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ELECTROMAGNETIC ANNUNCIATOR UNIT

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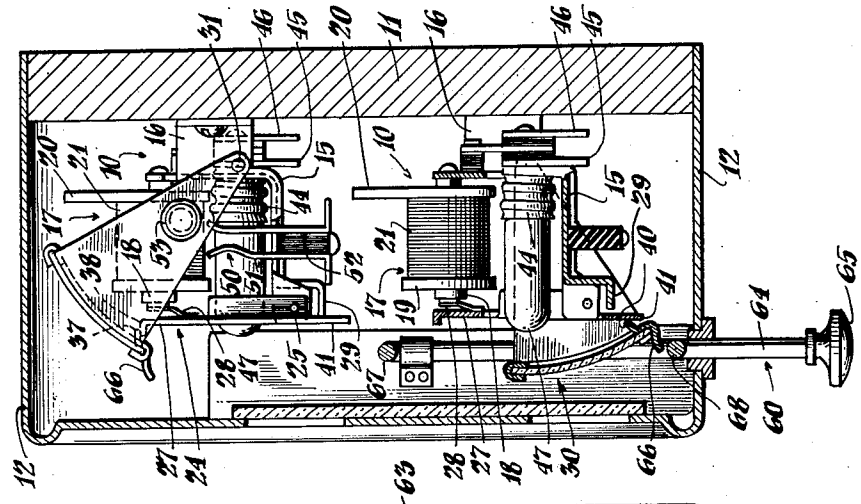


Fig. 2

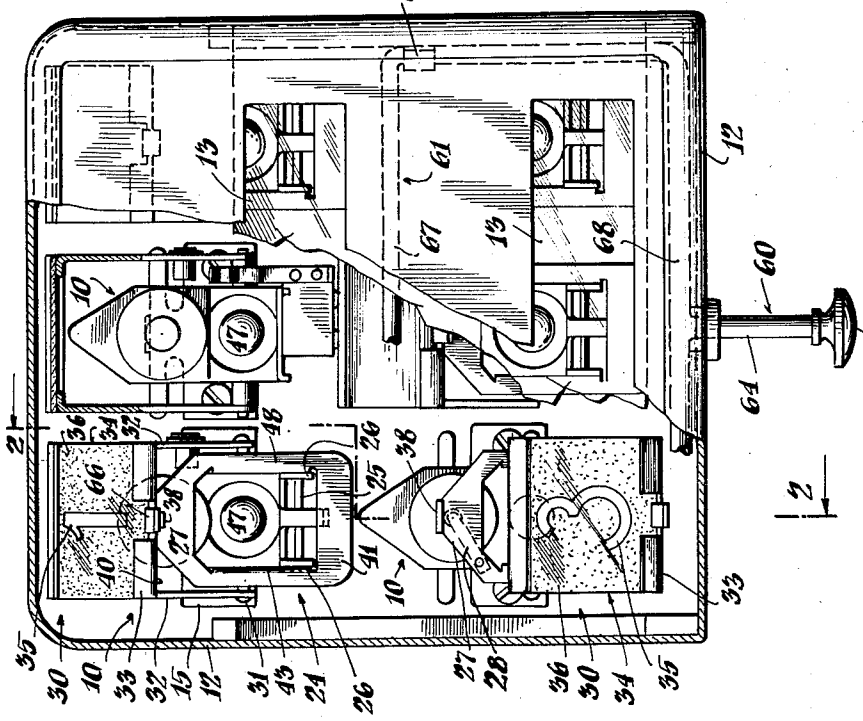


Fig. 1

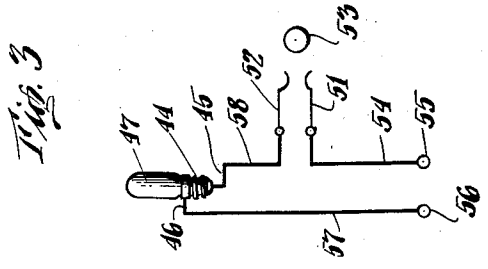


Fig. 3

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ELECTROMAGNETIC ANNUNCIATOR UNIT

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This invention relates to an annunciator unit and to an annunciator system embodying a plurality of such units.

In annunciator systems previously utilized, a plurality of annunciator units are provided each including an indicator or drop which is normally latched in a rest position, the latch being released by solenoid action when a signal is received thereby allowing the drop to fall to an indicating position. In such systems, a lever is usually provided to return all of the drops to their rest position when desired.

It is desirable, in many installations of this type, to utilize an indicating device which is illuminated when the drop is in an indicating position. However, previous systems of this type have not been satisfactory in many cases due to the increased space required for providing the illuminating feature. In addition, the extra parts required are costly and necessitate a larger and more elaborate assembly.

In accordance with this invention, each unit of an annunciator system is provided with an illuminating device which is energized when the annunciator drop is in indicating position. However, such illumination is afforded with great economy of space and with a minimum of extra parts so that a system is obtained which is suitable for commercial production. To this end, a structure is provided in which a lamp is mounted between the pivot point of the annunciator drop latch member and the electromagnet by which it is actuated, the latch member being provided with a cut away portion or opening through which the lamp illuminates a translucent screen defining an indicating character on the drop when the latter is in indicating position. Further economy in space may be obtained by utilizing the latch member as a stop for limiting the movement of the drop as it moves from rest position to indicating position. The electric current supply to the lamp is controlled by cooperating contacts on the drop and the support therefor, these contacts being closed when the drop is in indicating position and being open when the drop is in rest position. These contacts may advantageously include a bridging contact mounted on the drop and a pair of spaced contacts on the support connected in circuit with the lamp. Where a complete system is desired, it is contemplated that a plurality of units may be mounted on a common base and a common lever be provided to return the annunciator drops from their indicating positions to their respective rest positions.

Accordingly, it is an object of the invention to

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provide an improved annunciator unit embodying an illuminating device and a system utilizing a plurality of such units.

It is a further object of the invention to provide such a unit and system which is extremely compact, economical to manufacture, and which utilizes a minimum of parts.

It is a still further object of the invention to provide an improved contact system for actuating an illuminated annunciator unit.

Various other objects, advantages, and features of the invention will become apparent from the following detailed description taken in conjunction with the appended drawings in which:

Figure 1 is a plan view of my novel annunciator system with part of the cover broken away;

Figure 2 is a sectional view taken along the line 2—2 of Figure 1; and

Figure 3 is a schematic diagram showing the lamp circuit.

Referring now to the drawings in detail, the annunciator system may comprise any desired number of similar annunciator units 10 mounted on a common base 11 which is provided with a box like metal cover 12. As shown, there are two rows of annunciator units with three units in each row. A pair of transparent windows 13 are mounted behind suitable openings in the cover 12 and these windows overlie the respective rows of annunciator units so that their indicators or drops are clearly visible therethrough when the drops are moved to indicating position in the manner hereafter described.

Each unit 10 comprises a support 15 which is rigidly secured to the base 11, as by a bracket 16. The support 15 carries an electromagnet 17 which may include a pole piece 18 carrying a pair of spaced insulating members 19, 20 between which is wound a coil 21. With the assembly in operating position, the axis of the coil 21 is horizontal, that is, perpendicular to the base 11.

A combined latch, armature and stop member 24 is pivotally mounted on a pin 25 which is carried by two upright frame portions 26, 26 forming a part of the support 15. The member 24 includes a ferromagnetic armature portion 27 which is attracted toward the pole piece 18 when the electromagnet is energized by a suitable control circuit, not shown. However, when the electromagnet is deenergized, the armature portion 27 is biased by a leaf spring 28 to a position spaced from the pole piece and, in this position, the lower end of the member 24 engages a stop 29 protruding from and forming a part of the support 15. As shown, one end of the leaf spring 28 may

be secured to the armature portion 27 while the other end may rest against the pole piece 18 to provide the described biasing action.

An annunciator drop 30 is pivoted on a pin 31 which is mounted on the bracket 16. The drop comprises a pair of spaced, triangular side pieces 32, 32 which carry a generally rectangular frame structure 33. A translucent screen 34 of heavy paper, for example, is mounted on the frame structure 33 and a character 35, such as a letter or numeral, is delineated on the screen. This may be accomplished by covering the body of the screen, except for the character 35, with opaque black paint as indicated at 36.

It will be apparent that the drop is mounted on the support on bracket 16 for vertical movement from an upper or rest position to a lower or indicating position in which the character 35 is visible through the adjacent window 13. The drop is normally latched in its upper position by engagement of an inwardly protruding part 37 of the annunciator drop frame structure with a latch portion 38 which is integral with and extends outwardly from the member 24 at the upper end thereof, adjacent the armature portion 27. It will be observed that the member 24 is biased toward latching position by the leaf spring 28. However, when the electromagnet 17 is energized, the armature portion 27 is attracted and moves inwardly toward the pole piece 18 thereby disengaging the latch portions 37 and 38. This permits the drop to fall by gravity from its upper latched position to its lower indicating position and, in the latter position, the lower end 40 of the annunciator drop frame structure engages the lower portion 41 of the member 24. Thus, the area 41 serves as a stop portion limiting the downward movement of the drop. When the electromagnet 17 is deenergized, the spring 28 biases the member 24 to its normal position wherein the armature portion 27 is spaced from the pole piece 18 and the latch portion 38 is in position to engage the projection 37 when the drop is returned to its upper position in the manner hereinafter described.

In accordance with the invention, the member 24 has an opening or cut away portion 43 formed therein, this opening being located between the armature portion 27 and the pin or support 25 on which the member 24 is pivotally mounted. A lamp socket 44 is mounted on the support 15 behind the opening 43, this socket being provided with terminal connection lugs 45, 46 and carrying a lamp bulb 47. When the drop is in its lower indicating position, the bulb is adopted to illuminate the translucent portions of the screen 34 and clearly outline the character 35. It will be observed that the lamp socket 44 is mounted between the electromagnet 17 and the portion of the support carrying the pin 25 on which the member 24 is pivoted. This advantageously utilizes space which would otherwise be wasted and results in a small compact assembly. In this connection, the opening 43 allows the screen to be illuminated by the lamp and also allows the weight of the member 25 to be reduced. In some cases, it is contemplated that one of the side sections 48 defining the opening 43 may be omitted, in which case the resulting cut out portion at 43 permits the lamp to illuminate the translucent screen. It is further contemplated that various modifications may be made in the size and shape of the opening or cut out portion 43 so long as an uninterrupted space is provided through which the screen may be illuminated by the light bulb.

The supply of electric current to the lamp is controlled by contact means generally indicated at 50 so that the lamp is illuminated when the drop is in indicating position but the current is interrupted when the drop is in its upper or rest position. This contact means comprises cooperating contacts positioned, respectively, on the drop and on the support. Preferably, a pair of spaced contact springs 51, 52 are mounted on the support and a cooperating generally circular bridging contact 53 is mounted on the drop, said bridging contact engaging the springs 51, 52 when the drop is in indicating position. The contact spring 51 is connected by a conductor 54, Figure 3, to one terminal 55 of a suitable current source, the other terminal 56 of which is connected by a lead 57 to lamp socket terminal 46. The circuit is completed by a conductor 58 which connects socket terminal 45 to contact spring 52. It will be apparent that current is supplied to the lamp through the described circuit when the drop is in its lower indicating position and bridging contact 53 engages contact springs 51 and 52, this circuit being broken when the drop is moved to its upper rest position thereby causing bridging contact 53 to be disengaged from contact springs 51 and 52.

A common reset lever 60 is provided for returning annunciator drops 30 from indicating position to its latched rest position. This lever comprises a generally rectangular rod portion 61 which is slidably supported at its sides in brackets 63 which are mounted in the cover 12. A rod 64 is attached to the portion 61 and extends downwardly through a suitable opening in the cover to terminate in a knob 65. An outwardly protruding projection 66 is formed at the lower part of each drop and the projections 66 on the upper row of drops are adopted, when in their indicating positions, to be engaged by the horizontal portion 67 of the reset lever while the projections 66 on the lower row of drops are adopted to be engaged by, when in their indicating positions, by the horizontal portion 68 of the reset lever. Accordingly, when the knob 65 is moved upwardly, the resultant upward motion of the horizontal rod portions 67, 68 moves each drop which is in indicating position to its upper rest position. During this upward movement, the projection 37 on each drop is moved above the latch portion 38 and, accordingly, each drop is latched in its upper position by engagement of the members 37, 38 when the reset lever is actuated.

From the foregoing description, the operation of the annunciator system will be apparent to those skilled in the art. Assuming that each annunciator drop is latched in its upper position by engagement of the projection 37 and latch portion 38, the electromagnet of a desired annunciator unit is energized by a suitable control circuit, not shown. Responsive to the energization of the electromagnet, the armature portion 27 moves toward the pole piece 18 thereby disengaging the latch portion 38 from the projection 37. Thereupon, the annunciator drop falls by gravity to its lower indicating position in which the lower end 33 of the drop engages the stop portion 41 on the member 24. As the drop moves downwardly to its lower position, the bridging contact 53 engages the contact springs 51, 52 thereby completing the supply circuit of lamp 47 and illuminating the translucent portions of the screen 34. In this fraction, the illuminated char-

acter 35 is clearly visible through the associated window 13.

A similar action occurs as the electromagnets of other annunciator units are energized by their respective control circuits, the drop of each energized unit following to indicating position and the illuminated character on its screen becoming visible through the associated window 13.

When the operator desires to reset the system, the reset lever 60 is elevated by manual pressure on the knob 65. Thereupon, the horizontal rods 67, 68 engage the projection 66 on each drop which is in indicating position and move the drop upwardly to its rest position. Responsive to this upward movement, the bridging contact 53 on each unit is disengaged from the contact springs 50, 52 thereby breaking the lamp circuit. As each drop moves upwardly, the projection 37 engages the latch portion 38, moving it inwardly, and thereafter, said projection is moved to a position above the latch portion 38. As this occurs, the latch portion is moved away from the pole piece 18 by the leaf spring 28 so that said latch portion is engaged by the projection 37 when the lever 60 is released and permitted to return to its original position as shown. Accordingly, each drop is latched in its upper or rest position after the reset lever 60 is released and the system is ready for further operation.

It will be apparent that I have disclosed a structure which efficiently attains the objects and advantages of the invention. The number of parts is reduced to a minimum due to the threefold function of the member 24 which has a latch portion 38 for locking the drop in its upper position, an armature portion 27 for attraction by the pole piece 18, and a stop portion 40 limiting the downward movement of the drop. The position of the lamp and socket therefor between the electromagnet and the pivot of member 24 efficiently utilizes space which would otherwise be wasted and, in conjunction with the cut out portion or opening in the member 24, provides a simple and efficient method of illuminating the characters on their respective annunciator drops. The contact system provided for controlling the lamp circuit is economical to manufacture and prevents wasting of current when the drop is not in indicating position with an obvious increase in the life of the lamp. These factors, in combination with others, provide a simple compact system which is very efficient in operation and has a long operating life.

Although the invention has been described in conjunction with a present preferred example, various changes and modifications in the described structure may be made by those skilled in the art without departing from the spirit and scope of the invention and such changes and modifications are included within the scope of the appended claims.

What is claimed is:

1. An annunciator unit comprising, in combination, a support, an annunciator drop mounted on said support for movement between a rest position and an indicating position, said drop including a translucent screen defining an indicating character, means for latching said drop in one of said positions including a member having a ferromagnetic armature portion, a cut away portion, a latch portion engageable with a part of said drop, and a stop portion co-operating with said drop and electromagnet mounted on said support for attracting said armature portion thereby to disengage said latch portion from said part of the annunciator drop, a lamp positioned adjacent said cut away portion, and means for supplying electric current to the lamp when the drop is in said indicating position thereby to illuminate said screen and said indicating character.

2. An annunciator unit comprising, in combination, a support, an electromagnet mounted on said support, a generally flat combined latch, armature and stop member pivoted at its lower end on said support and having, at its upper end, an integral latch projection and an armature portion positioned adjacent said electromagnet, a spring biasing said armature portion to a spaced position relative to said electromagnet, an annunciator drop pivotally mounted on said support and normally occupying an upper position in which a part of said drop engage said latch, means for energizing said electromagnet to attract said armature portion and release the latch projection from engagement with said part of the drop thereby allowing the drop to fall by gravity to a lower position in which a part of the drop engages a stop portion at the lower end of said flat member, said drop including a screen of translucent material defining an indicating character which overlies an opening in said flat member when the drop is in its lower position, a lamp positioned behind said opening, and means operated by the fall of said drop for supplying electric current to said lamp when the drop is in its lower position thereby to illuminate said screen.

3. An annunciator unit comprising, in combination, a support, an annunciator drop mounted on said support for movement between a rest position and an indicating position, said drop including a translucent screen defining an indicating character, means for latching said drop in one of said positions including a member having a latch portion engageable with a part of said drop, a ferromagnetic armature portion, and a cut away portion and a portion positioned to act as a stop for said drop when in its indicating position, an electromagnet mounted on said support for attracting said armature portion thereby to disengage said latch portion from said part of the annunciator drop, a lamp positioned adjacent said cut away portion and within a space defined by said electromagnet and the lower portion of the framework of said support, and cooperating contacts connected in circuit with said lamp and positioned, respectively, on said drop and said support, said contacts being engaged when the drop is in indicating position thereby to close a circuit through said lamp for illumination of said screen and said contacts being disengaged when the drop is in its rest portion thereby to break said circuit.

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