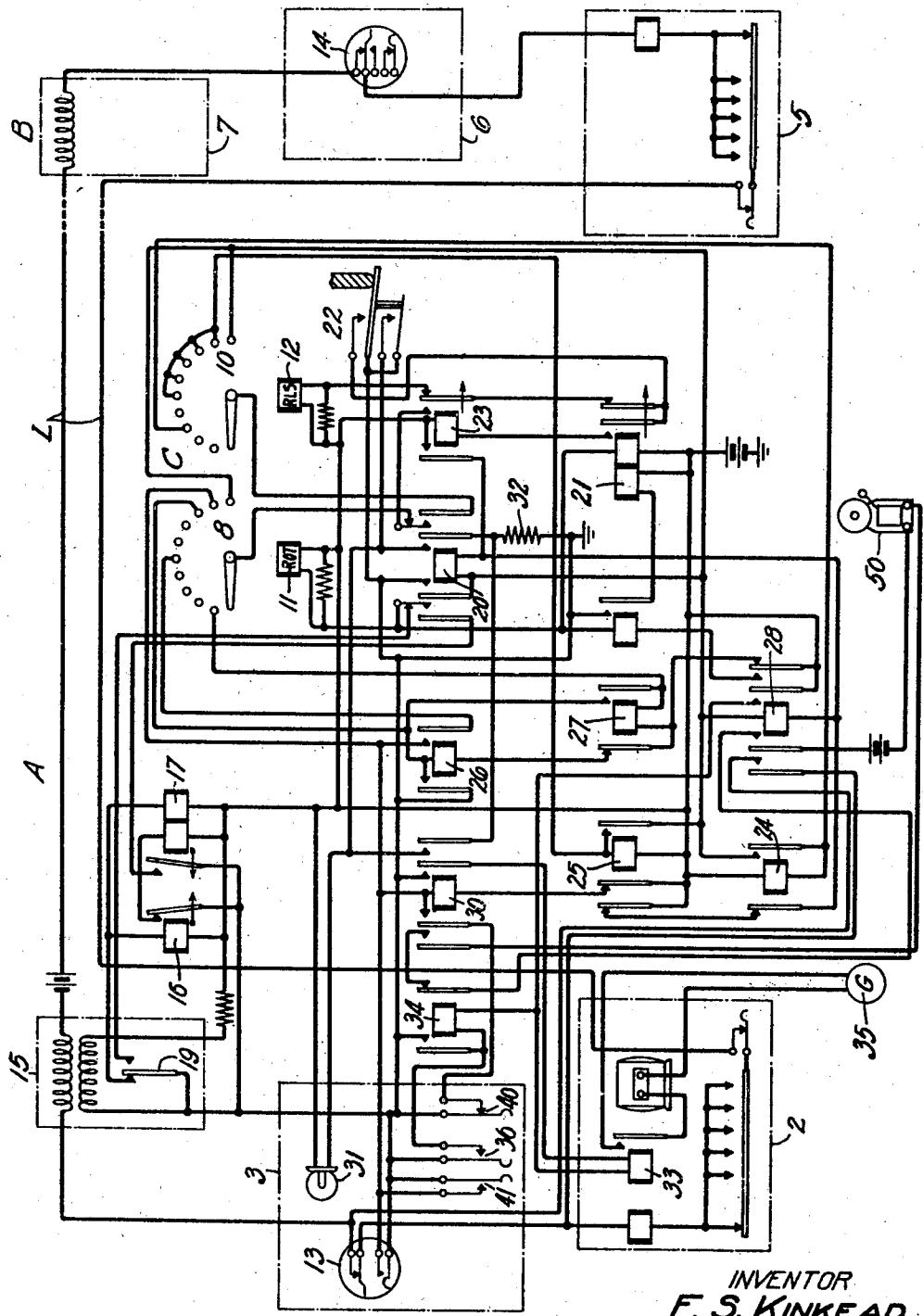


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TELEGRAPH SYSTEM

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TELEGRAPH SYSTEM

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This invention relates to the art of telegraph communication and particularly to selective calling and control arrangements for printing telegraph systems.

5 The objects of the invention are to facilitate the selection and control of telegraph stations, to simplify the apparatus employed, and to otherwise improve systems of this character.

10 A feature of this invention is a system comprising a plurality of printing telegraph stations each equipped with code selecting switches and impulse sending devices and so arranged that the operator at any station may
15 selectively call any other station by sending the proper code consisting of successive series of impulses, each series causing a temporary setting of the switches and the recording of the series at the called station only,
20 whereupon the switches release in order to receive and record the next series of impulses of the code.

Another feature is a system in which the selective switches are set by impulses of one
25 character to select a desired station and by impulses of another character for releasing partially selected stations to enable their subsequent selection.

30 A further feature is a system in which the sending of impulses of one character causes the operation of the selective switch to select the called station and render its printing equipment effective, whereas impulses of a different character operate the switch to cause
35 the release of a station so selected.

The invention has been illustrated in the accompanying drawing in which two stations A and B have been shown connected through a pair of conductors L representing an ordinary telegraph line and associated apparatus. At station A the telegraph printing apparatus has been shown in diagrammatic form in a dotted line enclosure marked 2. A dial, control keys and signal lamp have been
45 shown in a dotted line enclosure marked 3, where-

as the remaining equipment at this station for selecting it has been shown in detail. The switch responsive to impulses received over the line L has been shown with two rows of contacts and corresponding wipers at 8 and
50 10, respectively. This switch may be any well known step-by-step type having an operating magnet 11 and a release magnet 12. At station B all the equipment has been shown in diagrammatic form, the printer at 5, the dial
55 at 6 and the remaining apparatus indicated by the enclosure 7.

A description of the operation of this system under various conditions will now be described. To call one station from another
60 the number, which is a two digit number, should be dialed on a dial, such as 13, and followed by the digit 0 if no additional stations are to be called. A description of the operation of the equipment at station A when
65 called from station B will be described first. To dial station A the dial 14 at station B is operated. Station A has been assigned the number 85. The first operation of this dial will open and close the connection through the con-
70 ductors L eight times and thereby cause the armature of the polarized relay 15 shown in an enclosure to respond. It should be noted that the relays 16 and 17 are normally operated over a circuit from battery through the
75 windings of relay 17 and the winding of relay 16 in parallel through the normal connection closed by the armature 19 of polarized relay 15 to ground. These relays remain operated during the sending of the dial pulses as they
80 are slow-to-release. The first operation of the armature 19 closes a circuit for the stepping magnet 11 as follows: battery, winding of magnet 11, left make-before-break contacts of relay 20, armature 19 to ground. Relay 21 is
85 also operated at this time from battery through the right hand winding of this relay, left hand make-before-break contacts of relay 20, armature 19 to ground. Rotary magnet 11 follows the movement of armature 19 90

caused by the impulses received from station B whereas relay 21 is slow-to-release and remains operated during these impulses. After the first step of the switch C the off normal contacts 22 are operated and a circuit is there-
 by closed for the operation of relay 23 as follows: battery, winding of this relay, inner right hand armature and front contacts of relay 21, off normal contacts 22 to ground. Relay 23 in operating closes at its left hand armature and front contacts an alternate path to battery through the left hand armature and back contact of relay 24 and outer left hand armature and back contact of relay 25.
 When the eight impulses have been sent relay 21 releases and as relay 23 is slow-to-release ground will momentarily be provided through the off normal contacts 22, outer right hand armature and back contact of relay 21, right hand armature and front contact of relay 23, right hand make-before-break contacts of relay 20, wiper and eighth contact of switch bank 8, winding of relay 26, left hand armature and back contact of relay 27, outer right hand armature and back contact of relay 28 to battery. Relay 26 is thereby operated and provides a locking circuit for itself from battery and the armatures of relays 27 and 28 through its winding and left hand armature and front contact to ground.
 When relay 23 releases a circuit is provided for the release magnet 12 from battery, winding of this magnet, right hand armature and back contact of relay 23, outer right hand armature and back contact of relay 21, off normal contacts 22 to ground. Switch C is thereby released and on the return to normal magnet 12 is released through the opening of the off normal contacts 22 in the circuit therefor.
 The second digit from station B may now be sent and this causes the same operations at station A as hereinbefore described except that in this case the wipers of switch C will be advanced to the fifth terminal and the momentary circuit closed therethrough in bank 8 causes the operation of relay 30 as follows: battery, inner left hand armature and back contact of relay 25, winding of relay 30, right hand armature and front contact of relay 26, fifth terminal of bank 8 and the associated wiper, right hand make-before-break contacts of relay 20, right hand armature and front contact of relay 23, outer right hand armature and back contact of relay 21, off normal contacts 22 to ground. Relay 30 provided a locking circuit for itself from battery connected through its winding and inner left hand armature and front contact, through contacts of key 40, to ground. The busy signal 31 associated with dial 13 is now lighted dimly, over a circuit from battery through the lamp, outer right hand armature and front contact of relay 30, resistance 32 to ground, to indicate the busy condition of this station.
 The next operation of a dial at station B, which will be the number 0, causes an audible signal to be given through the signal apparatus 50 and operates the printer control relay 33 to the printer for the reception of the message. The operation of the equipment at station A is the same as when the previous numbers were dialed, except that the wipers of switch C will now be advanced to the tenth terminal. A momentary circuit is then closed for the operation of relays 20 and 28 from battery through the outer left hand armature and back contact of relay 25, left hand armature and back contact of relay 24, windings of relay 28 and 20 in parallel, tenth terminal of bank 8 and its wiper, to ground as hereinbefore described. Relay 20 provides a locking circuit for itself through its inner left hand armature and front contact and it also provides a locking circuit for relay 28 through this armature and front contact independent of the original circuit through the wiper of bank 8. Relay 20 provides another connection for lamp 31 in parallel with the outer right hand armature and front contact of relay 30. The circuit for rotary magnet 11 is also transferred by relay 20 from control by armature 19 to control by the armature of relay 17 through the outer left hand armature and front contact of relay 20. The connection from ground controlled by relay 23 for the wiper of bank 8 is transferred to the wiper of bank 10 at the outer right hand armature and front contact of relay 20 for a purpose as will hereinafter be described. The operation of relay 28 opens the circuit for relay 26 which is now released. Relay 28 also short circuits the pulsing contacts of dial 13 at the outer left hand armature and front contact and closes the circuit for the audible signal 50 at the inner left hand armature and front contact. The circuit for signal 50 is also controlled through contacts of relays 34 and 30. Finally relay 28 also closes the circuit for printer control relay 33, to start the printer. This circuit may be traced from battery through the inner right hand armature and front contact of relay 28, winding of relay 33, inner right hand armature and front contact of relay 30, to ground. The control relay 33 closes a circuit for the motor in this printer from a source 35. The message from station B to station A may now be sent with relays 30, 20, 28 and 33 in operated condition, busy lamp 31 lighted dimly and the alarm signal 50 operating. If it is desired to stop the alarm signal the key 36 may be operated thereby closing a circuit for the operation of relay 34 which opens the alarm signal circuit. Relay 34 provides a locking circuit for itself from battery through the inner right hand armature and front contact of relay 28, winding of relay 34 and its left hand armature and front contact to ground.

The operation of the switches at other stations is identical with the operations at station A but no combinations of relays corresponding to relays 26 and 30 are operated as the connections to the bank terminals for such relays are different. However, at such station where the first digit is the same as for station A, relays corresponding to relay 26 will be operated and locked in operated position until the digit 0 is dialed when they are released. On the other hand, relays corresponding to relays 20 and 28 will be operated and maintained operated although it should be noted that the audible signal circuits will not be closed, nor will the control relays be operated at these stations due to the fact that the relays corresponding to relay 30 are not operated.

If it is desired, after station A has been selected, to select other stations without releasing the equipment at station A, three so-called break signals will be transmitted from station B. These signals will be longer than impulses while dialing an ordinary number. Hence, if reference is made to operations at station A, relays 16 and 17 will be alternately released and operated three times through the operation of the armature 19. It should be noted now that the stepping magnet 11 is under the control of relay 17 so that the switches at the various stations will be advanced to the third terminal and when the wiper of bank 10 receives the momentary ground before relay 23 releases a circuit is completed for the operation of relay 24 as follows. From battery, winding of this relay, third terminal of bank 10 and the associated wiper, outer right hand armature and front contact of relay 20, right hand armature and front contact of relay 23 to ground as hereinbefore described. Relay 24 causes relays 20 and 28 to release as the locking circuit for these relays is controlled through the left hand armature and back contact of relay 24. The operation at all other stations will be identical so that when the new number is dialed, actions will take place as hereinbefore described to call the desired station. It should be noted that relay 30 at station A will remain operated to maintain this station in called condition for the reoperation of the printer control relay to restart the printer and to close the audible signal 50. It should be observed that the printer was stopped and the circuit for the signal 50 was opened at station A when relay 28 was released due to the break signals. Another station may now be dialed, and if no other stations are desired on the line the numeral 0 is dialed to operate the signal 50 and start the printer at the called stations. The operation at this called station and at the first called station will be the same as hereinbefore described.

If, however, a number of additional sta-

tions are desired on the line, the number 0 is not dialed but the numbers of the different stations are dialed in succession with the number 1 dialed between the numbers and after the last number is dialed the number 0 is dialed for the purposes as hereinbefore described, namely, to start the printers and operate the signals 50.

Referring to actions at station A, when the number 1 is dialed the momentary ground is provided through the wiper of bank 8 for the momentary operation of relay 27 over a circuit as follows. From battery, outer right hand armature and back contact of relay 28, winding of relay 27, first terminal of bank 8 and its wiper, right hand make-before-break contacts of relay 20, to ground as hereinbefore described. Relay 27 in operating opens the operating circuit from relay 26 and while this has no effect at station A it should be observed that when the relays corresponding to relay 27 operate at such stations where the relays corresponding to relay 26 may be operated, these latter relays will release. Such relays would be operated only at stations having the same first digit as the station just called.

If the operator at station B should have decided originally to call more than one station the number 0 would not have been dialed after having dialed the first station but instead this operator would have dialed the number 1 between each succeeding number and the number 0 after the last station.

To release the calling station and the called stations after the message is sent, a signal comprising five break signals will be transmitted from the calling station. This will bring the wipers of switch C and all the other switches to the fifth terminal. In this case, and referring to the actions at station A, a circuit will be closed for the operation of relay 25 from battery, winding of relay 25, the fifth terminal of bank 10 and the corresponding wiper to the temporary ground as hereinbefore described. Relay 25 provides a locking circuit for itself through its right hand armature and front contact to ground controlled by relay 20. This relay 25 releases relay 30 and opens the locking circuit for relays 20 and 28 so that all three relays 20, 28 and 25 will be released. The operations at the other called stations will be the same, that is, the relays corresponding to relays 20, 28 and 25 and 30 will release and thus restore the circuits at these stations to normal. At all stations but the calling and called stations, relays corresponding to relays 20, 28 and 30 will be released so that the circuits at all of these stations will also be returned to normal.

If all stations on the line are to be called the number 90 will be transmitted from station B. In this case when 9 is dialed a circuit will be closed for relay 30 and all relays corresponding to relay 30 and when 0 is

dialled relays 28 and 20 and all relays corresponding thereto at other stations will be operated so as to light the busy signals and start the printers and operate the alarm signals.

In designing the code for these signals any number from 2 to 8 may be used for the first digit of the codes and any number from 2 to 8 inclusive may be used for the second digit of the codes except the one which has been used for the first digit. In this manner 42 codes may be used for an equal number of stations in the system as presumably arranged. The printer control relay may be released at any station to stop the printer thereat by operating key 40 at station A or the corresponding key at other stations to open the circuit for relay 30 or corresponding relays. The printers may again be started by the operation of key 41 at station A or the corresponding keys at other stations.

It should be understood that while the invention has been disclosed in connection with but a single printing telegraph system it may readily be applied to other systems without departing from the spirit thereof.

What is claimed is:

1. In a signaling system, a line, a plurality of stations associated therewith, a selector switch at each station, means responsive to signals from one station for temporarily setting the switches at the other stations a plurality of times, and means for recording said settings at one of said stations only.
2. In a signaling system, a line, a plurality of stations associated therewith, a selector switch at each station, means responsive to signals from one station for simultaneously setting and thereafter releasing the switches at the other stations a plurality of times, and means for recording said settings at any desired number of stations only.
3. In a signaling system, a line, a plurality of stations associated therewith, a switch at each station, impulse transmitting means at each station, means responsive to one kind of impulses for actuating said switches to effect the selection of one station and the release of all switches, and means responsive to another kind of impulses for actuating said switches to effect the release of the selected station and the release of all switches.
4. In a signaling system, a line, a plurality of stations associated therewith, a switch at each station, impulse transmitting means at each station, means responsive to one kind of impulses for actuating said switches for conditioning one station only for reception of impulses of another kind and for effecting the release of said switches and removal of said switches from control by impulses of said other kind, and means responsive to a third kind of impulses for actuating said switches to effect the restoration of the conditioned station to normal and release of said switches.

5. In a signaling system, a line, a plurality of stations associated therewith, each station equipped with a printing telegraph set, a switch associated with each station, means at each station for transmitting series of impulses of two kinds, means responsive to each series of impulses of one kind from one station for actuating the switches at all other stations and for releasing them between series of impulses, and means selectively operated by the switch at one station for rendering the printing telegraph set thereat subject to control by impulses of the other kind, and means operated by the switch at each station individually for rendering it unresponsive to said other kind of impulse.

6. In a signaling system, a line, a plurality of stations each equipped with a printing telegraph set, a switch at each station, means at each station for transmitting series of impulses, means responsive to each series of impulses from one station for setting the switches at the other stations, means for automatically releasing said switches after each setting, and means selectively operated by the switches of a plurality of stations for rendering effective the printing telegraph sets thereat.

7. In a signaling system, a plurality of stations each equipped with a printing telegraph set, a switch at each station, means at each station for transmitting series of impulses, means responsive to each series of impulses from one station for setting the switches at the other stations, means for automatically releasing said switches after each setting, means selectively operated by the switches of a plurality of stations for successively rendering said switches responsive to other series of impulses, and means responsive to said other series of impulses for actuating the switches at said plurality of stations for simultaneously rendering the printing telegraph sets thereat effective.

8. In a telegraph system, a signal transmission circuit, a plurality of stations associated therewith, each station equipped with a printing telegraph set, a selective switch at each station, means at each station for transmitting series of impulses, means responsive to each series of impulses transmitted from any station for setting the switches at all other stations, means for automatically releasing said switches following each successive setting, and means selectively operated by the switch at the particular station being called for rendering effective the printing telegraph set at that station.

9. In a telegraph system, a signal transmission circuit, a plurality of stations associated with said circuit, each of said stations equipped with a printing telegraph set, a selective switch and an impulse transmitter, means responsive to impulses transmitted from one of said stations for operating

the switches at all other stations, means for automatically releasing said switches after each operation, other means at each of said stations for transmitting impulses of a different character, and means at a called station responsive to impulses transmitted by said last impulse sending means for operating the switch to cause release of the equipment at the called station.

10 In witness whereof, I hereunto subscribe my name this 1st day of October, 1929.

FULLERTON S. KINKEAD.

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