

(No Model.)

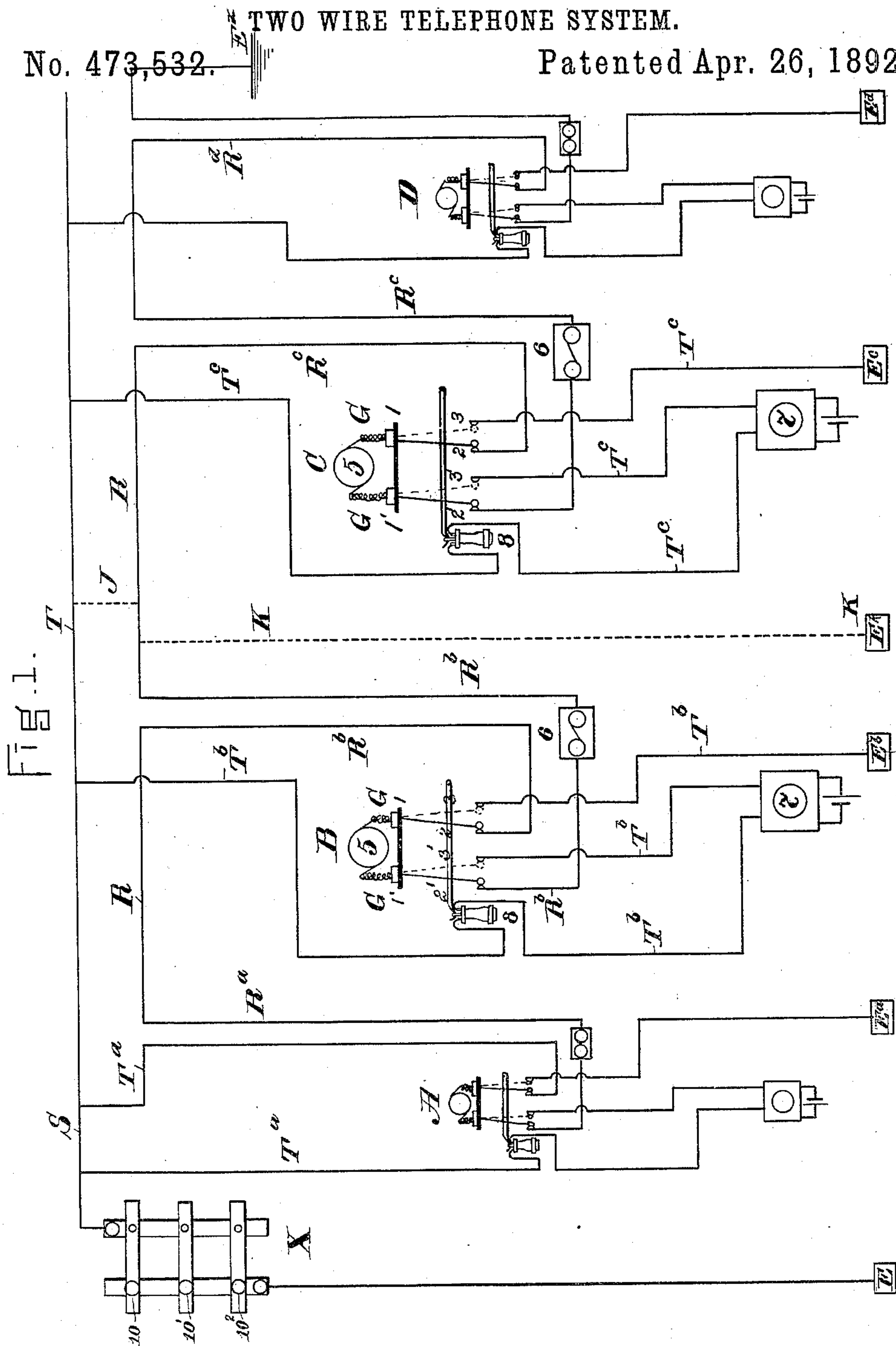
2 Sheets—Sheet 1.

G. T. TINTOR.

4. TWO WIRE TELEPHONE SYSTEM.

No. 473,532.

Patented Apr. 26, 1892.



WITNESSES.

Henry Marsh.  
John A. Dougherty,

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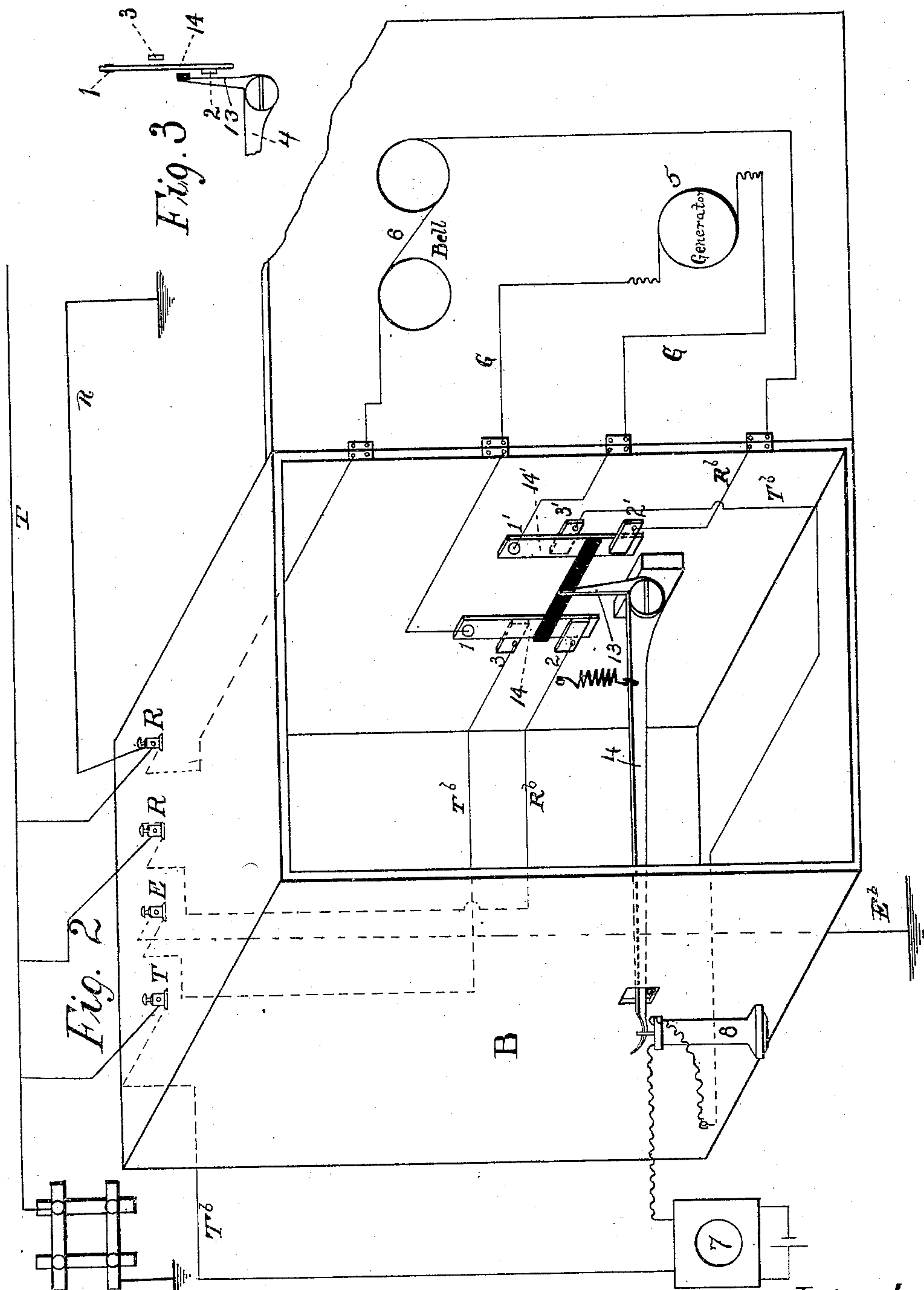
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TWO WIRE TELEPHONE SYSTEM.

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Witnesses.

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# UNITED STATES PATENT OFFICE.

GILES TAINTOR, OF KEENE, NEW HAMPSHIRE.

## TWO-WIRE-TELEPHONE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 473,532, dated April 26, 1892.

Application filed May 9, 1890. Serial No. 351,206. (No model.)

*To all whom it may concern:*

Be it known that I, GILES TAINTOR, a citizen of the United States, residing at Keene, in the county of Cheshire and State of New Hampshire, have invented a new and useful Two-Wire-Telephone System, of which the following is a specification.

This invention relates to "two-wire-telephone systems," so called, with a central office communicating with independent circuits, each or any of which contains a number of subscribers, the subscribers on one circuit having the means of talking with each and every subscriber on their own circuit, as likewise those upon every other circuit through the medium of the central office, as heretofore.

In the present instance my invention relates to that class of two-wire-telephone systems in which a common wire for ringing and talking starts from the central office. With this wire, at any suitable point from the central office, are connected two separate wires or circuits, one for ringing and one for talking, each connected with the instrument of the individual subscribers on this particular system.

The object of my invention is primarily to enable any station to call "central" should either of the wires, talking or ringing, become broken, but when one remains continuous or unbroken.

Secondly, to enable one subscriber to call "central" or any other subscriber on the line in case of the crossing of the ringing and talking lines. In this example it must be understood that the cross must occur beyond the subscriber, but in no case between him and the central. Should the latter accident happen, the ordinary process of ringing up would be used.

Thirdly, in case of an accidental ground, to enable one subscriber to call "central" and any other station between the grounded point and "central" when the ringing-line is grounded between the calling subscriber's station and central.

To accomplish these objects, briefly summarized and to be more particularly hereinafter explained, I provide a loop in which is located a generator; further, the terminals of said loop are so arranged as to be, by means

of an automatic switch, caused to make or break circuit with the terminals of either ringing or talking wires, which are situated in each subscriber's office. In this I consider is embodied the gist of my invention.

The drawings accompanying my specification represent, in Figure 1, diagram in plan of a two-wire-telephone system embodying my invention, showing the offices of two subscribers. Fig. 2 is a perspective view of the generator-box, with the various posts, terminals, and other connections necessary to the carrying out of my invention. Fig. 3 is a side view, in part, of the switch, showing the positions relatively of the several terminals and the circuit-closers.

In said drawings, Figure 1 represents a grounded system with the central office at X, having the switchboard provided with the series of bells 10 10' 10<sup>2</sup>, adapted for numerous local systems. From each bell at the central runs a single wire S, which at any given point divides, one wire R being termed the "ringing," the other T the "talking," both having a common entrance to central over S. Central is grounded at E, while the respective subscribers A B C D are likewise grounded at E<sup>a</sup> E<sup>b</sup> E<sup>c</sup> E<sup>d</sup>.

To more clearly indicate the course and direction of currents on the establishment of a complete line, I shall distinguish the several subscribers' wires by coefficients, as T<sup>a</sup> R<sup>a</sup> T<sup>b</sup> R<sup>b</sup>, &c., which will indicate the talking and ringing wires of subscribers B or C.

I will further premise that each subscriber is provided with a generator-box (see Fig. 2) which contains a telephone 8, and a transmitter 7, connected to the talking-wire T, having terminals 3 3'. Moreover, the ringing-wire R<sup>a</sup>, &c., is provided with a bell 6, while the terminals of said wire are indicated at 2 2'. Furthermore, each subscriber is provided with a generator 5, electrically connected in a loop G, the terminals of which are 1 1'. To cause these several terminals to co-operate and establish different circuits, as may be needed to carry out my invention, I make use of an automatic switch 4, pivoted to the side of the generator-box and spring-actuated, as is usual, so that when the telephone is removed from its free end the latter can rise.



Above the pivot or in the rear thereof is positioned a short arm 13, to which is affixed a cross-bar. Opposite either end of the latter are placed circuit-closers 14 14'. These latter are preferably plate-springs and are secured to the generator-box by the binding-posts for terminals 11' on loop G. Their front ends, bearing against the cross-bar, are free to move and contact with the terminals 2 2' 3 3', according as the switch is in a raised position or the reverse. When the telephone is hung thereupon, the closers 14 14' are in contact with the terminals 2 2' of the ringing-circuit, and this is the normal position of the switch. When the telephone is removed, the closers 14 14' are in contact with the terminals 3 3' of the talking-circuit. Assuming, then, that the above operating parts are as shown in Fig. 2, I will instance how the first purpose of my invention is effected—viz., to enable any station to call "central" should either of the wires (talking or ringing) become broken, but when one remains continuous or unbroken; the subscriber B (see Fig. 1) turns the crank of his generator, the normal ringing-circuit being as follows: from the generator along loop G, terminals 1' 2', line R<sup>b</sup>, bell 6, thence to the other subscribers to ground. The other portion of the circuit is from E, central station X, bell 10, line S, through bell in office of A to R<sup>b</sup>, terminals 2', loop G to generator. In this instance, however, the ringing-circuit is broken. Hence B, receiving no answer, lifts the telephone from the switch and puts the loop G and generator into electrical connection with the talking-line T<sup>b</sup>, and the circuit is as follows: generator, loop G, terminal 1' 3' to talking-wire through telephone and transmitter to wire S, bell 10 in central to ground E, thence from ground E<sup>b</sup>, line T<sup>b</sup>, terminals 3', loop G, and generator. Thus it is evident that every subscriber has two systems by which he can call central, whereas in the usual two-wire system he cannot use the talking-wire to "ring up." It must be understood, however, that B cannot ring up any subscriber by switching the generator upon the talking-line. He is limited to central alone as having a bell in common with the talking and ringing systems.

The second purpose of my invention is to enable one subscriber to call central or any other subscriber or subscribers on the line in case of the crossing of the ringing and talking lines. The cross must occur beyond the subscriber, but in no case between him and central.

In Fig. 1 the dotted line J represents the cross between the talking and ringing lines at a point between subscribers B and C. Subscriber B, wishing to ring up, actuates his generator with his apparatus at normal. The path of the current generated is as follows: Tracing from the end of the generator by loop G, terminals 1 2, wire R<sup>b</sup>, through station A,

thence by line of least resistance T<sup>a</sup> to T, thence to cross-line J R<sup>b</sup>, bell, to terminals 2' 1', to generator. Thus it will be seen the ringing-circuit is short-circuited. Subscriber B fails to ring central. Hence he removes the telephone and changes his switch to connect with the talking-line. The circuit is as follows: from generator by terminals 1' 3', line T<sup>b</sup>, through telephones 7 8, line T<sup>b</sup> T to S, and thence to central, grounds E E<sup>b</sup>, line T<sup>b</sup> to terminals 3 1, and generator. The current is compelled to central, since line of least resistance, through J R<sup>b</sup> and bell to terminal 2', as in the act of ringing in the first instance, is now open. By this course of procedure a subscriber between the cross and central may ring up the latter and all subscribers who are between himself and central, but he is likewise able to ring beyond the point where line is crossed, as current divides, part going to central and part to ground at last station.

My third purpose is to enable one subscriber to call central and any other station between the grounded point and central when the ringing-line is grounded between the calling subscriber's station and central.

Reference to Fig. 1 represents the line R grounded between subscribers B and C, as indicated at dotted line K, and C now desires to call central, or subscribers A or B, these two being located between the grounded point and central. Suppose B is to be called. With the ordinary position of parts, as shown in Fig. 2, C receives no response, the current passing from generator-terminals 1' 2', bell, R<sup>c</sup> to E<sup>x</sup> thence to ground E<sup>k</sup> by K to R<sup>c</sup>, terminals 2 1 to generator. Accordingly he changes his switch to connect with the talking-line, and the current is now by terminals 1' 3' T<sup>c</sup>, telephones 8 7 T<sup>c</sup> to T, to S, where it separates, one part passing through the central to ground E, thence to E<sup>c</sup> T<sup>c</sup>, terminals 3 1, to generator, the other part through R<sup>a</sup> to R<sup>b</sup> terminals 2 1, generator, terminals 1' 2' R<sup>b</sup>, bell of B to wire K and ground E<sup>k</sup> to ground E<sup>c</sup> T<sup>c</sup>, terminals 3 1 to generator. The switch in the present drawings is shown as automatic; but I do not desire to be limited to this particular form of switch, since one may be employed and worked manually.

What I claim is—

1. The combination, in a two-wire-telephone system, of a loop, a generator in connection therewith, and a switch with circuit-closers, combined with a cross-wire and with a branch wire to earth from either said talking or ringing circuits to enable stations outside the lines now short-circuited to be called, substantially as stated.

2. In a two-wire-telephone system, the combination, with a generator located in a loop, a talking-circuit, and a ringing-circuit adapted to be normally connected with the generator, of two movable terminals, a hook-switch, and an operating-receiver 8 to establish electric connection between the generator and the



talking or ringing circuits, substantially as specified.

3. The combination, with a central switch-board, talking and ringing circuits thereto,  
5 and a loop in which is located a generator, of the movable circuit-closers, one for each terminal of the loop-circuit, a switch, and its operating-receiver 8, to shift the circuit-closers simultaneously and connect the terminals of

the loop with the terminals of the talking or ringing circuits, one of said circuits always being open to central, substantially as herein described.

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Witnesses:

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W. R. PORTER.