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2,843,843	7/1958	Davis.....	340/276
2,855,588	10/1958	Allen.....	340/276
3,024,452	3/1962	Leonard.....	340/274
3,411,152	11/1968	Jackson.....	340/274

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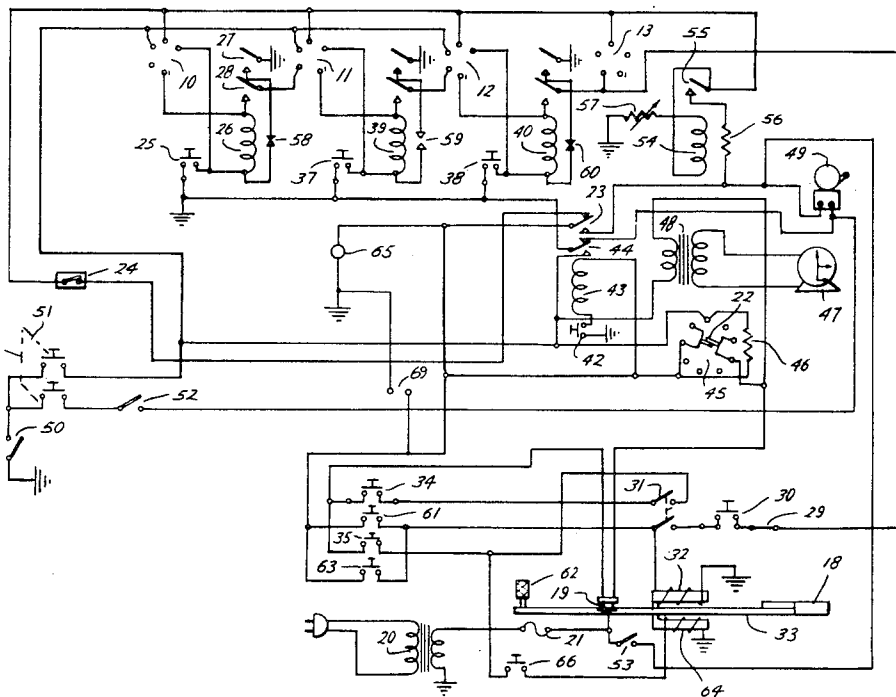
[54] **ELECTRIC PERMUTATION LOCK AND ALERTING SYSTEMS**
5 Claims, 3 Drawing Figs.

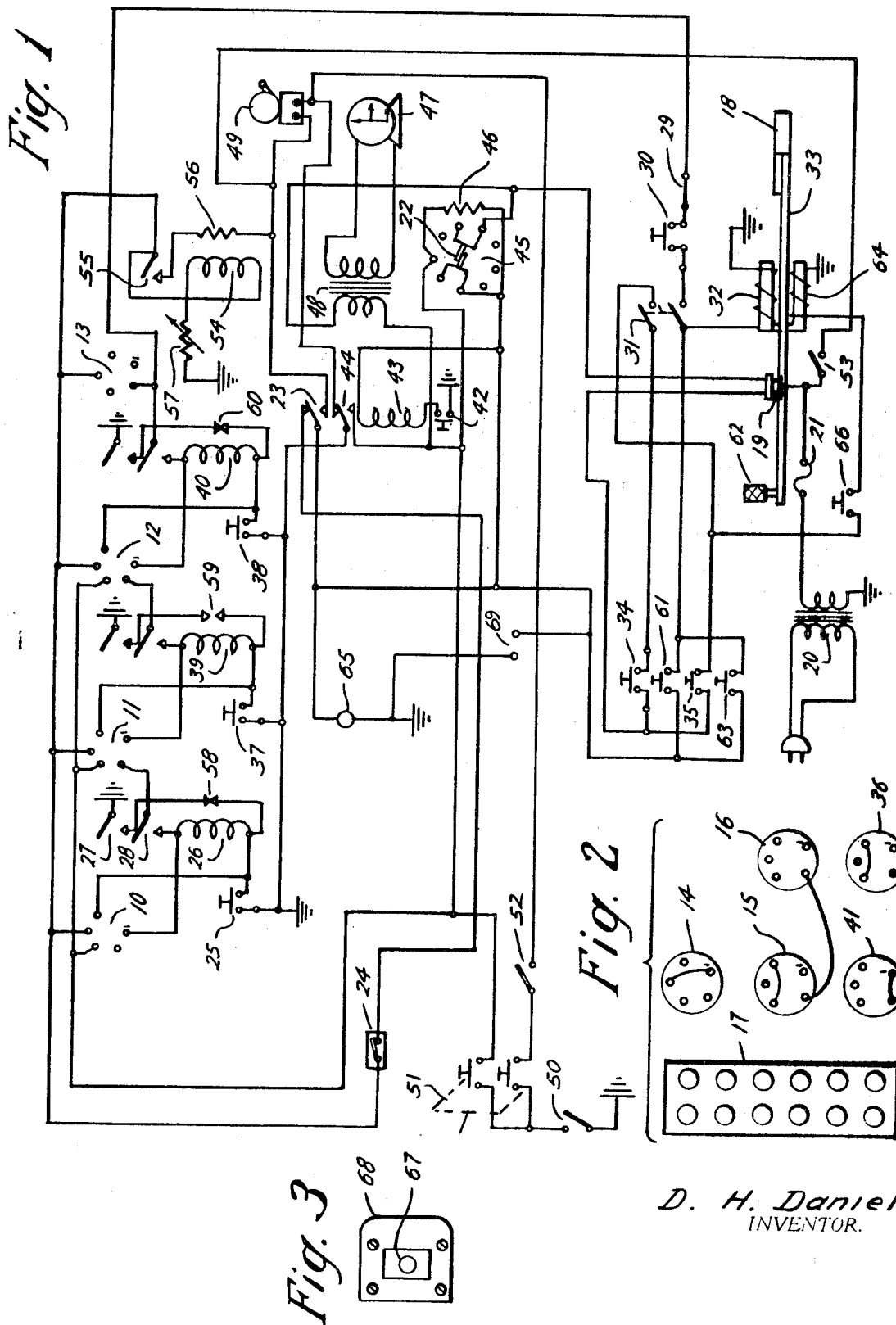
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[56] **References Cited**

UNITED STATES PATENTS
 3,441,808 4/1969 Crane..... 340/164

ABSTRACT: A composite door lock security system in which a door-unlocking combination function is provided through electric screening of outside-switch-generated signals. A preselected and changeable unlock combination is allowed to pass to an unlock solenoid while any erroneous unlock signals, burglar detection and community alert signals are channeled to the lock reset and to one or both of two alarm circuits which sound, register and identify the above source signals plus fire detection signals. Simple switch and manual lock-unlock means are also provided.





ELECTRIC PERMUTATION LOCK AND ALERTING SYSTEMS

SUMMARY

The object of this invention is to provide a multifunction electric permutation lock and alerting system having coded danger signals that are readily identifiable, and also having a larger number of combinations, positive door sensing and improved burglar deterrence.

Further objects and features of the invention will best be understood and appreciated from the following detailed description of a preferred embodiment thereof, selected for purposes of illustration and shown in the accompanying drawing, in which;

FIG. 1 is schematic representation of a system in accordance with the invention,

FIG. 2 illustrates means for selecting and implementing combinations; and

FIG. 3 illustrates means for door open-close sensing.

OPERATION

Combination Sequence Screening

Referring now to FIG. 1 and FIG. 2, four socket configurations 10, 11, 12, 13 are shown. This number can vary either upward or downward. Selective combination screening is achieved by using Input Plug 14, Jump From Plug 15, Jump To Plug 16. Let us consider a step-by-step analysis of the events that happen as a result of operation of outside pushbutton panel 17 and how these events are controlled by the various plug configurations.

With door-locking bolt 18 in lock position, sliding contact switch 19 is closed and source voltage from the power supply 20 is made available through fuse 21, switch 19, thermal relay contacts 22, contacts 23 and thermobreaker 24 to all socket pin 4 terminals. The insertion of Input Plug 14 into any socket causes voltage to appear on pin 1 of that socket. Let us suppose that the selected socket is socket 10. The closing of associated outside pushbutton switch 25, mounted in outside panel 17, causes current to flow in relay coil 26 which in turn is locked in by the closing of upper contacts 27. The source voltage is now advanced through the lower contacts 28 to pin 2 of socket 11 and then on to the next-selected stage and finally to output point 29 as the required combination sequence is pressed. Switch 30 constitutes the last step in the combination sequence. Inside double-pole disabling switch 31 must be closed in order for the correct combination sequence to energize unlock solenoid 32 which unlocks the bolt assembly 33 and switches contacts 19 to make voltage available only to outside lock switch 34 and inside lock switch 35.

Error-Sensing Plug 36 provides means of selecting pushbutton switch 25, 37, or 38 to momentarily ground the alarm circuit pin 3 terminal and thus trigger an alarm sequence as explained under Combination Lock Tamper Alert.

Jump From Plug 15 in conjunction with Jump To Plug 16 provides means of bypassing selected combination stepping relays 26, 39, 40 in the selection of a combination chain.

Sequential Plug 41 continues consecutive stepping sequence of stepping relays.

Only the selected sequence in the selected pushbuttons mounted in outside panel 17 will unlock the combination mechanism without triggering an alarm.

Combination Lock Tamper Alert

Referring again to FIG. 1 and FIG. 2, switch contacts 42 represent the function of selected tamper detection pushbuttons not otherwise previously mentioned in the outside panel 17. The momentary closing of any one of these tamper detection pushbuttons grounds the lower end of relay 43, and, upon the condition that the door is locked, completes a circuit from the power supply 20 through fuse 21, lock-unlock switch 19, thermal relay contacts 22 and relay 43 armature. Relay 43 then closes and is immediately locked in by contacts 44. Ther-

mal relay 45 immediately begins to heat by virtue of current passing through resistor 46 via contact 44 and eventually opens thereby releasing relay 43. Reset to the stepping relays is supplied through contacts 23. During the time that relay 43 armature is actuated, timer-alarm 47, whose function is supplied by the specialized use of an electric alarm clock, is also energized through transformer 48 to give a cumulative visual time indication. Then, if the alarm mode of the alarm clock is selected to coincide with the setting of the hour and minute hands, the alarm clock will also ring. Thus there is provided a visual, audible, both visual and audible, and a cumulative scope of tamper indication which indicates frequency of occurrence over a given period of time. The main alarm 49, whose ground circuit was opened by contacts 44, will not ring and will therefore not provide sounds to reveal that the button pressed was a tamper detection button. The unique one-pulse code resulting from the momentary closing of any tamper detection pushbutton array indicates the nature of disturbance as being a tamper.

Intruder Detection

Referring to FIG. 1, assume that burglar alarm disable switch 50 is closed. Then, if double-pole burglar alarm sensing switch 51 is closed to ground the lower end of relay 43 armature, intermittent cycling action of relay 43, thermal relay 45 and timer-alarm 47 will result as described under Combination Lock Tamper Alert. The unique-coded intermittent timing or both timing and ringing of the electric alarm clock indicates burglary. If option switch 52 is closed, the main alarm 49 will also ring since option switch 52 provides the necessary ground through the lower contacts of option switch 51. Thus there has been provided the switch option of either loud, quiet, or absolutely noiseless burglary indications whereby an intruder would have no means of anticipating the alarm type in current use, or whether or when his presence has been detected.

Fire Alarm

The closing of normally open fire-sensing switch 53 applied continuous unconditional energizing voltage to main alarm 49. The invention utilizes the resultant continuous ringing of the main alarm 49 as a unique and identifiable alarm signal meaning fire. Another distinguishing characteristic of the fire alarm is that it has the unique ability to function regardless of door status and may be tested accordingly.

COMMUNITY ALERT

A voltage surge in the voltage supplied to the power supply 20 such as could be provided with the cooperation of power-line companies would trip voltage-sensitive relay 54 and through contacts 55 cause continuous ringing of the main alarm 49 to provide a warning of imminent community danger from tornadoes, enemy attack, etc. Variable resistor 57 is set just below the actuating point of relay 54 which trips on the voltage surge and continues to hold after the voltage surge has passed. The invention, in order to make the community alert signal unique and readily identifiable and also provide a means of limiting the duration of that alarm, has incorporated a dual function resistor 56 to give a significantly suppressed type of alarm that can be readily distinguished as community alert. The other function of resistor 54 is to heat thermobreaker 24 which ultimately opens and releases relay 54, ending the alarm.

Limitation of Relay Activation Periods

Thermobreaker 24 also performs a reset function by opening to remove voltage supply to the combination relays when the ambient temperature reaches a selected level. This function limits the length of time that a combination relay can be energized.

Extended Number of Possible Combinations

Connectors 58, 59, 60 have been added to extend the number of available combinations in the electric permutation lock. When one of these connectors is left unconnected, as in the case of connector 59, the associated pushbutton switch 37 must be held manually closed in order to complete the combination sequence. These connectors therefore provide greater deterrence to tamper.

Main and Remote Control Points

Inside operation of the system is provided by lock switch 35 and unlock switch 61 placed at appropriate locations within a building or home. A manual bolt control 62 that is independent of electricity is also provided at an inside location. Unlock switch 63 is normally inaccessible for outside use and is for special admittance and emergency purposes, over riding all other outside and inside unlocking means. The system may be rendered inoperable from outside lock and unlock controls by the use of disable option switch 31.

The lock solenoid 64 is operable by inside pushbutton 35 and outside pushbutton 34. The unlock solenoid 32 is operable by inside pushbutton 61 and normally inaccessible outside pushbutton 63.

Solenoid and Switching Bolt Assembly

It should be noted that the lock solenoid 64 and unlock solenoid 32 are self-disabling, i.e. after each performs its lock function, it automatically cuts itself off by its associated sliding contact switch 19. Switch 19 removes all supply voltages from all systems except the lock switches when the bolt is in unlock position. Switch 19 further removes all supply voltages to all lock switches when bolt 18 is in lock position. This self-disabling feature results in a far longer life expectancy of many components and provides a voltage on-off source to remote status indicator lights 65.

Door Open-Close Sensing

The invention, as illustrated in FIG. 1 and FIG. 3, utilizes to great advantage the inherent characteristics of door spring-loaded latching bolt mechanisms as an aid to door open-close sensing. The invention does this by allowing the door spring-loaded latching bolt, over, above and including its normal use, to engage and close door open-close sensing switch 66. In order to provide positive sensing of the door open-close status, force-transmitting element 67 of door-sensing switch 66 is placed inside the door latch receptacle 68 mounted in the doorjamb. Consequently, only when the door is fully closed and in perfect locking position will the spring-loaded latching bolt of the conventional door latch engage and close sensing switch 66. This same sensing action is utilized for burglar alarm sensing switches 51 in doors, making it impractical to attempt to cheat or defeat the purpose of the burglar alarm sensing switch 51.

Door Status Indication

The on-off voltage source from bolt assembly switch 19 in conjunction with the action of door-sensing switch 66 provides positive door open-close and lock-unlock continuous visual status indication at selected remote control points.

Special Selective Unlock (outside)

Outside source voltage terminals 69 and unlock switch 63 are mounted together at an outside control station to provide unconditional means of operating unlock solenoid 32 when bolt 18 is locked. This arrangement provides special selective accessibility to authorized persons for routine accessibility requirements and for emergency use.

Sound Insulation

To further remove the possibility of switching sounds being used to crack the combination, all relays are mounted together in a suitable housing and isolated from the rest of the system. As a further precaution, the housing containing the relays is securely bound in an impervious material such as plastic and then completely submerged in sand or a similar material. This constitutes a simple, convenient and inexpensive, yet very safe and effective method of eliminating telltale sounds from the relays.

Thus there has been provided a greatly improved multifunction electric permutation lock and alerting system which more efficiently and effectively provides maximum security, safety, and convenience. The system is more versatile, providing more functions, yet is simple to operate and is much more reliable. The scope of the invention is not limited to the specific embodiment disclosed, but includes the various alternatives and modifications that fall within the true scope of the invention as defined by the following claims.

I claim:

1. In an electric permutation lock and alerting system having a plurality of combination-selecting stages operable by an outside switching means and having a source of voltage extended to successive stages to ultimately provide an unbroken chain to an unlocking solenoid as each successive outside switch requirement is met, a self-locking switch means responsive to an alarm trip means whereby energization of said reset switch means by an alarm-tripping event resets said combination-selecting stages to their normal state and further energizes a first alarm circuit and further energizes a thermally operated switch means which begins to open upon energization and finally opens after a period of time to release said reset switch means and start a new alarm cycle if said tripping event is still present, the number of said alarm cycles being indicative of whether said tripping event is momentary or continuous and wherein said alarm trip means comprise selected visually indistinguishable combination tamper detection switch means, the momentary closing of any said tamper detection switch means resulting in one said alarm cycle which constitutes a unique and recognizable code that indicates the nature of danger as tamper; and wherein said alarm trip means further comprise intruder detection switch means whose continuous closing results in repetitive said alarm cycles which further constitute a unique and recognizable code that indicates the nature of danger as intrusion.

2. The permutation lock and alerting system of claim 1 further including thermoresponsive switch means connected in series with a second alarm circuit to energize said second alarm circuit upon closure of said thermoresponsive switch means, the resultant continuous energization of said second alarm circuit constituting a unique and recognizable code that identifies the danger as fire.

3. The permutation lock and alerting system of claim 1 further including an electric alarm clock responsive to activation of said first alarm circuit, elapsed time indication and time duration of said alarm cycles being utilized as means of detecting and identifying dangers and frequencies of dangers resulting from tamper or intrusion.

4. The permutation lock and alerting system of claim 3 further utilizing the alarm mode of electric alarm clocks, alarm time being set to equal the approximate time registered on said alarm clock, said alarm mode utilizing the inherent characteristics of an electric alarm clock to provide audible indication of tamper and intrusion disturbances.

5. The permutation lock and alerting system of claim 1 further including connector means in series with the lock-in circuit of each said combination-selecting stage whereby the disconnection of one said connector means would, in order to provide said unbroken chain, then necessitate manual hold of respective energizing said outside switching means.

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