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PATENTED DEC. 31, 1907.

J. W. KELLY, JR.
TELEPHONE DICTATING SYSTEM OR APPARATUS.

APPLICATION FILED APR. 15, 1907.

2 SHEETS—SHEET 1.

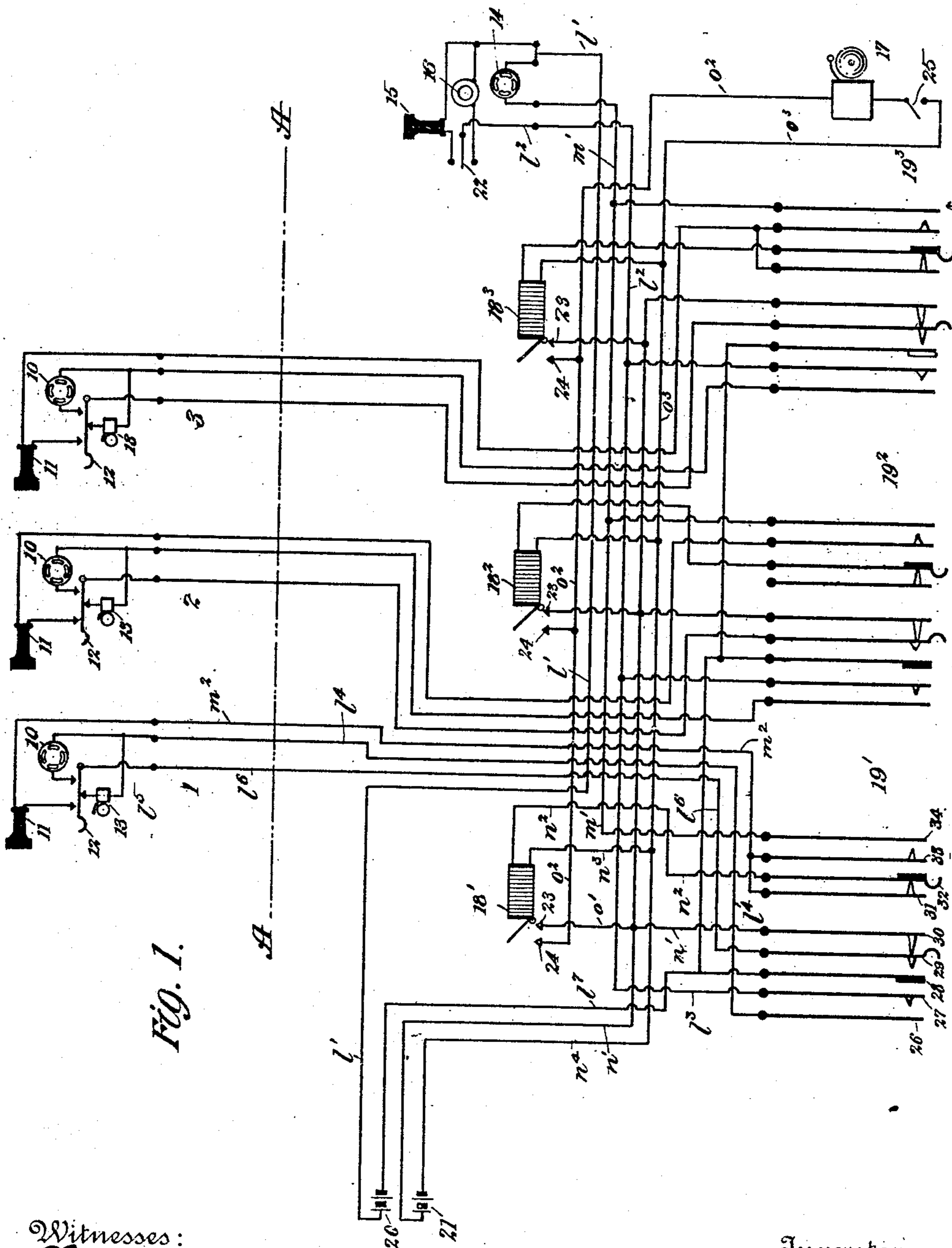


Fig. 1.

Witnesses:
Francis Ober
Arthur C. Stone

Inventor
John W. Kelly, Jr.
By his Attorneys
Rosenbaum & Rockledge



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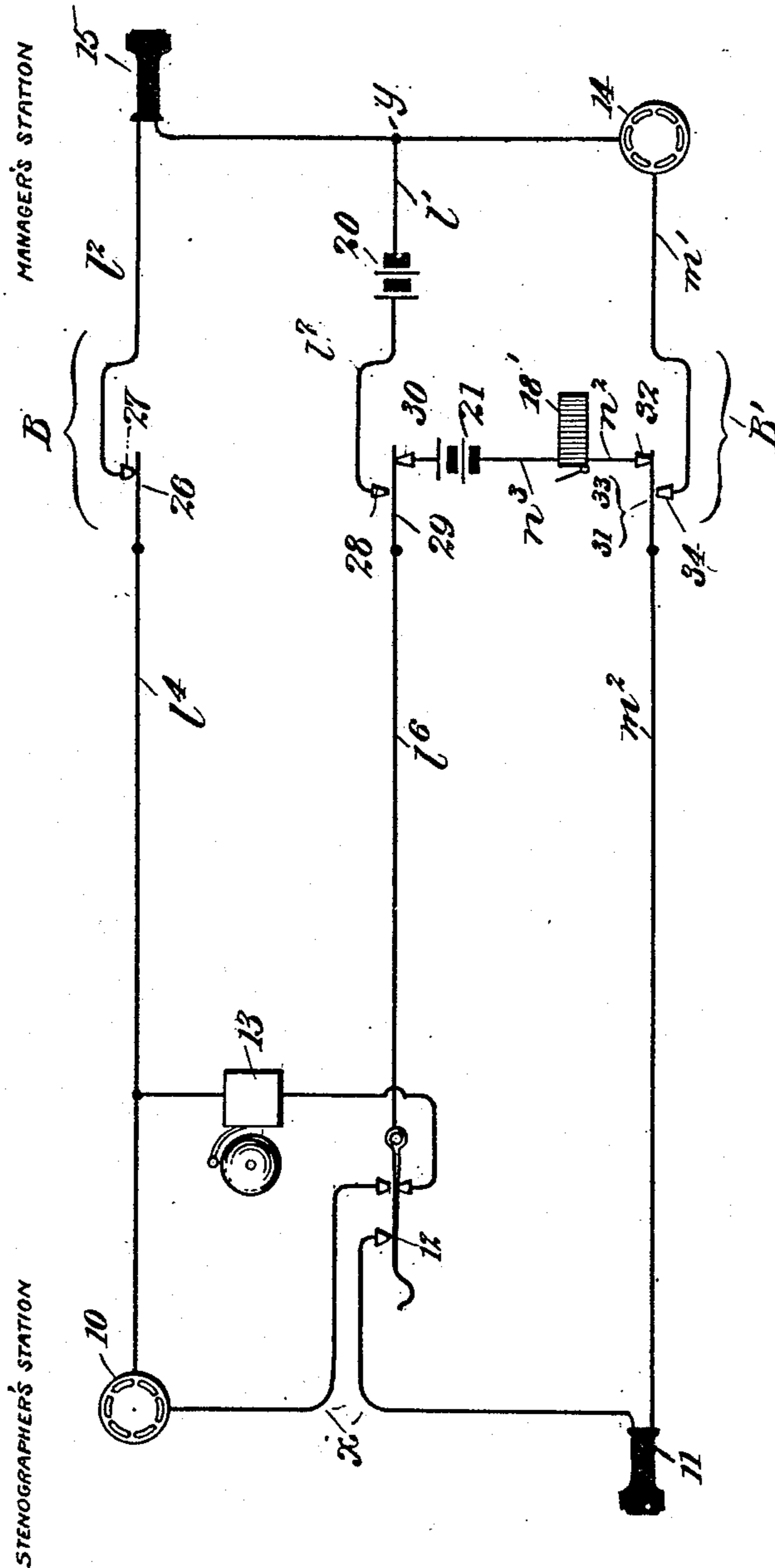
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APPLICATION FILED APR. 15, 1907.

2 SHEETS—SHEET 2.

FIG. 2.



Witnesses:

Francis S. Ober
Andrew S. Ober

Inventor

John W. Kelly Jr.
By his Attorneys
Rosenbaum, Stockbridge

UNITED STATES PATENT OFFICE.

JOHN W. KELLY, JR., OF CAMDEN, NEW JERSEY, ASSIGNOR TO GENERAL ACOUSTIC COMPANY,
A CORPORATION OF NEW YORK.

TELEPHONE-DICTATING SYSTEM OR APPARATUS.

No. 875,081.

Specification of Letters Patent.

Patented Dec. 31, 1907.

Application filed April 15, 1907. Serial No. 368,303.

To all whom it may concern:

Be it known that I, JOHN W. KELLY, Jr., a citizen of the United States, residing at Camden, in the county of Camden and State of New Jersey, have invented certain new and useful Improvements in Telephone-Dictating Systems or Apparatus, of which the following is a full, clear, and exact description.

My invention relates to what is known as a dictograph, being a telephonic system or apparatus by which a person, for example, the manager of an office, may dictate letters to any one of his corps of stenographers without requiring them to leave their places at their own desks. An apparatus of this character forms the subject of Letters Patent No. 843,186, dated February 5th, 1907, and in which four line or extension wires run from the manager's instrument to each of the stenographers' stations.

By the present invention I attain all of the characteristics and functions of the above apparatus by the use of three wires to the stenographers' stations.

By the present invention I also have a single common battery for the talking circuits in place of individual batteries for the separate circuits.

The invention also includes various other features of improvement later more fully described.

With these objects in view the invention consists in the features of construction and combination hereinafter set forth and claimed.

In the drawings: Figure 1 is a diagrammatic view showing the circuits of a dictograph and embodying the principles of my invention; and Fig. 2 is an idealized diagrammatic view which shows in simplified form the electrical circuits of a single line or stenographer's connection.

As has been fully set forth in the patent above mentioned, it is important in a dictating apparatus of the present character that the talking circuit of the manager to a stenographer's station be entirely separate from the talking circuit from the stenographer to the manager's station. The circuits should be entirely separate in every way so that the voice currents in one do not produce corresponding fluctuations in the other, either by a direct or divided circuit, or by cross induction. This is essential because it is not desirable

that the manager's conversation should be repeated or echoed through the room while he is dictating. A further and even more important reason is because the stenographer has to break in or interrupt from time to time to get the spelling of a word or make some remark, and her conversation or remarks should be audibly delivered at the manager's instrument without interference while he is talking, so as to inform him of the further data required. The stenographer's talking circuit therefore terminates in a loud ear piece of special construction at the manager's station, so that her conversation is audibly received throughout the manager's room, but aside from this the quiet is not disturbed by the repetition of his own voice, or in any other way. As will later appear, I accomplish all these functions by a special three-wire circuit to each stenographer's station, including a common battery at the manager's station.

Referring to the drawings in which like parts are designated by the same reference sign, the various devices and parts forming part of the manager's instrument, together with the circuits and connections therefor, are all illustrated beneath the dot and dash line A—A. Above the dot and dash line A—A are indicated three branch lines which correspond to separate stenographer's instruments. Each stenographer's instrument includes an acousticon transmitter 10, adapted to receive spoken sounds at any reasonable distance therefrom, and an ordinary telephone receiver 11.

12 indicates an ordinary telephone hook by which the receiver is hung up, and 13 indicates the usual call bells. The manager's instrument includes an acousticon transmitter 14, an ordinary telephone receiver 15, and a very sensitive telephone receiver which I shall term a loud ear piece 16.

17 denotes a call or night bell, and 18', 18² and 18³ are ordinary drop signals which cause an indication to be displayed when a current is passed therethrough.

19', 19² and 19³ indicate keys or jacks at the manager's instrument, and which control the various circuits and connections.

20 indicates the common battery for the talking circuits, and 21 is an additional battery which may be employed for the ringing or signal circuits.

In addition to the above features, there is

a switch 22, at the manager's instrument by which the ordinary receiver 15, or the loud ear piece 16, may be put into the talking circuit. There are also contacts 23, 24, which
5 are bridged by the shutter of the signals 18', 18² etc. falling to expose the signals. These complete a circuit through the night bell 17 whenever the switch 25 thereof is closed.

I will now describe the various conditions and operations which take place and the electrical circuits which are completed in the normal operation of the apparatus. The diagram of circuits shows the apparatus in its normal or passive condition when no one is
10 talking. I will suppose the manager wishes to dictate a letter to the stenographer at the station No. 1. Under these circumstances the key or jack 19' is operated so as to separate the blades 29 and 32 thereof. This
20 breaks the connection of these blades with the inside blades 30 and 31, but causes new contacts to be established between the blades 28 and 29, 26 and 27, and 33 and 34. This first causes a current to flow to station No. 1
25 so as to ring the call bell thereat and notify the stenographer that a connection is desired. The circuit is as follows: From battery 20, wire *l'*, receiver 15 or 16 (according to the position of switch 22), wire *l'*, connection *l'*, spring blade 27,—blade 26—wire *l'*,
30 wire *l'*, bell 13, hook 12, wire *l'*, blade 29, blade 28, wire *l'*, back to the battery 20. The bell 13 is thereby rung and the stenographer takes her receiver off the hook, completing the talking circuits as follows: from
35 battery 20, through wire *l'* and transmitter 14, wire *m'*, blade 34, blade 33, wire *m'*, receiver 11 at the stenographer's station, switch hook 12, wire *l'*, blade 29, blade 28,
40 wire *l'*, back to the battery 20. Since this circuit includes the battery, the manager's transmitter and the stenographer's receiver, it establishes a talking circuit from the manager to the stenographer. At the same time
45 an entirely separate talking circuit is established from the stenographer to the manager as follows: from battery 20, wire *l'*, receiver 15 (or 16), wire *l'*, connection *l'*, blade 27, blade 26, wire *l'*, transmitter 10, hook 12 and
50 wire *l'*, blade 29, blade 28, wire *l'*, back to battery 20. This circuit includes a battery and stenographer's transmitter and manager's receiver, so that it constitutes a talking circuit from the stenographer to the manager. As will later be fully discussed, this
55 circuit is entirely separate in every way from the manager's talking circuit although only three wires are made use of for both.

The above constitute all the necessary conditions when the manager calls up a stenographer for the purpose of dictation. In some cases it becomes necessary for the stenographer to call up the manager. This is accomplished as follows: Supposing stenographer at station No. 1 desires to com-

municate with the manager's station. She takes her receiver off the hook, which rises, and completes the following circuit through the drop 18'. It will be understood that at this time the key 19' is undepressed, so that
70 the blades are in the position shown in the drawing with 29 and 30 and 31 and 32 in contact. The circuit is established from battery 21, through wire *n'*, blade 30, blade 29, wire *l'*, hook 12, receiver 11, wire *m'*,
75 blade 31, blade 32, wire *n'*, signal 18' wire *n'*, wire *n'*, back to battery 21. The drop signal 18' is thereby actuated and notifies the manager that a connection is desired. He accordingly manipulates his key 19', establishing the talking circuits in the manner
80 already described. If the manager has his attention engaged with something else it becomes necessary to have some sort of audible signal in addition to the drop 18'. This
85 is established through night bell 17, by closing switch 25, as follows: From battery 21, through wire *n'*, wire *o'*, contacts 23, 24, wire *o'*, bell 17, switch 25, wire *o'*, wire *n'*, back to battery 21. While the above description
90 deals only with the establishment of the circuits with the first stenographer's station, it is evident that the circuits and procedure with the others is exactly identical in all respects.
95

Referring now particularly to Fig. 2, I have illustrated an idealized diagram of the circuits showing that there is no conflict or interference between the manager's talking circuit to the stenographer, and the stenographer's talking circuit to the manager.
100 The circuit wires are denominated *l'*, *l'* and *m'*, corresponding to their denomination in Fig. 1. The contacts of the key 19' are represented between the letters B and B', and they are shown simplified and separated for
105 clearness. The various contacts are, however, denominated in a manner corresponding to the blades of the organized and complete key, as shown in Fig. 1. The relation
110 of all the contacts and parts corresponds to that of Fig. 1 when no one is talking. During communication all of the switches and parts would be at the relation opposite to that of Fig. 2. Under these circumstances
115 the current from the battery 20 passes through a divided circuit, one branch of which includes manager's transmitter 14, line *m'*, and stenographer's receiver 11, and the other branch of which includes manager's receiver 15, line *l'*, and stenographer's transmitter 10. Both of these circuits therefore receive a current for talking purposes.
120 But inasmuch as the battery 20 has very low resistance in comparison to that of the various transmitters and receivers, the fluctuations in the resistance of either branch circuit do not affect the current in the other, but only in its own branch. It may be stated
125 that the current in each branch is determined
130

by the resistance of such branch and the potential difference between the points x and y . But the potential between the points x and y is equal to the total e. m. f. of the battery, minus the product of the battery resistance and the current in the circuit. If the battery resistance is very low, it is evident that the last quantity becomes almost negligible in its percentage or relation to the whole.

In other words, if the resistance of the battery 20 is low in comparison with the resistance of the transmitting and receiving instruments, the potential between the points x and y will not fluctuate to any appreciable extent. Since the current in either branch of the divided circuit of the battery depends only on such potential and its own resistance, it is clear that the changing resistance and current of one branch will have no effect, or, in any case, a negligible effect, on the current flow in the other branch. This is the important condition in a dictograph, namely, having the talking circuit of the manager to the stenographer entirely separate and distinct from the talking circuit of the stenographer to the manager. The operation of the various signals and talking circuits may be traced if desired from Fig. 2, but as these circuits have already been gone over in connection with Fig. 1, it is unnecessary to again consider them. The same reference characters are employed in both cases, so that the original description of these circuits in connection with Fig. 1 will be found applicable to Fig. 2.

In the above description it will be noted that all of the talking circuits are made from a single battery 20, which is a common battery for all of the lines. I regard this as an important feature of the invention, particularly as it is necessary or desirable to have a fairly low resistance battery and which is generally of fairly large size for this purpose.

What I claim, is:—

1. In a telephone system, a manager's station having a plurality of keys, and a plurality of stenographers' stations each having a receiver and a three-wire circuit leading therefrom and joined to the blades of the keys corresponding to the respective stations, a telephone set including a sensitive transmitter and a loud ear piece at the man-

ager's station, and means actuated by the depression of any key for putting said transmitter and loud ear piece in a three-wire circuit with the stenographer's station corresponding to such key, one of said wires being excluded from the manager's loud ear piece circuit, and another of said wires being excluded from the stenographer's receiver circuit.

2. In a telephone system, a manager's station having a plurality of keys, a plurality of stenographers' stations each having a receiver and a three-wire connection with the manager's station, a signal at each stenographer's station, a plurality of signals at the manager's station corresponding to the respective stenographer's stations, said signals being actuated over their respective three-wire connections, a loud ear piece at the manager's station, and means for establishing talking circuits over said three-wire connections in lieu of said signal circuits, one of said wires being excluded from the manager's loud ear piece circuit and another of said wires being excluded from the stenographer's receiver circuit.

3. In a telephone system, a manager's station having a plurality of keys, a plurality of stenographers' stations each having a receiver and a three-wire connection with the manager's station, signals at the manager's station completed over said three-wire circuits from the respective stenographer's stations, and means at the manager's station and at the stenographer's stations, said means including a loud ear piece at the manager's station, for establishing separate talking circuits therebetween over said three-wire connections, one of said wires being excluded from the manager's loud ear piece circuit, and another of said wires being excluded from the stenographer's receiver circuit, said signals being eliminated from the circuits when the talking circuits are established.

In witness whereof, I subscribe my signature, in the presence of two witnesses.

JOHN W. KELLY, Jr.

Witnesses:

WALDO M. CHAPIN,
JAMES D'ANTONIO.