No. 814,897. PATENTED MAR. 13, 1906.

J. C. BACKUS.

PIN SPOTTER AND SETTER FOR BOWLING ALLEYS.

APPLICATION FILED MAR. 31, 1905.

2 SHEETS—SHEET 1.

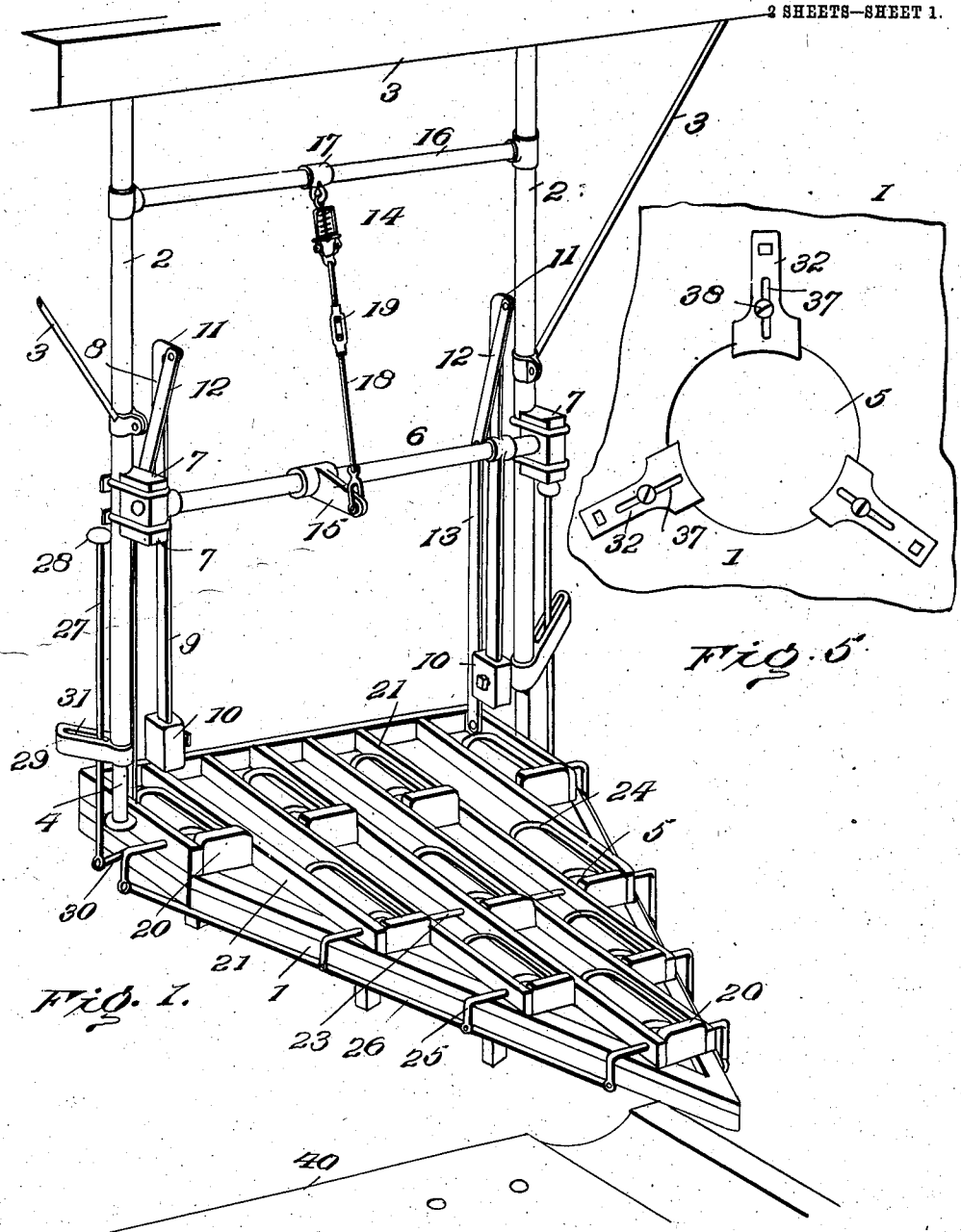


FIG. 1.

FIG. 5.

Witnesses

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2 SHEETS—SHEET 2.

Fig. 2.

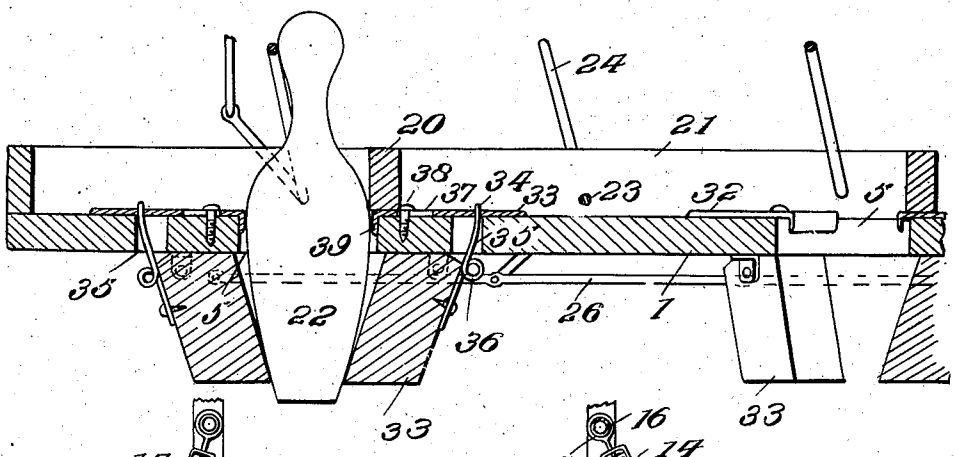


Fig. 3.

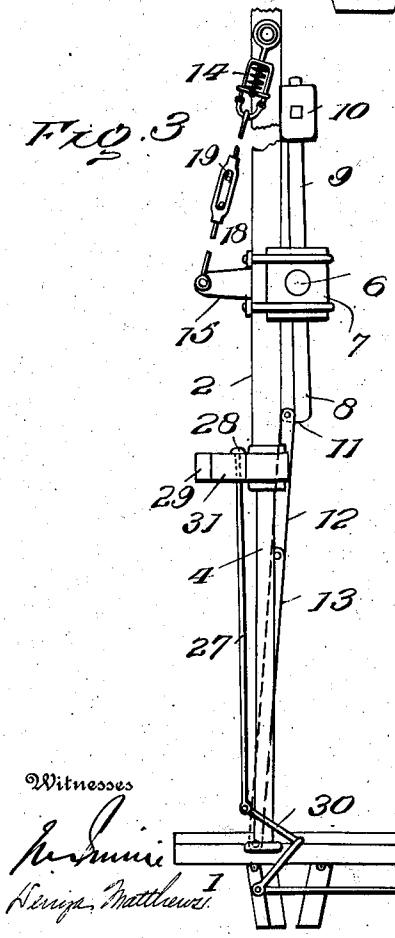


Fig. 4.

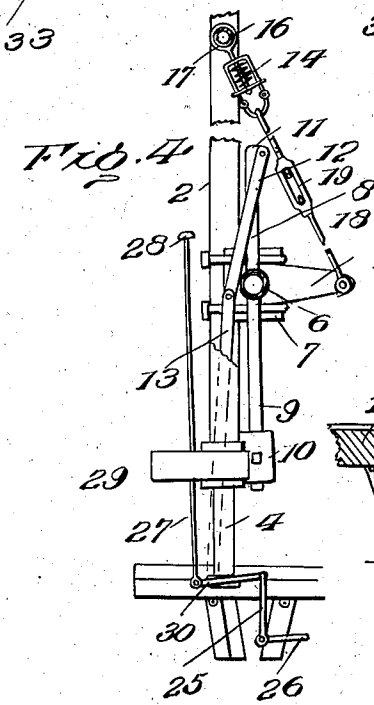
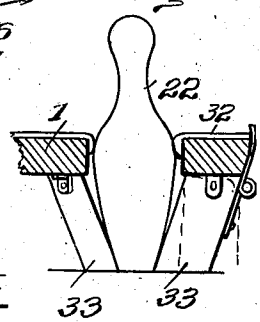


Fig. 6.



Witnesses

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UNITED STATES PATENT OFFICE.

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PIN SPOTTER AND SETTER FOR BOWLING-ALLEYS.

No. 814,897. Specification of Letters Patent. Patented March 13, 1906.

Application filed March 31, 1905. Serial No. 253,133.

To all whom it may concern:

Be it known that I, JOHN C. BACKUS, a citizen of the United States, residing at Smethport, in the county of McKean and State of Pennsylvania, have invented certain new and useful Improvements in Pin Spotters and Setters for Bowling-Alleys, of which the following is a specification.

In apparatus of this character a carrier for the pins is an essential element, and for convenience the said carrier is counterbalanced, preferably by weight, which serves to automatically return the carrier to normal position after placing the pins upon the alley and to prevent a too rapid descent of the carrier when moving to set the pins.

This invention provides a novel counterbalance for the carrier which exerts a variable modifying influence throughout the travel of the carrier in each direction, the resistance gradually increasing throughout the first half of the descent of the carrier and proportionately decreasing as the carrier completes its downward travel to deposit the pins upon the bed of the alley.

The invention further contemplates a buffer for cushioning the carrier at the limit of its movement in each direction and serving to give an initial impetus to the counterbalance on its return movement for resetting the carrier.

The invention also further contemplates, in combination with the carrier, shifting mechanism of peculiar construction for arighting the pins at the proper time to insure their delivery upon the alley, said shifting means consisting of parallel rods journaled to the carrier and having crank portions opposite to the respective pin-openings of the carrier and preferably connected in series for simultaneous operation and adapted to be actuated when the carrier reaches the predetermined point in its descent to safely and properly place the pins upon the bed of the alley.

The invention further embodies pin-guides to assure accuracy in positioning the pins when set upon the alley, said guides comprising yieldable complemental parts which are controlled by the pins both when shifted and when passing from the carrier to the alley.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result, reference is to be had to the following description and accompanying drawings, in which—

Figure 1 is a perspective view of an apparatus embodying the invention. Fig. 2 is a central longitudinal section of the carrier, showing the pin shifting and guide mechanism. Fig. 3 is a side view of the counter-balance, buffer, and actuating mechanism for the pin-shifting means, illustrating a portion of the carrier. Fig. 4 is a view similar to Fig. 3, showing the normal position of the parts when the carrier is elevated and adapted to receive the pins prior to placing them upon the bed of the alley. Fig. 5 is a top plan view of a portion of the pin-carrier, showing the slidable pin-guides. Fig. 6 is a detail view showing the relation of the complemental members of the pin-guides when clearing the pins after the same have been deposited upon the alley.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The carrier 1 is mounted for vertical movement and is directed in its descent and ascent by guides 2, which are pendent from an overhead beam 3 or other suitable support, said guides being braced by means of stays 3. The guides 2 are preferably tubular, and complemental guides 4, rigidly attached to the carrier, telescope therewith. The guide members 4 are of a length to insure proper movement of the carrier 1 in its ascent and descent. The carrier 1 may be of any substantial construction and is approximately of triangular form to correspond to the outline of the pins when set, so as to occupy the smallest amount of space possible. Pin-openings 5 are provided in the carrier and are located to coincide with the spots or positions of the pins. The carrier is moved toward and from the bed of the alley in any determinate way, according to its mounting, and preferably remains parallel to a given position and with the bed of the alley, so as to place the pins squarely thereon. A rock-shaft 6 is arranged some distance above the bed of the alley transversely thereof and is mounted in bearings 7, consisting of blocks shackled, clipped, or otherwise attached to the guides 2. Bars are fast to end portions of the rock-shaft 6, each consisting of arms 8 and 9 of different lengths and projecting in opposite directions. The arms 9 are supplied with weights 10, which serve to counterbalance the carrier and its load. The weights 10 may be adjustable on the arms 9 to provide for adjustment of

the counterbalance to meet varying conditions. The arms 8 have offstanding portions 11, to the extremities of which links 12 are pivotally connected, said links being connected by bars 13 with the carrier. It is to be understood that the carrier may be connected to the arms 8 in any manner whereby its vertical movement is assured in the operation of the appliance. The offstanding portions 11 serve to throw the pull of the load in line with or slightly forward of a vertical plane passed through the axis of the rock-shaft 6, thereby holding the carrier in suspension while placing the pins thereon and during the time that the alley is in use. The weighted arms 9 are pendent, as shown most clearly in Fig. 1, when the carrier is elevated, and the effectiveness of the counterbalance is less than the combined weight of the carrier, pins, and adjunctive parts, so that when the carrier is released and started on its downward travel it will continue to move by reason of the preponderence of weight until arrested by contact with the bed of the alley. As the carrier descends the rock-shaft 6 is turned and the weights 10 move upward and exert an increasing resistance proportionate to the increase of leverage of the arms 9. At the same time the leverage of the arms 8, from which the carrier is suspended, proportionately increase. The leverage of the arms 8 and 9 varies in inverse ratio during the first part of the descent of the carrier until said arms occupy a horizontal position, when the leverage of the arms varies in an opposite ratio during the completion of the downward movement of the carrier. In other words, during the movement of the weights from a pendent position to a horizontal plane passed through the axis of the shaft 6 their leverage increases, and as said weights pass from said horizontal plane to a perpendicular position above the shafts 6 their effective leverage decreases. This is true of the leverage of the arms 8, only in an inverse order.

A buffer 14 is provided for neutralizing any shock and gradually checking the movement of the carrier in its travel in each direction. This buffer also serves to give an initial impetus to the carrier upon its return after depositing the pins upon the alley. For convenience the buffer 14 exerts its controlling influence upon the rock-shaft 6, and for this purpose said rock-shaft is supplied with an arm 15, which is fast thereon. The buffer in its simplest form consists of a spring-clevis, one end being connected to the arm 15 and the opposite end to the overhead framework or support, which in the present instance consists of a transverse rod or bar 16, connecting the guides 2. The upper end of the buffer is attached to the rod or bar 16 by means of a connector 17 loose on said bar, so as to swing and adapt itself to the direction of strain as the arm 15 changes its position incident to the turning of the rock-shaft 6 in its bearings 7. The connection 18 between the buffer and the arm 15 is extensible and comprises a turnbuckle 19, whereby provision is had for varying the effectiveness of the buffer by regulating the tension of its spring. When the carrier 1 is elevated, the buffer is under a slight tension, and upon the descent of the carrier and as the same is approaching the limit of its downward travel the buffer is subjected to tension, which serves the dual function of relieving shock and giving an initial impetus to the carrier upon its return stroke, thereby carrying the weights or counterbalances past a dead-point.

Upon the top side of the carrier is arranged a series of abutments or stops 20 and longitudinal ribs 21, the latter being disposed in parallel relation and the abutments or stops 20 located in line with the forward sides of the pin-openings 5, so as to engage with the foot of the pins 22 and properly position the same. The longitudinal ribs 21 and abutments 20 may be provided in any manner and constitute means to insure correct position of the pins, so that they may be properly and positively set upon the bed of the alley in the operation of the machine.

The shifting means for arighting the pins comprises rods 23, arranged transversely of the carrier and journaled thereto and provided in their length with crank portions 24, upon which the pins rest when placed upon the carrier. The rods 23 may be provided at one or both ends with crank-arms 25, which are connected in series by means of a rod or bar 26, so as to cause the series of rods 23 to turn in unison. Operating rods or bars 27 have a crank connection with one of the rods 23 and are provided with stops 28 to come in contact with corresponding stops 29 and cause rocking of the rods 23 as the carrier settles at the limit of its downward travel, with the result that the crank portions 24 are thrown upward and the pins arighted and caused to pass through the pin-openings of the carrier onto the alley. As shown, the rods or bars 27 are connected at their lower ends with crank-arms 30, attached to or forming a part of the rearmost rod 23 and passing through slots 31 of the stops 29, which latter consist of track extensions secured to the guides 2 in any substantial manner. The crank portions 24 of the rods 23 are preferably formed by bending parts of the rods into the form of a loop, the portions of the rods between the loops being journaled to the carrier in any manner, preferably by being mounted in the ribs 21. The open ends of the loops or crank portions 24 are adjacent to the respective pin-openings, thereby permitting the pins to readily pass through said openings in the operation of the apparatus.

The pin-guides coöperating with the car-

rier comprise complemental members 32 and 33, preferably arranged upon opposite sides of the carrier and grouped about the respective pin-openings, usually three complemental members being provided to a group, although the number may be varied. The guide members 33 appear as short legs and are pivotally connected at their upper ends to the under side of the carrier and are arranged with reference to the pin-openings and pins so as to touch the sides of the latter and insure their correct position upon the spots of the alley. The guide members 33 may be pivotally connected to the carrier in any manner to admit of their having a swinging movement at their lower ends. Each guide member 33 is provided with a spring-arm 34, firmly attached thereto and extended upward through an opening 35 of the carrier and having engagement at its upper end with the sliding guide member 32. The spring-arm 34 is preferably formed of wire, which is coiled intermediate of its ends, as shown at 36, to increase the resiliency of the arm. Each of the guide members 32 is slidably mounted upon the carrier and is formed with a longitudinal slot 37, through which passes a screw or like fitted fastening 38, by means of which the member is held in place and properly directed in its reciprocating or sliding movements. The end of the guide member 32 adjacent to the pin-opening 5 conforms thereto, as shown most clearly in Fig. 5, and is provided with a pendent portion 39 to enter the pin-opening and provide a sufficient extent of surface for contact with the pin to obviate injury thereto. When the carrier is clear of pins, the pivoted guide members 33 hang in an approximately vertical position, as indicated most clearly in Fig. 6, and the inner ends of the guide members 32 project a short distance into the pin-openings. When the pins pass through openings 5, their lower tapered ends coming in contact with the inner ends of the guide members 32 force them outward, thereby moving the upper ends of the spring-arms 34 away from the pin-openings and correspondingly forcing the lower ends of the guide members 33 inward, so as to engage with and bear against the sides of the lower portion of the pins to properly position and steady them, the guide members 32 and 33 assuming the relative positions as shown most clearly in Fig. 2.

Fig. 1 shows a pin spotter and setter constructed in accordance with this invention, the parts being shown in the relation which they assume when the carrier is elevated above the pin end 40 of the bowling-alley to receive the pins preliminary to placing them upon the spots of the alley-bed. It being assumed that the carrier is loaded with a set of pins and it being required to deposit the same upon the alley, the weights 10 are moved forward a slight distance to break the joint of the carrier, and the upper ends of the links 12 pass a perpendicular line extending through the axis of the shaft 6, when the carrier will descend by reason of excess of weight. As the carrier approaches the bed of the alley and the limit of its downward travel the stops 28 of the operating rods or bars 27 come in contact with the stops 29 and operate the pin-shifting mechanism by turning the rods 23, whereby the pins are arighted or turned from a recumbent into a vertical position, when by gravitative force they slip through the pin-openings 5 and settle upon the alley. As the pins pass through their respective openings 5 the guide members 32 are moved outward and the lower ends of the guide members 33 are forced inward by yielding pressure, due to the spring-arms 34, thereby centralizing and correctly positioning the pins upon the alley. At this time the weights 10 have moved from a pendent position into an upright position and the rock-shaft 6 has made a half-revolution, so as to throw the arm 15 from a forward position to a rearward position, with the result that the buffer 14 is subjected to tension both to ease the final downward movement of the carrier and to throw the weights 10 forward of a line passing vertically through the axis of the shaft 6, so as to give an initial impetus to the carrier on its upward movement when returning to a normal position. The action of the buffer when being momentarily subjected to tension and reacting to start the carrier on its return travel results in a pause in the movement of the carrier sufficient to steady the pins upon the alley and insure their correct position. As the carrier begins its ascent and the stops 28 of the rods 27 tend to move away from the stops 29 the pin-shifting mechanism automatically returns to a normal position, this being due to the weight of the crank portions 24, which incline sufficiently to cause them to gravitate when released from the pins and the action of the coöperating stops 28 and 29. When the carrier is relieved of the weight of the pins, it is automatically returned to a normal position by reason of the superior force of the weights or counterbalance 10. When the carrier begins its upward movement, the guide members 32 slide downward upon the rapidly-converged sides of the pins, thereby permitting the lower ends of the guide members 23 to swing outward, so as to clear the pins. Should it become necessary or a player demand the lowering of the carrier to assure correct spotting of the pins, the pendent position of the guide members 33 admits of their passing over the pins, and as the guide members 32 are moved outward the lower ends of the guide members 33 are pressed inward, thereby shifting any of the pins that may have become displaced. It is to be understood that under these conditions the carrier is lowered by overcoming the su-

perior weight of the counterbalance 10, which may be effected by hand, as by pulling upon the arms 8 or in any elective way.

Having thus described the invention, what is claimed as new is—

1. In apparatus for placing pins upon the bed of a bowling-alley, the combination of a carrier for receiving the pins and movable toward and from the bed of the alley, a variable counterbalance therefor, and connecting means between said carrier and counterbalance having a variable effective leverage.

2. In apparatus for placing pins upon the bed of a bowling-alley, the combination of a carrier for receiving the pins and movable toward and from the bed of the alley, a rod or bar pivotally supported between its ends, and normally occupying a vertical position, a weight attached to the pendent arm of said bar, and connecting means between the upper arm of said bar and the carrier.

3. In apparatus for placing pins upon the bed of a bowling-alley, the combination of a carrier for receiving the pins and movable toward and from the bed of the alley, a rock-shaft, bars fast to opposite end portions of the rock-shaft to turn therewith and comprising upper and lower arms, a weight attached to the lower arm of the bars, and connecting means between the upper arm of said bars and the carrier.

4. In apparatus for placing pins upon the bed of a bowling-alley, the combination of a carrier receiving the pins and movable toward and from the bed of the alley, a counterbalance for the carrier, and means for checking the movement of the carrier in each direction and serving to impart an initial movement to the carrier upon its return travel.

5. In mechanism for spotting and setting pins of a bowling-alley, the combination of a carrier movable toward and from the bed of the alley and adapted to receive the pins, a bar pivotally supported between its ends and normally occupying an approximately vertical position, a counterbalance connected to the lower arm of said bar, means connecting the upper arm of the bar with the carrier, and means operatively connected with said bar for easing the movement of the carrier in each direction and imparting an initial impetus thereto on its return travel.

6. In mechanism for spotting and setting pins of a bowling-alley, the combination of a carrier movable toward and from the bed of the alley and adapted to receive the pins, a rock-shaft having an arm projected therefrom, a counterbalance for the carrier connected with said rock-shaft to impart movement thereto, a buffer having connection at one end with the arm of the rock-shaft, and means loosely connecting the other end of the buffer with an overhead support and movable to adapt itself to the direction of strain as the buffer changes its angular direction.

7. In mechanism for spotting and setting pins of a bowling-alley, the combination of a carrier movable toward and from the bed of the alley and adapted to receive the pins, a rock-shaft, a counterbalance for the carrier having connection with said rock-shaft, an arm projected from the rock-shaft and fast thereto, and means having connection with said arm for easing the movement of the carrier in each direction of its travel and serving to give an initial impetus thereto on its return movement.

8. In mechanism for spotting and setting pins of a bowling-alley, the combination of a carrier movable toward and from the bed of the alley and adapted to receive the pins, a rock-shaft, bars fast to opposite end portions of the rock-shaft and normally occupying a vertical position, weights attached to the lower ends of said bars, means connecting the upper ends of the bars with said carrier, an arm fast to and projected from the rock-shaft, an overhead support and a buffer having one end connected to said arm and its opposite end loosely connected to said overhead support to move and admit of the buffer adapting itself to the direction of strain.

9. In a pin spotting and setting mechanism for bowling-alleys, the combination of a carrier provided with pin-openings and movable toward and from the bed of the alley, pin-shifting means comprising rods mounted upon the carrier to receive a rocking movement and having crank portions, and actuating means for rocking said rods for throwing the crank portions into an approximately upright position for arighting pins and effecting their discharge through said pin-openings.

10. In a pin spotting and setting mechanism for bowling-alleys, the combination of a carrier provided with pin-openings and movable toward and from the bed of the alley, rods journaled to the carrier and having portions bent into loop form to provide crank portions, and actuating means for turning the rods to throw the loop-shaped crank portions into an approximately upright position for arighting pins and effecting discharge thereof through said pin-openings.

11. In a pin spotting and setting mechanism for bowling-alleys, the combination of a carrier provided with pin-openings and movable toward and from the bed of the alley, rods journaled to the carrier and having crank portions for arighting and effecting discharge of the pins through said pin-openings, means connecting the rods for simultaneous movement, and actuating means for turning the rods.

12. In a pin spotting and setting mechanism for bowling-alleys, the combination of a

carrier provided with pin-openings and movable toward and from the bed of the alley, pin-shifting means mounted upon the carrier for effecting discharge of the pins upon the bed of the alley, and actuating means for said pin-shifting means comprising coöperating stops, the one connected with the pin-shifting means and the other with the overhead framework.

13. In a pin spotting and setting mechanism for bowling-alleys, the combination of a carrier provided with pin-openings and movable toward and from the bed of the alley, pin-shifting means mounted upon the carrier for effecting a discharge of the pins upon the bed of the alley, an operating-rod connected with the pin-shifting means and provided with a stop, and a corresponding stop projected from the overhead framework.

14. In a pin spotting and setting mechanism for bowling-alleys, the combination of a carrier provided with pin-openings and movable toward and from the bed of the alley, pin-shifting means mounted upon the carrier to effect delivery of the pins upon the bed of the alley, slotted extensions projected from the overhead framework, and operating-rods connected to the pin-shifting means and passed through the slots of said extensions and provided with stops to effect actuation of the pin-shifting means when the carrier has nearly reached the limit of its movement toward the bed of the alley.

15. In mechanism for spotting and setting pins of bowling-alleys, the combination of a carrier adapted to receive the pins and movable toward and from the bed of the alley and provided with pin-openings, and pin-guides for the openings of the carrier comprising upper and lower complemental parts or members arranged, respectively, above and below the carrier.

16. In mechanism for spotting and setting pins of bowling-alleys, the combination of a carrier adapted to receive the pins and movable toward and from the bed of the alley and provided with pin-openings, pin-guides for the openings of the carrier comprising upper and lower complemental parts or members, and spring connections between the complemental guide members.

17. In mechanism for spotting and setting pins of bowling-alleys, the combination of a carrier adapted to receive the pins and movable toward and from the bed of the alley and provided with pin-openings, pin-guides for the openings of the carrier comprising upper and lower members or parts, and connecting means between corresponding upper and lower members to effect a simultaneous movement thereof in opposite directions, said movement being controlled by the pins in their passage through the pin-openings.

18. In mechanism for spotting and setting pins of bowling-alleys, the combination of a carrier adapted to receive the pins and movable toward and from the bed of the alley and provided with pin-openings, pin-guides for the openings of the carrier comprising complemental upper and lower members, the upper members being slidably mounted and the lower members pivotally mounted, and connecting means between corresponding upper and lower members to effect simultaneous movement thereof in opposite directions.

19. In mechanism for spotting and setting pins of bowling-alleys, the combination of a carrier adapted to receive the pins and movable toward and from the bed of the alley and provided with pin-openings, pin-guides for the openings of the carrier comprising complemental members, one set of said members being arranged above the carrier and the other set located below the carrier, and connecting means between corresponding upper and lower members extended across the plane of the carrier to effect simultaneous movement of said members in opposite directions.

20. In mechanism for spotting and setting pins of bowling-alleys, the combination of a carrier adapted to receive the pins and movable toward and from the bed of the alley and provided with pin-openings, pin-guides for the openings of the carrier comprising upper slidable members and lower pivoted members, and spring-arms attached to the pivoted members and extended through openings of the carrier and engaged with the sliding members, whereby corresponding members receive a simultaneous movement in opposite directions and are controlled by the pins in their passage through the pin-openings.

21. In mechanism for spotting and setting pins of bowling-alleys, the combination of a carrier adapted to receive the pins and movable toward and from the bed of the alley and provided with pin-openings, movable pin-guides mounted upon the carrier and having their inner end portions extended into the respective pin-openings to be engaged by the pins, and spring means normally tending to press the movable pin-guides inward.

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

JOHN C. BACKUS. [L. S.]

Witnesses:
J. D. YOAKLEY,
V. B. HILLYARD.