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PRINTING TELEGRAPH EXCHANGE SYSTEM

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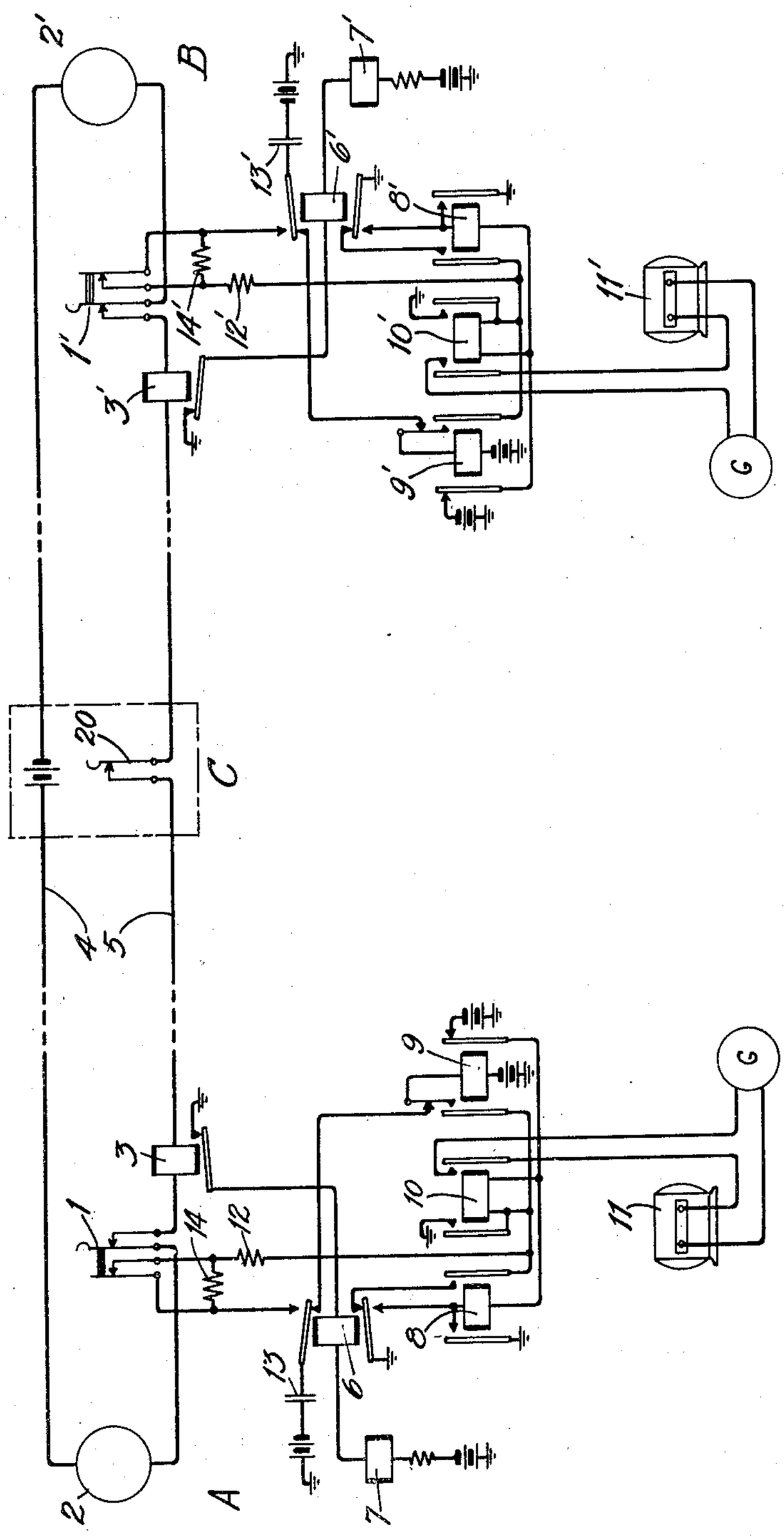

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PRINTING-TELEGRAPH-EXCHANGE SYSTEM.

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

An object of this invention is to effect a saving in current consumption and to reduce the maintenance expense of telegraph systems.

Another object is to automatically render effective a receiving set when the same is required for use and to disable it when no longer required.

In accordance with this invention the motors at interconnected stations are arranged to be controlled from the station originating the connection, and in this arrangement the motors are started by the momentary operation of the switching means at the originating station and are stopped by the prolonged operation of the same means. Accordingly, a feature relates to the employment at each of the interconnected stations of a slow-acting condenser in which a discharge current therefrom is used as a means for effecting the stopping of the motors, the condenser at the originating station requiring a longer period for charging than that at the terminating station, thereby insuring a sufficient charge to be accumulated in the condenser at the latter station before a similar charge is stored at the former, together with keys at the stations for controlling the charging of said condensers.

The above and other objects and features of this invention are set forth in the following description and appended claims, and may 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 printing system consisting of a central office and two subscribers' stations, with only that apparatus necessary for clear understanding of the invention. Referring now to the drawing, there are shown two printing telegraph subscribers' stations A and B, interconnected through a central office C. It will be understood, of course, that in actual practice many other lines similar to that shown may terminate at the same central office and that interconnections may be established at this office by either manually or automatically operated means. It will also be understood that this invention will not be confined to only those systems employing central switching stations but may also be adapted to such systems as those in which the subscribers' stations are interconnected by direct, or fixed, lines, or in which the subscribers' stations are arranged radially in respect to a central point from which point the motors at the subscribers' stations may be controlled.

Assume for the purpose of illustration that the subscriber A desires to communicate telegraphically with the subscriber B, and that the connection is established through central office C. The subscriber would thereupon transmit a start signal by actuating a non-locking key 1, and the line circuit comprising wires 4 and 5 and extending through central office C to the subscriber's station B, is momentarily opened. However, this open period effected in the line circuit by the key 1 is longer than the periods ordinarily effected by message signals. The opening of the line circuit causes a deenergization of line relay 3 which releases, thereby opening at its armature a circuit extending from ground, through the winding of relay 6, through the printer magnet 7, to battery. Relay 6 releases, and at its lower armature and back contact connects ground to a circuit extending through the winding of relay 8, to battery at the right armature of relay 9. Relay 8 operates and closes a locking circuit for itself at its left armature.

The subsequent closing of the line circuit when key 1 is released, re-energizes relay 3 which operates and effects the closing of the circuit extending through the winding of relay 6. Relay 6 re-energizes and thereby opens the original operating circuit of relay 8 and closes an operating circuit for relay 10, the latter circuit being traceable from battery at the right armature of relay 9, through the winding of relay 10, right armature of relay 8, to ground at the lower armature of relay 6. Relay 10 operates, and closes at its left armature a locking circuit for itself and at its right armature a circuit for starting motor 11.

Simultaneously with the de-energization and re-energization of relay 3 when the key 1 at station A is momentarily operated, relay 3′ at the distant station B is de-energized and re-energized in a similar manner, and the motor 11′ is correspondingly operated in conjunction with relays 8′ and 10′ as de-

scribed for the motor 11 at the originating, or transmitting, station A.

The subscriber at station A, after releasing the non-locking key 1 to permit the closing of the line circuit, operates his transmitter for transmitting to station B the impulses which constitute the message. During the transmission of the message impulses the line circuit is opened and closed in rapid succession at the transmitter 2 of the sending station and relays 3 and 3′, respectively, at stations A and B, de-energize and re-energize accordingly, to effect the recording operation of the printer magnets 7 and 7′, respectively, at stations A and B. A record of the transmitted message is therefore made at both stations A and B.

At the end of each message impulse when relay 3 releases, relay 6 and magnet 7 likewise release but the release of these relays at this time has no effect on relays 8 and 10 which are maintained in an operated condition by their respective locking circuits, as hereinbefore mentioned. Should the subscriber at the distant station B desire to send a break signal to station A, he will operate key 1′ momentarily to open the line and the consequent release of relays 3 and 6 and magnet 7 at station A will likewise have no effect on relays 8 and 10. Relay 6, which operates and releases with line relay 3, may, if desired, be designed to be slightly slow-to-release so that it will respond only to the longer interruptions due to the operation of key 1′ at the distant station for the purpose of sending a break signal.

When relay 6 releases in response to either the message impulses or break signals, the condenser 13 charges through the high resistance 12 in a circuit which may be traced from battery, condenser 13, upper armature and back contact of relay 6, left contact of key 1, resistance 12, to ground at the left armature of relay 10. The resistance 12 is of such value that condenser 13 will receive only a very slight charge during these short breaks of the line circuit, and therefore these charges produce no effect when relay 6 re-energizes and the condenser is permitted to be discharged through the low resistance winding of relay 9, as will hereinafter be explained.

At the completion of the message, the subscriber at station A again actuates key 1 to stop the motors at stations A and B but at this time the key is held in an open position for an interval longer than that required for starting the motor say 10 to 20 seconds. A circuit is thereby closed from battery, condenser 13, high resistances 14 and 12 in series, to ground at the left armature of relay 10. In this circuit, which is closed for the long interval, the condenser 13 receives a charge approximately equivalent to the full voltage of the battery, and when the key 1 is released, relay 6 operates and closes a circuit from battery, through the condenser, upper armature and front contact of relay 6, through the normal contact and comparatively low resistance winding of relay 9, to battery. The closing of the circuit for the long interval permits the accumulation of a high positive charge on the right-hand plate of condenser 13 and when relay 6 subsequently operates, this charge is discharged through the winding of relay 9 to the negative side of battery and is of sufficient strength to cause relay 9 to operate. Relay 9 in operating opens its normal contact and locks to its left armature in a circuit extending over the right contact of relay 8, to ground at the lower armature of relay 6. Also, relay 9 opens at its right armature the locking circuits for relays 8 and 10 and these two latter relays are released. The release of relay 8 opens the locking circuit for relay 9 and relay 9 releases. The release of relay 10 opens the operating circuit for motor 11 and the motor stops. The motor 11′ at station B is stopped in the same manner as that described for motor 11 at station A, except that the circuit for charging the condenser 13′ at station B to approximately the full voltage of the associated battery is extended through one resistance, namely that numbered 12′, instead of resistances 14′ and 12′ in series. The reason for this difference in charging the condensers at the distant station is explained below.

When key 1 at station A is operated for the long interval at the completion of the message, the resistance 14 is included in the circuit in which condenser 13, as heretofore stated, is charged to the strength approximately equivalent to the full voltage of the battery, and at the same time the condenser 13′ at the distant station B is also receiving a heavy charge inasmuch as its energizing circuit is also closed. But the circuit for charging condenser 13′ includes only one resistance, namely resistance 12′, because the other resistance, namely resistance 14′, is shunted by a path extending through the right contact of key 1′. The additional resistance connected in the charging circuit for condenser 13 at station A when key 1 is operated for the long interval, provides a longer period of time for the charging of condenser 13 to approximately the full value of the voltage of the battery than that which is required for a similar charge to be stored in condenser 13′ at station B. This arrangement insures the stopping of all the motors connected with the line circuit, when the motor at the sending station wherefrom the stop signal is transmitted, is stopped.

The transmission of a message from station B to station A may be made in the same manner as that described above for station A.

Facilities may be provided at the central office for sending signals for operating the printers or controlling the motors at either station. A provision for this facility is shown on the drawing in the form of a non-locking key 20 at office C, for opening the line comprising wires 4 and 5.

What is claimed is:

1. A communication system comprising a plurality of stations, a signal receiving set and a motor therefor at one of said stations, and means for starting and stopping the motor by transmitting impulses different in length from the signaling impulses.

2. A communication system comprising a plurality of subscribers' stations, a receiving set and a motor therefor at each of said stations, and means at one of said stations for transmitting impulses to effect the starting of the motors and impulses of a longer duration to effect the stopping of the motors at said stations.

3. A telegraph system comprising a plurality of subscribers' stations, a printer set, a motor therefor, and a slow-acting device at each of said stations, and means for transmitting impulses of a character different from the signaling impulses to effect the starting and stopping of the motors, the slow-acting device being responsive only to impulses of one characteristic to stop the motor.

4. A telegraph system comprising a plurality of subscribers' lines, means for interconnecting a calling and a called line, printer sets and motors for said lines, means to start said motors, and condensers serving to effect the stopping of said motors.

5. A telegraph system comprising a plurality of subscribers' lines, means for interconnecting a calling and a called line, printer sets and motors for said lines, means to start said motors, and condensers serving to effect by their discharge action the stopping of said motors.

6. A telegraph system comprising a plurality of subscribers' stations, a central office, a plurality of telegraph lines extending between said stations and said central office, means at said central office for interconnecting said stations, a power supply source at each of said subscribers' stations, and means at each of said stations controlled by one of two interconnected stations for effecting first the connection and then the disconnection of the sources of power at the interconnected stations, said last mentioned means at the controlling station being arranged to require a longer interval to become effective than the corresponding means at the other of the interconnected stations.

7. A telegraph system comprising a plurality of subscribers' stations, a central office, a plurality of lines terminating at said subscribers' stations, means at said central office for interconnecting a calling and a called line, a source of power at each of said stations, and means at the station of said calling line for effecting first a connection and then a disconnection of the sources of power at the stations of the interconnected lines, said last mentioned means at the station of the calling line being arranged to require a longer interval to become effective than the corresponding means at the other of the interconnected stations.

8. A telegraph system comprising a plurality of subscribers' stations, a central office, a plurality of calling and called lines terminating at each of said stations, means at said central office for interconnecting said calling and called lines, a motor at each of said stations, means at the station of an interconnected calling line arranged to be operated momentarily to simultaneously effect the operation of the motors at the interconnected stations, and a slow-acting device at each of said interconnected stations arranged to be ineffectively energized when the second mentioned means is momentarily operated but effectively energized when said second mentioned means is operated for a comparatively long period to stop the motors at said interconnected stations simultaneously.

9. A telegraph system comprising a plurality of subscribers' stations, a central office, a plurality of calling and called lines terminating at each of said stations, means at said central office for interconnecting said calling and called lines, a motor at each of said stations, a key at the station of an interconnected calling line arranged to be operated momentarily to simultaneously effect the operation of the motors at the interconnected stations, and a slow-charging condenser at each of said interconnected stations arranged to be ineffectively energized when the key is momentarily operated but effectively energized when the key is operated for a comparatively long period to stop the motors at said interconnected stations simultaneously.

In testimony whereof, I have signed my name to this specification this 17th day of March, 1926.

GILBERT S. VERNAM.