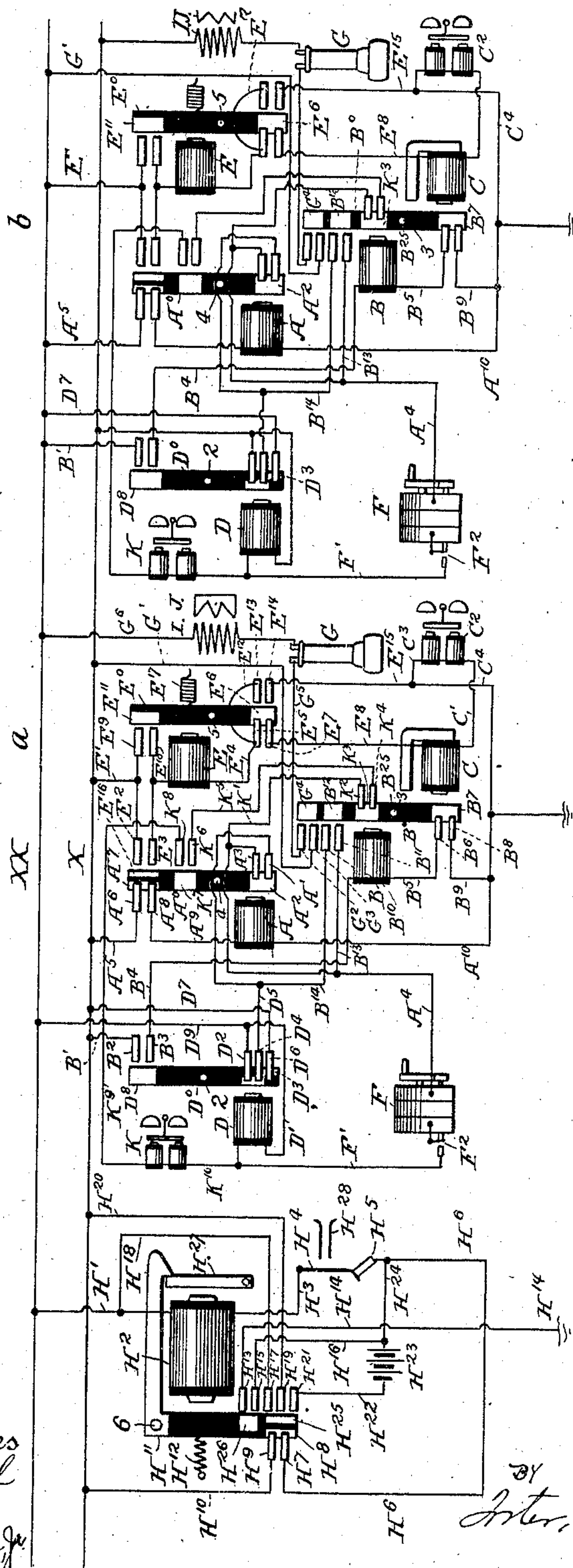


K. KOHN.  
TELEPHONE APPARATUS.  
APPLICATION FILED OCT. 24, 1903.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses  
J. G. Stinzel  
H. M. Gillman Jr.

Inventor  
K. Kohn  
Attorney  
Freeman Watson

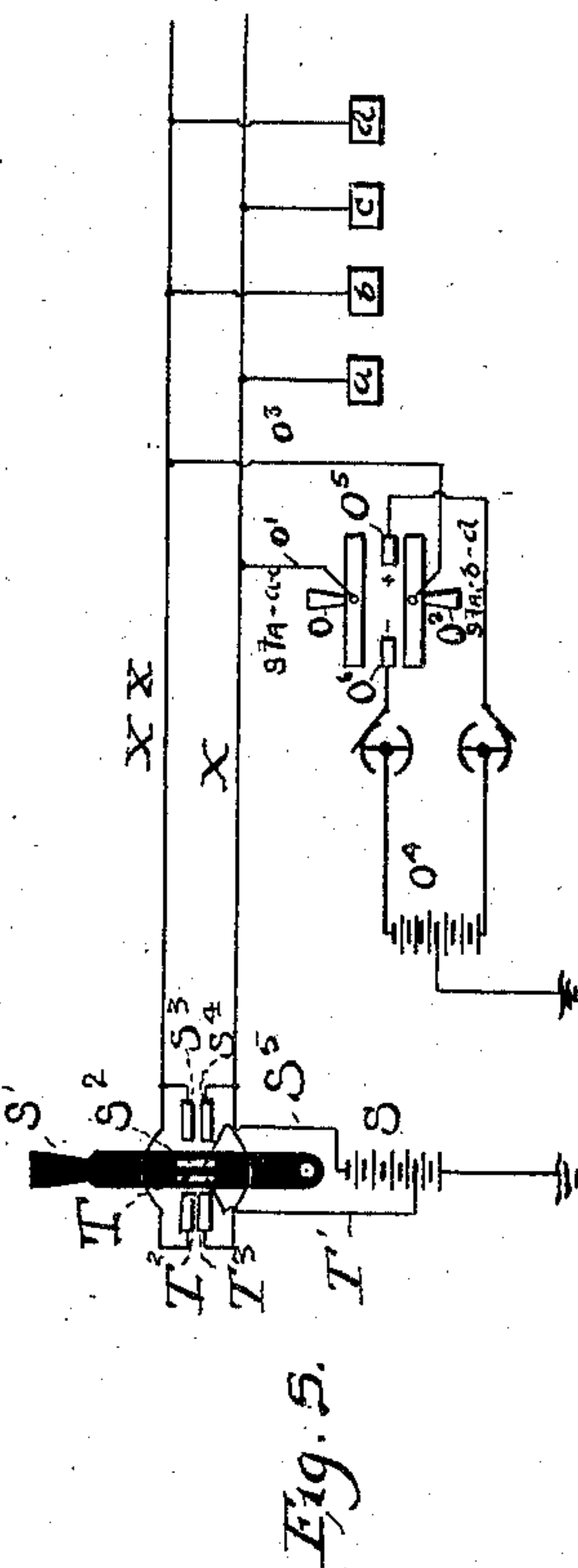


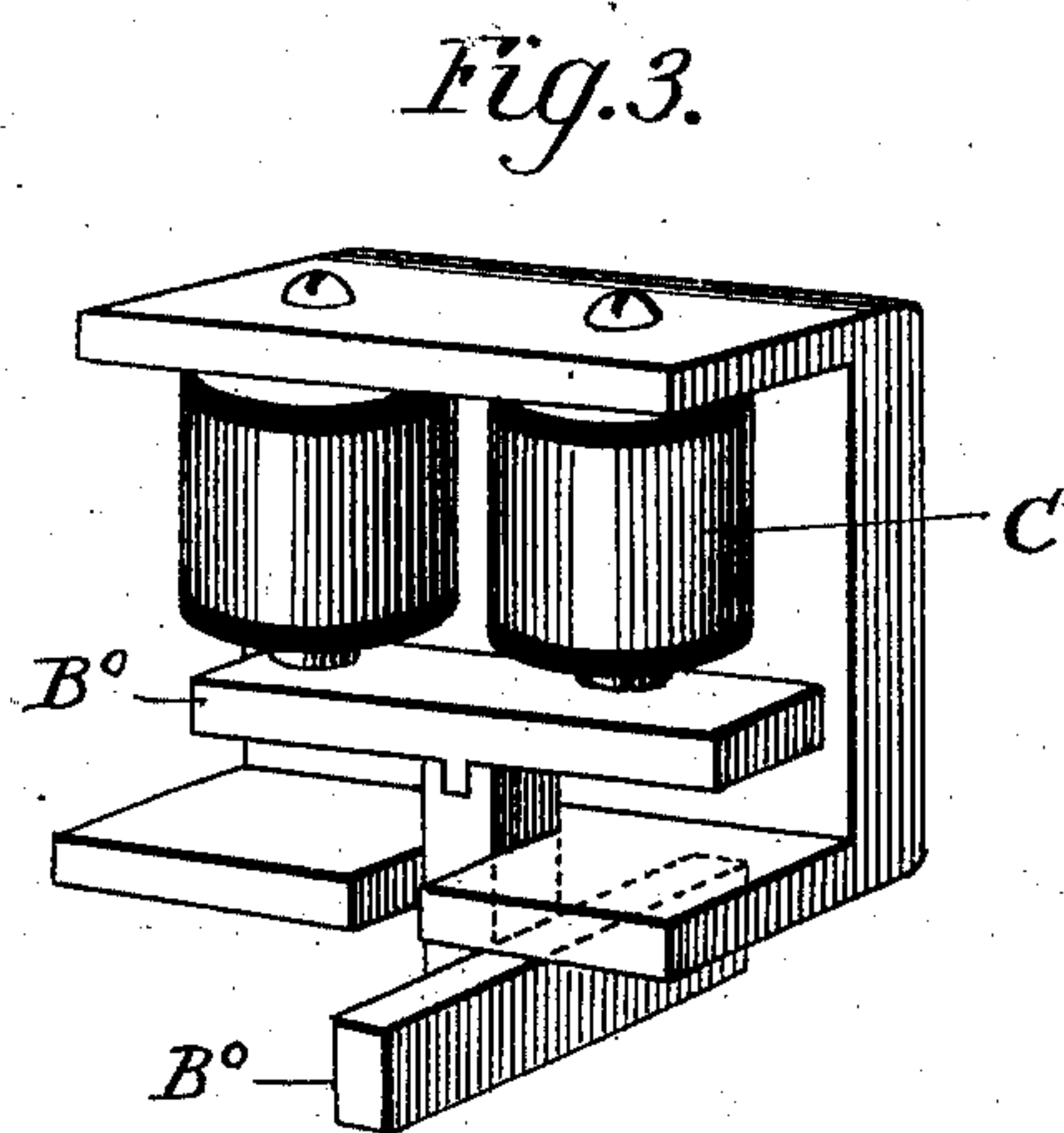
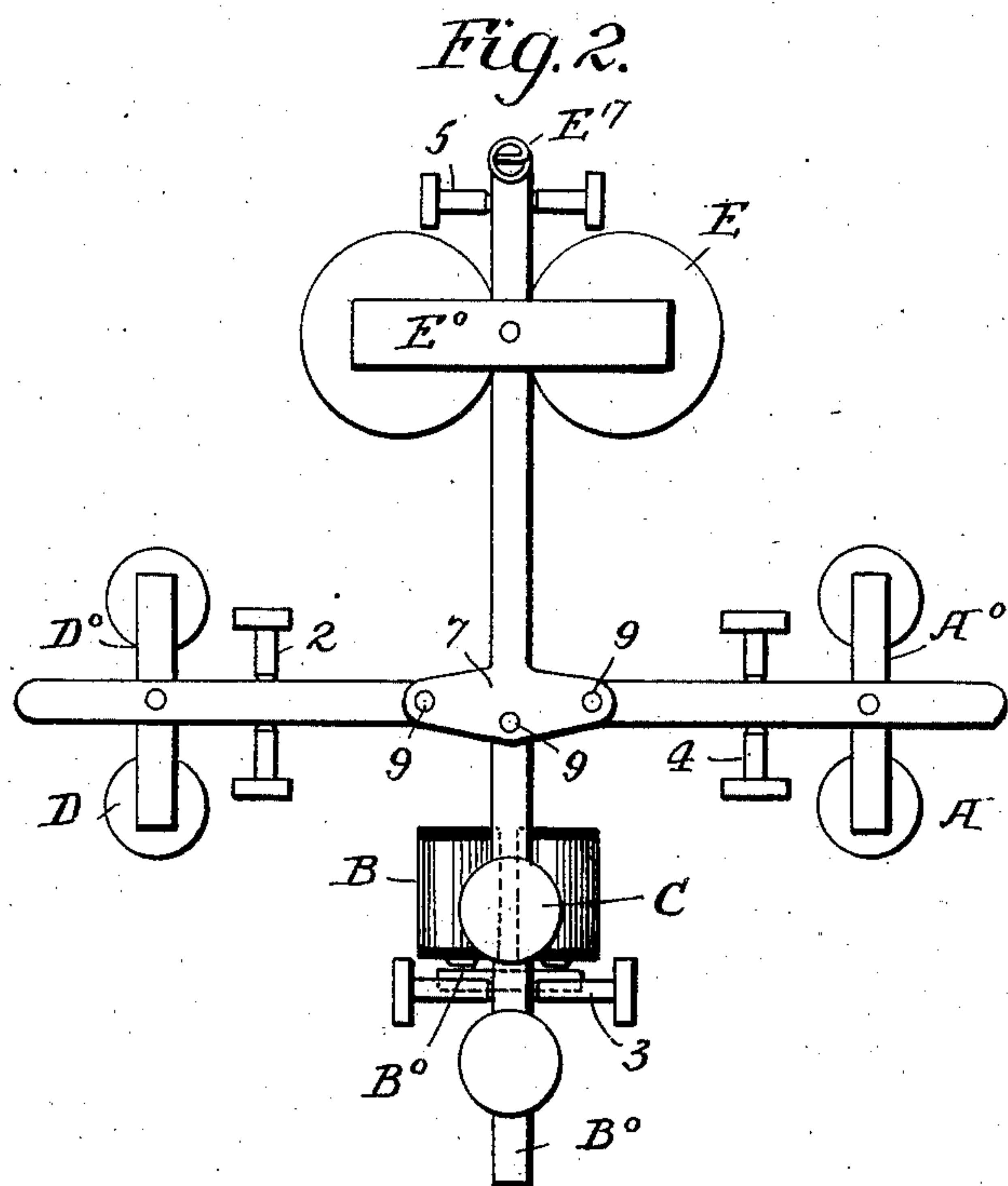
Fig. 5.

No. 850,433.

PATENTED APR. 16, 1907.

K. KOHN.  
TELEPHONE APPARATUS.  
APPLICATION FILED OCT. 24, 1903.

3 SHEETS—SHEET 2.



Witnesses  
*J. J. Hinkel*  
*Am. Gillman, Jr.*

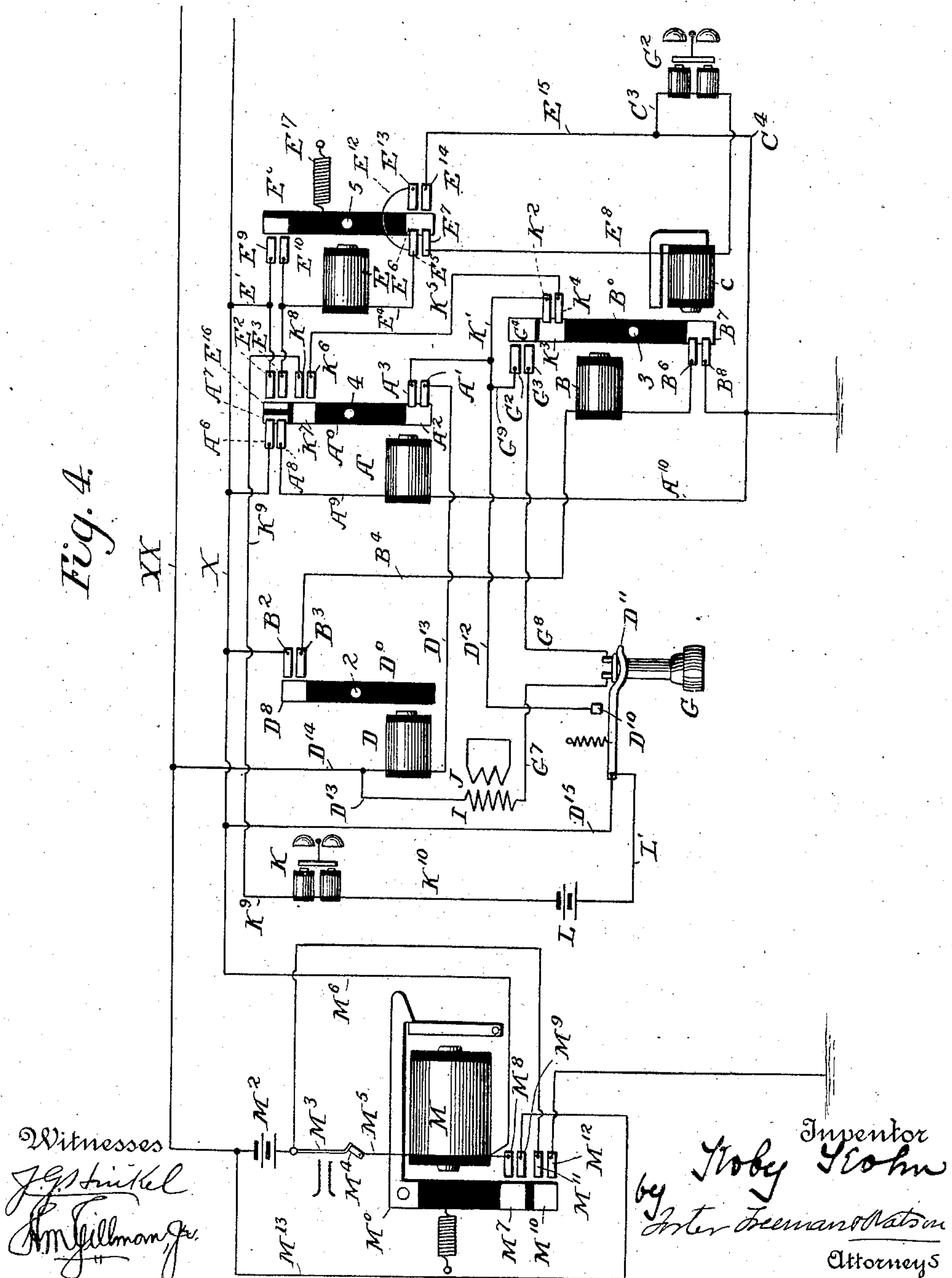
Inventor  
*Ernst Kohn*  
by *Arthur Freeman Watson*  
Attorneys

K. KOHN.

TELEPHONE APPARATUS.

APPLICATION FILED OCT. 24, 1903.

3 SHEETS—SHEET 3.





# UNITED STATES PATENT OFFICE.

KOBY KOHN, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO LOUIS A. KSENSKY, OF DENVER, COLORADO.

## TELEPHONE APPARATUS.

No. 850,433.

Specification of Letters Patent.

Patented April 16, 1907.

Application filed October 24, 1903. Serial No. 178,431.

*To all whom it may concern:*

Be it known that I, KOBY KOHN, a citizen of the United States, residing at New York, New York county, New York, have invented certain new and useful Improvements in Telephone Apparatus, of which the following is a specification.

This invention relates to telephone systems; and the object of the invention is to provide means whereby when one subscriber on a telephone party-line either calls central or receives a call from central all other subscribers on the line will be prevented from cutting in, thereby preventing any other subscriber on the line from overhearing the conversation or any part of it, and thus insuring absolute privacy on the line while in use.

One of the essential features of my invention is that all receivers on the party-line are in open circuits until a subscriber calls or is called, when his receiver-circuit will be closed and all other receiver-circuits on the line be prevented from being closed by the respective subscribers until the calling or called subscriber has finished the conversation and "central" has restored all parts to normal position.

The invention, which may be used with either the local-generator system or the central-energy system for calling, will be fully described hereinafter, reference being had to the accompanying drawings, in which—

Figure 1 is a diagrammatic view illustrating my invention as used in a system employing local generators for calling central. Fig. 2 is a plan view of the armature-resetting devices. Fig. 3 is a perspective view of one of the armature-carrying arms and its magnets. Fig. 4 is a diagrammatic view illustrating my invention as used in conjunction with what is termed the "central-energy" system. Fig. 5 is a diagram showing devices for sending currents over the main line-wires by the operator at central.

It is to be understood that the present invention may be embodied in an apparatus which may form an attachment to telephones at present in use, or it may be a part of the telephone.

Referring now to Fig. 1, I have illustrated diagrammatically the devices employed at central and also those for two stations *a* and *b*. It is to be understood, however, that the

invention may be used with four stations, of which two will be connected to the line-wires the same as *a* and two the same as *b*.

The line-wires are indicated by *X* and *XX*, and *F* is a generator of any known style, one of such generators being at each station, and when the generator is not in use its armature is cut out at *F*<sup>2</sup>, which may be considered its normal condition.

We will now assume that a person at station *a* wishes to call central. The generator *F* is operated to close the circuit at *F*<sup>2</sup>, and current then passes over wire *F*<sup>1</sup> to magnet *D*, wire *D*<sup>1</sup>, brush *D*<sup>2</sup>, contact *D*<sup>3</sup>, brush *D*<sup>4</sup>, wire *D*<sup>5</sup>, brush *A*<sup>1</sup>, contact *A*<sup>2</sup>, brush *A*<sup>3</sup>, wire *A*<sup>4</sup> back to the generator. This current energizes magnet *D*, which attracts its armature *D*<sup>6</sup>, pivoted at 2, and thereby brings contact *D*<sup>8</sup> into engagement with brushes *B*<sup>2</sup> *B*<sup>3</sup> and breaks the local circuit between the generator and magnet *D* at *D*<sup>2</sup> *D*<sup>3</sup>, while at the same time brush *D*<sup>6</sup> makes electrical contact with *D*<sup>3</sup>. The current from the generator *F* now passes through magnet *D* to wire *D*<sup>1</sup>, wire *D*<sup>9</sup> to main wire *XX*. It did not follow this path before, because the complete outside circuit was interrupted at *D*<sup>6</sup>, which is connected to main wire *X* by the wire *D*<sup>7</sup>. The current passes from wire *XX* to wire *H*<sup>1</sup>, magnet *H*<sup>2</sup> at central, wire *H*<sup>3</sup>, spring contact *H*<sup>4</sup>, contact *H*<sup>5</sup>, wire *H*<sup>6</sup>, brush *H*<sup>7</sup>, contact *H*<sup>8</sup>, brush *H*<sup>9</sup>, wire *H*<sup>10</sup>, wire *X*, wire *D*<sup>7</sup>, brush *D*<sup>6</sup>, contact *D*<sup>3</sup>, brush *D*<sup>4</sup>, wire *D*<sup>5</sup>, brush *A*<sup>1</sup>, contact *A*<sup>2</sup>, brush *A*<sup>3</sup>, wire *A*<sup>4</sup> to the generator. This current will energize magnet *H*<sup>2</sup> at central, and its armature *H*<sup>11</sup>, pivoted at 6, will be attracted, with the result that the drop *H*<sup>27</sup> will be released and central be notified of the call. The movement of the armature *H*<sup>11</sup> will cause contact *H*<sup>26</sup> to be engaged by brushes *H*<sup>13</sup> and *H*<sup>15</sup> and contact *H*<sup>25</sup> to be engaged by brushes *H*<sup>17</sup>, *H*<sup>19</sup>, and *H*<sup>21</sup>, which will establish a circuit for a current from a source of electrical supply, as a battery *H*<sup>23</sup>, as follows: from *H*<sup>23</sup> to wire *H*<sup>22</sup>, brush *H*<sup>21</sup>, contact *H*<sup>25</sup>, brushes *H*<sup>17</sup> and *H*<sup>19</sup>, wires *H*<sup>18</sup> and *H*<sup>20</sup> to main line-wires *XX* and *X*, respectively. It is now necessary to refer to magnets *A*, one of which is provided at each station. The magnet *A* at station *a* receives its current from wire *X* through wire *A*<sup>5</sup>, brush *A*<sup>6</sup>, contact *A*<sup>7</sup>, brush *A*<sup>8</sup>, wire *A*<sup>9</sup> to magnet *A*, thence to wire *A*<sup>10</sup> to the ground to wire *H*<sup>14</sup> at central, to brush *H*<sup>13</sup>,



contact  $H^{26}$ , brush  $H^{15}$ , wire  $H^{16}$ , to battery  $H^{23}$ . At station  $b$  the magnet  $A$  receives its current from wire  $XX$ , and if two other stations be on the line the magnet  $A$  at one will take its current from wire  $X$  and the other from wire  $XX$ . Thus when current is sent from battery  $H^{23}$  over wires  $X$  and  $XX$  the magnets  $A$  at all the stations will be energized and attract their armatures  $A^0$ , which are pivoted at 4.

Some of the current passing over wire  $H^{18}$  from the battery  $H^{23}$  will pass from wire  $H^{18}$  to magnet  $H^2$ , wire  $H^3$ , spring-contact  $H^4$ , contact  $H^5$ , and wire  $H^{24}$  to battery  $H^{23}$ , and this current will energize the magnet  $H^2$  and keep the circuits closed between the battery  $H^{23}$  and wires  $X$  and  $XX$  after the current from the generator  $F$ , which first energized the magnet  $H^2$ , has ceased.

When the armatures  $A^0$  are attracted, the contacts  $A^2$  move out of engagement with their respective brushes  $A^1$ ,  $A^3$ , and the circuits from generators  $F$  to magnet  $H^2$  are all broken at this point. This will prevent any other station on the line from calling up central until after all parts have been restored to normal position. The attraction of the armatures  $A^0$  also results in breaking the circuit from battery  $H^{23}$  through magnet  $A$  at  $A^6$ ,  $A^7$ , and  $A^8$ , and the resistance of the magnet  $A$  is therefore eliminated. When the generator  $F$  at station  $a$  was operated, the attraction of armature  $D^0$  caused the brushes  $B^2$ ,  $B^3$  to become engaged with contact  $D^8$ , which resulted in closing a circuit from wire  $X$  to wire  $B^1$ , brush  $B^2$ , contact  $D^8$ , brush  $B^3$ , wire  $B^4$ , magnet  $B$ , wire  $B^5$ , brush  $B^6$ , contact  $B^7$ , brush  $B^8$ , wire  $B^9$  to earth and back to battery  $H^{23}$ . Current will therefore flow over this circuit and energize magnet  $B$ , and its armature  $B^0$ , pivoted at 3, will be attracted and cause the contact  $G^4$  to engage brushes  $G^2$  and  $G^3$ , and thereby complete a metallic circuit for the receiver  $G$ , as follows: from wire  $X$  to wire  $G^1$ , brush  $G^2$ , contact  $G^4$ , brush  $G^3$ , wire  $G^5$ , receiver  $G$ , wire  $G^6$  to wire  $XX$ , and communication is then established between central and station  $a$ . At the same time the receiver-circuit is closed the contact  $B^{12}$  engages brushes  $B^{10}$  and  $B^{11}$ , and thereby establishes another generator-circuit in place of the one broken at  $A^1$ ,  $A^2$ ,  $A^3$  and which will enable the speaker at station  $a$  to ring off. This circuit is as follows: from generator  $F$  to wire  $F^1$ , magnet  $D$ , wire  $D^1$ , wire  $D^9$ , wire  $XX$ , wire  $H^1$ , magnet  $H^2$ , wire  $H^3$ , spring-contact  $H^4$ , contact  $H^5$ , wire  $H^6$ , brush  $H^7$ , contact  $H^8$ , brush  $H^9$ , wire  $H^{10}$ , wire  $X$ , wire  $D^7$ , brush  $D^6$ , contact  $D^3$ , brush  $D^4$ , wire  $D^5$ , wire  $B^{14}$ , brush  $B^{10}$ , contact  $B^{12}$ , brush  $B^{11}$ , wire  $B^{13}$ , wire  $A^4$  to generator. As only one magnet  $D$  on the line—viz., that at station  $a$ —was energized, it follows that only at this station can the receiver  $G$  be cut into circuit and the last-described generator-

circuit be established, and no other person on the line can interfere with or overhear the conversation between the person at  $a$  and the person with whom the conversation is being carried on.

When magnet  $B$  attracted its armature and closed the receiver-circuit and the generator-circuit, its own circuit was broken at  $B^6$ ,  $B^7$ , and  $B^8$ .

When central answers the call from the person at station  $a$ , a jack or plug is inserted in  $H^{28}$ , which will force the contact-spring  $H^4$  away from  $H^5$ , thereby breaking the circuit from the battery  $H^{23}$  and deenergizing the magnet  $H^2$ , which will release its armature, and the latter will be restored to normal position by the spring  $H^{12}$ . The drop  $H^{27}$  may also be restored to its normal position, and then the operator at central may withdraw the jack from  $H^{28}$  and permit the spring-contact  $H^4$  to engage  $H^5$ , and then the circuit from the generator  $F$  at station  $a$  will be complete to enable the person using the phone at such station to ring off.

We will now assume that central desires to call up station  $b$ . A current will first be sent over lines  $X$  and  $XX$  to energize all the magnets  $A$  and cause them to attract their armatures  $A^0$ , and thereby cause the contact  $E^{16}$  to engage brushes  $E^2$  and  $E^3$ , and thereby establish a circuit at each station from one or the other of wires  $XX$  or  $X$  to wire  $E^1$ , brush  $E^2$ , contact  $E^{16}$ , brush  $E^3$ , magnet  $E$ , wire  $E^4$ , brush  $E^5$ , contact  $E^6$ , brush  $E^7$ , wire  $E^8$ , magnet  $C$ , wire  $C^1$ , bell  $C^2$ , wire  $C^3$ , wire  $C^4$  to the earth to central and then to the respective wires  $X$  or  $XX$ . As before stated, it is intended to have four stations on the same line, and the bell  $C^2$  at two of the stations will be connected to the wire  $X$  and at the other two stations to the wire  $XX$ . As shown at station  $a$ , the bell is connected to wire  $X$  and at station  $b$  to wire  $XX$ , and we will assume that at station  $c$  the connection is the same as at  $a$  and at  $d$  the same as at  $b$ . Now when central desires to call a station—say  $b$ —it is not desirable to ring up  $d$ ; but as the current sent from central over wire  $XX$  will pass through the bell  $C^2$  at each of these stations one of the bells—say that at  $b$ —will be polarized to respond to a — current and the one at  $d$  to a + current only. Now when the operator at central desires to call  $b$  a — current will be sent over wire  $XX$ , which will ring the bell at  $b$ , but not at  $d$ .

It will be observed that the armature  $B^0$  is common to both magnets  $B$  and  $C$ , and as the — current sent out from central to station  $b$  will pass through magnet  $C$  at this station the end of armature  $B^0$  adjacent to  $C$  is in the form of a permanent magnet with a polarity opposite to that of the current in order that  $C$  may attract it. When, therefore, the current is sent from central over wire  $XX$  to  $b$ , the bell  $C^2$  at this station will



ring and the magnet C will attract the armature B<sup>0</sup>, and thereby close the receiver-circuit at G<sup>2</sup>, G<sup>3</sup>, and G<sup>4</sup> and the generator-circuit at B<sup>10</sup>, B<sup>11</sup>, and B<sup>12</sup>, and central can then talk  
 5 with a person at station b or put him into communication with some other person who may wish to talk to him, either on the same line or another. As shown, the magnets E and C are in series with the bell C<sup>2</sup>, and the current  
 10 used for operating the bell C<sup>2</sup> is a continuous vibratory current, which in itself is not new; but the use of such a current for operating a magnet to cut in the receiver and also accomplish the making and breaking of local  
 15 circuits is an important feature of my invention.

It will be observed that the armature E<sup>0</sup> of the magnet E is held retracted by a spring E<sup>17</sup> and that the armatures for magnets A,  
 20 B, C, and D have no springs. The function of the magnet E is to reset the armatures of the magnets A, B, C, and D after they have been attracted, and the spring E<sup>17</sup> is of sufficient strength to prevent the armature E<sup>0</sup>  
 25 being attracted when the current for operating the bell C<sup>2</sup> is passing through magnet E, it requiring a stronger current to attract the armature E<sup>0</sup> than it does to ring the bell C<sup>2</sup>.

Assuming now that the armatures A<sup>0</sup>, B<sup>0</sup>, and D<sup>0</sup> have been attracted by their magnets and it is desired to restore them, the operator at central will send a current over wires X and XX of the necessary strength to attract the armature E<sup>0</sup>. Before describing  
 35 the effect of this current it is necessary to refer to Fig. 2, which shows in plan view the relative positions of the armatures A<sup>0</sup>, B<sup>0</sup>, D<sup>0</sup>, and E<sup>0</sup> and the magnets A, B, C, D, and E, and it will be seen that the arm which carries the armature E<sup>0</sup> is pivoted at 5 on one  
 40 side of the magnet E and extends for some distance on the opposite side of the magnet E. The arms which carry the armatures D<sup>0</sup>, A<sup>0</sup>, and B<sup>0</sup> are respectively pivoted at 2, 4, and 3 and extend under an enlargement 7 on  
 45 the end of the arm carrying the armature E<sup>0</sup>. These arms are to be so arranged that when the armatures A<sup>0</sup>, B<sup>0</sup>, and D<sup>0</sup>, or either of them, have been attracted by their respective magnets their arms will engage the enlargement 7 when the armature E<sup>0</sup> is in its  
 50 normal or retracted position. If now the armature E<sup>0</sup> be attracted, its arm will press against the arms of such other armatures as have been attracted and rock them on their  
 55 pivots, and thereby disengage their armatures from their respective magnets. The particular arrangement illustrated is typical only, and the relative positions of the arms may be varied, it being essential only that  
 60 the arm carrying the armature E<sup>0</sup> shall in some manner engage the other arms and move them to disengage the armatures from their respective magnets.

65 Returning now to Fig. 1, it is to be under-

stood that the armature A<sup>0</sup> at all the stations has been attracted by the respective magnets A, and consequently the contact E<sup>10</sup> has engaged the brushes E<sup>2</sup> and E<sup>3</sup> at  
 each station. Current will then pass from 70 the wires X and XX, respectively, to wire E', brush E<sup>2</sup>, contact E<sup>10</sup>, brush E<sup>3</sup>, magnet E, wire E<sup>4</sup>, brush E<sup>5</sup>, contact E<sup>6</sup>, brush E<sup>7</sup>, wire E<sup>8</sup>, magnet C, bell C<sup>2</sup>, wire C<sup>3</sup>, wire C<sup>4</sup> to earth and back to central. The effect of 75 this current will be to energize the magnet E, and its armature will at once begin to move. The current will also affect momentarily such magnets as may have been cut into circuit with the line-wires X and XX by a call either 80 to or from central and also the magnets C, aiding those of opposite polarity to the current to attract their armatures B<sup>0</sup> and causing those of like polarity to repel their armatures. As the armature E<sup>0</sup> moves all arms 85 engaged with it will also move, with the result that contact will be broken between the brushes E<sup>2</sup> and E<sup>3</sup> and contact E<sup>10</sup>; between the brushes B<sup>2</sup> and B<sup>3</sup> and contact D<sup>8</sup>, assuming such contact has been made; between 90 brushes G<sup>2</sup>, G<sup>3</sup>, and contact G<sup>4</sup>; brushes B<sup>10</sup>, B<sup>11</sup>, and contact B<sup>12</sup>, and this will cut out the receiver and magnets D and B from the wires X and XX and eliminate their resistances to the current. Before the brushes E<sup>2</sup> and E<sup>3</sup> 95 are entirely disengaged from contact E<sup>10</sup> contact E<sup>11</sup> on armature E<sup>0</sup> will have engaged the brushes E<sup>9</sup> and E<sup>10</sup>, and the contact E<sup>6</sup> will engage brushes E<sup>13</sup> E<sup>14</sup> before it is entirely disengaged from brushes E<sup>5</sup> and E<sup>7</sup>, 100 and there is therefore no interruption to the flow of current from wires X and XX through the magnets E to the earth. When, however, the brushes E<sup>5</sup> and E<sup>7</sup> are disengaged from contact E<sup>6</sup>, the magnet C and bell C<sup>2</sup> 105 will be cut out and their resistances eliminated, thereby enabling the full strength of the current to be used for completing the stroke of armature E<sup>0</sup>, with the exception 110 of such as may flow through magnets A and which will not be sufficient to affect the movement of armature E<sup>0</sup>. When the bell C<sup>2</sup> and magnet C are cut out, the current will be from wire E' to brush E<sup>9</sup>, contact E<sup>11</sup>, brush E<sup>10</sup>, magnet E, wire E<sup>4</sup>, brush E<sup>5</sup>, loop 115 E<sup>12</sup>, brush E<sup>13</sup>, contact E<sup>6</sup>, brush E<sup>14</sup>, wire E<sup>15</sup>, wire C<sup>4</sup> to earth. After E<sup>0</sup> has made its full stroke the current is then discontinued at central, spring E<sup>17</sup> will retract E<sup>0</sup>, and all the parts will be in normal position. 120

In Fig. 3 I have shown a side view of the arm-carrying armatures B<sup>0</sup>. The armature for magnet C is polarized and is insulated from the armature for magnet B, as indicated at B<sup>25</sup> in Fig. 1. 125

It is desirable to provide some means for informing a person desiring to call when the line is busy that such is the fact, and I preferably employ an audible signal for this purpose, which is operated by a current from the 130



generator F. As before stated, when a call is sent to central or from central all the magnets A on the line are energized and attract their armatures, which results in breaking all the generator-circuits at A', A<sup>2</sup>, and A<sup>3</sup> and causing contacts K<sup>7</sup> to engage brushes K<sup>6</sup> and K<sup>8</sup>. If now a person at some other station should operate the generator F at such station, a current would be generated and flow from the generator over wire F' to wire K<sup>10</sup>, bell K, wire K<sup>9</sup>, brush K<sup>8</sup>, contact K<sup>7</sup>, brush K<sup>6</sup>, wire K<sup>5</sup>, brush K<sup>4</sup>, contact K<sup>3</sup>, brush K<sup>2</sup>, wire K', wire A<sup>4</sup> to generator. This will cause bell K to ring, and thus notify the person that the line is busy.

Preferably the enlargement 7 of the arm carrying armature E<sup>0</sup> will be provided with adjustable screws (indicated by 9) to engage the arms carrying the other armatures. It may be stated here that it is not desirable that the current which is sent out from central, either by the operation of magnet H<sup>2</sup> when a subscriber calls central or by central before calling a subscriber to energize magnets A and B, should operate magnets E or C or bell C<sup>2</sup>, which it would do if of sufficient strength. To prevent this, if the resistance for A is one thousand ohms, (for illustration,) magnet E is provided with one thousand ohms resistance and magnet C and bell C<sup>2</sup> each with the same resistance, and the current referred to is not of sufficient strength to overcome these combined resistances and at the same time operate either E, C, or C<sup>2</sup>, while it will be quite sufficient to operate A or B. The continuous vibratory current to operate C and C<sup>2</sup> may be, say, about three times as strong as the current for A and B; but even this will not cause E to attract its armature on account of the resistance offered by spring E<sup>17</sup>. The resetting-current must be still stronger, as it must be sufficient to cause the magnet E to overcome the resistance of spring E<sup>17</sup> and attract the armature E<sup>0</sup>.

Various means may be devised for sending the necessary currents over the wires X and XX to the stations a, b, c, and d by the operator at central, and in Fig. 5 I have shown apparatus which may be used for this purpose. Thus for sending the strongest current over the wires X and XX for energizing the magnets E, I provide a battery or other source of electrical supply S of the necessary capacity and provide a switch-lever S', having contacts S<sup>2</sup> and T, insulated from each other. Brushes S<sup>3</sup> and S<sup>4</sup>, adapted to be engaged by the contact S<sup>2</sup>, are respectively connected to wires XX and X. One pole of the battery S is electrically connected by a wire S<sup>5</sup> to the contact S<sup>2</sup> and the other pole to the ground. When the switch-lever S' is moved to engage contact S<sup>2</sup> with brushes S<sup>3</sup> and S<sup>4</sup>, current from the battery will be sent over both line-wires XX and X through magnets E to the ground, as already described,

and back to battery S. A portion of the same battery S may be utilized for energizing magnets A, which do not require so strong a current as magnets E. Thus the contact T is electrically connected by a wire T' with a portion only of the battery, as shown in Fig. 5. Two brushes T<sup>2</sup> and T<sup>3</sup>, adapted to be engaged by contact T, are respectively connected to wires XX and X, and when switch-lever S' is moved to engage contact T with brushes T<sup>2</sup> and T<sup>3</sup> current from a portion of battery S will flow over wires XX and X through magnets A to the ground and back to the battery S'.

The current for energizing magnets C and bells C<sup>2</sup> is preferably a continuous vibratory current, and in Fig. 5 I have shown one means for sending a current of this character over the lines X and XX. Thus the line X is connected to a pivoted switch O by a wire O', and the line XX is connected to a similar switch O<sup>2</sup> by a wire O<sup>3</sup>. A battery or other suitable generator O<sup>4</sup> is provided, and the positive pole thereof is connected to a contact O<sup>5</sup>, adapted to be engaged by either of the switches O or O<sup>2</sup>, and its negative pole is connected to a contact O<sup>6</sup>, adapted to be engaged by either of the switches O or O<sup>2</sup>. A commutator is provided in each connection between said contacts and the battery, and the latter is connected to the earth. If the switch O be rocked to engage O<sup>6</sup>, a negative current will be sent over line X through magnets C and return by the ground to battery O<sup>4</sup>. If switch O engages O<sup>5</sup>, a positive current will be sent over line X and return through the ground to battery O<sup>4</sup>. By operating switch O<sup>2</sup> the same effects take place over wire XX.

One other great advantage possessed by my invention, in addition to the absolute privacy in the use of the party-line by the party using it, is that the bell C<sup>2</sup>, being in series with the magnets C and E, offers so much resistance that the ringing of the bells C<sup>2</sup> is entirely obviated when a person who has been talking over the line "rings off."

The receiver-circuits are each provided with the usual secondary induction-coil I in close proximity to the usual primary induction-coil J; but these coils form no part of the present invention and are illustrated merely to show that my invention can be applied to telephones now in use without the necessity of mutilating them in any way.

Referring now to Fig. 4, which is a diagrammatic view showing the apparatus at central and that at one station on a party-line in a central-energy system, it will be observed that the magnets A, B, C, D, and E are employed in substantially the same relations as in the system heretofore described. The generator F and its circuits are, however, omitted. In this case the removal of the receiver G from its supporting-hook D<sup>11</sup> will



serve to send a signal to central. Assuming now that the receiver G is removed from the hook D<sup>11</sup>, the latter will be moved by its spring into engagement with a contact D<sup>10</sup> and close a circuit as follows: from hook D<sup>11</sup> to contact D<sup>10</sup>, wire D<sup>12</sup>, brush A<sup>3</sup>, contact A<sup>2</sup> on armature A<sup>0</sup>, brush A<sup>1</sup>, wire D<sup>13</sup>, magnet D, wire D<sup>14</sup>, main line-wire XX, through battery M<sup>2</sup>, spring-contact M<sup>3</sup>, contact M<sup>4</sup>, wire M<sup>5</sup>, magnet M, wire M<sup>6</sup>, line-wire X, wire D<sup>15</sup> to hook D<sup>11</sup>. The closing of this circuit will energize magnets D and M. The magnet D will attract its armature D<sup>0</sup> and close the circuit for the magnet B at D<sup>8</sup>, B<sup>2</sup>, and B<sup>3</sup>, and magnet B will be energized and attract its armature B<sup>0</sup> and close the receiver-circuit at G<sup>2</sup>, G<sup>3</sup>, and G<sup>4</sup> and break the local circuit for bell K at K<sup>2</sup>, K<sup>3</sup>, and K<sup>4</sup> in the same manner as previously described. The magnet M having been energized will attract its armature M<sup>0</sup> and cause the contact M<sup>7</sup> to engage the brushes M<sup>8</sup> and M<sup>9</sup> and the contact M<sup>10</sup> to engage brushes M<sup>11</sup> and M<sup>12</sup>. A circuit will thus be established from battery M<sup>2</sup> to wire M<sup>5</sup>, magnet M, brush M<sup>8</sup>, contact M<sup>7</sup>, brush M<sup>9</sup>, wire M<sup>13</sup>, to battery M<sup>2</sup>, and the current from the battery will keep magnet M energized to hold its armature attracted and keep circuits closed at M<sup>7</sup>, M<sup>8</sup>, and M<sup>9</sup> and at M<sup>10</sup>, M<sup>11</sup>, and M<sup>12</sup>, so as to absolutely insure the operation of all the magnets A on the party-line and of the magnet B at the station calling. Current can then be sent over both wires X and XX to energize all the magnets A and the magnet B, whose circuit was closed by the action of its coöperating magnet D, in the same manner as previously described in connection with Fig. 1. As soon as the magnets A attract their armatures the circuits for magnets D will be broken at A<sup>1</sup>, A<sup>2</sup>, and A<sup>3</sup>, and there will thus be no idle resistance in the line during subsequent operations.

As no generator is employed at the stations in the central-energy system, it is necessary to provide some means for ringing the bell K to indicate to a subscriber when the line is busy. As shown, I provide a battery L in the circuit for the bell. When the armature A<sup>0</sup> is attracted, the contact K<sup>7</sup> will engage brushes K<sup>6</sup> and K<sup>8</sup>. An open circuit with a break at D<sup>10</sup> and D<sup>11</sup> is then established, including the bell K and battery L, as follows: from hook D<sup>11</sup>, to wire L<sup>1</sup>, battery L, wire K<sup>10</sup>, bell K, wire K<sup>9</sup>, brush K<sup>8</sup>, contact K<sup>7</sup>, brush K<sup>6</sup>, wire K<sup>5</sup>, brush K<sup>4</sup>, contact K<sup>3</sup>, brush K<sup>2</sup>, wire K<sup>1</sup>, wire D<sup>12</sup>, and contact D<sup>10</sup>. If then the receiver be removed from the hook D<sup>11</sup>, the circuit will be closed between D<sup>10</sup> and D<sup>11</sup> and bell K will ring.

It will of course be understood that when the armature B<sup>0</sup> is operated the contact K<sup>3</sup> will be disengaged from the brushes K<sup>2</sup> and K<sup>4</sup>, and the bell-circuit will thus be broken at this point, and therefore the bell K will not

ring at any station, where armature B<sup>0</sup> has been operated, when the receiver is removed from hook B<sup>11</sup>. The same is equally true with reference to Fig. 1, where the generator F will not ring the bell at any station where the armature B<sup>0</sup> is attracted. In all other respects the apparatus illustrated in Fig. 4 will operate in the same manner described with reference to Fig. 1.

Without limiting myself to the details of construction illustrated and described, I claim—

1. In a telephone system for party-lines, the combination of the main-line wires leading from a central office, of a series of telephone-receivers each connected to the line-wires by an open electric circuit, a source of electric-current supply at the central office connected to the line-wires by an open circuit, means including a magnet and an armature, under the control of the user of one receiver for closing this receiver-circuit and for closing said open circuit at the central office for sending current over the line-wires to operate devices for preventing the closure of all the other receiver-circuits, substantially as set forth.

2. In a telephone system for party-lines, the combination of the main-line wires leading from a central office of a series of telephone-receivers each connected to the line-wires by an open electric circuit, a source of electric-current supply at the central office, a magnet and an armature at each receiver-station both connected to one of the line-wires, means under the control of an operator at the central office for sending a current from said source of supply over the line-wires to operate said armatures and magnets at all the receiver-stations to prevent the closure of the receiver-circuits by users thereof, and means under the control of the operator at the central office for subsequently closing each receiver-circuit selectively, substantially as set forth.

3. In a telephone system, the combination with the main-line wires, of a series of telephone-receivers each independently connected to said wires by an open electric circuit, a generator adjacent to each receiver, and means operated by each generator for closing its receiver-circuit and preventing the closure of all the other receiver-circuits, substantially as set forth.

4. In a telephone system for party-lines, the combination with the main-line wires of said party-line, of a series of telephone-receivers each independently connected to said wires by an open electric circuit, a generator adjacent each receiver, means operated by each generator for closing its receiver-circuit and preventing the closure of the other receiver-circuits, and a signal which may be operated by the generator at such stations where the receiver-circuits are not closed



when the line is in use, substantially as set forth.

5. In a telephone system for party-lines, the combination with the main wires of the said party-line leading from a central office, of a series of telephone-receivers each independently connected to said wires by an open electric circuit, a generator adjacent to each receiver, means controlled by each generator for sending a current of electricity from a central office over the line-wires, and devices operated by said current for closing the receiver-circuit adjacent to the active generator and for preventing the closure of all the other receiver-circuits, substantially as set forth.

6. In a telephone system for party-lines, the combination with the main-line wires leading from a central office, of a series of telephone-receivers each independently connected to the line-wires by an open electric circuit, a circuit-closer for each receiver-circuit including an armature, a magnet for each armature, means for energizing each of said magnets selectively to close its receiver-circuit, and means for preventing the closure of all the other receiver-circuits, substantially as set forth.

7. In a telephone system for party-lines, the combination with the main-line wires connected to central, of a plurality of telephone-receivers not exceeding four connected to said wires independently by open electric circuits, a circuit-closer for each circuit including a polarized armature, a magnet for each armature electrically connected to one of the line-wires, and each including in its circuit a polarized bell, two only of said magnets and bells being connected to one line-wire, and the polarities of the two bells being opposite, and the polarities of the armatures cooperating with the magnets being also opposite, whereby when a current of one polarity is sent over said line-wire it will ring one bell and operate one armature to close its receiver-circuit but will not affect the other bell and armature on the same line-wire, substantially as and for the purpose set forth.

8. In a telephone system for party-lines, the combination with the main-line wires leading from a central office, of a plurality of telephone-receivers each independently connected to said wires by an open electric circuit, a circuit-closer including an armature for each circuit, a magnet B for each armature, a generator F adjacent to each magnet B, means controlled by the generator for establishing electrical connection between a main line-wire, its magnet B and the earth, a magnet A adjacent to each receiver electrically connected to one of the main wires and the earth, and devices operated by the mag-

nets A for preventing the closure of all the receiver-circuits except the one to the generator which was operated, substantially as set forth.

9. In a telephone system for party-lines, the combination with the main-line wires leading from a central office, of a plurality of telephone-receivers each independently connected to said wires by an open electric circuit, a circuit-closer including an armature for each circuit, a magnet B for each armature, a generator F adjacent to each magnet B, means controlled by the generator for establishing electrical connection between a main-line wire, its magnet B and the earth, a magnet A adjacent to each receiver electrically connected to one of the main wires and the earth, means controlled by the generator for sending a current over the main wires through all the magnets A and the magnet B adjacent the generator operated, and devices operated by the magnets A for preventing the closure of all the receiver-circuits except the one to the generator which was operated, substantially as set forth.

10. In a telephone system, the combination of a series of magnets and their armatures for making and breaking circuits, said armatures being pivoted and normally tending to remain in any position to which they are moved, a resetting-magnet, and an armature to be operated by the latter magnet and normally in position to be engaged by arms on the other armatures when the latter are operated, and said resetting-armature when attracted by its magnet acting to restore all the other armatures which engage it to normal position, substantially as set forth.

11. In a telephone system, the combination of a series of magnets and their armatures for making and breaking circuits, said armatures being pivoted and normally tending to remain in any position to which they are moved, a resetting-magnet, an armature to be operated by the latter magnet and normally in position to be engaged by arms on the other armatures when the latter are operated, and said resetting-armature when attracted by its magnet acting to restore all the other armatures which engage it to normal position, and means for restoring the resetting-armature to normal position when released by its magnet, substantially as set forth.

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

KOBY KOHN.

Witnesses:

GEORGIA P. KRAMER,  
JOHN G. HINKEL.