Feb. 11, 1941. L. J. KAUFMAN 2,231,473

BOWLING PIN SPOTTER

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FIG. 1.

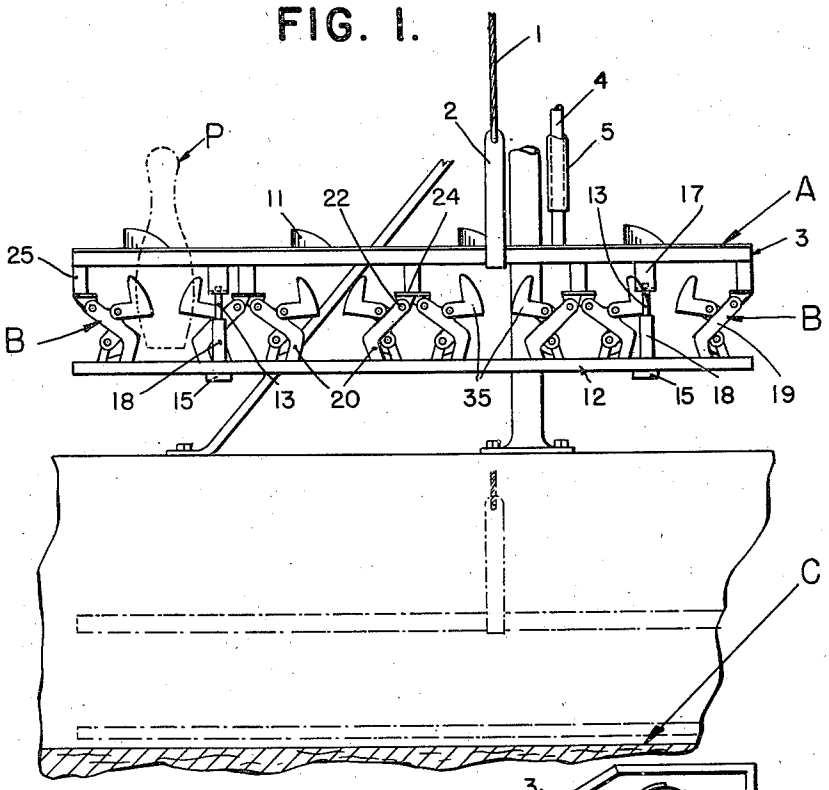
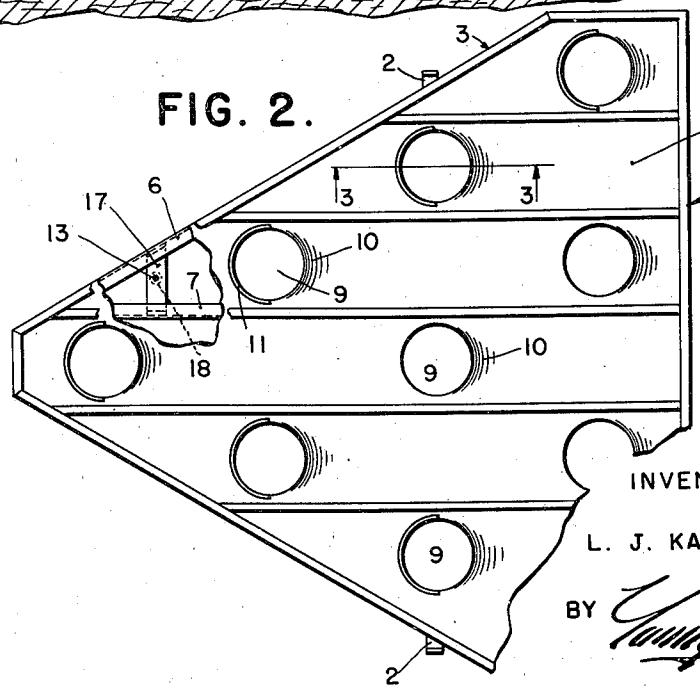


FIG. 2.



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FIG. 3.

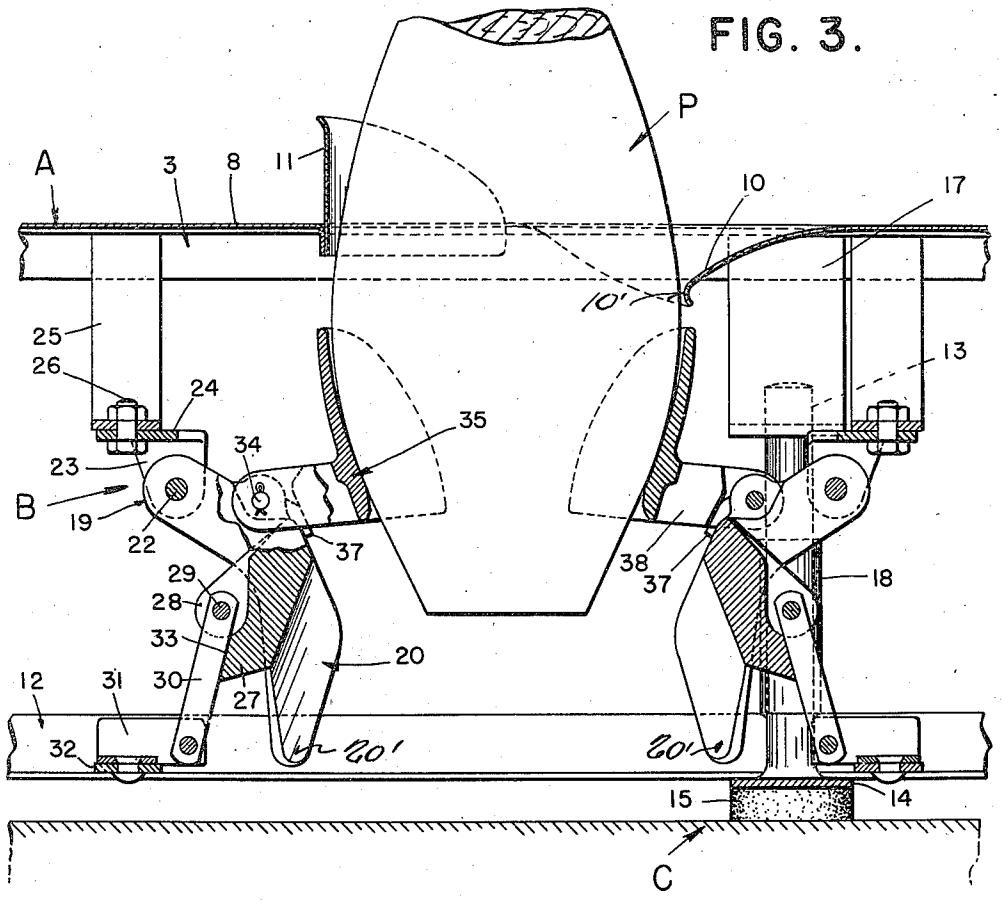


FIG. 6.

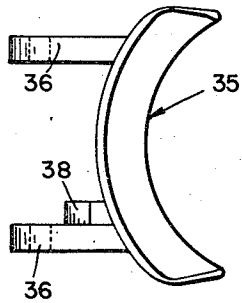
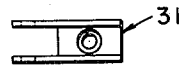


FIG. 7.



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FIG. 4.

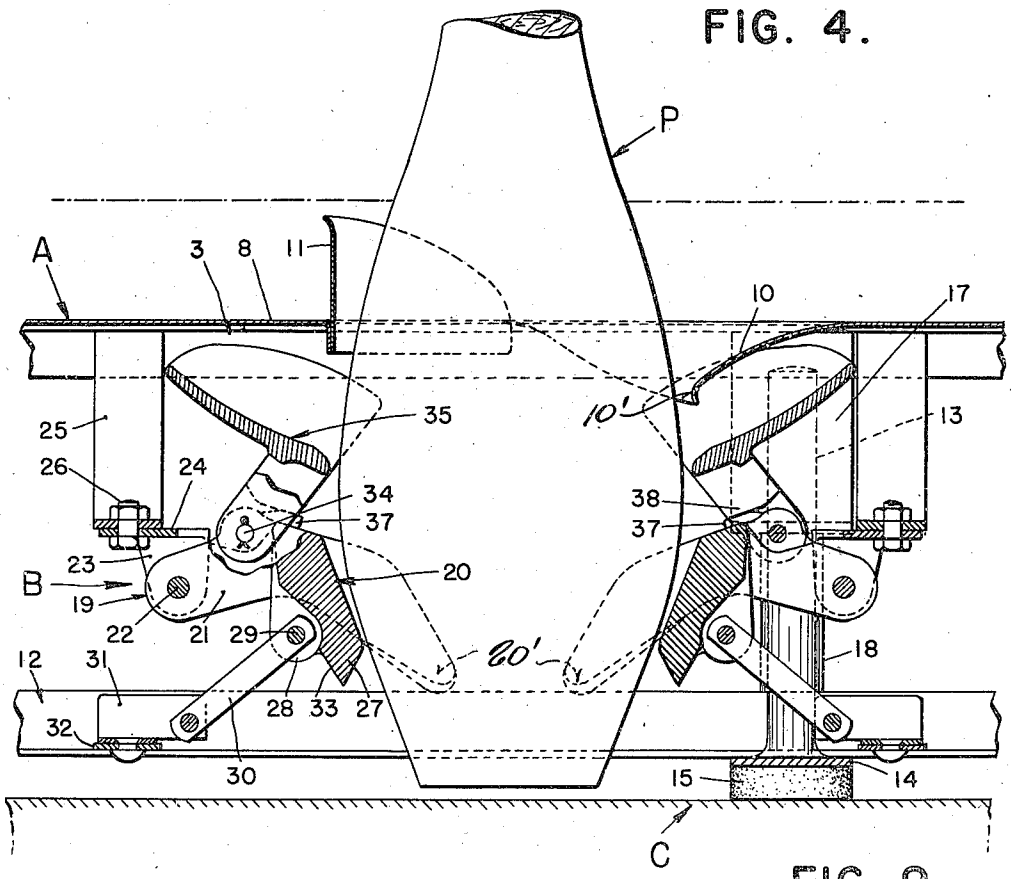


FIG. 9.

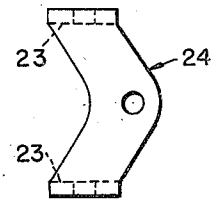
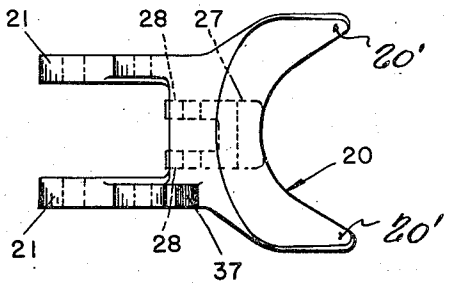


FIG. 8.



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FIG. 5.

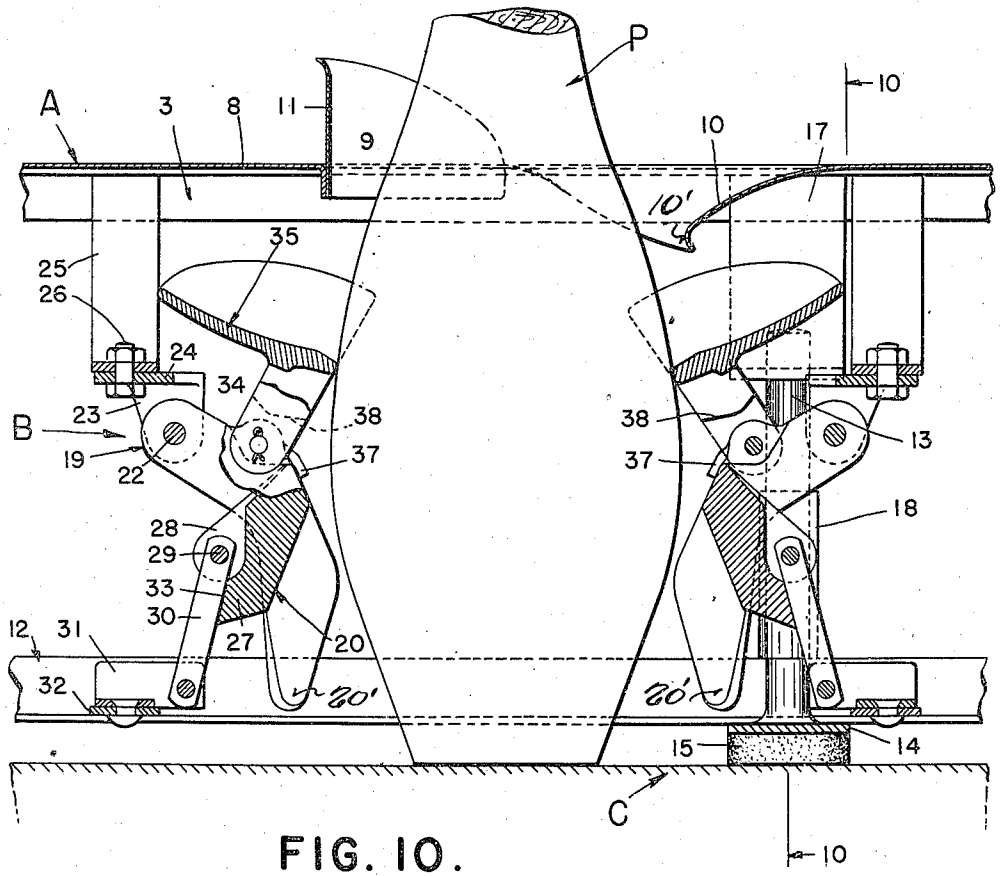
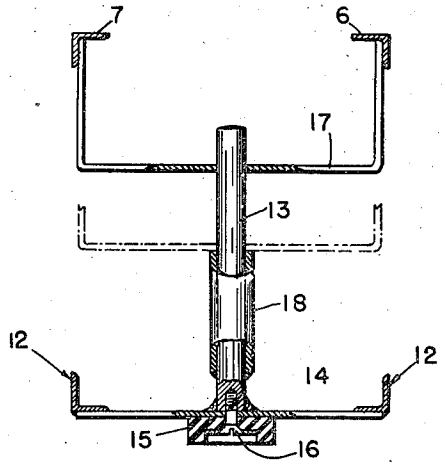


FIG. 10.



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Patented Feb. 11, 1941 2,231,473

UNITED STATES PATENT OFFICE

2,231,473

BOWLING PIN SPOTTER

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Application October 19, 1939, Serial No. 300,143

13 Claims. (Cl. 273—42)

This invention pertains to bowling pin-setting machines, and more particularly to an improvement in the spotting and setting mechanism.

The invention has primarily for its object the provision of a mechanism of the foregoing character, which is comparatively simple, exceedingly accurate and positive in operation, and which compensates for slight variations encountered in the pins as the result of manufacture, wear, or turning down, and the like.

Incidental to the foregoing, a more specific object of the invention resides in the provision of a spotting and setting mechanism comprising spaced receiving and setting frames respectively, co-jointly and relatively movable, for actuating holding and spotting devices positioned between the frames, upon relative movement of the same.

A more detailed object is the provision of holding and spotting devices in the form of toggles connected to the receiving and spotting frames, whereby they are positively actuated in the performance of their operative functions.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the novel construction, combination, and arrangement of parts, substantially as hereinafter described, and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the herein disclosed invention may be made as come within the scope of the claims.

In the accompanying drawings is illustrated one complete example of the physical embodiment of the present invention constructed according to the best mode so far devised for the practical application of the principles thereof.

In the drawings:

Figure 1 is an elevational view of a receiving and spotting mechanism constructed in accordance with one form of the present invention.

Figure 2 is a plan view of the same.

Figure 3 is an enlarged fragmentary section through one of the holding and spotting devices, illustrating the mechanism in its receiving and holding position, the same being taken on the line 3—3 of Figure 2.

Figure 4 is a similar view showing the mechanism in spotting position.

Figure 5 is a similar view, with the parts in setting position.

Figure 6 is a detailed top plan view of one of the holding jaws.

Figure 7 is a top plan view of one of the brackets to which the toggle links are pivotally connected on the lower frame.

Figure 8 is a top plan view of one of the spotting saddles.

Figure 9 is a detailed plan view of one of the clevices to which the spotting saddles are pivotally connected.

Figure 10 is a detailed section of one of the slidable connections and guides between the receiving and spotting frames.

Referring now more particularly to the accompanying drawings, the spotting and setting mechanism is indicated generally by the letter A, while B designates the novel holding and spotting devices comprising the essence of the present invention. The alley bed, above which the mechanism A is mounted, is indicated by the letter C.

As is customary in pin-setting machines of the general type to which the present invention pertains, the setting mechanism is supported above the alley bed for vertical movement by either manual or power-actuated means. Therefore, the supporting and elevating mechanism forms no part of the present invention, in that the same is capable of operation with various types of supporting apparatus. For the purpose of illustration, the spotting and setting mechanism A is shown supported by the cables 1 connected to hooks 2 suitably secured to the receiving frame 3 of the mechanism A. The frame 3 may be raised and lowered by means of any desired mechanism (not shown), either manually or power-actuated. Vertically extending rods 4 secured to the receiving frame 3, and slidably mounted in tubes 5 carried by the supporting mechanism, serve to guide the spotting and setting mechanism A in its vertical movement, and prevent horizontal shifting.

The receiving frame 3, as best shown in Figure 2, is of the usual triangular shape, and in the present instance is fabricated from angle iron side members 6 and transverse struts or braces 7, welded or otherwise secured together. The top of the frame 3 is provided with a sheet metal deck 8, having formed therein a plurality of spaced openings 9, alined with conventional pin spots on the alley bed C.

To facilitate insertion of the pins P into the spotting and setting mechanism A, the deck 8 has formed therein gulleys 10, adjacent the rear ends of the openings 9, while their forward ends, at least those in the forward end of the receiving frame remotely spaced from the operator, are provided with arcuate plates 11 extending above

and below the deck, which serve as stops and function to deflect the lower ends of the pins into the openings when the pins are thrown or slid across the deck by the pin boy stationed at the rear of the machine.

Referring to Figures 3 to 5 inclusive, it will be noted that the gulley 10 terminates in a rounded edge 10', designed to engage the side of the pin P in the event of rearward tipping of the same upon delivery to the opening 9. As best shown in Figure 4, upon collapsing of the upper and lower frames, the depressed gulley, in cooperation with the arcuate plate guides the pin into the holding jaws, the pin being caused to pivot on the rounded edge 10' of the gulley.

If the flange were not provided, the holding jaw would remain in its normal position, and the pin P would then pivot or rotate upon the holding points of the adjacent saddle, and the opposite holding jaw would be raised, allowing worn pins, and possibly new ones, to slip between the holding jaws and fall to the alley bed C with considerable noise and clatter. The arcuate plate 11 is equally as important as the gulley 10, in that it eliminates the possibility of a pin becoming stuck between the holding jaw and the deck, or on top of the jaw, with resultant damage or mutilation of the bottom edge of the pin. The lower edge of the holding jaws 35, which contact the pins on the release upward movement, is so formed as to cause them to slide easily. At the same time, the interior radius is such that they will not snugly engage the pin, or effect cam action on the surface of the pin, with resulting locking and raising of the pins with the frames.

Positioned below the receiving frame 3, and conforming in shape, is a setting frame 12, which may be fabricated in the same manner as the receiving frame. Here it may be explained that both the receiving and setting frames may be stamped from sheet material, and suitably ribbed to provide reinforcement against warpage. Such structure would materially reduce the weight of the frames, as well as the cost of manufacture.

The receiving and setting frames, which are relatively, as well as co-jointly, movable, are held in vertical alinement by means of suitably spaced pins 13 secured to transverse straps 14, carried by the setting frame 12. Resilient feet 15, formed of rubber or other cushioning material, are attached to the straps 14 by screws 16 passing through the straps and threaded into the lower ends of the pins 13. The upper ends of the pins 13 project through stirrups 17, welded or otherwise fastened to the receiving frame 3, and for the purpose of limiting the relative collapsing movement of the frames 3 and 12, a sleeve or collar 18 is welded or attached to the pin 13.

The holding and spotting devices B, disposed between the receiving and setting frames, each comprises a pair of opposed cooperating units 19 in substantial alinement with the front and rear portions of the openings 9 provided in the deck 8. Each unit consists of an arcuate spotting saddle 20, provided with spaced, lateral ears 21, mounted upon a pintle 22, carried by depending spaced ears 23 of the clevice 24, which in turn is connected to a depending yoke 25 attached to the frame 3 by bolts 26. The spotting saddle 20 is provided with a rearwardly extending boss 27, from which spaced ears 28 project laterally for reception of a pintle 29, to which one end of a toggle link 30 is connected. The opposite end of the link 30 is pivotally connected to a bracket 31, riveted or otherwise secured to a transverse strap 32 carried by the spotting frame 12.

As best shown in Figures 4 and 8, the arcuate contour of the inner faces of the saddles 20 is such that the pin P is only engaged by the lower extremities 20', the intermediate portion shown merely as a guide in directing the bottom of a pin into spotting and setting position.

Both in the holding and setting positions of the saddles 20, as shown in Figures 3 and 5, the surface 33 of the lug 27 is engaged by the toggle link 30 to limit the movement of the saddle away from the pin P, and prevent the pintle 22 from passing over center with relation to the pivotal connections of the saddle and toggle link with the receiving and setting frames, respectively, thus breaking the toggle to cause rotary movement of the saddle toward the pin upon movement of the frames toward each other.

Carried by the ears 21, intermediate the saddle 20 and the pintle 22, is a pin 34 upon which an arcuate holding jaw 35 is pivotally mounted by means of the lateral, spaced arms 36. One of the ears 21 is provided with a raised extension or boss 37 alined with a boss 38 formed on the adjacent arm 36 of the holding jaw 35 to provide a stop for the jaw and limit its movement in one direction, the center of gravity of the holding jaw, with relation to its pivotal axis, being such as to cause the jaw to swing inwardly toward the pin at all times. Upon releasing or setting operation, as shown in Figure 5, the holding jaws are free to swing outwardly on the saddles.

From the foregoing explanation, considered in connection with the accompanying drawings, it is believed that the structure of the present invention will be readily understood, and, therefore, its operation is now described.

Normally, the spotting and setting mechanism A is raised above the alley bed C, as shown in Figure 1, to a sufficient height to avoid possible obstruction of the pins during play, and also allow the pin boy to conveniently remove the down pins upon completion of play. The mechanism is then lowered to any convenient height to allow insertion of the pins in the openings 9 formed in the deck 8, which operation is materially facilitated by the gulleys 10 and the deflectors 11 provided in the deck 8, in that they eliminate the necessity of care in placing the pins, and as the pin boy becomes skilled, the pins are usually positioned in the openings by throwing or sliding the same across the deck. This is of considerable advantage in the saving of both effort and time, particularly as regards the more remote openings in the forward portion of the deck, which would otherwise necessitate awkward reaching and bending were it essential to accurately deposit the pins directly in each pocket.

In the holding position of the mechanism A, as shown in Figure 3, the receiving and setting frames are spaced apart their maximum distance, which position of the setting frame with relation to the receiving frame is determined by the toggle character of the connections of the spotting saddles 20 and links 30 with the upper and lower frames, the links engaging the faces 33 of the bosses 27 formed on the saddles 20 serving to limit the opening movement of the toggles.

In this position of the saddles, the jaws 35 are supported upon their stops so as to receive and hold the pins, their arcuate faces engaging the lower restricted portion of the pins as shown.

While the cushioning feet 15, carried by the

setting frame, are shown in engagement with the alley bed C of Figure 3, it will be understood that the parts still remain in their loading position, inasmuch as no collapsing movement between the frames has taken place.

Upon further lowering of the mechanism A, a relative movement occurs between the receiving frame and the setting frame, reducing the distance between them to a minimum, during which operation the toggle links 30 force the spotting saddles toward each other to receive and lower restricted portions of the pins released by the outward rotation of the holding jaws, as shown in Figure 4, the inward movement of the saddles being limited by the action of the toggle links 30, which in turn is determined by engagement of the sleeves 18 with the stirrups 17. In this position of the holding jaws it will also be noted that the lower edges of their operative faces have been forced away from the surface of the pins by the inward movement of the saddles, thus allowing the pins to drop into the saddles, which support them a slight distance above the alley bed. The advantage in normally supporting the pins slightly above the alley, prior to setting, resides in the fact that the spotting devices are enabled to accurately spot the pins even though the latter might vary in dimensions as the result of manufacture, wear, or turning down the pins, which is frequently resorted to in old mutilated pins.

A further advantage results in that the pins upon release for setting drop a comparatively short distance, thus reducing impact between the pins and alley bed to a minimum, which reduces noise, and prevents possible nicking or mutilation of the lower edges of the pins.

After the mechanism has been lowered, and the pins spotted, as shown in Figure 4, the receiving frame is then raised by means of the supporting and elevating mechanism, and during its elevating movement away from the setting frame, it will be obvious that the toggle links 30 will straighten and cause the saddles to be swung outwardly upon their pintles 22, away from the pins, allowing the same to drop to the alley bed. At the same time, the lower edges of the holding jaws, because of their pivotal connection with the spotting saddles, are permitted to move upwardly in contact with the sides of the pins, above their maximum diameter. Upon further upward movement of the mechanism A, the holding jaws, being freely pivoted on the spotting saddles, merely ride upwardly over the surface of the pins, during which movement they obviously swing inwardly toward each other, their movement being limited by engagement between the bosses 38 on the holding jaw arms 36 and the bosses 37, in which position the holding jaws are sufficiently spaced to clear the head of the pin upon elevation of the mechanism to its normal position. This being the normal position of the holding jaws, they are ready to receive pins for the succeeding operation.

Attention is directed to the fact that the parts comprising each of the spotting and holding units are duplicates, and, therefore, interchangeable, which eliminates the necessity of rights and lefts, thus reducing the cost of manufacture, assembly, and replacement. Also, due to the novel principle of operation employed, considerable tolerance or variation in dimensions is permissible, thus eliminating the necessity of close machining and accurate assembling.

The foregoing is further compensated for through the arcuate adjustment provided for alining the opposed holding jaws and spotting saddles.

The present invention also allows removal of any desired pin from the alley, without affecting the position of the remaining standing pins, in that upon lowering the mechanism, the holding jaws and saddles merely assume their setting position, allowing the heads of the standing pins to project above the deck 8 for manual removal, after which the mechanism is raised, leaving the standing pins in proper position.

From the foregoing it will be obvious that an exceedingly simple, positive, and efficient spotting and setting mechanism has been devised, and while the invention has been illustrated and described in considerable detail, it is to be understood that variations are contemplated within the scope of the appended claims.

I claim:

1. A bowling pin setting mechanism comprising, spaced upper and lower frames co-jointly and relatively movable, and a plurality of hinged holding and spotting devices interposed between and pivotally connected with said frames, said devices being actuated by said frames upon relative movement thereof.

2. A bowling pin setting mechanism comprising spaced upper and lower frames co-jointly and relatively movable, and a plurality of hinged holding and spotting devices interposed between and pivotally connected with said frames, said devices being actuated by said frames upon relative movement of the same to hold the bowling pins when said frames are spaced apart and release and spot said pins upon movement of the frames toward each other.

3. A bowling pin setting mechanism comprising spaced upper and lower frames co-jointly and relatively movable, a plurality of holding and spotting devices interposed between said frames, each of said devices including a pair of opposed spotting saddles pivotally connected to said upper frame, toggle links pivotally connected to said saddles and lower frames, and holding jaws connected with said saddles and actuated thereby.

4. A bowling pin setting mechanism comprising spaced upper and lower frames co-jointly and relatively movable, holding and spotting devices interposed between said frames, each including a pair of opposed spotting saddles pivotally connected to said upper frame, toggle links pivotally connected to said saddles and lower frame, and holding jaws pivotally carried by said spotting saddles and actuated thereby.

5. A bowling pin setting mechanism comprising spaced upper and lower frames co-jointly and relatively movable, holding and spotting devices interposed between said frames, each of said devices including a pair of opposed spotting saddles pivotally connected to said upper frame, toggle links pivotally connected to said saddles and lower frame, and means for limiting movement in one direction between said links and spotting saddles to determine maximum spacing between said frames and between said saddles.

6. A bowling pin setting mechanism comprising spaced upper and lower frames co-jointly and relatively movable, holding and spotting devices interposed between said frames, each of said devices including a pair of opposed spotting saddles pivotally connected to said upper frame, toggle links pivotally connected to said saddles and lower frame, means for limiting movement in one direction between said links and spotting saddles

to determine maximum spacing between said frames and between said saddles, and means interposed between said frames to limit their movement toward each other.

7. A bowling pin setting mechanism comprising spaced upper and lower frames co-jointly and relatively movable, holding and spotting devices interposed between said frames, each of said devices including a pair of opposed spotting saddles pivotally connected to said upper frame, toggle links pivotally connected to said saddles and lower frame, means for limiting movement in one direction between said links and spotting saddles to determine maximum spacing between said frames and between said saddles, and means interposed between said frames to limit their movement toward each other and hold said frame in alinement.

8. A bowling pin setting mechanism comprising spaced upper and lower frames co-jointly and relatively movable, holding and spotting devices interposed between said frames, each of said devices including a pair of opposed spotting saddles pivotally connected to said upper frame, toggle links pivotally connected to said saddles and lower frame, holding jaws pivotally carried by said spotting saddles, means for limiting movement in one direction between said links and spotting saddles to determine maximum spacing between said frames and between said saddles, and means interposed between said frames to limit their movement toward each other.

9. A bowling pin setting mechanism comprising spaced upper and lower frames co-jointly and relatively movable, holding and spotting devices interposed between said frames, each of said devices including a pair of opposed spotting saddles pivotally connected to said upper frame, toggle links pivotally connected to said saddles and lower frame, holding jaws pivotally carried by said spotting saddles, means for limiting movement in one direction between said links and spotting saddles to determine maximum spacing between said frames and between said saddles, and means interposed between said frames to limit their movement toward each other and hold said frames in alinement.

10. A bowling pin setting mechanism comprising spaced upper and lower frames co-jointly and relatively movable, holding and spotting devices interposed between said frames, each of said devices including a pair of opposed spotting saddles pivotally connected to said upper frame, toggle links pivotally connected to said saddles and lower frame, holding jaws pivotally carried by said spotting saddles, and stops interposed between said holding jaws and spotting saddles to limit movement of said jaws in one direction with relation to said saddles.

11. A bowling pin setting mechanism comprising, spaced upper and lower frames co-jointly and relatively movable, holding and spotting devices interposed between said frames, each of said devices including a pair of opposed spotting saddles pivotally connected to said upper frame, toggle links pivotally connected to said saddles and lower frame, means for limiting relative movement between said saddles and toggle links in one direction, holding jaws pivotally carried by said spotting saddles, and means interposed between said holding jaws and spotting saddles for limiting relative movement between said jaws and saddles in one direction.

12. A bowling pin setting mechanism comprising spaced upper and lower frames co-jointly and relatively movable, holding and spotting devices interposed between said frames, each of said devices including a pair of opposed spotting saddles pivotally connected to said upper frame, toggle links pivotally connected to said saddles and lower frame, means for limiting relative movement between said saddles and toggle links in one direction, holding jaws pivotally carried by said spotting saddles, means interposed between said holding jaws and spotting saddles for limiting relative movement between said jaws and saddles in one direction, and means interposed between said frames to limit their movement toward each other.

13. A bowling pin setting mechanism comprising spaced upper and lower frames co-jointly and relatively movable, holding and spotting devices interposed between said frames, each of said devices including a pair of opposed spotting saddles pivotally connected to said upper frame, toggle links pivotally connected to said saddles and lower frame, means for limiting relative movement between said links and spotting saddles in one direction to determine maximum spacing between said frames and said saddles, holding jaws pivotally carried by said saddles, means interposed between said holding jaws and spotting saddles to limit their relative spreading movement in one direction, means interposed between said frames to limit their movement toward each other, a deck mounted upon said upper frame and provided with openings alined with said holding and spotting devices, said deck having gulleys formed therein at the rear of said openings to guide pins thereto, and upwardly projecting arcuate shield at the forward edge of said openings to deflect pins into said openings.

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