

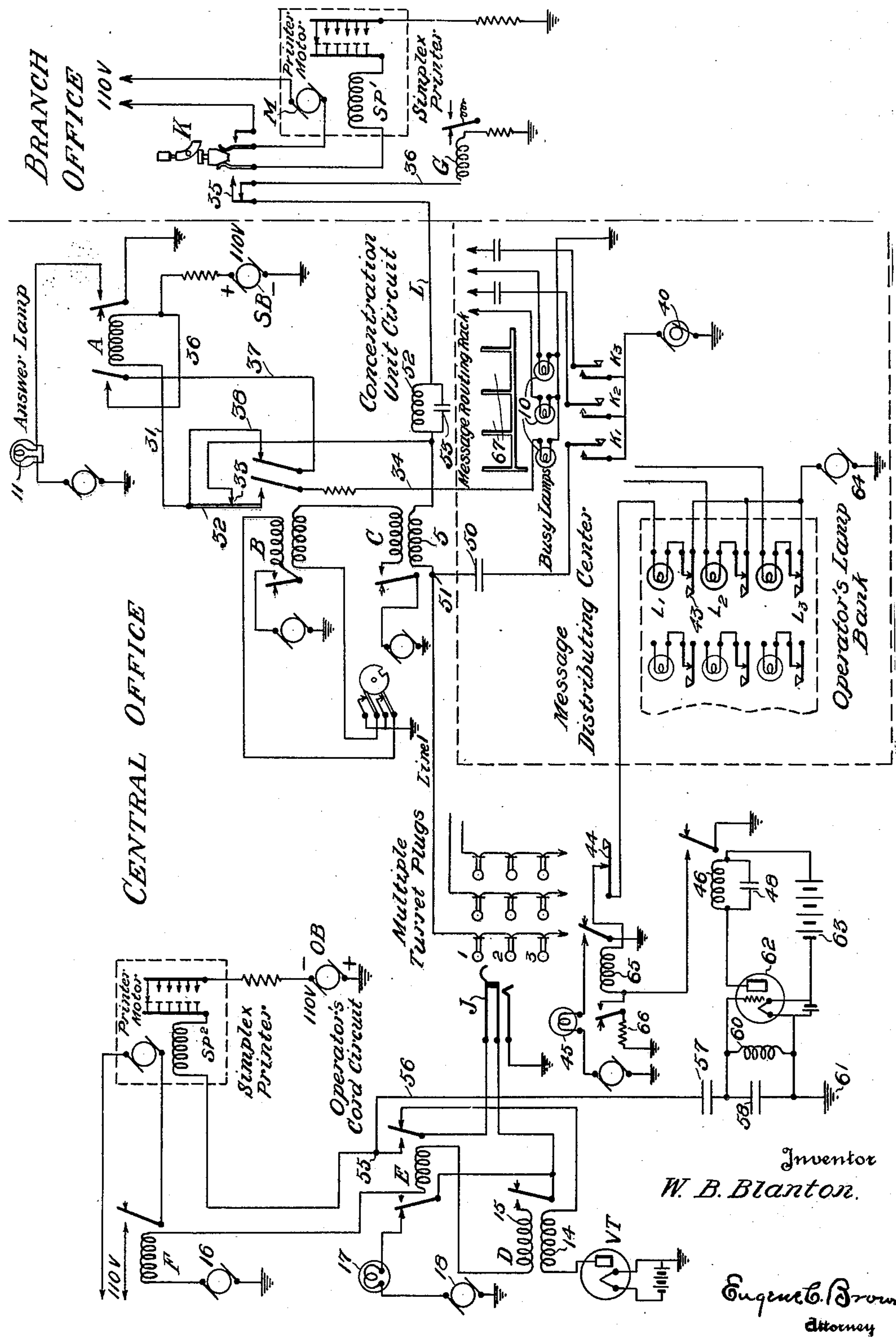
Oct. 4, 1932.

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1,880,724

METHOD OF LOCATING AN OPERATOR WORKING ANY LINE

Filed Sept. 21, 1931



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METHOD OF LOCATING AN OPERATOR WORKING ANY LINE

Application filed September 21, 1931. Serial No. 564,212.

This invention relates to the handling of traffic at a concentration unit or central station where a larger number of telegraph lines from outlying branch stations or sub-stations are terminated before a small number of operators so that the traffic of those lines may be handled by a small number of simplex printers.

Messages which are received at the central station for transmission or retransmission over the various lines to the different branch stations are received at a message distributing center from which they are taken to the operators by delivery girls or messengers. At the message distributing center there is located a rack, for the reception of the messages, having a compartment designated for each branch office connected to the concentration unit. In order that the messages may be transmitted with the least delay it is desirable to have them taken from the message distributing center directly to an operator who is working the line of the branch station to which the message is directed if that line is in operation at that instant.

The object of my invention is to provide a method of quickly locating the operator who is at any moment working any particular line and to provide means for producing the required visual indications.

As one means of accomplishing this purpose I provide a lamp and a key or switch in association with each compartment of the message receiving rack at the distributing center. The lamp is termed a "busy lamp" and is automatically lighted when a line is busy. I also provide near the routing rack an operator's lamp bank containing one lamp for each operating position and furthermore I provide a lamp at each operator's position, these lamps being controlled by the key or switch at the distributing center. If a message for line 1, for instance, should be placed in the compartment associated with this line, the delivery girl notes, by observing the corresponding busy lamp, whether this line is idle or busy. If the busy lamp is lighted she is then able to ascertain at once which operator is working this line by simply depressing the key designated for this line. This

causes two lamps associated with the operator's position from which the line is being worked to light, one lamp being located at the message distributing center in the operator's lamp bank and the other lamp being located at the operator's position. The lighting of the lamp at the operator's position warns her that more business is on the way and that she should hold the line until it arrives.

My invention will be more fully understood from the following detailed description in connection with the accompanying drawing which is a circuit diagram showing its application to the concentration unit disclosed in Patent No. 1,804,327 dated May 5, 1931.

The operation of the concentration unit circuit and the operator's cord circuit will be understood from the description in said patent. For convenience these circuits will be briefly described. The equipment at each branch station comprises a simplex printer SP', a key switch K, and a signal relay G. The branch station is connected by a line L to the central station. With the key K in the position illustrated, the line L is grounded through the signal relay G and in the other position of the key, the relay G is disconnected, the line is grounded through the simplex printer and the energizing circuit of the printer operating motor M is completed.

At the central station, the line L is connected through the line winding of relay C to the line plugs 1, 2, 3, etc. rigidly located in front of the respective operators. A circuit is normally closed over each line from the central office to the branch offices from the signal battery or generator SB through the winding of line relay A over conductor 31, spring contact arm 32 and contact 33 of relay B, coil 52, line L, contacts 35 of key switch K, conductor 36 and winding of relay G to ground. When the operator at the branch office sends a call by first shifting the key K to connect the printer and then depressing any key on the printer, thereby momentarily opening the line, the relay A will be deenergized and will remain in that condition because of a short circuit which is completed around its winding through the conductor 36 and its left

hand armature, conductor 37, back contact and right hand outer armature of relay B and conductor 38. The right hand armature of line relay A closes a circuit through the "answer" lamp 11. The lighting of this lamp indicates to any idle concentrator operator that this call may be answered by attaching her printer cord circuit to the corresponding line plug at her position.

The operator's cord circuit comprises the circuit arrangement interconnecting the jack J with relays D, E and F and with the simplex printer SP². The tip contact in the jack J is connected to the right-hand tongue of relay E, and the back contact cooperating with this tongue is connected through winding 14 of relay D to the plate element of a two-electrode vacuum tube VT; the filament of the tube being grounded. One of the extra contacts on jack J is connected to ground, and the other cooperating extra contact is connected to the tongue of relay D. Winding 15 of relay D and the windings of relays E and F are connected in series in a circuit extending from the contact of relay D to ground, including a source of current 16. The left-hand tongue of relay E is connected to the tongue of relay D, and the back contact cooperating with the said tongue of relay E is connected through a "busy" lamp 17, and a source of current 18, to ground. The contact of relay F is included in the motor operating circuit of simplex printer SP². The operating circuit for this printer extends from the front contact of the right-hand tongue of relay E through the printer to the source of operating current OB.

My present invention provides a method of quickly locating the particular operator working any line. For this purpose I provide near the message routing rack an operator's lamp bank containing one lamp L₁, L₂, L₃, etc. for each operating position. Associated with each lamp is a key or switch 43. In circuit with these lamps at each operating position there is located a key or switch 44 and a relay 65 which controls a lamp 45.

On the message routing rack I associate with each compartment 67 a busy lamp 10 and a key or switch. These keys or switches K₁, K₂, K₃, etc. are connected in multiple to a source of high frequency current 40. When the delivery girl depresses the particular key K₁, K₂, etc. associated with the line for which a message is destined, a high frequency current is impressed through the line upon the cord circuit of the operator working that line and actuates certain apparatus to cause lamp 45 at the operator's position to light and the proper one of the lamps L₁, L₂, L₃, etc. in the operator's lamp bank to light. The former lamp warns the operator that more business is on the way and that she should hold the line until it arrives, while the latter lamp in-

dicates to the delivery girl the operator to whom the message should be delivered.

The operation of the operator finder circuit will be understood from the following description. Assume that line 1 is busy as indicated by its lighted "busy" lamp 10. The delivery girl notes this fact as she removes the message from compartment 67, associated with line 1, of the routing rack at the message distributing center. She then depresses key K₁ which is also associated with line 1 and thus lights one of the operator indicating lamps L₁, L₂, L₃, etc.

Assume that operator No. 1 is working line 1. When the delivery girl depresses key K₁ a circuit is closed from high frequency source 40, through condenser 50 to point 51 on line 1, where the current may divide between two paths. The path outwardly over the line encounters the impedance of the winding 5 of relay C, which may be so designed that it will offer a high impedance to the high frequency current but if a low impedance winding is desired, a tuned choke unit may be inserted in the line consisting of inductance 52 and capacity 53 having such values as to offer a high impedance to the high frequency current while affording a path of low impedance to the telegraph signals.

The other path from the point 51 is of low impedance for the high frequency currents over the plug 1, the tip of jack J of the cord circuit of operator No. 1, the right-hand armature and front contact of relay E, to point 55 where again there are two paths for this current, one being through the simplex printer SP² and generator OB to ground, the other path extending through conductor 56, condenser 57, and condenser 58 and inductance 60 in parallel to ground at 61. The magnet windings of printer SP² are of such a design as to offer a high impedance to this high frequency current.

The parallel resonant circuit consisting of the condenser 58 and inductance 60, is tuned to offer a low impedance to the high frequency current. This causes the high frequency current to apply a potential to the grid of vacuum tube 62 which results in an increase in the flow through the plate circuit from battery 63 through the winding of relay 46. Condenser 48, shunted around the winding of relay 46 smooths out the pulsating current in this circuit thus causing a steady current to flow through the winding of relay 46.

The operation of relay 46 causes the armature of this relay to establish a circuit from generator 64, through key 43 and lamp L₄₅ at the message distributing center, and key 44 and relay 65 at the operator's position. Current flowing over this circuit causes lamp L₄₅ to glow and energizes relay 65. The right hand armature and contact of relay 65 establishes a circuit to lamp 45 thus causing this lamp to glow.

As long as the delivery girl holds key K_1 in the depressed position, relay 46 will remain in the operated position and lamp L_1 will glow brilliantly. When the delivery girl releases key K_1 , relay 46 becomes deenergized but a circuit is still established from generator 64 through key 43, lamp L_1 , key 44, relay 65, thence through resistance 66 to ground. Due to the resistance 66 less current flows through this circuit thus causing lamp L_1 to glow with diminished brilliancy. However, this decreased current is of sufficient value to maintain relay 65 in the energized position. When the delivery girl places the message before the operator, she may depress key 44 to open the locking circuit through relay 65, thereby deenergizing this relay and extinguishing lamps 45 and L_1 . Depressing the key 43 at the distributing center will also open this locking circuit thus permitting the delivery clerk to clear out any signals she may have set up unintentionally or through error.

The fact that lamp L_1 glows brilliantly only while key K_1 is depressed as mentioned in the preceding paragraph permits the operator finder system to be used by a second delivery girl while the first delivery girl is carrying a message or messages to operator No. 1. Thus when the second delivery girl causes a lamp to light in the operator's lamp bank, she can distinguish this lamp from lamp L_1 which is already lighted since the former lamp will glow more brilliantly. In fact two or more delivery clerks may use the system simultaneously. Thus each girl when depressing one of the keys K_1 , K_2 or K_3 could send some particular code and by noting which lamp in the operator's lamp bank followed this code she could readily distinguish this lamp from the lamps being actuated by the other two delivery girls. For example, one of the girls could send a series of short impulses with her key, while another could send a series of long impulses, and still another could send a series of short and long impulses.

For the purpose of this description I have illustrated only one concentration unit circuit and one operator's cord circuit but it is to be understood that the concentration unit is provided with a circuit for each branch office line and a printer cord circuit for each operator's position or turret. I have shown the circuit arrangement for indicating at some central point the operator who is working any one of a number of busy circuits, as applied to the concentration unit disclosed in said prior Patent No. 1,804,327, but it will be evident to engineers that various modifications and changes may be made within the scope of my invention.

I claim:

1. In a telegraph system including lines extending from a plurality of branch stations and terminating in multiplied jacks or

plugs at a central station, a message distributing center at said central station adapted to receive messages for transmission over said lines, a receiving equipment at the central station for each line comprising a busy signal operated upon the seizure of the line, a plurality of printers at the central station each provided with a cord circuit adapted to be connected with any of said jacks or plugs, a signaling device operatively connected to each cord circuit and manually controlled means located at the distributing center for causing the operation of the signaling device in any cord circuit connected to a busy line.

2. In a telegraph system including lines extending from a plurality of branch stations and terminating in multiplied jacks or plugs at a central station or turrets, a receiving equipment at the central station for each line, a plurality of printers each provided with a cord circuit adapted to be connected with any of said jacks or plugs, a signaling device operatively associated with each cord circuit when it is connected to a jack or plug, and means assembled at a particular location for causing the operation of the signaling device associated with any cord circuit connected to a line plug or jack.

3. A cord circuit for simplex printers comprising in combination with the printer, means adapted to be connected to multiplied line jacks or plugs, a circuit connecting said means to said printer, and means connected to said circuit including a signaling device responsive to high frequency currents but unresponsive to telegraph signals.

4. In a cord circuit as set forth in claim 3, said means responsive to high frequency currents, including a holding circuit and a signaling device.

5. In combination, a printer line terminating in a plurality of multiplied contacts located at separate operator's positions or turrets at a central station, a plurality of printers at said station each provided with a cord circuit, each cord circuit having associated therewith means responsive to currents of a frequency higher than that of the telegraph signals but unresponsive to the latter, and manually controlled means at said station for causing the operation of said means associated with any cord when it is connected to one of said contacts.

6. In a telegraph system as defined in claim 2, said signaling device responding only to high frequency currents, and said means including a source of high frequency currents.

7. In a telegraph system including lines extending from a plurality of branch stations and terminating in multiplied jacks or plugs at a central station, said jacks or plugs being located at separate operators' positions or turrets, a receiving equipment at the cen-

tral station for each line, a plurality of printers each provided with a cord circuit adapted to be connected with any of said jacks or plugs, a signaling circuit operatively associated with each cord circuit including a thermionic device and a relay, a holding circuit including another relay and a signal device, and manually controlled signal means including a source of high frequency currents adapted to be transmitted over said cord circuit when the latter is connected to a jack or plug to thereby impress a potential upon said thermionic device and cause the operation of said relay and signal device.

8. In an intercommunication system embodying a central office and a plurality of branch offices, a line from each branch office terminating at the central office, circuit arrangements at the central office permitting any of said lines to be worked from any one of a plurality of operators' positions, a message distributing center, and means at said distributing center for determining from which operator's position any busy line is being worked.

9. In an intercommunication system embodying a central office and a plurality of branch offices having lines terminating thereat, a receiving equipment at the central station for each line, a plurality of printers each provided with a cord circuit adapted to be connected to the receiving equipment of any line, a signaling device operatively associated with each cord circuit, indicating devices corresponding to each printer and assembled at a particular location, and means for causing the operation of the signaling device and the indicator corresponding to any printer connected to a busy line.

In testimony whereof, I affix my signature.

WILLIAM B. BLANTON.