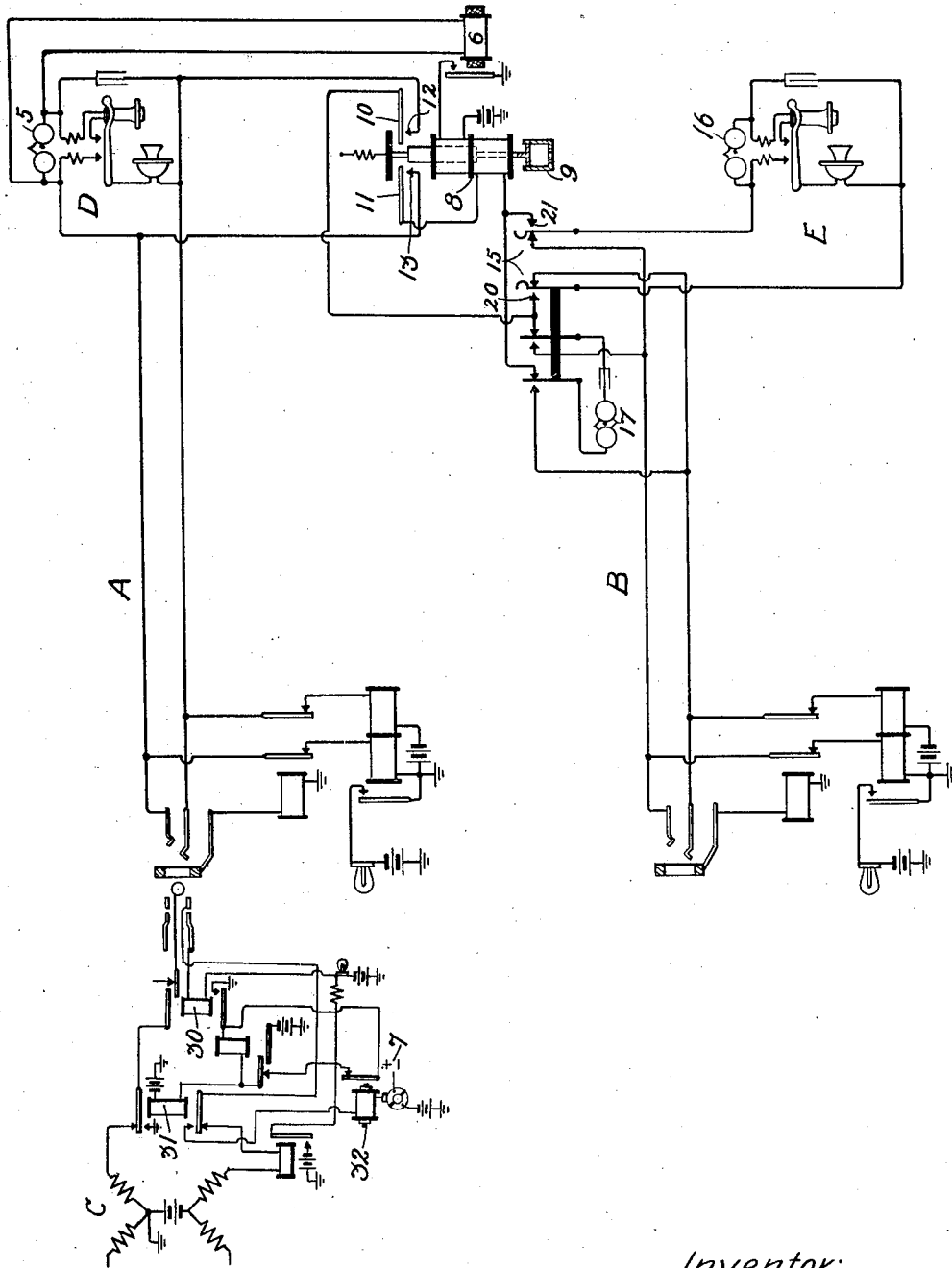


H. P. CLAUSEN.
 TELEPHONE SYSTEM.
 APPLICATION FILED NOV. 27, 1916.

1,360,722.

Patented Nov. 30, 1920.



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UNITED STATES PATENT OFFICE.

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TELEPHONE SYSTEM.

1,360,722.

Specification of Letters Patent.

Patented Nov. 30, 1920.

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To all whom it may concern:

Be it known that I, HENRY P. CLAUSEN, a citizen of the United States, residing at Mount Vernon, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Telephone Systems, of which the following is a full, clear, concise, and exact description.

This invention relates to telephone systems, and more particularly to such systems in which a line circuit is provided with both a main telephone station and an extension telephone station.

The object of the present invention is the provision of improved signaling means for such systems and of means for preventing listening in by a person at the extension telephone set.

In accordance with this invention, a line circuit, having a main telephone station connected therewith, the call bell of which is normally connected to the line circuit, is provided with an extension telephone station, the call bell and telephonic apparatus of which is normally disconnected from the line circuit. A slow operating relay, controlled by ringing current in the line circuit, serves to connect the call bell of the extension station to the line circuit at the expiration of a predetermined period after the beginning of the operation of the call bell at the main station. The main station may be that of an official in a private office, while the extension station may be that of a clerk located outside the private office.

For a more complete understanding of this invention, reference should be made to the following description taken in connection with the drawings, in which there are shown two line-circuits A and B, terminating at a central office in jacks with each of which are associated the usual line relay, line lamp and cut-off relay. A cord circuit C employed for interconnecting the line circuits is also located at the central office. Only so much of the cord circuit C is shown as is necessary for a proper understanding of this invention.

To line circuit A is connected a main telephone station D having a call bell 5 bridged across the line circuit. In parallel with the call bell 5 is a slow-release relay 6 which is responsive to alternating current from a source 7 at the central office or to current from the central office battery. A slow op-

erating relay 8 is controlled by the slow-release relay 6. Relay 8 is made slow in operating by a dash-pot 9 attached to the armature of the relay. The relay 8 controls contact springs 10 and 11, the first of which is connected by means of a conductor to contact springs of a key 15 of the locking type associated with the line circuit B, and the latter of which is connected to a terminal of the lower winding of relay 8. This relay also controls contact springs 12 and 13 which are connected respectively to the ring and tip sides of line circuit A.

Line circuit B is provided with a telephone station E having a call bell 16 bridged across the line circuit. At station E which, as will hereinafter more fully appear, serves as an extension station for line circuit A, is located the key 15, before referred to. The telephone apparatus and the call bell 16 at station E are connected to the tip and ring conductors of line circuit B through normally closed contacts of the key 15. A call bell 17, located at the station E and connected through normal contacts of key 15 to the contact springs 10 and 11 of the relay 8, is normally disconnected from the line circuit A but may be connected thereto upon the operation of relay 8.

To signal station D on line A, the operator inserts the plug of cord circuit C into the jack of line A, whereupon relays 30 and 31 in the cord circuit operate to connect a source of ringing current 7 to line A. The call bell 5 at station D and relay 6 thereupon operate. If the party at station D immediately responds to the operation of call bell 5, the closure of the switch hook contact causes the disconnection of ringing current from the line in the usual manner and provides such a low resistance shunt for relay 6 that this relay immediately releases. However, if the party at station D does not immediately respond, the operation of relay 6 completes an operating circuit for the upper winding of slow-operating relay 8. If this operating circuit remains closed for a predetermined length of time, contact springs 10 and 11 will be moved into engagement with contact springs 12 and 13, respectively, thereby bridging the call bell 17 across the line circuit A. The call bell 17 will thereupon be operated. The lower winding of relay 8 is included in this bridge with call bell 17. The subscriber at station E, responding

to the operation of call bell 17, actuates key 15 and removes the receiver from the switch-hook. The actuation of key 15 disconnects the station E with its call bell 16 from the line circuit B and connects it to line circuit A, and transfers call bell 17 from line circuit A to line circuit B, so that should a call be made on line B while the telephone apparatus of station E is connected to line circuit A, call bell 17 will be operated. Upon the actuation of key 15 and the removal of the receiver from the switch hook, a path of low enough resistance is established for causing the operation of tripping relay 32 in the cord circuit to disconnect ringing current from the line in the usual manner, and to cause the release of relay 6. Upon the removal of ringing current from the line, relay 8 is maintained operated due to current from the central office battery through the lower winding of this relay. Relay 8 in its operated condition now serves to connect the telephonic apparatus of station E to line circuit A.

Upon the restoration of the receiver at station E to its switchhook, relay 8 releases, disconnecting station E from line A. Should the party at station D remove the receiver thereat from its switchhook while relay 8 is in its operated condition, relay 8 will release immediately, due to the low resistance shunt path established by the closure of the switchhook contact at station D. It will be seen, therefore, that station E cannot be connected to line circuit A while station D is connected thereto.

What is claimed is:

1. A telephone system comprising a line circuit, a source of signaling current, means for connecting said source with the line circuit, a call bell associated with the line circuit and responsive to current from said source when connected with the line circuit, a normally inoperative call bell; means responsive when said source is connected with the line circuit to operatively connect the second call bell therewith; a telephonic apparatus associated with said second call bell, and means also associated therewith for disconnecting the second call bell from the line circuit and simultaneously connecting thereto the telephonic apparatus.

2. A telephone system comprising a line circuit, a call bell connected with the line circuit, a source of ringing current, means for connecting said source with the line circuit for operating the call bell, a second call bell, electro-magnetic means independent of the first call bell controlled by current from said source for connecting the second call bell to the line circuit and telephonic apparatus whose connection with the line circuit is controlled by the electromagnetic means.

3. A telephone system comprising a line circuit, two call bells associated with the line

circuit, a source of ringing current, means for connecting the source with the line circuit for operating the call bells, a relay bridged across the line circuit and responsive to current from said source, a slow operating relay responsive to the operation of the bridged relay for delaying the operation of one of the call bells, and a switch adapted when actuated before the full response of the slow operating relay to deenergize the bridged relay and thereby prevent the operation of the call bell whose operation is normally delayed.

4. A telephone system comprising a line circuit, a call bell connected with the line circuit, a source of ringing current, means for connecting said source with the line circuit for operating the call bell, a second call bell, a slow operating relay controlled by current from said source for connecting the second call bell to the line, and means associated with the first call bell adapted when actuated to prevent the operation of the slow operating relay.

5. A telephone system comprising a line circuit, a call bell connected with the line circuit, a source of ringing current, means for connecting said source with the line circuit for operating the call bell, a second call bell, a relay bridged across the line circuit and responsive to current from said source, a slow operating relay responsive to the operation of the bridged relay for connecting the second call bell to the line circuit, telephonic apparatus whose connection with the line circuit prior to the full response of the slow operating relay causes the deenergization thereof, and other telephonic apparatus whose connection with the line circuit maintains the slow operating relay energized.

6. A telephone system comprising a line circuit, a main and an extension telephone station therefor, a source of ringing current, means for connecting said source to the line circuit; a call bell for the main station connected with the line circuit and responsive to current from said source, a normally disabled call bell for the extension station, means controlled by current from said source for rendering the call bell of the extension station operative for signaling purposes, and a switching device at the main station for disabling the last-mentioned means while the telephone apparatus thereat is connected with the line circuit and for restoring said means to operative condition upon the subsequent disconnection of the telephone apparatus from the line circuit.

7. A telephone system comprising a line circuit, a main and an extension telephone station therefor, a source of ringing current, means for connecting said source to the line circuit, a call bell for the main station connected with the line circuit and responsive to current from said source, a normally dis-

abled call bell for the extension station, and means controlled by current from said source for rendering the call bell of the extension station operative for signaling purposes, and means at the main station for disabling the last mentioned means.

8. A telephone system comprising a line circuit, a main and an extension telephone station therefor, a source of ringing current, means for connecting said source to the line circuit, a call bell at the main station connected with the line circuit and responsive to current from said source, a disabled call bell for the extension station, a relay connected with the line circuit responsive to current from said source, a slow operating relay responsive to the operation of the first mentioned relay for operatively connecting the second call bell with the line circuit, telephonic apparatus at the extension station, a switch thereat for connecting the telephonic apparatus with the line circuit and for disconnecting the second call bell, and a maintaining circuit for the slow operating relay established when the telephonic apparatus is connected with the line circuit.

9. A telephone system comprising a line circuit, a main and an extension telephone station therefor, a second line circuit to which the extension telephone station is normally connected, a source of ringing current, means for connecting said source to the first line circuit, a call bell for the main station connected with the first line circuit and responsive to current from said source, a normally disabled call bell for the extension station, electromagnetic means controlled by current from said source over the first line circuit for operatively connecting the second call bell with the first line circuit, telephonic apparatus at the extension station normally connected to the second line circuit, and a switch thereat adapted when operated to disconnect the second call bell from the first and to connect it with the second line circuit and to cooperate with the electromagnetic means to connect the telephonic apparatus with the first line circuit.

In witness whereof, I hereunto subscribe my name this 24th day of November A. D., 1916.

HENRY P. CLAUSEN.