No. 767,284. PATENTED AUG. 9, 1904.

W. M. KELLY & G. E. TRUXELL.

CENTRAL ENERGY SYSTEM.

APPLICATION FILED MAY 20, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1

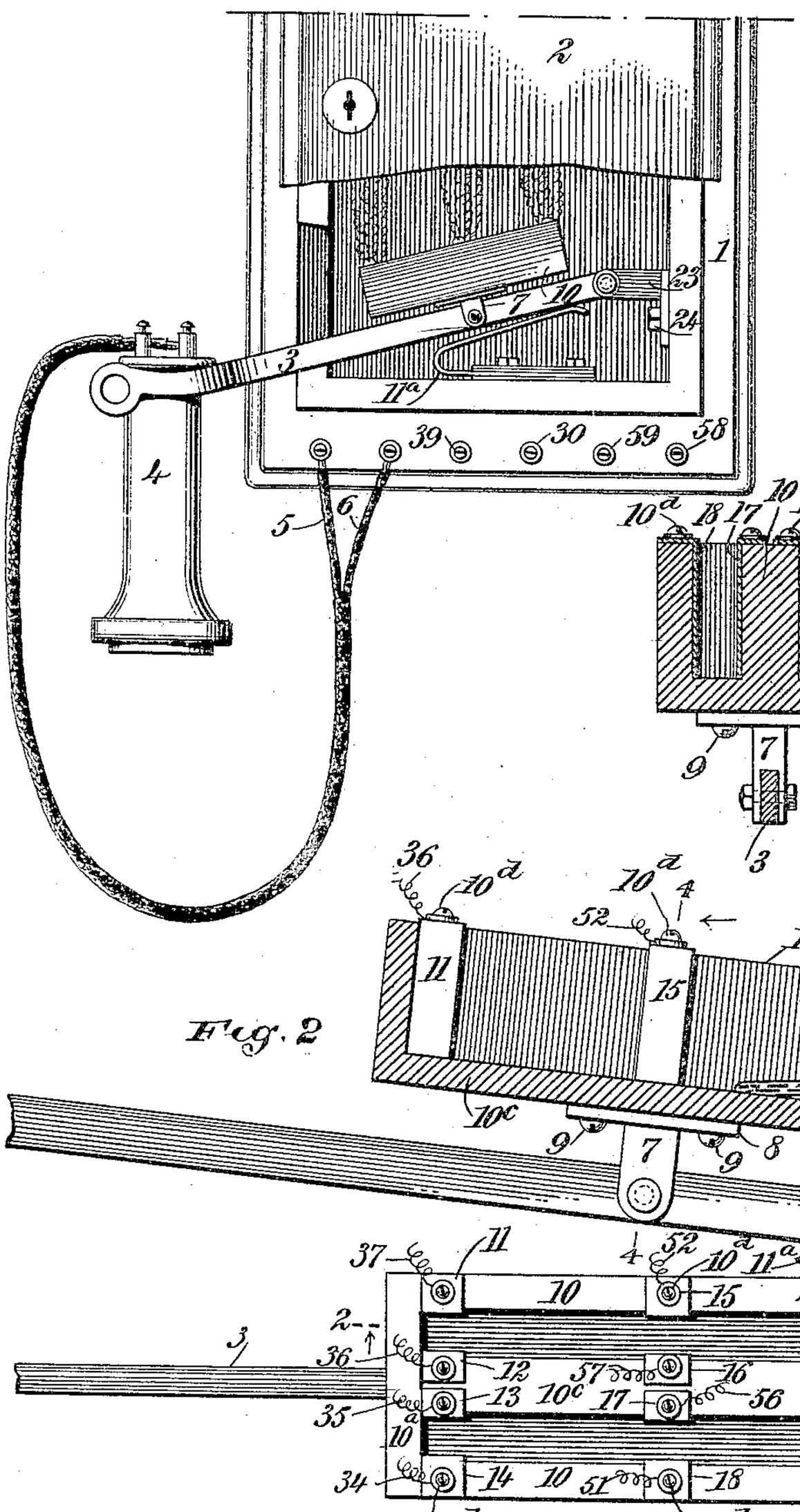

Fig. 4

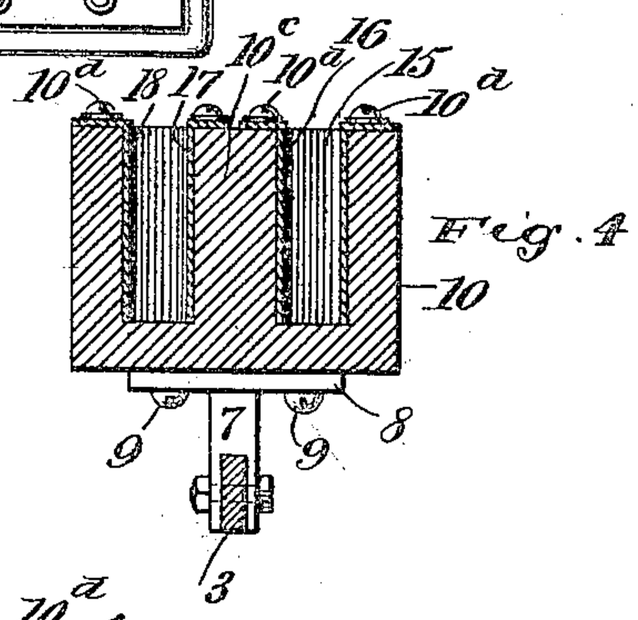

Fig. 2

Fig. 3

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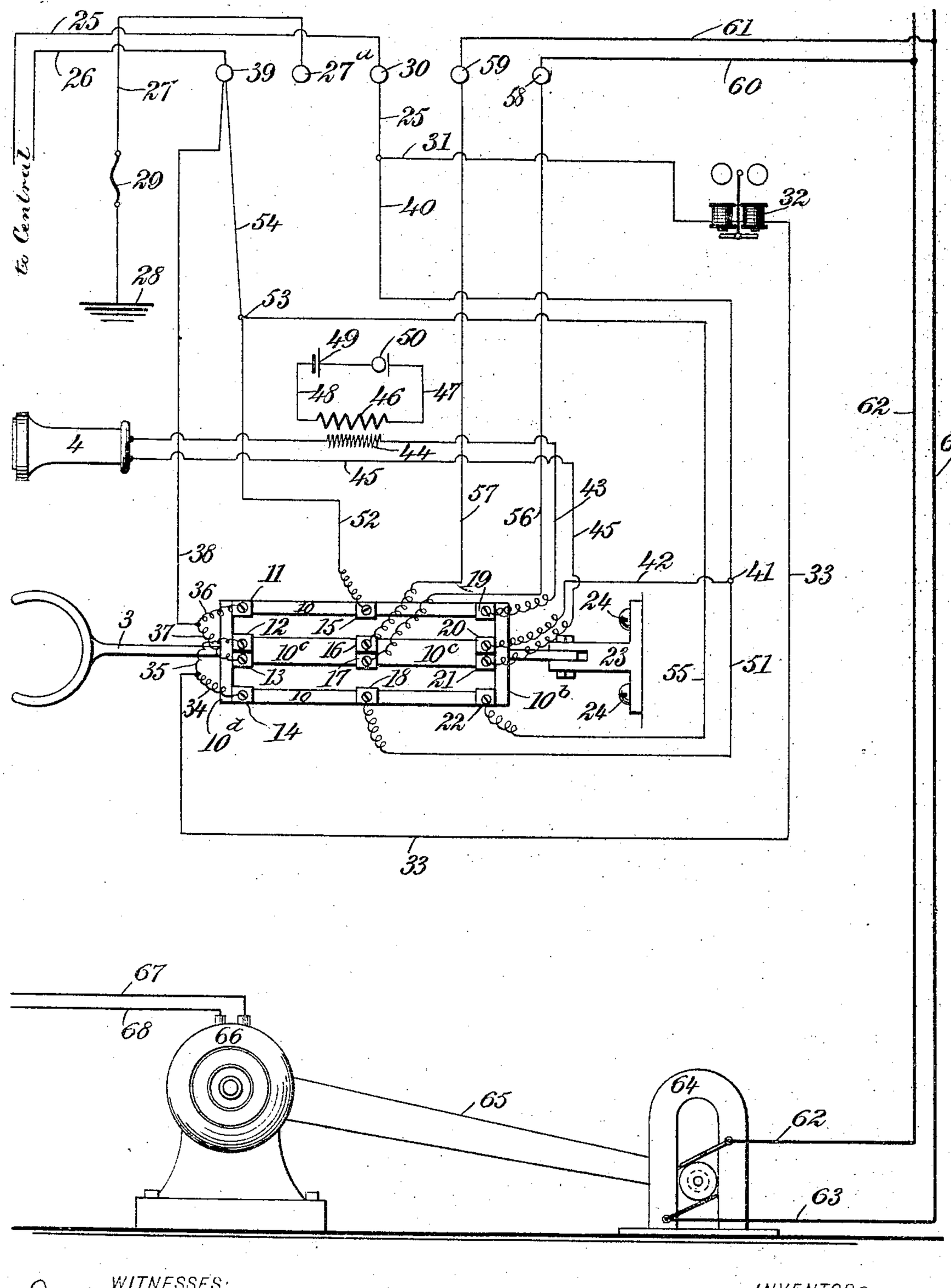

Fig. 5

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No. 767,284. Patented August 9, 1904.

UNITED STATES PATENT OFFICE.

WILLIAM MERRIAN KELLY AND GEARY ELDRIDGE TRUXELL, OF GREENSBURG, PENNSYLVANIA.

CENTRAL ENERGY SYSTEM.

SPECIFICATION forming part of Letters Patent No. 767,284, dated August 9, 1904.

Application filed May 20, 1903. Serial No. 157,948. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM MERRIAN KELLY and GEARY ELDRIDGE TRUXELL, citizens of the United States, and residents of Greensburg, in the county of Westmoreland and State of Pennsylvania, have invented new and useful Improvements in Central Energy Systems, of which the following is a full, clear, and exact description.

Our invention relates to telephony, our more particular object being to produce a simple, reliable, and efficient central energy system in which a power-circuit is automatically employed for energizing the individual ringing-circuits and in which an improved contact-box is connected with each individual switch-hook.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a fragmentary elevation partly broken away and showing our improved contact-box. Fig. 2 is a vertical sectional view through the same, somewhat enlarged and taken upon the line 2 2 of Fig. 3 and looking in the direction of the arrow. Fig. 3 is a fragmentary plan view of the contact-box as mounted upon the switch-hook. Fig. 4 is a vertical cross-section taken upon the line 4 4 of Fig. 2 and looking in the direction of the arrow, and Fig. 5 is a diagram showing the several circuits and the connection of the contact-box therewith.

The usual wooden casing 1 is provided with a door 2, and within the casing is mounted a switch-hook 3, upon which normally hangs the receiver 4, this receiver being provided with flexible cords 5 6 in the usual manner. Mounted upon the switch-hook 3 is a fastening 7, carrying upon its upper portion a flat plate 8, through which pass the screws 9, so as to engage the contact-box 10. This contact-box is provided with end pieces 10^a 10^b and a central partition 10^c. Mounted upon this contact-box are the metallic contacts 11 12 13 14 15 16 17 18 19 20 21 22, as indicated in Fig. 3. Each of these contact members consists of a flat spring, of non-corrosive metal, bent into L shape, as indicated, and secured in position by means of a screw 10^d, which passes through the upper portion of the contact member and binds the same rigidly upon the contact-box. The disposition of the several contact members within the box is such that the several contacts are each insulated from the other, and for this purpose the contact-box, including the partition thereof, should be of insulating material.

Mounted within the casing 1 is a bearing member 23, secured in position by a screw 24. The switch-hook 3 is journaled upon this bearing member and is free to move into the usual position characteristic of a switch-hook—to wit, a so-called "normal" position, in which the hook is depressed by the weight of the receiver, and a so-called "abnormal" position, in which the switch-hook reaches its highest point, the receiver 4 being lifted off. A spring 11^a causes the switch-hook to rise as soon as the weight of the receiver is removed from its outer or free end.

The line-wires are shown at 25 and 26, the ground-wire at 27, the earth connection at 28, and the fuse at 29. The ground-wire is connected with the apparatus in the usual manner by means of a binding-post 27^a. The line-wire 25 is connected with a binding-post 30, from which it continues into the casing. To the wire 25 is connected another wire, 31, which leads to the subscriber's bell 32 in the usual manner. From the bell 32 a wire 33 leads to the outer or free end of the contact-box 10 and is there connected, by means of wires 34 35, with the contact members 14 and 12, and somewhat similarly the wires 36 and 37 are connected with the contacts 11 13 and are also connected with the wire 38, which leads up to the post 39. The line-wire 26 is also connected with this post. The wire 40 connects with the line-wire 25, as indicated in the upper portion of Fig. 5, and is connected by a junction 41 with a wire 42, which leads to the contact 20. The contact 19 is connected by a wire 43 with the secondary winding 44 of the induction-coil, which is connected in the usual manner with the receiver 4. The wire 45 is connected with the receiver

and with the contact member 21. The primary winding 46 of the induction-coil is connected by wires 47 48 with the battery 49 and transmitter 50, these parts being of the usual construction. From the junction 41 a wire 51 leads to the contact member 18, and from the contact member 15 a wire 52 leads to the junction 53, from which a wire 54 leads to the binding-post 39, and consequently to the wire 26, and from this junction 53 a wire 55 leads to the contact member 22.

From the contact members 17 16, which are insulated from each other, as above explained, wires 56 57 run to binding-posts 58 59, and from these binding-posts wires 60 61 lead, respectively, to power-mains 62 63. These power-mains are energized by means of a generator 64, which is driven by a belt 65 from a motor 66, the motor in turn being energized by the pressure-wires 67 68, which may be fed from any appropriate electrical supply. The motor 66 and generator 64 may be located at any desired point, but are preferably placed in or near the central station. The line-wires 25 26 are connected with the central station, which is provided with the usual accessories.

The operation of our invention is as follows: The receiver 4 at each subscriber's station (indicated in the upper part of Fig. 5) normally hangs in the position indicated in Fig. 1, thus causing the contact-box 10 to occupy the position shown. A quantity of mercury 69 is poured into each of the two compartments of the box 10, and the mercury of course flows to the lower or left-hand portion of the box, thereby causing contact between the members 11 and 12 and also between the members 13 and 14. The line-wires are of course not energized except when some person is either ringing or talking. Consequently the mechanism remains idle. Suppose, however, that either the central operator or a distant subscriber rings. The following circuit is thereby energized: line-wire 25, wire 31, bell 32, wire 33, wires 34 and 35, contact members 14 12, thence across the mercury to contact members 13 11, wires 37 36, wire 38, binding-post 39 to line-wire 26. It will be observed that the circuit is then completed through the bell 32 and also that the circuit is bifurcated at the left end of the contact-box 10—that is to say, the current from wire 33 splits and goes through wires 34 and 35, coming out in parallel to the wire 38. By this means the ringing of the bell is rendered doubly sure, because if one of the mercury contacts at the left of the box should be rendered imperfect the other contact will suffice to complete the circuit. When a subscriber now removes his receiver, thereby allowing the switch-hook 3 to ascend, the mercury globules roll back, as indicated in Fig. 3, to the right end of the box, and in so doing they momentarily cause to contact together the contact members 15 16 and also the contact members 17 18, thereby completing the following circuit: power-main 62, shunt-wire 60, binding-post 58, wire 56, contact member 17, mercury, contact member 18, wire 51, wire 40, wire 25, binding-post 30, line-wire 25 to central station, thence back by line-wire 26, binding-post 39, wire 54, wire 52, contact member 15, mercury, contact member 16, wire 57, binding-post 59, shunt-wire 61 to power-main 63. By means of this circuit the power-mains 62 63, actuated by the motor 64, momentarily energize the line-wires 25 26—that is to say, as the mercury rolls from one end of the box to the other it makes a momentary contact, allowing a small portion of the current to pass by a parallel circuit from one of the power-mains 62 across the line of contact disposed in the center of the contact-box to the central station and thence back to the power-main. The central operator is thus apprised when the subscriber has taken down his receiver, thus answering the call. The mercury being now at the lower or right-hand end of the contact-box, as indicated in Fig. 2, forms a metallic connection between the contact members 21 and 22 and also between the contact members 19 and 20 and 21 and 22, thus throwing the local talking-circuit of the subscriber into line, the circuit being as follows: line-wire 25, wire 40, junction 41, contact member 20, mercury, contact member 19, wire 43, secondary winding 44, receiver 4, wire 45, contact member 21, mercury, contact member 22, wire 55, junction 53, wire 54, binding-post 39, and wire 26. The line-wires are thus connected serially with the secondary winding 44 and receiver 4, this circuit remaining completed so long as the receiver is kept off the switch-hook 3. The transmitter 50 and battery 49 are connected inductively therewith in the usual manner and are used to energize the primary winding 46, thereby energizing the so-called "talking-currents" of the secondary winding 44 and enabling the subscriber to converse with a person at a distance. The conversation being finished, the subscriber hangs up the receiver 4 in the usual manner, thereby depressing the switch-hook 3 and placing his apparatus in condition to receive another call. If now everything is quiet and he desires to call up central, he simply removes his receiver in the usual manner, and as the contact-box rises a momentary circuit is completed from one of the power-mains 62 through the contacts 17 18, line-wires 25 26, contacts 15 16 to the power-main 63, as above described, thus enabling the generator 64 to "flash the signal at central," whereupon the operator at central responds and makes any desired connection in the usual manner.

It will be understood, of course, that the power-mains 62 63 are general in their action and that they run along the principal thoroughfares of the city. When a sub-

scriber's station is to be put into the system, the wires 25 26 are run from the central station to the subscriber's station and the power-mains 62 63 are tapped at the nearest available point. The power-circuit need not follow the ramifications and the sinousities of the several line-wires and may be tapped on at any convenient point.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. In a telephone system, having a central source of signaling-current, the combination of a movable member disposed at each subscriber's station and free to occupy normal and abnormal positions, normal contact mechanism and abnormal contact mechanism connected with said movable member and controllable by the position thereof, another member connected with said movable member and controllable momentarily thereby while moving from one of its said positions to the other, a power-circuit connected with said last-mentioned contact mechanism and provided with an electric return, and lines separate from said power-circuit and connected with all of said contacts, said power-circuit being also connected with the central station from which it is energized.

2. In a telephone system, having a central source of signaling-current, the combination of a movable member disposed at each subscriber's station and free to occupy normal and abnormal positions, normal contact mechanism and abnormal contact mechanism connected with said movable member and controllable momentarily thereby while said movable member is in motion, separate metallic lines running in pairs from each subscriber's station to the central station, said lines being provided with separate connections extending in parallel to all of said contact members, and a power-circuit separate from said lines and provided with a return-circuit and with shunt-wires, said power-circuit being connected with said contact controllable momentarily by said movable member.

3. In a telephone system, having a central source of signaling-current, the combination of a switch-hook, a movable member connected therewith and free to occupy two definite positions, one being normal and the other abnormal, normal and abnormal contacts connected with said movable member and free to close an alarm-circuit or a talking-circuit, according to the position of said movable member, a separate contact member connected with said movable member and free to be closed momentarily, a power-circuit, and wiring connecting said last-mentioned contact mechanism with said power-circuit and with an alarm mechanism disposed at a distant point.

4. In a telephone system, having a central source of signaling-current, the combination of a pair of separate metallic lines for connecting each subscriber's station with the central station, a general power-circuit separate from said lines for energizing the same, said general power-circuit being provided with a forwarding-wire and a return-wire, mechanism connected with a switch-hook and controllable by movements thereof for simultaneously connecting one of said lines with said forwarding-wire and the other of said lines with said return-wire, and a switch-hook provided with contacts to be opened and closed by movements thereof for connecting one of said lines with said return-wire, and the other of said lines with said forwarding-wire, said contacts being duplicated and connected in parallel with each other so as to insure certainty of operation.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

WILLIAM MERRIAN KELLY.
GEARY ELDRIDGE TRUXELL.

Witnesses:
J. F. BEATTY,
MARTIN MCLAUGHLIN.