

(No Model.)

J. W. BRENNAN.

ELECTRIC SWITCH AND CIRCUIT FOR TELEPHONE SYSTEMS.

No. 267,059.

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Fig. 1.

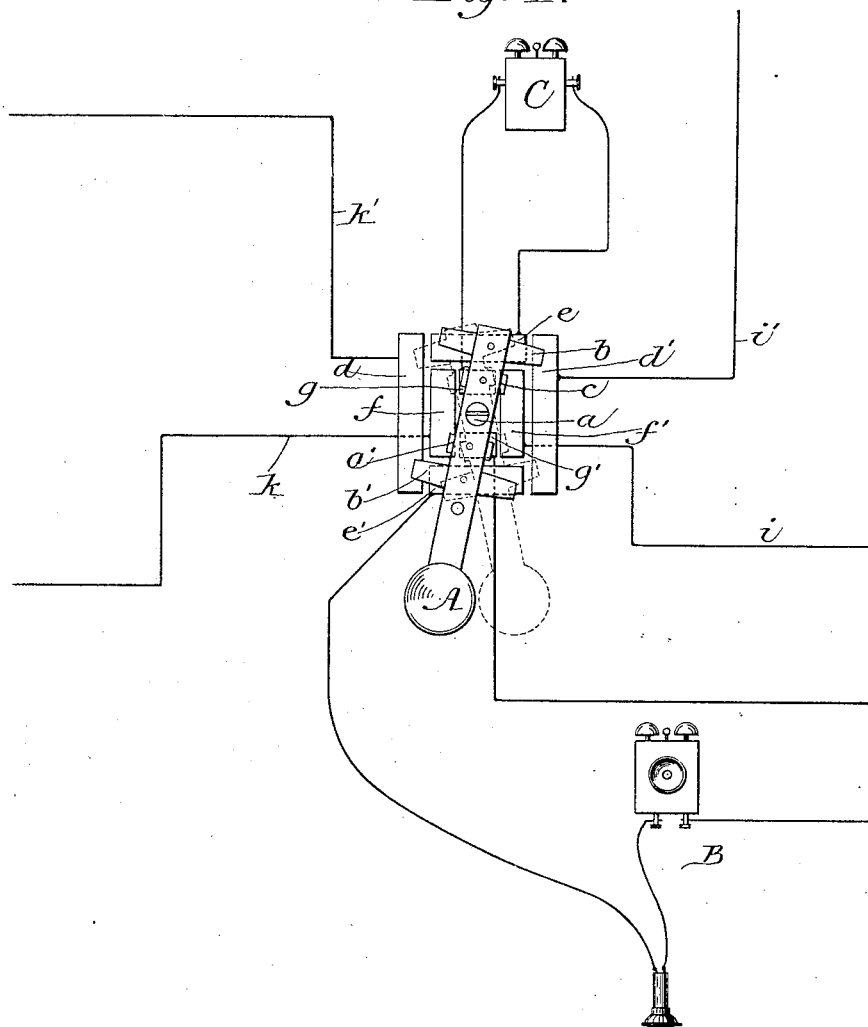
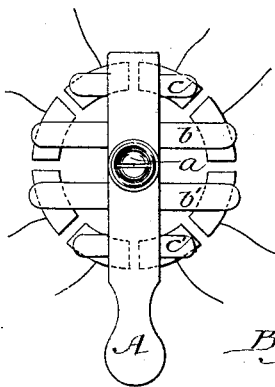


Fig. 2.



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ELECTRIC SWITCH AND CIRCUIT FOR TELEPHONE SYSTEMS.

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Application filed April 4, 1882. (No model.)

To all whom it may concern :

Be it known that I, JAMES W. BRENNAN, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Electric Switches and Telephone or Telegraph Systems, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, in which—

Figure 1 shows in plan view my improved electric switch connected up at an intermediate-line station with the other parts or instruments made necessary to the operation of my improved system of circuits. Fig. 2 is a modified form of the improved switch, showing the contact-plates arranged in circular form.

Prior to my invention when two distinct loops or circuits ran into the same station in an electro-telephonic system—as, for example, when the station was included in a line from a central office or general exchange and in a private line as well—if each of the loops were connected up with the same set of instruments—that is to say, with a telephonic receiver, transmitter, and audible signal, so that this single set of instruments could be used to operate at will in either circuit—it followed, from the nature of the switch employed, that when the instruments were thrown into one loop to receive and transmit messages the other loop would be broken and no signal be given if effort were made to call the station from any point in the broken loop. Thus, for example, if the operator were receiving and transmitting over the main line through the central office, the private-line loop would stand open, so that he would not be apprised of any call directed to the station from over said broken circuit. A neglect to return the switch to position after use of the telephone-instruments would still further prolong the cut-out, leaving the station practically isolated over the line with its circuit broken, and thus giving rise to much trouble and annoyance.

My invention is designed to maintain both loops of an electro-telephonic system, such as described, in permanently-closed circuit, so that whether the instruments at the station be connected up for use in either loop a call to

the station from over the other loop will always be sounded at the station.

To this end the invention consists of a certain improved shifting switch, as hereinafter described and defined in claims, and in the combination therewith of two distinct loops or line-circuits, a single set of telephone-instruments and connected signals, and an extra audible signal, so that whenever one circuit is directed through the telephone-instruments the other will pass through the extra audible signal, and thus, with both loops permanently closed, the operator at the station be always apprised of a call coming to it from either circuit. By the substitution of the improved form of switch and the addition of a simple magneto-signal one set of telephone-instruments may be conveniently used for duty in either one of two separate circuits at a material reduction in cost of maintaining the station and with increased efficiency of operation.

As shown in Fig. 1, the switch-lever A, consisting of a straight bar of gutta-percha or like insulating material, is pivoted at *a* to a base-board, and carries on its lower face the contact-pieces *b b' c c'*, projecting from said bar on either side, the end contact-pieces, *b b'*, being somewhat longer than the intermediate contact-pieces, *c c'*, whereby they may engage the outer contact-plates, *d d'* and *e e'*, while the inner plates, *f f' g g'*, are borne upon by the contact-pieces *c c'*. Each one of the several contact pieces and plates is carefully insulated from all of its fellows, the plates being secured to the same base-board to which the switch-lever is pivoted. The telephone-instruments and connected signal are shown at B in a short loop-wire, one end of which is in electrical connection with the outer plate *e'*, and the other end with the inner plate *g'*. For simplicity of illustration the local battery, induction-coil, and switch of the telephone-instruments are not shown, as their mode of connection is well known and forms no part of the present invention.

The extra audible signal is shown at C, being in this case an ordinary electro-magnet bell sounder situated in a short wire loop, one end of which is connected up with the inner contact-plate *g'*, and the other end with the outer

contact-plate *e'*. Of the two main-line loops or circuits, the wires *i i'* of one are shown connected up with the inner contact-plate *f'* and the outer contact-plate *d'*, respectively, and the wires *k k'* of the other are shown in electrical connection with the inner contact-plate *f* and with the outer contact-plate *d*, respectively. If, now, the switch-lever is in the position shown in full lines, Fig. 1, the course of a current from the main-line wire *k*, for example, is through the inner contact-plate *f*, short contact-piece *c'*, inner contact-plate *g'*, telephone-loop and instrument, B, returning thence to outer contact-plate *e'*, contact-piece *b'*, outer plate *d*, and to line-wire *k'*, and so to ground, or to the next station. At the same time a current over the line-wire *i* would pass by contact-plate *f'*, contact-piece *c*, contact-plate *g'*, and short loop-wire to the extra bell-sounder C, returning by the loop to contact-plate *e*, contact-piece *b*, contact-plate *d'*, and line-wire *i'* to ground, or to the next station. Hence it follows that both main-line circuits are permanently closed by the switch of the station, and thus if the operator be receiving or transmitting a message at the telephone-instruments over main line *k k'* a call to the station from over the other main line, *i i'*, will be sounded forthwith at the signal C. The operator, being made aware of the new summons, can respond thereto as soon as convenient, and by shifting the lever A to the position shown by dotted lines will so far reverse conditions that the current from the loop *i i'* will pass through the telephone-instruments, and that from the loop *k k'* will pass through the extra signal C. This is accomplished by the changed relation of the contact-plates to the contact-pieces of the switch-lever, and as the other connections remain the same the course of the circuits in the new relation of the parts may be readily traced by those familiar with the art without need of further detailed description.

It will be noted that in either position of the switch-lever the signal usual to the set of telephone-instruments and the extra signal (shown at C) will be in separate circuits; and so if the telephone-instruments proper be not in actual use the operator at the station will yet be made aware of a call coming over either circuit.

The switch shown in Fig. 2 does not differ from that heretofore described, except that the eight contact-plates are arranged in circular form instead of in inner and outer sets of four plates each in rectangular method, as shown in Fig. 1. In the modified form there is a pivoted switch-lever, A, of gutta-percha, or the like, and to this lever are attached the cross contact arms or pieces *b b' c c'*, as before. The connections of this form of switch with

the line-circuits and with the short loops of the station containing the telephone set and the extra signal respectively do not differ from what were heretofore defined for Fig. 1, and may be readily traced without need of present repetition.

I have thus far described my invention as applicable to a telephonic system; but it is manifest that in like manner it may be adapted to a telegraphic system, so that a single relay and sounder may do duty at will in either one of two separate circuits, and this by addition of an extra sounder, as hereinbefore set forth.

While the forms of switch as described are particularly applicable to telephone or telegraph stations, they may be used with equal success wherever it is desired to maintain two electric loops in closed circuit, and to shift the several devices or pieces of apparatus at will from one circuit to the other.

Having thus described the invention, what I claim, and desire to secure by Letters Patent, is—

1. An electric switch for two distinct loops or circuits, said switch consisting of a pivoted lever-arm having a series of contact-pieces secured thereto, in combination with a series of contact-plates arranged, substantially as described, to meet said contact-pieces, so that the loops or circuits may be closed in either position of the switch-lever, substantially as set forth.

2. In electric telephone or telegraph systems, the combination, with a single set of receiving and transmitting instruments having the usual audible signal, of an extra audible signal and a shifting switch, substantially as described, by which two distinct loops or sets of main-line wires may be maintained in closed electric circuit, the one through the instruments and the other through the extra signal, or reversely, substantially as set forth.

3. In electric telephone or telegraph systems, the combination, with a single set of receiving and transmitting instruments having the usual audible signal, of an extra audible signal and a shifting switch, which said switch consists of a pivoted lever-arm carrying a series of contact-pieces, and of a series of contact-plates arranged, substantially as set forth, to meet and coact with said contact-pieces, the entire combination being such that two distinct loops or sets of main-line wires may be maintained in closed electric circuit, the one through the instruments and the other through the extra signal, substantially as described.

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