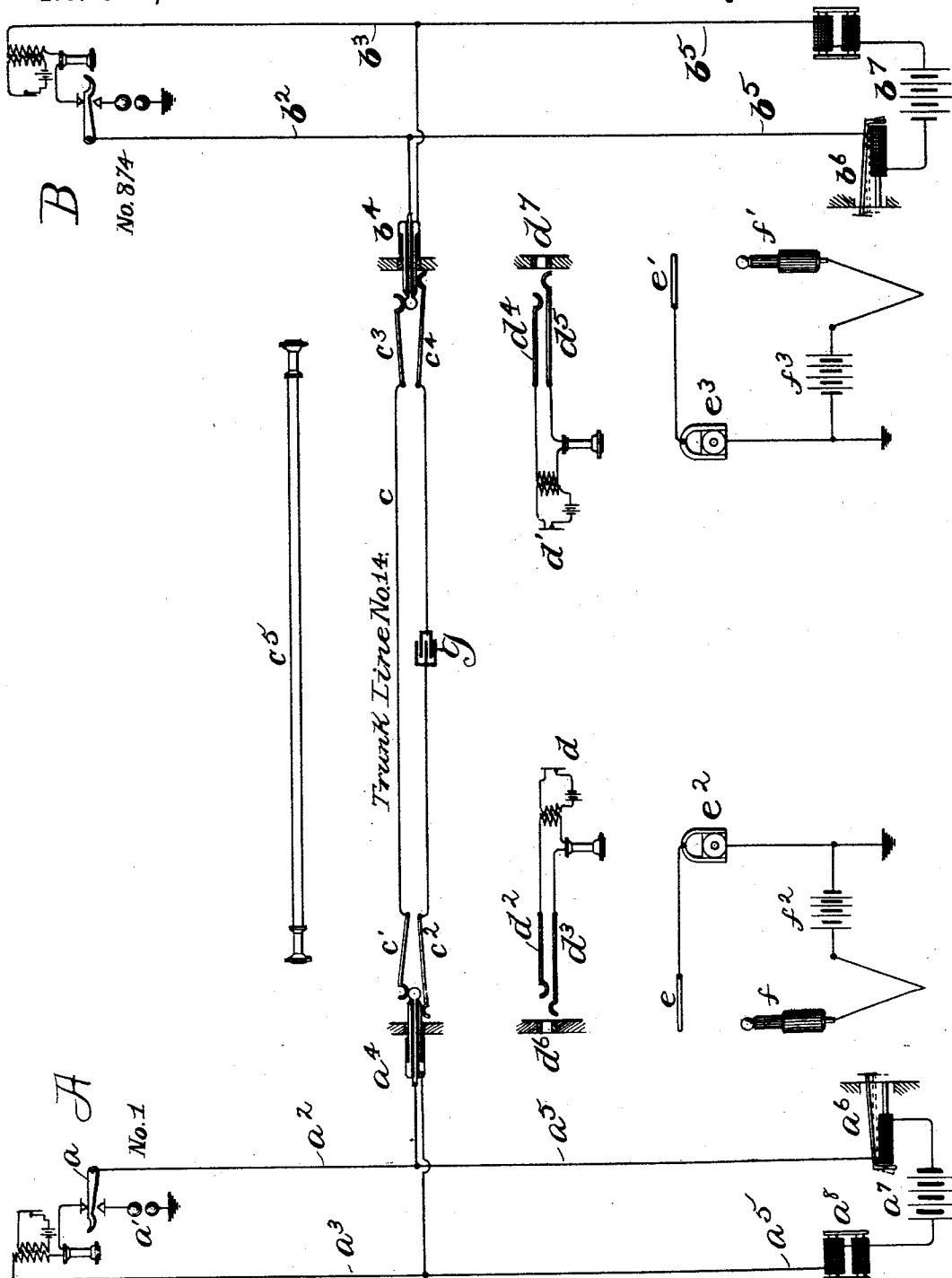


(No Model.)

J. I. SABIN & W. HAMPTON.  
TELEPHONE TRUNK LINE SYSTEM.

No. 520,083.

Patented May 22, 1894.



Witnesses:

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# UNITED STATES PATENT OFFICE.

JOHN I. SABIN AND WILLIAM HAMPTON, OF SAN FRANCISCO, CALIFORNIA.

## TELEPHONE TRUNK-LINE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 520,083, dated May 22, 1894.

Application filed February 12, 1894. Serial No. 499,954. (No model.)

*To all whom it may concern:*

Be it known that we, JOHN I. SABIN and WILLIAM HAMPTON, citizens of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented a certain new and useful Improvement in Telephone Trunk-Line Systems, (Case No. 8,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

Our invention relates to a telephone trunk line system, and its object is to facilitate the connection of subscribers through trunk lines, and to simplify the operator's connecting apparatus.

Our invention, in its preferred form, comprises telephone lines extending to the operators' boards, and terminating each in the contact terminals of a plug mounted upon a flexible cord. In a shunt circuit is located the subscriber's individual indicator which is of the self-restoring type, a battery being located in the shunt circuit adapted to be opened or closed through the indicator by a switch at the subscriber's station, which switch may be the subscriber's telephone switch. The shunt circuit is permanently connected with the line, so that the indicator may serve both as a clearing out and as a calling indicator. The operators at the several boards are connected by independent telephone circuits, each operator being also provided with a telephone set terminating in sockets upon the board whereby she may connect herself in circuit with a calling subscriber by the insertion therein of the plug of his line. The several boards are connected by a series of trunk lines terminating in switches, into which the plugs of the subscribers may be inserted to connect them in circuit. In connecting with the trunk line, the plug of the calling subscriber is removed from the socket of the operator's telephone set and placed in the trunk line switch, the operator being thus unable to cut her telephone set into circuit without breaking the talking circuit, absolute secrecy between the conversing subscribers being thus secured.

The operator at the board of the called subscriber may ring over the called subscriber's line by touching the shell of such subscriber's

plug, before inserting the same in the switch socket, to a bar grounded through the generator, the bell being normally included in a ground connection from the shell side of the line. To ring the called subscriber who does not immediately respond, a battery plug may be touched to the shell of the inserted plug to again ring the subscriber's bell.

We will describe our invention in connection with the accompanying diagrammatic illustration, in which are shown two subscribers connected for conversation.

The subscriber's apparatus may comprise the usual transmitter and receiver, the receiver hanging normally upon a telephone hook *a* to connect the ground branch containing the bell *a'* with one limb of the line, the hook when the telephone receiver is in use closing the circuit through the telephone set and cutting from circuit the branch containing the bell. The limbs *a*<sup>2</sup> *a*<sup>3</sup> of the line of subscriber A extend to the first operator's board, where they terminate respectively in the tip and the sleeve of a plug *a*<sup>4</sup>. In a shunt circuit *a*<sup>5</sup> is included the individual indicator *a*<sup>6</sup> together with a battery *a*<sup>7</sup>. To balance the line a retardation coil *a*<sup>8</sup> may be employed. Likewise, the limbs *b*<sup>2</sup> *b*<sup>3</sup> of the line of subscriber B, extend to a second operator's board, terminating thereat in the terminals of the single cord plug *b*<sup>4</sup>, a battery *b*<sup>7</sup> and indicator *b*<sup>6</sup> being included in a shunt circuit *b*<sup>5</sup>. The boards of the operators are connected by a number of trunk lines, but one of which, *c*, is shown in the drawing, the lines terminating at the boards in line springs *c*<sup>1</sup> *c*<sup>2</sup> and *c*<sup>3</sup> *c*<sup>4</sup>. The boards are also connected, in the usual manner, by a local telephone circuit *c*<sup>5</sup>, by means of which the operators may converse. The operators' telephone sets *d* *d'* terminate respectively in the line springs *d*<sup>2</sup> *d*<sup>3</sup> and *d*<sup>4</sup> *d*<sup>5</sup> of the telephone sockets *d*<sup>6</sup> and *d*<sup>7</sup>. The operators are also provided with ringing plates *e* *e'* connected through generators *e*<sup>2</sup> *e*<sup>3</sup> to ground. The operators are further provided with battery plugs *f* *f'* connected through batteries *f*<sup>2</sup> *f*<sup>3</sup> to ground. In the shell limb of the trunk line is provided a condenser *g* for a purpose hereinafter to be described.

Instead of providing a generator ringing plate and a battery plug a single generator or battery plug may be provided against which

the plug of the called subscriber may be placed in the first instance to send the ringing current, and which may be lifted into contact with the shell of the plug after it has been placed in the trunk line socket, for the purpose of sending an additional calling signal, but we prefer the provision of a ringing bar and a battery plug.

We will now describe the operation of the system as above described. Supposing subscriber A desirous of speaking with subscriber B, whose number may be 874; he removes his telephone from its hook, thus closing circuit of battery  $a^6$  and actuating indicator  $a^6$  and informing the operator that he desires connection. The operator then inserts plug  $a^4$  of subscriber A in her telephone socket  $d^6$ . Her telephone set being now in circuit, she inquires the number of the called subscriber. Having received the number of the called subscriber the operator at the first board merely repeats to the operator at the second board, through the local telephone circuit  $c^5$  the number of the called subscriber, "874," upon hearing which the operator at the second board instructs the first operator which trunk line to use by repeating the number of the trunk line. Supposing the second operator to say "on 14," the operator at the first board removes plug  $a^4$  from socket  $d^6$  and inserts it in the socket of trunk line 14. The operator at the second board upon receiving the number of the called subscriber, touches the shell of such subscriber's plug  $b^4$  to ringing bar  $e'$ , thus sending a ringing current over the shell side of B's line to ground through his bell, B's telephone being upon its hook. She then inserts plug  $b^4$  in the socket of trunk line 14, and should B respond, he removes his telephone from its hook, and the two subscribers are in conversation, the operator being informed that B has responded by the actuation of indicator  $b^6$ , since he closes the circuit of battery  $b^7$  by removing his telephone. Should B not respond immediately, the operator may send another ringing current by touching her ringing plug  $f'$  to the shell of  $b^4$  as it rests in the socket, the current of the battery being prevented from passing toward the calling subscriber's station by means of condenser  $g$ . When the subscribers have completed conversation and have hung up their telephones, the operators will be informed of the fact by the indicators  $a^6$  and  $b^6$ , and will remove plugs  $a^4$  and  $b^4$  from the sockets of the trunk line. The condenser  $g$  renders the indicators individual to the two connected subscribers by preventing the indicator battery of one subscriber from affecting the indicator of the other subscriber.

We are aware that our invention is susceptible of modifications, and that features of our invention may be used in other connections, and we do not, therefore, desire to limit ourselves to the specific embodiment shown and described herein, but

We claim as new and desire to secure by Letters Patent—

1. The combination with two single cord telephone lines connected for conversation through the central station, of individual indicators and batteries located in closed bridges between the sides of each of said lines, and a condenser in one side of the circuit and between said bridges, whereby said individual indicators may serve as individual clearing out indicators, substantially as described.

2. In a trunk line telephone system, the combination with telephone lines terminating in the contacts of connecting plugs at the operators' boards, of batteries and individual indicators located in permanent bridges between the opposite sides of each of said lines, trunk lines terminating in switch sockets at the several boards, and a condenser in one of the limbs of each of said trunk lines whereby connection may be made by the insertion of the subscribers' plugs in the trunk line sockets, and the individual indicators may serve for clearing out indicators, substantially as described.

3. In a trunk line telephone system, the combination with telephone lines terminating in the contacts of connecting plugs at the operators' boards, of batteries and individual indicators located in permanent bridges between the opposite sides of each of said lines, and trunk lines terminating in switch sockets at the several boards, and a condenser in one limb of said trunk line, whereby the individual calling indicators may serve as individual clearing out indicators, substantially as described.

4. The combination with a single cord telephone line, of an operator's telephone apparatus terminating in a switch socket, whereby the operator's telephone circuit may be brought into circuit by the insertion of the subscriber's plug, substantially as described.

5. The combination with a trunk line terminating in a switch socket at the operator's board, of single cord telephone lines terminating in connecting plugs thereat, and an operator's telephone set terminating in a switch socket, substantially as described.

6. The combination with a metallic circuit telephone line terminating in a cord and plug at the central station, of a calling device in a normally closed ground from one limb of the line, and a stationary plate at the central station connected through a source of calling currents to ground; whereby said calling device may be actuated by touching said plug to said stationary plate, substantially as described.

In witness whereof we hereunto subscribe our names this 5th day of February, A. D. 1894.

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Witnesses:

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