(No Model.)

C. E. SCRIBNER.

MULTIPLE SWITCHBOARD SYSTEM FOR TELEPHONE EXCHANGES.

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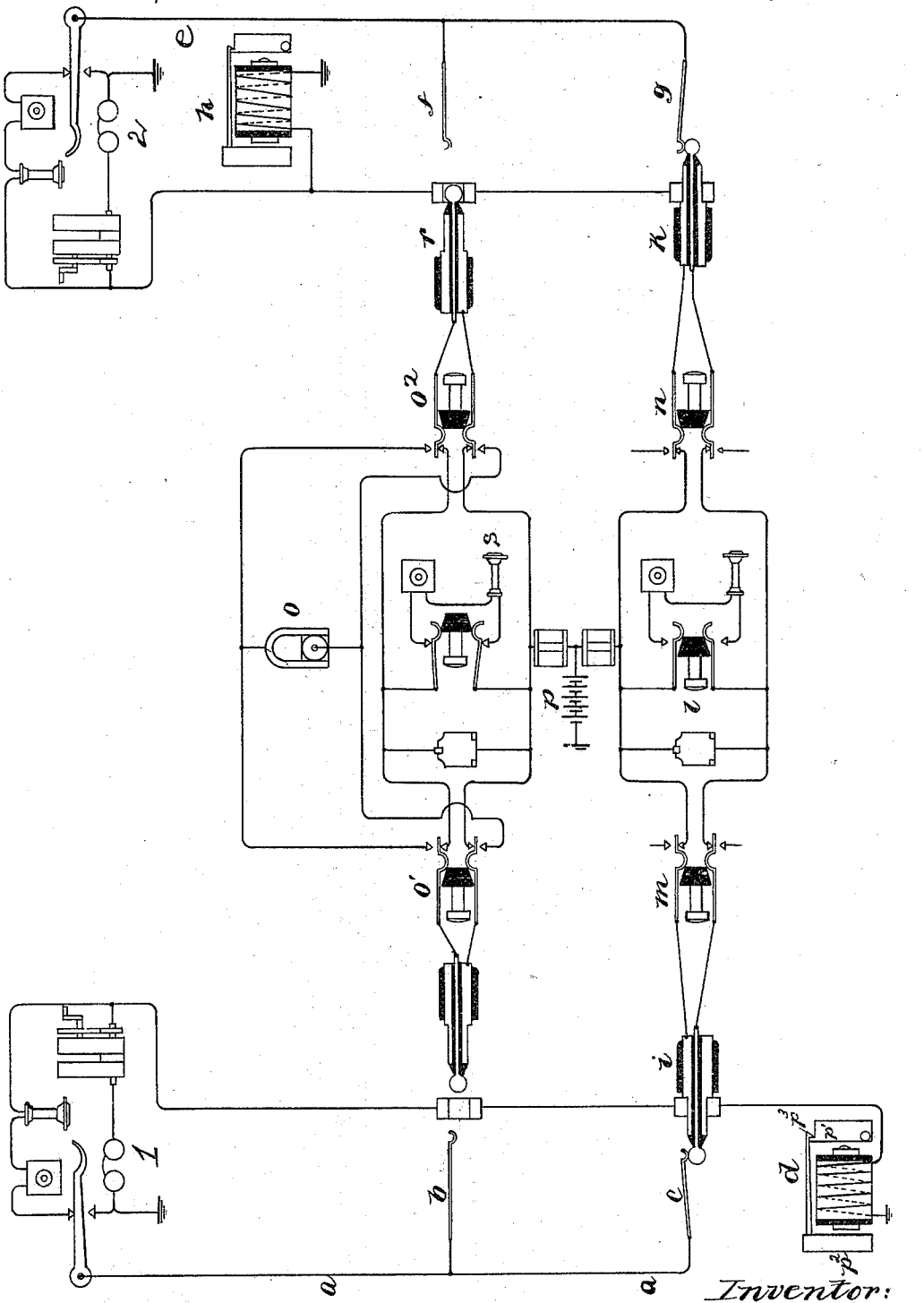

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MULTIPLE-SWITCHBOARD SYSTEM FOR TELEPHONE-EXCHANGES.

SPECIFICATION forming part of Letters Patent No. 552,724, dated January 7, 1896.

Application filed March 17, 1892. Serial No. 425,305. (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 Multiple-Switchboard Systems for Telephone-Exchanges, (Case No. 290,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to telephone-exchange systems, and more particularly to the individual annunciators and their circuits. The individual annunciator is provided with two armatures, one armature serving as the drop or target and the other armature being provided with a hooked lever or detent, which is held in engagement with the drop. When the subscriber sends current over the line, the armature carrying the hooked lever is attracted sufficiently to release the hook from the shutter and the shutter falls. This current from the generator is not of sufficient strength to hold up the soft-iron drop and prevent it from falling, and hence the shutter falls, as before stated, when the subscriber operates his generator to send current over the line through the individual annunciator. Battery is provided in connection with the strands of the pairs of cords and so arranged that when the operator plugs into the switch of a line a battery-current of considerable strength will be caused to flow through the individual annunciator of the line with which connection is thus made. This current will be strong enough to cause the soft-iron drop to be held in position by the attraction of the electromagnet. Thus a subscriber sends in a call, throwing down his annunciator. The operator sees the shutter fall, inserts a plug in the switch of the calling subscriber's line, and at the same time restores the shutter by hand. The battery-current, which is thus automatically closed through the electromagnet, will be of sufficient strength to hold up the soft-iron drop, notwithstanding the fact that at the same time the other armature will be attracted and the hook held out of engagement with the drop. The circuits are so arranged that the subscriber in signaling the central office sends current through the limb of the metallic circuit which is connected with the test-pieces of the switches upon the switchboard, and which limb is provided with a permanent ground connection at each end. On the other hand the central office on depressing a calling-key to call up a subscriber loops the generator into a metallic circuit, including both limbs of the line of the subscriber who is being called.

My invention will be more readily understood by reference to the accompanying drawing.

The drawing illustrates two metallic telephone-circuits, each extending from the subscriber's station thereof to the central office, and including each its individual annunciator at the central office, together with a set of cords and plugs at each of the two switchboards with which the lines are connected. Station 1 is provided with a metallic-circuit telephone-line *a*, which is connected with switches *b c* on different switchboards, the portion or limb of the line which connects with the test pieces or frames of the switches being extended through an individual annunciator *d* to ground. The other sub-station 2 is connected by a similar line *e* to spring-jacks *f g* upon the same switchboards, and with an individual annunciator *h* upon one of the switchboards. As shown in the drawing, these two stations 1 and 2 are connected together between their switches *c g* by means of the plugs *i k* and the pair of cords connected therewith. An ordinary listening-key *l* is provided for bridging the operator's telephone between the strands of the cords. Usual calling-keys *m n* are provided in connection with each cord for looping the generator into the circuit of a line to call up the subscriber with which the plug of the cord is connected.

In connection with the pair of cords shown at the first board—that is, the board on which switches *b f* are supposed to be placed—I

have shown the calling-generator *o* and the connections thereof with the calling-keys o' o^2 of said pair of cords.

The operation of my system is briefly as follows: Assume that the subscriber at station 1 wishes connection with subscriber at station 2. Subscriber of station 1, his telephone being on the switch, turns his generator sending-current from the ground branch containing the generator at his station over the portion of line *a* connected with the insulated frames or test-pieces of the switches *b c* through the individual annunciator *d* and thus throws down the shutter of said annunciator. Assume the individual annunciator *d* to be placed upon the second board—that is, the board supposed to contain the switches *c g* of the two lines. The operator seeing the individual annunciator *d* fall immediately inserts plug *i* into switch *c* and depressing listening-key *l* receives the order of subscriber of station 1. It will be understood that the subscriber at station 1 immediately takes down his telephone after operating his generator so as to bring his telephone into circuit to be in position to communicate with the operator when the operator depresses listening-key *l*. The operator having inserted plug *i* into switch *c* and depressed her listening-key *l* will be in communication with the subscriber of station 1. The act of inserting plug *i* in switch *c* serves also to close the circuit of battery *p* through individual annunciator *d*, this battery *p* being connected, as shown, with the pair of cords. The current of this battery *p* thus sent through annunciator *d* will be strong enough to cause the soft-iron drop p' to be held up, although the other armature p^2 will be at the same time attracted so as to raise the hook or detent p^3 to disengage the same from soft-iron armature-drop p'. Therefore, when the operator inserts her plug *i* in a switch *c* in answering a call she must at the same time restore the individual annunciator-drop p' by hand so that said soft-iron drop will be in position to be attracted by the electromagnet. The call will be answered in the usual way. In this instance, subscriber 1 having asked for subscriber 2, the operator on learning that line *e* is wanted will first apply the tip of plug *k* to the test-ring of switch *g* to test in the usual manner, and in this instance we will assume that she finds no current present on line *e* and so inserts plug *k* into switch *g*, as shown, and depresses calling-key *n* to throw current from the calling-generator *o* upon the line *e*. Subscriber 2 receiving the call takes down his telephone and thus subscribers 1 and 2 are connected for conversation, as illustrated in the drawing.

It will be observed that a clearing-out annunciator is included in the circuit or rather bridged between the strands of the cords, as shown. A condenser is preferably included in the bridge-wire to prevent the battery *p* from sending current through the clearing-out drop to the tip of the plug and thence over the line to earth at sub-station. The current from battery *p* will also be present on line *e*. The current from this battery thrown upon line *e* will be so strong that the individual annunciator *h* will not be thrown down. This battery *p* not only acts as a retaining-battery for the individual annunciators, but serves to throw current into the test portion of the connected telephone-lines, so that when a test is made of a busy line at another board, battery-current will be found present. Thus, at the first board, the tip of plug *r* is shown applied to the test-piece of switch *f*, and current being present on said line *e*, battery-current will be directed through the operator's telephone *s* to ground.

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

1. An electric annunciator provided with two independently pivoted armatures, one armature carrying a hook or detent adapted to engage with and retain the other armature, which serves as a drop or target, the armature carrying the hook being adapted to be operated by a less current than is required to operate and retain in position the armature which serves as a target.

2. The combination with an annunciator adapted to respond to a feeble current, but to be retained unresponsive by a strong current, of a circuit containing said annunciator and a source of feeble current and a source of strong current adapted to be short circuited through said annunciator, and a portion of said circuit, substantially as described.

3. The combination with an annunciator provided with two armatures, one provided with a hook adapted to engage with and retain the other, of two sources of current, one of sufficient strength to cause the attraction of both armatures, the other being adapted to cause the operation of the retaining armature only, and means for directing current from either of said sources through the electro magnet; substantially as described.

4. In combination with a telephone line, an electromagnet controlling two armatures, an indicator adapted to be actuated by one of said armatures when attracted and to be retained irresponsive by the other of said armatures when attracted, a source of signaling current connected with the telephone line, and a source of continuous current also connected therewith, substantially as described.

5. In combination with a telephone line circuit, an annunciator comprising an electromagnet, two armatures therefor, one controlling an indicator, and the other adapted to prevent the operation of the indicator when unattracted, and a battery adapted to be connected with the line circuit to find circuit through the annunciator, substantially as described.

6. The combination with a telephone line circuit, of an electromagnet connected therewith, two armatures for said electromagnet, an indicator controlled by one of the armatures to be actuated thereby, the other armature being adapted to prevent the operation of said indicator when it is attracted, substantially as described.

In witness whereof I hereunto subscribe my name this 12th day of February, A. D. 1892.

CHARLES E. SCRIBNER.

Witnesses:
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