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Patented Aug. 16, 1898.

A. F. SWAN.
TELEPHONE SYSTEM.

(Application filed Sept. 29, 1897.)

(No Model.)

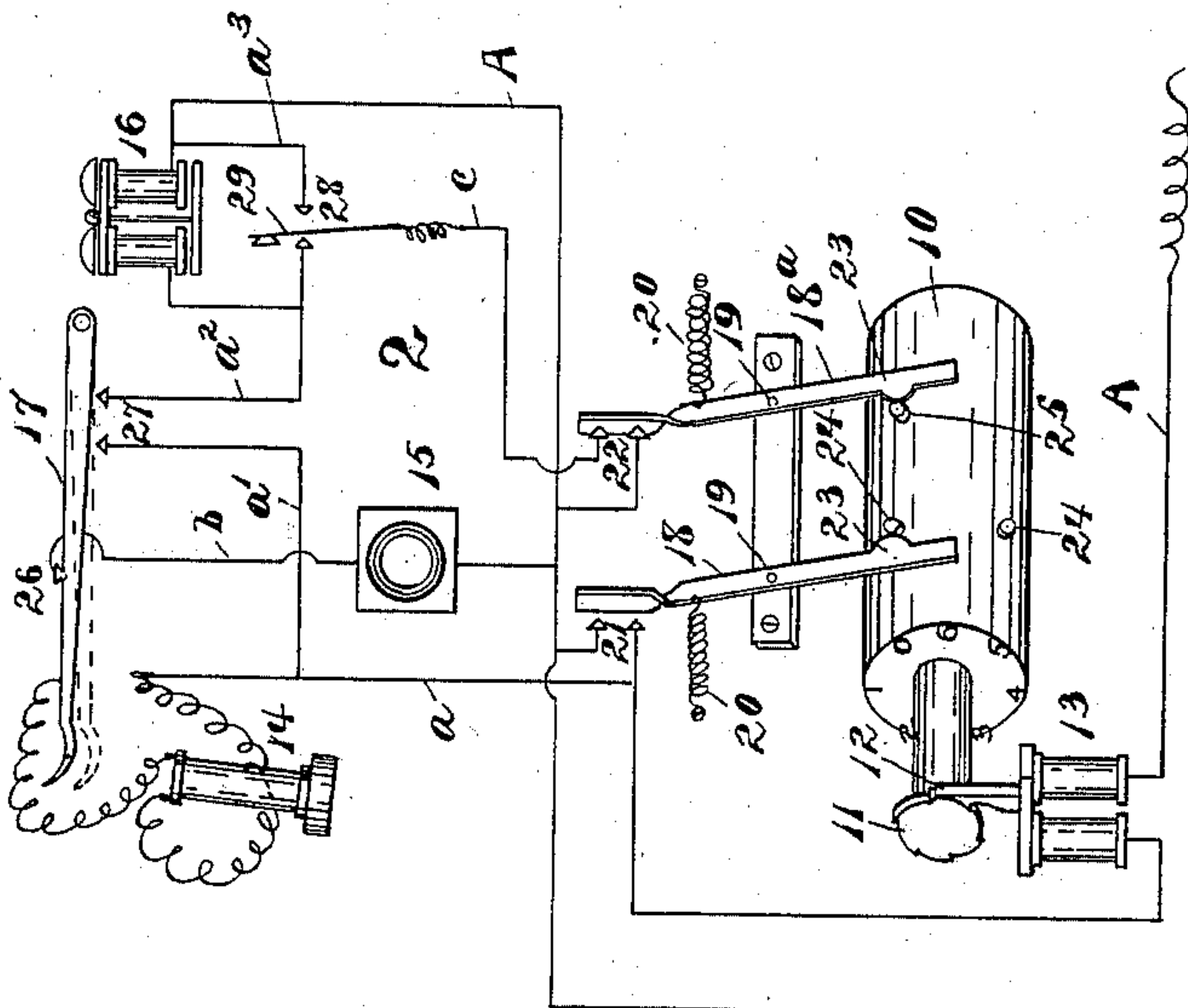


Fig. 1.

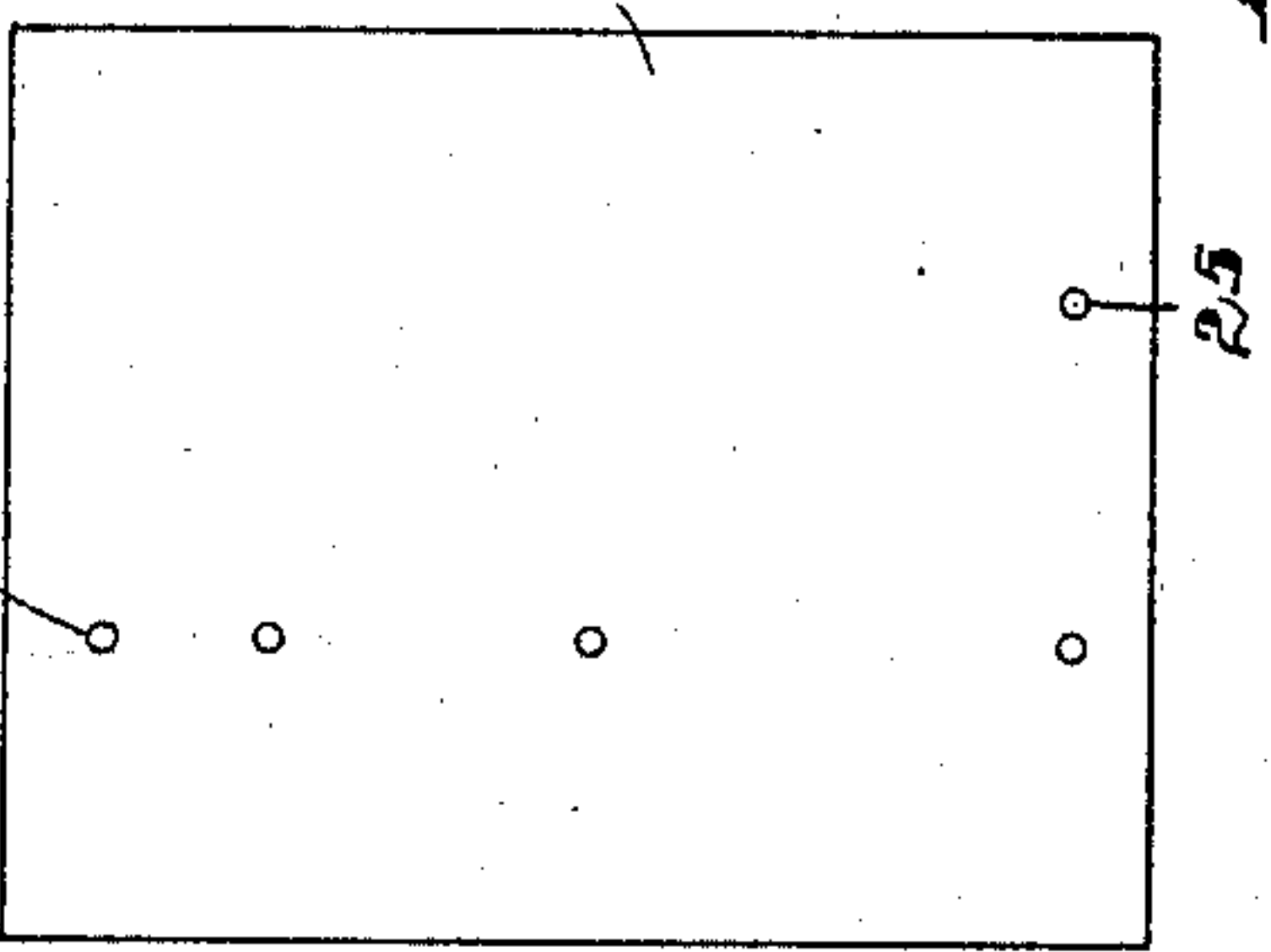
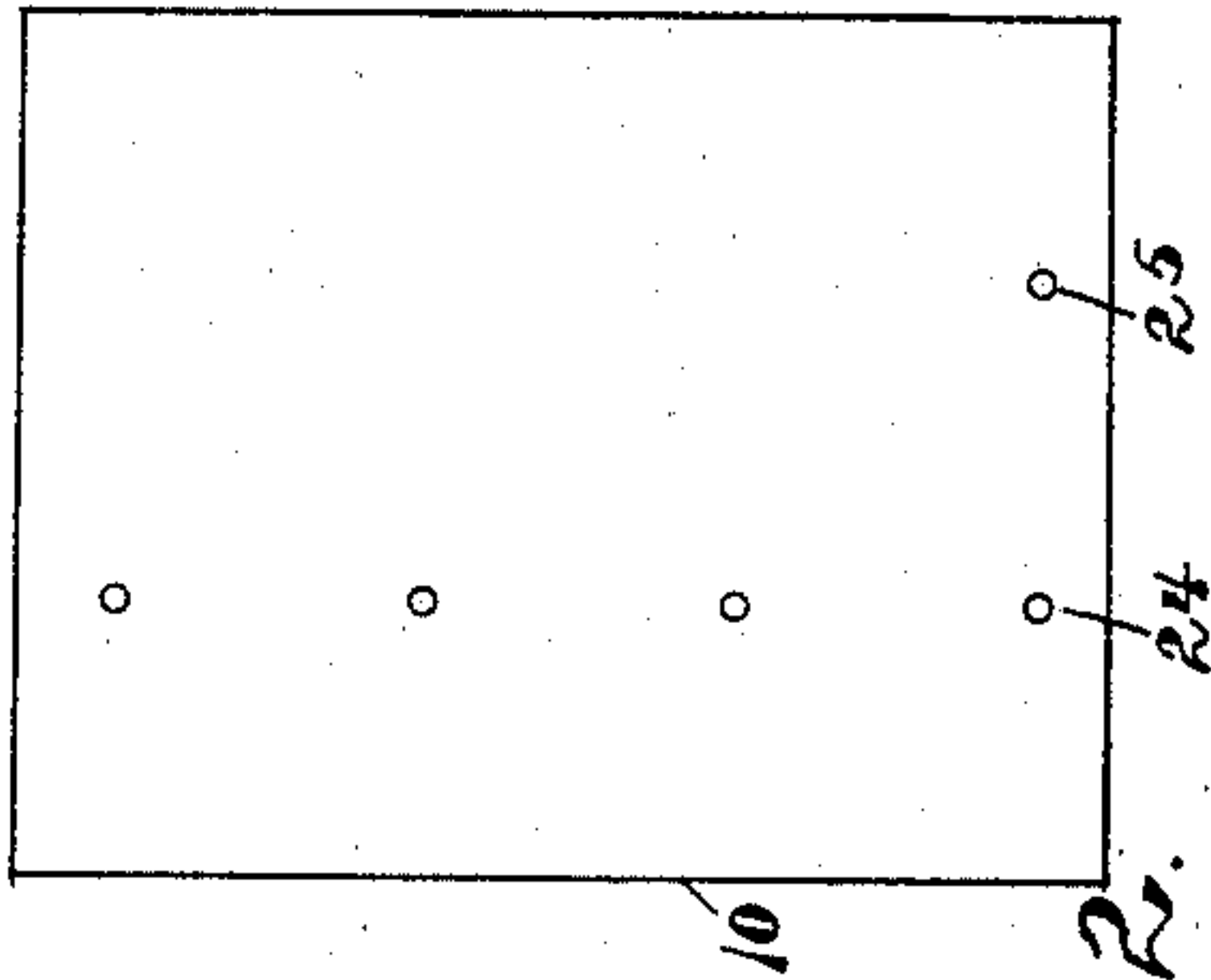
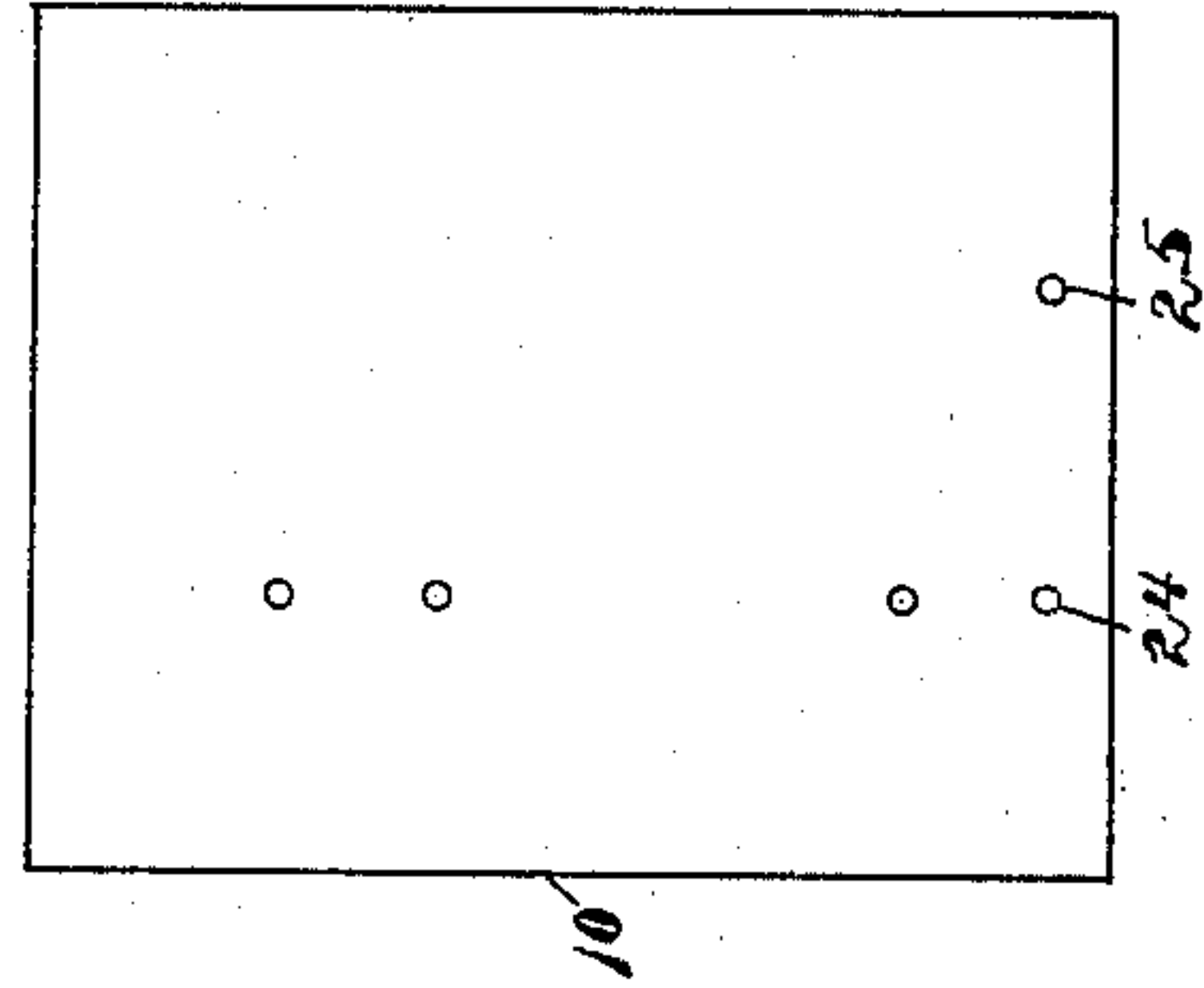


Fig. 2.

WITNESSES:

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TELEPHONE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 609,173, dated August 16, 1898.

Application filed September 29, 1897. Serial No. 653,433. (No model.)

To all whom it may concern:

Be it known that I, ALFRED F. SWAN, of Bayonne, in the county of Hudson and State of New Jersey, have invented certain new and
5 useful Improvements in Telephone Systems, of which the following is a full, clear, and exact description.

My invention relates to improvements in telephone systems and is in some respects
10 like the invention covered by Letters Patent of the United States No. 572,840, dated December 8, 1896, and the invention for which I have filed an application for Letters Patent of the United States, Serial No. 615,103.

15 The invention, like the others referred to, is particularly adapted for use on party-lines where several instruments are employed; and the particular object of my invention is to simplify the construction and arrangement
20 of the parts of each telephone apparatus, to the end that perfect connections may be made and the instruments kept easily in repair and operated economically.

25 A further object of my invention is to reduce the operative parts of the apparatus and to arrange the parts so that the cutting in and out is surer.

30 To these ends my invention consists of a telephone system the construction and arrangement of which will be hereinafter described and claimed.

35 Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters and figures of reference indicate corresponding parts in both views.

40 Figure 1 is a perspective diagrammatic view showing two instruments on a line, the left-hand instrument in the figure being at zero and the right-hand in position to talk to the central office, the zero position of the telephone hook or lever being shown in dotted lines; and
45 Fig. 2 is a diagrammatic development of the switch-barrels of three instruments and brings out the relative positions of the switch-pins.

50 Much of this apparatus is like that shown in my former applications, and some parts are similar to those of the telephones in ordinary use. For instance, the switch-barrel 10 is, except for its pins, like that shown in my previous applications, each switch-barrel be-

ing moved by a ratchet-wheel 11 and engaging pawl 12, the latter being moved up and down by a magnet 13, which is included in the circuit. Each apparatus also includes
55 the usual talking set, comprising a receiver 14 and transmitter 15, together with the bell or signal 16 and hook or lever 17 for the receiver.

60 Instead, however, of using the brushes, as shown in my previous applications, I employ on each switch-barrel parallel switch-arms 18 and 18^a, which are pivoted, as shown at 19, on a convenient support and which are held by
65 springs 20 so as to normally throw the arm 18 into contact with the points 21 and the arm 18^a out of contact with the points 22. The switch-arms are thrown out of or into contact with the points referred to by means of cam-
70 bends 23 on the switch-arms and pins 24 and 25 on the switch-barrel, the former pins operating the arm 18 and the latter the arm 18^a. The hook or lever 17, as in my previous applications, serves to make and break connections through the talking set and through the
75 signal-bell, as shown at 26 and 27, and is more specifically described hereinafter, and the bell-circuit is also specifically controlled by a push-button 29, which is adapted to en-
80 gage one of the contact-points at 28, and included in the circuit to be specifically pointed out presently.

The connections are as follows: The line A includes the magnet 13 of each apparatus
85 and connects directly with the contacts 21 and also directly with the bell 16 and with one of the contacts at 22. From the line-wire A also leads a wire *a* through the receiver 14 to the hook or lever 17. This lever is adapted
90 to close the circuit at 26 through a wire *b*, leading through the transmitter 15 to the line. From the wire *a* leads a wire *a'* to one of the contacts at 27, and from the second of these contacts leads a wire *a''* to the magneto-
95 bell 16 and to one of the contacts at 28. The second of these contacts at 28 connects by a wire *a'''* with the line. The push-button 29 connects by wire *c* with the second contact at 22.

100 The circuits are as follows: When in normal or zero position, with the receiver on the hook or lever 17, the several apparatus are in connection with the central office, as shown

by full lines at apparatus 2 in Fig. 1 and by dotted lines in apparatus 1.

Referring to apparatus 2 in Fig. 1, it will be seen that the circuit entering from the line A passes through the said wire, the wire a , the wire a' , the hook or lever 17, the contacts at 27, the wire a^2 , the push-button 29, the wire c , the contacts at 22, and the switch-arm 18^a, back to the line.

Referring again to Fig. 1, we will say that one of the subscribers wishes to ring up "central." He presses the push-button 29, and the circuit is then from the line A through the wire a , the wire a' , the contacts at 27, the telephone hook or lever 17, the wire a^2 , the bell 16, the wire a^3 , the push-button 29, the wire c , the contacts at 22, and switch-arm 18^a, back to the line. It will be seen, however, that the second or other instruments will be unaffected, because the circuit will be, as first indicated, through the first contact 28 and push-button 29, thus short-circuiting the bell 16. After ringing up central the subscriber removes, as usual, the receiver 14 from the hook or lever 17, whereupon the latter rises, precisely as usual, to the contact 26, as shown by full lines at apparatus 1 in Fig. 1. The circuit is then from the line A through the wire a , the receiver 14, the telephone hook or lever 17, the contact 26, the wire b , the transmitter 15, and the line.

Referring again to Fig. 1, it will be observed that the switch-pins 24 and 25 have engaged the cam-bends 23 of both arms 18 and 18^a, so that the former break the circuit at 21, while the latter close it at 22. The switch-barrels 10 are stepped around from the central office by makes and breaks in the circuit, precisely as in my other applications, and the switch-pins are disposed in such a way that a certain number of makes and breaks will bring certain pins and switch-arms into engagement, so as to cut in desired instruments and cut out others, all as will be specifically pointed out later on.

Referring now to Fig. 2 and also to the other figure, the manner of getting the desired apparatus in circuit with another will be understood. To avoid confusion, I have purposely omitted the circuits in Fig. 2 and have shown the developments of the switch-barrels on a party-line containing three instruments, it being understood, of course, that there would be a greater number of pins and that the arrangement would be somewhat different in case there were a greater or less number of instruments on the party-line. We will suppose that subscriber 1 wishes to talk with subscriber 2. He advises central, who makes the necessary number of makes and breaks in the circuit, which turns the three switch-barrels an equal distance; but the pins on the switch-barrels are so disposed that the switch-arms 18 and 18^a of subscribers 1 and 2 are opened, thus placing the talking-sets in talking-circuit, while the switch-arm 18 of subscriber 3 will be closed against

the contacts 21, thus cutting out subscriber 3 by short-circuiting. If now subscriber 1 wishes to talk with subscriber 3, the switch-barrels are all turned a similar distance from the central office, as before, and this brings the pins of the several instruments into such a position that the switch-arms 18 and 18^a of subscribers 1 and 3 are actuated so as to open the said switch-arms from the contacts 21 and 22, while the switch-arm 18 of subscriber 2 is out of contact with any pin 24 and closed against the contacts 21, thus cutting out subscriber 2 by short-circuiting, while subscribers 1 and 3 are placed in talking-circuit. In case subscriber 2 wishes to talk with subscriber 3 it will be noticed by reference to the diagram in Fig. 2 that the movement of the switch-barrels which brings the switch-pins 24 into position to operate the switch-arms 18 of subscribers 2 and 3 and place them in talking-circuit will not actuate the switch-arm 18 of subscriber 1, and so the latter will be cut out, as before described.

It will be readily seen from the foregoing examples that these switch-pins may be disposed on the several barrels so that a certain simultaneous movement of all the switch-barrels will bring some into talking-circuit and cut out others, this arrangement of the pins depending, of course, on the number of instruments on the line, and it will be clearly seen that the arrangement of the pins on each switch-barrel is peculiar to itself, so that a certain movement will cut the talking-set in or out at the desired point and also cut the bell in or out in a similar way. It will be observed, too, that but one pin 25 is necessary to operate the switch-arm 18^a and so close the circuit through the contacts 22, this action taking place only when the switch-barrels are turned to zero position, and the several apparatus are thus brought into circuit with the central office. After the line has been in use the central office turns the switch-barrels back to zero position, and this brings all the bells into line—that is, into position to be operated by moving the push-button 29 and ringing them in the usual way, this position being clearly indicated on the diagram of Fig. 2 and illustrated also in the connections of Fig. 1. The above examples will make it plain that with any reasonable number of instruments on a line the pins on the several switch-barrels 10 may be so disposed that by simply making and breaking the circuit from the central office any desired talking-set may be cut to line, while the others will by the same means be cut out.

In the foregoing description I have shown the switch-arms 18 and 18^a moving in a plane parallel with the axes of the switch-barrels 10; but it will of course be understood that these arms may be tilted in any convenient way by contact with the pins 24 and 25 or equivalent projections without affecting the principle of the invention.

Having thus described my invention, I

claim as new and desire to secure by Letters Patent—

1. The combination with the telephone apparatus, the line, and the switch-barrel moved by makes and breaks in the line, of the movable switch-arms directly controlling the circuit through the apparatus, and means for operatively actuating the arms by the movement of the switch-barrel, substantially as described.

2. The combination with the telephone apparatus, the line and the switch-barrel operated by makes and breaks in the line, of the movable switch-arms actuated from the switch-barrel, and suitable connections whereby one position of the switch-barrel cuts the bell to line, a second position cuts the talking set to line, and a third position cuts the bell and talking set out of line by short-circuiting, substantially as described.

3. The combination with the telephone apparatus, the switch-barrel having projections thereon, and means for moving the switch-barrel by makes and breaks in the line, of movable switch-arms actuated by contact with the projections on the switch-barrel, and electrical connections whereby one position of the switch-barrel cuts the bell to line, the second position cuts the talking set to line, and the third position cuts the bell and talking set out of line by short-circuiting, substantially as described.

4. The combination with the telephone apparatus, the line, and the switch-barrel actuated by makes and breaks in the line, and

provided with projections, of a pair of contacts connected directly with the line, a second pair of contacts, one connecting with the line and the other with a push-button controlling the bell-circuit of the apparatus, and switch-arms actuated by the projections on the switch-barrel, one of said arms being adapted to engage the first contacts and short-circuit the talking set and bell, and the second of said arms being adapted to engage the second contacts and cut the bell to line, substantially as described.

5. The combination with the telephone apparatus, the line, and the switch-barrel turned by makes and breaks in the line, said switch-barrel having projections thereon, of a pair of switch-arms actuated by the projections on the switch-barrel, and connections whereby the first movement of one arm is adapted to cut the talking set to line, the second movement adapted to cut the talking set and bell out of line by short-circuiting, and the movement of the second arm is adapted to cut the bell to line, substantially as described.

6. The combination with the talking set, the line, and the switch-barrel moved by makes and breaks in the line, of a movable switch-arm operated from the switch-barrel and adapted to cut the talking set in and out, substantially as described.

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Witnesses:

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