March 12, 1963 C. G. BUTTERFIELD 3,081,086

AUTOMATIC BOWLING PINSETTER OUT-OF-RANGE RESET ACTUATING DEVICE

Filed Oct. 27, 1961

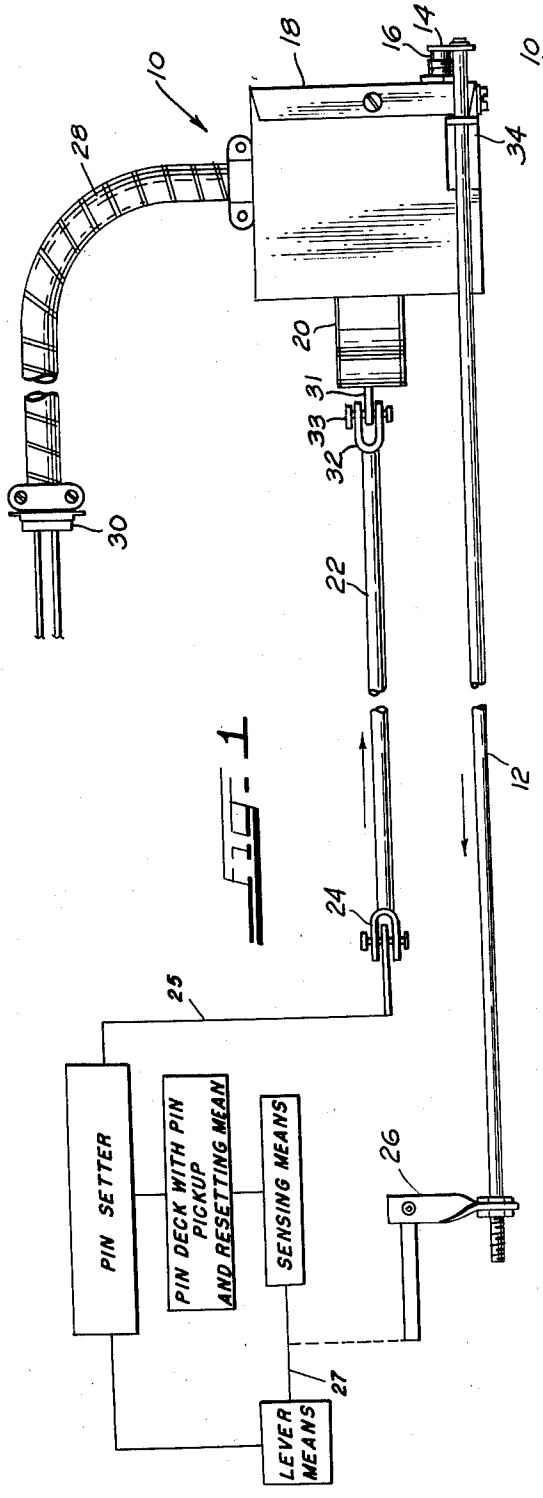


FIG. 1

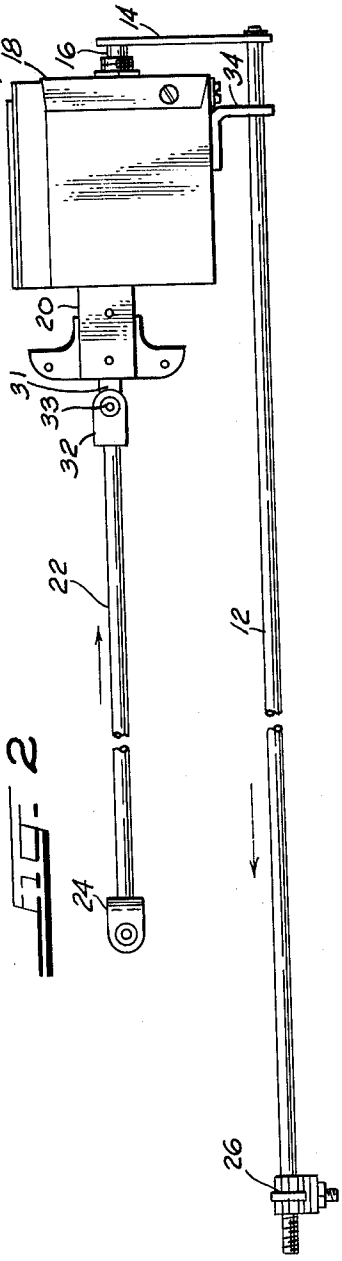


FIG. 2

INVENTOR.

CHARLES G. BUTTERFIELD

BY

Silverman, Mullin & Cass

ATTYS.

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AUTOMATIC BOWLING PINSETTER OUT-OF-RANGE RESET ACTUATING DEVICE

Charles G. Butterfield, Morris, Ill., assignor to Fielden Electronics, Morris, Ill., a partnership

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This invention relates to improvements in automatic bowling pinsetting machines and, more particularly, to a device for reactuating such machines, of the type disclosed in such patents as No. 2,973,204 issued to W. F. Huck et al. February 28, 1961; No. 2,991,078 issued to E. Hedenskoog et al. July 4, 1961; and No. 2,736,554 issued to J. M. Fluke, et al. on February 28, 1956, after the same has been inactivated by a standing bowling pin which has been moved out-of-range or too-far-off-spot by the first ball thrown during a "frame" of a bowling game.

Automatic bowling pinsetting machines of the type disclosed in the aforementioned patents are well known and have found almost universal acceptance, primarily because they are essentially labor saving devices which are intended to actually eliminate the necessity for human pinsetters or bowling alley attendants. Except for accasional machine maintenance, it is intended that cashiers alone, or in the smaller establishments, the proprietor himself, can operate the bowling alley establishment with the assistance of one or more automatic bowling pinsetting machines. However, complete and full automation has heretofore never been achieved because of situations which arise during the bowling game which result in the inactivation of the machines, thereby necessitating certain manual operations including the manual reactuating of the machine. Such a situation occurs when a bowling pin is moved out-of-range or too-far-off-spot on the bed of the alley by the first ball, but still remains standing. When this occurs, the normal cycle of operation of the machine is interrupted or stalled so as to avoid injury to the machine and the same is automatically shut off. To reactuate the machine, it is necessary for someone to walk all the way back to the rear of the alley where the machines are normally located for the purpose of manually operating a reset lever to reactuate the machine.

It is, therefore, an important object of this invention to afford means which will increase the degree of automation of automatic bowling pinsetting machines. A related object is to provide means which may be incorporated in, or attached to, and automatic pinsetting machine for automatically reactuating the machine after the same has been shut down because of an out-of-range situation.

The construction and operation of automatic pinsetting machines is fully disclosed in the aforementioned patents. As there disclosed, the machine is provided with a pinsetting and resetting deck, in turn comprised of a central deck having fixed setting shoes and an upper setting deck having buckets into which the pins drop from a turret bearing a supply of such pins and also having setting shoes which co-operate with the fixed setting shoes to confine the pins therebetween. A lower deck having enlarged openings, one for each bowling pin, defining a normal pick-up area through which the pins are set, is also provided. The under side of the upper deck is provided with pressure plates to engage the tops of the standing pins during the pick-up and reset operation.

The machine is further provided with a rake which may be operated to sweep the bed of the alley clean of "deadwood" (pins which have been knocked down by the bowling ball).

In playing the game of bowling, it is well known that the object is to knock down as many of the pins as possible in each frame of the game. Two balls may be rolled by a contestant in each frame. If all the pins are knocked down by the first ball (a strike) the rake is actuated to sweep the fallen pins from the bed of the alley into the pit where they are picked up by the machine. Immediately thereafter, the next step in the cycle of the machine occurs wherein the deck is lowered and a new set of pins is set up on the bed of the alley. In the event not all of the pins are knocked down, then the contestant is permitted to roll a second ball in the frame. To prepare for the rolling of the second ball, the deck is lowered until the necks of the standing pins protrude through the openings in the deck. The pressure plates then cooperate to secure the pins in the deck; the deck is raised, thereby raising the standing pins; the rake is then actuated to sweep the deadwood from the bed of the alley and the deck is then lowered until the remaining pins are standing on the bed of the alley. The pressure plates then release the pins; the deck raises and the alley is set for the rolling of the second ball.

If the pins which are left standing have been moved by the first ball to a spot not more than perhaps four inches from the original spot, the openings in the deck are sufficiently large to enable the pins to be picked up regardless of their having been moved as indicated. However, in the event that one or more pins have been moved too-far-off-spot or out-of-range, the top of the pins will not enter the opening when the deck is lowered. Instead, the top of the pins contact the bottom plate on the pin deck to prevent the deck from lowering sufficiently to engage the necks of the standing pins. When this occurs, a detecting or sensing means is actuated which, in turn, stops the machine in order to avoid damage to the same. When this happens, the operator must manually remove the deadwood from the alley and then actuate an out-of-range reset lever provided at the back of the machine for this purpose. This then reactuates the machine and raises the deck to permit the rolling of the second ball.

It is, therefore, another important object of this invention to afford means which may be incorporated into the machine or added thereto to automatically actuate the out-of-range reset lever, thereby reactuating the machine.

A further object is to provide an out-of-range reset actuating mechanism for automatic bowling pinsetting machines which may be linked to the out-of-range detecting means so that the same is automatically actuated immediately upon the actuation of the sensing means.

Yet another object is to afford an out-of-range reset actuating device having means connected to the out-of-range reset lever and which resets said lever immediately upon actuation by the out-of-range sensing means.

Yet a further object is to provide an electrically powered automatic out-of-range reset actuating device of the character described capable of being controlled by the same switches which control the machine itself.

Still another object is to afford an automatic bowling pinsetter out-of-range actuating device of simple, inexpensive construction and positive action which may be readily incorporated directly into the machine itself or may be readily mounted and affixed thereto as an auxiliary device.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel features of construction, arrangement and a combination of parts hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportion, size and minor details of the structure may be made with-

out departing from the spirit or sacrificing any of the advantages of the invention.

For the purpose of facilitating an understanding of my invention, I have illustrated in the accompanying drawings a preferred embodiment thereof, from an inspection of which, when considered in connection with the following description, my invention, its mode of construction, assembly and operation and many of its advantages should be readily understood and appreciated.

Referring to the drawings in which the same characters of reference are employed to indicate corresponding or similar parts through the several figures of the drawings:

FIG. 1 is a top plan view of an automatic bowling pinsetter out-of-range actuating device incorporating the principles of my invention therein, and showing in block diagram the associated parts of a bowling pin setter;

FIG. 2 is a side elevational view of the same.

Referring to the figures of the drawings, reference numeral **10** indicatese generally the reset actuating device comprising an elongated switch actuator rod **12** having a switch actuator arm **14** connected at one end thereof with one end of the switch actuator arm bearing against a solenoid pressure-type switch **16**. The switch **16** protrudes from a housing **18** within which is positioned a solenoid **20**, a portion of which protrudes from the opposite end of said housing, as shown in the several figures of the drawing.

The protruding portion of the solenoid **20** has removably connected thereto an extension arm **22** provided with a fork-like yoke **24** at the outer end thereof and designed to be connected to the previously mentioned out-of-range reset lever **25** of the automatic pinsetter. The free end of the switch actuator rod may be provided with a connecting and mounting bracket **26** which in turn is designed to be connected to the out-of-range link assembly **27** of the pinsetter. The link assembly is in turn linked to the out-of-range detecting or sensing means of the machine.

Suitable electrical leads, such as **28**, having a plug **30** at the free end thereof is connected to the solenoid **20** in the housing **18** and leads to a suitable power source. This power source may be an independent source of power but, preferably, the plug **30** may be plugged into the main switch control box (not shown) of the machine. This ensures that shutting off of the power to the machine, as for example at the end of the day, simultaneously shuts off power to the solenoid of the out-of-range reset actuating device.

It will be noted in FIG. 1 of the drawings that the solenoid arm extension rod **22** is removably connected to a solenoid shaft **31** protruding from the solenoid **20** by means of a yoke **32** formed on the adjacent end of the extension arm rod **22** and a suitable headed pin or bolt **33**. The switch actuator rod **12** may be secured to the solenoid housing **18** by means of an apertured bracket such as **34** affixed to one wall of the housing as shown in FIGS. 1 and 2 of the drawings.

The operation of the device upon the occurrence of an out-of-range pin situation may be readily appreciated and understood from the following brief explanation. As previously explained, the out-of-range sensing mechanism, which becomes actuated when the top of an out-of-range pin comes in contact with an unperforated portion of the lower part of the pinsetting and resetting deck, is translated into motion which is communicated to the out-of-range link assembly. The switch actuator rod **12**, connected by means of the bracket **26** to the out-of-range link assembly, is thereby pulled to the left in the direction indicated by arrows in the drawings. As the rod moves, it moves with it the actuator arm **14** so that the portion which abuts the solenoid switch **16** closes said switch, thereby actuating the solenoid **20**. This draws the solenoid shaft **31** inwardly, moving with it the extension arm **22**. The outer free end of the extension arm **22** is connected by means of the connecting member **24** to the out-of-range reset lever of the machine. Thus, the motion to the right, in the direction indicated by arrows in the drawings, pulls the lever, thereby reactuating the machine so that the pinsetting and resetting deck is raised and the alley is set for the rolling of the next ball.

It should be appreciated that when the out-of-range sensing device acts to stop the machine, the rake is held back to prevent sweeping of the deadwood from the floor of the alley. This is accomplished by means of a latching mechanism (not shown). This, of course, means that any deadwood left lying on the floor of the alley must be removed manually. However, experience has shown that when an out-of-range situation occurs, seldom if ever is any deadwood left lying on the bed of the alley. The pins are usually knocked into the pit.

It should be apparent from the foregoing description and drawings, that I have provided a simple yet most effective and efficient device for reactuating an automatic bowling pinsetting machine which has been stopped by a too-far-off-spot pin left standing after the first ball. The interruption occurs when the top of said pin comes in contact with the bottom of the pinsetting and resetting deck as it is being lowered to pick up standing pins preparatory to sweeping the deadwood from the floor of the alley into the pit. The device is designed so that it can be readily connected to the out-of-range link assembly of the machine and to the out-of-range reset lever. Thus, immediately upon the machine being stopped, the motion set up by the out-of-range sensing device and translated through the out-of-range link assembly for the purpose of stopping the machine, likewise actuates the reset device to operate the out-of-range reset lever to reactuate the pinsetting machine.

It is believed that my invention, its mode of construction and assembly, and many of its advantages should be readily understood from the foregoing without further description, and it should also be manifest that while a preferred embodiment of the invention has been shown and described for illustrative purposes, the structural details are nevertheless capable of wide variation within the purview of my invention as defined in the appended claims.

What I claim and desire to secure by Letters Patent of the United States is:

1. In an automatic pinsetter having a movable pin deck, means on said deck for picking up and resetting standing pins and for setting a set of pins, sensing means on said deck for detecting when a standing pin has been moved beyond the range of operation of the pin pickup means, lever means for turning off the pinsetter and stopping the movement of said deck when an out-of-range pin has been detected, out-of-range linkage connecting said sensing means and said lever means, and a reset lever; an out-of-range reset actuating mechanism having actuating means automatically operable by said sensing means to reactuate said pinsetter, said actuating mechanism connected between said out-of-range linkage and said reset lever, said actuating means including a solenoid operable to activate said reset lever immediately after the machine has stopped, the operation of said solenoid being controlled by a switch, and switch actuating means connected to said out-of-range linkage, said last-mentioned means movable to close said switch in response to said out-of-range sensing means, said switch actuating means including a switch actuator rod connected at one end to said out-of-range linkage and a switch actuator arm positioned on the other end, said arm movable into abutment with said switch to close the same.

2. The invention of claim 1 in which a solenoid extension arm connects said solenoid with said reset lever.

3. In an automatic bowling pinsetter out-of-range reset actuating device for reactuating a pinsetter machine after the same has been stopped by an out-of-range pin, said pinsetter machine having out-of-range pin sensing means, out-of-range linkage and an out-of-range reset lever;

solenoid means operable in response to said sensing means to operate said reset lever, said solenoid controlled by a switch, switch actuating means connected at one end to said out-of-range linkage and movable in response to said sensing means to close said switch and means connecting said solenoid and said reset lever.

4. An automatic bowling pinsetter out-of-range reset actuating device for reactivating a pinsetter machine after the same has been stopped by an out-of-range pin, said pinsetter machine having out-of-range pin sensing means, out-of-range linkage, and an out-of-range reset lever; said out-of-range reset actuating device comprising a solenoid mounted within a solenoid housing, a solenoid shaft protruding from the solenoid housing, a pressure-sensitive switch protruding from the opposite side of the housing and connected to said solenoid, a switch actuator rod having a bracket mounted on one end connecting said rod to said out-of-range linkage, a switch actuator arm mounted perpendicularly to said rod at the other end thereof, the free end of said arm movable into abutment with said switch for closing the same, and a solenoid arm extension connected at one end to said solenoid shaft and at the other end to said reset lever.

References Cited in the file of this patent

UNITED STATES PATENTS

2,973,204	Huck et al.	Feb. 28, 1961
2,991,078	Hedenskoog et al.	July 4, 1961