Aug. 29, 1950 J. F. TIMBERLAKE 2,520,662

INDICATING DEVICE FOR BOWLING ALLEYS HAVING ELEVATABLE PIN RECEIVING MEANS

Filed June 2, 1947

Fig. 1.

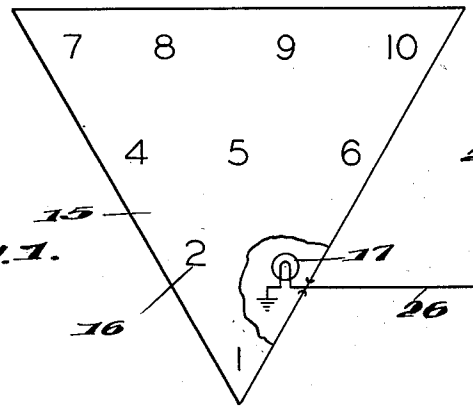


Fig. 2.

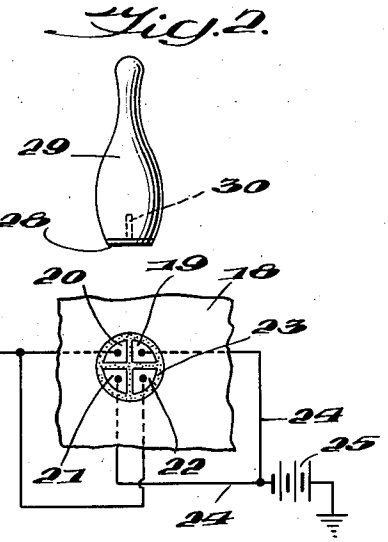


Fig. 3.

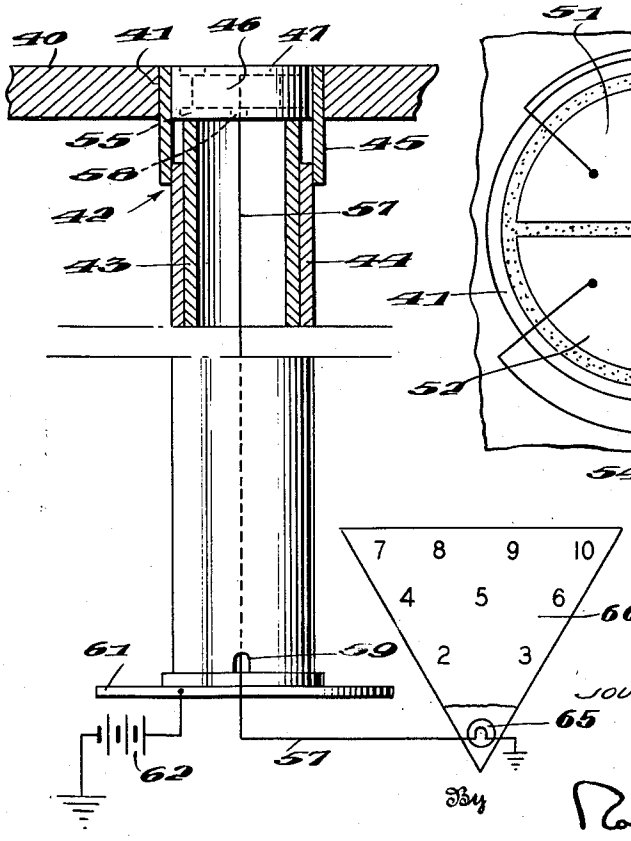
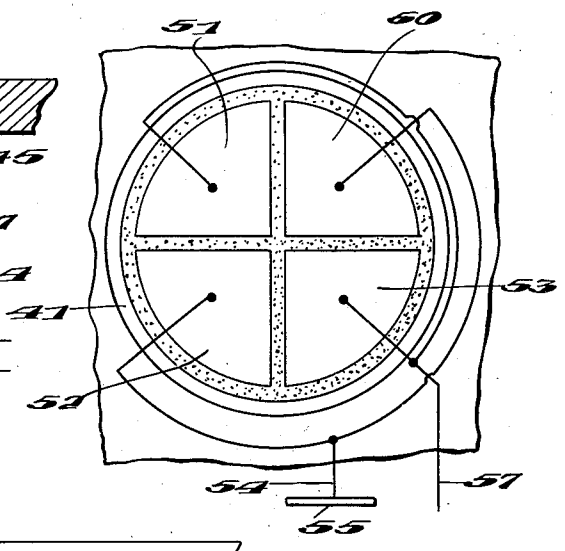


Fig. 4.



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INDICATING DEVICE FOR BOWLING ALLEYS HAVING ELEVATABLE PIN RECEIVING MEANS

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2 Claims. (Cl. 273—46)

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This invention relates to indicators, and more particularly to indicators for use with bowling alleys to inform the bowler as to which pins have been knocked down and which remain standing.

Because of the length of bowling alleys it is often difficult for bowlers, and particularly bowlers having impaired eyesight, to tell exactly which pins remain standing and which pins have fallen. It is particularly important that this information be clearly and readily available when a pin setting machine of the type described in my co-pending application, Serial No. 720,787, filed January 8, 1947, is in use.

With the machine to which I have referred, it is usually necessary after one ball has been bowled to sweep all of the pins from the alley and reset the pins which were not knocked down by the ball. This resetting is controlled at the bowler's end of the alley and a simple and clear indicator for showing which pins must be reset is of considerable convenience.

One object of the invention is to provide an indicator for use with bowling alleys to indicate which pins are standing and which have fallen.

Another object of the invention is to provide an indicator of the type referred to above for use with the pin setting machine disclosed in my above-referred-to co-pending application.

A further object of the invention is to provide an indicator as described above which is simple and inexpensive to manufacture and maintain in order, and which gives a clear indication of the desired information.

Still another object of the invention is to provide a novel switching arrangement for use with indicating means in bowling alley having elevatable pin receiving means.

These and other objects will be apparent from the following specification and the accompanying drawing, in which:

Fig. 1 is a diagrammatic view of an indicator for use with the ordinary type of bowling alley;

Fig. 2 is a side elevational view of a bowling pin adapted for use with the indicating device;

Fig. 3 is a diagrammatic view of the indicator as constructed for use with the pin setting machine described in my above-mentioned co-pending application; and

Fig. 4 is a partly diagrammatic plan view of the conducting plates and the insulating block shown in Fig. 3.

Briefly stated, the invention comprises a plurality of electrically conducting plates, conveniently four in number, mounted in the floor of the

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alley at the set position of each of the bowling pins. Each of the plates at each pin position is insulated from the other plates at that position and the plates are connected into an electrical circuit which is arranged to energize a light in an indicating board. The lights on the indicating board are arranged relative to each other in the same manner in which the pins are arranged when in their set positions on the bowling alley. Each bowling pin has an electrically conducting plate fastened to its lower end so that when the pin is in its set position on the aforementioned conducting plates in the floor of the alley the electrical circuit will be completed from one of the floor plates through the base plate of the pin to another of the floor plates to cause the light corresponding to that pin position to be energized, indicating the presence of the pin in its set position. Whenever a pin is knocked down, the circuit to the corresponding light will be broken and the light will become deenergized, indicating to the bowler that the pin corresponding to that light is down.

In the device shown in Fig. 1, the numeral 15 indicates a triangularly shaped indicating board having its front face made of opaque material. In positions corresponding to the set positions of the pins in the alley, are numerals 16 running from 1 to 10 made of translucent material. Mounted behind the indicating board at the position of each of the numerals 16 are ten electric light bulbs, one of which is shown at 17.

In the floor 18 of the alley at the set position of each of the pins are a plurality of electrically conducting plates 19, 20, 21 and 22. In Fig. 1 these plates are four in number and are segment shaped, but it should be understood that other numbers and shapes of conducting plates can be used as long as they serve the desired purpose, as will be explained presently.

Plates 19 through 22 are separated from each other by insulating material 23 which may either be the wood of the alley itself, or may be a different type of insulation, as for instance a plastic material which could be poured into holes in the alley surface in fluid condition. Two of the oppositely positioned plates 19 and 21 are connected by means of wires 24 to one terminal of a source of electrical energy 25, the other terminal of source 25 being grounded. The other two oppositely disposed plates 20 and 22 are connected by means of wire 26 to one end of the filament of one of the bulbs 17 while the other end of the filament is grounded. It will be apparent that bulb 17 may be energized by electrically connect-

ing any two adjacent plates of the group of plates 19 through 22.

The electrical connection between plates 19 through 22 is accomplished by means of a conducting plate 28 (Fig. 2) attached to the bottom of bowling pin 29, so that when the pin is in its set position centered on plates 19 through 22, the plate 28 will connect plates 19 through 22 in such a manner as to energize bulb 17.

Although not shown in the drawing, the upwardly projecting pins commonly used to center the bowling pins at their set positions may be positioned to extend upwardly above the surface of the alley between plates 19 through 22 into opening 30 in the base of the bowling pin.

Plates 19 through 22 are, of course, positioned with their upper surfaces flush with the surface of the bowling alley so that the pins are maintained upright in the usual manner.

Figures 3 and 4 show the adaptation of this invention to use with the bowling pin setting machine described in my above-referenced co-pending patent application. In the machine described in that application, the surface 40 of the bowling alley is provided with a circular opening 41 at the set position of each pin, and a pin receiver generally denoted by the numeral 42 is arranged so as to move upwardly through each opening 41 to receive a pin from an overhead device which need not be described herein.

The pin receiver 42 comprises a stationary inner guide tube 43 which terminates at its upper end a short distance below the alley surface 40, and about which is slidably positioned a shorter outer tube 44. A sleeve 45 of greater diameter than tube 44 is mounted about the upper end of tube 44 and is attached thereto in any convenient manner as by welding. A block 46 of insulating material fits within sleeve 45 and is normally positioned with its upper surface 47 flush with the surface 40 of the alley by the contact of its bottom surface with the upper end of inner guide tube 43 upon which block 46 rests.

When outer tube 44 and sleeve 45 are elevated above the surface of the alley by means which are described in my co-pending application, the shoulder formed by the upper end of tube 44 picks up the block 46 during the upward movement so that when the pin receiver comprising tube 44 and sleeve 45 reaches its elevated pin receiving position, the upper surface 47 of block 46 is spaced substantially below the upper end of sleeve 45 and constitutes the bottom of a cup shaped pin receiving opening in sleeve 45.

When the pin receiver 42 is again lowered to its normal position as shown in Fig. 3, block 46 is halted in its downward movement by the upper end of guide tube 43 and remains in its normal position with its surface 47 flush with the surface 40 of the alley.

As adapted for use with the present invention, block 46 is provided on its upper surface with four segment shaped conducting plates 50, 51, 52 and 53, each of which is insulated from the other plates and from sleeve 45. Obviously disposed plates 50 and 52 are connected by means of wire 54 to a plate 55 attached to the lower surface of block 46 so as to engage the upper end of guide tube 43. Plates 51 and 53 are connected to insulated wire 57 which passes downwardly through a hole 58 in plate 55, and then downwardly through the interior of guide tube 43 and out through an opening 59 at the lower end of tubes 43 and 44. Wire 57 is then connected to a grounded light bulb 65 of an indicator board 66 as in the embodiment shown in Fig. 1.

A base plate 61 which supports guide tube 43, and to which the guide tube is attached, is connected to one terminal of a source of electrical energy 62, the other terminal of which is grounded. The connections could, of course, be varied by placing electrical energy source 62 between bulb 65 and ground or in the connection 57 between bulb 65 and plates 51, 53.

It will now be apparent that plates 50 and 52 are connected by means of the contact of plate 55 with guide tube 43 to the source 62. The other two plates 51 and 53 are connected by means of wire 57 to the appropriate bulb 65 of the indicator board 66.

There is of course one of the pin receivers 42 at the set position of each of the bowling pins, and each pin receiver is connected to the corresponding bulb 65 of the indicator board 66.

The operation of this embodiment of the invention is the same as in the embodiment shown in Fig. 1, the appropriate light bulb 65 being energized only when a bowling pin as shown in Fig. 2 is standing in its set position.

If desired, block 46 could be of conducting material and two plates similar to plates 50—53 could be positioned in the upper surface of the block and insulated from the block. These two plates could be attached to wire 57, the remainder of the block serving as a ground connection.

The indicator board 15 or 66 may be positioned either at the bowler's end of the alley or at the other end of the alley in an elevated clearly visible position. When used with the pin setting machine to which I have referred, the indicator board is conveniently attached to the front end of the mechanism which is positioned above the set positions of the pins, and facing toward the bowler.

In the pin setting machine described in my co-pending application, there is described a control panel having a plurality of switches, one for each of the ten pin setting positions, and arranged in the same relative positions on the panel as the pins are arranged on the alley. The electric indicator bulbs of the present invention could conveniently be located adjacent the corresponding switches on the control panel so that the bowler by moving the switches adjacent the lighted bulbs could reset the pins corresponding to those bulbs to prepare for the bowling of the next ball.

Only very simple embodiments of the invention and the electrical circuits thereof are shown herein, as they are presented only for illustrative purposes. I realize fully that the invention is susceptible of numerous embodiments and I do not wish to limit my invention to the embodiments shown and described herein. It is my intention to cover all embodiments of the invention falling within the inventive concept as defined by the appended claims.

I claim:

1. In a bowling alley having a plurality of elevatable pin receiving means one of which is located at the set position of each pin, and utilizing pins having electrically conducting bottom portions, each of said pin receiving means including an electrically conducting support, a block normally resting on the support with the upper surface of the block flush with the alley surface, and means for raising said block to a pin receiving position above the alley surface and out of contact with said support, the ar-

rangement comprising a switch combined with each of said receiving means and including switch contacts located within the said block of each pin receiving means so as to be electrically connected by a bowling pin sitting in its set position, insulation in the block separating said contacts from each other, an electrically conducting element mounted on the underside of each block for contacting the corresponding support, a connection in each block between at least one of its switch contacts and the conducting element of that block, a first circuit connection to at least one other of said switch contacts in each block, and a second circuit connection to each of said supports, whereby the presence of a bowling pin on a block connects the two circuit connections for said block only when the block is in its normal position flush with the alley surface.

2. The structure set forth in claim 1, said supports being hollow, and said first connections passing downwardly through said supports.

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