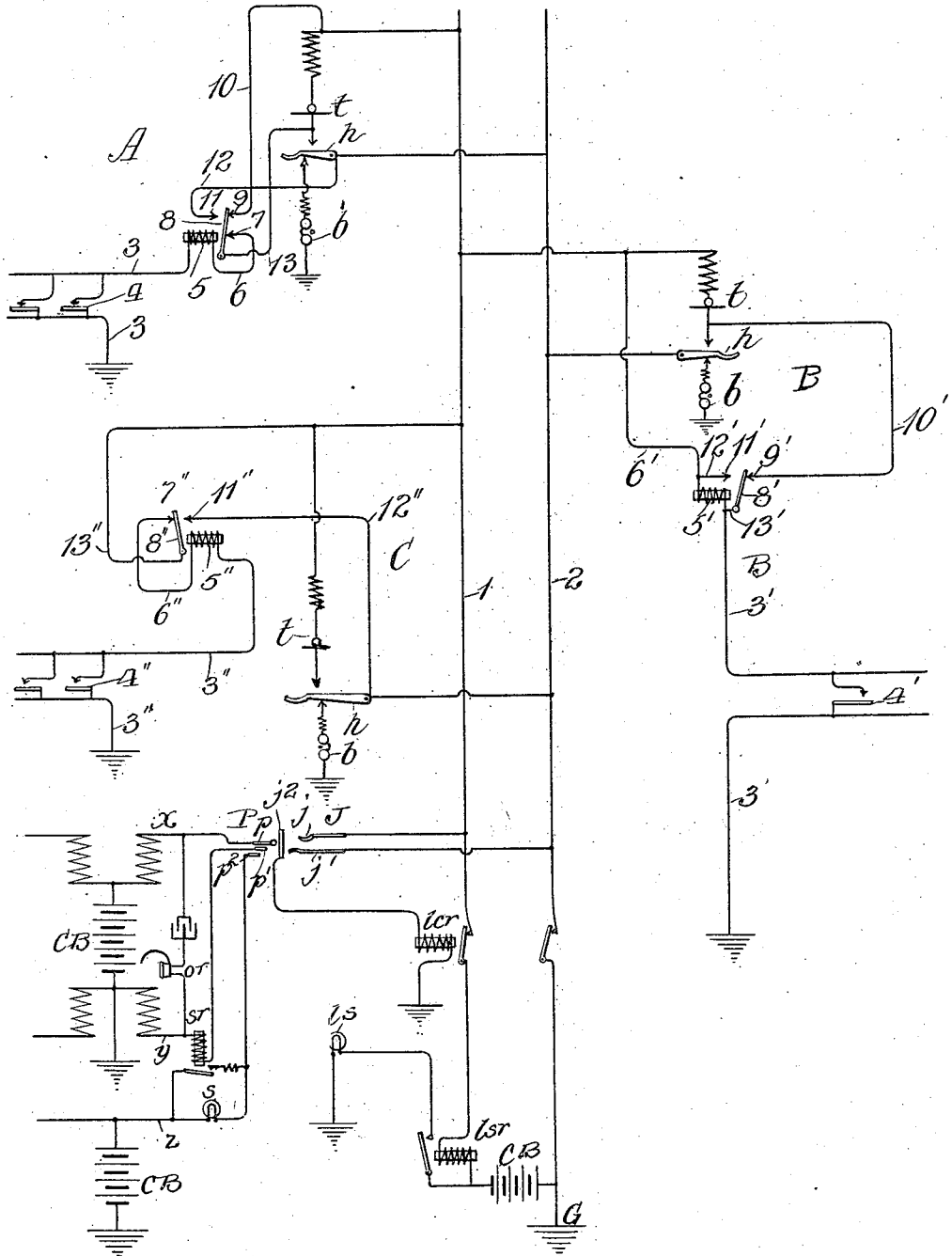


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 COMBINED BURGLAR ALARM AND TELEPHONE SYSTEM.
 APPLICATION FILED MAY 23, 1907.

946,259.

Patented Jan. 11, 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 Burglar-Alarm and Telephone Systems, of which the following is a specification.

My invention relates to improvements in combined burglar alarm and telephone systems, and has for its object to provide simple means for association with a telephone system and for occasioning the automatic transmission to the central station of an alarm signal of a character audible in the central station operator's receiver, in the event of the operation of the signal initiating devices associated with the protective or burglar alarm circuit.

A more particular object of my invention is to provide a system of the character described in which the alarm devices responsive to the action of the signal initiating devices, are self-operating electrical appliances, such as relays or buzzers, which have the effect of producing in the line variations of the electrical conditions such as to result in audible sounds in the operator's receiver.

Other and further objects of my invention will become apparent to those skilled in the art from the following description taken in conjunction with the accompanying drawing, which illustrates diagrammatically in a single figure a party line system involving several party stations differently equipped, but all in accordance with my present invention.

In said figure, 1 and 2 indicate line wires of a party line, at the central station equipped with conventional operating appliances including the jack J, whereof the tip contact *j* is connected with the line 1 and sleeve contact *j'* is connected with line 2, the test ring *j''* of such jack having connections to ground through the line cut-out relay *l c r* and terminating at one terminal of central battery C B, the opposite terminal of which is grounded at G and connected to the line wire 2. The line signal relay *l s r* includes an armature connected with the line *l* between the relay and the battery and the front contact of such armature is connected through the line signal *l s* to ground. It will be apparent that my invention is not limited in this construction, which *per se*

forms no part of the present invention, but is illustrated as typical of an operative arrangement only.

The central cord circuit and appliances may be of conventional type, those shown involving the tip strand *x* sleeve strand *y* and test strand *z*, a suitable plug P having its several contacts *p*, *p'* and *p''* connected with the appropriate strands, a supervisory signal *s*, a supervisory relay *s r*, and operator's set whereof *o r* is the receiver. In the particular arrangement shown, the grounded terminal of the battery is connected through a repeating coil winding with the sleeve strand *y*, which also includes the winding of the supervisory relay *s r*, controlling a normally open shunt connection around the supervisory signal *s* which is included in the test strand *z*, connected to the ungrounded side of the central battery. Said ungrounded side of the central battery has also direct connection through the repeating coil windings with the tip *p* of the plug P and the operator's receiver *o r* is adapted to be bridged through a suitable condenser across the tip and sleeve strands *x* and *y*. It will be understood that the cord circuit arrangement is also conventional, and forms no part of my invention, and is shown for illustration only and not by way of limitation.

The usual selective ringing apparatus may be associated with the cord strand in conventional manner, not shown.

At each of the subscriber's stations A, B, and C, is provided a customary set, preferably connected for ground ringing, such set involving a transmitter *t* connected to line 1, a switch hook *h* connected to line 2 and a grounded bell *b*.

With each subscriber's set is associated a protective system involving signal initiating devices so arranged that when operated they may occasion the establishment of a circuit including the line signal lamp *l s* and a source of current supply, so that the line lamp is operated, and preferably so connected with the line that should the central station cord circuit have been previously connected with the jack or the party line when a protective device at any subscriber's station is operated the supervisory relay is actuated to occasion the functional operation of the supervisory signal *s*. As a part of such protective system there is also asso-

ciated with each subscriber's set apparatus which automatically causes changes of electrical conditions in the line so as to produce audible results in the receiver of the central operator's set when the central operator switches the same upon the cord circuit in response to the actuation of the line or supervisory signal.

Specifically I prefer that the signaling apparatus comprise a self-supporting electrical instrument, such as a buzzer or relay movement, arranged to occasion rapid variations of condition in the line so long as the signal initiating or protective device is maintained in operation.

Specifically I have herein shown several forms of my apparatus and connections embodying my invention, for the purpose of indicating that my invention may be variously embodied as to the constructions and connections of the signaling device, without departure from its spirit and scope, but not with a view to limiting my invention to the particular embodiments shown. In such illustration, the station A is provided with a grounded protective circuit wire 3 having connected thereir in parallel signal initiating circuit closers 4; the wire 3 being connected to one terminal of a buzzer or relay coil 5, the opposite terminal whereof is connected by wire 6 with a back contact 7 for the armature 8, which is also provided with another back contact 9 connected by wire 10 with the ordinary wiring of the subscriber's set between the transmitter *t* and the line 1. A front contact 11, is further provided, which has connection through wire 12 with the switch hook, and the armature is connected by wire 13 to the transmitter contact of the switch hook. Now it will be seen that whenever a signal initiating circuit-closer 4 is operated, current flows from the grounded side of the central battery C B through the line signal relay *l s r* and line 1 to the wire 10, thence through the armature 7 and connections 6, 5, 3 and 4 to ground, establishing a circuit including the relay winding 5 which at once attracts its armature, breaking said circuit and momentarily establishing a metallic circuit from the central battery through the line wire 1, transmitter *t* connection 13, armature 8, contact 11 and connection 12 to the line 2 and thence back to the central battery. This connection momentarily causes current to pass through the transmitter, but since the connection established excludes the coil 5 the armature falls back under the influence of its customary spring, so that a vibrator action is established and the transmitter is alternately cut into and out of circuit with the same effect so far as the line signal is concerned as if the receiver hook were rapidly vibrated. When the operator listens in she hears the characteristic vibration. It will be noticed, however, that if the party

line be already in use at some other subscriber's station, so that the central cord circuit is connected with the jack J, then the operation of the signal initiator 4 establishes a ground circuit through the central battery C B, the tip strand *x* of the cord circuit, line wire 1 and connections 10, 9, 8, 7, 6, 5, 4, 3, back to ground, such circuit excluding and practically robbing the sleeve strand of the cord circuit to the ground shunt, thereby causing the deenergization of the supervisory relay *s r* the armature of which drops back breaking the shunt, which in the normal use of the telephone is established around the signal *s* through such armature, and permitting the supervisory signal *s* to receive current through the path C B, cord strand *z*, contacts *p*² and *j*², the line cut-out relay, ground, and back to battery. Thus the supervisory signal is lighted so long as the circuit just described remains established, but the vibrator action causing the constant making and breaking of said circuit occasions the rapid flashing of the supervisory lamp, which of itself is a signal readable by the central operator as a burglar alarm signal, and is confirmed when the central operator listens in and hears the buzzer.

In the arrangement shown at station B, the supervisory wire 3' including in parallel therein the signal initiating devices 4' extends to one terminal of the relay winding 5', the other terminal of which is connected by wire 6' with the transmitter wire of the customary set, connected to the tip wire 1 of the line. The armature 8' is connected as at 13' with the wire 3', and normally stands in engagement with the back contact 9' connected by wire 10' with the usual set between the transmitter and the upper switch-hook contact. The front contact 11' of the relay 5' is connected by the wire 12' with the wire 6'. Now it will be seen that the closing of a signal initiator closes the ground circuit establishing a grounded circuit for the line signal relay, or the supervisory relay, as the case may be, in part through the parallel paths afforded through the transmitter to wire 10, and armature 8', and in part through the wire 6' and winding 5', which when energized attracts armature 8' breaking the parallel leg of the circuit first described and closing a short circuit 12', 11', 8', 13', around the relay winding 5' so that the armature drops back and the vibrating action is thus set up. It will thus be seen that the ground circuit established through the wire 3' is not broken as long as the signal initiator 4' remains closed, so that the line lamp or the supervisory signal, as the case may be, burns continuously until the operator responds by listening in, when the rapid change of the resistance conditions at the subscriber's station due to the action of the resistances alternately cut into and out of

the grounded circuits, cause a noise in the line which is readily recognizable by the central operator.

At the subscriber's station C still another form of wiring is shown, wherein the grounded wire 3'', including in parallel the signal initiators 4'', extends to one terminal of the relay 5'' whose opposite terminal is wired as at 6'' to the back contact 7'' of the armature 8'' having tail connection by wire 13'' to the usual transmitter wire between the transmitter and the line. The front contact 11'' for the relay is connected by wire 12'' with the switch hook *h*. It will be seen that closing of the signal initiator 4'' results in a ground-return circuit including a central battery, the line signal relay (or the tip strand of the cord, as the case may be) the line wire 1 and connections 13'', 8'', 7'', 6'', 5'', 3'', 4'' back to ground. The armature is attracted and moved to make contact with point 11'', thereby establishing a bridge 12'', 11'', 8'', 13'' across the line wires, such bridge excluding the transmitter.

It will be seen that with the arrangement shown at A and C the ground connection made is not permanent, that, therefore, the subscriber's bell may be rung notwithstanding the action of the relay, as the bell receives current during the intervals when the ground connection is broken by the relay. It will further be seen that in any of the arrangements shown the central operator is invariably apprised of the actuation of a signal initiator, whether the line is already in use by some other subscriber or not. In case the line is not already in use the line lamp responds by flashing or a constant glowing, to the operation of the respective relays, and in the event the line is already in use and the cord circuit already connected with a party line, the supervisory lamp is caused to glow. But even if the central operator should misread the lighting of the one supervisory lamp as a clearing-out signal, as soon as she pulled out the plug the line lamp would relight, and immediately upon her inserting the same or another plug the supervisory lamp would again light—conditions which can not prevail in the ordinary operation of a telephone system of the character herein illustratively shown, and which, therefore, apprises the operator at once of the sort of signal being transmitted. The buzzers may obviously be of characteristic sounding qualities readily distinguishable.

While I have herein described in some detail several embodiments of my invention, it will be understood that many other changes in the wiring arrangement may readily be made without departure from the spirit and scope of my invention, and the various forms of wiring herein illustrated are shown merely as indicating that my invention is

not in its broader aspect limited to any particular wiring diagram but may be variously embodied without departure from its spirit and scope.

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

1. In a combined telephone and protective system, a party line circuit, a central station equipment, involving a line signal, a supervisory signal and an operator's receiver, a subscriber's equipment at each party's station, a protective system at a party's station involving protective devices for establishing an energized circuit for actuating the line signal if the line is idle or the supervisory signal if the line is busy, and means for automatically making and breaking said circuit connections and with each break of said circuit establishing another circuit of different resistance, involving the line, thereby to occasion variations of electrical conditions in the line detectable in the central operator's receiver.

2. In a combined telephone and protective system, a line circuit, a central station equipment involving a line signal and an operator's receiver, a subscriber's equipment involving a transmitter, and a protective system involving protective devices operable to establish an energized circuit connection for the line signal, and a buzzer in a circuit controlled by said protective devices operable to make and break circuit connections for itself and the transmitter to occasion vibrations in the line detectable in the central operator's receiver, controlled by the said protective device.

3. In a combined telephone and protective system, the combination of a line circuit involving at central station a grounded battery, a line signal and a cord circuit including a supervisory signal and the operator's receiver, and at the subscriber's station involving a switch hook, of protective devices and a grounded protective circuit at the subscriber's station, arranged when a protective device is operated to close a circuit proper to energize the line signal or supervisory signal, and a self-actuating electro responsive instrument responsive to the closing of such circuit to make and break a bridge circuit across the lines, for causing variations in the electrical conditions of the line detectable in the operator's receiver.

4. In a combined telephone and protective system, the combination with a line; a central equipment involving a line signal, a central battery bridged between the lines grounded on one side, and on its other side connected with the line signal controlling apparatus, and a cord circuit including said battery in bridged relation and providing a supervisory signal and a control-

ling device therefor in the grounded strand
of the circuit; and a subscriber's set involv-
ing a transmitter; of protective means at
the subscriber's station for establishing a
5 ground circuit excluding the transmitter
through the side of the line to cause the actu-
ation of the line signal or supervisory sig-
nal, and a buzzer in said circuit arranged
to respond to the closure thereof to make

and break a circuit including the trans- 10
mitter.

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

JAMES G. NOLEN.

In the presence of—

GEO. T. MAY, JR.

MARY F. ALLEN