

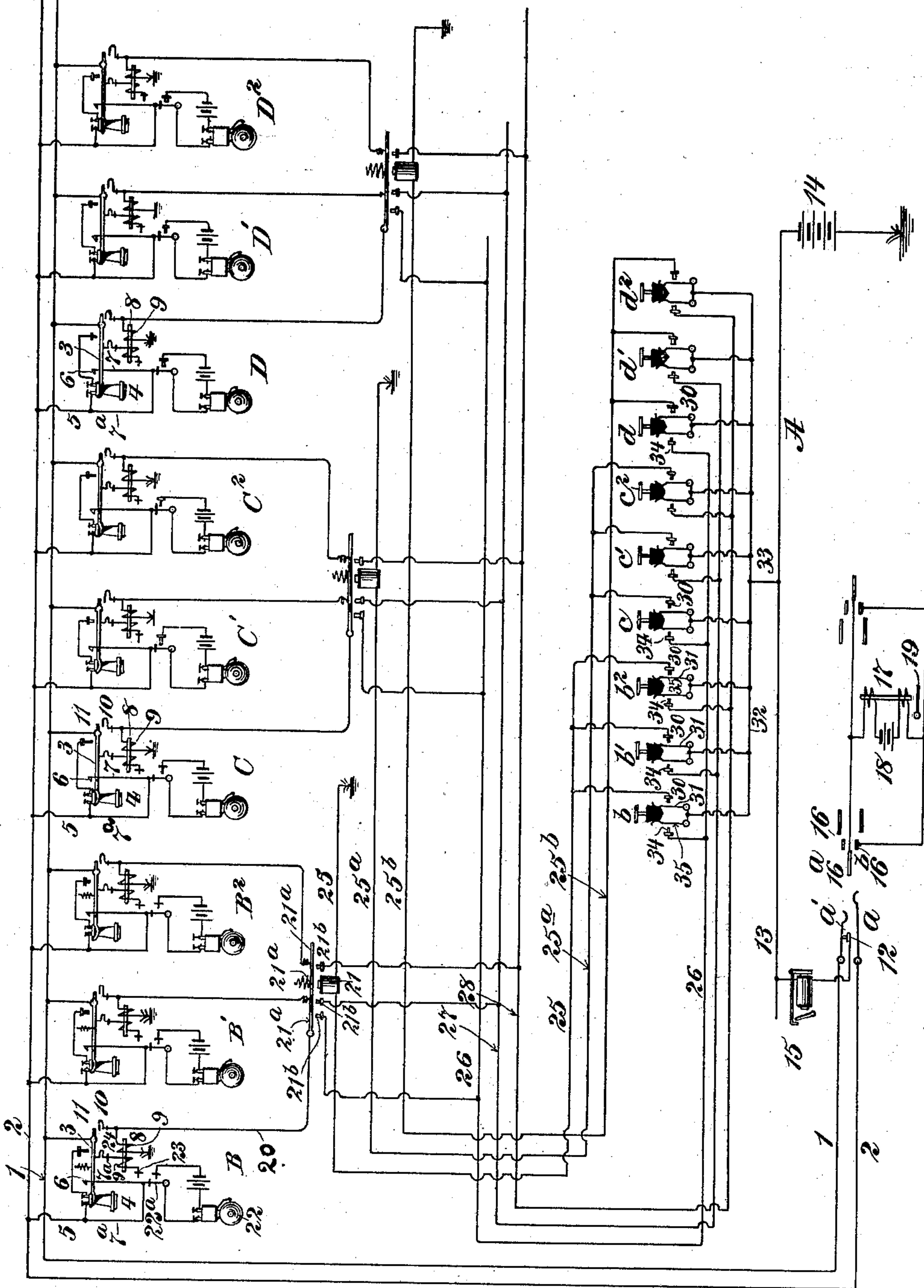
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C. B. SMITH.
TELEPHONE SYSTEM.

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NO MODEL.



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TELEPHONE SYSTEM.

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To all whom it may concern:

Be it known that I, CHARLES B. SMITH, a citizen of the United States, residing in New York city, borough of Manhattan, State of New York, have invented certain new and useful Improvements in Telephone Systems, of which the following is a specification.

My invention relates more particularly to the class of telephone systems comprising a central office and a pair of lines leading therefrom to a plurality of subscribers' stations, commonly called "party-lines," and one object of my invention is to provide improved means for enabling one subscriber to produce a call at central and for preventing another subscriber on the same line from producing a call while the first-mentioned subscriber is using the line, and another object is to enable the operator at central to call a desired subscriber only from central without signaling to any other subscriber on the same line, and also to enable said operator to permit a called-subscriber's telephone instruments to be connected with the line.

The invention further consists in the novel details of improvement that will be more fully hereinafter set forth and then pointed out in the claims.

Reference is to be had to the accompanying drawing, which is a diagrammatic view of a telephone system embodying my invention.

In the accompanying drawing, 1 2 indicate main telephone-lines, which lead from a central office, as A, to a plurality of subscribers' stations, preferably arranged in series, as B B' B² and C C' C² and D D' D². At each station the conductor 1 is connected with a telephone-receiver hook 3, adapted to engage a contact connected with receiver 4, which receiver is connected with conductor 2, as by a branch wire 5. When the receiver is upon the hook, the telephone-circuit is broken, as usual, and a stop, hook, or the like 6 of a lockout device checks the rising of hook 3 when the receiver is removed if the circuit over line 1 is broken. The stop or hook 6 is operated by an armature 7, that is connected with line 2, as by a branch conductor 7^a.

8 is a magnet adapted to attract armature 7, and it is shown provided with two coils, the coil 9 thereof being shown connected with

ground and with a contact 10, adapted to be engaged by a contact 11, operated by hook 3. The conductors 1 and 2 at central are provided with a jack *a*, the contact *a'* of said jack that is connected with line 1 being in normal engagement with a contact 12, connected with a conductor 13, that leads through a battery 14 to ground, a drop or indicating instrument 15 being shown connected with conductor 13. When a subscriber desires to signal to central, he removes the receiver from its hook, whereupon the latter rises, the contacts 10 11 engage, and if line 1 is not in use a circuit is thereupon established from ground at the calling-station through coil 9 of magnet 8 and over line 1 through contacts *a'* and 12, conductor 13, and battery 14 to ground, whereupon the instrument 15 operates to produce a signal. Magnet 8 being energized attracts armature 7, which operates hook 6 to enable hook 3 to rise until it engages the contact connected with receiver 4, whereupon the lines 1 2 are bridged through the receiver. When the operator at central places the plug 16 in the jack, its tip 16^a engages contact *a'*, thus breaking the ground from line 1, and its sleeve 16^b engages the other contact of the jack in the usual manner. The strands of the plug-cord are shown bridged by a magnet 17 and battery 18, an armature 19 being adapted to be attracted by magnet 17 when the line is in use, and when the subscriber hangs the receiver upon its hook and the circuit of the receiver is broken the armature 19 will fall away to indicate a clearing-out signal. It will thus be seen that when the plug is in the jack and the ground is broken from line 1 any other subscriber on the line will be prevented from calling central, because no circuit can be established for his coil 9 of magnet 8, and thus the stop or hook 6 will keep hook 3 from rising to complete the telephone-circuit. As the circuit to ground over line 1 is broken at jack *a* while a subscriber is using the line, secrecy is maintained.

It is designed that when the operator at central signals to a subscriber the stop or hook 6 of such subscriber will be moved to permit the corresponding hook 3 to rise to establish the circuit of his receiver. For this purpose I have shown coil 9 of each magnet 8 of a se-

ries of stations connected by a conductor 20 with one contact 21^a of a relay 21, the contacts 21^a being insulated from each other, the other contacts 21^b of which are connected with lines leading from central, and the relay is also connected with a different line leading from central, so that when the relay is operated to close the circuits of coils 9 of magnets 8 of a series of stations and current is sent to produce a signal at a desired subscriber's station armature 7 will be attracted to allow the corresponding hook 3 to rise. I have shown a signaling instrument 22 in each station connected with a local circuit having a contact 22^a, insulated from but operated by armature 7, so that when current is sent from central through the contacts of the relay the circuit of the signaling instrument will be closed to produce a call. In order to maintain magnet 8 energized after a call has been sent from central while the plug at central is in the jack of the corresponding lines 1 2 and until the called subscriber removes his receiver from its hook, I have shown the coil 9^a of magnet 8 as connected with a contact 23, normally out of engagement with but adapted to be engaged by armature 7 or a contact operated thereby, and the coil 9^a is also connected with a contact 24 in normal engagement with hook 3, whereby when hook 3 is in engagement with contact 24 and magnet 8 attracts armature 7, while the plug is in the jack at central a circuit will be established for coil 9^a through battery 18 to the plug and jack and over lines 1 and 2 and through hook 6, contact 24, coil 9^a, contact 23, armature 7, and conductors 7^a and 5 to keep stop or hook 6 out of the path of hook 3 of the called station, notwithstanding that the circuit of relay 21 may have been broken, so that when the called subscriber removes his receiver from the hook it can rise to establish circuit through the receiver, whereupon the circuit of coil 9^a will be broken at 3 24, and stop or hook 6 will fall back to its normal position, thereby also breaking the signaling-instrument circuit.

It will be understood that at each station corresponding instruments are provided for enabling a subscriber to call central and whereby central can call a station and arrange the devices thereat to enable the called subscriber to obtain a circuit for his receiver over lines 1 2. There will be relay-contacts for each station connected with the corresponding coil 9, and while any suitable means may be provided for operating the relay for various stations of a series and for sending current from central through coil 9 of magnet 8 in each station I have shown an arrangement as follows: 25 is a line leading from central through any desired number or series of stations, as B B' B², to ground and including the relay 21 for such stations. 26 27 28 are lines also leading from central to the stations of a party-line and which are respectively connected to the contacts 21^b of

the relays—that is to say, there is one of such lines for each contact 21^b of a relay and each pair of contacts 21^a 21^b correspond to a station of a series. When it is desired to signal to a subscriber connected with line 25, current is thrown on said line and the relay connected therewith closes the circuits of the corresponding magnets 8, and current is then thrown on the line 26, 27, or 28, that is connected with the station desired, whereupon the magnet 8 thereof will be energized to attract armature 7 and move stop or hook 6 to enable hook 3 to rise and at the same time closing the circuit of signaling instrument 22, and while the plug is in the jack at central the coil 9^a will keep the hook 6 in the last-mentioned position, so that if current be broken over lines 25 and 26 27 or 28 the signaling instrument will continue to operate until the called subscriber removes his receiver from the hook 3 or until the plug is removed from the jack at central.

I have shown devices located at the central office to enable the circuit of lines 25 and 26 27 or 28 to be closed through a battery simultaneously, the arrangements for which are as follows: *b b' b²* are push buttons or keys at central corresponding to the stations B B' B², and conductor 25 is connected with a contact 30 for each push-button, a spring 31 of each push-button being adapted to engage the corresponding contact 30, and said springs are connected with a conductor 32, (shown connected by conductor 33 with conductor 13,) and thus leading through battery 14 to ground. Each push-button has a contact 34, adapted to be engaged by a spring 35, arranged to be operated by the push-button, whereby as the button is pushed both springs 31 and 35 will be brought into engagement with the contacts 30 and 34, respectively. The contacts 34 of the push-buttons are respectively connected with the conductors 26, 27, and 28, as associated with the relay of the stations B B' B². Contacts 35 are also connected with conductor 32 or with a separate battery, if desired. If it is desired to call station B, the push-button *b* will be operated, whereupon a circuit will be established from ground at central through battery 14 and contacts 31 30 over conductor 25 to ground, thereupon operating the relay connected therewith, and thus closing the circuits of the corresponding magnets 8, and circuit over line 26 will be established at 35 34 from ground through battery 14 and over line 26, the contacts of the relay, and through coil 9 to ground at station B, thereupon operating stop or hook 6 and the signaling instrument thereat, as before explained. If the subscriber at station B' or B² had been desired, push-button *b'* or *b²* would have been operated, establishing the circuit over line 25 similar to that before described and also establishing a circuit over line 27 or 28 to operate the magnet 8 and the signaling instrument at station B' or B². Likewise whatever

the number of stations associated with a conductor, as 25, a push-button corresponding to each station is provided at central and connected with a line arranged similarly to the lines 26 27 28 and connected with a contact of the corresponding relay.

I may increase the number of stations and relays of a party-line without proportionately increasing the number of lines 26 27 28, and this may be done by providing one or more lines 25^a 25^b, corresponding to line 25, and connecting with each of such lines a relay having contacts, as before described.

The relay of line 25^a is associated with the instruments at stations C C' C², and the relay of line 26^b is associated with the instruments of stations D D' D², and all the relays have contacts connected with lines 26 27 28. At the central office are located push-buttons *c* *c'* *c*², corresponding to the stations C C' C², and push-buttons *d* *d'* *d*², corresponding to the stations D D' D², and the contacts 30 of push-buttons *c* *c'* *c*² are connected with conductor 25^a, and the corresponding contacts 30 of push-buttons *d* *d'* *d*² are connected with 25^b, while the contacts 34 of push-buttons *c* *c'* *c*² are connected with conductors 26 27 28, respectively, and the contacts 34 of push-buttons *d* *d'* *d*² are similarly connected with the lines 26 27 28, the springs of the push-buttons being shown connected with conductor 32 similarly to the springs of push-button *d*.

From the foregoing it will be understood that if a subscriber at a station, as C C' C², is desired the corresponding push-button *c* *c'* *c*² will be operated to close the battery-circuit over line 25^a to operate the relay thereof and also close the circuit over lines 26, 27, or 28 to operate the magnet 8 of the station desired, and if a station of a series of stations D D' D² is desired the push-button *d* *d'* *d*² will be operated to close the battery-circuit over line 25^b to operate the relay of said line and to close the circuit of lines 26 27 28 to operate the magnet 8 of the station desired. Thus the operator at central by operating the push-button of the station desired causes the relay of the corresponding series of stations to close the circuits of all the corresponding magnets 8; but only that magnet will be operated whose circuit over line 26 27 28 is closed by the push-button so operated.

While I have shown a magnet, as 8, having a single core and two coils, as 9 9^a, it is evident that two separate magnets for the purposes of said core and coils may be used, if desired.

While I have shown three subscribers' stations in a series, it is evident that any desired number of stations can be provided in each series, in which event a number of lines, as 26 27 28, will correspond to the number of stations in such series.

I do not limit my invention to the details of construction shown and described, as they may be varied without departing from the spirit thereof.

Having now described my invention, what I claim is—

1. A telephone system comprising a pair of lines normally open, one of said lines being normally connected to ground, a plurality of telephone instruments for connection with said lines, electrically-operating devices associated with said instruments and arranged to permit a circuit for the telephone instruments to be established through the telephone-hook over said lines if said circuit to ground is closed and to prevent said hook from establishing such circuit if said circuit to ground is broken, and means to break said ground-circuit and establish electrical connection between said two lines.

2. A telephone system comprising a pair of lines normally open, one of said lines being normally connected to ground, a plurality of telephone instruments for connection with said lines, electrically-operating devices associated with said instruments and arranged to permit a circuit for the telephone instruments to be established through the telephone-hook over said lines if said circuit to ground is closed and to prevent said hook from establishing such circuit if said circuit to ground is broken, means to break said ground-circuit and establish electrical connection between said two lines, and an indicating instrument in the circuit of said grounded line.

3. A telephone system comprising a central office, a telephone-line, a plurality of telephone instruments, electrically-operating devices to control the connection of the telephone instrument with said line, a circuit from central to operate said devices, and a magnet adapted to be placed in circuit with said telephone-line upon the operation of the lock-out devices to temporarily maintain said devices in the operated position.

4. A telephone system comprising a central office, a telephone-line, a plurality of telephone instruments each provided with an electrically-operating lock-out device having a magnet, a normally open circuit leading from central connected with such magnet, a relay to close said circuit, and a separate circuit leading from central for said relay.

5. A telephone system comprising a central office, a telephone-line, a plurality of telephone instruments each provided with an electrically-operating lock-out device having a magnet, a normally open circuit leading from central connected with such magnet, a relay to close said circuit, a separate circuit leading from central for said relay, and means to temporarily maintain the lock-out devices in the operated position.

6. A telephone system comprising a central office, a telephone-line, a plurality of telephone instruments, electrically-operating lock-out devices to control the connection of the telephone instruments with the line, magnets associated with the lock-out devices, relay-controlled contacts, and a separate circuit therefor leading from central, a plurality

of magnets being connected with the relay-contacts.

7. A telephone system comprising a central office, a telephone-line, a plurality of telephone instruments, electrically - operating lock-out devices to control the connection of the telephone instruments with the line, magnets associated with the lock-out devices and connected with contacts associated with a plurality of magnets, a relay, and a separate circuit therefor leading from central, the contacts that are associated with the relay being each connected with a different circuit leading from central.

8. A telephone system comprising a central office, a telephone-line, a plurality of telephone instruments, lock-out devices to control the connection of the telephone instruments with said line, and a separate line having means for controlling the lock-out devices from central, calling instruments associated with the telephone instruments, and means to be operated by the lock-out devices to produce a call.

9. A telephone system comprising a central office, a telephone-line, a plurality of telephone instruments, lock-out devices to control the connection of the telephone instruments with said line, a separate line having means for controlling the lock-out devices,

calling instruments associated with the telephone instruments, means to be operated by the lock-out devices to produce a call, and means for maintaining the lock-out devices in the operated position.

10. A telephone system comprising a central office, a telephone-line, a plurality of telephone instruments, lock-out devices having magnets to control the connection of the telephone instruments with said line, the magnets of the lock-out devices being connected with ground, an independent line, and a relay on said line to control the circuit of the magnet and adapted to be operated by current sent from central.

11. A telephone system comprising a central office, a telephone-line, a plurality of telephone instruments associated therewith, lock-out devices to control the connection of said instruments with said line, a plurality of lines also leading from central and connected with the magnets of different lock-out devices, and another circuit leading from central and having means to control a plurality of said lock-out devices.

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