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SWITCHING SELECTOR FOR PRINTING TELEGRAPH SYSTEMS

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FIG. 1

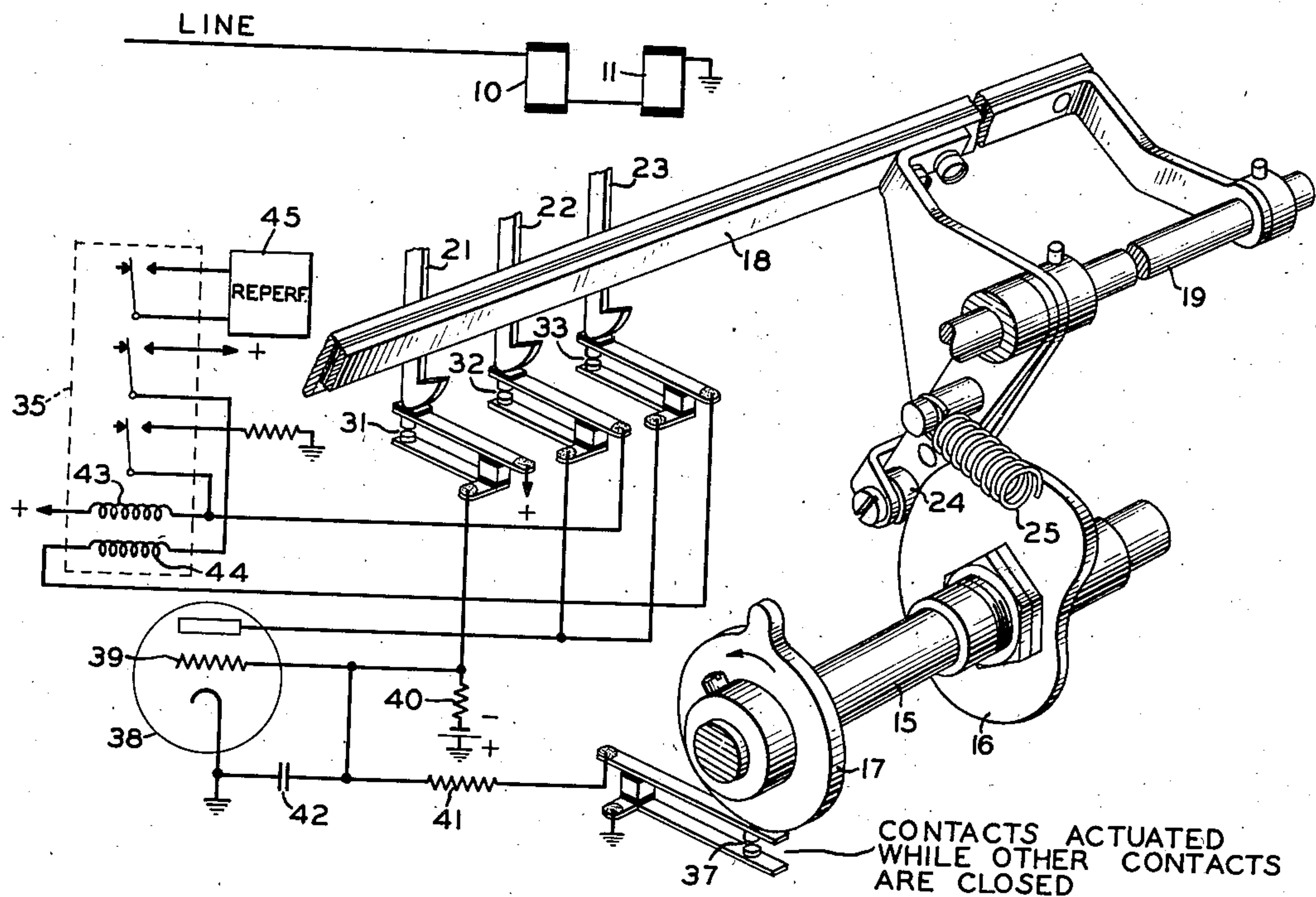
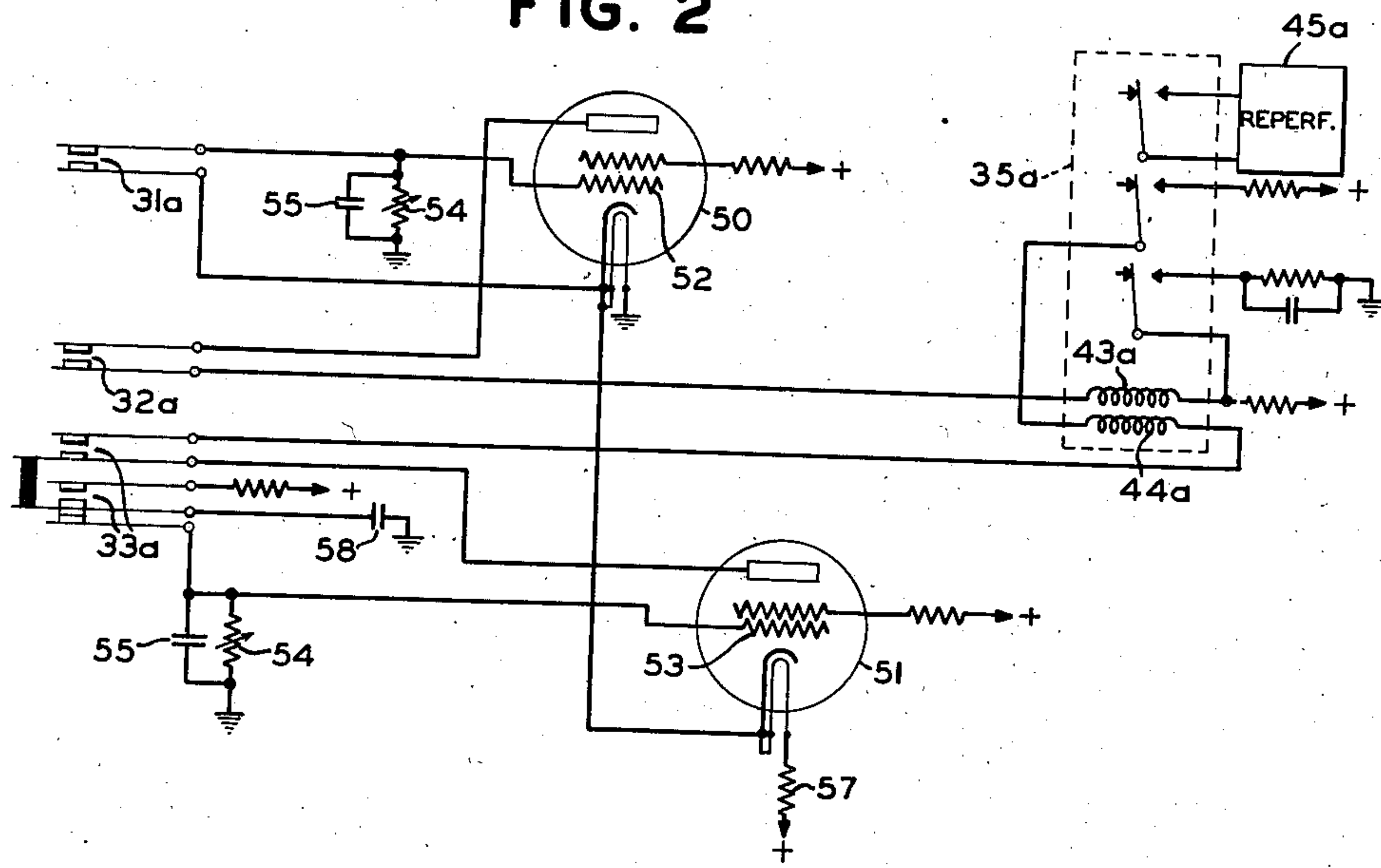


FIG. 2



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SWITCHING SELECTOR FOR PRINTING TELEGRAPH SYSTEMS

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6 Claims. (Cl. 178—23)

This invention relates to printing telegraph systems and more particularly to arrangements for selecting printing telegraph stations or lines in response to the transmission of code combinations of impulses to a printer.

In accordance with the invention a switching system is provided which operates in response to the transmission of characters or code combinations of impulses normally used in the transmission of messages. Thus, for example, a plurality of characters or selected code combinations may be employed to effect a switching function when they occur with a definite time relation which does not normally take place in the regular transmission of messages, or a plurality of characters or selected code combinations may be transmitted in succession to effect the switching operation where such code combinations are not normally transmitted in that particular order.

One object of the present invention, therefore, is to provide a simplified switching selector controlled by the reception of predetermined code combinations on a telegraph printer.

A further object of the invention is to provide a simple and effective arrangement for operating a selector or relay in response to transmitted code combinations having a definite time relation and to the transmission of such code combinations in succession, one after the other, without other code combinations being interposed.

A still further object of the invention is to provide a system of the character described in which the selector is operated by two successive characters or code combinations of impulses irrespective of the period of time elapsing between the transmission of the successive code combinations, providing no other code combination is transmitted during said period.

Other objects and advantages of the invention will appear from the following description of the embodiments thereof shown in the accompanying drawing, wherein:

Fig. 1 is a diagrammatic view of a preferred form of switching selector responsive to a plurality of predetermined code combinations irrespective of the time elapsing between the transmission of the respective code combinations; and

Fig. 2 is a similar view of a modification in which the controlling impulses must be transmitted with a definite time relation.

Referring to the drawing, Fig. 1 illustrates a portion of the mechanism of a printer similar to that shown in the patent to Noxon et al.,

No. 2,205,430 granted June 25, 1940. If desired, other forms of printers may be employed in carrying out the invention. The printer employs the usual printer selector magnets 10 and 11 connected in series relation in the line circuit and arranged to control the operation of the printer in response to code combinations of impulses received over the line circuit.

The detailed construction of the complete printer is shown in the above mentioned patent to Noxon et al. and only that portion of the printer mechanism involved in the present invention is illustrated in the accompanying drawing. As shown, the operating mechanism includes an operating shaft 15 on which is mounted an operating cam 16 and an auxiliary cam 17, the said cams being arranged to make one revolution from their positions shown for each cycle of operation of the printer. The mechanism further comprises an operating bail 18 which is pivoted on the axis represented by the shaft or rod 19 and swings downwardly during each printing cycle to operate a selected type or function bar (not shown) through the associated hook elements or bars such as 21, 22, 23. The operation of the bail 18 is effected in the particular mechanism illustrated through the instrumentality of a cam follower 24 and spring 25, the cam follower 24 engaging the cam member 16 on the operating shaft. It will be understood that one of the hook elements or bars similar to those indicated at 21, 22, 23 is selected by suitable selector mechanism (not shown) in response to the code combination impressed upon the magnets 10 and 11, and displaced laterally to a position where it will be engaged by the operating bail 18 and depressed to actuate the associated type or function bar.

In accordance with the present invention, three of the selectively operable elements are arranged to actuate contacts 31, 32 and 33 to control the operation of selective switch means which as shown is a relay 35. In order to obviate the accidental or undesired operation of the relay 35 during regular transmission of messages, a plurality of code combinations for operating contacts 31, 32 and 33 may be selected such that they do not occur during normal transmission in the same order and time relation. For example, the contacts 31 may be operated upon receipt of a "shift" combination, contacts 32 upon receipt of the character F, and contacts 33 upon receipt of the character S. Then if the contacts are closed in pairs, namely, 31 followed by 32, or 31 followed by 33, and these

pairs of code combinations utilized to operate relay 35, it will be apparent that the relay will not be operated during normal transmission since it is assumed that neither of the characters F or S is normally transmitted immediately following the "shift" character. If desired, any other pair or series of code combinations may be employed which do not normally occur in regular transmission.

The system as shown further comprises a pair of contacts 37 which are closed momentarily by the cam member 17 on the operating shaft at an intermediate point in the stroke of the operating bail 18 so that the contacts 37 are not closed until after the closure of contacts 31, 32 or 33, if one of these contacts is selected, and opened before any of said contacts are opened by the upward movement of the bail 18 at the end of the printing cycle. The system further embodies a space-discharge device 38 shown as a conventional triode with its control electrode 39 normally biased to a negative potential by its connection to negative battery through the resistance 40. The control electrode 39 may also be connected to ground through a resistance 41 and the contacts 37 when said contacts close. A condenser 42 is also connected between the cathode and the control electrode to maintain the positive bias potential impressed on the control electrode 39 through contacts 31 until the control electrode is grounded by the contacts 37 through the low resistance 41, thereby discharging the condenser 42. The resistance 40 is only for the purpose of stabilizing operation and may be, for example, of a value of one or two megohms. When the control electrode 39 of the device is at a positive potential with respect to the cathode, the space-discharge device is rendered conductive until the contacts 37 are closed. The anode or plate of the space-discharge device is connected through contacts 32 and 33 to the operating and release windings 43 and 44 respectively, of relay 35.

The operation is as follows: when the "shift" code combination is followed by character F without any interposed code combinations, the contacts 31 close, and contacts 37 close and open before contacts 31 reopen; then when F is received, contacts 32 and then contacts 37 are closed. The space-discharge device 38 is thus rendered conducting by the positive potential applied to the control electrode 39 through the contacts 31 which remain closed until after the contacts 37 have opened to impress a positive charge upon the condenser 42. Upon the initial closure of the contacts 32 (when the character F is received) before contacts 37 reclose, a circuit is closed from ground through the space-discharge device 38, contacts 32 and the operating winding 43 of relay 35 to battery, whereupon said relay becomes energized and locks up through said winding and the lower armature and front contact of said relay to ground. Thus the relay 35 becomes locked up during the second cycle of the printer even though the subsequent closure of the contacts 37 discharges the condenser 42 and thereby renders the space-discharge device 38 nonconducting by reason of the discharge of the condenser 42. After the contacts 37 reopen, negative battery is applied to the control electrode 39 and condenser 42 through the resistance 40. The operation is thus dependent upon the timing of the operation of contacts 31, 32 and 37, and particularly upon

the timing characteristics of the circuit of the control electrode 39.

The selective switch or relay 35 may be employed to operate a signal, to close a control circuit, or for any other desired purpose. As shown, the upper armature and front contact of said relay are connected to the circuit of a reperforator 45, for example to render the reperforator responsive to signals received over the line to which the printer is connected. The reperforator may be employed to perforate tape in accordance with the received signals which may then be repeated at any time by the operation of a tape transmitter (not shown) in the usual manner.

The release of relay 35 is effected upon the receipt of a "shift" combination followed by character S with no intervening characters. In this case the operation of contacts 31 in response to the "shift" combination renders the space-discharge device 38 conducting as described above. If the contacts 33 are then closed upon the next printing cycle in response to the receipt of the character S, a circuit is closed from positive battery through the middle armature and front contact of relay 35, the neutralizing or releasing winding 44 of relay 35, contacts 33 and the space-discharge device 38, whereupon the relay 35 is restored to normal. It will be evident that if any other code combination had been received between the "shift" combination and the character F or between the "shift" combination and the character S, the closure of contacts 37 by the cam 17 would render the space-discharge device 38 nonconducting and the subsequent transmission of the characters F and S will have no effect. However, the second characters of the selector codes need not be sent immediately following the first character or "shift" combination since the positive charge on the condenser 42 will remain for an appreciable time and the space-discharge device 38 remains conducting until said charge is partly or completely dissipated. This is advantageous in systems where the selector code combination may be sent manually as from a keyboard and thus in some cases there may be a pause between the two selector code combinations.

Fig. 2 illustrates a modification of the invention in which sets of contacts 31a, 32a, 33a, corresponding to the contacts 31, 32 and 33 of Fig. 1 are employed to control the energization or release of a relay 35a when two predetermined code combinations are received within a definite period of time, for example of the order of that required for the transmission of two or three characters. In this case it will be assumed that the contacts 31a are operated upon the receipt of the "shift" code combination, and the contacts 32a upon receipt of the "unshift" code combination, and the contacts 33a upon the receipt of the period dot code combination. One switching function is effected upon receipt of a "shift" code combination followed immediately by an "unshift" code combination, and another function upon the receipt of a double period dot code combination. The second code combination of each pair must be transmitted within a predetermined period after the first combination, for example not more than 300 milliseconds in the case of transmission at the usual rate of about six characters per second. The period allowed for the transmission of the second code combination may be varied so that the selector is adapted to function at any desired transmitting

rate. Thus the figures mentioned are simply typical of the conventional printing telegraph system as operated in practice. Any other code combinations may also be used to control the selector but preferably the sequence of combinations employed are those which do not ordinarily occur in message transmission.

As shown in Fig. 2, the control contacts 31a, 32a are connected to the space-discharge device 50, having its cathode-anode circuit in series relation with the operating winding 43a of the relay 35a. The contacts 33a are arranged to energize the release winding 44a of the relay 35a through a second space-discharge device 51. The control electrodes 52 and 53 of the respective space-discharge devices 50 and 51 are connected to ground through leak resistances 54 each shunted by a condenser 55. The values of the resistances 54 and condensers 55 are selected to give the desired timing characteristics to the control electrode circuit of each space-discharge device, for example to maintain the potential of said control electrode at such a point that the space-discharge device remains conducting for a period of 300 milliseconds. Both of the control electrodes 52 and 53 are normally at ground potential. When the control contacts 31a close upon receipt of a "shift" code combination, the potential of the control electrode 52 is made more positive with respect to the cathode since the contacts 31a connect the control electrode 52 to a positive point on the circuit including the heater for the cathode of the space-discharge device 50 in series with the heater of the second space-discharge device 51, the resistance 57 and positive battery. Thus, since the cathode of each of the devices 50 and 51 is normally at a positive potential with respect to ground, the control electrodes of said devices are at a negative relative potential when they are grounded. The positive charge impressed upon the condenser 55 associated with the space-discharge device 50 when the contacts 31a are closed renders the device 50 conducting for the period, for example 300 milliseconds, determined by the time characteristics of the control electrode circuit. If the "unshift" code combination is received immediately following the "shift" code combination, the contacts 32a are closed while the space-discharge device 50 is still conductive and the energizing winding 43a of the relay 35a will be energized through said space-discharge device 50. If, however, one or more characters are interposed between the "shift" and "unshift" code combinations, the space-discharge device 50 will be non-conductive when the contacts 32a close, and the selector relay will not be operated.

The relay 35a is released upon the receipt of two period dot code combinations sent one immediately following the other. The first code combination operates contacts 33a and connects positive battery momentarily through the lower make contacts 33a to the condenser 58. Upon the restoration of the contacts 33a the positive charge on the condenser 58 is impressed upon the control electrode 53 of the space-discharge device 51, thus rendering said device conducting for a predetermined period of time, for example 300 milliseconds. If the second period dot code combination is immediately received, the closure of the contacts 33a energizes the release coil 44a of relay 35a through upper make contacts 33a and the space-discharge device 51. After the space-discharge device 51a becomes non-conducting, the receipt of a period dot code com-

bination does not affect relay 35a and thus single periods may be transmitted in the regular way without releasing relay 35a.

Two modifications of the invention have been shown and described in order to illustrate the principles thereof but other modifications will occur to those skilled in the art and may be made without departing from the scope of the invention as defined in the appended claims.

We claim:

1. A printing telegraph system comprising a printer embodying selectively operable elements or bars and means for operating the same in response to line current impulses, contacts actuated by said elements or bars upon the receipt of predetermined code combinations of impulses, a space-discharge device operatively connected to a plurality of said contacts and provided with a control electrode, means for imparting a definite time characteristic to the current flowing in the circuit of the control electrode, switch means and means including said contacts and space-discharge device for operating said switch means in response to predetermined code combinations.

2. A printing telegraph system comprising a printer embodying selectively operable elements or bars and means for operating the same in response to line current impulses, contacts actuated by said elements or bars upon the receipt of predetermined code combinations of impulses, a switch, a space-discharge device provided with a control electrode, means including said contacts and the control electrode for varying the conductivity of said space-discharge device upon the receipt of a first predetermined code combination of impulses, means including said contacts and said space-discharge device for operating said switch upon receipt of a second predetermined code combination of impulses and means for preventing the operation of said switch by said second code combination if a different code combination precedes said second code combination.

3. A printing telegraph system comprising a printer embodying selectively operable elements or bars and means for operating the same in response to line current impulses, contacts actuated by said elements or bars upon the receipt of predetermined code combinations of impulses, a switch, a space-discharge device provided with a control electrode normally biased to a potential rendering said space-discharge device non-conductive, means including said contacts for varying the potential of said control electrode upon the receipt of a predetermined code combination of impulses and means for operating said switch or restoring the normal bias potential of said control electrode depending upon the next code combination of impulses received whereby said switch is operated only upon the receipt of two successive predetermined code combinations.

4. A printing telegraph system comprising a printer embodying selectively operable elements or bars and means for operating the same in response to line current impulses, contacts actuated by said elements or bars upon the receipt of predetermined code combinations of impulses, a switch, a space-discharge device provided with a control electrode, a second set of contacts in said printer actuated concurrently with each printing cycle and connected to said control electrode of the space-discharge device, means including said first-mentioned contacts and space-discharge device for operating said switch

upon receipt of a plurality of code combinations of impulses and means including said second set of contacts for rendering said switch-operating means ineffective depending upon the relationship of said plurality of code combinations.

5. A printing telegraph system comprising a printer embodying selectively operable elements or bars and means for operating the same in response to line current impulses, contacts actuated by said elements or bars upon the receipt of predetermined code combinations of impulses, a switch, a space-discharge device provided with a cathode and a control electrode, a condenser connected between said cathode and control electrode, a leak resistance in parallel relation to said condenser, a second condenser, means including certain of said contacts for charging said second condenser and then transferring the charge to said first-mentioned condenser upon receipt of a single predetermined code combination of impulses, and means including said condensers and space-discharge device for operating said switch upon receipt of a plurality of code combinations within a predetermined period of time.

6. A printing telegraph system comprising a printer embodying selectively operable elements or bars and means for operating the same in response to line current impulses, contacts actuated by said elements or bars upon the receipt of predetermined code combinations of impulses, a switch, a space-discharge device provided with a control electrode, means including said contacts and the control electrode for varying the conductivity of said space-discharge device upon the receipt of a first predetermined code combination of impulses, means to restore the conductivity of said space-discharge device to its initial condition after a predetermined time delay and means including said contacts and said space-discharge device for operating said switch upon receipt of a second predetermined code combination of impulses before the conductivity of said space-discharge device has been restored to its initial condition.

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CERTIFICATE OF CORRECTION.

Patent No. 2,279,335.

April 14, 1942.

RONALD V. MORGENSTERN, ET AL.

It is hereby certified that error appears in the above numbered patent requiring correction as follows: In the grant, line 1, and in the heading to the printed specification, line 4, residence of first named inventor, after "Irvington," insert --New York,--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 9th day of June, A. D. 1942.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.