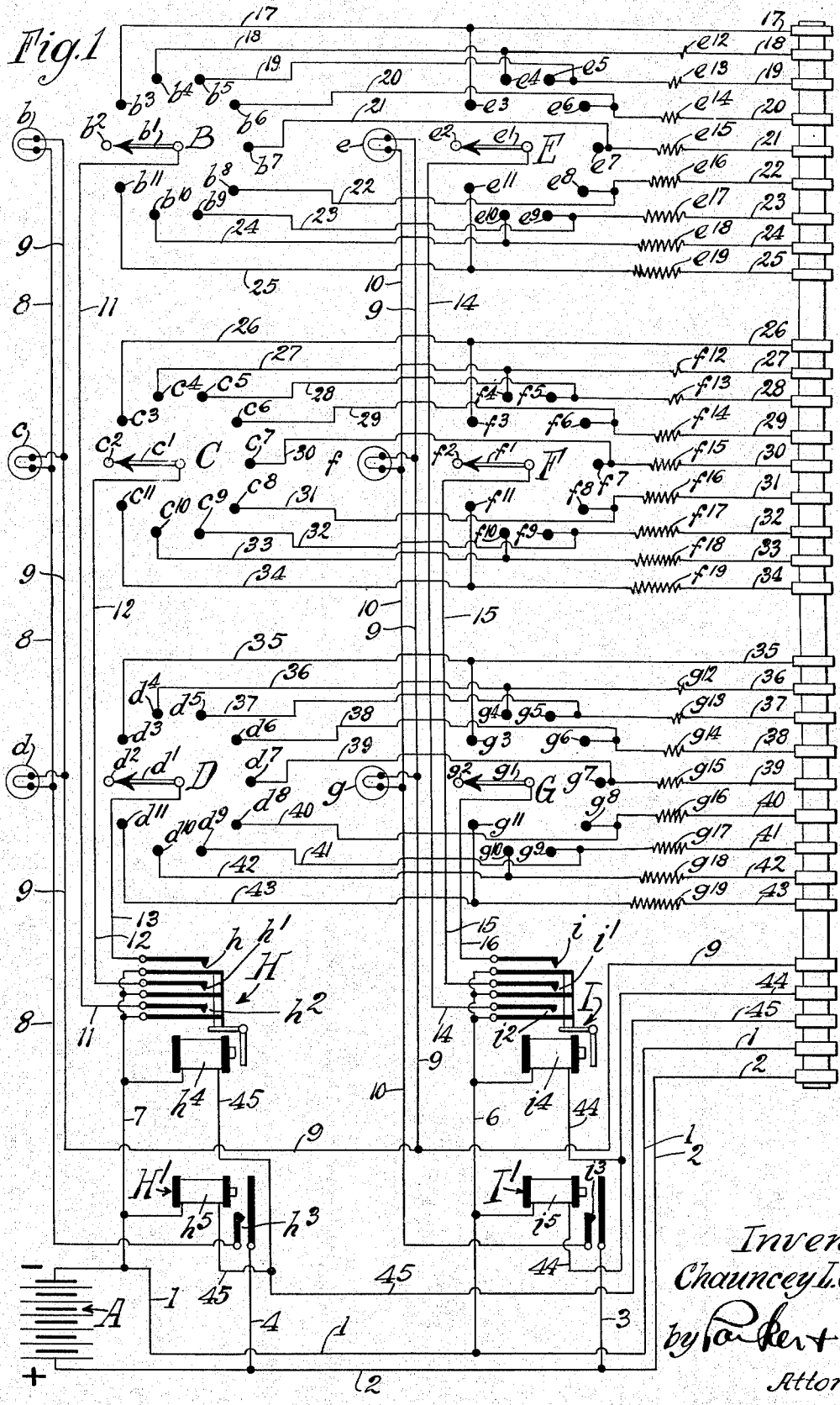
Nov. 15, 1938. C. L. CALKINS 2,136,672

ELECTRICAL TRANSMITTING MECHANISM AND CIRCUIT

Filed March 16, 1934 3 Sheets-Sheet 1

Fig. 1



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ELECTRICAL TRANSMITTING MECHANISM AND CIRCUIT

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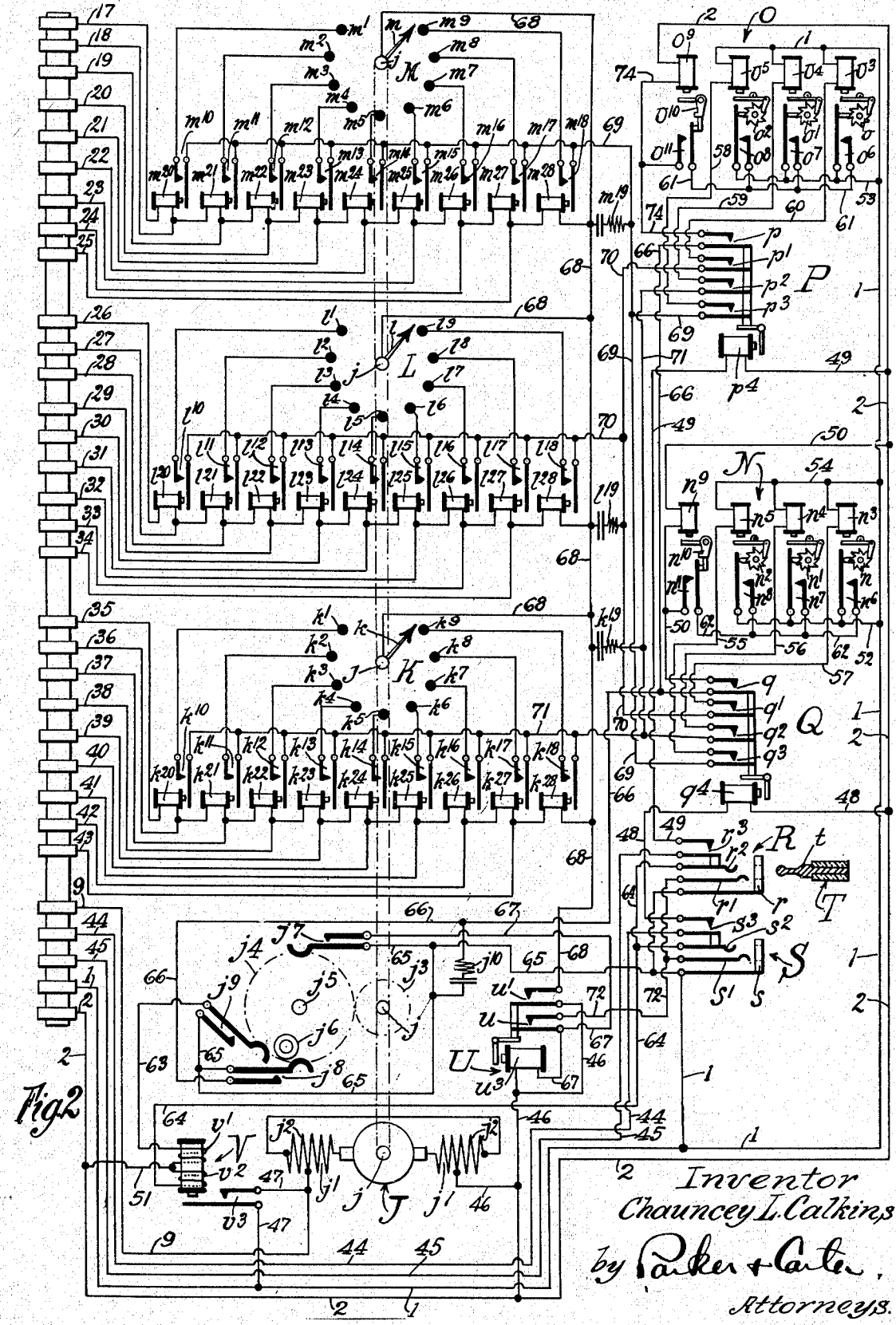


Fig2

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ELECTRICAL TRANSMITTING MECHANISM AND CIRCUIT

Filed March 16, 1934 3 Sheets-Sheet 3

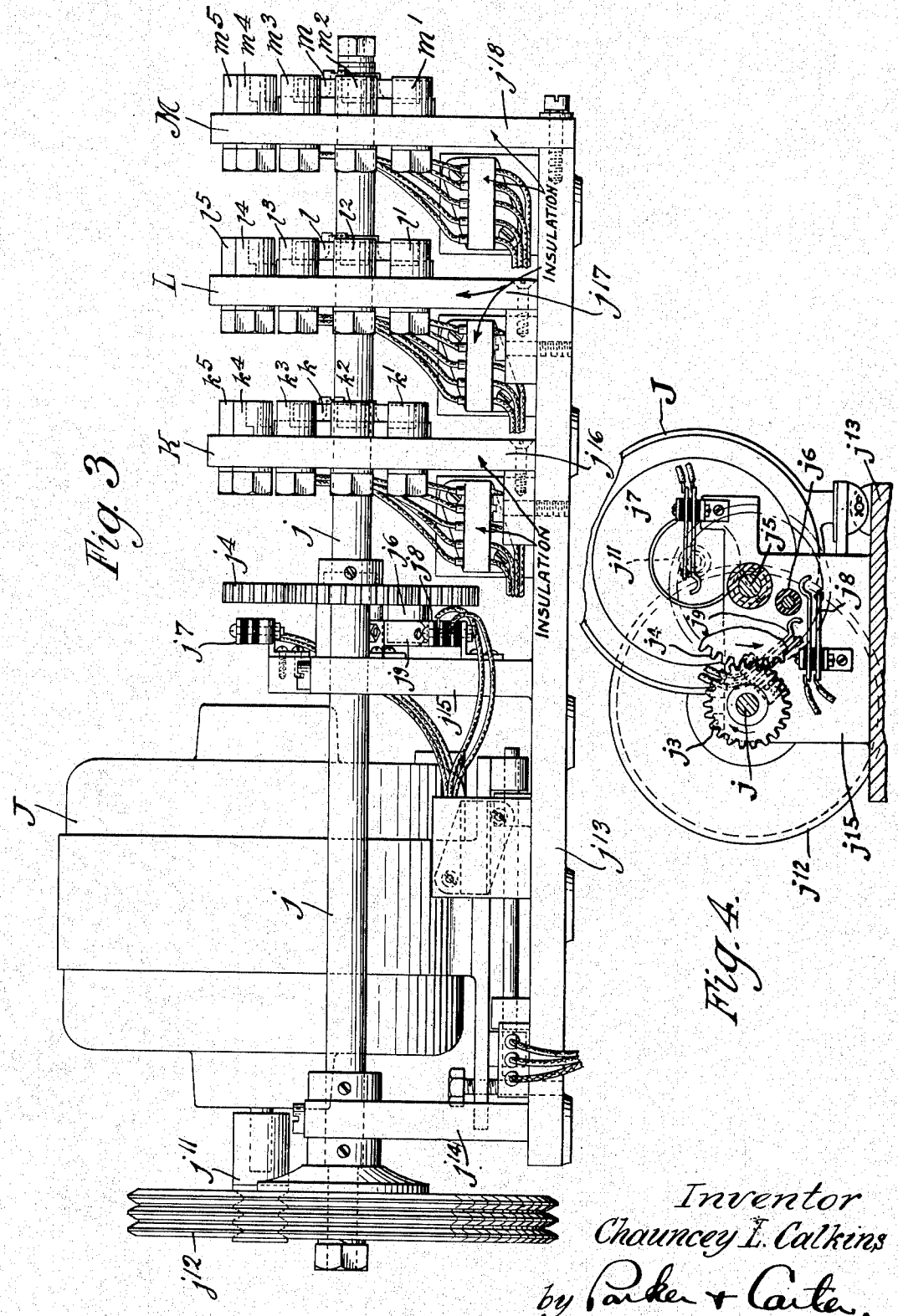


Fig. 3

Fig. 4.

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UNITED STATES PATENT OFFICE

2,136,672

ELECTRICAL TRANSMITTING MECHANISM AND CIRCUIT

Chauncey L. Calkins, Chicago, Ill., assignor to Lothar A. Ederer, Chicago, Ill.

Application March 16, 1934, Serial No. 715,908

6 Claims. (Cl. 177—353)

My invention relates to improvements in electrical message transmitting systems and particularly to automatic transmission of short messages and of more than one message simultaneously in a simple manner and by unskilled operators.

One object of my invention is to provide an electrical message transmitting system capable of sending a plurality of simple messages simultaneously. Another object of my invention is to provide an electric transmission system which will transmit a message comprised of a small number of code symbols or numbers quickly and accurately and in such a manner that the transmission of all characters and numbers takes place simultaneously. Other objects of my invention will appear from time to time in the specification and claims.

For the purpose of illustrating the system which I have invented, I have shown a complete wiring diagram and schematic drawing of such a system showing wiring and apparatus in diagrammatic manner capable of setting up two distinct groups, each capable of using any digit from one to ten, inclusive, in any of three positions. It will be seen from my description that the apparatus may be arranged in a variety of ways and that changes may be made in the electric circuit which will accomplish the same result as the particular showing in the drawings, and it is to be understood that my showing is therefore to be considered in a sense diagrammatic and that there are a variety of possible equivalent forms which do not depart from the spirit of the invention.

Figure 1 shows a wiring diagram and schematic layout of the message set-up apparatus;

Figure 2 shows a wiring diagram and schematic layout of the automatic electric message transmitter and its operating mechanism, together with the receiving apparatus for such messages;

Figure 3 is a side view of the mechanism of the multiple impulse generator; and

Figure 4 is a view partly in section of the impulse generator drive and the special transfer switch mechanism.

The apparatus of Figure 1, the wiring of which terminates in a single terminal strip, is connected by a cable to the apparatus of Figure 2, which also terminates in a single terminal strip. Although these drawings show but a single transmitter and receiver, it is obvious that a plurality of such systems may be used which may be operated in turn by the same electrical message sender. My showing is therefore not limited to a single unit of such apparatus.

For convenience and clarity of description, the following system of designation has been adopted. Capital letters designate sub-assemblies in each main unit, small letters of like character designate the parts of each sub-assembly, and numerals designate the wiring. Like characters indicate like parts throughout the specification and drawings.

Referring now to Figure 1, A is a battery or other source of electrical power capable of operating the entire circuit. B, C, and D are a group of three message set-up switches comprising one bank. E, F, and G are another group of three message set-up switches comprising a second bank. H and I are control relays operating the banks B, C, D and E, F, G, respectively. H^1 and I^1 are signal relays connected with each bank of switches. Relay I comprises three pairs of switch leaves i, i^1, and i^2. Relay H operates three pairs of switch leaves h, h^1, and h^2. The relay H^1 has a single pair of switch leaves h^3 and relay I^1 has also a single pair of switch leaves i^3. h^4 is the winding of relay H and h^5 the winding of the relay H^1. i^4 is the winding of the relay I and i^5 is the winding of the relay I^1. b, c, and d are signal lamps associated with their respective switches. e, f, and g are also lamps associated with their respective switches. Switch B comprises a wiper arm b^1 and the series of contact points b^2, b^3, b^4, b^5, etc., to b^{11}, which are connected and in parallel with the switch points e^2, e^3, e^4, etc., to and including e^{11}. Switch E is also provided with a switch arm e^1. In series with the switch points b^4 and e^4 is a resistance e^{12}. In series with the switch points b^5 and e^5 is a resistance e^{13}. In like manner the other pairs of switch points are provided with a resistance in series numbered consecutively up to and including e^{19}. The switches C and F, and also D and G, are connected together and are numbered and lettered in a manner exactly similar to the switches B and E. The connections are not here described since they duplicate exactly the connections already described for B and E.

Electric lead or wire 1 is a main negative lead. Wire 2 is a main positive lead. These leads terminate in suitable terminal pieces on a common terminal strip. Leading from the positive wire 2 to the switch leaf i^3 is the wire 3, and also leading from wire 2 to switch leaf h^3 is the wire 4. Leading to one side of the windings i^4 and i^5, and also to one side of the switch pairs i, i^1, i^2 is the negative wire 6. Similarly leading from negative wire

1 to the windings h^4, h^5 and to one side of the switch leaves h, h^1, h^2 is the wire 7. The wire 8 leads from one side of the switch leaf h^3 to one side of the signal lamps b, c, and d. The wire 9 leads to the other side of these lamps and also from one side of the lamps e, f, and g to a block on the terminal strip. Leading to the other side of this second group of lamps is the wire 10 which is connected to one side of the switch pair i^3. The wire 11 leads from the switch arm b^1 to the switch pair h^2. The wire 12 leads from the switch arm c^1 to the switch pair h^1. Wire 13 leads from the switch arm d^1 to the switch pair h. Wire 14 leads from the switch arm e^1 to the switch pair i^2. Wire 15 leads from the switch arm f^1 to the switch pair i^1. Wire 16 leads from switch arm g^1 to the switch pair i. Wire 17 is common to the switch points b^3 and e^3 and leads to a block on the terminal strip. Wire 18 is common to the switch points b^4, e^4 and likewise leads to a block on the terminal strip but has included in series the resistance e^{12}, as described. Similarly, wires 19 to 25 connect pairs of switch points and a resistance in series with appropriate terminal blocks in this group B, E of switches. Wire 26 connects switch points c^3 and f^3 of switch group C, F and wire 27 connects point c^4 and point f^4 with resistance f^{12} in series. In like manner wires 28 to 34 connect other pairs of points in this switch group and these wires are lead to terminal blocks. Wire 35 connects point d^3 and point g^3 of switch group D, G and similarly wire 36 connects points d^4 and g^4 with the resistances g^{12} in series. In like manner wires 37 to 43 connect other pairs of points in this switch group and these wires are brought to appropriate blocks upon the terminal strip. Wire 44 leads from the far side of the windings i^4, i^5 to a block upon the terminal strip. Wire 45 leads from the far side of the windings h^4, h^5 to another block upon the terminal strip.

Referring now to Figure 2, J is an electric motor driving three electric impulse generators K, L and M, the motor shaft j being common to the aforementioned impulse generators. The motor J is compound wound having the series field j^1, j^1 and the shunt field j^2, j^2. Mounted upon the shaft j is a special switch operating cam j^4 journaled upon the shaft j^5 and driven by the gear j^3 at half motor speed. This special switch operating cam has the cam striker j^6 which acts against three sets of switch leaves j^7, j^8 and j^9. j^{10} is a condenser resistance used as a spark suppressor.

The impulse generator K comprises wiper arm k and a series of wiper switch points k^1, k^2, k^3, etc. These wires are connected respectively to switch leaves k^{10}, k^{11}, k^{12}, etc. The impulse generator L comprises the wiper arm l and contacts l^1, l^2, l^3 etc., to and including l^9. These wires are connected, respectively, to switch leaves l^{10}, l^{11}, l^{12} etc., to and including l^{18}.

The impulse generator M comprises the wiper m, wiper switch points m^1, m^2, m^3, etc., connected to the switch leaves m^{10}, m^{11}, m^{12}, etc., k^{19}, l^{19} and m^{19} are condenser resistance spark suppressors. k^{20}, k^{21}, k^{22}, etc., to and including k^{28}, are relay coils operating the switch leaves k^{10}, k^{11}, k^{12}, etc. l^{20}, l^{21}, l^{22} etc. are relays operating the switch leaves l^{10}, l^{11}, l^{12} etc. Likewise m^{20}, m^{21}, m^{22} etc., are relays operating the leaves m^{10}, m^{11}, m^{12}, etc.

N and O are indicator banks actuated by the switch point groups E, F, G and B, C, D, respectively. P is a multiple relay having the switch pairs p, p^1, p^2 and p^3, the coil winding p^4. Q is a multiple relay having the switch pairs q, q^1, q^2, and q^3 and the coil winding q^4. R is a jack switch having contacts r, r^1, r^2 and insulated from r^2 the switch pair r^3. S is a jack switch having the contacts s, s^1, s^2 and insulated from s^2 the switch pair s^3. These jacks may be actuated by means of the loose plug T having the metallic conductive note t. U is an operating relay having the switch pairs u, u^1, and the coil winding u^3.

The annunciator unit N contains three step-up mechanisms designated as n, n^1 and n^2 which may be of any conventional form and may carry drums or dials upon which the characters are displayed. The step-up mechanisms are actuated by the solenoids n^3, n^4 and n^5. There are switch pairs n^6, n^7 and n^8 which are also actuated by the step-up mechanism. These step-up systems have a release or clearing mechanism comprising the solenoid or reset magnet n^9, its trip mechanism for the step-up ratchets n^{10}, and also a switch pair n^{11}.

The terminal bar of Figure 2 corresponds exactly to the terminal bar of Figure 1 and is similarly numbered as to the wiring. The motor J receives current through its series field and armature from the positive lead 2 through the wire 46 and returns current from this field through the wire 9. The wire 47 leads from the negative lead 1 to one side of the switch v^3 which in turn connects with the compound field through the wire 47 and 9. The positive wire 46 also supplies current to the winding u^3 of the relay U and to one side of the switch pair u^1. Positive wire 2 further extends and makes positive connection through the wire 48 through the winding q^4 and from thence to one side of the switch pair s^3. The wire 49 leads from the positive wire 2 to the winding p^4 and thence to one side of the switch pair r^3. Wire 50 leads from the positive wire 2 to the winding n^9 and from thence to one leaf of the switch q. Wire 2 finally leads to the winding of the reset magnet o^9 and from thence the wire 74 leads to a leaf of the switch o^{11} and a leaf of the switch p. Wire 51 leads from 2 to the intermediate point of the double winding v, v^2 of the relay V. From the negative lead 1, wire 52 is common to one side of the three switch pairs n^6, n^7 and n^8. In like manner wire 53 is common to one side of the switch pairs o^6, o^7 and o^8. Wire 54 is common to one side of the three solenoids n^3, n^4 and n^5 and from these solenoids the wires 55, 56 and 57 lead to the switch pairs q^3, q^2 and q^1. Further, the wire 1 extends as a common wire to the solenoids o^3, o^4 and o^5. From these solenoids the wires 58, 59 and 60 lead to the switch pairs p^3, p^2 and p^1. Wire 61 leads from the switch o^{11} and is common to the three switch pairs o^6, o^7 and o^8. Wire 62 leads to one side of the switch n^{11} and is common to the three switches n^6, n^7 and n^8. Wire 63 leads from winding v^1 of the relay V to one side of the switch pair j^9. Wire 64 leads from the the winding v^2 of the same relay to the contact s^2 of the jack S and the contact r^2 of the jack R. Wire 65 is common to the other side of both switches j^8 and j^9 and also to the switch j^7 from which it leads to the contact s of the jack S and r of the jack R. Wire 66 leads from switch pair j^8 to one side of the switch q and is extended to one side of the switch p. Across wires 65 and 66 is the spark suppressor j^{10}. Wire 67 leads from one side of the switch j^7 to one side of the switch u and also to the relay coil u^3. Wire 44 leads to one side of the switch s^3 and is therefore the actuated lead between switch bank E, F, G of Figure 1 and jack S of Figure 2. Wire 45 leads to one side of the switch r^3 and is therefore the

actuating lead between the switch bank B, C, D of Figure 1 and the jack R of Figure 2. Wire **68** leads from one side of the switch u^1 to a lead common to the relay series k^{20}, k^{21}, etc., also to the switch arm k of the wiper switch K, and in like manner feeds one side of the relay group l^{20}, l^{21} etc., and the switch arm l of the wiper switch L and finally the relay group m^{20}, m^{21}, etc., and the arm m of the wiper switch M. The other sides of these relay groups, namely, m^{20}, m^{21}, etc., l^{20}, l^{21}, etc., and k^{20}, k^{21}, etc. are connected to the wires **17**, **18** etc., for the first group and **26**, **27** etc., for the second, and **35**, **36**, etc., for the third. The lead **69** connects one side of the series of switch pairs m^{10}, m^{11}, etc., with one leaf of the switch pair p^3 and with one leaf of the pair q^3. The spark suppressor m^{19} is connected across leads **68** and **69**. The lead **70** is common to one side of the series of switch pairs l^{10}, l^{11} etc. and leads to one side of the switch pair p^1. Wire **70** also leads to one side of the switch pair q^1. The spark suppressor l^{19} is connected between wires **68** and **70**. The wire **71** is common to and connects one side of the series of switch pairs k^{10}, k^{11} etc., and leads to one side of the switch pair q^2 and also to one side of the switch pair p^2. The spark suppressor k^{19} is connected across the leads **68** and **71**. Wire **72** connects the contact r^1 and the contact s^1 with one side of the switch pair u.

Referring to Fig. 3, which is a side view of the mechanism of the multiple impulse generator, J is the electric motor driving the rotary switches K, L and M, comprising the impulse generator. The apparatus is mounted on a base plate j^{13} having the supports j^{14}, j^{15}, j^{16}, j^{17}, and j^{18}, carrying the shaft j. The friction wheel j^{12} is attached to the shaft j and is driven by the friction wheel j^{11} directly fastened to the motor. These friction wheels provide the desired speed reduction. Three special switches, j^9, j^7 and j^8 appear in the drawing, and they are acted upon by the cam j^6 carried on the wheel j^4 of the two to one reduction gearing. The rotary switches or impulse generators K, L and M include the contact buttons five of which, k^1 to k^5 and l^1 to l^5 and m^1 to m^5 are shown in each case, acting upon the three contacts on the wiper arm k, l and m carried on the shaft j.

Referring to Fig. 4, which is the reduction gearing and special switch mechanism, J is the electric motor, mounted on the base plate j^{13}. One of the supports j^{15} which carries the main shaft j also is shown in this drawing. The friction drive wheels are j^{11} and j^{12}. The two to one reduction gear operating the special switches appears in the gear wheels j^3 and j^4. The switches are j^7, j^8 and j^9.

One suitable form of the mechanical construction of the reset mechanism on the devices here indicated diagrammatically is shown in United States Patent 1,976,248, issued to Arch D. Rollins, October 9, 1934.

The use and operation of my invention are as follows:

My message transmitting apparatus may have a wide variety of uses. A particular use is the transmission of quotations from the floor of a stock or produce exchange to a recording board. I will now describe the use of the particular apparatus shown in this or similar service. It will be understood that while I have shown only one duplex set of transmitting switches and one duplex group of receiving annunciators, together with the automatic transmitter for such stock exchange use, the transmitter and receiver units, namely, the switch banks B, C, D and E, F, G, together with their related receiving annunciators O and N, will be duplicated for each stock listed. The operator of the device selects a stock and also the information either Bid or Ask by the insertion of the loose plug T in a series of pairs of jacks, including R, S, one of said jacks being the Bid information for a specific stock and the other the ask information for the same stock. Another stock will have allotted to it another pair of jacks and will be served by another group of message set-up sending switches and a group of annunciators. The automatic transmission apparatus, however, is common to any number of such combinations.

Assume then that the apparatus is in use in a stock exchange and that the apparatus shown in Figure 1 is either upon the floor or in immediate touch therewith, as by direct telephone. Another operator manipulates the two switch banks continuously according to the information received. In other words, for every change in price bid, or price asked, the operator will set up the three switches B, C, D to represent the figure bid, and the three switches E, F, G according to an "ask" quotation. The mechanism which registers and displays to the operator the position of the switch has not been shown herein as it forms no essential part of the invention. Any suitable dial or pointer system may be used, registering the digits 1 to 10, inclusive. As this setting up of the figures is presumed to be a more or less continuous process, the changes being made immediately upon receipt of information, there is supposed to be always a message ready to be sent at the sending switches. If there has been no change in quotation and the operator of the main board causes a message to be transmitted, the effect upon the annunciators will obviously be to repeat the previous quotation or figure. Assume then that the switches in bank B, C, D have been set to any arbitrary position, the switch arm b^1 being upon contact point b^3, the switch arm c^1 being upon contact c^4, and the switch arm d^1 being upon contact d^3. The operator at the central station desires this information which is upon the "bid" group of sending switches. She plugs into either jack and assuming the message unchanged for the "ask" quotation and the plug is inserted in the "ask" jack, gets no changed quotation or figure at that indicator. But upon inserting the plug T in the jack R, there being a change in the position of the sending switches, the following action takes place: Connection is made through the metallic tip t of the plug T from the main negative lead l which is connected to a contact in each jack to the leaf r^2 which, in turn, by means of the wire **64**, leads to the winding v^2 of the differential wound relay V, the other side of this winding being connected to the main positive power lead **2**. This energizes this relay closing the switch point v^3 which makes negative connection from the wire l through the wires **47** to the compound winding of the motor J.

From this winding connection is made through wire **46** to the main positive power lead **2**. This step then energizes and starts the motor. The switch leaves r^3 are closed as the result of the insertion of the plug T, although insulated from the metallic part of the plug. This closure places wire **45** in contact with the winding p^4 of relay P through the wire **49**, the other side of this relay being connected to the main positive power lead

2. Wire 45 shown in both Figure 2 and Figure 1, leads also through the terminal strip to the winding h^5 in the relay H^1 (Fig. 1) the other side of this relay being connected to the negative side of the battery. The contact established through wire 45 also places the winding h^4 of the relay H into contact with the main power lead 2 through the wire 49 and the winding p^4 of the relay P. The other side of the relay H is connected to the negative side of the battery by means of the wire 7. Hence this step energizes relays P and H^1 and H, said relays controlling sending switch bank B, C, D and its appropriate receiving annunciator O, as well as the signal lamp group *b*, *c*, *d*. Closure of the relay H^1 closing the switch leaves h^3 makes positive connection on the one side of the signal lamps *b*, *c*, *d*, through the wire 8. The other side of the lamps through the wire 9 in both Figures 1 and 2 is connected to the negative lead *l* by the wire 47, and interposed switch v^3. These signal lamps then light indicating this switch bank to be operated. Closure of the relay P closes four pairs of switch leaves p, p^1, p^2 and p^3. The closure of switch p brings wire 66, which is connected to one switch point of that switch and is actuated by the impulse generator, into connection with the wire 74 which, in turn, leads to the magnet o^9 and eventually to main constant power lead 2. The closure of the leaves p^1, p^2, and p^3 brings one side of the relay switches associated with the impulse generator units L, K, and M into contact with the annunciator magnets o^3, o^4 and o^5, the other side of said magnets being connected to the main negative lead *l*. The energizing of relay H makes negative connection through the wire 7 common to one side of each of the three switch pairs h, h^1, and h^2, thence through the wires 13, 12, and 11 to the arms d^1, c^1, and b^1 of their respective switches. As presupposed, the switch arm b^1 is upon contact b^3, the arm c^1 upon contact c^4, the arm d^1 upon contact d^3, these positions representing three different characters or numbers which are to be transmitted. Switch B set as described, connection is made through arm b^1, contact b^3 and wire 17 to one side of the magnet m^{20} of the relay group in the impulse generating unit M. It will be seen that this closure of this step will permit current to pass through the entire series of magnets m^{20}, m^{21}, m^{22} etc., which will close their respective switch points m^{10}, m^{11}, m^{12} etc., which in turn will cause 9 impulses to be generated for every revolution of the wiper arm m. In a similar manner in the case of switch C, negative connection is made through the arm c^1, the contact c^4, and the wire 27 to the magnet l^{21} of impulse generating unit L. In this case it will be seen that current can pass through only eight of these relay magnets, the magnet l^{20} not being energized. Hence impulse generator L will transmit but eight impulses per revolution and will therefore select a character different from that selected by generator M. In the case of switch B and the impulse generator K with the switch arm d^1 upon contact d^3, the setup will generate nine impulses as in the first case. If the number of impulses corresponds to a digit to be transmitted, the figure transmitted for this setup would be 989. It will be noted that in the case of the switch C a resistance f^{12} is found in the series with the wire 27. This resistance is to compensate for the resistance of the magnet l^{20} which is omitted in this particular setup. There are a series of such resistances, each of appropriate value, in the series in all the circuits except the first one in each switch group. These resistances are so proportioned as to balance the resistances of the magnets in the relays which are omitted by the setting of the switch so that the net result will be always to have a constant resistance in the circuit regardless of how many relays are energized. All these above described steps occur practically instantaneously at the time the motor J is started, which procedure has already been described, so that the motor drives the various impulse generator switches M, L, and K and also the special cam j^6 which is driven at half speed by means of the gear train j^3, j^4, the necessary steps for subsequent functioning having been taken in a manner which will be described further on, the motor J is caused to stop after the transmission of any given message at the position shown in Figure 2, namely, part way between the switch leaves j^9 and j^8, as will be described later. Hence, when the motor starts again, its first operation is to close the switch leaves j^8 which makes negative connection from the negative power lead 1 through wire 65 through the leaves j^8 to the wire 66, and thence to the switch leaves p of the relay P and thence through the wire 74 to the reset magnet o^9 in a manner in part already described. This energizes the reset magnet and trips or releases the indicator units of the group O, allowing these dials or drums to return to the zero position. The action of the magnet o^9, in addition to tripping mechanically the indicator dials, closes the relay switch o^{11} which is common to one side of the three switch pairs o^6, o^7, and o^8. Since the other sides of these switch pairs are connected to the main negative lead, it will be seen that as long as any of these switch pairs are closed, in other words, as long as any indicator is off normal or zero position, the magnet o^9 will be connected on one side to negative wire 1 and on the other side to positive wire 2, and will remain energized as long as any of the indicator units are off normal. When these units are returned to normal or zero position they automatically open their respective switch leaves which, when all three are so opened, breaks the circuit through o^9. This clearing step having been performed by the motor, the cam j^6 continues to revolve until it contacts the spring pair j^7 which then makes contact from the negative lead 1 through the wire 65 to the wire 67 and the coil u^3 of the relay U. The other side of this relay is connected to main positive lead 2 and is therefore energized. The energizing of the relay U closes the switch leaves u, u^1. The closure of the switch leaves u locks the relay in position since it makes negative connection through the wire 72 to the leaf r^1 of the jack R, which has previously been connected to the negative side of the system by the plug T. The closure of the switch leaves p^1 makes positive connection from main positive lead 2 through wire 46 to wire 68. Wire 68 is common to one end of each series of relay magnets. The negative connection to each has already been described as established through the setup switch arms b^1, c^1, d^1 and contacting selected contact buttons upon each switch. The wire 68 further supplies a positive connection for each of the rotating wiper arms m, l, and k of the three impulse generating units M, L, and K. Hence, subsequent to the closure of j^7 and the relay U, further turning of the motor J driving the arms m, l, and k, will cause electric impulses to be generated by closures effected in this rotation between the arms and their respec-

tive groups of buttons and finally from these buttons through the switch leaves associated with each button actuated by the closure of a certain number of relays in each group and in the manner already described. As has been stated, the cam j^6 is driven at half motor speed and hence the wiper arms which are directly connected to the motor shaft are able to sweep the entire group of contact buttons in the interval between the switch leaves j^7 and j^9 being contacted by the cam j^6. Upon the completion of the sweeping of the contact buttons by the arms of the impulse generators, the cam j^6 strikes the leaves j^9. This closure makes negative connection from main negative lead *l* through wire **65** to wire **63** and thence to the winding v^1 of the relay V. It will be seen that this winding is arranged in the opposite direction to the winding v^2 and hence neutralizes the action of this winding causing the relay V to open, which in turn stops the motor. Upon removal of the plug from the jack R this circuit through the leaves j^9 is broken and the relay V becomes again momentarily energized, causing the motor to start for an instant moving the cam j^6 off the leaves j^9 to the position between j^9 and j^8, which is the starting point for the transmission of the next message. The momentary energizing of the relay V is the result of the circuit in winding v^2 being broken by the removal of the plug T. This leaves the winding v^1 active since on one side it is connected to positive power lead **2** through wire **51** and on the other side through wire **63**, the switch leaves j^9, which are depressed by the cam j^6, and the wire **65** to negative lead *l*. The energizing of v^1 closes the switch leaves v^3 starting the motor. However, as soon as the motor starts it moves the cam j^6 off the switch j^9 opening the negative side of the connection through winding v^1 de-energizing the relay causing switch v^3 to open and motor J to stop. This then leaves the cam j^6 between the switches j^9 and j^8, which is the starting position, as already described, for the transmission of another message. The functioning of the set-up switch bank E, F, G is identical in every respect with the operation just described for the switch bank B, C, D, with the one exception that the operation is responsive to an insertion of the plug T into the jack S instead of the jack R, and the compound relay Q associated with the annunciator bank N is energized instead of the relay P associated with the annunciators O. These two set-up switch banks and the two annunciator groups are for the Bid and Ask quotations of the stock.

I claim:

1. In a message transmitting system, a plurality of character selectors, an electric impulse generator for each character selector adapted to generate a selective predetermined number of impulses, normally open electric circuits connecting the character selectors and the impulse generators respectively, and effective when energized to condition the impulse generators to transmit the selected characters by a number of electric impulses dependent upon the setting of the character selector, a character indicator for each character selector, each character indicator having means for causing it to indicate a different character responsive to the different numbers of impulses transmitted by its corresponding impulse generator normally open circuit connections between the respective impulse generators and character indicators, an electric motor for operating all the impulse generators in unison, means for energizing the motor and closing the circuit connections between the impulse generators and character indicators, and means responsive to operation of the motor for closing the circuit between the character selectors and impulse generators respectively.

2. In a message transmitting system, a plurality of character selectors, an electric impulse generator for each character selector adapted to generate a selective predetermined number of impulses, normally open electric circuits connecting the character selectors and the impulse generators respectively, and effective when energized to condition the impulse generators, to transmit the selected characters by a number of electric impulses dependent upon the setting of the character selector, a character indicator for each character selector, each character indicator having means for causing it to indicate a different character responsive to the different number of impulses transmitted by its corresponding impulse generator mechanism for resetting the character indicators to zero, normally open circuit connections between the respective impulse generators and character indicates, an electric motor for operating all the impulse generators in unison, means for energizing the motor and closing the circuit connections between the impulse generators and character indicators, and means responsive to operation of the motor for first actuating the character indicator reset mechanism, and then closing the circuit between the character selectors and impulse generators, respectively.

3. In a message transmitting system, an electric impulse generator and transmitter comprising a circular series of spaced impulse contacts; a wiper arm movable concentrically of said contacts to successively engage the same, a receiver including movable indicating means, reset mechanism for the receiver, circuit connections for energizing the reset, an impulse circuit including the receiver and impulse generator, one side of said circuit being connected to the wiper arm, the other side of said circuit including a plurality of branches, each branch including a pair of normally open contacts, and being connected to one of said impulse contacts, an electric motor for driving the wiper arm, means for selectively closing any desired number of said pairs of contacts in the branch circuits connected to the consecutive impulse contacts, means for energizing the motor, means actuated by said motor for energizing the reset circuit prior to engagement of the wiper arm with the first impulse contact, and means for stopping the motor after a predetermined cycle of operation.

4. In a message transmitting system, an electric impulse generator and transmitter comprising a circular series of spaced impulse contacts, a wiper arm movable concentrically of said contacts to successively engage the same, a receiver, an impulse circuit including the receiver and impulse generator, one side of said circuit being connected to the wiper arm, the other side of said circuit including a plurality of branches, each branch including a pair of normally open contacts, and being connected to one of said impulse contacts, an electric motor for driving the wiper arm, selector means effective when energized to close any desired number of pairs of contacts in the branch circuits, means for energizing the motor, means actuated by the motor for energizing said selective means to close predetermined connected branches of the impulse circuit prior to engagement of the wiper arm with the first impulse

contact, and means for stopping the motor after a predetermined cycle of operation.

5. In a message transmitting system, an electric impulse generator and transmitter comprising a circular series of spaced impulse contacts, a wiper arm movable concentrically of said contacts to successively engage the same, a receiver including movable indicating means, reset mechanism for the receiver, circuit connections for energizing the reset, an impulse circuit including the receiver and impulse generator, one side of said circuit being connected to the wiper arm, the other side of said circuit including a plurality of branches, each branch including a pair of normally open contacts, and being connected to one of said impulse contacts, an electric motor for driving the wiper arm, selector means effective when energized to close any desired number of pairs of contacts in the branch circuits, means for energizing the motor, means actuated by said motor for energizing the reset circuit prior to engagement of the wiper arm with the first impulse contact, means actuated by the motor for energizing said selector means to close said predetermined connected branches of the impulse circuit prior to engagement of the wiper arm with the first impulse contact, and means for stopping the motor after a predetermined cycle of operation.

6. In a message transmitting system, an electric impulse generator, a character display device, means responsive to electric impulses to actuate the character display device including movable character selectors and movable character indicators, an electric motor for driving the impulse generator, a plurality of normally open electric switches, each character indicator having means for causing it to indicate a different character responsive to the different numbers of impulses transmitted by its corresponding impulse generator, means actuated by the electric motor to successively engage the switches to thereby close the same, electromagnetic reset mechanism for said character display device, circuit connections between one of said switches and said reset mechanism, circuit connections for energizing the impulse generator, including another of said switches, and a control circuit for the motor including another of said switches for stopping the motor after a predetermined cycle of operation, and means for energizing the motor, whereby to successively reset the character display device, energize the impulse generator and stop the motor after a predetermined cycle of operation.

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