

Jan. 9, 1923.

1,441,791.

H. M. FRIENDLY.
TELEPHONE SYSTEM.
ORIGINAL FILED JUNE 11, 1917.

4 SHEETS—SHEET 1.

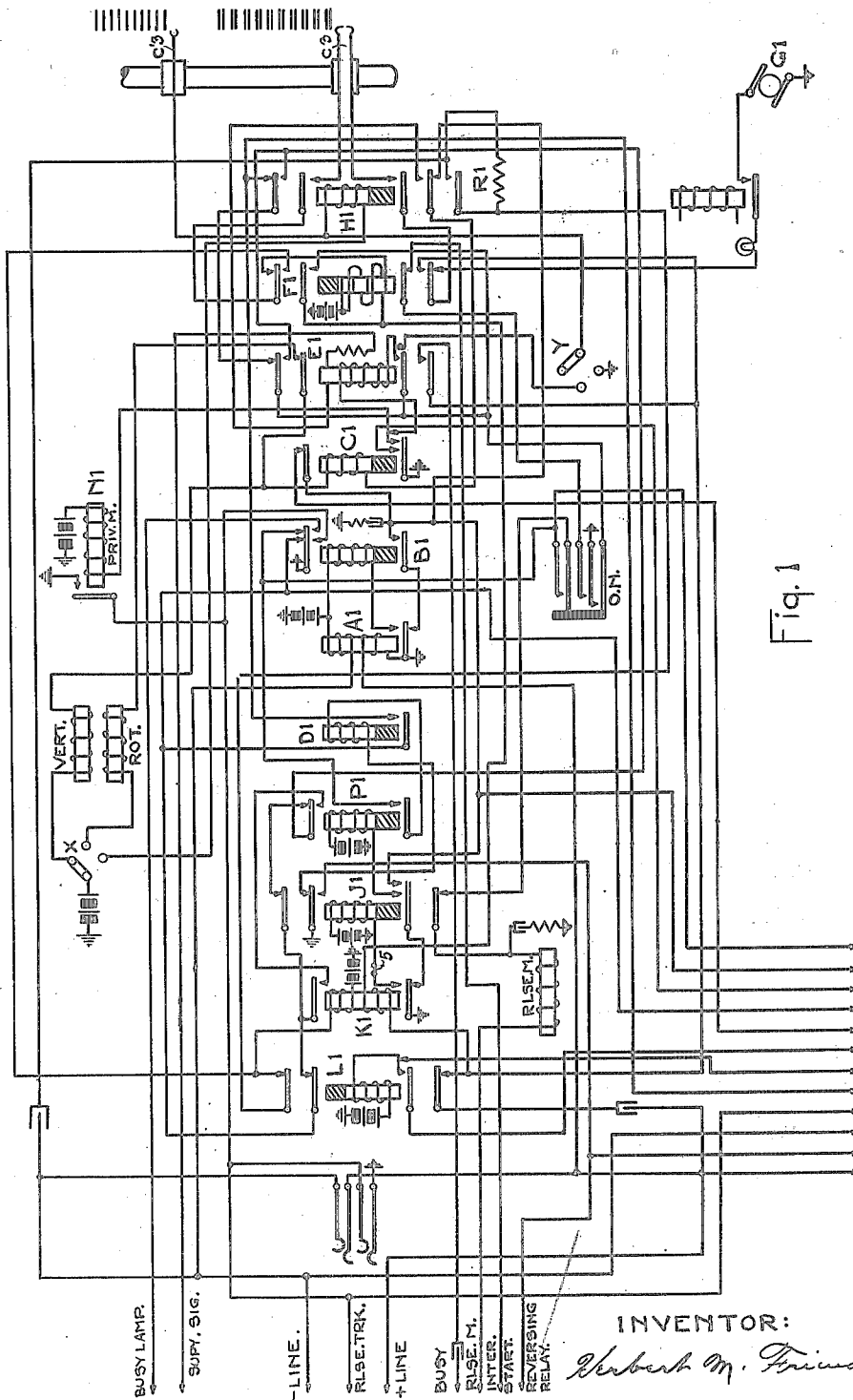


Fig. 1

INVENTOR:

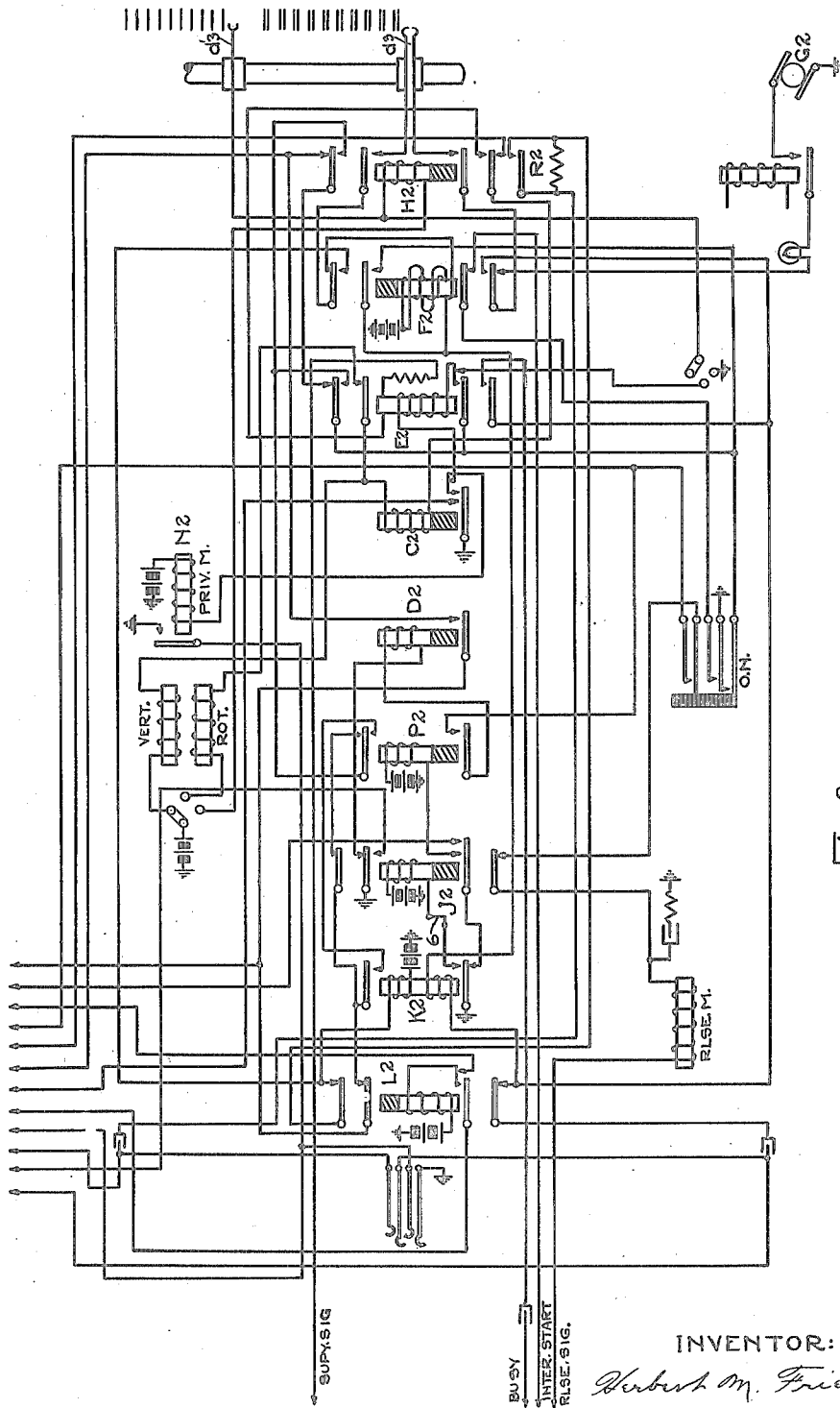
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4 SHEETS—SHEET 2.



INVENTOR:

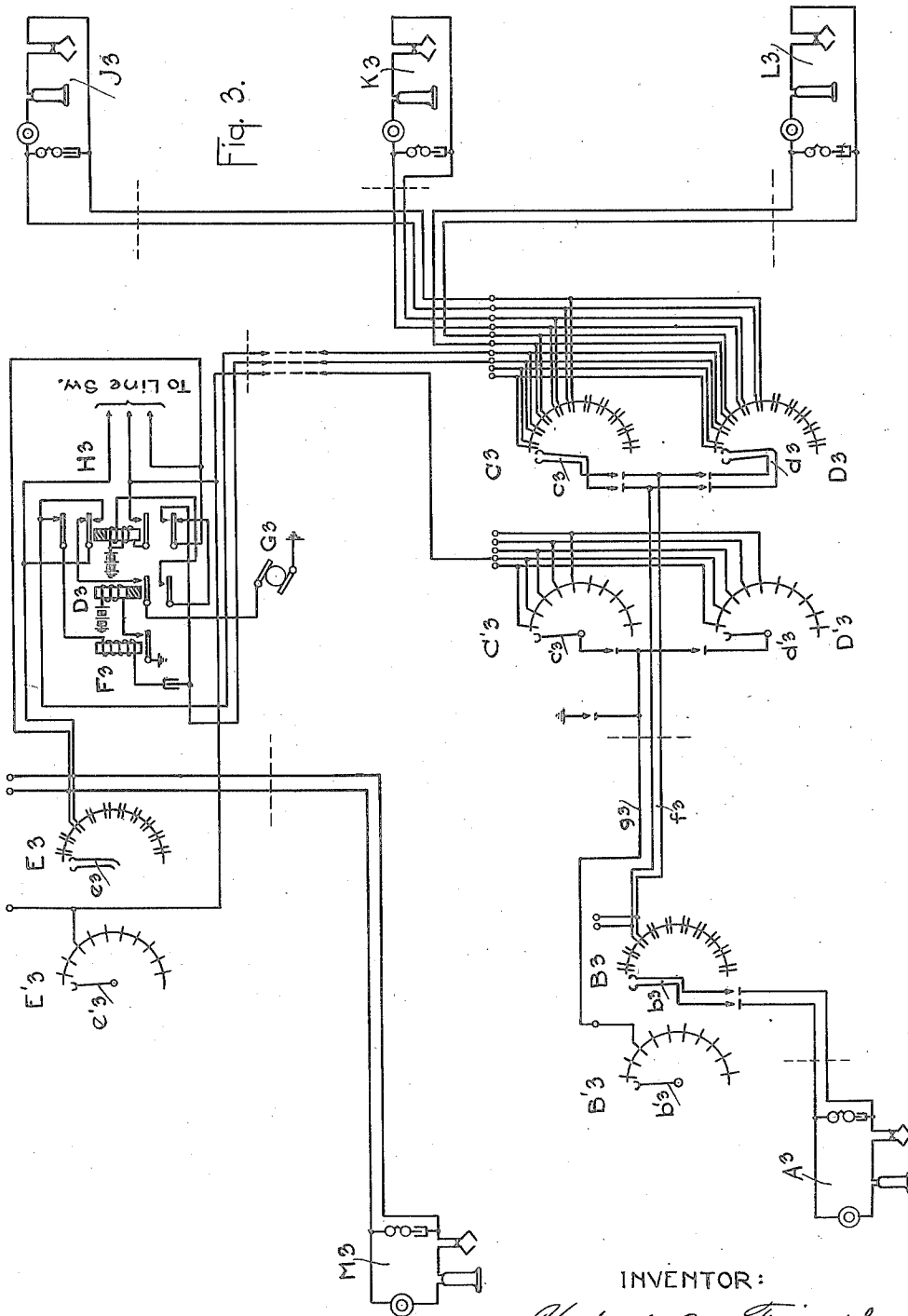
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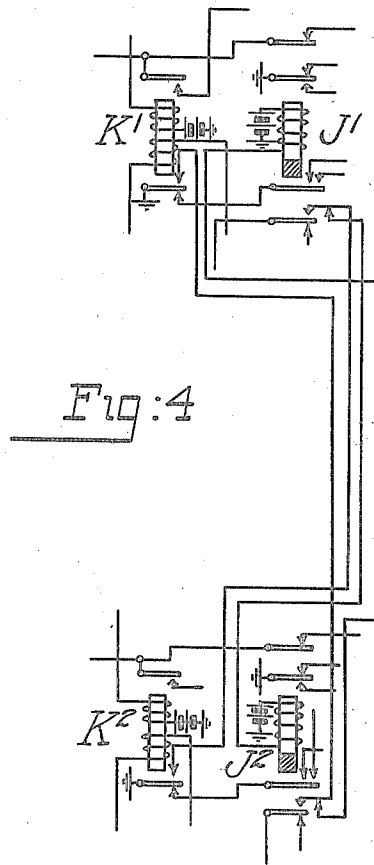


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4 SHEETS—SHEET 4.



Inventor
Herbert M. Friendly.

UNITED STATES PATENT OFFICE.

HERBERT M. FRIENDLY, OF PORTLAND, OREGON.

TELEPHONE SYSTEM.

Application filed June 11, 1917, Serial No. 173,957. Renewed January 3, 1922. Serial No. 526,807.

To all whom it may concern:

Be it known that I, HERBERT M. FRIENDLY, a resident of Portland, Multnomah County, Oregon, have invented certain new and useful Improvements in Telephone Systems, of which the following is a specification.

My invention relates to what are generally known as full automatic telephone systems, semi-automatic telephone systems and variations of such systems, including manual telephone systems.

An object of my invention, applied to private automatic exchange service, is to enable a party calling from a central or general exchange telephone to obtain access over a trunk line to stations in a private automatic exchange and to further provide means for transferring or passing the connection extending from the said trunk leading between calling party's station and to the called party's station in the private automatic exchange. That is to say, the call may be extended or transferred from the called party's station to a further called station in the private branch exchange by the called party manipulating the sending device at the called station, and it may also be likewise extended by the calling party manipulating the sending device at the calling station.

There are other objects.

The scope of my invention and the invention itself will be understood from the following specifications and accompanying drawings.

In the accompanying drawings:—

Fig. 1 is the major connector of a duplex connector of my invention.

Fig. 2 is an interlinked companion connector to the major connector, attaching below sheet showing Fig. 1; the corresponding terminals of both sheets registering.

Fig. 3 is a bank terminal layout of a central office trunk selector bank, a central office subscriber's connector bank and a private branch exchange trunk terminating switch and companion connector banks; the latter switch as shown in detail in Figs. 1 and 2.

Fig. 4 shows a modification of certain of the connections between the interlinked connectors of Figs. 1 and 2.

The general plan of operation of the system embodying my invention is shown schematically in Fig. 3.

Referring to the latter figure, station A3, for instance may call any private automatic

exchange stations through selector B3 over trunk $f3$ to major connector and interlinked companion connector C3 and D3. (Trunk $f3$ is shown companioned by a "private" conductor $g3$. Obviously well known means may be employed to locally "ground" $g3$ upon wiper $b'3$ seizing said private conductor's terminal to guard it against seizure by other switches having access to said $g3$, thus obviating the carrying of the conductor $g3$ companion to $f3$.) Such means as this is shown at the repeater R, Fig. 1 of the patent granted to Talbot G. Martin on March 26, 1918, No. 1,260,424. Subscriber's station M3, appearing on exchange connector banks at left hand corner also extends over conductors to connector banks of said major connector and interlinked companion connector shown in Figs. 1 and 2. J3, K3 and L3 are private automatic exchange stations each connected into banks accessible to duplex connectors referred to. $b3$ and $b'3$ are line wipers and a private wiper respectively of a selector located in the exchange at which subscriber's station A3 terminates, $c3$ and $c'3$ and $d3$ and $d'3$ are line wipers and private wipers, respectively of the major connector and interlinked companion connector shown in Figs. 1 and 2 respectively.

Upon the calling station obtaining access to trunk $f3$ extending through selector line wiper pair $b3$ in the well known manner so far as access to trunk $f3$ is concerned, access to telephone L3, which latter station may be conveniently termed station 23, may be obtained by pulling "23" on sending device at calling station A3. The operation of Figs. 1 and 2 will be as follows:—

Upon wipers $b3$ seizing bank contacts from which non-busy line conductors lead to Figs. 1 and 2, relay A1 will become actuated, which action closes ground through its contacts to the winding of relay B1, causing said latter relay to become actuated, closing and opening its contacts for the purpose of holding the preceding selector in its called position. Relay B1 in closing its contacts will also place the vertical magnet in the position to receive the impulses constituting the first digit through the winding of relay C1 from contacts on relay A1. Upon the digit "2" being pulled on the sending device, relay A1 will become deenergized by reason of the circuit being open

through the sending device at the calling station. Upon relay A1 being deenergized as described ground will be extended from its back contact through contacts on relay B1, through contacts on relay H1, through winding of relay C1, thence to the vertical magnet. Relay C1 is of low resistance and as it has a retarded release characteristic will remain in an actuated position while impulses are being transmitted from relay A1. Incidental to the closing of relay C1 ground will be extended from its contacts to private magnet N1, causing the latter magnet to become actuated and remain so during the time relay C1 remains in an actuated position.

Upon all the impulses of the digit "2" being transmitted as described, relay C1 will restore to its normal position, which also causes private magnet N1 to be restored to its normal position. Incidental to the operation of private magnet N1 a mechanical device of well known function as in simple connector switch will be operated for the purpose of stepping the side-switch wipers *x* and *y* into the 2nd position.

The purpose of the above mentioned side-switch is to remove the free pole of battery on wiper *x* from the vertical magnet and connect said free pole to the rotary magnet and also transfer side-switch wiper *y* from an open normal position to winding of relay E1. Upon the next digit "3" being pulled on the sending device, the rotary magnet will be operated in the same manner and through the same contacts as described in the operation of the vertical magnet and the private magnet N1, will permit the side-switch to step into the 3rd position.

The next function is that of signaling the subscriber by means of current from source G1. This current is controlled and projected out upon said called line over wipers b1 in the manner common in well known types of connector switches. Upon the called party responding, the well known functions of cutting off the signaling current ensues.

Should the calling station A3 desire to call station K3; L3 not having answered, station A3 may do so by pulling the number "24" on sending device (the latter number being the bank terminal number of station K3) without replacing receiver on the hook-switch.

Upon the station A3 pulling the digit "2" on the sending device relay A1 will, as before described, close ground through its back contact, through contacts on relay B1, through contacts on relay C1, thence to interlinked connector Fig. 2, through contacts on relay H2, through relay C2, through winding of vertical magnet, thence to free pole of battery on sideswitch. The operation of C2 and relay N2 is similar to that of the relay C1 and the private magnet N1

which has been hereinbefore described. Upon pulling the digit "4" ground will be extended from bank contacts on relay A1, through the various contacts as described above to the winding of relay C2, thence through contacts on relay E2, through winding of rotary magnet, thence to free pole of battery on the sideswitch wiper. Upon the sideswitch wiper stepping into the third position (in the well known manner) major connector Fig. 1 will be restored to normal in the following manner: Ground will be extended from off-normal contacts on connector Fig. 2, through contacts on relay E2, through contacts on relay H2, through contacts on relay L2, through contacts on relay D2, through contacts on relay J2, thence to Fig. 1, through off-normal contacts, through contacts on relay J1, thence to winding of release magnet, thereby actuating the same for the purpose of restoring the shaft of said major connector Fig. 1 to its normal position.

Should station A3 again desire to call L3 the operation would be the same as above described; major connector Fig. 1, being used to connect the calling party and the called station L3. The interlinked connector Fig. 2 releases upon station L3 being connected through bank contacts "23" to calling station A3.

Returning now to the operation of the major connector after connection is made with the called line, when the called subscriber answers current is supplied to the called party serially through relay K1, said relay will become actuated thereby, closing its contacts and thus extending ground to relay J1; also actuating said relay J1 for the purpose of opening and closing contacts carried by said latter relay. Should the called subscriber L3 desire to transfer or pass the incoming call from station L3 to station K3, which latter station may be conveniently termed station 24, the operation would be as follows: Party at station L3 will pull the digit "2" on sending device at said station which will cause relay K1 to become deenergized successively for each impulse during the series constituting the digit "2." Upon the action of relay K1 ground will be extended through its back contact, through contacts on relay J1 to winding of relay P1, thereby causing said relay P1 to become actuated. Said ground from back contact on relay K1 is also extended through said contacts on relay J1, through contacts on relay C1, thence to companion connector Fig. 2, through contacts on relay H2, through winding on relay C2, through winding of vertical magnet, thence to free pole of battery through sideswitch wiper. It will be noted that relay C2 is of low resistance and as it has a retarded release characteristic will be come actuated upon

any impulse or series of impulses constituting a digit being transmitted to the vertical magnet and remains so during the duration of said impulse or said series of impulses. 5
Incidental to the operation of relay C2 ground will be extended from its contacts to the winding of private magnet N2 which magnet becomes actuated and remains so during the time the said series of impulses 10
are being transmitted to the vertical magnet. At the termination of the said series of impulses private magnet N2 will become deenergized, causing a mechanical device, as referred to previously, to step the side- 15
switch into the 2nd position.

Upon the next digit "4" being pulled on the sending device the operation will be the same as just described with the exception that the rotary magnet will be operated by 20
reason of free pole of battery on the side-switch wiper being transferred from the vertical to the rotary magnet. Upon the series of impulses of the digit "4" being transmitted the side-switch will step into 25
the 3rd position, thereby transferring the free pole of battery from the rotary magnet to the winding of relay H2. Ground will also be extended from a wiper of the side-switch to the other terminal of the 30
winding of relay H2, causing the same to become actuated. The further operation of signaling called telephone K3 is as described in connection with Fig. 1.

Upon said called station K3 responding 35
the signaling current will be cut off by means of relay F2 and the line extended through its contacts to the upper and lower winding of relay K2, which relay furnishes transmitter current to the called station telephone 40
K3. Upon the operation of relay K2 ground will be extended to the winding of relay J2, causing the same to become actuated. Incidental to the operation of relay J2 the various circuits involved to transfer the call 45
are placed in a position to do this should the party at called station K3 desire so to do.

The major and interlinked companion connectors, Figs. 1 and 2, respectively, being now connected to called stations L3 and 50
K3, the former having been called by the outside party and then the former having transferred or passed the connection to station K3, station L3 now desires to replace 55
the receiver upon the hookswitch, which action causes the major connector Fig. 1 to restore to its normal position, leaving the interlinked companion connector Fig. 2 connected to station K3. The release of the 60
major connector Fig. 1 is accomplished in the following manner. Upon relay K1 restoring to normal ground will be extended through its back contact through contacts on relay J1, thence to winding of relay P1, 65
which causes said relay P1 to become actu-

ated. Incidental to the operation of relay K1 as just described ground to relay J1 will be disconnected by means of contacts on relay K1. Relay J1 will now be restored to its normal position. Ground will be ex- 70
tended from contacts on relay J1, through winding of relay D1, through contacts on relay P1, through off-normal springs, through contacts on relay J1, thence to winding of release magnet, causing the same to 75
become actuated for the purpose of restoring the shaft to its normal position. It will be noted that the ground which is extended from relay K1, through contacts on relay J1, to the winding of relay P1 was caused 80
to be opened upon the restoring to normal of relay J1, but relay P1 having a retarded release characteristic will remain energized for an appreciable period, giving the re- 85
lease magnet time to operate. It will be noted that relay D1, which has a retarded release characteristic and being in series with the release magnet as described, will also be actuated when ever the release magnet 90
is actuated. The purpose of relay D1 is to release the shaft of Fig. 2 under the following conditions:

Upon Fig. 1 being connected to one of its bank contacts,—for example "23"—extending to station L3 and the said station L3 95
responds and finishes the conversation, then restores the receiver on the hookswitch before the calling party disconnects, it will be noted that relay K1 will have extended ground through its back contact, through 100
contacts on relay J1, thence through back contact on relay C1, through back contact on relay H2, through winding on relay C2, thence to vertical magnet, causing the shaft of Fig. 2 to be stepped off-normal. The said 105
ground from back contact on relay K1 is also extended to the release magnet as previously described. It will be noted that the shaft of Fig. 2 having been stepped off-normal, by 110
reason of receiver of the called station L3 being restored to its hookswitch before the calling party has been disconnected, must be restored and this restoration is accomplished in the following manner:

Ground will be extended from the off- 115
normal springs through contacts on relay E1, through contacts on relay H1, through contacts on relay D1, through off-normal contacts on Fig. 2, through contacts on relay J2, thence to winding of release magnet, 120
causing the latter to become actuated for the purpose of restoring the shaft of said Fig. 2 to its normal position.

The main and auxiliary elements Figs. 1 and 2 being now normal, the sending device 125
on the calling line can be operated to cause the main connector to function in the same manner as in the original connection, and the calling line extended and transferred as before.

The connector Fig. 2 being connected to station K3 places said station K3 in a position to transfer the call to any station accessible to connector Fig. 1, as for instance M3.

In transferring the call to station M3 the functions of Fig. 1 will be the same as when the call was passed by telephone L3 to telephone K3, described hereinbefore.

Station M3 is a main exchange telephone station arranged to also receive service as a private automatic exchange station "22."

The signal device at station M3 is responsive to different character of current than that impressed by connectors, Figs. 1 and 2, being for instance responsive to 66 cycle signaling current from source G3, while the signaling current impressed by the said Figs. 1 and 2 is 33 cycle from sources G1 and G2. To reconcile this condition so that the impressing of the said 33 cycle current by Figs. 1 or 2 upon the conductors leading to said station M3 will cause 66 cycle signalling current to be applied to the signal device at station M3, a signaling current repeater equipment shown to the right of connector bank E3 is introduced. Referring to the latter device, upon the private and line wipers of connector Fig. 1 seizing bank contacts "22", private wiper C'3 will have access to a conductor leading to contact on relay H3 and also private wire to line switch and connector bank contacts corresponding to main exchange station M3. Upon wipers c3 being extended over bank contacts, thence to signaling current repeater, signaling current will cause relay F3 to become actuated for the purpose of connecting ground by means of its contacts to the winding of relay D3, causing the latter relay to become actuated for the purpose of impressing proper signaling current to station M3. Upon the receiver of the called station M3 being removed from hookswitch current will be extended through upper winding of relay H3, through contacts on relay D3, through contacts on relay H3, through telephone at station M3, through contacts on relay H3, through contacts on relay D3, thence to signal current source G3. It will be noted from the above that relay H3 will be caused to become actuated, locking itself through means of its lower winding receiving ground through its contacts. The ringing source in the connector E3 is of the character to which the signal bell at station M3 is responsive, being therefore of the same character as source G3.

Incidental to the operation of relay H3 the signaling current is disassociated from the circuit and the lines of the called station M3 are extended to the connector bank contacts of Figs. 1 and 2 respectively.

Should the subscriber at station K3 have desired to pass the call to station J3 in lieu of to station M3, the operation of Fig. 1

would have been the same as when station M3 was called with the exception that the wipers of Fig. 1 would have been connected to bank contacts No. 25 in the place of No. 22. This would signal J3 direct, and should the subscriber at K3 receive no response the digit "1" would be pulled on sending device at the calling station K3, which action would cause connector Fig. 1 to be restored to its normal position, and is accomplished in the following manner:

Upon the digit "1" being pulled on the sending device of the calling subscriber's telephone at station K3, relay K2 will become deenergized for an instant, thereby extending ground through its back contact through contacts on relay J2 to the winding of relay P2, causing said relay P2 to become actuated, and the latter relay having a retarded release characteristic will be caused to remain actuated for an appreciable time. Upon relay P2 becoming actuated ground will be extended from off-normal contacts through contacts on relay E2, through contacts on relay H2, through contacts on relay P2, through contacts on relay K2, through contacts on relay L2, through off-normal contacts on Fig. 1, through contacts on relay J1, thence to winding of release magnet of connector Fig. 1, which causes said release magnet to become actuated for the purpose of restoring its shaft to the normal position. Had the called number "25" been "busy" the release of connector, Fig. 1, would have been accomplished in the same manner as it was when no response was made, as before described.

Referring to Fig. 4, I have shown a modification of the connections between the inter-linked connector switches of Figs. 1 and 2 whereby the response of the called party to whom the call is passed releases the existing connection to the called party who is passing the call. Assuming the use of these modified connections and also assuming that station L3 has passed the call to station K3 by means of connector Fig. 2 as previously described. Upon station K3 removing receiver from switchhook in responding relay K2 will become actuated closing ground through its contacts, through contacts on relay J1, thence to winding of release magnet, causing the latter to be actuated to the purpose of releasing the shaft to normal and disconnecting station L3, thereby making the conversation to station K3 secret. If station K3 were to pass the call to station J3 said station K3 would be disconnected upon station J3 responding, in the same manner as just described. I prefer to employ the conductors represented in this modification so the character of service as relates to secrecy of passed calls may be readily changed after installation to suit individual requirements.

There are many possible modifications and

adaptations of my invention; the adaptation set forth being by way of illustration only.

The term "progressive" as used herein is intended to qualify a switch or switch-mechanism having a mechanically movable member which is operated by a plurality of individual step impulses imparted thereto. It also comprehends a switch mechanism involving a plurality of relays which are successively operated responsive to directive impulse periods to selectively connect, for instance, a line to one of a plurality of different extensions.

I claim:—

1. In a telephone system, a calling station, a line from said station to a connector involving independently operative elements, a first called line and station thereon accessible to said connector, a second called line and station thereon accessible to said connector, a sending means at said calling station for controlling a master relay in said connector, said relay in turn adapted to control the mechanical movements of a first element of said connector to the end of selecting said first called line, automatic switching means in said connector for transferring the master relay control from said first element to a second element of said connector upon said first line having been selected, said second element thereupon becoming responsive to said sending means to the end of extending the connection to said second called line.

2. In a telephone system, a calling station, a line from said station to a connector involving independently operative elements, a first called line accessible to said connector, a second called line accessible to said connector, sending means at said calling station for controlling a master relay in said connector, the latter in turn adapted to control the mechanical movements of a first element of said connector to the end of selecting said first called line, automatic switching means in said connector for transferring the master relay control from said first element to a second element of said connector upon said first line having been selected, said second element becoming responsive to said sending means to the end of extending the connection to said second called line, and means made operative for restoring said first element to normal position upon said second element selecting said second called line.

3. In a telephone system, a calling station, a line from said station to a connector involving independently operative elements, a first called line and station thereon accessible to said connector, a second called line accessible to said connector, sending means at said calling and said first called stations, a master relay in said connector normally controllable by said calling station, the said

master relay in turn adapted to control the mechanical movements of a first element of said connector to the end of selecting said first called line, automatic switching means in said connector for transferring the master relay control from said first element to a second element of said connector upon said first line having been selected, said second element thereupon becoming responsive to said sending means at said calling station, and also said sending means at said first called station, if said first called line is seized, to the end of extending the connection to said second called line.

4. In a telephone system, a calling station, a line from said station to a connector involving independently operative elements, a first called line and station thereon accessible to said connector, a second called line accessible to said connector, sending means at said calling and said first called stations, a master relay in said connector normally controllable by said calling station, the said master relay in turn adapted to control the mechanical movements of a first element of said connector to the end of selecting said first called line, automatic switching means in said connector for transferring the master relay control from said first element to a second element of said connector upon said first line having been selected, said second element thereupon becoming responsive to said sending means at said calling station and also said sending means at said called station if said first called line is seized, to the end of extending the connection to said second called line, said first element restoring to normal position upon said second element selecting said second called line, when controlled by said calling station, and upon the called line being seized by said second element if controlled by said first called station.

5. In a telephone system, a calling station, a line from said station to a connector involving independently operative elements, a first called line and station thereon accessible to said connector, a second called line and station thereon accessible to said connector, sending means at said calling and said called stations, a master relay in said connector normally controllable by said calling station, the said master relay in turn adapted to control the mechanical movements of a first element of said connector to the end of selecting said first called line, an auxiliary relay adapted to impress signaling current on said called line and cut off said current upon response of said first called station thereon, automatic switching means in said connector for transferring the master relay control from said first element to said second element upon said first line having been selected, said second element thereupon becoming re-

sponsive to said sending means at said calling station and also said sending means at said first called station, to the end of extending the connection to said second called line and signal upon said second called line from a second auxiliary relay adapted to cut off the signaling current projected therefrom upon the response of said second called station, and means for automatically releasing said first element upon said second element obtaining selective connection with said second called line, if controlled by the calling station, and adapted to be similarly released only upon seizing said second called line and thereafter obtaining a response from the second called station thereon, if controlled by said first called station.

6. In a telephone system, a telephone line, two branches extending from said line, first, second and third signaling current sources, a relay connected to a first said branch responsive to the first source applied to the first said branch for applying the second source to the line, means for applying the third source to the line through a second said branch, a signal device connected to the line selectively responsive to the second and third sources applied to it over the line, but non-responsive to the first source, and means controlled from the line to disconnect the first source of signaling current.

7. In a telephone system, a telephone line, two branches extending from said line, first, second and third signaling current sources, a relay connected to a first said branch responsive to the first source applied to the first said branch for applying the second source to the line, means for applying the third source to the line through a second said branch, a signal device connected to the line responsive to the second source applied to it over the line, but non-responsive to the first source, and means controlled from the line to disconnect the second source of signaling current.

8. In a telephone system, a telephone line, two branches extending from said line, first, second and third signaling current sources, a relay connected to a first said branch responsive to the first source applied to the first said branch for applying the second source to the line, means for applying the third source to the line through a second said branch, a signal device connected to the line responsive to the second source applied to it over the line, but non-responsive to the first source, means including a relay energized in series with the line for disconnecting the first source from the line and for disconnecting the said relays from operative relation with the line.

9. In a telephone system, a telephone line, first and second sources of signaling current, a signal device associated with the line, a relay connected to the line, to apply the

second source to the line to operate the signal device, means for applying the first source to the line to operate the relay, a second relay for disconnecting the first source from the first said relay, and means including the second relay energized in series with the line for disconnecting the second source from the line and for disconnecting the said relays from operative relation with the line.

10. In a telephone system, a calling station, a line from said station to a connector involving independently operative elements, a first called line and station thereon accessible to said connector, a second called line and station thereon accessible to said connector, sending means at said calling and said first called stations, a master relay in said connector normally controllable by said calling station, the said master relay in turn adapted to control the mechanical movements of a first element of said connector to the end of selecting said first called line, an auxiliary relay in said connector automatically controlled for transferring the master relay control from said first element to said second element upon said first called line having been selected, the said connector thereupon becoming responsive to said sending means at said first called station to the end of including the said second called line into the talking conductors of the connector.

11. In a telephone system, a calling station, a line from said station to a connector involving independently operative elements, a first called line and station thereon accessible to said connector, a second called line and station thereon accessible to said connector, sending means at said calling and said first called stations, a master relay in said connector normally controlled by said calling station, the said master relay in turn adapted to control the mechanical movements of a first element of said connector to the end of selecting said first called line, automatic switching means in said connector for transferring the master relay control from said first element to said second element upon said first line having been selected, said second element thereupon becoming responsive to said first called station, means in the connector controlled from the sending means at the said first called station for introducing the said second called line into the connection, and means made effective consequent to a response at the said second called station for disconnecting the said first called line.

12. In a telephone system, main and auxiliary switches permanently connected in pairs, means whereby a calling subscriber can operate one of said main switches to connect with a called line, and means whereby the subscriber on the called line can op-

erate the associated auxiliary switch to transfer the call to a second called line.

13. In a telephone system, main and auxiliary switches permanently connected in pairs, means whereby a calling subscriber can operate one of said main switches to connect with a called line, means whereby the subscriber on the called line can operate the associated auxiliary switch to transfer the call to a second called line, and automatic means for releasing the operated main switch upon the response of the second subscriber.

14. In a telephone system, main and auxiliary switches permanently connected in pairs, means whereby a calling subscriber can operate one of said main switches to connect with a called line, means whereby the subscriber on the called line can operate the associated auxiliary switch to transfer the call to a second called line, and means for releasing said main switch controlled by the subscriber on the line first called.

15. In a telephone system, a trunk line, a pair of automatic switches, means for operating one of said switches over the said trunk line to connect with a called telephone line, and connections between the said switches whereby the second switch may be operated over the connected called line to establish connection with a second called line.

16. In a telephone system, a trunk line, a pair of automatic switches, means for operating one of said switches over the said trunk line to connect with a called telephone line, connections between the said switches whereby the second switch may be operated over the connected called line to establish connection with a second called line, and means for releasing the said first switch automatically when the subscriber answers on the said second line.

17. In a telephone system, a trunk line, a pair of automatic switches, means for operating one of said switches over the said trunk line to connect with a called telephone line, connections between the said switches whereby the second switch may be operated over the connected called line to establish connection with a second called line, and means controlled by the subscriber on the second line for releasing said first switch.

18. In a telephone system, a trunk line, a pair of automatic switches, means for operating one of said switches over the said trunk line to connect with a called telephone line, connections between the said switches whereby the second switch may be operated over the connected called line to establish connection with a second called line, and means controlled by the subscriber on the line first called for releasing said first switch.

19. In a telephone system, telephone lines, a pair of automatic switches for connecting

with said lines, means for operating one of said switches to connect with a called one of said lines, and means for thereafter operating and releasing said switches alternately under the control of the subscribers on the successively called lines.

20. In a telephone system, main and auxiliary connectors having access to subscribers' lines, means for completing a connection to a called subscriber's line with said main connector, means for transferring the call to a second called line with said auxiliary connector and means for then releasing said main connector while said auxiliary connector is still maintained in connection with the said second called line.

21. In a telephone system, subscribers' lines, automatic switching mechanism, means for operating said switching mechanism over two sides of a calling one of said lines in series to complete a connection to a called one of said subscribers' lines, and means operative thereafter to cause said switching mechanism to establish a connection with a second called subscriber's line while said first established connection is still maintained, and means on the second said called line for disconnecting the first said called line from the calling line.

22. In a telephone system, subscribers' lines, automatic switching mechanism, means for operating said switching mechanism to complete a connection to a called one of said subscribers' lines and thereafter to cause said switching mechanism to establish a connection with a second called subscriber's line while said first established connection is still maintained, and means made operative consequent to a response on the second called line for disconnecting the first called line.

23. In a telephone system, calling and called subscribers' lines, automatic switching mechanism, means whereby a calling subscriber may operate the said switching mechanism to establish a connection with one of said called subscribers' lines and then complete a second connection to another subscriber's line while said first established connection is still maintained, and means whereby the calling line can be released from the connection leaving the called lines connected.

24. In a telephone system, calling and called subscribers' lines, automatic switching mechanism, means whereby a calling subscriber may operate the said switching mechanism to establish a connection with one of said called subscriber's lines and then complete a second connection to another subscriber's line while said first established connection is still maintained, and means made operative when the second connection is completed for releasing said first established connection to the first called line.

25. In a telephone system, calling and

called subscribers' lines, automatic switching mechanism, means whereby a calling subscriber may operate said switching mechanism to establish connection with one of said called subscriber's lines, and means then operative whereby said called subscriber may operate said switching mechanism over a portion of said first extended connection to establish a connection with a second called subscriber's line.

26. In a telephone system, calling and called subscribers' lines, automatic switching mechanism, means whereby a calling subscriber may operate said switching mechanism to establish connection with one of said called subscriber's lines, and means then operative whereby said called subscriber may operate said switching mechanism over a portion of said first extended connection to establish a connection with a second called subscriber's line, and means for releasing said first established connection when said last connection is completed.

27. In a telephone system, subscribers' lines, automatic switching mechanism, means for operating said switching mechanism to complete a connection to a called one of said subscribers' lines and thereafter to cause said switching mechanism to establish a connection with a second called subscriber's line while said first established connection is still maintained, and means made operative when the second connection is completed for releasing said first established connection by the said first called party replacing his receiver upon the switchhook.

28. In a telephone system, calling and called subscribers' lines, automatic switching mechanism, means whereby a calling subscriber may operate the said switching mechanism to establish a connection with one of said called subscribers' lines and then complete a second connection to another subscriber's line while said first established connection is still maintained, and means made operative when the second connection is completed for releasing said first established connection by the said first called party replacing his receiver upon the switchhook.

29. In a telephone system, calling and called subscribers' lines, automatic switching mechanism, means whereby a calling subscriber may operate said switching mechanism to establish connection with one of said called subscribers' lines, and means then operative whereby said called subscriber may operate said switching mechanism over a portion of said first extended connection to establish a connection with a second called subscriber's line, and means for releasing said first established connection when said last connection is completed by the said first called party replacing his receiver upon the switchhook.

30. In a telephone system, subscribers' lines, automatic switching mechanism, means for operating said switching mechanism over two sides of the line in series to complete a connection to a called one of said subscribers' lines and thereafter to cause the said switching mechanism to establish a connection with a second called subscriber's line while said first established connection is still maintained, and means made operative when the second connection is completed for releasing said first established connection.

31. In a telephone system, subscribers' lines, automatic switching mechanism, means for operating said switching mechanism to complete a connection to a called one of said subscribers' lines and thereafter to cause said switching mechanism to establish a connection with a second called subscriber's line while said first established connection is still maintained, and means made operative when the second connection is completed for releasing said first established connection by the second called party removing his receiver from the switchhook.

32. In a telephone system, calling and called subscribers' lines, automatic switching mechanism, means whereby a calling subscriber may operate the said switching mechanism to establish a connection with one of said called subscriber's lines and then complete a second connection to another subscriber's line while said first established connection is still maintained, and means made operative when the second connection is completed for releasing said first established connection by the second called party removing his receiver from the switch hook.

33. In a telephone system, calling and called subscribers' lines, automatic switching mechanism, means whereby a calling subscriber may operate said switching mechanism to establish connection with one of said called subscriber's lines, and means then operative whereby said called subscriber may operate said switching mechanism over a portion of said first extended connection to establish a connection with a second called subscriber's line, and means for releasing said first established connection when said last connection is completed by the second called party removing his receiver from the switchhook.

34. In a telephone system, calling and called subscribers' lines, interlinked connector switches, a calling device under control of a subscriber on one of said calling lines for operating one of said connector switches over two sides of the line in series to complete a connection to one of said called subscriber's lines, and means responsive to the first subsequent operation of said device to cause the second of said connector switches to establish connection in the direction of

second called subscriber's line while said first established connection is still maintained.

35. In a telephone system, calling and 5 called subscribers' lines, interlinked connector switches, a calling device whereby a calling subscriber may operate one of said interlinked connectors to establish connection with one of said called subscriber's lines and 10 means responsive to the first subsequent operation of said device to operate the other of said interlinked connector switches to complete a connection in the direction of second called subscriber's line while said first established connection is still maintained. 15

36. In a telephone system, calling and called subscribers' lines, a pair of interlinked connector switches, means whereby a calling subscriber may operate one of said interlinked connectors to establish connection with one of said called lines, and means then operative whereby the said called subscriber may operate the other of said interlinked connector switches over a portion of said 20 first extended connection to establish a connection with a second called subscriber. 25

37. In a telephone system, calling and called subscribers' lines, a pair of interlinked connector switches, means whereby a calling subscriber may operate one of said interlinked connectors to establish connection with one of said called lines, and means then operative whereby the said called subscriber may operate the other of said interlinked connector switches over a portion of said 30 first extended connection to establish a connection with a second called subscriber, and means for releasing said first interlinked connector switch when said last connection is completed. 40

38. In a telephone system, calling and called subscribers' lines, a pair of interlinked connector switches, means whereby a calling subscriber may operate one of said interlinked connector switches to establish connection with one of said called subscriber's lines, and means then operative whereby either the said calling or called subscriber may operate the other of said connector switches to establish connection with a second called subscriber's line. 50

39. In a telephone system, a pair of automatic connector switches, a line, called lines, a line relay for said switches, means for first operating said line relay over said line to connect one of said switches with one of said called lines, and means for then operating said relay over said line to cause the other of said connector switches to connect with another called line while said first connection is still maintained. 60

40. In a telephone system, a pair of automatic connector switches, a line, called lines, a line relay for said switches, means whereby a calling subscriber may operate said 65

line relay over said line to connect one of said switches with one of said called lines, and thereafter operate said line relay to cause the other of said connector switches to connect with another called line while said first connection is still maintained. 70

41. In a telephone system, a pair of automatic connector switches, a line, called lines, a line relay permanently connected to said switches, means whereby a calling subscriber may operate said line relay over the said line to connect one of said switches to one of said called lines, and means operative thereafter whereby the subscriber on the said called line may operate said second connector switch to complete a connection to a second called line. 80

42. In a telephone system, a pair of automatic connector switches, a line, called lines, a line relay permanently connected to said switches, means for first operating said line relay over said line to connect one of said switches with one of said called lines, a controlling relay in the said switch then operative to cause said line relay in response to impulses to operate said second connector switch to complete a connection to a second called subscriber's line. 90

43. In a telephone system, a pair of automatic connector switches, a line, called lines, a line relay permanently connected to said switches, means whereby a calling subscriber may operate said line relay over said line to connect one of said switches with one of said called lines, and thereafter operate said line relay to cause the other of said connector switches to connect with another called line. 100

44. In a telephone system, a pair of automatic connector switches, a line, called lines, a line relay for said switches, means for first operating said line relay over said line to connect one of said switches with one of said called lines, and means for then operating said relay to cause the other of said connector switches to connect with another called line, and means made operative when the second connection is completed for releasing said first established connection. 110

45. In a telephone system, a pair of automatic connector switches, a line, called lines, a line relay for said switches, means whereby a calling subscriber may operate said line relay over the said line to connect one of said switches to one of said called lines, and means operative thereafter whereby the subscriber on the said called line may operate said second connector switch to complete a connection to a second called line, and means whereby the first called subscriber may release the first established connection upon replacing his receiver on the switchhook. 115

46. In a telephone system, a pair of automatic connector switches, a line, called lines, 120 125 130

a line relay for said switches, means for first operating said line relay over said line to connect one of said switches with one of said called lines; a controlling relay in the said switch then operative to cause said line relay in response to impulses to operate said second connector switch to complete a connection to a second called subscriber's line, and means whereby the first called subscriber may release the first established connection upon replacing his receiver on the switchhook.

47. In a telephone system, a pair of automatic connector switches, a line, called lines, a line relay for said switches, means whereby a calling subscriber may operate said line relay over the said line to connect one of said switches to one of said called lines, and means operative thereafter whereby the subscriber on the said called line may operate said second connector switch to complete a connection to a second called line, and means whereby the second called subscriber may release the first established connection upon removing his receiver from the switchhook.

48. In a telephone system, a pair of automatic connector switches, a line, called lines, a line relay permanently connected to said switches, means for first operating said line relay over said line to connect one of said switches with one of said called lines, means whereby a subscriber on said called line may operate the other of said connector switches over a portion of the said first extended connection to complete a connection to a second called line.

49. In a telephone system, a pair of automatic connector switches, a line, called lines, a line relay for said switches, means for first operating said line relay over said line to connect one of said switches with one of said called lines, means whereby a subscriber on said called line may operate the other of said connector switches over a portion of the said first extended connection to complete a connection to a second called line, and means made operative when the second connection is completed for releasing said first established connection.

50. In a telephone system, a pair of automatic connector switches, a line, called lines, a line relay for said switches, means for first operating said line relay over said line to connect one of said switches with one of said called lines, means whereby a subscriber on said called line may operate the other of said connector switches over a portion of the said first extended connection to complete a connection to a second called line, and means operated when the first called party replaces his receiver upon the switchhook for releasing said first established connection.

51. In a telephone system, a pair of auto-

matic connector switches, a line, called lines, a line relay for said switches, means for first operating said line relay over said line to connect one of said switches with one of said called lines, means whereby a subscriber on said called line may operate the other of said connector switches over a portion of the said first extended connection to complete a connection to a second called line, and means operated when the second called party removes his receiver from the switchhook for releasing said first established connection.

52. In a telephone system, a pair of automatic connector switches, a line, called lines, a line relay for said switches, means for first operating said line relay over said line to connect one of said switches with one of said called lines, and means for then operating said relay to cause the other of said connector switches to connect with another called line while said first connection is still maintained, and means operated upon the first called party replacing his receiver upon the switchhook for releasing said first established connection.

53. In a telephone system, a pair of automatic connector switches, a line, called lines, a line relay for said switches, means whereby a calling subscriber may operate said line relay over said line to connect one of said switches with one of said called lines, and means whereby either the calling subscriber may then operate the said line relay to cause the other of said connector switches to connect with another called line while said first connection is still maintained, or the said called subscriber may operate the said second connector switch to connect to the said second called subscriber's line, and means operated upon the first called party replacing his receiver upon the switchhook for releasing said first established connection.

54. In a telephone system, a pair of automatic connector switches, a line, called lines, a line relay for said switches, means for first operating said line relay over said line to connect one of said switches with one of said called lines, and means for then operating said relay to cause the other of said connector switches to connect with another called line while said first connection is still maintained, and means operated upon the second called party removing his receiver from the switchhook for releasing said first established connection.

55. In a telephone system, a pair of automatic connector switches, a line, called lines, a line relay for said switches, means whereby a calling subscriber may operate said line relay over said line to connect one of said switches with one of said called lines, and thereafter operate said line relay to cause the other of said connector switches to connect with another called line, and means operated upon the first called party replacing

his receiver upon the switchhook for releasing said first established connection.

56. In a telephone system, a pair of automatic connector switches, a line, called lines, a line relay for said switches, means whereby a calling subscriber may operate said line relay over said line to connect one of said switches with one of said called lines, and thereafter operate said line relay to cause the other of said connector switches to connect with another called line, and means operated upon the second called party removing his receiver from the switchhook for releasing said first established connection.

57. In an automatic telephone system, means whereby the subscriber on a called line can extend the connection to a second called line, and means for disconnecting the first called line and leaving the calling line and the second called line connected together.

58. In a telephone system, automatic switches for connecting a calling and called line, and means for extending the connection to other called lines either from the originally called line or a subsequently called line a plurality of times without at any time leaving more than three lines connected together.

59. In an automatic telephone system, means controlled by a calling subscriber for connecting with a called line, means whereby the called subscriber can extend the connection to a second called line, and means whereby the subscriber first called can disconnect without disturbing the extended connection.

60. In a telephone system, automatic switches for connecting calling and called lines, means whereby the subscriber on a called line can operate one of said switches to extend the connection to a second called line, and means whereby the subscriber first called can disconnect without disturbing the extended connection.

61. In a telephone system, automatic switches for connecting calling and called lines, means whereby the subscriber on a called line can extend a connection from the calling line to a second called line, and means for disconnecting the line first called from the calling line without releasing the extended connection.

62. A telephone system including telephone lines, and automatic apparatus for connecting a calling one of said lines to a called line and then operative to transfer the call from one called line to another indefinitely and release the antecedent called line after each transfer.

63. A telephone system including telephone lines, automatic apparatus for connecting a calling one of said lines to a called line and then operative to transfer the call

from one called line to another called line, said apparatus being controllable over the calling line, and means controlled from the antecedent called line whereby the last called line may be released from the connection if the call thereto is unanswered.

64. A telephone system including telephone lines, automatic apparatus for connecting a calling one of said lines to a called line and then operative to transfer the call from one called line to another called line, said apparatus being controllable over the calling line, and means controlled from the antecedent called line whereby the last called line may be released from the connection if the call thereto is unanswered without releasing said antecedent called line.

65. A telephone system including telephone lines, automatic apparatus for connecting a calling one of said lines to a called line and then operative to transfer the call from one called line to another called line, said apparatus being controllable over the calling line, and means controlled from the antecedent called line whereby the last called line may be released from the connection if the said last called line is busy.

66. A telephone system including telephone lines, automatic apparatus for connecting a calling one of said lines to a called line and then operative to transfer the call from one called line to another called line, said apparatus being controllable over the calling line, and means controlled from the antecedent called line whereby the last called line may be released from the connection if the said last called line is busy without releasing said antecedent called line.

67. A telephone system including telephone lines having calling devices connected thereto, automatic apparatus responsive to said calling devices for connecting calling ones of said lines to called lines and then operative to transfer the calls from one called line to another called line, and means responsive to the calling device at the antecedent called line whereby the apparatus may be disconnected from said last called line if busy.

68. A telephone system including telephone lines having calling devices connected thereto, automatic apparatus responsive to said calling devices for connecting calling ones of said lines to called lines and then operative to transfer the calls from one called line to another called line, and means responsive to the calling device at the antecedent called line whereby the apparatus may be disconnected from said last called line if the call thereto is unanswered.

69. A telephone system including telephone lines having calling devices connected thereto, automatic apparatus responsive to said calling devices for connecting calling ones of said lines to called lines and then op-

erative to transfer the calls from one called line to another called line, and to prevent the calling impulses from being transmitted back over the calling line when a call is being transferred

70. In a telephone system, automatic switches for connecting a calling and a called line, means for extending the first connection to other called lines a plurality of times, each extension being controlled from the last called lines, without at any time leaving more than three lines connected together.

71. In a telephone system, subscribers' lines, automatic switching mechanism, means for operating said switching mechanism over two sides of a calling one of said lines in series to complete a connection to a called one of said subscribers' lines, means operative thereafter to cause said switching mechanism to establish a connection with a second called subscriber's line while said first established connection is still maintained, and directive controlled means for releasing solely said first established connection after the establishment of said second connection.

72. In a telephone system, subscribers' lines, automatic switching mechanism, means for operating said switching mechanism over two sides of a calling one of said lines in series to complete a connection to a called one of said subscribers' lines, means operative thereafter to cause said switching mechanism to establish a connection with a second called subscriber's line while said first established connection is still maintained, and means controlled from the first called line for releasing said first established connection upon the establishment of said second connection.

73. In a telephone system, calling and called subscribers' lines, automatic switching mechanism, means whereby a calling subscriber may operate the said switching mechanism over two sides of the calling line in series to establish a connection with one of said called subscribers' lines and then complete a second connection to another subscriber's line while said first established connection is still maintained, and means for releasing the first operated switching mechanism while maintaining the second connection.

74. A telephone system including telephone lines, automatic apparatus for connecting a calling one of said lines to a called line and then operative to successively transfer the call from one called line to another called line but release the antecedent called line, and means controlled from the antecedent called line over two sides thereof in series whereby the last called line may be released from the connection if the said last called line is busy.

75. A telephone system including telephone lines, automatic apparatus for con-

necting a calling one of said lines to a called line and then operative to successively transfer the call from one called line to another called line but release the antecedent called line, and means controlled from the antecedent called lines over two sides thereof in series whereby the last called line may be released from the connection if the said last called line is busy without releasing said antecedent called line.

76. In a telephone system, telephone lines, a directive controlled automatic switch for extending a connection to a called one of said lines, another automatic switch individual to said first switch, and means effective without any preliminary directive operation for operating said other switch to extend the connection from said first switch to a second called one of said lines.

77. In a telephone system, telephone lines, a directive controlled automatic switch for extending a connection to a called one of said lines, another automatic switch individual to said first switch, and means effective without any preliminary directive operation for operating said other switch from the calling line to extend the connection from said first switch to a second called one of said lines.

78. In a telephone system, telephone lines, a directive controlled automatic switch for extending a connection to a called one of said lines, another automatic switch individual to said first switch, and means for operating said other switch from the calling or called line to extend the connection from said first switch to a second called one of said lines.

79. In a telephone system, telephone lines, a directive controlled automatic switch for extending a connection to a called one of said lines, another automatic switch individual to said first switch, and means for operating said other switch from the said first called line to extend the connection from said first switch to a second called one of said lines.

80. In a telephone system, a first automatic switch for extending a connection to a first called line, a second automatic switch controlled from the first called line for then extending the connection to a second called line, a release circuit for said first automatic switch, and a relay in said second automatic switch for controlling said release circuit.

81. In a telephone system, a first automatic switch for extending a connection to a first called line, a second automatic switch controlled from the first called line for then extending the connection to a second called line, a release circuit for said first automatic switch, a relay in said second automatic switch for controlling said release circuit, and a circuit for said relay controlled from said second called line.

82. In a telephone system, a calling line, called lines, automatic switches directly controlled from said calling line for extending a connection to one of said called lines, means under the control of the subscriber on the said called line for extending the connection to include a second one of said called lines, and means controlled from said calling line for releasing said last established connection.

83. In a telephone system, a calling line, called lines, automatic switches directly controlled from said calling line for extending a connection to one of said called lines, means controlled over a part of said extended connection for then extending the connection to include a second one of said called lines, and means controlled from said calling line or from a called line for releasing both of said established connections.

84. In a telephone system, a calling line, called lines, a pair of automatic switches, means controlled from said calling line for operating one switch of said pair to extend a connection to one of said called lines, means effective without any preliminary directive operation for then operating the other switch of said pair into connection with another of said called lines, and means controlled from said calling line for releasing either of said connections before or after they are completed.

85. In a telephone system, a calling line, called lines, a pair of automatic switches, means controlled from said calling line for operating one switch of said pair into connection with one of said called lines, means controlled from said called line for operating the other switch of said pair to extend a connection to a second called line, and means controlled from said calling line for releasing the extended connection to said second called line during its establishment.

86. In a telephone system, calling lines, called lines, calling devices on the said called lines, a pair of automatic switches, means controlled from said calling line for operating one switch of said pair into connection with one of said called lines, means controlled by the calling device on the said called line for then operating the other switch of said pair into connection with another of said called lines, and a relay energized to prevent the calling impulses from being transmitted back over the calling line when the second connection is being established.

87. In a telephone system, calling lines, called lines, calling devices on the said called lines, a pair of automatic switches, means controlled from said calling line for operating one switch of said pair into connection with one of said called lines, means controlled by the calling device on the said called line for then operating the other

switch of said pair into connection with another of said called lines, a relay energized to prevent the calling impulses from being transmitted back over the calling line when the second connection is being established, and a locking circuit for said relay opened upon said second connection being established.

88. In a telephone system, a pair of automatic switches, called lines accessible thereto, means for operating one switch of said pair into connection with one of said called lines, means under the control of the subscriber on said called lines for releasing said operated automatic switch, said means operative to operate the other switch of said pair, a release circuit for said other switch, and a relay energized when said first switch is released for closing said release circuit.

89. In a telephone system, a pair of automatic switches, called lines accessible thereto, means for operating one switch of said pair into connection with one of said called lines, means for operating the other switch of said pair into connection with another of said called lines, and means controlled from said first called line for releasing both switches of said pair.

90. In a telephone system, a calling line, called lines, means for establishing a connection between said calling and one of said called lines, means for then extending the connection to include another of said called lines, and means controlled from said first called line for releasing the connection to both of said called lines.

91. In a telephone system, a pair of automatic switches, called lines accessible thereto, magnets for operating one switch of said pair into connection with one of said called lines, operating magnets for the other switch of said pair, a circuit for the magnets of said first switch, said circuit having a multiple extending to the magnets of said other switch, a relay operated in said first mentioned circuit, and means controlled by said relay for opening said multiple circuit.

92. In a telephone system, a pair of automatic switches, called lines accessible thereto, means for operating one switch of said pair into connection with one of said called lines, means for then operating the other switch of said pair into connection with another of said called lines, means for producing long and short interruptions in the first called line, means responsive to a short interruption in the said first called line for releasing the second switch of said pair and means responsive to a long interruption in said first called line for releasing the first switch of said pair.

93. In a telephone system, calling and called lines, means for connecting one of

said calling lines with one of said called lines, automatic means for then extending the connection to include another of said called lines, means for producing long and short interruptions in the first called line, means responsive to a short interruption to release said last established connection, and means responsive to a long interruption for releasing the said first established connection.

94. In a telephone system, calling and called lines, means for establishing a connection between one of said calling and called lines, means for then extending the connection to include another of said called lines, means for producing short interruptions in said first called line and means responsive to such short interruptions for releasing said last established connection.

95. In a telephone system, a calling line, a pair of automatic switches, called lines, means controlled from said calling line for operating one switch of said pair to extend a connection to one of said called lines, means for producing short directive calling interruptions in said calling line, the other switch of said pair being responsive to such interruptions without any preliminary directive switch operation for establishing a connection with another of said called lines, and means then operative for releasing the first switch of said pair.

96. In a telephone system comprising main and branch exchanges and an interconnecting trunk line, a connector switch at the end of the trunk line for completing main to branch exchange connections, a circuit for operating said connector including the two sides of said trunk line in series, and means for releasing said connector from any called station while holding the trunking connection in order to permit a subsequent operation of the same to transfer the call to another station.

97. In a telephone system, a series of selector switches, a final connector accessible to the last of said selectors, means for operating said switches over the two sides of a calling line in series to set up a telephone connection between a calling and a called line, means thereafter controlled over the calling line for releasing said connector while retaining all of said selectors in operated position, and means for reoperating said connector over the calling line to set up a new connection.

98. In a telephone system, a series of selector switches, a final connector accessible to the last of said selectors, means for operating said switches over the two sides of a calling line in series to set up a telephone connection, means for releasing said connection while retaining all of said selectors in operated position, said releasing means controlled by the subscriber on the calling line

or on the line called, and means for reoperating said connector over the calling line to set up a new connection.

99. In a telephone system, a calling and called lines, an automatic switch mechanism directly controlled from the calling line for effecting a connection from the calling to a called one of said lines and for connecting the switch subject to directive control of means on the called line whereby a second called line can be introduced into the connection.

100. In a telephone system, a leading-in and called lines, an automatic switch mechanism directly controlled from the said leading-in line for effecting a connection from the leading-in to a called one of said lines and for connecting the switch subject to directive control of means on the called line whereby a second called line can be connected to the leading-in line.

101. In a telephone system, telephone stations, means controlled at a calling station for extending a telephonic connection over a trunk line to a called station, means for connecting ringing current controlled at the calling station for signalling the called station, and means including a directive controlled progressively movable switch permanently related to said trunk line located at a point intermediate of the telephones which is controlled by the called telephone for extending the connection to a third telephone over a branch from an intermediate point of the first established connection.

102. In a telephone system, telephone stations, means controlled at a calling station for extending a telephonic connection over a trunk line to a called station, means for connecting ringing current to signal the called station, and means including a directive controlled progressively movable switch permanently related to said trunk line located at a point intermediate of the telephones which is controlled by the called telephone for extending the connection to a third telephone over a branch from an intermediate point of the first established connection.

103. In a telephone system, telephone stations, means controlled at a calling station for extending a telephonic connection over a trunk line to a called station, means for connecting ringing current controlled at the calling station for signalling the called station, and means including a progressively movable switch permanently related to said trunk line included in a circuit branching off from an intermediate point of said telephonic connection and directly operated from either telephone for extending the connection to a second called one of a plurality of accessible telephones.

104. In a telephone system, telephone stations, means controlled at a calling station

for extending a telephonic connection over a trunk line to a called station, means for connecting ringing current for signalling the called station, and means including a progressively movable switch permanently related to said trunk line included in a circuit branching off from an intermediate point of said telephonic connection and directly operated from either telephone for extending the connection to a second called one of a plurality of accessible telephones.

105. In a telephone system a calling and a called telephone, a means controlled from the calling telephone for directly selecting and signalling a particular called telephone, means for completing a talking circuit between the said telephones, and means including a directly controlled progressively movable switch temporarily related to the called telephone located at a point intermediate of the telephones which is controlled by the called telephone for extending the connection to a third telephone over a branch from an intermediate point of the first established connection.

106. In a telephone system, telephone stations, means controlled at a calling station for extending a telephonic connection over a trunk line to a predetermined called one of a plurality of accessible telephones, and means including a progressive switch included in a circuit branching off from an intermediate point of said telephonic connection permanently related to said trunk line and directly operated from the called telephone for extending the connection to a second called one of a plurality of telephones selectively accessible to said switch.

107. In a telephone system, telephone stations, means controlled at a calling station for extending a telephonic connection over a trunk line to a predetermined called one of a plurality of accessible telephones, and means including a switch included in a circuit branching off from an intermediate point of said telephonic connection permanently related to said trunk line and directly operated from either telephone for extending the connection to a second called one of a plurality of accessible telephones selectively accessible to said switch.

108. In a telephone system, a calling and a called telephone, means controlled from the calling telephone for directly selecting and signalling a particular called telephone over a trunk line, means for completing a talking circuit between the said telephones, and means including a directly controlled progressive switching mechanism permanently related to said trunk line located at a point intermediate to the telephones which is controlled by the called telephone for extending the connection to a

third telephone over a branch from the first established connection.

109. In a telephone system, telephone lines, means including a dual switch controlled from a calling one of said lines for establishing a connection with a called one of said lines, and means controlled from said called line for then operating said dual switch to extend the connection to a second called one of said lines.

110. In a telephone system, telephone lines, automatic switching mechanism directly controlled from a calling one of said lines for establishing a connection with a called one of said lines, and other automatic mechanism associated with the called line by the establishment of said first connection controlled from said called line for then extending the connection to a second called one of said lines.

111. In a telephone system, subscribers' lines, automatic switching mechanism, means for operating said switching mechanism to complete a connection to a called one of said subscriber's lines and thereafter to cause said switching mechanism to establish a connection with a second called subscriber's line while said first established connection is still maintained, and means made operative when the second connection is completed and a response is obtained for releasing said first established connection.

112. In a telephone system, subscribers' lines, automatic switching mechanism, means for operating said switching mechanism over two sides of a calling one of said lines in series to complete a connection to a called one of said subscribers' lines, and means operative thereafter to cause said switching mechanism to establish a connection with a second called subscriber's line and release the antecedent established connection upon the response of the last called line while said first called line is still maintained.

113. In a telephone system, telephone lines, a series of automatic switches operative to extend a connection from a calling to a called one of said lines, and means under the directive control of the subscriber on the said calling line for releasing only the last switch of said series while maintaining the remaining parts of said series of switches operated.

114. In a telephone system, telephone lines, a series of automatic switches operative to extend a connection from a calling to a called one of said lines, means under the control of the subscriber on the said calling line for releasing only the last switch of said series while maintaining the remaining parts of said series of switches operated, and means for reoperating the said last switch into connection with another of said called lines.

115. In a telephone system, a trunk line terminating in a pair of connector switches, called lines accessible to said connector switches, means for operating one switch of
 5 said pair into connection with one of said called lines, means for operating the other switch of said pair into connection with a second called line, a relay in said other switch for supplying talking current to the
 10 second called line, and means controlled by said relay for releasing the first switch of said pair.

116. In a telephone system, a calling and a called line, a calling device on the said calling line, a series of selector switches and a connector switch controlled from said calling
 15 line by means of said calling device for extending the connection to a called line, and means controlled by a subsequent operation of said calling device for releasing said connector switch exclusive of said selector
 20 switches.

117. In a telephone system, a calling and a called line, a calling device on the said calling line, a series of selector switches and a connector switch controlled from said calling
 25 line by means of said calling device for extending the connection to a called line, means controlled by a subsequent operation of said calling device for releasing said connector switch exclusive of said selector
 30 switches, and means for then operating said connector switch.

118. In a telephone system, calling and
 35 called lines, automatic switching mechanism, means for directly operating said switching mechanism to establish a connection between one of said calling and a called line, other automatic switching mechanism
 40 temporarily associated with the called line responsive to said connection and controlled from the called line operative to extend the connection to a second called line.

119. A telephone system including telephone lines, and automatic apparatus for
 45 connecting a calling one of said lines to a called line and then operative to transfer the call from one called line to another indefinitely and release the antecedent called line
 50 incidental to each transfer.

120. A telephone system including telephone lines, automatic apparatus for connecting a calling one of said lines to a called line and then operative to transfer the calling
 55 line from one called line to another indefinitely and means for automatically releasing the antecedent called line each time a call is transferred.

121. In a telephone system, a pair of automatic switches, means for operating said
 60 switches alternately to connect with called lines, a release circuit common to said switches and having two branches, release magnets for said switches in the said

branches, respectively, and means for closing
 65 said branches alternately for releasing said switches.

122. In a telephone system, a line consisting normally of a first and a second section permanently paired, a signal device normally associated with the second section, a
 70 first relay normally associated with the first section, first and second signaling current sources, means for applying said first source over the first section to operate said first relay
 75 to apply said second source to the second section to operate the signal device, and means controlled from the second section for disconnecting said first source from the first section.

123. In a telephone system, a line consisting normally of a first and a second section permanently paired but conductively and inductively un-connected, a signal device associated with the second section, a first relay
 85 associated with the first section, a first and a second signaling current source, means for applying said first source over the first section to operate said first relay to apply said second source to the second section to
 90 operate the signal device, and means controlled from the second section for disconnecting said first source from the first section.

124. In a telephone system, a line consisting normally of a first and a second section permanently paired, a signal device associated with the second section, a first and a second signaling current source, means for
 95 applying said first source over the first section, means associated with the first section responsive to the said first source to apply said second source to the second section to operate the signal device, and means controlled from the second section for disconnecting said first source from the first section.

125. In a telephone system, a line involving a first and a second section as a portion thereof, said sections being permanently paired, a signal device associated with the second section, a first and a second signaling current source, means for applying said first source over the first section, means associated with the first section
 115 responsive to the said first source to apply said second source to the second section to operate the signal device, and means controlled from the second section for disconnecting said first source from the first section.

126. In a telephone system, a line involving a first and a second section as a portion thereof, said sections being permanently paired, a first and a second current
 125 source, means for applying said first source over the first section, means responsive to said first source associated with the first

section the purpose of which is to apply said second source to the second section, and means controlled from the second section for disconnecting said first source from the first section.

127. In a telephone system, a line involving a first and a second section as a portion thereof, a signal device associated with the second section, a first and a second signaling current source, means for applying said first source over the first section, means associated with the first section responsive to the said first source to apply the said second source to the second section to operate the signal device, and means controlled from the second section for disconnecting said first source from the first section.

128. In a telephone system, a line involving a first and a second section as a portion thereof, said sections being conductively and inductively un-connected, a signal device associated with the second section, a first and a second signaling current source, means for applying said first source over the first section, means associated with the first section responsive to the said first source to apply the said second source to the second section to operate the signal device, and means controlled from the second section for disconnecting said first source from the first section and for effecting a talking relation between the sections.

129. In a telephone system, a line involving a first and a second section as a portion thereof, said sections being conductively and inductively un-connected, a first and a second current source, means for applying said first source over the first section, means responsive to said first source associated with the first section the purpose of which is to apply said second source to the second section, and means controlled from the second section for disconnecting said first source from the first section and for effecting a talking relation between the sections.

130. In a telephone system, a line leading to a signal device, a first and a second source of signaling current, a first relay operated by said first source applied over the line for applying said second source to the line to operate the signal device, and means controlled from the line for disconnecting said first source and for preventing the re-application of said first source to the line.

131. In a telephone system, a connector bank contact set, first and second signaling current sources, a telephone line associated with the connector bank contact set, a signal device connected with the line operative from the second source, a relay associated with the line responsive to the first source

applied through the connector bank contact set to apply the second source to the signal device, and means controlled from the line to disconnect the first source from the connector bank contact set while maintaining the established connection.

132. In a telephone system, a connector bank contact set, first and second signaling current sources, a telephone line associated with the connector bank contact set, a signal device connected with the line operative from the second source, a relay associated with the line responsive to the first source applied through the connector bank contact set to apply the second source to the signal device, means controlled from the line to disconnect the first source from the connector bank contact set while maintaining the established connection, and means whereby the said first source cannot be thereafter re-applied without first destroying the connection.

133. In a telephone system, a connector bank contact set, first and second signaling current sources, a telephone line associated with the connector bank contact set, a signal device connected with the line operative from the second source, a relay associated with the line responsive to the first source applied through the connector bank contact set to apply the second source to the signal device, means controlled from the line to disconnect the first source from the connector bank contact set while maintaining the established connection, and disconnect said second source from the signal device, whereby neither source can be thereafter re-applied without first destroying the connection.

134. In a telephone system, a connector bank contact set, first and second signaling current sources, the said first source being of a character to which a condenser is transparent, a telephone line associated with the connector bank set, a signal device connected with the line operative from the second source, a relay in bridge of the talking contacts of the connector bank contact set responsive to the first source applied through the connector bank contact set for applying the second source to the signal device, and means controlled from the line to disconnect the first source from the connector bank set while maintaining the established connection.

135. In a telephone system, a connector bank contact set, first and second signaling current sources, the said first source being of a character to which a condenser is transparent, a line associated with the said connector bank contact set, a signal device connected with the line responsive from the second source, a relay in bridge of the talking conductors leading from the connector bank contact set responsive to the first

source applied through the connector bank set for applying the second source to the signal device, means controlled from the line to disconnect the relay from its bridged relation with the said talking conductors and also for disconnecting the first source, and means for preventing the re-bridging of the relay and for preventing the re-applying of the first source without first destroying the connection.

136. In a telephone system, a calling line leading to a first selective switch, a second selective switch, a called line, a first and a second source of signaling current, the said first source being of a character to which a condenser is transparent, directive means for remotely controlling the establishment of a connection from the calling line through the switches to the called line, a relay responsive to the first source for applying the second source to the called line, and means the functioning of which is automatically initiated from the second switch whereby the first source of current is primarily applied therefrom effective to the relay.

137. In a telephone system, a calling line leading to a first selective switch, a second selective switch, a called line, a first and a second source of signaling current, the said first source being of a character to which a condenser is transparent, directive means for remotely controlling the establishment of a connection from the calling line through the switches to the called line, a relay responsive to the first source for applying the second source to the called line, and means the functioning of which is automatically initiated whereby the first source of current is primarily applied therefrom effective to the relay.

138. In a telephone system, first, second and third sources of signaling current, a telephone line leading to a signal device non-responsive to the character of signaling current adapted to be primarily applied to the line from the first source, but responsive to the third source, a relay associated with the line responsive to current applied to it from the first source for applying the said second source to the line to operate the signal device, and means controlled over the line for disconnecting the second source.

139. In a telephone system, first, second and third sources of signaling current, a telephone line leading to a signal device non-responsive to the character of signaling current adapted to be primarily applied to the line from the first source, but responsive to the third source, a relay associated with the line responsive to current applied to it from the first source for applying the said second source to the line to operate the signal device, means controlled over the line for disconnecting the second source, and

means for preventing its re-application without first destroying the connection.

140. In a telephone system, first, second and third sources of signaling current, a telephone line leading to a signal device non-responsive to the character of signaling current adapted to be primarily applied to the line from the first source, but responsive to the third source, a relay associated with the line responsive to current applied to it from the first source for applying the said second source to the line to operate the signal device, means controlled over the line for disconnecting the first source, and means for preventing its re-application without first destroying the connection.

141. In a telephone system, a calling station, a telephone line involving near and remote sections thereof, a junction point of the sections, a first relay controlled from the remote section and a second relay controlled from the near section together operative to join the sections at the junction point, first and second signaling current sources, said first source being of a character to which a condenser is transparent, a third relay on the near section responsive to the first source applied over the near section to operate the second relay to apply the said second source to the remote section, selective switch mechanism, means for directing the selective switch mechanism to complete a connection from the calling station to include the line, means for initially applying the first source over the near section to operate the third relay to in turn operate the second relay to apply the second source to the remote section after the last directive operation has been transmitted to the selective switch mechanism, and a circuit connection made operative consequent to the operation of the second relay whereby the first relay will become in control of the remote section to join the sections.

142. In a telephone system, a calling station, a telephone line involving near and remote sections thereof, a junction point of the sections, a first relay controlled from the remote section and a second relay controlled over the near section together operative to join the sections at the junction point, first and second signaling current sources, said first source being of a character to which a condenser is transparent, the second relay responsive to the first source applied over the near section to apply the said second source to the line and to prepare an operative circuit path for controlling the first relay for joining the sections, selective switch mechanism, means for directing the selective switch mechanism to complete a connection from the calling station to include the line, means for initially applying the first source over the near section after the last directive operation

tion has been transmitted to the selective switch mechanism to apply the second source to the remote section and to prepare the said circuit path for the first relay, whereby the first relay will become in control of the remote section to join the sections.

143. In a telephone system, a calling station, a telephone line involving near and remote sections thereof, a junction point of the sections, a first relay controlled from the remote section and a second relay controlled over the near section together operative to join the sections at the junction point, first and second signaling current sources, the second relay responsive to the first source applied over the near section to apply the said second source to the line and to prepare an operative circuit path for controlling the first relay for joining the sections, selective switch mechanism, means for directing the selective switch mechanism to complete a connection from the calling station to include the line, means for initially applying the first source over the near section after the last directive operation has been transmitted to the selective switch mechanism to apply the second source to the remote section and to prepare the said circuit path for the first relay, whereby the first relay will become in control of the remote section to join the sections, and disconnect the said relays from the connection.

144. In a telephone system, a calling station, a telephone line involving near and remote sections thereof, a junction point of the sections, a first relay controlled from the remote section and a second relay controlled from the near section together operative to join the sections at the junction point, first and second signaling current sources, said first source being of a character to which a condenser is transparent, the second relay responsive to the first source to apply the said second source to the line and to prepare an operative circuit path controlled by the first relay, means for completing a connection from the calling station to the line, and means for applying the first source over the near section to operate the second relay to apply the second source to the remote section and to prepare the said circuit path controlled by the first relay and the second relay whereby the sections will become joined under control of the remote section and both said relays will become disconnected from operative relation with the connection.

145. In a telephone system, a calling station, first and second signaling current sources, a telephone line involving near and remote sections thereof, a relay in bridge of one of the talking conductors of the near section responsive to the first source for ap-

plying the second source to the remote section, said first source being of a character to which a condenser is transparent, selective switch mechanism, means including the selective switch mechanism for directing establishing a connection from the calling station to the near section of the telephone line, means for initially applying the first source over the near section to operate the relay after the last directive operation has been effectuated at the calling station, means consisting of component elements of the selective switch mechanism for maintaining the application of the second source, and means controlled from the remote section for disconnecting the second source.

146. In a telephone system, a calling station, first and second signaling current sources, a telephone line involving near and remote sections thereof, a relay in bridge of one of the talking conductors of the near section responsive to the first source for applying the second source to the remote section, said first source being of a character to which a condenser is transparent, selective switch mechanism, means including the selective switch mechanism for directing establishing a connection from the calling station to the near section of the telephone line, means for initially applying the first source over the near section to operate the relay after the last directive operation has been effectuated at the calling station, means consisting of component elements of the selective switch mechanism for maintaining the application of the second source, and means controlled from the remote section for disconnecting the first source.

147. In a telephone system, a calling station, first and second signaling current sources, a telephone line involving near and remote sections thereof, a relay in bridge of one of the talking conductors of the near section responsive to the first source for applying the second source to the remote section, said first source being of a character to which a condenser is transparent, selective switch mechanism, means including the selective switch mechanism for directing establishing a connection from the calling station to the near section of the telephone line, means for initially applying the first source over the near section to operate the relay after the last directive operation has been effectuated at the calling station, means consisting of component elements of the selective switch mechanism, the functioning of which is automatically initiated and sustained, for maintaining the application of the second source, and means controlled from the remote section for disconnecting the second source.

148. In a telephone system, a calling station, first and second signaling current sources, a telephone line involving near and

remote sections thereof, a relay in bridge of one of the talking conductors of the near section responsive to the first source for applying the second source to the remote section, said first source being of a character to which a condenser is transparent, selective switch mechanism, means including the selective switch mechanism for directly establishing a connection from the calling station to the near section of the telephone line, means for initially applying the first source over the near section to operate the relay after the last directive operation has been effectuated at the calling station, means for maintaining the application of the second source, and means controlled from the remote section for disconnecting the second source.

149. In a telephone system, a calling station, a selective control agency at the calling station, first and second signaling current sources, a telephone line involving near and remote sections thereof, a signal device on the remote section responsive to the second source, a relay in bridge of the talking conductors of the near section responsive to the first source, said first source being of a character to which a condenser is transparent, the said relay for applying the second source to the remote section to operate the signal device, selective switch mechanism, means including the selective switch mechanism and the control agency at the calling station for directly establishing a connection from the calling station to operate the signal device, means for initially applying the first source to operate the relay after the last directive operation for establishing the connection has been effectuated at the calling station, means intermediate of the calling station and the signal device for maintaining the application of the second source, and means controlled from the remote section for disconnecting the second source.

150. In a telephone system, a calling station, first and second signaling current sources, a telephone line involving near and remote sections thereof, a signal device on the remote section responsive to the second source, a relay in bridge of the talking conductors of the near section responsive to the first source, the said relay for applying the second source to the remote section to operate the signal device, selective switch mechanism, means including the selective switch mechanism for directly establishing a connection from the calling station to operate the signal device, means for initially applying the first source to operate the relay after the last directive operation for establishing the connection has been effectuated at the calling station, means for maintaining the application of the second source, and

means controlled from the remote section for disconnecting the second source.

151. In a telephone system, a calling station, first and second signaling current sources, a telephone line involving near and remote sections thereof, a signal device on the remote section responsive to the second source, a relay connected to a conductor of the near section responsive to the first source, said first source being of a character to which a condenser is transparent, the said relay for applying the second source to the remote section to operate the signal device, selective switch mechanism, means including the selective switch mechanism for directly establishing a connection from the calling station to operate the signal device, means for initially applying the first source to operate the relay after the last directive operation for establishing the connection has been effectuated at the calling station, means for maintaining the application of the second source, and means controlled from the remote section for disconnecting the second source.

152. In a telephone system, a calling station, first and second signaling current sources, a telephone line involving near and remote sections thereof, a signal device on the remote section responsive to the second source, a relay connected to a conductor of the near section responsive to the first source, the said relay for applying the second source to the remote section to operate the signal device, selective switch mechanism, means including the selective switch mechanism for directly establishing a connection from the calling station to operate the signal device, automatic means for applying the first source to operate the relay to initially operate the signal device after the last directive operation for establishing the connection has been effectuated at the calling station, means for maintaining the application of the second source, and means controlled from the remote section for disconnecting the second source.

153. In a telephone system, a calling station, first and second signaling current sources, a telephone line involving near and remote sections thereof, a signal device on the remote section responsive to the second source, a relay connected to a conductor of the near section responsive to the first source, the said relay for applying the second source to the remote section to operate the signal device, selective switch mechanism, means including the selective switch mechanism for directly establishing a connection from the calling station to operate the signal device, means for applying the first source to operate the relay to initially operate the signal device after the last directive operation for establishing the connection has been ef-

fectuated at the calling station, means for maintaining the application of the second source, and means controlled from the remote section for disconnecting the second source.

154. In a telephone system, a calling station, first and second signaling current sources, a telephone line involving near and remote sections thereof, a signal device on the remote section responsive to the second source, a relay associated with the near section responsive to the first source, said first source being of a character to which a condenser is transparent, the said relay for applying the second source to the remote section to operate the signal device, a second relay controlled from the remote section for disconnecting the second source and for uniting the sections in talking relation, selective switch mechanism, means including the selective switch mechanism for directing establishing a connection from the calling station to operate the signal device, automatic means for initially applying the first source to operate the first said relay after the last directive operation has been effectuated at the calling station, means intermediate of the calling station and the signal device for maintaining the application of the second source, and means including the second relay controlled from the remote section for disconnecting the second source and for uniting the sections.

155. In a telephone system, a calling station, first and second signaling current sources, a telephone line involving near and remote sections thereof, a signal device on the remote section responsive to the second source, a relay associated with the near section responsive to the first source, said first source being of a character to which a condenser is transparent, the said relay for applying the second source to the remote section to operate the signal device, a second relay controlled from the remote section for disconnecting the second source and for uniting the sections in talking relation, selective switch mechanism, means including the selective switch mechanism for directing establishing a connection from the calling station to operate the signal device, means for initially applying the first source to operate the first said relay after the last directive operation has been effectuated at the calling station, means intermediate of the calling station and the signal device for maintaining the application of the second source, and means including the second relay controlled from the remote section for disconnecting the second source and for uniting the sections.

156. In a telephone system, a calling station, first and second signaling current sources, the first source being of a character to which a condenser is transparent, a telephone line, a signal device connected to the

remote end of the line responsive to the second source, a relay connected to the line responsive to the first source for applying the second source to operate the signal device, a selective switch, means including the selective switch for directing establishing a connection from the calling station to operate the signal device, means for initially applying the first source to the line after the last directive operation is completed at the calling station to apply the second source to the signal device, means for maintaining the application of the second source after its application is initiated, and means controlled from the remote end of the line for disconnecting the second source.

157. In a telephone system, a calling station, first and second signaling current sources, the first source being of a character to which a condenser is transparent, a telephone line, a signal device connected to the remote end of the line responsive to the second source, a relay connected to the line responsive to the first source for applying the second source to operate the signal device, a selective switch, means including the selective switch for directing establishing a connection from the calling station to operate the signal device, means for initially applying the first source to the line after the last directive operation is completed at the calling station to apply the second source to the signal device, means for maintaining the application of the first source after its application is initiated, and means controlled from the remote end of the line for disconnecting the second source.

158. In a telephone system, a calling station, first and second signaling current sources, the first source being of a character to which a condenser is transparent, a telephone line, a signal device connected to the remote end of the line responsive to the second source, a relay connected to the line responsive to the first source for applying the second source to operate the signal device, a selective switch, means including the selective switch for directing establishing a connection from the calling station to operate the signal device, means for initially applying the first source to the line after the last directive operation is completed at the calling station, to apply the second source to the signal device, means for maintaining the application of the second source after its application is initiated, and means controlled from the remote end of the line for disconnecting the second source and relay.

159. In a telephone system, a calling station, first and second signaling current sources, a telephone line, a signal device connected to the remote end of line responsive to the second source, a relay connected to the line responsive to the first source for applying the second source to operate the

signal device, a selective switch, means including the selective switch for directly establishing a connection from the calling station to operate the signal device, means
 5 for initially applying the first source to the line after the last directive operation is completed at the calling station to apply the second source to the signal device, means for maintaining the application of the second
 10 source after its application is initiated, and means controlled from the remote end of the line for disconnecting the second source.

160. In a telephone system, a leading-in and called lines, a selective switch directly controlled from the said leading-in
 15 line for connecting the leading-in line to a called one of said lines, means whereby said switch is then subject to directive control of the called line whereby the called
 20 line can extend a connection therefrom to a second called line.

161. In a telephone system, a calling station, a leading-in line, called lines, a selective switch directly controlled from the
 25 the calling line over the leading-in line for effecting a connection from the calling line to a called one of said lines, means whereby said switch is then subject to directive control of the called line whereby the called
 30 line can extend a connection therefrom to a second called line, and means for disconnecting the calling station from the connection leaving the first and second called lines connected.

35 162. In a telephone system, a calling station, a leading-in line, called lines, a selective switch directly controlled from the calling line over the leading-in line for effecting a connection from the calling line to
 40 a called one of said lines, means whereby said switch is then subject to directive control of the called line whereby the called line can extend a connection therefrom to a second called line, means for disconnecting
 45 the calling station from the connection leaving the first and second called lines connected, and means controlled from the said called lines for restoring the said switch.

163. In a telephone system, a calling station, a leading-in line, called lines, a selective switch directly controlled from the calling line over the leading-in line for effecting a connection from the calling line
 50 to a called one of said lines, means whereby said switch is then subject to directive control of the called line whereby the called line can extend a connection therefrom to a second called line, means for disconnecting
 55 the calling station from the connection leaving the first and second called lines connected, and means controlled from each said called lines for disconnecting the concerned
 60 said line from the said selective switch.

164. In a telephone system, a calling station, a series of selective switches, a lead-

ing-in line and terminating switch therefor, called lines, means including said selective and terminating switches for directly extending a connection from the calling station to the leading-in line and to a
 70 called line, means whereby said terminating switch is then subject to directive control of the called line whereby the called line can extend a connection therefrom to a second called line, and means for disconnecting the calling station from the
 75 said leading-in line, leaving the first and second called lines connected.

165. In a telephone system, a calling station, a series of selective switches, a leading-in line and terminating switch therefor, called lines, means including said selective and terminating switches for directly extending a connection from the calling station to the leading-in line and to a called
 85 line, means whereby said terminating switch is then subject to directive control of the called line whereby the called line can extend a connection therefrom to a second called line, and means for disconnecting the
 90 calling station and the said series of selective switches from the said leading-in line, leaving the first and second called lines connected.

166. In a telephone system, a calling station, a series of selective switches, a leading-in line and terminating switch therefor, called lines, means including said selective and terminating switches for directly extending a connection from the calling station to the leading-in line and to a called
 100 line, means whereby said terminating selective switch is then subject to directive control of the called line whereby the called line can extend a connection therefrom to a second called line, and means controlled from the calling station for disconnecting the calling station from the said leading-in line, leaving the first and second called lines
 105 connected.

167. In a telephone system, remotely controlled interlinking switches terminating line sections, calling and called line sections, a signal device on the called line section, first and second signaling current
 115 sources, the said first source being of a character to which a condenser is transparent, means on the calling line section for directly operating the switches for interlinking a connection from the calling to the called line section, a relay connected to a talking conductor of the connection responsive to the first source for applying the second source for operating the signal device, means for applying the first source
 120 to a talking conductor of the connection and automatically sustaining the application of the second source, means controlled over the called line section for disconnecting the second source consequent to the
 130

operation of a manual switch upon response thereon, and means whereby a restoration of the said called line switch will render the said second source available for reapplication to the called line section by control from the calling line section without destroying the established connection from the calling line section to the linking switch remotest therefrom.

168. In a telephone system, remotely controlled interlinking switches terminating line sections, calling and called line sections, a signal device on the called line section, first and second signaling current sources, the said first source being of a character to which a condenser is transparent, means on the calling line section for directing the switches for interlinking a connection from the calling to the called line section, a relay connected to a talking conductor of the connection responsive to the first source for applying the second source for operating the signal device, means for applying the first source to a talking conductor of the connection and automatically sustaining the application of the second source, means controlled over the called line section for disconnecting the second source consequent to the operation of a manual switch upon response thereon, means whereby a restoration of the said called line switch will render the said second source available for reapplication to the called line section by control from the calling line section without destroying the established connection from the calling line section to the linking switch remotest there-

from, and means whereby the said manual switch may be operated to again disconnect the second source.

169. In a telephone system, remotely controlled interlinking switches terminating line sections, calling and called line sections, a signal device on the called line section, first and second signaling current sources, the said first source being of a character to which a condenser is transparent, means on the calling line section for directing the switches for interlinking a connection from the calling to the called line section, a relay connected to a talking conductor of the connection responsive to the first source for applying the second source for operating the signal device, means for initially applying the first source to a talking conductor of the connection after the connection has been established and automatically sustaining the application of the second source, means controlled over the called line section for disconnecting the second source consequent to the operation of a manual switch upon response thereon, and means whereby a restoration of the said called line switch will render the said second source available for reapplication to the called line section by control from the calling line section without destroying the established connection from the calling line section to the linking switch remotest therefrom.

Signed by me at Indianapolis, county of Marion and State of Indiana, this 8th day of June, 1917.

HERBERT M. FRIENDLY.

DISCLAIMER

1,441,791.—*Herbert M. Friendly*, Portland, Oreg. TELEPHONE SYSTEM. Patent dated January 9, 1923. Disclaimer filed October 9, 1933, to *Milton S. Friendly* and *Central Republic Trust Company*, as co-executors of the estate of *Herbert M. Friendly*, deceased.

Hereby enter this disclaimer to the claims in said specification which is in the following words, to wit: -

"141. In a telephone system, a calling station, a telephone line involving near and remote sections thereof, a junction point of the sections, a first relay controlled from the remote section and a second relay controlled from the near section together operative to join the sections at the junction point, first and second signaling current sources, said first source being of a character to which a condenser is transparent, a third relay on the near section responsive to the first source applied over the near section to operate the second relay to apply the said second source to the remote section, selective switch mechanism, means for directing the selective switch mechanism to complete a connection from the calling station to include the line, means for initially applying the first source over the near section to operate the third relay to in turn operate the second relay to apply the second source to the remote section after the last directive operation has been transmitted to the selective switch mechanism, and a circuit connection made operative consequent to the operation of the second relay whereby the first relay will become in control of the remote section to join the sections.

"142. In a telephone system, a calling station, a telephone line involving near and remote sections thereof, a junction point of the sections, a first relay controlled from the remote section and a second relay controlled over the near section together operative to join the sections at the junction point, first and second signaling current sources, said first source being of a character to which a condenser is transparent, the second relay responsive to the first source applied over the near section to apply the said second source to the line and to prepare an operative circuit path for controlling the first relay for joining the sections, selective switch mechanism, means for directing the selective switch mechanism to complete a connection from the calling station to include the line, means for initially applying the first source over the near section after the last directive operation has been transmitted to the selective switch mechanism to apply the second source to the remote section and to prepare the said circuit path for the first relay, whereby the first relay will become in control of the remote section to join the sections.

"143. In a telephone system, a calling station, a telephone line involving near and remote sections thereof, a junction point of the sections, a first relay controlled from the remote section and a second relay controlled over the near section together operative to join the sections at the junction point, first and second signaling current sources, the second relay responsive to the first source applied over the near section to apply the said second source to the line and to prepare an operative circuit path for controlling the first relay for joining the sections, selective switch mechanism, means for directing the selective switch mechanism to complete a connection from the calling station to include the line, means for initially applying the first source over the near section after the last directive operation has been transmitted to the selective switch mechanism to apply the second source to the remote section and to prepare the said circuit path for the first relay, whereby the first relay will become in control of the remote section to join the sections, and disconnect the said relays from the connection."

[*Official Gazette* October 31, 1933.]