

(No Model.)

C. B. SMITH.
TELEPHONE AND CALLING SYSTEM.

No. 559,086.

Patented Apr. 28, 1896.

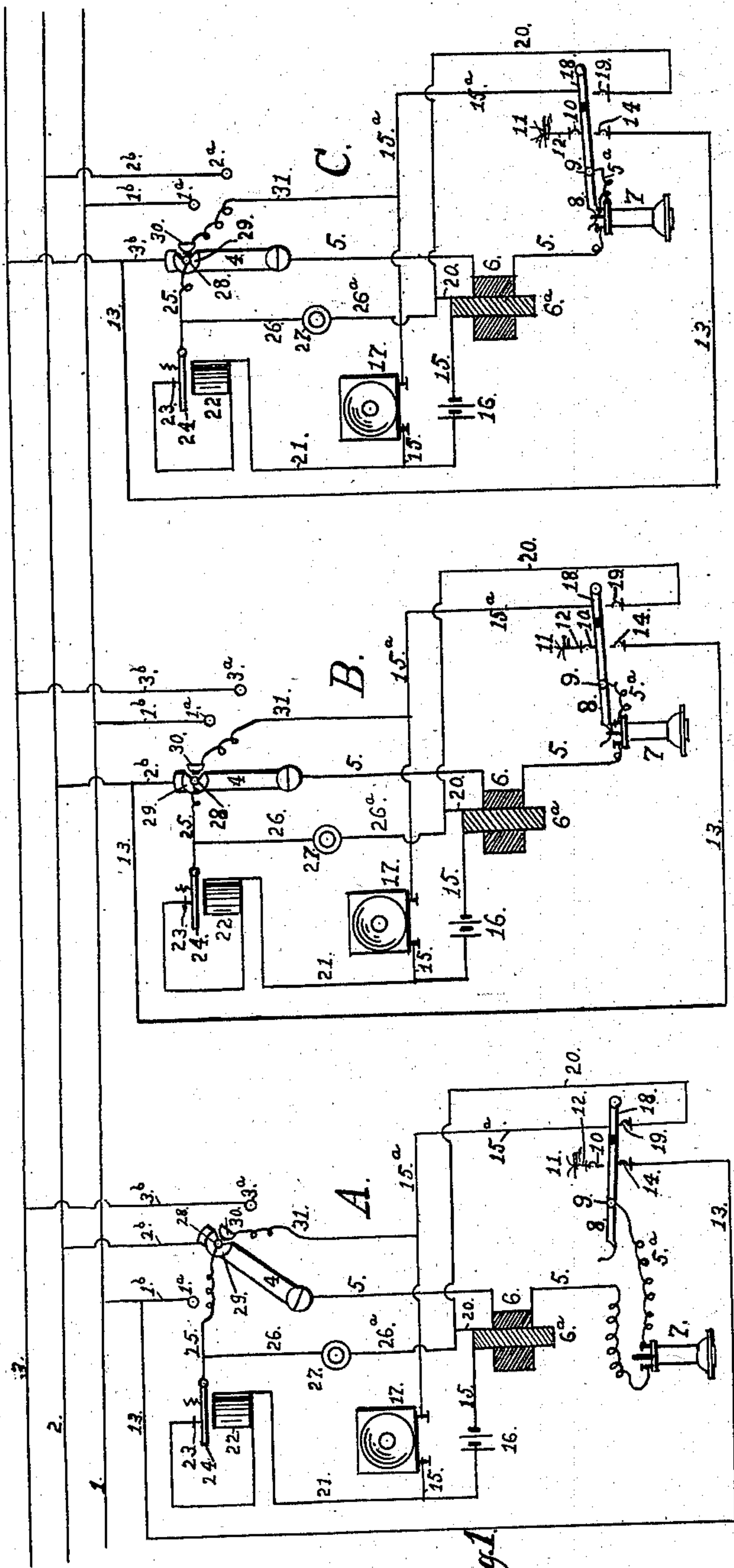


Fig. 1.

WITNESSES:

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Fig. 2.

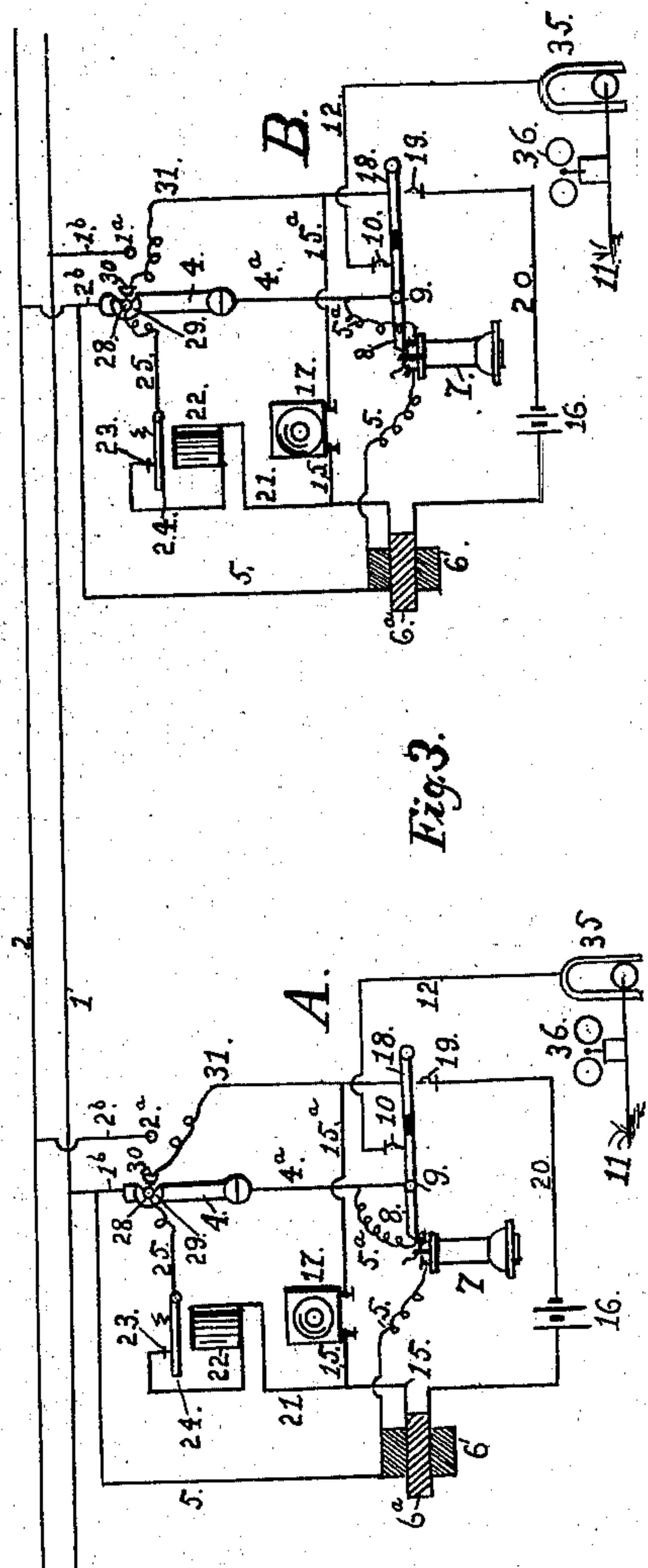
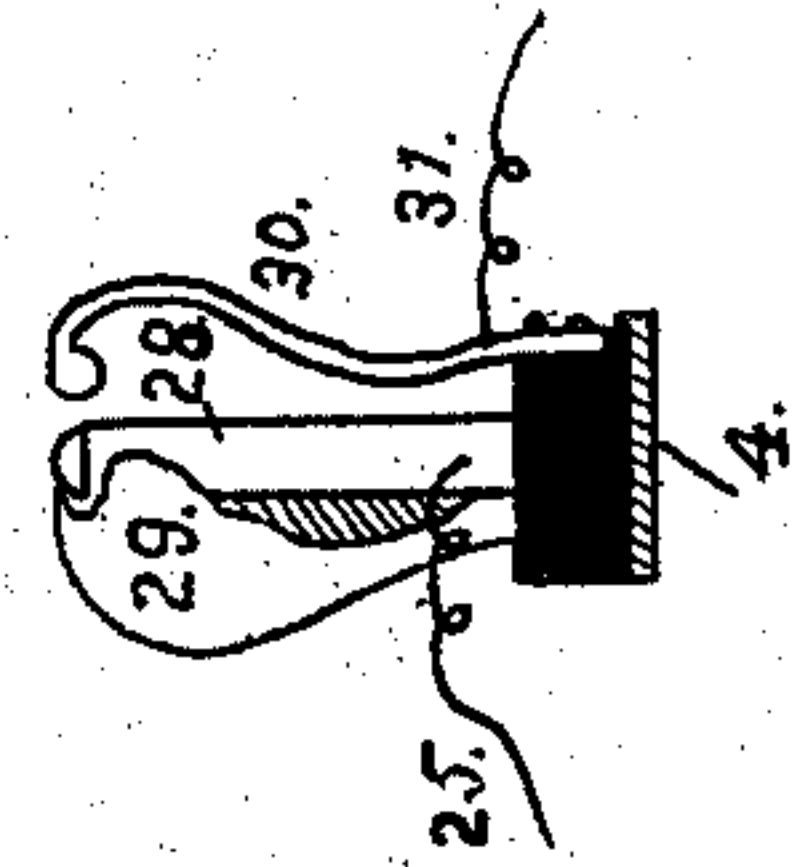


Fig. 3.

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TELEPHONE AND CALLING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 559,086, dated April 28, 1896.

Application filed November 18, 1895. Serial No. 569,300. (No model.)

To all whom it may concern:

Be it known that I, CHARLES B. SMITH, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Telephone and Calling Systems, of which the following is a specification.

My invention relates to an improved system for telephoning and calling, and the invention is particularly adapted for use in what are commonly called "interior" telephone systems, or those systems which are placed in a building in which any desired number of rooms or departments are fitted with instruments for communication one with another, although the invention is not limited for use in this regard.

One portion of the invention pertains to a system of circuits for use with suitable telephone instruments, whereby closed metallic circuits for telephoning can be established between a calling and a called station with a minimum number of conductors or wires, these wires also being arranged for use with calling devices for giving a call in a desired station.

In carrying out the invention I provide a plurality of stations and a plurality of conductors or wires passing through said stations, there being one wire set apart for each station, and at each station the telephoning or calling instruments are normally connected with the respective line conductors or wire for that station, so that a call can be received. At each station, also, the other line-wires of the system are all connected with contacts that are adapted to be put into electrical connection with a switch at each station to enable a calling station to signal to a called station after the switch is turned to the contact on the wire that leads to the telephones or calling instruments in the latter station, which operation also partially forms the closed metallic circuit for the telephone instruments. In each station, also, there is another switch to aid in establishing the closed metallic circuit for the receiver. To establish the closed metallic circuit between the calling and the called station, the attendant or subscriber at the called station, after he has been called, operates his second-mentioned switch and also

turns his first-mentioned switch until it engages the contact leading to the wire belonging to the calling station, the attendant in the calling station having also operated both of his switches, whereupon a closed metallic circuit will be established between the two stations.

A further portion of my invention relates to improved means for producing a call or giving a signal in a station to be called. In carrying out this portion of my invention I provide a normally open battery-circuit, which includes the primary coil of an induction-coil of a telephone circuit and instruments, in which battery-circuit is also included circuit-closing means and a make-and-break device, which acts to make and break the circuit through said primary coil when the circuit is closed, which causes intermittent currents to traverse the circuit of the secondary coil through the telephone instruments on said circuit, thereby producing a noise and thus giving a call in the telephone instruments.

A further portion of the invention pertains to novel means for notifying the called subscriber or attendant when he has selected or made electrical connection between his telephone instruments and the line conductors or wire corresponding to (or normally apportioned to) the calling subscriber or station. For convenience in carrying out this portion of my invention I have shown an arrangement whereby I utilize the make-and-break device above mentioned and part of its local circuit. For this purpose I have shown the circuit of the make-and-break device as connected with the first-mentioned switch, as by suitable wires or conductors extending to said switch, and at said switch said circuit is normally broken, and contacts for closing said circuit are so arranged that when the handle of the switch is grasped (to operate it) said circuit will be closed, so that when said switch has been turned to the proper line-wire (to establish a closed metallic circuit between the calling and a called station) a signal will be given in the receiver of the called station to announce the fact of the selection of the proper line-wire leading from the calling station.

Other arrangements of circuits and con-

tacts by which the entire system can be practically operated will be more fully described in this specification.

The invention also consists in the novel details of improvement more fully hereinafter set forth, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming part hereof, wherein—

Figure 1 is a diagrammatic view of a telephone and calling system embodying my improvements. Fig. 2 is a partly-broken detail view of the switch and the circuit-closer operated when the handle of the switch is grasped; and Fig. 3 is a diagrammatic view of the telephone system, showing well-known means used in connection therewith for producing a call.

Referring now to the accompanying drawings, in which similar numerals and letters of reference indicate corresponding parts in the several views, the numbers 1, 2, and 3 indicate the main-line conductors or wires or circuits which pass through the several stations A B C of a system, there being any suitable or desired number of such stations on a system and one of such line conductors or wires set apart for each station, said line-wires being normally open at their ends.

At each station the respective line-wire 1 2 3, &c., is provided with a contact 1^a 2^a 3^a, &c., which normally leads to the telephone instruments in the respective station, as in Fig. 1, or to a call-bell, as in Fig. 3. I have shown said contacts as connected with spur or branch wires 1^b 2^b 3^b, connected with the respective line-wires 1 2 3. 4 is a switch suitably arranged at each station and adapted to be swung around into electrical engagement with any of the contacts 1^a 2^a 3^a, &c., said switches being normally in engagement with the contact 1^a, 2^a, or 3^a in the respective station to normally connect the respective switch with the proper line-wire 1, 2, or 3 for that station. In Fig. 1 a wire 5 leads from each switch 4 through the secondary coil 6 of an induction-coil to a telephone-receiver 7, and from said receiver a conductor 5^a leads to the hook, switch, or lever 8, that normally sustains said receiver, which hook, switch, or lever is shown pivoted at 9 and normally engages a contact 10, which leads to ground 11, as by a wire 12. The weight of the receiver 7, when it hangs on one end of the hook or switch 8, acts to raise the opposite end thereof into engagement with contact 10, so that when said receiver is removed the circuit to ground 11 will be broken. The normal circuit in each station is from its respective wire 1, 2, or 3 through its switch 4, wire 5, secondary coil 6, receiver 7, switch 8, contact 10, and wire 12 to ground 11. The weight of the free end of the switch 8 is such that when the receiver 7 is removed from it said switch will turn on its pivot to break the ground-circuit at 10, as shown at the left in Fig. 1, or said switch can be operated by a spring.

A complete metallic circuit for telephoning between any two stations on the system is established as follows: In each station a wire 13 leads from the respective wire 1^b 2^b 3^b (corresponding to the proper line-wire 1, 2, or 3 of each section, or direct to said line-wire) to a contact 14, which is normally out of engagement with the switch 8, as at the right in Fig. 1, but is adapted to be engaged by said switch when the receiver 7 is lifted from the switch 8, as at the left in Fig. 1. By this means when the ground 11 is broken from the receiver 7 the circuit between the receiver and its respective line-wire 1, 2, or 3 is maintained through wire 13. Now, with the circuits above described, suppose a subscriber or attendant at station A desires to call station B. He first turns his switch 4 to contact 2^a, (as at the left in Fig. 1,) which leads by wire 2 direct to the instrument at station B and produces a signal in station B by the means hereinafter explained. The attendant or subscriber at station B then turns his switch 4 to contact 1^a, which leads by wire 1 to station A.

When both attendants or subscribers raise their receivers 7 from their switches 8, the closed metallic circuit will be established as follows: from switch 4, contact 2^a, and wire 2^b to line-wire 2, (in station A,) thence by wire 2 to wire 2^b, (in station B,) thence by wire 13, contact 14, switch 8, wire 5^a, receiver 7, wire 5, (through secondary coil 6,) switch 4, contact 1^a, and wire 1^b to wire 1, (all in station B,) thence along wire 1 to wire 1^b, (in station A,) thence through wire 13, contact 14, switch 8, wire 5^a, receiver 7, wire 5, (through secondary coil 6,) and back to switch 4, the starting-point, (in station A.) Thus the individual wires normally belonging to two stations are connected together, through the telephone instruments in two stations, to form a closed metallic circuit between two stations. When the parties have finished talking, their respective switches 4 are returned to zero or the home point in connection with their respective main lines 1 2, &c., and the receivers are hung on the switches or hooks 8, thus re-establishing the normal circuits through the receivers 7 to ground 11. It will be apparent that with the circuits and devices above described any subscriber can communicate with any other subscriber on the system.

The primary or local circuits for the telephone instruments or transmitters may be arranged as follows: From the primary coil 6^a of the induction-coil a wire 15 leads through a battery 16 and transmitter 17 and by wire 15^a to a contact 18, carried by and insulated from the switch 8. The contact 18 is normally out of engagement with a contact 19, which leads by a wire 20 to the primary coil 6^a. Thus when the receiver 7 is raised the switch 8 descends, and the local or primary circuit for the transmitter is closed at 18 19 and may be completely traced from the coil 6^a through wire 15 (including battery 16 and transmitter 17) and wire 15^a to contact 18,

thence through contact 19 and wire 20 back to said coil 6^a, so that conversation can be carried on in the usual manner.

My improved means for giving a signal or call in the called or selected station are as follows: From the wire 15 extends a wire 21, including a magnet 22 of a make-and-break device, the wire 21 leading to a contact 23, normally in engagement with a spring-actuated armature 24 or a contact carried thereby. The armature 24 (or said contact) is connected with a wire 25, (which also forms part of a circuit hereinafter described,) and from the wire 25 (in Fig. 1) a wire 26 leads to a push-button 27, and a wire 26^a leads from said push-button to the primary coil 6^a of the induction-coil, (the wire 26^a for convenience being shown connected to wire 20.) With this arrangement when the circuit is closed through the push-button 27 the local circuit just described is rapidly made and broken (by the magnet 22 and armature 24) through the primary coil 6^a, which causes intermittent currents to traverse the circuit of the secondary coil 6 through the receiver in said circuit, thereby producing a noise, and thus giving a call in said receiver. With this arrangement when a call is to be given in a desired station the switch 4 in a calling station (say A) is first turned to the contact 1^a or 2^a, &c., of the wire belonging to the desired station—that is to say, if station B is desired, the switch 4 in station A will be turned to contact 2^a in that station, as shown at the left in Fig. 1, thus establishing a circuit from station A through wire 2 to wire 2^b, switch 4, wire 5, and receiver 7 in station B to ground 11, in that station. The push-button 27 in the calling station (A) will next be closed, thus causing intermittent currents to be sent through the induction-coil in the calling station, as before explained, which will produce a sound in the receiver 7 in the selected or called station. The called subscriber should now raise his receiver and turn his switch 4 to the contact belonging to the wire 1, 2, or 3 normally leading to the calling subscriber; but as the called subscriber does not know as yet which other subscriber has called him it is desired to give an audible signal to the called subscriber to announce to him the fact that he has made proper connection (by his switch 4) with the wire belonging to the calling subscriber. For this purpose I utilize the make-and-break device 22 24, and to accomplish this without requiring undue manipulation by the subscriber the wire 25 is connected to a contact or post 28, carried by and insulated from the switch 4. (See Fig. 2.) This contact 28 may be surrounded (or partially so) by or form the stem of a knob or handle 29 for operating the switch 4.

30 is another contact carried by and insulated from the switch 4 and normally out of engagement with the contact 28, the contact 30 being preferably spring-acting to keep it from engagement with the contact 28. (See

Fig. 2.) The arrangement is such that when the switch 4 is to be operated the knob 29 and contact 30 will necessarily be grasped, and thus the contact 30 will be brought into engagement with the contact or post 28. From the contact 30 a wire 31 leads to the wire 15^a to form a circuit through the battery 16 and primary coil 6^a of the induction-coil.

The local circuit through contacts 28 and 30 is as follows: from primary coil 6^a through wire 15 to wire 21, thence through magnet 22, contact 23, armature 24, and wire 25 to contact or post 28 on switch 4, thence to contact 30 (when it is grasped to engage contact 28) and wire 31, thence to wire 15^a and contact 18, thence to contact 19 (when the receiver 7 has been lifted from the switch 8 and the latter has descended) and wire 20 back to the primary coil 6^a. With this arrangement when the called subscriber hears a signal announcing that he is called he first raises his receiver 7 to his ear, which allows switch 8 to move to engage contacts 18 and 19 as well as to make contact between said switch and contact 14; but the circuit between the two stations is still open. The called subscriber next grasps the handle of his switch 4, thereby causing contact 30 to engage contact or post 28 to close the local circuit 25 31, &c., and turns said switch to the contacts 1^a 2^a, &c. When this switch reaches the contact 1^a or 2^a, &c., corresponding to the calling subscriber, the metallic circuit between the calling and called stations will be closed, (provided the calling subscriber has lifted his receiver 7 from the switch 8, which he should do as soon as he has sent a call,) whereupon the intermittent currents caused by the make-and-break device 22 24 (now operating through the closing of its circuit at 28 30) will cause a sound to be heard by the called subscriber in his receiver 7, as before explained, thus announcing to him that his switch has reached and made electrical connection with the wire 1, 2, or 3 corresponding to the subscriber calling him. The called subscriber then releases his switch-handle, whereupon the contact 30 will move back from contact 28, thus breaking the local circuit through the make-and-break device 22 24 and causing the signal to cease. The subscribers thus connected can now communicate through the telephone instruments.

The resistance of magnet 22 is less than the resistance of the transmitter to enable said magnet to properly operate when utilizing the transmitter-battery, although a separate battery could be used for this purpose.

It is evident that the local circuit 25 31, &c., can be closed otherwise than by the contacts 28 30, arranged as shown; but I find this a convenient arrangement.

Furthermore, I do not limit my invention to using part of the calling circuit of the make-and-break device for giving a signal when a subscriber has completed a closed metallic circuit between the telephone instru-

ments at two stations, as a separate circuit could be used for this purpose, or a separate make-and-break device could be used on a suitable circuit, if preferred.

5 While in Fig. 1 I have shown an improved arrangement for giving a call directly in the receiver of a called or desired station, it is evident that other means may be employed for calling or signaling while still using the
10 other portions of my invention. In Fig. 3 I have shown the well-known magneto calling or signaling devices as used in connection with my improvements. For this purpose a generator 35 and call-bell 36 are located on
15 wire 12, and the receiver is shunted, although not necessarily so. The wire 5 from the receiver 7 passes through the secondary coil 6 direct to the respective spur-wire 1^b 2^b, &c., of the main-line wire 1 2, &c., (or to the main-
20 line wire direct,) and the wire 5^a from the receiver leads to a wire 4^a. The switch 4 is connected with the switch 8 or its pivot 9 by the wire 4^a to enable a current for operating the calling or signaling device to travel to
25 ground 11, through wire 12, when switch 4 is normally at zero or the home point connected with the main-line wire of its station.

The normal calling or signaling circuit in a station may be traced as follows: from the
30 contact 1^a or 2^a, &c., connected with the respective main line 1 or 2, &c., to switch 4, thence through wire 4^a to switch 8, contact 10, wire 12, and through the generator or its shunt and the bell 36 to ground 11.

35 The circuit for the receiver 7 may be traced in a station when the switch 4 has been turned to the desired contact 1^a or 2^a, &c., as follows: from the spur-wire 1^b or 2^b, &c., of the normal line-wire 1 or 2, &c., of a station,
40 through wire 5 and secondary coil 6 to the receiver 7, thence by wire 5^a to wire 4^a and switch 4 to the contact 1^a or 2^a, &c., of the line-wire belonging to the other station to be communicated with.

45 The operation of calling or signaling from one station to another, according to Fig. 3, and the making of the connections from one station to another are practically the same as in Fig. 1, excepting that the generator is op-
50 erated instead of the push-button 27.

It is evident that instead of using a magneto or generator for producing a call I can use the well-known battery and push-button or circuit-closer on the circuit to operate the
55 signaling instruments. Of course a return-wire could be used between the wires 12 12 of the several stations for the calling devices instead of using grounds 11.

My improvements will be found very use-
60 ful as an interior telephone and calling system where a number of rooms or departments are to be connected and where it is desired that a person in any room or department can communicate with a person in any other room or
65 department on the system. As one wire is normally apportioned to a station, a call can readily be sent to the desired station by merely

making connection with the wire of the station desired, and then conversation can be had by looping the main-line wires of the two stations together through their respective telephone instruments.

When in this specification I say that the main-line conductors or wires pass through the stations, I mean of course that they are
75 connected with the stations in suitable manner, either by passing directly through or into the stations or by having suitable connecting or branch wires leading to the stations, the idea being that the current can traverse any line
80 conductor or wire for the purpose of entering any station.

I do not limit my invention to the details of construction and arrangement, as they may be varied without departing from the spirit
85 of my invention.

Having now described my invention, what I claim is—

1. In a telephone system having a plurality of stations, a plurality of conductors passing through said stations, each conductor being normally apportioned to one station, telephone instruments in each station, and means in each station arranged to form a closed metallic circuit between the conductor normally apportioned to a station and any one of the conductors that are normally apportioned to the other stations, so that when corresponding connections have been made in any two stations a closed metallic circuit between said stations, through their telephone instruments, will be established, through the line conductors normally apportioned to said two operating stations.

2. In a telephone system having a plurality of stations, a plurality of main wires passing through said stations, each wire being normally apportioned to one station, telephone instruments in each station normally in circuit with the main wire apportioned to the respective station, and means in each station to enable its telephone instruments to be connected with the wire belonging to any other station and with the wire belonging to its own station so that when corresponding connections have been made in any two stations a closed metallic circuit will be formed through the telephone instruments in said stations through the main-line wire belonging to the two operating stations.

3. In a telephone system having a plurality of stations, a plurality of wires passing through said stations, telephone instruments in each station normally connected with one of said wires, means in each station to form a connection for its telephone instruments to the wire leading to another station, and a switch 8 at each station to break and make or change the normal circuit of the receiver, to reconnect said receiver with its main-line wire whereby a closed metallic circuit through the telephone instruments in two stations can be established through the main-line wires belonging to the two operating stations.

4. In a telephone system having a plurality of stations, a plurality of wires passing through said stations, telephone instruments in each station normally connected with one of said wires, means in each station to form a connection for its telephone instruments to the wire leading to another station, and a switch in each station controlled or operated by the respective receiver to break and make or change the normal circuit of the receiver, whereby a closed metallic circuit through the telephone instruments in two stations can be established through the main-line wires belonging to the two operating stations.

5. In a telephone system having a plurality of stations, a plurality of main wires passing through said stations, a contact in each station connected with each main wire, telephone instruments in each station, means in each station for connecting one of said main wires with the telephone instruments in the corresponding station, and means in each station for connecting its telephone instruments with the contact of the main wire leading to any other station, whereby the telephone instruments in any two stations may be connected through a closed metallic circuit formed through the main-line wires belonging to the two operating stations.

6. In a telephone system having a plurality of stations, a plurality of wires passing through said stations, each wire having a contact connected with it in each station, telephone instruments in each station normally connected to one of said wires whereby one wire is normally apportioned to a station, a switch in each station to make connection with any of said contacts, and another switch or operating device in each station connected with the first-mentioned switch to make through connections between the main line of a station and the main-line wire belonging to another station, whereby a closed metallic circuit through the telephone instruments in two stations can be formed through the main-line wires belonging to the two operating stations by the proper operation of said switches.

7. In a telephone system having a plurality of stations, a plurality of wires passing through said stations, each wire having a contact connected with it in each station, telephone instruments in each station normally connected to one of said wires, whereby one wire is normally apportioned to a station, a switch in each station to make connection with any of said contacts, a spur-wire in each station connected with its main line and with a contact, and another switch in each station arranged to be held in one position by a receiver to break the circuit of said spur-wire, said switch being arranged to close the circuit of the receiver through said spur-wire when the receiver has been removed from action on the switch, to reconnect the receiver with the main-line wire belonging to its station and connections in each station between said switches, whereby when the first-mentioned

switches are turned to the proper contacts in two stations and the receivers are removed from the second-mentioned switches in said stations a closed metallic circuit will be established through the telephone instruments in two stations through the main-line wires belonging to the two operating stations.

8. In a calling or signaling system, a main circuit, two stations, a receiver in one station located in said main circuit, an induction-coil in the other station to operate with said main circuit, a local circuit including the primary coil of the induction-coil and a transmitter therein, a normally open shunt-circuit around said transmitter, a make-and-break device in said shunt-circuit, and means for closing said shunt-circuit to operate said make-and-break device to cause intermittent currents to traverse said primary coil to produce a call or signal in said receiver.

9. In a telephone and calling system having a plurality of stations, a plurality of wires passing through said stations each wire normally apportioned to a station, telephone instruments in each station normally in circuit with the wire apportioned to that station, means in each station for connecting the respective telephone instruments with the wire leading to the instruments in another station and with the wire normally apportioned to its station to enable a closed metallic circuit between two stations to be formed through the main-line wires belonging to the two operating stations, a local circuit in each station including the primary coil of the induction-coil of the telephone instruments, a make-and-break device in said local circuit, and means for operating said make-and-break device in any station to cause a call or signal to be produced in the receiver of a station with which a calling station has been connected.

10. In a telephone and calling system having a plurality of stations, a plurality of wires passing through said stations each wire normally apportioned to a station, telephone instruments in each station normally connected to one of said wires and leading to ground, a switch in the circuit of each receiver to break the ground therefrom and to reestablish the circuit of said receiver with its main wire, a local circuit in each station connected with the primary coil of the induction-coil of the telephone instruments, means for causing intermittent currents to traverse the primary coil, and means in each station for connecting its telephone instruments with the wire leading to the telephone instruments in another station, whereby a call can be sent from one station through the receiver in another station and the telephone instruments in two stations can be connected through a closed metallic circuit formed through the two main-line wires belonging to the two operating stations.

11. A telephone or calling system having a plurality of stations, a plurality of wires lead-

ing through said stations, telephone instruments in each station normally connected to one of said wires and leading to ground, a contact in each station connected with each of said wires, a switch in each station in the circuit of the respective receiver and adapted to engage each of said contacts to connect the receiver in one station with the receiver in the next station, a switch in each station to break the ground of its receiver and to reestablish the circuit of said receiver with the respective main-line wire, a local circuit in each station including the primary coil of the induction-coil of the respective receiver, a make-and-break device in said local circuit, and a push-button or circuit-closer and battery in the local circuit to cause intermittent currents to traverse said primary coil, whereby a call can be produced in the receiver of a selected station and the telephone instruments in the two stations can be connected through a closed metallic circuit.

12. In a telephone system having a plurality of stations, a plurality of wires, telephone instruments in each station, means in each station to enable a closed metallic circuit to be formed from the wires belonging to two stations, means in each station for sending a call from one station to another over the wire belonging to the latter station and means in each station arranged to be operated in the called station to give a signal when its telephone instruments have been connected with the wire leading to the calling station.

13. In a telephone system having a plurality of stations, a plurality of wires passing through said stations, telephone instruments in each station, means for connecting any two of said wires together to form a closed metallic circuit through the telephone instruments in any two stations, and means in each station to give a signal upon the closing of said metallic circuit to signify that the proper circuit has been established.

14. In a telephone system having a plurality of stations, a plurality of wires passing through said stations, a contact in each station connected with each wire, telephone instruments in each station, a switch in the circuit of the respective telephone instruments to connect the latter with any one of said contacts, means in each station to complete a closed metallic circuit through the telephone instruments in any two stations, a normally open local circuit in each station including the primary coil of the induction-coil of the respective telephone instruments, a make-and-break device and battery and push-button in said local circuit, and means for closing said local circuit upon the operation of said switch to cause intermittent currents to traverse said primary coil so that when the circuit between the telephone instruments in two stations has been closed a signal will be given in the receiver of the called station.

15. In a telephone system having a plurality of stations, a plurality of wires passing

through said stations, a contact in each station connected with each wire, telephone instruments in each station, a switch in the circuit of the respective telephone instruments to connect the latter with any one of said contacts, means in each station to complete a closed metallic circuit through the telephone instruments in any two stations, a normally open local circuit in each station including the primary coil of an induction-coil of the respective telephone instruments, a make-and-break device and a battery and push-button connected with said local circuit, one part of said local circuit leading to a contact or post on said switch, the other part of said local circuit leading to another contact on said switch, said contacts being normally disconnected and arranged to be brought into electrical connection upon the operation of said switch to cause intermittent currents to traverse said primary coil so that when the circuit between the telephone instruments in two stations has been closed a signal will be given in the receiver of the called station.

16. In a telephone and calling system having a plurality of stations, a plurality of wires passing through said stations, telephone instruments in said stations, means to connect said instruments with any of said wires, means for sending a call from one station to another, and means in each station to give a signal to announce in both stations when the wires between the called and the calling stations have been connected in a closed metallic circuit through the telephone instruments in the calling and the called stations.

17. In a telephone and calling system having a plurality of stations, a plurality of wires passing through said stations, telephone instruments in said stations, means to connect said instruments with any of said wires, means for sending a call from one station to another station, a local circuit in each station including the primary coil of the induction-coil of the telephone instruments, and a make-and-break device, contacts and battery in the local circuit to cause a signal to be produced in the receiver to announce when the respective telephone instruments in a called station have been connected with the wire leading to a calling station.

18. In a telephone and calling system having a plurality of stations, a plurality of wires passing through said stations, a contact in each station connected with each wire, telephone instruments in each station leading to ground, a switch in each station normally connecting the telephone-receiver with the wire for that station, said switch being arranged to make connection between its receiver and any of said contacts, means for maintaining the circuit of the receiver with its main wire, a local circuit in each station including the primary coil of the induction-coil of the respective telephone instruments, a make-and-break device in the local circuit to produce a call in the receiver of a desired station, said

make-and-break device having an additional circuit leading to said switch and normally open at said switch, and means for closing the latter circuit upon the operation of said switch to give a signal to announce when the telephone instruments have been connected with the desired line-wire.

19. In a telephone and calling system having a plurality of stations, a plurality of wires passing through said stations, a contact in each station connected with each wire, telephone instruments in each station leading to ground, a switch in each station normally connecting the telephone-receiver with the wire for that station, said switch being arranged to make connection between its receiver and any of said contacts, a local circuit in each station including the primary coil of the induction-coil of the respective telephone instruments, a make-and-break device in the local circuit and means for operating said device to produce a call in the receiver of a desired station, said make-and-break device having an additional circuit leading to said switch and normally open at said switch, and means for closing the latter circuit upon the operation of said switch to give a signal to announce when the telephone instruments have been connected with the desired line-wire, and a switch 8 in the circuit of the receiver to break the ground from said receiver and to reestablish the circuit of the receiver with its main line, the switch 8 also having a contact to normally break the local circuit of the make-and-break device that is controlled by the first-mentioned switch and to close said circuit when the receiver is removed from the switch 8.

20. A telephone and calling system having a plurality of stations comprising the following elements in combination: a plurality of wires passing through said stations, a contact in each station connected with each wire, telephone instruments in each station, a switch 4 in each station normally connected with one of said wires, a wire connected with the switch 4 and including the secondary coil of the induction-coil and the receiver, a switch 8 connected with said receiver, a contact leading to ground normally connected with said switch 8, the receiver normally acting to connect said switch and said contact, a local circuit including the primary coil of said induction-coil, a make-and-break device and a battery in said circuit, a push-button also in said circuit, another circuit including said make-and-break device, battery and primary coil, the last-mentioned circuit having a contact 19 normally disengaged from a contact 18 on the switch 8 and adapted to be connected when the receiver is removed from the switch 8, the switch 4 also having contacts 28, 30, connected with the last-mentioned circuit to close the latter when the switch 4 is operated, and a wire 13 leading from the main wire of a station to a contact 14, the latter being arranged to be connected with the switch 8 when the latter moves to break the ground of the receiver so as to reestablish the circuit for the receiver with its main line, all arranged for operation substantially as set forth.

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Witnesses:

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