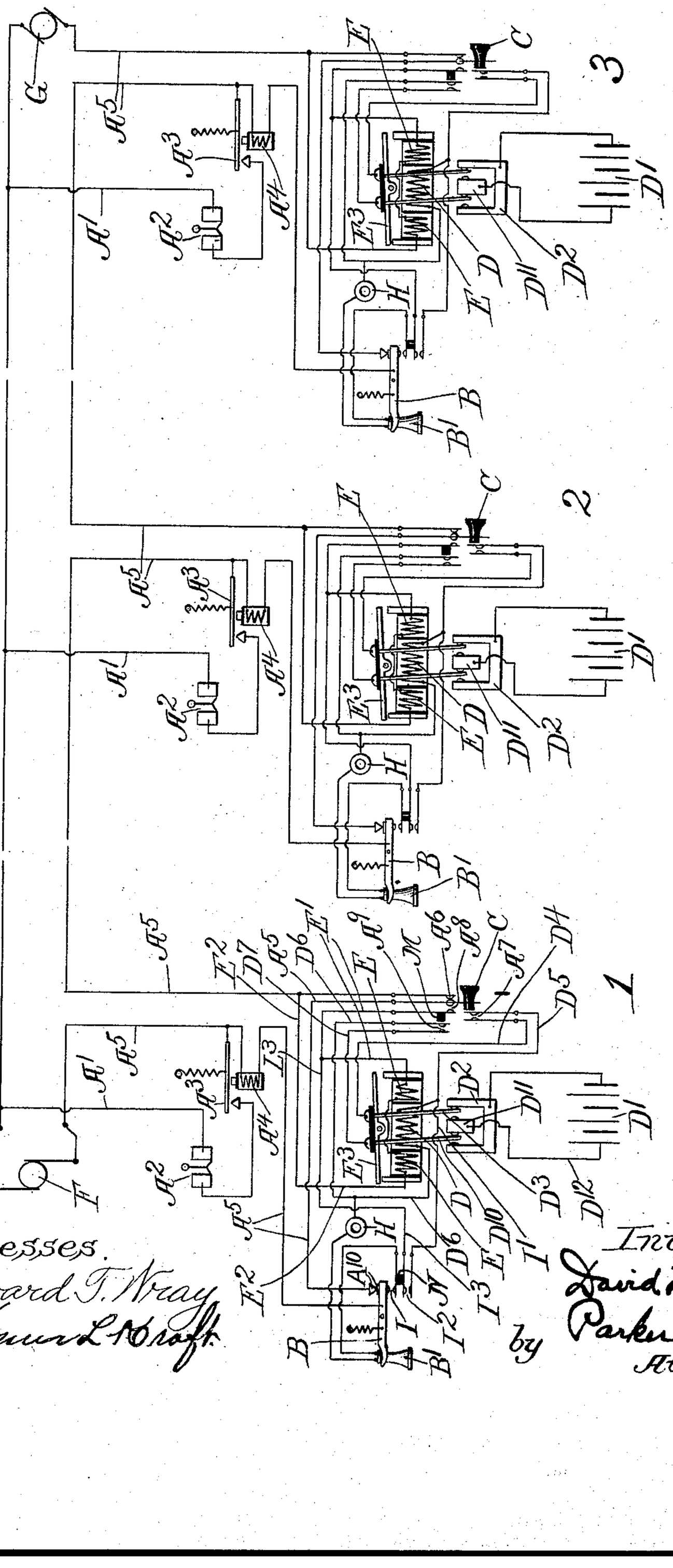
No. 860,175. PATENTED JULY 16, 1907.

D. H. WILSON.

TELEPHONE SYSTEM.

APPLICATION FILED OCT. 29, 1904.



UNITED STATES PATENT OFFICE.

DAVID H. WILSON, OF CHICAGO, ILLINOIS, ASSIGNOR TO GEORGE W. KRETZINGER, OF CHICAGO, ILLINOIS.

TELEPHONE SYSTEM.

No. 860,175. Specification of Letters Patent. Patented July 16, 1907.

Application filed October 29, 1904. Serial No. 230,452.

To all whom it may concern:

Be it known that I, DAVID H. WILSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Telephone Systems, of which the following is a specification.

My invention relates to telephone systems, and has for its object to provide a new and improved system of this description.

My invention is illustrated in the accompanying drawing, wherein I have shown diagrammatically a telephone system comprising a series of instruments in diagrammatic relation to each other.

Associated with each instrument is a bridge circuit, A^1, in which is located a signaling device, A^2, and a switch, A^3. Associated with the switch A^3 is an electro magnet, A^4, connected in the main circuit, A^5, the receiver hook, B, being included in the circuit or loop A^5 of the main circuit. When the receiver, B^1, is in position this circuit A^5 is completed through the receiver hook and the contacts A^{10} and A^6. A signaling or ringing switch, C, is provided which controls a number of contacts. Normally this switch is in such position as to bring the contacts A^6 into engagement. When this switch is operated it opens contacts A^6 and closes contacts A^7, A^8 and A^9, completing the circuit through the primary coil D of the induction coil. This primary circuit is then traced as follows: from source of electric supply D^1 to contact D^2, then through contact D^3 of the circuit reversing device, then through conductor D^4, contacts A^7, conductor D^5, to primary coil D, thence by conductor D^6 to contacts A^9, thence by conductor D^7 to contact D^{10} of the circuit reversing device, and thence by contact D^{11} and conductor D^{12} back to the source of electric supply. This energizes the core of the induction coil and causes an induced current in the secondary coil, E, of the induction coil, thus sending a signaling current out upon the line. This current is traced as follows: from the two sections of the coil E, which are connected together, through conductor E^1 to contacts A^8, then by conductor A^5 to the receiver hook B, thence by conductor A^5 through magnet A^4 and out upon the line, then back through conductor A^5 to conductor E^2, thence to coil E. The contacts D^3 and D^{10} of the circuit reversing device are connected to a pivoted arm, E^3, in proximity to the poles of the induction coil, said induction coil being formed with pole pieces for this purpose. When the induction coil is energized by pressing the ringing switch C, it attracts this arm and moves it so as to disconnect the contact D^3 from contact D^2, and connect it with contact D^{11}, at the same time disconnecting contact D^{10} from contact D^{11} and connecting it with contact D^2, thus breaking and reversing the current through the primary coil. This reverses the poles of the induction coil, and, since the arm E^3 is a permanent magnet, it will again be moved to bring the contacts into the position shown in full lines in the drawing, and this operation will be repeated as long as the signaling switch C is closed. It will be seen that this sends out a signaling or ringing current upon the line.

The line is preferably continuously charged by means of the sources of electric supply F and G, which may be of any suitable variety, preferably located at separated points on the line, it being, of course, evident that other sources of supply may be inserted in the line at any points desired, depending upon the length of the line and the conditions presented. The magnet A^4 is arranged so that the normal current on the line during talking is not sufficient to energize it enough to cause it to attract the switch A^3, and hence during the talking the bridge circuit A^1 is open. When, however, the signaling circuit is sent out upon the line, it energizes the magnet and causes it to move the switch A^3 to close the bridge circuit A^1, thus completing the circuit through the signaling device A^2 so as to operate it and cause the signal to be given. It will be seen that the circuits are such as to make the coil D a primary coil, and the coil E a secondary coil. When the signaling switch C is opened, the circuit is opened at contacts A^7, A^8 and A^9, and closed at contacts A^6. This cuts the local circuit, including the source of electric supply D and the circuit reversing device, out of circuit, and when the receiver is removed from the hook, the circuit arrangement is such as to place the receiver B^1 and the transmitter H and the coils E and D in the same circuit and connect them with the line. The circuit will then be traced as follows: from conductor A^5 to receiver hook B, thence through contacts I, thence to receiver B^1, thence to transmitter H, thence by conductor D^6 to coil D, thence by conductor I^1 to contacts I^2, which are now closed by the movement of the receiver hook B when the receiver is removed, thence by conductor I^3 to conductor E^1, thence through coils E, thence by conductor E^2 to conductor A^5, and thence out upon the line and back to conductor A^5. Under these conditions the talking circuit is completed and the bridge circuit A^1 opened, and the characteristics of the talking current impressed upon the charging current on the line.

I have described in detail the circuits of the instruments at station 1; the circuits at stations 2 and 3 are similar, and hence it is unnecessary to trace them.

When the talking current from station 1 goes out on the line, it is received at the receiving instruments which are in connection with the line, said instruments then being in the same relation as the instruments of station 1 when the receiver B^1 is removed from the hook B.

It will be seen that in this system a bridge circuit is

provided for each set of instruments, the bridge circuit being normally open during talking, and automatically closed during signaling, so as to in no manner interfere with the talking current, and yet permit the operation of the signaling device when desired.

It will further be seen that during the signaling operation the primary coil of the induction coil is in the local circuit, and the secondary coil in the line circuit, while during the talking operation the local circuit is cut out and all the coils are in the line circuit, as are also the receiver and transmitter.

I have described in detail a particular construction embodying my invention, but it is, of course, evident that this construction may be varied in many particulars without departing from the spirit of my invention, and I, therefore, do not limit myself to the construction shown.

I have found that by means of this system I am able to use the bridge system for ringing, and at the same time avoid the defects produced thereby in talking, and can, therefore, secure far better results in long lines.

It will be noted that in the particular construction shown in the drawings there is, when talking, a dynamo current on the main line, and this dynamo current passes through the transmitter and the receiver, and is the current used for talking purposes. This current therefore passes through both sets of instruments and hence when the operator is talking into one transmitter the current is varied because of the action of the transmitter and this variation affects the receiver at the other station and thus the message is transmitted from one station to the other.

Suitable insulating pieces, M and N, are associated with the circuits controlled by the reversing switch and the receiver hook so as to keep the circuits properly insulated from each other.

I claim:

1. A telephone system comprising a series of telephone instruments, a bridge circuit associated with each instrument and normally open when the talking circuit is completed, and means in the circuit of each telephone instrument for automatically closing the bridge circuit during the signaling operation.

2. A telephone system comprising a series of instruments, a bridge circuit associated with each instrument and provided with a switch normally open when the talking circuit is completed, a magnet in the talking circuit wound so as to be ineffective to operate the switch when the talking circuit is completed, means for impressing a signaling current upon the line and through said magnet so as to actuate it and cause it to move the switch to close the bridge circuit.

3. A telephone system comprising a receiver, a transmitter, two coils, a local circuit, and means for connecting one of said coils with the local circuit, and the other with the line circuit when signaling, and for connecting all the coils and the receiver and transmitter in the same circuit when talking.

4. A telephone system comprising a receiver, a transmitter, two coils, a local circuit, a current reversing device in said local circuit, and means for connecting one of said coils with the local circuit and the current reversing device, and the other coil with the line circuit when signaling, and for disconnecting the local circuit and current reversing device, and connecting all the coils and the receiver and transmitter in the same circuit when talking.

5. A telephone system comprising a receiver, a transmitter, two coils, a local circuit, means for connecting one of said coils with the local circuit and the other with the line circuit when signaling, and for connecting all the coils and the receiver and transmitter in the same circuit for talking, a bridge circuit normally open when the talking circuit is completed, and means for automatically closing the bridge circuit when the signaling circuit is completed.

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Witnesses:
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