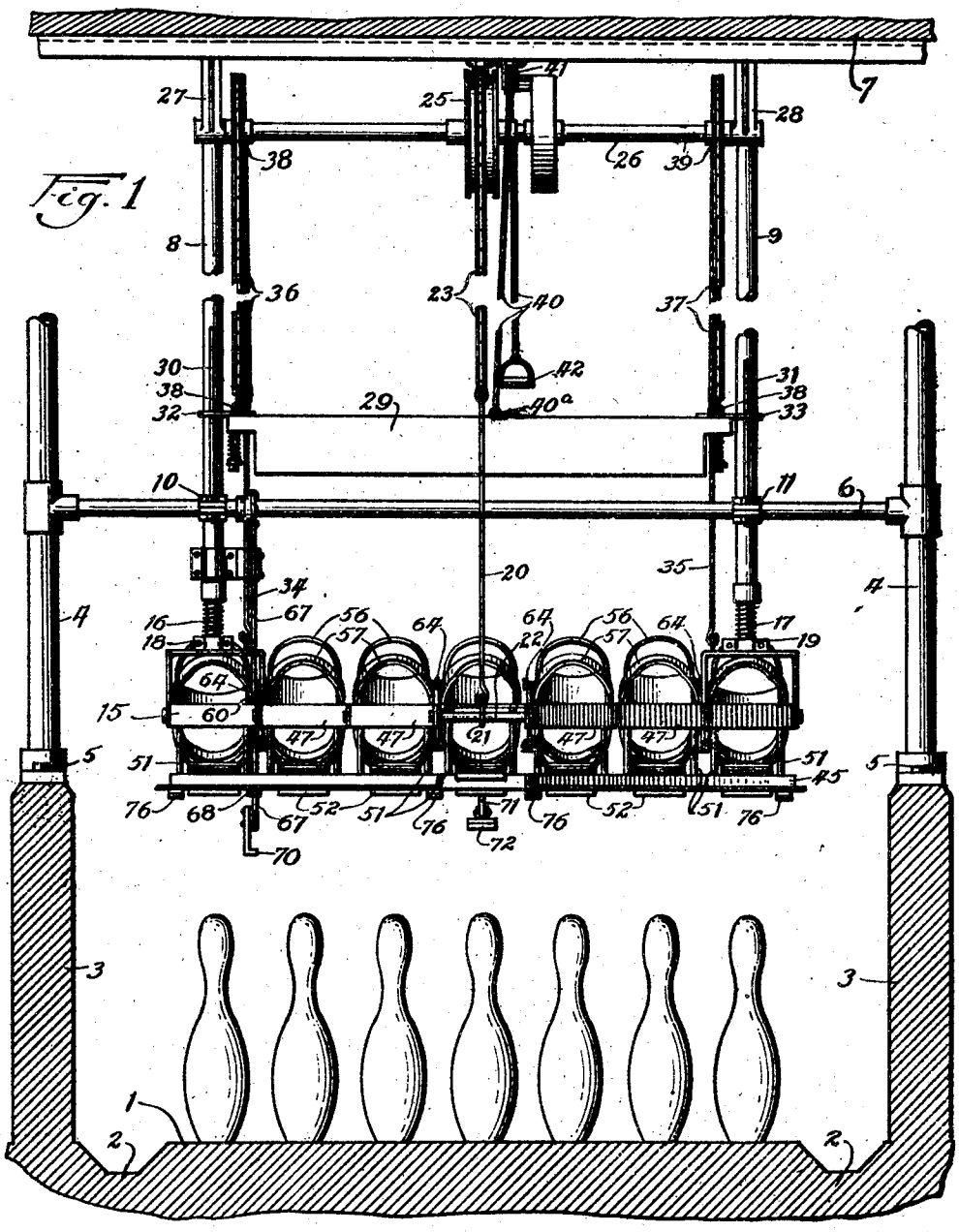
Aug. 31, 1926. 1,597,974

E. HEDENSKOOG

PIN SETTING MACHINE FOR BOWLING ALLEYS

Filed April 23, 1924 5 Sheets-Sheet 1

Fig. 1



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Filed April 23, 1924 5 Sheets-Sheet 2

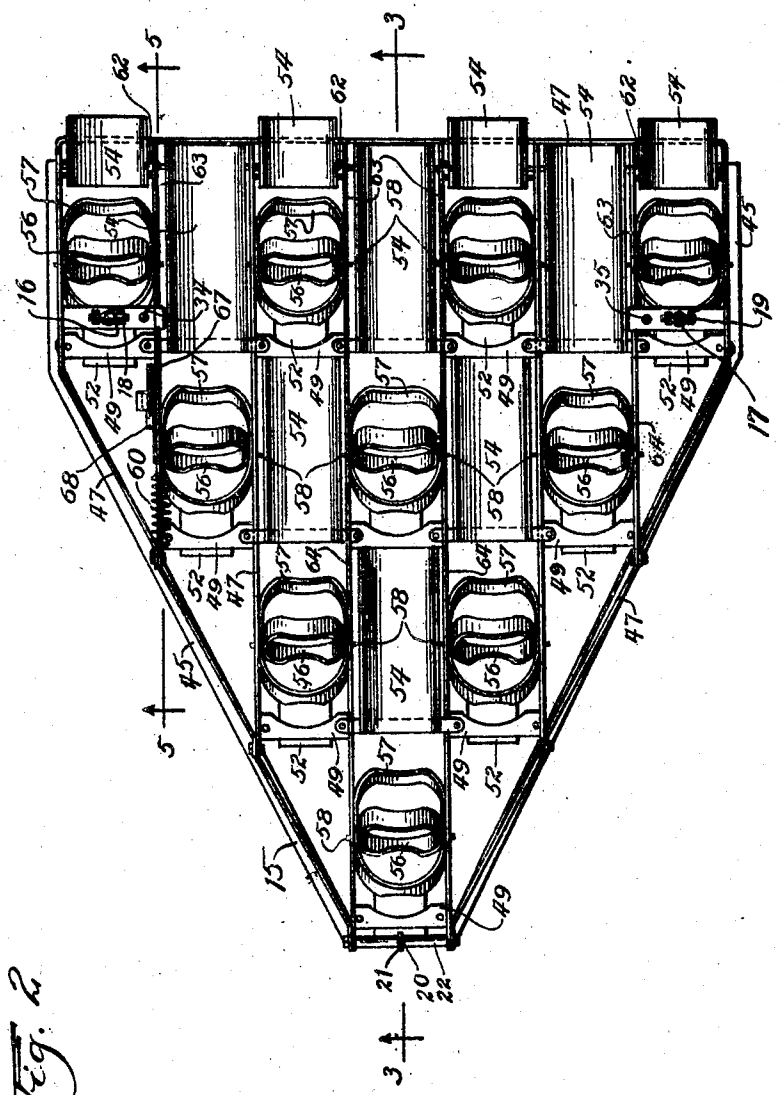

Fig. 2

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Filed April 23, 1924 5 Sheets-Sheet 3

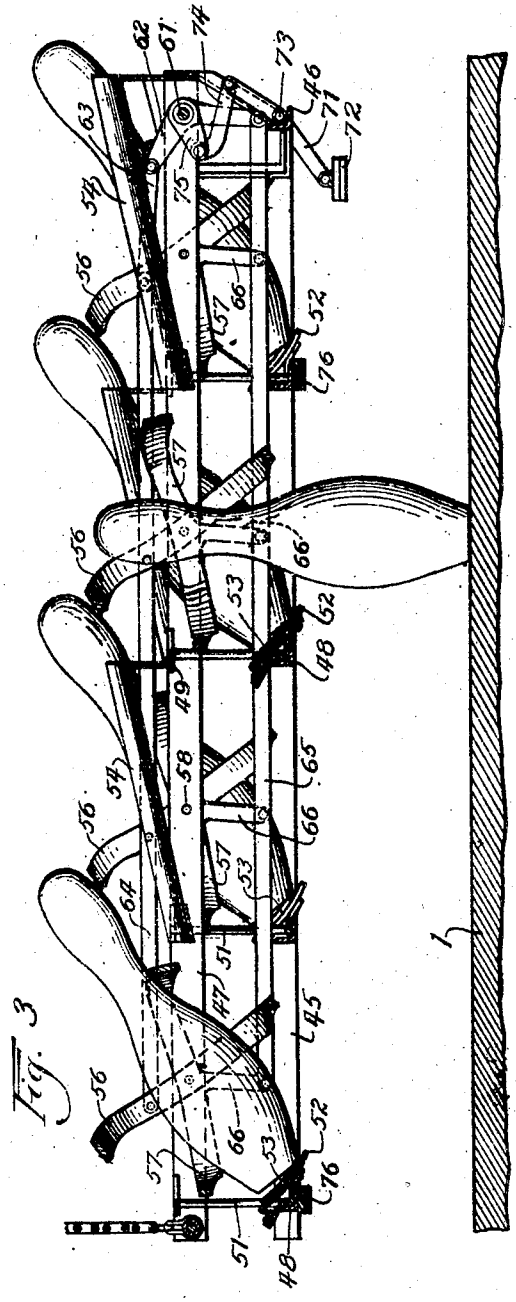

Fig. 3

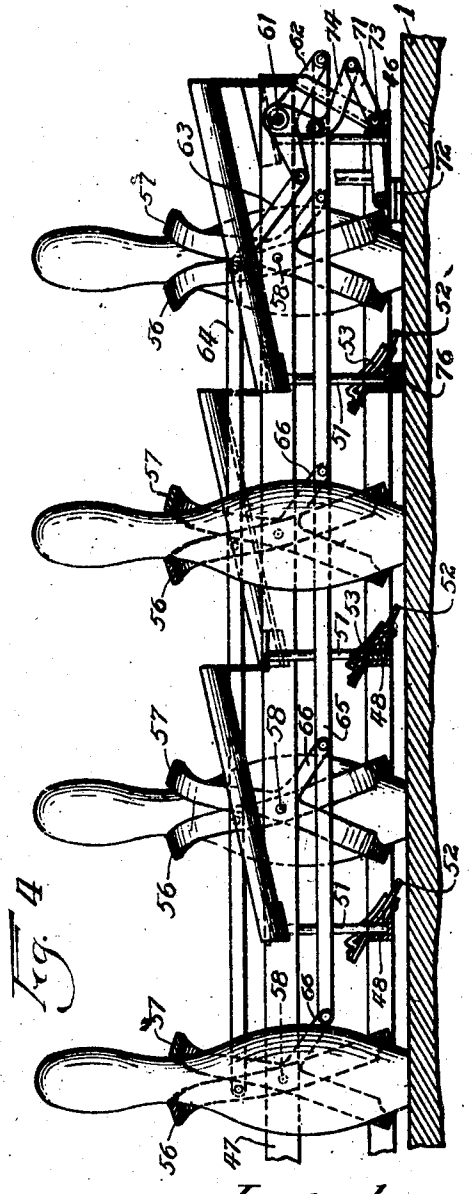

Fig. 4

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PIN SETTING MACHINE FOR BOWLING ALLEYS

Filed April 23, 1924 5 Sheets-Sheet 4

Fig. 5

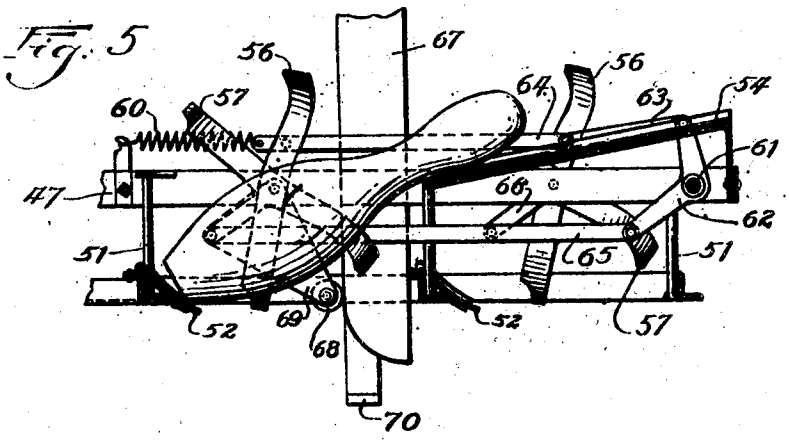


Fig. 6

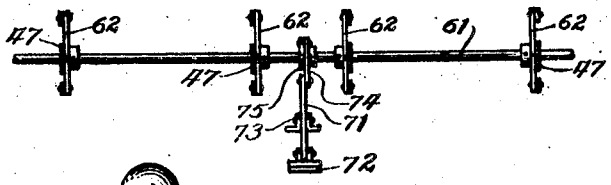
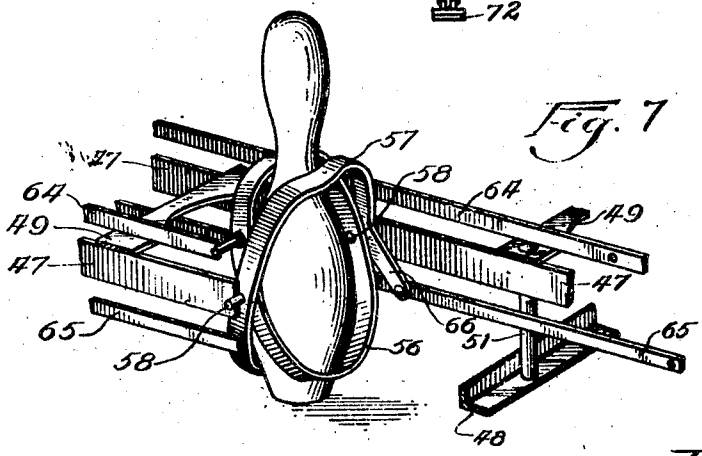


Fig. 7



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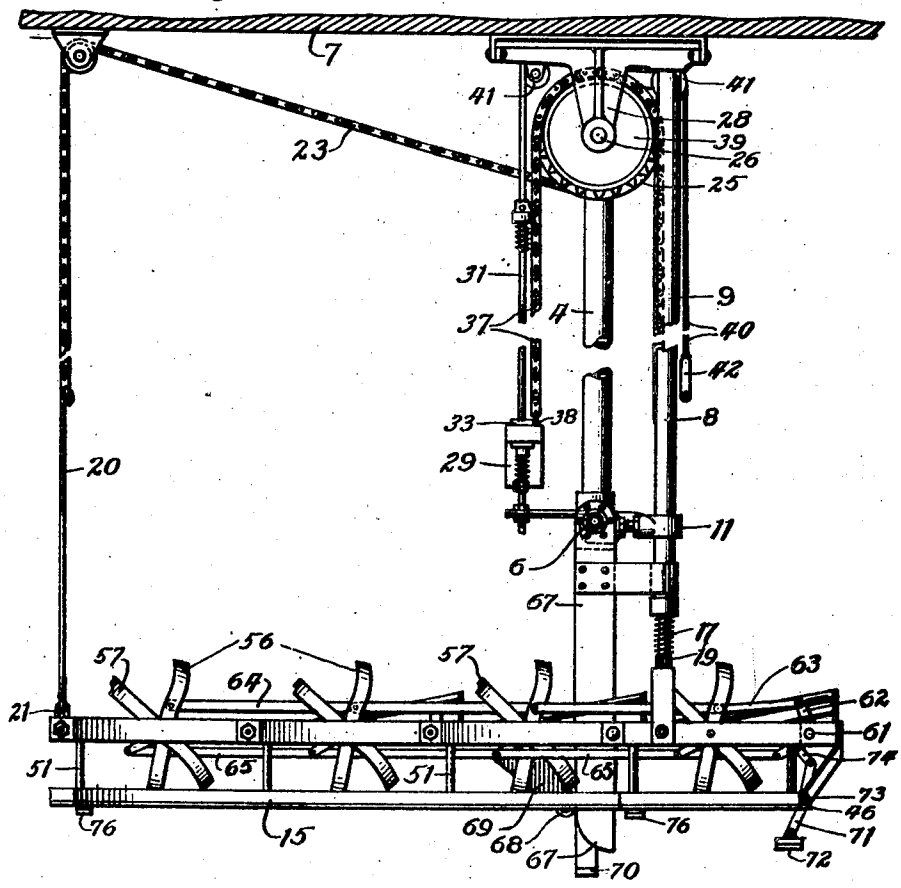
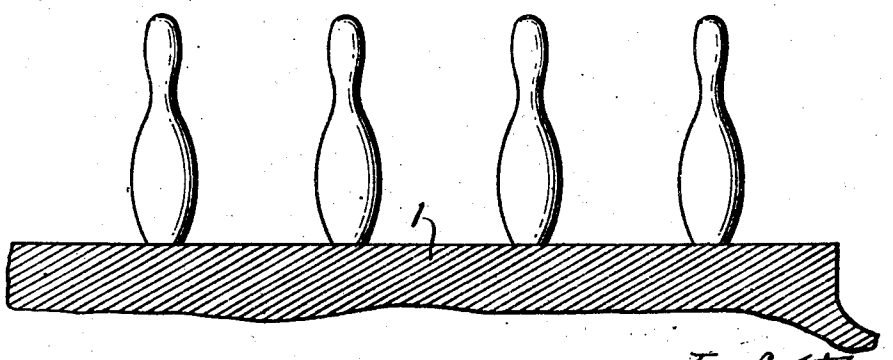
Filed April 23, 1924 5 Sheets-Sheet 5

Fig-8





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Patented Aug. 31, 1926. 1,597,974

UNITED STATES PATENT OFFICE.

ERNEST HEDENSKOOG, OF MUSKEGON, MICHIGAN, ASSIGNOR TO BRUNSWICK-BALKE-COLLENDER COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE.

PIN-SETTING MACHINE FOR BOWLING ALLEYS.

Application filed April 23, 1924. Serial No. 708,442.

The invention relates to pin-setting machines for bowling alleys and which are adapted to place the pins in the desired playing arrangement upon the bowling alley beds.

The pin setting machines in use prior to my invention have usually been provided with parts of relatively frail construction extending below the main body of the setter frame in position to be damaged by pins flying up thereagainst in play upon the alley and also by the inadvertent lowering of the frame when a ball is approaching the alley pit.

A principal object of my invention is the provision of a pin setting machine of improved action and which will be devoid of parts readily damaged by play upon the alley or in manipulation of the setter frame in connection with such play.

Another object of my invention is the provision of a machine that will be silent in its action.

An important object of the present invention is to provide a pin-setting machine having pin-engaging portions designed to engage the pin bodies above and below their portions of greatest diameter, i. e. at points where practically no wear occurs, and to thereafter accurately position the same upon the spots of alley beds.

A further object of the invention is to provide a pin-setting machine having pin-receiving pockets of such construction, that accidental falling of the pins to the alley bed, prior to their being positioned on the spots is effectually prevented.

A further object of the invention is to provide a machine of the character described, which may be conveniently and rapidly operated by a single attendant and which is entirely automatic in its operation of positioning the pins upon the spots after the pins have been placed in the receiving pockets of the apparatus.

A further object of the invention is to provide a pin-setting machine which will operate to replace upon the spots, pins which have been knocked down without interfering with, or necessitating the removal of pins which have been left standing upon the spots from a prior pin-setting operation.

A further object of the invention is to provide a pin-setting machine which is so designed as to accurately position upon the spots, pins which have been left standing from a prior operation, and which have been accidentally moved slightly off the spots and out of proper alinement, said repositioning operation taking place coincident with the replacement of pins which have been knocked down and thereafter placed in the proper pin-receiving pockets of the apparatus.

A further object of the invention is to provide a pin-setting machine adapted to be readily installed in a standard bowling alley, parts of which are of sturdy construction and comprise a minimum number of relatively movable members.

Numerous other objects and advantages of the invention will be apparent as the same is understood from the following descriptions, which taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

On the drawings,

Figure 1 is a front elevation of a pin-setting machine constituting a preferred embodiment of the invention and showing the same in its assembled arrangement on a standard bowling alley;

Fig. 2 is a plan view of the pin-receiving and positioning frame;

Fig. 3 is an enlarged longitudinal vertical sectional view on line 3—3 of Fig. 2, illustrating a subsequent position of the pin-engaging and positioning rings;

Fig. 4 is a similar view showing the position of the frame and the mechanism carried thereby, in its operation of positioning the pins upon the alley bed;

Fig. 5 is a similar view of the frame and the pin receiving pockets, taken on line 5—5 of Fig. 2, showing the frame and mechanism carried thereby in position to receive pins;

Fig. 6 is a detail view of the operating shaft;

Fig. 7 is a perspective view illustrating the manner of engaging the pins above and below the portion of greatest diameter as the same are being positioned upon the spots; and

Fig. 8 is a side view showing the device in uppermost or normal position after setting, and in position to receive the pins.

Referring to the drawings the apparatus is illustrated as being used in conjunction

with a bowling alley having the usual bed 1, gutters 2, and side walls or partitions 3. The manner of supporting the pin-receiving and positioning frame forms no part of the present invention and may be of any usual or preferred arrangement. As illustrated, a pair of upright posts or standards 4 are secured as at 5 to the partitions 3 and are connected by a transverse brace or rod 6. The ceiling is shown at 7 and suitably secured thereto are a pair of depending tubular rods or members 8 and 9 which are secured at their lower ends by means of suitable brackets 10 and 11 to the transverse member 6.

The pin receiving and positioning frame is indicated as an entirety at 15 and as shown in Fig. 2 is substantially triangular in shape to conform to the arrangement of the spots on the bowling alley bed. The frame 15 is supported for vertical reciprocatory movement above the alley bed by means of vertical rods 16 and 17, slidably contained within the tubular members 8 and 9 and secured at their lower ends as at 18 and 19, to the frame. A pair of cushioning springs are disposed on the reciprocating rods 16 and 17, and between the lower ends of the tubular members 8 and 9 and the frame, and the purpose of which is to cushion the frame at the conclusion of the upward movement of the rods 16 and 17 within the tubular members 8 and 9.

The frame is supported for vertical movement at its front and by means of a preferably rigid member or link 20, removably connected at its lower end with a link 21, fixed to a horizontal sleeve member 22, bolted or otherwise secured to the frame 15. The upper end of the rod 20 is connected to a sprocket chain 23 which passes over a pulley hung from the ceiling 7 and passing therefrom to and around a winding drum 25 disposed substantially centrally of a transverse shaft 26 journaled at each end in suitable hangers 27 and 28 secured to the ceiling 7.

A counterweight 29 is suitabliy guided for vertical movement by means of guide rods 30 and 31 extending upwardly from the brackets 10 and 11, and which guides suitably engage the pair of extensions 32 and 33 secured to the counterweight at each end thereof. A pair of vertically disposed rods or attaching members 34 and 35, similar to the rod 20, are removably secured at their lower ends to either side of the rear portions of the frame 15 and are connected at their upper ends to a pair of chains or cables 36 and 37. The latter are carried over sprocket wheels 38 and 39 fixed on the shaft 26 adjacent the hangers 27 and 28, and the opposite ends of the chains 36 and 37 secured as at 38 to the counterweight 29. A rope or cable 40 is secured at one end, as at 40^a, to substantially the center portion of the counterweight, passes over a pair of pulleys carried in brackets 41 attached to the ceiling 7, and terminates at its other end in a handle 42.

The counterweight 29 is of a size sufficient to overbalance the weight of the frame 15 and a set of pins contained therewithin. When it is desired to lower the frame 15 to position the pins upon the alley bed in a manner hereinafter described, the operator pulls downwardly on the handle 42 thereby raising the weight 29 on its guides 30 and 31, and the relief of this weight 29 allows the frame 15, containing the pins to be spotted, to descend by gravity, being guided in this action by the tubular members 8 and 9 and the chain 23 pays out and downwardly from the drum 13. As soon as the pins have been positioned on the alley bed the attendant releases the handle 42 and the resulting downward movement of the weight 29 raises the empty frame 15 to the position illustrated in Fig. 1.

The apparatus above described for raising and lowering the frame 15 is of usual or standard construction. As the same forms no part of the present invention it has not been illustrated in detail and has been described only to an extent necessary to illustrate the manner of raising and lowering the frame 15.

The vertically movable pin setter frame is of skeleton construction, having lower outer side bars 45 and lower end bar 46 of angle iron construction, upper side and end bars 47 and cross members 48 and 49. The frame is fabricated of these structural parts into a lower triangular frame part and an upper triangular frame part, the two parts being held permanently into desired vertically spaced relation by upright members 51, which may be bolts, rivets or the like. A series of pin-receiving pockets are arranged in the frame in accordance with the spots of the alley bed. The bottom of the pins received in the frame rest on pin-bottom seats 52 carried by appropriate cross-members 48. These pin-bottom seats consist of flat metal sheets curved slightly as shown in Figure 5 and provided with cushions 53 upon their upper faces. When the pins are received by the pin-setter frame, which occurs when the frame is in its upper position, the heads of the pins rest upon the lower end of pin slides or chutes 54 extending above the upper frame part and inclined downwardly from the rear of the frame toward the player's end.

The pin slides are of sheet metal curved transversely to direct the pins into the received position as shown in Fig. 5 above mentioned.

At each pin-receiving position or pocket two pivoted ring members 56 and 57 are pivoted together at 58 and at the same point

in intermediate frame members 47 at the top of the frame. These ring members arrange the pins for spotting on the alley bed and then place them accurately in position, all as will be presently described. The pins as received in the pockets are in inclined or reclining position, with the pins disposed through the two rings of the individual pocket. Slightly prior to this point, which is at the top of the setter frame travel, the rings are automatically moved to provide the wide passage through them shown in Fig. 5.

All of the rings 56 are linked together for conjoint movement and the same is true of the rings 57, and the two sets of rings move oppositely in the setting action of the pin-setter.

A shaft 61 is mounted to rock in the top frame parts 47 at the rear of the machine. This shaft has a number of bell cranks upon it fixed to rock with the shaft, these bell cranks being indicated by 62. The bell cranks are arranged between pin positions, viewed lengthwise of the alley, and the upper arm of each is connected by a link 63 with a bar 64, passing alongside a set of ring members 56 and pivoted thereto above their pivots in the frame. The other or downwardly extending arm of the bell crank is connected to a bar 65 arranged alongside the set of rings 57, each of which is provided with a downwardly extending arm 66 to pivotally engage with the bar 65 below the pivotal connection of the ring members in the frame. The ring members are swung to the position shown in Fig. 5 to receive the pin when the frame arrives at upper or pin-receiving position by a fixed cam 67 arranged to extend down from the cross-bar 6. This cam is engaged by a roller 68 carried on a plate 69 in turn pivoted on an appropriate ring axis and pivoted also conjointly with the pivotal connection of a bar 65 and an arm 66 of a ring 57. A spring 60 is secured to a link or bar 64 so that it tends to move the parts into position to dispose the upper arm of the lever 62 in horizontal position. When the roller 68 engages the cam 67 the rings and parts connected to them are swung to the position shown in Fig. 5 extending the spring 60. In this action the upper arm of the member 62 is moved in a clockwise direction. When the pin setter frame descends with a set of pins the roller 68 passes down around the cam 67 and a depending foot 70, fixed just beneath the cam, engages the roller 68 and positively insures the assumption of the normal position shown in Fig. 3. In this position it will be noted that the rings at such pockets as may be unoccupied by pins assume a position permitting a pin standing on the alley after the previous play to pass through the setter frame as the frame reaches the alley bed.

The heads of the pins are slightly lifted as the result of this ring position under the action of the spring 60.

When the center frame reaches the alley bed the ring members right the pins and bring them into accurate position upon the spots. This is accomplished by swinging the ring members toward vertical position, as shown in Fig. 4.

A lever 71, having a cushion foot 72, is pivoted at 73 in the lower frame and is connected by a link 74 to an arm 75 fixed on the shaft 61. As the frame nears the alley the foot 72 first engages it and the lever 71 is moved in a clockwise direction against the action of the spring 60, viewing Figs. 3 and 4, with the readily apparent resultant movement of the ring members through their connections to the shaft 61. This action causes the ring members 57 to first lift the heads of the pins and then to engage the bottoms thereof and swing them in a counter-clockwise direction to vertical position.

The engagement of the foot 72 with the alley bed causes the upper arm of the lever 75 to be swung down in a counter-clockwise direction from its normal position, i. e. the position that is held by the spring 60. It will be noted that the movement of the lever 71 in moving the rings is very much less than the movement of the rings themselves. When the frame starts upwardly the rings immediately swing away from the pins under the action of the spring 60, as will be readily understood.

In the setting operation the movement of the ring members accurately centers the entire set of pins upon the spots, sliding the bottoms of the pins carried by it off the pin-bottom seats and along the alley bed into position and moving sidewise or lengthwise of the alley any standing pins which in the previous play may have been displaced.

It will be noted that the ring members engage the pins above and below their centers and on opposite ends of the enlarged central parts. These points of engagement are protected against deformation by the shape of the pins, as will be readily apparent, so that their engagement for accurate positioning results in perfect registration. The ring surfaces engaging the pin portion are preferably of larger diameter than the diameters of the pins at the points of engagement, the registration being effected by the rolling of smaller circles within larger ones. It will, however, be manifest that effective setting action can be obtained by having the rings formed to accurately fit the pins.

The pin-setter embodying my present invention is of silent action and to further produce this result I provide cushions 76 upon the bottom of the frame to engage the

alley bed at the end of the setting movement.

It will be readily manifest that a pin-setter embodying my present invention may be installed at a bowling alley of standard construction without alteration of the alley parts and by merely arranging the parts of the pin-setter in position as hereinbefore described.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing without further description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention, or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. A pin setting machine for bowling alleys, comprising a frame mounted for vertical movement to and from the alley bed, means in said frame for receiving pins and for accurately arranging them upon the spots of the alley bed, said means moving the pins into accurate position by engagement on opposite sides of the pins both above and below the points of largest pin diameter.

2. A pin setting machine for bowling alleys, comprising a frame mounted for vertical movement to and from the alley bed, and pin positioning means carried thereby, said pin positioning means comprising a pair of conjointly movable members engaging the pins above and below the center.

3. A pin setting machine for bowling alleys, comprising a frame mounted for vertical movement to and from the alley bed, combined pin depositing and positioning members carried by the frame, said means being pivoted in the frame and embracing the pins, and operating mechanism for said members actuated by engagement with the alley bed upon descent of the frame.

4. A pin setting machine for bowling alleys, comprising a frame mounted for vertical movement to and from the alley bed, and pin-setting members carried by said frame, said pin-setting members engaging the pins during the setting operation at the front and at the back and both above and below the portions of largest diameter of the pins.

5. A pin-setting machine for bowling alleys, comprising a frame movable toward and from the alley bed, bottom rests carried by the frame, slides for receiving the pins and directing the bottoms thereof onto said bottom rests, and means for depositing the pins on the alley bed.

6. A pin-setting machine for bowling alleys, comprising a frame movable toward and from the alley bed, pin supporting members in said frame and pin positioning members carried thereby, said pin positioning members having three positions, one permitting reception of the pins, a second permitting passage of a pin onto the alley bed, and a third embracing the pins in accurate registration on the spots of the alley bed.

7. A pin-setting machine for bowling alleys, comprising a frame movable toward and from the alley bed, pin supporting members in said frame and pin positioning members carried thereby, said pin positioning members having three positions, one located at the top of the movement, one at the bottom of the movement, and one intermediate, the arrangement of said members at the top and bottom being obtained by movement of the parts against a spring holding said parts in a said position.

8. A pin-setting machine for bowling alleys, comprising a frame mounted for vertical movement above the alley bed, said frame having receiving pockets for pins to be positioned, means carried by said frame for grasping the pins bodily and automatically positioning the pins upon the alley bed, said pin positioning means being actuated by the contact of a part of said frame with the alley bed.

9. A pin-setting machine for bowling alleys, comprising a frame mounted for vertical movement above an alley bed and having pin receiving pockets therein, means actuated by said alley bed for grasping the pins bodily and automatically positioning the pins during the downward movement of said frame, said pin positioning means being further adapted to reposition the pins left standing on the alley bed.

10. A pin-setting machine for bowling alleys, comprising a frame suspended for vertical movement above the alley bed and having pockets therein for receiving pins to be positioned, and setting means carried by said frame for engaging said pins bodily at points remote from the greatest diameter of their body portions, said pin-engaging means being further adapted to position said pins on said alley bed.

11. A pin-setting machine for bowling alleys, comprising a frame suspended for vertical movement above the alley bed and having pockets for receiving pins to be positioned, means carried by said frame for engaging said pins above and below the greatest diameter of their body portions, and automatic means for actuating said pin-engaging means to position said pins upon the alley, said pin-engaging means being further adapted to engage and reposition the pins left standing on the alley bed.

12. A pin-setting machine for bowling alleys, comprising a frame suspended for ver-

tical movement above the alley bed, co-operating ring members carried by said frame for engaging the pins to be positioned during downward movement of the frame, and means actuated by said alley bed for automatically positioning the engaged pins on the alley bed during continued downward movement of said frame, said ring members being further adapted to release said positioned pins during upward movement of said frame.

13. A frame for receiving pins and positioning the same on a bowling alley, comprising a plurality of pin-receiving pockets, pin-setting means pivotally mounted on said frame in each pocket, and means carried by said frame and actuated by the alley bed for actuating said pin-setting means to set and position said pins upon the alley bed.

14. A frame for receiving pins and positioning the same on a bowling alley, comprising a plurality of pin-receiving pockets, co-operating ring members mounted on said frame to engage the pins at points remote from the greatest diameter of their body portions, and means carried by said frame and actuated by the alley bed for actuating said co-operating ring members to engage said pins and position the same upon the alley.

15. A frame for receiving pins and positioning the same on bowling alleys, and adapted to be suspended above the alley bed, comprising a plurality of co-operating pin-engaging rings pivotally mounted on said frame, and means carried by said frame and actuated by said alley bed for swinging said pin-engaging rings on their pivots to engage said pins and position the same upon the alley bed, said pin-engaging rings being further adapted to encircle the pins left standing on the alley and reposition the same.

16. A frame for receiving pins and positioning the same on a bowling alley, comprising a plurality of pin-receiving pockets, pin-engaging and positioning means mounted on said frame, means for normally holding said pin-engaging means out of engagement with said pins, and means carried by said frame for actuating said pin-engaging means to engage the pins and position the same upon the alley bed, said holding means being automatically actuated to disengage said pin-engaging means after the pins have been positioned.

17. A frame for receiving pins and positioning the same on a bowling alley, comprising a plurality of pin-receiving pockets, a plurality of pin-engaging rings mounted on said frame, means for normally holding said pin-engaging means out of engagement with said pins, and means carried by said frame and actuated by the alley bed for actuating said pin-engaging means to engage the pins and position the same upon the alley bed, when the frame is lowered, said holding means being automatically actuated to disengage said pin-engaging means after the pins have been positioned.

18. A pin setting machine for bowling alleys, comprising a frame movable to and from the alley bed, and pin positioning means carried by the frame and comprising a pair of interengaged ring members adapted to receive each pin in inclined position, and means for operating said ring members to upright the pins and set them upon the alley bed.

19. A pin setting machine for bowling alleys comprising a frame movable to and from the alley bed, a plurality of ring members pivotally engaged in pairs one within the other, one pair for each pin, means for holding said ring members open to receive the pins in inclined position, and means for swinging the ring members on their pivots to upright the pins and set them on the alley bed.

20. A pin setting machine for bowling alleys comprising a frame movable to and from the alley bed, a plurality of ring members pivotally engaged in pairs one within the other, one pair for each pin, said ring members being normally open to receive the pins in inclined position, and means for swinging said ring members to upright the pins, to grasp the pins, and to set the pins on the alley bed.

21. A pin setting machine for bowling alleys comprising a frame movable to and from the alley bed, a plurality of ring members including a pair for each pin pivotally engaged one within the other to each other and to the frame, said ring members being normally open to receive the pin in inclined position, and means for operating said ring members to upright the pins and to engage the pins on opposite sides adjacent the bottom, and at or about the neck, and to set the pins on the alley bed.

22. A pin setting machine for bowling alleys comprising a frame movable to and from the alley bed, and means for receiving and setting each pin comprising a pair of ring members arranged one within the other, and pivotally connected to each other and to the frame, and means for operating the ring members.

ERNEST HEDENSKOOG.

DISCLAIMER

1,597,974.—*Ernest Hedenskoog,* Muskegon, Mich. PIN-SETTING MACHINE FOR BOWLING ALLEYS. Patent dated August 31, 1926. Disclaimer filed October 26, 1931, by the assignee, *Brunswick-Balke Collender Company.*

Hereby enters this disclaimer to those claims in the specification which are in the following words, to-wit:

"A pin-setting machine for bowling alleys, comprising a frame movable toward and from the alley bed, bottom rests carried by the frame, slides for receiving the pins and directing the bottoms thereof onto said bottom rests, and means for depositing the pins on the alley bed.

"A pin-setting machine for bowling alleys, comprising a frame suspended for vertical movement above the alley bed and having pockets therein for receiving pins to be positioned, and setting means carried by said frame for engaging said pins bodily at points remote from the greatest diameter of their body portions, said pin-engaging means being further adapted to position said pins on said alley bed.

"A frame for receiving pins and positioning the same on a bowling alley, comprising a plurality of pin-receiving pockets, pin-engaging and positioning means mounted on said frame, means for normally holding said pin-engaging means out of engagement with said pins, and means carried by said frame for actuating said pin-engaging means to engage the pins and position the same upon the alley bed, said holding means being automatically actuated to disengage said pin-engaging means after the pins have been positioned."

[*Official Gazette November 17, 1931.*]