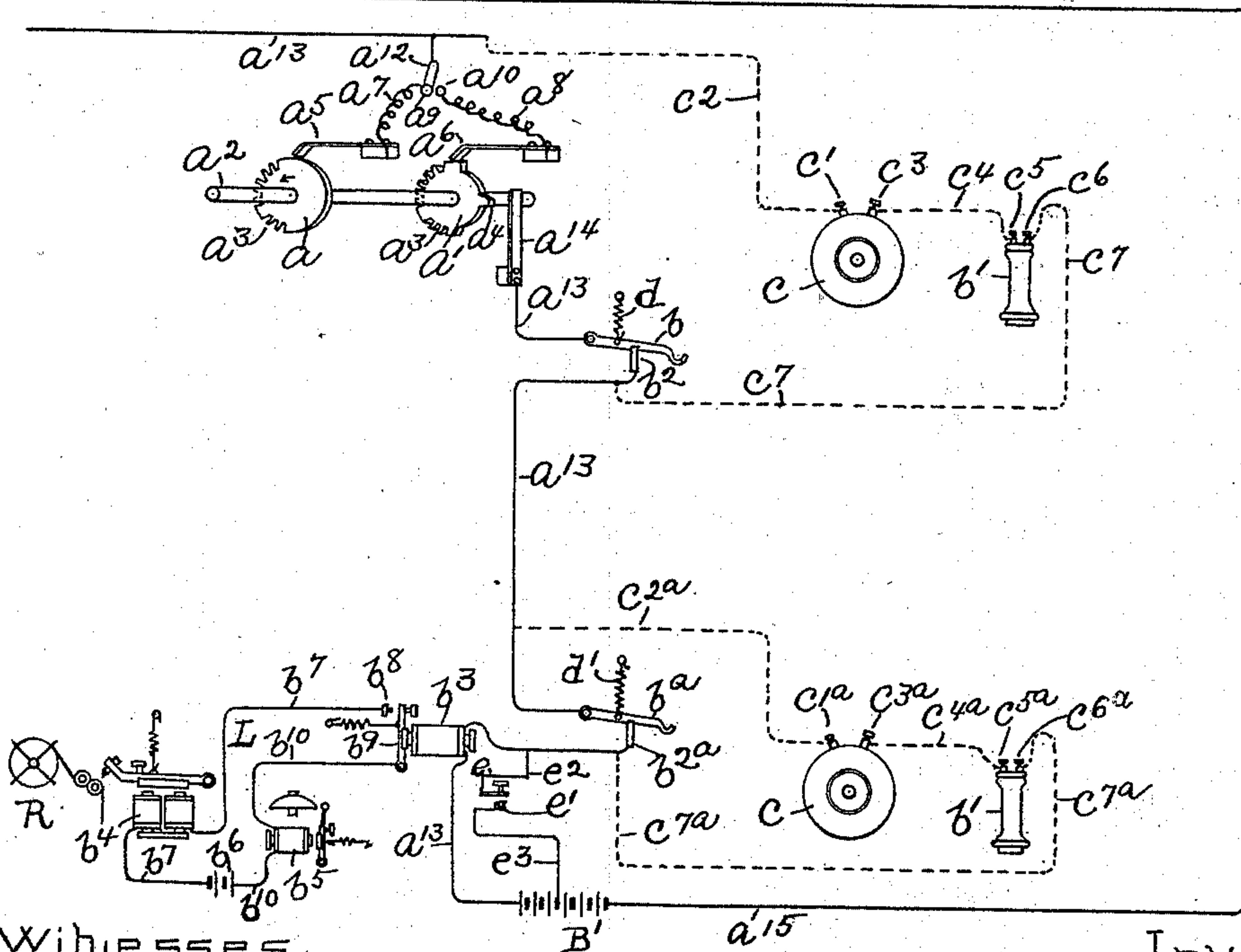
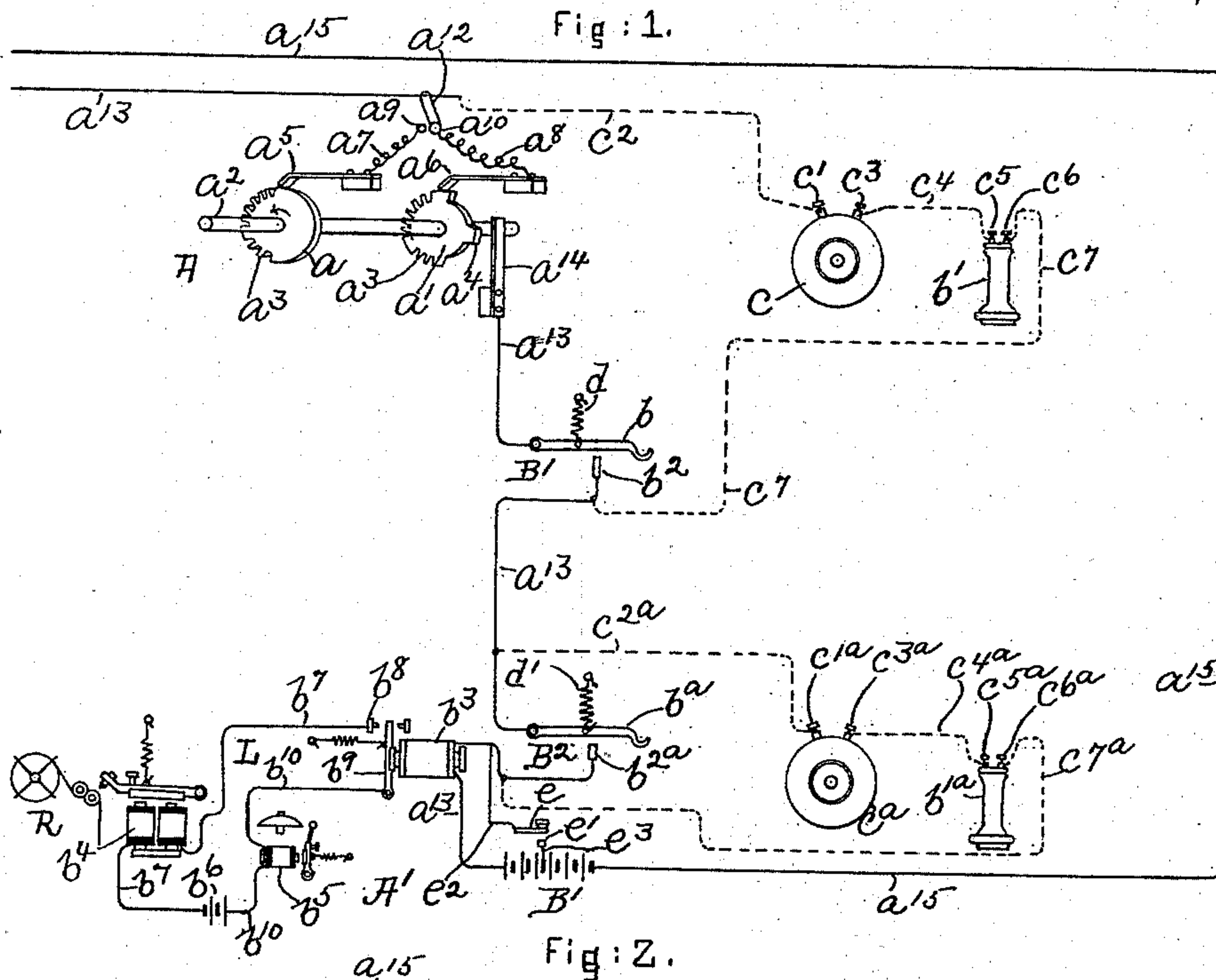


(No Model.)

H. A. CHASE.  
COMBINED TELEPHONIC AND SIGNALING SYSTEM.

No. 528,075.

Patented Oct. 23, 1894.



Witnesses.  
Howard F. Eaton.  
J. Murphy.

Inventor.  
Henry A. Chase  
by Jas. H. Churchill  
Atty.



# UNITED STATES PATENT OFFICE.

HENRY A. CHASE, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO ALBERT WATTS, OF SAME PLACE.

## COMBINED TELEPHONIC AND SIGNALING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 528,075, dated October 23, 1894.

Application filed June 25, 1894. Serial No. 515,588. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY A. CHASE, residing in Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in a Combined Telephonic and Signaling System, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to a combination telephone and signaling system, and has for its object to provide an efficient and less expensive system, in which the use of extra batteries for the telephone and ground taps or connections through condensers, such as now commonly employed in signaling systems employing the telephone as an auxiliary, may be dispensed with, thereby avoiding disturbances from earth currents and obtaining a superior telephonic service in connection with a signaling system. This result is achieved by the employment of a telephone transmitter of that class known as the carbon transmitter, which, in accordance with this invention, is connected in a branch or shunt circuit around the signal transmitting apparatus, and by means of a circuit controller in the main line, which, when opened, brings the shunt circuit into effective operation, to place the telephonic apparatus in speaking connection with a telephonic apparatus at a distant point or station.

The circuit controller governing the main line may and preferably will be employed as a support for the telephone receiver.

In the present instance, I have represented the telephonic apparatus as used in conjunction with a signaling system comprising a substation and a main station, the substation being represented as provided with a signal transmitting apparatus comprising two break wheels, one to indicate the number of the box or substation and the other to indicate the telephone signal for said box or substation, the main station comprising a relay and a local circuit controlled by said relay and including a register magnet and a bell magnet.

The signaling system may be employed for any desired or required purpose, such for instance, as fire, police, messenger service, &c., and to facilitate description, I will hereinafter refer to the signaling system as a police signaling system.

Figure 1 is a diagram of circuits representing a combined telephone and signaling system embodying this invention, the system being shown in condition for communication by telephone, and Fig. 2, a like diagram of circuits showing the combined system in its normal condition, that is, with the telephone part of the system in its ineffective or inoperative condition, and the main line or signaling part of the system in its operative condition.

The signaling portion of this combined system comprises a transmitting station A and a receiving station A', which may be of any usual or suitable construction, such as now commonly employed for fire, police and messenger service, in which a main or receiving station is connected in circuit with one or more substations located at distant points and which are usually signal boxes. In the present instance, the signaling transmitting apparatus A is shown as comprising two break wheels  $a$   $a'$  mounted upon a suitable shaft  $a^2$ , which in practice, is driven by clock work or other suitable motor mechanism, such as now commonly employed in police and fire alarm signal boxes and not herein shown. In the present instance, the break wheel  $a$  is provided with teeth  $a^3$  of suitable number to indicate the box number 36, while the break wheel  $a'$  is provided with like teeth  $a^3$  to indicate the box number, and with an additional tooth  $a^4$  forming two substantially long breaks to indicate a telephone signal. The break wheels  $a$  and  $a'$  as herein represented have co-operating with them two contact springs  $a^5$   $a^6$  connected by wires  $a^7$   $a^8$  to terminals  $a^9$   $a^{10}$ , with which co-operates a switch or lever  $a^{12}$  included in the main line circuit wire  $a^{13}$ . The shaft  $a^2$  has co-operating with it the contact spring  $a^{14}$  also included in the main line wire  $a^{13}$ . The main line wire  $a^{13}$ , which may be supposed to be the positive wire, is connected to the positive pole of the battery B, which in practice is located in the main station A', and the negative pole of the said battery has connected to it the other main line wire  $a^{15}$ .

In accordance with this invention, the main line wire  $a^{13}$  has included in it at the signal transmitting apparatus, a circuit controller B', herein shown as a hooked lever  $b$ , which may be supposed to be the well-known hooked



lever upon which the telephone receiver  $b'$  is suspended, the said lever forming one member of the switch  $B'$  and co-operating with a contact or terminal  $b^2$  forming the other member of the said switch. The main line  $a^{13}$  at the receiving station  $A'$  is provided with a like circuit controller  $B^2$  herein shown as comprising a telephone hook  $b^a$  and a terminal  $b^{2a}$ . The main line  $a^{13}$  as herein represented further includes at the receiving station a relay  $b^3$ , governing a local circuit  $L$ , which in the present instance is shown as including the electro-magnet  $b^4$  of a register  $R$ , a bell operating magnet  $b^5$ , and a local circuit  $b^6$ , one pole of the battery  $b^6$  being connected by the wire  $b^7$  to a back stop  $b^8$  for the armature  $b^9$  of the relay  $b^3$ , and the other pole of the battery  $b^6$  being connected by wire  $b^{10}$  to the said armature.

In accordance with this invention, the signaling system thus far described has co-operating with it at the transmitting and receiving stations, telephonic transmitting and receiving apparatus, which are included in the main line circuit under conditions to be hereinafter described, so as to afford speaking communication between the said substation and main station.

The telephonic apparatus at the transmitting station comprises a telephonic receiver or handphoned  $b'$  and a transmitter  $c$ , which may and preferably will be substantially such as shown and described in United States Patent No. 250,250, dated November 29, 1881, and commonly known as the Hunning transmitter.

The transmitter  $c$  and the handphoned  $b'$  are included in a branch or shunt circuit around the signal transmitting apparatus  $A$ , one terminal  $c'$  of the transmitter being connected by wire  $c^2$  to the main line  $a^{13}$  on one side of the transmitting apparatus  $A$ , and the other terminal  $c^3$  of the said transmitter being connected by wire  $c^4$  to one terminal  $c^5$  of the handphoned, the other terminal  $c^6$  being joined by wire  $c^7$  to the main line  $a^{13}$  on the other side of the transmitting apparatus  $A$  and beyond the circuit controller  $B'$ .

The telephonic apparatus at the receiving station comprises a transmitter  $c^a$  and a handphoned  $b'^a$ , which are included in a shunt around the circuit controller  $B^2$ , the terminal  $c'^a$  of the transmitter  $c^a$  being joined by wire  $c^{2a}$  to the wire  $a^{13}$  on one side of the switch  $B^2$ , and the terminal  $c^{3a}$  being joined by wire  $c^{4a}$  to the terminal  $c^{5a}$  of the handphoned, the other terminal  $c^{6a}$  of which is connected by wire  $c^{7a}$  to the main line  $a^{13}$  on the other side of the switch or circuit controller  $B^2$ .

The transmitters  $c$  and  $c^a$  are commonly made of two terminal plates or diaphragms with an interposed body of comminuted carbon, and when these transmitters are included in a line circuit the resistance of the line is materially increased, so that under normal conditions, the line circuit may be maintained operative for signaling purposes with-

out being interfered with by the said resistance, the presence of which for signaling purposes may be disregarded.

In Fig. 2, the system is represented as in condition for transmitting a box number from the substation  $A$  to the receiving station  $A'$ , which box number will be received and recorded upon the register  $R$ . If it is desired by the operator at the substation  $A$  to hold telephonic communication with the operator at the main station  $A'$ , the circuit controller or switch  $a^{12}$  at the substation is moved from the terminal  $a^9$  and brought into engagement with the terminal  $a^{10}$ , and when in this condition, the signal transmitting apparatus may be operated to transmit the telephone signal indicated by the break wheel  $a'$ , which will be received at the main station upon the register, and in the present instance, also upon the bell, which telephone signal in the present instance will comprise the box number and two substantially long dashes, but instead of this particular manner of identifying the telephone signals, any other suitable or desired character may be employed.

When the operator at the substation has transmitted the signal indicated by the break wheel  $a'$ , he opens the main line  $a^{13}$ , which, in the present instance, may be done by simply removing the handphoned  $b'$  from its hook  $b$ , so as to permit the spring  $d$  connected to the said hook to withdraw it from contact with its co-operating terminal  $b^2$ , and the operator at the central or main station, upon the receipt of the telephone signal, also opens the main line at the receiving station, by removing the handphoned  $b'^a$  from its hook  $b^a$ , thereby permitting the spring  $d'$  to withdraw the said hook from engagement with its terminal  $b^{2a}$ . The opening of the main line at the transmitting station as just described, throws the shunt circuit including the telephone transmitter  $c$  and receiver  $b'$  into active or effective condition, that is, into active circuit relation with the transmitter and receiver  $c^a$  and  $b'^a$  at the central station, which are also included directly in the line by the opening of the switch  $B^2$ . When the circuit connection thus described, is established, communication may be held between the station  $A$  and substation  $A'$  and vice versa, and the main line circuit is at the same time maintained intact for the reception of any signal from any other box or substation connected in the line.

The telephonic circuit may be traced as follows:—from the positive pole of the battery  $B$ , by wire  $a^{13}$ , through the relay  $b^3$ , thence by the wire  $c^{7a}$ , handphoned  $b'^a$ , wire  $c^{4a}$ , transmitter  $c^a$ , wire  $c^{2a}$ , main line  $a^{13}$ , wire  $c^7$ , handphoned  $b'$ , wire  $c^4$ , transmitter  $c$ , wire  $c^2$ , to the line  $a^{13}$ , thence through the movement of the next adjacent box and return wire  $a^{15}$  to the negative pole of the battery  $B'$ .

In some instances, it may be desirable to reduce the resistance in the main line circuit by short circuiting the relay, which may be



accomplished by means of a circuit controller, which may be made after the manner of any usual or well-known manually operated circuit controller, and which, in the present instance, is represented as similar to a telegraphic key, but which also may be an ordinary push button. The circuit controller consists of the movable member *e* and the stationary member or terminal *e'*, the member *e* being connected by wire *e<sup>2</sup>* to the main line *a<sup>13</sup>* on one side of the relay *b<sup>3</sup>*, and the terminal *e'* being connected by wire *e<sup>3</sup>* to the battery *B'* and preferably to only a portion of the battery. When it is desired to cut out the relay *b<sup>3</sup>*, the operator at the central station may press upon the member *e* of the circuit controller so as to bring it in contact with the terminal *e'*, in which case the circuit connection will be made through this manually operated circuit controller instead of through the relay *b<sup>3</sup>*.

In the combined telephonic and signaling system herein shown, it will be noticed that the telephonic instruments, both transmitter and receiver, are included in the main line to form a part thereof when telephonic communication between stations is desired, and by so doing, a very considerable saving in the cost and maintenance of the combined system is effected, inasmuch as the extra batteries now commonly employed in telephonic systems and also the ground taps or earth connections through condensers are dispensed with, so that a superior service is obtained, owing to the fact that disturbances from earth currents are avoided. In the present instance, I have represented the hooked levers *b* and *b<sup>a</sup>* as moved in one direction by the springs *d* and *d'*, but I do not desire to limit my invention in this respect as the said levers may be positively moved by hand to open the main line, and while I prefer to make the telephonic supporting levers *b* and *b<sup>a</sup>* as part of the circuit controllers for the main line, I do not desire to limit myself in this respect, as the said main line may be provided with other forms of circuit controllers, and a separate support for the telephonic receivers disconnected from the main line may be employed.

I claim—

1. In a combined telephonic and signaling system, the combination of the following instrumentalities, viz:—a main line circuit provided with a source of electric supply, a signal transmitting apparatus, and with a signal receiving apparatus included in the main line, a normally closed circuit controller included in the main line at the signal transmitting apparatus, a shunt circuit around the said controller, a second normally closed circuit controller in the main line at the signal receiving apparatus, a shunt circuit around the second circuit controller, a telephonic apparatus comprising a transmitter and a receiver in circuit with each other and included in the shunt circuit at the transmitting sta-

tion under control of the circuit controller at the transmitting station, and both transmitter and receiver being supplied with current from the main line source of supply, a second telephonic apparatus in the shunt circuit at the receiving station under control of the circuit controller at the receiving station, for the purpose specified.

2. In a combined telephonic and signaling system, the combination of the following instrumentalities, viz:—a main line circuit provided with a source of electric supply, a signal transmitting apparatus, and with a signal receiving apparatus included in the main line, a normally closed circuit controller included in the main line at the signal transmitting apparatus, a shunt circuit around the said controller, a second normally closed circuit controller in the main line at the signal receiving apparatus, a shunt circuit around the second circuit controller, a telephonic apparatus comprising a transmitter and a receiver in circuit with each other and included in the shunt circuit at the transmitting station under control of the circuit controller at the transmitting station, and both transmitter and receiver being supplied with current from the main line source of supply, and a second telephonic apparatus at the receiving station comprising a transmitter and a receiver in circuit with each other and included in the shunt around the circuit controller at the receiving station, for the purpose specified.

3. In a combined telephonic and signaling system, the combination of the following instrumentalities, viz:—a main line circuit provided with a source of electric supply, a signal transmitting apparatus included in the said circuit and comprising a break wheel and a co-operating pen, and a relay at the receiving station, a normally closed circuit controller included in the main line at the signal transmitting apparatus, a shunt circuit around said controller, and a second normally closed circuit controller in the main line at the signal receiving apparatus, a shunt circuit around the second controller, a telephonic transmitter and receiver in circuit with each other and included in the shunt circuit at the transmitting apparatus, and both transmitter and receiver being supplied with current from the main line source of supply, and a telephonic transmitter and receiver at the receiving station in circuit with each other and included in the shunt circuit at the said receiving station, and both being supplied with current from the main line source of supply, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY A. CHASE.

Witnesses:

JAS. H. CHURCHILL,  
J. MURPHY.