

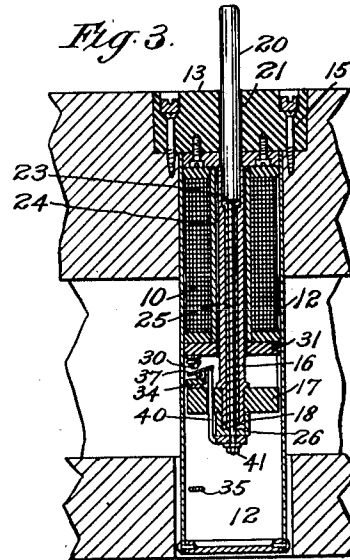
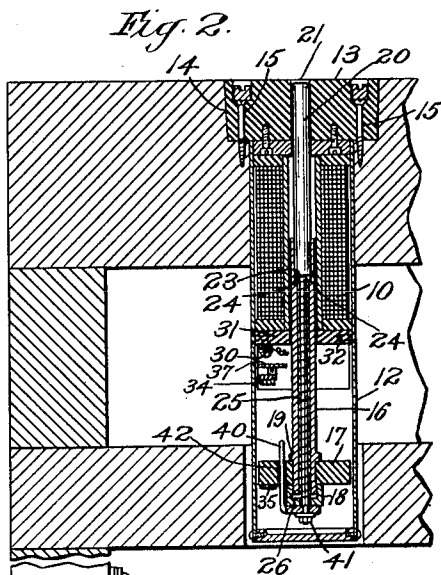
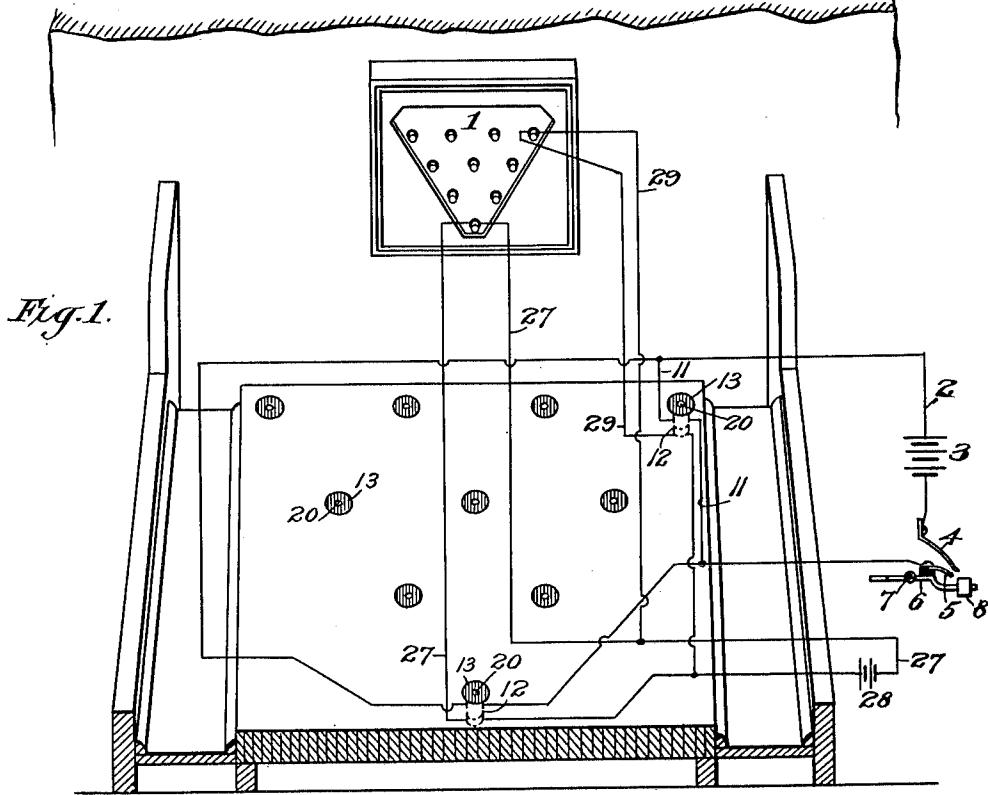
F. C. HOBBS.
BOWLING ALLEY.

APPLICATION FILED JUNE 9, 1909.

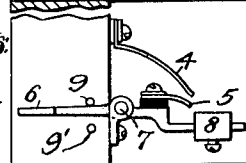
Patented Apr. 2, 1912.

1,022,083.

2 SHEETS-SHEET 1.



Witnesses:
A. White
P. M. Tilden

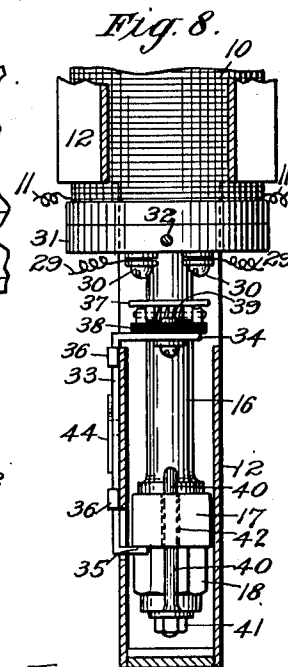
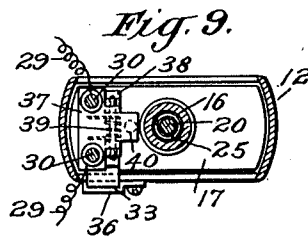
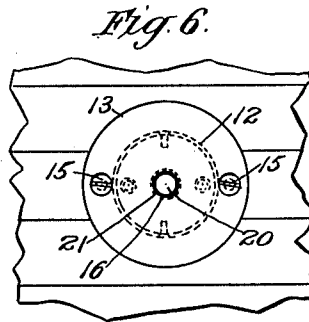
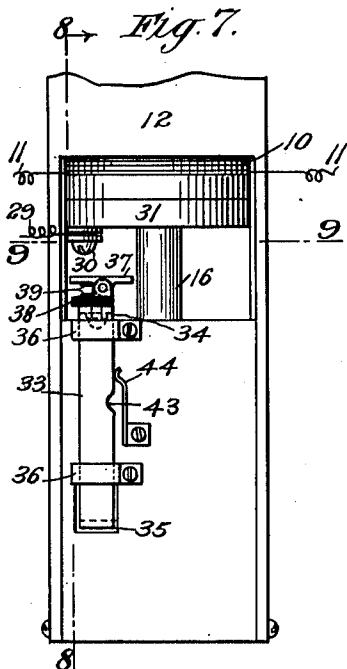
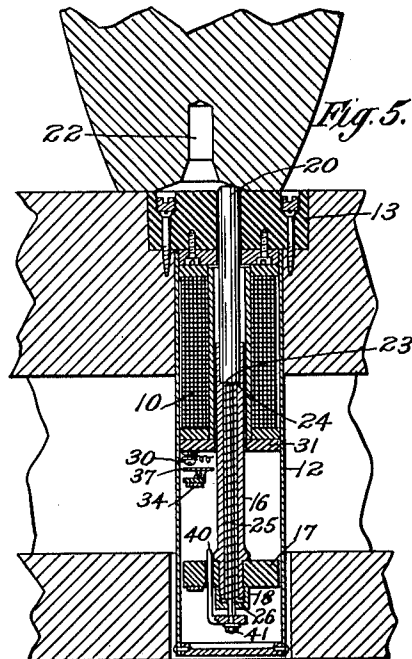
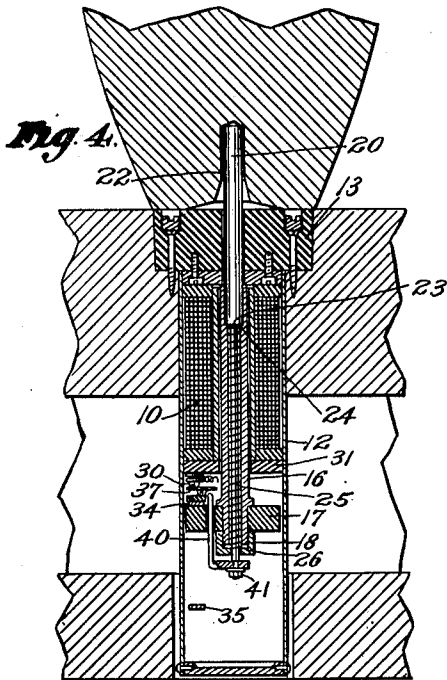


Inventor:
Francis C. Hobbs
By his Attys:
Phillips Sawyer Rice & Kennedy

1,022,083.

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2 SHEETS-SHEET 2.



Witnesses:
A. White
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UNITED STATES PATENT OFFICE.

FRANCIS C. HOBBS, OF NEW YORK, N. Y., ASSIGNOR TO THE BRUNSWICK-BALKE-COLLENDER COMPANY OF NEW YORK, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

BOWLING-ALLEY.

1,022,083.

Specification of Letters Patent.

Patented Apr. 2, 1912.

Application filed June 9, 1909. Serial No. 501,070.

To all whom it may concern:

Be it known that I, FRANCIS C. HOBBS, a citizen of the United States, residing at New York, county of New York, and State of New York, have invented certain new and useful Improvements in Bowling-Alleys, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to certain improvements in bowling alleys.

In bowling alleys it is important that the pins be accurately positioned before the bowler rolls his ball, as a slight variation in the position of one or more of the pins will sometimes result in the failure by the bowler to make the score which he would otherwise make. In bowling alleys the position which the pins are to occupy is indicated by spots accurately located with respect to each other, the pins being properly "spotted" when they are centered with the center of the spots.

It is one of the objects of this invention to produce a bowling alley which shall be provided with improved indicating mechanism to disclose to the bowler whether the pins are accurately spotted.

A further object of the invention is to produce an improved mechanism by which the pins may be accurately centered.

A further object of the invention is to produce a mechanism by which the pins may be accurately centered, said mechanism including an improved indicating mechanism which discloses to the bowler whether or not the pins are so centered.

A further object of the invention is to produce a mechanism for centering bowling alley pins, said mechanism including means for engaging the pins and safety devices by which a failure on the part of the pin engaging means to be disengaged after the centering operation is completed is made evident.

The invention further extends to certain details of construction by which the invention is carried into effect.

With this and other objects not specifi-

cally referred to in view, the invention consists in certain constructions, and in certain parts, improvements and combinations as will be hereinafter fully described and then specifically pointed out.

Referring to the accompanying drawings—Figure 1 is a perspective view of the pin section of a bowling alley, an indicator mechanism constructed in accordance with the invention being diagrammatically illustrated in connection therewith. Fig. 2 is a sectional view, on a large scale, of a part of the alley, this sectional view being taken through one of the spots. Fig. 3 is a section similar to Fig. 2 with the parts in a different position. Fig. 4 is a section similar to Fig. 3, showing a pin in place, this figure illustrating the action of the construction when a pin is properly centered. Fig. 5 is a section similar to Fig. 4 with the parts in a different position, this figure illustrating the operation of the construction when a pin is off center. Fig. 6 is a plan view of one of the spots. Fig. 7 is a detail side view illustrating certain operating mechanism which may be employed. Fig. 8 is a section on the line 8—8 of Fig. 7. Fig. 9 is a section on the line 9—9 of Fig. 7.

Constructions embodying the invention will usually include an indicating mechanism, the construction of which may be varied widely. The purpose of this mechanism is to show whether the pins are properly spotted. When this indicating mechanism is employed, it will, in the best constructions, include an indicator for each pin. In the particular construction illustrated, the mechanism includes a series of lamps mounted on a base 1, there being a lamp for each pin. When this form of indicating mechanism is employed it may be conveniently placed at the end of the alley, or at any other point where it can be readily seen by the bowler.

While the indicating mechanism may be operated in various ways, it will usually be operated by suitable connections from the pins, and in the best constructions the connections will be electrical. In the particu-

lar construction illustrated, there is provided a circuit 2 leading from a suitable source of electrical energy, a battery 3 being shown, this circuit 2 including a suitable circuit controller, which, as shown, comprises a contact 4 and a contact 5 mounted on but insulated from a treadle 6 pivoted at 7 to the frame of the alley, conveniently located for the pin boy. This treadle, as illustrated, is normally held, by a weight 8, in such position that the circuit is open, the extent of movement of the treadle being determined by stop pins 9, 9'.

When, as in the particular construction illustrated, the indicating mechanism is controlled from the pins, the devices by which the control is effected may be widely varied. In the particular construction illustrated, the controlling devices include a plurality of magnets, there being one magnet for each indicating device. As illustrated, these magnets, marked 10, are in branches 11 from the circuit 2. The particular construction of one of these magnets is shown in Fig. 2, it being understood that the magnets employed may be duplicates. The magnet 10 is contained in a casing 12, this casing being located in a socket or opening directly beneath the pin spot 13. In the particular construction illustrated, this spot is located in a socket 14 somewhat larger in diameter than the opening in which the magnet is located, and is secured in position by screws 15. As illustrated, the magnets are solenoids, although it will be understood that the invention is not confined to the use of solenoids. The armature or core of the solenoid is indicated at 16, this armature, as illustrated, carrying a fiber or other insulating block 17 which is secured to the lower end of the armature by means of a nut 18, the armature being shouldered, as indicated at 19, to provide a bearing for the block. From the construction so far described, it will be understood that when the circuit 2 is closed all the magnets, which may be characterized as the pin magnets, are energized and their armatures are caused to move upward.

In the particular construction illustrated, although as has been indicated, the construction may be widely varied in this respect, each of the pin magnets controls the operation of a centering device, each centering device in turn controlling the operation of the indicator for the corresponding pin. As shown, each of the centering devices consists of a comparatively short rod or plunger 20, the upper ends of these plungers working through perforations 21 in the spots 13, and being caused to project a short distance above the surface of the alley when their magnets are energized. Each centering plunger is arranged when its magnet is energized and when its bowling pin

is properly spotted (see Fig. 3) to engage a socket 22 in the bottom of the pin. In the construction illustrated, these bowling pin sockets are slightly less in depth than the effective length of projection of the plungers above the alley bed. Each plunger, further, in the particular construction illustrated, is mounted so as to have a limited movement with respect to its magnet armature. This may be effected by reducing the diameter of the lower part of the plunger so as to provide it with a shoulder as 23. The upper end of the armature may be recessed out to form a shoulder, as 24, and the lower part of the plunger may be surrounded with a spring, as 25, this spring bearing against the shoulder 23 and against a shoulder 26 formed on the nut 18 which is the nut which holds the block 17 to the armature. The spring is arranged so that it normally holds the shoulder 23 on the plunger somewhat above the shoulder 24 on the armature. In the particular construction illustrated, each of the plungers controls a circuit which effects the action of the corresponding indicator. While these circuits may be variously arranged, in the particular construction illustrated, there is provided a circuit; as 27, this circuit being connected with a suitable source of electrical energy, a battery 28 being shown. This circuit 27 is divided into branches in which the lamps, or other indicators employed, lie, these branch circuits being controlled by the centering devices or plungers referred to. As shown, the main circuit 27 leads through the indicating device for the number 1 or head pin, and through the controlling device actuated by the centering device for that pin. A branch circuit 29 of this main circuit 27 is shown as leading to the indicator for the number 10 pin and through the controlling device actuated by the centering device for that pin, it being understood that similar branches will be provided for the indicators for the other pins.

While the particular construction of the indicator circuit controllers and the specific means by which they are actuated by the centering devices may be widely varied, in the particular construction illustrated, each circuit controller includes a pair of contacts 30 (see Figs. 2, 3 and 9) to which the indicator circuits are connected, each contact being mounted on an insulating disk 31 supported in the magnet casing 12 by screws 32, or in any other suitable manner. As shown, the lower end of the magnet casing is flattened and there is mounted thereon a bar 33 (see Fig. 8), this bar having an upper operating projection 34 and a lower projection 35 which projections extend through openings in the casing so as to lie in the path of movement of the disk 17 which is attached to the magnet armature. The bar may be mounted

on the casing by clips 36 and may, therefore, have a limited movement when its projections are struck by the fiber disk. This bar 33, in the particular construction illustrated, is provided with a rocking contact 37 pivoted on an insulating block 38, this block being mounted on the projection 34. As illustrated, these contacts are normally held by springs 39 in such position that when each bar 33 is in its upper position the contact 37 will, unless it is rocked against the stress of its holding spring, bridge the contacts 30, thus closing the corresponding indicator circuit.

In the particular construction illustrated, each plunger has secured to it a controlling finger 40, the attachment being effected by a nut 41 or in any suitable manner. In the construction illustrated, this finger is bent to provide a part which is parallel with the plunger, this bent part passing through a perforation 42 in the disk 17 before referred to.

The bar 33 may be provided with a notch 43 so arranged as to be engaged by a light spring detent 44 mounted on the casing 12 when the bar is in its upper position.

The operation of the construction described is as follows:—When the pin-boy is ready to set up the pins, he places his foot on the treadle 6, thus operating the circuit controller 4, 5 and closing the magnet circuit 2. This energizes all the magnets 10 and causes them to attract their armatures 16, which rise and carry up the plungers 20, thus causing their upper ends to project above the surface of the alley bed. As the armatures 16 and plungers 20 are about to complete their upward movement, each controller pin 40 strikes the circuit controller 37, as indicated in Fig. 3, thus tipping it against its spring 39, immediately after which the block 17 strikes the projection 34, thus moving the bar 33 into its upper position in which it is held by the detent 44. The plungers are, therefore, at this time projecting above the surface of the alley bed, but the indicator circuits are all open, so that each indicator lamp, if this form of indicator be adopted, is not lighted. As the pin-boy places each pin in position, if the pin be properly centered, the corresponding plunger 20 is depressed slightly, this movement being permitted by the spring 25,—it being remembered that the depth of the socket in the pin is slightly less than the effective length of projection of the plunger above the alley bed. This depression of the plunger moves the controller finger 40 out of contact with the controller 37, thus permitting the spring 39 to rock the controller, causing it to bridge the contacts 30 and establishing a circuit through the indicator of the pin which has been thus properly positioned, as indicated in Fig. 4. Should, how-

ever, the pin-boy fail to properly center the pin, as indicated, in Fig. 5, the socket in the pin will not be entered by the upper end of the plunger 20, and the weight of the pin will depress the plunger flush with the surface of the alley bed. This downward movement of the plunger will cause its shoulder 23 to strike the shoulder 24 on the armature, thus pushing the armature down against the pull of the magnet. As the armature travels down, the disk 17 strikes the lower projection 35 of the bar 33, thus moving the bar down so that the circuit is not made through the indicator for the misplaced pin, because the controller 37 is moved so that it cannot bridge the contacts 30. When, therefore, the pins are all set up, if any pin is not properly centered, the indicator discloses this fact to the bowler, and he can inform the boy which pin is off center. When the pins are all properly centered, the pin boy removes his foot from the treadle, thus opening the magnet circuits and deenergizing the magnets. The armatures and plungers, therefore, are then free to fall, so that the plungers are all below the surface of the alley bed, and the bowler may roll his ball.

It may happen, through some disarrangement of the mechanism, that one or more of the plungers might fail to drop when the magnet circuit is opened. Should this occur, and the bowler roll his ball, there would be danger of breaking off the plunger which had thus failed to drop or of disarranging the mechanism in some way. Constructions embodying the invention in its best form will, therefore, be provided with a safety device which will notify the bowler of the failure of any plunger to drop. While the safety device, when employed, may be constructed in various ways, the mechanism already described accomplishes this result, because if any plunger fails to drop below the surface of the alley bed, the bar 33 will not be moved downward, it being remembered that this bar is held in its upper position by the detent 44 until its lower projection 35 is struck by the disk 17 which will not occur until the armature and plunger have been moved down sufficiently so that the top of the plunger is flush with the surface of the alley bed. If, therefore, any plunger fails to drop, the indicator light for that particular pin will remain lighted after the pin-boy has opened the magnet circuits and the other lights are extinguished, for the reason that the contacts 30 of the branch circuit for that indicator will remain bridged by the controller 37, because the bar 33 has not moved the controller away from the contacts.

Changes and variations may be made in the construction by which the invention is carried into effect. The invention is not, therefore, to be confined to the particular

construction herein described and illustrated in the accompanying drawings.

What is claimed is:—

1. In a bowling alley, the combination
5 with a plurality of indicators corresponding in number with the number of pins, of a centering device for each pin, and connections rendered operative by each centering device as its pin is centered for rendering the corresponding indicator operative.

2. In a bowling alley, the combination
10 with a plurality of electrically operated indicators corresponding in number with the number of pins, of a centering device for each pin, and circuit controlling means operated by each centering device.

3. In a bowling alley, the combination
15 with a plurality of electrically operated centering devices corresponding in number with the number of pins, of a plurality of operating mechanisms, one for each centering device.

4. In a bowling alley, the combination
20 with a plurality of centering devices corresponding in number with the number of pins, of a plurality of actuating magnets one for each centering device, a circuit including all the magnets, and circuit controlling devices.

5. In a bowling alley, the combination
25 with centering devices corresponding in number with the number of pins, of an operating mechanism for each centering device, indicators corresponding in number with the centering devices, a plurality of indicator circuits, and circuit controlling means operated by the centering devices.

6. In a bowling alley, the combination
30 with centering devices corresponding in number with the number of pins, of an operating magnet for each centering device, means for simultaneously energizing or de-energizing the magnets, an indicator for each centering device, circuits for the indicators, and circuit controlling devices for the indicator circuits operated from the centering devices.

7. In a bowling alley, the combination
35 with centering devices corresponding in number with the number of pins, each centering device including a movable centering member, of an operating magnet for each centering member, means for simultaneously energizing or deenergizing the magnets, an indicating device for each centering device, and circuit connections for each indicating device, said connections including a circuit controller for each indicating device, each controller being actuated by a centering device.

8. In a bowling alley, the combination
40 with a plurality of indicators corresponding in number with the number of pins, of a circuit having a plurality of branches one for each indicator, an electrically operated cen-

tering device for each pin, means for simultaneously operating the centering devices, and a circuit controller for each indicator branch circuit operated by its centering device.

9. In a bowling alley, the combination
45 with indicators corresponding in number with the number of pins, of a circuit having a branch for each indicator, a centering device for each pin, each centering device including an operating magnet, means for simultaneously energizing or deenergizing the magnets, and a circuit controlling device for each indicator circuit operated from a centering device.

10. In a bowling alley, the combination
50 with indicators corresponding in number with the number of pins, of a plurality of centering devices one for each pin, each centering device including a movable plunger and an operating magnet therefor, means for simultaneously energizing or deenergizing the magnets, and circuit connections from each centering device to the corresponding indicator, said connections including circuit controlling devices operated from the centering devices.

11. The combination with a removable
55 bowling alley spot, of a movable centering device attached thereto, whereby the spot and centering device may be simultaneously placed in position or removed from the alley.

12. The combination in a bowling alley
60 of a spot removably secured in place therein, and a movable centering device attached to and supported by the spot.

13. In a centering device for bowling
65 alleys, the combination with a magnet, of an armature therefor, and a movable centering member operated from the armature.

14. In a bowling alley, the combination
70 with a plurality of centering devices, of means for causing said devices to be engaged with and disengaged from the pins, and means for indicating whether the centering devices have been disengaged from the pins.

15. In a bowling alley, the combination
75 with a plurality of centering plungers, means for positioning the plungers so that they may be engaged by the pins and for causing them to be disengaged therefrom, and means for indicating failure of any of the plungers to be disengaged from its pin.

16. In a bowling alley, the combination
80 with a plurality of centering devices, of means for operating the devices to enable them to be engaged by or disengaged from the pins, circuits controlled by the centering devices, and means in the circuits for indicating failure of any centering device to be disengaged from its pin.

17. In a bowling alley, the combination
85 with a plurality of centering plungers, of an operating magnet for each plunger, means

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for simultaneously energizing or deenergizing the magnets the plungers being arranged to move out of engagement with the pins when the magnets are deenergized, a plurality of indicators one for each plunger, circuits for the indicators, means controlled by the plungers for closing the circuits and operating the indicators, and means for holding any circuit closed should the correspond-

ing plunger fail to be disengaged from its pin. 10

In testimony whereof, I have hereunto set my hand, in the presence of two subscribing witnesses.

FRANCIS C. HOBBS.

Witnesses:

A. WHITE,

P. N. TILDEN.