(No Model.) 2 Sheets—Sheet 1.

E. T. GILLILAND.

METALLIC CIRCUIT TELEPHONE SYSTEM.

No. 306,240. Patented Oct. 7, 1884.

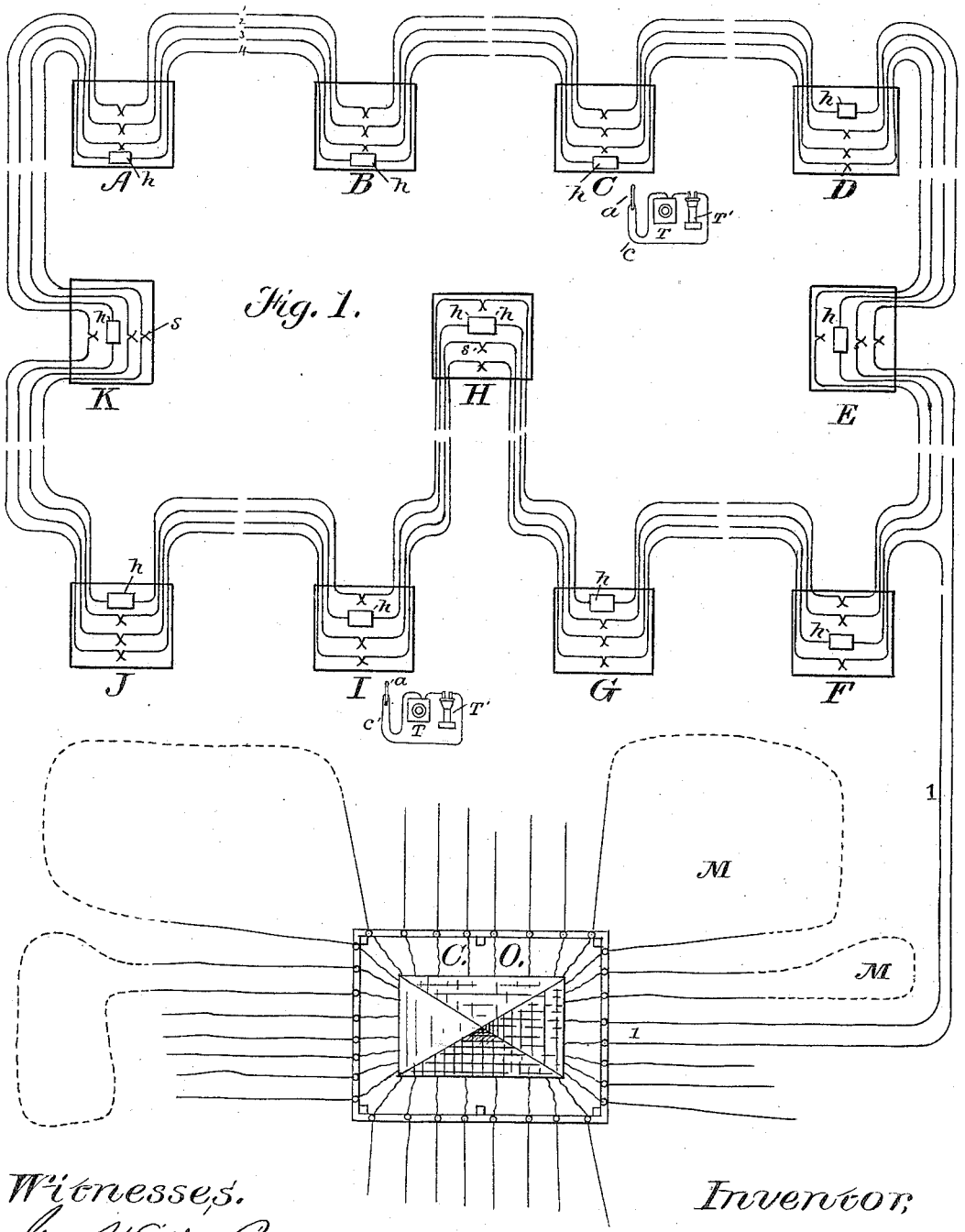

Fig. 1.

Witnesses.
Geo. Willis Pierce
Thos D Lockwood

Inventor.
Ezra T. Gilliland

(No Model.) 2 Sheets—Sheet 2.

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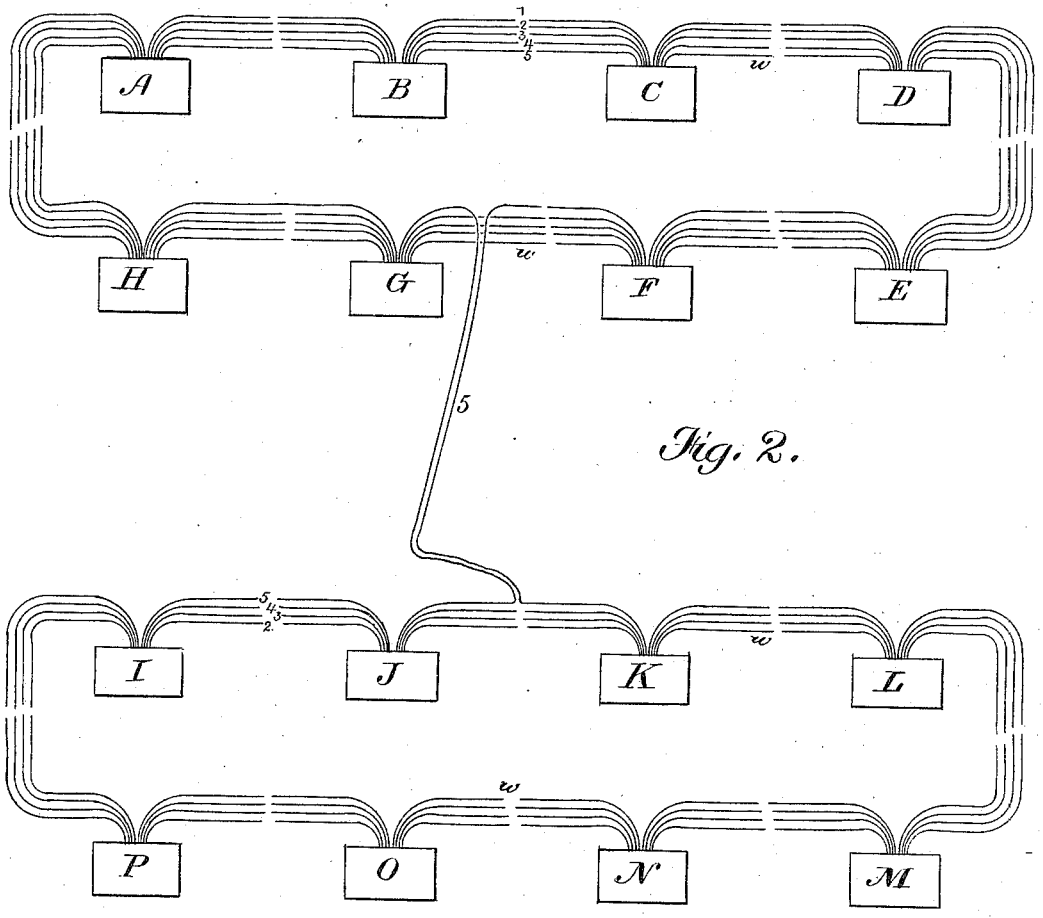

Fig. 2.

Witnesses.
Geo. Willis Pierce
Thos D Lockwood

Inventor:
Ezra T. Gilliland

UNITED STATES PATENT OFFICE.

EZRA T. GILLILAND, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE AMERICAN BELL TELEPHONE COMPANY, OF SAME PLACE.

METALLIC-CIRCUIT TELEPHONE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 306,240, dated October 7, 1884.

Application filed May 22, 1884. (No model.)

To all whom it may concern:

Be it known that I, EZRA T. GILLILAND, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Metallic-Circuit Telephone Systems, of which the following is a specification.

My invention relates to the arrangement and construction of telegraphic circuits, constituting an improvement on and expansion of former applications filed by me, which I will hereinafter more fully specify. By this invention intercommunication may be maintained between telephonic centers distant from one another, whether the various corresponding stations or centers be of the same general character or otherwise.

In an application for Letters Patent filed April 21, 1884, I have shown and described a system of telephony consisting, broadly, in a series of main lines extending between and entering all of the said sub-stations, a looping-in switch being provided at each station, whereby the subscriber may introduce his signaling mechanism and telephones into any one of the main-line circuits, and call and converse with the sub-stations normally connected thereon. In the same specification, to which reference may be made, I have provided that the said apparatus at each station should be normally connected in some particular one of the said main lines, so that when the entire system is quiescent a certain number of stations—say five—are normally connected in and with No. 1 main line, five more with No. 2, five more with No. 3, and so on *ad libitum*, so that each station may call and communicate with any other station on the same line without a change in its connections, and may furthermore connect with any station or any other line by transferring his instrument-loop to the said line. In such a system each substation therefore has its calling and telephonic instruments normally connected in one of the said main lines, and is understood by all stations to have the power of withdrawing its instruments from their normal location and of transferring them to any other of the entering main lines, either by manual or automatic operation, so that the stations of those lines can be readily called and communicated with.

In a second application, filed May 3, 1884, and serially numbered 130,218, I have shown and described a system similar to the above, but with a trunk line or extension added thereto, and operated upon the same principle, extending to a second telephonic center, which second system may either be of the same character or of the ordinary central-office type.

The object of my present invention is to provide a complete system of metallic circuits arranged upon the plan described in my application of April 21, 1884; and, furthermore, to adopt in conjunction with such a metallic-circuit system the trunk-line feature involved in my second application of May 3, 1884.

In the drawings which accompany this specification, Figure 1 is a diagram showing a system of metallic circuits of the class wherein a central station is dispensed with, connected by a metallic-circuit trunk-wire with a metallic-circuit central-office system; and Fig. 2 is a diagram showing two like systems similarly connected.

Any or all of the forms of switching apparatus shown in my prior applications may be used in connection with this improvement.

It is well known that by the employment of properly-arranged metallic circuits the disturbances commonly caused by induction between parallel lines may be in a great part avoided, and I design to take advantage of this fact.

In Fig. 1, a series of stations, A, B, C, D, E, F, G, H, I, J, and K, comprising an entire system of telephonic communication, are connected together by a series of line-wires, 2, 3, and 4, in metallic circuit. According to the terms of my prior application, all of the wires pass through all of the stations, but the signal-receiving apparatus *h* is preferably located in some particular one of the said lines, so that it may always be clearly understood what line any station may be called on. Thus it will be seen that the signal apparatus at stations A, B, C, G, and J is normally connected with line No. 4, that of stations E, H, and I with line 3, and that of F and K with line 2. Line No. 1 is a trunk-line, is also a metallic circuit, and, in addition to looping into all of the aforesaid stations, it extends outward to the distant exchange system C O, which in this instance is assumed to be a system consisting of a central

station having lines radiating therefrom. Each of the lines, however, has a spring-jack or equivalent device, *s*, whereby the telephone-instruments may be at the pleasure of the operator included therein, so that all stations may freely communicate with one another.

The telephone-instruments at each station are represented by the transmitter T and receiver T', both by means of a flexible cord, *c*, being connected with a double conducting-wedge, *a*, adapted to be included in any of the line-circuits.

The trunk-line I, although represented by a spring-jack at each station, has a signaling apparatus at only one station, D, in the system, and in the event of any subscriber in the distant exchange desiring to speak with any of the stations A, B, C, &c., it becomes necessary for the operator at D to receive the call first, and to notify the desired station to introduce its apparatus into the trunk-line. Any of the stations A, B, C, &c., having a message for a station in either the distant or home system, may work direct, by at once including their apparatus into line No. 1. The lines diverging from the station C O are likewise supposed to be in whole or in part metallic circuits, several of them, M, being for the purpose of indicating the fact, shown as being completed in dotted lines. It is obvious that by the use of this plan any subscriber in the first system can at will put himself into electrical connection over a metallic circuit with any other subscriber of the same system, or by means of the metallic-circuit trunk with the distant system. The several metallic circuits may enter the stations through cables, as indicated in my prior application.

In Fig. 2 I show two systems of like character connected by the double trunk-line 5. Both systems comprise any required number of line-circuits *w* running into all the stations.

It will be understood from Fig. 1 that the several lines are at each station provided with suitable connections whereby the station-telephones may be looped into any line, each line having several stations normally connected therewith. The trunk-line 5 connects with all of the stations of both systems, and at one special station of each system the telephone-instruments are normally included in said trunk-line.

Although I have shown and described but one trunk-line, it is obvious that my invention contemplates any desired number, and that I am by no means limited to any specific number.

I am aware that it has been proposed heretofore to connect two central-office systems at different places by means of a metallic circuit, and therefore do not claim such arrangement as my invention.

The distinguishing feature of my invention consists in the application of the metallic circuit to any exchange system of local and trunk telephone-wires, in which a central station is dispensed with, and in which all the wires of each system connect with all the stations thereof.

I claim—

The combination of two telephone-exchange systems, each comprising a series of telephone-stations, a series of telephone-stations, a series of metallic circuits extending between and looping in all of the said telephone-stations, and telephone apparatus at each station capable of being included in any of the said circuits, with a metallic or double-conductor circuit extending between the said two systems, and to each of the stations in the two systems, for the purposes specified.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 20th day of May, 1884.

EZRA T. GILLILAND.

Witnesses:

THOS. D. LOCKWOOD,

GEO. WILLIS PIERCE.