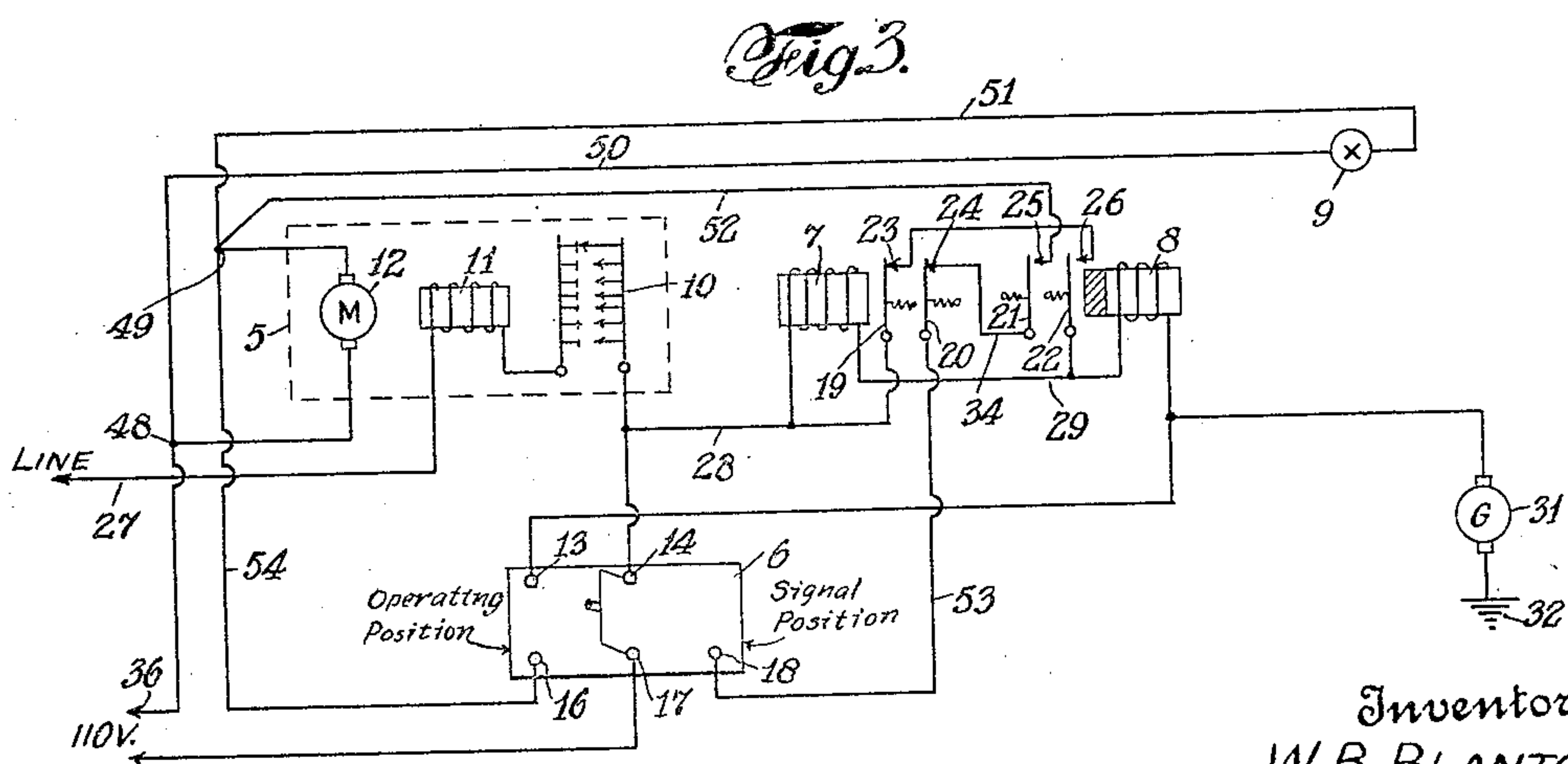
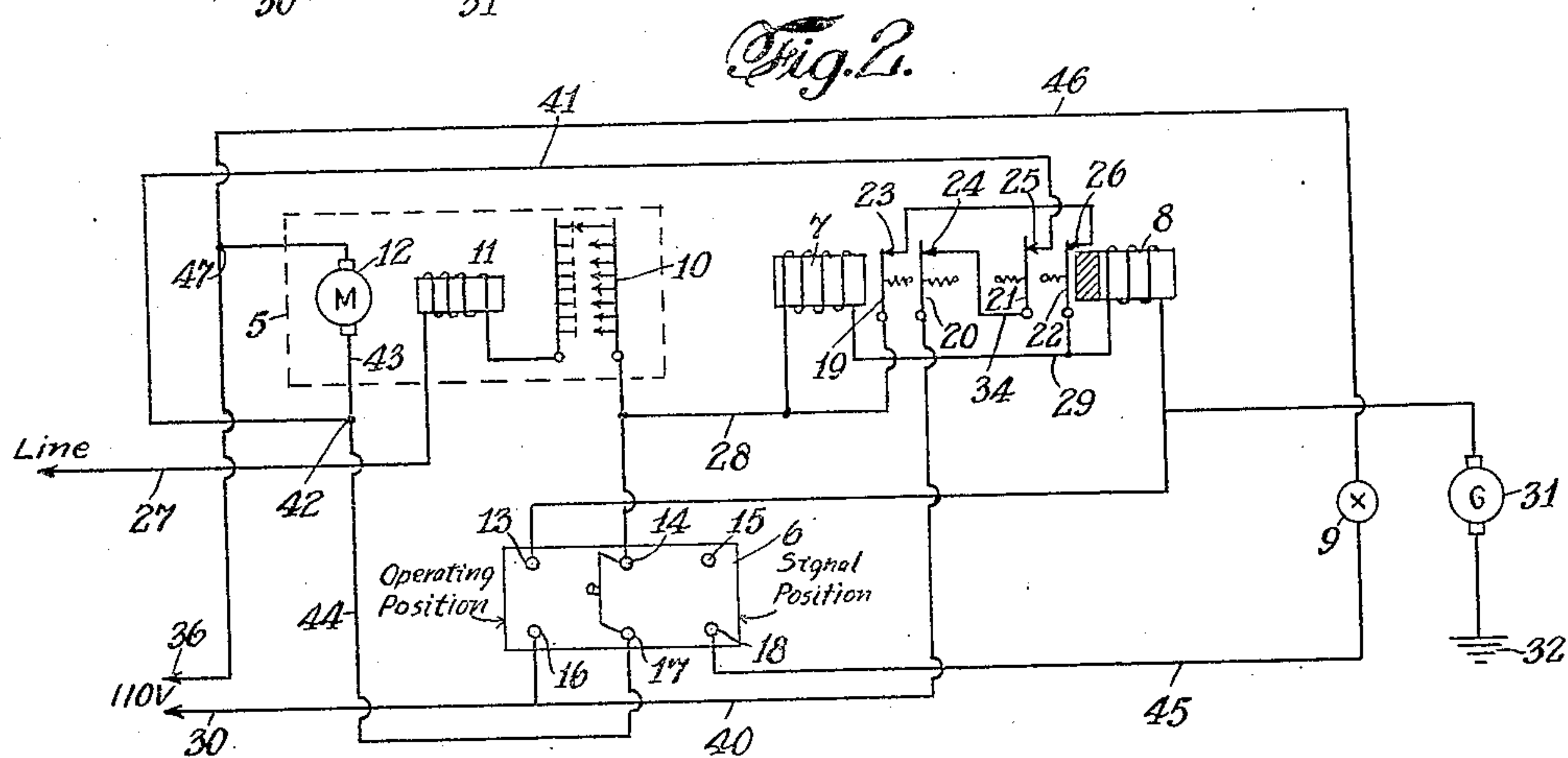


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CALL SIGNAL AND MOTOR CONTROL BOX FOR SIMPLEX PRINTERS

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By his Attorney Eugene C Brown

UNITED STATES PATENT OFFICE

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CALL SIGNAL AND MOTOR CONTROL BOX FOR SIMPLEX PRINTERS

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This invention relates to a call signal for a telegraph system and more particularly for a system employing printing machines.

In printing telegraph systems it is desirable, in order to save wear on the printing machines, eliminate noise and conserve on the current consumption of the machines, to maintain the driving motors idle when the circuit is not in operation but to have the printing unit immediately available when it is desired to transmit thereto.

In a copending application of Rothermel and Hewitt, filed Aug. 31, 1929, Serial No. 389,850, there is described, a call signal and motor control system for simplex printers in which the call signal and, if desired, the motor of the printing and transmitting unit are controlled at the distant station by a single open circuit condition of the line, the call system responding irrespective of the length of the time the open circuit condition is maintained. While this system has proven highly satisfactory there are certain installations in which so-called "concentrators" are employed at one terminal of the line, to which the above mentioned system is not well adapted since there is an opening of the line of from one to two seconds when the concentrator operator removes the plug of the printer cord circuit from the line jack, which sets up a false operation of the call signal. The concentration unit comprises a number of operating positions with a number of simplex printer lines disposed before each position so that the operator may plug into any one of the lines to receive or transmit over the line.

The improper operation of the signal device, due to the concentrator operator removing the plug from the line jack, has been avoided in a call system described in a copending application of E. W. Hewitt, filed Aug. 3, 1929, Serial No. 383,376, this latter system requiring a succession of open circuit conditions of the line, to effect the operation of the call signal.

It is one of the objects of the present invention to provide a call system for a telegraph circuit operable by a predetermined condition of the line, which may be employed

at an outer office having a line terminating in a concentration unit or other apparatus at a main office and which call system may be operated directly from the ordinary key-board transmitter.

Another object is to provide a call system for a telegraph system which is responsive to a predetermined condition of the line of limited duration.

Another object is to provide a simple and reliable call system for a simplex telegraph system.

Other objects and advantages will hereinafter appear.

In accordance with my invention I employ, at the station to be called, an audible or a visible signal, the operation of which is controlled, by a single open circuit condition of the line, through a pair of co-operating relays having different speeds of operation, one being fast to operate and one slow to operate, and a manually operated switch having two positions, i. e., a motor operating position and a signal position, in the latter of which the switch is placed when the printing and transmitting unit is idle. The manual switch is associated with the printing and transmitting unit and the signal controlling relays so that the call signal controlling mechanism is operable only when the switch is in the signal position.

When an open circuit condition is produced by the calling operator, the fast relay will release its contact tongue, which will close a contact to operate the call signal device and at the same time close a short circuit for its winding through the contacts of the slow relay. If the open circuit condition is discontinued before the slow relay has released its contact tongue, the call signal will remain in operation until discontinued by the attendant at the called station throwing the manual switch to its "operating" position. If, however, the open circuit condition of the line is prolonged for a sufficient period to enable the armature of the slow relay to be released, the call signal circuit may be broken at the relay contact and only a momentary energizing of the call signal device will have occurred, or the call signal circuit

may be maintained as long as the open circuit condition continues but will be opened when the open circuit condition is discontinued.

5 If desired the motor of the printing and transmitting unit may be automatically started simultaneously with the closing of the call signal circuit.

10 The motor of the printing and transmitting unit is stopped, when the exchange of business has been completed, by the attendant manually returning the switch to the signal position, thus conditioning the call mechanism so it will respond to the succeeding call.

15 In order that the invention may be more fully understood reference will be made to the accompanying drawings in which:

20 Figure 1 is a circuit diagram of the call system applied to a simplex printing unit;

Figure 2 is a circuit diagram showing the call system and automatic motor control for a simplex printer; and

25 Figure 3 is a circuit diagram of a call signal and motor control system in which the call signal remains in operation during the entire period of operation of the printing and transmitting unit.

30 In the drawings I have shown diagrammatically the apparatus and circuit arrangement at a single station only, it being understood that the opposite end of the line may terminate in a concentration unit or other apparatus, or where it is desired to call in each direction, a similar apparatus may be employed at the opposite end of the line.

35 The essential apparatus of the call system comprises the printing and transmitting unit 5, a manual switch 6, a fast to operate and fast to release relay 7, a slow to operate and slow to release relay 8 and a signal device 9.

40 The printing and transmitting unit is diagrammatically illustrated and includes the transmitting contacts 10, selecting magnet 11 and motor 12. The manual switch 6 is illustrated as a double pole, double throw, knife switch, having contacts 13, 14, 15, 16, 17 and 18. Contacts 13 and 16 constitute the operating position of the switch and contacts 15 and 18 the signal position.

45 The controlling relays 7 and 8 are each provided with two tongues 19, 20 and 21, 22, respectively. Tongues 19 and 20 of relay 7 are each provided with a single back contact 23 and 24, respectively, and the tongues 21 and 22 of the relay 8 are each provided with a single front contact 25 and 26, respectively. The normal position of the relay tongues when the line is idle and the relay windings energized is such that the contacts of relay 7 are open and those of relay 8 closed, as shown in Figure 1. When an open circuit condition of the line is produced of insufficient duration to release the tongues of relay 8, all the relay contacts are closed as

shown in Figure 2. This is the normal position of the relay contacts for operating the call signal. When a prolonged open circuit condition of the line is produced the contacts of relay 7 are closed and those of relay 8 70 opened, as shown in Figure 3.

Referring first to the system shown in Figure 1, it will be noted that with the line idle and switch 6 in the signal position, the contacts 23 and 24 will be open and the contacts 21 75 and 22 closed by the steady line current, the line circuit being completed from the line 27, through switch contacts 15 and 14, conductor 28, winding of the relay 7, conductor 29, winding of the relay 8, conductor 30 and 80 generator 31, to the ground at 32. The selecting magnet 11 and transmitting contacts 10, of the printing and transmitting unit, are short circuited across the contacts 14 and 15. When an open circuit condition of the line 85 is produced the relay tongues 19 and 20 of relay 7 are first released, the tongues 21 and 22 of the relay 8 being retained against their contacts by the slow to release characteristic of the relay. The closing of contact 20 90 completes the signal circuit from one side 30 of the power line through conductor 31, switch contacts 17 and 18, conductor 32, signal device 9, conductor 33, relay contact 25, conductor 34, relay contact 24 and conductor 95 35 to the opposite side 36 of the power line. At the same time the winding of the relay 7 is short circuited through the contact 23, conductor 37 and contact 26, so as to maintain the tongue 20 closed. 100

If the open circuit condition is of such short duration that the relay 8 does not have sufficient time to release its tongues, the signal will be maintained in operation until manually released by the operator, whose attention 105 has been attracted by the signal, throwing the manual switch 6 to the operation position. If, however, the open circuit condition is of such duration as to effect the release of the tongues of the relay 8, as by the 110 disengagement of the plug at the concentration unit or due to an accidental opening of the line, the signal circuit will be immediately opened at the contact 25 and the short circuit for the relay 7 will be opened at contact 26, thus restoring the winding of the relay 7 to the line circuit and reconditioning the system to respond to a true call signal of the proper duration. 115

In practice I have found that a slow relay 120 which releases in about one-third of a second and operates in from one-fiftieth to one one-hundredth of a second to be satisfactory providing the relay 7 is sufficiently rapid.

If, for instance, the open circuit condition 125 of the line is maintained for a sufficient period to cause both relays 7 and 8 to release, upon again closing the line circuit, relay 7 must be sufficiently slow to pick up to enable the relay 8 to operate first, to open its con- 130

tact 26, since should contact 23 of relay 7 close before contact 26 opened, the short circuit for relay 8 would be reestablished and the call signal would continue to operate.

5 Upon movement of the switch 6 to its operating position the circuit to the motor 12 is closed from the conductor 31, contacts 17 and 16, conductor 38, motor 12 and conductor 39 to the power line and at the same time the
10 relays 7 and 8 are short circuited across the contacts 13 and 14 so that there will be no extra resistance or induction included in the line due to the control mechanism. The short circuiting of relay 8 releases the con-
15 tact tongues thereof and thus breaks the short circuit to the winding of the relay 7 so that upon return of the switch 6 to its signal position the controlling relays will be in condition to respond to the succeeding signals.

20 The motor is stopped after the exchange of business has been completed by manually returning the switch 6 to its signal position.

In Figure 2 I have shown a slightly different arrangement in which the motor 12 is
25 started simultaneously with the closing of the circuit to the signal device, so that the transmitting operator need not wait for the attendant to throw over the manual switch, but may transmit immediately. In such
30 case it is necessary that the selecting magnet 11 remain in the line in both the signal and operating positions of the switch 6, which is accomplished by leaving the contact 15 disconnected. The motor and signal
35 device circuits are completed by the closing of the relay contact 24 and may be traced from the power conductor 30 through the conductor 40, contacts 24 and 25, conductor 41 to the point 42, where the current divides,
40 part going through the conductor 43 and motor 12 to the point 47 and the other part going through the conductor 44, switch contacts 17 and 18, conductor 45, signal device 9 and conductor 46 to the point 47, where the cur-
45 rent recombines and proceeds to the opposite side 36 of the power line. The motor 12 is thus started into operation so that the transmitting operator may immediately transmit to the printing unit.

50 As soon as the attention of the attendant has been attracted by the operation of his signal device, he moves the switch 6 to the operating position, thus breaking the signal circuit at the contact 18 and completing the
55 motor circuit across the contacts 16 and 17. The continued operation of the motor will then not be dependent upon perfect electrical connections at the relay contacts 24 and 25.

If, for some reason, the attendant is not
60 present at the time the call is made, the transmitting operator may nevertheless proceed to transmit and at the conclusion of the transmission to stop the motor of the printing apparatus by producing an open circuit
65 condition sufficiently prolonged to cause the

slow to release relay 7 to release, thereby interrupting the motor circuit at contact 24 and the short circuit around relay 8 at contact 23.

In Figure 3 a further arrangement is shown
70 similar to Figure 2 except that the signal lamp is maintained in operation during the entire period of operation of the printing and transmitting unit. This arrangement is desir-
75 able where there are a number of printing units located in the same room since it gives the attendant a visible indication of which machines are in operation.

With the switch 6 in the signal position the motor and signal circuits may be traced from
80 the power conductor 36 to the point 48, where the current divides, part going through the motor 12 to the point 49 and part going by the conductor 50, signal device 9 and conductor 51 to the point 49, where the current recom-
85 bines and returns to the power line through the conductor 52, relay contacts 25 and 24, conductor 53, and contacts 18 and 17 of the switch 6. When the switch is in the operating position, the circuit for the motor and signal
90 is completed as before to the point 49, from which it proceeds through conductor 54 and contacts 16 and 17 to the power line.

Thus it will be noted that the signal lamp serves both as a call signal when the system
95 is idle and as an indicating lamp to indicate the operating condition of the system during the transmission of business.

If desired, the relay tongue 21 and its con-
100 tact 22, of the slow relay 8 may be omitted and the contact 24 connected directly to the conductor to which the contact 25 is connected, in which case the signal will not be discontinued when the slow relay releases its
105 tongue but will remain in operation as long as the open circuit condition of the line continues. However, the short circuit path of the winding of the fast relay 7 will be opened
110 upon release of the tongue of the slow relay 8 so as to enable the relay 7 to restore itself when the open circuit condition of the line is discontinued and thereby open the signal circuit.

This is particularly desirable in connection
115 with the embodiments shown in Figures 2 and 3, since it eliminates one contact in the completion of the motor circuit.

It is obvious that other changes and ar-
120 rangements may be devised within the scope of the invention and therefore I do not desire to be limited to the exact circuit arrangements illustrated and described, except in accordance with the appended claims.

What is claimed is:

125 1. A call system for a telegraph system comprising a signal device, means for operating said signal device only in response to a predetermined condition of the line of short duration, said means comprising a fast to re- 130

lease relay and a slow to release relay, in the line circuit.

2. A call system for a telegraph system comprising a signal device, a circuit therefor, means for operating said signal device in response to an open circuit condition of the line of short duration, said means comprising a pair of relays having different speeds of operation and manual means for short circuiting the windings of said relays.

3. A call system for a telegraph system comprising a signal device, a circuit therefor, a fast relay and a slow relay in the line circuit, said fast relay responding to an open circuit condition of the line to close said signal circuit and at the same time short circuiting the winding of the fast relay, and said slow relay operating after a predetermined duration of said open circuit condition of the line to open the short circuit path of the winding of the fast relay.

4. A call system for a telegraph system comprising a signal device, a circuit therefor, a fast relay and a slow relay in the line circuit, said fast relay responding to an open circuit condition of the line to close said signal circuit and at the same time short circuit the winding of the fast relay, and said slow relay operating after a predetermined duration of said open circuit condition of the line to open the short circuit to the winding of the fast relay, and means for opening said signal circuit and for short circuiting the windings of both relays.

5. In a telegraph system having a printing machine and a driving motor therefor, a call signal and motor control system comprising a signal device, a circuit therefor, a circuit for said motor and relay means responsive only to a predetermined condition of the line of short duration for closing and maintaining the motor and signal circuits simultaneously.

6. In a telegraph system having a printing machine and a driving motor therefor, a call signal and motor control system comprising a signal device, a circuit therefor, a circuit for said motor and relay means responsive only to an open circuit condition of the line of short duration for closing and maintaining the motor and signal circuits, and a manually operated switch for closing said motor circuit independently of said relay means.

7. In a telegraph system having a printing machine and a driving motor therefor, a call signal and motor control system comprising a signal device, a circuit therefor, a circuit for said motor and relay means responsive only to an open circuit condition of the line of short duration for simultaneously closing and maintaining the motor and signal circuits, and a manually operated switch for opening said signal circuit, closing said motor circuit independently of said

relay and short circuiting said relay means.

8. In a telegraph system having a printing machine and a driving motor therefor, a call signal and motor control system comprising a signal device, a circuit therefor, a circuit for said motor, relay means responsive only to an open circuit condition of the line of short duration for closing and maintaining the signal circuit and a manually operated switch for closing said motor circuit.

9. In a telegraph system having a printing machine and a driving motor therefor, a call signal and motor control system comprising a signal device, a circuit therefor, a circuit for said motor and relay means responsive only to an open circuit condition of the line of short duration and maintaining the signal circuit and a manually operated switch for opening said signal circuit, closing said motor circuit and short circuiting said relay means.

10. In a telegraph system having a printing machine and a driving motor therefor, a call signal and motor control system comprising a signal device, a circuit therefor, a circuit for said motor, relay means responsive only to predetermined condition of the line of short duration for closing and maintaining the signal circuit and a manually operated switch for opening said signal circuit and closing said motor circuit.

11. In a telegraph system having a printing machine including a code signal responsive mechanism and a driving motor, a call system comprising a call signal device, a circuit therefor, a circuit for said motor, a switch having an operating position and a signal position, said switch in its signal position preparing the circuit for said call signal device and means for closing the signal circuit only in response to a predetermined condition of the line of short duration, said means comprising a fast to release relay and a slow to release relay having their windings in the line circuit, said switch in the operating position closing the motor circuit and short circuiting the windings of said relays.

12. A call system for a telegraph line comprising a signal device, a circuit therefor, a relay responding to a line condition for closing said circuit and at the same time short circuiting the relay winding, and means operating after a predetermined duration of said line condition for opening said short circuit.

13. A printing telegraph system comprising a plurality of stations, a normally closed line connecting said stations, printing telegraph apparatus and a motor therefor at one of said stations, means for opening and closing said line at the other of said stations and means at said first station, directly in said line circuit, responsive to an open circuit condition of the line to effect the starting of said motor and other means also directly in said

line circuit responsive when said line is maintained open for a predetermined period to effect the stopping of said motor.

14. A printing telegraph system comprising a plurality of stations, a normally closed line connecting said stations, a printing telegraph apparatus and a motor therefor at one of said stations, means for opening and closing said line at the other of said stations, a relay at said first station responsive to an open circuit condition of said line to effect the starting of said motor and a second relay in series with the first relay responsive when said line is maintained open for a predetermined period to effect the stopping of said motor.

15. A printing telegraph system comprising a plurality of stations, a normally closed line connecting said stations, a printing telegraph apparatus, a motor therefor and a call signal at one of said stations, means for opening and closing said line at the other of said stations, a relay at said first station responsive to an open circuit condition of the line to effect the operation of said signal and a second relay in series with said first relay responsive when said line is maintained open for a predetermined period to discontinue the operation of said signal.

16. A printing telegraph system comprising a plurality of stations, a normally closed line connecting said stations, a printing telegraph apparatus, a motor therefor and a call signal at one of said stations, means for opening and closing said line at the other of said stations, a relay at said first station responsive to an open circuit condition of the line to effect the operation of said signal and starting of said motor and a second relay in series with said first relay responsive when said line is maintained open for a predetermined period to effect the stopping of said motor and discontinuing the operation of said signal, said second relay being slower to operate and slower to release than said first relay.

17. A printing telegraph system comprising a plurality of stations, a normally closed line connecting said stations, a printing telegraph apparatus and a motor therefor at one of said stations, means for opening and closing said line at the other of said stations, electro-magnetic means at said first station directly in the line circuit responsive to an open circuit condition of said line to effect the starting of said motor and further responsive when said line is maintained open for a predetermined period to effect the stopping of said motor and means for eliminating said electro-magnetic means from said line circuit during the operating of said printing telegraph apparatus.

18. A printing telegraph system comprising a plurality of stations, a normally closed line connecting said stations, a printing tele-

graph apparatus, a motor therefor and a call signal at one of said stations, means for opening and closing said line at the other of said stations, a relay at said first station responsive to an open circuit condition of the line to effect the operation of said signal, a second relay in series with said first relay responsive when said line is maintained open for a predetermined period to discontinue the operation of said signal and means for eliminating said relays from the line circuit during operation of said printing telegraph apparatus.

In testimony whereof I affix my signature.

WILLIAM B. BLANTON.

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