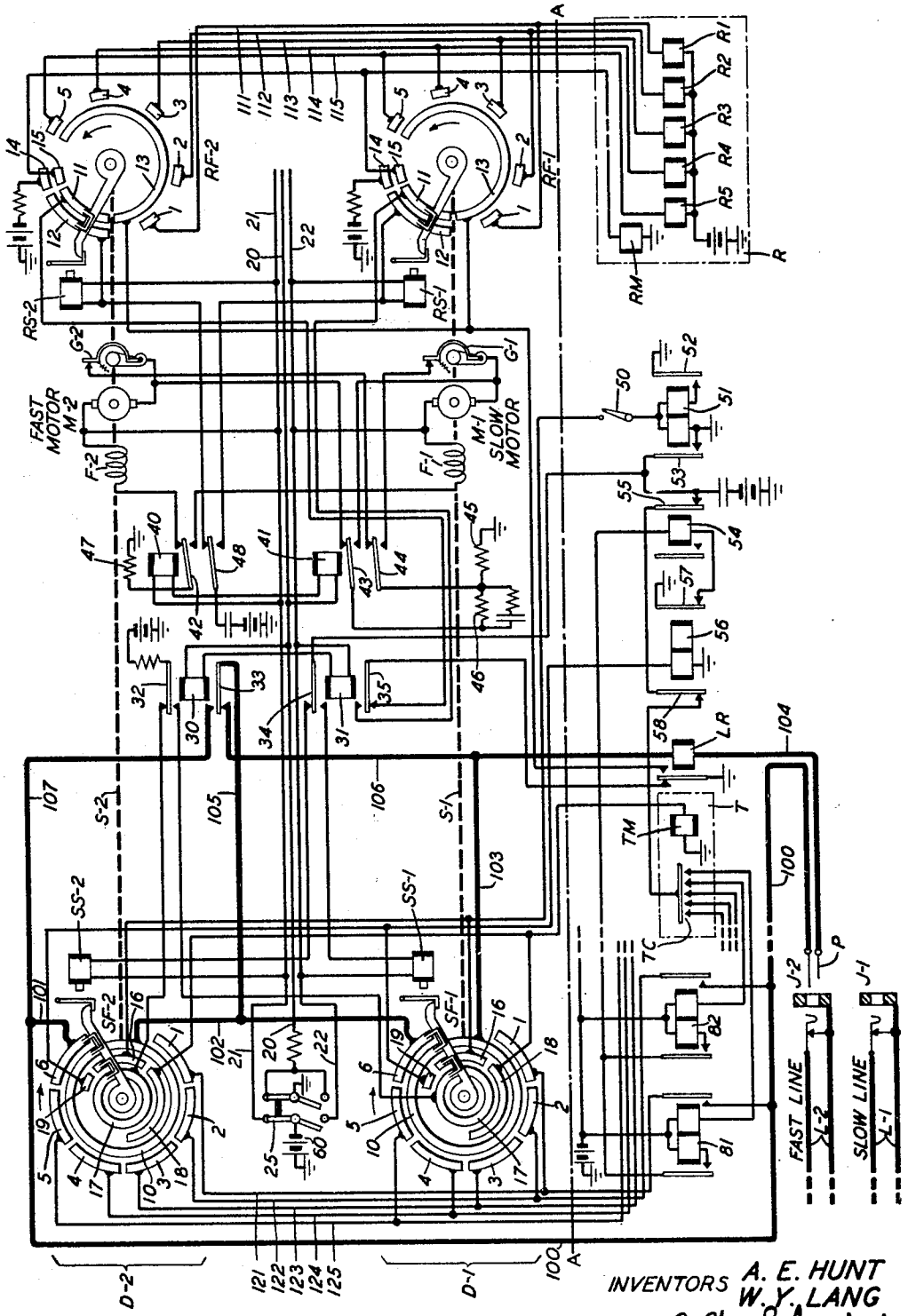
Oct. 11, 1932. A. E. HUNT ET AL 1,881,607

PRINTING TELEGRAPH SYSTEM

Filed June 13, 1931



Patented Oct. 11, 1932 1,881,607

UNITED STATES PATENT OFFICE

ARTHUR E. HUNT, OF BROOKLYN, NEW YORK, AND WILMARTH Y. LANG, OF TOWACO, NEW JERSEY; SAID HUNT ASSIGNOR TO AMERICAN TELEPHONE AND TELEGRAPH COMPANY, A CORPORATION OF NEW YORK, AND SAID LANG ASSIGNOR TO BELL TELEPHONE LABORATORIES, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

PRINTING TELEGRAPH SYSTEM

Application filed June 13, 1931. Serial No. 544,056.

This invention relates to printing telegraph systems and more particularly to monitoring equipment for such systems.

The invention is particularly applicable to telegraph systems in which series of impulses are transmitted and received in their proper sequence and phase relation by means of signal distributing mechanisms of the start-stop type, and in which it is desirable at intervals to monitor the systems from a point where many lines are present.

In its preferred form the invention is applicable to telegraph systems of the type which is frequently used for news distribution service and which serves one or more stations over a single line. The line is usually a two-wire line forming in effect a loop in which the stations are serially included through repeaters. The distributors are of the start-stop type adapted for isochronous operation of the various stations and, besides the series of impulses require for the transmission of a symbol, two extra impulses are required for starting and stopping the distributors for each symbol. The line is normally closed between symbols and an opening of the line causes all distributors to start off and complete one revolution for the reception of a symbol.

In present day practice, certain lines in these systems are run at a higher signaling speed than other lines, the high speed lines being designed for 368 symbols per minute and the low speed lines for 239 symbols per minute. It has been the practice in the past to have a monitoring equipment which comprised a transmitter, a recorder and two distributor units. One distributor unit would operate at the higher speed, the other at the lower speed, and by placing one or the other in a mounting frame, connections would be made to the transmitter and recorder. The interchange of the heavy distributor sets for use with lines of different speed was cumbersome and slow.

An object of the invention is to simplify the monitoring of a group of lines operated at different speeds.

Another object is to prevent mutilation of messages on telegraph lines during monitoring, when a change over from one operating speed to another of the monitoring set is made.

Another object of the invention is to simplify the change over from one distributor set to another in a printing telegraph set adapted for signaling at two different speeds without the necessity of using duplicate transmitting and receiving equipment.

For the attainment of these objects the invention involves a telegraph station equipment, which may be a monitoring set, for insertion successively into a plurality of line or loop circuits some of which are operated at high speed and others at low speed, the equipment comprising a loop circuit and two separate power driven distributor sets each having a sending and a receiving face to which are connected a common signal transmitter, a common recording device and a common set of relays for start-stop control and storing of signals. The circuit changes required for the switching of the loop circuit from one distributor set to the other are accomplished automatically in response to the manual operation of a two position switch. The circuit is so arranged that during a switch-over operation the loop circuit is kept closed over by-paths around the distributors.

Some of the advantages of such an arrangement over prior arrangements are that only a single telegraphing set composed of transmitter, receiver and control relays is required for the two distributors; that by a single throw of a switch the starting and stopping of the two distributor drives and all other necessary circuit changes are automatically carried out; that there is no danger of mutilation of messages passing on the line by the switch-over operation; and that one distributor set may be removed from the equipment without disabling the other or disturbing its operation.

The arrangement in accordance with the invention may readily be extended to equipments for three or more speeds.

In the following detailed description of a preferred embodiment of the invention, reference will be made to the accompanying drawing which is a diagrammatic representa-

tion of a monitoring set comprising two distributor mechanisms with their common controls and with a loop circuit which may be plugged into a plurality of fast and slow lines.

In the drawing, jacks J—1 and J—2 are shown connected to a slow line L—1 and a fast line L—2, respectively. The jacks may be mounted on a switchboard together with a large number of similar jacks connected to other slow and fast lines. Each line may be assumed in effect, to form a loop circuit, such as referred to above, including two or more stations and it is normally closed through the springs of its corresponding jack. It should be understood that the telegraph stations may be connected through repeaters to the main line and that repeaters may be inserted at intervals in the main line in a well-known manner. It should also be understood that the monitoring jacks may be located at any or all stations and at intermediate repeater stations, where a plurality of lines would be present.

The monitoring set comprises a distributor set D—1, of the start-stop type, having a motor M—1 and a sending face SF—1 and receiving face RF—1 mounted on a common shaft S—1, which for simplicity is represented by a dotted line. The motor on the distributor set D—1 is controlled to run the set at a speed corresponding to the speed of the slow lines, which is 239 operations per minute. The monitoring set further comprises a similar start-stop distributor set D—2 having a motor M—2, a sending face SF—2 and a receiving face RF—2 mounted on the shaft S—2. The motor M—2 is controlled to run the distributor at a speed corresponding to that of the fast lines, or for 368 operations per minute.

For the purpose of accurately adjusting the speed of the motors and to maintain the speed constant, each motor is provided with a governor mechanism G—1 and G—2, respectively, which controls the contact for regulation of the armature current to vary the speed within two narrow limits in a known manner.

Each distributor face comprises a series of stationary contact rings sub-divided into segments in various manners as shown in the drawing. Associated with each distributor face is a brush arm carrying wipers adapted to bridge two adjacent contact rings. Each arm is mounted for rotation over the distributor face by a friction clutch (not shown) attached to the distributor shaft; and its rotation is prevented by a catch, which may be operated by its associated start magnet to release the arm and permit its free rotation in unison with the distributor shaft for the distribution of a series of impulses representing a symbol. The control of the start magnet is such that after completion of one revolution, the brush arm will again be caught and held stationary awaiting a new symbol.

The monitoring set further comprises a transmitter T, of any well-known type, and which is shown in the drawing as an automatic transmitter of a type such as is disclosed in French Patent 361,261. It is operated by the passing of a perforated tape to set up contact combinations corresponding to the various symbols to be transmitted.

The monitoring set also comprises a recording device R similar to that disclosed in Patent 1,128,422 dated February 16, 1915.

The transmitter T and the recorder R and their associated relays comprise a circuit portion, shown in the drawing below the dot and dash lines A—A, which is required for the operation of a single distributor set and which in accordance with the preferred form of the invention is made common to the low speed distributor D—1 and the high speed distributor D—2 shown above the line A—A.

For the switching from one distributor to the other of the common circuit, a two-pole double throw switch 25 is provided which connects a current source 60, such as a grounded battery, to the control lines 20, 21 and 22 for the operation of switching relays 30, 31 and 40, 41.

With the two sending brush arms in their stationary positions a loop circuit is normally closed through the distributor faces SF—1 and SF—2 in series through the winding of a line relay LR to the tip and ring of a plug P which may be plugged into any one of the jacks J for the purpose of monitoring on the corresponding line L.

Further details of the circuit will be understood from a description of the operation of the system.

The circuit is shown in the drawing in condition for monitoring on a fast line, and it will be assumed that it is desired to monitor on the fast line L—2. Plug P will be inserted in the jack J—2, whereby the normally closed path for the line L—2 over the springs of the jack is opened and replaced by the closed loop circuit in the monitoring set without interruption of the line, the contacts between the plug and the jack being made before the spring contact on the jack is opened. The closed loop circuit referred to may be traced as follows: From the tip of plug P, conductors 100 and 101, bridged segments 6 and 10 of sending face SF—2, conductor 102, bridged segments 6 and 10 of distributor face SF—1, conductor 103, winding of line relay LR, conductor 104, to the sleeve of plug P. The line relay LR is thus included in the line circuit L—2 and will be operated and released in response to impulses on the line.

The switch 25 is shown in its upper position, connecting battery and ground to the control conductors 21 and 20 respectively. An

energizing circuit is thereby closed through the windings of relays 40 and 41 in series and in the operated condition of these relays the following circuits are closed: Armature 44 connects ground through resistance 45, contact of governor G—2, armature of motor M—2 to line 21 and battery; armature 42 connects ground through resistance 47, field winding F—2 of motor M—2, line 21 to battery. The motor M—2 thus is energized and runs the shaft S—2. The operation of armature 43 closes another ground path through resistances 45 and 46 to armature of motor M—2, line 21 and battery. When the motor attains a certain speed the governor G—2 opens its contact and thereby opens a short circuit for resistance 46, which then is added to the armature circuit and causes the motor to slow down until its speed is such that governor G—2 again closes its contact; the motor will continue to vary its speed between the two limits at which the governor operates, and which are fixed by adjustment of resistances 45 and 46 to be such that the average speed will condition the distributor set for 368 operations per minute.

The placing of battery 60 on conductor 21 by switch 25 prepares an operating circuit for start magnet RS—2 which will be completed whenever the line relay LR de-energizes. This circuit may be traced as follows: From ground, back contact of line relay LR, armature 35 of relay 31, bridged segments 11 and 12 of receiving face RF—2, winding of start magnet RS—2 to line 21 and battery; the start magnet is energized in this circuit and withdraws its catch, thereby releasing the brush arm on the receiving face RF—2, which in turn makes one revolution at a speed determined by the speed of the motor M—2; the arm is then again held stationary by the catch until released by another de-energization of the line relay LR.

After the reception of a few symbols from the line the distributor will fall into phase with the line. When this condition obtains, the starting of the receiving distributor and the monitoring recorder in response to a de-energization of the line relay will be in phase with the starting of all receiving faces included in the line L—2 and will be caused by the start impulse from a transmitter on the line. In the system described, the line loop is assumed to be normally closed between successive series of impulses representing successive symbols, and the sending of a new symbol is preceded by a start impulse during which the line is opened at a transmitting station causing all line relays in the line loop to release and thereby starting off all receiving distributors associated with the line relays in the manner just described for the distributor RF—2. The start impulse is followed by a series of five impulses comprising different combinations of line openings and closures corresponding to different symbols; in the case of high speed lines, such as L—2, the impulses pass over the loop circuit with a rapidity determined by the high speed sending distributor at the transmitting station. After the reception of the start impulse the brush arm on the receiving distributor RF—2 will pass its wipers over segments 1, 2, 3, 4 and 5, which consequently are placed in connection with the segment 13 through the wipers on the arm. The speed of motor M—2 being adjusted for operation with the fast line L—2, the brush arm will pass over segment 1 at the time when the first line signal passes through line relay LR and will pass the succeeding segments at such times as the succeeding signals pass through line relay LR.

Assuming that the first signal of a symbol being transmitted is represented by a close of the line, relay LR will be energized and by its armature connects ground over bridged segment 13, conductor 111 to receiving magnet R—1 which operates. Assuming next that the second signal is an open of the line, line relay LR de-energizes and removes ground from segment 13 with the result that no ground will be placed on segment 2 connected through conductor 112 to receiving magnet R—2, and this magnet consequently does not operate. The remaining three signals of the symbol passing through relay LR similarly cause the operation or non-operation of receiving magnets R—3, R—4 and R—5 over conductors 113, 114 and 115. The operation or non-operation of the receiving magnets of the recording device R effect selections of operating mechanism in the recorder for the translation of the received series of signals into the corresponding symbol. Immediately before the completion of its revolution the brush arm of distributor RF—2 bridges contacts 14 and 15 and thereby closes a circuit from battery through a magnet RM in the recorder R for the operation of the printing mechanism. The operator is thus enabled to observe the operating conditions of the line L—2.

It will now be assumed that the operator desires to transmit a message over the line L—2 at this time, for which purpose he may place a perforated tape containing his message in the transmitter T. The transmitter T comprises a stepping magnet SM for advancing the tape each time a symbol has been transmitted over the loop. The transmitter also comprises a series of transmitting contacts TC which in response to the perforations in the tape cause the operation of one or more storing relays individual to each transmitting contact. For the sake of simplicity only two storing relays 81 and 82 are shown in the drawing, having their right-hand operating windings connected to corresponding contacts TC. Such storing relays

as have been operated will lock themselves in operated condition and thus permit a new setting of the transmitting contact TC to be made while the setting on the storing relays is being transmitted by the sending distributor.

The operator now closes switch 50 whereby a circuit is extended from ground through left-hand winding of start relay 51, switch 50, bridged segments 16 and 17, back contact of armature 32 on relay 30 to battery, causing relay 51 to operate and close a locking circuit to ground through its right-hand winding over the same circuit. Relay 51 in operating also closes two circuits to ground at its left-hand armature 53, one of which may be traced over armature 55 of keyboard relay 54, armature 58 of lockout relay 56, one or more of the transmitting contacts TC through corresponding operating windings of the storing relays to battery. Assuming that the circuit for storing relay 81 is closed and the circuit for relay 82 is opened at the transmitting contacts TC, relay 82 will remain de-energized and relay 81 will be operated and close a locking circuit from battery through its left-hand winding and left-hand armature through relay 54 and armature 57 of relay 56 to ground. Relay 54 operates in this locking circuit and opens the operating circuit for the storing relays at its armature 55. The right-hand armatures of all the storing relays are connected over conductors 121, 122, 123, 124 and 125 to corresponding segments 1, 2, 3, 4 and 5 on the sending distributor SF—2, which consequently are connected to or disconnected from the conductor 100 of the main loop circuit in accordance with the setting of the storing relays.

The other circuit closed by the operation of armature 53 of relay 51 may be traced from ground through armature 53, armature 34 of relay 31, sending start magnet SS—2 to battery on line 21. Start magnet SS—2 operates and releases the brush arm, which consequently makes a revolution over the sending face SF—2 at a speed determined by the motor M—2 and corresponding to the transmitting speed of the line L—2. Commencing its travel the brush arm removes its wipers from segment 6 of the sending face SF—2, thereby opening the main loop circuit which results in a start impulse being transmitted over the line L—2, causing the release of all line relays including line relay LR of the monitoring set. The release of line relay LR starts the receiving distributor RF—2 as described above and the release of all line relays including the line L—2 similarly starts their corresponding receiving distributors.

As the brush arm of sending distributor SF—2 subsequently passes over segments 1, 2, 3, 4 and 5, the loop circuit will be closed and opened in accordance with the setting of the storing relays 81, 82, etc., as follows: From conductor 100, right-hand armature of operated storing relays 81, 82 etc., segments 1, 2, etc. and ring 10 of sending face SF—2, conductor 102, bridged segments 6 and 10 of sending face SF—1, conductor 103, line relay LR to conductor 104. Impulses corresponding to the setting of the storing relays are thus transmitted over the line circuit L—2 with the proper speed for correct reception over the various receiving distributors. These impulses are also received over the receiving distributor RF—2 of the monitoring set by the recorder R, which produces a record of the transmitted message. Thus in accordance with the setting assumed above of the storing relays 81 and 82, etc. the loop circuit will be closed while the brush arm passes over segment 1 causing the operation of receiving magnet R—1 and will be opened while the brush arm passes over segment 2 causing the receiving magnet R—2 to remain de-energized. The remaining magnets R—3, R—4 and R—5 are similarly selected. The loop circuit is again closed when the brush arm of distributor SF—2 reaches segment 6 on which the arm comes to a stop.

The control relays 51, 54 and 56 are provided for the purpose of preventing interference between successive series of impulses and their operation is controlled from the sending distributor SF—2 in the following manner. When the brush arm leaves segment 16, the operating and holding circuits for relay 51 described above are opened and the relay releases and is prevented from again operating until the brush arm comes to rest on segment 16. While the brush arm passes over segment 18 a circuit is closed from battery, armature 32 of relay 30, bridged segments 17 and 18, stepping magnet TM of the transmitter T to ground. Magnet TM steps the perforated tape for alignment of a new set of perforations and for a new setting of the transmitting contacts TC which however has no effect upon the storing relays, since the ground at armature 53 has been removed by the release of relay 51 and by the operation of relay 54. The release of relay 51 also removed the ground at armature 53 from the operating circuit for the start magnet SS—2 thereby causing the catch to fall back into the path of the brush arm of distributor SF—2. Immediately before the completion of its revolution the brush arm passes over segment 19 and thereby closes a circuit from battery at armature 32, bridged segments 17 and 19, operating winding of relay 56 to ground, thereby temporarily operating relay 56 which at its armature 58 introduces another temporary break in the operating circuit for the storing relays 81, 82, etc. The operation of armature 57 of relay 56 removes ground from the locking circuit of the stor-

ing relays causing them to release and releasing relay 54. Relay 56 again releases when the brush arm leaves segment 19 and prepares the locking circuit for the storing relays at its armature 57 and also prepares the operating circuit of the storing relays at its armature 58. The release of relay 54 also prepares at its armature 55 the operating circuit for the storing relays. When the brush arm comes to a stop on segment 16, relay 51 will again be operated and the operations described above are repeated in connection with the new contact combination on the transmitter T.

It should be noted that the loop circuit through the monitoring set besides being closed over the path including the bridged segments 6 and 10 of the sending face SF—1 is also closed over a by-path which extends over conductor 105, armature 33 of relay 30 and its normally closed contact and conductor 106; the loop circuit is thus independent of the bridging of contacts 6 and 10 on sending face SF—1 and the distributor D—1 may be entirely disconnected and removed from the circuit without disturbing the operation of the fast distributor D—2.

If the operator, instead of plugging into jack J—2 as described above, had plugged into jack J—1 of the slow line L—1 with the switch 25 in its upper position for operation of the fast distributor D—2, the difference in speed of the line L—1 and the distributor D—2 would cause the receiving distributor RF—2 to operate in a jerky manner and would prevent proper reception of signals by the recorder R. Observing this, the operator will disconnect the distributor D—2 by throwing switch 25 to its lower position thereby connecting the slow distributor D—1 for operation.

In this position of the switch 25, battery and ground are extended to lines 22 and 20 thereby causing the operation of switching relays 30 and 31 in series and the release of switching relays 40 and 41. When battery is placed on line 22 the various circuits required for the operation of motor M—1 are completed over the back contacts of relays 40 and 41, and the motor M—1 is brought up to speed and is controlled by its governor G—1 in a manner similar to that described above for the motor M—2. The governor G—1 is adjusted for speed variations such that the average speed of motor M—1 will correspond to 239 operations per minute of the distributor D—1, which corresponds to the operating speed of the slow line L—1.

When now the line relay LR de-energizes, ground is connected from its armature over armature 35 and its front contact, bridged segments 11 and 12 of receiving face RF—1 start magnet RS—1 to battery on line 22 thereby starting the brush arm of the receiving face RF—1. As soon as isochronism is attained between the receiving face RF—1 and the line L—1, messages will be received on the recording device R over the conductors 111, 112, 113, 114 and 115 in the same manner as described for the receiving face RF—2.

When now for the purpose of transmission, the operator closes switch 50, the operating circuit for relay 51 is excited from ground through its left-hand operating winding, switch 50, bridged segments 16 and 17 of the sending face SF—1, front contact and armature 32 of relay 30 to battery, causing relay 51 to operate and lock over its armature 52. The ground at armature 53 also is extended over armature 34 and its front contact, through the start magnet SS—1 of distributo D—1 to battery on line 22, whereby the brush arm of sending face SF—1 is started off on a revolution. Segments 1, 2, 3, 4 and 5 of the sending face SF—1 are connected over conductors 111, 112, 113, 114 and 115 to the right-hand armatures of the storing relays 81, 82, etc. The further operation of the circuit for transmission of impulses over the line L—1 is similar to that described above in connection with the transmission of impulses over the distributor D—2 and line L—2.

It may be noted that the main loop circuit of the monitoring set besides being closed over the path including bridged contacts 6 and 10 of sending face SF—2 under these conditions is also closed over a multiple path including conductor 107, front contact and armature 33 of relay 30 and conductor 105. The opening of the loop circuit by the removal of distributor D—2 or by the accidental release of its brush arm consequently will not interfere with the transmission of signals by the distributor D—1.

If now the plug P is plugged into another fast line, the difference in speed of the slow distributor D—1 and the fast line would again prevent the proper reception of messages and cause the distributor to operate in a jerky manner. The operator in observing this condition would throw switch 25 to its upper position thereby associating the fast distributor with the fast line.

It may be further noted that, due to the fact that the loop circuit of the monitoring set is completed in parallel paths through the bridged segments 6 and 10 of the distributor faces SF—1 and SF—2 and through the armature 33 of relay 30 and its associated contacts, the throwing of switch 25 from one position to another and the consequent switching of the armature 33 on relay 30 between conductors 106 and 107 has no effect upon the loop circuit and consequently in no way interferes with the messages on the line.

The system described above is a preferred form of the invention and may be modified in various ways without a departure from the

scope of the invention. Thus, the distributors may be duplicates and run at the same speed; the number of distributors may be greater than two; the distributors may be driven through magnetic clutches and appropriate gearing from common driving means; and other types of distributors than that shown may be used, as for example, the oscillating type or the continuously rotating type used in full duplex telegraph systems.

What is claimed is:

1. In a signaling system having lines for high and low speed signaling, a telegraph station comprising a line circuit, a high speed signal distributing device, a low speed signal distributing device, a common telegraphing system connected to both of said devices, and a switching system for operatively associating said telegraphing system with said line circuit through either one of said distributing devices.

2. A telegraph system comprsing a line circuit, two rotary distributors, a transmitting means for impressing impulses upon said line circuit in accordance with a code and connected by multiple connections to said distributors, a recording means for receiving impulses from said line circuit and connected by multiple connections to said distributors, and switching means for simultaneously rendering one distributor ineffective and the other distributor effective to associate said transmitting and receiving means with said line circuit for impression and reception of impulses.

3. A printing telegraph set for operation with high and low speed signaling lines which comprise a high speed distributor and a low speed distributor each having sending and receiving contacts, a transmitting device and a receiving device common to said distributors, a loop circuit connected through said devices and through said sending contacts of both distributors in series, switching means for supplying power to one or the other of said distributors, for bridging the sending contacts of one or the other of said distributors, and for associating said receiving device with the receiving segments of one or the other of said distributors, and means for connecting said loop circuit to a line.

4. A telegraph station for operation in connection with high speed signaling lines and with low speed signaling lines which comprises a high speed distributor and a low speed distributor each having sending and receiving contact faces, brush arms, driving and speed control means for said arms, a common signal transmitter including storing and control relays multipled to corresponding contacts on said sending faces, a common signal recording device multipled to corresponding contacts of said receiving faces, a loop circuit connecting through said sending faces in series and including a line relay having contacts for transfer of signals from said loop circuit through said receiving face to said recording device, a source of electrical power, and switching means having contacts for switching said source of power from one of said driving means to the other to stop one distributor and to drive the other and having contacts for completing the loop circuit over a by-path around the sending face of said stopped distributor to prevent it from multilating signals in said loop circuit and also having contacts for switching the signal transfer contacts of said line relay from the receiving face of said one stopped distributor to that of said other driven distributor, said switching operations being reversible in respect to said two distributors.

5. A telegraph system comprising a plurality of lines having different signaling frequencies, a transmitter having a plurality of selectively operated circuit closing devices, a plurality of distributing mechanisms for transmitting to said lines series of impulses determined by the selection of said circuit closing devices and at frequencies corresponding to said signaling frequencies, and switching means for connecting said circuit closing devices successively to said lines through any one of said distributing mechanisms in accordance with the required frequency.

6. In a telegraph signaling system including lines for high and low speed signaling, a printing telegraph set comprising a loop circuit including means for making connection with any one of said lines, a high speed sending distributor and a low speed sending distributor each having transmitting segments for opening and closing said loop circuit, common transmitting means multipled to corresponding transmitting segments on said high and low speed distributors to cause the opening and closing of said loop circuit by either of said distributors, and switching means for bridging the segments on either of said distributors to prevent mutilation of the signals transmited over the loop by the other of said distributors.

7. A telegraph system comprising a plurality of lines for at least two different signal frequencies, a line circuit including a line relay, means for connecting said line circuit to any one of said lines, a recorder having a plurality of selecting magnets, a plurality of distributing mechanisms for receiving from said line relay a series of impulses for selection of said magnets, and switching means for connecting said selecting magnets successively to said line relay through any one of said distributing mechanisms in accordance with the signal frequency of the line connected to said line circuit.

8. In a telegraph signaling system, a line, a station equipment for reception of signals from said line comprising a loop circuit for

insertion in said line and including a line relay responsive to signals passing over said line, a first motor driven receiving distributor normally adjusted for isochronism with a high signaling speed on said line, a second motor driven receiving distributor normally adjusted for isochronism with a considerably lower signaling speed than said first distributor, a signal recording device normally connected for operation from either of said distributors, a source of electrical energy, and switching means for supplying driving power from said source to said first distributor or to said second distributor and for connecting said line relay in operating relation with said first distributor or said second distributor, respectively, for reception of signals by said recording device in accordance with the signaling speed of said line.

9. A printing telegraph system for operation with high and low speed lines comprising a high speed signal distributing device, a low speed signal distributing device, each device having a movable contacting element and means for arresting the movement of said element at the end of a signal, a common relay for operating said arresting means to release said contacting elements, and switching means for selectively connecting said relay to either one of said arresting means in accordance with the speed of the line with which said system is operated.

10. A printing telegraph system for operation with high and low speed lines comprising a loop circuit including connecting means to any one of said lines, a high speed distributor having a sending and a receiving face, a low speed distributor having a sending and a receiving face, common signal transmitting means connected by multiple connections to both of said sending faces for signaling over any one of said lines, common signal recording means connected by multiple connections to both of said receiving faces for reception from any one of said lines, means for driving said distributors at their predetermined speeds, and switching means for conditioning said driving means for operation of either one of said distributors and for inoperation of the other of said distributors.

In witness whereof, we hereunto subscribe our names this 6th day of June, 1931.

ARTHUR E. HUNT.
WILMARTH Y. LANG.