

No. 631,167.

Patented Aug. 15, 1899.

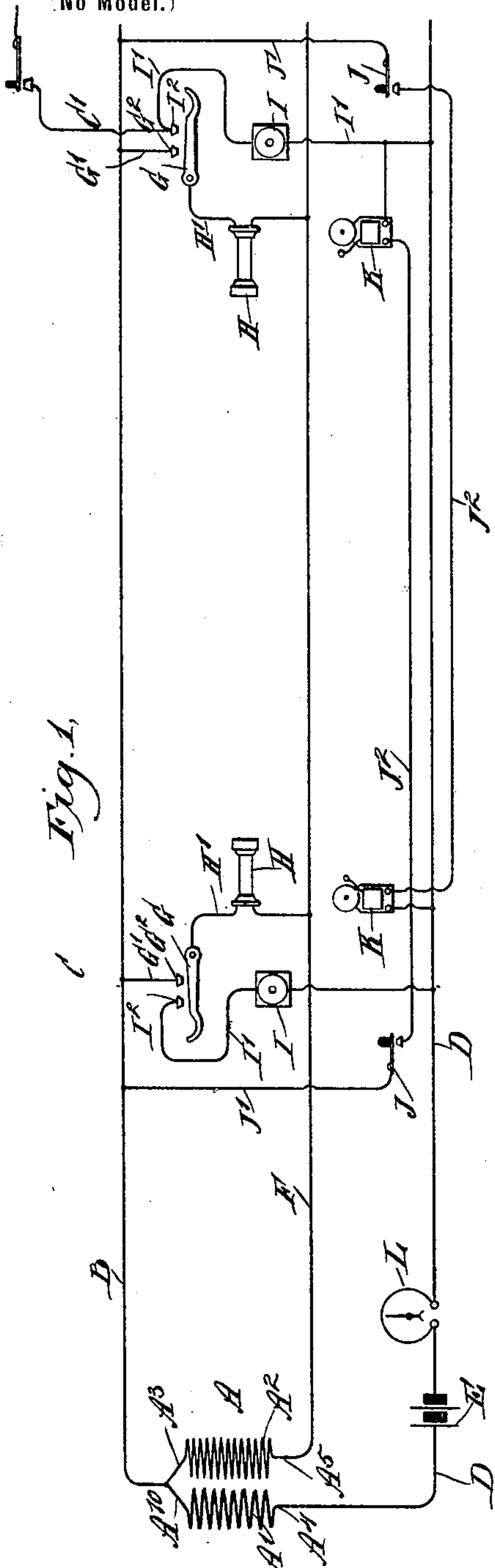
M. S. KEYES & J. H. SPENCER.

TELEPHONE SYSTEM.

(Application filed Jan. 3, 1899.)

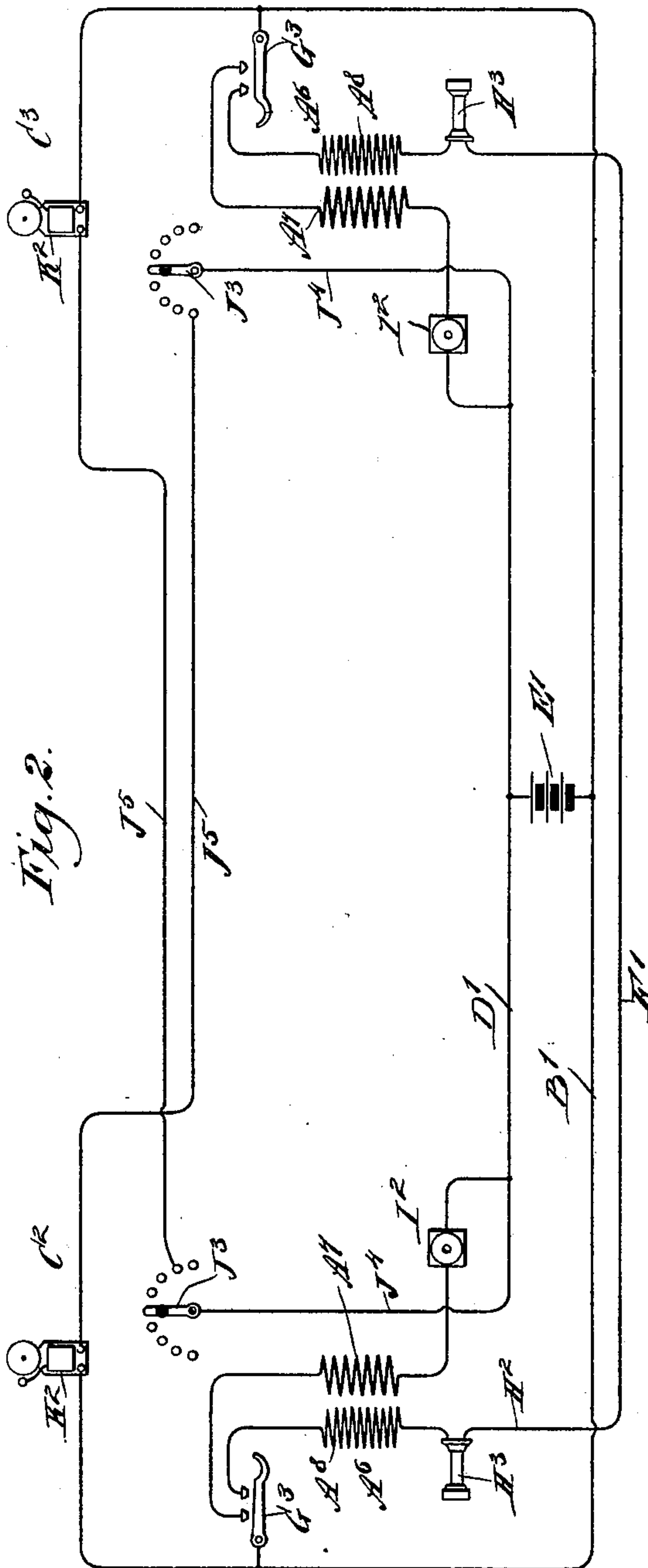
(No Model.)

2 Sheets—Sheet 1.



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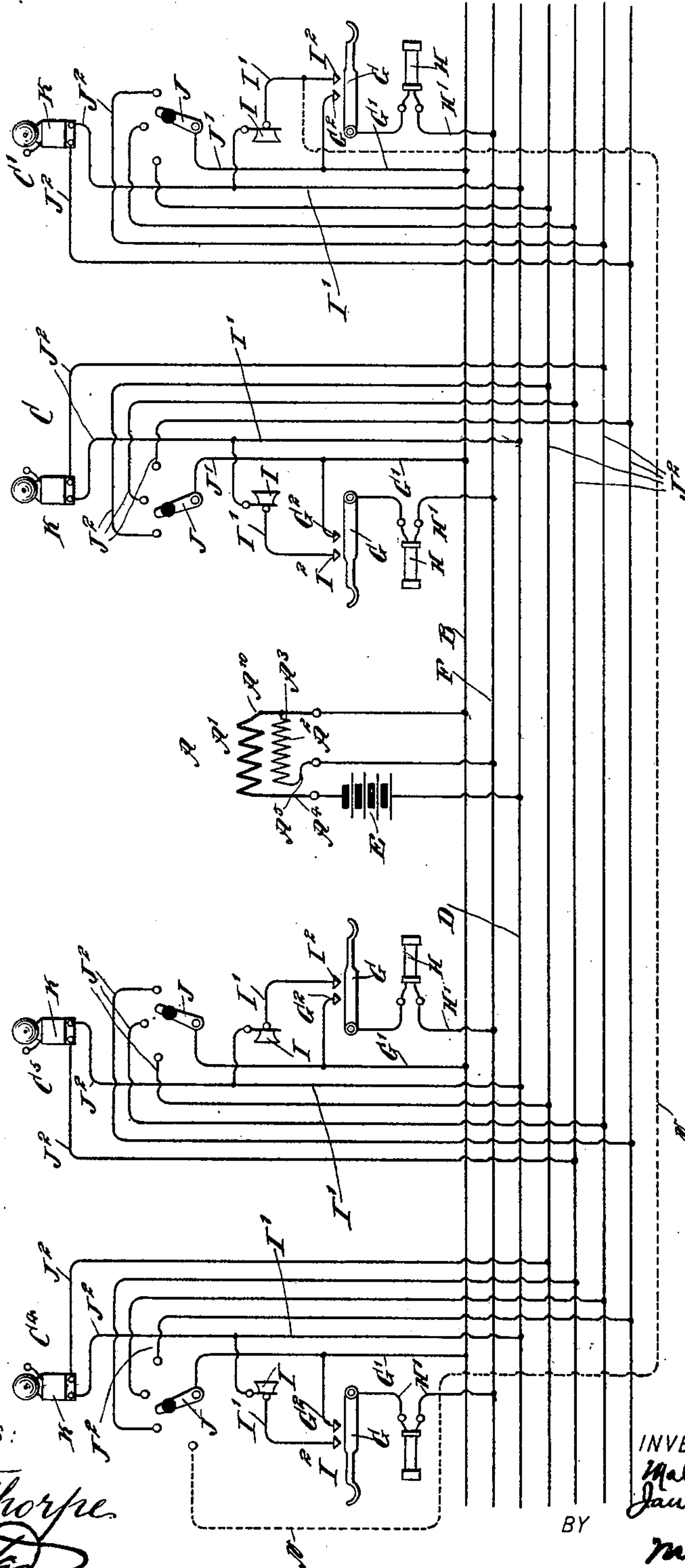
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Fig. 3.



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MALCOLM S. KEYES AND JAMES H. SPENCER, OF NEW YORK, N. Y.,
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TELEPHONE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 631,167, dated August 15, 1899.

Application filed January 3, 1899. Serial No. 700,977. (No model.)

To all whom it may concern:

Be it known that we, MALCOLM S. KEYES and JAMES H. SPENCER, of the city of New York, borough of Manhattan, county of New York and State of New York, have invented a new and Improved Telephone System, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved telephone system more especially designed for use in stores, factories, hotels, and other buildings and places and arranged in such a manner that the several stations in the system can be readily connected with each other telephonically and without the use of an expensive exchange, as each station in itself forms a central station and but one movement for a call is required whether the receiver of the other station is on or off.

The invention consists principally of an induction-coil having both primary and secondary coils connected by wires with the several stations to form circuits, a receiver in one induction-coil circuit and a transmitter in the other induction-coil circuit.

The invention also consists of certain parts and details and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

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

Figure 1 is a diagrammatic view of the improvement, showing two stations. Fig. 2 is a similar view of a modified form of the improvement; and Fig. 3 is a diagrammatic view of the improvement, showing four stations connected with each other.

The telephone system, as illustrated in Figs. 1 and 3, is provided with an induction-coil A, having the usual primary coil A' and the secondary coil A², connected at one end by other wires A¹⁰ and A³, respectively, with a line-wire B, connecting with all the stations C C' C⁴ C⁵ of the system. The other end of the coil A' has its wire A⁴ connected with a second line-wire D, also extending to the several stations C C' C⁴ C⁵ and containing a battery E or

other source of electricity-supply. The other end of the coil A² is connected by its wire A⁵ with a third line-wire F, also leading to the several stations in the system. The line-wire B is connected at each station by a branch wire G' with a contact-point G² for the receiver-switch G, connected by a wire H' with the line-wire F and containing a receiver H, normally hung on the receiver-switch G. The latter is also adapted to make contact with the contact-point I², connected by a branch wire I' with the line-wire D and containing a transmitter I. The line-wire B is further connected at each station by a branch wire J' with a call-key J on a switchboard connected by wires J², containing at the other station a bell or annunciator K, the wire J² being also connected with the branch wire I', leading to the line-wire D. Now it will be seen that when the operator at station C desires to call up station C' he simply moves the call-key J on the switchboard to the wire J², leading to the station C'. In doing so the call-circuit is closed, and the bell K at the station C' will ring, the circuit running from the call-key J by wire J² to the wire I' of the station C' into the wire D and back through the battery E to the primary coil A' and by wire B to the wire J', leading to the call-key J at the first station C. Now it will be seen that it is wholly immaterial whether the transmitter I of the station C' is on its switch-lever G or not, as the alarm will be sounded in the manner above described. The moment the operators at the stations C and C' take the receivers H off the corresponding receiver-switches G the latter make contact with the contact-points I² and G², so that circuits are established for the receivers through the wires B and F for the secondary coil A², and the transmitters I are contained in a circuit containing the wires B and D of the primary coil A'. When through using the telephone system, the operators at the two stations again hang up the receivers H on the receiver-switches, the phones then being ready for another call.

A galvanometer L may be placed in the line-wire D to indicate at some particular point in the circuit when the telephones are in use or when a short circuit is on the line.

As illustrated in Fig. 2, the induction-coil A⁶ has its primary coil A⁷ and the secondary coil A⁸ connected with contact-points for the receiver-switches G³ at each station C² C³, and the receiver-switches G³ are connected with each other by the line-wire B', which is connected by the battery E' with the line-wire D', containing a transmitter I² and connected with one end of the primary coil A⁷. The secondary coils A⁸ are connected with each other by the line-wire F', containing the receivers H³. A branch wire J⁴ leads from the line-wire D' to the call-key J³ on the switch-board, connected by wires J⁵ with each station at the corresponding receiver-switch G³, each wire J⁵ containing a bell or annunciator K². The operation is similar to the one above described—that is, the operator at the station C² in order to call up the station C³ simply moves the call-key J³ to the contact-point for closing the call-circuit of wires J⁵, J⁴, and D'. When the receivers H³ are removed from the receiver-switches G³, the latter makes connection with the wires leading to the primary and secondary coils to establish circuits for both receivers and transmitters. A wire N (see Fig. 3) may be run from one or more of the instruments to the line of a central office or a central station and by pressing a key at that point allows the operator to hear what is going on between any other two stations telephonically in connection with each other, as above described, and without being obliged to call up either of the said two stations. It is understood that by the arrangement described only one battery is required, and the battery and coils can be placed at any part of the line. Instead of a key any other mechanical device can be used for the purpose. There is no home station, as each instrument has a separate wire to each other station for an independent call, and the call-key is in the form of a spring and is released from the call-point as soon as pressure of the hand is removed. In order to enable a person to listen at a certain phone to hear all sounds reaching a certain distant phone, it is only necessary to connect the wire N (see Fig. 3) with a contact-point I² and a certain listening-phone by connecting this wire to a call-point of the call-key of this phone. For instance, as shown in Fig. 3, the wire N connects with the wire I' of the transmitter I at station C' and is adapted to be engaged by the key J on station C⁴. Now when the key is brought in action through the battery of the transmitter the party at station C⁴ is enabled to listen to all sounds reaching the distant phone at station C'. This listening-key and wire can be run from one or several of outlying stations to the contact-point of any one of the phones, and thus the listening-key permits a person

in a house or office to listen to any sounds in a distant stable, store, or other place.

In Fig. 3 the wire N is shown only as having connection with the receiver and transmitter circuit at station C' and adapted to be placed in the receiver-circuit at the central office C⁴ by manipulating a circuit-closing key. Obviously, however, the wire N will practically be connected with all of the stations on a line. Referring particularly to the circuit, if C' is in talking connection with either of the other stations and if at the central office the switch J is placed in connection with the wire N a listening-circuit will be established as follows: from the switch J at station C⁴ to the wire N, then to the wire I' of station C', through the transmitter I to D, E, F, H', and G² back to J after passing through the receiver at station C⁴, which of course has been removed from its hook, which closes the circuit.

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

1. A telephone system, comprising a plurality of stations, an induction-coil having one end of each of its coils connected to a line-wire leading to all the stations, the other end of the primary having connection with a battery and with a second line-wire connecting with the calling device at each station, and the other end of the secondary coil having connection with a third line-wire in which the receivers of the several stations are arranged, and transmitters in the signal-circuit, the battery, primary and secondary circuits being completed by removing the receiver at any one station, substantially as specified.

2. A telephone system, comprising a plurality of stations, an induction-coil having one end of each of its coils connected to a line-wire leading to all the stations, the other end of the primary having connection with a battery and with a second line-wire connecting with the calling device at each station, and the other end of the secondary coil having connection with a third line-wire in which the receivers of the several stations are arranged, transmitters in the signal-circuit, the battery, primary and secondary circuits being completed by removing the receiver at any one station without reference to any other station, a listening-wire, and means for putting said listening-wire into the receiving-circuit at a central station, the said listening-wire having connection with the transmitter-circuit of a substation, substantially as specified.

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