

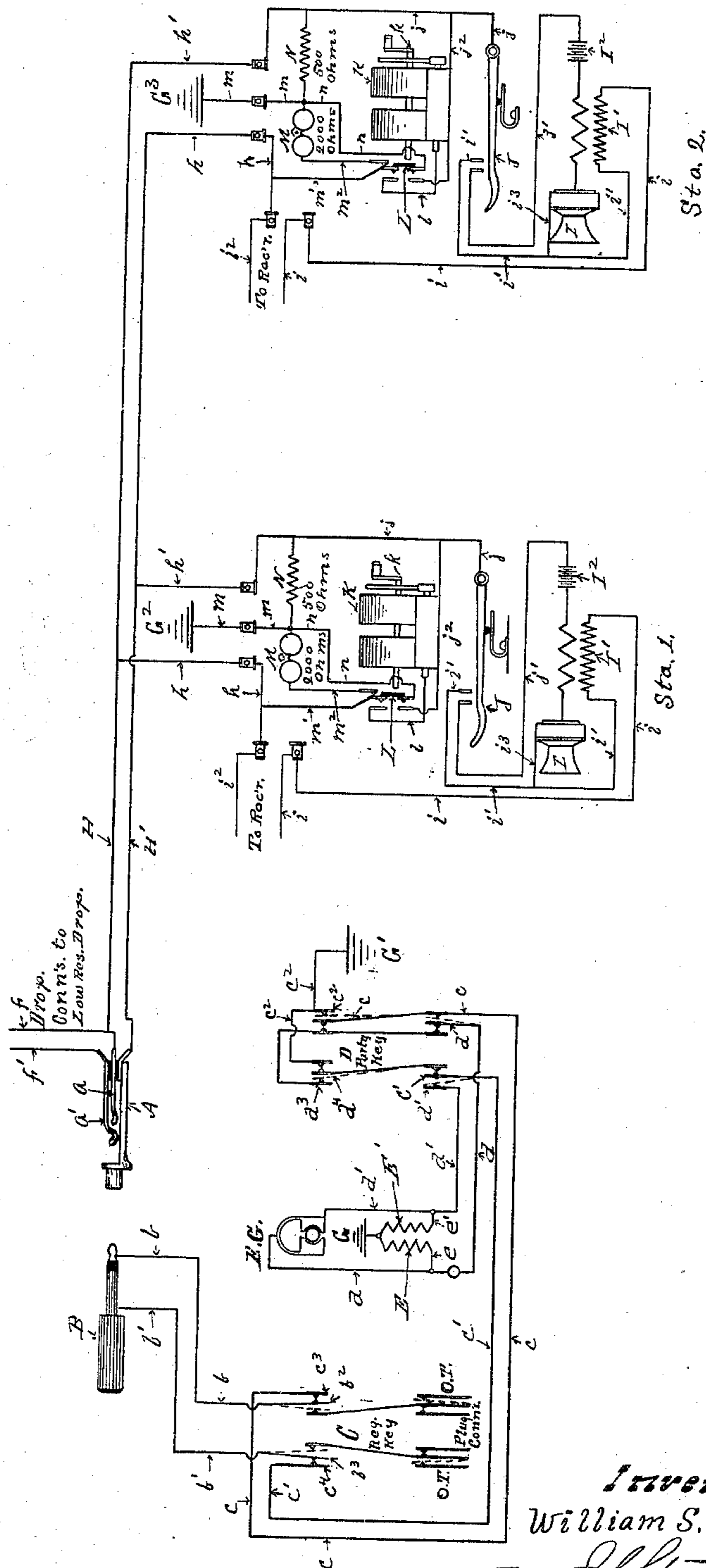
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W. S. PACA.
TELEPHONE CALL BELL APPARATUS.

(Application filed Dec. 26, 1900.)

(No Model.)



Witnesses
H. M. Sturgeon.
F. J. Barrett.

Inventor
William S. Paca
By H. M. Sturgeon
att'y.

UNITED STATES PATENT OFFICE.

WILLIAM S. PACA, OF ERIE, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO
PETER H. ADAMS, OF SAME PLACE.

TELEPHONE CALL-BELL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 684,615, dated October 15, 1901.

Application filed December 26, 1900. Serial No. 41,062; (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. PACA, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Telephone Call-Bell Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, forming part of this specification.

My invention relates to improvements in telephone call-bell apparatus and circuits whereby two call-bells can be utilized on the same circuit without interference with each other.

In the practice of telephone communication it is often desirable to place two stations on the same circuit, and when this is done each station has its own particular call—for example, station No. 1 has one ring and station No. 2 has two rings, or vice versa, the bells at both stations, however, ringing all signals sent over the line. This ringing of signals at one station when the other station is being called is annoying to subscribers and has the further objection that one station always knows when the other station is using the line, so that the party at one station can at any time know what the party of the other station is saying if he or she cares to listen thereto. This difficulty has in some devices been overcome by the use of polarized bell-magnets at stations on the same line; but this has been found very objectionable, as special generators and other special apparatus of delicate adjustment must be used to accomplish the desired end. To overcome these objections, I have devised a telephone and selective call-bell apparatus and so connected up this apparatus in circuit with the lines leading to the telephone-exchange that it operates only to signal the exchange and receive only the signals sent from the exchange to the station at which it is installed, neither the ingoing or outgoing calls from and to this station being audible at the other station with a like call-bell apparatus, and vice versa, so that each station

apparatus is operated without in any manner calling or signaling the other station located on the same circuit leading to the telephone-exchange.

The construction of the telephone and call-bell apparatus and the circuits thereto is hereinafter set forth and described, and illustrated in the accompanying drawing, in which the figure is a diagrammatic illustration of telephone and call-bell apparatus and circuits therefor embodying my invention and also shows portions of the telephone-exchange mechanism.

In the diagram the telephone-exchange switchboard-jack is designated by A, and the plug by B, the circuits leading from the point and body of the plug B to the regular key C by *b* and *b'*, the circuits leading from the regular key C to the party-key D by *c* and *c'*, and the circuit leading from the party-key D to the exchange-generator E G by *d* and *d'*, the branch lines leading to the high-resistance coils E E' by *e* and *e'*, and G designates the ground connected with the resistance-coils E E'. The line leading from the party-key D to the ground G' is designated by *c*². The jack-tongues are designated by *a* and *a'* and the drop connections by *f* and *f'*, these parts all being parts of the exchange mechanism.

The lines forming the metallic circuit leading out from the jack A are designated as H and H', the branches leading from the line H to the telephone and call-bell apparatus at stations Nos. 1 and 2 as *h* and *h'*, and the branches leading from the line H' to the telephone and call-bell apparatus at said stations as *h'* and *h'*, these stations being duplicates both in construction and connections with the lines H and H'.

The telephone and call-bell apparatus at station No. 1 comprises, substantially, a telephone-transmitter I, induction-coil I', battery I², a receiver and switch-lever J, with a conductor *i*, leading from the induction-coil I' to the receiver and through the receiver by conductor *i*² and by branch line *h* to the main line H, and from the other side of the induction-coil I' by line *i'* to the switch-lever J, and through the switch-lever J by line *j* to the branch *h'* and to the line H', and the

transmitter and battery I^2 also connect with the switch-lever J by a branch conductor i^3 , which joins conductor i' , and by the line j' , leading to the switch-lever J. K designates
 5 a magneto-generator of usual construction, the crank-shaft k of which moves longitudinally to operate a switch L when signaling the exchange. M designates the call-bell magnets, which I make of high resistance,
 10 preferably of about two thousand ohms, though they may be of higher or lower resistance, if desired. N is a resistance-coil, preferably made of low resistance—say about
 15 five hundred ohms, but which may, if desired, be of higher or lower resistance—and is connected with the conductor n at its junction with the conductor m , leading from the bell-magnets M to a ground G^2 , and with the line j , and operates not only to resist the pas-
 20 sage of currents from the line j to ground when the bell at the other station is operated, but also operates to prevent part of the current passing through the bell being rung from passing to the line j and then through its
 25 line connections to the bell-magnets M at the other station. The coil N further operates to balance up the circuit when the telephone is being used, so as to eliminate induction influences, cross-talk, &c.
 30 From the branch h a normally-closed circuit exists through line m' past the switch L and through the line m^2 to the bell-magnets M, and thence through the line m to ground G^2 , so that a signal sent out from the ex-
 35 change over the line H passes to branch h and to bell-magnets M, and thence to ground G^2 at station No. 1; and likewise a signal sent out on the line H' passes to the branch h and bell-magnets M and to ground G^2 at sta-
 40 tion No. 2.
 The sending out of the signals to station No. 1 is accomplished in the following manner: The regular key C is moved so as to bring the conductor-contacts b^2 c^3 and b^3 and
 45 c^4 into contact, as shown in the diagram, with the party-key D in the position shown, the line d' from the generator connecting through resistance-coil E' to ground G. Now when the plug B is inserted into the jack A a line-
 50 circuit is formed from ground G through resistance-coil E' and the exchange-generator E G to line d , to party-key D, and thence by lines c and b to the tip of the plug B, and thence by jack-tongue a , line H, and branch
 55 lines h , m' , and m^2 to bell-magnet M at station No. 1, and by line m to ground G^2 , the return-circuit being by ground. Now if the exchange-generator is operated the bell M at station No. 1 is rung without any disturb-
 60 ance of the bell at station No. 2. If, however, the party-key D is moved so as to bring the line c into contact with the lines c^2 and d^4 into contact with line d^3 , as shown in dotted lines, then the circuit is from ground G
 65 through resistance-coil E and the generator E G to line d' , to party-key D, and then by line c' to line b' and body of plug B. Then

if the plug B is inserted into the jack A the circuit will be through the jack to line H', and thence by branches h m' m^2 to bell M at station No. 2, and thence through line m to ground G^2 , the return-circuit being by ground. The resistance-coils E E' operate to prevent the short-circuiting of the exchange-gener-
 70 ator and present sufficient resistance to prevent the grounding of the generator and permit signals to be sent over a metallic circuit therewith. These coils also operate to bal-
 75 ance up the generator-circuit and prevent induction through the switchboard. In each
 80 case, however, one of the lines leading to the switch-plug B is grounded at G' to prevent a false signal being transmitted to the other station in case the subscriber called removes the receiver from the switch-lever J while
 85 the call is being made.

In calling the exchange from station No. 1 the generator-shaft k is moved laterally, so as to operate the switch L and connect the lines m' and l through the switch L, so that
 90 the circuit is through the generator K by line l through switch L to line m' and through branch h to main line H and thence through the drop by connections f and f' back through the jack-tongue a' to jack-body A and main
 95 line H' back to branch h' through lines j and j^2 to ground at G^2 . The resistance-coils N at station No. 2 operate to prevent a circuit being formed with ground at station No. 2. When the exchange answers the signal, the
 100 telephonic mechanism at station No. 1 is operated in the usual manner.

At station No. 2 the signaling and telephoning apparatus and the circuits are the same in all respects, both in construction and
 105 operation, as hereinbefore described, except that the branch line h at station No. 2 connects with the main line H' and branch line h' with main line H. In all other respects the circuits and the operation thereof are the
 110 same as hereinbefore described.

The construction and operation of the exchange-generator and party-key are such that when it is desired to send a call out there-
 115 with over an ordinary return-circuit line the party-key D is moved so as to bring the lines c d and c' d' into contact, as illustrated in dotted lines, which cuts out the ground G' . Then coils E E' operate to obstruct the pas-
 120 sage of the generator-current to ground G, and when the plug B is inserted into a jack A on the switchboard the generator E G is in circuit in the usual manner and can be oper-
 125 ated to signal a subscriber connected with the exchange by the usual metallic circuit.

I have thus described a convenient signaling apparatus and circuit for the construc-
 130 tion and operation of selective call-bells upon a metallic circuit. I am aware, however, that modifications thereof may be made without
 135 departing from the spirit of my invention; therefore

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a multiple-station telephone-circuit, a telephone, a generator, and call-bell mechanism, call-bell magnets therein of relatively high resistance, a branch line normally connecting said magnets on one side with one line of the circuit leading into the exchange and on the other side with a ground, a resistance-coil between said ground-line and a branch line leading from the generator and telephone apparatus at said station to the other line of the circuit leading into the exchange, a signaling apparatus at the exchange and switch mechanism whereby signals can be sent out over either line of the main circuit leading out of the exchange, substantially as set forth.

2. In a multiple-station telephone-circuit, a call-bell and telephone mechanism at each station embodying substantially call-bell magnets of relatively high resistance each normally in connection with one of the main lines leading into the exchange on one side, and with a ground on the other side, a generator normally out of circuit, which, when operated, contacts at one side with one of the main lines leading into the exchange and back on the other main line to a ground, substantially as and for the purpose set forth.

3. The combination of a metallic telephone-circuit extending by both of its main conductors from an exchange to two telephone-stations, a telephone and call-bell apparatus at each station, a branch line leading from one side of said metallic circuit to one side of the call-bell magnets at one station and from said magnets to a ground, a branch line leading from the other line of said metallic circuit to one side of the call-bell magnets at the other station and thence to a ground, a generator at each station, which, when operated, cuts out the bell-magnets and connects with the branch leading from the main line to the bell-magnets on one side and back through the other main line to a ground on the other side, and telephone mechanism at each station adapted to connect with both sides of said metallic circuit, and exchange call mechanism adapted to send out calls over one side of said main circuit to one of said stations, and over the other side of said main circuit to the other of said stations, substantially as and for the purpose set forth.

4. The combination in a metallic telephone-circuit extending from an exchange to two telephone-stations, a telephone apparatus connected with said metallic circuit at each sta-

tion, call-bell magnets at one station connected at one side with one line of said main circuit and at the other side with a ground, and call-bell magnets at the other station connected at one side with the other line of said main circuit and at the other side with a ground, a generator at each station adapted, when operated, to cut out the bell-magnets at said station and connect with the line leading from the main conductor at one side and to a ground at the other side, substantially as and for the purpose set forth.

5. The combination of a metallic telephone-circuit extending from an exchange to two telephone-stations, a telephone apparatus connected with said metallic circuit at each station, a call-bell apparatus at each station comprising call-bell magnets of relatively high resistance, the call-bell magnets at one station being normally connected at one side with one line of said circuit, and at the other side with a ground, and the call-bell magnets at the other station being in like manner connected with the other main line and a ground, a generator at each station adapted, when operated, to signal the exchange over said main lines without signaling the other station, and an exchange signaling mechanism and switch mechanism adapted to ground one side of the circuit so as to send out signals over one main line to one station and over the other main line to the other station, substantially as and for the purpose set forth.

6. The combination in a metallic telephone-circuit extending from an exchange, a telephone apparatus adapted to operate from a telephone-station over said metallic circuit, a magnetic generator and call-bell mechanism at such station comprising substantially call-bell magnets of relatively high resistance normally in connection at one side with one of the lines of the main circuit and at the other with a ground, a magneto-generator normally out of circuit, which when operated, connects with branches leading to both of the lines of the main circuit, and a resistance-coil of relatively low resistance between said call-bell-magnet ground connection and a line leading from the generator to the other main line, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM S. PACA.

Witnesses:

H. M. STURGEON,
HENRY A. CLARK.