

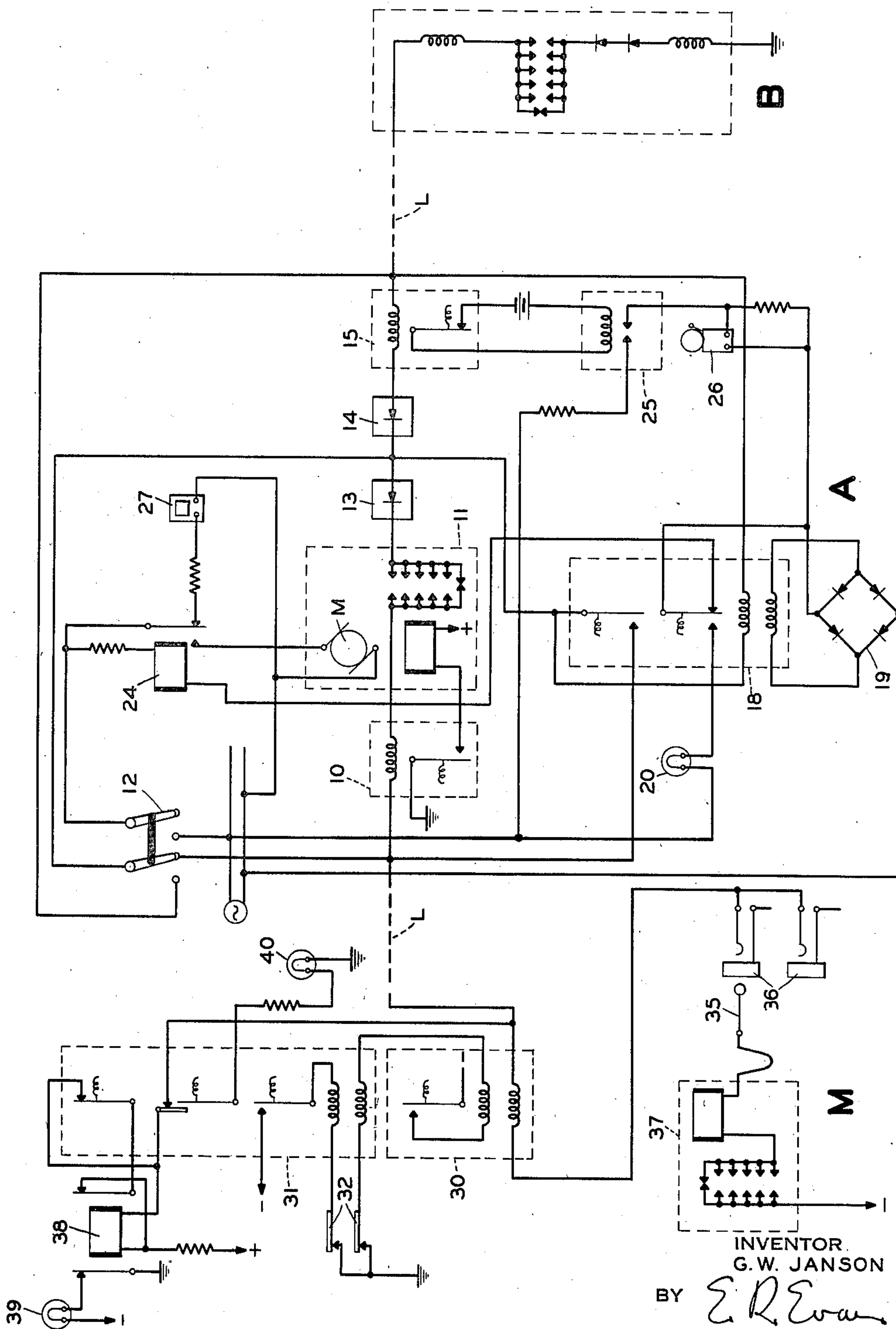
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PRINTING TELEGRAPH SYSTEM

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PRINTING TELEGRAPH SYSTEM

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This invention relates to selective calling and control arrangements for printing telegraph systems and more particularly to systems embodying a central station and a plurality of branch stations connected by a single line circuit to the central station.

An object of the invention is to provide improved and simplified apparatus for the selection and control of printers in a telegraph system.

Another object of the invention is to provide a printing telegraph system having a number of stations on a single line circuit arranged to permit selective two-way communication between any two stations of the system and to lock out certain stations until the line circuit becomes idle.

Another object of the invention is to provide a system of this character arranged for secret or exclusive communication between a central station and any one of the substations on the common line circuit.

Another object of the invention is to provide a printing telegraph system in which a number of stations are arranged for two-way calling and two-way communication between two or more individual stations over a single line circuit extending between the several stations as distinguished from ordinary multiple operation.

Another object of the invention is to provide a printing telegraph system in which a main or control station is connected to a plurality of substations by a single line circuit and arranged for selective broadcasting from the central station simultaneously to any two or more of the substations; or in more general terms, arranged to broadcast from any of the stations exclusively to other stations designated for example by the central station or a calling substation.

A further object of the invention is to provide a system of the above mentioned character in which the polarity of the line circuit is reversed when the line becomes busy and the reversal of line polarity is arranged to effect a desired function, such as immediate lockout of all but the calling station.

A further object of the invention is to provide a printing telegraph system comprising a central station and series-circuit substations in which the condition of the line circuit is altered in one manner when seized by the central station and in a different manner when seized by one of the substations, all the substations except the one originating a call being locked out or rendered inoperative in either instance until signalled from an operative station or until the line circuit is restored to normal.

A further object of the invention is to provide a printing telegraph system comprising a central station and a plurality of substations connected by a single line circuit wherein a called station is conditioned for operation jointly by a signal transmitted from the calling station and by a manipulative response at the called station, as for example by the manual operation of a switch at the receiving printer.

Other objects and advantages of the invention will appear from the following description of the preferred embodiment thereof shown on the accompanying drawing, the single figure of which is a circuit diagram of a system including a central station and a plurality of substations.

In accordance with the invention, the substations (which may be telegraph branch offices or subscriber's substations) are connected to the central station or main office by a series line circuit. Printing telegraph equipment is provided at each station and the system is arranged for two-way communication between the central station and any desired station or stations to the exclusion of the other stations which are locked out until the line circuit becomes idle.

In accordance with the preferred embodiment of the invention, each substation is provided with a selector arranged to operate a call signal in response to signalling impulses received over the line circuit. The selectors are preferably controlled by the printer keyboards, thereby avoiding the necessity of providing special code transmitters and providing for control of the selectors from any operative station. In accordance with a further feature of the invention, the selectors are arranged to control the printer motor at a called substation in conjunction with a manually operable device, as for example a key or switch, at the called station. Thus the motor switch is not able to start the printer motor if the line circuit is in use, unless the local selector has been operated in accordance with the designation of the substation. On the other hand, if the line circuit is idle, the closure of the motor switch starts the printer motor and, as will be explained, also seizes the line circuit, locks out the other substations and operates a "call" lamp or other signal at the central station.

In accordance with another feature of the invention, the normal electrical condition of the line circuit when it is idle is altered in one manner when any substation seizes the line circuit and in a different manner when the central station printer is connected to the line circuit or rendered operative. The system may include a

concentrator at the central station arranged to reverse the polarity of the line battery when an operator connects a printer to the line, either to originate a call or to answer a call originating at a substation. In this case means is provided at each substation for interrupting the line circuit to lock out the other substations when a call is made from one substation; and also means for rendering the substation printer inoperative when the polarity of the line circuit is reversed or the circuit interrupted, unless the local selector receives the code combination representing the particular substation.

Thus it will be seen that the invention provides an improved printing telegraph system in which a plurality of substations may be connected to a main office or central station with two-way calling and two-way communication over a single line circuit shared by the two or more substations. A secret or exclusive connection may be established between any substation and the central station or messages may be broadcast simultaneously to any two or more of the substations from either the central station or one of the substations.

Referring to the drawing, the branch offices or substations A, B are connected to a central or main station M by a common series line circuit L. As shown, the line circuit consists of a single conductor with ground return circuit, but obviously a complete metallic circuit or other equivalent signalling channel may be employed. Furthermore while only two substations are shown, a greater number is contemplated in certain installations, the equipment at each substation being similar to that shown for substation A.

At each substation a line relay 10 and the transmitting contacts of a printer 11 are connected in series relation with the line circuit L. The winding of relay 10 and the transmitting contacts are shunted by a control switch 12 when this switch is in the "off" position shown in the drawing so that the line relay is short-circuited except when the substation is conditioned for operation. Two asymmetric conducting devices or rectifiers 13 and 14 and the winding of a selector relay 15 are also connected in series relation with the line L. Another relay 18 has the operating winding thereof connected in shunt relation to the rectifier 14 and relay 15. The locking winding of the relay 18 is connected to the alternating current source of power at the station through a rectifier 19 to maintain the relay energized under certain conditions as will be explained hereinafter. A "busy" lamp 20 is connected in series with the lower armature and back contact of said relay to indicate the busy condition of the line circuit, relay 18 being normally energized when the line circuit is idle or when a call is originated at substation A.

The line relay 10 is arranged to control the printer magnet of the printer 11 in response to code signals received over the line circuit in the usual manner. If desired the printer magnet may be connected in the circuit and the line relay 10 omitted. A motor control relay 24 is arranged to control the circuit of the printer motor M. The contacts of selector relay 15 are connected to the operating winding of a selector 25, preferably a Gill selector, arranged to close its contacts upon receipt of a predetermined code signal representing the designation of substation A. Obviously the winding of selector 25 may also be connected in the line circuit and the selector relay 15 omitted if desired. A call bell or signal

25 is connected to the contacts of the Gill selector 25 and the selector 25 cooperates with the manually operable control switch 12 to permit the starting of the printer motor when the substation A is called from a remote station in a manner that will be explained hereinafter. If the control switch 12 is operated when the line circuit is in use and the Gill selector 25 has not been actuated in accordance with the predetermined code of substation A, an alarm or buzzer 27 is operated and the printer motor does not start.

The central station M, in the system shown for the purpose of explaining the invention, embodies a concentrator switchboard of the type shown in the patent to Drake and Blanton No. 1,804,327, dated May 5, 1931. Reference may be had to this prior patent for a detailed explanation of the operation of the concentrator.

As shown, the concentrator comprises a relay 30 having the operating winding thereof connected in series with the line circuit L and the locking winding thereof connected in series relation with an operating winding of a second relay 31 and interrupter contacts 32. The interrupter contacts 32 comprise two sets of contacts which are operated periodically and at different times to test the busy or idle condition of the line circuit as explained in the above mentioned patent. The concentrator further comprises switch means such as a plug 35 and jacks 36 arranged to connect the operator's printer 37 at the main station to the line circuit L when a call from one of the substations is to be answered, or in the case of a call originating at the main station for one of the substations.

The line circuit L is normally connected through the make-before-break contacts of relay 31 and the winding of a control relay 38 to positive battery, thereby energizing the relay 38 as long as the line circuit is idle. A "call" lamp 39 and a "busy" lamp 40 are also provided for each line circuit terminating at the concentrator.

The operation of the concentrator switchboard may be briefly summarized as follows: When a substation desires to transmit a message to a central station, the concentrator operator is signaled by an interruption of the line current through the line circuit L whereupon relay 38 becomes deenergized and closes, through its left hand armature and back contact, the circuit of the "call" lamp 39. The right hand armature and back contact of relay 38 close a short circuit through the upper armature and back contact of relay 31 around the winding of relay 38 so that the latter cannot be reenergized until relay 31 is operated. One of the concentrator operators plugs a printer such as the printer 37 into a jack 36 connected to the line circuit L whereupon the polarity of the line circuit is reversed since the line is now connected through the operator's printer to negative battery as shown. Relay 30 becomes energized in series with the printer 37 and is locked up through its locking winding, the locking circuit including the armature and front contact of relay 30, the operating winding of relay 31 and the lower interrupter contact 32. The energization of the relay 31 also disconnects at its middle armature and break contact the connection to positive battery from the line circuit through the winding of relay 38. A circuit is now closed through the middle armature and make contact of relay 31 for lighting the "busy" lamp 40 in series with the winding of relay 38. Relay 31 remains locked up through its lower armature

and front contact, the upper or locking winding of said relay and the upper interrupter contact 32. The interrupter contacts 32 operate successively at frequent intervals, the lower of said contacts first being opened momentarily and then the upper of said contacts. If the line circuit has become idle, as by the disconnection of the operator's printer 37 from the line, relay 30 becomes deenergized when the lower interrupter contact 32 opens. After a short time interval the opening of the upper interrupter contact 32 opens the locking circuit of relay 31 provided relay 30 has not become energized again and restores the concentrator supervisory equipment to normal. In this manner the "busy" lamp and "call" lamp do not respond to the short circuit interruptions of the printer signals but operate in response to the restoration of the circuit to its idle condition shortly after this condition occurs. When the cord circuit is pulled down and the relay 31 becomes deenergized, the polarity of the line circuit is again reversed to indicate at the substations that the circuit is idle.

In the case of a call originating at the main office M the plugging of the operator's printer 37 into one of the line jacks 36 reverses the polarity of the line and operates relays 30 and 31 in substantially the same manner as described above but relay 38 is not deenergized to light the "call" lamp 39. Since the printer magnets and the keyboard contacts of the printers at the central station M and the respective substations are in series with the line circuit L, two-way communication can be carried on between any of the substations and the central station provided the substation printer is not locked out in the manner that will now be described.

The rectifiers 13 and 14 in the line circuit L at each substation are so connected as to oppose the passage of current through the circuit during the periods when the line circuit is idle, namely, when the latter is connected to positive battery at the central station. Normally, however, the rectifier 13, as well as the keyboard contacts of the printer 11 and the winding of the line relay 10, is short-circuited by the left hand blade of the manually operable control switch 12. The rectifier 14 prevents passage of the line current through the winding of the selector relay 15 but the winding of relay 18 in shunt relation to the rectifier 14 is continuously energized so that the armatures of said relay remain operated to the right as long as the line circuit is idle. In order to initiate a call to the central station M, the control switch 12 is thrown to the left thereby opening the short-circuit around the line relay 10 and the printer contacts of the printer 11. The switch 12 further closes the circuit of the motor control relay 24 through the right hand blade of said switch, the lower armature and front contact of relay 18 and the rectifier 19. The energization of relay 24 closes the circuit of the printer driving motor M through the armature and front contact of said relay and the right hand blade of switch 12 to the alternating current supply circuit. When the motor M is running, the printer 11 is conditioned for transmission and reception of messages.

When the switch 12 is thrown to the left as described above, the shunt path for the line current around the rectifier 13 is opened. However, although relay 18 remains energized the polarity of the line is such that the line current cannot flow through the rectifier 13 and therefore the line current is interrupted or re-

duced to a sufficiently low value to deenergize the control relays corresponding to relay 18 at the other substations, as well as the relay 38 at the central station. The deenergization of the latter relay lights the "call" lamp 39 at the central station to indicate that a substation is calling and the deenergization of the control relays locks out the other substations on the line L, and lights their busy lamps 20. The line circuit has thus been seized by the substation A by the operation of switch 12. The relay 18 at substation A is locked up since the locking winding thereof is connected to the direct current terminals of the rectifier 19, the alternating current terminals of which are connected to the local supply circuit through the above described circuit including the motor control relay 24. Upon answering the call at the central station, the polarity of the line is reversed as described above and normal line current flows through the line circuit L since the rectifier 13 offers negligible resistance to the reversed flow of current and rectifier 14 and selector relay 15 are shorted out by the left hand blade of switch 12. Therefore the line relay 10 will respond to make and break printer signals from the keyboard at the central station and two-way communication may be held between the printers 11 and 37. The rectifiers 14 at the other substations short-circuit the relays 18 at these stations so that the latter remain deenergized. However any of the other substations may be called from the central station or substation A for broadcasting purposes in a manner that will be explained.

The manner in which the respective substations are locked out when the line circuit has been seized by one substation will appear from a description of the operation when substation A has been locked out as a result of a call being initiated from one of the other substations. When said other substation has interrupted the line current in the line circuit, relay 18 becomes deenergized. A circuit is closed through a "busy" lamp 20, the lower armature and back contact of relay 18 and the rectifier 19, whereupon the lamp 20 is lighted to indicate the busy condition of the circuit. When the polarity of the line circuit is reversed at the central station as described above, the relay 18 does not become reenergized as the operating winding thereof is short-circuited by the rectifier 14 and the low resistance relay winding 15. The circuit of the other winding of relay 18 is opened at the lower armature and front contact of relay 18. The current taken by the "busy" lamp 20 which is of high resistance is not sufficient to operate relay 18. The circuit through the inoperative substation includes the winding of selector relay 15, rectifier 14, and the upper armature and back contact of relay 18. Thus if the operator or subscriber at substation A attempts to operate the printer while the line circuit is busy by throwing the control switch 12 to the left, the line relay 10 and the printer contacts are short-circuited by the contacts of relay 18. The printer driving motor M does not start because the circuit of the motor control relay 24 is open at the front contact of relay 18. However, when the switch 12 is thrown, a circuit is closed through the right hand blade thereof and the armature and back contact of relay 24 for energizing the buzzer 27 to indicate to the operator who has ignored the "busy" lamp 20 that the line circuit is busy. Even though the switch 12 is left operated until after the line circuit becomes

idle, the relay 18 will not be reenergized to permit the substation to seize the line circuit because a short-circuit around the operating winding of said relay is closed through the left hand blade of the switch 12. Thus it is necessary to restore the switch 12 and to operate the same only after the line circuit has become idle in order to seize the line circuit.

As described above, the central station equipment initiates a call by plugging a printer into the line circuit and thereby reversing the polarity of the line circuit. Since all of the substations are inoperative at this time, the control switches 12 are thrown to the right. Upon the reversal of the polarity of the line circuit, the rectifiers 14 at the respective substations offer a low resistance shunt path around the windings of the relays corresponding to the relay 18 at each substation whereupon the latter become deenergized and the stations are temporarily locked out as described above. The central station operator then transmits from her printer keyboard the code combination representing the desired substation. The selector relays 15 respond to the code signals and the selector 25 at the called substation is operated in such a manner as to close its contacts, thereby closing a circuit through said contacts and the rectifier 19 whereupon the bell 26 rings to summon the operator or attendant at the called substation.

The closing of the circuit to the alternating current terminals of the rectifier 19 as described energizes the locking winding of relay 18 which is connected to the direct current terminals of said rectifier. Therefore, relay 18 becomes energized as soon as the selector 25 closes its contacts, thereby preparing a circuit for the motor control relay 24 so that the printer driving motor at the called substation may be started when the attendant responds to the call by operating the motor control switch 12. The closure of the motor control switch 12 energizes relay 24 in the same manner as described above in connection with the initiation of a call from substation A. The attendant at the called substation signals the operator at the central station as by sending "GA" (go ahead) from the keyboard of the printer 11. As soon as any printer signals are transmitted over the line circuit, the selector 25 is released and the circuit of the bell 26 is opened. The substation A is now in readiness to communicate with the printer at the central station.

If the operator at the central station desires to broadcast a message simultaneously to more than one substation, the stations are successively signaled in the same manner as described above in connection with substation A and each substation may be conditioned for operation by the switch 12 as soon as the selector 25 has been operated in accordance with the code combination of such station, each of the stations being rendered operative until the line circuit become idle and the motor control switches 12 are restored to normal.

In a system of the character described the telegraph traffic is normally between a central station and one or more substations or between one of the substations and the central station. However, if one of the substations desires to communicate with another substation, the first mentioned station can call the central station and then the other substation can be called from either the calling substation or the central station in the manner described above.

It will be apparent that in accordance with the invention a plurality of substations may be operated in connection with a central station, the respective substations sharing a single line circuit but being arranged for secret or exclusive communication with the central station. Various modifications of the system shown and described in detail will occur to those skilled in the art and may be made without departing from the scope of the present invention.

I claim:

1. A telegraph system comprising a central station, a line circuit terminating at said station, a plurality of substations associated with said line circuit, printing telegraph equipment for communicating between said central station and any of said substations over the line circuit, means controlling the operativeness of the printing telegraph equipment at each of the substations, a selector at each substation connected to the line circuit, means including said selectors for individually signalling each substation and thereby calling the selected substation at which the printing telegraph equipment is inoperative and means at each substation dependent upon said signalling means when the line circuit is in use for rendering the printing telegraph equipment at a called substation operative and for preventing operation of the printing telegraph equipment at an uncalled substation, whereby a substation that is not called is locked out, said last mentioned means including a manually operable control device at the called substation.

2. A telegraph system comprising a central station, a line circuit terminating at said station, a plurality of substations associated with said line circuit, printing telegraph equipment for communication between said central station and any of said substations over the line circuit, a selector at each substation connected to the line circuit, means including said selectors for individually signalling each substation from said control station, means operative under such conditions for locking out the substations that are not called, means at each substation for signalling the central station when the line circuit is idle and means operative under such conditions for locking out all the substations except the calling substation.

3. A telegraph system comprising a central station, a line circuit terminating at said station, a plurality of substations associated with said line circuit, printing telegraph equipment for communication between said central station and any of said substations over the line circuit, a selector at each substation connected to the line circuit, means including said selectors for individually signalling each substation from said central station, means operative under such conditions for locking out the substations that are not called, means at each substation for signalling the central station when the line circuit is idle, means operative under such conditions for locking out all the substations except the calling substation and means controlled at one of the two connected stations to disable the lock-out means of a third station which is to be conditioned for the reception of printer signals.

4. A telegraph system comprising more than two stations, a single line circuit connecting all of said stations, telegraph equipment at said stations, local control means at each station for conditioning the telegraph equipment thereat for operation, means including said telegraph equipment for effecting two-way communication be-

tween any two of said stations, means for locking out said control means at certain of the other stations when one station seizes the line circuit, means for thereafter rendering the lockout means ineffective with respect to the wanted station whereby the same may be conditioned for operation and means operative after two stations are conditioned for transmission for rendering the lockout means ineffective with respect to another inoperative station whereby the latter may also be conditioned for operation.

5. A telegraph system comprising a central station, a plurality of substations, a single line circuit connecting all of said stations, telegraph equipment at said stations, lockout means for rendering said equipment inoperative to transmit or receive over said line circuit, means at the central station for altering the electrical condition of the line circuit to lock out all of the substations and means controlled from the central station for thereafter rendering the lockout means inoperative with respect to one of the substations whereby the same may be conditioned for operation.

6. A telegraph system comprising a central station, a plurality of substations, a single line circuit connecting all of said stations, telegraph equipment at said stations, lockout means for rendering said equipment inoperative to transmit or receive over said line, means at each of said substations for altering the electrical condition of the line circuit to lock out all of the other substations and signal the central station and means including said telegraph equipment for effecting communication between any one of the substations and the central station except when locked out by another substation.

7. A telegraph system comprising a central station, a plurality of substations, a single line circuit connecting all of said stations, telegraph equipment at said stations, means at the central station for altering the electrical condition of the line circuit in one manner when a call is to be initiated from said central station, and means at each of the substations for altering the electrical condition of the line circuit in a different manner when a call is to be originated from one of the substations, both of said means also operating to lock out the other substations.

8. A telegraph system comprising a central station, a plurality of substations, a single line circuit connecting all of said stations, telegraph equipment at said stations, means at each substation for interrupting the flow of current through the line circuit, means responsive to said current interruption to signal the central station and to lock out the other substations from the line circuit, means at the central station for reversing the polarity of the line circuit and means operated thereby to lock out all of the substations from the circuit.

9. A telegraph system comprising a central station, a plurality of substations, a single line circuit connecting all of said stations, signals at the respective stations, selectors at the substations operatively connected to the line circuit, means at each substation for operating the signal at the central station by interruption of the line current and means including said selectors for operating the substation signals from the central station.

10. A telegraph system comprising a central station, a plurality of substations, a single line circuit connecting all of said stations, signals at the respective stations, selectors at the substa-

tions operatively connected to the line circuit, means at each substation, for operating the signal at the central station by interruption of the line current and means including said selectors for operating the substation signals from any of the stations.

11. A printing telegraph system comprising a central station, a plurality of substations, a single line circuit connecting all of said stations, printing telegraph equipment at each station, means for signalling the central station over said line circuit from any of said substations, means for reversing the polarity of the line circuit upon answering a call from a substation and means whereby the printers except that at the calling substation are maintained inoperative until the line circuit again becomes idle.

12. A printing telegraph system comprising a central station, a plurality of substations, a single line circuit connecting all of said stations, printing telegraph equipment at each station, means for reversing the polarity of the line circuit upon initiating a call from the central station to one of said substations, means responsive to said reversal for locking out all of the substations and means dependent upon signals transmitted from the central office over said line circuit for rendering the printer at the called substation operative.

13. A printing telegraph system comprising a central station, a plurality of substations, a single line circuit connecting all of said stations, printing telegraph equipment at each station, means including selectors at each substation for conditioning the printing telegraph equipment for operation and means including said selectors for broadcasting simultaneously to any two or more selected stations exclusively.

14. A printing telegraph system comprising a printer having a driving motor, a line circuit, means for transmitting code combinations of impulses over said line circuit to control the printer, manually operable switch means adjacent said printer to control said motor and means whereby said switch means is ineffective to start the motor when the line circuit is busy.

15. A printing telegraph system comprising a line circuit, a printer connected thereto, said printer being provided with a driving motor, manually operable switch means adjacent said printer to control said motor, other printers connected to said line circuit, a selector connected to the line circuit and means whereby said switch means is only operative to start said motor when the line circuit is idle or the selector is operated in a predetermined manner indicating that the first-mentioned printer is wanted by one of the other printers.

16. A printing telegraph system comprising a plurality of stations, printers at said stations, a single line circuit connecting all of said stations, means at one of said stations for reversing the polarity of the line circuit, asymmetric conducting devices in the line circuit at the other stations and control means in shunt relation to said devices.

17. A printing telegraph system comprising a plurality of stations, printers at said stations, a single line circuit connecting all of said stations, asymmetric conducting devices in the line circuit at each of several stations, means for shunting said devices and signalling means at one station connected to the line circuit.

18. A telegraph system comprising a plurality of stations, telegraph equipment at said stations,

a single line circuit connecting all of said stations, an asymmetric conducting device in the line circuit at one station and a control relay in shunt relation to said device whereby it is short-circuited for current flow in one direction in the line circuit.

19. A telegraph system comprising a central station, a line circuit terminating at said station, a plurality of substations associated with said line circuit, printing telegraph equipment at each of said stations for communicating between said central station and any of said substations over the line circuit, means connected to said line circuit for operating said printing telegraph equipment, a selector at each substation connected to the line circuit, means for operating said selectors over said line circuit, manually operable means at each substation for rendering the printing telegraph equipment at the substation operative, means to disable said manually operable means when the line circuit is busy to lock out the printing telegraph equipment during a call and means whereby said manually operable means and the associated selector at the same substation jointly control the operativeness of the printing telegraph equipment when the line circuit is busy whereby a substation that has not been called by predetermined operation of its selector is locked out until the line circuit is idle.

20. A printing telegraph system comprising more than two stations, a single line circuit connecting all of said stations, printing telegraph equipment at said stations, circuit controlling means at each of several of said stations for rendering the associated printing telegraph equipment operative when desired, said circuit controlling means including a manually operable switch having idle and operating positions, means associated with said line circuit for operating said printing telegraph equipment over said line circuit, means for rendering the manually operable switches ineffective when the line circuit is busy and thereby excluding all except the called station from receiving printer signals and means for controlling said last mentioned means over said line circuit from any calling station.

21. A printing telegraph system comprising more than two stations, a single line circuit connecting all of said stations, printing telegraph equipment at said stations, means connected to said line circuit for operating said printing telegraph equipment over the line circuit, means at each station for seizing the line circuit when the same is idle to initiate a call, means connected to the line circuit for locking out certain of the other stations when one station seizes the line circuit and means connected to the line circuit for thereafter rendering the lockout means ineffective with respect to the wanted station.

22. A printing telegraph system comprising a central station, a plurality of substations, a single line circuit connecting all of said stations, printing telegraph equipment at said stations, means connected to said line circuit for operating said printing telegraph equipment over said line circuit, means at the central station connected to the line circuit to lock out or render inoperative all of the substations and means at the central station connected to the line circuit for thereafter rendering the lockout means ineffective with respect to a selected one of the substations.

23. A printing telegraph system comprising a central station, a plurality of substations, a single line circuit connecting all of said stations, means connected to said line circuit for operating said

printing telegraph equipment over said line circuit, means at the central station connected to the line circuit for locking out or rendering inoperative all except a selected substation and means at each of the substations connected to the line circuit for locking out all except the calling station when a call is originated from one of said substations.

24. A printing telegraph system comprising a central station and a plurality of substations, a series line circuit connecting said substations to said central station, printing telegraph equipment providing communication between said central station and said substations over said line circuit, means for signalling the central station from any substation when the latter has a message for the central station and for calling any substation from the central station when the central station has a message for one of the substations, said last-mentioned means comprising selectors at the respective substations only and means including said selectors for locking out the printing telegraph equipment at unselected substations whereby communication is provided exclusively between the central station and a selected substation.

25. A printing telegraph system comprising a central station and a plurality of substations, a series line circuit connecting said substations to said central station, printing telegraph equipment providing communication between said central station and said substations over said line circuit, means for signalling the central station from any substation when the latter has a message for the central station and for calling any substation from the central station when the central station has a message for one of the substations, said last-mentioned means comprising selectors at the respective substations only and means including said selectors for locking out the printing telegraph equipment at unselected substations whereby communication is provided exclusively between the central station and a selected substation, said means for signalling the central station from any substation including means for varying the idle line current in said line circuit and means responsive thereto for locking out the printing telegraph equipment at the other substations when a call is initiated to the central station from one substation.

26. In a telegraph switching system having a single telegraph central office, a multiparty single telegraph line extending from said office to a plurality of subscribers' stations, means whereby an operator may call any of said stations, means for setting any called station into communicative relation to the central office over said line, lock-out means in each station and means controlled by setting any one of said stations into communication relation to actuate said lock-out means to prevent all but said called one subscriber station from being conditioned for communicative relation in response to the operation of the setting means at said called subscriber's station.

27. A telegraph system comprising a main station and a source of signals thereat, a plurality of stations, a line circuit connecting said stations to said main station, signal means at each of said stations responsive to signals from said source, an operable start switch in each of said stations for seizing said line circuit for communication purposes, and means at each of said stations responsive to the operation of said operable switch at any one of said stations for preventing the remaining of said stations from seiz-

ing said line circuit when said line circuit is seized by said one station.

28. A telegraph system comprising a main station and a source of signals thereat, a plurality of stations, a line circuit connecting said stations to said main station, an operable start key at each of said stations for seizing said line circuit for communication purposes, means at each of said stations responsive to the operation of said start key at any one of said stations for preventing the remaining of said stations from seizing said line circuit when said line circuit is seized by said one station, and indicating means at each of said stations responsive to the operation of said start key at any one of said stations for indicating at only the remaining of said stations that said one of said stations has seized said line circuit.

29. In a telegraph switching system having a single telegraph central office, a multiparty single telegraph line extending from said office to a plurality of subscribers' stations, means whereby an operator may call any of said stations, means for setting any called station into communicative relation to the central office over said line, lock-out means in each station and means controlled by setting any one of said stations into communication relation to control said lock-out means to prevent all but said last mentioned one subscriber's station from being conditioned for

communicative relation in response to the operation of the setting means at said subscriber's station.

30. A telegraph system comprising a printing telegraph central station, a plurality of branch printer stations, a line circuit connecting said branch stations to said central station having a predetermined electrical condition during idle periods, and a starting switch at each of said branch stations, said starting switch at any one of said stations arranged, when operated, to alter the idle line condition of said line and render said one only of said branch stations operative for communication purposes to the exclusion of the remaining branch station or stations.

31. A telegraph system comprising a printing telegraph central station, a plurality of branch printer stations, a line circuit connecting said branch stations to said central station having a predetermined electrical condition during idle periods, a starting switch at each of said stations and relay means at each of said stations controlled by said starting switch to render the calling one of said branch stations operative for communication purposes over said line circuit to the exclusion of the remaining branch station or stations.

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