

TELEPHONE EXCHANGE APPLIANCE.

No. 306,817.

Patented Oct. 21, 1884.

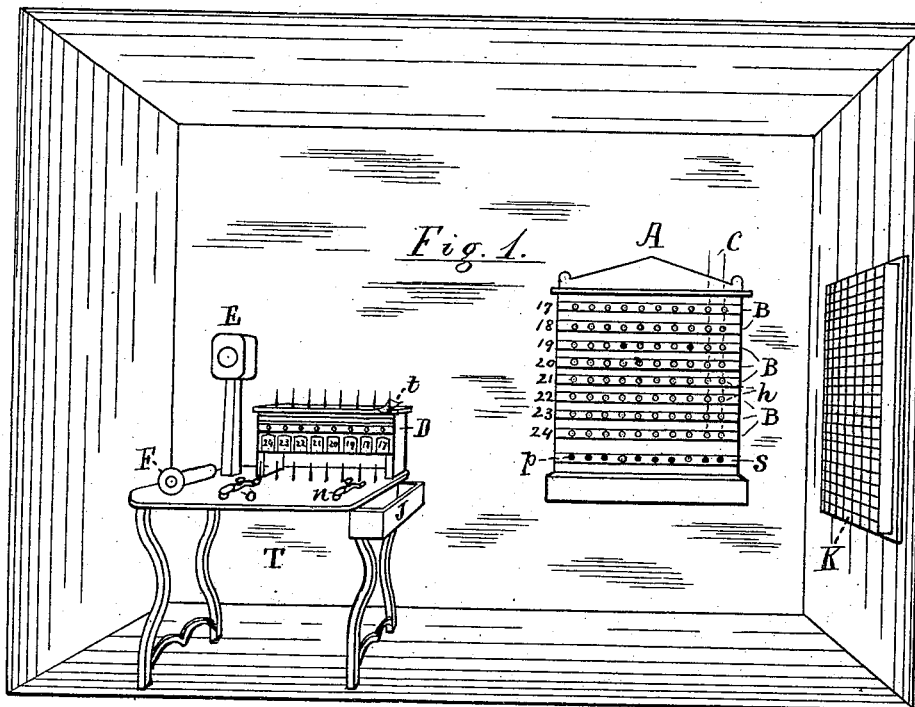
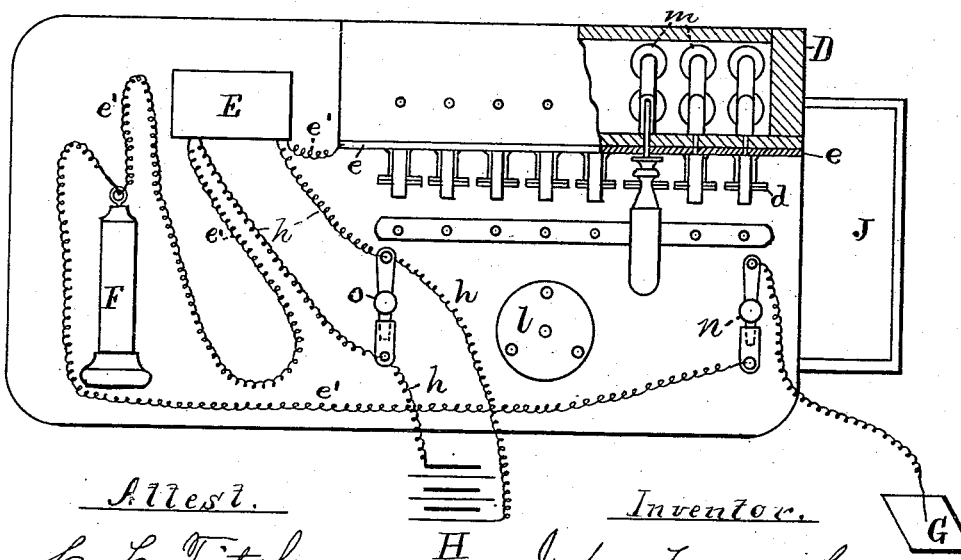


Fig. 2.



Attest.

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Fig. 3.

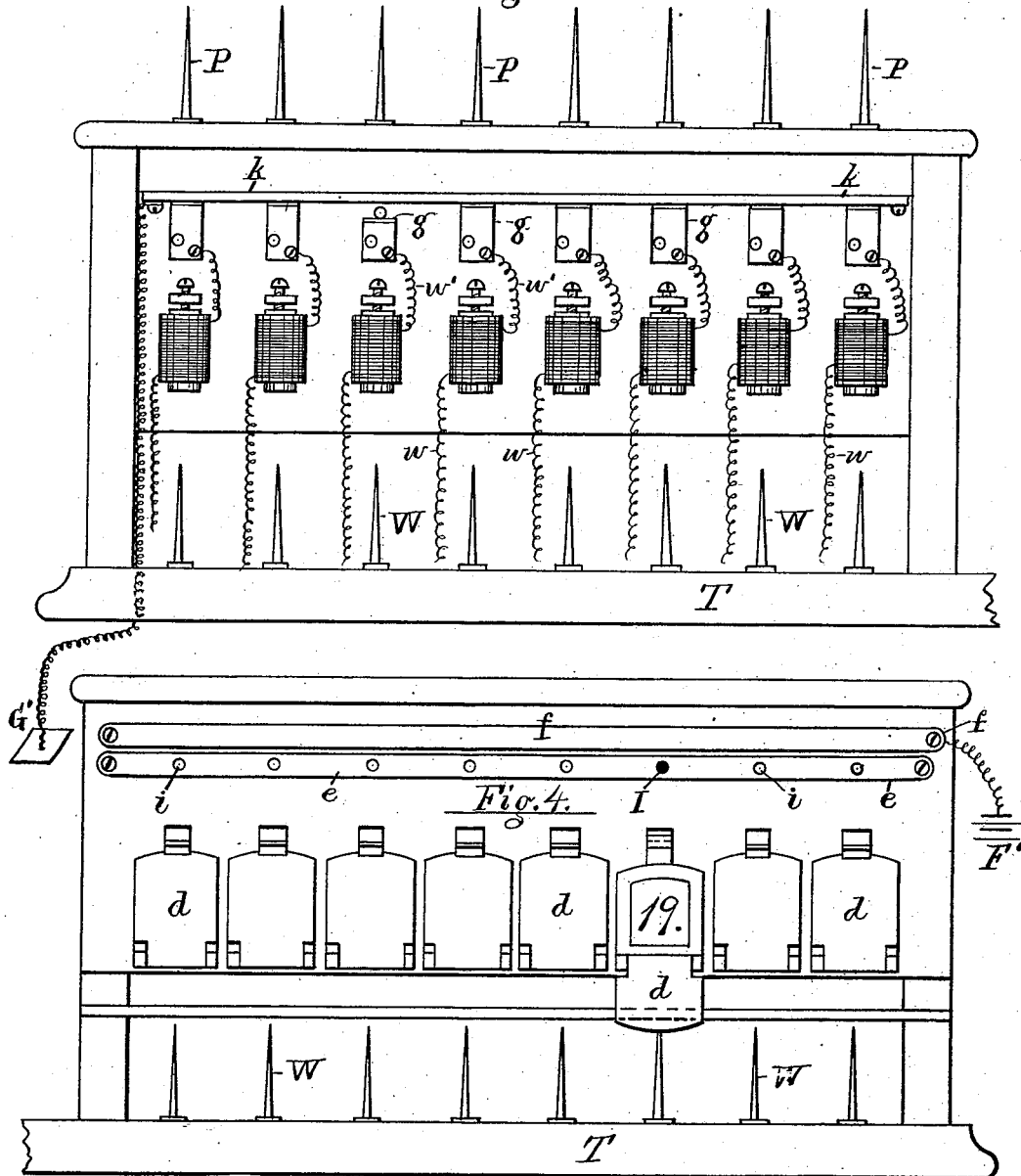
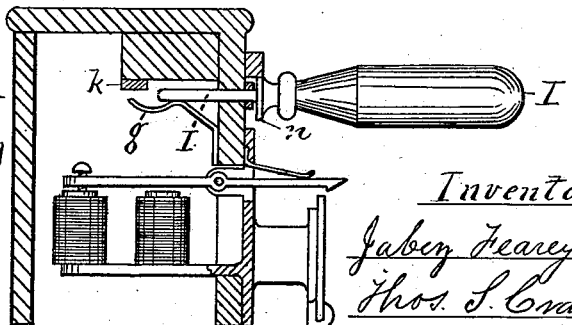


Fig. 4.

Fig. 5.



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TELEPHONE-EXCHANGE APPLIANCE.

SPECIFICATION forming part of Letters Patent No. 306,817, dated October 21, 1884.

Application filed November 19, 1883. (No model.)

To all whom it may concern:

Be it known that I, JABEZ FEAREY, a citizen of the United States, residing in Newark, Essex county, in the State of New Jersey, have
5 invented certain new and useful Improvements in Telephone Exchanges and Appliances, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

10 This invention consists in an improved apparatus for making the necessary connections between the telephone-exchange and its various subscribers or the lines which connect them therewith, and it includes an improved
15 device for connecting, by means of a single plug, two or more subscribers with a transmitter, a receiver, and a generator of electricity; also, a device for cutting off the ground-connection from the said transmitter and receiver
20 when throwing the generator-current into the subscribers' lines; a device for cutting the transmitter out of the circuit when the subscribers are connected, and a device for holding memoranda to indicate the several calls
25 made upon a single wire or subscriber.

The invention includes the use of the annunciator improvements patented to me November 29, 1881, as No. 250,140, the same being combined with a table and a bank of switch
30 bars or strips, such as is commonly used for directly connecting the several subscribers' lines.

The nature of my new improvements and the manner in which they are combined with
35 those previously patented to me to produce new results will be fully understood by reference to the annexed drawings, in which—

Figure 1 is a perspective view of a telephone-exchange room, showing an annunciator and
40 a bank of switch-strips upon the wall and a transfer-table near by. Fig. 2 is a plan of the said table, showing a portion of the connecting-wires and a part of the annunciator-magnets through a break in the casing containing
45 them. Fig. 3 is a rear view of the said casing, and Fig. 4 a front view of the same, the two latter views being enlarged to double the scale of Fig. 2, and one of the drops being open, to correspond with the plug inserted in the plug-
50 ging-strip over one of the shutters; and Fig. 5 is a transverse section of the casing at the center of the plug shown in Fig. 2, the mag-

net, armature, and shutter not being shown in section.

A is the bank, sometimes called a "central- 55 office switch-board," provided with a series of continuous plugging-strips, B, behind which are arranged transversely the series of wires partially shown at C, which are connected with the several subscribers' lines. These wires are
60 brought into connection with the strips by inserting the plugs *p* in the holes *h*, where the plug makes the desired contact, and thus connects one line-wire with any other plugged in the same strip. When not used for such con- 65 nection, the plugs are inserted in the bottom or ground strip, *s*, to run the several lines to the ground.

By means of the annunciator K, constructed as already patented to me, or by other equivalent means, the subscribers call up the central exchange and indicate by a telephonic receiver with whom they desire a connection; and the object of my present invention is to
70 furnish the means of notifying, conversing with, and connecting together the different subscribers at the transfer-table, (shown at T in Figs. 1 and 2.) 75

By my method of operation the one who attends the primary annunciator K, or his assistant, makes a written ticket or memorandum
80 of the several parties who are to be connected, and gives the same to the operator at the bank A or transfer-table T. By my method of connecting the bank and table the operator at
85 the latter has the duty transferred to him of notifying the required parties, keeping them connected during the use of the lines, and then causing their connection, through the bank, to be severed. The table operator is not only
90 notified of the connected parties' numbers by the paper ticket furnished to him, but his table is provided with a series—usually eight in number—of annunciators connected, respectively, with eight strips in the bank. The
95 primary-annunciator attendant or the table operator causes the designated subscribers' lines to be connected by plugging both of such lines on one bank-strip; and the lines, being thus cut off from the ground, form a con-
100 nection with the ground through the magnets attached to the annunciators on the table and throw down the drop or shutter corresponding to the plugged strip. This drop advises

- the table operator through which strip or table connection he must connect the subscribers with his receiver, transmitter, and generator, the latter being used to ring up the subscriber called for by the party first signaling the office. The construction of the table for effecting these connections is shown in Fig. 2, the general appearance only being indicated at T in Fig. 1.
- 10 D is a casing mounted upon the table T, to carry the eight annunciator-drops *d*, their magnets *m*, and plugging-strips *e* and *f*. Such casing is preferably mounted at the rear edge of the table, as shown, to afford room in front of it for the switches required, and for a series of "waiting" pins, W, when the latter are provided, and the drops being arranged upon the casing so as to be in full view of the operator when seated at the table. The drops are arranged at the front of the casing, and over them is a plugging-strip, *e*, connected by a wire, *e'*, with a transmitter, E, receiver F, and ground G. Behind each drop is a magnet, *m*, connected with one strip in the bank by a wire, *w*, as shown in Fig. 3, and from the magnet a wire, *w'*, runs to a spring, *g*, (see Fig. 5,) which normally presses against a continuous strip, *k*, connected with the ground at G'. The springs *g* are severally behind holes *i*, formed in the plugging-strip *e*, and when a plug, I, is inserted in the hole over any of the drop-shutters it detaches the spring from the ground-strip *k* and makes a connection from the bank-strip to the transmitter and receiver through the plugging-strip *e* and wire *e'*. The table operator is then in communication with the connected parties, and to notify the one called for he operates his plug in connection with the generator-strip *f* and generator F', in the manner claimed in my former patent. The strip *f* is fixed adjacent to the plugging-strip *e*, so that the pressure of a collar, *n*, formed on the plug I, Fig. 5, suffices to connect the generator with the plug, and thus (through the spring *g*) with the lines joined together in the bank. The party who calls receives the signal rung by the generator-current, as well as the one called for; but the latter is advised by the signal that his attention is wanted at the telephone. When he makes himself heard at the transfer-table and both parties to be connected are in communication, the operator may attend to other calls, which, however, have to be transferred to his table by the use of another strip in the bank.
- To advise the bank operator that any particular strip is still in use by the connected parties, and to indicate when he may properly disconnect them, I provide a pin, P, upon the top of the casing D over each of the annunciator-drops *d*, and keep the paper ticket first supplied to the table operator stuck upon this pin so long as the parties named thereon are using the wires. The presence of this ticket over a certain drop, and a number at the pin corresponding with the number of the bank-strip connected with such drop, indicates to the bank operator that such strip is in use, and the removal of the ticket by the table operator shows that the connection is required no longer, and that the strip may be used for connecting other lines.
- In connection with the pins P, I employ a box, J, to receive the obsolete tickets, and a set of pins shown at W in Figs. 1, 2, and 4, the latter to be used for preserving tickets when the party called is already connected elsewhere. These pins W are arranged in a row upon the table in the space before the casing D, one pin for each annunciator, their relation to the latter being indicated by their respective positions, so that a ticket placed on a given pin is at once associated with the adjacent drop. Thus the line No. 10 may call No. 16, and they may be connected, as shown in Figs. 1 and 4, on a strip numbered 19 in the bank A. While No. 10 is conversing with No. 16 the ticket marked "10 wants 16" would be placed on the upper pin, P, over the drop 19, (seen in Fig. 4,) to indicate to the bank operator that the strip 19 was in use.
- With the apparatus heretofore used, should another party—say line No. 25—call for No. 16, he would be informed that the latter line was engaged, and that he must call the exchange again after an interval. With my improved apparatus this annoyance of calling the same party over again is entirely obviated, as well as the noise and confusion entailed by calling out the different numbers to be connected. When a number or line is called up when in use, a ticket is simply prepared thus: "25 wants 16," and the ticket is placed upon the lower pin, W, beneath the one already indicating that No. 16 is connected with No. 10. The table operator is thus prevented from disconnecting No. 16, but when he is done with No. 10 connects him at once by ordering a change in the plugs in the bank, and notifies him that No. 25 wishes him also. When the generator-current is thrown into the strip for this purpose, it also rings up No. 25, who is thus advised that he can communicate with No. 16, as desired.
- It will be seen from the above that the construction required includes a series of numbered annunciators connected with a series of correspondingly-numbered strips in the central-office switch-board; a series of pins placed above the casing D in sight of the central switch-board operator, so that the mere presence of a ticket thereon may indicate when certain strips are in use, and a series of pins placed upon the transfer-table before the table operator, so that the tickets thereon may indicate who is waiting to use a given line. It is obvious that the proper use of these pins requires a certain method of procedure, as just described, which I have claimed herein as a new process for using the said apparatus. With the construction thus described all the noise and confusion heretofore common in telephone-exchanges (and arising from the loud repeti-

tion of the various numbers) may be avoided, and the necessary connections between the subscribers secured with more rapidity and quiet than is otherwise possible. The primary annunciator attendant may prepare the ticket by writing on a slip of paper the numbers of the lines to be connected and hand it to the bank attendant, who connects the required lines on some strip in the bank, which act throws down a drop before the table operator. The bank attendant then places the ticket upon the pin P over such drop, as shown at *t* in Fig. 1, thus indicating to the table operator the numbers of the lines connected. Should another call be made at the primary annunciator for one of the same lines, a second ticket is prepared and placed on the corresponding pin, W, as described above. The entire routine is thus carried through without the necessity of any noise in indicating the numbers of the lines wanted. Great annoyance to the subscribers is also avoided by the use of the waiting-pins W, upon which the record of a call may be preserved if the line wanted is engaged when first called.

The primary annunciator is merely indicated in Fig. 1 at K, as its construction and operation are immaterial and form no part of my invention herein.

The construction I have invented for cutting out the receiver and transmitter, when desired, is as follows: In Fig. 2 the transmitter-plugging strip *e* is shown connected by wire *e'*, first to the transmitter, thence to the receiver, and thence to the ground at G. Between the receiver and the ground I insert a self-closing key, *n*, which thus normally keeps those instruments on line *e'* in connection with G.

Heretofore, when ringing up the parties called, the generator-current derived from the strip *f* would be divided, and the greater part of it would go to the ground G through the transmitter and receiver, thus furnishing a very insufficient current to the subscriber's bell; but by my construction I cut off this ground-connection during the brief time I am using the generator-current, by pressing upon the self-closing key or switch at *n*, and thus get the whole force of the generator in the subscriber's line to operate his bell. This mode of operation makes a great difference in the action of the bell, and secures prompt working of the signal apparatus.

The cut-off key (shown at *o* in Fig. 2) is for the purpose of cutting the transmitter out of the subscriber's circuit when they are conversing, that they may not hear anything from the central exchange. To effect this object, I provide the transmitter with a local battery, H, and connect it therewith on a closed circuit, *h*, thus keeping the battery in good condition. By inserting the self-closing key *o* in this circuit (shown at *h*) I short-circuit the battery while the subscribers are talking and prevent the working of the transmitter. The parties thus connected are therefore entirely freed from the disturbance heretofore caused,

and, as the key is self-closing, the transmitter is automatically prevented from working, except the operator opens the key, and thus drives the current through the transmitter, which he does when it is necessary for him to communicate with the connected parties.

The wires *w*, necessary for connecting the bank-strips B with the annunciators upon the table T, are not shown in Fig. 1, as its scale is too small to admit the same without confusing the drawing; but it is obvious that a direct connection is required between each numbered strip in the bank A and the correspondingly-numbered annunciator on the table. The strips in the bank are shown numbered from 17 to 24, inclusive, and the drops upon the table T in a similar series, and the connections of the wires *w* with the magnets of the annunciators are fully shown in Fig. 3. The full arrangement of the wires C in the bank is also well known as being already in use, as also the character of the plugs *p* and the proper ground-connection for the strip *s* in the bank.

All the details of construction may be varied to produce the combinations claimed herein, as the method of making electrical connections and the making and breaking of contacts is immaterial.

I am aware that it is not new to combine an operating-table with a bank constructed as described for connecting the various subscribers with the central operator in a telephonic or telegraphic office, and I do not therefore claim such a combination as new; but I am not aware that any operator's table has been constructed to form all the necessary connections with the annunciators, the transmitter, receiver, and generator by means of a single plug; and my present invention therefore consists in combining the elements of my Patent No. 250,140, referred to above, with the bank-strips in the manner described, and with the devices for automatically connecting the transmitter with the ground and with a circuit, *h*, in which a battery, H, can be included at the operator's option.

The entire construction of the transfer-table shown renders it exceedingly simple and easy to manage, the connections *h* and *e'* shown in Fig. 2 being all concealed beneath the top of the table in practice, so that nothing exists to cumber its surface except the keys *n* and *o*. A plate, *l*, is provided on top of the table with a small hole to retain the tip of the plug I when not in use, and same is thereby kept in a convenient position for use.

In place of the ticket-pins P and W, any other means—as little clamps or boxes—may be used to retain the same in connection with each annunciator, and either series of pins may be used without the other.

Having thus set forth the nature and object of my invention, I claim—

1. The combination, in a transfer-table containing a transmitter, receiver, and a series of numbered annunciators electrically connected with a series of numbered strips in a central

switch-board, of a casing, D, and the series of annunciators and drops, arranged as described, and the series of pins P, corresponding in number with the annunciators, and arranged above
5 them on the casing, and operated substantially as and for the purpose set forth.

2. The combination, in a transfer-table containing a transmitter, receiver, and a series of numbered annunciators electrically connected with a series of numbered strips in a
10 central switch-board, of a casing, D, mounted upon the rear part of the table T, and the series of annunciators and drops, arranged as shown and described, and a series of pins, W,
15 corresponding in number with the annunciators, and arranged in front of them upon the table, all operated substantially as and for the purpose set forth.

3. The combination of the following elements, arranged and operated substantially as set forth: a series of numbered strips in a bank, a series of correspondingly-numbered magnetic annunciators on a table, and a ground-connection common to all the annunciator-
20 magnets, the three being electrically connected in the order named, a strip connected with a generator, a contiguous plugging-strip connected with a transmitter and receiver, and a
25 single plug constructed and operated to cut off the ground from any specific annunciator-magnet, and to connect the corresponding bank-strip at pleasure with either the generator
30 or transmitter or receiver.

4. The combination, in a transfer-table, of
35 a series of annunciators connected through a

bank with any desired line-wires, a plugging-strip in connection with a transmitter or receiver, a generator-connection, and means, as a plug, for throwing the generator-current
40 into the desired line-wires, a ground-connection with the transmitter or receiver, and means, as switch or key *n*, for severing the ground-connection from the transmitter when using the generator, substantially as and for
45 the purpose set forth.

5. The combination, in a transfer-table, of a series of annunciators connected through a bank with any desired line-wires, a receiver and transmitter connected with the line-wires
50 by a plugging-strip, *e*, and plug I, and a self-closing key or switch, as *o*, for cutting the transmitter out of the circuit, substantially as and for the purpose set forth.

6. The combination, in a transfer-table, of the elements herein shown and described—
55 namely, the series of annunciators, the plugging and generator strips, the receiver and transmitter and their ground-connection, the ground cut-off key *n*, the transmitter cut-off
60 *o*, and the local battery H, the whole being electrically connected and operated substantially as herein set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JABEZ FEAREY.

Witnesses:

THOS. S. CRANE,
A. R. MILLIGAN.