No. 708,779. Patented Sept. 9, 1902.

C. J. OLSON.

BOWLING ALLEY.

(Application filed Oct. 11, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

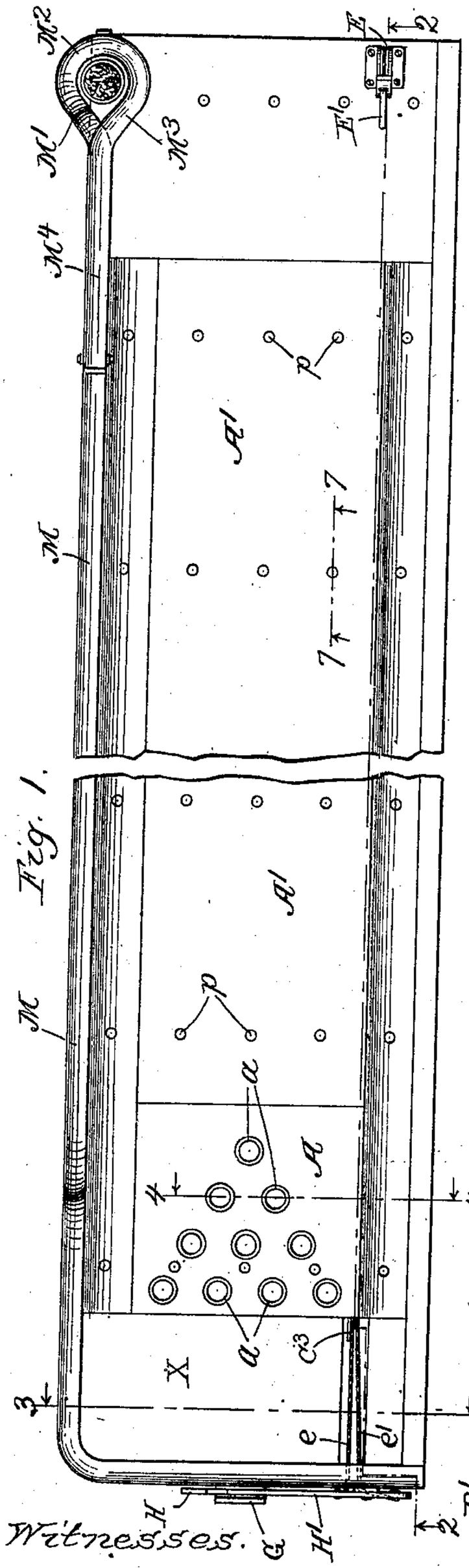


Fig. 2.

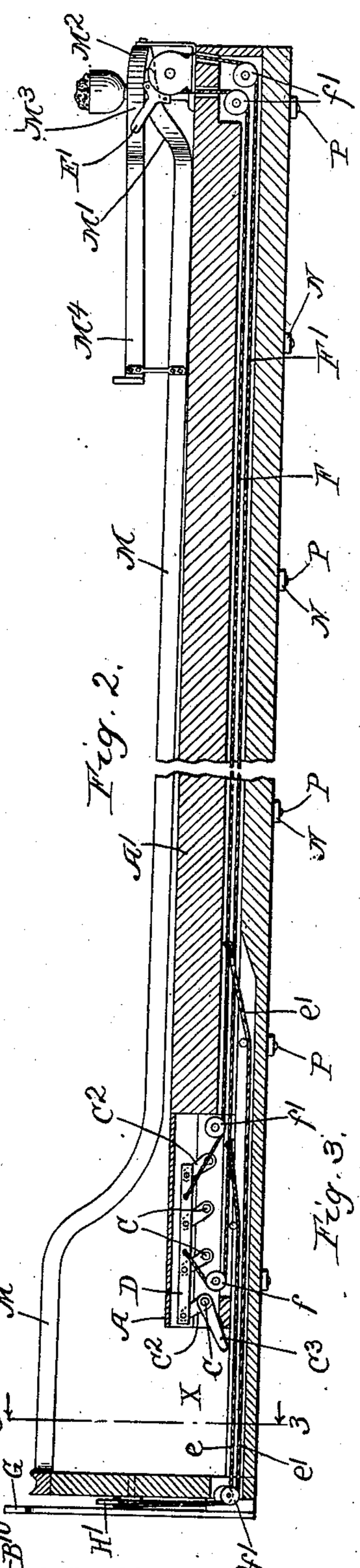


Fig. 5.

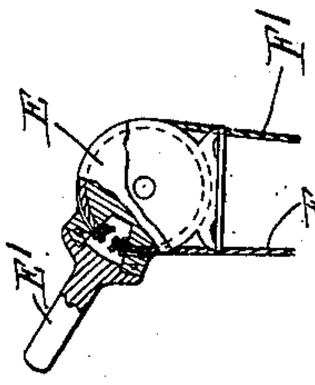


Fig. 4.

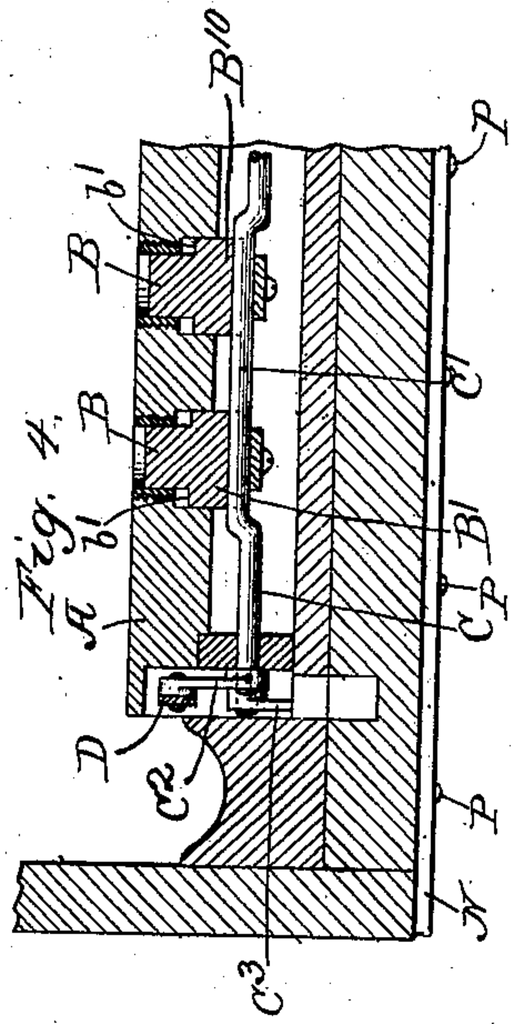


Fig. 3.

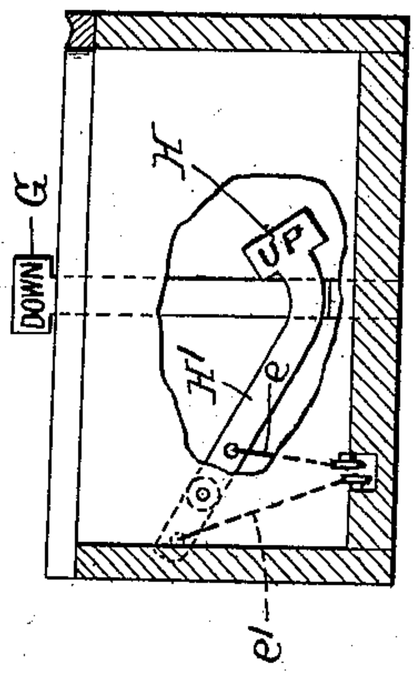
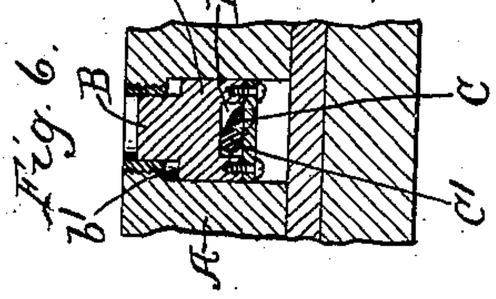


Fig. 6.



Witnesses.

Edward T. Wray.

Edgar L. Conant.

Inventor.

Charles J. Olson

by Burton & Burton

his Attys.

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2 Sheets—Sheet 2.

Fig. 7.

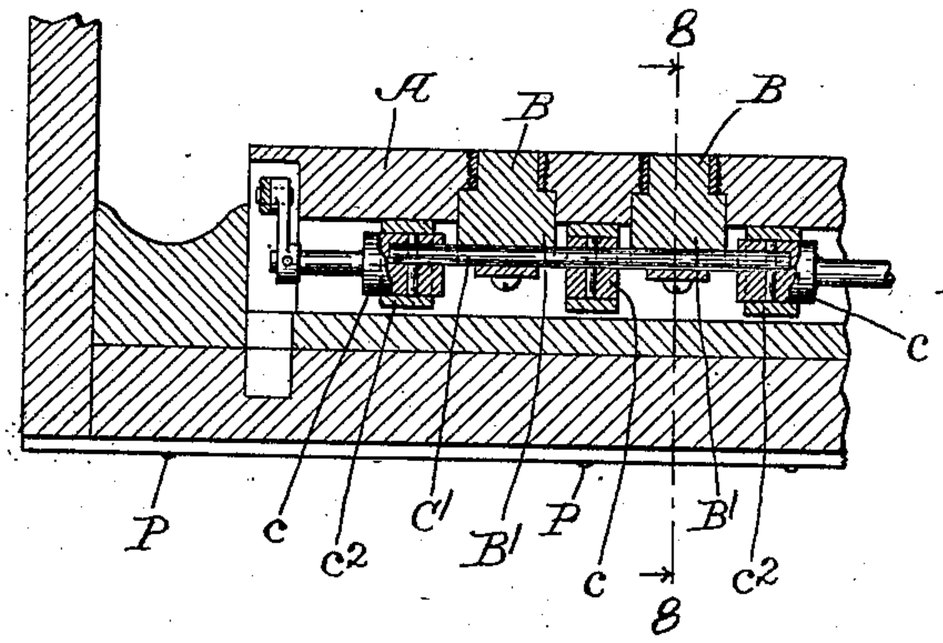
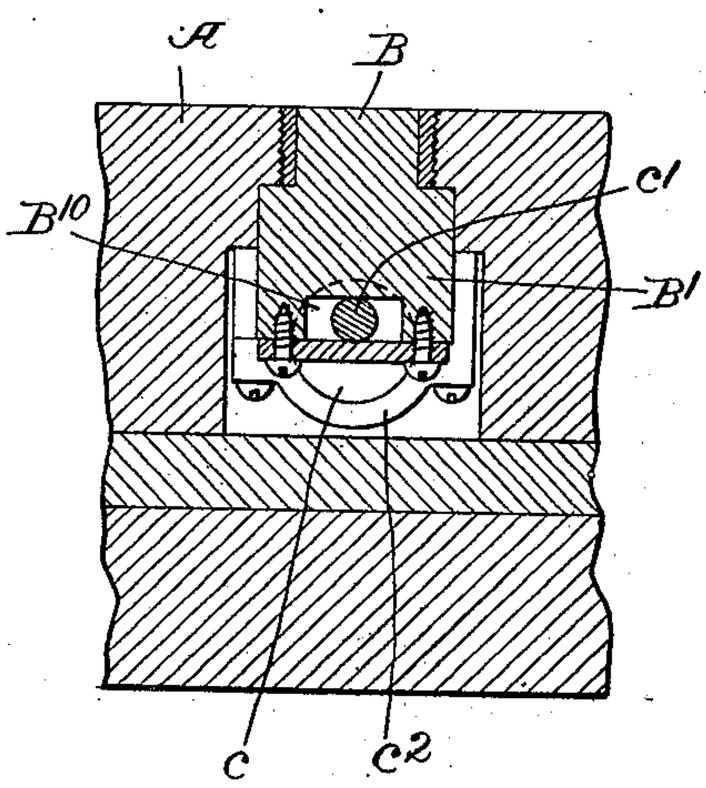


Fig. 8.



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UNITED STATES PATENT OFFICE.

CHARLES J. OLSON, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO NIELS BUCK, OF CHICAGO, ILLINOIS.

BOWLING-ALLEY.

SPECIFICATION forming part of Letters Patent No. 708,779, dated September 9, 1902.

Application filed October 11, 1900. Serial No. 32,674. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. OLSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Bowling-Alleys, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

In the drawings, Figure 1 is a plan of my improved bowling-alley, having the middle portion of the extent broken away to condense the figure. Fig. 2 is a longitudinal section at the line 2 2 on Fig. 1, showing the mechanism in side elevation. Fig. 3 is a transverse section at the line 3 3 on Figs. 1 and 2 looking in the direction of the arrow 3 on said figures. Fig. 4 is a detail section at the line 4 4 on Fig. 1. Fig. 5 is a detail side elevation of a certain cable-actuating sheave and its connections for operating the pin-centering devices. Fig. 6 is a detail section at the line 6 6 on Fig. 4. Fig. 7 is a detail section axially through one of the plunger-operating shafts, showing a modification of that shaft and the eccentric plunger-actuating elements thereon. Fig. 8 is a detail section at the line 8 8 on Fig. 7.

My improved bowling-alley comprises two features constituting my invention. The first relates to means for centering the pins on their respective spots, or, as it is commonly termed, "spotting the pins." For the purpose of this part of my invention I provide the pin-deck A with sockets *a a*, corresponding to the proper positions of the pins, adapted to receive the lower ends of the pins, and thus definitely center them on their respective spots. These sockets are most conveniently formed by boring holes entirely through the deck; but I term them "sockets," because the lower part of each aperture is occupied by the upper end of the plunger B B, &c., which intrude into them and are adapted to be thrust upward in the socket until the upper end is flush with the surface of the deck, and thereby lift the pin bodily, the upper ends of the plungers at their elevated position completing the surface of the deck, as if no sockets had been formed therein. The plungers B B have downward extensions B′, which are suitably guided vertically below the deck and have shoulders *b′*, facing upward and colliding with stop-shoulders formed by counterboring the socket-holes *a* from the under side of the deck, limiting the upward thrust of the plungers at the position at which the upper ends of the latter are flush with the upper surface of the deck. The sockets are preferably provided with metal bushings *a′*, screwed up from below into place, lining the sockets. Said extensions B′ have the oblong apertures B^{10}, and in the framework which supports the deck there are journaled rock-shafts C C C, &c., extending underneath the several rows of sockets and plungers and through the apertures B^{10} of the extensions B′ of the plungers, and on these shafts are formed eccentrics or crank-wrists C′ C′, &c., which engage the plungers in said extensions as the shaft is rocked or partly rotated, raising or depressing the plungers, according to the direction of rocking of the shaft. The apertures B^{10} are elongated horizontally to accommodate the movement of the wrists or eccentrics C′. On the same end of the several shafts they are each provided with a lever-arm C^2, and said arms are connected by a bar D, so that the shafts may all be rocked simultaneously by the same means. The means which I have shown for rocking the shaft consists of cables F F′, connected to the bar D, the cable F extending from its attachment to said bar toward the entrance end of said alley and the cable F′ extending from its attachment to the bar in the opposite direction about a guide-pulley *f*, thence returning to the entrance end of the alley, both cables being attached to the same sheave E, mounted at convenient position near the entrance end and having a handle E′, by which it may be operated, the cables running in opposite directions around the sheave from their respective points of attraction thereto. Obviously the two cables might be united and form an endless cable attached to the sheave and to the bar D. I have made it in two pieces, preferably attached to the bar D and to the sheave at the other end, merely for convenience in assembling the parts. The ca-

bles are guided about the pulleys $f' f' f'$, which will cause them to occupy convenient positions along the length of the alley.

In order that the player may know whether or not the plungers have been depressed after the pins have been set, I provide at the head of the alley beyond the deck an indicator G, marked in any suitable way to indicate visibly one position of the plungers, (whether up or down,) and I provide in addition an indicator H, adapted to be moved from a position at which it obstructs the view of the fixed indicator to a position at which it is itself concealed or obstructed behind the inclosing end wall of the alley, the latter movable indicator being marked to indicate the opposite position from that which is denoted by the fixed indicator. The movable indicator is connected to the mechanism for operating the plungers. The connection shown in the drawings and most conveniently made consists in extending branches $e e'$ from the two plies of the cable F to the lever H', which carries the indicator H at opposite sides of the fulcrum of said lever, so that when the cable E is actuated in one direction it throws the indicator H into visible or display position, and when the cable is actuated in the opposite direction it moves said indicator into concealed position. As illustrated, the fixed indicator is marked to denote the depressed position of the plungers—that is, the position at which the sockets are open to receive the pins—and the movable indicator is marked to denote the opposite position. Inasmuch as the movement to be given the plungers is very short and requires a very short crank or slightly-extended projections of any sort to communicate such movement and inasmuch as the shaft is of considerable length and should have bearings adjacent to the several plungers in order to prevent inaccuracy from the springing of the shaft, I prefer the specific construction shown in Fig. 8, wherein the shaft at its bearing has a sufficient diameter to take in the entire sweep of the crank-arm or eccentric projection of whatever sort which actuates the plungers. These enlarged journals of the shaft are shown at c, the crank-wrist c' in this construction constituting the connection between the journals, the latter having journal-bearings in hangers C^2, which are suitably attached to the under side of the deck.

In order that the attendants at the foot of the alley may operate the plungers, both raising them and lowering them, as occasion requires, any suitable operating mechanism may be made with the mechanism—as, for example, the lever-arm C^3 on one of the rock-shafts C, such lever-arm extending out into the pit or pocket X beyond the deck and so entirely out of the way of the balls during play.

I claim—

1. In a bowling-alley, the pin-deck, having sockets for the pins, in combination with plungers in such sockets; means for guiding them at their lower part; shafts extending under the rows of sockets having projections which engage the downward extensions of the plungers respectively when the shafts are rocked or rotated in direction to carry said shaft projections upward.

2. In a bowling-alley, the pin-deck, having sockets for the pins, in combination with plungers in such sockets having downward extensions, and shafts extending under the rows of sockets and plungers, having eccentric abutments or crank-wrists which engage the downward extensions of the plungers respectively when the shafts are rocked or rotated in direction to carry said abutments upward.

3. In a bowling-alley, the pin-deck, having sockets for the pins, in combination with plungers in such sockets having downward extensions; shafts extending under the rows of sockets and plungers, having eccentric abutments or crank-wrists which engage within the downward extensions of the plungers respectively abutting thereon both upwardly and downwardly, and thereby actuating them positively upward and downward as the shafts are rotated.

4. In a bowling-alley, the pin-deck, having devices for centering the pins on their respective spots; means for disengaging the pins from such centering devices at will; a fixed indicator denoting one of said positions of the disengaging means; and a movable indicator connected to the disengaging means and moved thereby into position obstructing the display of the fixed indicator.

5. In a bowling-alley, the pin-deck, having sockets for the pins, in combination with plungers in such sockets respectively, and means for raising and depressing the plungers at will; a fixed indicator, indicating one of the positions of the plungers, and a movable indicator connected to the plunger-operating mechanism and moved thereby into and out of display position, obstructing and disclosing the fixed indicator.

6. In a bowling-alley, the pin-deck, having sockets for the pins, in combination with plungers in such sockets; rock-shafts extended underneath the rows of sockets and plungers having eccentric abutments arranged to actuate the plungers as the shafts are rocked; lever-arms on the rock-shafts respectively; a bar connecting said lever-arms, whereby all the lever-arms may be actuated simultaneously by the same means; a cable connected to said bar; a guide-pulley for the same beyond said connection, said cable extending from its connection and from the guide-pulley in two plies to the entrance end of the alley; and suitable means at said entrance end connected to the two plies for actuating the bar in either direction at will.

7. In a bowling-alley, the pin-deck, having sockets for the pins, in combination with plungers in such sockets having downward extensions, shafts extending under the rows of

sockets and plungers, comprising enlarged journals and wrists eccentric with respect to the journals and connecting the same, and fixed bearings for the journals, the plungers having horizontally-elongated wrist-bearings at which said eccentric wrists are engaged therewith.

In testimony whereof I have hereunto set my hand, at Chicago, Illinois, this 26th day of September, A. D. 1900, in the presence of two witnesses.

CHARLES J. OLSON.

In presence of—
CHAS. S. BURTON,
EDGAR L. CONANT.