Nov. 15, 1927. 1,648,974

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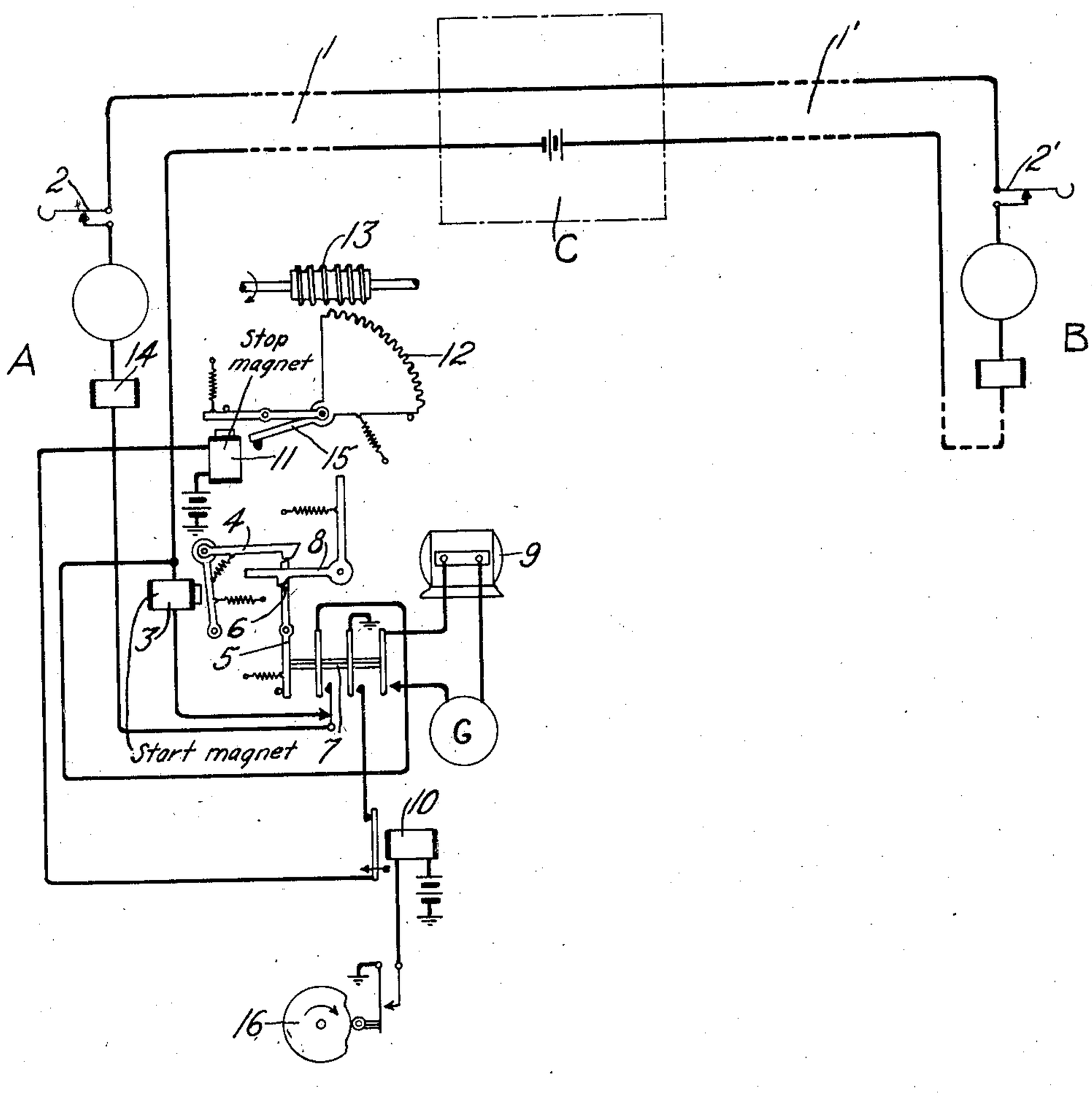
PRINTING TELEGRAPH EXCHANGE SYSTEM

Filed March 16, 1926



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Patented Nov. 15, 1927. 1,648,974

UNITED STATES PATENT OFFICE.

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PRINTING-TELEGRAPH-EXCHANGE SYSTEM.

Application filed March 16, 1926. Serial No. 95,067.

This invention relates to telegraph systems, and particularly to printing telegraph systems wherein the local power supply at the printer is controlled from a distant point.

An object of this invention is to reduce the current consumption and the maintenance expense incurred in the operation of telegraph apparatus in either printing telegraph exchange or intercommunicating systems.

Another object is to render telegraph equipment effective automatically when required for use and to disable it when its service is no longer needed.

This invention is particularly adaptable to those systems in which the printer sets are idle for a considerable part of the time, during which it is desired to have no parts in motion. Accordingly, a feature of the invention relates to an arrangement in which the starting of a motor at a subscriber's station is controlled by an impulse from a distant station and the stopping of such motor is accomplished automatically by a local slow-acting mechanism upon the cessation of received message impulses for a predetermined period. Considering this feature more specifically, there is provided a printer set mechanism in which the circuit of the driving motor is closed in response to the act of opening and then closing the line at any distant station. During the transmission of character signals the motor circuit is maintained closed, but if these signals cease for a predetermined period, a slow-acting time counting device becomes effective to open said circuit and disable the printing mechanism.

The above noted and other objects and features of this invention are set forth in the following description and appended claims, and will be more readily understood when the description is taken in conjunction with the accompanying drawing which illustrates the invention.

In the drawing there is shown a telegraph line extending through a central office and interconnecting two subscribers' stations, with only such apparatus as is necessary for a clear understanding of the invention. It is understood, of course, that this invention may be adapted for use in systems wherein the subscribers' stations are interconnected by direct, or fixed, lines, and in printing telegraph exchange systems of either the machine switching or manually operated types and also in those systems in which a plurality of stations are connected in series.

Referring now to the drawing, there are shown two subscribers' stations A and B, interconnected through central office C by the lines 1 and 1′ with only that apparatus necessary to effect the starting and stopping of the motor at station A. The corresponding apparatus required at station B is the same as that shown for station A, but this is not shown inasmuch as it is not deemed of any consequence as far as it pertains to a complete description of the invention.

Assume for the purpose of illustration that the subscriber at station B desires to communicate telegraphically with the subscriber A. The subscriber B thereupon actuates a non-locking start key 2′ to effect a momentary break in a normally closed circuit extending over line 1. Start magnet 3 at station A, which is normally operated in the line circuit, releases momentarily and during the open interval a hook-shaped member 4, which is pivotally mounted on the armature of magnet 3, is permitted to drop back and lock with a pivotally supported switch lever 5. Magnet 3, reenergizing after its momentary deenergization attracts its armature and by means of the locking engagement between member 4 and lever 5, switch 7 is operated. On lever 5 is fixedly attached a pin 6 which, during the operation of switch 7, is positioned in locking engagement with the horizontal arm of a bell crank 8, and this crank provides a means for holding switch 7 in an operated position when magnet 3 is subsequently released.

The operation of switch 7 closes at the outer right blade of the switch, an obvious operating circuit for motor 9, and the motor starts. At the outer left blade of the switch the normal contact in the line circuit extending through the winding of start magnet 3 is opened, but this circuit is maintained closed at the make-before-break contact at the switch blade, thereby providing a path which shunts the magnet. Magnet 3 thereupon releases but has no effect now on switch 7 because the lever 5 is locked in an operated position by the interengagement of pin 6 and bell crank 8. At the middle blade of switch 7, ground is connected to a circuit

extending over the armature of relay 10, through the winding of stop magnet 11, to battery, causing magnet 11 to operate.

The operation of magnet 11 attracts an armature which is pivotally supported at its middle point and which has pivotally arranged on its end opposite that which is attracted, a sectoral member 12. The sectoral member is arranged with its arcuated edge serrated so that when it is raised upwards, through the operation of magnet 11, the serrated edge will engage a worm 13 which is fixedly mounted upon the shaft of motor 9. The operation of the motor causes the worm to rotate the sectoral member in a counter-clockwise direction and the rotation of this member will continue until the subscriber at station B begins to transmit the message impulses.

When the message impulses are received at station A the printer magnet 14 effects the operation of the station printer (not shown) and the main shaft of said printer is rotated one complete revolution for each of the received sets of character impulses. Fixedly attached to the main shaft of the printer is a cam 16 which is rotated correspondingly during the operation of the printer. This cam is arranged to keep two associated contacts closed continuously except for the brief intervals between the message characters. The closing of these contacts completes an energizing circuit for relay 10 which, being of the slow-to-release type, remains energized during the time when the message signals are being received.

When relay 10 operates it opens the circuit extending through stop magnet 11 and the magnet deenergizes, thereby permitting the sectoral member 12 which is in rotatable engagement with worm 13, to return to its normal position. If there should be any appreciable delay in the transmission of the message, slow-to-release relay 10 would deenergize, inasmuch as its energizing circuit would be maintained open at the contacts associated with cam 16, and permit the closing of the operating circuit for magnet 11. The operation of magnet 11, as explained above, would position the sectoral member 12 in operable relation with worm 13 and the rotation of the sectoral member would again be started. If the delay in the message transmission is less than the predetermined period, the sectoral member is checked in its rotation and returned to its normal position, as previously described, as soon as transmission is resumed.

When the message is completed, the relay 10 is deenergized to effect the operation of magnet 11, as herebefore explained, and the sectoral element is again moved into engagement with worm 13. Inasmuch as there are no further message impulses to be received, the sectoral member will be permitted to rotate for the predetermined period, say from 10 to 20 seconds, and at the end of this period an arm 15 which is integrally formed with the sectoral member, on the side opposite the serrated rim, will engage the vertical arm of bell crank 8 and exert sufficient pressure thereon to release the pin from its locking engagement with the horizontal arm of the bell crank. An extension of bell crank 8 will lift hook 4 to prevent it from interfering with the return to normal of member 5 and switch 7.

While switch 7 is in an operated position, starting magnet 3 is deenergized, and when pin 6 is released the switch 7 is permitted to return to normal. The return of switch 7 to a non-operated position restores the station apparatus to its normal condition by opening the shunt circuit for magnet 3 to permit the magnet to resume its normal operated position; opening the operating circuit extending through 11, to effect the restoration of the sectoral member 12; and opening the operating circuit for motor 9 to stop the motor. Magnet 11 should preferably be slightly slow to release, so as to permit magnet 3 to energize before sector 12 and bell crank 8 have returned to their normal positions.

The motor at station B, the transmitting station in this case, may be stopped in the same maner as that described for station A.

What is claimed is:

1. A telegraph system comprising a plurality of stations, a line circuit for interconnecting said stations, a source of energy and a timing device at each of said stations, means at one of said stations for rendering effective the local source of energy and causing the operation of the local timing device simultaneously, and other means arranged to operate when message impulses are received from the other of said stations to release said timing device, the last mentioned means being further arranged to cause the re-operation of said timing device at the end of a predetermined period following the conclusion of the message to disable the source of energy and release said timing device.

2. A printing telegraph system comprising a plurality of stations, a line circuit for interconnecting said stations, a source of energy and a timing device at each of said stations, a switch at one of said stations for engaging the local source of energy and operating the local timing device simultaneously, a line relay at the local station responsive to a starting impulse from a distant station for operating and locking said switch, said operated switch being arranged to render said relay ineffective to message impulses, and a relay responsive to the first message character arranged to release at the conclusion of a message, said release being

effective to operate said timing device for a predetermined period at the end of which said switch is automatically restored to disconnect said source of energy and to permit said timing device to return to normal.

3. A printing telegraph system comprising a plurality of stations, a line circuit for interconnecting said stations, a source of energy and a timing device at each of said stations, a member actuated by said source of energy to operate the timing device at one of said stations, a switch at said station for engaging the local source of energy, a line relay at the local station responsive to a starting impulse from a distant station for operating and locking said switch, said operated switch being arranged to render said relay non-responsive to message impulses and to position said timing device in operable relation with said member, and a relay responsive to the first message character received and arranged to restore at the first character said timing device, said relay being further arranged to release at the conclusion of the message to re-operate said timing device for a predetermined period at the end of which said device is arranged to effect the restoration of said switch, the disconnection of said source of energy, and the operation of said line relay.

In testimony whereof, I have signed my name to this specification this 13th day of March, 1926.

GILBERT S. VERNAM.