

UNITED STATES PATENT OFFICE.

CHARLES E. SCRIBNER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE WESTERN
ELECTRIC COMPANY, OF SAME PLACE.

TELEPHONE-EXCHANGE APPARATUS.

SPECIFICATION forming part of Letters Patent No. 667,460, dated February 5, 1901.

Application filed September 25, 1896. Serial No. 606,924. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. SCRIBNER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Telephone-Exchange Apparatus, (Case No. 391,) 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.

My invention concerns switching systems for telephone-lines in which a calling-line is extended immediately to the particular office or group containing the line with which connection is required. It is a system of signals to permit a calling subscriber to indicate by a visible device the group or office in which the required correspondent may be found in order to avoid the necessity of bringing an operator into communication with the subscriber to obtain that information. The invention consists generally in the combination, with a switching system having an annunciator-board wherein telephone-lines terminate in signal-indicating instruments, switchboards containing connection-terminals of different groups of lines, and trunk or transfer lines for completing connection between a calling-line on the annunciator-board and a line of one of the groups, of two or more different conductors constituting a signal-circuit between the annunciator-board and the substation of each line, and separate signal-indicating devices for controlling each or any of the signals from the substation. Thus a user of a telephone is enabled to designate to the operator at the annunciator-board the particular group of lines among which his correspondent may be found by causing the display of a proper signal, so that the operator shall extend the calling-line at once to some operator within reach of the designated group of lines. For instance, in an exchange system comprising a number of different devices the subscriber whose line terminates in one office may indicate to the distributing operator in charge of his line the office with which he requires connection, and the line having been extended by means of a trunk-circuit to the designated office the re-

quired connection may be completed at the latter office with a minimum expenditure of time and labor.

The specific invention involved in this new combination consists in the combination, with a metallic line-circuit, of a signal in a branch from each line conductor, a key at the substation controlling each of the signals, and a third key at the same point adapted to cause the display of both signals simultaneously. This device enables the subscribers to give three different signals through the agency of the three keys and the two signal-indicating appliances.

I prefer to connect the line conductors with the source of current at the central office and to use small incandescent lamps for visible signals, although electromagnetic signals may be used equally well.

The invention is shown in the accompanying drawing, wherein I have represented the signaling apparatus of a single line and substation in connection with an annunciator-board at one office, together with the three switchboards at different offices and trunk-lines between the annunciator-board and each of the switchboards.

I have not deemed it necessary to show in detail the telephonic apparatus at the substation A. The line conductors 1 and 2 of the metallic line-circuit are arranged for connection with the telephone, as usual. At the central office these conductors are led through two signal-lamps *b* and *c* and thence to a common earth connection, a source of current *d* being included in the conductor leading to ground. These line conductors include the switch-contacts of a spring-jack *e* and of another spring, to be described, which are arranged to sever the connection between the lamps and the external line-circuit when a plug is inserted in the spring-jack. The lamps *b* and *c* and the spring-jack *e* are located in an annunciator-board *f*, which may contain similar appliances for all the lines entering the office wherein it is located. At substation A three keys (lettered *g*, *h*, and *i*) are placed. One of these, *g*, is arranged to close a ground branch from line conductor 1 when depressed, while another, *h*, is constructed to close a similar branch from the

line conductor 2. The key *i* has two contact-springs, which are connected with the line conductors 1 and 2, respectively, the anvils of the switch-levers of the key being grounded, so that when this key is operated the grounds are connected with both of the line conductors. Hence the depression of key *g* will cause the illumination of lamp *b*. The movement of key *h* will light lamp *c*, and pressure upon key *i* will cause both of these lamps to be lighted.

I have assumed an exchange system comprising three offices G, H, and I. In the office G may be located both the annunciator-board *f* and a switchboard *k*. The latter will contain a spring-jack *l* or line-terminal of the line of station A, together with similar terminals of all the lines entering office G. The switchboards *k* at the offices H and I will contain line-terminals of all the lines terminating in those offices, respectively. From the annunciator-board *f* at office G trunk-lines extend to the switchboards *k* at the offices G, H, and I. The switchboards are equipped with the usual appliances for connecting any trunk-line with any subscriber's line in the switchboard. The trunk-lines may be furnished with suitable signals to indicate to each of the operators involved in making a connection the acts performed by the other. In the use of this system the subscriber at station A finds it necessary to know the office in which the line of the required correspondent terminates. This may of course be either office G, H, or I. Having this information, he presses the correspondingly-designated key at his substation, whereby a distinctive signal is displayed before the operator at the annunciator-board *f*, designating the office to which the calling-line must be extended by means of a trunk-line. Thus should the subscriber require connection with a line entering office G he will depress the key *g* and cause the display of signal *b*. Similarly the key *h* will be depressed in case of a demand for connection with a line at office H. To call for a connection with office I, the subscriber will depress the key *i*, lighting both signals *b* and *c* simultaneously, which will serve as an indication that the connection is to be trunked to office I. Having observed the signal displayed, the operator at the annunciator-board *f* inserts in a spring-jack of the calling-line the terminal plug of a trunk-line extending to the proper office, which act should call the attention of the operator at switchboard *k* to that trunk-line. This operator will then learn from the subscriber at station A the number of the line with which connection is required and will proceed to establish the connection between the trunk-line and the required line in the usual way.

It will be observed that the use of the signals which constitute my invention permits the distributing operator at board *f* to perform her work without any oral communication with the subscriber. The efficiency of

the operator in distributing incoming calls to their destinations is thereby materially enhanced, while any annoyance to a subscriber incident to giving orders to two different operators is avoided.

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

1. In combination with subscribers' lines entering a common annunciator-board, switchboards having terminals of different subscribers' lines and trunk-lines extending from the annunciator-board to each of the switchboards, of two or more separate signal-indicating instruments for each subscriber's line, located in the said annunciator-board, different circuits for each of said signal-indicating instruments associated with the corresponding telephone-line, and means at the substation of the line for actuating either of said signals of the line through the agency of the proper circuit, as described.

2. The combination with a switching system, comprising an annunciator-board, different switchboards having switching-terminals of different subscribers' lines, trunk-lines from the annunciator-board to each of the switchboards, and subscribers' lines extending to the annunciator-board, of several distinct signaling instruments for each subscriber's line, each instrument being in a different circuit extending to the substation of the line, and means at the substation for producing current in any of the signaling-circuits, as described.

3. The combination with a telephone-line extending from a substation to a central office, of a number of signal-indicating instruments at the central office all associated with the one line, means at the substation of the line for selectively actuating any one of said signal-indicating instruments, and means at the substation of the line for actuating a distinctive group of instruments, substantially as set forth.

4. The combination with a metallic-circuit telephone-line extending in two line conductors from a substation to a central-office switchboard, of signal-indicating instruments associated with the line at the central-office switchboard, connected with each of the line conductors of the telephone-line, a source of current connected with both limbs of the telephone-line, a switch at the substation controlling the current in each of the line conductors, and another switch controlling the current in both line conductors simultaneously, whereby any one of said instruments or a distinctive group of the instruments may be actuated at the central office by the operation of the switch at the substation corresponding thereto, substantially as set forth.

5. The combination with a telephone-line extending from a substation to a central office, of a number of signal-indicators associated with the line at the central office, a number of switch-keys at the substation, each of said switch-keys corresponding to a particu-

lar signal-indicator, a source of current, and means, controlled through the agency of said switch-keys, for selectively establishing circuits for said source of current through the
5 correspondingsignal-indicators, whereby any one of said signal-indicators may selectively be excited by actuating the switch-keys at the substation corresponding thereto, substantially as described.

10 6. In a telephone-exchange system having a number of switchboards, the combination with a telephone-line extending from a substation to one of said switchboards, means for extending said telephone-line to any one
15 of the other switchboards, a number of signal-indicators associated with said telephone-line at its switchboard, each of said signal-indicators corresponding to a particular one of the other switchboards, a source of cur-

rent associated with said telephone-line, a 20 number of switch-keys at the substation of the line adapted to be actuated by the subscriber to signal the central office, each of said switch-keys corresponding to a particular one of said signal-indicators, and means 25 controlled through the agency of said switch-keys for establishing circuits from said source of current through the corresponding signal-indicators, whereby the subscriber may indicate the particular board to which he wishes 30 his line extended, by actuating the corresponding switch-key, as set forth.

In witness whereof I hereunto subscribe my name this 17th day of July, A. D. 1896.

CHARLES E. SCRIBNER.

Witnesses:

ELLA EDLER,

MYRTA F. GREEN.