Dec. 26, 1939. G. KINER 2,184,387

STATION SELECTOR SYSTEM

Filed Dec. 23, 1935 2 Sheets-Sheet 1

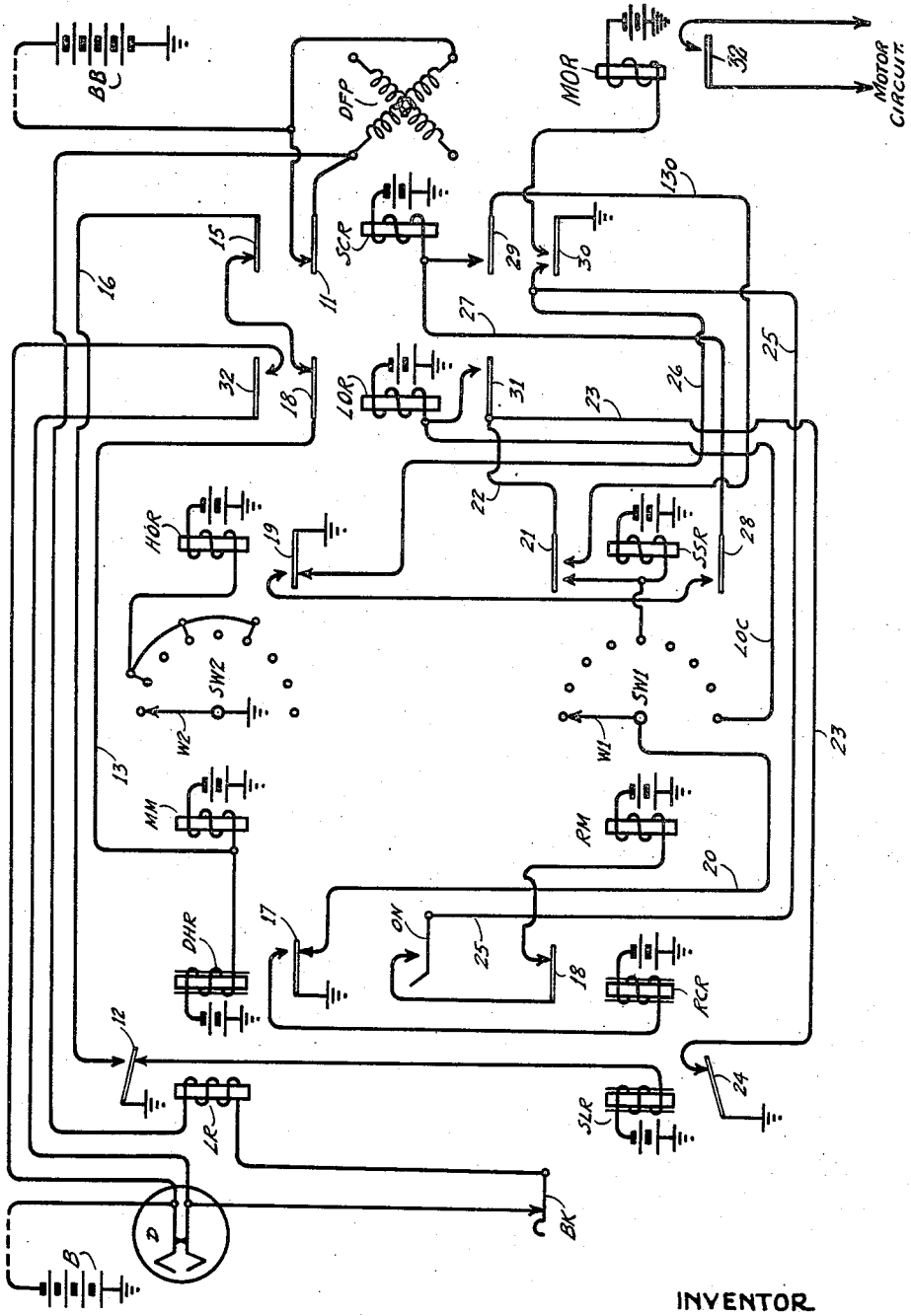


Fig. 1.

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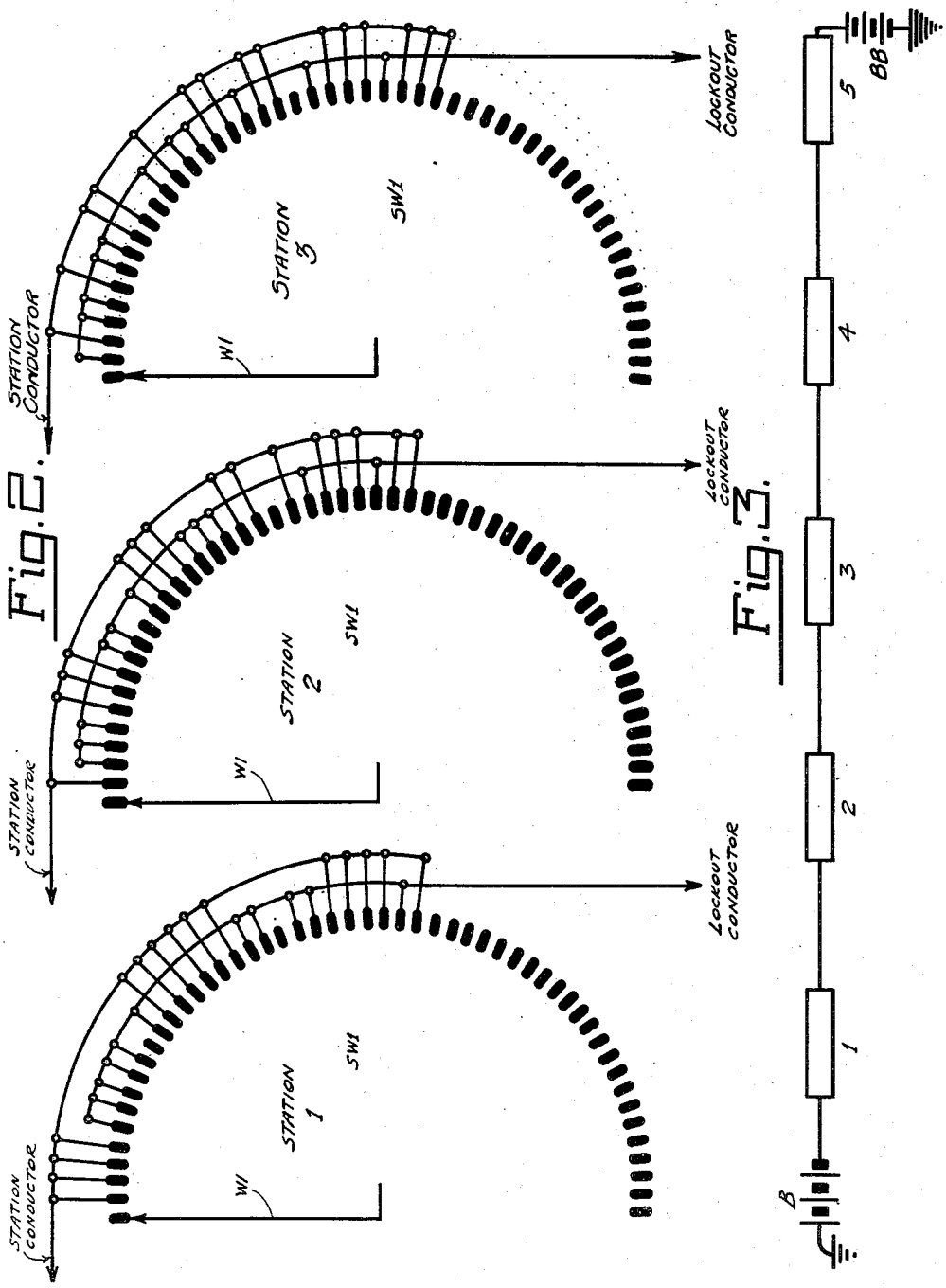


Fig. 2.

Fig. 3.

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2,184,387

STATION SELECTOR SYSTEM

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22 Claims. (Cl. 178—2)

This invention relates to the art of telegraph communication and describes a telegraph system adapted principally to the use of printing telegraph equipment in which several units are associated with a line to which any one or any combination of the units may be simultaneously operatively connected.

The system is proposed for lines which consist of three or more stations composed of the usual and well known telegraph printers of the combined sending and receiving type and relates particularly to the selection of certain of the stations and their connection to the line.

A feature of my invention is the provision of means at each station for selecting any or all or any combination of the other stations to which it is desired to send a message.

A further feature of my invention is the provision of means at the several stations for preventing the unauthorized operative connection of an unwanted station to the line during the time it is in use by other stations.

Another feature is the provision of means for starting the printer motor at the selected stations only and for shunting out the printer relay at the stations not selected.

Other features will become apparent upon a further perusal of the specification, and, together with the features already enumerated, will be explained fully hereinafter, reference being had to the accompanying drawings in which:

Fig. 1 is a schematic circuit of the apparatus located at each station on the line;

Fig. 2 is a view of the switch terminal connections at three of the stations; and

Fig. 3 is a diagrammatic view of a telegraph line having five stations thereon.

The apparatus shown in Fig. 1 is used at each station shown in Fig. 3. Line battery B supplies operating current to the line but on long lines battery current is supplied at both ends. In such a case the batteries have opposite poles connected to the line and to ground which supplies the return conductor of the circuit. In Fig. 1 the batteries B and BB are shown connected to the station equipment by dotted lines which indicate the omission of the other stations associated with the line. The main line conductor can be traced from battery B, through the dotted line portion, through the dial D, the closed contacts of the break key BK, the winding of line relay LR, to the winding of the differential printer relay DFP which is normally shunted out by the closed contacts 11 of the shunt control relay SCR, through the contacts 11 and the dotted line portion to the battery BB and ground. This is the normal line circuit and the line relay LR is normally operated by current flowing from battery B to battery BB. This is true of all the line relays at all the stations as the apparatus at each is identical.

Each station is provided with a contact bank SW1 as shown in Fig. 2. In the illustration a fifty point switch is used and the connections for stations 1, 2 and 3 in a five station system are shown. With a system of this size, of course, all the contacts on the switch are not used as all the possible combinations of stations (twenty-six in number) can be provided for with a fewer number of contacts. The station conductor of station 1 is multiply connected to contacts 1 to 4, 12 to 17, and 23 to 26 inclusive, and 28 of the switch SW1 located at that station. The station conductor for station 2 is multiply connected to terminals 1, 5 to 7, 12 to 14, 18, 19, 21, 23 to 25, 27, 28. The station conductor of station 3 is connected in multiple to contact terminals 2, 5, 8, 9, 12, 15, 16, 18, 19, 22–24, 26–28 inclusive. Thus we see that stations 1, 2 and 3 are each connected to terminal 12 so that in order to interconnect these stations the wipers of the switches at each station must be stepped to the twelfth contact as will be later explained. Stations 4 and 5 are not shown but they are respectively connected to the following contacts: Station 4 to contacts 3, 6, 8, 11, 13, 17, 18, 21 to 23, 25 to 28 inclusive. Station 5 to contacts 4, 7, 8, 11, 14, 16, 17, 19, 21, 22, 24 to 28 inclusive.

Whenever a dial at any station is operated all the switches, one at each station, step in unison and the brushes of the several switches come to rest on corresponding contacts. If, at any station, the switch brush rests on a contact which is connected to the station conductor, as set forth in the above table of switch contact connections, that station will be operatively connected to the line. This is accomplished due to the removal of the shunt from the winding of the differential relay. The printer motor at each of the selected stations will also be started at this time as will be hereinafter described.

The contacts of each switch bank which are not connected to the station conductor, with the exception of the tenth contact, are connected to the lock-out conductor and whenever the wiper W1 of a switch engages one of the contacts connected to the lock-out conductor the station at which that switch is located cannot be connected operatively to the line either by dialing another station or by being dialed by another sta-

tion. The former case is prevented by a direct shunt provided around the dial contacts and the latter case is prevented by the opening of the dialing conductor.

Referring again to Fig. 1, a second switch contact bank SW2 is provided and the wiper W2 rotates in synchronism with the wiper W1 of switch SW1 to engage the contacts in the bank. The "tens" contacts in the switch bank SW2 are multiply connected together to enable the switch to hold over during the interval between the dialing of successive digits as will be hereinafter described. The first tens contact which is the tenth contact is utilized to start the printer motor and it is necessary that the last digit dialed be ten or "0" on the dial. The following list shows the various combinations of stations together with the dial number therefor:

Station numbers					Dial numbers
1	2	3	4	5	
X	X				10
X		X			20
X			X		30
X				X	40
	X	X			50
	X		X		60
	X			X	70
		X	X		80
		X		X	90
			X	X	010
X	X	X			020
X	X		X		030
X	X			X	040
X		X	X		050
X		X		X	060
X			X	X	070
	X	X	X		080
	X	X		X	090
	X		X	X	0010
		X	X	X	0020
X	X	X	X		0030
X	X	X		X	0040
X	X		X	X	0050
X		X	X	X	0060
	X	X	X	X	0070
X	X	X	X	X	0080

Operation of circuit

Having discussed the principal features of the system disclosed herein the detailed circuit operation will now be described. Assume that the operator at station 1 desires to send a message to stations 2 and 3. As shown on the above list the number to be dialed to connect these stations together is 020 therefor the operator at station 1 dials 020 on the dial D. The interruption of the contacts at dial D of station 1 interrupts the line circuit and causes the line relays LR, one at each station, to deenergize and restore the contacts 12 to normal. This happens at the calling station 1 and at each of the other four stations also and the resultant operation at each station is the same.

The restoration of contact 12 of LR establishes energizing circuits for the motor magnet MM and dial holding relay DHR, which are operated by current flowing from battery through the respective windings of DHR and MM, conductor 13, normal contacts 14 and 15 of LOR and SCR, conductor 16 to ground at normal contact 12 of LR. Relay DHR closes its alternate contact 17 to establish an energizing circuit for the release control relay RCR which opens its contact 18 to prevent the premature restoration of the wipers W1 and W2 to normal. The motor magnet MM, which is of the type to step its associated wipers upon its restoration, energizes and deenergizes for each interruption of the line and steps the wiper W1 one step into engagement with the first contact in the switch bank. The wiper W2 is also moved one step. As the line circuit is interrupted ten times due to the digit "0" being dialed the wipers W1 and W2 are moved into engagement with the tenth contact. The dial holding relay DHR being of slow to release construction does not release during the rapid interruptions of the circuit but after the final interruption and during the interval between the digits it does release its armature 17 to open the circuit of RCR which is also of slow to release construction.

The tenth contact in the switch contact bank SW1 is open but the contact engaged by the grounded wiper W2 is connected with grounded battery through the winding of hold-over relay HOR which relay operates and closes its alternate contact 19 to prevent the restoration of the switch wipers at this time. As soon as the dial is operated to dial the second digit which is "2" the motor magnet MM and relay DHR again operate. The relay DHR remains energized during the interruptions but the motor magnet MM follows the interruptions to step the switch wipers W1 and W2 two steps. After the second impulse the relay DHR restores and after a slight interval the relay RCR restores its contact 18 to normal.

The number 12 contact in the terminal banks located at stations 1, 2 and 3 is connected to the station conductor at these stations and to the lock-out conductors at stations 4 and 5. At stations 1, 2 and 3 which are the stations desired to be interconnected the station selector relay SSR will be energized by current flowing from grounded local battery, through the winding of SSR, station conductor, contact 12, wiper W1, conductor 28 to ground at normal contact 17 of DHR. Station selector relay SSR closes a holding circuit for itself through its alternate contact 21, conductors 22 and 23 to ground at alternate contact 24 of the secondary line relay SLR. The relay SSR also closes its alternate contact 28 but this action has no effect at this time. As soon as the wiper W2 was stepped in response to the dialing of the second digit the circuit for the hold-over relay HOR was broken and it restored its contact 19 to normal to prepare a circuit for the release magnet RM which circuit is completed upon the restoration of relays DHR and RCR after the cessation of the second digit dialing impulses. The release magnet RM is energized by current flowing from grounded local battery, through the winding of RM, normal contact 18 of RCR, closed off-normal contacts ON, which assumed their closed position upon the first movement of the switch wipers W1 and W2, conductors 25 and 26, to ground at normal contact 19 or HOR. The operation of the release magnet RM restores the switch wipers W1 and W2 and the off-normal springs ON to normal. The holding circuit for relay SSR is not broken, as relay SLR is operated, and it remains energized.

The operator at station 1 next dials the "0" digit and the impulses of current through the motor magnet MM again operate and release the magnet MM to step the wipers W1 and W2 to the tenth contact. The wiper W2 engaging the tenth contact again closes an obvious energizing circuit for the hold-ever relay HOR. The relay HOR closes its alternate contact 19 to establish an energizing circuit for the shunt control relay SCR which relay is operated by current flowing from grounded battery through the winding of relay SCR, conductor 27, alternate contact 28 of relay SSR, to ground at normal contact 19 of relay HOR. The shunt control re-

lay SCR closes a holding circuit for itself through its alternate contact 29, conductor 30, alternate contact 21 of SSR, conductors 22 and 23 to ground at alternate contact 24 of the secondary line relay SLR. The shunt control relay SCR opens its normal contact 15 to open the dialing conductor and opens its normal contact 11 to remove the shunt around the winding of the differential printer relay DFR which is thereafter included in the main line circuit. The closure of contact 30 of the shunt control relay SCR establishes an obvious energizing circuit for the motor control relay MOR which relay closes its alternate contact 32 to complete the operating circuit for the printer motor not shown on the drawings.

The closure of alternate contact 30 of relay SCR closes an energizing circuit for the release magnet RM which magnet is operated by current flowing from the grounded battery through the winding of release magnet RM, normal contact 18 of RCR, alternate off-normal contacts ON, conductor 25, to ground at alternate contact 30 of relay SCR. The release magnet restores the wipers W1 and W2 and the off-normal springs ON to normal, the relay HOR restoring when the wiper W2 leaves the tenth contact in the switch bank SW2. The relays LOR, SCR and MOR remain in their energized condition at this time. The line is now ready for the transmission of the printer impulses and the line relay LR at each of the stations chatters to the printer impulses but as the impulse circuit is open at contact 15 of relay SCR the switches of the respective stations are not affected.

Returning now to the point at which the switch wiper W1 engaged the twelfth terminal contact on the bank SW1, the twelfth contact in the bank at stations 4 and 5 is connected to the lock-out conductor as explained above and the engagement of this twelfth contact at stations 4 and 5 by their respective wipers W1 closes an energizing circuit for the lock-out relay LOR. The relay LOR is energized by current flowing from grounded battery through the winding of relay LOR, the lock-out conductor LOC, the twelfth contact in the bank SWL, wiper W1, conductor 20 to ground at normal contact 17 of the dial hold-over relay DHR. The lock-out relay LOR closes a holding circuit for itself through its alternate contact 31 and conductor 23 to ground at alternate contact 24 of relay SLR. The opening of normal contact 14 of relay LOR opens the dialing conductor for the stations 4 and 5 and prevents their being associated with the line while it is in use by the other stations should some other unconnected station attempt to connect itself with either station 4 or 5.

The closing of alternate contact 32 of the lock-out relay LOR provides a direct shunt around the contacts of the dial D which thereby effectively prevents the station from connecting itself to the line by calling some other station. As explained in connection with the connected stations, as soon as the relays DHR and RCR restore after the impulses for the second digit an energizing circuit for the release magnet RM is completed to ground at normal contact 19 of HOR and as contact 14 of the lock-out relays LOR at stations 4 and 5 is open the motor magnet MM and switch wipers W1 and W2 will not respond to the dialing of the second "0" digit which starts the printer motors at the stations connected to the line.

When the connection is to be cleared the operator operates the break key BK holding it down for a period of five seconds which will open the energizing circuit for all the line relays LR, and the secondary line relays SLR, though they are of slow to release construction and do not release during the sending of dialing or printer impulses, will release. The opening of alternate contact 24 of relay SLR opens the holding circuit for the lock-out relay LOR at those stations which have not been connected to the line and this relay restores to normal to again close the dialing conductor at its contact 14 and to open the shunt around the dial at contact 32.

At stations 1, 2 and 3 which were connected operatively to the line the opening of the contact 24 of the secondary line relay SLR opens the locking circuits for the station selector relay SSR and the shunt control relays SCR which relays restore their contacts to normal. The opening of contact 30 of SCR opens the energizing circuit for the motor control relay MOR which relay in restoring opens its contact 32 to stop the operation of the printer motor. The closing of normal contact 11 of relay SCR replaces the direct shunt around the winding of the differential printer relay DFP and the closing of contact 15 again completes the dialing conductor.

As explained above the switch has already released and therefore we find all the apparatus at all the stations in its restored condition and the release of the break key BK by the operator again operates the line relay LR and the secondary line relay SLR to render the system ready for another connection.

While I have described my invention in certain particular embodiments I intend no limitations upon my invention other than those imposed by the appended claims.

Having described my invention, what I claim is new and desire to secure by United States Letters Patent is:

1. In a telegraph system comprising a single line, a plurality of stations associated with said line, each equipped with a printing telegraph transmitter and receiver, signalling means at each station, means at each station responsive to said signalling means, said means cooperating to operatively connect at choice, either all, or any one of all groups of more than two and less than all of said stations to said line, responsive to a single complete operation of said signalling means.

2. In a telegraph system comprising a single line, a plurality of stations associated with said line each equipped with a printing telegraph transmitter and receiver, dialing means at each of said stations and relay means at each of said stations responsive to a single complete operation of said dialing means for operatively interconnecting said printing telegraph transmitters and receivers either at all stations, or at any one of all groups of more than two and less than all of said stations.

3. In a telegraph system comprising a single line, a plurality of stations associated with said line, each equipped with a printing telegraph transmitter and receiver, dialing means at each of said stations, relay means at each of said stations responsive to said dialing means for operatively interconnecting said printing telegraph

transmitters and receivers at any two or more stations, and relay means operable at the undesired station for preventing the connection of said undesired stations.

4. In a telegraph system of the character described comprising a single line, a plurality of stations associated with said line, printing telegraph apparatus at each station, selecting means at each station, means at each station responsive to said selecting means for interconnecting over said line the printing telegrpah apparatus at certain of said stations, and means operable at certain other stations for excluding said certain of said other stations.

5. In a telegraph system of the character described including a single line, a plurality of stations associated with said line, printing telegraph apparatus at each station, a differentially wound relay for said apparatus at each station, a shunt for said relay, selecting means at each station, means at each station responsive to said selecting means for removing said shunt to operatively connect said printing telegraph apparatus at said stations to said line.

6. In a telegraph system of the character described including a single line, a plurality of stations associated with said line, printing telegraph apparatus at each station, a differentially wound relay for said apparatus at each station, a shunt for said relay, selecting means at each station, means at each station responsive to said selecting means for removing said shunt at certain desired stations to operatively connect said printing telegraph apparatus at said desired stations to said line, and means for maintaining said shunt at undesired stations to prevent their connection to the line.

7. In a telegraph system of the character described including a single line, a plurality of stations associated with said line, selecting means at each station for selecting any combination of said stations, a contact bank at each station, a station conductor multipled to certain of the contacts in said bank, a wiper adapted to step into engagement with said contacts, and relay means connecting said station to said line when said wiper engages a contact connected to said station conductor.

8. In a telegraph system of the character described including a single line, a plurality of stations associated with said line, selecting means at each station for selecting any combination of said stations, a contact bank at each station, a lock-out conductor multipled to certain of the contacts in said bank, a wiper adapted to step into engagement with said contacts, and relay means preventing the connection of a station to the line when said wiper engages a contact connected to said lock-out conductor.

9. In a telegraph system of the character described including a single line, a plurality of stations associated with said line, selecting means at each station for selecting any combination of said stations, a contact bank at each station, a station conductor multipled to certain of the contacts in said bank, a lock-out conductor multipled to certain other contacts, a wiper adapted to engage said contacts and relay means for connecting the station to the line when said wiper engages a contact connected to said station conductor and for preventing said connection when said wiper engages a contact connected to said lock-out conductor.

10. In a telegraph system comprising a single line, a plurality of stations associated with said line, each equipped with a telegraph transmitter and receiver, dialing means at each of said stations responsive to a single complete operation of said dialing means for operatively simultaneously interconnecting said transmitters and receivers at more than two stations, and relay means preventing the connection of undesired stations.

11. In a telegraph system comprising a single line, a plurality of stations associated with said line, each station equipped with a telegraph transmitter and receiver, dialing means at each of said stations, relay means at each of said stations responsive to said dialing means for simultaneously operatively interconnecting said transmitters and receivers at any two or more stations, and relay means preventing any interference with an established connection by an unconnected station.

12. In a telegraph system comprising a single line, a plurality of stations associated with said line, each equipped with a telegraph transmitter and receiver, dialing means at each of said stations, relay means at each of said stations responsive to said dialing means for simultaneously operatively interconnecting said transmitters and receivers at any two or more desired stations, and relay means closing a shunt circuit around the dialing means at the undesired stations to prevent the connection of said station to said line as a calling station by the operation of said dialing means at said undesired station.

13. In a telegraph system comprising a single line, a plurality of stations associated with said line, each equipped with a telegraph transmitter and receiver, dialing means at each of said stations, a dialing conductor, relay means at each of said stations associated with said dialing conductor and responsive to said dialing means for operatively connecting said transmitters and receivers at any two or more desired stations, and relay means for interrupting said dialing conductor at the undesired stations to prevent the connection to the line of said undesired station as a called line.

14. In a telegraph system comprising a single line, a plurality of stations associated with said line, each equipped with a telegraph transmitter and receiver, dialing means at each of said stations, a dialing conductor at each station, relay means controlling said dialing conductors and responsive to said dialing means for operatively interconnecting said transmitters and receivers at any two or more desired stations, said relay means interrupting said dialing conductors at said connected stations to prevent the operation of said relay means due to the line interruptions operating the said printing transmitters and receivers.

15. In a communication system, a line, a plurality of separate stations associated with said line, intelligence receiving and transmitting mechanism at each station associated with said line, an impulse sending mechanism at one of said stations associated with said line, selective switching apparatus at each said station, said switching apparatus being responsive to a single series of groups of impulses transmitted by said impulse sending mechanism for operatively joining said intelligence receiving and transmitting mechanisms at either all stations, or at any one of all groups of more than two and less than all said stations, to said line.

16. In a communication system, a line, a plurality of separate stations associated with said

line, intelligence receiving and transmitting mechanism at each station associated with said line, an impulse sending mechanism at one of said stations associated with said line, selective switching apparatus at each said station, said switching apparatus being responsive to a single series of groups of impulses transmitted by said impulse sending mechanism for operatively joining said intelligence receiving and transmitting mechanisms at any desired combination of said stations to said line, and means for preventing any other station, not connected to said line, from interfering with the said connection.

17. In a communication system, a line, a plurality of separate stations associated with said line, intelligence receiving and transmitting mechanism at each station associated with said line, an impulse sending mechanism at each station associated with said line, selective switching apparatus at each said station, said switching apparatus being responsive to a single series of groups of impulses transmitted by any one of said impulse sending mechanisms for operatively joining said intelligenve receiving and transmitting mechanisms at any desired combination of said stations to said line, and means for preventing any other station, not connected to said line, from interfering with the said connection.

18. In a communication system, a line, a plurality of separate stations associated with said line, intelligence receiving and transmitting mechanism at each station associated with said line, an impulse sending mechanism at each station associated with said line, selective switching apparatus at each said station, said switching apparatus being responsive to a single series of groups of impulses transmitted by any one of said impulse sending mechanisms for operatively joining said intelligence receiving and transmitting mechanisms at either all stations or at any one of all groups of more than two and less than all of said stations, to said line.

19. In a communication system, a line comprising a single conductor, a plurality of separate stations associated with said line, intelligence receiving and transmitting mechanism at each station associated with said line, an impulse sending mechanism at one of said stations associated with said line, selective switching apparatus at each said station, said switching apparatus being responsive to a single series of groups of impulses transmitted by said impulse sending mechanism for operatively joining said intelligence receiving and transmitting mechanisms at either all stations or at any of all groups of more than two and less than all of said stations, to said line.

20. In a communication system, a line comprising a single conductor, a plurality of separate stations associated with said line, intelligence receiving and transmitting mechanism at each station associated with said line, an impulse sending mechanism at one of said stations associated with said line, selective switching apparatus at each said station, said switching apparatus being responsive to a single series of groups of impulses transmitted by said impulse sending mechanism for operatively joining said intelligence receiving and transmitting mechanisms at any desired combination of said stations to said line, and means for preventing any other station, not connected to said line, from interfering with the said connection.

21. In a communication system, a line comprising a single conductor, a plurality of separate stations associated with said line, intelligence receiving and transmitting mechanism at each station associated with said line, an impulse sending mechanism at each station associated with said line, selective switching apparatus at each said station, said switching apparatus being responsive to a single series of groups of impulses transmitted by any one of said impulse sending mechanisms for operatively joining said intelligence receiving and transmitting mechanisms at any desired combiantion of said stations to said line, and means for preventing any other station, not connected to said line, from interfering with the said connection.

22. In a communication system, a line comprising a single conductor, a plurality of separate stations associated with said line, intelligence receiving and transmitting mechanism at each station associated with said line, an impulse sending mechanism at each station, said switching apparatus being responsive to a single series of groups of impulses transmitted by any one of said impulse sending mechanisms for operatively poining said intelligence receiving and transmitting mechanisms at either all stations, or at any of all groups of more than two and less than all of said stations, to said line.

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