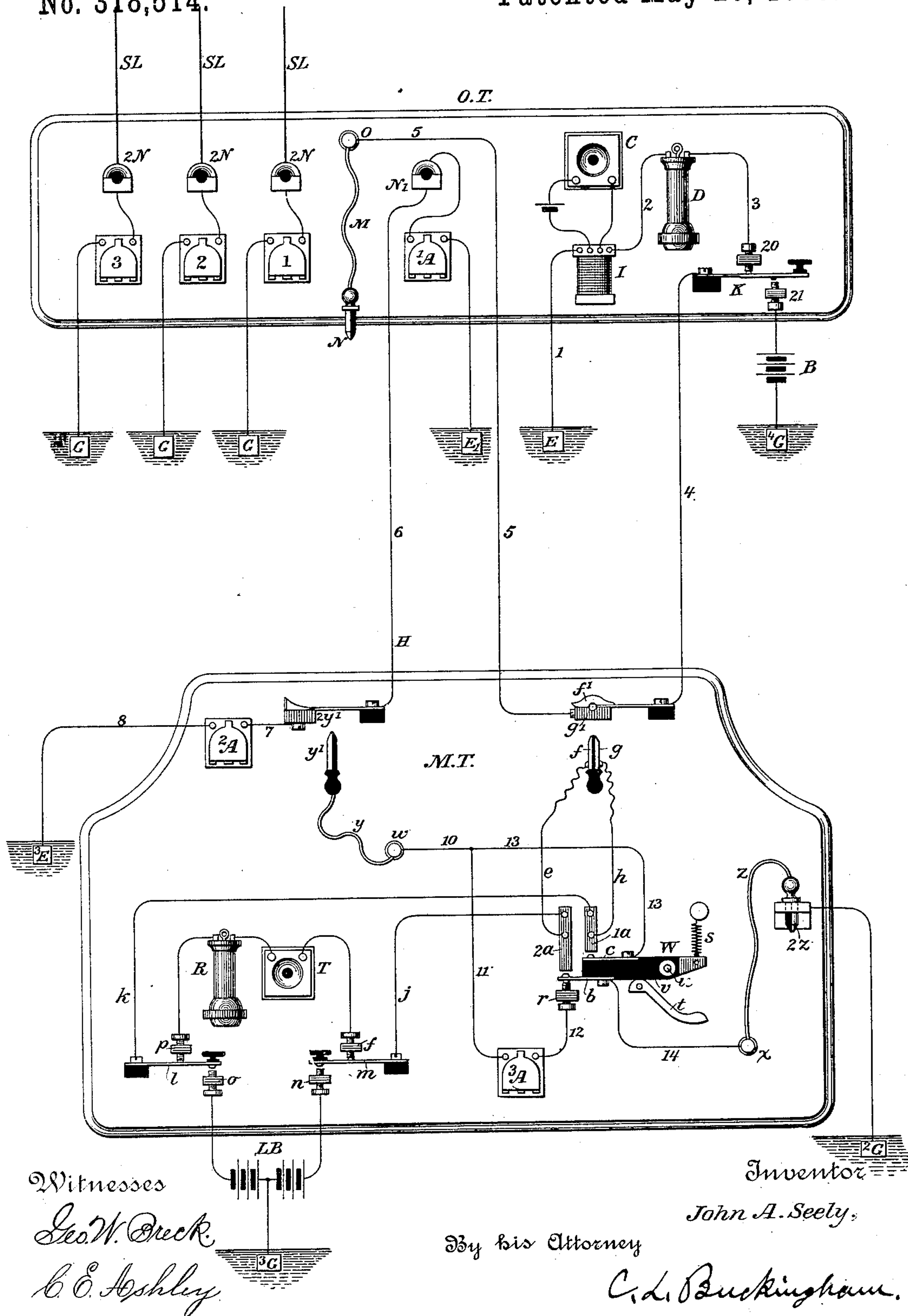


(No Model.)

J. A. SEELY.
TELEPHONE EXCHANGE.

No. 318,514.

Patented May 26, 1885.



UNITED STATES PATENT OFFICE.

JOHN A. SEELY, OF NEW YORK, N. Y.

TELEPHONE-EXCHANGE.

SPECIFICATION forming part of Letters Patent No. 318,514, dated May 26, 1885.

Application filed October 6, 1884. (No model.)

To all whom it may concern:

Be known that I, JOHN A. SEELY, of the city, county, and State of New York, a citizen of the United States of America, have made
5 a new and useful Improvement in Telephone-Exchanges, of which the following is a specification.

At a central office of a telephone-exchange many operators are employed, each of whom
10 is entrusted to attend to the calls of a certain number of subscribers, while all of said operators are under the immediate supervision of a manager who is provided with means whereby he may communicate with and call all of
15 the operators, and may connect his telephone in any subscriber's wire with which an operator may be in connection.

I am aware that it is not new to provide an exchange with a series of operators' tables,
20 to each of which tables a part of the lines centering into the exchange are connected, together with a manager's table which is capable of being connected with all of the operators' tables; nor is it broadly new to loop a
25 manager's telephone into an operator's line at the manager's table. Each operator's table is provided with what is commonly known as an "operator's line," which extends from the earth at the operator's table, through a receiving and
30 transmitting telephone, to the manager's table, there passing through a spring-jack or other suitable switch, by which the manager can loop his telephone into said line; and from the manager's table the operator's line extends
35 back to the operator's table, where it terminates in the switch-block, which forms a normally-insulated terminal therefor. A second conductor, which I term the "manager's line," extends from each operator's table to the manager's table, and is provided at each end with
40 a spring-jack and annunciator, thus enabling an operator, by connecting his line with the manager's line, to signal the manager, or the manager, by connecting a battery to his line,
45 to call the operator. The manager's table is provided with a telephone in an electrical conductor terminating in a switch-plug, whereby the manager may loop his telephone directly into an operator's line by means of the spring-
50 jack in said line which is at the manager's table. The manager's table is also provided with an additional loop branch terminating in two

switch-plugs, one of which normally connects with earth, whereby the manager may connect any two managers' lines together, or any
55 one manager's line to earth. The manager's table is provided with a signaling-battery and two keys, whereby the manager may signal either of two operators who are connected by managers' lines, and each operator has a key
60 and battery for signaling the manager over the operator's and manager's lines when connected, or for signaling a subscriber over the operator's and subscriber's lines when joined.

I will now describe my invention by reference to the accompanying drawing.

O T is one of a series of operators' tables, to which a series of subscribers' lines, S L, are connected, said lines being joined to earth through
70 spring-jacks having upper plates, 2 N, thence through ordinary drop-annunciators, and to G. Each operator's table is also provided with a telephonic transmitter and receiver placed in a wire, hereinafter referred to as the operator's
75 line, one end of which is connected to earth at 4 G, while its other end terminates in a connecting-cord, M, and a plug having conducting part N. When a call is received over a
80 subscriber's line at the operator's table, the operator inserts his switch-plug in the spring-jack of the calling-line, with conducting part N of the plug in contact with 2 N of the
spring-jack, thus removing the annunciator and normal ground-connection of the sub-
85 scriber's wire and completing the subscriber's circuit from the spring-jack through the operator's line, including cord M, post O, wire 5, spring-jack *f' g'*, hereinafter described as the listening spring-jack, wire 4, key K, its back
90 contact 20, wire 3, receiving-telephone D, wire 2, secondary of induction-coil I of the transmitting-telephone C, and thence to earth E by wire 1. With the plug of the cord-switch
95 inserted as just described, the operator may converse with the subscriber, or if connection with the subscriber's line be made without a call from the subscriber, to attract the attention of the subscriber the operator will de-
100 press his key K upon contact 21, thus closing the subscriber's line to earth 4 G through battery B, thereby actuating the subscriber's annunciator-drop.

In addition to the connecting of the oper-

ator's apparatus to a subscriber's line by cord-switch M, said cord-switch may be used to connect the operator's line with the manager by inserting the part N of the plug into contact with N' of the spring-jack of the manager's line—that is a line, H, extending from the manager's table to each operator's table. By means of the insulating part of the plug the earth-connection E 1 and annunciator 1 A are removed from the manager's line H, and a circuit is completed from 3 E of the manager's desk through wire 8, annunciator-drop 2 A, wire 7, spring-jack 2 y', wire 6 N' N M, and thence over the operator's line to earth E. It will be seen that the operator may now call the manager by depressing his own key K and dropping the manager's annunciator 2 A, and that upon the manager connecting his telephone with spring-jack 2 y' the operator can, upon raising switch W, to bring strips c b into contact with 1 a and 2 a, converse with the manager through his own telephone. By means of annunciator 1 A on the manager's line the manager is enabled to call the operator.

M T is the manager's table. To comply with the requirements of the system, the manager should be able first to call the operator; and to this end the manager has a local battery which he can connect to the manager's line H to operate annunciator 1 A; second, the manager should be able to converse with the operator both when the operator is connected to a subscriber's wire and when he is not. At the left side of the manager's table is an ordinary telephone-set, R being the receiver and T the transmitter. The induction-coil and local therefor of the transmitter are not shown.

f and p are two set-screws, against which two keys, m and l, normally rest at back contact, which keys are respectively connected by wires j and k with conducting bars or pieces 2 a and 1 a. Bar 2 a is connected by wire e with conducting-strip f of a cord switch-plug, and 1 a by wire h with conducting-strip g of the same plug. With the circuit-connections as just described, if the cord switch-plug be inserted into its spring-jack with f in contact with f' and g in contact with g', it will be seen that the manager's telephone is inserted or looped directly into a subscriber's line leading through the telephone of the operator, it being assumed, however, that cord-switch M has already connected the operator to a subscriber's line, and that the normal earth of said line has been broken. Spring-jack f' g', I designate as a listening spring-jack, from the fact that by it the manager can loop his telephone-set into a subscriber's circuit connecting with an operator. The earth 3 G is connected to the middle of battery L B, and said battery, by depressing key m, may be employed to operate an annunciator-drop at the subscriber's station when the plug f g is inserted in the listening-jack f' g', as above described, and key l may be employed to operate a drop at the operator's table when the listening-plug is re-

moved; but in this case plug y' must be inserted in spring-jack 2 y', and the switch W, pivoted at u, must be depressed by turning cam-bar t until conducting-strip b comes in contact with 2 a and conducting-strip c in contact with 1 a. When thus arranged, it will be seen that normally there is a circuit established from earth 2 G, through 2 z, cord z, post x, wire 14, conducting-strip b, bar 2 a, wire j' m f T R p 1, wire k, bar 1 a, strip c, wire 13, post w, cord y y' 2 y', line H to annunciator 1 A and earth E'. Upon depressing key l against stop o a circuit will be established from 3 G to battery L B o 1, wire k 1 a c, wire 13, post w, cord y y' 2 y', and thence over manager's circuit H to the operator's annunciator 1 A. To call the operator, therefore, plug y' being inserted in spring-jack y', the manager has only to depress lever W until strips b c come in contact with 2 a and 1 a, and to then depress key l. In the same manner it will be seen that by depressing switch W and key m a second operator may be called, but as a condition precedent thereto plug 2 Z must be removed from its support and be placed in the spring-jack of a manager's line (not shown) leading to the second operator's board. If it is desired to place two operators' switch-boards in communication, plug y' is placed in spring-jack 2 y', and plug 2 Z is placed in the spring-jack of the manager's line (not shown) leading to the second operator's switch-board, thus completing a circuit, as follows: From E' over line H 2 y y' y, wire 11, annunciator 3 A, wire 12, stationary back stop r, strip b, wire 14, cord z, plug 2 z, a spring-jack in the manager's line (not shown) leading to the second operator's board, and thence over the manager's line running to the annunciator of said second operator-board. With the two operator-boards thus connected, if it is desired by the manager to call the second operator by the annunciator on the manager's line leading to the second operator's table, lever W is depressed until strip b comes in contact with 2 a. Key m is then depressed against stop n, thus connecting the annunciator of the second operator with battery L B, through key m, bar 2 a, strip b, wire 14, plug 2 z, and thence through the manager's line to the second operator's annunciator. Annunciator 3 A is employed only when two operator-boards are connected to apprise the manager when to disconnect said circuit by removing plugs y' and 2 z from their spring-jacks in the managers' lines. The manager is thus informed by the operator, say at O T, who, by the depression of his key k against stop 21, sends a current from battery B through annunciator 3 A. With the arrangement here shown, and while two operators are connected, it will be seen that the manager's telephone may be connected in said circuit by inserting plug f g in spring-jack f' g', thereby enabling the manager to listen to the conversation between the operators, and to speak to them. This circuit, including the manager's telephone, is as follows: Earth E, operator's

telephone, wire 4, $f'f$, wire e , 2 a , wire j , R T, wire k 1 a , wire $h g g'$, plug N, line H 2 y' , wire 11, annunciator 3 A, wire 12 r , strip b , wire 14, and plug 2 z , and the manager's line to the second board corresponding with manager's line H. Each operator's board is provided with a line, H, and an open branch circuit, including a telephone-set and a listening spring-jack, as here shown.

10 What I claim, and desire to secure by Letters Patent, is—

1. In a telephone-exchange, an operator's line for each operator's table, including a spring-jack for looping in the manager's telephone a manager's line for each operator's table, and plugs and spring-jacks for joining any two managers' lines together through the manager's table, and a looping apparatus for joining the manager's apparatus in an operator's line.

2. In a telephone-exchange, the combination of an operator's and a manager's line at each operator's table, a manager's telephone and signaling devices, switching devices for looping two manager-lines together through the manager's table, and switching devices for looping the manager's table into an operator's line.

3. In a telephone-exchange, the combination of an operator's table at which a part of the subscribers' wires terminate, an operator's line, including a spring-jack for looping a conductor therein, a manager's table, a manager's line for each operator's table of the exchange, a manager's telephone adapted to be looped into the operator's line, a battery at the manager's table, a switch at said table, two switch-plugs for connecting with managers' lines, and two signaling-keys, substantially as described.

4. In a telephone-exchange, the combination of an operator's line having a telephone and a spring-jack for connecting a loop-wire therein, and a series of subscribers' wires each having an earth-connection at the switch-board, and respective spring-jacks, whereby the operator's line may be connected to any one of the subscribers' lines terminating at the operator's table, and the earth-connection of the subscribers' lines may at the same time be broken.

5. In a telephone-exchange, the combination of an operator's line whose ends are respectively connected to earth and to a switch-plug embracing a telephone and a spring-jack, a battery at the operator's table, and a key for connecting said battery to the operator's line, an independent manager's line extending from the operator's table to the manager's table, having a spring-jack and annunciator at each end, a loop conductor embracing an annunciator terminating in two switch-plugs for connecting two operators' tables together through the manager's table, a battery, a switch, W, and two keys for signaling from the manager's table to either operator when connected together, and a loop-circuit embracing the manager's telephone which may be inserted into an operator's line.

6. In a telephone-exchange at a manager's table, the combination of a loop branch, including annunciator 3 A, which terminates in switch-plugs y' and 2 z , earth-connection 2 G, switch W, substantially as described, battery L B, and earth-connection 3 G, keys l and m , and a loop conductor embracing the manager's telephone R T and terminating in switch-plug $f g$.

7. In a telephone-exchange, the combination of a series of managers' lines, H, extending to the operator-tables, each line having a spring-jack and annunciator at both ends, a loop conductor embracing annunciator 3 A, and terminating in switch-plugs y' and 2 z for connecting any two of the lines H, and an earth-connection, 2 G, for connecting any one of the managers' lines to earth through annunciator 3 A.

8. In a telephone-exchange, the combination of a manager's line to enable the manager and operator to signal each other when at their respective tables, an operator's line extending from the operator's table by way of the manager's table to the switch-board, and switching devices for looping the manager's telephone into the operator's line.

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Witnesses:

WM. ARNOUX,
A. A. WATTERS.