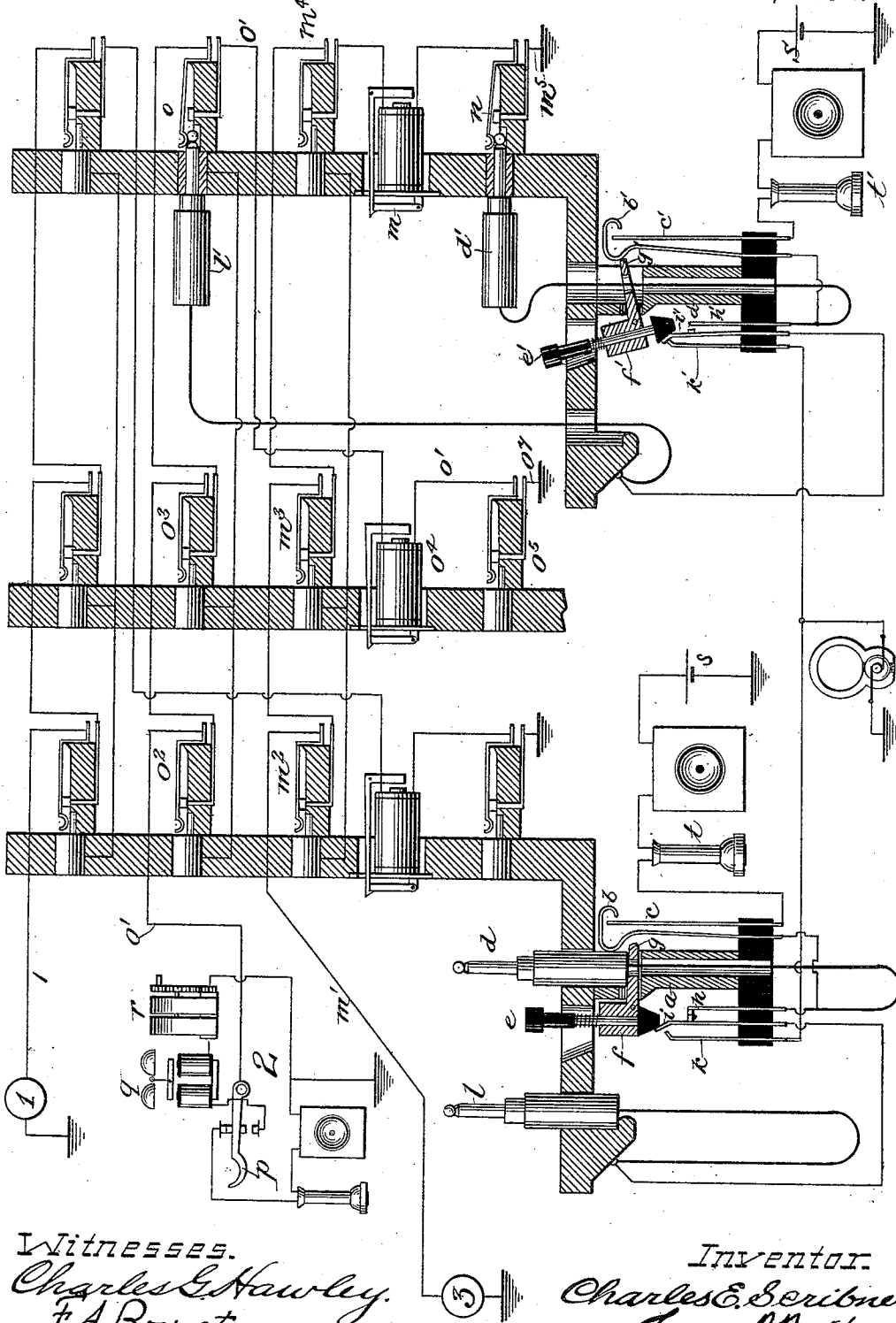


C. E. SCRIBNER.
MULTIPLE SWITCHBOARD SYSTEM.

Patented Nov. 20, 1894.



Witnesses.
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UNITED STATES PATENT OFFICE.

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

MULTIPLE-SWITCHBOARD SYSTEM.

SPECIFICATION forming part of Letters Patent No. 529,421, dated November 20, 1894.

Application filed May 1, 1890. Serial No. 342,279. (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 Multiple-Switchboard Systems, (Case 228,) 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 relates to that class of multiple switch board systems in which the telephone lines are provided with test circuits so arranged that when a line is in use it is crossed or connected with its test circuit, the absence or presence of this cross being determined at any board by connecting a telephone and battery with the test piece of any line. Such a system is illustrated and claimed in my Patent No. 305,021, granted September 9, 1884.

My invention herein relates more particularly to the operator's switching apparatus which I term the cord switch, this being so arranged that the calls are answered, the tests made, the lines connected and disconnected and the signals sent and received in a more simple manner than heretofore.

My invention will be readily understood by reference to the accompanying drawing, in which I have shown three telephone lines each connected with switches on three different switch boards and each through its individual annunciator and answering spring jack switch to ground in connection with the cord switch at two of the switch boards.

The subscribers' stations 1, 2 and 3 are each provided with usual subscriber's apparatus and are connected by lines 1, 2 and 3 respectively through their switches and respective annunciators and answering jacks to ground in the usual manner. Pairs of plugs and cords in connection with the operator's telephone and the calling generator are provided at the different switch boards, a special cord switch being provided for each pair of cords. These cord switches and plugs are so arranged that when a call is received at a switch board the operator at that board by lifting one of the plugs of a pair and inserting it in the answering switch of a calling subscriber's line makes connection therewith through her

telephone, the act of lifting the plug from the socket of the cord switch serving to connect the operator's telephone with the particular cord. The operator listening at her telephone thus connected receives the order of the subscriber and then with the other plug applied to the test piece of the called subscriber's line makes the test to determine whether the line wanted is busy. If the line is found free she simply inserts the plug and by a simple movement of the handle of the plunger of the cord switch she disconnects her telephone and rings up the called subscriber. The calling subscriber's individual annunciator is left in circuit as a clearing out annunciator.

I will now describe the construction of the cord switch. It will be understood that several, preferably twenty, may be built up in strips side by side upon the same frame. As shown at board 1 the cord switch consists in the frame *a* provided with a plug socket and an opening for the cord. The contact springs *b c* included in the circuit containing the operator's telephone and test battery are separated when the plug is resting in its socket as shown. On lifting the plug *d*, however, from its socket spring *b* will close upon spring *c* thus connecting the ground branch containing the operator's telephone and test battery with the cord of plug *d*.

The plunger *e* is mounted in the pivoted guide *f* carrying the arm *g*, arm *g* being adapted to be forced against spring *b* when tilted to separate said spring *b* from spring *c*. The contact *h* and the spring *i* are included in the circuit of the pair of cords and are normally in contact as shown at board 1. The generator contact *k* is placed near the free end of spring *i*. By depressing the plunger, no matter what may be the position of its guide, this spring *i* is separated from contact *h* to open the circuit back and closed to the generator contact *k*. Thus when plug *l* is inserted in the switch of a line the generator will be closed to that line by depressing the plunger *e*.

At board 3 the different parts of the operator's outfit are marked with letters corresponding to the letters of the outfit at board 1, except that each letter is marked with the numeral 1. Thus we have at board 3 the

frame a' of the cord switch corresponding to the frame a of the cord switch at board 1 and so on.

I will now describe the manner of connecting two lines together. Suppose subscriber at station 3 sends current over his line throwing down the shutter of his individual annunciator m . The circuit of the telephone line m' of station 3 may be traced through the spring and contact of each of the switches m^2, m^3, m^4 , through the said individual annunciator m , and thence normally through the spring contact of answering switch n to ground m^5 . The operator will at once raise plug d' from its socket in the cord switch and insert said plug d' into the answering switch n of line 3. The arm g' being in the position of the arm g at board 1 when the plug is lifted it is evident that spring b' will close upon spring c' . Thus the operator's telephone at board 3 will be connected with plug d' and hence with line 3 so that the operator may receive the order of subscriber 3. Having received the order, I will say for line 2, she picks up plug l' and touches the tip thereof to the frame of spring jack o of said line 2. The circuit of this line may be traced normally as indicated by o' through the switches o^2, o^3 and o , and thence through the individual annunciator o^4 , and thence through the spring and contact of the answering switch o^5 to ground o' . Now if the line 2 is free the test ring or piece of switch o will be opened and hence no circuit will be found for the test battery when the tip of the plug is thus applied to the test piece, and the absence of a click in the telephone will thus indicate that line 2 is free and the operator will insert plug l' into the switch o as shown. She will now send current over line 2 to call up the subscriber 2 by depressing plunger e' . At the same time the plunger e' is depressed she may tilt the guide f' to the position shown to bring the arm g' against spring b' , thus disconnecting her telephone at the same time she sends the call signal. As the spring v' is forced against the generator contact h' said spring v' is separated from contact h' , thus preventing signal current from being sent over line 3.

It will be observed that the arm g' is provided with an opening for the cord. When the subscribers are through talking, one or the other sends the clearing out signal to throw down the shutter of annunciator m , whereupon the plugs $l' d'$ are pulled out and returned to their sockets. The returning of plug d' to its socket tilts the guide f' back so as to leave the plunger in its upright position. Thus as shown at board 1 the plug d is shown resting in its socket and the several parts of the cord switch in their normal positions.

The telephone apparatus at each of the subscriber's stations is of usual construction. Thus, at station 2, the switch p is adapted to rest upon its upper contact when the telephone is removed, as shown. When the tele-

phone is hung on the switch, the switch is separated from the contact leading to the telephone and closed upon its lower contact, thus bringing the bell q and the generator r into 70 circuit. The test battery s is included in a ground branch with the operator's telephone t . In this manner the work of the operator in receiving and answering the calls and connecting and disconnecting the lines is greatly 75 facilitated.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination with a pair of plugs and 80 cords, of a cord switch consisting of a frame having a socket for one of the plugs, a pair of springs in a branch from said cords through a telephone and battery to ground and a plunger mounted in a pivoted guide provided with 85 an arm and contact springs operated by forcing down the plunger, substantially as and for the purpose specified.

2. The combination with a pair of plugs and 90 cords, of a cord switch consisting of a plug socket, a contact point connected through the operator's telephone, a spring connected with the cord and adapted to make contact with said contact point but held out of contact therewith while the plug is in the socket, a 95 plunger mounted in a pivoted guide, a spring actuated by the depression of the plunger to connect the generator in circuit, said pivoted guide carrying an arm adapted to engage said first mentioned spring to move the same out 100 of contact with its contact point during the time the plug does not rest in the socket, substantially as described.

3. The combination with a pair of plugs and 105 a single strand cord, of a cord switch comprising a contact point connected through the operator's apparatus to ground, a spring connected with the cord adapted to make contact with said contact point but held out of contact therewith while the plug is in the socket, 110 a plunger mounted in a pivoted guide, a contact point connected through the generator to ground, a spring connected with the cord normally out of contact therewith but moved into contact therewith by the depression of said 115 plunger, said pivoted guide carrying an arm adapted to move said first mentioned spring out of contact with its contact point, substantially as described.

4. The combination with two connecting 120 plugs, of a conductor uniting the two plugs, a cord switch for one of the plugs adapted to connect the operator's telephone with said conductor when the plug is removed from its socket, a lever controlling the switch springs 125 of the cord switch independently of the plug, a plunger operating a calling key adapted to disconnect one of said plugs from the other and to connect it with a source of calling current, and a handle controlling both the lever 130 and the plunger, substantially as described.

5. The combination with two connecting

plugs, of a cord switch for one of the plugs | operate the calling key in the other move-
controlling the connection of a telephone with | ment, substantially as described. 10
the plugs, a calling key controlling the con-
nection of a generator of signaling current
5 with the plug, a lever capable of two differ-
ent movements adapted to operate the cord
switch independently of the plug and of the
calling key in one of its movements, and to

In witness whereof I hereunto subscribe my
name this 17th day of February, A. D. 1890.

CHARLES E. SCRIBNER.

Witnesses:

CHARLES G. HAWLEY,
F. A. BOYNTON.