

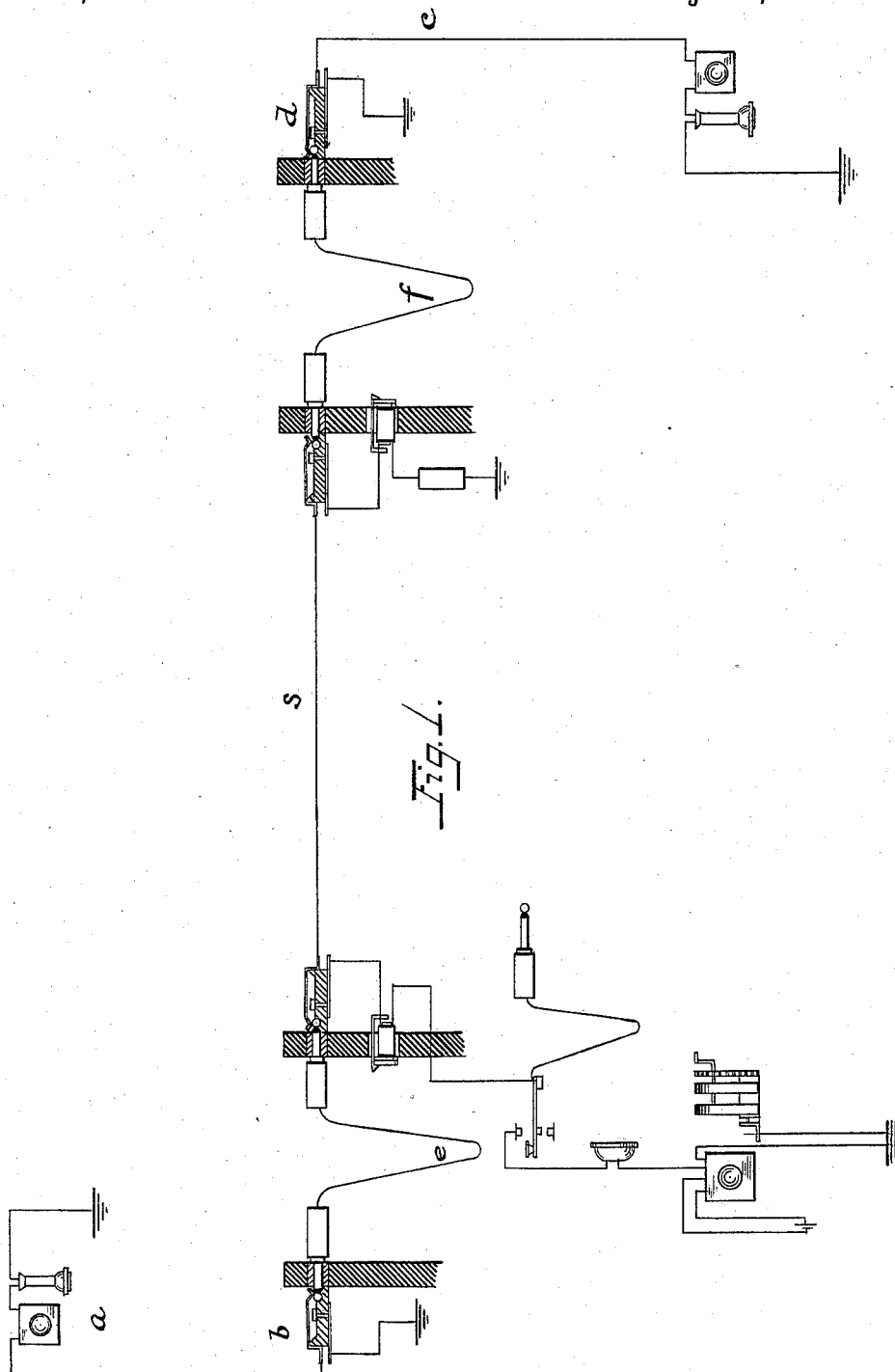
(No Model.)

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J. J. O'CONNELL.  
TRUNK LINE SYSTEM.

No. 474,854.

Patented May 17, 1892.



Witnesses.

Ella Edler

Geo. R. Parker

Inventor

Joseph J. O'Connell.

By George H. Barton  
Attorney.

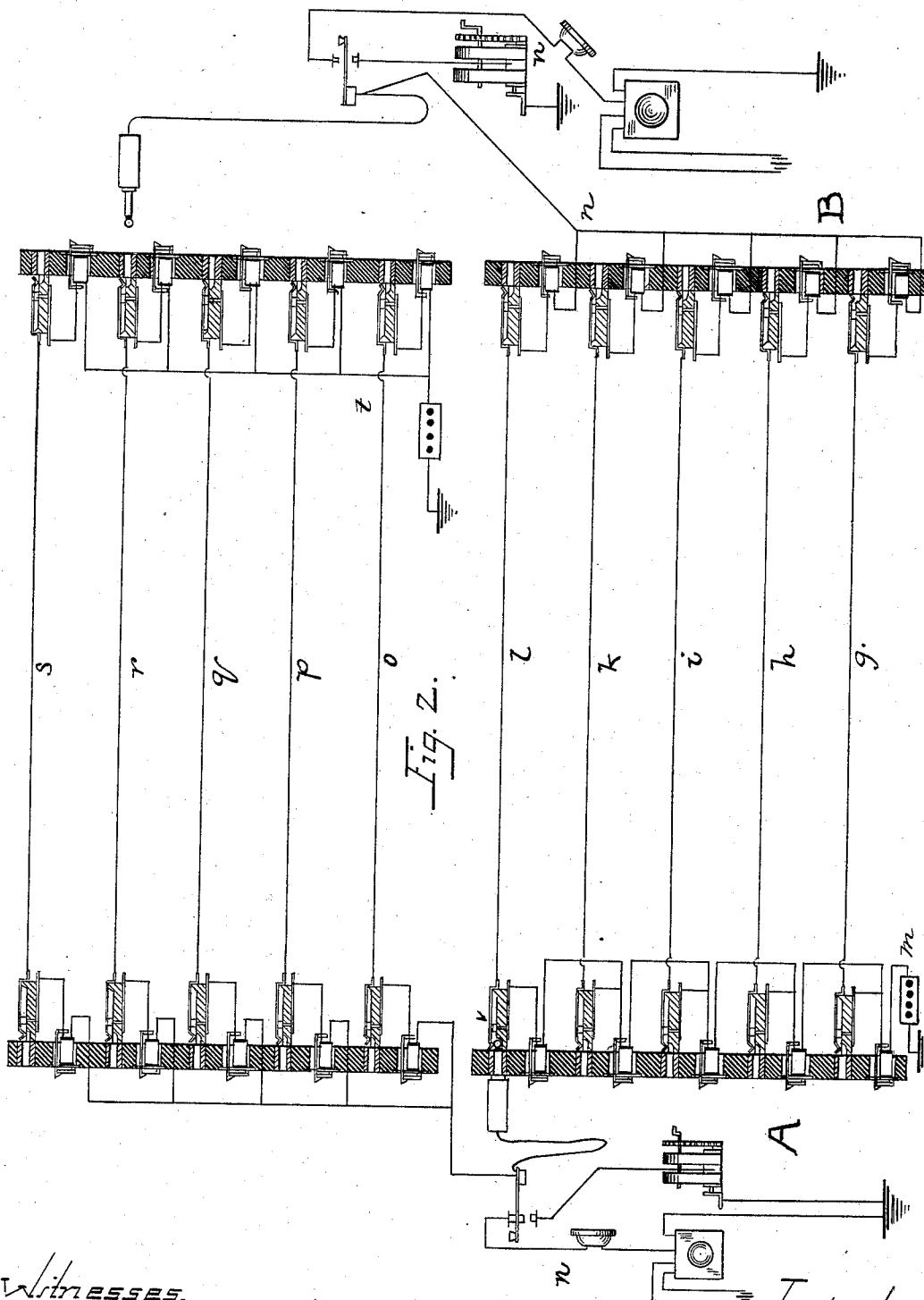
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# UNITED STATES PATENT OFFICE.

JOSEPH J. O'CONNELL, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE WESTERN ELECTRIC COMPANY, OF SAME PLACE.

## TRUNK-LINE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 474,854, dated May 17, 1892.

Application filed October 4, 1888. Serial No. 287,255. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH J. O'CONNELL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Trunk-Line Systems, (Case No. 4,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to telephone-exchange systems in which the lines are grouped upon different switchboards, either at the same central office or at different sub-offices, and trunk-line connections provided between the different boards in such manner that a line having its terminal upon one board may be connected with a line having its terminal upon another board through the medium of one of the trunk-lines.

The object of my invention is to provide ready means of communicating directly over the trunk-lines between the operators at different boards. The trunk-lines between any two boards or sub-offices are divided into two divisions, one division extending from spring-jack switches and annunciators at one sub-station to spring-jack switches and annunciators at the other station, the lines being connected at the first station to a common ground-wire, including, say, a thousand ohms resistance, and at the other sub-station with a common wire, including a telephone. The other division is connected in the same way between the two sub-stations or between the two switchboards, but in the reverse order. The two operators may thus communicate between one another, and having given the proper orders any two telephone-lines may be put in connection through the same trunk-wire over which the operators communicated in giving and receiving the order.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a detailed view illustrative of two telephone-lines having their terminals on different switch boards connected together for conversation through a trunk-line. Fig. 2 is a diagram showing ten trunk-lines connected between two different stations and di-

vided into two divisions in accordance with my invention.

Like parts are indicated by similar letters of reference throughout the different figures.

Referring now to Fig. 1, telephone-line *a* extends from the subscriber's station of said line to spring-jack switch *b* upon the general switchboard of one sub-exchange. Telephone-line *c* in like manner extends from its subscriber's station to a spring-jack switch *d* of the general switchboard of the other sub-exchange. These lines are connected together by means of pairs of plugs and cords *e f* and the trunk-line *s*.

Referring now to Fig. 2, it will be seen that the trunk-lines each extend from a common line *m*, including resistance, through an annunciator and a spring-jack at sub-station A, through a spring-jack switch and an annunciator at sub-station B, and thence to a common line *n*, including a listening operator's telephone. The other division of the trunk-lines consists of lines *o p q r s*, each connected in the same way between the two sub-stations A and B, but in the opposite direction—that is to say, each line is connected to a common ground-wire *t*, including resistance at sub-station B, and passes thence through a switch and an annunciator at sub-station A, and thence to a common line *n*, including the listening operator's telephone at sub-station A. Suppose the operator at sub-station A desires to speak to the operator at sub-station B. She simply connects her telephone with any one of the trunk-lines of the division of outgoing trunk-lines *g h i k l*, and is at once in communication with the listening operator at sub-station B. Thus the operator's telephone at sub-station A is shown connected by means of a flexible cord and terminal plug with switch *v* of trunk-line *l*, and thence the circuit is completed, as shown, through common line *n* and the operator's telephone at sub-station B. The operator at sub-station B desiring to communicate with operator at sub-station A will do so in the same manner through the medium of one of the trunk-lines *o p q r s*. The operators at the different stations, as is well known, will be each provided with several pairs of connecting-cords pro-

vided with terminal plugs. A call coming in, as over line *a*, the operator will insert one plug of a pair in spring-jack switch *b* of the calling subscriber's line and bring her telephone into circuit and receive the order. The order being for a line having its terminal upon the switchboard of another sub-station, she will insert the other plug of the pair in a trunk-line spring-jack and inform the operator at the sub-station where the line wanted terminates of the call, it being understood that such pairs of cords will be provided with the usual connections with the operator's telephone outfit. Leaving the pair of cords thus connected, the work of the first operator is finished for the present, and she disconnects her telephone from said pair of cords and proceeds with her other work. We will suppose that line *c* was called for. The operator at sub-station B on being notified of the call at once connects with said line by inserting a plug of a pair in spring-jack *d*, as shown, the other plug of the pair being inserted in the spring-jack switch of trunk-line S at sub-station B, as shown in Fig. 1. It will be understood, of course, that the usual signal will be sent over line *c* by operator at sub-station A to ring the subscriber's bell included therein to notify the subscriber of the call. This may be done in any well-known way. The special plug and cord shown connected with the operator's telephone and a key for closing this circuit to the generator may be used in signaling, if desired, or the usual connections may be provided with the cords *e* and *f* for doing this work. The resistance in the common lines *m* and *t* should not be so great as to prevent the generator-current from operating the annunciators in the trunk-lines, and yet it should be sufficient to cause the voice-current when sent over any trunk-line to operate the listening operator's telephone.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. Trunk-lines between two switchboards or sub-stations divided into two divisions, one division extending from a common ground-wire including resistance at one station, each through a different spring-jack switch, and thence each to the other sub-station and each through a different spring-jack switch, and thence to a common line including an oper-

ator's telephone, the other division extending from a common line including resistance at the last sub-station, each through a different spring-jack switch, and thence each to the other or first sub-station, and thence to a common line including the listening operator's telephone, in combination with switching apparatus whereby the operators may communicate over the different trunk-lines, said trunk-lines being adapted in making the connections between different telephone-lines terminating at the different stations, substantially as and for the purpose specified.

2. The combination, with two groups of telephone-lines, each group being connected with different switchboards at the same central office or at different sub-offices, of trunk-lines extending between the switchboards, said trunk-lines being in different sets or divisions, the lines of each division extending from spring-jack switches and annunciators of one switchboard to spring-jack switches and annunciators at the other switchboard, and each division being provided reciprocally at different stations or boards with a common ground branch of high resistance and a common wire including an operator's telephone, and switching apparatus for connecting the telephone at either station with one of the trunk-lines of the division extending to the other station, substantially as and for the purpose specified.

3. The trunk-line system, substantially as hereinbefore described, consisting in two divisions of lines, one division being connected from a common ground-wire including resistance, each through a different annunciator and spring-jack switch at sub-station A and extending to sub-station B, and being there connected each through a different spring-jack switch and annunciator to a common line *n*, including a listening operator's telephone, the other division being connected from a common line *t* at station B, each through a different annunciator and spring-jack switch and extending to station A and being there connected each through a different spring-jack switch and annunciator to a wire *n*, including the listening operator's telephone at station A.

In witness whereof I hereunto subscribe my name this 30th day of August, A. D. 1883.

JOSEPH J. O'CONNELL.

Witnesses:

GEORGE P. BARTON,  
ELLA EDLER.