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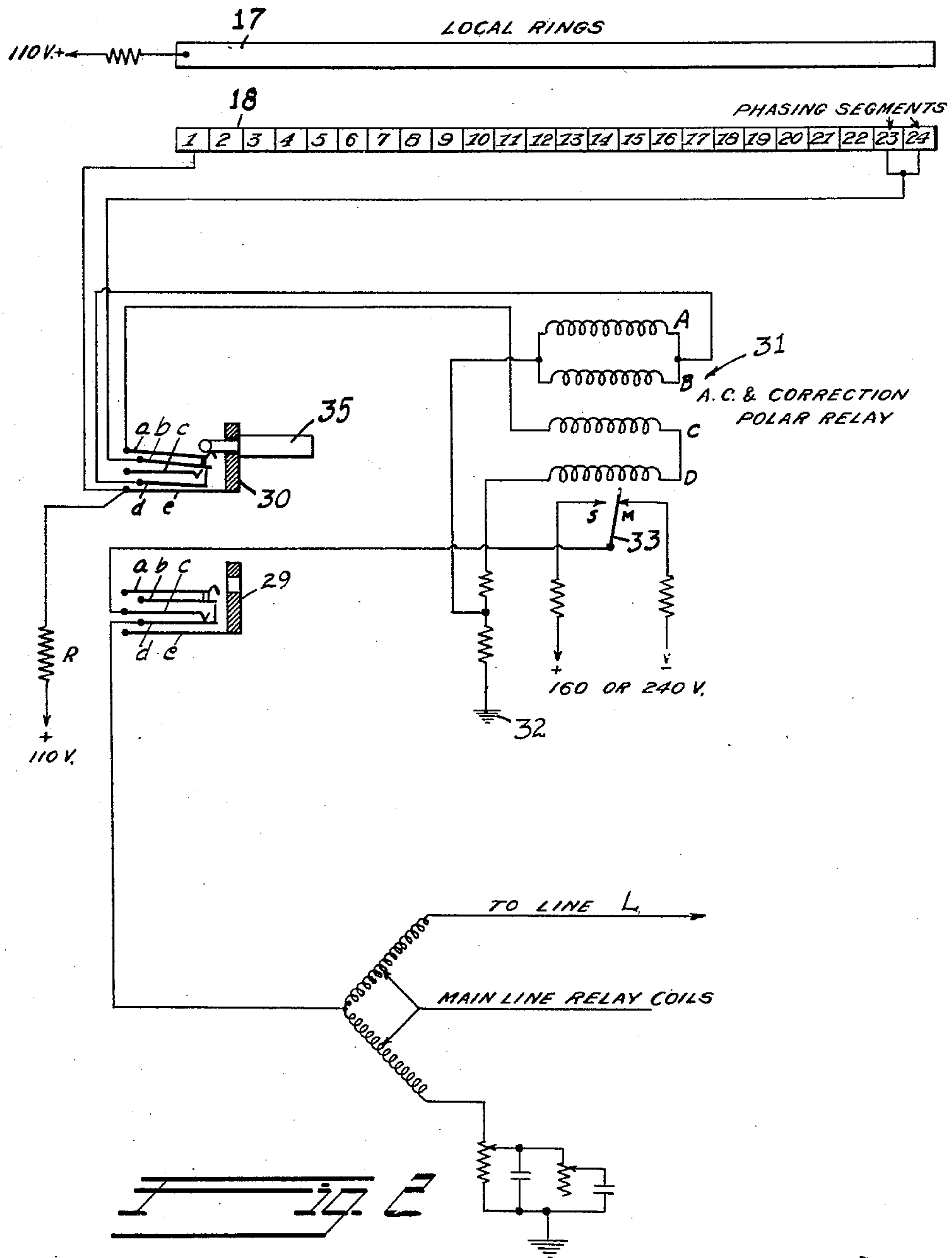
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MEANS FOR SENDING ALTERNATING CURRENTS TO MULTIPLEX LINES

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MEANS FOR SENDING ALTERNATING CURRENTS TO MULTIPLEX LINES

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This invention relates to a telegraph transmission system and more particularly to a multiplex telegraph system for transmitting rapid current reversals to duplex telegraph lines for balancing purposes.

The present invention is particularly advantageous in multiplex telegraph transmission systems in which a single distributor is employed to transmit simultaneously to a plurality of lines, as for instance, in the distribution of news, commodity quotations, and similar information, although it is not limited thereto.

In the operation of multiplex systems, in addition to the ordinary intelligence signals, it is necessary to transmit, from time to time, series of rapid current reversals or alternating current impulses for use in obtaining a balance between the artificial and real lines of the duplex system, and also to transmit phasing impulses for use in obtaining the proper phase relation between the transmitting and receiving distributors.

Heretofore it has been necessary to discontinue the operation of the tape or other transmitter while sending the alternate current impulses or balancing signals over the line. According to one system extensively used, the sending segments of the transmitting distributor are disconnected from the contacts of the tape transmitter by means of a plug and socket connection, and joined to a balancing or alternating current block which serves to supply potential of one polarity to the alternate segments of the sending ring and to the remaining segments potential of the opposite polarity, so as to transmit, alternately, impulses of positive and negative polarity to the duplex line as the sending brush of the distributor passes over the sending segments.

Similarly, the transmitting distributor must be employed for sending the phasing signals to the line and, therefore, during the phasing periods the transmission of intelligence signals through the distributor must be discontinued.

It will be appreciated from the foregoing that where a single transmitting distributor is employed to send to a large number of lines,

that the transmission to all lines must be discontinued and the lines rendered idle whenever it is necessary to send either balancing or phasing signals to any one of the lines.

An arrangement permitting the transmission of phasing signals to any one or more of a number of lines associated with a single distributor without interrupting the transmission of intelligence signals to the remaining lines, is described in our Patent No. 1,790,150, dated January 27, 1931, and entitled "Means of phasing."

The present invention has for one of its objects to produce a multiplex telegraph system utilizing a single distributor for transmitting simultaneously to two or more lines, in which balancing signals may be transmitted to any one or more of the lines without interrupting the transmission of intelligence signals to the remaining lines.

Another object is to provide a distributor having facilities for simultaneously transmitting intelligence signals to one or more lines and for transmitting balancing signals or rapid current alternations to other lines.

A still further object is to provide a distributor having facilities, independent of the sending rings, for transmitting balancing signals to the lines associated therewith.

Other objects and advantages will hereinafter appear.

The present invention will be described with particular reference to the accompanying drawings in which

Figure 1 is a diagrammatic view of a transmitting apparatus embodying our invention; and

Figure 2 is a diagrammatic view of a portion of the apparatus for transmitting phasing signals showing the relation thereof to the present invention.

The transmitting distributor shown in Figure 1 comprises a pair of sending rings, a pair of local rings, and a pair of A. C. sending rings or balancing rings, the distributor being arranged for two channel multiplex operation, although it is to be understood that the invention is equally applicable to three or four channel systems. The sending rings comprise a solid ring

and a segmented ring 11, the latter having segments numbered 1 to 12. Segments 1 to 6 are connected, by a group of conductors 12 to the contact tongues 13 of a tape transmitter 14, operating into channel A of the multiplex system and segments 7 to 12 are similarly associated, through a group of conductors 15, with a tape transmitter 16 operating into channel B. The tape transmitters serve to set up on the sending segments, combinations of positive and negative battery in accordance with a permutation code, for transmission to the outgoing lines. The tape transmitters may be of the type shown in Patent #1,298,440 to G. R. Benjamin, granted March 5, 1919.

The local rings comprise a solid ring 17 connected to a source of positive polarity and a segmented ring 18 having twenty-four segments. Segments 2, 3 and 4 are connected to one terminal of the operating magnet 19 of the B channel transmitter 16, and segments 14, 15 and 16 are connected to the operating magnet 20 of the A channel transmitter 14. Certain of the remaining segments of ring 18 are employed for purposes apart from the present invention, as for transmitting phasing signals and operation of the receiving printing mechanism.

The A. C. sending rings comprise a solid ring 21 and a segmented ring 22, the latter having segments corresponding in number to sending ring 11. The odd numbered segments of ring 22 are strapped together and connected to a source of positive polarity, and the even numbered segments are strapped together and connected to a source of negative potential.

The solid sending ring 10 is joined by a conductor 24 to the series windings A and B of a polarized transmitting relay 25, the opposite terminal of the windings being connected to the ground at 26. The marking and spacing contacts M and S of the relay 25 are connected to negative and positive battery respectively, and the tongue 27 is joined by a conductor 28 to a spring *b* of a pinjack 29 and thence through spring contact *d* to the apex of a duplex line L.

The solid A. C. sending ring 21 is joined to the spring *c* of pinjack 30 and through spring *d* to the windings A and B in parallel of a polarized relay 31, and thence to the ground at 32. The marking and spacing contacts of the relay 31 are connected to negative and positive battery respectively, and the relay tongue 33 is connected to spring *c* of jack 29.

With the solid pin 35 in jack 29, as shown in Figure 1, the system is in condition for transmitting intelligence signals directly from the sending rings 10 and 11 through the polarized relay 25 to the duplex line. Simultaneously, alternating current impulses

or current reversals are produced by the A. C. sending rings, which operate the polarized relay 31 to move the relay tongue back and forward between the marking and spacing contacts. The circuit to the tongue 33 of the relay is open at the spring *c* of jack 29 however, so that the current reversals are not transmitted to the line.

When it is desired to send balancing impulses over the line, the pin 35 is removed from jack 29, thus breaking the contact between springs *b* and *d* to disconnect the relay 25 from the line, and establishing contact between the springs *c* and *d*, thus connecting the tongue of the balancing polarized relay 31 to a line.

The sending rings 10 and 21 may be connected, as by groups of conductors 36 and 37 respectively, to the polarized relays and pinjacks associated with a number of other duplex lines, so as to transmit simultaneously to any number of lines.

It will be noted that the arrangement is such that any one of the lines may be disconnected from the sending ring 10 and connected to the A. C. sending ring 21 without interfering with the operation of the remaining lines.

It will be understood that in order to perform the functions described, the jacks 29 and 30 may be dispensed with and the connections between the duplex line and the tongues of the relays 25 and 31 be made through a simple switch. However, the jacks perform the additional function of permitting phasing impulses to be transmitted in addition to the balancing signals, so that it is possible to simultaneously transmit intelligence signals over certain lines, balancing signals over other lines, and phasing impulses over still other lines.

In Figure 2 we have illustrated an arrangement for transmitting phasing signals, in order to show the relation thereof to the present invention. For this purpose, segments 23 and 24 of local ring 18 are connected to spring *b* of jack 30, and segment 1 of the local ring 18 is connected to sleeve *e* of jack 30. The sleeve *e* is also connected through a high resistance R to a source of positive potential. The tip spring *a* of the jack 30 is connected to the series windings C and D of the polarized relay 31, and thence to the ground 32.

When it is desired to send phasing signals to the duplex line, the solid pin 35 is removed from jack 29 and inserted in jack 30, thus completing the circuit shown in Figure 2 from the phasing segments 23 and 24 of the local ring 18 to the windings A and B of relay 31, and also completing a circuit from segment 1 of the local ring 18 through the sleeve and tip springs of jack 30 to the windings C and D in series. Upon each revolution of the brush over the local rings, the cir-

cuit through the phasing segments 23 and 24 is completed, thus moving the tongue of the relay 31 to its marking contact and transmitting a marking signal to the line. As the brush leaves the phasing segments, it engages segment 1, thus completing a circuit from positive battery to the windings C and D, in such direction as to return the tongue 33 to its spacing contact. The tongue is held on its spacing contact during the passing of the brush over the remaining local segments by the holding battery supplied through the resistance R and sleeve of the jack 30 to the windings C and D. The holding current is reduced by the resistance R to such magnitude that its effect is readily overcome by marking current applied through the phasing segments 23 and 24 to the windings A and B.

It will be noted that with the pin 35 in jack 29 or in jack 30, or in neither of the jacks, that either intelligence signals, corrections signals or balancing signals may be transmitted to any one of the duplex lines without interrupting the transmission of any of these signals to any of the other lines.

It is obvious that the invention is useful in other applications than that described, and that it may be embodied in various forms without departing therefrom, and we do not desire to be limited to the exact details shown and described, except in accordance with the appended claims.

What we claim is:

1. In a multiplex telegraph system, a distributor having means for transmitting intelligence signals to a multiplicity of lines and means for simultaneously transmitting current reversals to other lines.

2. In a telegraph system, a distributor, a plurality of lines associated with said distributor and means including said distributor for selectively transmitting either intelligence signals or current reversals to any of said lines.

3. In a telegraph system, a transmitting apparatus having means for simultaneously generating a plurality of sets of independent signals, a plurality of lines associated with said transmitting apparatus and means for selectively transmitting any of said sets of signals to any of said lines.

4. In a telegraph system, a transmitting apparatus having means for simultaneously generating at least two sets of independent signals, a plurality of lines associated with said transmitting apparatus and selective means for permitting the transmission of either set of signals to all or a part of said lines or for transmitting one set of signals to certain of said lines simultaneously with the transmission of the other set of signals to others of said lines.

5. In a telegraph system a transmitting distributor having a plurality of signal dis-

tributing rings, a plurality of lines associated with said distributor and means for selectively distributing signals from any of said rings to any of said lines.

6. In a multiplex telegraph system, a rotary distributor having an intelligence signal sending ring and a balancing signal sending ring, a plurality of duplex lines, an intelligence signal transmitting relay and a balancing signal transmitting relay for each line, connected to said rings and means for connecting the tongues of either of said relays to any of said lines to transmit either intelligence or balancing signals thereto.

7. A telegraph system comprising a rotary distributor having two sets of sending rings, means connected to one of said sets of sending rings for transmitting permutation code signals and means connected to the other of said sets of rings for transmitting current alternations, a plurality of lines associated with said distributor and means for selectively transmitting either said permutation code signals or said current alternations to any of said lines.

8. A telegraph system comprising a rotary distributor having two sets of sending rings, means connected to one of said sets of sending rings for transmitting permutation code signals and means connected to the other of said sets of rings for transmitting current alternations, a plurality of lines associated with said distributor and means for repeating permutation code signals over any one or more of said lines and means for repeating current alternations over all or a part of the remaining lines.

9. In a telegraph system, a transmitting apparatus having means for simultaneously generating three distinct sets of signals, a line associated with said apparatus, a relay controlled by one of said sets of signals, a second relay, means for controlling said second relay from either of said other two sets of signals and means for connecting the tongues of either of said relays to said line whereby any one of said three sets of signals may be transmitted over said line.

In testimony whereof we affix our signatures.

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