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W. R. WHITEHORNE.
TELEPHONE ATTACHMENT.
APPLICATION FILED SEPT. 19, 1906.

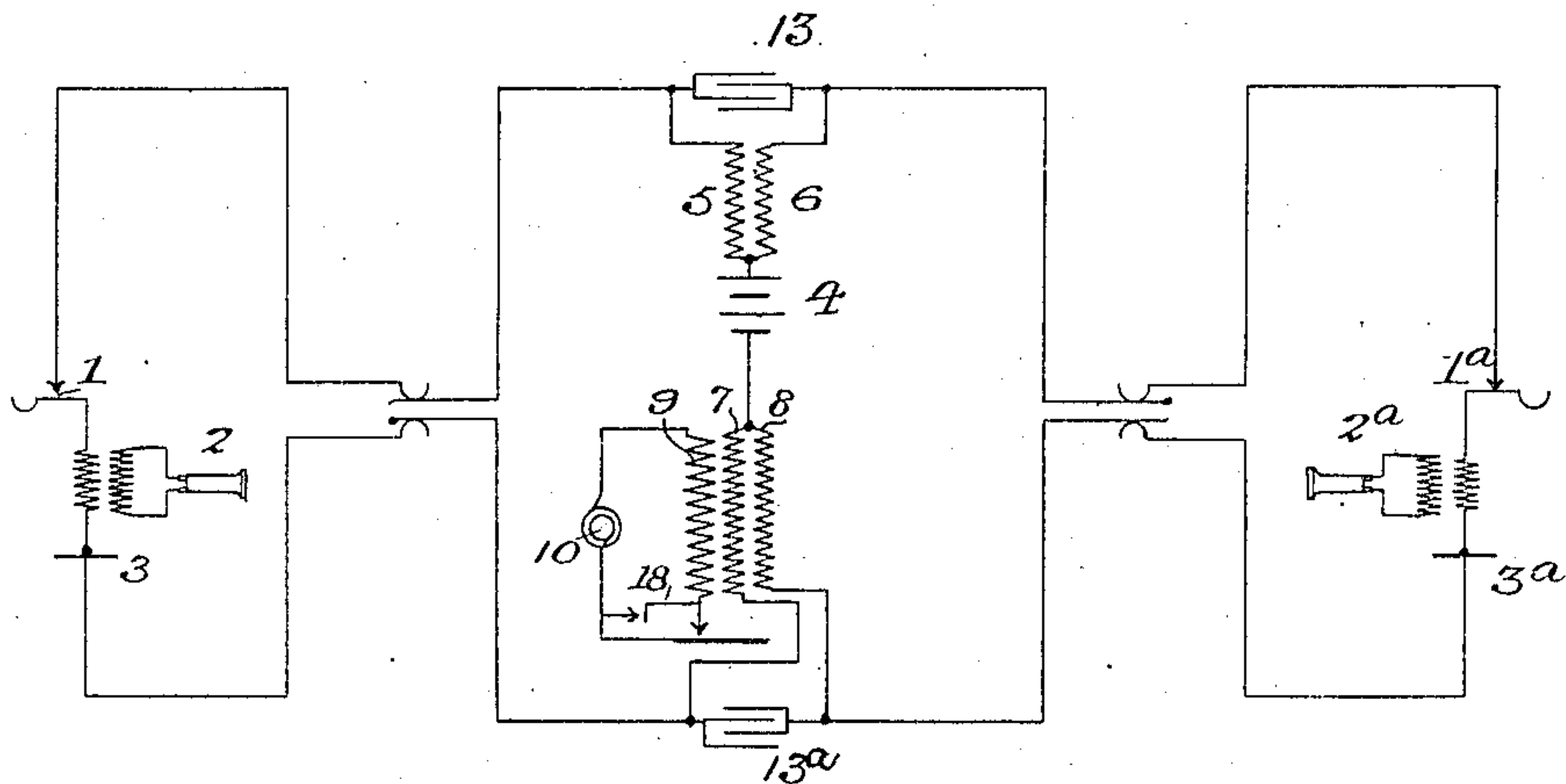


Fig. 1.

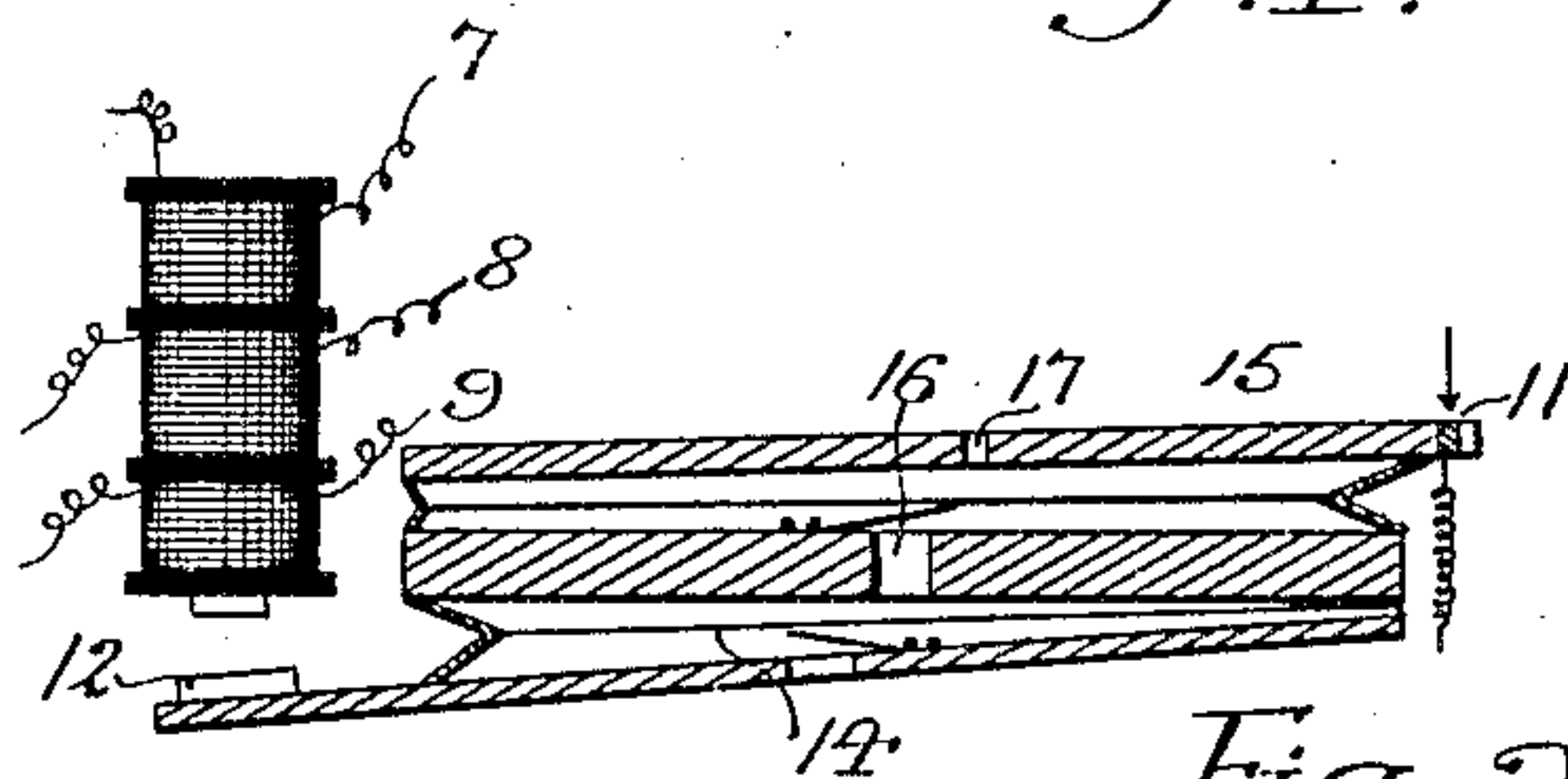


Fig. 2.

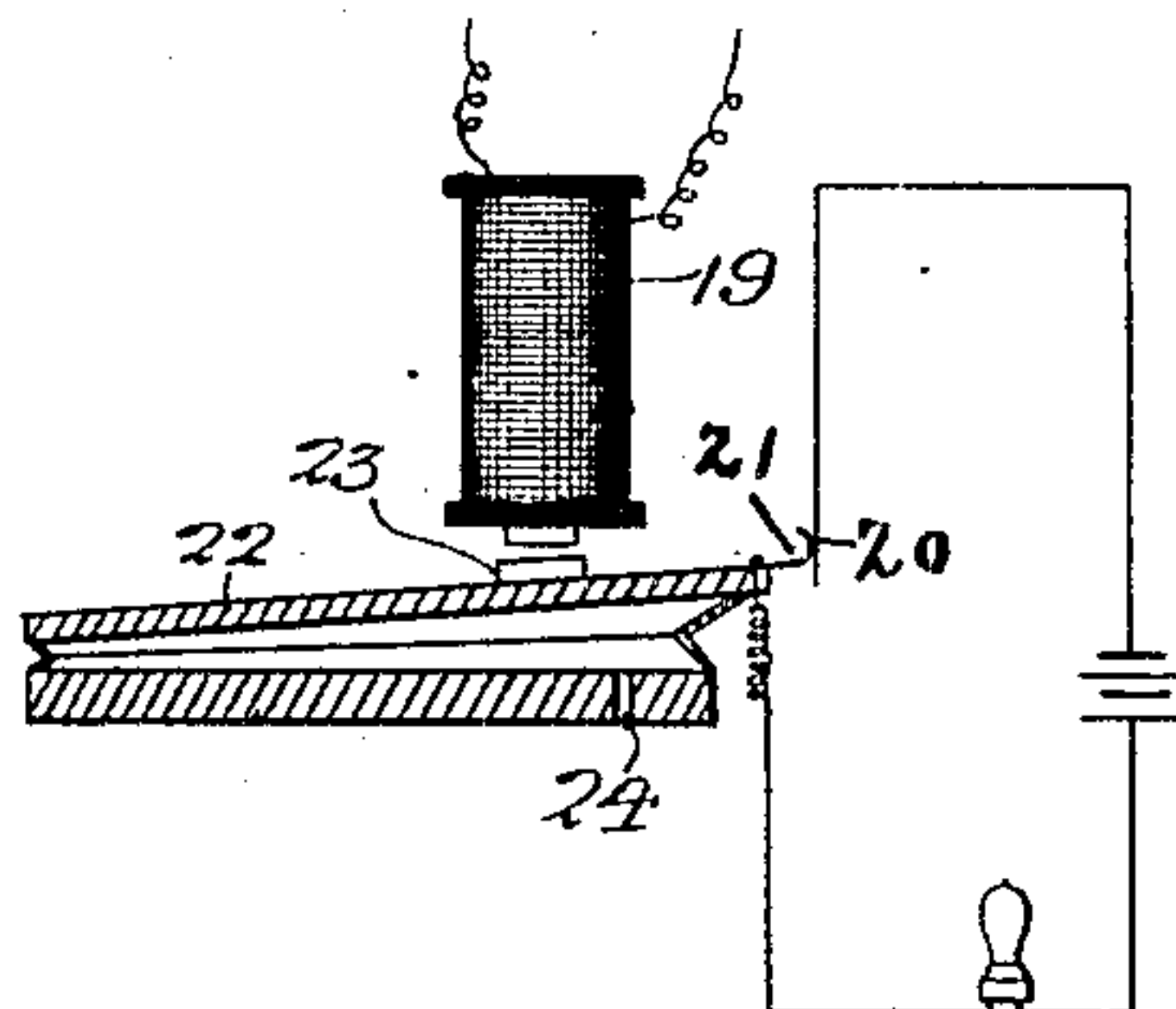


Fig. 3.

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TELEPHONE ATTACHMENT.

No. 844,839.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM R. WHITEHORNE, a citizen of the United States, residing in Bethlehem, Pennsylvania, have invented certain Improvements in Telephone Attachments, of which the following is a specification.

In modern telephone systems as at present organized it is frequently desirable after two subscribers have been put in communication with each other by the usual manipulation of apparatus at the central station that one of them should be able to attract the attention of the other, even though the latter has laid down the receiver without hanging it upon its hook. A case in point is one in which a subscriber is kept waiting for a relatively long time while the person to whom he has been talking leaves the telephone to secure some desired information; and it is one object of my invention to provide means whereby when the latter person returns to his instrument he shall be enabled to call the attention of the first subscriber, independently of the central operator, to the fact that he is ready to continue the conversation, thereby making it possible for the first subscriber to lay down his receiver and attend to other matters, where, at the present time, he is compelled to remain idle with the receiver held to his ear. It is further desired to provide relatively simple means whereby the central operator shall be able to call the subscriber's attention to the fact that his telephone-receiver is off of its hook. These objects and other advantageous ends I attain as hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a diagrammatic view illustrating my invention as applied to a well-known arrangement of telephone apparatus. Fig. 2 is a vertical section, to some extent diagrammatic, illustrating the contact-making device employed as part of my invention; and Fig. 3 is a vertical section, to some extent diagrammatic, illustrating a device for preventing the "winking" of the supervisory signal when one subscriber operates his instrument to attract the attention of the subscriber to whom he is connected.

In the above drawings, 1, 2, and 3 represent, respectively, the hook-switch, receiver,

and transmitter of one subscriber's instrument, while 1^a, 2^a, and 3^a represent similar parts of a second subscriber's instrument.

4 is a source of direct current connected to supply the subscribers' lines and instruments through a pair of repeating coils 5 6 and 7 8, and the latter of these has its two windings so arranged that when current flows through both of them one substantially neutralizes the magnetic effect of the other. The windings 5 and 6 of the second repeating coil are so fixed as to produce a magnetic flux in its core flowing in the same direction for both of them.

In addition to the two windings 7 and 8 of the first repeating coil there is on the same core a winding 9, connected in circuit with an alternating-current generator 10 and a switch 11, this latter being designed to be controlled by the repeating coil having the windings 7 and 8. One of the members of this switch 11 is attached to a piece 12, forming the armature of the repeating coil, so that when only one of said windings 7 or 8 is energized said armature is attracted, so as to close said switch 11, and similarly when both of said windings are energized they neutralize each other, and the armature is not effected.

13 and 13^a are condensers which may be used, if desired, although they have no effect upon the operation of my invention.

In order to control the operation of the switch 11 under the action of the repeating coil 7 8, I provide a double bellows 14 15, the movable member of the first bellows carrying the armature 12 and the movable member of the second carrying the movable member of the switch 11. The first of these bellows communicates with the second through a valved opening 16, and said second bellows is provided with a constantly-open vent 17, which permits the escape of a small quantity of air at a substantially uniform rate.

Under operating conditions if the hook switches 1 and 1^a be closed by the removal of the receivers from their hooks, as when two subscribers are conversing, the windings 7 8 of the repeating-coils will neutralize each other. If, however, after the subscribers have left their instruments without returning them to the hooks and one subscriber desires to attract the attention of the other, some

as to continue the conversation, the moving up and down of one of the hooks—as that of the switch 1^a, for example,—causes the winding 8 to be successively energized and
 5 deenergized. As a consequence the armature 12 is attracted by the winding 7 as many times as the switch 1^a is opened, and as a result the bellows 14 pumps a supply of air into the bellows 15.

10 I so proportion the vent 17 that after the switch 1^a has been closed a predetermined number of times—as four, for instance—the movable member of the bellows 15 will be raised sufficiently to close the switch 11, and
 15 as a result an alternating current is sent through the winding 9. This induces an alternating current in the winding 7, and as a consequence the receiver 2 “howls,” producing, preferably, a musical note of any de-
 20 sired intensity, and thereby calling attention to the fact that the subscriber at the other end of the line desires to continue the conversation.

It is of course obvious that when under ordinary conditions a subscriber leaves his instrument for a long time without returning the receiver to its hook the central operator may call his attention to the fact by the operation of a switch 18, capable of short-
 30 circuiting switch 11.

In order to avoid winking of the supervisory lamp at the central-operator's desk when one of the subscribers opens and closes his hook-switch in order to attract the attention of another subscriber, I provide some form of retarding device for the lamp-governing relay, such as is shown in Fig. 3. The relay-magnet is shown at 19 in said figure, and the fixed and movable members of
 40 the supervisory-lamp switch are indicated at 20 and 21, respectively, the latter being attached to the movable element of a bellows 22, having a small opening 24. This latter element carries an armature 23, placed to be acted upon by the core of the magnet 19.
 45 These various parts are so assembled that if the relay-circuit be completed a number of times in quick succession, as when that portion of my invention previously described is being operated, the movable element of the
 50 bellows 22 will not be attracted for a sufficiently long time to permit the completion of the circuit between the switch members 20 and 21, since the movement of said element is retarded because of the slow inflow of air through the opening 24. If, however, the hook-switch be operated slowly or kept
 55 closed for a predetermined time, then the action of the magnet 19 upon the armature 23 is such that the switch members 20 and 21 are brought together and the circuit of the supervisory lamp completed, it being of course desired that said members should be in engagement or the switch closed when the main
 60 circuit is opened by hanging up the receiver.

I claim—

1. The combination with a telephone system, of a device placed at the central station and including means for producing an abnormal sound in the receiver of any instru-
 70 ment off its hook, said device being capable of being set in operation by the instrument of any subscriber, substantially as described.

2. The combination in a telephone-system including an electromagnetic device at a central station whose energization is controlled by the hook-switch of any subscriber's instrument, and means controlled by said device for producing an alternating current on the telephone-line whereby one subscriber is enabled to cause an abnormal sound in the receiver of any other subscriber when this latter is off its hook, substantially as described.

3. The combination in a telephone system including an electromagnetic device at a central station whose energization is controlled by the hook-switch of any subscriber's instrument, means controlled by said device for producing an alternating current on the telephone-line whereby one subscriber is enabled to cause an abnormal sound in the receiver of any other subscriber when this latter is off its hook, a supervisory signal also at the central station and means for preventing lighting of the supervisory signal at the central station when one subscriber's instrument is manipulated to actuate said device, substantially as described.

4. The combination with a telephone system including a magnet having two windings arranged to substantially neutralize each other when they are respectively in circuit with two telephone instruments in use, a switch controlled by said magnet, means controlled by said switch for producing an alternating current in the telephone system, with means for preventing operation of the said switch by its magnet except under predetermined conditions of operation of one of the telephone instruments, substantially as described.

5. The combination in a telephone system, of a repeating coil having its windings arranged to substantially neutralize each other under the conditions existing when it is in circuit with two telephone instruments in use, a winding placed to act inductively upon said coil, a switch controlled by the coil, and an alternating-current generator in circuit with the coil and with the switch, substantially as described.

6. The combination in a telephone system, of a repeating coil having its windings arranged to substantially neutralize each other under the conditions existing when it is in circuit with two telephone instruments in use, a winding placed to act inductively upon said coil, a switch controlled by the coil, an alternating-current generator in cir-
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cuit with the coil and with the switch, and means for preventing operation of the switch except under predetermined conditions of energization of the repeating coil, substantially as described.

7. The combination with a telephone system, of a source of direct current and a double-wound magnet placed in the central-operator's cord-circuit, a winding inductively placed relatively to said magnet, an alternating-current generator and a switch in circuit with said winding, said switch being placed to be closed when the magnet-windings are energized to different degrees, substantially as described.

8. The combination with a telephone system, of a source of direct current and a double-wound magnet placed in the central-operator's cord-circuit, a winding inductively placed relatively to said magnet, an alternating-current generator and a switch in circuit with said winding, said switch being placed to be closed when one of the magnet-windings is deenergized, and a device placed to prevent closing of the switch until after such magnet-winding has been deenergized a predetermined number of times, substantially as described.

9. The combination with a telephone system, of a source of direct current and a double-wound magnet placed in the central-operator's cord-circuit, a winding inductively placed relatively to said magnet, an alternating-current generator and a switch in circuit with said winding, said switch being placed to be closed when one of the magnet-windings is deenergized, and a pneumatic retarding device placed to prevent closing of the switch until after such magnet-winding has been deenergized a predetermined number of times, substantially as described.

10. The combination with a telephone system, a device at the central station having means for producing an alternating current on the line connecting two subscribers whose receivers are off their hooks after one of said subscribers has operated his hook-switch a predetermined number of times, a supervisory signal also at the central station and means for preventing closing of the circuit of the supervisory signal when a subscriber operates his hook-switch under predetermined conditions, substantially as described.

11. The combination with a telephone sys-

tem, of means at the central station for producing an alternating current on the line connecting two subscribers whose receivers are off their hooks after one of said subscribers has operated his hook-switch a predetermined number of times, a supervisory signal, a relay, a switch controlled thereby and in circuit with the supervisory signal, and a retarding device operative on the relay-controlled switch for preventing closing of said switch when a subscriber operates his hook-switch under predetermined conditions, substantially as described.

12. The combination with a telephone system of means at the central station for producing on the telephone-line a current capable of causing an abnormal sound in a receiver off its hook, and other means under the control of any subscriber for causing said first means to be thrown into action, substantially as described.

13. The combination with a telephone system of means at the central station for producing on the telephone-line a current capable of causing an abnormal sound in a receiver off its hook, a switch controlling said means, a magnet operative on the switch, and a connecting device interposed between the armature of the magnet and the movable member of the switch constructed to require a predetermined number of impulses from the armature before it will cause operation of the switch, substantially as described.

14. The combination with a telephone system of means at the central station for producing on the telephone-line a current capable of causing an abnormal sound in a receiver off its hook, a switch controlling said means, a magnet operative on the switch, and a bellows interposed between the armature of the magnet and the movable member of the switch, said bellows being constructed to require a predetermined number of actuations of the magnet-armature before it can cause closing of the switch, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM R. WHITEHORNE.

Witnesses:

HELEN E. WHITEHORNE,
R. W. LEIBERT.