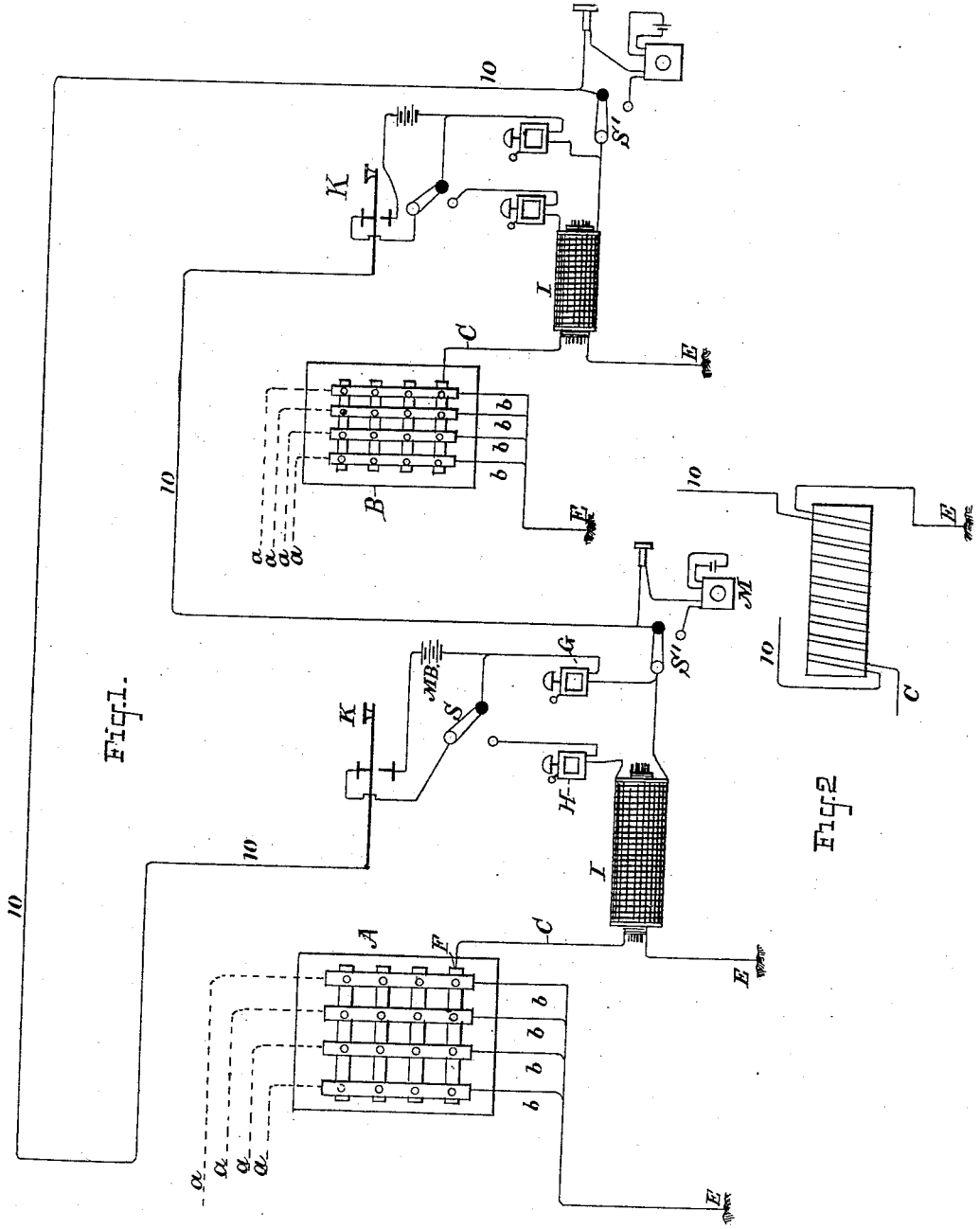
(No Model.)

G. W. COY.

TELEPHONE EXCHANGE SYSTEM.

No. 264,631. Patented Sept. 19, 1882.



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TELEPHONE-EXCHANGE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 264,631, dated September 19, 1882.

Application filed February 23, 1882. (No model.)

To all whom it may concern:

Be it known that I, GEO. W. COY, a citizen of the United States, residing at Milford, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Telephone-Exchange Systems, of which the following is a specification.

My invention consists of certain novel combinations of switching and signaling apparatus for employment with telephone systems in which distant central stations are connected by trunk-lines composed of complete metallic circuits arranged to form a connection between the secondary coils of induction apparatus at two central stations when a subscriber of one station is conversing with a subscriber of the other.

The nature of my invention will be hereinafter described, and the invention will be specified in the claims.

Figure 1 is a diagram illustrating my invention. Fig. 2 illustrates a construction of induction-coil that I sometimes employ.

A and B represent the switch-boards of two distant telephone-exchange systems of any construction; *a a a a*, subscribers' wires of those systems; and *b b b b*, &c., the wires by which the circuits of the subscribers are completed in any suitable manner, either by passing to earth or to a common return-wire, or by independent wires for the various lines.

C represents a wire at each station, leading to the primary of an induction-coil, I, or to a wire of the same size as and parallel to the wire in the induction-coil, which is designed to form a portion of the trunk-line circuit, or to any other device adapted to induce currents in another wire or circuit.

E represents the earth-plate or equivalent connection of said wire C, and F a bar, strip, or plate, or other suitable device by which any one of the lines of the exchange system may be connected to the wire C. The metallic circuit connecting the distant exchanges is represented by the figure 10. Suitable apparatus for connecting said line through the induction-coil, and for receiving and sending calls and conversing over said line, is provided at each exchange. Said apparatus may be located in or arranged to be connected to the trunk-line, or it may be, so far as the latter objects are concerned, apparatus arranged to be connected to the wire C, in which case the ordinary signaling and communicating apparatus of the exchange might be brought into play.

Any suitable signaling and communicating apparatus may be employed, and any desired construction of switches for making the required electrical connections may be used. I have herein shown one arrangement of apparatus that may be employed for this purpose, and which also possesses the advantage that the induction-coil may be removed from the circuit, but that the line cannot, through neglect in restoring the switches to their proper position, be left in an inoperative condition, either for sending or receiving calls.

K represents a spring-key or other circuit-shifting apparatus for changing the line-circuit to a loop containing a signaling-battery, M B, or equivalent device.

S is a switch for removing the induction apparatus from or introducing it into the line-circuit.

G and H are signal-bells or annunciators, the one, G, in the normal line-circuit and the other, H, in a circuit leading to the induction apparatus.

If desired, bell H only may be used, or said bell may be located in the trunk-line at some point outside of the switch apparatus.

S′ is a switch whereby the telephone apparatus M, of any desired construction, may be interposed in the trunk-line when it is desired to communicate orally between the exchanges.

The operation is as follows: Normally the switches S are upon the studs connected to bell G, and switches S′ on the stud completing the line-circuit outside of the telephone apparatus M, and keys or switches K are against their upper stops. The circuit of line 10 is then through upper stop of K, switch S, and bell G, battery M B, the induction apparatus I and telephone apparatus M being out of circuit. If a subscriber in exchange A desires to communicate with a subscriber at B, the operator at A depresses key K, thus introducing main battery M B into the circuit and cutting out

the switch S, and, if the switch be connected to the induction apparatus, the latter also, thus causing the bell G at B to ring. By turning switches S′ at both exchanges so as to introduce the apparatus M the operators at both stations may communicate orally. Operator at B having learned the subscriber wanted, connects that subscriber's line with the wire C, leading through one wire of the induction coil or apparatus, and throws the switch S so as to introduce the other and parallel wire of the induction apparatus into the trunk-line circuit. Operator at A connects the line of the subscriber asking for the connection and the trunk-line in a similar way with the induction apparatus at A. The telephonic vibrations or pulsations from subscriber's line on A will then by circulating through the induction apparatus I at A induce corresponding pulsations in the line-circuit 10, which, by circulating also through the induction apparatus I at B, induce pulsations in the wire C and the connected subscriber's line of exchange B, so that conversation may take place between the subscribers of the distant exchange.

If after conversation is finished either operator should neglect to restore his switch S to normal position, calls would be indicated in an annunciator or bell, H. It would also be possible to introduce the battery M B into the circuit, so as to call another exchange office, while, moreover, the operation of the key K will cut out the induction-coil I when the battery is introduced.

If induction-coils of ordinary construction be employed, I prefer to make what is known as the "secondary" coil a portion of the trunk-line circuit, and to connect the coarser or primary wire to the wire C. I may, however, employ a coil in which both wires are of the same size and wound side by side throughout. Such a construction is indicated in Fig. 2.

My invention is not confined to any particular construction of switching or signaling apparatus; nor, as I before mentioned, to any particular kind of induction apparatus, it being only necessary, so far as the latter element of the invention is concerned, that it should be of such a construction that the passage of a current in one portion thereof will induce a current in the other portion thereof.

It is obvious that any number of trunk-lines similarly connected to the exchange apparatus and provided with the apparatus described might be employed, and that more than two exchanges may be connected to the same metallic circuit.

What I claim as my invention is—

1. The combination, substantially as described, of two or more distant telephone exchanges, a complete metallic circuit connecting said exchanges, an induction-coil at each exchange, provided with means for introducing it into the metallic circuit, and a signaling-key and annunciator in said circuit at each station.

2. The combination, substantially as described, of the telephone-exchange switch-board provided with a strip common to the subscribers' lines, induction apparatus I, one coil of which is permanently connected to said strip, and a metallic-circuit wire leading to another station and arranged to be connected to the other coil of the induction apparatus.

3. The combination, substantially as described, of two or more exchange-switches, an induction-coil at each switch, arranged to form a portion of a metallic circuit connecting said switches, and circuit-shifting apparatus or key K for alternately introducing a generator into and removing it from said metallic circuit.

4. The combination, substantially as described, of two or more exchange-switches, an induction apparatus at each switch, one coil of which is connected to the exchange switch-board, a complete metallic circuit connecting the exchange-switches, and a switch in the metallic circuit at each exchange for introducing one coil of the induction apparatus into and withdrawing it from the metallic circuit.

5. The combination, substantially as described, of the induction apparatus located at the telephone exchange, the trunk-telephone line, a switch for throwing the induction apparatus into the main-line circuit, a main battery, and a switch for connecting the battery to a loop around both the induction apparatus and the induction apparatus switch.

6. The combination, substantially as described, of the trunk-telephone line, the induction apparatus, the two-point switch S, with connections, as described, the main battery M B, and the key K, all connected in the manner shown and described.

GEORGE W. COY.

Witnesses:
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