

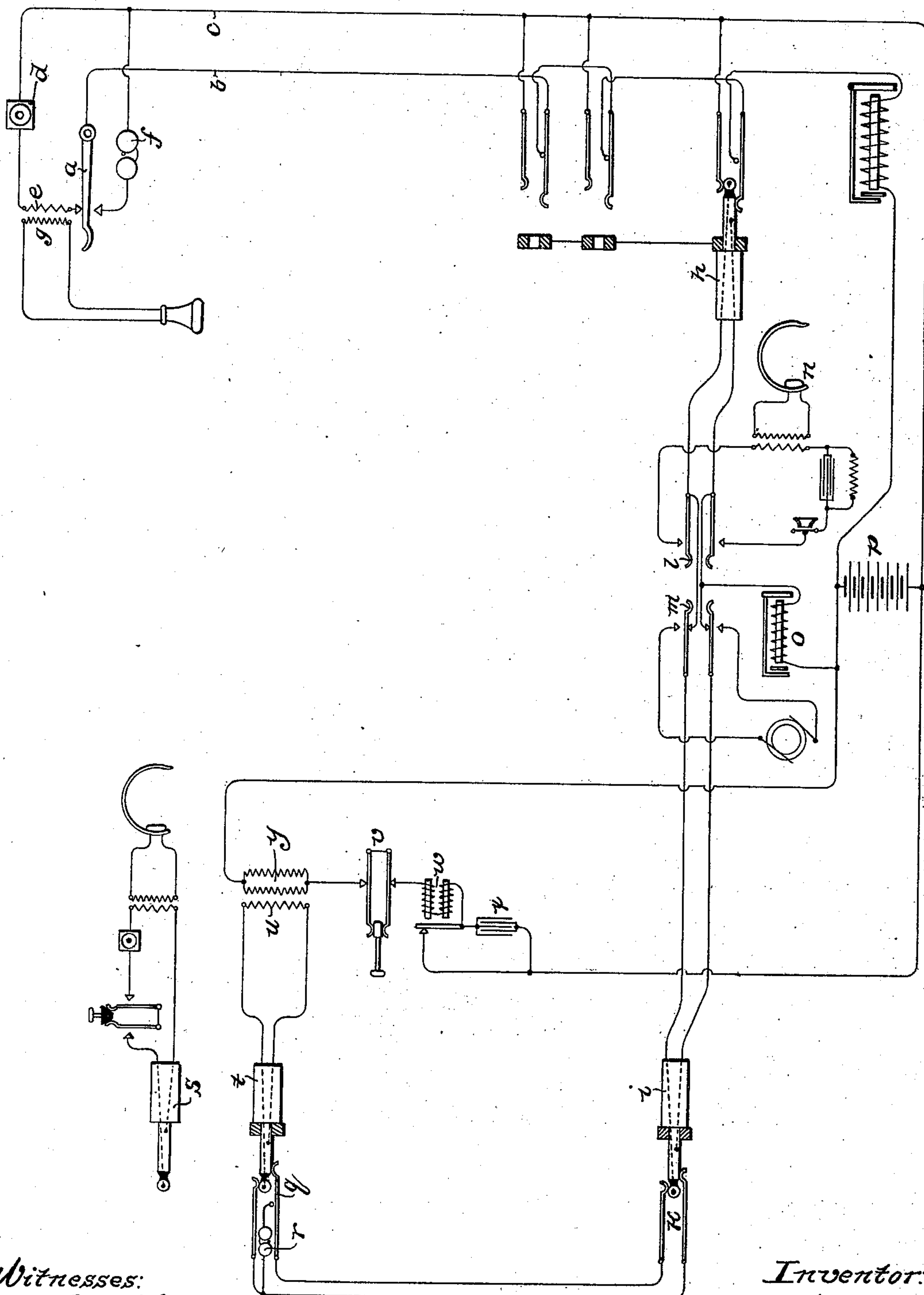
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H. G. WEBSTER.
TELEPHONE EXCHANGE SYSTEM.

(Application filed Feb. 25, 1901.)

(No Model.)



Witnesses:
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UNITED STATES PATENT OFFICE.

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TELEPHONE-EXCHANGE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 698,087, dated April 22, 1902.

Application filed February 25, 1901. Serial No. 48,716. (No model.)

To all whom it may concern:

Be it known that I, HARRY G. WEBSTER, 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-Exchange Systems, (Case No. 3,) 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 telephone-exchange systems, and has for its object the provision of improved means whereby a subscriber who fails to restore his receiver to its switch-hook after conversation is finished may be signaled to remind him of the fact. In accordance with my invention this service is preferably performed by an operator who makes this one of his special duties, the switching operator being thus relieved of this work. In accordance with my invention I provide means whereby this special operator may send a signal through the cord-circuit that has been employed for connecting the subscriber for conversation to produce a vibration in the subscriber's receiver, this being accomplished through the agency, preferably, of an alternating current, so that a humming noise is produced in the subscriber's receiver that will serve to attract his attention. I employ as the source of current for thus actuating the subscriber's receiver the common battery that is employed in the common-battery systems for supplying the transmitters at the subscribers' stations with current. This common battery is included in a subsidiary circuit that extends to the signaling-operator's desk, this subsidiary circuit preferably including a make-and-break device and the primary of an induction-coil, whereby alternating current is produced, an operating-key being also included in this circuit to close the same when it is desired to transmit the signaling-current. The secondary of the induction-coil is included in circuit with a plug that is adapted for insertion within a trunking-jack that extends to the desk of the operator that switches lines into and out of con-

nection. To simplify the apparatus, the same cord-circuit that is used to unite subscribers for conversation is also used for connecting the trunk-line as a continuation of the line of the subscriber who has failed to restore his receiver, the plug that is used for connecting this trunking-line having been removed from the jack of the subscriber who has restored his telephone.

I will explain my invention more fully by reference to the accompanying drawing, that illustrates a single telephone-line extending to an exchange, with instrumentalities at the exchange for continuing this telephone-line to the desk of the operator, who may effect an actuation of the receiver at the substation illustrated.

In this particular instance I have shown one type of telephone substation apparatus, to which, however, I do not wish to be limited, wherein a gravity switch-hook *a* is connected with one limb *b* of the telephone-line, the other limb *c* of the telephone-line being connected through a transmitter *d* and the primary coil *e* to the upper contact of the switch-hook and also through the bell *f* to the lower contact of the switch-hook. The receiver is shown included in a local circuit with the secondary *g* in inductive relation with the primary *e*. A multiple switchboard is illustrated, to the jacks of which the limbs *b* and *c* extend; but the invention obviously is applicable to all forms of telephone-exchange systems. The switching-operator's cord-circuit is shown with the answering-plug *h* in the answering-jack of the subscriber, the connecting-plug *i* having been removed from the jack of the called subscriber, who is considered to have properly restored his telephone to its switch-hook and inserted within the trunking-jack *k* for the purpose to be more fully explained.

The operator's cord-circuit is equipped with the usual listening-key *l* and ringing-key *m*, by means of which instrumentalities the operator may bridge her telephone set *n* between the strands of the cord-circuit to ascertain the condition of use of the telephone-

line and to signal the subscriber. A clearing-out indicator *o* is illustrated, that is connected across the telephone-circuit, a common battery *p* being included in this same cross connection, the clearing-out indicator being of sufficient impedance to prevent a shunting of the voice-currents. It will be observed that this clearing-out indicator, when the cord-circuit is employed to connect two subscribers for conversation, is included in a bridge of the united telephone-lines, so that the clearing-out signal will not be given until both subscribers have restored their telephones. By means of the listening-key the operator may test the condition of the line from time to time, the clearing-out indicator not conveying a clearing-out signal, and if no conversation is being carried on and she gets no response to her inquiry as to whether or not the parties are engaged in conversation she withdraws one plug or the other, keeping that plug in the jack of the line that is still in closed circuit with the clearing-out indicator and placing the companion plug in the trunking-jack extending to the chief-operator's jack *q*. Any suitable means may be employed for notifying the chief operator. I have illustrated a signal *r*, included in circuit with springs of the jack *q*, which circuit is opened when the chief operator plugs into his trunk-line jack. A special cord-circuit provided with a single plug *s* and a connected telephone may be employed to enable the chief operator to receive word from the switching operator. The chief operator is provided with a signaling-plug *t*, provided with a loop-cord circuit, including the secondary *u*, across the limbs of the subscriber's telephone-line. The subsidiary circuit, including the generator, extends from the common battery to the chief-operator's desk. This subsidiary circuit includes the chief-operator's signaling-key *v*, and also includes a circuit-breaking magnet *w*, the armature of the said magnet being included in series with its coil in the said subsidiary circuit, the armature in one position serving to close the circuit and in the alternate position to open the same. To prevent injurious sparking between the armature and its contact, a condenser *x* is included in shunt about the said armature and contact. The primary *y* is included in this subsidiary circuit and is in inductive relation to the secondary. The chief operator to effect the actuation of the diaphragm of the subscriber's receiver operates the signaling-key *v*, whereby the continuous current from the battery *p* is transformed into an alternating current, which is conveyed by induction through the secondary coil, chief-operator's plug and trunking-jack, the trunk-line between the chief-operator's desk and the switching-operator's desk, the jack of the switching-operator's desk and the inserted plug, and thence by the cord-circuit

through the jack of the subscriber's line and the plug inserted therein to the primary of the induction-coil at the subscriber's station, and thence by induction through the closed circuit including the subscriber's receiver.

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

1. In a common-battery telephone-exchange system, the combination with a subscriber's line extending from the substation to an exchange, the said substation being provided with a telephone receiver and transmitter, of a common battery at the exchange connected with the said telephone-line and serving to supply the transmitter at the subscriber's station with current, a subsidiary circuit including the said common battery, means for creating in the said subsidiary circuit a signaling-current that is adapted to operate the diaphragm of the receiver at the subscriber's station to produce a calling-signal, and means for directing this current over the telephone-line, substantially as described.

2. In a common-battery telephone-exchange system, the combination with a subscriber's line extending from a substation to an exchange, the said substation being provided with a telephone receiver and transmitter, of a common battery at the exchange connected with the said telephone-line and serving to supply the transmitter at the subscriber's station with current, a local subsidiary circuit including the said common battery, means for creating from the battery a signaling-current in the said subsidiary circuit, a primary coil included in the subsidiary circuit, a secondary coil for the said primary, and means for including the secondary coil in circuit with the subscriber's telephone-line, whereby the receiver at the said substation may be operated to give a signal if it is off its hook, substantially as described.

3. In a common-battery telephone-exchange system, the combination with a subscriber's line extending from a substation to an exchange, the said substation being provided with a telephone receiver and transmitter, of a common battery at the exchange connected with the said telephone-line and serving to supply the transmitter at the subscriber's station with current, a local subsidiary circuit including the said common battery, means for creating a signaling-current in the said subsidiary circuit, a primary coil included in the subsidiary circuit, a secondary coil for the said primary, a trunk-line extending between a chief operator and the switching operator, a jack and plug for connecting the secondary coil with the said trunk-line at the chief-operator's desk, a jack at the switching-operator's desk also connected with the said trunk-line, and an operator's cord-circuit at the switching-operator's desk for connecting the said jack with the jack of the

5 said subscriber, whereby the signaling-current created in the said subsidiary local circuit is passed over the trunk-line through the switching-operator's cord-circuit to the substation to operate the diaphragm of the receiver at the said substation if the receiver is off its hook, substantially as described.

In witness whereof I hereunto subscribe my name this 19th day of February, A. D. 1901.

HARRY G. WEBSTER.

Witnesses:

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