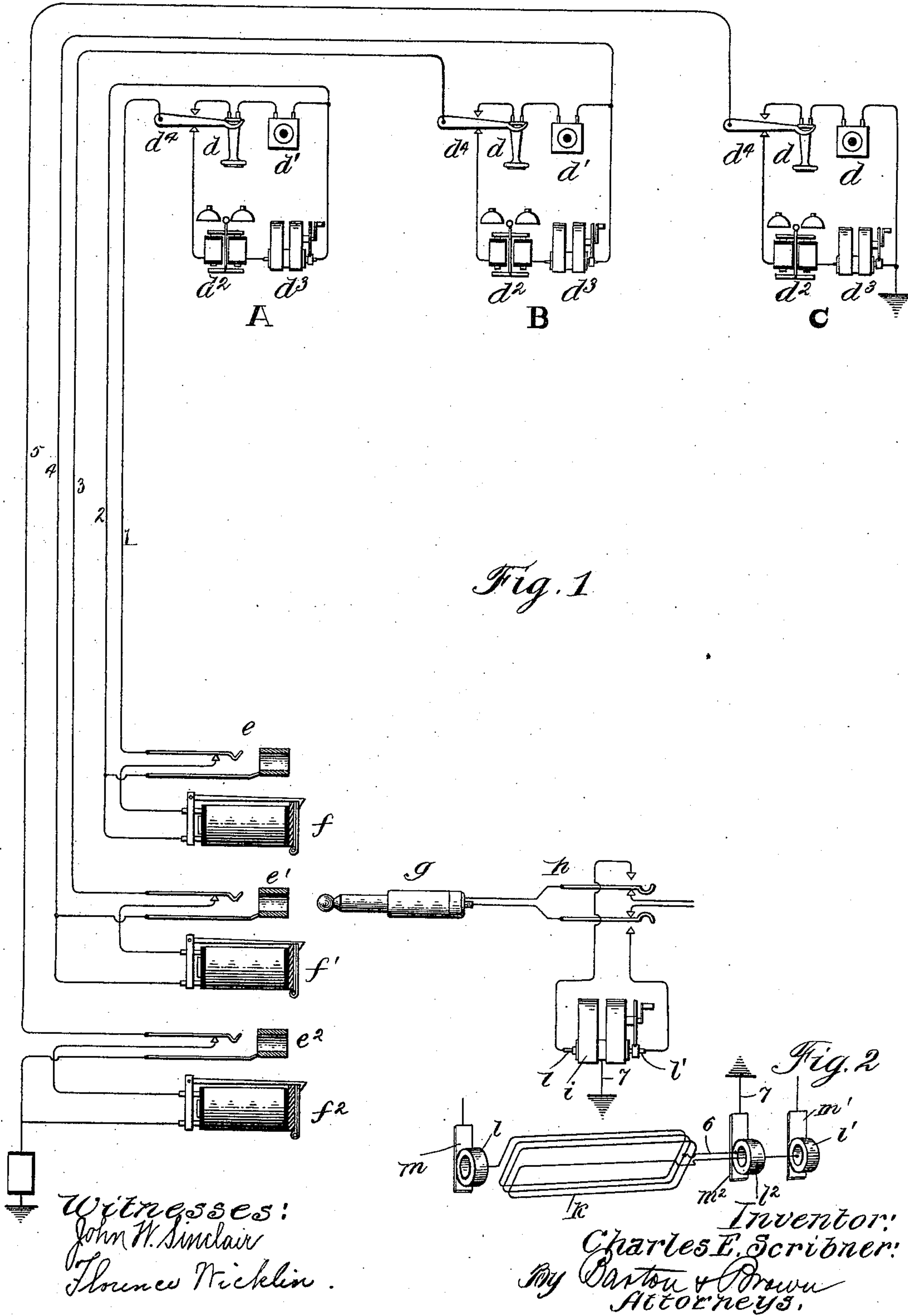


(No Model.)

C. E. SCRIBNER.  
SIGNALING APPLIANCE FOR TELEPHONE SWITCHBOARDS.  
No. 575,131. Patented Jan. 12, 1897.



# UNITED STATES PATENT OFFICE.

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

## SIGNALING APPLIANCE FOR TELEPHONE-SWITCHBOARDS.

SPECIFICATION forming part of Letters Patent No. 575,131, dated January 12, 1897.

Application filed November 4, 1895. Renewed December 15, 1896. Serial No. 615,807. (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 Signaling Appliances for Telephone-Switchboards, (Case No. 408,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention concerns the current-generator for operating the substation-bells of telephone-lines in an exchange system comprising both metallic and grounded circuit lines. Its purpose is to so apply the ground connection of the generator for operating the bells on grounded lines that it may not interfere with the transmission of signals on metallic-circuit lines of which either conductor is accidentally grounded.

It is customary in telephone-exchange systems to employ a single generator of signaling-current to operate the bells on either metallic or grounded circuits, or upon both simultaneously. It is of course necessary to provide a ground connection, either permanent or temporary, with the generator for working over the grounded lines; but such a ground connection is undesirable in ringing over metallic circuits which are liable to accidental ground contacts on either line conductor, since the signaling-current from the grounded generator may be short-circuited by an accidental ground which does not otherwise seriously affect the operativeness of the line.

In my invention the ground connection is applied at the central point of the source of signaling-current, as of the armature of the generator. Then if the terminals of this generator be applied to the line conductors of a metallic circuit the entire source of current will be effective in operating the station-bell, while if one of the line conductors be grounded, or if there be but one line conductor, as in the case of a grounded line, one-half of the source of current will still be operative to ring the station-bell.

In employing this invention in a magneto-generator of ordinary type two coils may be

wound upon the armature and serially connected, the ground branch being applied at the point of junction of the two coils.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 represents three stations A, B, and C, connected by three telephone-lines with the switching apparatus of a telephone-switchboard, which is provided with a signaling generator of the type which constitutes this invention. These telephone-lines exemplify the three different conditions which must be met—namely, metallic circuits free from grounds, metallic circuits of which one line conductor is accidentally grounded, and grounded lines. Fig. 2 illustrates, diagrammatically, a construction of the armature of the signaling-generator.

Referring to Fig. 1, the substation is furnished with the usual receiving-telephone  $d$ , transmitting-telephone  $d'$ , signal-bell  $d^2$ , generator  $d^3$ , and telephone-switch  $d^4$  for connecting the telephones and the signaling appliances alternately with the line-circuit. The apparatus at station A is connected by lines 1 and 2 with a spring-jack  $e$  in a telephone-switchboard at the central station and with an annunciator  $f$ , the spring-jack being adapted to disconnect the annunciator from the line when a plug is inserted into the jack. Station B is connected by line-wires 3 and 4 with a similar spring-jack  $e'$  and annunciator  $f'$ , and station C is included in a ground-circuit 5, leading from earth at the substation to earth at the central station, and connected also with a spring-jack  $e^2$  and annunciator  $f^2$ . Lines 1 2 may constitute a metallic circuit which is free from ground connections. Lines 3 4 are a similar metallic circuit, excepting that an accidental ground has occurred upon conductor 3. Line 5 is obviously a ground-circuit line.

The operator at the central station is provided with the usual connecting-plugs  $g$  and ringing-key  $h$ , which, when depressed, connect the terminals of the calling-generator  $i$  with the contact-pieces of the plug. This generator  $i$  may be constructed in the way illustrated in Fig. 2 or in any equivalent manner.

As shown in Fig. 2, the armature consists of a coil of wire  $k$ , whose terminals are brought



to contact-rings  $l$  and  $l'$ , upon which bear suitable brushes  $m$  and  $m'$ . From the central point of this coil a branch 6 is led to a third contact-ring  $l^2$ , upon which a brush  $m^2$  rests.

5 Of course the coil of wire  $k$  is supposed to be wound upon the usual core rotating between pole-pieces of magnets, as represented at  $i$ . The rings  $l$  and  $l'$  may be carried in any suitable manner upon the shaft of the generator,  
10 and an equivalent of the ring  $l^2$  may be, if desired, the frame of the machine. The brush  $m^2$  or the frame of the machine is grounded by a conductor 7.

If in the device represented in Fig. 2 circuit be closed between brushes  $m$  and  $m'$ , the  
15 whole coil  $k$  of the armature will of course be effective in creating current in the closed circuit. If, however, circuit be closed between ground branch 7 and either brush  $m$  or  
20  $m'$ , one-half the armature will act to produce current in the circuit thus closed. Hence if plug  $g$  be inserted in spring-jack  $e$ , the line of which is devoid of ground connections, the key  $h$  being depressed, a current will be set  
25 up impelled by the entire electromotive force of the armature. If the plug be inserted in spring-jack  $e'$ , one half the armature will be short-circuited by the accidental ground on the line conductor 3, but the other half will  
30 have sufficient electromotive force to operate the bell  $d^2$  at the substation B. If the plug be inserted into spring-jack  $e^2$ , similarly one-half the armature will act to excite the bell at substation C. Thus this generator, pro-  
35 vided with its permanent ground connection,

may be used indifferently upon grounded or metallic lines, and its action will not be interfered with by accidental grounds upon the latter lines.

I claim as my invention—

1. The combination with a plug-circuit of a telephone-switchboard, a calling-key in the plug-circuit, and a source of signaling-current having its terminals connected with the switch-contacts of the calling-key, of a ground  
40 connection to the middle point of said source of current, substantially as described. 45

2. The combination with a plug-circuit, a calling-key in the plug-circuit, and a generator of signaling-current having the terminals of its armature connected with switch-contacts of the calling-key, of a ground connection to the middle point of the active wire of said armature, as described. 50

3. The combination with a group of telephone-lines comprising both metallic and grounded circuit-lines provided with bells at their substations, a generator of signaling-current, and means for applying the terminals of said generator to the different lines,  
55 of a permanently-closed ground branch from the middle of the armature-winding of said generator, substantially as described. 60

In witness whereof I hereunto subscribe my name this 24th day of September, A. D. 1895. 65

CHARLES E. SCRIBNER.

Witnesses:

FRANK R. MCBERTY,  
ELLA EDLER.