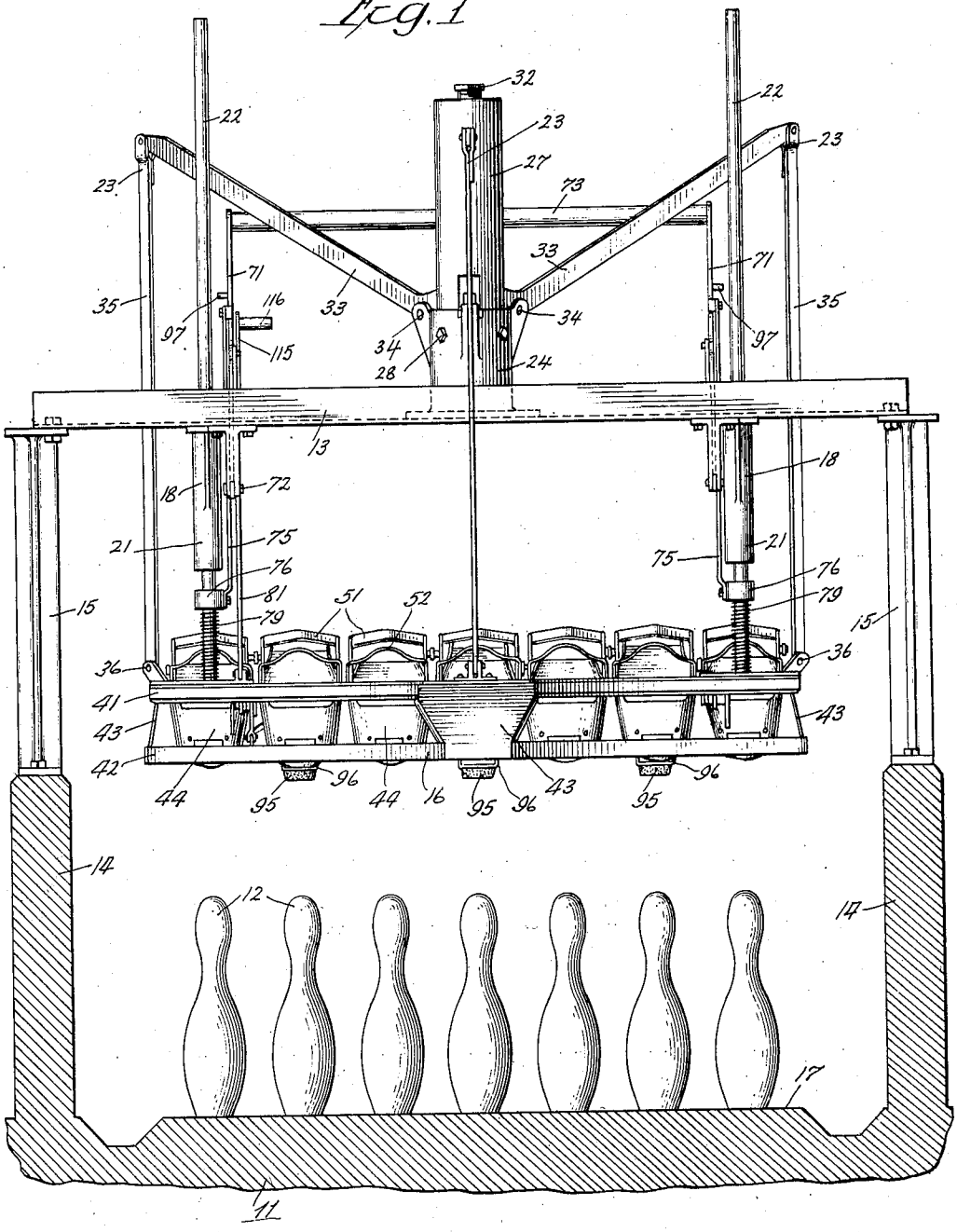
Jan. 4, 1927. 1,612,867

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PIN SPOTTER

Filed Oct. 16, 1925 6 Sheets-Sheet 1

Fig. 1



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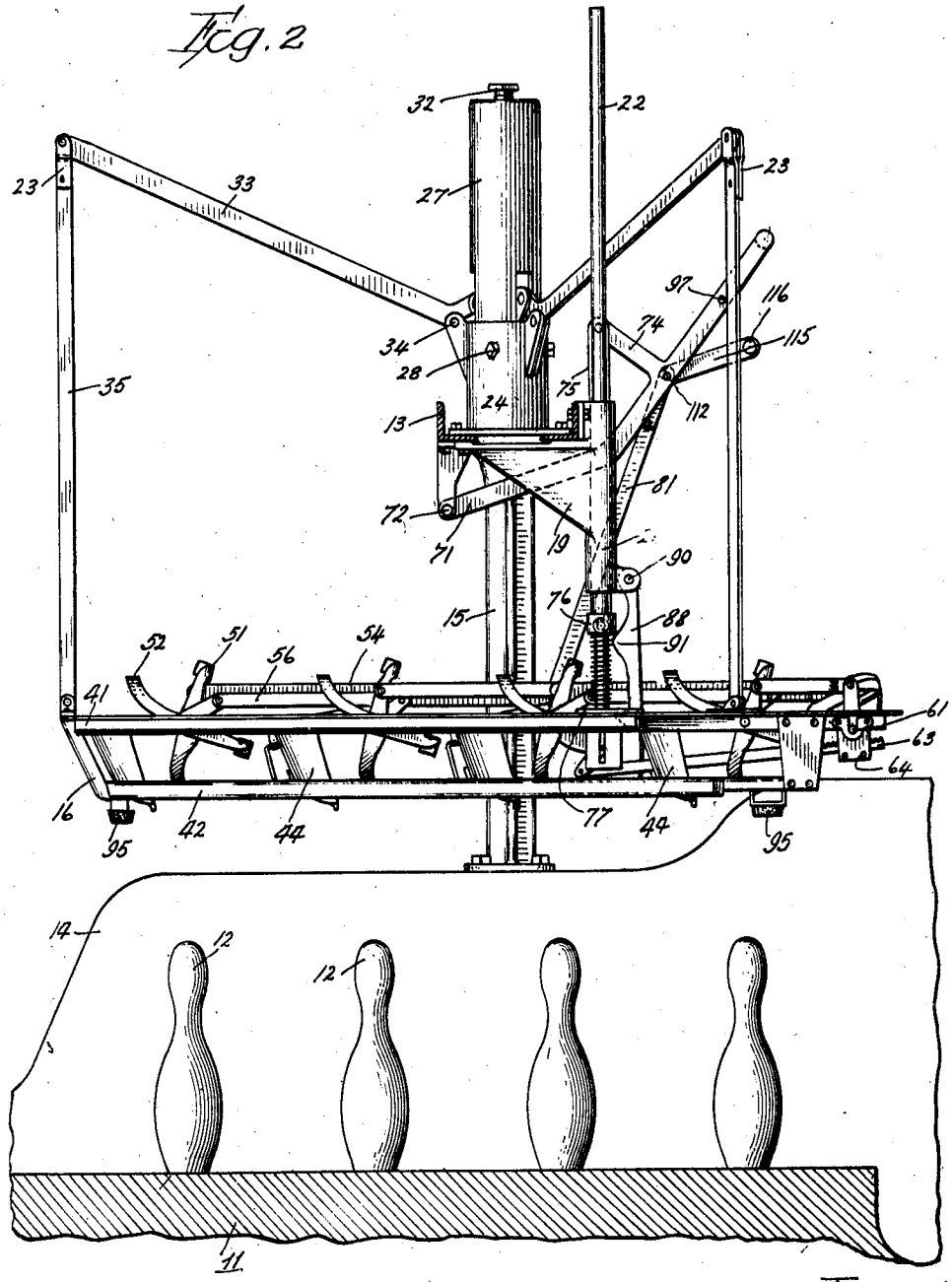
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PIN SPOTTER

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Fig. 2



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PIN SPOTTER

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Fig. 11

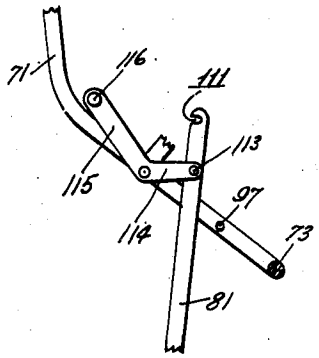


Fig. 3

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PIN SPOTTER

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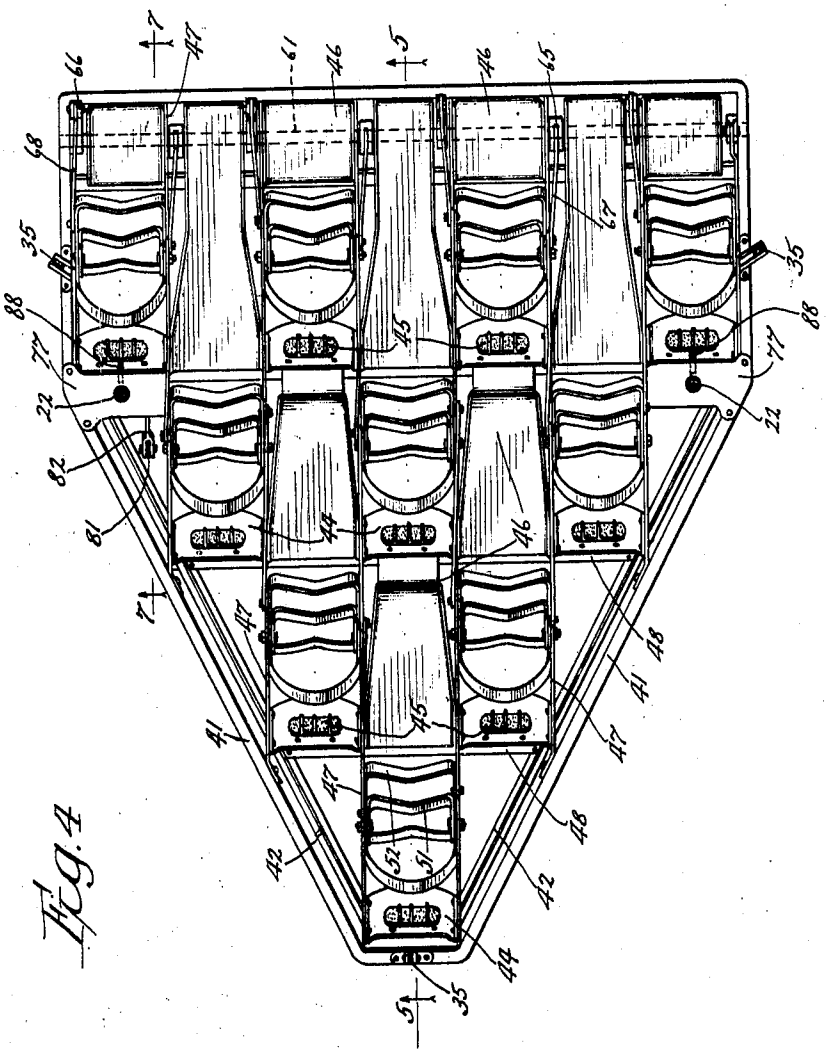


Fig. 4

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PIN SPOTTER

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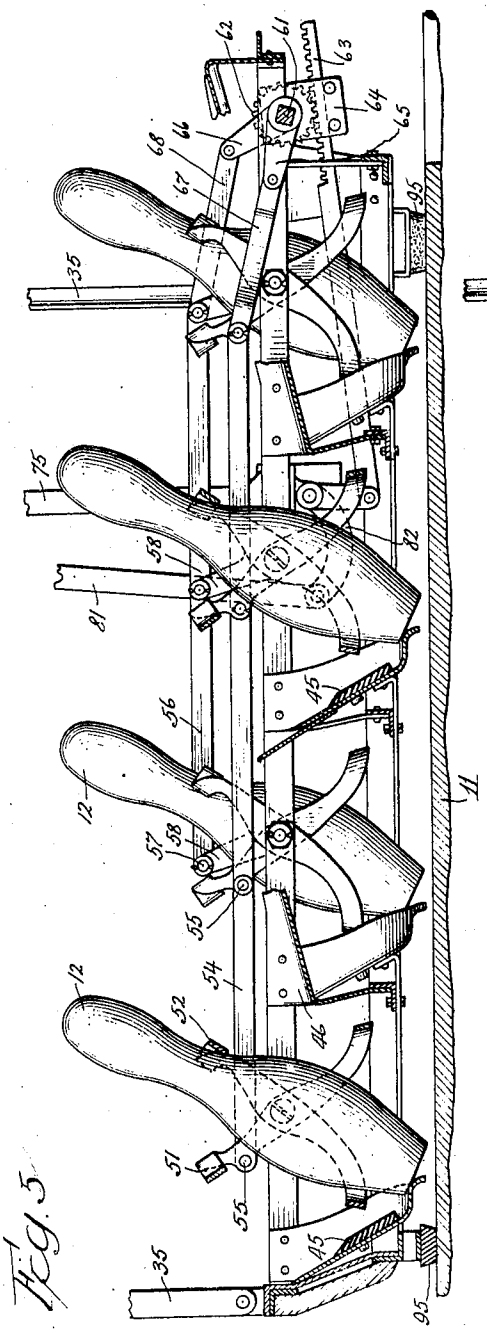


Fig. 5

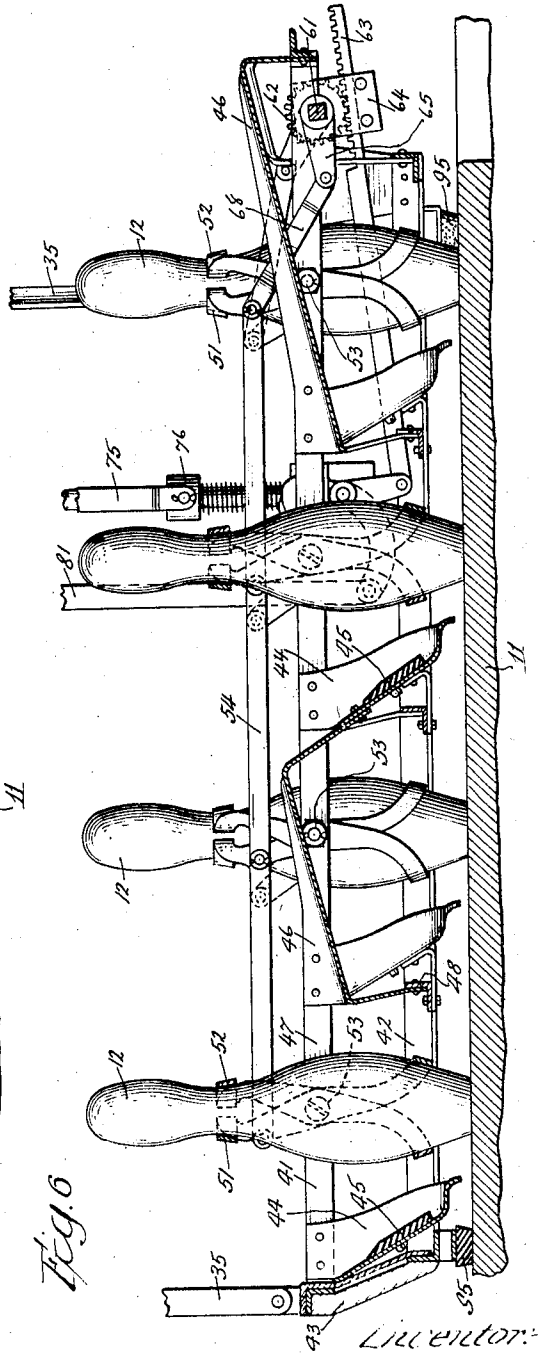


Fig. 6

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PIN SPOTTER

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Fig. 7

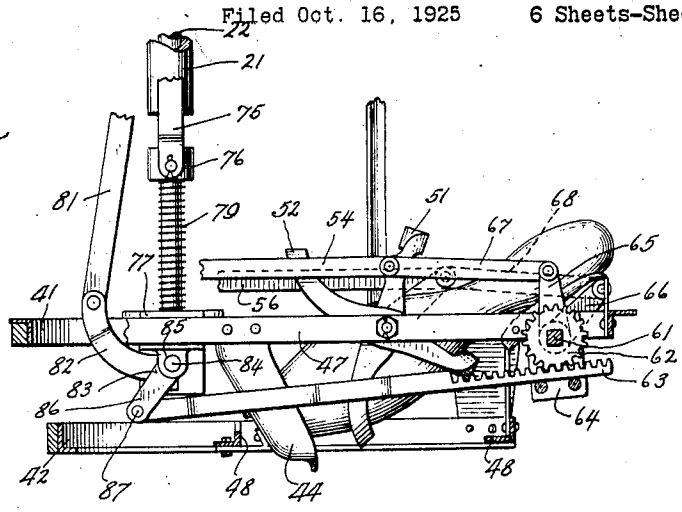


Fig. 8

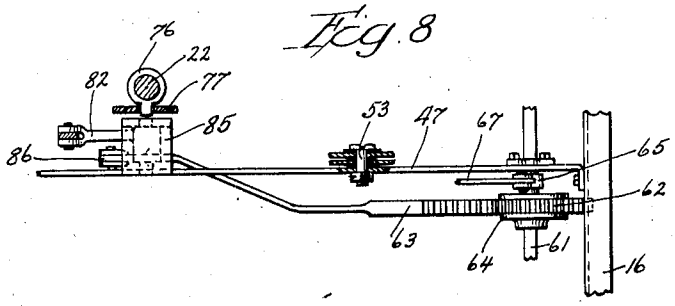


Fig. 9

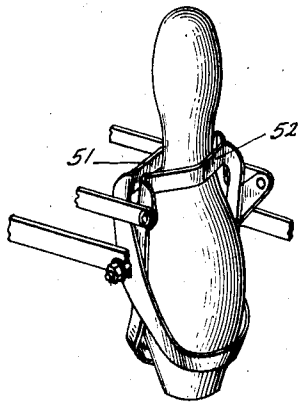
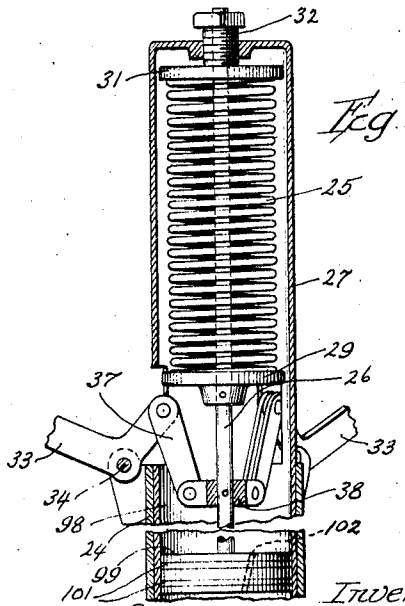


Fig. 10



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Patented Jan. 4, 1927. 1,612,867

UNITED STATES PATENT OFFICE.

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PIN SPOTTER.

Application filed October 16, 1925. Serial No. 62,718.

This invention relates to pin spotting machines for bowling alleys, and has more particular reference to machines of this kind which are operated by the attendants manually placing the pins in a setter frame and then upon desired action moving the setter frame down to deposit the pins accurately upon the spots of the alley bed.

A principal object of the invention is the provision of a pin spotting machine which will be of improved construction and adapted in every manner to fulfill all the needs and rules of the game, and which at the same time will be carried in a frame arranged at relatively greater or less distance above the alley floor than has been possible prior to my invention. This enables the commercial manufacture of the device without regard to the ceiling height and permits of standard directions for installation.

A further important object of the invention is the provision of a pin spotting machine which may be readily installed upon and wholly supported by the alley side rails. It has been usually the custom, prior to my invention, to support these machines, in part at least, from the ceiling. This circumstance has also precluded in large measure the provision of machines adapted for installation under any conditions encountered without the necessity for providing special parts or altering the machine to fit the particular surroundings.

Another important object of the invention is the provision of pin spotting machines, the return and counter-balancing action of which will be accomplished by means of springs and permit the elimination of cables, chains, and other flexible members of relatively short life.

Another important object of the invention is the provision of a hand pin spotting machine wherein the action of the pin setter will be more certain, more accurate, and of smoother operation than has heretofore been accomplished.

Another important object of the invention is the provision of a pin spotting machine, which is adapted to accurately arrange the pins upon the alley bed by engaging the pins at the opposite front and back points of two circumferences of the pin, one located below the center and the other above.

Another important object of the invention is the provision of a device for locking the pin spotter frame against independent lowering thereof when or if the attendant should place his weight upon it in avoiding the balls and the flying pins incident to the rolling of the ball by a player before the attendant is ready.

A further important object of the invention is the provision of a pin spotter controlled by a handle or lever, the direction of the movement of the handle or lever being in the direction of the setter frame in its setting of the pins.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, 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 spotting 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 side elevation of the device shown in Figure 1;

Fig. 3 is a similar view showing the pin spotting machine in pin setting operation and positioning the pins upon the alley;

Fig. 4 is a plan view of the pin-receiving and positioning frame;

Fig. 5 is a section taken substantially on line 5—5 of Fig. 4 and showing the device just prior to its pin spotting operation;

Fig. 6 is a similar view showing the device in pin spotting position;

Fig. 7 is a sectional view taken substantially on line 7—7 of Fig. 4 and showing one of the pin pockets in pin-receiving position and the control mechanism for the pin spotting devices;

Fig. 8 is a plan view of the control mechanism shown in Fig. 7;

Fig. 9 is a perspective view showing the method of embracing the pin for the accurate location thereof; and

Fig. 10 is a detail view of a preferred counterbalancing means.

Fig. 11 is an enlarged detail view showing details of construction.

To illustrate my invention, I have shown a section of a portion of a standard bowling alley 11 upon which bowling pins 12 are, or

may be, arranged in playing position. Above this alley, I provide a suitable cross support 13 which may be supported on alley-dividing rails 14 through one or more posts or brackets 15. A pin spotting frame 16 is mounted on the cross support 13 for movement toward and from the alley bed 17 in pin spotting operation. Guiding devices 18 are, or may be, provided for controlling the frame 16 to prevent twisting thereof and to permit the frame to locate the pins at the same point on the alley bed 17 in each pin setting operation. A frame counterbalancing means is provided which is preferably supported by the cross support 13, and an operating device may be provided for manually controlling the movement of the frame 16.

The guiding devices 18 may be of any suitable form or construction, and in the present instance I have shown a pair of brackets 19, which may be attached to the cross support 13 on opposite sides of the center thereof in any suitable manner, and having tubular portions 21 of sufficient length to provide sliding bearings for guide rods 22, which may be attached to the frame 16 in any suitable manner.

Any suitable counterbalancing means may be provided which may be adapted to exert a lifting force on the frame, or which tends to lift the frame from the alley bed after a setting operation, such as one or more devices for engaging the frame at one or more points and having separate or unitary counterbalancing means. This construction and its adjustment is or may be such that the frame is spring-lifted without exertion by the operator and the apparatus may be actuated both upward and downward without the exertion of any lifting or depressing force by him, because as soon as the frame is released, by means hereinafter described, the weight of the pins carries the frame down to setting position, and the pins having been set and released the spring carries the frame up to filling position. These results can be obtained by proper adjustment of the tension of the spring, as hereinafter set forth. It is to be understood that the arrangement shown in the drawings is merely a preferred embodiment that includes toggle link devices attached to the frame 16 and pivoted to a housing member 24, which may be mounted above the alley bed in any suitable manner, such as on the cross support 13. The frame counterbalancing effect, in the present embodiment, is accomplished by providing a spring member 25, which may be adapted for operation by expansion or contraction. The spring member 25, in the present instance, is adapted to operate by expansion, and is mounted over a rod 26 and preferably enclosed in a housing 27, which may be secured to the housing member 24 in any suitable manner, such as by a plurality of bolts 28. A spring seat 29 is suitably secured to the rod 26, and a second spring seat 31 is slidably positioned on the rod 26. Means are preferably provided for varying the tension and counterbalancing effect of the spring 25. To accomplish this, I provide a bearing unit 32, having screw threaded engagement in the housing 27, and which may be of any suitable length to provide for maximum adjustment towards and from the seat 29 to more or less compress the spring 25. The toggle link devices 23 include a plurality of levers or arms 33 pivoted to the housing 24, as at 34, and extending radially therefrom. Links 35 are connected to the ends of the arms 33 and to the frame 16, as at 36. Links 37 are pivotally connected to the arms 33 opposite the pivot 34 and to a bracket 38, which may be secured to the rod 26 in any suitable manner.

The pin spotter frame 16 is preferably of skeleton construction, comprising upper and lower, substantially triangular frames 41, 42, which are rigidly secured together by means of spacing braces 43. A series of pin-receiving pockets are arranged on the frame in accordance with the spots of the alley bed. A cup-shaped plate 44 is secured to the frame member 41 in each of these pockets to provide an abutment against which the pin may be positioned when the frame is in pin-receiving position, and a resilient pad 45 may be secured in each of these cup-shaped plates to cushion the pin and to eliminate undesired noise.

An inclined and curved chute 46 is provided for guiding the pins into the pockets and for supporting the pins in inclined or reclining position (Figs. 5 and 7). The chute 46 is preferably secured to the frame member 41 and to members 47 and 48 thereof, and may also be secured to the plate 44. The members 47 and 48 are arranged within the frames 41 and 42 in position to outline the pin-receiving pockets. Means movable relative to the frame are provided to locate the pins on the alley bed. These means, in the present instance, comprise cooperating ring members 51 and 52 which are pivotally mounted to the frame members 47 in each of the pin-receiving pockets, a common pivot 53 being provided on each side of the rings for each set of the ring members. Ring members 51, 52 are preferably of metal and formed to embrace the pin in two planes, one above and the other below the center of said pin when in pin setting position. The ring members 51 are connected together in rows extending between the front and back of the machine by a plurality of bars 54, which are secured to the rings, as at 55 (Fig. 5). The rings 52 are similarly secured together by bars 56, which are connected as at

57 to arms 58 formed integral with the rings 52.

Means are provided for controlling the cooperating ring members through the bars 54 and 56, which in the present instance comprise a shaft 61 having suitable bearings in the frame and rotatively mounted at the rear thereof. The shaft 61 is preferably square in cross section and is rotated by means of a spur gear 62, which is controlled by a rack 63 held in contact with the gear 62 by means of a bracket 64, which may be positioned over the shaft or secured to the frame or to a bearing for the shaft. A pair of arms 65 and 66 are positioned over the square shaft 61 between each row of pockets for the control thereof. The arms 65 and 66 extend outward from the shaft 61 in different directions, or at an angle of approximately 30 degrees to each other and are connected to the bars 54 and 56 by means of connecting links 67 and 68. While any suitable means may be provided for rotating the shaft 61, I provide a means for accomplishing this result, through the rack 63, and for cooperating with the means for controlling the movement of the frame 16 toward and from the alley bed. This, in the present instance, comprises a toggle link device which includes a control lever 71 at each side of the machine, which is preferably pivoted to the cross support 13, as at 72. The levers 71 are of sufficient length to provide for manual manipulation and are preferably provided with a handle or cross connector 73 for connecting the ends thereof. An arm 74 extends upward from each of the levers 71 and a link 75 is pivoted thereto. Each of the links 75 is pivotally connected to a collar 76 positioned over and secured to guide rods 22, the lever 71 and the link 75 forming a toggle for controlling the rods 22, and hence, the frame 16. It is to be noted that guide rods 22 are not fixed to the frame 16, but are mounted in a stop bracket 77 on the frame and are provided with an enlarged portion 78 at their ends. A spring 79 is positioned over the rod 22 between the frame 16 and the collar 76 and holds the enlarged portion 78 normally in contact with the bottom face of the bearing 77 for lifting the frame. A link 81 is also connected to the lever 71 at a point where the desired relative movement may be obtained and is connected to an arm 82 of a bell crank 83, which is pivoted on a stub shaft 84, mounted in bearings 85, which may be secured to the frame in any suitable manner. The rack 63 may be connected to an arm 86 of the bell crank 83, as at 87. Means are preferably provided to lock the frame against predetermined movement when in pin-receiving position, or such movement as may be caused by an operator resting his weight upon the frame when avoiding flying pins or balls, or to prevent downward movement from causes other than by the operation of the control handle. To accomplish this, I provide a depending hook member 88, which is pivoted on the bracket 19 at 90, having a hook portion 89 formed to engage beneath the stop bracket 77. The hook member 88 is also formed to provide a cam portion 91 adapted to extend outwardly therefrom and into the path of movement of the collar 76. When the frame is brought to raised position, the hook member 88 swings by gravity into engagement beneath the stop bracket 77 to lock the frame in elevated position. Movement of the operating handle controls the movement of the bars 22, and the frame 16 being yieldably connected thereto, sufficient downward movement of the bar 22 is permitted to disengage the hook portion 89 from beneath the stop bracket 77 before movement of the frame 16 can occur. In order to prevent vibration or movement during the pin-setting operation, the frame 16 is brought into contact with the alley, and to eliminate unnecessary noise, yieldable parts 95 are provided which may be attached to brackets 96 secured to the frame 16.

In operation, the frame 16 is normally held above the alley bed in the position shown (Fig. 1), the counterbalancing mechanism being of sufficient power to lift the frame when empty. When the frame is in this position, the movable members, or cooperating rings 51 and 52, are in the position shown in Fig. 7. In this position, it will be noted that a pin may be inserted into the pocket through the rings but cannot drop through the pocket, and is supported between the plates 44 and 46. When all of the pockets are filled with pins, the counterbalancing mechanism should be just equal to the load. It is not necessary, however, that the pockets be filled, as it is frequently necessary to set certain pins while other pins remain in position on the alley bed. During the first small portion of the downward movement of the frame and before reaching the top of the pin, the cooperating rings assume the position shown (Fig. 5), so that any pins remaining on the alley bed may pass therebetween, the pins in the pockets being supported by the plates 44 and the rings 52. This position is controlled by the point of connection of the links 81 with the control lever 71, and is substantially maintained until the frame 16 strikes the alley bed. Further movement of the operating lever 71 causes movement of the guide rods 22 in the brackets 77, compressing the spring 79, and also further movement of the cooperating ring members 51 and 52, this movement being continued until the pins are embraced, as shown (Figs. 6 and 9). Upon upward movement of the operating lever 71, the cooperating ring members separate, first to release the pin, due to the

force of the springs 79, and, during the further upward movement of the frame, are brought back to pin-receiving position. When in the upper position, the frame being locked by the latching device, the hooks 89 catching under the brackets 77, downward movement of the frame is prevented except by the operation of the operating lever. Downward movement of the operating lever 71 may, if desired, be limited by means of a pin or pins 97 secured to the handle 71 in position to engage the links 75, or any suitable fixed stop.

Cushioning means are preferably provided to control the action of the counterbalancing device or devices to prevent jarring or undue noises, and are also desirable to prevent sudden movement of the frame, such as may cause dislocation of the pins. To accomplish this, I provide a pneumatic means for controlling the action of the spring 25. The housing member 24 is formed to provide a cylinder 98, and a piston head 99 is suitably secured to the end of the rod 26, which is mounted coaxially with the cylinder 98. The piston head 99 may be provided with suitable packing rings 101, if desired, or may be otherwise suitably formed to provide a seal between the piston head and the wall of the cylinder 98, and may be apertured, as at 102, to provide a by-pass communicating with opposite sides of the piston head, the size of the aperture being determined in accordance with the desired cushioning effect.

It will be noted that the levers 33 are of angular formation and when the setter frame is in upper position, the short arms of these levers are horizontal, or nearly horizontal, with the long arms extending up. As the spring within the housing is compressed through the lowering of the frame to the alley bed, the spring pressure, i. e., the spring resistance, greatly increases. The lever construction is such that the effective ratio between the short and long arms of the levers lowers and, in a measure, the power of the levers correspondingly increases, so that the lower position of the frame is attained by the exertion of a pressure which is uniform throughout its travel, or which is uniform for all practical purposes.

Means are preferably provided to control the pin setting mechanism to re-collect the pins from the alley upon occasion, such as when the operator resets the pins by mistake when certain pins remain on the alley to be played, or for any similar reason. To accomplish this, I provide a loose connection between the link 81 and the operating lever 71 and separate means for controlling this link to vary the normal action thereof. The link 81 is preferably slotted, as at 111, and engages over a pin 112, which serves as a means of connecting the link 81 to the operating lever 71. A lever 113 is also pivoted to the pin 112 and an arm 114 thereof is pivoted to the link 81.

Normally, the lever 113 is in the position shown in Fig. 2 and holds the link 81 in contact with the pin 112, due to the action of gravity exerted through an arm 115 and an operating handle 116. When it is desired to remove pins from the alley, the frame is brought down in pin setting position. The lever 113 at this time assumes the position shown in Fig. 3, and to remove the pins from the alley, the arm 115 is rotated in a counterclockwise direction a sufficient distance to bring the pins onto the plates 44 and into the position shown in Fig. 5. If it is desired to permit one or more pins to remain upon the alley, the operator may manually re-position the pins upon the spot and upon lifting the frame from the alley, the link 81 and lever 113 again assume the normal position shown in Fig. 2. In this way, any or all of the pins may be removed from the alley bed.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing 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. In a pin spotting machine for a bowling alley and the like, the combination of a setter frame movable toward and from the alley bed, a cross-support mounted above the travel of said setter frame in fixed position, guide parts fixed on said cross-support, and guide members movable with the setter frame and engaged with the fixed guide parts and adapted to pass said cross supports during the reciprocation of said setter frame.

2. In a pin spotting machine for a bowling alley and the like, the combination of a setter frame adapted to move toward and from the alley bed in setting operation, a central counterbalancing device above the setter frame, and members extending outwardly from said central counterbalancing device to above the corners of said setter frame.

3. In a pin spotting machine for a bowling alley and the like, the combination of a setter frame adapted to move toward and from the alley bed in setting operation, a central counterbalancing device above the setter frame, and counterbalancing members extending radially from said counterbalancing device for attachment to said setter frame.

4. In a pin spotting machine for a bowling alley and the like, the combination of a

setter frame adapted to move toward and from the alley bed in setting operation, a central counterbalancing device above the setter frame, and toggle links for manipulating said frame from said counterbalancing device.

5. In a pin spotting machine for a bowling alley and the like, the combination of a setter frame adapted to move toward and from the alley bed in the setting operation, and a suspending device for said pin setting frame comprising a plurality of sets of toggle links, a member of each set being connected to said setter frame.

6. In a pin spotting machine for a bowling alley and the like, the combination of a setter frame movable toward and from the alley bed in the setting operation, and a plurality of spring pressed levers for returning the setter frame to pin receiving position after a setting operation.

7. In a pin spotting machine for a bowling alley and the like, the combination of a setter frame movable toward and from the alley bed in the setting operation, a support mounted above the travel of said setter frame, a plurality of levers for counterbalancing said setter frame, and spring means for actuating said levers in their counterbalancing movement.

8. In a pin spotting machine for a bowlinw alley and the like, the combination of a setter frame movable toward and from the alley bed in the setting operation, a support mounted above the travel of said setter frame, a plurality of levers for counterbalancing said setter frame, and a spring common to all said levers for actuating said levers in their counterbalancing movement.

9. In a pin spotting machine for a bowling alley and the like, the combination of a setter frame movable toward and from the alley bed in the pin setting operation, a support above said setter frame, a lever connected to said setter frame, a spring carried upon said support for actuating said lever to produce a frame counterbalancing influence.

10. In a pin spotting machine for a bowling alley and the like, the combination of a setter frame adapted to move toward and from the alley bed in its pin setting operation, a support above the movement of said frame, a plurality of arms connected to said frame, spring means for actuating said arms to count rbalance said frame, and a housing for said spring means mounted upon said support.

11. In a pin spotting machine for a bowling alley and the like, the combination of a setter frame adapted to move toward and from the alley bed in pin setting operation, and having mechanism for accurately arranging the pins upon the alley bed, a manipulative lever movable in the direction of the desired movement of the frame upon manipulation, and means connecting said lever with said mechanism to produce actuation of said mechanism at predetermined points in the setter travel.

12. In a pin spotting machine for a bowling alley and the like, the combination of a setter frame adapted to move toward and from the alley bed in pin setting operation, and having mechanism for accurately arranging the pins upon the alley bed, and a lever adapted for manipulation in the direction of the movement of the setter frame for moving the setter frame and actuating said mechanism.

13. In a pin spotting machine for a bowling alley and the like, the combination of a setter frame adapted to move toward and from the alley bed in pin setting operation, a support structure, and a lever connected to the support structure and to the setter frame and adapted for manipulation by an operator to actuate said pin setter.

14. In a pin spotting machine for a bowling alley and the like, the combination of a setter frame adapted to move toward and from the alley bed in pin setting operation, a support structure, and a lever connected to the support structure and to the setter frame and adapted for manipulation by an operator to actuate said pin setter, said lever controlling both the vertical movement of the pin setter and the accurate arrangement of the pins upon the spots of the alley bed.

15. In a pin spotting machine for a bowling alley and the like, the combination of a setter frame adapted to receive the pins in reclining position and to right the pins as an incident to their deposit upon the spots of the alley bed, fixed supports arranged above the travel of said setter frame, a frame manipulating lever movable in a downward direction to lower the frame and connected to said frame and to said support, said lever actuating said setter frame to right the pins and arrange them in position on the alley bed, links extending up from the setter frame, arms extending out from the support and engaged by the links, spring means for elevating the ends of said arms for counterbalancing the setter frame and lifting it after a pin setting operation, a housing for said spring means mounted upon said support, guide sleeves carried by the support, and guide members arranged through said sleeves and fixed to said frame and reciprocating past said support.

16. In a pin spotting machine for a bowling alley and the like, the combination of a setter frame adapted to move toward and from the alley bed in setting operation, a counterbalancing device above the setter frame, links connecting said counterbalancing device with the frame and for the manipulation thereof, and a latching device for

preventing movement of said frame under predetermined conditions.

17. In a pin spotting machine for a bowling alley and the like, the combination of a setter frame adapted to move toward and from the alley bed in setting operation, a counterbalancing device above the setter frame, links connecting said counterbalancing device with the frame and for the manipulation thereof, and means for locking said frame against downward movement.

18. In a pin spotting machine for bowling alleys, 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 and automatically positioning the pins upon the alley, and a control lever for actuating said frame, said pin positioning means being actuated by a link connected thereto and to the frame control lever.

19. In a pin spotting machine for bowling alleys and the like, the combination of a setter frame movable toward and from the alley bed in setting operation, and central spring actuated lifting means for returning the frame to pin-receiving position after the setting operation.

20. In a pin spotting machine for bowling alleys and the like, the combination of a setter frame movable toward and from the alley bed in the setting operation, a plurality of spring-pressed levers for returning the setter frame to pin-receiving position after a setting operation, a plurality of pin-receiving pockets in said frame, cooperating ring members mounted on said frame to engage the pins at points remote from the center thereof, and means connected to the frame and to the support for controlling said cooperating ring members.

21. In a pin spotting machine for bowling alleys and the like, the combination of a setter frame movable toward and from the alley bed in the setting operation, a plurality of spring-pressed levers for returning the setter frame to pin-receiving position after a setting operation, a plurality of pin-receiving pockets in said frame, cooperating ring members mounted on said frame to engage the pins at points remote from the greater diameter of their body portions, and means connecting said frame and said support for controlling the movement of the frame and for actuating said cooperating ring members to engage said pins and position the same upon the alley.

22. In a pin spotting machine for a bowling alley and the like, the combination of a setter frame adapted to move toward and from the alley bed in pin setting operation, a plurality of pin-receiving pockets in said frame, cooperating rings pivoted in said frame and adapted for arranging the pins on the alley bed, and means for manipulating said rings including rack and gear devices.

23. In a pin spotting machine for a bowling alley and the like, the combination of a setter frame adapted to move toward and from the alley bed in pin setting operation, a plurality of pin-receiving pockets in said frame, cooperating ring members pivoted in said frame and movable in said pin-receiving pockets, and means for actuating said cooperating rings including a control shaft and rack and gear devices adapted to control said shaft.

24. In a pin spotting machine for a bowling alley and the like, the combination of a setter frame adapted to move toward and from the alley bed in pin setting operation, and means carried by said frame for locating the pins on the alley bed, said means being operable to locate the pins while the frame is resting upon the alley bed.

25. In a pin spotting machine for a bowling alley and the like, the combination of a setter frame movable toward and from the alley bed in pin setting operation, a support above said setter frame, a lever connected to said setter frame, a spring carried upon said support for actuating said lever to produce a frame-counterbalancing influence, and means for varying the action of said spring.

26. In a pin spotting machine for a bowling alley and the like, the combination of a setter frame adapted to move toward and from the alley bed in pin setting operation, guiding means for controlling the positioning of said frame, counterbalancing means for controlling the movement of said frame, and a device for operating said frame including a main operating lever, a link connected to said main operating lever and to the frame, and a second link connected to said main operating lever for controlling the movement of said movable parts on said frame.

27. In a pin spotting machine for a bowling alley and the like, the combination of a setter frame for disposing the pins upon the alley bed, spring actuated means for counterbalancing said frame, and a cushioning device for controlling said means.

28. In a pin spotting machine for a bowling alley and the like, the combination of a setter frame for disposing the pins upon the alley bed, spring actuated means for counterbalancing said frame, and a pneumatic cushioning device for controlling said means.

29. In a manually operable pin spotting machine for a bowling alley and the like, manually operable mechanism for positioning pins upon an alley, and means for controlling said mechanism to remove pins from said alley.

30. In a pin spotting machine for bowling alleys and the like, a pin setting frame

adapted to receive pins in reclining position and to move said pins to an upright position as an incident to the positioning thereof on the alley, and means for controlling said frame to return pins to reclined position for elevating said pins from the alley.

31. In a pin spotting machine for bowling alleys and the like, a pin setting frame adapted to receive pins in reclining position and to move said pins to an upright position as an incident to the positioning thereof on the alley, and means for returning certain pins to reclined position as an incident to the elevation thereof from the alley and permitting other pins to remain in position upon the alley.

32. In a pin spotting machine for bowling alleys and the like, a frame movable toward and from the alley bed in pin setting operation, means on said frame for positioning the pins on the alley, a device for controlling the vertical movement of said frame, and means cooperating with said device for reversing the action of said pin setting means.

33. In a pin spotting machine for bowling alleys and the like, a frame movable toward and from the alley bed in pin setting operation, means on said frame for positioning the pins on the alley, a device for controlling the vertical movement of said frame, and means cooperating with said device for controlling the movement of said pin setting means to collect pins from the alley.

34. In a pin spotting machine for bowling alleys and the like, a frame movable toward and from the alley bed in pin setting operation, means on said frame for positioning the pins on the alley, a device for controlling the vertical movement of said frame, and means cooperating with said device for controlling the movement of said pin setting means to collect pins from the alley and permitting certain pins to remain in position upon the alley.

35. In a pin spotting machine for bowling alleys and the like, the combination of a setter frame adapted to move toward and from the alley in a setting operation, devices in said frame for individually receiving the pins and conveying them for deposit to the spots on the alley bed, and mechanism operable to return the pins to said devices upon the lowering of the frame with the pins absent therefrom.

36. In a pin spotting machine for bowling alleys and the like, the combination of a setter frame adapted to move toward and from the alley bed in the setting operation, spring actuated means for returning said frame to normal position and against which the pressure of a setting operation must be accomplished by an operator, and levers through which the spring pressure acts, said levers having arms adapted to increase the lever ratio as the setter frame moves toward the alley.

37. In a pin spotting machine for bowling alleys and the like, the combination of a setter frame adapted to move toward and from the alley bed in the setting operation, spring actuated means for returning said frame to normal position and against which the pressure of a setting operation must be accomplished by an operator, and levers through which the spring pressure acts, said levers having arms adapted to increase the lever ratio in accordance with the increase of the spring resistance.

38. In a pin spotting machine for bowling alleys and the like, the combination of a setter frame adapted to move toward and from the alley bed in the setting operation, spring means for returning the setter frame to normal or upper position, and a manipulating device acting against such spring pressure and increasing in power as said spring pressure increases with the lowering movement of the frame.

39. In a pin spotting machine for bowling alleys and the like, the combination of a setter frame adapted to be moved towards and from the alley bed in the setting operation, members formed to embrace the pins, levers connected respectively with the said members, and mechanism for actuating said levers and movable with the setter frame.

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