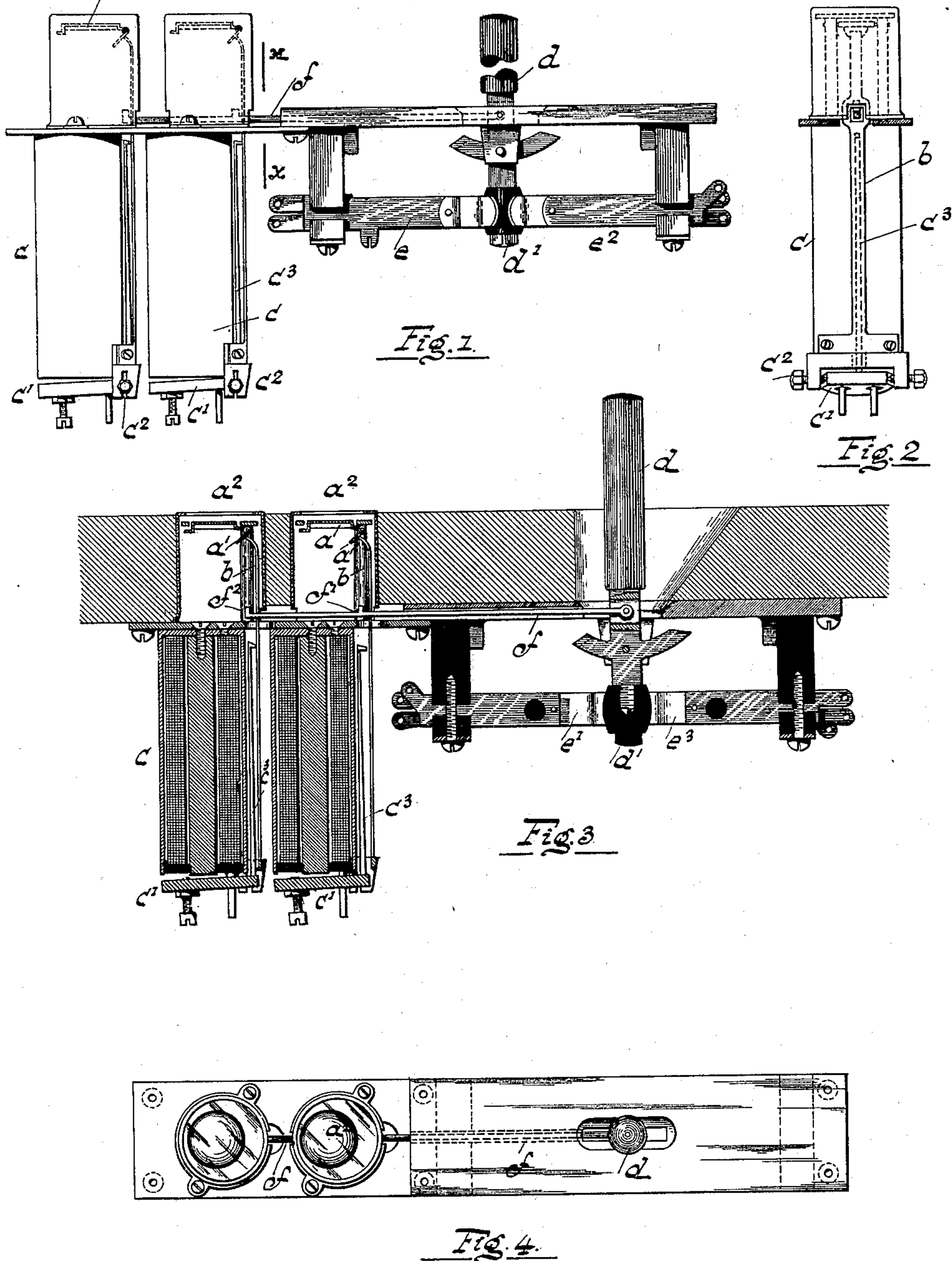


(No Model.)

2 Sheets—Sheet 1.

C. E. SCRIBNER.  
SUPERVISORY SIGNAL FOR TELEPHONE SWITCHBOARDS.  
No. 596,628. Patented Jan. 4, 1898.



Witnesses:  
*A. M. Danner*  
*George L. Cragg*

Inventor:  
*Charles E. Scribner*  
by *Barton Brown* his Attys.

(No Model.)

2 Sheets—Sheet 2.

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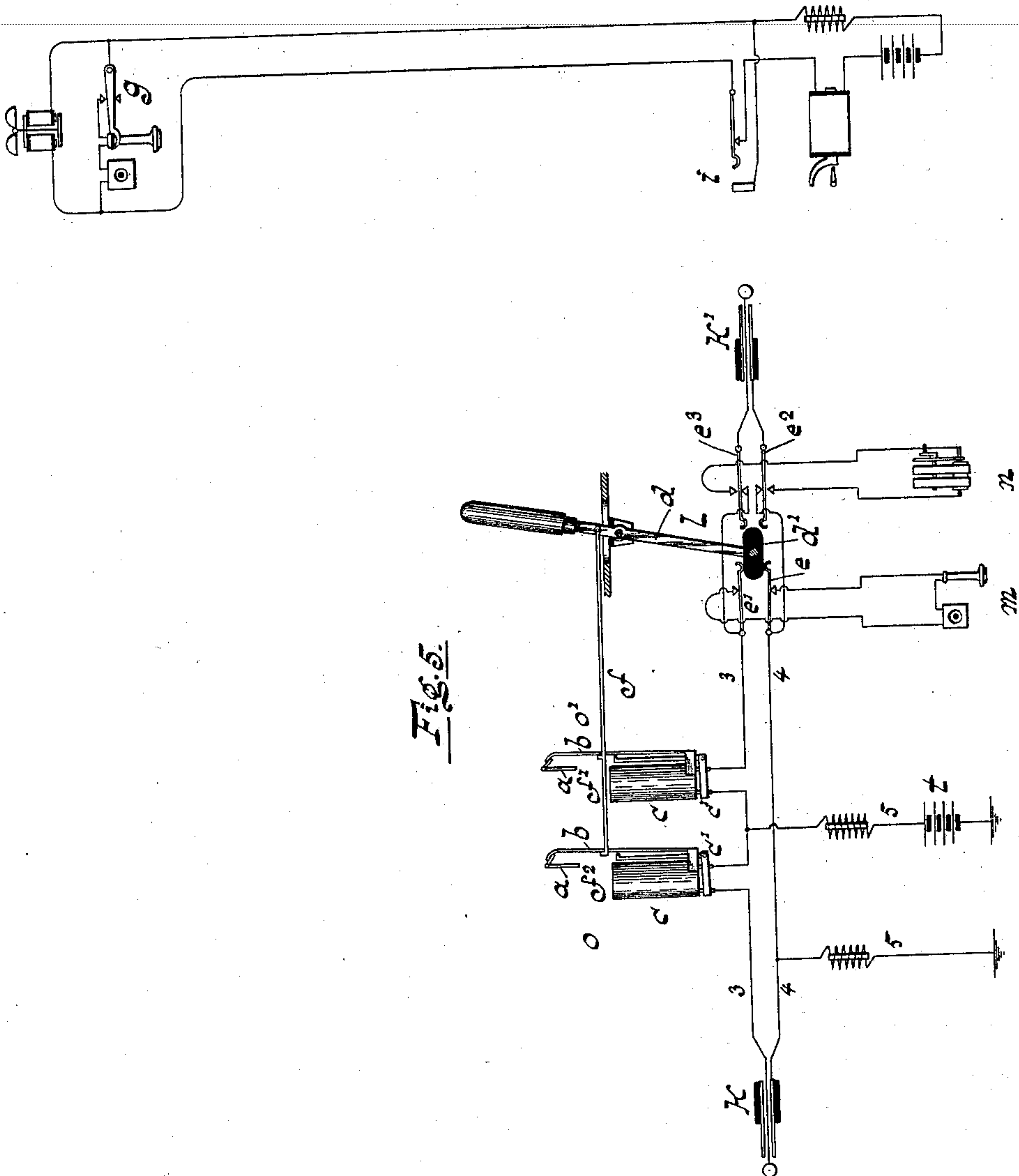


Fig. 5.

Witnesses:  
*W. M. C. Gannett*  
*George A. Gannett*

Inventor:  
*Charles E. Scribner.*

By: *Barton Brown his atty.*



# UNITED STATES PATENT OFFICE.

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

## SUPERVISORY SIGNAL FOR TELEPHONE-SWITCHBOARDS.

SPECIFICATION forming part of Letters Patent No. 596,628, dated January 4, 1898.

Application filed November 16, 1896. Serial No. 612,271. (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 Supervisory Signals for Telephone-Switchboards, (Case No. 432,) 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 relates to signals commonly employed for informing an operator of the condition or position of the appliances at two different united stations under her charge known as "supervisory" or "keyboard" signals.

The improvement is a device for effecting the concealment of the supervisory signal during the idleness of the connecting-cords with which it is associated through the agency of a key whose position is altered by the operator in disconnecting her telephone from the circuit of the plugs.

In switchboards furnished with automatically-operating supervisory signals it is convenient to arrange the signal-indicating instrument in such a way that its magnet shall be excited and its indicator thereby concealed during the closure of the line-circuit with which it is associated at the substation in the use of the telephone. The signal then becomes displayed, when upon the replacement of the telephone upon its switch-hook the current through the magnet of the signal is interrupted and the latter becomes inert. Such signal-indicating instruments are, however, commonly used in groups of a considerable number in each keyboard. In such a group those signals whose plugs are not in use are displayed, their controlling-magnets being inert, as well as those associated with plugs which are in use in connections which are no longer required. Hence the signals of the latter instruments are likely to be overlooked.

The present invention applies to signals operating in this manner; and it consists in a device controlled by the operator's listening-key constructed to hide or otherwise conceal from view the indicator or target of the cor-

responding signal. This result may be effected through the agency of the key by any suitable electrical or mechanical mechanism. A satisfactory device consists in a link connected with the key-operating lever acting directly upon the signal-indicating instrument.

The invention is especially adapted to use with the well-known type of key described in Patent No. 564,457, of July 21, 1896, to C. E. Scribner and F. R. McBerty, in which a movable lever carries a wedge lying between the presented extremities of oppositely-directed switch-springs, the lever being constructed to remain placed between one pair of switch-springs, and thereby to connect the switch-springs with the terminals of the operator's telephone. In the use of such keys the levers are left normally in position to bring the telephone into each of the plug-circuits of the keyboard. The act of sending a call-signal, however, at the same time disconnects the telephone, the lever remaining in a different position as long as the plug-circuit is in use in connecting lines. Applying the present invention to such a key the signal hiding or concealing mechanism is linked or otherwise mechanically connected with the lever of the switch-key, being effective to conceal the indicator when the lever is in position to bring the operator's telephone into the plug-circuit. This form of the invention is shown in the attached drawings.

Of the drawings, Figure 1 represents a side elevation of a key and two supervisory signals designed for association with the two plugs of the corresponding plug-circuit. Fig. 2 is a view of one of the signal-indicating instruments, being a section on line *x x* of Fig. 1. Fig. 3 is a vertical sectional view of the appliance. Fig. 4 is a plan view of the same. Fig. 5 is a diagram showing the circuits with which the signals and key are adapted to be used.

The signal-indicating instrument comprises an indicator *a*, pivoted at its edge in a suitable frame. The indicator or target is furnished with an extension *a'* at an acute angle to it, upon which bears the free extremity of the flat spring *b*, whose other extremity is fixed to the frame. This spring tends to



bring the indicator into a horizontal position, in which it shall appear before an opening  $a^2$  in the frame of the instrument. Fixed to the frame is a tubular magnet  $c$ , whose armature  $c'$ , pivoted in a bracket  $c^2$ , carried by the shell of the magnet, operates an arm  $c^3$ , which is adapted to be thrust against the spring  $b$  when the armature is attracted and to raise the spring out of engagement with the extension  $a'$  of the target. Hence when the magnet is excited the target is permitted to fall into its vertical position, reappearing at the opening  $a^2$  only when the magnet again becomes inert.

The listening and ringing key comprises a lever  $d$ , pivoted in the same frame which carries the other parts, having a double wedge or block  $d'$  of insulating material at one extremity. Upon opposite sides of this block and substantially in its plane of movement are sets of symmetrically-disposed switch-springs  $e$ ,  $e'$ ,  $e^2$ , and  $e^3$  with their normal resting-anvils and their alternate contact-points. The springs are so formed with relation to the wedge that when the handle of the lever is moved to the right the springs  $e$  and  $e'$  are thrust apart and a wedge enters so far between them as to be retained in a stable position. The springs  $e^2$  and  $e^3$ , however, are differently formed, being constructed to force the wedge outward from between them, returning it to a central position between the extremities of the different springs. The springs  $e$  and  $e'$  are connected with the plug-circuit and close upon contact-anvils which form the terminals of the operator's telephone. The key is constructed in this way in order that the lever may be left in position to connect the operator's telephone with the plug-circuit as long as the latter is not in use. The operator then finds herself at once in communication with a calling subscriber upon inserting the proper plug into the spring-jack of the calling-line.

A sliding rod or link  $f$  is pivoted to the lever  $d$ . This rod  $f$  passes through openings in the springs  $b$  of the two signals associated with the key and carries two catches  $f'$  and  $f^2$ , which are adapted to engage these springs when the lever is moved to its extreme position toward the right, raising the springs away from the extensions  $a'$  of the targets, and thus permitting the latter to assume their concealed positions. In other words the rod  $f$ , when moved toward the right, exercises in both of the signaling instruments the same functions that the magnet  $c$  of each is adapted to exercise. While the lever  $d$  lies in its intermediate position these catches permit free play to the springs  $b$ . When the lever is moved to the extreme left, for the purpose of sending a call-signal, the rod  $f$  slides freely through the openings in the springs and does not affect them.

As before stated, this instrument is designed for use in connection with lines where-in the current circulates as long as the tele-

phones of the line are in use, the line-circuits being then closed at the substations through the telephones. Such line-circuits are illustrated in a simple manner in Fig. 5. Each line-circuit is provided at the substation with a telephone-switch  $g$ , which, when relieved from the weight of the receiving-telephone  $h$ , closes the line-circuit through the latter and the transmitting-telephone  $h'$ . These lines terminate in spring-jacks  $i$  in the telephone-switchboard. The switchboard is furnished with pairs of connecting-plugs  $k$  and  $k'$ , with their uniting plug-circuits 3 4, it being understood that each operator is provided with a considerable number of these plugs and their associated appliances. For each plug-circuit there is a listening and calling key  $l$  of the type described. When the wedge of the key is thrust between springs  $e$  and  $e'$ , these are forced outward against the contact-anvils, which constitute the terminals of the operator's telephone  $m$ . When the wedge is thrust between springs  $e^2$  and  $e^3$ , these are separated from their normal resting contact-anvils, through whose agency the plug-circuit 3 4 is completed, and are forced outward against contact-anvils which lead to the poles of a generator  $n$  of signaling-current, so that the plug  $k'$  then becomes disconnected from its mate and looped into circuit with the generator  $n$ . The magnets  $c$  of supervisory signals  $o$  and  $o'$  may be included serially in conductor 3 of the plug-circuit. At a point intermediate of these signals a bridge 5 of the plug-circuit is created, including the source of current  $t$ , together with two impedance-coils, in the usual manner.

While the plug-circuit is not in use the lever of key  $l$  is left in position to connect the telephone with the plug-circuit. Then the targets of the supervisory-signals  $o$  and  $o'$  are hidden. This will then be the normal condition of the signals in the keyboard.

Having received a call from one of the lines, the operator inserts one of the plugs into the spring-jack of the line, and having learned the order inserts the other plug into the spring-jack of the corresponding line. She then throws the lever of key  $l$  into the position for ringing, finally permitting the lever to return to its free position between the switch-springs. In this position the catches upon the rod  $f$  are disengaged from the target-controlling springs of both signals  $o$  and  $o'$ . In the case of the former of these, however, a current has been set up through the magnet of the indicator over the telephone-line, since the telephone at that station has been removed from its hook for the purpose of giving the order to the operator. Hence the indicator of supervisory signal  $o$  will remain concealed. The telephone at the correspondent station has not yet been brought into use, however. The magnet of signal  $o'$  hence remains still inert and permits the spring  $b$  of that signal to raise the target into view. When the telephone at the correspondent station is finally



removed from its switch for use, the magnet of signal o' becomes excited and permits the target of that signal to fall out of view.

When during the connection of the lines either telephone is replaced upon its switch, the target of the corresponding indicator is of course displayed, the magnet of that indicator having been deprived of current. When both substation-telephones have been thus replaced, both signals are displayed, and this may be interpreted by the operator as a signal to remove the connection between the lines. After returning the plugs to their normal position she brings her telephone again into connection with the idle plug-circuit, whereby the targets of the supervisory signals are again concealed.

I do not desire to limit myself to any particular means for effecting the concealment of the targets or indicators, the essential feature of my invention being a means of performing this operation through the agency of the operator's listening or ringing key.

I claim as new—

1. The combination with a telephone-circuit, a magnet therein, a target or indicator controlled by the magnet and adapted to be moved from its normal to its other position when the current in the line is changed, a key controlling the connection of the operator's telephone with the line, of a mechanical connection between the key and indicator to control the signal independently of the current in the line, as described.

2. The combination with a plug-circuit, an operator's key for controlling the connection

of an appliance with the plug-circuit, and supervisory signals adapted to be concealed through the action of current in the plug-circuit, of a mechanical connection between the key and the indicator, adapted to conceal the indicators of the supervisory signals, as described.

3. The combination with an operator's plug-circuit, a listening-key and the supervisory signals having signal-controlling magnets included in the plug-circuit adapted to conceal the indicators of the signals when excited, of a mechanical device connecting the key with the indicator actuated by the key in connecting the telephone to the plug-circuit, adapted to conceal the indicators of the supervisory signals, as described.

4. The combination with a plug-circuit for uniting telephone-lines, and means for causing current to flow in the plug-circuit while the lines are in use, an operator's listening-key for the plug-circuit, and a supervisory signal having a magnet connected with the plug-circuit, the signal being arranged to be displayed when the magnet is inert, of mechanism actuated by the listening-key when in position to connect the operator's telephone to the plug-circuit, adapted to conceal the indicator of the supervisory signal, as described.

In witness whereof I hereunto subscribe my name this 3d day of October, A. D. 1896.

CHARLES E. SCRIBNER.

Witnesses:

ELLA EDLER,

PEARL CLENDENING.