

(No Model.)

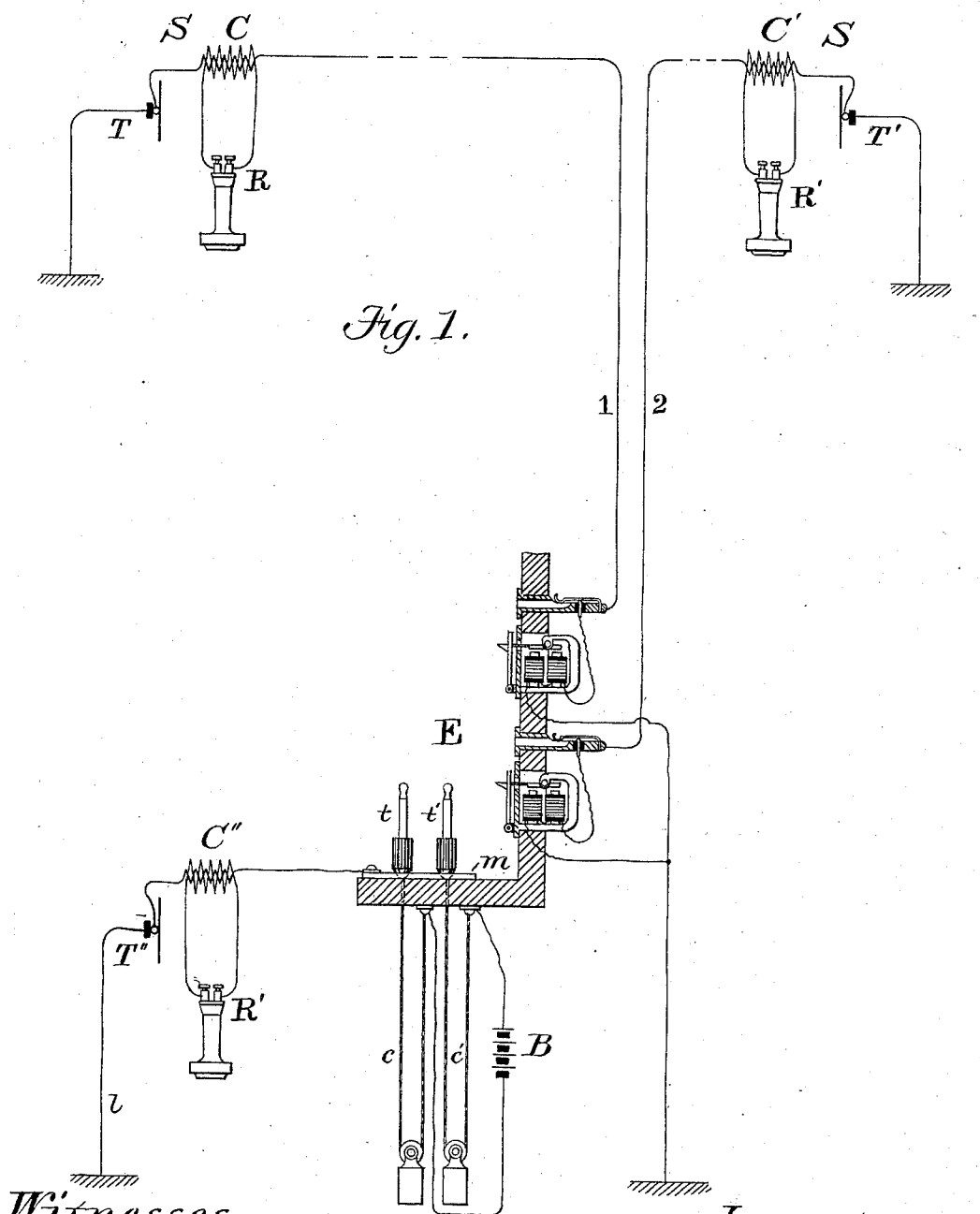
2 Sheets—Sheet 1.

C. W. PRICE & A. BARRETT.

TELEPHONE SYSTEM.

No. 324,591.

Patented Aug. 18, 1885.



Witnesses,
Philip Mauro
C. J. Hedrick

Inventors,
Charles W. Price & Albert Barrett
by Anthony Pollak their attorney

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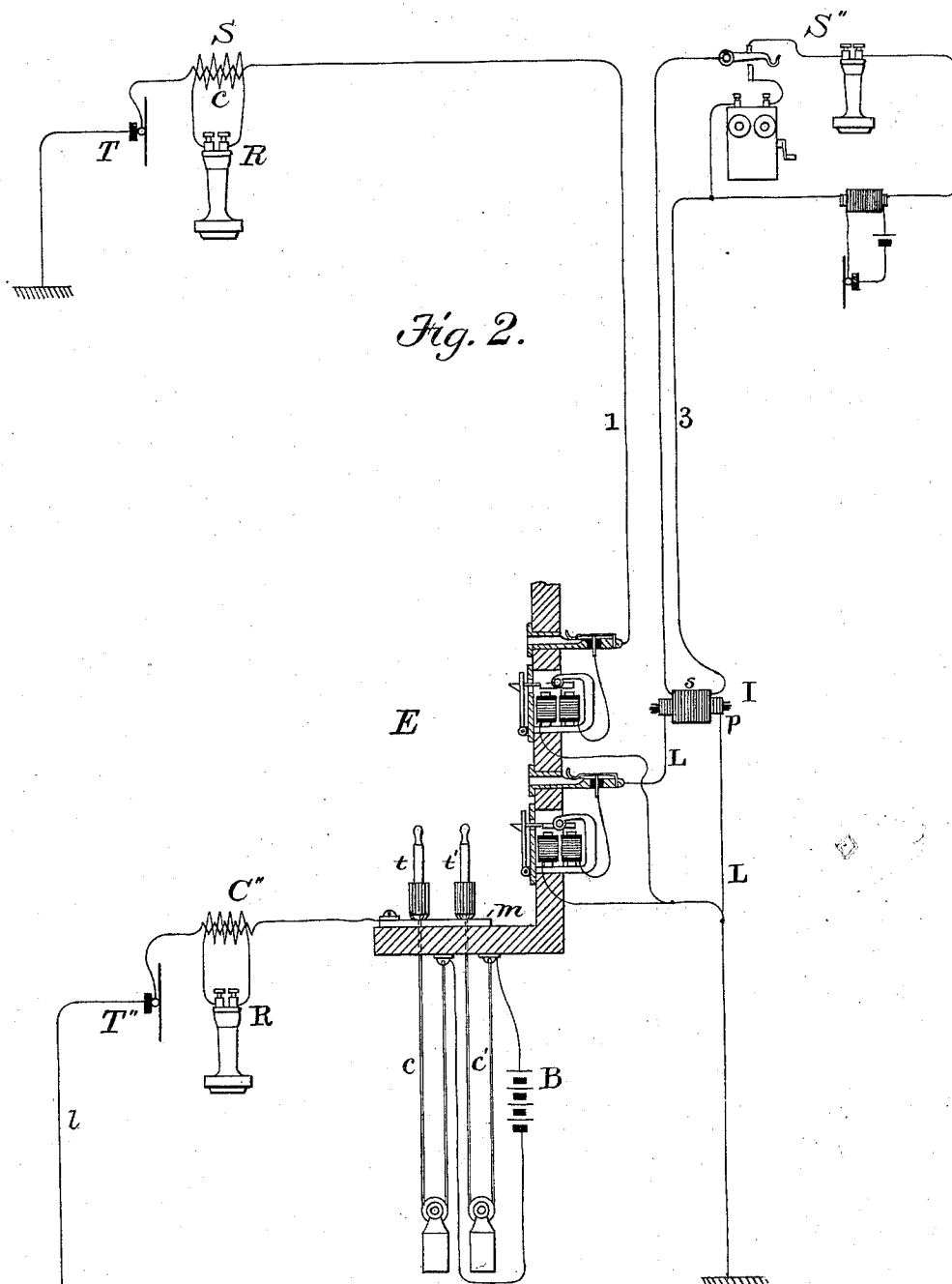
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Their attorney.

UNITED STATES PATENT OFFICE.

CHARLES W. PRICE AND ALBERT BARRETT, OF KANSAS CITY, MO., ASSIGN-
ORS TO THE AMERICAN BELL TELEPHONE COMPANY, OF BOSTON, MASS.

TELEPHONE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 324,591, dated August 13, 1885.

Application filed March 27, 1885. (No model.)

To all whom it may concern:

Be it known that we, CHAS. W. PRICE and ALBERT BARRETT, both residing at Kansas City, in the county of Jackson and State of Missouri, have jointly invented certain Improvements in Telephone Systems, of which the following is a specification.

Our invention relates to the arrangement and connection of telephone-circuits.

10 The object of our invention is to furnish means for quickly and effectively connecting together subscribers' circuits for the purpose of communication in that arrangement of exchange system wherein the battery for operating the transmitters is located at the central station, as described in the United States Letters Patent of G. L. Anders, No. 252,986, January 31, 1882, and No. 287,356, October 23, 1883. In this system the battery-transmitter and primary of an induction-coil are located in the main circuit. The receiving-telephone is in the secondary coil, and upon receipt of a call the central exchange places battery in the main circuit to operate the transmitters. To the end that this may be readily accomplished we provide pairs of connecting-cords at the central station, between the terminals of which appropriate battery-power is permanently located. The operator's transmitter is placed in a normally-open branch, one end of which is permanently grounded, and the other terminal is connected to a plate or other conductor, upon which the butts of the switch-cord tips normally rest. In this branch we also place the primary of an induction-coil the secondary of which is closed through a receiving-telephone. Upon receipt of a call-signal the operator takes either one of a pair of switch-cord tips and inserts it in the jack of the calling-line. This forms a circuit including the operator's transmitter, primary coil, the switch-cords and battery, the calling-line, and the subscriber's transmitter and primary coil. After receiving instructions the operator places the second switch-cord tip of the pair in the jack of the called-for circuit, thus in effect substituting the second subscriber's wire and instruments for the branch line and listening set of the exchange. When a subscriber's circuit,

consisting of a single wire with grounded terminals, is to be connected with a subscriber's station connected to the central exchange by a metallic circuit, we connect the single line into the primary of an induction-coil, the secondary of which is placed in the metallic circuit. In this manner we secure the advantages of transmitting into the metallic circuit as a secondary instead of a tertiary circuit, as is the case with the arrangement in common use.

The accompanying drawings illustrate our invention. Figure 1 shows subscribers' lines connected to a central exchange having our improved arrangements for communicating and connecting such lines together for communication. Fig. 2 is a similar arrangement, in which one of the subscribers' lines is a metallic circuit.

Referring to Fig. 1, subscribers' stations SS' are connected to a central station or exchange, E, by single lines 1 and 2. The telephone sets at these stations consist of a transmitter, T, of any well-known form, located in the main line, and an induction-coil, C, the primary being in the main line and the secondary closed through the coil of a magneto-telephone, R. At the exchange the lines enter and pass to ground through spring-jacks and annunciators, as is customary. *t t'* are plugs or tips to fit the spring-jacks, and are connected together through conducting-cords *c c'* and a suitable battery, B. The amount of battery is dependent upon the length of lines. We have found two or three cells of Leclanché sufficient in ordinary cases. T' is the operator's transmitter, C' the induction-coil, and R' the receiving-telephone connected into a branch-line, 1, in a manner similar to that described for the sub-stations. One end of line 1 is to ground. The opposite terminal is connected to a plate of metal, *m*, or other conductor, upon which the metal butts of the cord-tips normally rest. Upon receipt of a call from the sub-station the operator places either tip of a pair, as *t*, in a jack, thus forming a circuit *via* elements 1 T' C' *m t' c' B c t*, jack, sub-station line and instruments, to ground, and after receiving instructions the tip *t'* is placed in the jack of the called-for line, as line 2, the cir-

cuit then including the transmitters and coils at the sub-stations, the cords and tips, with battery B.

In Fig. 2 is shown our arrangement of means
5 for connecting a single ground-return subscriber's line with a metallic-circuit subscriber's line. The subscriber S'' is upon a metallic circuit, 3, and the instruments at said station may be connected in any well-known
10 manner. At the central station the secondary s of an induction-coil, I, is placed in the metallic circuit 3. The primary p is in a short grounded branch, L, in which the spring-jack and annunciator are included. Upon receipt
15 of instructions to connect a metallic-circuit line with a ground-return line the plugs t and t' are placed in the calling-line, as I, and the branch L of the metallic-circuit line 3, respectively. This allows the sub-station S to
20 transmit into metallic circuit 3 direct from the primary circuit, avoiding the use of one induction-coil in transmitting from the grounded line into the metallic circuit.

We do not herein claim the combination of
25 a main-line metallic circuit containing one coil of an inductorium located at a central station, having a spring-jack and an annunciator connected to the opposite terminals of the second coil, and one or more ground-return
30 main lines having their terminals in switch-connections at the central station, as such subject-matter is the invention of another person.

Having described our invention, what we claim, and desire to secure by Letters Patent,
35 is—

1. In a telephone-exchange, the combination of a switch-board upon which a series of sub-station lines are connected, a pair of connecting-cords with metallic tips united through a
40 battery, a branch line having one terminal connected to earth and the opposite terminal to a metal plate or conductor, upon which the tips of the connecting-cords normally rest, and a battery-transmitter in the circuit of the branch
45 line.

2. In a telephone-exchange, the combination of a switch-board to which the terminals of a series of sub-station lines are connected, a

pair of connecting-cords with metallic tips united through a battery, a branch line having
50 one terminal connected to earth and the opposite terminal to a metal plate or other conductor, upon which the tips of the connecting-cords normally rest, a battery-transmitter, and the primary of an induction-coil located in the
55 branch line, and a receiving-telephone in the secondary of the induction-coil.

3. The combination, in a telephone-exchange, of a switch-board upon which a series of subscribers' lines are grouped, one or more
60 pairs of connecting-cords having metal tips, a metal plate or other conductor, upon which the cord-tips normally rest, connected to ground through the primary of an induction-coil, and a receiving-telephone in the secondary circuit of
65 the coil.

4. The combination, in a telephone-exchange, of a metallic circuit, connecting with a sub-station, containing the secondary of an induction-coil, the primary of which is con-
70 nected with a spring-jack or equivalent device and ground at the central station, a single ground-return subscriber's line containing a battery-transmitter at the sub-station, and means, substantially as described, for con-
75 necting the single line with the primary of the induction-coil and battery.

5. The combination, in a telephone-exchange, of a single-line wire containing a battery-transmitter, a metallic circuit line con-
80 taining the secondary of an induction-coil located at the central station, the primary thereof being connected to ground, and a pair of connecting-cords united through one or more cells of battery for connecting the single line with
85 the primary of the induction-coil, substantially as described.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 17th day of
90 March, 1885.

CHAS. W. PRICE.
ALBERT BARRETT.

Witnesses:

RODNEY FERGUSON,
C. D. CRANDALL.