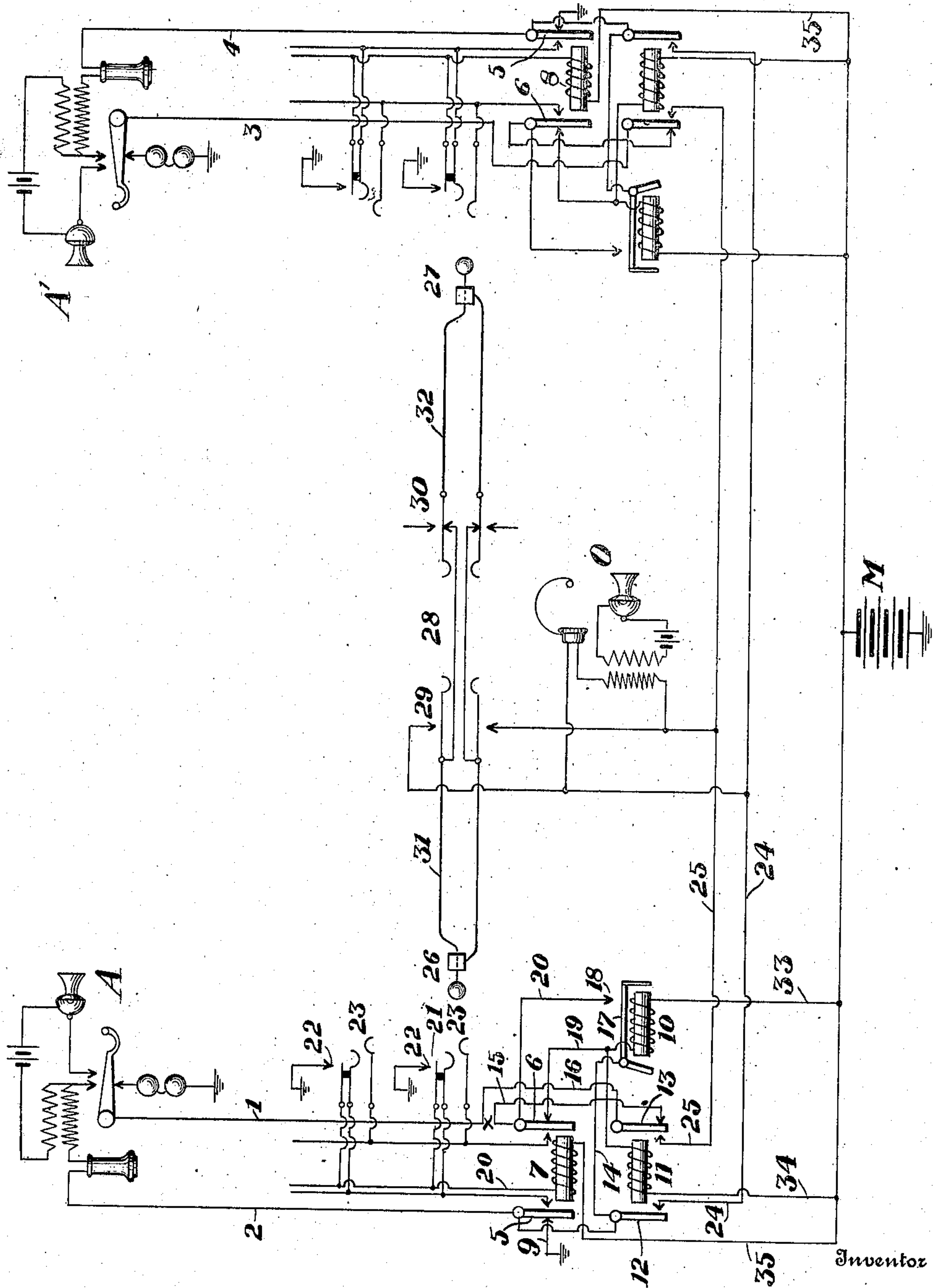


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TELEPHONE EXCHANGE SYSTEM.
APPLICATION FILED JULY 29, 1908.

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Patented Feb. 9, 1909.



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TELEPHONE-EXCHANGE SYSTEM.

No. 911,798.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM ANDREW WYNNE, a citizen of the United States, residing at Raleigh, in the county of Wake and State of North Carolina, have invented certain new and useful Improvements in Telephone-Exchange Systems, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to telephone exchange systems, and has for its object the provision of means whereby calling subscribers may be answered and their wants ascertained with little or no delay, the service being thereby rendered more efficient.

It is well understood by engineers that the most important step in the process of connecting subscribers through an exchange is the initial or answering step; and the most important apparatus to keep in perfect condition is that whereby the subscribers are answered. By this I do not mean that the rest of the apparatus and the other steps in the connection are unimportant, but that it is essential to limit the troubles which are inevitable in all exchange work, to other steps than the first and to other apparatus than the answering. The reason for this is almost obvious, and needs no more than suggestion to be understood. When a subscriber makes a call it is for service, and the telephone exchange force is organized for rendering service. Such service to be of value must always be prompt, but to be of full value and to cover all emergencies it must be instantaneous. Now, if the subscriber feels that he can depend upon getting prompt response to his call, he is not concerned with the balance of the work done in getting the connection wanted, or rendering any service he may require. In other words, if a calling subscriber can always get to an operator a certain percentage of troubles can be permitted beyond the operator without detriment to the service.

The ordinary method of answering calls is of course by plugging in on the calling subscriber's line and using a listening key in the cord circuit. One mental act of selection and two manual acts are thus required, and this is very little reduced by making the lis-

tening key automatic and dependent in its action upon the insertion of the plug in the jack. It is necessary, in order to make any essential improvement, to go direct to the line in answering, and to dispense with any selective act on the part of the operator, making the connection automatic.

In order to attain my object, I go direct to the line, and make the action not only automatic but simple. For each line I provide a special line relay arranged to be energized when the line calls, and to the normally open contacts of a plurality of these relays I connect the circuit of the operator who is to answer that group. As a variation of this arrangement I may of course run different operators' wires to split groups, dividing the lines arbitrarily. I may also provide more than one relay per line, or more than one pair of contacts per relay, so as to be able to put the same line on more than one operator.

Various modifications of my arrangement will occur to those skilled in this art, and it should therefore be understood that I do not limit myself to the specific forms and connections to be shown and described herein, but present the same for purposes of definition alone.

My invention is illustrated in the accompanying drawing, in which the figure is a diagram showing a common battery call system for switchboards.

Referring to the drawing, A and A' are subscribers' stations provided with the usual substation apparatus and connected to the central office by line-wires 1-2 and 3-4, respectively, which terminate at the contacts 5 and 6 of cut-off relays 7-8. As these lines are identical it will be sufficient to describe the line from A. This is provided with a signal magnet 10 and a special connecting relay 11 having contacts 12 and 13 similar to the cut-off contacts 5 and 6. The line is normally connected on one side to ground by wire 9, and by way of wire 14 to the contact 12 of relay 11 and contact 17 of the signal magnet 10. On the other side the line is connected through wires 15 and 16 and contact 13 to the contact 6, and thence by wire 19 to the magnets 10 and 11 in par-

allel and so to battery. A branch 20 from contact 6 goes to the contact 18 of the signal magnet. When the relay 11 is energized the wires 14 and 15 are connected to the operators' wires 24—25, whereby the operator's telephone O is brought into connection with the substation telephone at A direct. I have shown the contact 13 controlling the break α in the line-wire 1 outside of the contact 6, but this break may be otherwise placed provided the wire 20 is properly connected.

In operation, if a subscriber A calls, the signal circuit is immediately closed as follows: main battery M, 33, 10 and 34—11, in parallel, 19, 6, 15, 13, 16, 1, substation, 2, 5, 9 and ground to battery. The signal 10 immediately pulls up and closes the contacts 17—18, thereby closing a shunt for magnets 10 and 11 as follows: battery through wires 33 and 34, magnets 10 and 11 in parallel, 19, 6, 20, 18, 17, 14, 5, 9 and ground. Immediately after this shunt is established contact 13 opens wires 15—16, and connects the line circuit to the operator's circuit 24—25 as follows: substation, 1, 16, 13, 25, 0, 24, 12, 14, 2, and back to the substation. The wire 15 being disconnected, the shunt circuit established through contacts 17—18 has no effect upon the clean talking circuit between the operator and the subscriber. When in answer to the call the operator inserts the plug 26, the contacts 21—22 are closed together, and the relay 7 is energized by the following path: battery M, 35, 7, 20, 21, 22, and ground back to battery. This pulls down the contacts 5 and 6, disconnects the wires 9 and 19, and puts the line-wires 1 and 2 onto the jack spring 23. Should the operator desire to again connect with the line, she may do so by means of the key 29, and she completes the connection through the cord 31—32 and the plug 27 in the usual way. I have shown no clearing-out signal in the cord, but it should be understood that the cord-circuit may be completed in any desired and well-known manner, as it forms no part of the present invention. If a hand generator is used at the substation, a bridged high-wound drop may be used on the cord 28; but with a common battery circuit the usual repeating coil or pair of condensers would be employed, together with a pair of supervisory relays in the cord conductors 31—32.

I am aware that line annunciators have been used to connect their lines directly to the operator's circuit, but I believe that I am the first to adopt a separate relay for this purpose, in accordance with the dictates of good practice. I am aware that sundry modifications may be made as I have already stated, and I pointed out that the break α in the line might be differently located. I would call attention to one modifi-

cation, which I have not illustrated because it appears almost obvious, but which may be used in practice. This is to carry the connection from the contact 17 to the ground wire 9, and locate the break α between such ground connection and the contact 5. All such changes and modifications are within the scope of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent of the United States is:

1. In a telephone exchange system, a plurality of subscribers' lines extending to a central office, with means therein to interconnect the lines, an operator's telephone circuit, an individual signal for each line, and a relay for each line acting when the line comes into use to connect the same directly with the operator's circuit.

2. In a telephone exchange system, a plurality of subscribers' lines extending to a central office, means therein for interconnecting the lines, an operator's telephone circuit, a signal device individual to each line, a relay for each line adapted when the line comes into use to connect the same directly with the operator's circuit, and means whereby such signal and relay when rendered active are maintained in such condition, subject to the control of the operator.

3. In a telephone exchange system, a plurality of subscribers' lines extending to a central office, means therein for interconnecting the lines, an operator's telephone circuit, means for connecting the same with the lines through the connective devices, and a separate line controlled means for connecting the same directly with the lines when calling.

4. In a telephone exchange system, a plurality of subscribers' lines extending to a central office, means therein for interconnecting the lines, an operator's telephone circuit, an individual signal for each line, an individual relay for each line, said relay acting when its line is calling to connect the same directly to the operator's circuit, and said signal acting when set to maintain the relay energized.

5. In a telephone exchange system, a plurality of subscribers' lines extending to a central office, plug and cord circuits for interconnecting the lines, a listening and ringing key and operator's circuit connections to each cord, an individual signal magnet for each line, an individual relay for each line adapted to be energized when the line is calling to connect the same to the operator's circuit, and a cut-off relay acting when a cord is connected with a line to disable both the line signal and the line relay.

6. In a telephone exchange system, a plurality of subscribers' lines extending to a central office, terminal jacks for said lines, plug and cord circuits for interconnecting

the same, listening and ringing keys in said
cords, an operator's telephone circuit extend-
ing thereto, an individual signal magnet for
each line, an individual connecting relay for
5 each line, means whereby the signal magnet
may short-circuit the line when energized,
and means whereby the relay may discon-
nect the line outside of the short-circuit and
extend it directly onto the operator's circuit,
all substantially as described. 10
In testimony whereof I affix my signature
in presence of two witnesses.

WILLIAM ANDREW WYNNE.

Witnesses:

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