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1,951,916

PRINTING TELEGRAPH EXCHANGE SYSTEM

Filed Dec. 14, 1932

FIG. 1

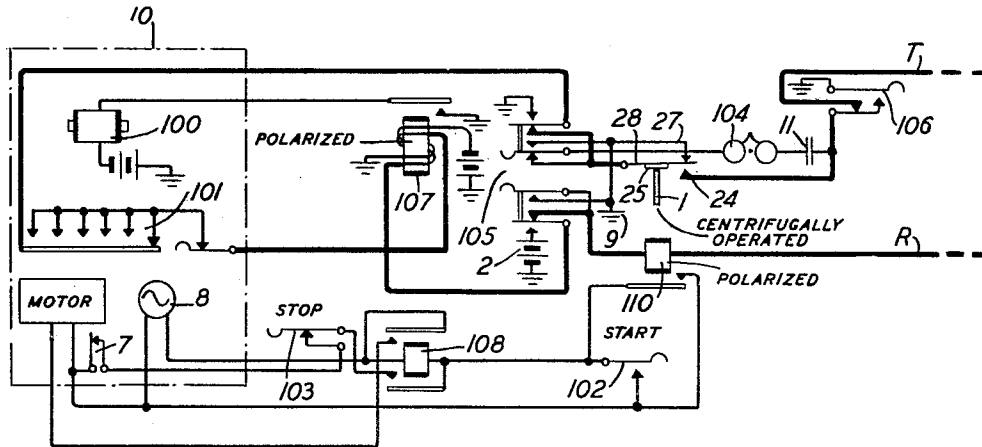


FIG. 2

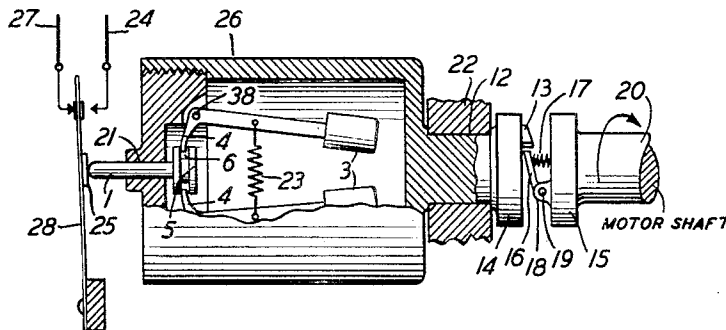


FIG. 3

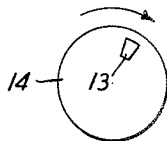
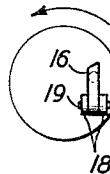


FIG. 4



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1,951,916

PRINTING TELEGRAPH EXCHANGE
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Application December 14, 1932, Serial No. 647,179

3 Claims. (Cl. 178—4.1)

This invention relates to printing telegraph exchange systems and more particularly to improvements in the subscribers' printing telegraph station circuit and apparatus.

The invention provides a subscriber's station similar to the one disclosed in my copending application Serial No. 546,688, filed June 25, 1931 which enables a telegraph subscriber connected to a telegraph exchange system to communicate over the system in a convenient and efficient manner.

More specifically the invention provides a station circuit capable of functioning with telegraph exchange systems of the type which can furnish service which is similar in many respects to that which is now furnished between telephone stations. Such a telegraph system is disclosed in an application, Serial No. 459,684, filed June 7, 1930 by Messrs. G. A. Locke and F. S. Kinkead. These two applications, Serial Nos. 459,684 and 546,688 are hereby made part of the present application as if fully included herein.

The object of this invention is to provide an improved and simplified telegraph subscriber's station, circuit and apparatus.

A feature of the invention is a centrifugal contact associated with the printer driving motor which does not close a loop circuit to the central office until the printer motor has started and maintains its loop circuit closed until the printer motor has come to rest.

Another feature of the invention is a one way clutch which is used to couple the centrifugally operated contact mechanism to the printer motor and making the ratio of moment of inertia to friction of the centrifugally operated contact mechanism higher than that of the printer motor and its load so that the printer motor will stop before this centrifugally operating contacting mechanism actuates its associated contacts.

Another feature of the invention is the motor control means which enables the motor to be controlled either locally or from the central office.

Still another feature of the invention is a switch provided to enable the printer mechanism to be tested locally.

Other features of the invention are recited in the following specification and appended claims.

A specific embodiment of the invention provides a printing telegraph transmitting and receiving mechanism driven by a motor, relay means for controlling the motor either locally or over the loop from the central office and centrifugally operated contacts which close the loop circuit to the central office when the printer mo-

tor starts and opens this loop after the printer motor has stopped. Switches are provided to enable the printer to be tested locally and to attract the attention of the central office operator after a connection has been established. A bell or buzzer is provided to call the subscriber.

The invention may be more fully understood from the following description of this specific embodiment when read with reference to the attached drawing in which:

Fig. 1 illustrates in diagrammatic form the apparatus and electrical circuit connection of the subscriber's station; and,

Fig. 2 shows the details of the centrifugally operated contact mechanism, while Figs. 3 and 4 show certain features of the one way clutch which couples the centrifugally operated contacting mechanism to the driving motor.

Under normal conditions when a subscriber's station circuit is not connected for communication, a circuit may be traced from the tip side T of the transmission line extending from the subscriber's premises to the central office through contacts of the flash key 106 through condenser 11 and bell ringer 104, swinging contacts of key 105 and the normal break contacts 28 and 27 which are centrifugally controlled to ground 9. This ground is also normally connected to the ring side R of the transmission line over a path traced from ring R through the winding of polarized relay 110, contact of key 105, winding of relay 107, contacts 101 of the subscriber's printing telegraph transmitting and receiving mechanism 10, upper contact of key 105 and normal break contacts 28 and 27 to ground 9. The circuit hereinbefore traced from the tip side T of the line through the bell ringer to ground permits the operation of this bell ringer to attract the attention of the subscriber at the station when ringing current is transmitted over the tip side T of the line from the central office. The circuit from the ring side of the line R through relay 110 is provided to enable the motor to be started from the central office as will be hereinafter described.

Assuming that the subscriber desires to initiate a call, start switch 102 will be operated which closes a circuit from one side of the power supply circuit 8 through winding of relay 108 to the other side of the power supply causing relay 108 to operate. Relay 108 in operating locks operated through its lower contact, contact of the stop key 103, through the motor control contacts 7 of the printer mechanism to the other side of the power supply 8. In operating relay 108

closes a path through its upper contact to start the printer motor.

When the printer motor starts, the motor shaft 20 (see Fig. 2) will start to rotate and the clutch member 16 fastened thereto through pivot 19 (see Fig. 4) and brackets 18 will engage pin 13 (see Figs. 2 and 3) attached to the end 14 of the centrifugal member 26 and cause member 26 to rotate with the motor shaft. The centrifugal elements 3 will then tend to move outward against the tension of spring 23 (see Fig. 2). The ends 4 of these elements which engage groove 6 of the head 5 of pin 1 will move pin 1 to the right and thus actuate contacts 24, 27 and 28 when the motor has reached its operating speed. Normally contact springs 27 and 28 are held in contact with each other by pin 1 pressing on the insulation 25 due to the tension of spring 23 transmitted through the ends 4 of elements 20 3 which engage groove 6 of the head 5 of pin 1. When the motor has reached its operating speed and the elements 3 move outward and move pin 1 to the right, the armature spring 28 will follow since it is biased or tensioned against pin 1. This will cause contact springs 28 and 24 to be held in contact with each other. It should be noted that pin 1 moves to the right in Fig. 2 and down in Fig. 1 when the motor has reached its operating speed.

The operation of these contacts opens the bell ringer circuit over the tip T of the line, removes ground from the ring side R of the line and connects the T and R leads of the line from the central office through the subscriber's station set. This last circuit is traced from the tip T of the line from the central office, flash key 106, make contacts of the centrifugal contacts 24 and 28, upper contacts of key 105, sending contacts 101 of the printer set 10, one winding of relay 107, lower contact of key 105, winding of relay 110, to the ring R side of the line to the central office. This will complete a direct current circuit including a battery and a lamp at the central office to indicate to the operator that a subscriber wishes to make a call. The operator at the central office may now connect her printer set with the subscriber's printer for communication thereto. It should be noted that the polarized relay 110 does not operate since the current flowing through its winding is not in the operating direction at this time.

A subscriber often has occasion to signal the operator after a connection has been established with the operator or another subscriber. For this purpose flash key 106 is provided in the subscriber's station equipment. The operation of this non-locking flash key 106 at the subscriber's station opens the circuit extending from the tip T of the line to the central office and places ground on the ring side R of the line, which will operate relays at the central office and cause a supervisory lamp to flash and attract the attention of the operator. A complete description of the operation of the central office equipment is disclosed in my patent application Serial No. 546,688, filed June 25, 1931 and the application of G. A. Locke et al., Serial No. 459,684 filed June 7, 1930.

The station circuit may be returned to normal when the message is completed either by operating stop key 103 or by sending the motor stop signal combination which operates motor control contact 7. The operation of either of these contacts will open the locking circuit of relay 108

thereby releasing relay 108 and opening the current supply circuit for the motor.

In case the motor has been stopped by sending a stop signal which actuates contact 7, it is desirable to have contacts 7 remain open until the motor has stopped. It is also desirable to prevent the printing mechanism 10 from printing additional letters or characters while the motor is coming to rest by maintaining the loop circuit to the central office closed until the motor has come to rest, these requirements are fulfilled and in addition the open loop or disconnect signal is not sent to the central office until the motor has stopped. Thus the operator at the central office will not interrupt the circuit at the central office until the motor at the subscriber's station has stopped after which these interruptions will cause no trouble.

In this embodiment the moment of inertia of member 26 about its axis of rotation is made greater than that of the printing mechanism and the driving motor, while its friction at bearing 12, which may be anti-friction if necessary is made less than that of the printing mechanism and motor so that the printing mechanism and motor will come to rest first. Thus by adjusting the relative movement of inertia and friction as well as the tension of spring 23, contacts 24, 25 and 28 may be held operated until the motor has come to rest. It should be noted that when the clutch face 14 attached to the centrifugal member 26 is rotating faster than face 15 attached to the motor shaft 20, pin 13 will slide over clutch member 16 and compress spring 17 but will not tend to rotate the motor shaft. Thus the centrifugal member 26 is driven by the motor, but is free to continue to rotate after the motor has come to rest.

If desired, the operator at the central office may start an unattended subscriber's printer set, thus permitting the calling subscriber to transmit a message to the unattended station. This may be done by applying battery of a predetermined polarity to the ring side R of the line at the central office. This predetermined polarity on the ring side R of the line will operate polar relay 110 at the subscriber's station. Relay 110 in operating closes a circuit of relay 108 and conditions the station for the reception of a message in a manner identical with that hereinbefore described in connection with start key 102.

Key 105 at the subscriber's station is provided for testing the printer set locally while the line is arranged so that the operator can ring. The operation of key 105 disconnects T and R sides of the line from the subscriber's set. The tip T of the line is connected through the ringer circuit and contacts of key 105 to ground and the ring R is connected to ground through the winding of relay 110 and the contacts of key 105. Battery 2 will then be connected to the lower make contact of key 105 to operate relay 107 over a circuit traced from ground through the upper make contact of key 105 through printer contact 101, winding of relay 107 to battery 2 on the lower contacts of key 105 thereby operating relay 107. Relay 107 in turn actuates printer magnet 100 from ground on its make contact. The motor may then be started and the printer tested locally while the loop is arranged so that the operator may ring from the central office.

It is to be understood that the above description of one specific embodiment of the invention is not to limit or restrict the scope of this invention since there may be many other embodiments

and modifications without departing from the spirit of the invention as defined in the appended claims.

What is claimed is:

5 1. A printing telegraph station circuit comprising terminals for connecting said station circuit to a ground connection, and to a loop circuit from a central office, a bell connected to said terminals for attracting the attention of an attendant, a printing telegraph receiving and transmitting mechanism connected to said terminal, motor driving means for driving said mechanism, means for connecting said motor to a source of power, a centrifugally operated contact associated with said motor which shunts said bell and removes said ground connection when said motor starts.

2. A printing telegraph station comprising a transmitting and receiving mechanism, a motor for driving said mechanism, motor control means cooperating with said mechanism for starting and stopping said motor, centrifugally operated

contacts, a one way clutch connecting said centrifugally operated contacts to said motor, and a loop circuit extending to a central station which includes said mechanism and said centrifugally operated contacts.

3. A printing telegraph subscriber's station which comprises a printing telegraph transmitting and receiving apparatus, a motor driving said apparatus, motor control means connected to said apparatus and said motor, a telegraph loop circuit extending to a central office connected to said apparatus and said motor control means, centrifugally operated contacts connected to said loop circuit, a one way clutch coupling said centrifugally operated contacts to said motor, the ratio of moment of inertia to friction of said centrifugally operated contacts being higher than that of said motor, and said telegraph apparatus whereby said contacts maintain said loop circuit closed until after said motor has stopped rotating.

CUTHBERT C. LANE.

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