No. 645,958. Patented Mar. 27, 1900.

A. K. KELLER.

TELEPHONE SYSTEM.

(Application filed Feb. 6, 1899.)

(No Model.)

Fig. 1.

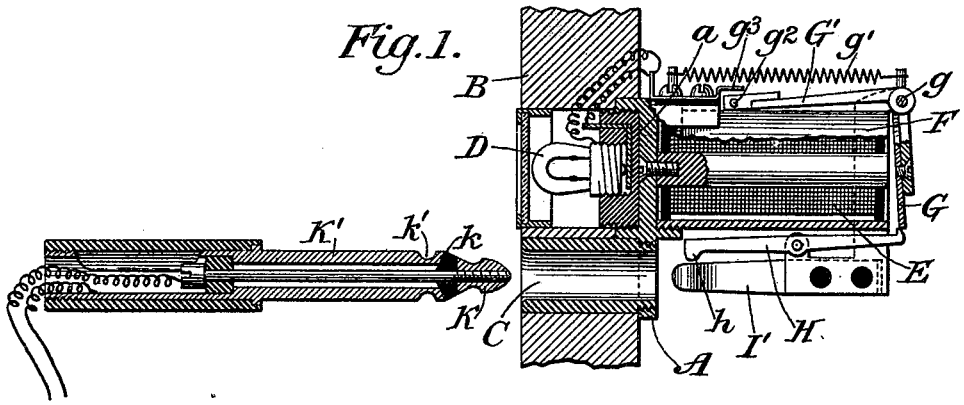


Fig. 2.

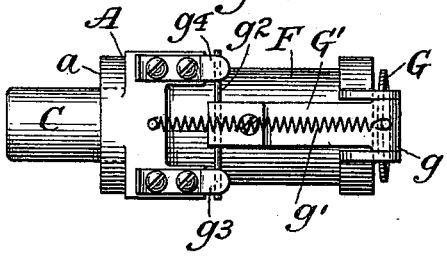


Fig. 3.

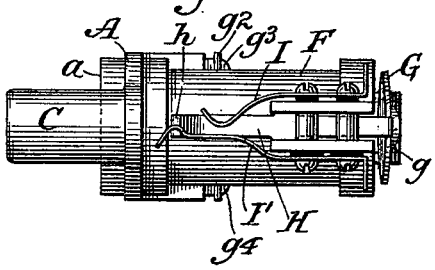
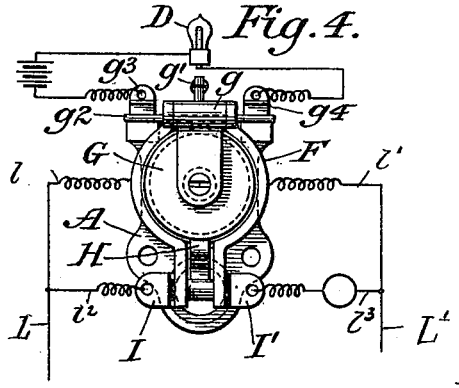


Fig. 4.



Attest:
A. M. Jesbera.
F. M. Eggleston.

Inventor:
Albert K. Keller
by Redding, Kiddle & Fraley
Attys.

UNITED STATES PATENT OFFICE.

ALBERT K. KELLER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE INTERNATIONAL TELEPHONE AND SWITCHBOARD MANUFACTURING COMPANY, OF PLAINFIELD, NEW JERSEY.

TELEPHONE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 645,958, dated March 27, 1900.

Application filed February 6, 1899. Serial No. 704,625. (No model.)

To all whom it may concern:

Be it known that I, ALBERT K. KELLER, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Telephone Systems, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

This invention relates to telephone-switchboards, and more especially to the annunciators or drops and to the electrical connections of the same with other parts of the system.

One object is to simplify and improve the construction of annunciators or drops, and a further object is to so construct the annunciators and to so arrange their electrical connections that each annunciator or drop shall serve the double purpose of a calling signal to indicate to the operator the number of the subscriber who desires a connection to be established and as a ringing-off signal to indicate to the operator when such subscriber has finished his communication.

In the practical operation of the invention in the form chosen for illustration and description hereinafter the introduction of the operator's plug for the purpose of establishing desired connection after the operation of the calling signal is made to restore the drop to such a position that it will respond to the ringing off by the subscriber, while the withdrawal of the plug by the operator for the purpose of disconnecting the subscribers' lines after the ringing off again restores the drop to a condition in which it will serve again as a calling signal. Moreover, the construction of the drop and the arrangement of the electrical connections are such that the coil of the electromagnet of the drop, which is in series in the subscriber's line during the calling, is bridged across the line by the introduction of the operator's plug when the desired connection is established, so that the high resistance of this coil is removed from the circuit while the talking is going on.

The signaling device, which is employed to attract the operator's attention, in the embodiment of the invention shown in the drawings is a small electric lamp included in the local circuit, which is normally open, but is adapted to be closed whenever the subscriber calls. It is obviously immaterial, however, what form of signaling device is employed.

The invention will be more fully described hereinafter with reference to the accompanying drawings, in which—

Figure 1 is a vertical section of one of the annunciators or drops with parts in elevation, a portion of the supporting-board being indicated and the operator's plug being shown in section in readiness for introduction into the jack. Figs. 2 and 3 are respectively a top view and a bottom view of the annunciator or drop removed from the board. Fig. 4 is an end view thereof with the signaling device and its circuit indicated diagrammatically.

In the form of the annunciator or drop represented in the drawings the several parts for convenience in manufacture are supported by a plate A, which is secured in any suitable manner to the board B. A sleeve C is extended forward from the plate A to guide and support the operator's plug in proper relation to parts with which it coöperates. A socket is also provided, as at a, to receive the lamp D, which in this particular instance is adopted as the signaling device. Upon the rear side of the plate A is secured the electromagnet E with its armor F, the latter supporting in a suitable manner the other parts, hereinafter referred to. The armature G, pivoted at g and thrown back normally by a spring g', is provided with an arm G', which carries a contact strip or bridge g^2, adapted to establish connection between two fixed contacts g^3 and g^4 when the magnet E is energized and the armature attracted. The armature is retained in its forward position until released by a movement of the operator's plug by a latch H, which is represented as a lever pivoted at its middle and having a toe h for coöperation with the operator's plug. Two spring-contacts I and I' are also supported so as to coöperate, respectively, with the core and the shell or sleeve of the operator's plug. The latter is represented in Fig. 1 as of substantially common construction,

having a tip or core K and a sleeve K′, to which the wires of the operator's set are connected as usual.

The two spring-contacts g^3 and g^4 form the terminals of the local circuit, which includes the lamp D, and is closed from one terminal to the other by the bridge or contact-piece g^2 when the armature G is attracted, whereby the lamp receives current and glows so long as the armature is held in its forward position by the latch H. The line-wire, (indicated at L L′ in Fig. 4,) which normally includes the magnet E in series, as at $l\ l'$, is connected on each side of the magnet, as at $l^2\ l^3$, to the contacts I I′, respectively, so that when the operator's plug is inserted and the talking-circuit completed through said contacts and the tip and sleeve of the plug and their connections the magnet becomes bridged on the line and its resistance is removed from the talking-circuit. When the plug is inserted, a shoulder k on the tip engages the toe h of the latch H and causes the latch to release the armature G, whereby the local circuit through the lamp is broken; but when the plug is thrust completely home a notch k' receives the toe h and leaves the latch free to move again. When the subscriber has finished his communication and hangs up his receiver, thereby closing the ringing-circuit through the magnet, and rings off, the magnet is again energized, and its armature is attracted and held by the latch H, thereby again closing the local circuit through the lamp between the contacts $g^3\ g^4$, so that the lamp continues to glow until the latch is again operated to release the armature by the contact of the shoulder k of the plug with the toe h of the latch, when the plug is withdrawn. The removal of the plug therefore not only breaks the local circuit through the lamp, but leaves the jack in its original condition in readiness to respond to another call. It will be seen, therefore, that not only is the construction of the jack exceedingly simple, but that the single device, with the proper connections, serves both as a calling signal and as a ringing-off signal, thereby dispensing with a separate ringing-off signal and the complicated connections consequent upon the use of a separate ringing-off signal.

It will be obvious that the details of construction and arrangement may be varied without departing from the spirit of the invention, while providing for the accomplishment of the same general result. Wherefore the invention is not to be limited to the precise construction and arrangement of parts shown and described herein.

I claim as my invention—

1. In a telephone-annunciator, the combination with an electromagnet, a signaling device controlled by the armature of said magnet, and line connections to said magnet, of a latch to engage said armature and control its movements, said latch standing in the path of movement of the operator's plug and operated during the insertion of the plug and again during the withdrawal of the plug.

2. In a telephone-annunciator, the combination with an electromagnet, a local circuit including a signal and controlled by the armature of said magnet, and line connections to said magnet, of a latch to engage said armature and control its movements, said latch standing in the path of movement of the operator's plug and operated during the insertion of the plug and again during the withdrawal of the plug.

3. In a telephone-annunciator, the combination with an electromagnet, a normally-open circuit including a signal and closed by the armature of said magnet when the latter is attracted, and line connections to said magnet, of a latch to engage said armature and retain it in its forward position, said latch standing in the path of movement of the operator's plug and operated during the insertion of the plug and again during the withdrawal of the plug to release said armature.

4. The combination with a telephone-circuit, a magnet included in said circuit, a normally-open circuit including the lamp and closed by the forward movement of the armature of said magnet, a latch to engage said armature and hold it in its forward position, said latch having a toe to coöperate with a shoulder on the operator's plug, whereby said latch is operated to release the armature and open said local circuit when the plug is inserted and again when the plug is withdrawn.

This specification signed and witnessed this 17th day of January, A. D. 1899.

ALBERT K. KELLER.

In presence of—
ANTHONY N. JESBERA,
WILLIAM A. REDDING.