

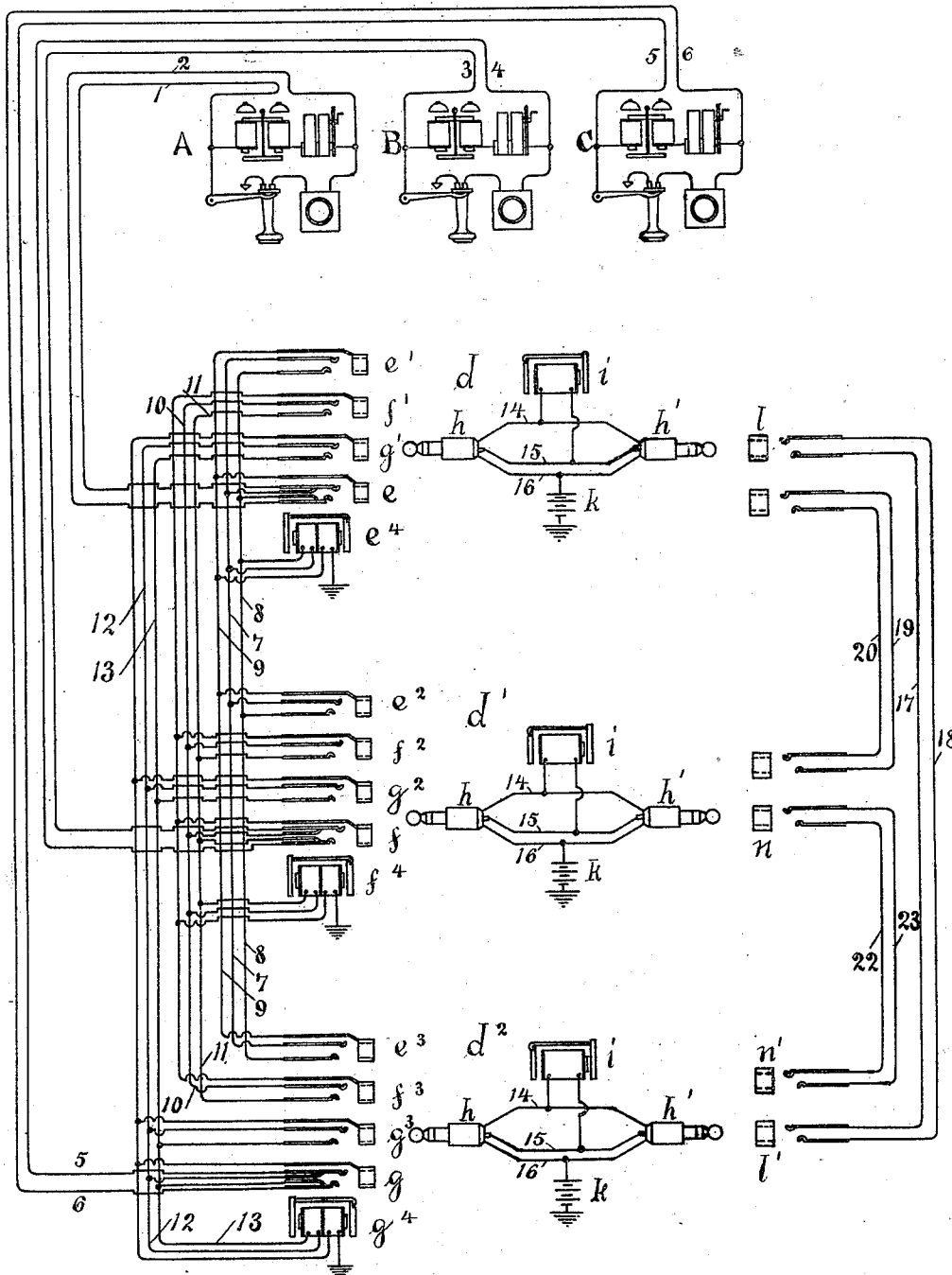
(No Model.)

C. E. SCRIBNER.

APPARATUS FOR TELEPHONE SWITCHBOARDS.

No. 554,399.

Patented Feb. 11, 1896.



WITNESSES

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

APPARATUS FOR TELEPHONE-SWITCHBOARDS.

SPECIFICATION forming part of Letters Patent No. 554,399, dated February 11, 1896.

Application filed July 2, 1895. Serial No. 554,701. (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 Apparatus for Telephone-Switchboards, (Case No. 392,) 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 the circuits and the arrangement of spring-jacks of telephone-lines in multiple switchboards of the branch-terminal type, being a device for dissociating from the line its shunting-annunciator or signal-indicator, together with the cable through this instrument, and for permitting complete or thorough connections between different lines to be made under certain circumstances without leaving any unnecessary instruments or cables appended to the lines.

In multiple telephone-switchboards of the type mentioned the spring-jacks on the different sections of switchboards are connected in multiple with the line, while the signaling-instrument or line-annunciator is placed in a permanent bridge of the line-circuit. The annunciator is constructed to have high resistance and impedance to prevent, as far as possible, the shunting of telephonic current through it. On account of the imperfection with which this function was exercised in cases where very long or high resistance-circuits were coupled together it has been customary to provide at the beginning of the switchboard system a separate section of switchboard with spring-jacks having separable switch-contacts, which, when the plug was inserted into the jack, disconnected from the outgoing line-circuit the cables of the remainder of the switchboard, including the bridged line-annunciator, and connected with the spring-jacks on the other sections of switchboard, all "long-distance connections" with lines being made at this section of the switchboard.

It is the purpose of my present invention to perform the functions of this peculiar section of switchboard, while avoiding the large number of special spring-jacks contained in

it, and at the same time to obtain its advantages to a certain extent in all connections.

The invention consists in providing for each line upon that section of the switchboard which contains the line-annunciator a special spring-jack having such separable switch-contacts, these switch-contacts being included in the telephone-line at the beginning of the system, so that when separated they disconnect the main line from the apparatus in the remainder of the switchboard. This spring-jack may preferably be the answering-jack in the switchboard—that is, a spring-jack distinct from the line spring-jacks in the same section of the switchboard and located at some easily-accessible point—after the manner of Patent No. 330,067, dated November 10, 1885, to J. A. Seely. Hence when connection is made with any line at the answering-jack, in response to an initial signal from the subscriber, the line-annunciator of that line, together with the cables extending through all other sections of the switchboard, is disconnected from the outgoing line. Usually the connection will be completed at the same section of switchboard with a line-jack of another line, so that the cables and annunciator of the latter line will still remain connected with it and will become useless appendages to the completed circuit; but a considerable advantage is attained by thus disconnecting from even one of the lines the unnecessary cabling and apparatus.

Each section of switchboard is furnished with trunk-lines or transfer-circuits extending to each other section, by means of which, when desired, a connection made with an answering-jack of a line at one section of the switchboard, may be "trunked" to the switchboard whereon is located the answering-jack of the line with which the connection is to be completed, and may be made with that answering-jack. Under these circumstances all cable and instruments will be disconnected from both lines of the completed circuit, the result being then the exact equivalent of that obtained by the use of the special switchboard-section before described. Of course this last mode of connection, by trunking from an answering-jack on one section to another on a different section of

the switchboard, would be made use of only in the case of long-distance connections, in which it might be necessary to leave the lines wholly free from attachments extraneous to the telephone-circuit.

My invention, then, comprises, first, a telephone-line extending through the switch-contacts of a special answering spring-jack upon some section of a multiple switchboard and thence to a branch terminal spring-jack upon each other section of the switchboard, being closed finally through a line-annunciator, and, second, transfer-circuits or trunk-lines from each section of switchboard to every other section, by which a through connection may be made from any answering spring-jack on one section to an answering spring-jack on any other section of the switchboard.

When connection is made at a single section of the switchboard between an answering-jack of the line terminating at that switchboard and the line-jack of another line in the same section, the cabling and the line-annunciator of the call-initiating line are cut off. When a connection is made from an answering-jack of a call-initiating line through a trunk-line to another section of the switchboard, and there with the answering-jack of the correspondent line, all switchboard-cable and both line-annunciators are removed from the circuit.

I have shown the arrangement of circuits of my invention in the accompanying diagram. In this figure three sub-stations, A, B and C, are represented, furnished with the usual signaling and telephonic appliances. These stations are connected by lines, which are designated 1 2, 3 4 and 5 6, respectively, with the apparatus upon three sections, d , d' and d'' , of a multiple telephone-switchboard at a central station. The two line conductors, 1 2, of line to station A, are connected with the contact-springs of an answering spring-jack e upon section d of the switchboard. This spring-jack is of the type before mentioned—that is, its switch-springs are separable from the contact-points upon which they normally rest, and are opened from them when a plug is inserted into the spring-jack. From the contact-anvils of the spring-jack e a pair of conductors 7 8 extend through the switchboard, being connected with the corresponding line-springs in line spring-jacks e' , e'' and e''' in the different sections of the switchboard, and with the main coil of annunciator e^4 , which is located on the section d of the switchboard near the answering-jack e .

All the spring-jacks of the line have the usual test-rings, which are connected together through a wire 9 and form a portion of a local circuit which is closed when connection is made with the line, and which serves both to restore the line-annunciator which has been operated and to prevent its operation by subsequent signals in the line. The

arrangement of circuits for this purpose is well known in the art.

The line conductors, 3 4, likewise extend through the switch-contacts of an answering-jack f at section d' of the switchboard, and thence to wires 10 11, which lead to the contact-springs of spring-jacks f' , f'' , f''' and to the annunciator f^4 on section d' . The conductors of line to station C are connected with answering-jack g , line spring-jacks g' , g'' and g''' and with annunciator g^4 .

The wires 7 8, 10 11 and 12 13 are, in practice, made up into a cable.

Each switchboard is provided with pairs of connecting-plugs h , h' , each having three contact-pieces adapted to register with the three contact parts of the spring-jack. The like line-contacts of the different members of each pair of plugs are connected together by conductors 14 15, which constitute what is generally known as the "plug-circuit." A clearing-out annunciator i is connected in a bridge of this circuit. Those contact-pieces of the plugs which register with the test-rings of the spring-jacks form the terminals of a conductor 16, which is grounded through a battery k . This battery serves to produce a test and also to reset the line-annunciators.

A trunk-line is provided extending from each section of the switchboard to each other section, and terminating at each position in a spring-jack. Thus, trunk-line or transfer-circuit 17 18 extends between sections d and d'' of the switchboard, terminating in spring-jacks l and l' at the different boards. Trunk-line 19 20 extends between boards d and d' and line 22 23 between boards d' and d'' .

For the purpose of tracing the operation of the system assume that subscriber at station C transmits an initial call-signal by rotating his signaling-generator. The annunciator g^4 is operated and indicates the call to the operator at the section d'' of the switchboard. This operator then inserts her answering-plug h into the answering-jack g , learning the order from the subscriber by means of her telephone bridged across the plug-circuit in a well-known way. By the insertion of plug h into the answering-jack g the conductors 12 13 are disconnected from the line conductors 5 6, so that these line conductors are left free from all appended cables and from the shunting-magnet of annunciator g^4 . If the operator, having learned the order, desires to make connection with the correspondent line at her own section of the switchboard, she inserts plug h' into the line-jack of that line—for example, into line-jack f^3 , if the call be for connection with station B. This may be done in case either or both of the lines are of low resistance and transmission between the stations is so good that the deleterious effect of the cable remaining attached to the line 3 4 and the shunting effect of the line-annunciator f^4 are inappreciable. If, however, the connection required were with the station A, which may be assumed to be so distant as to

make telephonic communication with it difficult, the operator may proceed in a different manner.

Having received the order for connection with station A, she will insert plug *h'* into the trunk-jack *l'*, which forms the terminal of the transfer or trunk circuit 17 18 to section *d* of the switchboard. She will then, by any suitable order wire or other contrivance, such as are well known in the art, instruct the operator at section *d* to connect the trunk spring-jack *l* with the answering-jack *e*. When this connection has been made, it will be noted that a complete metallic circuit will have been formed from station C to station A, being by way of line conductors 5 6, plug-circuit 14 15 at board *d*², transfer-circuit 17 18, plug-circuit 14 15 at board *d*, and line-circuit 1 2 to station A. The normal line connections of both lines, including the cable in the switchboard, the unused spring-jacks and the line-annunciators will be cut off from this through circuit at the answering-jacks *g* and *e*, respectively. The greatest possible efficiency of transmission through the switchboard will be thus attained.

I have not considered it necessary to show in detail the mechanism of the plug-circuit, or the signaling appliances for facilitating the transfer of connections by means of the office trunk-lines. Various modes of performing all that is here required are well known in the art.

I claim as new—

1. The combination with a telephone-line, of a line spring-jack upon each of several sections of a multiple switchboard, and an answering spring-jack at one of the sections having contacts adapted to be separated when a

plug is inserted into the spring-jack and arranged to cut off the conductor extending to the line spring-jacks, as described.

2. The combination with a telephone-line, of a line spring-jack upon each of several multiple switchboards and an annunciator in a bridge of the circuit, and an answering-jack having separable contacts included in the line-circuit between the sub-station and the line-jacks and annunciator, as described.

3. In combination, two telephone-lines, each extending normally through separable contacts in an answering-jack, and thence to line spring-jacks upon different sections of a multiple switchboard, connecting-plugs inserted in the different spring-jacks, and a loop-conductor completing the circuit between the plugs, as described.

4. In combination, two telephone-lines, each extending normally through separable contacts in an answering spring-jack upon a section of a multiple switchboard, and thence to a signal-indicator in the same section and to line spring-jacks on the different sections of the switchboard, a transfer-line extending between the switchboards whereon the answering-jacks are located, and means for connecting each answering-jack with the trunk-line, whereby the telephone-lines may be united in a through circuit devoid of appended line-jacks and signaling instruments, as described.

In witness whereof I hereunto subscribe my name this 13th day of June, A. D. 1895.

CHARLES E. SCRIBNER.

Witnesses;

ELLA EDLER,

MYRTA F. GREEN.