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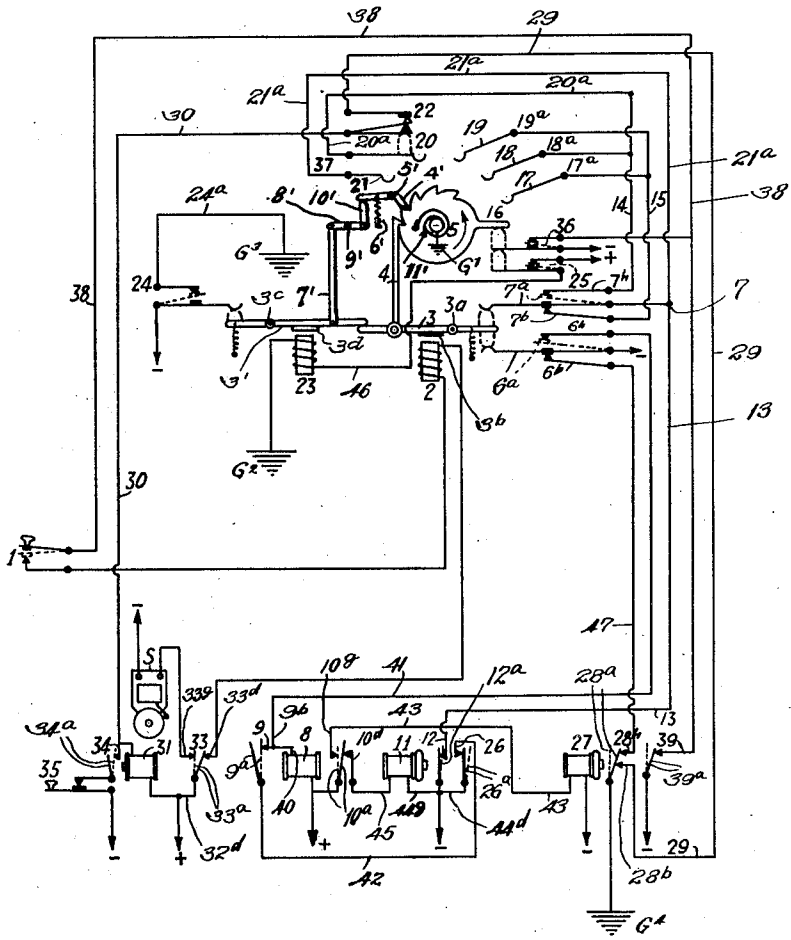

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CALL SELECTOR.

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The present invention relates to a new type of call selector. The object of this apparatus is to cause the actuation of a calling device (bell, etc.). The apparatus may be controlled over wires or by means of wireless telegraphy and is responsive to signals composed of groups of impulses or different duration, e. g. letters of the Morse code composed of dots and dashes.

The apparatus is so arranged that the calling device is actuated only when the selector receives the predetermined group of signals for which it is adjusted. All other groups of signals, no matter how arranged, do not actuate the calling device.

In the following description, the invention is exemplified as applied to a selector schematically illustrated in the drawing. In the drawing, the arrows marked + or − indicate connections with the (+) and (−) poles, respectively, of a source of electricity (battery, storage battery, generator, etc.) not shown in the drawing.

1 is a contact which may be closed manually or by means of any suitable relay (not shown) controlled by a receiver for wireless or wire telegraphy. This contact 1 controls the circuit of magnet 2 in such a manner that the magnet is energized upon each closure of the contact and while the contact is closed. When the key 1 is actuated, the circuit of magnet 2 is closed from the (+) source of energy, through wire 32^d, armature 33^a, contact 33^d, magnet 2, key 1, wire 38, contact 39, armature 39^a, to (−). Armature 3^b is then drawn to magnet, and rod 3 carrying this armature pivots about the axis 3^a thereby drawing downwardly the pawl 4 and causing the rotation of the tooth wheel 5 by a step in the direction of the arrow. The wheel 5 has as many teeth as there are impulses in the code employed if the code consists of combinations formed of equal numbers of impulses. If not, the number of the teeth on the wheel may be equal to the number of the impulses in the combination comprising the highest number of impulses, in case not all the combinations are composed of the same number of impulses. The apparatus is provided also with a stopping pawl 4′. The stopping pawl 4′ is pivoted at 5′ to the frame of the device and is urged into engagement with the teeth of wheel 5 by a tension spring 6′. A lever mechanism comprises a vertical rod 7′ pivoted to rod 3′ which carries the armature 3^d actuated by the magnet 23, a horizontal lever 8′ pivoted near its center at 9′ to one end of which is pivoted vertical rod 7′ and to the other end of which is fastened the push member 10′ for actuating the pawl 4′ out of engagement with the teeth of the wheel when the magnet 23 is energized. Coil spring 11′ tends to return the wheel 5 to its normal position when released by pawl 4′.

The magnet 2 controls also two sets of reversing contacts 7^h, 7^b and 6^h, 6^b through switch-arms 7^a and 6^a respectively normally closed on the lower contacts 7^b, 6^b. When the magnet 2 is energized, it attracts armature 3^b, moving switch-arms 6^a and 7^a upwardly to contact with the upper contacts 6^h, 7^h thereby closing the circuit through the self-locking magnet 8. The circuit will then be from (+), magnet 8, wire 40, junction 9^b, wire 41, contact 6^h, switch-arm 6^a to (−). Consequently at each closing of the key the magnet 8 is energized and attracts its two armatures 9^a and 10^a. The armature 9^a being closed against contact 9, the circuit will then be from (+), magnet 8, contact 9, armature 9^a, wire 42, contact 26, armature 26^a, wire 44^d to (−), in such a manner that as long as the contact 26 is closed, the magnet 8 will then be energized even if the circuit from (+), magnet 8, junction point 9^b, wire 41, contact 6^h, switch-arm 6^a to (−) is broken.

The armature 10^a (retracted in the absence of signals against the contact 10^d) will be attracted by the magnet 8 and to move against the contact 10^e and close the circuit of the slow releasing relay 27, that is, from (+), armature 10^a, contact 10^e, wire 43, relay 27 to (−). At the same time the armature 10^a having left the contact 10^d opens at this point the circuit of the slow releasing relay 11, from (+) through armature 10^a, contact 10^d, wire 45, slow releasing relay 11, wire 44^e, to (−). The opening of this last circuit releases the armatures 12^a and 26^a of the slow releasing relay 11; the contact 12, open in the absence of signals, closes; the contact 26, closed in the absence of signals, opens.

The closing of contact 12 induces the closing of the following circuit from (+) to contact 25, wire 46, magnet 23, ground G^2 (equivalent to ground G^1), tooth wheel 5, projection 16, one of the contacts 17 to 20 (according to which signal is received the

first, second, etc., from the beginning of the group) corresponding wires 14 or 15, contacts 17 and 19 being joined to wire 15 and contacts 18 and 20 joined to wire 14, contacts 7^b (for wire 15) or 7^h (for wire 14), switch-arm 7^a (for both), junction point 7, wire 13, contact 12, armature 12^a to (−).

As a sequence to the above, on closing the contact 12 a current can be sent through wire 15 or wire 14, depending on the position of the switch-arm 7^a through its association with contact 7^b and 7^h, that is to say, by the opening of key 1 (which corresponds to the application of 7^a to 7^b) or by its closure 7^a against 7^h.

The slow releasing relay 11 is an electromagnet of the slow releasing type employed in automatic teelphones and is regulated in such a manner that its contact 12, which is open in the absence of signals closes only after the expiration of a space of time corresponding to the duration of a dot after the closing of key 1 so that the closing of contact 12 can be effected: (*a*) at the moment when the key 1 has been released, when the signal has been a dot; (*b*) at the moment when this key is still contacting when the signal is a dash. In the first case, at the moment when the switch-arm 7^a is transmitting current by consequence of the closing of contact 12, the switch-arm 7^a will already have had the time to return into a position of repose, that is to say, against the contact 7^b; the current must then continue its path through the wire 15. In the second case, at the moment when the closure of contact 12 sends current through switch-arm 7^a, the latter has not yet left 7^h, since the key 1 is still closed and the current is directed across contact 7^h through wire 14. This constitutes the disposition of the apparatus for the automatic selection of wire 14 and 15, according as the signal received is a dash or dot.

The opening of contact 26 (simultaneously with the closing of contact 12) produces the opening of the circuit: from (+), magnet 8, wire 40, contact 9, armature 9^a, wire 42, contact 26, armature 26^a, line 44^d to (−). Now the magnet 8 can only be energized through the following circuit: from (+), magnet 8, wire 40, junction point 9^b, wire 41, contact 6^h, switch-arm 6^a to (−).

If the signal received is a dot, this last circuit is already open at the moment of the opening of contact 26; consequently the magnet 8 is de-energized and, at the expiration of time equivalent to a dot, after the beginning of the signal, ceases to attract its armatures: the situation corresponding to the absence of signals is re-established and the whole apparatus is ready to receive a new signal.

If the signal received is a dash, that is to say, if, when at the opening of contact 26, the key 1 is still depressed and the switch-arm 6^a still rests against 6^h, the magnet 8, after the opening of its feed circuit passing through contact 26 continues to be fed by another circuit, whose continuity is maintained by the switch-arm 6^a and contact 6^h, so that they engage, that is to say, as long as the key 1 is depressed. When this key is open the supply current for magnet 8 and its action ceases; the apparatus is then in a position of repose.

It is necessary to provide means for controlling the order of the signals in the group. For this purpose, the wheel 5 carries a projection 16 which in advancing encounters in succession the contacts 17, 18, 19, 20 and 21.

When the first signal is received, the projection 16 engages contacts 17, when the second signal is received the projection 16 engages the contact 18, etc. If the group for which the apparatus is adjusted is such that the first signal is a dash, the contact 17 is connected with the line over which the dots are sent, and the other contacts 18, 19 and 20 are also connected to the line corresponding to the other signal than the one for which the apparatus is adjusted.

It will be seen therefore that, if the group of signals sent is the one for which the apparatus is adjusted, the contacts 17, 18, 19 and 20 are not traversed by current, since the circuits mentioned herein result in the closing of contact 12, each of them comprising one of the contacts 17 to 20, (−) is opened at the moment of the closing of contact 12. In effect, by reason of the existence of 17^a, 18^a, 19^a, 20^a, the switch-arm 7^a is each time disconnected from the contact corresponding to the closing of the circuit in question, that is to say, from the closing of contact 7^b or 7^h according to the signal received. If on the other hand, the group of signals received does not correspond to the adjustment of the apparatus, one of the above mentioned contacts is placed under current and conducts the current through the frame of the apparatus to the magnet 23, through the following circuit: from (+), contact 25, wire 46, magnet 23, ground G^2 (ground G^1), wheel 5, projection 16, one of the contacts 17 to 20, corresponding wires 17^a to 20^a, wires 14 or 15, switch-arm 7^a, corresponding contact 7^b or 7^h, junction point 7, wire 13, contact 12 to (−). This magnet becomes energized and actuates the driving pawl 4 and the pawl 4′, whereupon the wheel 5 is returned to its normal position under the control of the spring 11′.

If the signal is not the correct one, the wheel 5 is returned to its normal position and the projection 16 cannot pass by contacts 17 to 20 unless the signals are the ones for which the apparatus is adjusted.

The magnet 23 is provided with a locking contact 24 whereby the supply current for the circuit of this magnet is assured from

the time it receives an impulse until the projection 16 opens the contact 25, so that when the projection 16 is between two contacts, for example 20 and 19, and when the supply current for the magnet 23 has been broken in the manner indicated, the supply current for magnet 23 is still maintained by means of the following circuit: from (+), contact 25, wire 46, magnet 23, ground G^2 (ground G^3), wire 24^a, contact 24 to (−).

When the holding magnet 8 is energized, it closes through its actuated armature 10^a the circuit of slow releasing magnet 27. The function of the latter is to control the duration of the silent period separating the impulses of the same code signal. In response to each impulse received, the magnet 27 is energized. If the impulses follow in normal succession, i. e. if the duration of the silent periods separating two consecutive signals is inferior to the time for which the slow releasing magnet 27 is adjusted, this magnet does not allow its armature 28^a to close. However, if the duration of the silent period separating two signals is superior or equal to this time, the armature 28^a is closed. Since at this time the magnet 2 is in normal condition, the switch-arm 6^a connects the (−) pole of the battery with the lower contact 6^b, and establishes the following circuit: from (−), switch-arm 6^a, contact 6^b, wire 47, contact 28^b, ground G^4 (ground G^2), magnet 23, wire 46, contact 25 to (+), whereupon the restoring magnet 23 is energized. The apparatus will, therefore, be restored to normal when the silent period is too long.

When the signals received are the ones for which the apparatus is adjusted, and if these signals are sent out in normal succession, i. e. separated by suitable silent intervals, the projection 16 may advance until contact 20 is reached. Two conditions may now obtain; the group of signals received may be either the one for which the apparatus is adjusted or it may comprise an additional signal.

In the first case, the group received will be followed by a longer silent period than the normal interval between the signals. Under these conditions, the silence controlling magnet 27 allows its contact to close and the ringing magnet 31 is energized from (+), through magnet 31, wire 30, contact 22, wire 29, contacts 28^b, 28^b, wire 47, contact 6^b, switch-arm 6^a to (−). Magnet 31 closes contact 33 completing the circuit of the call-bell S. At the same time, the magnet 31 locks up through contact 34 to the (−) pole until the apparatus is stopped, either by hand or by means of a key 35. When the magnet 31 operates, the magnet 2 is disconnected from the (+) pole in contact 33. For this reason, the signals that might be sent later on, will not be received until the magnet 31 is returned to its normal condition upon the actuation of key 35.

The bell will ring until the key 35 is depressed, and during all this time the signals do not actuate the apparatus.

It will be noticed also that when the ringing magnet 31 is energized upon the closure of armature 28^a against contacts 28^b and 28^b of silence controlling magnet 27, the following circuit is established: from (−), through switch-arm 6^a, contact 6^b, wire 47, contact 28^b, armature 28^a, ground G^4 (ground G^2), magnet 23, wire 46 to contact 25. The magnet 23 therefore actuates the pawls, and the wheel 5 is returned to its normal position.

In the second case, if the group of signals received is followed by another signal instead of a silent period of sufficient duration, the wheel 5 will advance by one notch. As a result, projection 16 will now engage contact 21, and the following circuit will be closed: (+), contact 25, wire 46, magnet 23, G_2, G_1, 16, contact 21, wire 21^a, junction point 7, wire 13, contact 12, armature 12^a to (−). No matter what kind of an extra signal is received, the magnet 23 will be energized and the apparatus will return to normal without ringing the bell.

The calling device therefore cannot be actuated by a group of signals composed of the same signals as the group for which the apparatus is adjusted but comprising an additional signal (dash or dot). In this manner, if the Morse code is used and the apparatus is adjusted for the letter S (•••), it will not respond to the letter H (••••) or the letter V (•••▬).

On the other hand, an apparatus adjusted for a group is prevented from responding to the final signals of another group (e. g. in the case of the letter S •••, to the letter B ▬•••). After the first signal (a dash), the wheel 5 in returning to its initial position opens at contact 36 the connection between pole − and the line 38. The following closure of contact 1 in response to the next signal is without any effect (notwithstanding the fact that this signal is a dot) because, before magnet 27 allows its contact 39 to close the path from the − pole to line 38, a longer time expires than the normal silent period between two signals.

It will be seen, therefore, that when an apparatus is adjusted for a certain group of signals, the calling device does not respond unless the group is normally sent out, i. e. it is neither preceded nor succeeded by any signal and the periods for spacing the signals are not too long. In this manner, the system adjusted for a certain group cannot be actuated by elements of other consecutive groups.

The above description was given merely for the purpose of exemplifying the invention, the arrangement disclosed relating to a group of signals corresponding to the letter

C (—•—•) of the Morse code. Obviously, the apparatus may be subjected to various modifications or simplifications depending on the particular application desired. The type and construction of the relays and magnets is arbitrary, the main thing being that these relays perform the functions disclosed.

The apparatus may be used to respond to call signals, such as groups of letters in wireless telegraphy for ships. In this case the number of the contacts 17 to 20 will be made equal to the total number of signals forming the different letters of the call indication. The contacts corresponding to dashes must be fed to wire 15, the signals corresponding to dots must be fed to wire 14. The contact 22 closed by the last signal impulse is connected to wire 29.

Let it be supposed that one desires to prepare the apparatus for the registering of the signal (•—•—•). Now, the first contact 17, the third 19, the fifth (which being the last of the group is always the 20 .....), corresponding to dots, must be joined to wire 14; the second and the fourth contact 18 and a supplementary contact must be joined to wire 15.

Obviously the group of contacts may be so disposed as to respond to a diversity of signals arranged with a view to avoiding atmospheric disturbances resulting in a false call.

In the case of transmission over wires, the apparatus may be simplified, whenever possible, by substituting in the place of the Morse code, a code composed of groups comprising a uniform number of signals. The number of the signals forming the groups of such code depends on the number of the stations to be selected, and the number of the contacts 17 to 20 will vary accordingly. The group to which the apparatus is responsive may be varied at will by changing the connections of contacts 17 to 20.

A certain elasticity in the cadence of operation may be obtained by proper adjustment of the slow acting magnets 11 and 27 in such a manner that, the contact 1 may be manually controlled.

In addition to its use as a call selector, this apparatus may be used also as a selector for controlling distant mechanical functions or as a telephone or telegraph selector.

Having described my invention, what I claim is:

1. An apparatus for selectively causing an indication under the action of premeditated electrical impulses of the Morse type, comprising, in combination, a work circuit, a movable element, electrical means for moving said movable element step by step through equal portions of its path on reception of each current impulse, means for causing energization of the work circuit in the final position of the movable element, and means to immediately return said movable element to initial position on the reception of an unpremeditated impulse for the particular position of the movable element.

2. An apparatus for selectively causing an indication under the action of premeditated electrical impulses of the Morse type, comprising, in combination, a work circuit, a movable element, electrical means for moving said movable element step by step through equal predetermined distances on reception of each impulse, means for causing energization of the work circuit in the final position of the movable element, means for restoring said movable element to initial position on the reception of an unpremeditated impulse for the particular position of the movable element, and means for causing actuation of the restoring means upon the expiration of a predetermined time interval after the termination of a received impulse at any position of the movable element.

3. An apparatus for selectively causing an indication under the action of premeditated electrical impulses of the Morse type, comprising, in combination, a work circuit, a movable member, electrical means for moving said movable member step by step through equal predetermined distances on reception of each impulse, means for causing energization of the work circuit in the final position of the movable member, means for restoring the movable member to initial position, means for immediately causing actuation of the restoring means on the reception of an unpremeditated impulse for the particular position of the movable member, said means including a series of contacts to be sequentially engaged by the movable member during its movement, and other electrical means for causing actuation of the restoring means upon the expiration of a predetermined time interval during which no impulse is received, said electrical means comprising a slow releasing relay controlled by the impulses.

4. In a call selector, means responsive to received impulses, a movable member actuated step by step by the impulse responsive means, dot and dash line conductors having a plurality of contacts associated therewith, the movable member contacting with one of said contacts upon the reception of each impulse, the arrangement being such that when the proper impulse is received circuits associated with the line conductors remain open, but when an improper impulse is received these circuits are closed, a restoring relay energized when said line conductor circuits are closed, and means actuated by said restoring relay for returning the movable member to initial position.

5. The combination as claimed in claim 4, together with electrically operated means controlled by the impulses and connected to

the restoring relay for causing restoration of the movable member to initial position at the expiration of a predetermined period of time during which no impulse is received.

6. In an apparatus for selectively causing an indication under the action of premeditated electrical impulses of the Morse type, a source of energy, two lines, means to energize either of said lines according as the impulse received is short or long, means for making successive connections to said lines according to the inverse of the premeditated sequence of impulses to be received, and means for immediately restoring the apparatus to its initial position when the impulses received do not correspond to said predetermined sequence of impulses.

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