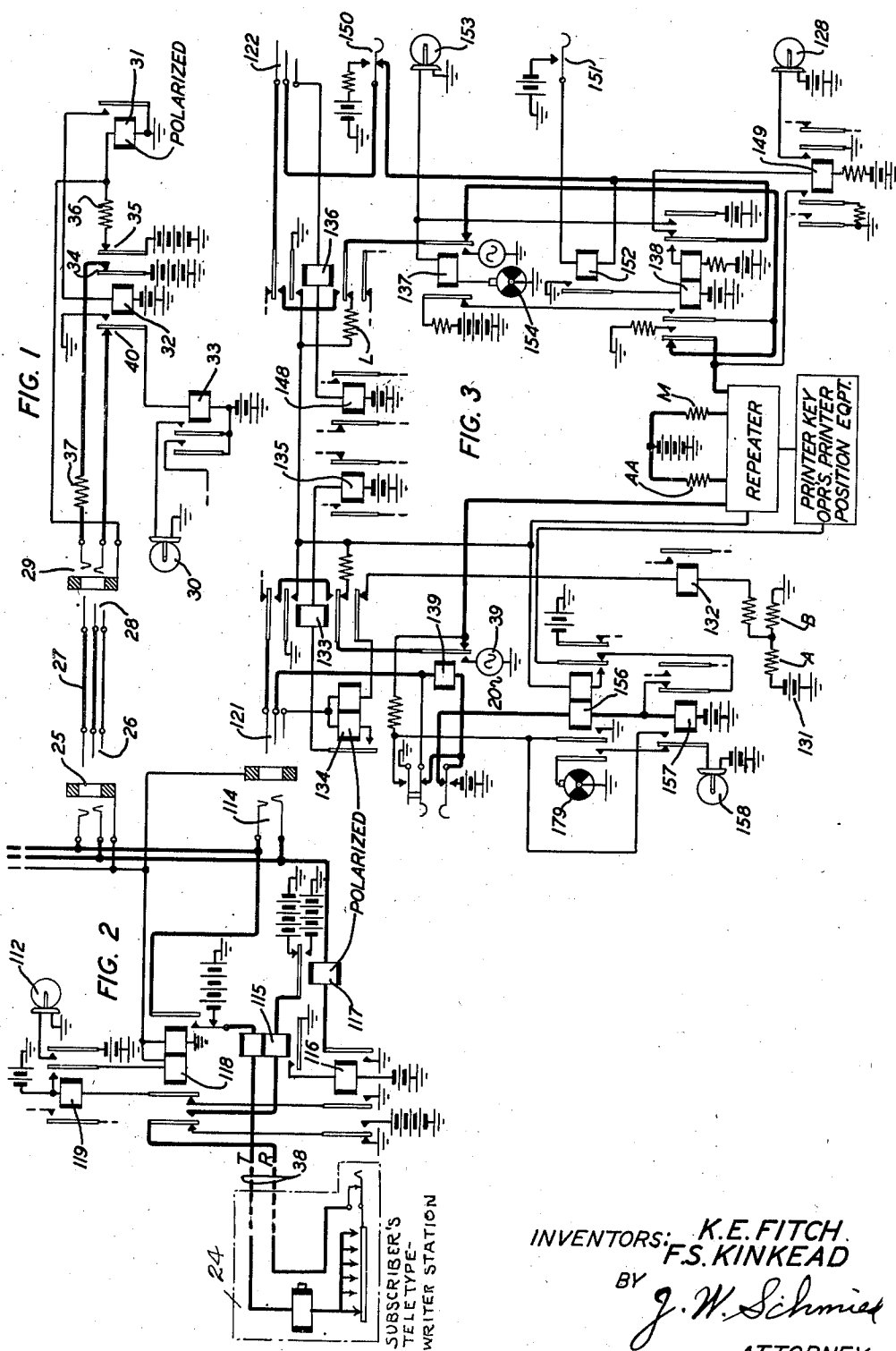


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TELEGRAPH EXCHANGE SYSTEM

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TELEGRAPH EXCHANGE SYSTEM

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5 Claims. (Cl. 178—2)

This invention relates to telegraph systems and more particularly to printing telegraph exchange systems.

In many teletypewriter exchange systems such as that disclosed in the copending application of G. A. Locke and F. S. Kinkead, Serial No. 459,684, filed June 7, 1930, it is desirable to allow subscribers to practice on their teletypewriter machines under the supervision of the operator at the central exchange so that they may learn and become familiar with the operation of the machine.

The object of this invention is to provide means for enabling the subscribers to practice on their teletypewriter machines.

A feature of the invention prevents the subscriber's line from testing busy at the switchboard during the time the subscriber is practicing.

A further feature is that the practice circuit is automatically interrupted in case some one desires to communicate with the subscriber during the time he is practicing.

Other supervisory features are also provided to signal the operator at the switchboard when the subscriber has finished practicing.

In brief, the invention is exemplified in an auxiliary battery supply or practice circuit which may be connected to a subscriber's line so that the subscriber may practice on his teletypewriter machine under the supervision of the operator at the central exchange. The circuit is so arranged that the subscriber's line will not test busy during the time it is connected to this practice circuit to enable the subscriber to receive all the calls directed to his station. In addition, the auxiliary battery supply or practice circuit is arranged so that it will automatically interrupt certain circuits to enable signals to be sent to the subscriber without interference from the practice circuit. Other supervisory features are incorporated in the circuit to signal the operator when the subscriber has finished practicing.

The terms "practice circuit" or "auxiliary battery supply circuit" and "battery supply circuit" as used in this specification do not include spare or idle equipment and circuits such as spare or idle line or cord circuits, but are intended to include only special circuits designed, primarily, to permit a subscriber to transmit practice messages.

This invention may be more readily understood from the following description when read with reference to the drawing in which:—

Fig. 1 shows the circuit details of the practice circuit located at the central exchange;

Fig. 2 shows details of the subscriber's line circuit located at the central exchange; and

Fig. 3 shows some details of the usual cord circuits employed to interconnect various subscribers' line circuits so that they may communicate with each other.

Since all the details of such a central exchange system are not necessary to the understanding of this invention, they will not be shown nor described. For complete details of such a system, reference is made to the above identified copending application, Serial No. 459,684, filed June 7, 1930.

Referring now to the drawing 24 represents a printing telegraph or teletypewriter subscriber's station equipment connected to the central office over line 38. As described in the above identified application as well as the application of C. C. Lane, Serial No. 546,688, filed June 25, 1931, patented as U. S. Patent 1,965,383 on July 3, 1934, both applications being hereby made part of this application, the tip T and ring R of line 38 are not normally connected together through the subscriber's station apparatus. The relays in the line circuits shown in Fig. 2 will therefore normally be in the position shown. When a subscriber wishes to originate a call, he operates certain keys which connect the tip and ring leads of line 38 together. This causes relay 115 to operate and in turn operates relay 116. Relay 116 then operates relay 119 which lights lamp 112 to indicate to the operator that the subscriber 24 wishes to originate a call. The operator then inserts calling plug 121 of Figs. 3 in jack 114. This completes a circuit from battery 131 through the potentiometer comprising resistances A and B, the winding of relay 132, bottom contacts of relay 133, right-hand winding of relay 134, the sleeve of plug 121 and jack 114, and the right-hand winding of relay 118 to ground. Relays 132 and 134 operate in this circuit, but relay 118 does not. Relay 134 in operating completes a circuit from battery through the windings of relays 135 and 133, contacts and left-hand winding of relay 134, sleeve of plug 121 and jack 114 to ground through the right-hand winding of relay 118. Relays 135, 133 and 118 operate in this circuit and relay 134 locks operated through its left-hand winding and make contact. Relay 118 in operating interrupts the circuit of relay 119 which releases and extinguishes the calling lamp 112. Relay 118 in operating also connects both windings of relay 115 in the loop circuit in series

opposition so that the magnetic field of this relay due to current through both its windings is reduced to substantially zero thus allowing relay 115 to release which in turn releases relay 116. Relay 116 in releasing disconnects ground from the ring of jack 114 through the winding of relay 117. This prevents the operation of the supervisory relays 156 and 157 thus preventing the lighting of the supervisory lamp 158. The operation of sleeve circuit relay 133 extends the subscriber's loop circuit through the cord circuit repeater to the operator's printer and position equipment. Resistances AA and M connected in series with the battery supplied to the cord circuit repeater are provided to prevent excessive current flowing in short subscribers' loops. The flashing recall interrupter 179 as well as the ringing key and ringing relay 139 which may connect source of ringing current 39 to the subscriber's line circuit perform no useful function at this time.

In case the subscriber indicates that he wishes to practice on his machine, the operator will insert a plug 26 of cord 27 in one of the multiple jacks 25 connected to the subscriber's line circuit and the other plug 28 of cord 27 in jack 29 of the practice or auxiliary battery supply circuit. The operator will also remove plug 121 from jack 114. This establishes a circuit from ground through the right-hand winding of relay 118, the sleeve of jack 25, plug 26, cord 27, plug 28, and jack 29 through polarized relay 31 to ground and also through resistance 36 to positive battery through contacts 35 of relay 32. Current through this circuit will operate relay 118 but will not operate relay 31. Relay 31 is polarized so that it will not operate on current of the polarity flowing through its winding at this time. The subscriber's line circuit is completed to negative battery through the contacts 34 of relay 32, resistance 37, tip of jack 29, plug 28, cord 27, plug 26 and jack 25, contacts of relay 118, winding of relay 115 through the subscriber's line and station equipment, contacts of relay 118, lower winding of relay 115, contacts of relay 117 to positive battery. The subscriber can then practice on his machine by transmitting various signals and messages without any further assistance from the central exchange operator.

When the subscriber has finished practicing he will stop his machine in the usual manner which will interrupt the circuit between the T and R leads of line 38, and connects ground to the R lead. This causes relay 115 to again operate and operate relay 116. Relay 116 in operating closes a circuit from ground through its right-hand contact, relay 117, ring of jack 114, jack 25, plug 26, cord 27, plug 28 and jack 29, contacts 40 of relay 32 through the winding of relay 33 to battery. Relay 117 is polarized so that it will not operate on the current flowing in this circuit. This relay 33 will be operated by currents flowing in this circuit. Relay 33 in operating closes a circuit to light lamp 30 as well as the circuit to light a pilot lamp (not shown). This indicates to the operator that the subscriber has finished practicing. The operator will then disconnect the auxiliary or practice circuit from the line circuit by removing plugs 26 and 28 from jacks 25 and 29, respectively. This will restore all the circuits and the relays in them to their normal conditions.

Should a call be originated from some other source for a subscriber during the time that the subscriber 24 is practicing, the operator will test the subscriber's line for busy with a calling plug

of a cord similar to that shown by plug 122 of Fig. 3. The busy test will indicate a positive battery connected to the sleeve of the subscriber's line. This normally indicates an out of order but not a busy condition on the line. However, in exchanges furnishing practice service to subscribers the operator will be instructed to insert plug 122 in one of the multiple jacks connected to the subscriber's line even if the busy test indicates that the line is out of order. This places a negative potential through relays 148 and 136 on the sleeve of the subscriber's line which will hold relay 118 operated, but will reverse the current through relay 31 so that relay 31 will operate at this time. Relay 31 in operating operates relay 32 which disconnects the positive battery from resistance 36 and also the negative battery from the tip of the line. Relay 32 in operating also operates relay 33 by closing a circuit from ground through its contacts 40 and winding of relay 33 to battery. Relay 33 in operating will light supervisory lamp 30 and also the pilot lamp to indicate to the operator that the subscriber's line is connected to a practice circuit. Current flowing in the sleeve circuit through the winding of the sleeve relay 136 causes this relay to operate. This relay then connects a subscriber's line circuit to the repeater circuit. Since relay 115 is released at this time, relay 116 will not be operated and therefore no ground will be connected to the ring of the jack 114. Consequently, supervisory relay 149 will not operate so that lamp 128 will not light. This indicates to the operator that the subscriber's loop circuit is closed and that the subscriber's equipment is ready to receive messages. The remote start key 150, ringing key 151 as well as the ringing relays 138, 152 and 137 and ringing interrupter 154 and ringing lamp 153 will not be employed at this time. Instead, the operator will then send a break signal to the subscriber's line to attract the attention of the subscriber and then tell him that another party wishes to communicate with him. The operator will then establish the communication path between the various subscribers. If the subscriber wishes, the operator may leave his line connected to the practice circuit so that the subscriber may again practice upon the termination of the message to be transmitted to him. It would probably be desirable, however, for the operator to disconnect the practice circuit at this time, by removing plugs 26 and 28 from jacks 25 and 29, respectively. Then upon the completion of the message, the subscriber, if he still wishes to practice, would again have to call the operator and request that this line be connected to a practice circuit.

While the foregoing description has been limited to a subscriber directly connected to the central office by a line, it is to be understood that the practice circuit may be employed in any of the line circuit arrangements shown in the above identified copending application Serial No. 459,684, filed June 7, 1930 in which repeaters and other apparatus may be interposed between the subscriber's station and the central office. Thus the foregoing description is for the purpose of illustrating this invention, while the following claims clearly define its scope.

What is claimed is:

1. A telegraph system comprising a central station, a plurality of subscribers' stations connected thereto, switch means at said central station for interconnecting said subscribers' stations, a practice circuit, means for connecting said practice

circuit to any of said subscribers' stations to enable said subscribers to transmit practice signals, said practice circuit including means for preventing said subscriber's station testing busy at said central station, signal means for signaling the operator when said subscriber has finished practicing, and means for automatically interrupting said practicing circuit when another station is connected to a practicing subscriber's station so that the subscriber may receive messages during the time he is connected to said practice circuit.

2. In a telegraph communication system, comprising a central exchange station, a plurality of subscribers' stations connected thereto, interconnecting means located at said central exchange station for interconnecting any of said subscribers' stations, a practice circuit, means for connecting said practice circuit to any of said subscribers' stations, said practice circuit comprising means for indicating to the operator when a subscriber has finished practicing, means for indicating to an operator who desires to connect another subscriber's station to a practicing subscriber's station that said subscriber's station is connected to a practice circuit, and means for automatically disconnecting said practice circuit from said subscriber's station when another station is connected to said subscriber's station during the time said subscriber's station is connected to said practice circuit.

3. In a telegraph communication system comprising a central station and a plurality of subscribers' lines terminating in subscribers' tele-

graph station equipment connected thereto, a practice circuit, means for connecting said practice circuit to any of said subscribers' lines, said practice circuit including means for cooperating with said subscribers' lines which prevents them testing busy at said central station.

4. In a telegraph communication system comprising a central station, a plurality of subscribers' stations connected thereto and interconnecting means at said central station for interconnecting said subscribers' stations, an auxiliary battery supply circuit, means for connecting said battery supply circuit to any of said subscribers' stations to enable said subscribers to transmit practice messages, said battery supply circuit including supervisory means to signal the central station when the subscriber has finished practicing.

5. A teletypewriter exchange system comprising a plurality of subscribers' stations, a central station, a telegraph line connecting said subscribers' stations to said central exchange station, means at said central exchange station for communicating with said subscribers' stations, means at said central station for interconnecting said subscribers' stations, an auxiliary battery supply circuit for supplying battery to only one of said telegraph lines at a time, and auxiliary connecting means for connecting said auxiliary supply circuit to any one of said subscribers' stations over the associated telegraph line.

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