

No. 644,546.

Patented Feb. 27, 1900.

C. W. CRAWFORD.  
BOWLING ALLEY.

(No Model.)

(Application filed Nov. 3, 1899.)

2 Sheets—Sheet 1.

Fig. 1,

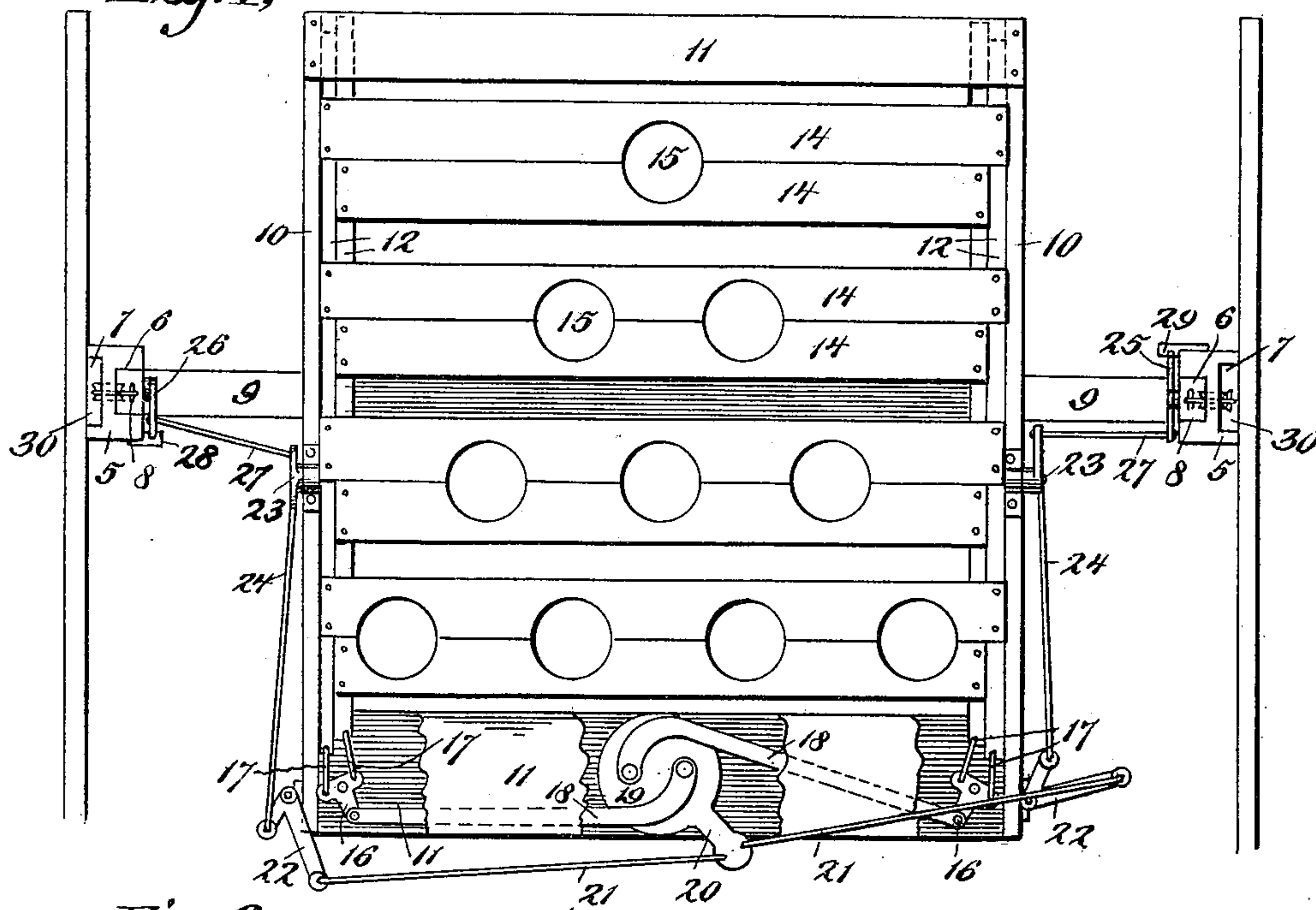
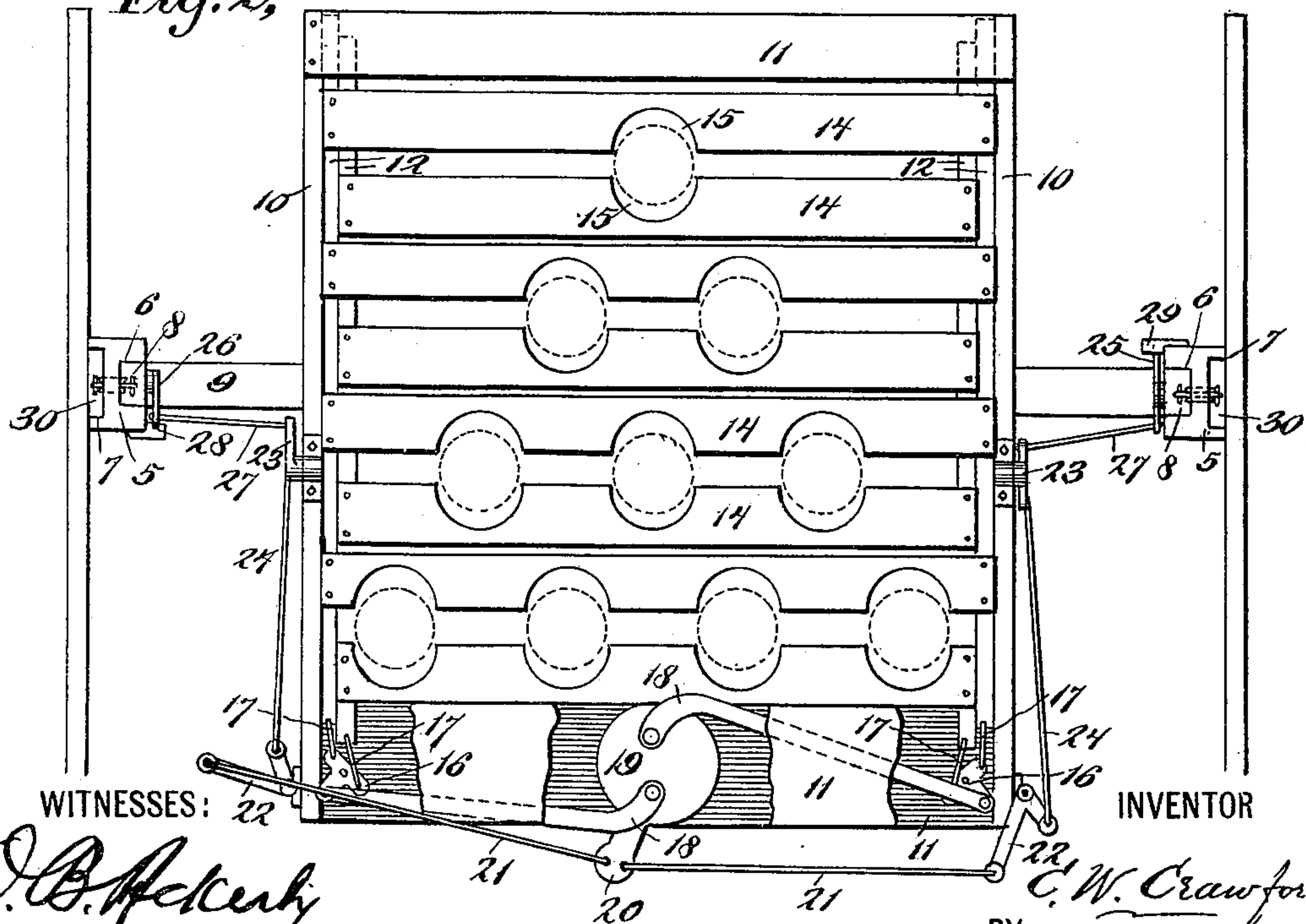


Fig. 2,



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Fig. 3.

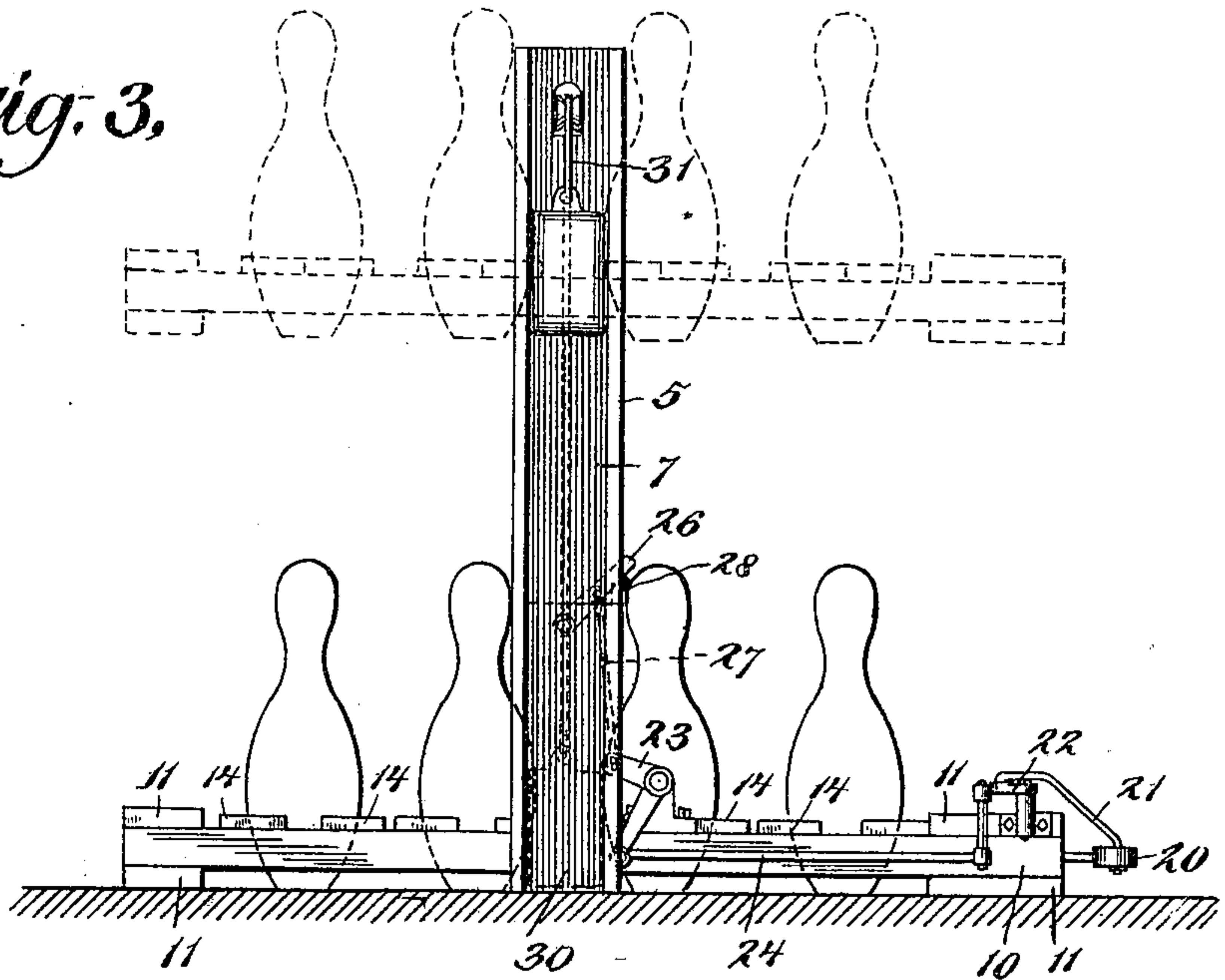
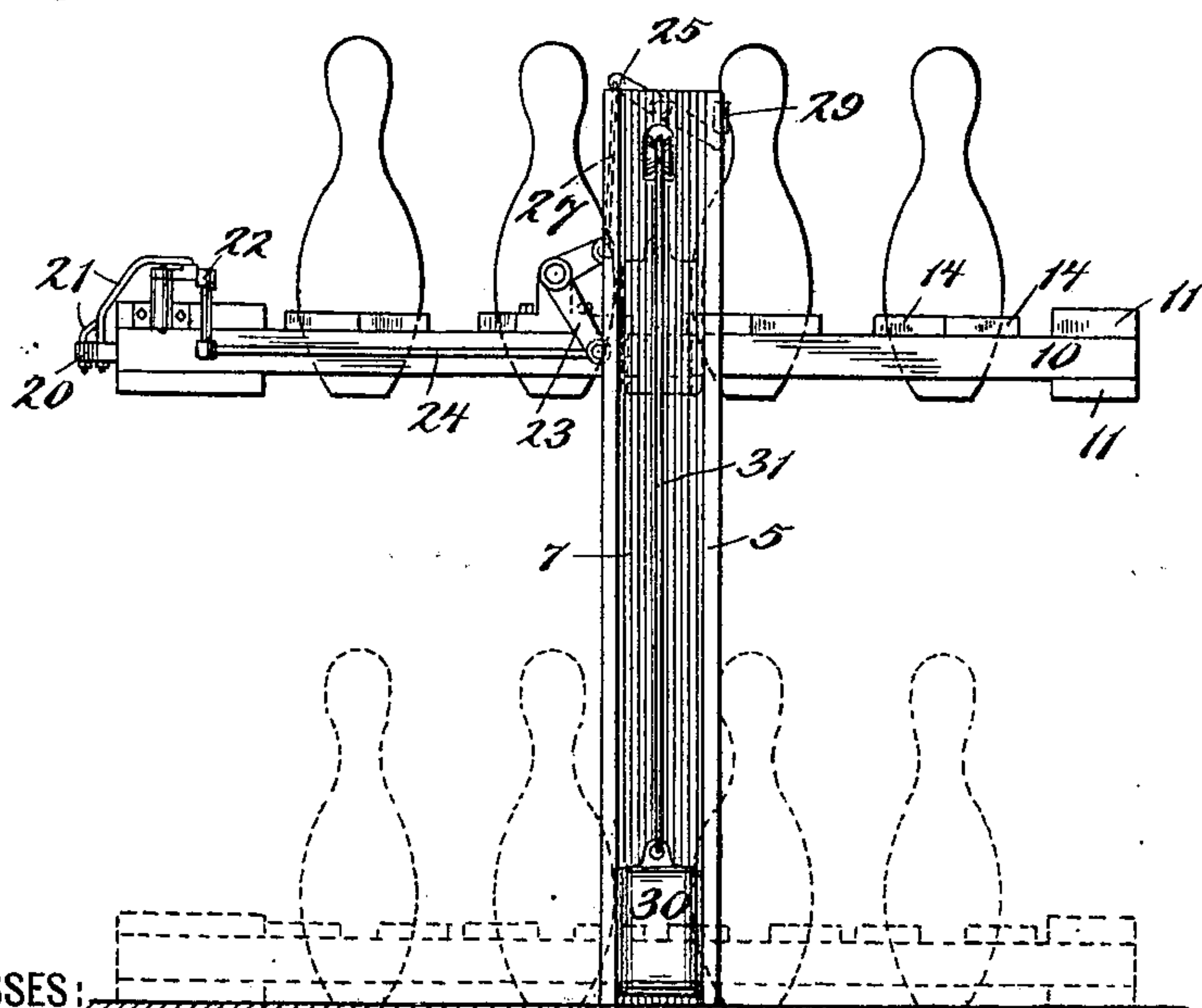


Fig. 4



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# UNITED STATES PATENT OFFICE.

CHARLES W. CRAWFORD, OF CINCINNATI, OHIO.

## BOWLING-ALLEY.

SPECIFICATION forming part of Letters Patent No. 644,546, dated February 27, 1900.

Application filed November 3, 1899. Serial No. 735,653. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES W. CRAWFORD, of Cincinnati, (Evanston,) in the county of Hamilton and State of Ohio, have invented  
5 a new and useful Improvement in Bowling-Alleys; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this  
10 specification.

My invention relates wholly to that part of a bowling-alley which comprises the means or contrivance employed to spot (or set up  
15 accurately on the pin-platform portion of the alley-bed) the pins to be bowled at.

Previous to my invention various devices or contrivances have been devised having for their object to reset or spot the pins of a bowling-alley more accurately than this is  
20 always or even usually done by the boys generally employed, to send home the bowled balls, and reset the pins for the players of whatever game may be played on the alley—as, for instance, tenpins, ninepins, &c.—but  
25 all the constructions of pin-setting devices or mechanisms heretofore devised that I know of may be properly divided into two genera—viz., first, that genus in which the mechanism for resetting the pins has some sort of perma-  
30 nent flexible connection with the bases or lower ends of the pins which operates to first draw or pull the displaced pins home to the localities from which they were knocked and to then force or pull the pins into erect  
35 positions, with their lower ends exactly on the respective spots on which the pins belong, and, second, that genus in which the pins are not permanently connected with any part of the mechanism for resetting them; but  
40 the latter comprises either a perforated vertically-movable pin-platform surface into the holes of which the boy puts the pins when said movable device is slightly elevated and which then, being caused to descend to the  
45 level of stationary spotted surfaces that are in the same plane with the alley-bed, deposits the pins on said spot-surfaces and in its lowered position constitutes, in connection with said spot-surfaces, the entire top surface of  
50 the pin-platform, or else comprises a fixed pin-platform which is perforated with holes larger than the extreme lower ends of the

pins and provided with vertically-movable spot-surfaces or devices, all in such manner that with said spot-surfaces depressed below  
55 the surface of the pin-platform the boy places the pins in said holes in which the lower tapering ends of the pins, of course, center themselves, whereupon on the rising of the  
60 said spot-surfaces (actuated by suitable mechanism) to the level of the pin-platform's surface the pins will be lifted (all exactly spotted) until their bottoms, the surfaces of the  
65 spot devices, and the stationary perforated top of the pin-platform all come flush or into plane. In the various species of these two  
70 genera of pin-setting means for bowling-alleys there, however, exist serious practical defects or objections which so far have rendered them of little or no use for full-sized  
75 alleys on which are played the games usually engaged in by bowlers.

The first-named genus under various specific constructions is objectionable, because  
80 the bases of the pins being permanently connecting with cords or chains for resetting them the pins are not free to be knocked about or to fly about, (against each other and the side buffers of the alley,) as is requisite  
85 in practice in the playing of the games usually played on a tenpin-alley, and, furthermore, the presence of the chains or cords on the pin-platform interferes with the rolling  
90 of the balls upon the surface thereof. Indeed, this genus of pin-setting apparatus, as is well known to bowlers and alley-keepers, though  
95 possessing some utility for the purposes of toy alleys, has never gone into use in full-sized alleys or is now never used thereon.

The second-named genus of pin-setting  
100 apparatus is objectionable on account of the impracticability of having either a movable perforated pin-platform surface, as in one species, or movable spot-surfaces or devices working up and down within the holes of such  
105 perforated platform. In a full-sized tenpin-alley it is necessary to have the pin-platform wholly stationary and unperforated or otherwise superficially mutilated with the pin-  
110 spots made thereon, and the practical problem is simply to set up the pins on these spots with greater accuracy than in practice is certain of accomplishment by the pit-boy engaged to do the pin-setting by hand. He has



to work quick, will not always take pains to set every pin exactly in its proper spot, and, while it is of course physically possible for a pit-boy to always set the pins up accurately, in practice this is not possible.

To provide for use a mechanical substitute for doing always accurately what has heretofore been done by hand is the new idea involved in my invention, which, to the end and object of effectuating this new idea into a tangible form, consists in the use, in combination with the ordinary—*i. e.*, the usual fixed spotted—pin-surface of a bowling-alley bed, of mechanism adapted to receive from the hands of the pit-boy a set of pins and operating to accurately deposit said pins on the spots of the alley-bed and to then move out of the way until again needed to perform said function, all as will be hereinafter more fully explained and as will be most particularly pointed out in the claims of this specification.

To enable those skilled in the art to make and use bowling-alleys provided with my new genus of pin-setter, I will now proceed to more fully describe the latter, referring by reference-numbers to the accompanying drawings, which form part of this specification and in which I have shown my invention carried out in that form in which I have so far practiced it, though it may of course be carried out in other specific forms of mechanism.

In the drawings, Figure 1 is a plan view of my new pin-setter with the pin receiver and depositor shown in an elevated position. Fig. 2 is a similar view showing the carrier in its lowered position. Fig. 3 is a side view looking toward the left of Fig. 2, and Fig. 4 is a side view looking toward the right of Fig. 1.

On the floor or other part of the alley two guide-standards 5 are mounted, the standards being formed with grooves or guideways 6 in their inner faces and grooves or guideways 7 in their outer faces. In the guideways 6 shoes or runners 8 respectively slide, and these runners are fastened rigidly to a beam 9, which extends horizontally across between the standards 5 and supports the carrier, which comprises side bars 10, rigidly joined by transverse bars or other connections 11. Mounted on each side bar 10 are two independently-movable slides 12, connected in pairs by the tenpin-holders 14. These holders 14 consist of a number of pairs of bars formed with registering curved openings 15, as shown in Figs. 1 and 2. The members of the several pairs of bars are arranged to move toward and from each other from the position shown in Fig. 1 to the position shown in Fig. 2, and reversely. Fig. 1 is the closed position in which the tenpins are held, as indicated by the dotted lines on Fig. 3 and full lines in Fig. 4, and Fig. 2 is the opened position. The members of the holders 14 are moved to their several positions by means of the slides 12, to which alternate holder members 14 are connected, as shown.

For operating the slides 12 to cause the

slides at each side of the carrier to move oppositely I provide two bell-crank levers 16, which have links 17 connecting them with the respective slides. The bell-cranks are also connected by links 18 with a crank-disk 19, pivotally mounted on one of the cross braces or beams 11. By throwing this disk 19 the bell-crank levers 16 will be operated and their movement transmitted to the slides 12, as will be understood. The crank-disk 19 has an arm 20, with which two links 21 are connected, the links extending oppositely to the respective sides of the carrier and are there respectively connected with the long arms of differential crank-levers 22, fulcrumed, respectively, on the side beams 10 of the carrier. Mounted at approximately the middle portion of each side beam 10 is a bell-crank lever 23, which are connected with the respective levers 22 by means of links 24. Fulcrumed on the respective shoes or runners 8 are tripping-levers 25 and 26, which are respectively connected with the bell-crank levers 23 by means of links 27. The lever 26 is adapted to engage with a detent 28, fastened to the adjacent standard 5, when the tenpin-carrier is in the lowered position shown by the full lines in Fig. 3, thereby to trip the lever 26 and throw the several parts 23, 22, and 19, so as to separate the members of the clamps 14, and thus release the tenpins, and the lever 25 is adapted to engage with a detent 29 at the upper end of the corresponding standard 5 when the carrier is in the raised position shown in Fig. 4, thus throwing the several parts connected therewith—*viz.*, 23, 22, and 19—so as to move the members of the clamps 14 together, thus placing them in position again to receive the tenpins.

The carrier is normally raised, as shown in Fig. 4, by means of weights 30, which slide in the grooves 7 of the standards 5 and which are connected with the shoes or runners 8 by means of cords or other flexible connections 31. These weights are adjusted so that they will raise the carrier when it is empty; but when the carrier is loaded with the tenpins the weights 30 will be preponderated and the carrier, with the tenpins, will drop to the position indicated by the full lines on Fig. 3.

In using the invention, assuming that the carrier is in the position shown in Fig. 1 and that the lever 25 has struck its detent 29, thus moving the sections of the clamps 14 together, the tenpins should be placed within the clamps, as shown, and when the last tenpin is in place the weight on the carrier will be such as to preponderate the weights 30, and the carrier will descend to the floor of the alley, thus striking the lever 26 against its detent 28 and throwing open the clamps 14, the tenpins meanwhile having been deposited accurately upon the spots or marks on the floor of the alley indicating the proper position of the tenpins. As the carrier is relieved of the weight of the tenpins, the weights 30



will assert themselves and automatically return the carrier to its uppermost position, thus placing it ready to be used again when the tenpins have been knocked down by the players and are again to be set or "spotted."

It should be understood that the openings 15 in the members of the clamps 14 are so arranged as to accurately conform to the position of the "spots" on the floor of the alley, thus insuring that the tenpins will be accurately placed.

Having now so fully described the construction and operation of my new pin-setter, made in that form shown in the drawings, that those skilled in the art can easily understand and practice my invention in either said shown and specific form or under some modified construction, what I claim as new, and desire to secure by Letters Patent, is—

1. In combination, with the usual, spotted, end portion of the bed of a bowling-alley, a mechanism adapted to receive a set of pins and operating to place the said set of pins on the spots of the alley-bed and then move away, to permit the usual free use of the alley-bed and spotted pins; substantially as set forth.

2. In a mechanism for spotting pins on an alley-bed, a carrier adapted to receive a set of pins; means for moving said carrier, and its pins to the proper position to bring the bases of said pins onto their respective spots on the alley-bed; and means for then releasing said pins from said carrier; substantially as and for the purpose set forth.

3. In a pin-setting mechanism, the combination, with a carrier, movable toward and from the surface on which the pins are to be set up and actuated in its movement toward said surface by the weight of the pins car-

ried, of means for effectuating the retention of the pins in the said carrier until it shall have carried them to their destination; and means for then automatically releasing the pins from the carrier; to permit the latter to be moved out of the way and into a position for reuse when needed; substantially as set forth.

4. In an apparatus for placing tenpins, the combination of guided standards, shoes running vertically thereon, a carrier attached to the shoes, tenpin-clamps mounted on the carrier, means for moving the clamps to open and close the same, and detents arranged to operate said means.

5. In an apparatus for placing tenpins, the combination of a vertically-movable carrier, clamps mounted thereon, the clamps comprising members movable toward and from each other to clamp the tenpins, bell-crank levers having connection with the members to move the same, a crank-disk having connection with the bell-crank levers, tripping-levers movable with the carrier and connected with the crank-disk, and stationary detents engaged by the tripping-levers to throw the members of the clamps.

6. An apparatus for placing tenpins, the apparatus comprising a carrier movable toward and from the floor, clamps mounted on the carrier and comprising members movable toward and from each other to clamp the tenpins, and means for operating the clamps.

In witness whereof I have hereunto set my hand this 31st day of October, 1899.

CHARLES W. CRAWFORD.

In presence of—

GEO. W. EDWARDS,  
BEN. V. TYLER.