

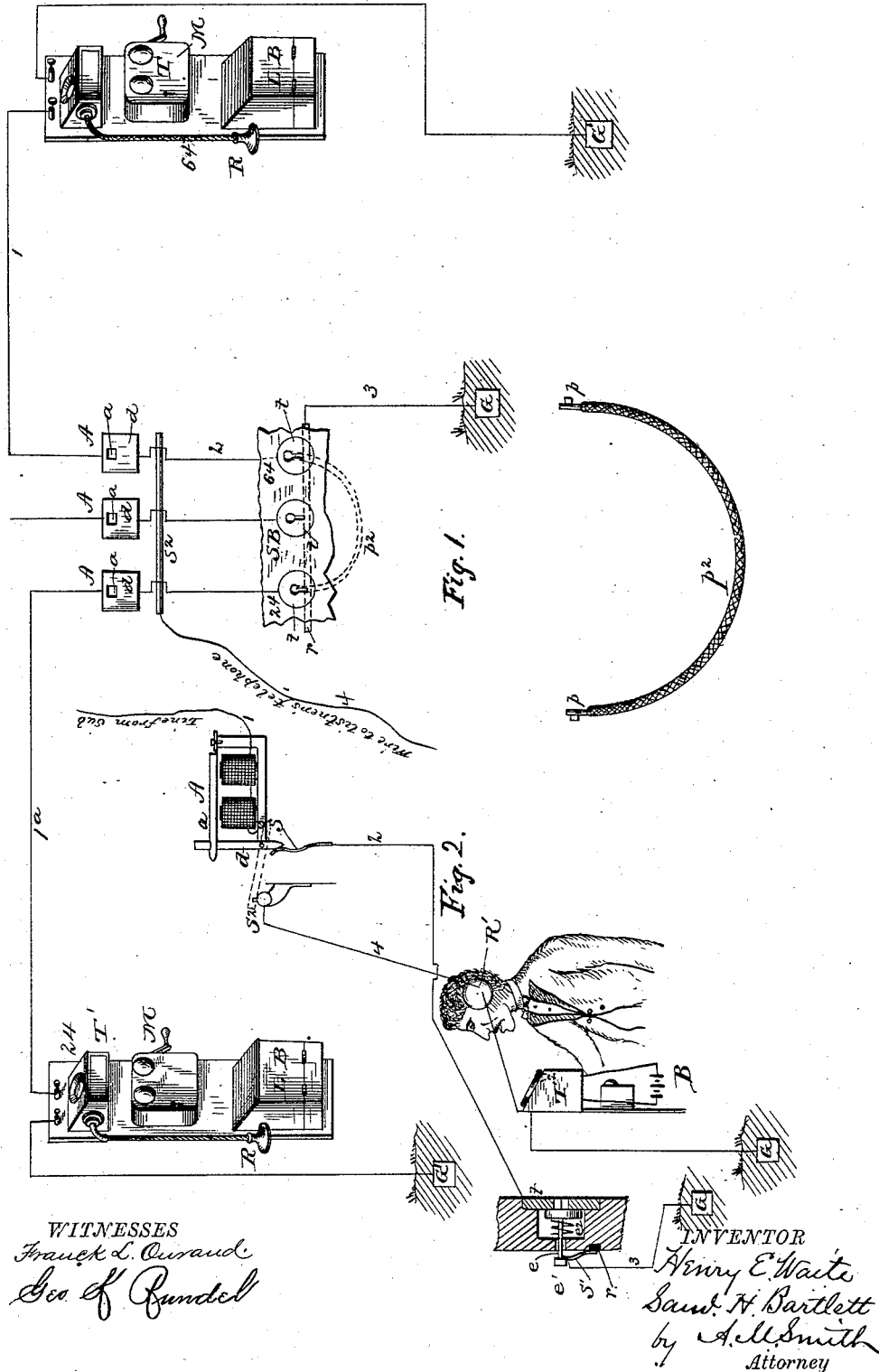
(No Model.)

H. E. WAITE & S. H. BARTLETT.

TELEPHONE EXCHANGE SYSTEM.

No. 302,364.

Patented July 22, 1884.



# UNITED STATES PATENT OFFICE.

HENRY E. WAITE AND SAMUEL H. BARTLETT, OF NEW YORK, N. Y., AS-  
SIGNORS TO CHARLES F. LIVERMORE, TRUSTEE, OF SAME PLACE.

## TELEPHONE-EXCHANGE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 302,364, dated July 22, 1884.

Application filed March 31, 1884. (No model.).

*To all whom it may concern:*

Be it known that we, HENRY E. WAITE and SAMUEL H. BARTLETT, of the city, county, and State of New York, have invented a new and useful Improvement in Telephone-Exchange Systems, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification:

Our invention relates to the employment in a listening telephone system of an annunciator-drop which by its action breaks the normal circuit of the subscriber's line, and automatically connects him with a telephone strapped to the ear of the listener at the central office, enabling the subscriber at once, and without waiting for an answering signal, to communicate with the central office, and to name the subscriber with whom he desires to be put in communication, after which the listening operator answers, and calls at once to the boy in charge of the switch-table, who immediately replaces the annunciator-drop in its original position, and, calling the subscriber asked for, places the two in communication by plugs and flexible conductor or any of the usual or preferred means for that purpose.

In the accompanying drawings, Figure 1 is a general diagrammatic view of the switch-board, annunciators, and subscriber's line; and Fig. 2 shows one of the annunciators in side elevation, its connection with the terminal tube in the switch-table and with the ground, and the manner in which the annunciator-drop connects a subscriber's line with the telephone of the listening operator.

A A A represent annunciators in the central office, connected each, when the annunciator-drop  $d$  is in its normal position, through a spring,  $s$ , and conductor 2, with a terminal tube,  $f$ , in the switch-board S B, and thence through spring  $s'$ , rod  $r$ , and conductor 3 with the ground. The annunciator-frame is of metal and forms a part of the subscriber's circuit, a conductor, 1 or 1<sup>a</sup>, extending thence to the subscriber's instrument or telephone, two of which are indicated at T and T', having each a transmitter, receiver R, magneto-call M, and local battery contained in a box, L B, and grounded at G'. The subscriber's line is grounded normally through the annunciator

and the switch-table in the central office, and when a current is passed over said line, indicated at  $l$ , either by a magneto apparatus, indicated at M, or by switching on a local battery, located at L B, the armature  $a$  is drawn down and releases annunciator-drop  $d$ , resting in contact with a spring,  $s$ , connected by wire 2 with the switch-table, and thence by wire 3 with the ground. As the drop  $d$  falls, breaking the circuit through spring  $s$  and wire 2, it comes in contact with a spring or bar,  $s''$ , connected by wire 4 with the transmitter T<sup>2</sup> and receiver R' of the listening operator's telephone, and thence through battery B with the ground of the latter, enabling the subscriber at once, and without waiting for an answering signal, to communicate his wishes to the central-office operator, who at once calls to the switch attendant, and the latter immediately restores the annunciator-drop of the calling subscriber to its original position, signals the subscriber called for, and connects the calling subscriber with the one called through the switch-board by means of plugs or pins  $p$  and  $p'$ , connected by a flexible conductor,  $p''$ , or in any other of the usual methods. The two subscribers are thus placed in immediate communication over a single direct wire, which is cut out from any possibility of interruption from any other subscriber, and cannot be disturbed except from the central office, where, if the attendant desires, he may signal either subscriber in any usual manner for the purpose of ascertaining whether they are still in communication or not. When the calling subscriber has completed his communication with the one called, he announces the fact to the central-office listening operator by again, through his magneto or local battery, operating the annunciator-drop, and, informing the listening operator of the fact, the latter causes the plugs to be withdrawn and the annunciator-drops to be restored to their original positions, and awaits other calls.

As above stated, the subscribers' circuits are normally through the annunciator-drops, springs  $s$ , conductor 2, switch-board S B, conductor 3, to ground G. After the annunciator-drop has fallen the circuit is through said drop, spring  $s''$ , and conductor 4, to the listening operator's telephone, and thence to the

ground; but after the drop is restored and the plugs  $p$  and  $p'$  placed in the terminal tubes of the calling and called subscriber, respectively—as, for example, of numbers 24 and 64—  
 5 the connection with the ground at the central office is broken, and the circuit is from one subscriber's telephone, through the annunciators of the communicating subscribers, through wires 1 and 1<sup>a</sup> and their terminal tubes, plugs  
 10  $p$  and  $p'$ , and connecting-cord  $p^2$ , grounded at each end in the subscribers' offices, and forming a direct and unbroken connection between the two. The means for breaking the ground-connections of the terminal tubes with  
 15 the central-office ground, upon the introduction of the plugs  $p$  and  $p'$  in said tubes, may be such as is ordinarily employed for that purpose, being shown as consisting of a sliding headed pin,  $e$ , the head  $e'$  of which is normally held in contact with spring  $s'$  by means  
 20 of a spring,  $e^2$ , surrounding the pin  $e$ , and from the spring  $s'$  a conductor, 3, extends to the ground. When the plug  $p$  or  $p'$  is forced into the terminal tube, overcoming the tension of  
 25 the spring  $e^2$ , the head  $e'$  is removed from contact with spring  $s'$ , and the circuit will then be through the plug and its flexible conductor, as explained.

We are aware that it is not new, broadly, to  
 30 break the normal ground of a subscriber at

the central office and to cut in the listening operator's telephone by the falling of an annunciator-shutter; but,

Having now described our invention, we claim as new—

In a telephone-exchange system, the combination, with the subscribers' lines, grounded, each through an annunciator in the central office, of annunciator-drops and contact-points  
 35 arranged in relation to said drops substantially as described, whereby when a drop is  
 40 operated by a subscriber's line it is made to automatically connect said line with the listening operator's telephone, and when restored to its normal position and its line-terminal and annunciator are connected with the line-terminal and annunciator of another subscriber's line, by a suitable connection uniting said  
 50 terminals and breaking their central-office ground-connections, a single, direct, and unbroken line or circuit is formed between said subscribers, substantially as described.

In testimony whereof we have hereunto set our hands this 27th day of March, A. D. 1884.

HENRY E. WAITE.  
 SAMUEL H. BARTLETT.

Witnesses:

CHARLES SPARMAN,  
 WM. H. WOODHULL.