

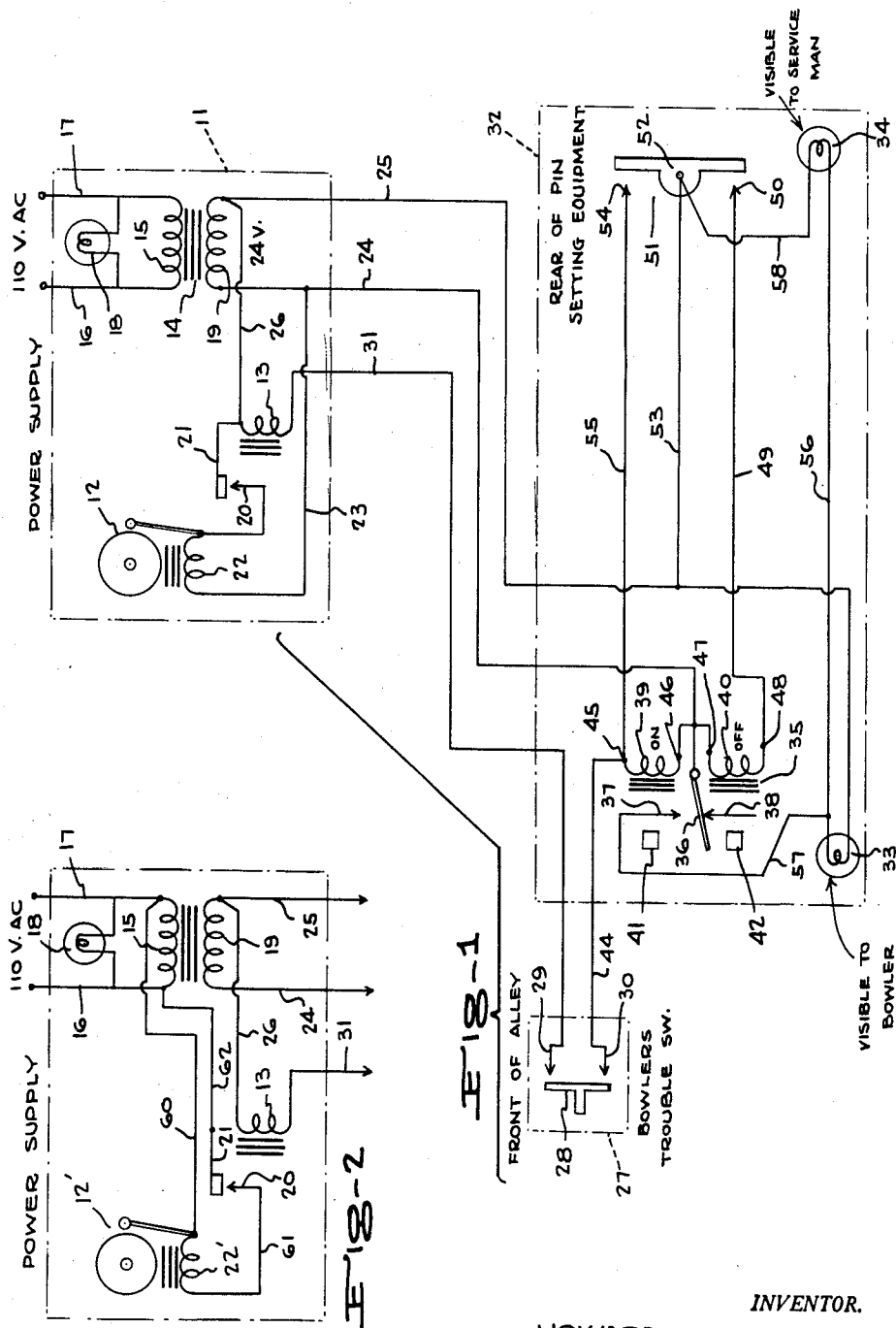
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PIT SERVICE SIGNAL ALARM

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PIT SERVICE SIGNAL ALARM

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This invention relates to bowling alley alarm devices, and more particularly to an audible and visible signal alarm circuit for use in a bowling alley provided with automatic pin setting equipment.

A main object of the invention is to provide a novel and improved signal alarm circuit for a bowling alley, the circuit providing a means whereby a bowler may place the circuit in operation in the event that trouble arises in the pin setting equipment, whereby to notify service personnel at the rear of the alley, and whereby the service personnel may rectify the difficulty and subsequently reset the signal circuit to its normal, non-indicating condition.

A further object of the invention is to provide an improved audible and visible signal alarm circuit for a bowling alley, such circuit involving relatively simple components, being easy to operate, and providing a reliable indication to service personnel at the rear of the bowling alley as to trouble in the equipment associated with the bowling alley.

A still further object of the invention is to provide an improved audible and visible signal alarm circuit for a bowling alley, said circuit being operable by a bowler in the event that trouble arises in the pin setting or other equipment associated with the bowling alley, the circuit involving relatively inexpensive components, being easy to maintain in an operating condition, and enabling a bowler to rapidly notify service personnel located at the rear of the bowling alley as to the difficulty in the pin setting or other associated equipment, whereby the service personnel may rectify the difficulty and thereafter reset the signal equipment to its normal, non-indicating condition.

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

Figure 1 is a schematic diagram illustrating the electrical connections of one form of signal alarm circuit constructed in accordance with the present invention.

Figure 2 is a partial schematic circuit illustrating a modification of the signal alarm circuit of the present invention.

Referring to the drawings, and more particularly to Figure 1, the improved bowling alley signal alarm circuit comprises a power supply section, designated generally at 11, located adjacent the bowling alley and mounted in any suitable manner, for example, in a suitable housing in which is included an alarm bell 12 and an associated alarm bell relay 13. As shown, the power supply section 11 comprises a step-down transformer 14 having its primary winding 15 connected to the respective line wires 16 and 17, which are adapted to be connected in turn, to the domestic electric power supply source, for example, to a source of 110 volt alternating current.

A suitable indicating lamp 18 is included in the power supply section 11 and is connected across the line wires 16 and 17, whereby said lamp 18 is energized when the line wires 16 and 17 are electrically connected to the

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domestic power source, indicating the operative condition of the system.

Transformer 14 is provided with the low voltage secondary winding 19, providing a suitable value of output voltage, for example, 24 volts across its terminals.

The alarm bell relay 13 is provided with a stationary contact 20 and with an armature 21 engageable with the stationary contact 20 responsive to the energization of the winding of the relay 13. Stationary contact 20 is connected through the operating winding 22 of the bell 12 and a wire 23 to one of the terminal wires 24 of transformer secondary 19. The remaining terminal wire 25 of said transformer secondary is connected by a wire 26 to the armature 21, and also to one terminal of the winding of relay 13.

Located at the front of the alley, namely, within convenient reach of a bowler using the alley, is a switch unit 27 comprising a pushbutton switch pole 28 bridgingly engageable with a pair of stationary contacts 29 and 30. The stationary contact 29 is connected by a wire 31 to the remaining terminal of the winding of the audible signal relay 13.

Designated generally at 32 is the main portion of the alarm circuit, said main portion 32 comprising a first signal lamp 33 located in a position wherein it is visible to a bowler using the alley, and a second signal lamp 34 located at the rear of the alley in a position wherein it is visible to a service man located at the rear of said alley in a position to perform required repair operations upon notification of the necessity of same.

The main section 32 of the alarm system includes a conventional holding relay 35 of the type provided with a movable armature 36 and respective contacts 37 and 38 located on opposite sides of the armature. The relay 35 includes a first winding 39 which is effective to move the armature 36 into engagement with the stationary contact 37 responsive to energization thereof, the armature 36 being held in this position until the second winding, shown at 40, is subsequently energized, whereupon the armature 36 then moves into engagement with the opposite contact 38 and disengages from the contact 37. Armature 36 is held in one or another of its two possible positions, namely, in engagement with either contact 37 or contact 38 until moved by the energization of the opposite relay winding 39 or 40. Thus, the relay 35 may be provided with respective permanent magnets 41 and 42 which may serve as the holding means to retain the armature 36 in either of its two possible positions until said armature is moved by the energization of the opposing relay winding.

The relay 35 is of conventional construction and in itself forms no part of the present invention.

As will be readily apparent, when the winding 39 of relay 35 is energized, the armature 36 is elevated into engagement with the upper stationary contact 37. Similarly, when the winding 40 is subsequently energized, the armature 36 is moved downwardly into engagement with the bottom stationary contact 38.

The stationary switch contact 30 is connected by a wire 44 to one terminal 45 of relay winding 39. The opposite terminal 46 of said relay winding is connected to the wire 24. Also connected to wire 24 is one terminal 47 of relay winding 40. The remaining terminal 48 of relay winding 40 is connected by a wire 49 to one stationary contact 50 of a manually operated reset switch 51 located at the rear of the bowling alley, adjacent the rear of the associated pin setting equipment. The switch 51 includes the rotatable switch pole 52 which is connected by a wire 53 to the wire 25. The switch 51 also includes a stationary contact 54 connected by a wire 55 to the terminal 45 of relay winding 39. The pole 52 may be manually rotated so as to either engage the stationary

contact 50 or the stationary contact 54, and may be normally maintained in a centered position out of engagement with both stationary contacts, as shown in Figure 1. As will be readily apparent, when the pole 52 is rotated to engage the stationary contact 50, the relay winding 40 is energized by a circuit comprising the secondary winding 19 of transformer 14, the wire 24, the relay winding 40, the wire 49, stationary contact 50, switch pole 52, wire 53 and wire 25. Similarly, when switch pole 52 is rotated into engagement with stationary contact 54, the relay winding 39 becomes energized by a circuit comprising the transformer secondary 19, the wire 24, the relay winding 39, the wire 55, the contact 54, the switch pole 52, the wire 53 and the wire 25. Energization of the relay winding 39 elevates the armature 36 into engagement with stationary contact 37, as above described, and this may be done to test the system so as to determine that it is in satisfactory operating condition. On the other hand, as will be presently described, the switch pole 52 is rotated into engagement with the stationary contact 50 when it is desired to reset the system to its normal condition after an alarm signal has been established.

One terminal of each of the lamps 33 and 34 is connected to a common wire 56. The stationary contact 37 is connected to wire 56 by a wire 57. The remaining terminal of the lamp 33 is connected to the wire 25. The remaining terminal of the lamp 34 is connected by a wire 58 to the switch pole 52.

Normally, the system is in the condition illustrated in Figure 1. When trouble develops in the pin setting equipment or any other portion of the bowling alley, the bowler actuates the switch 27 by pushing the switch button 28 to momentarily bridge the contacts 29 and 30. This connects the relay winding 39 and the alarm bell relay 13 to the secondary 19 of transformer 14 by a series circuit comprising the winding 19, wire 26, the winding of relay 13, wire 31, the switch 27, wire 44, relay winding 39, and wire 24. Armature 21 engages contact 20, thus energizing the actuating winding 22 of the alarm bell 12, by connecting the winding 22 across the wires 24 and 25 by a circuit comprising wire 26, armature 21, contact 20, wire 22, and wire 23. The relay 13 remains energized as long as the pushbutton 28 is held in bridging engagement with the stationary contacts 29 and 30, and therefore the audible alarm device 12 continues in operation during this period. The relay winding 39, being energized, elevates the armature 36 into engagement with the stationary contact 37, and said armature remains in engagement with contact 37 even after the pushbutton 28 is released.

When armature 36 engages contact 37, both of the signal lamps 33 and 34 become energized by a circuit comprising secondary winding 19, wire 24, armature 36, contact 37, wire 57, the common wire 56, the respective lamp elements, and the wire 25, the lamp 33 being connected between the wire 56 and the wire 25, and the lamp 34 being connected between the wire 56 and wire 25 through the wires 58 and 53, as above explained.

When the bowler releases the pushbutton 28, the audible alarm terminates, since the bell 12 becomes deenergized by the disengagement of armature 21 from stationary contact 20. However, the signal lamps 33 and 34 remain energized, since the armature 36 remains in engagement with the upper contact 37 of relay 35. The service man at the rear of the bowling alley is thus notified by the energized signal lamp 34 that trouble exists in the pin setting or other equipment associated with the bowling alley, and proceeds to rectify the trouble. After the situation has been corrected, the service man rotates the switch pole 52 into engagement with the stationary contact 50, thus energizing resetting winding 40 of relay 35 through a circuit comprising transformer secondary 19, wire 24, relay winding 40, wire 49, contact 50, switch pole 52, wire 53 and wire 25. This moves the armature 36 away from contact 37 and into its normal position in

engagement with the bottom contact 38. After this reset operation, the service man may move the pole 52 into its normal position, shown in Figure 1, wherein it is disengaged from both contacts 54 and 50.

As will be readily apparent, when armature 36 disengages from contact 37, the lamps 33 and 34 become deenergized, indicating that the equipment has been restored to its normal operating condition.

In the modification illustrated in Figure 2, the audible signal bell, shown at 12', is of a type energizable from the normal domestic power supply line, for example, is of the 110 volt type. Thus, the actuating winding 22' of the bell has one terminal thereof connected by a wire 60 to one line wire 17 and has its other terminal connected by a wire 61 to the stationary contact 20 of the relay 13. The armature 21 of relay 13 is connected by a wire 62 to the remaining line wire 16. The winding of the relay 13 is connected in the same manner as described in connection with the modification illustrated in Figure 1, namely, is connected so as to become energized when the trouble switch 27 is actuated by the bowler. As previously explained, when the bowler operates the switch button 28 to bridge the contacts 29 and 30 the winding of the relay 13 becomes energized and remains energized as long as the button element 28 bridges the contacts 29 and 30. The audible alarm device 12' thus is maintained actuated while the button 28 is retained in engagement with the contacts 29 and 30. Upon release of said button 28 the signal device 12' becomes deenergized. However, as with the previously described form of the invention the visible signal devices 33 and 34 remain energized until the service man resets the circuit by operating the reset switch 51 in the manner previously described.

It will be understood that the power supply section 11 may be employed with a plurality of bowling alleys, each bowling alley being provided with a trouble switch 27 and a main signal circuit 32, the respective alleys being connected to the wires 31, 24 and 25 in parallel.

While certain specific embodiments of an improved audible and visible signal system for bowling alleys and for similar equipment have been disclosed in the foregoing description it will be understood that various modifications within the spirit of the invention may occur to those skilled in the art. Therefore, it is intended that no limitations be placed on the invention except as defined by the scope of the appended claims.

What is claimed is:

1. In combination with a bowling alley, respective visual indicating devices at the front and rear of the alley, a trouble switch at the front of the alley, a source of current, a reset switch at the rear of the alley, a holding relay having a pair of contacts and respective opening and closing windings controlling the opening and closing of said contacts, an audible alarm device connected in series with the closing winding and said trouble switch, means connecting said contacts in circuit with said source of current and said indicating devices, means to energize the closing winding and maintain said closing winding energized and momentarily energize said audible alarm device responsive to momentary actuation of said trouble switch, and means to energize the opening winding responsive to actuation of said reset switch.

2. In combination with a bowling alley, respective visual indicating devices at the front and rear of the alley, a trouble switch at the front of the alley, a source of current, a reset switch at the rear of the alley, a holding relay having a pair of contacts and respective opening and closing windings controlling the opening and closing of said contacts, an audible alarm device, an alarm relay having contacts, means connecting said audible alarm device to said source through said last-named contacts, means connecting said first-named contacts in circuit with said source of current and said visual indicat-

ing devices, said closing winding, trouble switch, and alarm relay being connected in series to said source, means to energize the closing winding and maintain said closing winding energized and momentarily energize said alarm relay responsive to momentary actuation of said trouble switch, and means to energize the opening winding responsive to actuation of said reset switch.

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