portion of an alley having the present improvements applied thereto.

Fig. 2 is a section on line 2—2, Fig. 1.

Fig. 3 is a section on line 3—3, Fig. 2.

Fig. 4 is a section on line 4—4, Fig. 2.

Fig. 5 is a section on line 5—5, Fig. 4.

Fig. 6 is a vertical section through one of the pin guiding tubes, two positions of a pin therein being shown by full and dotted lines, respectively.

Fig. 7 is a section on line 7—7, Fig. 6.

Fig. 8 is a section on line 8—8, Fig. 2.

Referring to the figures by characters of reference, 1 designates the alley, which can be of the usual construction and provided at the sides with gutters 2, at the rear end with a padded pit 3 and also provided with an inclined ball return 4 extending along the side and back end of the alley. Located at the sides of the alley close to the pit 3 are sheaves 5 and additional sheaves are located at the sides of the alley at points removed from the pit. Extending under these sheaves are endless belts 6 which also pass over upper guide sheaves 7 suitably supported. The belts are connected by a cross strip 8 and the parts are so arranged and proportioned that, when the belts are actuated in one direction, the strip 8 will be moved downwardly toward and thence along the alley until it comes close to the pit 3. This will cause any pins or balls on the alley to be swept back into the pit. The belts can be operated by any desired mechanism. For example two of the sheaves 5, one at each side of the alley, can be provided with additional sheaves 9 revoluble therewith and driven by belts 10. These belts are driven by pulleys 11 on a transverse shaft 12 adapted to be driven by a motor 13. Any suitable clutch mechanism can be provided for coupling the pulleys 11 to the shaft when desired. Clutches have been shown generally at 14 and the operating mechanism therefor can be of any construction desired. It has not been deemed necessary to show or describe it in detail.

The bottom of the pit 3 consists of a hopper 15 having an outlet at one side as shown at 16 and which outlet is in the form of a slot extending from front to rear and just large enough to allow a single pin to fall therethrough. The bottom and walls are inclined so that when pins are directed into the hopper they will gravitate toward the outlet slot and drop therethrough one at a time, and while lying in substantially horizontal positions. The rear wall of the hopper is inclined downwardly and forwardly and is provided, at the rear end of the slot 16, with a round ball outlet 17 opening into the upper end of an inclined trough 18,

This trough extends rearwardly and is cut away at the lower or rear end of the bottom thereof to permit the upward movement of a series of buckets 19 extending from an endless elevator 20. Said elevator is mounted on upper and lower sprockets 21 and 22 and works within a slot 23 formed in the rear portion of the ball return, as shown in Fig. 1. The upper sprocket 22 is mounted on a shaft 24 suitably supported while the lower sprocket 21 is secured to a shaft 25 continuously rotated by a belt 26 engaging pulleys 27 on the shafts 12 and 24. It will be obvious that as the balls are deposited in the pit 3 they will be directed to the outlet 17 and roll along the trough 18 where they will be engaged successively by the buckets and conveyed upwardly over shaft 22 and dropped onto the return 4. The elevating buckets are moving continuously during the use of the alley.

Formed in the floor of the alley at the points where the usual "spots" are ordinarily located are openings of slightly greater diameter than the pins, said openings being indicated at 28 and being tapered slightly upwardly, as shown in Fig. 6. Below each opening and leading upwardly thereto is a guide tube 29 having a longitudinal guide groove or slot 30. These tubes are arranged in the same relation to each other as are the openings 28 and each of them has a plunger 31 slidably mounted therein and provided with a tapered end 32. A lug 33 extends from each plunger and is slidably mounted in the groove or slot 30 so as to prevent the plunger from rotating. The tapered ends of the plungers are adapted to wedge within the tapered openings 28 with the upper ends of the plungers flush with the top surface of the alley floor. Rods 34 extend downwardly from the plungers and are connected to a frame 35. One of the plungers 23 is preferably in the form of a rack, as shown at 36 and is engaged by a gear 37 on a transverse shaft 38 carrying a sprocket 39. A chain 40 engages the sprocket and is driven by a sprocket 41 on the shaft 12. This sprocket 41 is loose on shaft 12 but has a clutch 42 one member of which is adapted to be shifted by a bell crank lever 43. This lever has one arm extending close to the chain 40 and a small lug 44 is provided on the chain for engagement with the lever. Shaft 12 is rotating continuously and when it is desired to operate the chain 40 so as to elevate the plungers to their uppermost positions within the openings 28, the lever 43 is shifted by any suitable means, such as a rod 45, so as to move the clutch 42 and couple the shaft 12 to the sprocket 41. Said sprocket will therefore drive the chain 40 and gear 37, causing the plungers to move upwardly and just as they arrive at their uppermost positions the lug 44 will come against the lever 43 and shift it and the clutch and disengage the sprocket 41 from the shaft 12. The plungers will be wedged and held within the openings 28 until pulled downwardly by any suitable means, such as a cord 46 whereupon they will gravitate to their lowermost positions, returning the chain 40 to its initial or starting position. It is to be understood, of course, that any other means than those described can be provided for raising and lowering the plungers at will.

Located back of the tubes 29 is an inclined series of parallel tubes 47, each tube being inclined downwardly and forwardly to one of the tubes 29 and gradually increasing in vertical area as it approaches its tube 29 so that when a pin is directed end first through any one of the tubes 47 it will be free to swing upwardly and assume a vertical position in the tube 29 and above the plunger in said tube. The upper or rear ends of the tubes 47 are provided with stop lugs or ledges 48 forming means for limiting the tilting movement of setting boxes mounted and arranged in a novel manner. Ten of these boxes are provided and are arranged side by side in a transversely inclined series, as shown at 49, each box being built to accommodate one pin. The box 49 at the highest end of the series is located directly under the slot 16 and above and back of one of the tubes 47. The other boxes are also located back of different tubes 47 as shown. A shaft 50 is extended transversely under the boxes and has arms 51 extending upwardly therefrom and supporting the respective boxes. A frame 52 is secured to and rotates with the shaft 50 and springs 53 connect the rear portion of this frame to the rear ends of the respective boxes 49 so as to hold said ends normally pressed onto a supporting rail 54. Mounted on the front portion of the frame 52 are solenoids 55, one under the front end of each box, and the core of each solenoid is pivotally connected to the front end of the box thereabove. Each solenoid is pivotally mounted and is in circuit with a source of electrical energy. Any suitable means, not shown, may be provided whereby any selected solenoid can be energized by pressing a button. When a solenoid is thus energized the box 49 connected thereto will be tilted so that the pin supported thereon will slide therefrom and into the tube 47 in the path thereof, the tilting movement being limited by the stop lug 48. A pulley 56 is secured to the shaft 50 and is connected by a belt 57 to a pulley 58 on the shaft 12, any suitable clutch mechanism, indicated generally at 59, being provided for coupling the pulley to and uncoupling it from the shaft 12, this means being under the control of the operator. When the parts are coupled the shaft

50 will be rotated so as to simultaneously tilt all of the boxes 49 to deliver their contents.

When the pins are directed into the pit 3 they will roll to the outlet slot 16 and the first pin will drop into the first box 49. The second pin will drop onto the first pin and roll laterally to the second box and will drop thereinto. The third pin will roll over the first two pins and drop into the third box. This operation will be continued until all of the boxes are filled. By then dumping all of the boxes the contents thereof will be directed end first into the respective tubes 47 and gravitate into the tubes 29 where they will stand on the respective plungers 31. Said plungers are then elevated to move the pins upwardly and the pins will emerge through the openings 28 and remain standing, the ends of the plungers being flush with the floor of the alley. As the balls are thrown along the alley they will be directed to and gathered up by the elevator and returned to the user. The pins can be directed into the pit by means of the sweep or strip 8 as described.

Should it be desired to set up a certain pin or pins, the pins on the alley are swept back into the pit so as to be distributed in the manner described. Those pins desired are then discharged from their boxes 49 by tilting the boxes independently of the others through the aid of the magnets. These pins will gravitate to their tubes 29 and, when the plungers are elevated, the desired pins will be brought to position on the alley.

What is claimed is: —

1. The combination with an alley having openings in the floor thereof, and tubes below and leading to the openings, of means below the pit of the alley for collecting and arranging the pins directed into the pit, mechanism for operating said means to deliver the pins to the respective tubes, and means within the respective tubes for elevating the pins through the openings and supporting them above the alley.

2. The combination with an alley having openings in the floor thereof and tubes below and leading to the openings, of an inclined pin holder below and adapted to receive pins from the pit of the alley, said holder having separate compartments each adapted to hold a single pin, means for shifting the holder to deliver the pins to the respective tubes, and means for elevating the pins within the tubes to positions above the alley.

3. The combination with an alley having openings in the floor thereof and tubes below and leading to the openings, of a transversely inclined pin holder having separate pin receiving compartments side by side and parallel, means for directing pins one at a time from the pit of the alley and onto the upper side portion of the holder, each compartment being adapted to hold but a single pin and, when filled, constituting means for deflecting a loose pin laterally to another compartment, means for shifting the pin holder to deliver the pins therefrom to the respective tubes, and means for elevating the pins within the tubes to standing positions above the alley.

4. The combination with an alley having openings in the floor thereof, tubes below and leading to the openings, and pin elevating means within the tubes, of a hopper constituting the bottom of the pit of the alley and having an outlet slot, an inclined pin holder having separate compartments each adapted to hold but a single pin and, when filled, to deflect laterally loose pins deposited thereon, the upper compartment of the holder being disposed below the slot in the hopper, and means for shifting the holder to direct the pins therefrom and into the respective tubes.

5. The combination with an alley, separate pin elevating means therebelow, and a hopper for receiving pins from the alley, said hopper having a pin outlet, of means between the said hopper and the elevating means for arranging the pins and delivering them to the said elevating means, said arranging means including a transversely inclined holder having separate compartments side by side and each adapted to hold but a single pin, the uppermost compartment being located below the pin outlet of the hopper and each compartment, when filled, constituting means for deflecting to another compartment loose pins deposited thereon, and means for shifting said holder to deliver the arranged pins to the elevating means.

6. In apparatus of the character described the combination with elevating means and a hopper having a pin outlet, of a pin holder inclined laterally and having separate compartments side by side each adapted to hold but a single pin and to be filled thereby, the upper compartment being arranged below and adapted to receive a pin from the outlet, means for tilting the holder to simultaneously deliver to the elevating means the contents of all of the compartments, and selective means for tilting one of the compartments to deliver its contents independently of the other compartments.

7. In apparatus of the character described the combination with pin elevating mechanism including separate tubes, and a hopper for receiving pins, said hopper having an outlet, of tubes inclined downwardly to the respective tubes of the elevating mechanism, an inclined pin holder having separate pin receiving compartments each adapted to be filled by a single pin, the uppermost compartment being below the hopper outlet, and

means for delivering pins from the compartments to the respective inclined tubes.

8. The combination with an alley having holes in the floor thereof and guide members leading to the respective openings from below the alley, of pin elevating means within the respective members, means for collecting pins from the alley and delivering them therefrom, a transversely inclined pin holder having separate compartments for receiving pins from the collecting means, the uppermost compartment being located below the outlet of the collecting means, each compartment being adapted to be filled by a single pin, and means for delivering pins from the compartments to the respective elevating means.

9. The combination with an alley and means for elevating pins through the floor of the alley, of a pit at the back end of the alley having a hopper like floor provided with a pin outlet, endless belts parallel with the sides of the alley, a cross strip carried by said belts, means for actuating the members to move the strip rearwardly along the alley to sweep pins and the like into the pit, and thence upwardly from the alley, and means interposed between the outlet of the hopper and the elevating means for arranging the pins and delivering them to the elevating means.

10. The combination with an alley having a ball return and an elevator for delivering balls onto the return, of a hopper constituting the bottom of the pit of the alley, said hopper having a ball outlet and a pin outlet, a chute leading from the ball outlet to the elevator, means for elevating pins through the floor of the alley, and means between the pin outlet and the pin elevating means for arranging pins and delivering them to the respective elevating means.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

WILBERT F. BARRETT.

Witnesses:
HUBERT C. THOMPSON,
RICHARD E. PHILLIPS.