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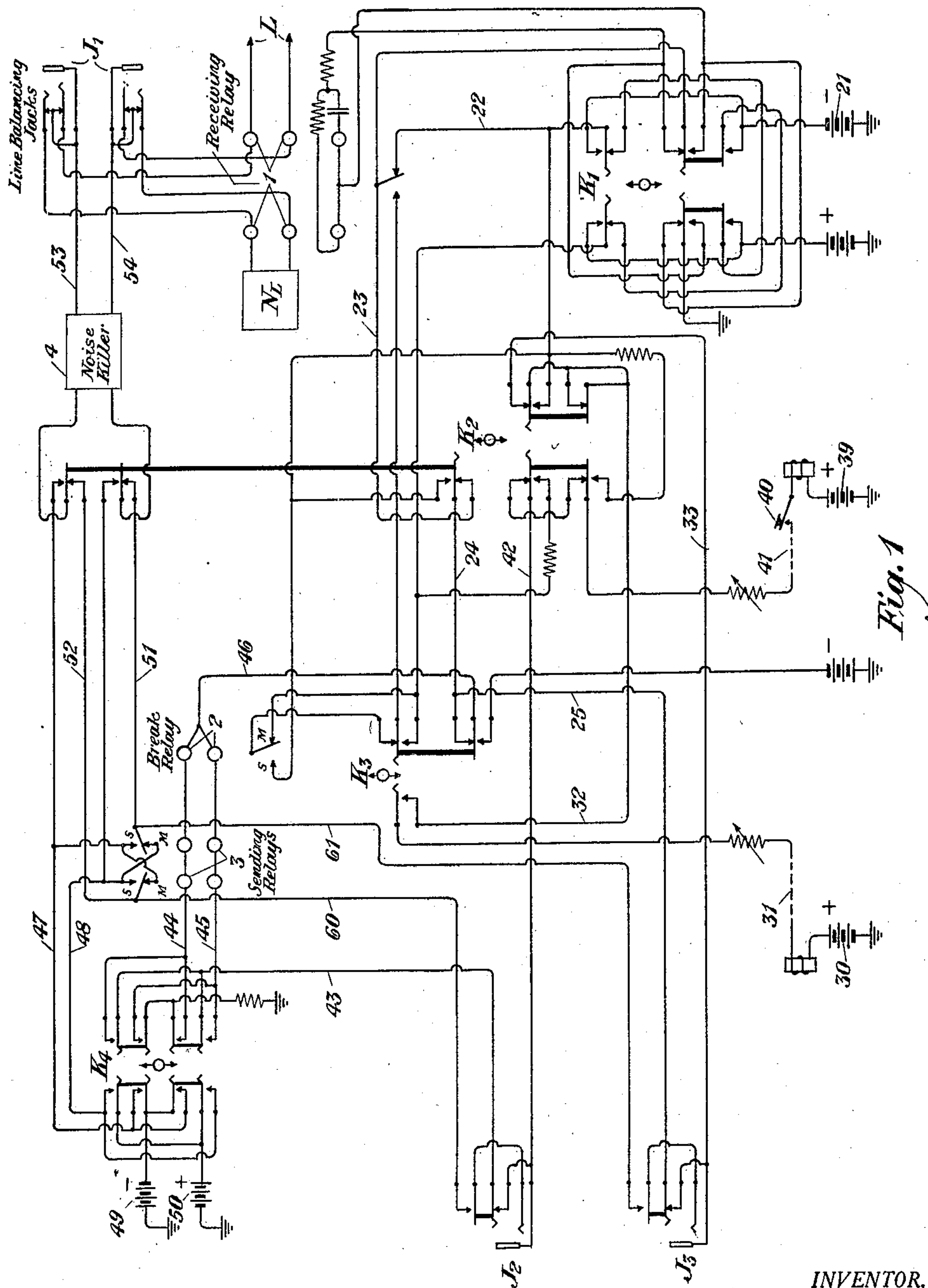
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1,732,255

TELEGRAPH MONITORING SYSTEM

Filed Dec. 16, 1927

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

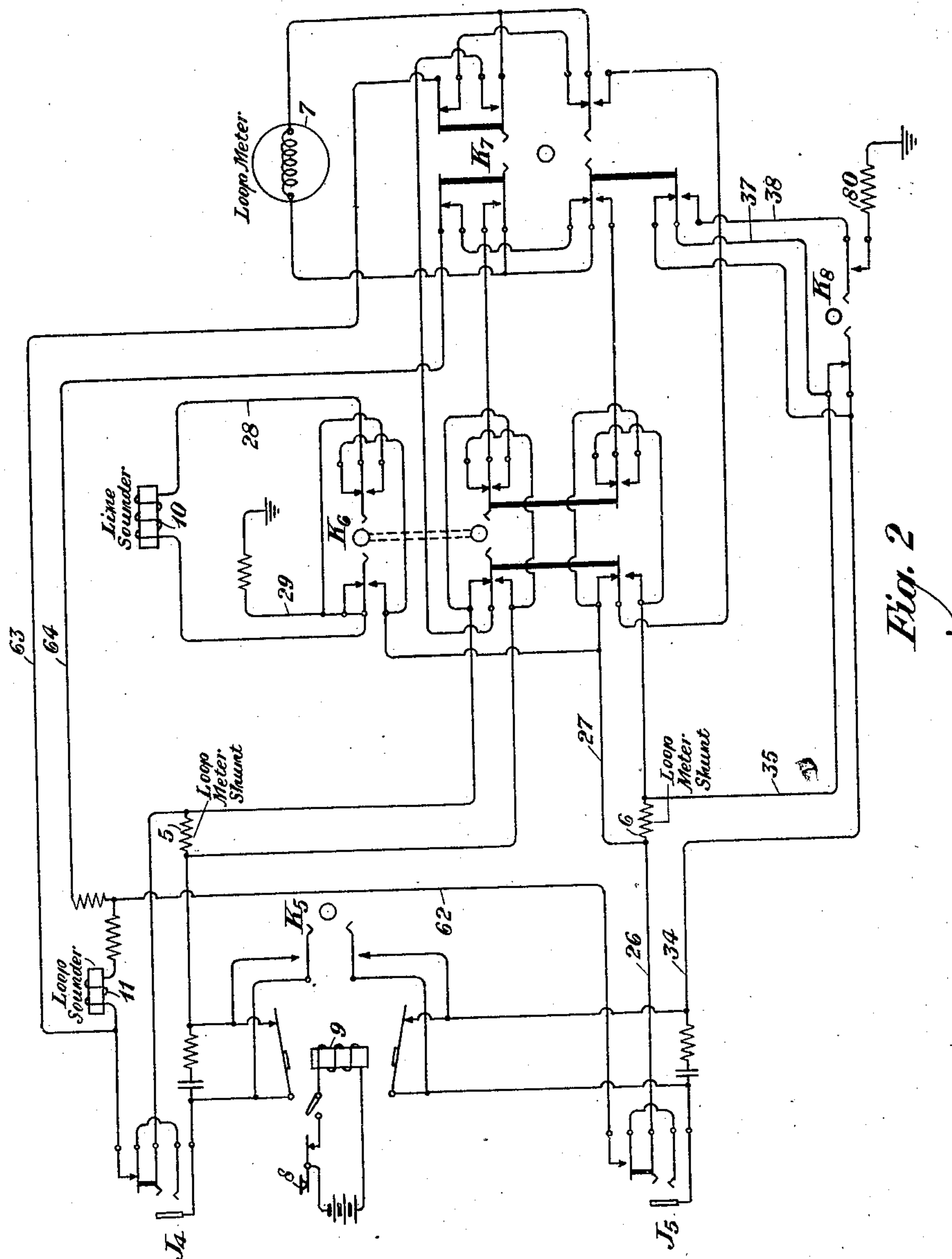


Fig. 2

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TELEGRAPH-MONITORING SYSTEM

Application filed December 16, 1927. Serial No. 240,478.

This invention relates to telegraph systems and more particularly to improved monitoring arrangements for use with the repeater apparatus of such systems.

5 An office at the terminal of a telegraph system will include racks which will hold a plurality of terminal repeaters. It has been the practice in the past to provide each of these repeaters with individual monitoring
10 equipment, whereby an attendant may send or receive signals through the repeater or make desirable current measurements therein. It is the primary purpose of the arrangements of this invention to provide a monitoring
15 arrangement which may be common to a plurality of repeaters at a terminal office. Such an arrangement of common monitoring would have great advantages over a system of individual monitoring in respect to a large
20 saving in equipment. Other features and advantages of the invention will appear more fully from the detailed description hereinafter given.

The invention may be more fully understood from the following description together with the accompanying drawing in the Figures 1 and 2 of which the invention is illustrated. Fig. 1 is a circuit diagram of a metallic terminal telegraph repeater. In
30 Fig. 2 is shown a circuit diagram of a common monitoring set which may be utilized with the terminal repeater of Fig. 1.

In Fig. 1 is shown the circuit of a terminal metallic repeater of the balanced loop type.
35 The repeater includes the line L and the line receiving relay 1, the sending relays 3, the break relay 2, the switching keys K_1 , K_2 , K_3 and K_4 and in addition connections to the noise killer device 4 and the balancing network N_L . It also includes a number of
40 sending and receiving batteries to be described later and the line balancing jacks J_1 and the jacks J_2 and J_3 whereby connections may be established with the monitoring set. The circuit of the monitoring
45 set of Fig. 2 includes jacks J_4 and J_5 . It also includes the loop meter shunts 5 and 6 and the meter 7. There is also shown a telegraph sending key 8 connected to a local
50 sending relay 9, a line sounder 10 and a

loop sounder 11. There are provided four switching keys K_5 , K_6 , K_7 and K_8 incidental to the operation of the monitoring set. As has been pointed out connections are made between the monitoring set and repeater by
55 means of cords and plugs and the jacks J_2 , J_3 , J_4 and J_5 .

The invention may be more fully understood from the following description of its operation.

60 Signals coming in over line L will operate the receiving relay 1 which will operate its armature to close a circuit through the sounder in the subscriber's loop and also through the line sounder 10 in the monitoring set. For this purpose key K_1 will be
65 thrown up, key K_6 left normal and key K_3 thrown down. The circuits may be traced as follows: from battery 21, upper right hand contact of key K_1 , conductor 22, contact of
70 relay 1, conductor 23, contact of key K_2 , conductor 24, conductor 25, tip contacts of jacks J_3 and J_5 , conductors 26 and 27, upper right hand contact of key K_6 , conductor 28, through
75 line sounder 10, upper left hand contact of key K_6 , over conductor 29 to ground. This circuit will control the operation of the sounder 10 in the monitoring set. The above traced circuit may be extended as follows:
80 from conductor 26, through the line meter shunt 6, conductor 35, contact of key K_8 , conductor 34, sleeve contacts of jacks J_5 and J_3 , conductor 33, upper right hand contact of key K_2 , conductor 32, left hand contact of
85 key K_3 , and thence over the subscriber's receiving loop 31 to battery 30. This circuit will operate the sounder in the subscriber's loop 31.

With the above described circuits closed a reading may be taken by meter shunt 6 and
90 meter 7 when key K_7 is operated down. This reading will give a measurement of the receiving loop current.

To measure the bias of the received or incoming signals the keys K_8 and K_7 would
95 be thrown down. The above traced circuit from the armature of the receiving relay 1 would be completed from conductor 26 as follows: meter shunt 6, conductor 35, conductor
100 37, contact of key K_7 , conductor 38, and right

hand contact of key K_3 , to ground through resistance 80. Under the above conditions a reading of meter 7 and meter shunt 6 will indicate the bias of the received signals.

5 When the subscriber wishes to send signals he will operate the key 40 in his sending loop 41. The key K_2 may be in normal position and key K_4 will be up. This will complete the following circuit: from battery 39, key
10 40, loop 41, left hand contacts of key K_2 , conductor 42, conductor 43, then over conductor 44 and through windings of sending relays 3 and break relay 2, conductor 46, contact of key K_3 , conductor 24, contact of key K_2 , con-
15 ductor 23, armature of relay 1, conductor 22, contact of key K_1 , to battery 21. This will operate the sending relay 3 and by means of conductors 47 and 48 will connect the sending batteries 49 and 50 to the conductors 51 and
20 52, the conductors 53 and 54, and thence to the sides of line L to transmit signals thereover. At the same time current may be transmitted over a circuit in parallel with conductors 51 and 52. This circuit comprises
25 conductors 60 and 61, ring contacts of jacks J_2 , J_3 , J_4 and J_5 , winding of loop sounder 11 and conductor 62. Accordingly the transmitted signals will be heard on the monitoring set by the loop sounder 11.

30 To measure the bias in the transmitted signals the key K_7 will be left in normal position. The above traced circuit to loop sounder 11 may be extended by a shunt or leak circuit comprising conductors 63 and 64, contacts
35 of key K_7 and loop meter 7. The loop meter 7 will then indicate the bias in the transmitted signals.

The key K_2 is termed the cutting key. When it is in normal position the received
40 signals will pass through the repeater both to the subscriber's loop and to the sounder in the monitoring set as has been pointed out heretofore. The sending loop is connected to the repeater so that signals originating in that
45 loop will be repeated to line "L". When the cutting key K_2 is thrown to a downward position the loops are cut off from the repeater and the monitoring arrangements may be used for communication with the line. Under this
50 condition it is still possible for the subscriber to send signals in the loop locally without being transmitted to the line "L".

When the cutting key K_2 is thrown to its upward position it opens the conductors 51
55 and 52, and hence disconnects the sending relay armatures from the line L, thereby preventing signals from being transmitted to the line L from the loop. Signals will be recorded to the loop sounder 11 under this condi-
60 tion. Also the receiving relay circuit and conductor 23 will be opened at key K_2 to prevent signals from the line going to the subscriber.

The process of sending from the monitoring
65 set is as follows: Signals are sent from the

monitoring set by opening and closing the loop circuit by means of the contacts of relay 9, which is operated from battery by means of key 8. This opening and closing of the loops when opposing batteries are connected there-
70 to will cause the subscriber's relays to operate and also cause the sending relays 3 to operate and send signals to the line L.

While the invention has been disclosed as embodied in certain specific arrangements
75 which are deemed desirable, it is understood that it is capable of embodiment in many and other widely varied forms without departing from the spirit of the invention as defined by the appended claims.

What is claimed is:

1. A telegraph station comprising a plural-
ity of repeater sets of the terminal type, each of said repeater sets including individual
85 transmitting circuits and individual receiving circuits, a single monitoring set common to a plurality of repeater sets, and switching means whereby each of said transmitting cir-
90 cuits and receiving circuits may be individually extended into said common monitoring set.

3. A telegraph station including a repeater set of the terminal type, said repeater set hav-
ing a transmitting circuit and a receiving cir-
95 cuit, a monitoring set, switching means in said repeater set and said monitoring set whereby said transmitting circuit and said receiving
100 circuit may be extended into said monitoring set, and signal responsive means in said cir-
cuits as extended into said monitoring set.

3. A telegraph station including a repeater
100 set of the terminal type, said repeater set hav-
ing a transmitting circuit and a receiving cir-
cuit, a monitoring set, switching means in said
105 repeater set and said monitoring set whereby said transmitting circuit and said receiving
110 circuit may be extended into said monitoring set, signal responsive means and current meas-
uring devices in said monitoring set, and
switching means in said monitoring set where-
by said signal responsive means and said cur-
rent measuring devices may be selectively as-
sociated with said circuits as extended therein.

4. A telegraph station including a repeater
115 set of the terminal type, said repeater set hav-
ing a transmitting circuit and a receiving cir-
cuit, transmitting means in said transmitting
circuit, a monitoring set, switching means in
said repeater set and said monitoring set
whereby said transmitting circuit and said
120 receiving circuit may be extended into said
monitoring set, and means in said monitoring
set whereby said transmitting means may be
actuated.

5. A telegraph station including a repeater
125 set of the terminal type, said repeater set hav-
ing a transmitting circuit and a receiving cir-
cuit, and a monitoring set, said repeater set
and said monitoring set each including switch-
ing means and a set of six conductors where-
130 by said transmitting circuit and said receiv-

ing circuit may be individually extended into said monitoring set.

6. A telegraph station including a repeater set of the terminal type, said repeater set having a transmitting circuit and a receiving circuit, a line circuit, a cutting key whereby said circuits may be selectively associated with said line circuit, a monitoring set, and switching means whereby said transmitting and receiving circuits may be individually extended into said monitoring set.

In testimony whereof, I have signed my name to this specification this 16th day of December, 1927.

DAVID E. BRANSON.