A. MARCHAND.

PARTY LINE TELEPHONE SYSTEM.

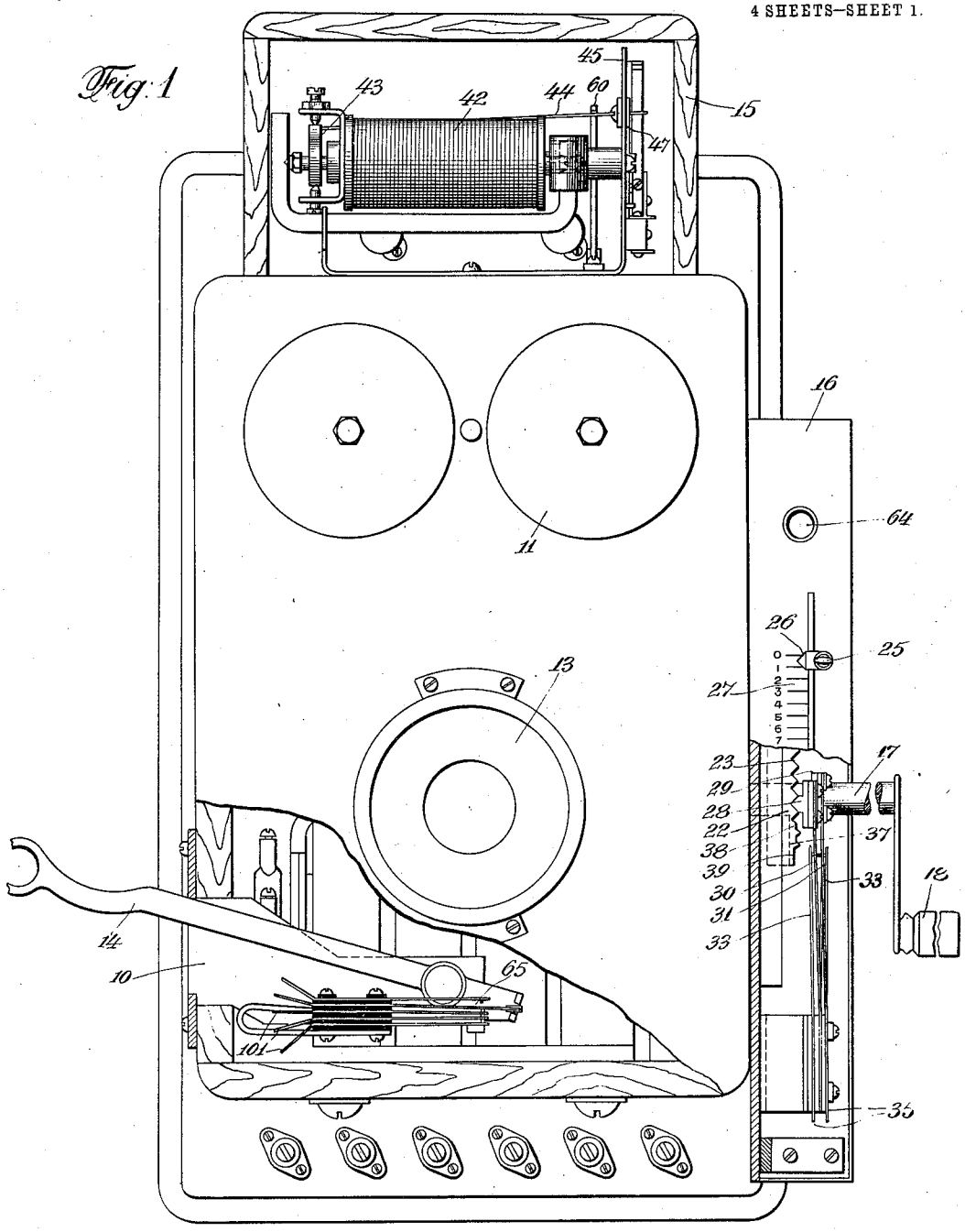
APPLICATION FILED MAR. 3, 1909.

1,013,412.

Patented Jan. 2, 1912.

4 SHEETS—SHEET 1.

Fig. 1



Witnesses:
D. Barshell.
J. E. Prager.

Alexis Marchand Inventor
By his Attorney Fredk P. Schueck

A. MARCHAND.

PARTY LINE TELEPHONE SYSTEM.

APPLICATION FILED MAR. 3, 1909.

1,013,412.

Patented Jan. 2, 1912.

4 SHEETS—SHEET 2.

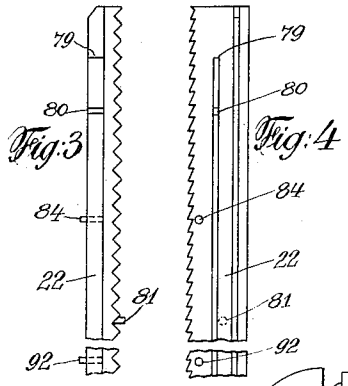


Fig. 3

Fig. 4

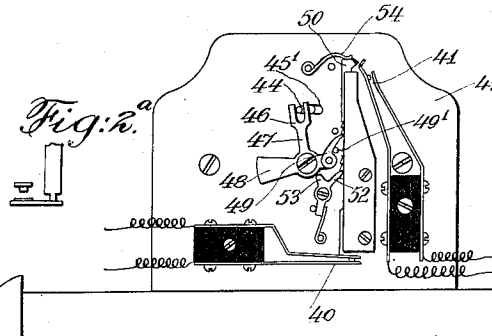


Fig. 2ª

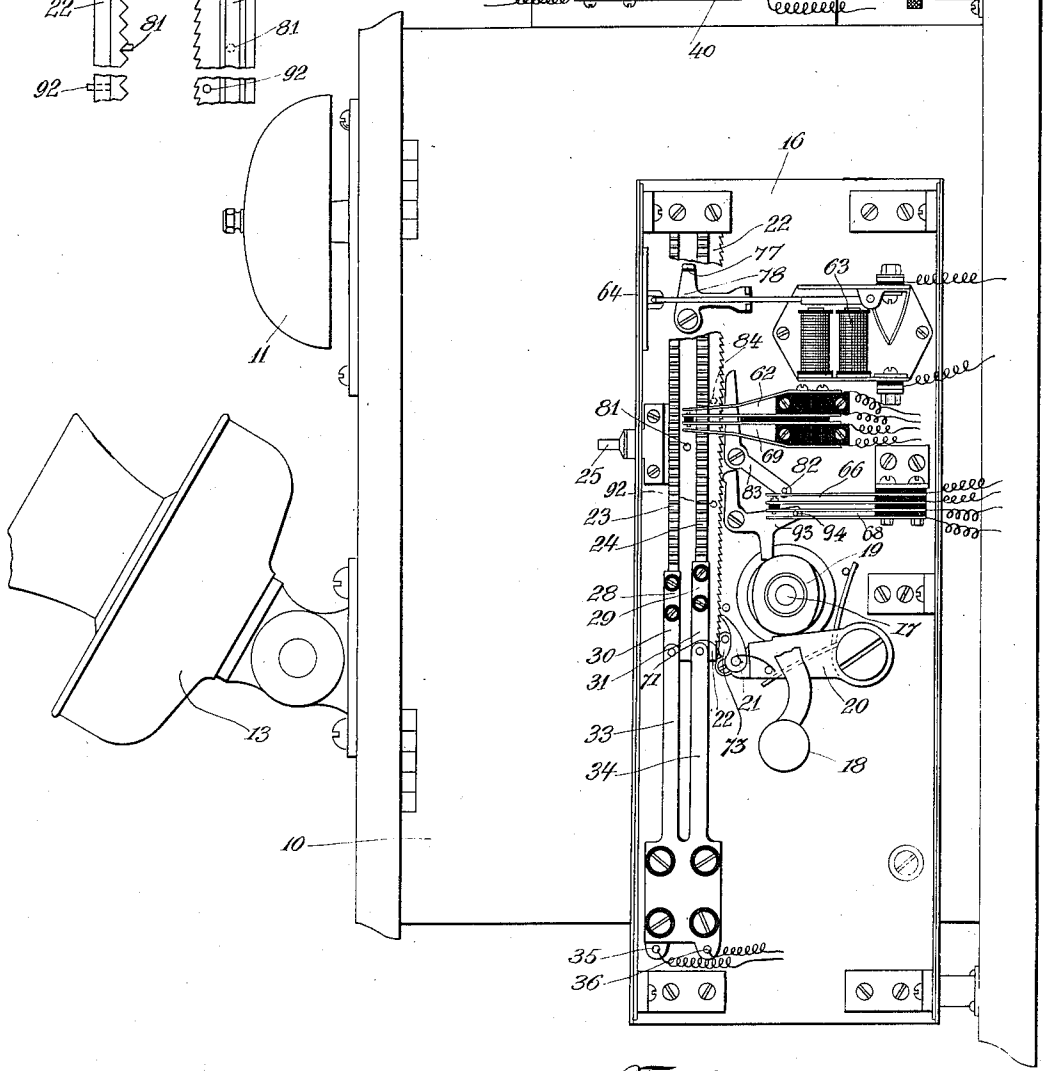


Fig. 2

Witnesses:
C. Barnhell.
J. E. Prager.

Alexis Marchand Inventor
By his Attorney Fred'k P. Schuetz.

A. MARCHAND.

PARTY LINE TELEPHONE SYSTEM.

APPLICATION FILED MAR. 3, 1909.

1,013,412.

Patented Jan. 2, 1912.

4 SHEETS—SHEET 3

Fig. 5

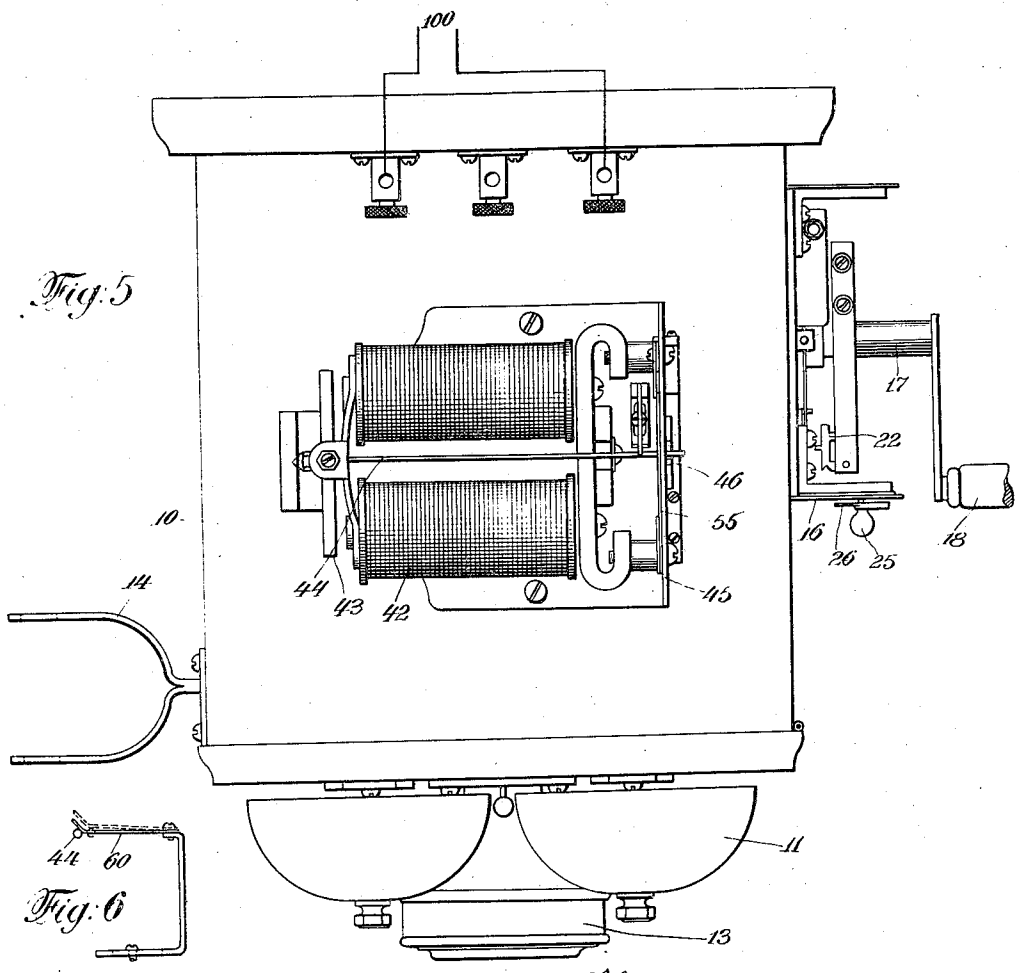


Fig. 6

Fig. 7

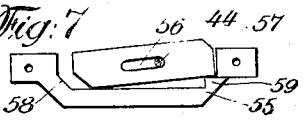


Fig. 8

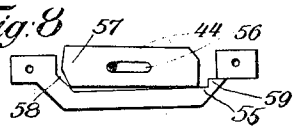


Fig. 9

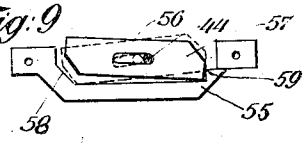
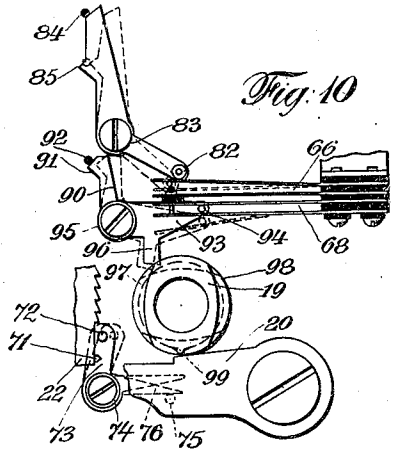


Fig. 10



Witnesses:

O. Barshell.

J. E. Prager.

Aleris Marchand Inventor

By his Attorney Fred'k P. Schueler.

A. MARCHAND.

PARTY LINE TELEPHONE SYSTEM.

APPLICATION FILED MAR. 3, 1909.

1,013,412.

Patented Jan. 2, 1912.

4 SHEETS-SHEET 4

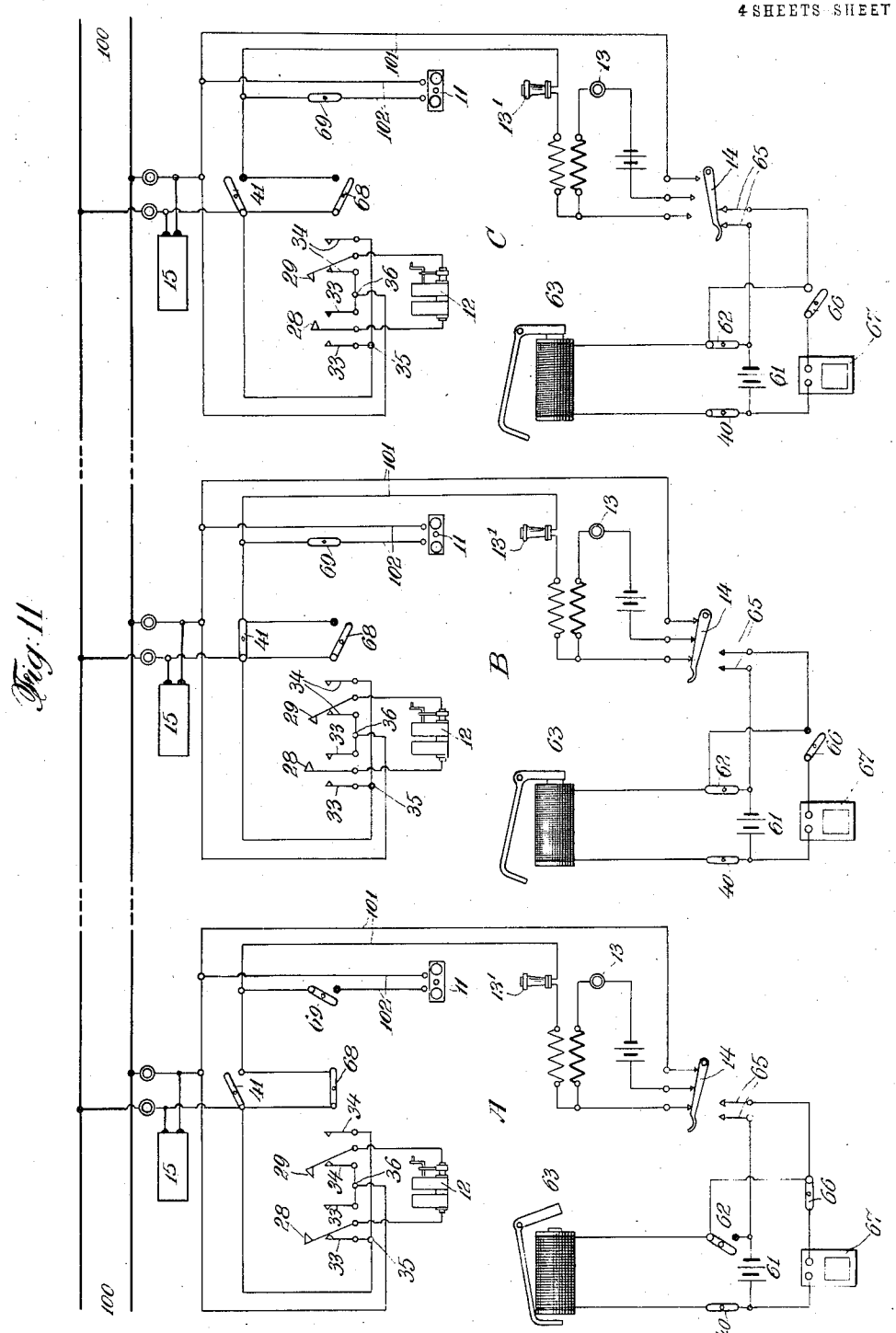


Fig. 11.

Witnesses:
D. Barnell
J. E. Prager

Alexis Marchand
by his Atty's
Fredk P. Schuetz

UNITED STATES PATENT OFFICE.

ALEXIS MARCHAND, OF BRIDGEPORT, WASHINGTON.

PARTY-LINE TELEPHONE SYSTEM.

1,013,412. Specification of Letters Patent. Patented Jan. 2, 1912.

Application filed March 3, 1909. Serial No. 481,086.

To all whom it may concern:

Be it known that I, ALEXIS MARCHAND, a citizen of the United States, and a resident of Bridgeport, in the county of Douglas and State of Washington, have invented certain new and useful Improvements in Party-Line Telephone Systems, of which the following is a specification.

My invention relates to systems, for electrically transmitting intelligence, such as telegraph and telephone systems; and more particularly to the so-called party-line systems in which a plurality of stations are intercommunicating with or without connection to a central station.

It has for its object to enable any desired station to be automatically selected from, and be connected to any other station of the system; and, at the same time, to automatically give suitable indications that the line is in use, or "busy", and to effectively lock out said remaining stations so that the communicating parties cannot be disturbed, nor the communications received by any of the other stations.

It has for its further object to automatically restore the various stations upon the conclusion of the connection, and to provide a suitable alarm in case such restoration is forgotten.

The various mechanism, and the connections to accomplish these objects are set forth in the following specification and shown in the accompanying drawings, in which—

Figure 1 is a front elevation of a telephone box with the apparatus attached, portions of the various boxes being removed to permit a view of the mechanism. Fig. 2 is a side elevation of a telephone box with the covers removed from the attached apparatus. Fig. 2ª is a fragmentary end view of a switch. Fig. 3 is a partial side view and Fig. 4 a partial rear view of a movable rack. Fig. 5 is a plan view of the telephone box and attached apparatus, with the covers removed. Fig. 6 is a detail view of a spring. Figs. 7 to 9 are detail views of a stroke limiting device. Fig. 10 is a detail view of a system of operating levers and switches. Fig. 11 is a diagrammatic view illustrating the various electrical connections, and a number of stations under operating conditions.

Similar characters of reference designate corresponding parts throughout the several views.

Referring now to the drawings, 10 designates a telephone box located at each station, and is provided with a pulsating magneto bell 11, magneto 12, transmitter 13, receiver 13′ and receiver hook 14. To the top of box 10 is attached a box 15 containing the selecting mechanism hereinafter described, while to the side of box 10 is attached a box 16 containing the calling, annunciating, locking and restoring mechanisms. The crank shaft 17 of handle 18 of the magneto 12 extends through this box 16 and is provided with a cam 19 engaging a pivoted, spring pressed arm 20 carrying a spring pressed pawl 21. Pawl 21 engages and is adapted to raise a rack 22, vertically movable in said box, and provided on its face with two sets of V-shaped teeth 23 and 24. The rack may be moved manually, when not locked, by means of a finger piece 25 extending through the box 16, and carries a pointer 26 moving over a scale 27 on the side of said box. Upon the scale are marked the numbers of the various stations of the system, and to which the pointer must be set in calling any desired station, as will hereinafter be set forth. Two pointed blocks 28 and 29 are adapted to coöperate respectively with the said teeth 23 and 24, the block 29 being at a distance of one-half a tooth above the block 28, corresponding to one step of the rack 22, so that when block 28 is in a notch, block 29 is resting upon a crown, and vice versa. The blocks 28 and 29 are carried respectively by vertical conducting strips 30 and 31 connected to the terminals of magneto 12. Suitable contact points are carried by the strips 30, 31 and are arranged to engage either of the pairs of conducting strips 33 and 34. As the handle 18 is turned, the spring pressed arm 20 rocks through the action of cam 19 and the pawl 21 will raise the rack 22 and thereby cause the blocks 28 and 29 to alternately rest in a notch or upon a crown of the two sets of teeth 23 and 24, and thus alternately make contact with the strips 33 and 34, acting as a pole changing device to deliver electrical impulses of alternate polarity at the terminals 35 and 36, corresponding to the number of teeth, of the rack 22, advanced. Near the bottom of the rack 22, at 37, the teeth of set 24 are cut away entirely. At 38 of its

set 23, there is a filled portion to a height of one-half a tooth. The two succeeding and final teeth are also filled to the same height as well as the remaining portion 39 of the rack 22. The position 38 corresponds to the stopped position of the rack 22 as will hereinafter be set forth. In turning the handle 18, the said rack is not advanced in this position and the strips 33 and 34 will deliver a pulsating current of constant and the same polarity as the last impulse delivered to the selecting device; and this pulsating current of constant polarity is used to call by ringing the magneto bell 11. The two succeeding teeth of set 23 will cause two pulsations of the same polarity to be transmitted, as the filled portion will not permit block 28 to reverse the polarity; and the further position at 39, at which the surface, though flat, is raised, throws the contact point of strip 30 free, and is the normal position so that the current is broken and the magneto 12 can send no current into the line 100. The pulsations of alternate polarity and the two successive ones of the same polarity are received by the selecting mechanism in the box 15 which is bridged across the line 100 at all of the stations, so that each selecting device will respond when the pulsations are generated by any station. These selecting mechanisms are arranged to control two switches 40 and 41, normally open. The former is closed immediately upon the selecting mechanism receiving an impulse, to close a local circuit containing an indicating device and lock out mechanism. The switch 41 is normally open; and is closed, only in the desired station, upon the corresponding selecting mechanism receiving a predetermined number of alternate impulses, although the corresponding switches of the other selecting mechanisms may have been momentarily closed during the selection.

The selecting mechanism consists of an electro-magnet 42 bridged across the line 100 and provided with a pivoted, magnetized armature 43, which will be attracted to the opposite poles of the electro-magnet according to the polarity of the current received, and thereby rock the said armature. A rod 44 is fixedly attached to the armature 43 and passes through a stroke limiting device, hereinafter described, and attached to the magnet side of frame plate 45. This rod passes through a slot 45′ in the said frame plate 45 and is vibrated by the rocking of armature 43. Its outer end engages a fork 46 of arm 47 of a lever 48, pivotally connected to the frame plate 45. This lever carries an advancing pawl 49 engaging the teeth of a vertically movable rack 50, slidably mounted on said frame plate. The lower end of the rack 50 is adapted to drop upon the lower member of switch 40 to normally maintain the said switch open (see Fig. 2ª). As soon as the rack 50 begins to ascend, however, switch 40 closes and remains closed until the rack has returned to normal position. The vibration of rod 44 rocks the lever 48 and causes pawl 49 to raise the rack 50 a distance of one tooth for each two alternate pulsations. The upper end of rack 50 is adapted to engage with one member of the switch 41, closing said switch when a predetermined number of impulses has advanced the rack 50 to the height for the particular station. In all other stations the rack is likewise raised but may not reach the switch 41, or may move past same and momentarily close the said switch 41 in passing, sufficient teeth, only, being provided on the rack to allow same to advance one step beyond the contact point. A locking pawl 52 is provided to prevent return of the rack 50 until the line is restored. When the two successive impulses of the same polarity are received by the electro-magnet 42, the limiting device about to be described permits the fork 46 to be moved a greater distance to the right than before. This allows the pawl 49 to drop downwardly a greater distance and it is moved outwardly by coming in contact with a pin 49′ and is withdrawn from the teeth. The said pawl also engages the arm 53 of the locking pawl 52. This will move pawl 52 away from the teeth of rack 50 so that the rack is free to drop to its normal position, being assisted by a spring 54 to pass the upper contact switch 41.

The stroke limiting device (Figs. 7 to 9) consists of a frame 55 secured to the magnet side of frame plate 45, and through a slot 56 therein passes the rod 44 vibrated by the armature 43. Within the frame is a reciprocating member 57 one of whose ends is squared and the other beveled, the latter adapted to abut and slide upon a correspondingly beveled portion 58 of the frame and the former a shoulder 59. As the rod 44 is vibrated, the member 57 moves laterally with it, and in one direction rides upon the beveled portion 58 (Fig. 8) of the frame, and in the other strikes the shoulder 59 (Fig. 9) thereby limiting the vibration of the rod 44. A spring 60 engages rod 44 and is adapted to slightly move the member to the left as shown in dotted lines (Fig. 9) so that it will be free of the shoulder 59; and the left hand portion being heavier, then drops about rod 44 to the dotted position shown and points above the shoulder so that if again moved in the same direction by rod 44 (toward the right), as in case the electro-magnet 42 receives a second impulse of the same polarity as the previous one, the member 57 will ride up on the said shoulder to the position shown in Fig. 7, and thus allow the rod 44 a greater amplitude, (moving under spring 60 Fig. 6) limited by move-

ment of the armature 43 and will thereby release the pawls 49 and 52 as explained.

The switch 40 is in a local circuit including a local battery 61, switch 62 and an annunciator 63. The switch 62 is opened only in the calling station in setting the pointer 26 as hereinafter described. Upon the closing of switch 40 the local circuit is closed and the annunciator will indicate by some suitable signal visible through an opening 64 that the line is busy. The switch, as stated, will remain closed, and thereby display the signal (except in calling station when receiver hook 14 is up) until the rack 50 has been returned to its normal position. A shunt circuit is added to the circuit of the annunciator 63, and excludes the switch 62 but includes a switch 65 operated by the receiver hook 14 and normally closed.

A local alarm circuit includes the battery 61, switch 65, a switch 66 normally open and closed only in the calling instrument when setting the pointer in calling, as hereinafter described, and a buzzer 67 or other suitable alarm.

A shunt circuit is added to the selector switch 41 and includes a switch 68 normally open and adapted to be closed at the calling station only, and when setting the pointer 26 in calling, and throws the talking circuit 101 of the calling station into the line 100.

A cut-out switch 69 normally closed is inserted in the bell circuit 102, which is bridged across the line 100 at each station but beyond the switch 41, and is adapted to be opened at the calling station, only when setting the pointer 26, to cut out the bell 11.

The operation of the system is as follows:—The pointer 26 is first set to a number corresponding to the station it is desired to communicate with, by grasping finger piece 25 and moving same downwardly, the instrument in normal condition having the pointer at its extreme upper limit. At the beginning of the downward movement of the rack 22, a projection 71 of said rack encounters a pin 72 of arm 73 of a bell crank, forcing said pin slightly to the right (Fig. 10) provided the arm 20 is in its lowest position under action of the cam 19. If the arm be not in its lowest position the rack cannot be moved and the crank must be turned to place it so. This causes pin 72 to move pawl 21 out of engagement with the teeth of the rack and allows said rack to be set by moving the finger piece 25 downwardly. A spring washer 74 holds the said bell crank in this position until it is returned by turning the handle 18 which moves the cam 19 to the horizontal position shown in dotted lines and causing the arm 20 thereby to rise and through a pin 75 attached to its underside, to engage arm 76 of the bell crank and return same. The pawl 21 then engages the teeth of rack 22, and further turning of the handle 18 causes the said rack to be advanced until it is stopped by a lockout latch 77 operated by the movement of the annunciator 63 through a bell-crank 78. This latch acts as a stop for a shoulder 79 on the under side of the rack 22 (Figs. 3 and 4) limiting its upward movement so long as the magnets of annunciator 63 are energized. The upward movement of rack 22 caused by turning the handle 18 has impressed upon the line 100 a succession of electrical impulses of alternate polarity as explained. This actuates the selecting devices 15 at the various stations, closing the switches 40 and thereby energizing the magnets of the annunciators 63 to display a suitable signal to indicate that the line is in use. At the same time it locks the rack 22 in all of the stations except the calling station (which is not locked until, as explained, a predetermined number of turns has been given the handle 18) through latch 77 entering a notch 80 at the under side of the rack 22 (Figs. 3 and 4). The rack cannot therefore be moved in any station but the calling station, and its upward movement in such station is also stopped, as explained. When the rack 22 at the calling station is thus stopped in its upward movement, further turning of handle does not advance it, but impresses upon the line 100 a pulsating current of constant polarity and of the same polarity as the last impulse impressed. At the time of reaching this point, the predetermined number of impulses to close switch 41 of the desired station B will have been made, and the talking and transmitting circuit 101 as well as the bell circuit 102 of said station will thus have been cut in the line 100. The pulsating current of constant polarity generated at the calling station A (Fig. 11) will cause the bell 11 of station B to ring and call same, the switches 41 of the remaining stations C having been only momentarily closed or not at all, the bells of said stations will not respond, nor will their talking and transmitting circuits 101 be cut in the line 100. Upon lifting the receiver hook 14 at the calling station A, the local annunciating circuit will be broken at switch 65. Switch 62, also, has been opened due to a pin 81 which projects from the upper side of rack 22 and no longer coöperates, upon the downward movement of said rack 22, with said switch to close same. This pin coöperates with said switch 62 and with the switch 69 to close same only when the rack 22 is in normal position. The lifting of the receiver hook 14 at the called station B as well as at the remaining stations C has no effect upon the local annunciating and locking circuit as the switch 62 in these stations has not been opened, and the circuit is closed through said switch and switch

40. The other switch 69 normally closed by the pin 81, is in the bell circuit 102 and opens same at the calling station only, due to the movement of rack 22, so that the calling bell 11 of the calling station A does not ring when ringing the called station B. The normally open switch 66 in the local circuit is closed by the movement of a pin 82 of bell crank 83 actuated by a pin 84 on the underside of rack 22. This engages a nose 85 on said bell crank when the rack 22 has been brought into calling position. The normally open switch 68 shunted across selector switch 41 is adapted to be closed by the movement of pin 82. but not until the handle 18, is turned, so that it is impossible to cut in the talking and transmitting circuit 101 at the calling station A, without impressing an impulse or impulses upon the line 100. This is accomplished by means of a second bell crank 90 provided with a nose 91 adapted to be engaged by a pin 92 on the underside of the rack 22. The inner arm 93 of said bell crank carries a pin 94 which slides between the contact springs of switch 68, and when the bell crank is forced inwardly through the downward movement the pin 92, presses the lower spring of said switch downwardly so that contact will not be made through switch 68 even if the upper pin 82 tends to close same. A spring washer 95 holds said bell-crank in any position it is moved. An arm 96 extends downwardly from the arm 93 into a groove 97 of a wheel 98 driven by the handle 18. This groove contains a projection 99 which, when the cam 20 is in the horizontal position shown in dotted lines engages said arm 96 and returns the bell crank 90 to normal position, permitting the switch 68 to be closed. To restore the various stations to normal condition, the handle 18 must be given several turns, which will raise the rack 22 into its normal position, the rack having been unlocked after calling by the lifting of receiver 13′ which opened the switch 65 and thereby the local circuit controlling the annunciator 63. The upward movement of the rack 22 has caused the block 29 to move over the portion 37 and the block 28 over the filled portion 38 as well as the two final teeth of the rack. In this movement the two succeeding impulses of the same polarity caused by the two final teeth, have operated the various selecting devices as set forth to restore same to normal condition. In the final and normal position of the rack 22, block 29 rests upon the removed portion 37 and block 28 upon the filled portion 39 beyond the two final teeth, and the circuit will thereby be broken through the contact controlled by the block 28. Should the receiver 13′ have been placed upon hook 14 before restoring, alarm would have been given by the buzzer 67 through closing of switch 65, as the switch 66 would still be closed.

If one of the stations be made a central station, the party line herein described may be connected to other direct lines or similar party lines.

I claim:—

1. In a telephone system: a plurality of stations, and the usual connecting circuit across which the said stations are bridged, the talking circuits of said stations being normally disconnected from said connecting circuit; a selecting device bridged across said connecting circuit at each station and continually connected thereto; and a calling device to automatically connect any two of said stations, bridged across said connecting circuit at each station but normally disconnected therefrom.

2. In a telephone system: a plurality of stations, and the usual connecting circuit across which the said stations are bridged, the talking circuits of said stations being normally disconnected from said connecting circuit; a selecting device bridged across said connecting circuit at each station and continually connected thereto; a calling device to automatically connect any two of said stations, bridged across said connecting circuit at each station but normally disconnected therefrom; and means to automatically lock out the remaining stations.

3. In a telephone system: a plurality of stations, and the usual connecting circuit across which the said stations are bridged, the talking circuits of said stations being normally disconnected from said connecting circuit; a selecting device bridged across said connecting circuit at each station and continually connected thereto; a calling device to automatically connect any two of said stations, bridged across said connecting circuit at each station but normally disconnected therefrom; means to automatically lock out the remaining stations; and means to automatically indicate at each station the condition of said station.

4. In a telephone system: a plurality of stations, and the usual connecting circuit across which the said stations are bridged, the talking circuits of said stations being normally disconnected from said connecting circuit; a selecting device bridged across said connecting circuit at each station and continually connected thereto; a calling device to automatically connect any two of said sections, bridged across said connecting circuit at each station but normally disconnected therefrom; and means to automatically restore all of the stations to normal condition.

5. In a telephone system: a plurality of stations, and the usual connecting circuit across which the said stations are bridged, the talking circuits of said stations being

normally disconnected from said connecting circuit; a selecting device bridged across said connecting circuit at each station and continually connected thereto; a calling device to automatically connect any two of said stations, bridged across said connecting circuit at each station but normally disconnected therefrom; means to automatically lock out the remaining stations; and means to automatically restore all of the stations to normal condition.

6. In a telephone system: a plurality of stations, and the usual connecting circuit across which the said stations are bridged, the talking circuits of said stations being normally disconnected from said connecting circuit; a selecting device bridged across said connecting circuit at each station and continually connected thereto; a calling device to automatically connect any two of said stations, bridged across said connecting circuit at each station but normally disconnected therefrom; means to automatically lock out the remaining stations; means to automatically indicate at each station the conditions of said station; and means to automatically restore all of the stations to normal condition.

7. In a telephone system: a plurality of stations, and the usual connecting circuit across which the said stations are bridged, the talking circuits of said stations being normally disconnected from said connecting circuit; a selecting device bridged across said connecting circuit at each station and continually connected thereto; a calling device to automatically connect any two of said stations, bridged across said connecting circuit at each station but normally disconnected therefrom; means to automatically lock out the remaining stations; means to automatically indicate at each station the condition of said station; and means to automatically restore from the calling station all of the stations to normal condition.

8. In a telephone system: a plurality of stations, and the usual connecting circuit across which the said stations are bridged, the talking circuits of said stations being normally disconnected from said connecting circuit; a selecting device bridged across said connecting circuit at each station and continually connected thereto; a calling device to automatically connect any two of said stations, bridged across said connecting circuit at each station but normally disconnected therefrom; means to automatically restore all the stations to normal condition; and means to automatically give an alarm in case the calling receiver is hung up while the stations are not restored upon concluding the connection.

9. In a telephone system: a plurality of stations, and the usual connecting circuit across which the said stations are bridged, the talking circuits of said stations being normally disconnected from said connecting circuit; a selecting device bridged across said connecting circuit at each station and continually connected thereto; a calling device to automatically connect any two of said stations, bridged across said connecting circuit at each station but normally disconnected therefrom; means to automatically lock out the remaining stations while the two stations are connected; means to automatically indicate at each station the condition of said station; means to automatically restore all of the stations to normal condition; and means to automatically give an alarm in case the calling receiver is hung up while the stations are not restored upon concluding the connection.

10. In a telephone system: a plurality of stations, and a connecting circuit across which the said stations are bridged, the talking circuits of said stations being normally disconnected from said connecting circuit; means at each station and normally disconnected from the connecting circuit to impress upon the said connecting circuit electrical impulses of alternate polarity; and a selecting device bridged across said circuit at each station, continually connected thereto and responsive to the said electrical impulses of alternate polarity.

11. In an electrical system: a plurality of stations, and a connecting circuit across which said stations are bridged; means to impress upon said connecting circuit a succession of electrical impulses of alternate polarity, a pulsating current of constant and the same polarity as that of the last impulse of said succession of impulses, and two successive impulses of same polarity but of opposite polarity to the last of said succession of impulses; and a selecting device bridged across the connecting circuit at each station and responsive to the succession of impulses of alternate polarity, and the two said impulses of same polarity, but not to the pulsating current of constant polarity.

12. In an electrical system: a plurality of stations, and a connecting circuit across which said stations are bridged; means at each station to impress upon the said connecting circuit a succession of electrical impulses of alternate polarity, a pulsating current of constant and the same polarity as that of the last impulse of said succession of impulses, and two successive impulses of same polarity but of opposite polarity to the last of said succession of impulses; and a selecting device bridged across the circuit at each station and responsive to the impulses of alternate polarity; a contact device advanced in a step by step movement by said selecting device, and not advanced when the selecting device receives the pulsating current of constant polarity, and returned to

normal position when the selecting device receives the two successive impulses of the same polarity.

13. In an electrical system: a plurality of stations, and a connecting circuit across which said stations are bridged; means at each station to impress upon the said connecting circuit a predetermined number of electrical impulses of alternate polarity and two successive impulses of the same polarity; a selecting device bridged across the connecting circuit at each station; a contact device operated by said selecting device; two switches controlled by said contact device one to be closed upon the selecting device receiving one or more impulses, and the other upon the selecting device receiving a predetermined number of the electrical impulses of alternate polarity.

14. In an electrical system: a plurality of stations, and a connecting circuit across which said stations are bridged; means at each station to impress upon the said connecting circuit a predetermined number of electrical impulses of alternate polarity and two successive impulses of the same polarity; a selecting device bridged across the connecting circuit at each station; a contact device operated by said selecting device; two switches controlled by said contact device— one to be closed upon the selecting device receiving one or more impulses, and the other upon the selecting device receiving a predetermined number of electrical impulses of alternate polarity; and means to return said contact device to normal position upon the selecting device receiving the two successive impulses of the same polarity.

15. The combination with a party line telephone system comprising a plurality of stations whose talking and transmitting circuit is normally cut out, and a calling device and selecting device at each station, of means to actuate the selecting devices from any of said stations, a switch at each station controlled by the corresponding selecting device and normally cutting out said talking and transmitting circuit and adapted to be automatically closed from any of the calling devices, and a second normally open switch at each station controlled by the corresponding selecting device, a local circuit controlled by said latter switch, an annunciating device included in said local circuit, and mechanism to lock the calling device and controlled by said annunciating device.

16. The combination with a party line telephone system comprising a plurality of stations whose talking and transmitting circuit is normally cut out, of a selecting device, and a calling device at each station to actuate the said selecting devices, a switch at each station controlled by the corresponding selecting device and normally cutting out said talking and transmitting circuit and adapted to be automatically closed from any of said calling devices, a second, normally open switch at each station controlled by the corresponding selecting device, a local circuit controlled by said latter switch, an annunciating device included in said local circuit, lockout mechanism controlled by said annunciating device, and a normally closed switch in said local circuit operated by the calling device of the corresponding station.

17. The combination with a party line telephone system comprising a plurality of stations whose talking and transmitting circuit is normally cut out, of a selecting device, and a calling device at each station to actuate the said selecting device, a switch at each station controlled by the corresponding selecting device and normally cutting out said talking and transmitting circuit and adapted to be automatically closed from any of said calling devices, a second, normally open switch at each station controlled by the corresponding selecting device, a local circuit controlled by said latter switch, an annunciating device included in said local circuit, lockout mechanism controlled by said annunciating device, a normally closed switch in said local circuit operated by the calling device of the corresponding station, a shunt across the local circuit excluding said normally closed switch, and a normally closed switch included in said shunt and controlled by the telephone receiver hook.

18. The combination with a party line telephone system comprising a plurality of stations whose talking and transmitting circuit is normally cut out, of a selecting device, and a calling device at each station to actuate the said selecting devices, a switch at each station controlled by the corresponding selecting device and normally cutting out said talking and transmitting circuit and adapted to be automatically closed from any of said calling devices, a second, normally open switch at each station controlled by the corresponding selecting device, a local circuit controlled by said latter switch, an annunciating device included in said local circuit, lockout mechanism controlled by said annunciating device, a normally closed switch operated by the calling device of the corresponding station, a shunt across the local circuit excluding said normally closed switch, a normally closed switch included in said shunt and controlled by the telephone receiver hook, and a second local circuit, an alarm device included in said second local circuit, a normally open switch controlled by the calling device, and a normally closed switch controlled by the telephone receiver hook, both in said second local circuit.

19. The combination with a party line telephone system comprising a plurality of stations whose talking and transmitting cir-

cuit is normally cut out, of a selecting device at each station, and a calling device at each station to actuate the said selecting devices, a switch at each station controlled by the corresponding selecting device and normally cutting out said talking and transmitting circuit and adapted to be automatically closed from any of said calling devices, a shunt across said switch, a normally open switch included in said shunt and operated by the said calling device, a second, normally open switch at each station controlled by the corresponding selecting device, a local circuit controlled by said latter switch, an annunciating device included in said local circuit, lockout mechanism controlled by said annunciating device, a normally closed switch operated by the calling device of the corresponding station, and a shunt across the local circuit excluding said normally closed switch, a normally closed switch included in said shunt and controlled by the telephone receiver hook, a second local circuit, an alarm device included in said second local circuit, a switch normally open and controlled by the calling device, and a normally closed switch controlled by the telephone receiver hook.

20. The combination with a party line telephone system comprising a plurality of stations whose talking and transmitting circuit is normally cut out, of a selecting device at each station, and a calling device at each station to actuate said selecting devices, a switch at each station controlled by the corresponding selecting device and normally cutting out said talking and transmitting circuit and adapted to be automatically closed from any of said calling devices, a shunt across said switch, a normally open switch included in said shunt and operated by the said calling device, a calling bell bridged across said talking and transmitting circuit, a normally closed switch controlling said calling bell and operated by said calling device, a second, normally open switch at each station controlled by the corresponding selecting device, a local circuit controlled by said latter switch, an annunciating device included in said local circuit, lockout mechanism controlled by said annunciating device, a normally closed switch operated by the calling device of the corresponding station, a shunt across the local circuit excluding said normally closed switch, a normally closed switch included in said shunt and controlled by the telephone receiver hook; and a second local circuit, and an alarm device, a normally open switch controlled by the calling device, and the said normally closed switch controlled by the telephone receiver hook, included in said second local circuit.

21. In a system of the character set forth, a selecting device comprising an electro-magnet; a pivoted armature; a rod carried by said armature and adapted to be vibrated upon the electro-magnet receiving electrical impulses of alternate polarity; an arm adapted to be rocked by said rod; a movable rack; a pawl actuated by said rocking arm to advance said rack; a locking pawl to prevent return of said rack; and means to limit the amplitude of vibration of said rod upon the said electro-magnet receiving two successive impulses of the same polarity.

22. In a system of the character set forth, a selecting device comprising: an electro-magnet; a pivoted armature; a rod carried by said armature adapted to be vibrated upon the electro-magnet receiving electrical impulses of alternate polarity; an arm adapted to be rocked by said rod; a vertically movable rack; a pawl actuated by said rocking arm to advance said rack; a locking pawl to prevent return of said rack; means to limit the amplitude of vibration of said rod, and comprising a frame; a reciprocating member held therein, having one end squared and the other beveled and provided with a slot through which the said rod passes; a bevel stop of said frame and a squared shoulder with which the said beveled and square ends of the said reciprocating member are respectively adapted to cooperate; and a spring adapted to exert pressure against the said rod.

23. In a system of the character set forth, a calling device comprising: a movable rack; means to manually set same; means to automatically lock said rack in normal position; means to advance same in a step by step movement to calling position; and means to automatically lock same in calling position.

24. In a system of the character set forth, a calling device comprising: a movable rack; means to manually set same; means to automatically lock said rack in normal position; a pawl to advance said rack to calling position in a step by step movement; means to release said pawl to permit said rack to be manually set; and means to automatically lock said rack in calling position.

25. In a system of the character set forth, a calling device comprising: a movable rack; means to manually set same; means to advance same in a step by step movement to calling position; means to automatically lock same in calling position; and a normally closed switch in circuit with said locking means and means to open said switch to unlock said rack.

26. In a system of the character set forth, calling means to produce a succession of electrical impulses of alternate polarity comprising: a movable rack; means to advance said rack in a step by step movement; two rows of teeth on said rack; and contact means coöperating with the said rows

of teeth to alternately close an electric circuit.

27. In a system of the character set forth, calling means to produce a succession of electrical impulses of alternate polarity comprising: a movable rack; means to advance said rack in a step by step movement; two rows of teeth on said rack; two blocks mounted respectively upon two flexible conducting strips and coöperating with said rows of teeth, the one block a distance of one-half a tooth in advance of the other; two conducting strips at opposite sides of each of said flexible conducting strips; and contact points carried by said flexible conducting strips adapted to alternately make contact with the respective conducting strips located at opposite sides of same.

28. In a system of the character set forth, means to produce a succession of electrical impulses of alternate polarity, a pulsating current of constant polarity and two successive pulsations of the same polarity, but of opposite polarity to the last of said succession of impulses, comprising: a movable rack; means to advance said rack in a step by step movement; two rows of teeth on said rack a portion of one set being removed, and at the corresponding position of the other a portion filled to approximately one-half the depth of a tooth and including two successive teeth and then a portion free of teeth; two blocks mounted upon flexible conducting strips, one a distance of one-half a tooth in advance of the other, said blocks coöperating with said rows of teeth; two conducting strips at opposite sides of each of said flexible conducting strips; and contact points carried by said flexible conducting strips adapted to make contact with the respective conducting strips located at opposite sides of same.

Signed at New York in the county of New York and State of New York this 1st day of March A. D. 1909.

ALEXIS MARCHAND.

Witnesses:
LAURA E. SMITH,
FREDK. F. SCHUETZ.