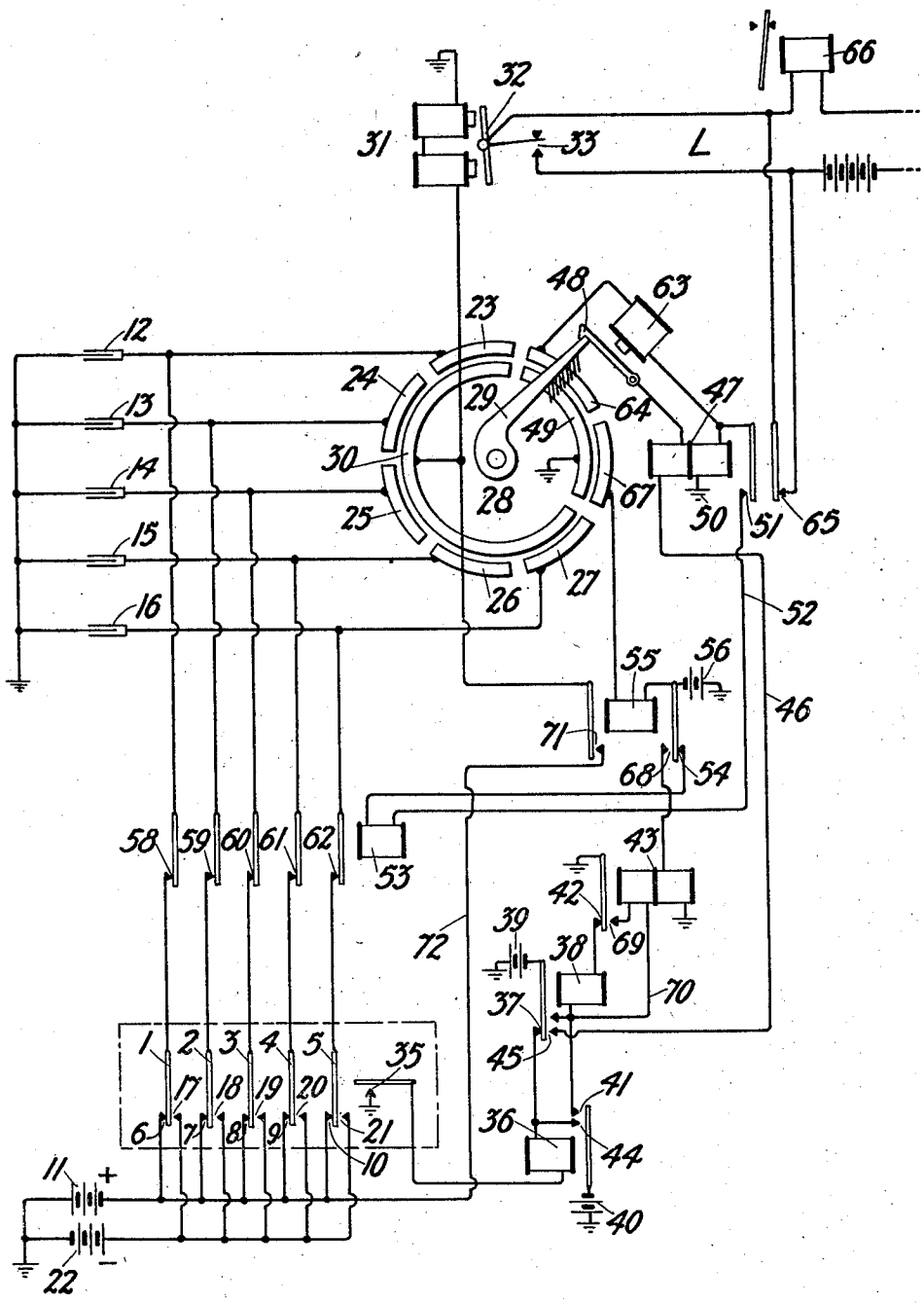
DE WITT C. TANNER.

SIGNALING SYSTEM.

APPLICATION FILED JUNE 6, 1918.

1,332,961. Patented Mar. 9, 1920.



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UNITED STATES PATENT OFFICE.

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SIGNALING SYSTEM.

1,332,961. Specification of Letters Patent. Patented Mar. 9, 1920.

Application filed June 6, 1918. Serial No. 238,485.

To all whom it may concern:

Be it known that I, DE WITT C. TANNER, a citizen of the United States, residing at Glen Ridge, in the county of Essex, State of New Jersey, have invented certain new and useful Improvements in Signaling Systems, of which the following is a full, clear, concise, and exact description.

This invention relates to selective signaling systems, and is particularly applicable to systems for transmitting to a line various combinations and permutations of current impulses for actuating selectively a plurality of electro-responsive devices such as the selecting relays or magnets of a printing telegraph receiver.

The primary object of the invention is to provide means operable in connection with a set of selectively actuated transmitting switches and a sending distributer for storing up the various impulses of a signal combination pending transmission, and for permitting the selective actuation of the transmitting switches for a new signal combination before the combination previously stored up has been fully transmitted.

This invention therefore provides a set of electrical storage devices, preferably a set of condensers with circuit connections therefor under the control of a set of permutation switches, whereby the condensers may be charged in different combinations depending upon the selective actuation of the set of switches. These condensers are connected to respective segments on a transmitting distributer, which in its operation discharges the charged condensers sequentially through a circuit, to operate a responsive device such as a relay, by the current impulses so produced. However, any suitable electrostatic storage devices may be used, for example, a set of inductances.

The invention is particularly adapted for use in systems operating on the closed-circuit principle and, when so applied, is adapted to operate a polar relay which, through its armature contacts, opens or closes the circuit of a transmission line depending upon the direction of the condenser discharge through the windings of said relay. Each of the several circuits leading from the storage condensers to the permutation switches passes through contacts under the control of an electromagnet which operates, prior to the transmission of the signal combination, to separate the condensers from the charging circuit. These circuits are restored at the completion of the sending cycle and if in the meantime the permutation switches have been operated to set up a new signal combination, this combination will immediately become effective to charge the condensers according to the new combination.

The attached drawing illustrates the principle of this invention applied to the transmitting circuit of a printing telegraph system. Referring to the drawing, 1, 2, 3, 4 and 5 represent a set of permutation switch contact members which are normally in engagement with their respective contacts 6, 7, 8, 9 and 10. These switch members may be moved into engagement with their right-hand contacts 17 to 21 inclusive in various combinations, according to the signal to be transmitted, by any of the devices well-known in the art such as a manually operated keyboard or an automatic mechanism controlled by a perforated tape. In the position shown the permutation switches close charging circuits from positive battery 11 to a set of storage condensers 12, 13, 14, 15 and 16. When, however, any of the contact members 1, 2, 3, 4 or 5 is moved into engagement with its right-hand contact 17, 18, 19, 20 or 21, it disconnects the charging circuit of its respective condensers from the positive battery 11 and connects it to negative battery 22, thus reversing the charge on the condenser. The condensers 12 to 16 inclusive are respectively connected to segments 23, 24, 25, 26, 27 of a sending distributer 28, having a brush arm 29, which, in rotating, connects the segments 23 to 27 inclusive sequentially to a common ring 30. From this ring 30 a circuit extends to ground through the windings of the polar relay 31. Thus assuming for the moment that no other discharge path is present, it will be seen that as the distributer brush 29 passes over segments 23 to 27, inclusive, it will discharge condensers 12 to 16 sequentially through the windings of the relay 31. This relay, being polarized, will move its armature 32 in one direction or the other and will open or close its contact 33 in the line circuit L depending

upon the direction of the cendenser discharge. The distributer 28 herein illustrated is designed to make one complete revolution for each signal combination transmitted, and to be arrested automatically at the end of each revolution. The starting of the distributer is under the control of a common contact 35, which is closed whenever any of the switch members 1, 2, 3, 4 or 5 is operated. The closure of contact 35 completes a circuit from ground through the windings of relay 36 and back contact 37 of relay 38 to battery 39. Relay 36 operates, establishing an operating circuit from battery 40, through contact 41 and winding of relay 38 to ground through back contact 42 of relay 43. So long as contact 35 is closed, relay 36 will be locked up over a circuit extending from battery 40 by way of contact 44 to ground at contact 35. The purpose of this circuit will be explained later. When relay 38 operates, it connects battery 39 by way of its armature and front contact 45, conductor 46, winding of start relay 47, detent 48, brush arm 29 to distributer ring 49 which is connected to ground. Relay 47 operates, closing a holding circuit for itself from ground 50, by way of its front armature contact 51, conductor 52, winding of multiple contact relay 53, back contact 54 and armature of relay 55 to battery 56. Relay 53 operates, opening the contacts 58, 59, 60, 61 and 62 in the circuits from the permutation switches 1 to 5 inclusive to the condensers 12 to 16 inclusive. An operating circuit for release magnet 63 is also completed from battery 56, by way of contact 54 of relay 55, relay 53, conductor 52, contact 51, release magnet 63, distributer segment 64, by way of brush arm 29 to segment 49 and ground. The energization of magnet 63 pulls up the detent 48, and releases the brush arm 29 which is frictionally mounted on a constantly rotating shaft. Simultaneously with the release of the brush arm 29, contacts 65 will have been broken to open the circuit of the line L. This initial opening of the line circuit is for the purpose of providing a starting impulse, operated preferably from the back contacts of the line relay 66 or its equivalent at the receiving station for releasing the receiving distributer. The manner in which the release of the receiving distributer is effected need not here be considered, as it forms no part of the present invention and will be fully understood from reference to a pending application of P. M. Rainey and A. D. Dowd, Serial No. 176,390, filed June 22. 1917.

The brush arm 29 of the distributer, having been released, starts to rotate, and passing over the segments 23, 24, 25, 26 and 27, will discharge condensers 12 to 16 inclusive, through the windings of the relay 31, as above described, and will therefore open and close the line circuit at the contacts 33, in accordance with the permutation selected by the switches 1 to 5 inclusive. After the brush arm 29 has discharged the last condenser 16 of the series, it passes on to a clear-out segment 67, completing a circuit from ground, through the windings of the clear-out relay 55 to battery 56. Relay 55 is consequently energized, opens the contact 54, deënergizing relays 53 and 47, and closes a circuit from battery 56 by way of its forward contact 68 through a winding of relay 43 to ground. Relay 43, on operating, breaks its contact 42, therefore opening the holding circuit of relay 38. Relay 43 also closes its contact 69. If now the common contact 35 be still closed, as for example by the prolonged depression of one of the keys of a transmitting keyboard, the relay 36 will, as we have seen above, be locked up. Consequently battery 40 will be connected by way of front contact 41 of relay 36 over conductor 70, through a locking winding of relay 43 and contact 69 to ground. This arrangement is for the purpose of preventing a repetition, in keyboard operation, of a signal, due to the prolonged depression of a key, and insures that the circuit of the relay 38, which controls the starting of the distributer, will be open at the contact 42 until the contact 35 is released. If, however, the key of the keyboard is depressed, released and again depressed before the distributer has completed its revolution, no such lock-out will be effected, due to the fact that the holding circuit of the relay 36 will have been opened at contact 44 upon the release of the key, and an energizing circuit for the said relay will again be completed as soon as relay 38 is deënergized to close its back contact 37.

It will be obvious that, depending upon the particular combination of impulses transmitted, the last impulse through the windings of relay 31, namely, that from segment 27, may be of either positive or negative polarity, and will consequently leave the line open in some cases and closed in others. As stated above, the present system provides that the receiving distributer shall be released by an initial opening of the line circuit at the contact 65 of relay 47. Consequently, it is necessary, in order that this initial opening of the line shall be effected, that a final impulse be sent through the windings of the relay 31 in such a direction as to open the contacts 33. This may be effected in a variety of ways, either from a separate contact on the distributer, or as herein illustrated, by means of an extra contact 71 controlled by the clear-out relay 55. As noted above relay 55 operates when distributer arm 29 connects segment 67 to segment 49. This energization of the relay 55 closes its contact 71 and connects positive

battery 11 over conductor 72 to relay 31 and ground, thus insuring that the contact 33 is left open at the end of each signal cycle.

What is claimed is:

1. In a printing telegraph transmitter the combination with a plurality of electrical storage devices, of a plurality of switches and means controlled thereby for selectively storing electrical impulses in said storage devices, a responsive device, and a distributer adapted to bring said storage devices successively into circuit with said responsive device for discharging said stored impulses to operate the responsive device.

2. In a printing telegraph transmitter, a line circuit, a relay controlling said line circuit, a series of condensers, means for charging said condensers in different combinations, and means for successively connecting said condensers with said relay to operate the same.

3. The combination with a set of selectively operable switches, of a corresponding set of condensers, charging circuits connecting said switches and condensers, means for charging said condensers in various combinations depending upon the selected positions of said switches, a responsive device, a distributer for connecting said condensers successively to said responsive device, and means for opening said charging circuits prior to the connection of any of said condensers with said responsive device.

4. The combination with a set of condensers of a corresponding set of selectively operable switches, means normally charging said condensers in one direction, means rendered effective by the selective operation of said switches to reverse the charge on predetermined ones of said condensers, a polarized responsive device, and means for discharging said condensers successively through said responsive device.

5. In a telegraph transmitter, a work circuit, a series of electrostatic storage devices, means for storing energy in said storage devices in different combinations, a relay, and means for successively applying the energy in said storage devices to said work circuit for effecting the operation of said relay.

In witness whereof I hereunto subscribe my name this 31st day of May, A. D., 1918.

DE WITT C. TANNER.