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ELECTRICAL SELECTOR.

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1,226,184. Patented May 15, 1917.

Fig. 1.

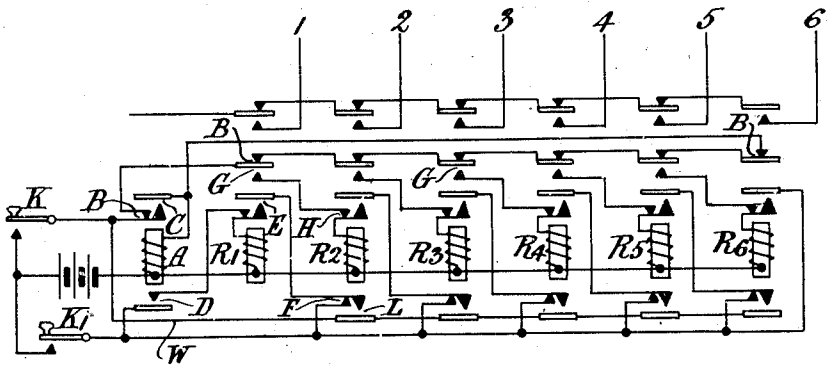
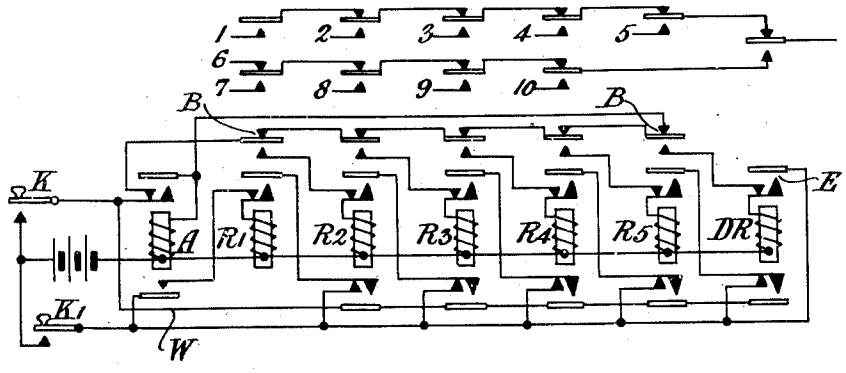


Fig. 2.



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ELECTRICAL SELECTOR.

1,226,184. Specification of Letters Patent. Patented May 15, 1917.

Application filed February 8, 1916. Serial No. 76,955.

To all whom it may concern:

Be it known that I, LEONARD CHARLES BYGRAVE, a subject of the King of Great Britain, residing at Marconi House, Strand, London, England, have invented new and useful Improvements in Electrical Selectors, of which the following is a specification.

The invention relates to electrical selectors or impulse responders consisting of relays which are energized in succession to select a certain circuit. The principal objects of the invention are to simplify the circuits of the selector and to reduce the number of relays required for a given number of selective positions.

The invention is illustrated by the accompanying drawing. Figure 1 shows one form of the invention having one switching relay for each selective position and Fig. 2 shows a selector in which the number of switching relays is less than the number of selectable lines.

The selector shown in Fig. 1 normally consists of ten switching relays R, only six being shown, and one auxiliary or starting relay A. The selective impulses are sent over an impulse wire W from an impulse transmitter, here represented by a key K. A release key K^1, controlling the locking circuits of the relays R, is closed before the impulses are sent.

Upon the first impulse being sent, A is energized over a circuit extending through back contacts B of all relays R. A, upon operating, connects itself through its contact C directly to W and closes at its contact D the circuit of the first switching relay R^1 which cuts itself in a locking circuit through its contact E and a contact F on the second relay R^2 and prepares the circuit of the latter by closing contact G. When the first impulse ceases A deënergizes and as its operating circuit is now open at contact B of relay R^1, the second impulse does not affect A, but operates the second relay R^2 over contact B of A, contact G of relay R^1 and contact H of relay R^2.

Relay R^2 locks up over a circuit similar to that of relay R^1 and prepares the circuit of relay R^3 by closing its contact G. At the same time the locking circuit of the first switching relay is switched over to the impulse wire W at contact L. In consequence thereof relay R^1 is deënergized upon the cessation of the second impulse. In a similar manner the third impulse causes the operation of R^3 and the deënergization of R^2, and so on.

A relay, once deënergized, is evidently not reënergized during the same setting period. The slector is restored to normal position by opening the key K^1. The selectable circuits, numbered 1 to 6, and here shown as single wire circuits, are connected to front contacts of the corresponding switching relays.

The selector shown in Fig. 2 consists of seven relays only, but may nevertheless be used to select any of ten circuits numbered 1 to 10. The circuits of the first six relays are mainly the same as in Fig. 1, there being five switching relays R. The seventh relay DR is a differentiating relay, operated by the sixth impulse to switch the impulse circuit back to the starting end of the selector.

The first five impulses operate the selector in the manner just described.

The sixth impulse energizes relay DR, which locks itself over its contact E and remains energized until the selector is restored to normal position. When the sixth impulse ceases, relay R^5 deënergizes and connects W over the back contacts B of all relays R to relay A. The selector is thereafter operated as before from the starting end by the seventh and following impulses.

The selectable circuits are divided in the manner shown in the drawing into two groups numbered 1 to 5 and 6 to 10 respectively, a circuit of the first group being connected up over a back contact of DR, while a circuit of the second group is connected up over a front contact thereof.

It appears from the above description that after six impulses have been sent, the differentiating relay DR only remains energized, and the sixth circuit is then connected up over back contacts of all relays R and a front contact of DR.

A selector according to this invention, may be used for selecting circuits of any kind, but is particularly adapted for automatic and semi-automatic telephone systems. In such systems, for instance, it may be employed individually with each talking circuit to hold up a talking connection which it has established, or it may be used in common by a plurality of talking lines and merely select and complete operating circuits for relays which make and hold up the

connection; or it may be operated by a first series of impulses to select a group of lines and then by a second series of impulses to select a particular line of that group and to uphold the connection with said lines. It may also be used in combination with operators' key-sets in semi-automatic systems to control the transmission of current impulses, in which case the selector acts in known manner as a counting device to permit a certain number of impulses to be sent to the selectors of the exchange.

What I claim is:—

1. A selector comprising a series of switching relays, an impulse circuit for energizing the relays in succession and means for deënergizing a previously energized relay on the interruption of the impulse energizing the next relay.

2. A selector comprising a series of switching relays, an impulse circuit for energizing the relays in succession, means whereby each relay on operating prepares the circuit of the next and means whereby each relay on deënergizing extends the impulse circuit to the next relay but one.

3. In an electrical selector, the combination of a starting relay, a plurality of switching relays, an impulse wire, means for transmitting electrical impulses to such wire, a back contact of each switching relay connected to a spring of the next succeeding relay, all such back contacts and springs being normally connected in series with the winding of the starting relay, a front contact of each switching relay being normally connected to the winding of the next succeeding relay, one of the springs of such next relay being adapted to break such connection and being connected to a front contact of the succeeding relay, springs of the relays connected to the impulse wire and adapted to coöperate with the last mentioned contacts and means for restoring the relays to normal.

4. A selector comprising a series of switching relays, an impulse circuit for energizing the relays in succession, means whereby each relay after having been operated is deënergized on the interruption of the impulse energizing the next relay, said means comprising a holding circuit for each relay and means for opening such circuit on the cessation of the impulse succeeding the impulse which caused such relay to be energized.

5. A selector comprising a series of switching relays, an impulse circuit for energizing the relays in succession, means whereby each relay, after having been operated, is deënergized on the interruption of the impulse energizing the next relay, said means comprising a holding circuit for each relay and means for branching such circuit to the impulse circuit on the operation of the next relay.

6. A selector comprising a series of switching relays, a number of selective lines controlled by said relays, an impulse circuit for energizing the relays in succession and means whereby the selector is automatically reset after it has been set to a fixed selective position.

7. A selector comprising a series of switching relays, a number of selective lines controlled by said relays and arranged in groups, an impulse circuit for energizing the relays in succession and means whereby, after the selector has been set to a fixed selective position, a new group of selective lines is automatically switched into selective connection.

8. A selector comprising a series of switching relays, a number of selective lines controlled by said relays, an impulse circuit for energizing the relays in succession, means whereby each relay, after having been operated, is deënergized on the interruption of the impulse energizing the next relay and a differentiating relay operating, after the selector has been set to a fixed selective position, to switch the impulse circuit back to the first relay of the series.

LEONARD CHARLES BYGRAVE.