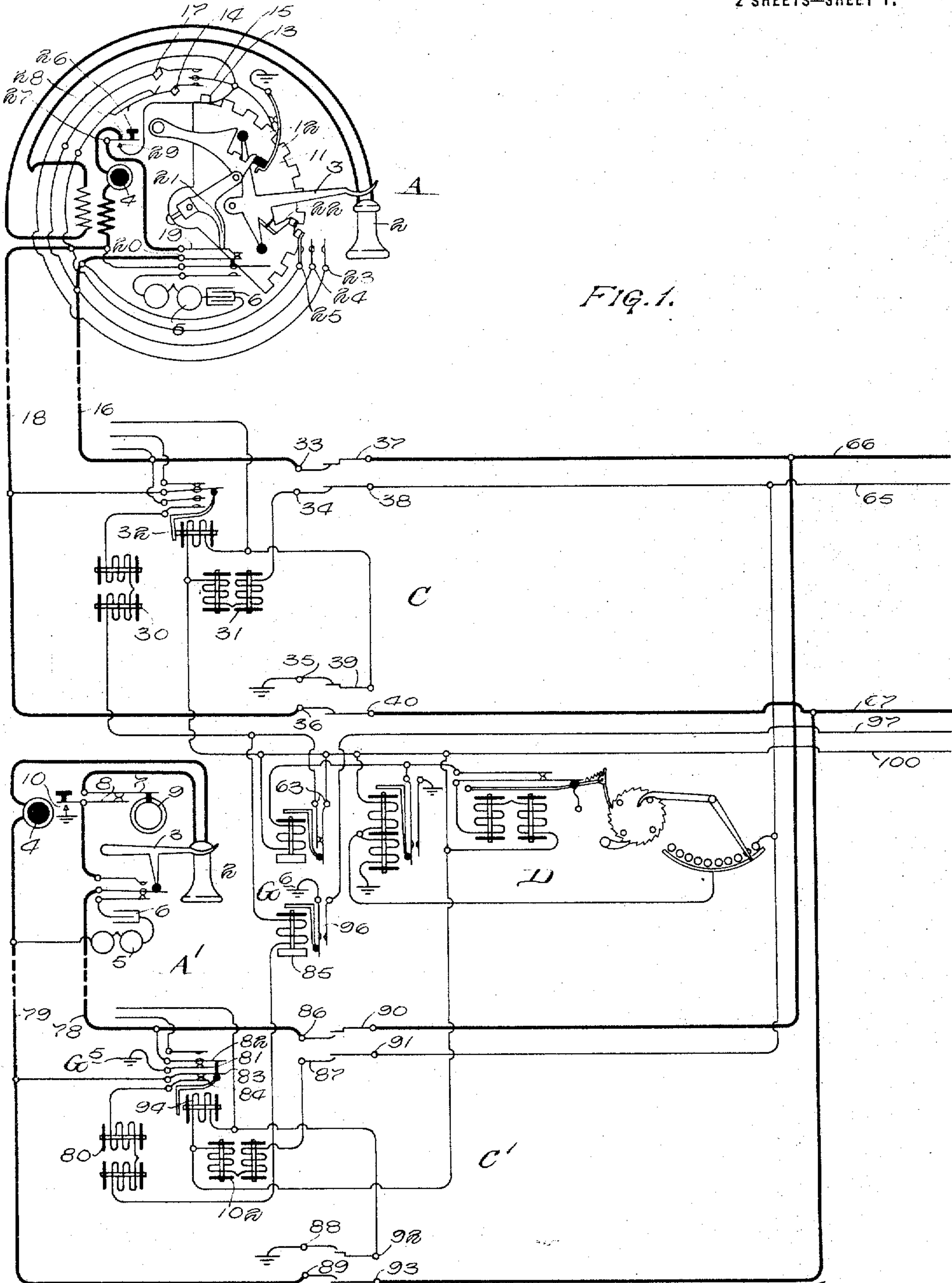


C. E. ROGERS.
 AUTOMATIC TELEPHONE SYSTEM.
 APPLICATION FILED DEC. 12, 1913.

1,216,365.

Patented Feb. 20, 1917.

2 SHEETS—SHEET 1.



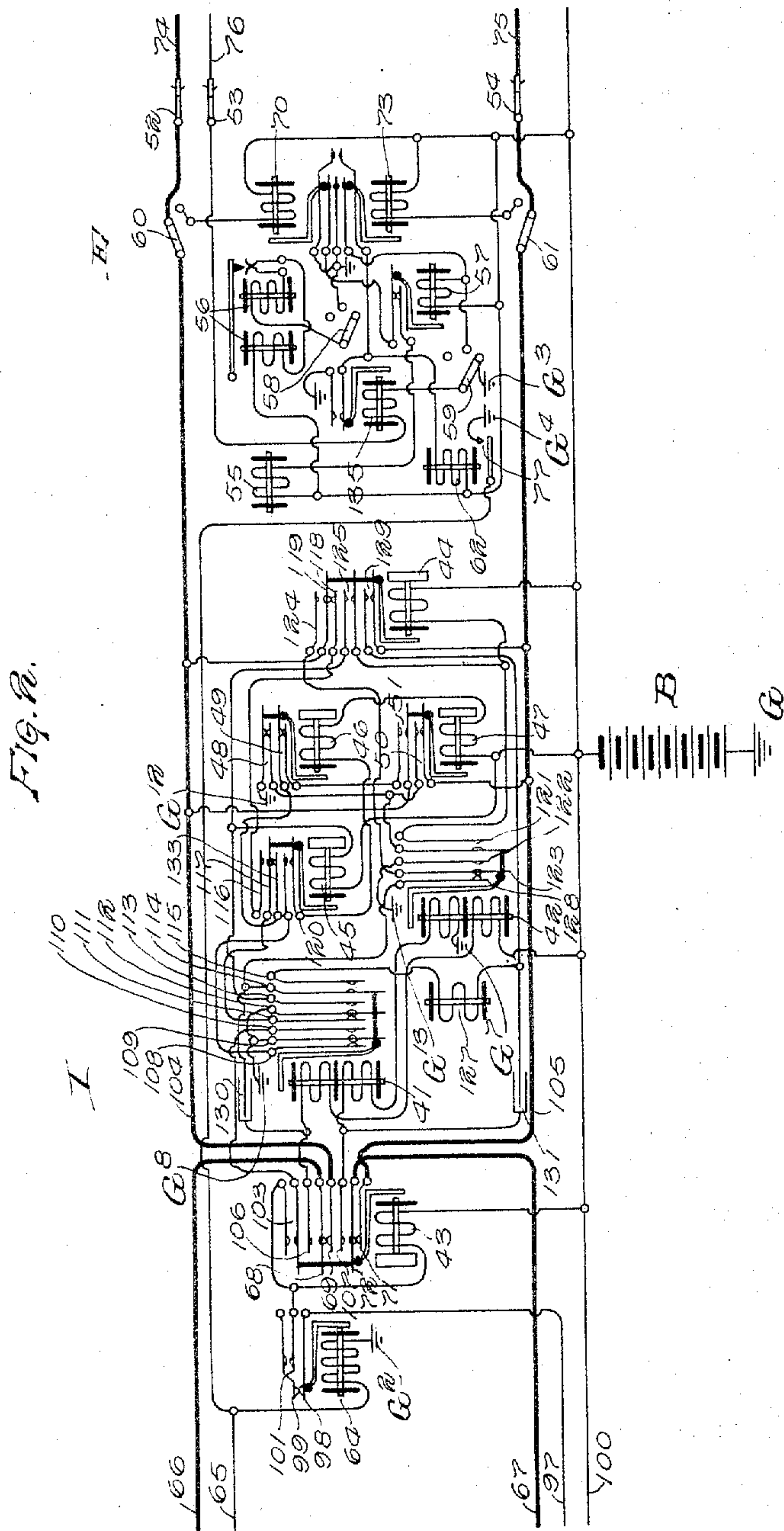
WITNESSES
 James H. Jordan
 C. A. Cole

INVENTOR.
 Clarence C. Rogers
 By Bulkley, Swanton
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James A. Jordan
C. A. Cole

INVENTOR:

Clarence E. Rogers
G. Bulley & Swenata
ATTORNEYS,

UNITED STATES PATENT OFFICE.

CLARENCE E. ROGERS, OF OAKLAND, CALIFORNIA, ASSIGNOR TO AUTOMATIC ELECTRIC COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

AUTOMATIC TELEPHONE SYSTEM.

1,216,365.

Specification of Letters Patent.

Patented Feb. 20, 1917.

Application filed December 12, 1913. Serial No. 806,281.

To all whom it may concern:

Be it known that I, CLARENCE E. ROGERS, a citizen of the United States of America, and resident of Oakland, Alameda county, California, have invented certain new and useful Improvements in Automatic Telephone Systems, of which the following is a specification.

My invention relates to improvements in automatic telephone systems, and has for its object the provision of improved means for uniting into one system two-wire and three-wire apparatus in such a manner that a connection from either a two-wire or a three-wire subscriber's line can be extended to the central office over the same trunk line and either of said subscribers can employ the same central office equipment. More specifically, my invention relates to the provision of repeating mechanism which is interposed in the trunk line between the automatic switches at the central office and the subscribers' lines, so that these automatic switches can be operated by impulses sent from the subscribers' lines either over two sides of the line in series, or by impulses from the subscribers' lines over the two sides of the line and ground.

My invention will be more clearly understood by reference to the accompanying drawings, in which I have illustrated my invention in connection with certain well-known forms of automatic switches.

It will, of course, be understood that various forms of line switches and selectors could be employed in place of the ones I have illustrated, and likewise that the completion of the connection from the selector to the called line could be accomplished in any well-known manner, either through further automatic switches or through a manual operator's board.

In the drawings Figures 1 and 2 taken together represent diagrammatically a portion of the central office apparatus necessary for completing a connection between a calling subscriber and a called subscriber.

Fig. 1 shows a substation A and a substation A', together with their individual switches C and C', which are under the control of the common mechanism or master switch D. The line switches C and C' belong to a group of similar line switches, the plungers (not shown) of which engage a shaft and are controlled by the operation of the master

switch D in such a manner that they are, when in normal position, held directly in front of an idle trunk line.

Fig. 2 represents a trunk line leading from the above-mentioned group of line switches through a repeater I to a first selector E.

The automatic substations with which I have chosen to illustrate my invention are of two types. The substation A is of the type in which the impulses are transmitted to the central office over two sides of the line separately with a ground return—that is, the usual form of three-wire substation. This substation comprises the usual receiver 2, the switch-hook 3, the transmitter 4, ringer 5 and the condenser 6. This substation is likewise provided with an impulse-transmitting device comprising the impulse wheel 11 provided with ten so-called vertical impulse teeth 12 and one rotary impulse tooth 13. These teeth are so arranged that as the impulse wheel is rotated forward through the medium of the dial (not shown), the rotary tooth 13 forces the so-called rotary impulse spring 14 into engagement with the ground spring 15, whereby the rotary line conductor 18 is given a preliminary impulse for operating the line switch C. As the wheel 11 returns to normal position, the vertical impulse spring 17 is forced into engagement with the ground spring 15 a number of times corresponding to the digit called, after which the rotary spring 14 is once more forced into contact with the ground spring 15. While the impulses are being transmitted, the connection between the two sides of the line is broken between the springs 19 and 20, which come into engagement when the receiver is removed from the switch-hook, but are permitted to disengage by the dog 21 whenever the dial is out of normal position. As the switch-hook is lowered, the cam arm 22 momentarily presses the release springs 23, 24 and 25 into engagement, whereby the substation line conductors may be grounded simultaneously. Means whereby a subscriber may signal a called subscriber comprises the push-button 26, which, when pressed, carries the spring 27 out of engagement with the contact point 28 and into engagement with the contact point 29, whereby the vertical line conductor 16 is grounded.

The substation A' is somewhat similar to

the substation A in that it likewise comprises the usual receiver 2, switch-hook 3, transmitter 4, bell 5 and condenser 6. It is also provided with an impulse transmitter or calling device which is represented herein by a pair of impulse springs 7 and 8 and an impulse wheel 9, which latter is assumed to be controlled through the medium of a finger hole dial (not shown) in such a manner that the impulse springs 7 and 8 may be momentarily separated a number of times corresponding to the digit called. The substation A' is also provided with a push button 10 which, when depressed, applies ground battery to the substation line conductors.

The line switch C is similar to that type of line switch shown in British patent to R. W. James No. 26,301 of 1906. In its general form it comprises a trip magnet 30, a release magnet 31 and a bridge-cut-off relay 32. The trip magnet is designed to operate the usual plunger for pressing the bank springs 33, 34, 35 and 36 into engagement with their respective bank springs 37, 38, 39 and 40, of which there are a number of similar sets. The plunger is so arranged that when in normal position it is under the control of the master switch D, whereby the said plunger may always be moved from opposite a seized trunk to a position opposite an idle trunk. The release magnet operates to restore the plunger to normal position. The bridge-cut-off relay 32 operates to disconnect the line switch from the substation trunk lines 18 and 16. Although only one set of springs (33 to 40) is shown in connection with the line switch C, each line switch is provided with a plurality of such sets, each set forming a terminal of a trunk line leading to a first selector E. Each trunk line is connected in multiple with the corresponding springs of all the line switches of the group which is controlled by the master switch D.

The line switch C' is of the same general type as the line switch C, but is modified slightly to operate in a so-called two-wire system, *i. e.*, a system in which the impulses are delivered over the two sides of the line in series.

The master switch D is of the same general type as that disclosed in British patent to R. W. James No. 26,301 of 1906, above referred to. The function of the master switch, as is well known, is to maintain the plungers of all the idle line switches in position to engage the terminal of an idle trunk line.

The repeater I is placed in the trunk line connecting the line switch bank terminals to the first selector E and is adapted to receive impulses from the two-wire substation A' and repeat them to the switches in a three-wire exchange. The repeater I

comprises, among other details, the double-wound relays 41 and 42 and the slow acting relays 43, 44, 45, 46 and 47. The slow acting relays 46 and 47 are connected in series and are so arranged that the relay 46 de-energizes quicker than the relay 47, thus operating to close the contact of springs 48 and 49 before the contacts of the springs 50 and 51 are opened.

The selector E is of the general type disclosed in United States Letters Patent No. 815,321, granted March 13, 1906, to Keith, Erickson and Erickson. In general it comprises the usual shaft (not shown) carrying the wipers 52, 53 and 54. This shaft has a vertical motion controlled by the vertical magnet 55 and a rotary motion controlled by the rotary magnet 56. The private magnet 57 controls the side switch carrying the wipers 58, 59, 60 and 61 in the usual manner. The release of the switch mechanism is provided for in the release magnet 62.

Having given a general description of the apparatus involved in the system, and in order to give a complete understanding of my invention, I will now describe how the calling subscriber A, whose substation is of the three-wire type, may make connection with and operate the first selector E. Since the operation of the switching apparatus disclosed herein is in general well known in the art, it is not thought necessary to describe its operation in detail, only sufficient description being given to enable a complete understanding of my invention. We will assume that the first digit of the desired number to be called is 2.

When the calling subscriber, after removing his receiver from the switch-hook, operates his calling device for the digit 2, the preliminary impulse over the rotary conductor 18 passes through the springs of the cut-off relay 32 of the line switch C, and through the trip magnet 30, contact of the springs 63 to the battery lead 100 and thence through the battery B to ground G. The magnet 30, upon energizing, releases the plunger of the line switch C, allowing it to enter its bank, whereby the line conductors 16 and 18 are extended through the line switch bank springs 33 and 37, and 36 and 40 through the repeater I to the selector E. After the line switch C has operated, its master switch D operates in a well-known manner to advance the plungers of the remaining line switches of the group to which the switch C belongs to an idle trunk line. The relay 64 of the repeater I is energized as soon as the bank springs 34 and 38 make contact. The said circuit extends from ground G² through the relay 64 (Fig. 2), conductor 65, bank springs 38 and 34 and the release magnet 31 to the battery lead 100. The relay 64 is of a rather high resist-

ance and does not permit sufficient current to flow to operatively energize the release magnet 31. The operation of the relay 64 is functionless at this time and therefore the line remains connected through to the selector E.

After the connection has been thus extended to the first selector E, two impulses are transmitted from the substation A over the vertical line 16, conductor 66, springs 68 and 69 of the relay 43 and through the selector vertical line relay 70 to battery B, followed by one impulse over the rotary line 18, conductor 67, springs 71 and 72 of the relay 43 and through the selector rotary line relay 73 to battery B. The selector E operates in response to said impulses transmitted through its vertical and rotary line relays to extend the connection to an idle trunk line. When the connection is thus extended to said trunk line, the usual guarding ground is extended to its selector private bank contacts, extending from ground G^2 in the selector E through the side switch wiper 59 (in third position), release relay 135, and the selector private wiper 53 to the bank contact 76 and the corresponding contact in the banks of all the selectors which have access to said trunk. After the connection has been completed, the release of the apparatus is brought about by the calling subscriber A replacing his receiver upon the receiver-hook, thus causing the cam arm 22 to press the springs 23, 24 and 25 into engagement momentarily, which action grounds the vertical and rotary trunk lines, causing the apparatus to release in a well-known manner. The release circuit for the line switch C extends from ground G^4 through the contact of springs 77 of the release magnet 62, over the trunk conductor 65, through the line switch springs 38 and 34 and the release magnet 31 to the battery lead 100.

It having been explained how the subscriber A may make connection with and operate the selector E over the trunk line 66, 67, it will now be explained how the subscriber A' (whose substation is of the two-wire type) may make connection with and operate the same first selector E over the same trunk line. The subscriber A', upon removing his receiver 2 from the receiver-hook 3, closes a bridge across the line conductors 78 and 79. The closing of this bridge across the line conductors establishes an energizing circuit for the trip magnet 80 of the line switch C'. This circuit extends from ground G^5 through the contact of springs 81 and 82, trunk line 78, through the substation A', return conductor 79, springs 83 and 84, trip magnet 80, slow acting relay 85 and the contact of springs 63 to the battery lead 100. The magnet 80, upon energizing, releases the plunger of the line switch C', allowing it to enter the bank and

force the springs 86, 87, 88 and 89 into contact with the springs 90, 91, 92 and 93, respectively. The engagement of the springs 90 and 93 by the springs 86 and 89 connects the substation lines 78 and 79 to the trunk conductors 66 and 67, respectively. After the line switch C' has operated, its master switch D operates in the well-known manner to advance the plungers of the remaining line switches of the group to an idle trunk line. The engagement of the bank springs 87 and 91 closes a circuit through the said relay 64. The said circuit extends from ground G^2 through the relay 64, conductor 65, bank springs 91 and 87 and the release magnet 102 to the battery lead 100. The relay 64 is of a rather high resistance and does not permit sufficient current to flow to operatively energize the release magnet 102. The relay 85 energizes in series with the trip magnet 80 and operates in conjunction with the relay 64 to close a circuit through the relay 43 of the repeater I. The engagement of the bank springs 88 and 92 closes an energizing circuit for the cut-off relay 94 of the line switch C, which, upon energizing, breaks the circuit of the trip magnet 80 and the relay 85. The relay 85 is slow acting and consequently does not de-energize immediately after its energizing circuit is broken, but retains ground battery on the spring 98 of the relay 64 until the said relay 64 has energized. The circuit for the relay 43 extends from ground G^6 through the contact of springs 96, conductor 97, contact of the springs 98, 99 and 101 and the relay 43 to battery B. The springs 98, 99 and 101 are adjusted to insure a long contact between the springs 98, 99 and 101 before the springs 99 and 101 break contact. The relay 43, upon energizing, closes a locking circuit for itself through the springs 103 independent of its energizing circuit. A further result of the energization of the relay 43 is to disconnect the trunk conductors 66 and 67 from the conductors 104 and 105 and to bridge the relays 41 and 42 across the said conductors 66 and 67. The circuit of said relays extends from ground G^7 through the upper winding of the relay 42, lower winding of the relay 41, contact of springs 107 and 72, trunk conductor 67, through the substation A', return trunk conductor 66, springs 106 and 68, upper winding of the relay 41 and the lower winding of the relay 42 to battery B. The relay 42 is differentially wound and consequently does not operatively energize at this time. The relay 41, upon energizing, closes a circuit for the relay 45. The said circuit extends from ground G^8 through the contact of springs 112 and 113 and the relay 45 to battery B. The apparatus is now in readiness to receive impulses from the substation A' and repeat the same to the selector E.

The calling subscriber now operates his calling device for the digit 2, whereby the substation impulse springs 7 and 8 are separated twice momentarily, each time breaking the circuit of the line relay 41 of the repeater I. The relay 45 being slow acting does not deenergize during the momentary interruptions of its circuit by the line relay 41 and consequently each time the latter relay deenergizes, an impulse is transmitted over the vertical trunk conductor 104 over a circuit extending from ground G^8 through the contact of springs 112 and 111, springs 117 and 116, springs 118 and 119 and through the vertical line relay 70 of the selector E to battery B. A further result due to the successive deenergization of the relay 41 is to close a circuit through the slow acting relays 46 and 47 in series. The said circuit extends from ground G^8 through the contact of springs 109 and 108, springs 120 and the relays 46 and 47 in series to battery B. The relays 46 and 47 remain energized during the entire time that the line relay 41 is operating to send impulses to the vertical line relay 70 of the selector E. After the last impulse has been delivered, the relay 46 deenergizes, closing the contact of springs 48 and 49 before the contacts of springs 50 and 51 of the relay 47 open. The relay 47 then deenergizes, thus transmitting an impulse of current over the rotary trunk conductor 105 from ground G^{12} through the contact of springs 48, springs 50 and the rotary line relay 73 of the selector E to battery B. The selector E, receiving the two vertical impulses and the one rotary impulse, operates in the manner previously described to connect the conductors 104 and 105 to the trunk lines 74 and 75.

After the connection from the trunk lines 74 and 75 to a called line has been completed in any desired manner, the calling subscriber presses the key 10 to signal the called subscriber. The key 10, upon being pressed, grounds both the conductors 66 and 67. The grounding of said conductors retains the relay 41 energized and allows the relay 42 to be operatively energized. The relay 42, upon energizing, closes a circuit through the relay 44. The said circuit extends from ground G^{12} through the contact of springs 48, contact of springs 121 and the relay 44 to battery B. A further result of the energization of the relay 42 is to close a circuit over the vertical trunk conductor 74 from ground G^{13} through the contact of springs 122 and 123, springs 124 and 119, over the conductor 104 and the conductor 74. If the usual connector switch is employed to complete the connection to the called line, the closure of this circuit will energize the vertical line relay of the connector, which in turn operates the ringing relay to apply ringing current to the called line. The re-

lay 44, upon energizing, closes a locking circuit for itself through the springs 125 independent of its energizing circuit and also bridges the resistance 127 across the conductors 104 and 105. The said circuit extends from the conductor 104 through the contact of springs 119 and 124, springs 123 and 128, springs 114 and 115, the resistance 127 and the springs 129 to the conductor 105.

The replacing of the receiver on the hook at the calling substation allows the switch-hook to open the bridge across the line conductors 78 and 79, which permits the relay 41 to deenergize. The relay 41, upon deenergizing, closes a circuit through the slow acting relays 46 and 47 in series and opens the circuit of the relay 45. The energizing circuit for the relays 46 and 47 extends from ground G^8 through the contact of springs 109 and 108, springs 120 and the relays 46 and 47 in series to the battery B. The relay 45, upon deenergizing, opens the circuit of the relays 46 and 47 at the springs 120. The relays 46 and 47, upon deenergizing, operate to ground the trunk conductors 74 and 75 momentarily. The ground for the conductor 74 extends from ground G^8 through the contact of springs 112 and 111, springs 117 and 133, springs 49 and the springs 51 to the said conductor. The ground for the conductor 75 extends from ground G^{12} through the contact of springs 48 and the springs 50 to the said conductor. The grounding of the conductors 74 and 75 would cause the connector switch to release in the well-known manner which in turn would cause the release relay 135 of the selector E to close the circuit of the release magnet 62 for releasing said selector. The release magnet 62, upon energizing, closes the circuit of the release magnet 102 of the line switch C' and thus all the apparatus is returned to normal position.

It will thus be seen that I have devised a very efficient system in which a subscriber on either a line of the two-wire type or a line of the three-wire type may extend a connection over the same trunk line and use the same central office equipment.

While I have illustrated my invention in connection with automatic apparatus of a particular type, it will, of course, be understood that I do not wish to limit myself to the use of such apparatus, but that other forms of line switches and selectors can be employed, and various other changes and modifications can be made without departing from the spirit of my invention.

What I claim as my invention is:—

1. In a telephone system, a subscriber's line provided with means for transmitting impulses over two sides of the line in series, a second subscriber's line provided with means for transmitting impulses over two sides of said line with ground return, a

trunk line, and means by which either of said subscribers may obtain connection with said trunk and extend a connection there-over.

5 2. In a telephone system, a trunk line, a subscriber's line provided with means for transmitting one character of impulses over said line, a second subscriber's line provided with means for transmitting a different
10 character of impulses, means by which a connection can be established from either of said lines with said trunk, and means for then extending the connection from said trunk controlled by either of said types of
15 impulses.

3. In a telephone system, a trunk line, a selector switch in which said trunk terminates, a repeating mechanism in said trunk, a plurality of subscribers' lines adapted to
20 be connected with said trunk, and means for bringing said repeating mechanism into operation only when certain of said subscribers seize said trunk.

4. In a telephone system, a trunk line, an
25 automatic switch connected with said trunk, a plurality of subscribers' lines, means for extending a connection from said lines to said trunk, means for transmitting impulses from certain of said subscribers' lines over
30 said trunk to said switch, a repeating mechanism in said trunk, and means whereby said repeating mechanism repeats impulses received from other of said subscribers' lines to said automatic switch.

35 5. In a telephone system, a trunk line, a repeater in said trunk, means for transmitting impulses of two characters to said trunk, means whereby impulses of one character pass directly through said trunk, and
40 means whereby impulses of the other character will be repeated over said trunk by said repeater.

6. In a telephone system, a trunk line, a
45 repeater in said trunk, means for transmitting impulses of two characters to said trunk, means whereby impulses of one character pass directly through said trunk, and means whereby impulses of the other character will be repeated over said trunk by
50 said repeater and will be transformed into impulses of the first character.

7. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk
55 line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for
60 connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a bat-
65 tery and also comprising, when the first line

is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and when the second line is connected with the trunk comprising the two sides of the second line in series and the impulse sender of the second line.

8. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof and when the second line is connected with the trunk, comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising also two sides of the trunk line in series.

9. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of one section of the trunk line separate from the other side thereof and when the second line is connected with the trunk comprising the two sides of the second line in series, and comprising also two sides of one section of the trunk line.

10. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progres-

sively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising also two sides of one section of the trunk line in series and one side of the other section of the trunk separate from the other side of said other section.

11. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and when the second line is connected with the trunk comprising the two sides of the second line in series and the impulse sender of the second line, and a relay for separating the two sections of the trunk.

12. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk, comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising two sides of the trunk line in series, and a relay for separating the two sections of the trunk.

13. In a telephone system, a first line, an impulse sender for said line, a progressively

movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of one section of the trunk line separate from the other side thereof and when the second line is connected with the trunk comprising the two sides of the second line in series, and comprising also two sides of one section of the trunk line, and a relay for separating the two sections of the trunk.

14. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising also two sides of one section of the trunk line in series and one side of the other section of the trunk separate from the other side of said other section, and a relay for separating the two sections of the trunk.

15. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of

the first line and its impulse sender, and when the second line is connected with the trunk comprising the two sides of the second line in series and the impulse sender of the second line, a relay for separating the two sections of the trunk, and a second relay for repeating the control impulses from one of the sections to the other.

16. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk, comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising two sides of the trunk line in series, a relay for separating the two sections of the trunk, and a second relay for repeating the control impulses from one of the sections to the other.

17. In a telephone system, a first line, an impulse sender for said first line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of one section of the trunk line separate from the other side thereof and when the second line is connected with the trunk comprising the two sides of the second line in series, and comprising also two sides of one section of the trunk line, a relay for separating the two sections of the trunk, and a second relay for repeating the control impulses from one of the sections to the other.

18. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch,

a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising also two sides of one section of the trunk line in series and one side of the other section of the trunk separate from the other side of said other section, a relay for separating the two sections of the trunk, and a second relay for repeating the control impulses from one of the sections to the other.

19. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and when the second line is connected with the trunk comprising the two sides of the second line in series and the impulse sender of the second line, a relay for separating the two sections of the trunk, and a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay.

20. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said

progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk, comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising two sides of the trunk line in series, a relay for separating the two sections of the trunk, and a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay.

21. In a telephone system, a first line, an impulse sender for said first line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of one section of the trunk line separate from the other side thereof and when the second line is connected with the trunk comprising the two sides of the second line in series, and comprising also two sides of one section of the trunk line, a relay for separating the two sections of the trunk, and a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay.

22. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk comprising the two

sides of the second line in series, and the impulse sender of the second line, and comprising also two sides of one section of the trunk line in series and one side of the other section of the trunk separate from the other side of said other section, a relay for separating the two sections of the trunk, and a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay.

23. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and when the second line is connected with the trunk comprising the two sides of the second line in series and the impulse sender of the second line, a relay for separating the two sections of the trunk, and a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk.

24. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk, comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising two sides of the trunk line in series, a relay for separating the two sections of the trunk and a second relay for repeating the control impulses from one of the sections to

the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk.

25. In a telephone system, a first line, an impulse sender for said first line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of one section of the trunk line separate from the other side thereof and when the second line is connected with the trunk comprising the two sides of the second line in series, and comprising also two sides of one section of the trunk line, a relay for separating the two sections of the trunk, and a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk.

26. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising also two sides of one section of the trunk line in series and one side of the other section of the trunk separate from the other side of said other section, a relay for separating the two sections of the trunk, and a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk.

27. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and when the second line is connected with the trunk comprising the two sides of the second line in series and the impulse sender of the second line, a relay for separating the two sections of the trunk, and a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk, whereby the second relay is placed under line control.

28. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk, comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising two sides of the trunk line in series, a relay for separating the two sections of the trunk and a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk, whereby the second relay is placed under line control.

29. In a telephone system, a first line, an impulse sender for said first line, a progressively movable automatic trunking switch, a trunk line terminating therein and

divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of one section of the trunk line separate from the other side thereof and when the second line is connected with the trunk comprising the two sides of the second line in series, and comprising also two sides of one section of the trunk line, a relay for separating the two sections of the trunk, and a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk, whereby the second relay is placed under line control.

30. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising also two sides of one section of the trunk line in series and one side of the other section of the trunk separate from the other side of said other section, a relay for separating the two sections of the trunk, and a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk, whereby the second relay is placed under line control.

31. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided

into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and when the second line is connected with the trunk comprising the two sides of the second line in series and the impulse sender of the second line, a relay for separating the two sections of the trunk, and a control circuit for said relay separate from the line and trunk conductors mentioned.

32. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk, comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising two sides of the trunk line in series, a relay for separating the two sections of the trunk, and a control circuit for said relay separate from the line and trunk conductors mentioned.

33. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate

from the other side of the first line and its impulse sender, and one side of one section of the trunk line separate from the other side thereof and when the second line is
5 connected with the trunk comprising the two sides of the second line in series, and comprising also two sides of one section of the trunk line, a relay for separating the two sections of the trunk, and a control circuit
10 for said relay separate from the line and trunk conductors mentioned.

34. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk
15 line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches
20 for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising
25 a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the
30 other side thereof, and when the second line is connected with the trunk comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising also two sides of one section of the trunk line in series and one side of the
35 other section of the trunk separate from the other side of said other section, a relay for separating the two sections of the trunk, and a control circuit for said relay separate from the line and trunk conductors
40 mentioned.

35. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk
45 line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of
50 said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line
55 comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and when the second line is
60 connected with the trunk comprising the two sides of the second line in series and the impulse sender of the second line, a relay for separating the two sections of the trunk, a second relay for repeating the control im-

pulses from one of the sections to the other, 65 and a control circuit for said first relay separate from the line and trunk conductors mentioned.

36. In a telephone system, a first line, an impulse sender for said line, a progressively 70 movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said 75 trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively 80 movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, 85 and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk, comprising the two sides of the second line in series, and the impulse sender of the second 90 line, and comprising two sides of the trunk line in series, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, and a control cir- 95 cuit for said first relay separate from the line and trunk conductors mentioned.

37. In a telephone system, a first line, an impulse sender for said first line, a progres- 10 sively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the sec- 10 ond line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progres- 11 sively movable switch comprising operating magnets, means for controlling said progressively movable switch from either 11 line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its 11 impulse sender, and one side of one section of the trunk line separate from the other side thereof and when the second line is con- 11 nected with the trunk comprising the two sides of the second line in series, and comprising also two sides of one section of the 12 trunk line, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, and a control circuit 12 for said first relay separate from the line and trunk conductors mentioned.

38. In a telephone system, a first line, an impulse sender for said line, a progressively

movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising also two sides of one section of the trunk line in series and one side of the other section of the trunk separate from the other side of said other section, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, and a control circuit for said first relay separate from the line and trunk conductors mentioned.

39. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and when the second line is connected with the trunk comprising the two sides of the second line in series and the impulse sender of the second line, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay, and a control circuit for said first relay separate from the line and trunk conductors mentioned.

40. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said

trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk, comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising two sides of the trunk line in series, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay, and a control circuit for said first relay separate from the line and trunk conductors mentioned.

41. In a telephone system, a first line, an impulse sender for said first line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches, for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of one section of the trunk line separate from the other side thereof and when the second line is connected with the trunk comprising two sides of the second line in series, and comprising also two sides of one section of the trunk line, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay, and a control circuit for said first relay separate from the line and trunk conductors mentioned.

42. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising magnets, means for controlling said progres-

sively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising also two sides of one section of the trunk line in series and one side of the other section of the trunk separate from the other side of said other section, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay, and a control circuit for said first relay separate from the line and trunk conductors mentioned.

43. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and when the second line is connected with the trunk comprising the two sides of the second line in series and the impulse sender of the second line, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk, and a control circuit for said first relay separate from the line and trunk conductors mentioned.

44. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one

side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk, comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising two sides of the trunk in series, a relay for separating the two sections of the trunk and a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk, and a control circuit for said first relay separate from the line and trunk conductors mentioned.

45. In a telephone system, a first line, an impulse sender for said first line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of one section of the trunk line separate from the other side thereof, and when the second line is connected with the trunk comprising the two sides of the second line in series, and comprising also two sides of one section of the trunk line, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk, and a control circuit for said first relay separate from the line and trunk conductors mentioned.

46. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the

first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising also two sides of one section of the trunk line in series and one side of the other section of the trunk separate from the other side of said other section, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk, and a control circuit for said first relay separate from the line and trunk conductors mentioned.

47. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and when the second line is connected with the trunk comprising the two sides of the second line in series and the impulse sender of the second line, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk, whereby the second relay is placed under line control, and a control circuit for said first relay separate from the line and trunk conductors mentioned.

48. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of

the trunk line separate from the other side thereof, and when the second line is connected with the trunk, comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising two sides of the trunk line in series, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk, whereby the second relay is placed under line control, and a control circuit for said first relay separate from the line and trunk conductors mentioned.

49. In a telephone system, a first line, an impulse sender for said first line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of one section of the trunk line separate from the other side thereof, and when the second line is connected with the trunk comprising the two sides of the second line in series, and comprising also two sides of one section of the trunk line, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk, whereby the second relay is placed under line control, and a control circuit for said first relay separate from the line and trunk conductors mentioned.

50. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side

thereof, and when the second line is connected with the trunk comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising also two sides of one section of the trunk line in series and one side of the other section of the trunk separate from the other side of said other section, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk, whereby the second relay is placed under line control, and a control circuit for said first relay separate from the line and trunk conductors mentioned.

51. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and when the second line is connected with the trunk comprising the two sides of the second line in series and the impulse sender of the second line, a relay for separating the two sections of the trunk, and a control circuit for said relay separate from the line and trunk conductors mentioned, said control circuit under the control of one of said switches.

52. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk, comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising two sides of the trunk line in series,

a relay for separating the two sections of the trunk, and a control circuit for said relay separate from the line and trunk conductors mentioned, said control circuit under the control of one of said switches.

53. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of one section of the trunk line separate from the other side thereof and when the second line is connected with the trunk comprising the two sides of the second line in series, and comprising also two sides of one section of the trunk line, a relay for separating the two sections of the trunk, and a control circuit for said relay separate from the line and trunk conductors mentioned, said control circuit under the control of one of said switches.

54. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising also two sides of one section of the trunk line in series and one side of the other section of the trunk separate from the other side of said other section, a relay for separating the two sections of the trunk, and a control circuit for said relay separate from the line and trunk conductors mentioned, said control circuit under the control of one of said switches.

55. In a telephone system, a first line, an

impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and when the second line is connected with the trunk comprising the two sides of the second line in series and the impulse sender of the second line, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, and a control circuit for said first relay separate from the line and trunk conductors mentioned, said control circuit under the control of one of said switches.

56. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk, comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising two sides of the trunk line in series, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, and a control circuit for said first relay separate from the line and trunk conductors mentioned, said control circuit under the control of one of said switches.

57. In a telephone system, a first line, an impulse sender for said first line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of

said switches, for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of one section of the trunk line separate from the other side thereof and when the second line is connected with the trunk comprising the two sides of the second line in series, and comprising also two sides of one section of the trunk line, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, and a control circuit for said first relay separate from the line and trunk conductors mentioned, said control circuit under the control of one of said switches.

58. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising also two sides of one section of the trunk line in series and one side of the other section of the trunk separate from the other side of said other section, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, and a control circuit for said first relay separate from the line and trunk conductors mentioned, said control circuit under the control of one of said switches.

59. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable

switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and when the second line is connected with the trunk comprising the two sides of the second line in series and the impulse sender of the second line, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay, and a control circuit for said first relay separate from the line and trunk conductors mentioned, said control circuit under the control of one of said switches.

60. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk, comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising two sides of the trunk line in series, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay, and a control circuit for said first relay separate from the line and trunk conductors mentioned, said control circuit under the control of one of said switches.

61. In a telephone system, a first line, an impulse sender for said first line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected

with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of one section of the trunk line separate from the other side thereof and when the second line is connected with the trunk comprising two sides of the second line in series, and comprising also two sides of one section of the trunk line, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay, and a control circuit for said first relay separate from the line and trunk conductors mentioned, said control circuit under the control of one of said switches.

62. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising also two sides of one section of the trunk line in series and one side of the other section of the trunk separate from the other side of said other section, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay, and a control circuit for said first relay separate from the line and trunk conductors mentioned, said control circuit under the control of one of said switches.

63. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising,

when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and when the second line is connected with the trunk comprising the two sides of the second line in series and the impulse sender of the second line, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk, and a control circuit for said first relay separate from the line and trunk conductors mentioned, said control circuit under the control of one of said switches.

64. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk, comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising two sides of the trunk in series, a relay for separating the two sections of the trunk and a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk, and a control circuit for said first relay separate from the line and trunk conductors mentioned, said control circuit under the control of one of said switches.

65. In a telephone system, a first line, an impulse sender for said first line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also

comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of one section of the trunk line separate from the other side thereof, and when the second line is connected with the trunk comprising the two sides of the second line in series, and comprising also two sides of one section of the trunk line, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk, and a control circuit for said first relay separate from the line and trunk conductors mentioned, said control circuit under the control of one of said switches.

66. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising also two sides of one section of the trunk line in series and one side of the other section of the trunk separate from the other side of said other section, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk, and a control circuit for said first relay separate from the line and trunk conductors mentioned, said control circuit under the control of one of said switches.

67. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunks accessible to both of said switches for connecting either line with the trunk, means for operating said pro-

gressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and when the second line is connected with the trunk comprising the two sides of the second line in series and the impulse sender of the second line, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk, whereby the second relay is placed under line control, and a control circuit for said first relay separate from the line and trunk conductors mentioned, said control circuit under the control of one of said switches.

68. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk, comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising two sides of the trunk line in series, a relay for separating the two sections of the trunk and a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk, whereby the second relay is placed under line control, and a control circuit for said first relay separate from the line and trunk conductors mentioned, said control circuit under the control of one of said switches.

69. In a telephone system, a first line, an impulse sender for said first line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the

second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of one section of the trunk line separate from the other side thereof, and when the second line is connected with the trunk comprising the two sides of the second line in series, and comprising also two sides of one section of the trunk line, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk, whereby the second relay is placed under line control, and a control circuit for said first relay separate from the line and trunk conductors mentioned, said control circuit under the control of one of said switches.

70. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising also two sides of one section of the trunk line in series and one side of the other section of the trunk separate from the other side of said other section, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk, whereby the second relay is placed under line control, and a control circuit for said first relay separate from the line and trunk conductors mentioned, said control circuit under the control of one of said switches.

71. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and when the second line is connected with the trunk comprising the two sides of the second line in series and the impulse sender of the second line, a relay for separating the two sections of the trunk, a trunk release circuit extending from one of said switches to said progressively movable switch, and a circuit for said relay controlled over said trunk release circuit.

72. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk, comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising two sides of the trunk line in series, a relay for separating the two sections of the trunk, a trunk release circuit extending from one of said switches to said progressively movable switch, and a circuit for said relay controlled over said trunk release circuit.

73. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said pro-

gressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of one section of the trunk line separate from the other side thereof and when the second line is connected with the trunk comprising the two sides of the second line in series, and comprising also two sides of one section of the trunk line, a relay for separating the two sections of the trunk, a trunk release circuit extending from one of said switches to said progressively movable switch, and a circuit for said relay controlled over said trunk release circuit.

74. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising also two sides of one section of the trunk line in series and one side of the other section of the trunk separate from the other side of said other section, a relay for separating the two sections of the trunk, a trunk release circuit extending from one of said switches to said progressively movable switch, and a circuit for said relay controlled over said trunk release circuit.

75. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the

trunk, one side of the first line separate from the other side of the first line and its impulse sender, and when the second line is connected with the trunk comprising the two sides of the second line in series and the impulse sender of the second line, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, a trunk release circuit extending from one of said switches to said progressively movable switch, and a circuit for said first relay controlled over said trunk release circuit.

76. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk, comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising two sides of the trunk line in series, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, a trunk release circuit extending from one of said switches to said progressively movable switch, and a circuit for said first relay controlled over said trunk release circuit.

77. In a telephone system, a first line, an impulse sender for said first line, a progressively movable automatic trunking switch, a trunk-line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of one section of the trunk line separate from the other side thereof and when the second line is con-

nected with the trunk comprising the two sides of the second line in series, and comprising also two sides of one section of the trunk line, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, a trunk release circuit extending from one of said switches to said progressively movable switch, and a circuit for said first relay controlled over said trunk release circuit.

78. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising also two sides of one section of the trunk line in series and one side of the other section of the trunk separate from the other side of said other section, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, a trunk release circuit extending from one of said switches to said progressively movable switch, and a circuit for said first relay controlled over said trunk release circuit.

79. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and when the second line is connected with the trunk comprising the two sides of the second line in series and the impulse sender of the second line, a relay for separating

the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay, a trunk release circuit extending from one of said switches to said progressively movable switch, and a circuit for said first relay controlled over said trunk release circuit.

80. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk, comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising two sides of the trunk line in series, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay, a trunk release circuit extending from one of said switches to said progressively movable switch, and a circuit for said first relay controlled over said trunk release circuit.

81. In a telephone system, a first line, an impulse sender for said first line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of one section of the trunk line separate from the other side thereof and when the second line is connected with the trunk comprising the two sides of the second line in series, and comprising also two sides of one section of the trunk line, a relay for separating the

two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay, a trunk release circuit from one of said switches to said progressively extending movable switch, and a circuit for said first relay controlled over said trunk release circuit.

82. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising also two sides of one section of the trunk line in series and one side of the other section of the trunk separate from the other side of said other section, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay, a trunk release circuit extending from one of said switches to said progressively movable switch, and a circuit for said first relay controlled over said trunk release circuit.

83. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and when the second line is connected with the trunk comprising the two sides of the second line in series and the impulse sender of the second line, a relay for separating the two sections of the trunk,

a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk, a trunk release circuit extending from one of said switches to said progressively movable switch, and a circuit for said first relay controlled over said trunk release circuit.

84. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk, comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising two sides of the trunk line in series, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk, a trunk release circuit extending from one of said switches to said progressively movable switch, and a circuit for said first relay controlled over said trunk release circuit.

85. In a telephone system, a first line, an impulse sender for said first line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of one section of the trunk line separate from the other side thereof, and when the second line is connected with the trunk comprising the two sides of the second line in series, and

comprising also two sides of one section of the trunk line, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of the first relay to connect the second relay with a section of the trunk, a trunk release circuit extending from one of said switches to said progressively movable switch, and a circuit for said first relay controlled over said trunk release circuit.

86. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunks, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising also two sides of one section of the trunk line in series and one side of the other section of the trunk separate from the other side of said other section, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk, a trunk release circuit extending from one of said switches to said progressively movable switch, and a circuit for said first relay controlled over said trunk release circuit.

87. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and

when the second line is connected with the trunk comprising the two sides of the second line in series and the impulse sender of the second line, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk, whereby the second relay is placed under line control, a trunk release circuit extending from one of said switches to said progressively movable switch, and a circuit for said first relay controlled over said trunk release circuit.

88. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk, comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising two sides of the trunk line in series, a relay for separating the two sections of the trunk and a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk, whereby the second relay is placed under line control, a trunk release circuit extending from one of said switches to said progressively movable switch, and a circuit for said first relay controlled over said trunk release circuit.

89. In a telephone system, a first line, an impulse sender for said first line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising operating magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when

the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of one section of the trunk line separate from the other side thereof, and when the second line is connected with the trunk comprising the two sides of the second line in series, and comprising also two sides of one section of the trunk line, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk, whereby the second relay is placed under line control, a release circuit extending from one of said switches to said progressively movable switch, and a circuit for said first relay controlled over said trunk release circuit.

90. In a telephone system, a first line, an impulse sender for said line, a progressively movable automatic trunking switch, a trunk line terminating therein and divided into two sections, a second line, an impulse sender therefor, an automatic trunking switch for the first line and one for the second line, said trunk accessible to both of said switches for connecting either line with the trunk, means for operating said progressively movable switch comprising magnets, means for controlling said progressively movable switch from either line comprising a battery and also comprising, when the first line is connected with the trunk, one side of the first line separate from the other side of the first line and its impulse sender, and one side of the trunk line separate from the other side thereof, and when the second line is connected with the trunk comprising the two sides of the second line in series, and the impulse sender of the second line, and comprising also two sides of one section of the trunk line in series and one side of the other section of the trunk separate from the other side of said other section, a relay for separating the two sections of the trunk, a second relay for repeating the control impulses from one of the sections to the other, said second relay under the control of said first relay to connect the second relay with a section of the trunk, whereby the second relay is placed under line control, a trunk release circuit extending from one of said switches to said progressively movable switch, and a circuit for said first relay controlled over said trunk release circuit.

91. The combination with a plurality of automatic substations and automatic switches at the exchange cooperating therewith according to a definite system of control for extending connections, of a second plurality of automatic substations connected

to the same exchange but operating according to a different system of control, and a device individual to each of said switches cooperating with substations of the second plurality to enable them to control said switches also.

92. The combination with subscribers' lines and impulse senders thereof of two different kinds, of a trunk line at the exchange terminating in an automatic switch responsive only to a particular character of impulses, a device associated with said trunk line for changing impulses of one character to those of another, means for extending any line when calling to said trunk line, and discriminating means for rendering said device effective only when the calling line is of a particular kind.

93. In a telephone system, a trunk line terminating in an automatic switch, means for transmitting impulses of a particular character over said trunk line to operate said switch, means for transmitting impulses of a different character over said trunk line, and means for receiving the latter impulses and for changing them to impulses of the first character to operate said switch.

94. In a telephone system, a trunk line terminating in an automatic switch, means for transmitting impulses of a particular character over said trunk line to operate said switch, means for transmitting impulses of a different character over said trunk line, a device for changing impulses of the latter character to those of the first to render them effective for operating said switch, and automatic means for bringing said device into operation only when impulses of the latter character are to be transmitted.

95. In a telephone system, a subscriber's line provided with means for transmitting impulses over two sides of the line in series, a second subscriber's line provided with means for transmitting impulses over two sides of said line with ground return, a trunk line terminating in an automatic switch responsive only to impulses of the latter character, means by which either subscriber's line may be extended to said trunk line, and means for receiving impulses of the first character over said trunk line and

for changing them into those of the proper character to operate said switch.

96. In a telephone system, a subscriber's line provided with means for transmitting impulses over two sides of the line in series, a second subscriber's line provided with means for transmitting impulses over two sides of said line with ground return, a trunk line terminating in an automatic switch responsive only to impulses of the latter character, means by which either subscriber's line may be extended to said trunk line, a device for changing impulses of the first character to those of the latter to render them effective for operating said switch, and automatic means in said trunk line responsive to the connection of said first line therewith for bringing said device into operation.

97. In a telephone system, a subscriber's line provided with means for transmitting impulses over two sides of the line in series, a second subscriber's line provided with means for transmitting impulses over two sides of said line with ground return, a trunk line terminating in an automatic switch responsive only to impulses of one character, means by which either subscriber's line may be extended to said trunk line, and means in said trunk line automatically brought into operation when the said first line is so extended for receiving the impulses transmitted thereover and for changing them into those of the proper character for operating said switch.

98. In a telephone system, a subscriber's line comprising a pair of talking conductors, means for transmitting impulses over the said talking conductors in series, a second subscriber's line provided with means for transmitting impulses over two sides of said second line with ground return, a trunk line, and means by which either of said subscribers may obtain connection with said trunk to extend a connection thereover.

Signed by me at Oakland, Alameda county, California, this 3rd day of December, 1913.

CLARENCE E. ROGERS.

Witnesses:

JAMES H. JORDAN,
C. H. COLE.