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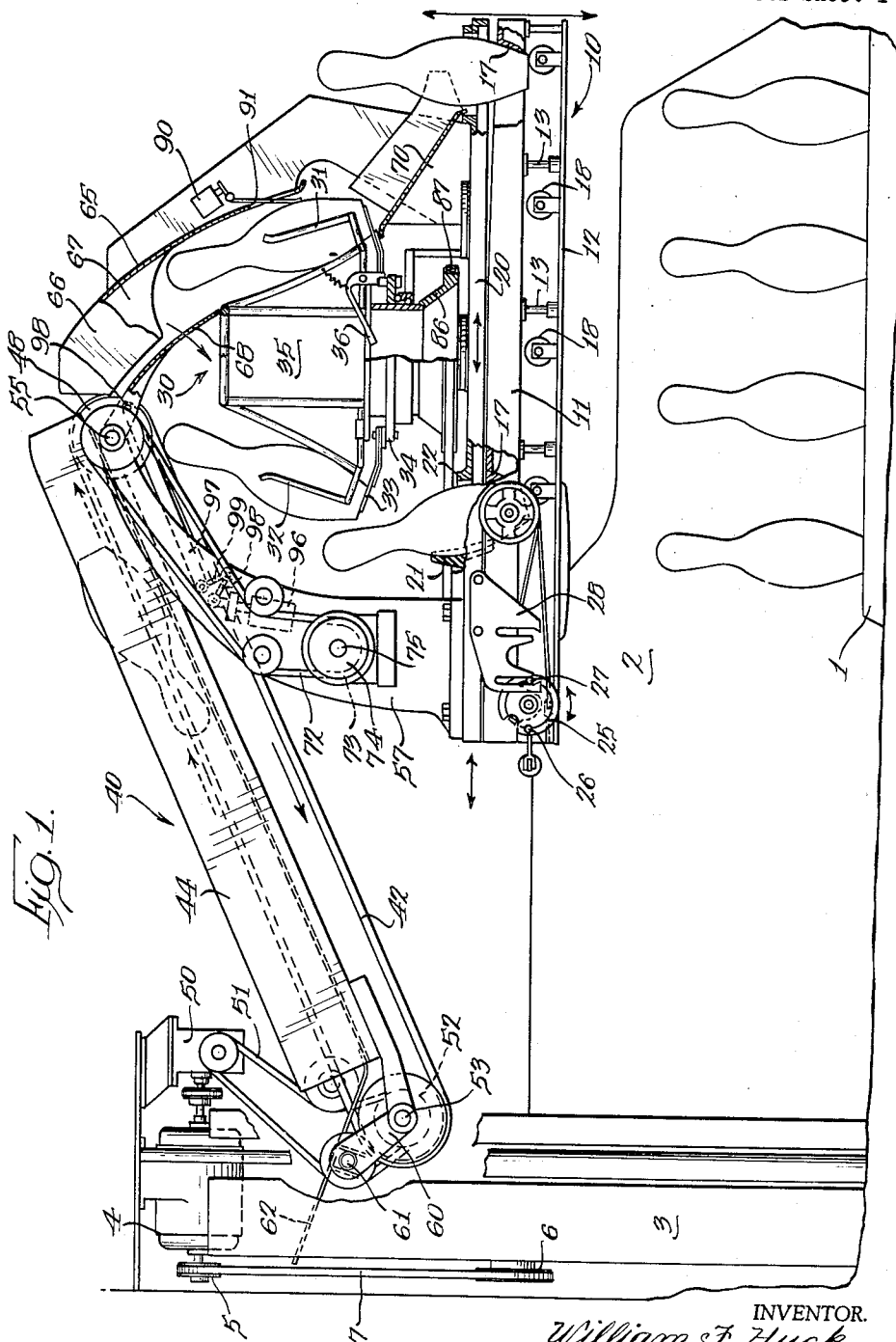
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2,941,804

BOWLING PIN HANDLING MECHANISM

Filed Feb. 11, 1958

3 Sheets-Sheet 1



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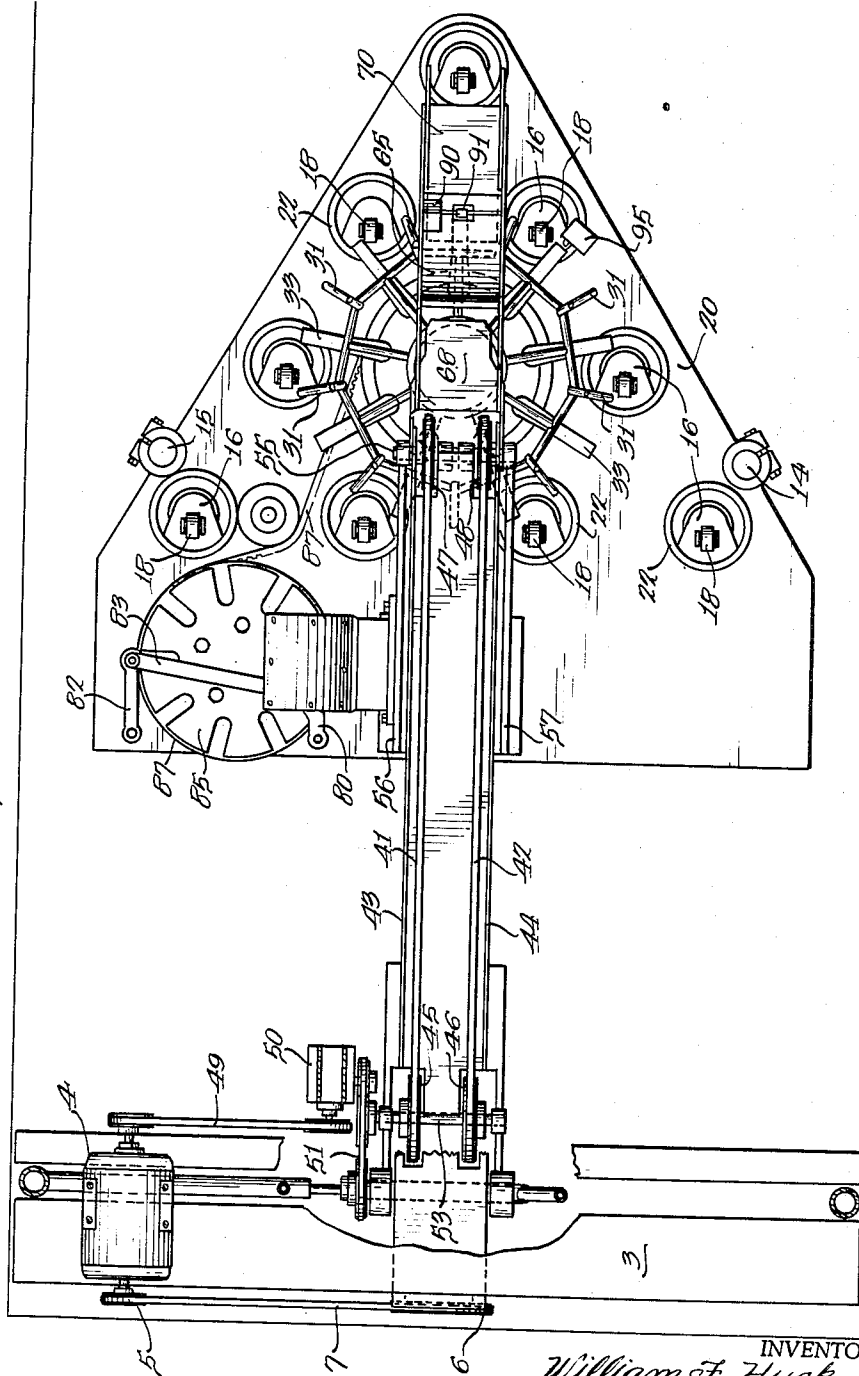
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FIG. 2.



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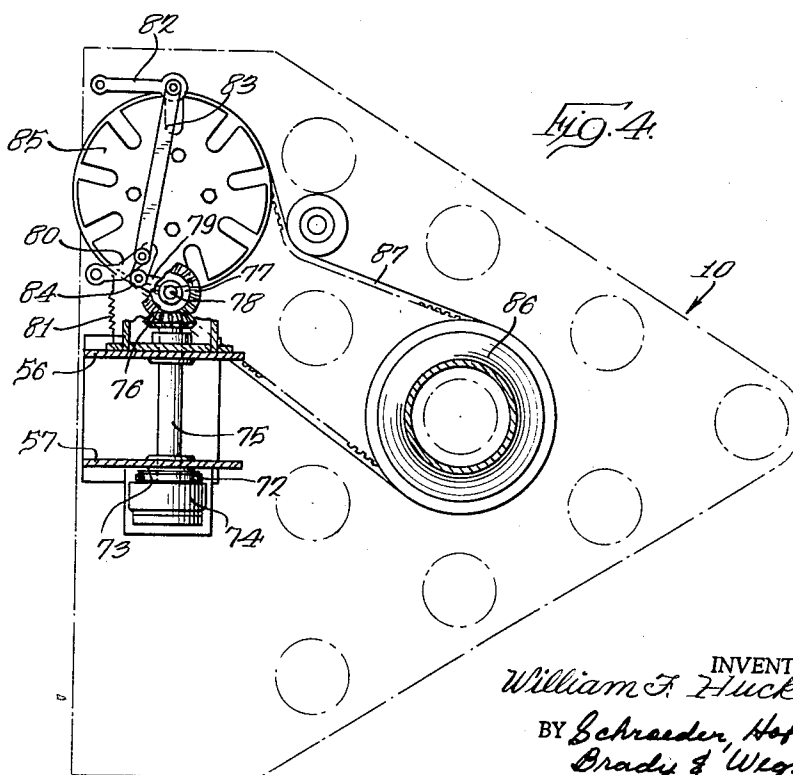
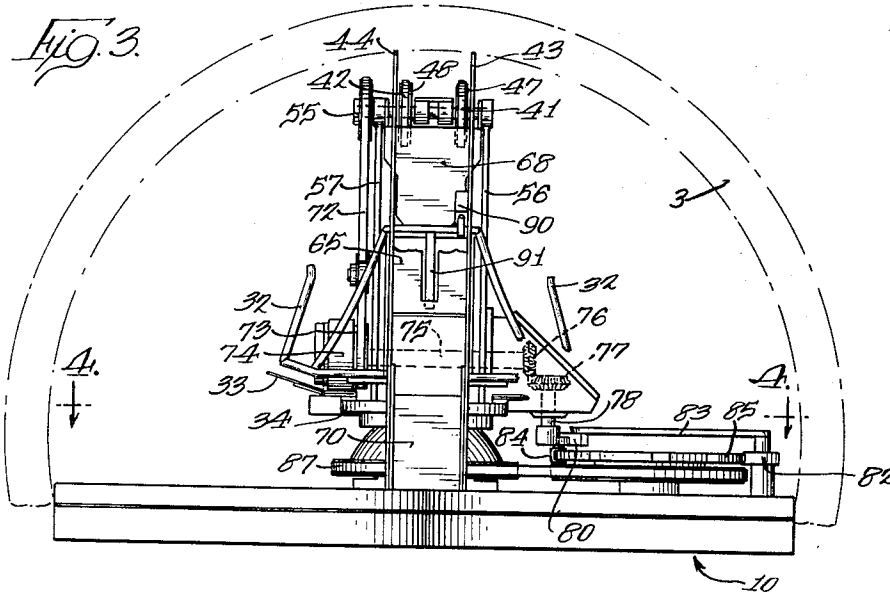
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3 Sheets-Sheet 3



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BOWLING PIN HANDLING MECHANISM

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5 Claims. (Cl. 273—43)

This invention relates to automatic pinsetters and more particularly to bowling pin handling mechanism for an automatic pinsetter.

An object of this invention is to provide new and improved pin handling mechanism for an automatic pinsetter.

An object of the invention is to provide pin handling mechanism in which a pin deck for setting and resetting bowling pins is movable up and down relative to an alley bed and has mounted thereon means for collecting pins one by one at a pin receiving station and simultaneously discharging a set of pins therefrom to said pin deck, and means for delivering pins one by one to said pin collecting means in any position of said deck.

Still another object of the invention is to provide a pin handling mechanism as defined in the preceding paragraph wherein the pin collecting means comprises an indexible turret having a plurality of pockets arranged to generally overlie triangularly arranged pockets in the pin deck whereby discharge of a set of pins from the turret causes pins to move into the pockets in the pin deck, and wherein said means for delivering pins to the collecting means includes a cross conveyor mounted at its discharge end for up and down movement with the turret and arranged to drop pins successively into succeeding turret pockets located at the pin receiving station.

Further objects and advantages will become apparent from the following detailed description taken in connection with the accompanying drawings in which:

Fig. 1 is a fragmentary side elevational view of an automatic pinsetter in association with a bowling alley.

Fig. 2 is a fragmentary plan view of the structure shown in Fig. 1.

Fig. 3 is an end view in elevation of the pin-setter mechanism looking toward the right in Fig. 1; and

Fig. 4 is a plan view taken generally along the line 4—4 in Fig. 3.

While this invention is susceptible of embodiment in many different forms, there is shown in the drawings and will herein be described in detail an embodiment of the invention with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiment illustrated. The scope of the invention will be pointed out in the appended claims.

As shown in Fig. 1, a bowling alley has an alley bed 1 with which are associated a pair of kickbacks at opposite sides thereof with one of the kickbacks indicated at 2. Components of the automatic pinsetter include a pin elevating wheel shown diagrammatically at 3 mounted across the rear end of the alley which is driven from a motor 4 by pulleys 5 and 6 and an interconnecting belt 7.

Means for setting and resetting pins on the alley bed 1 includes a pin deck indicated generally at 10 which comprises a main deck 11, a lower deck 12 connected thereto by brace members 13 and having a pair of upstanding arms 14 and 15 (Fig. 2). The upstanding arms 14 and

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15 connect to well-known mechanism (not shown) supporting the pin deck 10 for up and down movement relative to the alley bed 1.

The pin deck has ten generally triangularly arranged pockets 16 (Fig. 2) with each pocket having a rearwardly facing shoe 17 fixed to the main deck 11 and a pin supporting roller 18 upstanding from the lower deck 12 to support a pin in a pocket.

The pin deck 10 has an upper deck 20 slidably mounted on the main deck 11 for lateral forward and rearward movement relative to the main deck. The upper deck 20 has a forwardly facing shoe 21 in opposed relation to the shoe 17 for each pocket and has a collar 22 spaced from the shoe 21 adapted to surround a bowling pin. The collar 22, shoes 17 and 21, and roller 18 all coact to support a pin in a pocket in the pin deck 10 and rearward movement of the upper slidable deck 20 causes rearward movement of the collars 22 to carry the pins in the pin deck rearwardly to positions off the supporting rollers 18 so that pins may drop through openings (not shown) in the lower deck 12 onto the alley bed 1 when the pin deck 10 is disposed adjacent thereto.

The means for moving the slidable deck 20 relative to the main deck 11 includes a cable operated wheel 25 having a pair of pins 26 and 27 which coact with a slotted plate 28 affixed to the slidable deck 20. With the parts as shown in Fig. 1, rotation of the wheel 25 will cause the pins 27 and 26 in succession to carry the slotted plate 28 and the slidable deck 20 toward the rear to shift bowling pins off the supporting deck rollers 18 so that pins may be set on the alley bed.

The lower deck 12 may carry suitable mechanism (not shown) for picking up and resetting standing pins such as shown in Patent No. 2,817,528.

Means for collecting a set of pins one by one and discharging a set of pins into the pockets 16 in the pin deck 10 comprises a turret indicated generally at 30 which is rotatably mounted on the upper deck 20 of the pin deck 10 so as to have up and down movement with the pin deck and back and forth movement with the upper slidable deck 20. As shown particularly in Fig. 2, the turret has a bent rod structure in which adjacent rod sections 31 define a pocket space therebetween so that a pin will be confined by these sections and rest upon an arm 33 of a pin supporting spider mechanism 34. There are spaced apart rod sections 31 sufficient in number to provide nine equally spaced turret pockets about the periphery of the turret and there are a total of nine spider arms 33 for supporting pins in the pockets. The turret 30 has a tenth centrally located pocket 35 for receiving a tenth pin and upon entry of a tenth pin therein an arm 36 (Fig. 1) is engaged to release the spider 34 for movement relative to the turret pockets whereby a set of pins may drop from said pockets into the pockets in the pin deck 10.

Means are provided for directing pins successively from the pin elevating wheel 3 forwardly to the turret 30 comprising a cross conveyor indicated generally at 40 having a pair of spaced apart endless belts 41 and 42 which advance pins butt end first along a confining frame including upstanding sides 43 and 44. The rear ends of the belt 41 and 42 pass around pulleys 45 and 46 while the forward ends of the belts pass around pulleys 47 and 48. The rear pulleys 45 and 46 are driven from the motor 4 through a belt 49 and a speed reducer unit 50 which drives a belt 51 passing around a pulley 52 mounted on a drive shaft 53 for the rear drive pulleys 45 and 46.

The forward drive pulleys 47 and 48 have their mounting shaft 55 supported by a pair of spaced arms 56 and 57 upstanding from the upper slidable deck 20. In

order that the cross conveyor 40 may travel up and down with the turret 30 and also travel in a forward and rearward direction with the turret 30 and slidable deck 20 the rear end of the cross conveyor is movably mounted. This mounting includes a pair of arms 60 one of which is shown in Fig. 1 for supporting the rear pulley drive shaft 53 and the arms are pivotally mounted on the shaft 61 supported from the machine framework.

As pins come up singly in the pin elevating wheel 3 they discharge onto a tray 62 which functions to turn pins to place them butt end first and pins are successively advanced by the cross conveyor 40 to the forward end thereof and discharged therefrom at a pin receiving station for the turret 30. At the pin receiving station the peripherally spaced turret pockets are advanced successively into alignment with guide members 65, 66, and 67 forming a chute leading to a pocket and this guiding is facilitated by a movable ramp plate 68. Entry of a pin into the pocket results in indexing the turret to present a succeeding pocket to the pin receiving station by means hereinafter described. After the nine peripheral pockets have received pins the ramp plate 68 is pivoted in a clockwise direction as viewed in Fig. 1 so as to direct a tenth pin into the central pocket 35 overlying the deck pocket 16 for the No. 5 pin with resultant tripping of the arm 36 to free the spider 34 so that the ten pins in the turret may drop into the pockets 16 in the pin deck 10. A guide plate 70 is mounted on the upper slidable deck 20 to facilitate guiding of a pin from a turret pocket into the pin deck pocket 16 for the No. 1 pin.

The means for indexing the turret includes a drive taken from the forward drive shaft 55 for the cross conveyor pulleys by a belt 72 driving the pulley 73 connected to an electric clutch 74 which functions to impart a single revolution to an output shaft 75 which by bevel gears 76 and 77 drives a shaft 78. The shaft 78 has a first arm 79 mounted thereon which functions to engage a pivoted arm 80 and move the arm against the action of a spring 81 to shift outwardly a lock arm 82 for a Geneva drive through connecting link 83. A Geneva driver 84 is also connected to the shaft 78 and functions with a Geneva wheel 85 to drive a turret pulley 86 through a connecting belt 87.

The operation of the electric clutch 74 is controlled by an actuator switch 90 having a feeler 91 in position to be engaged by a pin entering a turret pocket. The switch 90 is connected to the electric clutch 74 by a circuit (not shown).

A ramp actuator switch 95 is mounted on the upper deck 20 and is closed by engagement with a part of the turret when the eighth peripheral turret pocket has received a pin. The switch 95 is in circuit with the switch 90 so that when switch 95 is closed, switch 90 is ineffective and the entry of a ninth pin into its pocket and operation of the switch 90 will not result in operating the electric clutch 74. With both the switches 90 and 95 closed after a ninth pin has entered its turret pocket, a solenoid 96 will be energized to operate a link 97 through connecting links 98 and 99 and the link 97 is connected to the ramp plate 68 by a pivot pin 98 whereby the ramp plate 68 will pivot in a clockwise direction, as viewed in Fig. 1, to align the ramp plate with and direct a tenth pin into the central turret pocket 35.

In operation the pin elevating wheel 3 and cross conveyor 40 will be directing pins to the turret 30 so long as pins are discharged into the pit of the alley. The turret 30 will function to receive these pins one by one for subsequent discharge of a set of the pins to the pin deck 10 during up and down movement of the pin deck and in any vertical position thereof. This operation is facilitated by movement of the cross conveyor with the turret 30.

With entry of successive pins into the peripheral tur-

ret pockets between the rod sections 31, the receipt of nine pins therein will result in closing both switches 90 and 95 to pivot the ramp plate 68 and entry of a tenth pin into the central pocket 35 will operate the trip arm 36 to release the spider 34 whereby the spider 34 moves in a known manner relative to the rod sections 31 forming the turret pockets to permit simultaneous discharge of ten pins into the pin deck 10. Subsequent return of the spider 34 to its normal position relative to the other turret parts actuates a switch (not shown) to energize the electric clutch 74 and index the turret 30 to a position to receive the first pin of a new set.

The pins that have been received in the pin deck 10 may be discharged from the pin deck 10 when in a lowered position by operation of the wheel 25 in the manner previously set forth. This operation entails rearward movement of the upper slidable deck 20 which carries the turret 30 therewith as well as the cross conveyor 40. The cross conveyor is free to move by the pivotal mounting of the cross conveyor adjacent its rear end about the pivot shaft 61. The cross conveyor having its forward pulley drive shaft 55 carried on the brackets 56 and 57 upstanding from the upper slidable deck 20 causes the cross conveyor to maintain a fixed position relative to the turret and its pin receiving station so that pins may leave the cross conveyor and enter the turret 30 in any spatial position of the turret 30.

I claim:

1. Bowling pin handling mechanism comprising, means for setting and resetting pins on an alley bed including a main deck mounted for up and down movement relative to an alley bed and a second deck carried on said main deck and laterally slidably mounted thereon having ten triangularly arranged pin receiving pockets, means for collecting a set of pins for transfer to said deck pockets including a turret mounted on said second deck for indexing movement relative thereto and sliding movement therewith relative to the main deck, said turret having nine circularly arranged pockets and a tenth central pocket arranged to generally overlie the deck pockets, indexing mechanism for presenting the circularly arranged pockets successively to a pin receiving station, a cross-conveyor for delivering pins successively to the pin receiving station having its discharge end operatively connected to said second deck, means mounting the cross-conveyor for movement whereby the discharge end of the cross-conveyor travels with the second deck, a ramp plate having a first position directing pins to said circularly arranged turret pockets and a second position to direct a pin to said central turret pocket, means for shifting the ramp plate, and means for dropping a set of pins from the turret pockets into said deck pockets.

2. Bowling pin handling mechanism comprising, means for setting pins on an alley bed including a deck mounted for up and down movement relative to an alley bed and pin receiving pockets, means for collecting a set of pins for transfer to said deck pockets including a turret mounted on said deck for indexing movement relative thereto, said turret having a plurality of circularly arranged pockets and a central pocket arranged to generally overlie the deck pockets, indexing mechanism for presenting the circularly arranged pockets successively to a pin receiving station, a cross-conveyor for delivering pins successively to the pin receiving station, means mounting the cross-conveyor for up and down movement with the deck, a ramp plate at the pin receiving station having a first position directing pins to said circularly arranged turret pockets and a second position to direct a pin to said central turret pocket, and means for shifting the ramp plate.

3. Bowling pin handling mechanism comprising, a first means for setting and resetting pins on an alley bed including a deck mounted for up and down movement relative to an alley bed and having ten triangularly arranged

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pin receiving pockets, means for collecting a set of pins for transfer to said deck pockets including a turret mounted on said deck for indexing movement relative thereto, said turret having a plurality of pockets arranged to generally overlie the deck pockets, indexing mechanism for presenting the pockets successively to a pin receiving station, means for conveying pins one by one to said pin receiving station in any vertical position of the deck including a cross-conveyor, and means for dropping pins from the turret into said deck pockets.

4. A pinsetting apparatus comprising, a deck movable up and down for setting and resetting pins on an alley, means on said deck for holding a set of pins preparatory to setting pins on the alley bed, means on said deck for collecting one by a set of pins for simultaneous discharge to said holding means, and means for conveying pins

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one by one to said collecting means in any vertical position of said deck.

5. A pinsetting apparatus comprising, a deck movable up and down for setting and resetting pins on an alley, means on said deck for setting pins on an alley bed, means on said deck for collecting one by one a set of pins for simultaneous discharge to said setting means, and means mounted in fixed relation to said collecting means for conveying pins one by one to said collecting means in any position of said deck.

References Cited in the file of this patent

UNITED STATES PATENTS

1,524,241	Hedenskoog	Jan. 27, 1925
2,015,428	Hedenskoog	Sept. 24, 1935
2,736,554	Fluke et al.	Feb. 28, 1956
2,767,984	Zuercher	Oct. 23, 1956