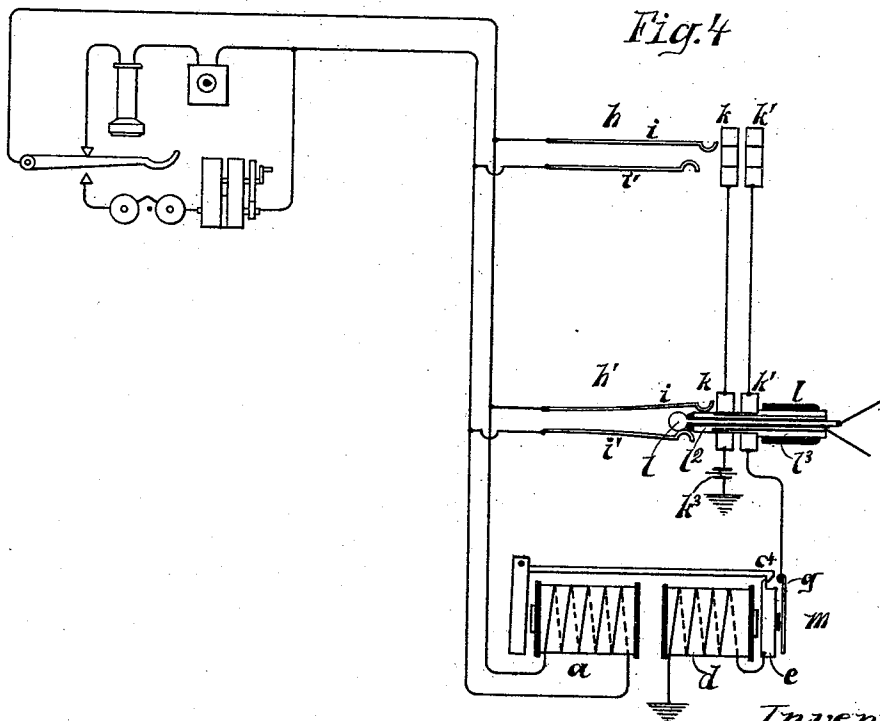
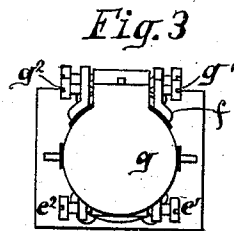
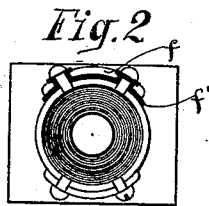
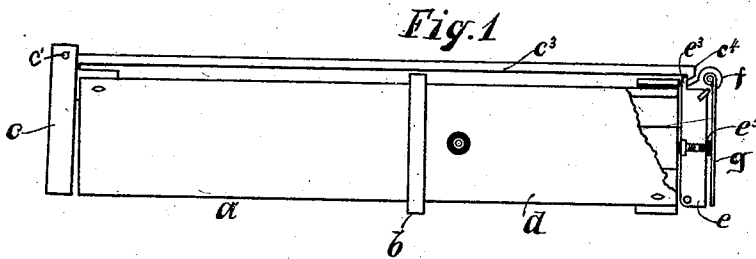


(No Model.)

C. E. SCRIBNER.
TELEPHONE SWITCHBOARD APPARATUS.

No. 488,037.

Patented Dec. 13, 1892.



Witnesses
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UNITED STATES PATENT OFFICE.

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

TELEPHONE-SWITCHBOARD APPARATUS.

SPECIFICATION forming part of Letters Patent No. 488,037, dated December 13, 1892.

Application filed April 16, 1892. Serial No. 429,489. (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-Switchboard Apparatus, (Case No. 304,) 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 that class of switchboards in which the individual annunciator of a line is prevented from operation during the existence of a connection with the line by the electro-magnetic effect of a current in a local circuit at the exchange. The object of my invention is to prevent continuous flow of current in the local circuit when it is not required to perform its function, and thus to avoid waste of energy and a consequent unnecessary expense. In some switchboards the annunciator has been so constructed and arranged in relation to the other parts of the system and the connecting apparatus so disposed that the operation of establishing connection with the line closes a local circuit through an electro-magnetic device upon the annunciator adapted to prevent the actuation of the indicator thereof by signaling currents sent upon the line subsequent to the establishment of the connection. In other switchboard systems the additional electro-magnetic device has been arranged not only to retain the indicator of the annunciator unresponsive while energized, but to reset the indicator as soon as the electro-magnet becomes energized by the establishment of connection with the line. Heretofore the local circuit has been closed as soon as the connection has been established with the line, and has remained closed as long as such connection existed, and has thus required the continual expenditure of energy by the local source of current. My invention applies generally to this class of apparatus, and is designed to avoid such waste of current by providing a normally-open break in the line-circuit, adapted to be closed only by the flow in the line-circuit of such current as would tend to operate the annunciator. In practice it is found desirable to provide contact-points upon the individual annunciator

itself, adapted to be closed together by the first movement of some moving part of the annunciator—as, for example, the indicator or the armature. These normally-open contact-points constitute the terminals of the said second break in the local circuit, the other break being between contact-points located upon the spring-jacks of the system, adapted to be crossed together by the insertion of a connecting-plug into the spring-jack. Obviously when the connecting-plug is thus inserted into the spring-jack the local circuit will remain open at the point of separation of the contact-points upon the annunciator; but as soon as the signal-current comes upon the line either from the exchange to the sub-station or from the sub-station to the exchange the annunciator will start to operate, but in so doing will close the contact-points together, and thus complete the local circuit, whereby the electro-magnetic mechanism will be energized to prevent the operation of the annunciator or to restore it to its normal position.

My invention is illustrated in the accompanying drawings.

In Figure 1 thereof I have shown a side elevation of a self-restoring annunciator having points arranged upon its shutter and upon the shield adapted to be actuated thereby, so disposed as to be closed together as soon as the shutter is released and has started to fall. In Fig. 2 is a cross-section thereof on the line 2 2, showing the means of insulating the shield trunnions from the shutter, so that the shield itself may constitute one of the contact-points. Fig. 3 is a front elevation of the annunciator. Fig. 4 is a diagram showing a sub-station connected by lines with spring-jacks at an exchange and with an individual annunciator thereat, the annunciator being of construction shown in Figs. 1, 2, and 3.

Referring to Fig. 1, *a* is a tubular electro-magnet having its closed ends secured to a supporting-plate *b*. In front of its open end or poles is placed an armature *c*, pivoted at its upper edge upon trunnions *c'* *c''*. The armature carries an arm *c'''*, projecting forward and provided with a catch *c''''* at its forward end. A second tubular electro-magnet *d* is secured to the front of the plate *b*, having its poles facing forward. In front of its poles is placed

another armature e , pivoted at its lower edge upon trunnions $e' e^2$, the pivotal point being beneath the center of gravity and to one side of it, so that the armature or shutter e tends to fall outward. A projection e^3 at the upper edge of the armature normally engages with the catch c^4 and is retained in its vertical position thereby. A small bracket f is secured to the shell of magnet d , being insulated from it by an interposed hard-rubber plate f' . The bracket f carries a shutter g , depending from trunnions $g' g^2$ in the bracket. The shutter or shield g is of such size and shape as normally to conceal the face of the armature e .

15 When the armature e is released by the disengagement of catch c^4 with it, it falls outward, its forward portion striking the shield g near its pivotal point and, on account of the greater weight and the momentum of the armature e , forcing the shield into a horizontal position, thus disclosing the face of the armature e . That portion of the armature e which strikes the shield g is provided with a contact-point, so as to make a reliable contact with the shutter when it touches it. The shield g is normally prevented from coming into contact with the face of the shutter e by a small stud e^5 of hard rubber or other suitable insulating material. When the magnet a is energized,

30 it attracts its armature c , releasing the shutter e and allowing it to fall outward, thus throwing the shield g into a horizontal position and disclosing the face of the shutter e and the number which may be painted thereupon. The magnet d is included in the local circuit at the exchange, and when connection is established with the line to answer the call its local circuit becomes closed, magnet d is energized and attracts its armature e into its

40 normal position in engagement with the catch c^4 , allowing the shield g also to return to its normal position.

Referring to Fig. 4, the sub-station apparatus shown is of the usual character and is connected by a telephone-line with spring-jacks $h h'$ upon two sections of multiple switchboard. Each of the spring-jacks is provided with two line-springs i and i' , connected to the different sides of the line-circuit, respectively, and with two other contact pieces or thimbles $k k'$. The connecting-plug for use with these spring-jacks is shown at l , inserted into a spring-jack h' . It comprises a tip l' , arranged to connect with the shorter line-spring i' of the spring-jack, a short sleeve l^2 , arranged to connect with the longer line-spring i of the spring-jack, and a contact-sleeve l^3 , arranged to connect with both the contact-pieces k and k' of the spring-jack,

60 and hence to cross them together. The contacts $k k$ of the different spring-jacks and the contacts $k' k'$ are connected together, contacts $k k$ being connected to earth through a battery k^3 .

65 An extension of the telephone-line includes coil a , which for convenience I shall designate the "operating-coil" of the individual

annunciator m . The other coil d is included in a branch connection from earth to the shutter e , and the shield g is connected with the remaining contact-pieces k' of all the spring-jacks of the line.

In the normal or unconnected condition of the line a signal sent from the sub-station will find circuit over the lines and through the operating-coil a of the annunciator, releasing the shutter e and throwing the shield g into its horizontal position, as described. The local circuit, including the coil d , is thereby closed from earth to the contact-pieces k' of the spring-jacks, but is open at those points from the contact-pieces k . When the operator answers the call, by inserting the connecting-plug l into the spring-jack of the line calling the contact-pieces k and k' are crossed together through the sleeve l^3 of the plug, thus completing the local circuit and allowing the current to flow from the battery k^3 , through the contact-piece $k k'$, to the shield g , thence to the shutter e , thence through the magnet d to earth. The magnet d is thereby energized and attracts its armature e , imparting to it such momentum that it enters into engagement with the catch c^4 , and is thus restored to its normal position, the local circuit being at the same time opened at the point of separation of the contact-point upon armature e from the shield g . Further waste of the energy of battery k^3 is thus prevented. A subsequent calling-signal set upon the line-circuit will tend to operate the annunciator m ; but almost as soon as the shutter e is released the local circuit is closed and the shutter is attracted toward its normal position and prevented from falling to actuate the shield g .

I do not desire to limit myself to the details of the construction herein shown. Obviously my invention is applicable to various other forms of annunciator and is capable of quite different disposition in connection with different apparatus.

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

1. The combination, with an individual annunciator, of an electro-magnetic device adapted to prevent the actuation of the indicator thereof when energized, a local circuit including a source of electricity and the said electro-magnetic device normally open at two points, means for closing the local circuit at one point when a connection is established with the line, and an electro-magnetic switch adapted to be actuated by calling-currents in the line-circuit and when actuated to close the remaining break of the said local circuit, substantially as described.

2. The combination, with a telephone-line, of spring-jacks connected therewith and an individual annunciator in circuit therein, an electro-magnetic device adapted to prevent the actuation of the indicator thereof, a local circuit including the said electro-magnetic

device with a source of electricity normally open at two points, contact-pieces upon the spring-jacks adapted to be crossed together when connection is made with the line, and
5 an electro-magnetic switch in the line-circuit adapted to close the remaining break in the local circuit when actuated, substantially as specified.

3. The combination, with a telephone-line,
10 of spring-jacks connected therewith and an individual annunciator in circuit therein, an electro-magnetic device adapted when energized to prevent the actuation of the indicator of the annunciator, a local circuit including
15 the said electro-magnetic device and a source of electricity normally open at two points, contact-points upon the spring-jacks forming the terminals of one of the breaks in the local circuit, an electro-magnetic device in the line-
20 circuit, and contact-points thereon adapted to be closed together when said device is energized, said contact-points forming the terminals of the remaining break in the local circuit, substantially as specified.

4. The combination, with a telephone-line, 25
of spring-jacks connected therewith, an annunciator in circuit therein, an electro-magnet adapted when energized to restore the indicator of the annunciator to its normal position, a local circuit including the said electro- 30
magnet and a source of electricity normally open at two points, contact-pieces upon the spring-jacks adapted to be crossed together by a plug inserted into the jack and when
crossed together to close one of the breaks in 35
the local circuit, contact-points upon the annunciator adapted to be closed together by the first motion of the annunciator and when
so closed to complete the remaining break of 40
the said local circuit, substantially as described.

In witness whereof I hereunto subscribe my name this 10th day of March, A. D. 1892.

CHARLES E. SCRIBNER.

Witnesses:

M. J. TALLETT,
GEORGE W. MCMAHON.