

(No Model.)

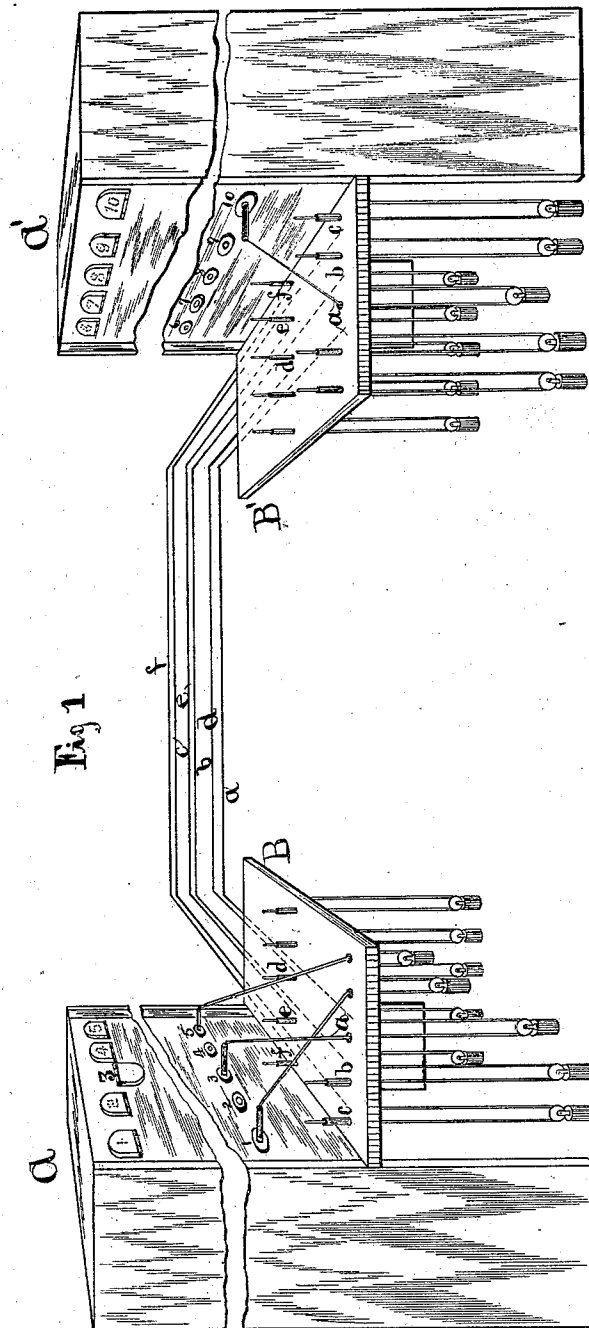
3 Sheets—Sheet 1.

C. W. ROSS.

TELEPHONE EXCHANGE CIRCUIT.

No. 252,259.

Patented Jan. 10, 1882.



Witnesses
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Fig 2.

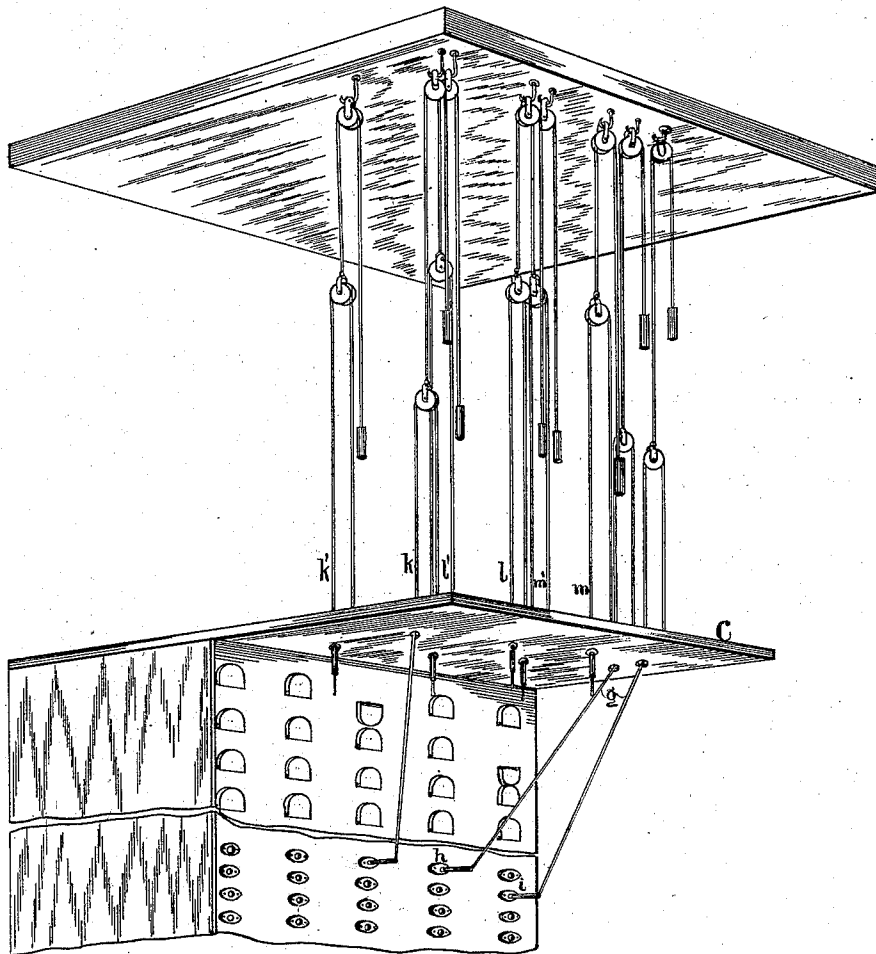
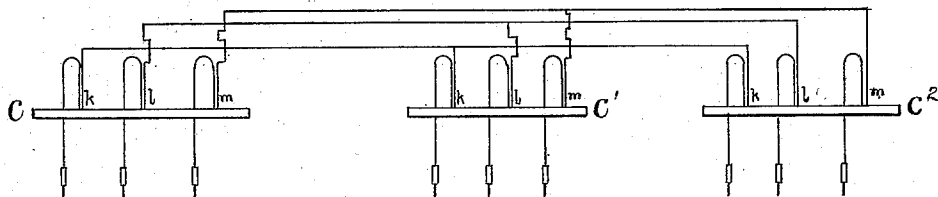


Fig 3



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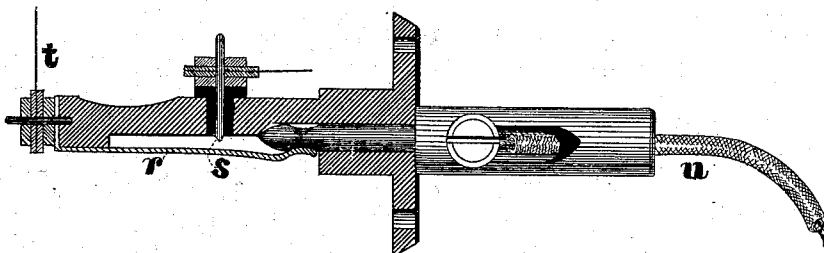


Fig. 4.

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UNITED STATES PATENT OFFICE.

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TELEPHONE-EXCHANGE CIRCUIT.

SPECIFICATION forming part of Letters Patent No. 252,259, dated January 10, 1882.

Application filed September 24, 1881. (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. ROSS, of Columbus, Ohio, have discovered a certain new and useful Improvement in Circuits between Table-Operators of a Telephone-Exchange, of which the following is a full, clear, concise, and exact description.

My invention relates to telephone-exchanges in which the individual lines are arranged in groups at the central office upon the several switch-boards, and when flexible conducting-cords with pegs are used to make the required connections. The operators are placed at tables or leaves in front of the switch-boards. The calls are sent in and answered in the usual manner.

Prior to my invention trunk-lines were used connecting several switch-boards of one system. These lines always terminated in bolts or connecting-strips fastened rigidly to the switch-boards, and in order to make a connection between a telephone-line and the trunk-line one peg of a set of conducting-cords was placed in the switch belonging to the line and the other peg in the bolt or connecting-strip. Two connections were thus required at each board, or four connections in all, to complete the circuit of two subscribers' lines. The slack of the cords was taken up by means of springs from above or by weights below the table. The springs were not wholly satisfactory on account of their uneven tension, and the weights below made it necessary, where long cords were required, to raise the platforms of the operators to an inconvenient height.

My improvement consists in providing a suitable number of pairs or sets of cords and plugs, and so connecting them that each set shall extend to all operators' boards; and also in the method of taking up the slack of the flexible conducting-cords from above.

The switches and annunciators of five different subscribers' lines are shown at each of the boards A and A' of Fig. 1. The lines are not shown, as they may be run from the subscribers' stations and connected with the central-office apparatus in any well-known way. I usually group about fifty lines on each switch-board. The calls are received and answered by means of the usual listening-operator's out-

fit, and clearing-out annunciators may be provided in the circuit of any two connected lines in the usual manner.

The switch and annunciator boards A and A' and the operators' tables B and B' are the same as have been heretofore used. The switches 1 and 5 are connected at board A in the usual manner. The sets of cords and plugs *a b c d e f* are connected respectively to all operators' boards.

Suppose operator at board A receives a call from subscriber 3, who asks for subscriber 10 of board A'. The operator at board A, as she inserts the plug of set *a* in switch 3, tells operator at board A' to connect set *a* with line 10, which she does, as shown at board A'. The two subscribers' lines are thus connected by a single connection at each board.

Each common set of cords and plugs *a b c d e f* must be connected with all the operators' boards, so that an operator at any given board may give the order of a subscriber to the operator of another board by simply indicating to her the set of cords to be used and the line of the subscriber wanted.

To prevent confusion I reserve certain sets of plugs and cords at each board for making connections with the calling-subscribers. Thus sets *a b c* may be used by operator at table B and sets *d e f* by the operator at table B' for connecting with the lines of subscribers calling for subscribers connected with other boards. I find this arrangement especially useful when there are a large number of table-operators.

In Fig. 2 of the drawings I have shown spring-jacks and annunciators placed on the switch-board in the usual manner, with the flexible conducting-cords suspended from the ceiling by means of weights and pulleys. The plugs, when not in use, are thus held under the leaf C, in convenient reach of the operator.

I have shown a set, *g*, of cords connecting the switches *h* and *i*; also, sets *k k'*, *l l'*, and *m m'*, for connecting switches of one board with switches of other boards. Fig. 3 is a diagram showing the connections of sets *k l m* with the leaves C C' C² of three different switch-boards. The sets *k k'*, &c., are used at the first board for making connections with switches of subscribers who have asked for connection with

subscribers at the second or third board. Sets l l' , &c., are used in like manner at the second board for connecting with switches of subscribers calling for subscribers of the first or third board, and sets m m' , &c., at the third board for making connection with lines at the first or second board.

The method of disposing of the slack of the flexible conducting-cords is shown in Fig. 2.

The terminal plugs, when not in use, are in convenient reach of the operator under the leaf. Each cord passes up through the leaf over its movable pulley and down again to the top of the leaf, and is connected from thence to the tops of the leaves at other switch-boards, or in any direction desired. Each movable pulley is supported by a cord or rope passing over a fixed pulley, fastened to the ceiling. Sufficient weight is attached to each supporting-cord to hold the movable pulleys up against the tension of the conducting-cords, which are thus always held taut. The tension of the cords will always be uniform, whether drawn down and connected with the switches or otherwise.

In Fig. 3, Sheet 3, I have shown a full-sized section of the well-known automatic cut-out or spring-jack with the plug inserted, so as to separate the lever r from ground-contact s .

The telephone-line t is thus connected with the flexible cord u , as shown. Any other of the well-known switches that will do the necessary work may be used upon the switch-boards.

When the lines are open at the switch-board ordinary connecting plates or bolts may be used.

I claim—

1. The combination of one or more sets of conducting-cords and plugs with the different switch-boards and connecting-wires permanently connecting each set to all the boards, whereby any given switch of one board may be connected directly with any given switch of any other board.

2. The combination of a fixed pulley, a movable pulley, and a supporting-cord and weight with a flexible conducting-cord and a switching device, as described, whereby telephone-lines may be connected and disconnected, while the slack of the conducting-cord is taken up from above and a uniform tension maintained, as and for the purpose specified.

3. The combination of sets of cords and plugs with three or more switch-boards, a cord with a terminal plug of each set being at each board, and connecting-wires, one for each set, permanently connecting the different sets respectively to all the switch-boards, whereby the circuit of any line of one board may be united directly with the circuit of any given line of any other board through a portion of the connecting-wire of any given set, substantially as and for the purpose specified.

4. Two or more telephone switch-boards provided with automatic cut-outs or switches, in combination with a conducting-wire passing to the several boards, and flexible conducting-cords, with pegs, connected to the conducting-wire, one at each board, whereby by making one connection at each of the two boards any two lines, one connected at one board and the other at the other board, may be disconnected from the ground and connected together.

5. Two or more telephone switch-boards provided with line terminals or switches, in combination with a conducting-wire passing to the several boards, and flexible conducting-cords, with pegs, connected to the conducting-wire, one at each board, whereby by making one connection at each of two boards any line of one board may be connected to any line of the other board.

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Witnesses:

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