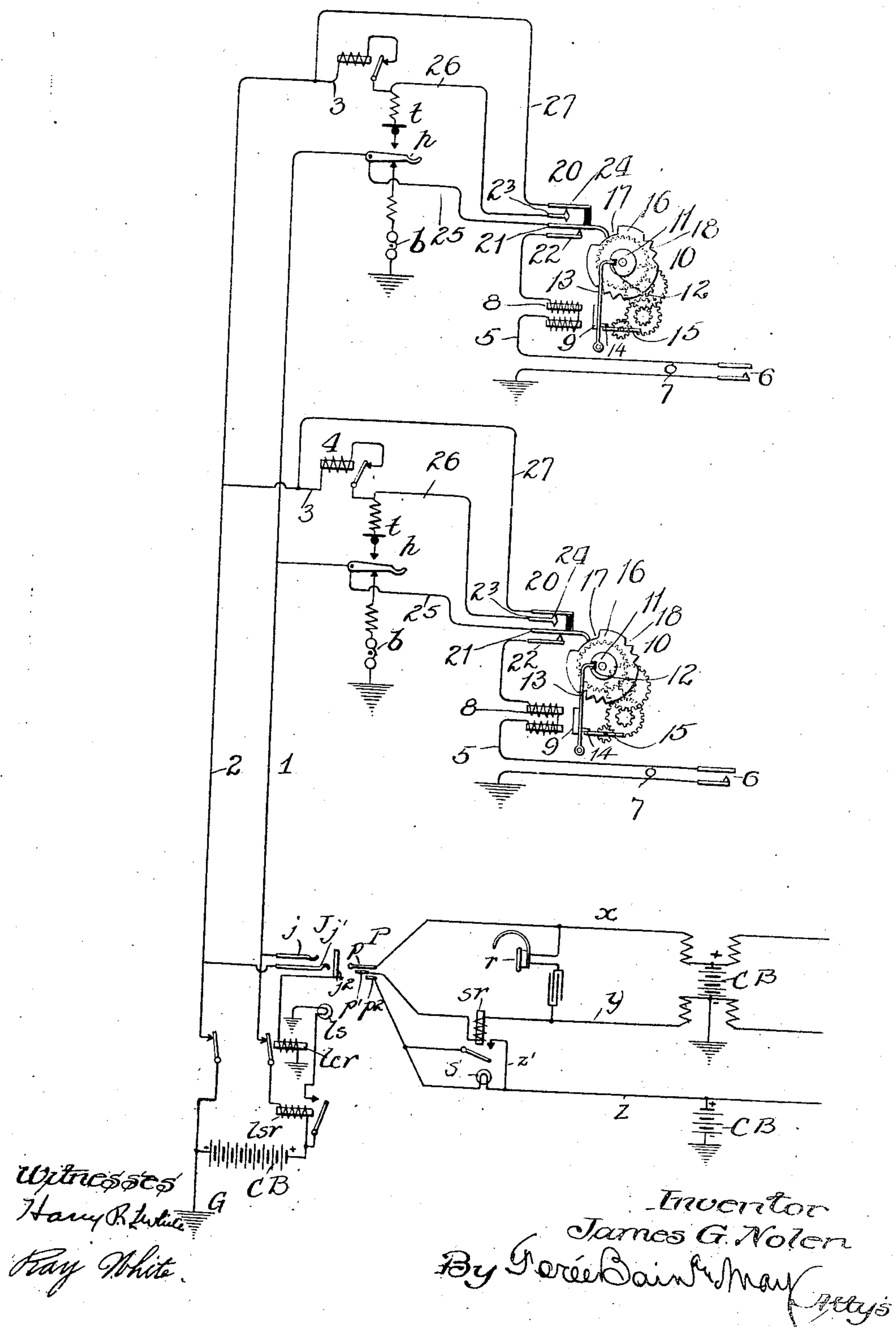


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 COMBINED TELEPHONE AND PROTECTIVE ALARM SYSTEM.  
 APPLICATION FILED MAY 31, 1907.

955,472.

Patented Apr. 19, 1910.



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# UNITED STATES PATENT OFFICE.

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COMBINED TELEPHONE AND PROTECTIVE ALARM SYSTEM.

955,472.

Specification of Letters Patent.

Patented Apr. 19, 1910.

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To all whom it may concern:

Be it known that I, JAMES G. NOLEN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Combined Telephone and Protective Alarm Systems, of which the following is a specification.

My invention relates to improvements in combined telephone and protective alarm systems.

One of the salient objects of my invention is to provide a system of the character described wherein the actuation of the signal initiating device constituting part of the protective system conditions for operation a self-operating circuit changer connected in the line.

Another object of my invention is to provide an arrangement such that said circuit changer is normally rendered inoperative or disabled as by a short circuit established therearound, and does not interfere in any way with the normal operation of the telephone, and so to associate the protective devices that the said short circuit is broken only when the signal initiating device is operated.

Another object of my invention is to provide a simple and effective protective installation for the subscriber's station, suitable for association with private or party lines, arranged to insure that the central operator's attention will be attracted to the alarm whether or not the line is already in use at the time a signal initiator is operated, and adapted, when associated with party lines to transmit from any station a signal peculiar to said station.

Other and further objects of my invention will best become apparent to those skilled in the art from the following description, taken in conjunction with the accompanying drawing, wherein I have illustrated in a single view in diagrammatic fashion the application of my invention to a party line telephone system of well known character.

It will be understood that the showing of the telephone system proper is illustrative only and not limitational, as ordinary wiring skill will permit the use of my invention in connection with other particular telephone systems.

In the drawings 1 and 2 indicate the tip and sleeve wires of a party line, provided

at the central station with the usual equipment including a central battery C B, grounded at G at one terminal, and at said terminal connected to line 2, the other terminal of the central battery being connected through a line signal relay *l s r* with line 1. Said line signal relay has an armature connected to the ungrounded terminal of the battery, and arranged for coaction with the front contact connected through the line signal *l s* to ground. A suitable jack J is provided, its tip *j* being connected with line wire 1, its sleeve *j'* connected to line wire 2 and its test ring *j''* connected through the line cut-out relay *l c r* to ground. The central cord circuit may also be of approved character, the central battery C B having connection at its ungrounded terminal through the tip strand *x* to the tip *p* of a plug P, and also through the test strand *z* with the test contact *p''* of the plug, said strand including in series therein the supervisory signal *s*.

The grounded terminal of the battery is connected through sleeve strand *y* including a supervisory relay *s r* with the sleeve contact *p'* of the plug. The supervisory relay *s r* is provided with an armature, which when attracted closes a shunt *z'* around the supervisory signal *s* to short circuit the latter. It will of course be understood that suitable repeating coils, impedances, and like paraphernalia of a central station cord circuit may be employed in the usual manner, unnecessary here to describe.

*r* represents the receiver of the central operator's set, which may in any usual manner be bridged through a condenser across the tip and sleeve strands of the cord. It will be understood that this installation is illustrative only and forms *per se* no part of my invention.

At each subscriber's station is provided a suitable set, in the equipment shown there being provided the usual hook *h* connected with the wire 1, and a transmitter *t*, the circuit whereof is normally opened by the hook switch, connected by wire 3 with the sleeve side 2 of the line. The lower switch hook contact is connected through suitable resistance and the bell *b* with the ground.

For the practice of my invention I provide in association with each subscriber's station a protective system involving a self-operating electric circuit changer connected

in a line wire or a wire of the subscriber's bridge and adapted when operating to vary the conditions of the circuit with which it is associated, connections for disabling the circuit changer, under normal conditions, a circuit (preferably grounded) closable through signal initiating devices, and including a relay, and a motor controlled by said relay operating when tripped to condition the circuit changer for operation, preferably breaking the circuit closed by the signal initiator, and establishing bridge connection across the line wires, including in circuit the said circuit changer.

15 In the specific embodiment shown 4 indicates a self-operating circuit changer, in the form of a circuit-breaking buzzer cut into the bridge or line wire 3, said relay comprising an electro-magnet coil connected in series in the line, provided with an armature normally completing the circuit through the coil and arranged when attracted by the coil to break said circuit in a well understood fashion.

25 5 indicates a protective circuit wire, grounded at one terminal and including in parallel therein circuit closers 6 and 7 (which may be window and door springs, as indicated at 6, or thermostats, as indicated at 7, or other protective devices), said wire also including in series the coil 8 of an electro-magnetic motor-controlling device the armature 9 whereof is associated with the moving parts of a normally wound motor diagrammatically indicated at 10. Preferably the motor 10 has mounted on one of its slow moving arbors a disk 11, having a suitable notch 12, into which may pass the extremity of the armature arm 13, the latter being also provided with a projection 14 adapted for engagement with the fly or other rapidly moving part 15 of the motor train, at such time as the end of the arm 13 engages in the notch 12. Consequently if the arm 13 is moved to withdraw its extremity from the notch 12 the projection 14 is disengaged from the fly, and the motor cannot then be stopped until the disk 11 has made a complete revolution whereupon the extremity of the armature arm 13 may again engage the notch 12 and projection 14 may catch the fly 15.

16 indicates a toothed wheel, having in its periphery a notch 17 and preferably provided with other peripheral notches 18 arranged in suitable relation to constitute number signal groups for effecting transmission of plural impulse signals. With the wheel 16 is operatively associated a switch 20 comprising preferably four pens, one whereof, indicated at 21, is controlled and movable to follow the contour of the periphery of wheel 16, said pen standing normally in the notch 17 and being arranged to be raised by the periphery of the wheel save

when the notches 17 or 18 are passed thereunder.

22 indicates a contact with which pen 21 normally coacts, and 23 indicates a contact into coaction with which the pen 21 may be raised by the periphery of the wheel 16.

24 indicates a contact spring, insulated from, but connected for movement with, the pen 21, and normally coacting with the contact 23. Pen 22, in the embodiment shown, is connected with the wire 5; pen 21 is connected by wire 25 with the switch hook; contact 23 is connected by wire 26 with the wire 3 between the relay 4 and the transmitter *t* and contact 24 is connected by wire 27 with the wire 3 of the opposite side of the relay 4. Now it will be seen that normally buzzer 5 is short circuited, and wire 5 is connected with line 1, so that whenever a signal initiator 6 or 7 is operated to close the grounded circuit 5 a circuit for the line signal is established as follows: from the ungrounded terminal of the central battery through the line signal relay *l s r* line 1 to the switch hook, by wires 25, contacts 21 and 22 and wire 5 through the relay 8 to ground, returning to the grounded side of the central battery. Thus the line signal lamp is lighted and the relay 8 energized to attract its armature 9 releasing the motor for a complete revolution of its signal wheel 16, which promptly actuates the switch 20 by lifting the associated springs 24 and 21 out of contact with the springs 23 and 22 respectively, and connecting springs 21 with contact 23. Accordingly the grounded circuit last described is broken and a metallic circuit is closed through the bridge across the line wires established to the switch hook by wire 25 closed spring 21 and contact 23, wire 26 and wire 3 including relay 4. It will be observed that the short circuit normally established around the relay 4 by the wires 27 and 26 has been broken by the separation of contacts 23 and 24 so that the relay 4 operates as a buzzer in the line. Consequently when the central operator plugs in in response to the flashes of the line signal, and bridges her receiver across the line she hears the buzzer operating. Further it will be noted that the notches 18 in the periphery of the disk permit momentary return of the circuit connection to initial condition, so at intervals corresponding with the peripheral arrangement of notches 18 the buzzer is short circuited, and consequently, the central operator may read the interruptions of the buzzer circuit, or the sounds of the buzzer, as number signals to determine in respect to a party line the particular station from which the signal is coming. It will further be observed that should the party line be already in use at one station where the signal initiator at another station operates, and under which conditions the plug *p* will be inserted in the jack *j* and the central operator's at-

tention will generally be directed elsewhere, the closing of the signal initiator in the grounded wire 5 completes the circuit through the central battery, the cord strand  $x$ , the line wire 1 to ground, robbing the sleeve strand  $y$  and deenergizing the signal relay  $s$  so that current may flow from the central battery through the strands  $z$  and the supervisory signal  $s$  to ground through the test ring  $j^2$  thereby occasioning the illumination of the supervisory signal and consequently attracting the attention of the operator. Also it will be noted that if the operator does not immediately respond to this flashing of her supervisory signal, the signal lamp  $s$  goes out while the unbroken portion of the periphery of wheel 18 at the subscriber's station is revolving beneath the pen 21 of the switch 20, but whenever a notch 18 comes into operative relation to pen 21 the grounded circuit is restored and the supervisory lamp caused to flash momentarily, so that the momentary flashes of the supervisory lamp may be read by the central operator as a number signal indicative of the fact that the alarm system at the station of the subscriber identified by the number signal is operating, and this information may be confirmed by the central operator listening on the party line. Further it will be observed that during part of the rotation of wheel 18 when the pen 21 is raised by the unbroken periphery of the wheel, the ground circuit is broken so that the central operator may ring the subscriber through the grounded bell  $b$  in customary manner, to alarm the intruder or attract the attention of the occupants of the subscriber's station.

While I have herein described in some detail a specific embodiment of my invention, it will be apparent to those skilled in the art that numerous changes in the construction and arrangement may be made without departure from the spirit and scope of my invention, and I do not limit my invention in its broader aspect to the specific devices and arrangement illustratively shown and described.

Having thus described my invention, what I claim and desire to secure by Letters Patent, of the United States, is:

1. The combination with a telephone system involving a line; a central station equipment comprising a line signal and a central operator's receiver; and a subscriber's station equipment, of a protective system at the subscriber's station involving suitable circuit connections, signal initiating devices for establishing when operated a suitable energized circuit for the line signal; a self-operating electric circuit changer in the line operable on the initiation of the signal initiating device to vary the conditions in the line in a manner detectable in the central operator's receiver, and means for short circuiting and

thereby disabling the circuit changer at predetermined intervals during its operation.

2. The combination with a telephone system involving a line; a central station equipment comprising a line signal and a central operator's receiver; and a subscriber's station equipment, of a protective system at the subscriber's station involving suitable circuit connections, signal initiating devices for establishing when operated a suitable energized circuit for the line signal; a self-operating electric circuit changer in the line operable on the initiation of the signal initiating device to vary the conditions in the line in a manner detectable in the central operator's receiver, and means normally short circuiting said circuit changer, arranged to break the short circuit upon the operation of the signal initiator.

3. The combination with a telephone system involving a line; a central station equipment comprising a line signal and a central operator's receiver; and a subscriber's station equipment, of a protective system at the subscriber's station involving suitable circuit connections, signal initiating devices for establishing when operated a suitable energized circuit for the line signal, and a buzzer in the line normally short circuited and operable only on the initiation of the signal initiating devices.

4. The combination with a telephone system involving a line; a central station equipment comprising a line signal and a central operator's receiver and a subscriber's station equipment, of a protective system at the subscriber's station involving suitable circuit connections, signal initiating devices for establishing when operated a suitably energized ground circuit for the line signal, a self-operating electric circuit changer operatively associated with the line, a switch for making and breaking a short circuit around said circuit changer, and a motor controlling the switch controlled by the condition of the ground circuit.

5. The combination with a telephone system involving a line; a central station equipment comprising a line signal and a central operator's receiver and a subscriber's station equipment, of a protective system at the subscriber's station involving suitable circuit connections, signal initiating devices for establishing when operated a suitably energized circuit for the line signal, a self-operating electric circuit changer operatively associated with the line, a normal short circuit for said circuit changer, a switch controlling the said circuit changer to break and make its short circuit and coincidentally to make and break a line circuit therefor, a motor for operating the switch, and a relay controlling the motor responsive to operation of the signal initiating devices.

6. The combination with a telephone sys-

tem, of alarm means at the subscriber's station for transmitting a signal detectable in the central receiver and readable as a number signal, comprising a buzzer, a circuit for the buzzer, including a circuit portion local to the subscriber's station, a switch for said circuit part and a motor device for operating said switch; a signal initiator, a circuit therefor controlled by the motor, and closed thereby when the buzzer is dis-

abled by the motor, and means in the last said circuit for controlling the starting of the motor.

In testimony whereof I hereunto set my hand in the presence of two witnesses.

JAMES G. NOLEN.

In the presence of—

FORÉE BAIN,

MARY F. ALLEN.