

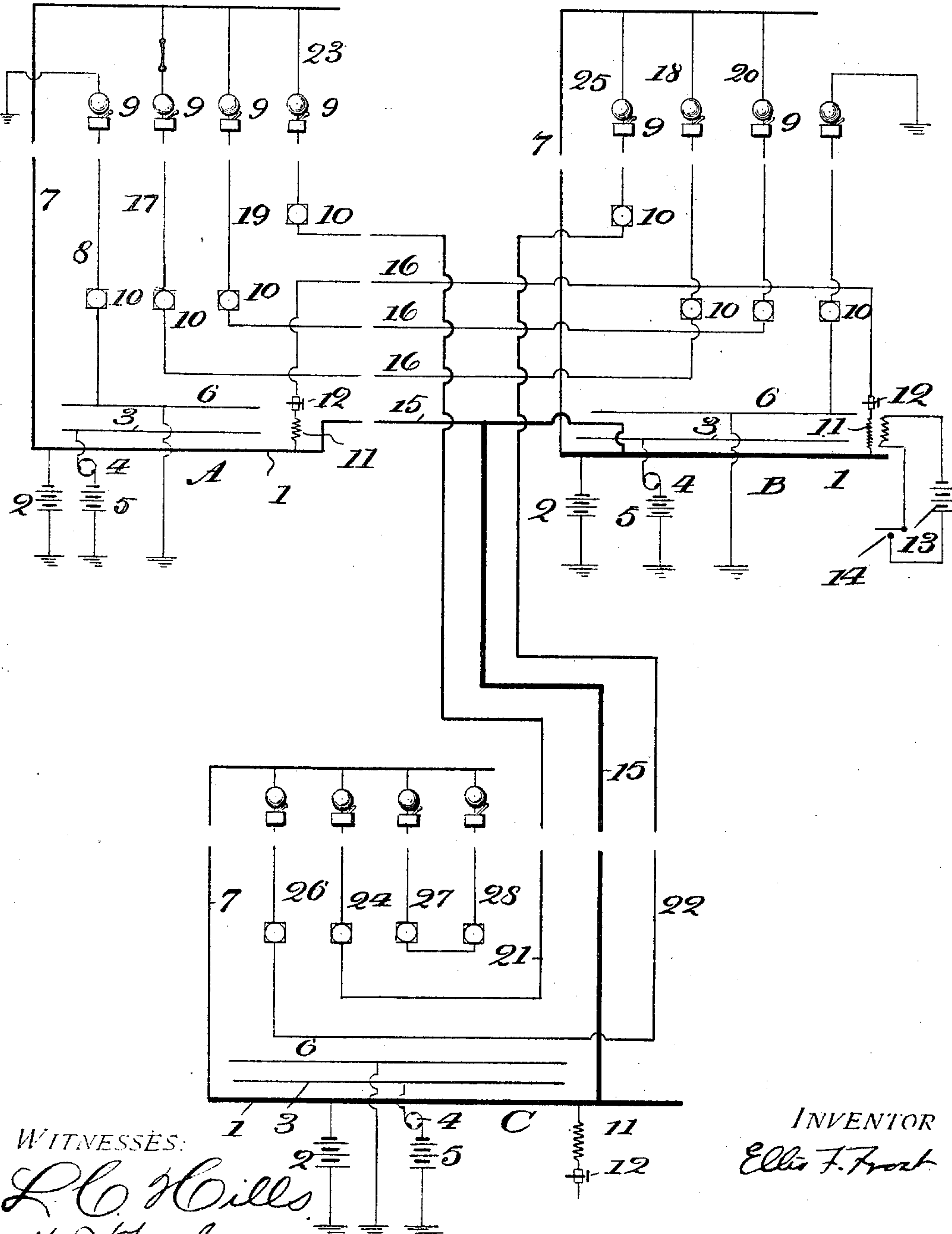
No. 674,860.

Patented May 28, 1901.

E. F. FROST.
TELEPHONE CIRCUIT SYSTEM.

(Application filed June 27, 1900.)

(No Model.)



UNITED STATES PATENT OFFICE.

ELLIS F. FROST, OF WASHINGTON, DISTRICT OF COLUMBIA.

TELEPHONE-CIRCUIT SYSTEM.

SPECIFICATION forming part of Letters Patent No. 674,860, dated May 28, 1901.

Application filed June 27, 1900. Serial No. 21,761. (No model.)

To all whom it may concern:

Be it known that I, ELLIS F. FROST, a citizen of the United States, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Telephone-Circuit Systems; and I do 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 drawing, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to telephone-circuit systems; and it consists in the combination of telephone-line circuits, bus-bars, trunk-lines, and common return-lines, as fully described, claimed, and illustrated in this application for Letters Patent.

Reference being made to the accompanying drawing, my invention is particularly described as follows:

A represents a telephone-circuit system as the plant of one central office, and B represents a telephone-circuit system as the plant of another central office. In both circuit systems at the central office are the bus-bars 1. A battery 2 has the like pole connected to earth, the other pole being connected to the bus-bar 1. A bus-bar 3 is connected through a circuit-breaker 4 with one pole of a battery 5, the other pole being connected to the earth. A bus-bar 6 is connected to the earth. Connected to the bus-bar 1 is the common return-line 7, which also serves as a current-supply line.

Various telephone-lines extend from the central office to the subscribers' stations and when not in use are connected at the central office to the bus-bar 6 and at each subscriber's station to earth, as shown in line 8. The common return-line 7 extends to each subscriber's station. In each telephone-line, both at the subscriber's station and at the central office, are suitable signaling devices, as shown at 9 and 10. At each subscriber's station there is the proper means for telephoning and the mechanisms for making the desired connections and disconnections of the telephone-line, as desired, but which apparatus forms no part of this invention.

At each central office there is the proper

apparatus for operating the various lines as desired, but which apparatus forms no part of this invention. Also at the central office there is an operator's telephone-line, said line being connected to the bus-bar 1 and including the secondary winding of the induction-coil 11 and the magneto telephone-receiver 12. The primary winding of the induction-coil 11 is in circuit with a battery 13 and a microphone 14. Extending between the central offices A and B is the central-office common return-line 15, which is connected to the bus-bars 1 at each office. Also extending between the central offices A and B are the trunk-lines 16. Appropriate signaling means are afforded for signaling between the central offices A and B, but these form no part of my invention.

When a telephone-line is in proper condition for talking purposes, it is connected to the common return-line 7 at the subscriber's station, as shown by line 17.

It is clear that when a telephone-line of one central office—say line 17 of central office A—is connected at the subscriber's station to the common return-line 7 and at the central office to a trunk-line 16, and that when a telephone-line of another central office—say line 18 of central office B—is connected at the subscriber's station to its common return-line 7 and at the central office with the same trunk-line 16, then the two lines 17 and 18 are connected together in metallic circuit, the circuit being line 17, common return-line 7, bus-bar 1 of central office A, common central-office return-line 15, and of central office B, bus-bar 1, common return 7, line 18, and trunk-line 16. If two other lines, as 19 of A and 20 of B, are connected, as shown, it is clear that the common return-line 15 between the bus-bars 1 of both A and B forms a part of this circuit, as well as of the circuit of lines 17 and 18. Also, as shown, the operator's telephone-lines of A and B are connected together, the common return 15 serving to complete this circuit. If there is another central office, as C, with which it is desired to connect, the parts at this central office being as above described for A and B, the common return-line 15 is branched and is connected with the bus-bar 1 of office C. Also a set of trunk-lines 21 extends from the central office A to central of-

5 fice C, as well as a set from central office B to central office C, as trunk-line 22. In the drawing the line 23 of central office A is shown connected with line 24 of central office C. Also line 25 of central office B is shown connected with line 26 of central office C.

10 It is clear that the line 15, connecting the bus-bars 1 of the various central offices, serves as a common return for all telephone-line circuits connected together by means of trunk-lines extending between the various central offices, while the lines 7 of each central office forms a portion of this common return, as well as a common return for the telephone-lines of the particular central office to which the telephone-lines belong, as shown in telephone-lines 27 and 28 of central office C.

20 The various common return-lines, as common return-lines 7 and 15, mentioned above, must for their successful employment be of a relatively low resistance to that of the telephone-lines. The object in having these various common return-lines of a relatively low resistance is to prevent the telephone-currents of one telephone-line finding their return-path over other telephone-lines. Therefore the object in making the common return-lines of relatively low resistance is to prevent any confusion in the telephone-circuits due to what is technically known as "cross talk."

30 I claim—

1. In a telephone-circuit system the combination with a plurality of central offices, a bus-bar at each of said central offices, of a common return-line extending between the

said central offices and connected to each bus-bar.

2. In a telephone-circuit system the combination with a plurality of central offices, a plurality of telephone-lines and a bus-bar at each of said central offices, a source of electric energy connected to the said bus-bars, of a common return-line extending between the said central offices and connected to the bus-bars.

3. In a telephone-circuit system the combination with a plurality of central offices, a plurality of telephone-lines and a bus-bar at each of said central offices, a trunk-line adapted to connect the said telephone-lines, of a common return-line extending between the said telephone-lines.

4. In a telephone-circuit system the combination with a plurality of central offices, a plurality of telephone-lines and a bus-bar at each of the said central offices, a trunk-line adapted to connect the telephone-lines, of a common return-line extending between the said telephone-lines consisting of the local common return-line and said bus-bar proper to each central office and a line extending between the said central offices connected to the said bus-bar.

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

ELLIS F. FROST.

Witnesses:

F. A. LEHMANN,
ROSANN SMITH.