

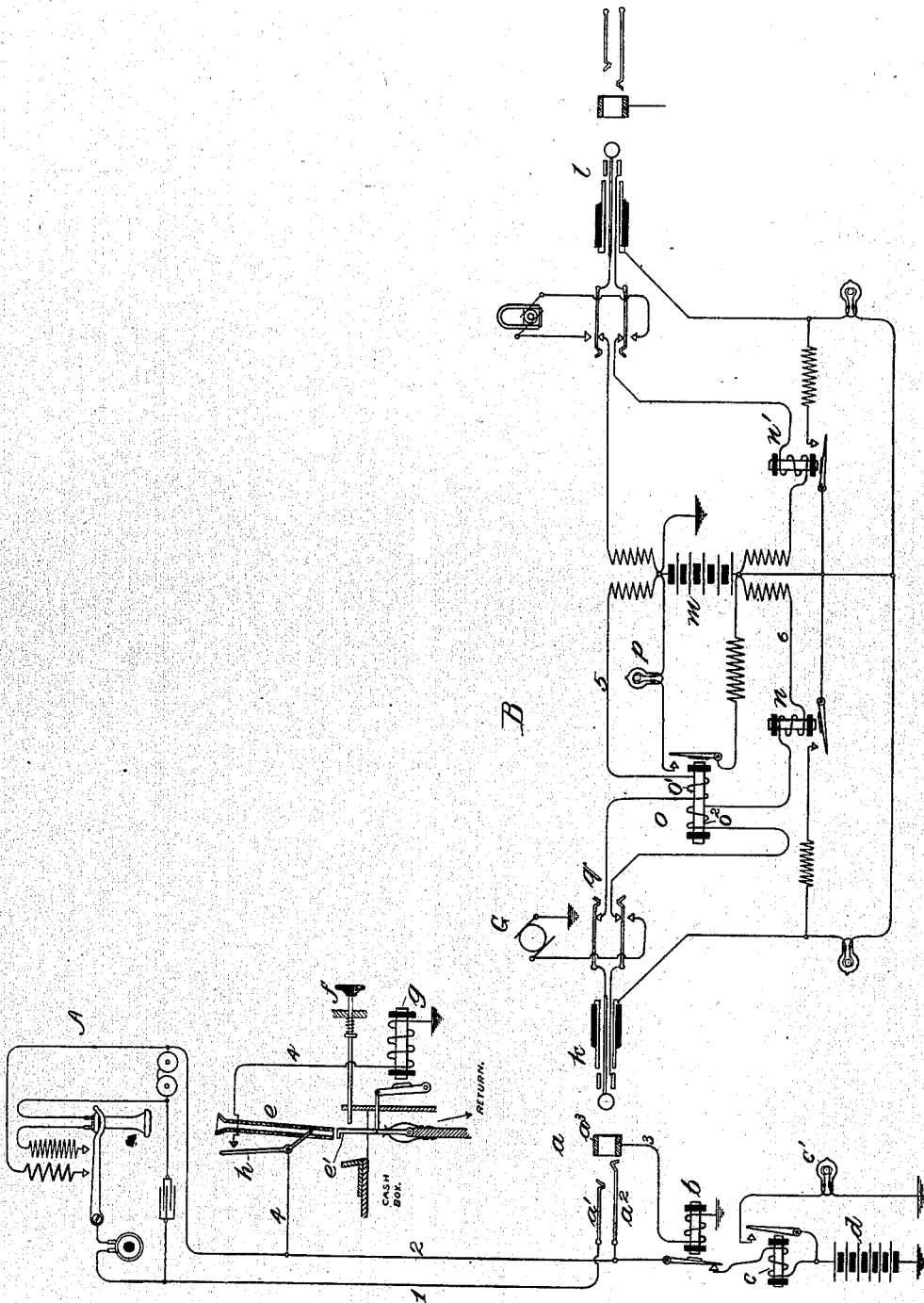
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C. E. SCRIBNER.
SUPERVISORY SIGNAL FOR TELEPHONE EXCHANGE SYSTEMS.

(Application filed Apr. 1, 1901.)

(No Model.)



WITNESSES:

J. M. Stickle.
A. W. Leach.

INVENTOR:

CHARLES E. SCRIBNER,

BY *Wm. P. Burton,*
ATTORNEY.

UNITED STATES PATENT OFFICE.

CHARLES E. SCRIBNER, OF CHICAGO, ILLINOIS, ASSIGNOR TO WESTERN ELECTRIC COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

SUPERVISORY SIGNAL FOR TELEPHONE-EXCHANGE SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 716,293, dated December 16, 1902.

Application filed April 1, 1901. Serial No. 53,883. (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-Exchange Systems, (Case No. 495,) of which the following is a full, clear, concise, and exact description.

10 My invention relates to a supervisory signal for telephone-toll lines, and has for its object to provide a signal at the central office of a telephone-exchange by which the central-office operator may be informed of the condition of the telephone-toll device at the sub-
15 station.

I will describe my invention more particularly by reference to the accompanying drawing, which is a diagram illustrating a tele-
20 phone-line extending from a substation to a central office, with the operator's switching apparatus at the central office, the system being equipped with the signal and circuits of my invention.

25 The features which I regard as new will be pointed out in the appended claims.

The telephone-line extends in two limbs 1 2 from the toll-station A to the central office B, where it terminates in the line-springs a' a'' ,
30 respectively, of the spring-jack a . The limb 2 of the line is connected at the central office through the armature and back contact of a cut-off relay b and the winding of the line-
35 line-relay c with the free pole of the grounded line-battery d . The line-relay c controls a subsidiary-line signal-lamp e' in the usual manner. The winding of the cut-off relay b
40 is included in a grounded conductor 3 from the test-ring a^3 of the spring-jack. At the substation the usual telephone talking apparatus and signal-bell are included in bridges of the line-circuit, the bridge containing the talking apparatus being controlled by the
45 usual telephone-switch.

The toll device at the substation has a coin-
50 chute e , adapted to receive coins of suitable size, and a pivoted valve or deflector-plate e' , mounted underneath the lower end of said coin-chute and adapted to stop the coin in its downward course within the chute. The de-

flector-plate is adapted to be moved to either side to release the coin and direct it either into the cash-box or into a return-chute leading to the outside of the box.

A push-button f is provided, by which the
55 subscriber may throw the deflector-plate e' to the left to release the coin and cause it to return to the outside of the box. The subscriber may do this at any time before the coin has been disposed of. The valve is con-
60 nected, by means of a link, with the pivoted armature-lever of the magnet g , and when the magnet is excited its armature in moving over throws the deflector-plate e' to the
65 right, so releasing the coin and guiding it into the cash-box.

A switch-lever h controls a grounded branch 4 from the limb 2 of the telephone-
70 line, said grounded branch containing the helix of the magnet g . The switch-lever is provided with an arm which projects into the coin-chute in position to be engaged by a coin therein, so that when a coin is in the chute the grounded branch 4, containing the mag-
75 net g , is closed. The helix of magnet g is of high impedance, and the magnet is adjusted so that it will not respond to the battery-currents in the line, but will respond only to a special current of, say, one hundred and ten
80 volts from the generator G at the central office.

The switchboard operator is provided with
85 pairs of plugs and their associated cord-circuits for uniting any two lines by plugging into the spring-jacks thereof. A pair of plugs kl is illustrated, each plug having tip,
90 ring, and sleeve contacts, which are adapted to engage with the short and long line-springs and the test-rings, respectively, of the spring-jacks. The tips of the plugs are united by
95 a conductor 5 of the cord-circuit, and, similarly, the rings are united through a cord conductor 6.

A repeating coil is interposed in the plug-
100 circuit in the usual manner, and a battery m is connected in a bridge between the windings of the repeating coil. The pole of the battery which is connected with the cord-strand 5 is grounded, and the other or free pole is connected to the sleeves or third con-

tacts of the plugs through supervisory-signal lamps, as usual. The cord-strand 6 may contain the usual supervisory relays $n n'$ between the free pole of the battery and the ring-con-

5 tacts of the plugs $k l$, respectively, which relays control shunts about their respective supervisory-signal lamps.

A special supervisory relay o is provided, having differential windings $o' o^2$, which are 10 included in the cord-strands 5 6, respectively. The relay is adapted when excited to close a local circuit containing a special supervisory-signal lamp p . The windings $o' o^2$ are of low resistance and impedance, so as not to interfere with the passage of telephonic currents.

15 When subscriber A desires a connection at the central office, he deposits in the coin-chute e a suitable coin, which falls down until stopped by the deflector-plate e' , in which position it causes the closure of the ground 20 branch 4 from the line conductor 2. Circuit from the line-battery d is thus completed through the line-signal relay c to ground at the substation, the line-lamp c' is lighted, and 25 the operator observing the signal inserts her answering-plug in the spring-jack. The cut-off relay b is then excited by current from the battery m flowing to the third contact or sleeve of the answering-plug and thence to ground 30 through the conductor 3, the line-signal apparatus being thus cut off. When the answering-plug is inserted in the spring-jack, current from the grounded battery m flows out over the cord-strand 6 and the line conductor 2 to 35 ground by way of the branch 4 at the substation. The supervisory relay n is excited and shunts out its associated lamp. The winding o^2 of the magnet o also receives current and causes said magnet to be excited, 40 closing the local circuit, which includes the special signal-lamp p , so that said lamp is lighted to indicate that the coin is still present in the coin-chute at the substation. A portion of the current from battery m instead 45 of passing to ground at the substation by way of branch 4 returns to the central office over the limb 1 of the telephone-line, which includes the winding o' of relay o ; but so much current is diverted to ground at the substation that the two windings $o' o^2$ do not balance one another, and the relay attracts its armature in consequence. When the connection asked for has been made, the operator 50 presses the key q , which connects the generator G to the limb 2 of the telephone-line, so causing the excitement of the magnet g . The valve e' is thereby thrown to the right and the coin released and guided into the cash-box. If, however, the desired connection 55 cannot be made, as when the line called for is busy, the operator will tell the subscriber to press the button f , and his coin will be returned to him. The pressing in of the button f throws the deflector-plate to the left, 60 releasing the coin and guiding it into the return-chute leading to the outside of the toll-box. As soon as the coin is released from

the chute the ground branch 4 is broken, and both windings $o' o^2$ of the relay o in the plug-circuit receive equal current, so that the re- 70 lay being differentially wound is deenergized and breaks the local circuit containing the signal-lamp p . The differentially-wound signal-controlling device o thus serves to inform the operator of the condition of the toll de- 75 vice at the substation. If the subscriber attempts to get back his coin while the connection is being made, the release of the coin and consequent breaking of the ground branch 4 will cause the extinction of the sig- 80 nal-lamp p , and the operator will take this as a signal for disconnection and pull out the plugs.

My invention thus contemplates a metallic circuit between the substation and the central 85 office, a source of current in a bridge of the circuit, one pole of said source of current being connected to ground or other return-conductor, a switch h at the substation for grounding one of the line conductors, two 90 magnet-windings, one in each side of the metallic circuit, and a signal controlled through the agency of the two magnet-windings acting jointly.

Having thus described my invention, I 95 claim as new, and desire to secure by Letters Patent, the following:

1. The combination with a metallic-circuit telephone-line extending from a substation to a central office, of a source of current in a 100 bridge of the line, one pole of said source of current being connected to a return-conductor, a branch from one of the limbs of the telephone-line at the substation to the return-conductor, a switch controlling said branch, 105 two magnet-windings, one in each limb of the metallic circuit, and a signal controlled by the differential effect of said windings, substantially as set forth.

2. The combination with a metallic-circuit 110 telephone-line extending from a substation to a central office, of a source of current in a bridge of the circuit at the central office, one pole of said source of current being connected to a return-conductor, telephone apparatus 115 in a bridge of the circuit at the substation, a branch to the return-conductor at the substation from the line conductor which is connected to the free pole of the source of current, a switch controlling said branch, and a 120 signal-controlling instrument at the central office having two differential windings, one in each side of the metallic circuit, substantially as set forth.

3. The combination with a metallic-circuit 125 telephone-line extending from a toll-station to a central office, of a battery in a bridge of the line at the central office, one pole of the battery being grounded, telephone apparatus in a bridge of the line at the substation, a 130 toll-box having a coin-chute and a switch adapted to be actuated by a deposited coin, mechanism whereby the subscriber may control the disposal of the coin, a ground branch

from one of the line conductors, controlled
by the said coin-actuated switch, and a sig-
nal-controlling electromagnet having two dif-
ferential windings, one in each of the line
5 conductors, whereby the central-office opera-
tor may be informed of the presence of a coin
in the toll-box, as described.

In witness whereof I hereunto subscribe my
name this 4th day of March, A. D. 1901.

CHARLES E. SCRIBNER.

Witnesses:

ELLA EDLER,
ADELL HOCKETT.