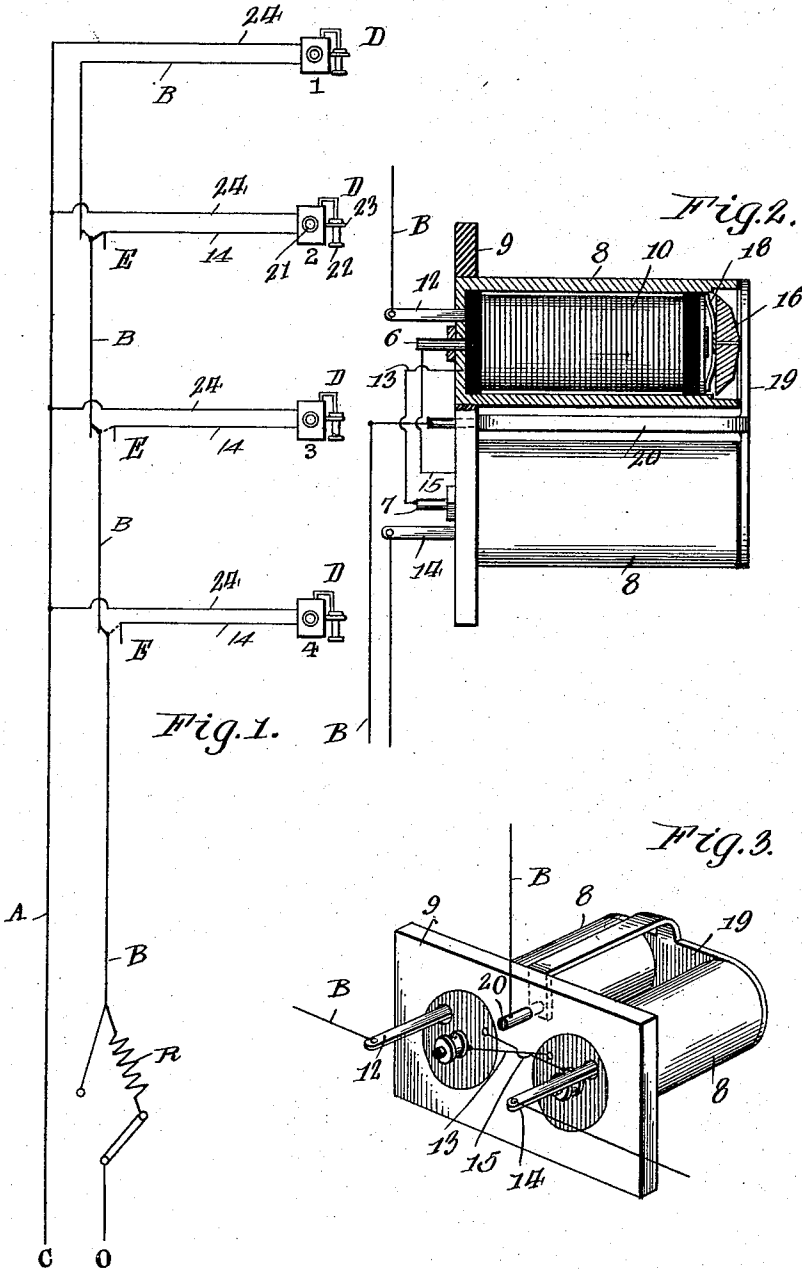


A. F. ERICKSON.
 LOCK-OUT PARTY LINE TELEPHONE SYSTEM.
 APPLICATION FILED JULY 12, 1913.

1,147,223.

Patented July 20, 1915.
 2 SHEETS—SHEET 1.



Witnesses

G. M. Spring

[Signature]
 Everett Lancaster

By

Inventor

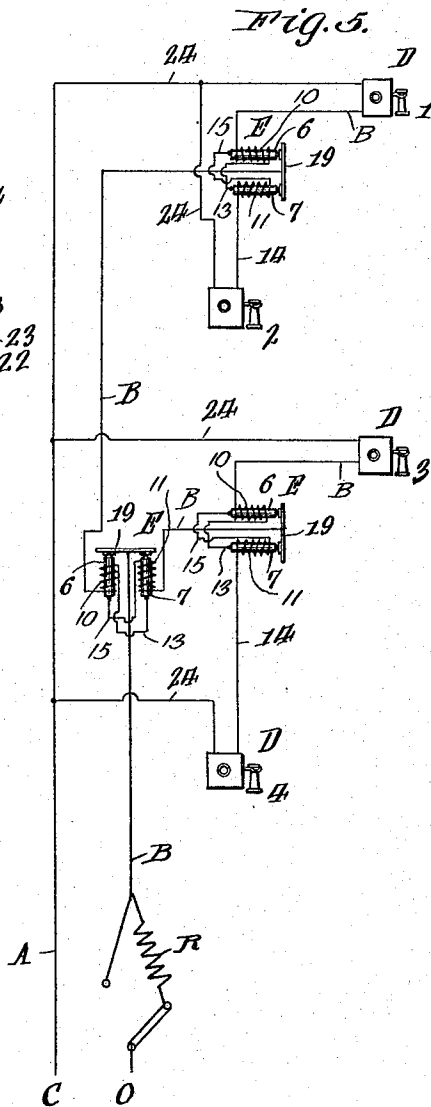
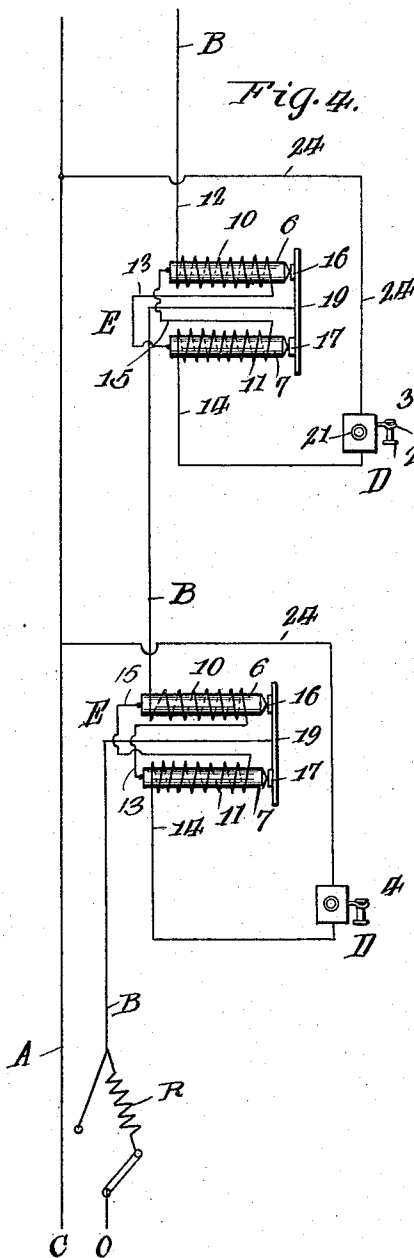
Arthur F. Erickson,

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 Richard Owen,
 his Attorney

UNITED STATES PATENT OFFICE.

ARTHUR F. ERICKSON, OF SEATTLE, WASHINGTON, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF ONE-FOURTH TO JOHN V. BOCK AND ONE-FOURTH TO GEO. T. NONNENBACHER, BOTH OF SEATTLE, WASHINGTON.

LOCK-OUT PARTY-LINE TELEPHONE SYSTEM.

1,147,223.

Specification of Letters Patent.

Patented July 20, 1915.

Application filed July 12, 1913. Serial No. 778,709.

To all whom it may concern:

Be it known that I, ARTHUR F. ERICKSON, citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Lock-Out Party-Line Telephone Systems, of which the following is a specification.

My present invention relates to telephone systems and more particularly to party lines or systems of that character where a plurality of subscriber's telephone apparatuses are disposed in circuit with the same line wires. In such systems now in common use conversation among two parties may be overheard by a third party through the receiver and at the annoyance to parties using the telephone apparatus resulting from a third party attempting to communicate with the central office during conversation between the first mentioned parties.

The principal object of my invention is to provide apparatus whereby when two parties on their respective lines are conversing, a third party on either line cannot overhear such conversation or throw resistance in circuit, as commonly results from the lifting of the receiver on apparatus now in use and thereby decreasing the audibility of the conversation.

Further objects of the invention are to provide apparatus whereby the resistance necessary for successful operation thereof is, as far as possible, uniform to the conducting of the current to any station in circuit.

Still further objects of my invention are to provide a lock-out device which may be easily installed in connection with existing apparatus without modification or alteration of the same apparatus; a device of the character described requiring no auxiliary apparatus or device at the central office, or at any of the subscribers' apparatuses, thereby enabling its installation to be accomplished at very low cost and its maintenance reduced to a minimum; a lock-out device which is protected from inclement weather so that it may be disposed exteriorly of the building containing the telephone apparatus and thus being unaccessible

for tampering by unauthorized persons; and, to provide such a device that, including electro-magnets in parallel, will prevent overhearing of the conversation between the two parties by a third party, by induction between the said electro-magnets.

Other objects of the invention will appear in the following detail description, taken in connection with the accompanying drawings, forming a part of this specification, and in which drawings:—

Figure 1 is a diagrammatic view of a party line telephone system embodying my invention. Fig. 2 is a detail view partly in plan and partly in section, showing the lock-out device. Fig. 3 is a perspective view of the lock-out device. Fig. 4 is a detail diagrammatic view of a portion of the apparatus shown in the diagram in Fig. 1. Fig. 5 is a modification of the diagram disclosed in Fig. 1.

In the drawings, where similar characters refer to similar parts, A and B designate line wires, C O the central office, D subscriber's telephone apparatus and E lock-out devices.

Each lock-out device includes cores 6 and 7 supported, as through cylindrical casings 8 in insulated relation, by a suitable base 9 which latter, in itself, may be composed of insulative material. Coils of conducting material 10, to provide an electro-magnet, are disposed about core 6 and similar coils 11, are disposed about core 7 for the same purpose.

The lead 12 of coil 10 is in conducting communication with one section of line wire B while the other lead 13 is in conducting communication with the core 7. One lead 14 of the coil 11 is in conducting communication with the subscriber's telephone apparatus D, while the other lead 15 is in conducting communication with the core 6.

For coaction with the core 6 I provide an armature 16 and for core 7, an armature 17. These armatures are preferably of disk shape and are normally held retracted from the cores as by spring 18. The armatures may be in conducting electrical communication with their respective cores, in any suit-

able manner, and as disclosed in the drawing, the springs 18 contact with the walls of the cylindrical casing 8 which accommodates the electro-magnet and its armature, and being of magnetic metal, place the armature in direct magnetic circuit with the core as clearly shown in Fig. 2 of the drawings. The casings 8 serve the dual purpose of protecting the electro-magnet from inclement weather as well as forming a conducting means between the armature and its core being so constructed that they carry all possible magnetic lines of force from one of the electro-magnets to its opposite pole through the armature as agent, and also prevent induction between the two electro-magnets which might otherwise enable a third party to overhear the conversation between two other parties although such would be only faintly audible. These springs 18 normally position their respective armatures in electrical engagement with the contacts 19 which, as disclosed in the drawings, are insulated from cylindrical casings 8 and covers the open ends thereof. This contact 19 is placed in conductive communication with another section of line wire B as through lead 20. Each subscriber's telephone apparatus includes the usual transmitter 21, receiver 22 and receiver hook 23, and it is well known that the raising of this receiver from its hook places the particular apparatus in circuit with the line wires of the telephone system. The lock-out device may be disposed preferably at terminals of distribution of drops such as in the building or at the telephone pole from which the drops are taken to the building containing the station.

It is obvious from the foregoing that the circuit for each apparatus D includes the wire B, lead 20, contact 19, armature 16, coil 11, and lead 14, as well as any suitable conductor 24 in communication with the other line wire A.

The operation of the system as diagrammatically disclosed in Fig. 1 is as follows: It is well known that, in telephone systems of the character described, a resistance R is normally placed in circuit with the line wires A B while such are not in use for the transmission of undulatory currents by which the sounds of the voice are transmitted. Therefore, the current through the coils 10 and 11 is not such as to magnetize their respective cores sufficiently to draw the respective armatures of the cores except when such resistance R is thrown out of circuit and one of the receivers 22 is raised sufficiently to complete the circuit through its respective subscriber's telephone apparatus. Assuming now that a party on another line desires to communicate with the subscriber for apparatus designated 2, the

central office C O is called in the usual manner and the operator thereat proceeds to give the necessary audible signal at the various apparatuses 1, 2, 3 and 4, or selectively if suitable apparatus is provided, assuming that it is a four-party line, designated for subscriber 2. The subscriber in question communicates with the calling subscriber's apparatus. This placing of the subscriber's apparatus in operative relation one to the other causes the resistance hereinbefore referred to to be removed and the core 7 of the device E adjacent the apparatus designated 2 is energized sufficiently by the current to draw its armature 17 from engagement with contact 19 and the circuit is broken at this point. Likewise the core 6 of the other device E intermediate the device in question and the central office are energized so as to draw the respective armatures 16 from engagement with contact 19, so that the current is broken at each of the apparatuses 3 and 4, and the circuit for apparatus 1 is broken by the holding of the armature 17 at the device E adjacent the apparatus 2, from engagement with the contact 19.

If a party on the subscriber's line desires to call a party on the same line, such as subscriber 4, desiring to call subscriber 2, the former proceeds to call the central office and after having given the number is instructed to replace the receiver until the party wanted is called. The operator then proceeds to give the audible signal at the apparatus designated for subscriber number 2. During this operation the resistance R is thrown in circuit with the mains A and B to render the electro-magnet of devices E without power to move their respective armatures. The subscriber recognizing the call raises the receiver and the conversation is proceeded with. The resistance R is thrown in and remains so until such conversation, over the same subscriber's line, is brought to a close as will be indicated at the central office board. As previously stated, because of such resistance the electro-magnets of devices E are without power to move their respective armatures although there is sufficient current to provide for successful operation of devices D. A conversation may be heard by a third party when two parties on the same line are in conversation, however, in practice it seldom occurs that two parties on the same line carry on a conversation one with another, so that such is without serious objection. It is to be understood, however, that, assuming subscriber 3 to raise the receiver to communicate with C. O., that when C. O. answers, the resistance is relieved and none of the other subscribers can get into communication with C. O. without such resistance is again thrown in circuit, since the relieving of resistance, other

than that, of course, in the line wires and devices E and D, permits of such energizing of the electro-magnets of the four devices as to draw the armatures and break the circuits as previously described.

Referring now to the diagram in Fig. 5, I have disclosed a system whereby the object set forth in the third paragraph of this specification is accomplished. This system is particularly adapted for use for a four-party line system and the idea is to conduct a current through the two devices E regardless as to whether apparatuses 1, 2, 3 or 4 is brought into use. For instance, assuming that apparatus 4 is called the cores 7 of the devices E will be magnetized as soon as the resistance is relieved and a break will occur at their respective armatures, the current being conducted successively through wire A; wire 24; apparatus D; thence to wire 14; to the adjacent device E. It is then conducted through coil 11; about core 7, and having energized it causing a break at the armature of 7; through wire 15; core 6; contact 19, to the line wire B. Then through wire B to the next adjacent device E following through coil 11 energizing core 7 and making a break at its armature; through wire 15; core 6; contact 19; and back to C. O. through wire B. The break at the armature of core 7 of devices E mentioned cuts out apparatus 1, 2 and 3 so long as the resistance is not thrown in circuit. It is of course understood that all of the wires 24 are inactive except the one connected with the apparatus in use since the circuit is always normally broken at apparatus D. This will lock out apparatuses 1, 2 and 3 unless the call has been for a party on the same line whereupon the said resistance renders all of the electro-magnets of devices E inoperative for the purpose intended. Likewise if the circuits of the various other apparatuses are traced it will be found that the raising of the receiver of any other apparatus will cause a circuit to be conducted through the former two devices E in contra-distinction to the conducting of a current to the other three devices E in the system as disclosed in the diagram in Fig. 1 when their apparatuses 1 or 2 is brought into use.

Changes in detail may be made without departing from the spirit or scope of my invention; but;

I claim:—

1. A lock-out device for party line telephone systems comprising in combination, two electromagnets the one lead of the coil of each being in electrical conducting communication with the core of the other electro-magnet, an armature for each core normally disposed retracted therefrom, and a contact with which both of the said arma-

tures are normally in electrical conducting communication, said contact being otherwise insulated from the cores of said electro-magnets.

2. A lock-out device for party line telephone systems comprising in combination, two electro-magnets the one lead of the coil of each being in electrical conducting communication with the core of the other electro-magnet, an armature for each core normally disposed retracted therefrom, and means for conducting an electric current from each of said individual armatures only when it is in a normal position.

3. A lock out device for party line telephone systems comprising in combination, two electro-magnets, the lead of the coil of each being in electrical conducting communication with the core of the other electro-magnet, an armature for each core normally disposed retracted therefrom, a casing of magnetic metal about each electro-magnet and in direct magnetic circuit with the core and armature thereof, a contact conducting an electric current through each individual armature only when it is in a normal position and closing the ends of said casings, and means for insulating said contact from said casings.

4. A lock out device for party line telephone systems comprising in combination, two electro-magnets, the lead of the coil of each being in electrical conducting communication with the core of the other electro-magnet, an armature for each core normally disposed retracted therefrom, a cylindrical casing of magnetic metal about each electromagnet in direct magnetic circuit with one pole of the core of its respective electro-magnet and having an open end adjacent the other pole thereof, an armature for each electro-magnet disposed within its cylindrical casing adjacent the open end thereof, means for holding each armature normally retracted from its respective core, and a contact with which the said armatures normally engage for the conducting of an electric circuit and extending over the open ends of said cylindrical casings, said contact being otherwise insulated from said electro-magnets.

5. In a telephone system of the character described, the combination with line wires leading from a central office, of two pairs of telephone apparatus, two lock out devices in the circuit of one of said line wires, one of said devices being intermediate the telephone apparatus of each pair, and each of said lock out devices being adapted, when the receiver circuit of any particular telephone apparatus is closed, to lock out the other telephone apparatus of the pair, and a third lock-out device disposed in the circuit of the line wire intermediate the pairs

of telephone apparatuses, adapted, when
the receiver circuit of any particular tele-
phone apparatus of one pair is closed to
lock out the other pair of telephone appara-
5 tuses, from the circuit of the line wires,
substantially as and for the purpose set
forth.

In testimony whereof I affix my signature
in presence of two witnesses.

ARTHUR F. ERICKSON.

Witnesses:

L. A. PRICE,
RICHARD B. OWEN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."