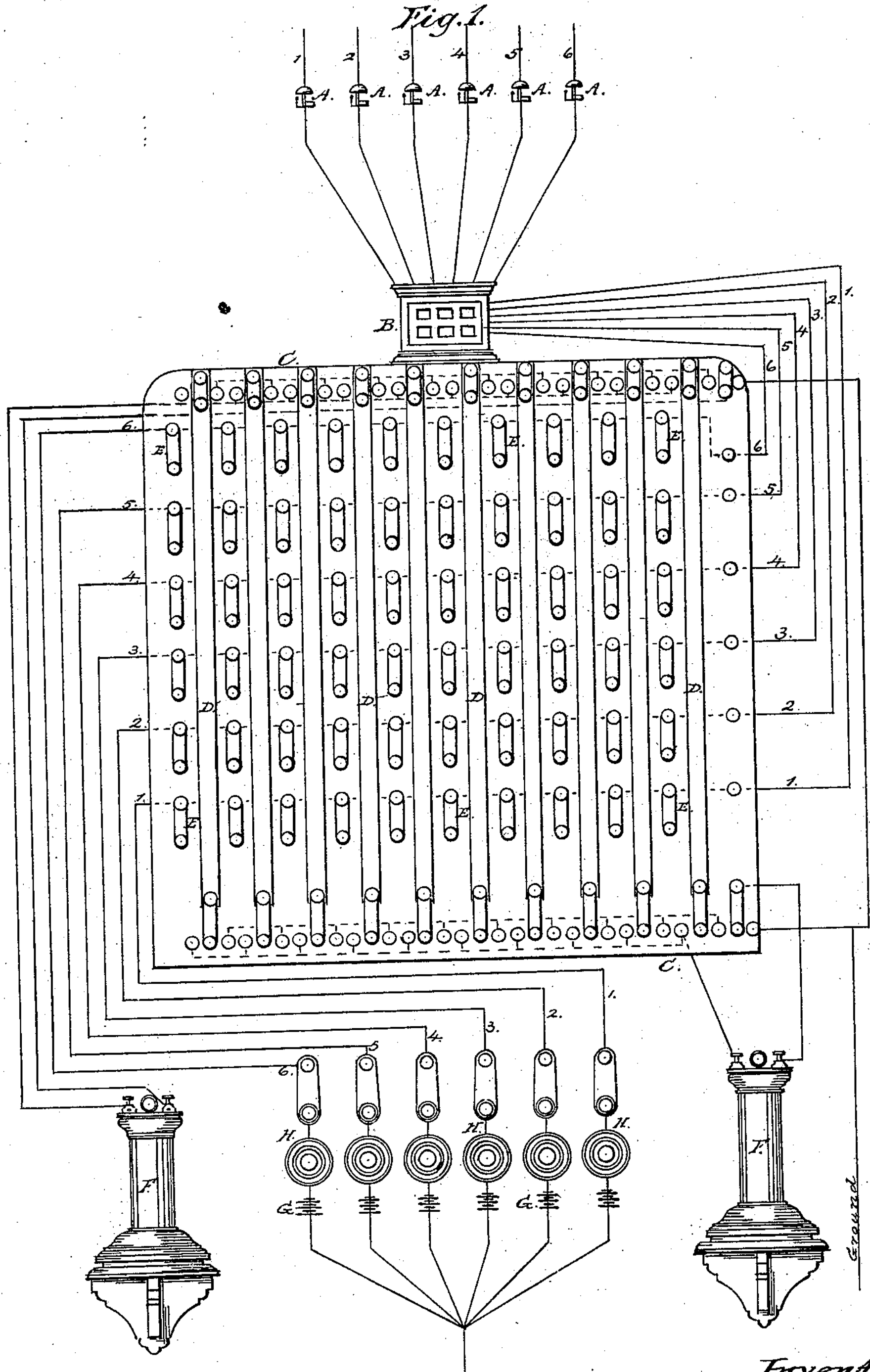
T. B. DOOLITTLE.

Switch for District Telephone System.

No. 209,115. Patented Oct. 22, 1878.

Fig. 1.



Witnesses;
F. W. Howard
John Tyler

Inventor;
T. B. Doolittle
by Atty.
Wm C. McIntire

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

3 Sheets—Sheet 2.

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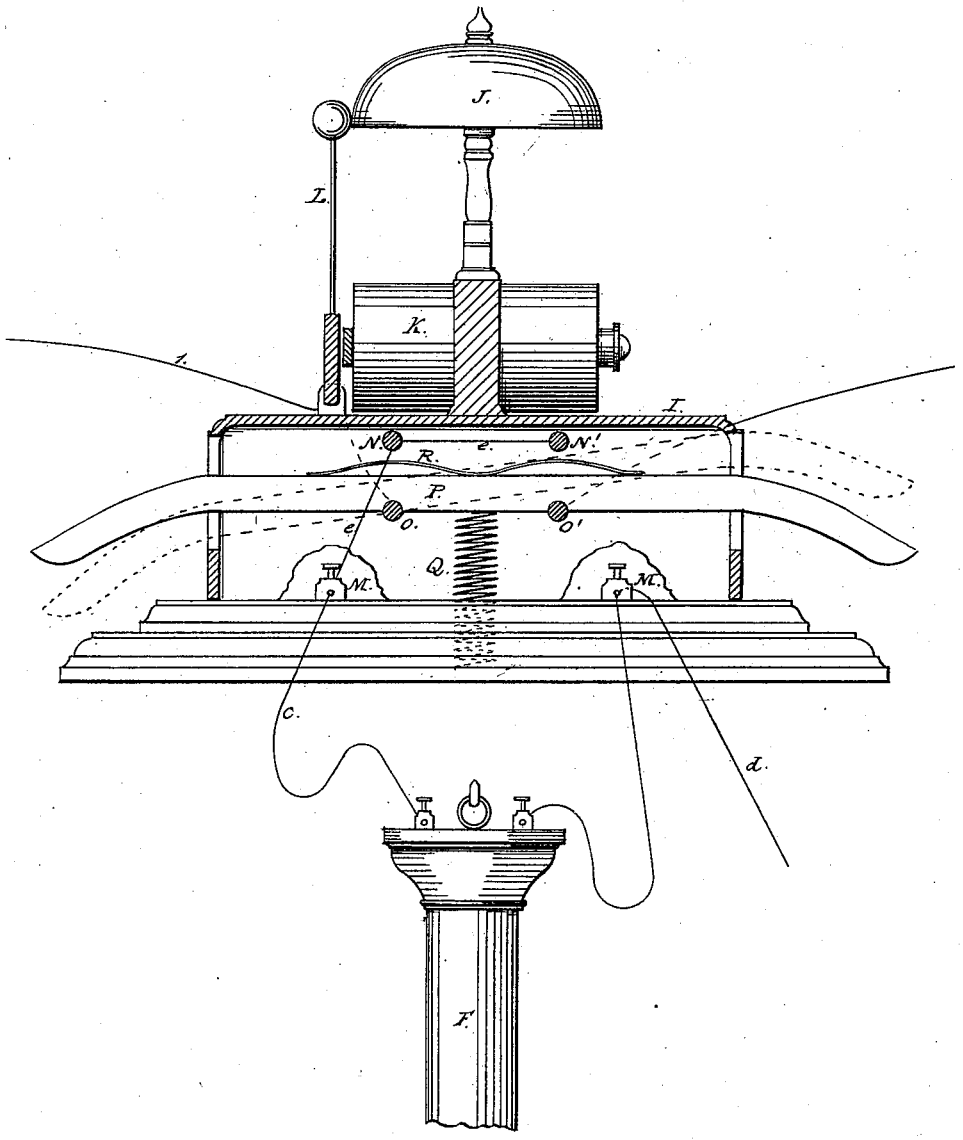
Fig. 2.



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Inventor;
T. B. Doolittle
by Atty.
Wm. C. W. Foture

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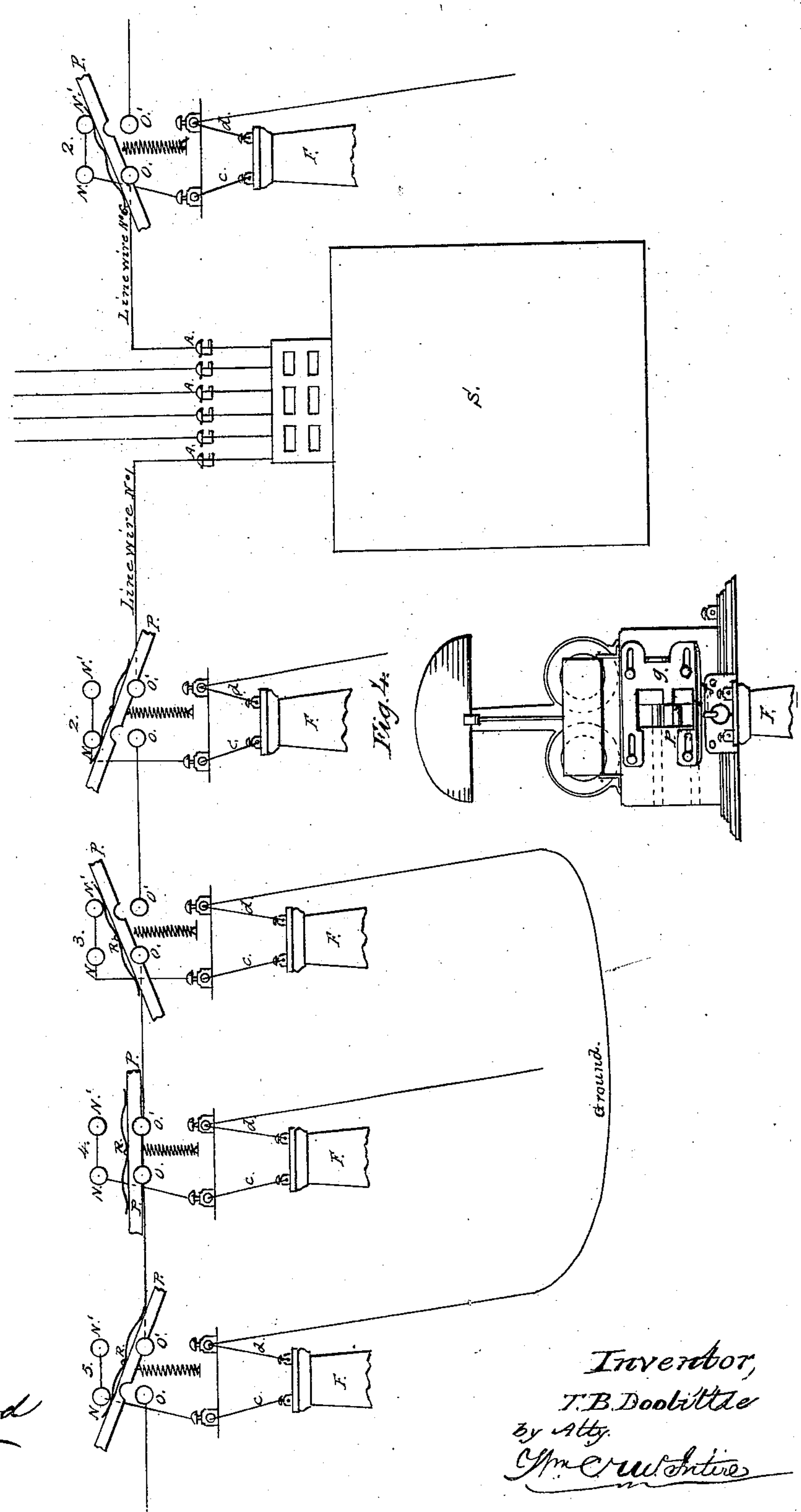
Fig. 3.



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by Atty.
Wm. C. McIntire

UNITED STATES PATENT OFFICE.

THOMAS B. DOOLITTLE, OF BRIDGEPORT, CONNECTICUT.

IMPROVEMENT IN SWITCHES FOR DISTRICT-TELEPHONE SYSTEMS.

Specification forming part of Letters Patent No. **209,115**, dated October 22, 1878; application filed April 10, 1878.

To all whom it may concern:

Be it known that I, THOMAS B. DOOLITTLE, of Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in District-Telephone Systems; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making a part of this specification.

My invention relates to certain improvements in the art of transmitting sound and messages by the use of the telephone.

It has for its object to render sound or messages sent through a wire between given points inaudible at any other than the initial and objective points; and consists not only of a general system, somewhat similar to the "American District Telegraph," involving a main office, wire circuits, battery, and a code of signals, but also of a novel instrument arranged in connection with the telephones along the line, whereby the telephones on any given circuit or circuits may be switched together and messages transmitted between any two, all the balance being cut out and prevented from taking up the message or conversation, as will be hereinafter more fully explained.

In the use of the telephone system as it exists at present, where more than two stations are connected with a line-wire, there is no practical means, that I am aware of, of preventing a message between any two stations from being heard or picked up at any or all of the other stations. This condition of things is a great disadvantage in the use of the telephone in a district system, where notice is sent to a main office to respond to an inquiry, or a command given to put two stations in communication.

My invention overcomes these disadvantages, and enables the telephones to be used in a district system with as much privacy as may be desired, for the reason that all stations outside of the two in use are cut out by the act of putting the said two in connection, and any intermediate station attempting to get in on the line separates the said two. Notice to the intruder from one or the other of the parties so separated will induce the third party to cease the use of his telephone, such cessation automatically re-establishing the conditions previously existing.

To embody this system in practical form the following condition of things must exist: There must be a central or main office, connected with the outlying stations by a circuit or circuits of wire. The circuit-wires entering the office connect with an alarm and a switch-board, first passing into an annunciator. Connected with the switch-board are one or more telephones, and telephones must also exist at the several stations along the wire-circuits; and in addition to all of these conditions there must be at each station a device which, when used, will put the telephone at the station on the line, while at the same time the wire is cut out behind any such station. This instrument will be described in detail presently.

In order that my general system and the novel devices employed may be fully understood, I will proceed to describe the same, referring by letters to the accompanying drawings, in which—

Figure 1 represents the arrangement of wires and devices in the main office, including a novel switch-board, an annunciator, system of bells, series of batteries, and one or more telephones. Fig. 2 is view, partially in elevation and partly in section, of a novel instrument which I use at each station in connection with the telephones. Fig. 3 is a plan, illustrating the general system in operation and the results accomplished; and Fig. 4 is a plan view of the end of the instrument illustrated at Fig. 2, showing a detail of construction hereinafter referred to.

Where the same parts appear in the several figures they are designated by the same letters.

I will first in order refer particularly to Fig. 1, in which 1 2 3 4, &c., are a series of wires or lines entering the main office. These wires have connected with each a bell, A, and enter an annunciator, B, provided with drop-signs, which are operated by the current passing through the wires or lines to which they are respectively connected from this annunciator B. The lines 1 2 3, &c., connect with a switch-board, C, to which are also attached one or more telephones.

D D, &c., are vertical parallel metal bars, and E E, &c., switch-cranks, by which the connections and changes in the circuits are made.

F F represent two telephones, which, by reason of their connection with the switch-board, may be put on any circuit or line. I preferably use two, in order that the use of any given circuit by subscribers may not prevent the receipt of signals or messages through any other independent line.

G G, &c., are a series of batteries, connected with the series of wires 1 2 3, &c., by any suitable means; and H H, &c., are a series of "push-buttons," for giving signals to given stations by making and breaking the circuit.

I have shown the closed-circuit system, but, of course, do not confine myself in this respect. The metal bars and switch-cranks on the switch-board are, as before described, arranged parallel. The cranks are pivoted at their upper ends, the objects of this arrangement being that the attendant of the switch-board can, at a glance, determine whether the circuits are in their normal condition or whether they have been changed, as the eye will readily detect any crank out of a vertical line, and draw attention to the fact that a circuit has been created.

The advantage of pivoting the cranks at their upper ends relative to their movement is that any tendency to gravitate, should they become loose, will not tend to accidentally establish an undesired circuit, which might be the case were the cranks pivoted below.

I will now proceed to describe Fig. 2. I is a box or case, of any desirable form and material, upon which is arranged an alarm-bell, J, and armature K.

L is a bell-hammer, pivoted to the box or case, and operated by the current passing through the line-wire 1.

F is a telephone, connected by wires to the posts M M on the case, *c* being a line and *d* a ground wire.

N and N′ are two metal screw rods or bars, passing horizontally through the case in any convenient manner, and connected together by a wire, *e*, which wire or another connects the rod N with the telephone line-wire post M.

O and O′ are two more cross-rods, similar to those just described, and arranged below and parallel with the same; and P is a metal walking beam or bar, suitably notched, and resting horizontally upon the rods O O′, in which position it is held against accidental displacement, and to which position it is automatically returned, if moved, by a spiral spring, Q, arranged as shown, one end to the bar P and the other connected to the case.

R is a bow-spring, secured at the center to the bar P, and out of contact with the rods N N′ when in normal position. The object of this spring is to keep bright and free from dirt the under sides of the rods N N′ and the top surface of the bar P, which is accomplished by the longitudinal movement of the ends of the spring when the bar P is vibrated, and the presence of any matter which might effect conductivity is avoided.

The line-wire 1 joins the bell-hammer post to the lower cross-rod, O, and the other end of the line-wire comes into the box from the opposite side and connects with the other lower cross-rod, O′, so that when the bar P is in its normal position on the rods O O′ it completes the line.

Instead of the two posts N N′ and wire *e*, I may, of course, use a single bar or plate.

From this construction and arrangement it will be seen that when the parts are in the position described the line-wire 1 is completed, or continued through the box or case by the bar P and its contact with the cross-rods O O′, and that the telephone is in no manner connected with the line, but may be connected therewith in either direction by depressing one or the other end of the bar P, the ends of which project through the end of the box or case, and, when desired, may be so constructed that the bar cannot be weighted down, and thus guard against continued depression of the lever beyond the time absolutely necessary.

The result of depressing either end of the bar P will be manifest by observing the dotted lines, which show the bar with its left end depressed. The right end has been elevated and has left contact with the cross-rod O′, and completely broken the connection with the line-wire to the right of the box as effectually as if it had originally terminated at the box, while it has, by reason of coming in contact with the cross-bar N′, established communication between the line-wire 1, to the left of the box, and the cross-bar N′, which, through the medium of the wire *e*, cross-rod N, post M, and wire *c*, has brought the telephone F onto the line. The bow-spring R, it may here be remarked, not only subserves the ends before referred to, but also tends to maintain contact, which might otherwise be unintentionally broken by any slight tremulous movement of the end of the lever P.

When the end of the bar P is released, the spiral spring Q returns the bar to its normal position on the cross-bars O O′ and cuts out the telephone F, so that all the telephones can only be put on the line by a mechanical movement and operation. The end of the bar P must be kept depressed so long as the telephone is in use; but to prevent it from being so held beyond the time required by any forgetfulness, I propose to either curve the ends of the bar P, so that they cannot be weighted down, or when it is desired to provide a special means to hold it down to free the hands, I employ such means as I have illustrated at Fig. 4 of the drawings, which consists of a hook, *f*, upon which to hang the telephone when not in use, such hook being arranged under the end of bar P, so that when it is depressed and caught by a latch, *g*, the hook *f* is covered or concealed, and it follows that before the tele-

phone can be hung in place after use the latch *g* must be released, whereupon the spiral spring Q in the box immediately returns the bar P to its position, cutting out the telephone and re-establishing the main line. Were the bar P vibrated in the opposite direction to that shown in dotted lines at Fig. 2, the cross-rods O′ and N would be brought in connection, and, *a priori*, the line-wire 1 cut out from the left of the box or case.

Now, having described Figs. 1, 2, and 4, I will now, by reference to Fig. 3, illustrate how any station or subscriber can signal and communicate with the main office, and be put in connection or communication with any other station or subscriber on the same or any other circuit, and converse with said station without being heard at any other point on the line.

Let S represent the main office, and suppose stations 2 3 4 5 are on a single line-wire to the left of the office, at each of which stations there are telephones, between which and the line-wire are arranged the devices shown at Fig. 2 of the drawings. In the figure I am now referring to I have only shown so much of the device as is necessary to illustrate the operation of cutting in and out. Now, a person at station No. 5 desiring to converse confidentially with a party at station No. 3 first depresses the right-hand end of bar P. This act produces a temporary break in the circuit and rings the alarm-bell at main office, and drops the sign in the annunciator corresponding to the circuit sending the signal. The attendant immediately puts his telephone in circuit by means of the switch, and person at station No. 5 informs him that he desires to speak with the party at station No. 3. The attendant then, by means of the push-button between the battery and such line, gives No. 3 the signal appropriated to that station, and then by the telephone informs him that No. 5 wishes to talk to him. No. 3 then depresses the left end of lever or bar P at his station, breaks the line between said station and main office, and puts station No. 3 in telephonic communication with No. 5.

It will be observed that at all intermediate stations the telephones are normally out of the circuit. When No. 5 and No. 3 cease conversation the bars P are released, and both telephones are automatically cut out and the original circuit-line re-established.

If, during the time No. 5 and No. 3 are using the line, station No. 2 should wish to converse with main office or any station on any other line—say, station No. 2 on line-wire No. 6—the main office would be notified, and by the observance of the steps just described No. 2 on line-wire No. 1 and No. 2 on line No. 6 could converse at same time Nos. 3 and 5 were in communication. Now, suppose that while No. 5 and No. 3 are conversing No. 4 should attempt to get in on the line, either for the purpose of calling main office or for picking up conversation between No. 5 and No. 3, the necessary movement of the lever-bar P to put him on the line with the office would only put him on line with No. 3, and at the same time cut out No. 5, which No. 3 would, of course, know; or, if No. 4 should reverse the movement of the bar P, he would be in communication with No. 5, and No. 3 cut out, and the same result would ensue, and the moment he leaves his telephone the self-acting bar P re-establishes the line between No. 5 and No. 3.

Of course many changes may be made in the details of construction and arrangement of the devices employed without departing from the spirit of my invention; but

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

1. In a district-telephone system, a series of switches, normally constituting portions of the main line, and adapted to sever the main line and complete a circuit from the earth at any station through either fragment of the broken main line on either side of said station, substantially as and for the purposes specified.

2. A district-telephone switch of conducting material, normally forming a portion of the main line and resting on two conducting-posts of main line, and adapted to be swung about either of said posts, as centers, into contact with a metallic post having a ground-connection, substantially as hereinbefore set forth.

3. The case I, provided with an alarm-bell and armature, a vibratory bar, and four cross-rods and wire connections, substantially as and for the purposes set forth.

4. In combination with the vibratory bar P and the cross-bars N N′, the bow-spring R, substantially as and for the purposes set forth.

5. The lever ends of the bar P, formed as described, in combination with the suspension-hook *f* and latch *g*, arranged to operate in the manner and for the purpose set forth.

Witness my hand and seal this 8th day of April, A. D. 1878.

T. B. DOOLITTLE. [L. S.]

In presence of—

WM. C. MCINTIRE,

ARTHUR L. MCINTIRE.

3,000 words