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T. S. CONIGLIARO
MAIL INDICATOR DEVICE

3,008,132

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Fig. 1

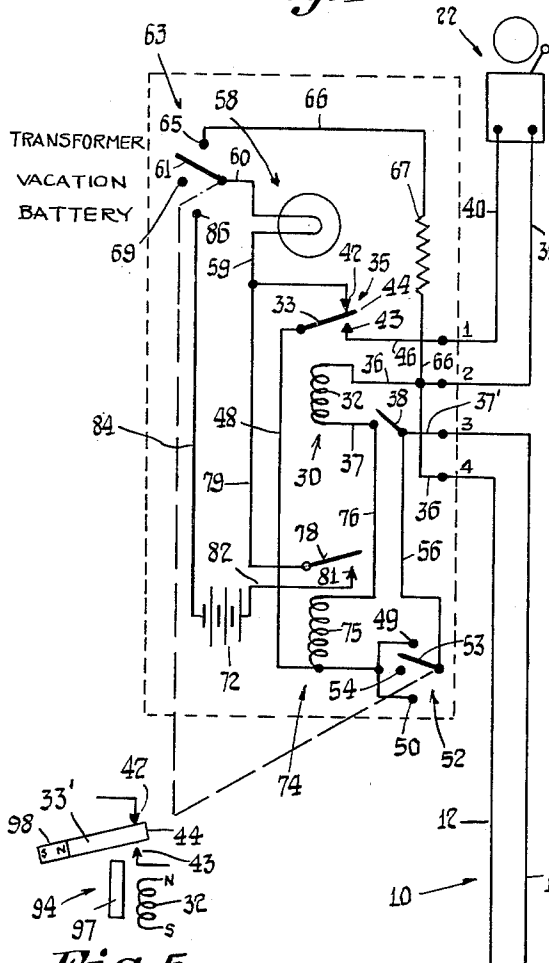


Fig. 2

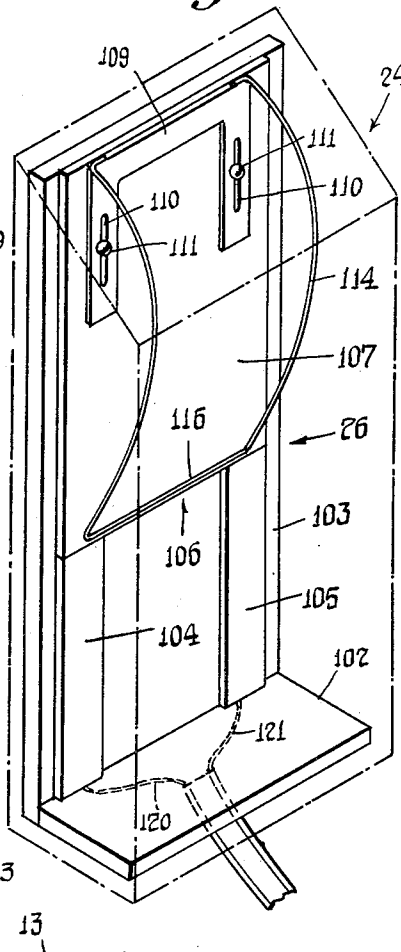


Fig. 5

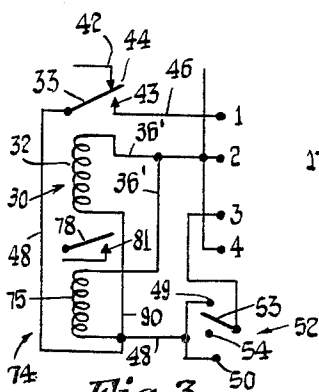


Fig. 3

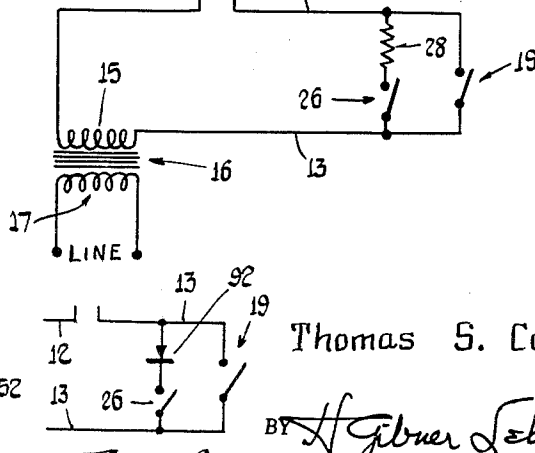


Fig. 4

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3,008,132

MAIL INDICATOR DEVICE

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19 Claims. (Cl. 340—281)

This invention relates to mail indicating devices for use with mail boxes and the like, and more particularly to electrical indicators having mail-actuated switches, by which a user will be apprised of the presence of mail.

An object of the invention is to provide a novel and improved electrical mail indicator having a mail actuated switch by which a person at a remote point, as for example a second or third floor of a dwelling will be given a continuous signal whenever mail or other matter is deposited in the mail box. Another object of the invention is to provide an improved electrical indicator as above set forth, wherein the existing two-wire energized door signal line may be utilized to effect the signal, without requiring the addition of any auxiliary lines or conductors, grounds or other return paths or the like.

A further object of the invention is to provide a novel mail indicator device in accordance with the foregoing, wherein relatively few components are required to effect the desired result, the said components being of the type already existing and usually readily available on the market.

A further object of the invention is to provide an improved mail indicator device as characterized, which is of extremely simple construction, and which may be economically fabricated and produced.

Yet another object of the invention is to provide a novel mail indicator device in accordance with the above, wherein the existing source of electrical energy as provided for the doorbell may be utilized to effect the said continuous indication or signal upon mail being deposited in the mail box.

A still further object of the invention is to provide a novel and improved mail indicator device utilizing the existing door bell line, wherein the continuous signal which is activated by the deposit of mail in the mail box may be energized from a separate, easily replenished supply of electrical energy or else from the existing energy supply for the door bell, at the will of the operator.

An additional object of the invention is to provide a novel mail indicator device of the type above set forth, wherein the door bell system and the mail indicator device may be readily shut off when desired, as for purposes of repair or replacement, or when the user is to go on an extended trip as for example a vacation.

Additional objects of the invention are to provide a novel and improved mail or paper-actuated electrical switch device for incorporation in new mail boxes or else in existing mail boxes as an accessory or attachment therefor; to provide a mail-actuated switch as above set forth which is adapted to a wide variety of different mail boxes; to provide a switch of this character which is easily and quickly adjustable, to the end that it may be made extremely sensitive in its response even to few letters or sheets of paper; and to provide a switch of this character which is of extremely simple construction, is economical to fabricate, and may be easily and quickly installed in existing mail boxes.

Other features and advantages will hereinafter appear.

In the drawings accompanying this specification, similar characters of reference are used to designate like components throughout the several views, in which:

FIGURE 1 is a schematic circuit diagram of an existing energized door-bell system having incorporated with it the present improved mail indicator device.

FIG. 2 is a perspective view of the mail box electrical

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switch as provided by the invention, for use with the indicator device of FIG. 1.

FIG. 3 is a fragmentary circuit diagram illustrating a modification of the invention wherein a pair of relays are connected in parallel instead of being in a series circuit as in the embodiment of FIG. 1.

FIG. 4 is a schematic diagram of a portion of the indicator device, illustrating a different type of current limiting or modifying means for use in series with the mail box switch.

FIG. 5 is a diagrammatic representation of a polarized relay for use with the circuit of FIG. 4.

Referring first to FIG. 1, there is shown a conventional two-wire energized door signal line 10 having conductors 12 and 13, said lines being connected to the secondary coil 15 of a bell transformer 16 having a primary coil 17 connected to the 110 volt line. In the door signal line 10 there is included in series a push button 19 of the usual type, and also shown as connected to the line 10 is a conventional door signal in the form of a doorbell 22. It will be understood that the push button 19 is inserted in the portion of the door signal line 10 which is located at the front door of the dwelling, being shown as in the conductor 13.

In accordance with the present invention, the door signal line 10 is utilized to enable indications to be had at a remote point, of the presence of mail or other papers in a mail box such as that indicated by the broken outline 24 in FIG. 2, without requiring any auxiliary conductors or supplementary circuit means, as for instance additional wires, a ground return or the like. In accomplishing this, in accordance with the invention and referring to FIGS. 1 and 2, an electrical switch 26 is provided for actuation by mail or other papers which are placed in the mail box 24. With the mail indicator device shown in FIG. 1 any suitable mail-actuated switch may be utilized. By the invention a specific novel and advantageous mail-actuated switch is shown in FIG. 2, and will be described in detail at a later point.

The mail-actuated switch 26 is connected with a series resistor 28, and this series circuit is connected so as to parallel the push button 19, as shown. With this arrangement it will be understood that when the push button 19 is closed, full voltage and current from the transformer secondary 15 is available for energizing and ringing the bell 22 whereas when only the mail-actuated switch 26 is closed, the resistor 28 in series with the switch will limit the current to a smaller value, so that a lesser voltage and current will be available at the remote end of the door signal line 10, as compared with the voltage and current available when the push button 19 is closed.

The mail indicator device further comprises a relay means 30 having a coil 32 connected with the signal line 10 and having an armature 33 and a switching device 35 controlled by the armature, said armature being actuated only in response to full energization of the relay coil 32. For a lesser energization of the relay coil 32 the armature 33 will not be actuated. The relay coil 32 is shown as being connected by means of a wire 36 to the wire 12 of the door signal line, the wire 36 being connected to terminals numbered 2 and 4 of the mail indicator device (with the conductor 12 being connected to the terminal 4). By means of other wires 37, 37', and a single pole single throw switch 38, the other end of the relay coil 32 is connected to the conductor 13 of the door signal line, this connection being effected through the terminal marked 3 of the mail indicator device. The signal device is connected to the bell or audible signal 22 by means of wires 39 and 40, the latter wire being connected to a terminal marked 1 of the device.

The switching device 35 of the relay comprises a pair

of stationary electrical contacts 42 and 43 and a co-operable movable contact 44 which contact is normally engaged with the stationary contact 42 and is separated from the latter and brought into engagement with the stationary contact 43 upon the relay coil 42 being fully energized. The stationary contact 43 is connected by a wire 46 with terminal number 1 of the mail indicator device or system. The armature 33 and movable contact 44 are connected by a wire 48 to the outer stationary contacts 49 and 50 of a three-position selector switch 52 having a switch arm 53 and a center, dead contact 54, the switch arm 53 being connected by a wire 56 to the single pole switch 38 and the wire 37' thereof.

In accordance with the above organization, closing of the push button 19 to effect a full voltage from the transformer 16 on the door signal line 10, will result in the relay coil 32 being fully energized, thereby to attract the armature 33 and cause the movable contact 44 to engage the stationary contact 43.

This will result in full energization of the audible signal or bell 22 from the door signal line 10, inasmuch as the line wires 12 and 39 are permanently joined and since the line wire 13 is connected through the intermediary of the selector switch 52 and the relay switching device 35 to the line wire 40. In consequence, closing of the push button 19 will effect an energization and sounding of the audible signal 22 in the usual manner. However, upon only partial energization of the relay coil 32 as may be effected by closing of the mail-actuated switch 26 instead of by closing of the push button 19, the armature 33 will not be attracted and instead the movable contact 44 of the switching device will remain in engagement with the stationary contact 42 thereof. Use is made of this condition, in accordance with the present invention, to effect an energization of a second electric signal which operates from the reduced current in the door signal line as occasioned by the presence of the current-limiting resistor 28. Preferably, as shown in FIG. 1, the second electric signal is constituted as an electric bulb whereby it is a visual signal rather than an audible signal such as the bell 22. However, it should be understood that an audible signal may be utilized as well, or any other suitable signaling device, such as an annunciator, relay, etc. The electric bulb 58 has one terminal connected by a wire 59 to the stationary contact 42 of the switching device 35, the other terminal of the bulb being connected by the wire 60 to a switch arm 61 of a three-position selector switch 63 which is coupled to the similar three-position selector switch 62 for simultaneous actuation therewith. The selector switch 63 has a stationary outer contact 65 which is connected by a wire 66 through a suitable current-limiting resistor 67 to the wire 36 and thence to terminals 2 and 4 of the mail indicator device. Thus, when the selector switches 62 and 66 are in the uppermost positions with the switch blades engaged with the stationary contacts 49 and 65, the visible signal bulb 58 will be energized and will light up when the mail box switch is closed, with the relay 30 only partially energized. The energization of the visible signal 58 is effected from the transformer 16 through the conductors 12 and 13 of the door signal line 10, and through the terminals 3 and 4 of the mail indicator device. Current will flow through the wire 36, the wire 66 and resistor 67, the switch contacts 65 and 61, the wire 60 and the bulb 58, and thence through the wire 59 and contacts 42 and 44 of the relay switching device, through the wire 48 and the switch contacts 49 and 53, and finally through the wires 56 and 37.

In accordance with the invention, the rating and characteristics of the visible signal bulb 58 are such that, in conjunction with the current limiting resistor 67, the bulb will be well illuminated in response to the reduced voltage which exists across the terminals 3 and 4 of the mail indicator device, this reduced voltage existing across

the relay coil 32 and being insufficient to enable the said coil to actuate the armature 33 and movable contact 35. Since the relay 30 is not operative, the audible signal bell 22 will remain open circuited and inoperative.

When it is desired to shut off and render inoperative the mail indicator system, the selector switches 52 and 63 are merely shifted so that the contact arms thereof engage the dead contacts 54 and 69 of the selector switches with the single pole switch 38 open whereupon the relay coil 30 will be open circuited and the audible signal or bell 22 will remain open circuited. Thus, these conditions result in shutting off the device, and may be effected when the user is to be away for a certain period of time, as for example on vacation.

In connection with the circuit of FIG. 1, the voltage of the transformer secondary 15 may be on the order of 10 volts, the resistance of the resistor 28 may be 10 ohms, the audible signal 22 may be a six-volt bell, the resistor 67 may have 25 ohms, and the lamp 58 may be a number 40 lamp rated at 6-8 volts and .15 ampere. The battery 72 may consist of two size C dry cells. The relays 74 and 30 may be A.C. relays, and may have their coils rated at 6 volts.

In accordance with the present invention the three-position selector switches 52, 63 are also utilized in conjunction with an auxiliary or separate source of energy whereby the visible signal bulb 58 may be energized independently of the energy from the transformer 60, as for example from a set of batteries 72. In effecting this, the invention provides a second relay 74 having a coil 75 which at one end is connected with the wire 48 and at its other end is connected by a wire 76 to the single pole switch 38 and the wire 37 thereof.

By this organization the relay coils 32 and 75 may be energized in series from the door signal line 10 when the single pole switch 38 is kept open. With such arrangement, the relay coil 32 and the adjustment of the relay 30 are so arranged, in conjunction with the voltage of the transformer secondary 15 and the value of the series resistor 28 connected to the mail box switch 26, that closing of the push button 19 will effect an instantaneous actuation of the relay armature 33 whereas closing of only the mail box switch 26, energizing the relay coil 32 at reduced voltage will not result in the relay armature 33 being actuated at all. Also, where the two relays 30 and 74 are to be used, together with the auxiliary or separate source of energy 72, then the relay coils 32 and 75 are so arranged, together with the adjustment of the relays, to obtain the same, above-described action of the relay 30 whereas the relay 74 will be made operative not only in response to closing of the push button 19 but also in response to the reduced current as occasioned by closing of the mail actuated switch 26. Thus, the operation of the two relays are distinguished from each other in this respect.

The second relay 74 has an armature 78 comprising a movable contact, the said armature being connected by a wire 79 to the lead 59 from the visual signal lamp 58. A stationary contact 81 of the relay 74 is connected by a wire 82 with the battery 72, and the said battery is connected by a wire 84 to an outer stationary contact 86 of the selector switch 63. By the above organization, when the selector switches 52 and 63 are in their lowermost positions wherein the contacts 50 and 86 are engaged, the visible signal lamp 58 will be connected with the battery circuit and will be energized upon actuation of the relay armature 78. Such actuation is effected in response to closing of the mail box switch 26 by which reduced current flows in the signal line 10, by virtue of the reason that the relay coil 75 and the armature are arranged to respond to this value of current while at the same time the relay armature 33 remains inoperative.

In accordance with the foregoing organization, when the selector switches 52 and 63 are in the lower positions

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the lamp 58 will receive its energy from the battery 72 by virtue of the relay 74 closing when the mail box switch 26 is closed, and when the push button 19 is closed the relay 30 will be activated, separating the contacts 42 and 44 thereof and establishing a circuit through the door bell 22, thereby to effect energization of the door bell. For such circumstance, the lamp 58 will not be energized at any time from the transformer 16, regardless of the position of the selector switches 52 and 63. However, when the selector switches are in their lowered positions, the lamp 58 will be energized from the batteries 72 even when the door bell button 19 is depressed. Thus, a visual signal will be given at the time that the door bell is rung, but this signal will be extinguished as soon as the push button 19 is released, thereby apprising the user of the fact that actually there are no letters or papers in the mail box 24. It will be understood, however, that the present improved mail indicator device is wholly operative without the auxiliary energy supply 72 and the second relay 74, and for such condition the single pole switch 38 will be closed, except when the system is to be put out of use as for vacation and like purposes.

Instead of the relay coils 32 and 75 being connected in series as shown in FIG. 1, they may be connected in parallel as illustrated in FIG. 3, by properly relating their resistances or impedances. The parallel connection of FIG. 3 is effected by connecting the lower end of the coil 32 by means of a wire 90 with the lower end of the coil 75, and connecting the upper ends of the two coils together by a wire 36'. By suitable design of the relay coils, and adjustment of the armature tensions, these relays may be made to operate in parallel in the manner already described above in connection with the circuit of FIG. 1.

In place of the current modifying or limiting resistor 28 connected with the mail box switch 26, other current modifying means may be employed. For example, in FIG. 4 there is shown a rectifier 92 which is used in place of the resistor 28. Obviously, the rectifier 92 will eliminate alternate loops of the alternating current, thereby reducing the total current value in the door signal line 10, whereby the relay 30 may remain inoperative when the mail box switch 26 is closed, and will be immediately operative whenever the push button 19 is closed. Also, as illustrated in FIG. 5, a polarized type relay 94 may be utilized in place of the relay 30. The relay 94 has an energizing coil 32 and an armature 33' together with a switching device comprising a movable contact 44 and stationary contacts 42 and 43. Associated with the coil 32 is a laminated core member 97, and the armature 33' is also preferably laminated to adapt the relay 94 for alternating current operation. Thus, when the relay 94 is substituted for the relay 30, closing of the push button 19 will effect an energization of the coil 32 of the relay 94, and will actuate the armature 33', thereby to engage the contacts 43 and 44 and separate the contacts 42 and 44.

Associated with the armature 33' is a small permanent magnet 98 having north and south poles as indicated. Thus, the armature 33' is polarized, and will be given a north pole at its rightmost end. The rectifier 92 is so arranged that a direct current flows in the door signal line 10 when the mail box switch 26 is closed, in such a direction that the coil 32 will be polarized to effect a north pole at its upper extremity, thereby to polarize the upper extremity of the core member 97 with a north pole, which will now repel the north-polarized armature 33', thereby causing the armature to be inoperative when the mail box switch is closed. Thus, the contacts 42 and 44 remain in engagement, and the reduced current flowing in the door signal line, which is now mostly direct current, will energize the signal lamp 58 through the closed contacts 42, 44. Since a selective operation of the relay 74 is not required, as is necessary with the relays 30 or 94, the relay 74 need not be of the polarized type but instead would be so arranged as to be made operative

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when either the push button 19 is closed or the mail box switch 26 is closed.

In accordance with the present invention a novel and improved mail box switch is provided, as illustrated in FIG. 2, this switch being especially adapted for insertion in existing mail boxes of various sizes and shapes. The mail box switch shown in this figure comprises a small flat base 102 to which there is attached an upstanding rectangular back board 103, both of these being preferably of electrically insulating material. The back board 103 carries a pair of electrically conducting, spaced parallel bars 104 and 105, and the upper extremities of the bars 104, 105 abut the lower edge 106 of a panel 107 which is also secured to the back board 103 at its upper portion. The insulating panel 107 has secured to it a U-shaped bracket 109 provided with a pair of slots 110 through which screws 111 pass, the said screws being threaded into the panel 107 and back board 103 and enabling the bracket 109 to be vertically adjusted. The bracket 109 has secured to it a U-shaped, flexible and resilient bowed contact wire 114 which is of spring metal such as Phosphor bronze or the like. The wire 114 is sufficiently bowed so that it will engage the front wall of the mail box 24, even though the said mail box is relatively deep. By suitable adjustment of the bracket 109, the lower contacting edge 116 of the wire 114 may be brought very close to the upper extremities of contact bars 104, 105 without touching the latter. When thus adjusted, the presence of letters or papers in the mail box 24 will usually flatten the bowed contact wire 114 sufficiently to cause the contact-making yoke portion 116 to engage and bridge the contact bars 104 and 105. These bars thus constitute the stationary contacts of the mail box switch, whereas the movable contact of the switch is constituted by the bowed wire 114, 116. Suitable leads 120, 121 may be connected to the bars 104, 105 and brought out through an opening in the lower portion of the mail box 24 and the said leads may be constituted of a flat, twin-wire ribbon such as is commonly used for television antenna lead-in purposes.

It will now be understood from the foregoing that I have provided a novel and improved mail indicator device by which an indication of the presence of mail in a mail box will be had, the said device utilizing the existing door signal line of the door bell system. An indication may be readily had at a remote point as to the presence of mail, which is of great advantage when a user lives on the second, third or higher floors of a dwelling, for example.

No additional wires or conductors, or ground return circuits are required, and utilization is made of modification of the current passing through the door signal line to effect the mail indication and to simultaneously prevent sounding of the door bell.

The system is seen to be relatively simple in its construction, and economical to fabricate and produce.

Variations and modifications may be made within the scope of the claims, and portions of the improvements may be used without others.

I claim:

1. A combined door signal and mail indicator system comprising a two-wire energized door signal line including an energizing means and a push button connected in the line; a mail box controlled circuit comprising a mail box switch and series current-modifying device said circuit being connected so as to parallel the push button, said switch being responsive to mail being placed in the mail box; an audible electric door signal; a relay means separate from said signal, having a coil connected in series with the signal line and having an armature and switching device controlled by the armature, said armature being fully actuated in response to closing of the push button to connect said audible door signal through said switching device for energization from the door signal line, said audible signal being normally open-circuited by the switching device; a second electric signal; and

means effecting energization of the second signal in response to modified current in the door signal line as effected by closing of the said mail box switch.

2. The invention as defined in claim 1 in which the means effecting energization of the second signal includes a second relay made operative when the said switch is closed.

3. The invention as defined in claim 2 in which the means effecting energization of the second signal includes a source of energy separate from the said energizing means and connected to the second relay.

4. The invention as defined in claim 3 in which the separate source of energy comprises a battery arranged to provide energization solely of the second signal.

5. The invention as defined in claim 2 in which the said relays are connected in parallel.

6. The invention as defined in claim 2 in which the said relays are connected in series.

7. The invention as defined in claim 1 in which there is a second relay and a source of energy separate from said energizing means and connected to the second relay, and in which there is a selector switch means for effecting energization of the second signal either from the said energizing means or else from the said source of energy, at will.

8. The invention as defined in claim 7 in which the selector switch means has "off" positions open-circuiting the second signal and the coils of the said relays.

9. The invention as defined in claim 1 in which the means effecting energization of the second signal includes the said energizing means of the door signal line.

10. The invention as defined in claim 1, in which the second signal comprises a lamp having a rating such that it will be illuminated by a fractional part of the reduced current in the signal line, another part of said current effecting the energization of the relay means.

11. The invention as defined in claim 1, in which there is a resistor in series with the second signal, to increase the impedance of the second signal circuit with respect to the relay coil.

12. The invention as defined in claim 1 in which there is a circuit interrupting means in series with the relay coil, and a circuit interrupting means in series with the second signal, for shutting off the system.

13. The invention as defined in claim 1, in which the current modifying device is a rectifier.

14. The invention as defined in claim 13, in which the relay is a polarized relay.

15. A combined door signal and mail indicator system comprising a two-wire energized door signal line including an energizing means and a push button connected in the line; a mailbox controlled circuit comprising a mail box switch and series current-modifying device said circuit being connected so as to parallel the push button, said switch being responsive to mail being placed in the mail box; an audible electric door signal; a relay means separate from said signal, having a coil connected in series with the signal line and having an armature and switching device controlled by the armature, said armature being fully actuated in response to closing of the push button to connect said audible door signal through said switching device for energization from the door signal line, said audible signal being normally open-circuited by the switching device; a second electric signal; and means effecting energization of the second signal through said switching device in response to modified current in the door signal line as effected by closing of the said mail box switch.

16. The invention as defined in claim 15 in which the switching device comprises a single-pole double-throw switch normally closed in one of its positions, and in which the relay armature is inoperative when the said switch is closed.

17. A combined door signal and mail indicator system comprising a two-wire energized door signal line including

an energizing means and a push button connected in the line; a mail-box controlled circuit comprising a mail box switch and series current-limiting means, said circuit being connected so as to parallel the push button, said switch being responsive to mail being placed in the mail box; an audible electric door signal; a relay means separate from said signal, having a coil connected in series with the signal line and having an armature and switching device controlled by the armature, said armature being fully actuated in response to closing of the push button to connect said audible door signal through said switching device for energization from the door signal line, said audible signal being normally open-circuited; a second electric signal; and means effecting energization of the second signal in response to reduced current in the door signal line as effected by closing of the said mail box switch.

18. A combined door signal and mail indicator system comprising a two-wire energized door signal line including an energizing means and a push button connected in the line; a mail-box controlled circuit comprising a mail-box switch and series current-limiting means, said circuit being connected so as to parallel the push button, said switch being responsive to mail being placed in the mail box; an audible electric door signal; a relay means separate from said signal, having a coil connected in series with the signal line and having an armature and switching device controlled by the armature, said armature being actuated in response to closing of the push button and being inoperative in response to reduced current in the signal line by virtue of closing of only the said switch, said audible door signal being connected through said switching device for energization from the door signal line when the push button is closed and the armature is actuated; and a second electric signal connected through said switching device for energization with reduced current from the door signal line when the said mail box switch is closed and the armature is inoperative.

19. A combined door signal and mail indicator system comprising a two-wire energized door signal line including an energizing means and a push button connected in the line; a mail-box controlled circuit comprising a mail box switch and series resistor, said circuit being connected so as to parallel the push button, said switch being responsive to mail being placed in the mail box; an audible electric door signal; a relay means separate from said signal, having a coil connected in series with the signal line and having an armature and switching device controlled by the armature, said armature being actuated in response to closing of the push button and being inoperative in response to reduced current in the signal line by virtue of closing of only the said switch, said audible door signal being connected through said switching device for energization from the door signal line when the push button is closed and the armature is actuated; a second electric signal connected through said switching device for energization with reduced current from the door signal line when the said mail box switch is closed and the armature is inoperative; a second relay means having a coil connected with the signal line and having an armature and contact means controlled by the armature, said armature being actuated in response to reduced current in the signal line caused by closing of the said switch; a separate source of energy connected with the contact means of the second relay means and adapted to energize the said second signal; and means including a selector switch device for effecting energization of the second signal at will from either the separate source of energy or the signal line when the said mail box switch is closed and the line has reduced current.

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