

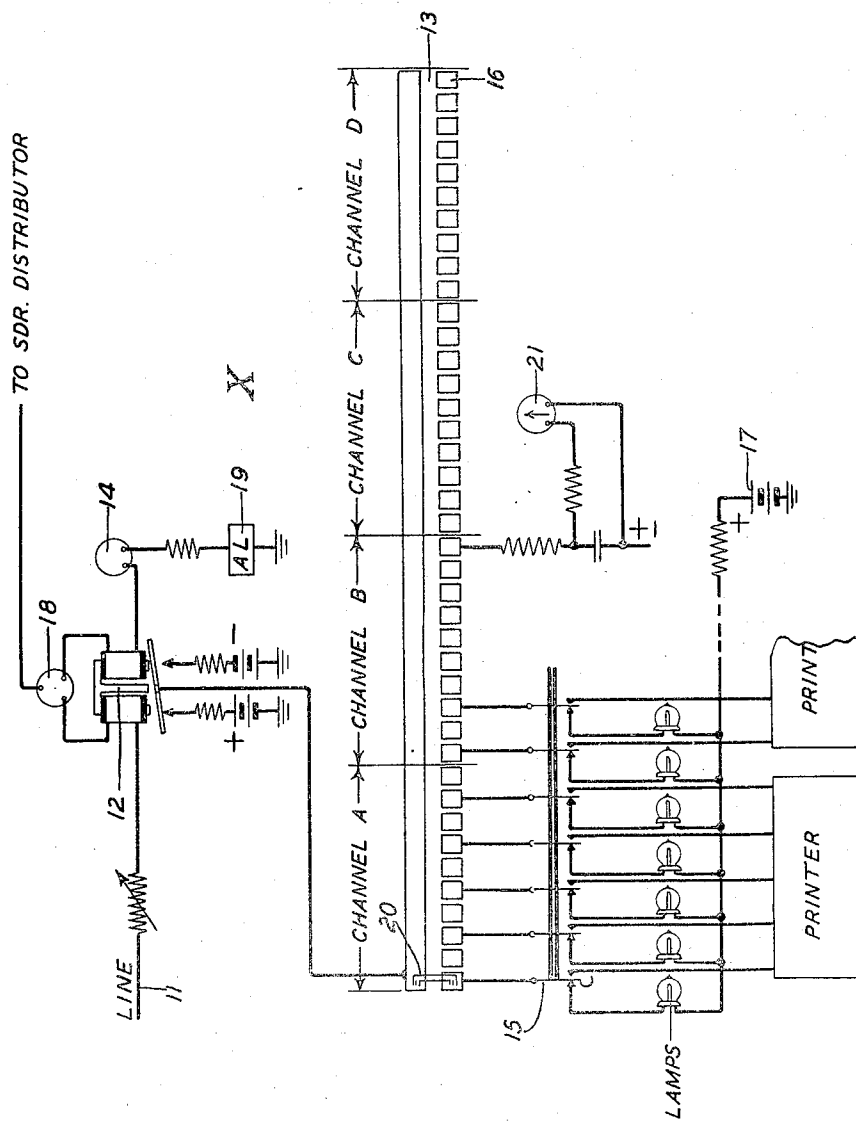
Aug. 23, 1932.

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1,873,440

ROTARY DISTRIBUTOR PHASING CIRCUIT

Filed Jan. 22, 1931



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ROTARY DISTRIBUTOR PHASING CIRCUIT

Application filed January 22, 1931. Serial No. 510,366.

This invention relates to impulse transmission systems employing synchronous distributing devices.

5 An object of the invention is to improve the method of attaining a refined adjustment for synchronous phase of two or more multiplex rotary distributing devices in a signaling system.

10 In certain types of multiplex telegraph systems phase correction is effected by means of lamps. For the purpose of arranging the channels at the sending and receiving stations so that signals are received over the channel corresponding to the one transmitting, these
15 lamps are arranged to be connected during adjusting intervals to the receiving distributor in place of the receiving printers. The connections are established by means of a switch on the receiving distributor whereby
20 the lamps are connected to the incoming line or cable when preparing the system for transmission after a period of non-use. Five impulses are transmitted for each channel over the line or cable, the polarity of these pulses
25 reversing at the end of each channel. The lamps are also connected in multiple to a positive or negative battery, as desired, and as the rotatable brush passes over the segments of the receiving distributor the lamps
30 connected to alternate groups of five segments will light, indicating that the brush is in synchronous phase with the incoming spacing impulses. Should the lamps in adjacent groups light, which indicates a departure
35 from synchronous phase, the receiving distributor rings are oriented in either a forward or backward direction with respect to the direction of rotation of the brush, until the proper groups of lamps are lighted or the
40 brush may be adjusted as hereinafter described. However, it has been noticed when adjusting the system for proper phase relation that the lighting of the proper groups of lamps during the phasing operation does
45 not always prove that the receiving brush is

in correct phase with the incoming spacing impulses because, although the brush may be in engagement with the proper segment at the time an impulse is received, the brush may not be in position to receive the middle portion of the impulse and therefore the phase relation is only approximately correct.

According to this invention, the phase relation may be made more nearly correct by using a margin adjusting circuit connected to a segment at the end of a channel. The segmented receiving ring on the receiving distributor is divided into alternate live and dead segments, there being five live segments and five dead segments in each group. When perfect phase relation is had the incoming impulses are impressed on the live segments and by means of the phasing lamps this phase relation may be partially obtained if a pulse is impressed on any part of a live segment, the remaining part being impressed on the adjacent dead segment. By connecting a margin adjusting circuit to the dead segment at a point where a change in polarity occurs and true phase relation does not exist, a part of the incoming impulse will be received in the circuit. By providing an indicating meter in this circuit the direction of the pulse current is indicated by a movable pointer or indicator whereby it can be determined in what direction the receiving rings must be further oriented in order to bring the live segment into position to receive the middle portion of the incoming impulse.

The single figure of the drawing illustrates a preferred embodiment of the invention.

Referring to the figure, line 11 is shown terminating at station X in differential line relay 12 which is responsive to the incoming signals only. The incoming signal impulses reproduced by relay 12 are impressed on receiving rings 13 to operate a series of printers, or a set of storing relays if it is desired to repeat the signals to another station. For the purpose of illustration, it is assumed here

that the incoming signals distributed by ring 13 operate printers. The transmitting end of the system is not shown but will be readily understood to be present in the system.

5 In preparing the system for transmission after a period of non-use a series of adjustments are made with timed intervals allotted for each adjustment. The first adjustment is that of the speed of the distributor
10 (transmitting) at the other end of line 11 in any well known manner appropriate for the particular type of driving motor employed thereat. The attendant at station X then adjusts the drive motor at his station as soon
15 as the incoming impulses begin to arrive as indicated by the operation of meter 14. The attendant will then operate switch 15, to connect in place of the printers, a series of lamps to the receiving segments of ring 16. Ring
20 16 is divided into forty alternate live and dead segments to provide for four channels A, B, C and D, there being five live and five dead segments for each channel. Each lamp is connected at one side to a live segment
25 and at the other side to a common grounded positive battery 17. These lamps are numbered in accordance with the live segments of ring 16 to which they are connected. At each revolution of the distributors at the station (not shown) there are transmitted over
30 line 11 twenty spacing impulses, namely, five positive impulses, five negative impulses, five positive impulses and five negative impulses and received in the two windings in series
35 of relay 12, meter 14, artificial line 19 and returned through earth. Relay 12 will close its left contact during the reception of each group of positive impulses and its right contact during the reception of each group of
40 negative impulses. Positive battery will therefore be connected over the armature of relay 12 through the phasing lamps to positive battery 17 during the reception of impulses Nos. 1 to 5 and 11 to 15, while negative battery will be connected during the
45 reception of impulses Nos. 6 to 10 and 16 to 20. Rotatable brush 20 on ring set 13 is differentially coupled to the distributor drive shaft so as to be capable of manual adjustment relative thereto without interfering with
50 the driving. Inasmuch as the lamps are connected to positive battery, only those lamps to which negative impulses are directed will be lighted. Brush 20 will then be adjusted
55 until lamps 6 to 10 and 16 to 20, that is, those connected to channels B and D are lighted. The impulses are then received at station X in the same order and relation as those that are sent from the distant station.

60 After this adjustment is completed a perfect phase relation between the rotatable brush and the reproduced impulses may be still lacking because the middle portions of the reproduced impulses may not be centered on the live segments. This condition will be

indicated by the pointer on meter 21 which will swing a greater distance to one side of its zero position than to the other, as the brush 20 passes over the last dead segment of channel B to which the margin adjusting
70 circuit, shown herein, is connected. The brush 20 may then be further adjusted until the pointer of meter 21 is brought to a zero position or shows the same readings on opposite sides of the zero position when the
75 polarity of the spacing impulses changes from negative to positive at the end of channel B. At the end of the interval allotted for the above adjustment, say five minutes, the attendant of station X will restore switch 15 directing the incoming pulses to the printers.
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For a description of a complete system in which the present invention is applicable reference may be made to the Curtis U. S. Patent 1,689,328, granted October 30, 1928.
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What is claimed is:

1. In an impulse reception system, an incoming circuit, a device connected thereto adapted to be synchronized with impulses received from impulse transmitting mechanism at a remote terminal of the circuit, means for establishing approximate synchronism of said device, characterized in this, that an indicating circuit is connected to said device at a point whereat the character of the received impulses reverses, to indicate any slight error in the true synchronous phase relation between said device and the received impulses.
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2. In a signaling system, a line, devices connected to opposite ends of said line and arranged to transmit and receive, respectively, impulses of opposite polarities, each of said devices comprising a contacting element, means for establishing approximate synchronism between said devices, a circuit connected to the receiving device at a single point where the polarity of adjacent received impulses reverses, and an element in said circuit for indicating any slight error in the adjustment of synchronous phase relation between the contacting element of the receiving device and the received impulses.
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3. In a signaling system, a multi-channel transmission circuit, multiplex rotary distributors connected to the opposite ends of said circuit and arranged to transmit and receive, respectively, impulses reversing in polarity at the end of each channel, each of said distributors comprising a rotatable brush and a ring of alternate live and dead segments on said receiving distributor, means for establishing approximate synchronism between said devices, a circuit connected to a dead segment at the end of one channel only, and an element in said circuit for indicating the amount of adjusting to be made in order to bring the rotatable brush of the receiving distributor into true synchronous phase relation with the received impulses.
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4. A signaling system, according to claim 3, wherein the indicating element is a recording meter.

5. A signaling system, according to claim 3, wherein receiving devices are connected to the live segments of the receiving distributor and a plurality of lamps which may be arbitrarily connected in place of said receiving devices to the respective live segments of the receiving distributor whereby approximate synchronous phase is indicated.

In witness whereof, I hereunto subscribe my name this 16th day of January, 1931.

GEORGE A. LOCKE.