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H. BURTON

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SELECTOR

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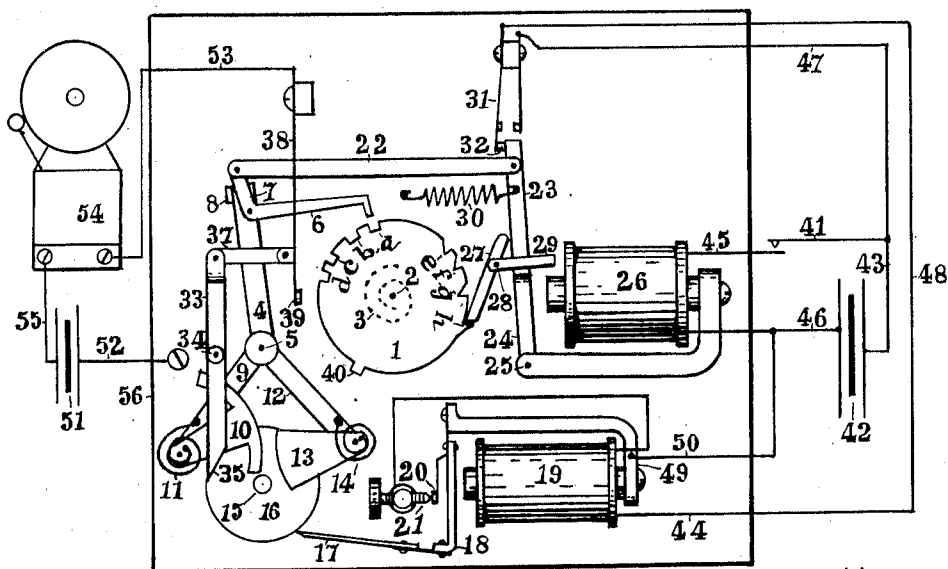


Fig. 1

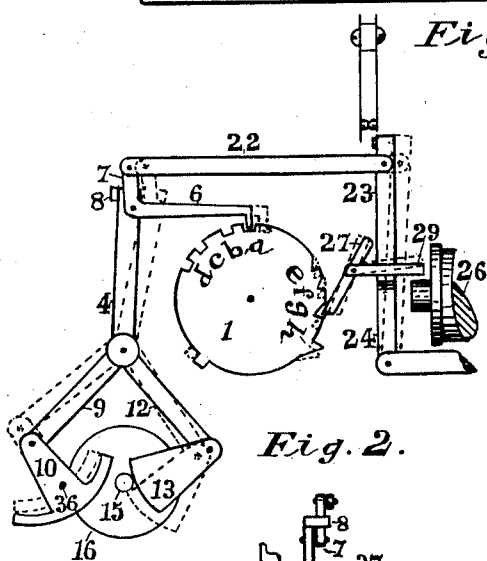


Fig. 2.

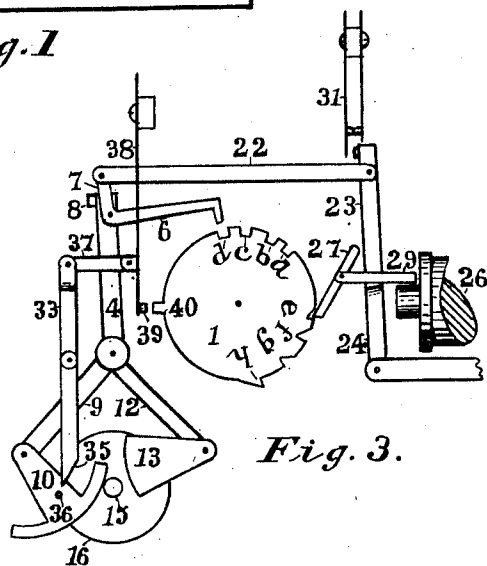


Fig. 3.

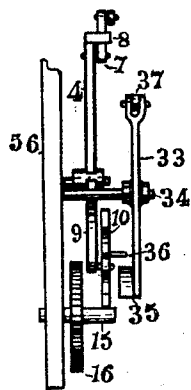


Fig. 4.

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## UNITED STATES PATENT OFFICE

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## SELECTOR

Henry Burton, Gardena, Calif.

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5 Claims. (Cl. 177—332)

My invention relates to a selector of the step by step type and the principal object is to provide a selector of simple construction adapted to interpret code messages or signals transmitted by long and/or short impulses such as the dots and dashes of the familiar telegraph code, or the short and long rings of the signal code commonly used on multi-party telephone lines. In describing my invention, reference is had to the accompanying drawing;

Fig. 1 is a general plan showing the various elements in normal position. Fig. 2 shows in solid lines the position assumed by the code member and step up elements responsive to a short impulse or dot and in dotted lines the position assumed by the same elements responsive to a long impulse or dash. Fig. 3 indicates the position assumed by the same elements during the interval between impulses and the means by which the signal is manifested when the code member has responded to its particular code. Fig. 4 is a side view of part of the time control and manifesting mechanism.

Referring to Fig. 1, the code member 1 is a thin disk adapted to rotate upon the pivot 2, and is biased to the position shown in Fig. 1, by the spring 3, back of the code member. The number and spacing of the notches *a*, *b*, *c*, *d*, and *e*, *f*, *g*, serve as a means to identify the code member with a predetermined code. The first notch *g*, is so located with reference to the starting point *h*, as to be brought into engagement with the detent 27, responsive to a short impulse. The second notch *f*, is a long step from notch *g*, therefore the second impulse must be a long one to advance the code member a long step in order for it to be detained by the detent 27. The third notch *e*, is a short step from notch *f*, and will be engaged by the detent in response to a short impulse, consequently the code member shown is identified with a code of one short, one long and one short impulse or dot dash dot and will respond to no other code. The bifurcated lever 4 is movable upon the pivot 5. To the upper end of lever 4 is pivoted the pawl 6 provided with the arm 7. The pawl 6, is limited in its movement relative to lever 4, by the stop 8 on lever 4. Pivoted to the arm 9, of lever 4 is the segment 10, biased to the position shown in Fig. 2, by the spring 11. To the other arm 12, of lever 4 is pivoted the segment 13, biased to the position shown in Figs. 1 and 3, by the spring 14. The purpose of these segments is to limit temporarily the movement of lever 4 by impingement upon the shaft 15 of the timing motor. The

wheel 16 of the timing motor is adapted to be rotated in clockwise direction by the spring pawl 17 connected to the armature 18 which is adapted to be vibrated by the motor magnet 19 when it is energized by current passing through the interrupter springs 20, 21, like an ordinary buzzer.

The periphery of wheel 16 is knurled as shown in Fig. 4. The arm 7, of pawl 6, is connected by the link 22 to the lever 23, carried by the armature 24 which is movable upon pivot 25, and responsive to the actuating magnet 26. The detent 27, is movable upon the pivot 28 and has the arm 29 responsive to magnet 26. The lever 23 and the elements connected therewith are biased to the normal position shown in Fig. 1 by the spring 30. Switch 31, controls the circuit to the timing motor and is held normally open by the insulating button 32 carried on the upper end of lever 23. The lever 33 is movable upon the pivot 34 and is provided at its lower end with the inwardly projecting inclined lip 35 (see Fig. 4). The lip 35 is adapted to cooperate with the pin 36 carried by segment 10. When segment 10, moves from the position shown in Fig. 3, to the position shown in Fig. 1, the pin 36 slides upon the inclined face of the lip 35 and forces the lower end of lever 33 to the left, but when segment 10 moves, responsive to spring 11, from the position shown in Fig. 1 to that shown in Fig. 2, the pin 36 passes back of the lip 35. The upper end of lever 33 is connected by the link of insulating material 37, with the contact spring 38. The purpose of the lever 33 and associated elements is to move the contact point 39 into contact with point 40 carried by the code member 1, whenever the code member has fully responded to its particular code of actuating impulses.

The step up mechanism, just described, is adapted to advance the code member 1, a short step responsive to a short impulse and a long step responsive to a long impulse. The detent 27 is effective to hold the code member in advanced position only if the detent is in engagement with a notch of the code member at the instant the impulse by which it is advanced ceases, because, when magnet 26 is de-energized, it ceases to attract the arm 29 so that the detent remains in whatever position it happens to be. If it is in a notch, it is effective to detain the code member. If it is out of the path of the notches as indicated in dotted lines, Fig. 2, it remains so and the code member reverts to normal position, responsive to spring 3.

The operation of the selector is as follows: As stated, the code member here shown and described is adapted to respond to a short, long, short code, i. e. dot, dash, dot. When the switch 41 is closed, the circuit is completed from the battery 42 and wires 43 and 45, through winding of the actuating magnet 26, over wire 43 back to battery, energizing magnet 26. Armature 24 is attracted. The first movement of arm 23 is transmitted by link 22 to the arm 7, and moves the point of pawl 6 into notch *a*, of the code member, then further movement of lever 23 moves the lever 4, pawl 6 and code member 1 to the position shown in solid lines, Fig. 2. Movement of lever 4 is arrested when the segment 13 impinges upon the shaft 15. The segment 10 being drawn clear of the shaft 15 responds to spring 11 and assumes the position shown in solid lines Fig. 2. The arm 29 is attracted toward the pole of magnet 26 so that the toe of detent 27 is moved into notch *g*, of the code member. The movement of arm 23 allows the spring 31 to close the circuit of the timing motor from battery 42 over wires 43 and 47, through switch 31, wire 48—44 through winding of motor magnet 19, interrupter contacts 20 and 21, frame 49, wire 50 and 46, back to battery. Armature 13 is set into vibration and causes rotation of the shaft 15 by the whipping action of the pawl 17 against the periphery of the wheel 16. Rotation of shaft 15 rolls segment 13 toward the position shown in Fig. 2; however, since the first impulse of the code is a short one the switch 41 is opened and the magnet 26 is de-energized before segment 13 has rolled off of shaft 15 to release the lever 4. When switch 41 is opened and magnet 26 is de-energized the arm 23 is retracted by the spring 30, the link 22 pushes the arm 7 so as to raise the point of pawl 6, out of engagement with the code member and when arm 7 impinges upon the stop 8, lever 4 with the pawl 6, is moved back until segment 10 impinges upon the shaft 15 which leaves the levers 4 and 23, and pawl 6 in the position shown in Fig. 3 and the code member advanced one step held by the toe of detent 27 in notch *g*, as indicated in solid lines, Fig. 2.

It will be noted that the levers 4 and 23 with the pawl 6 are not fully retracted to normal position, so that the switch 31, remains closed and the shaft 15 continues to rotate and to roll segment 10 toward the position shown in Fig. 1. Before segment 10 has rolled far enough to slip off of shaft 15 and release the lever 4, the switch 41 is again closed for the second impulse. Magnet 26 is again energized and the pawl 6 engages notch *b* of the code member and advances it as before. When lever 4 is arrested by the impingement of segment 13 upon shaft 15, this time the code member will not be advanced far enough for notch *f* to be engaged by the detent 27, because the step from notch *g* to *f* is a long one; however, since the second impulse of the code is a long one the armature 24 and the arm 29 of detent 27 continue to be attracted toward the pole of magnet 26 until segment 13 has rolled far enough to slip past the shaft 15 whereupon the lever 4 is released for the additional movement necessary to rotate the code member into a position where the notch *f* can be engaged by the detent 27, as indicated in dotted lines, Fig. 2. When switch 41 is opened and magnet 26 de-energized after the long impulse, the levers 4 and 23, segment 10, segment

13 and pawl 6 are restored as before to the positions shown in Fig. 3, leaving the code member advanced two steps. The next short impulse advances the code member in the same manner as was described for the first step. The code being now completed, the switch 41 remains open and the levers 4 and 23, pawl 6 and code member 1 remain in the positions shown in Fig. 3, while the shaft 15 continues to rotate and to roll segment 10 toward the position shown in Fig. 1. As the pin 36 slides upon the inclined lip 35, the lower end of lever 33 is moved to the left and the upper end of lever 23, by means of link 37, moves the contact point 29 into contact with point 40 carried by the code member, closing the circuit from battery 51, wire 52, frame of the selector 56, pivot 2, code member 1, spring 38, wire 53, to the bell 54, and back to battery over wire 55. When segment 10 has rolled far enough to pass the shaft 15, the elements are retracted to the normal position shown in Fig. 1. Lever 23 impinges upon the upper end of detent 27 and disengages the toe of the detent from the code member whereupon it is retracted to normal position responsive to spring 3, and the timing motor circuit is opened at switch 31 as shown in Fig. 1. It will be apparent that the code member will not respond to any other code of actuating impulses except the one for which it is especially notched. For instance: If the code member here shown should be subjected to a code of less than the three specified impulses it would not be advanced to a position whereat the contact point 39 could cooperate with the point 40. If the code consisted of more than the three specified impulses, say, a short, long and two short impulses, the code member would respond as described for the first three impulses, but the fourth impulse would advance the code member so that the detent 27 would be forced out of the path of the notches *e*, *f*, *g*, then when released by the pawl 6 the code member would immediately revert to normal position because, when the magnet 26 is not energized, the detent 27 is inoperative as heretofore described. When the code member is in normal position the first notch *a* is too far back to be engaged by the pawl 6, until segment 10 has passed the shaft 15 to permit full retraction of the lever 4, so that the code member could not be again advanced until enough time had elapsed to indicate the beginning of another code.

If the sequence of the short and long impulses should be different, say, two shorts and a long, then the second impulse being a short one the code member would be released by the pawl 6 while detent 27 was out of the path of the notches, *e*, *f*, *g*, whereupon the code member would revert to inoperative position as described. The code member 1 is shown with the three retaining notches *e*, *f*, *g*, and the four notches *a*, *b*, *c*, *d*, merely to disclose how the member is advanced a short step by a short impulse or a long step by a long impulse, and that the distance which the contact 40 must travel to bring it into position for cooperation with the contact 39 is equal to the sum of the individual steps which accrue from the impulses. It is to be understood that the member may be so fashioned that the necessary angular displacement of the point 40 will be the accretion from one or more short impulses, one or more long impulses, or a combination of short and long impulses, provided that the notches are num-

bered and spaced to correspond with the impulses, and the point 40 is located in the proper position relative to the starting point *h*. It will be seen then, that the selector is exclusively responsive to any code for which its code member is especially adapted. The terms short and long impulses are merely relative and are used throughout this specification merely to differentiate between different kinds of impulses. The selector may be adapted to recognize an impulse of less than any predetermined maximum length as a short impulse, whereupon any longer impulse will function as a long impulse. The maximum length of a short impulse is determined by the time required for segment 13 to roll off of the shaft 15 to the position indicated in dotted lines, Fig. 2, which time interval is dependent upon the speed of rotation of shaft 15 and length of the arc traveled by segment 13. The time interval allowable between impulses of a code is determined by the length of the arc traveled by segment 10 and the speed of shaft 15. Any suitable means for effecting rotation of the shaft 15 may be used. The bell 54 is merely representative of a manifesting means. Any suitable device may be actuated in like manner.

I claim—

1. A selector comprising in combination a movable code member biased to a normal position, a reciprocatory actuating element biased to a normal position, cooperating to advance the code member step by step responsive to code impulses, means for applying code impulses, detent means associated with the code member according to a predetermined code, a detent member cooperating to detain the code member whenever it is advanced in step with the code to permit reversion of the code member whenever it is out of step with the code, timing means cooperating with the actuating element to limit retraction thereof for a period greater than the normal period between code impulses, means effective to render the code member after reversion unresponsive to the actuating element pending full retraction thereof, and manifesting means responsive to the code member.

2. A selector comprising in combination a movable code member biased to a normal position, a magnet, means for intermittently energizing the magnet, a reciprocatory actuating element biased to a normal position cooperating to advance the code member step by step responsive to the code impulses, a timing motor, means for effecting constant motion thereof, a member cooperating with the timing motor to limit retraction of the actuating element for a period greater than the normal period between code impulses, detent means associated with the code member according to a predetermined code, a detent member cooperating to detain the code member whenever it is advanced in step with the code, to permit reversion of the code member when it is advanced out of step with the code, means effective to render the code member after reversion unresponsive to the actuating element pending full retraction thereof, and manifesting means responsive to the code member.

3. A selector comprising in combination a movable code member biased to a normal position, a magnet, means for intermittently energizing the magnet for code impulses, a reciprocatory actuating element biased to a normal position, cooperating to advance the code member step by step

responsive to the code impulses, detent means associated with the code member according to a predetermined code, a detent member cooperating to detain the code member whenever it is advanced in step with the code to permit reversion of the code member when it is advanced out of step with the code, timing means cooperating with the actuating element to limit retraction thereof for a period greater than the normal period between code impulses, means effective to render the code member after reversion unresponsive to the actuating element pending full retraction thereof, and manifesting means responsive to the code member cooperating with the timing means to manifest a signal after completion of the impulse code.

4. A selector comprising in combination a movable code member biased to a normal position, a magnet, means for intermittently energizing the magnet for short and long code impulses, a reciprocatory actuating element biased to a normal position, cooperating to advance the code member step by step responsive to the code impulses, a timing motor, means for effecting constant motion thereof, a member cooperating with the timing motor to temporarily limit advancement of the actuating element whereby it is advanced a short step responsive to a short impulse and a long step responsive to a long impulse, a second member cooperating with the timing motor to limit retraction of the actuating element for a period greater than the normal period between impulses of a code, detent means associated with the code member according to a predetermined code, a detent member cooperating to detain the code member whenever it is advanced in step with the code to permit reversion of the code member when it is advanced out of step with the code, means effective to render the code member after reversion unresponsive to the actuating element pending full retraction thereof, and manifesting means responsive to the code member cooperating with the timing motor to manifest a signal after completion of the impulse code.

5. A selector comprising in combination, a movable code member biased to a normal position, means responsive to each impulse of one kind of impulses to move the member a given distance and responsive to each impulse of a different kind of impulses to move the member a greater distance, said means including a magnet energized by the impulses, a notched member rigidly attached to the code member for movement therewith, the notches in the notched member being spaced to correspond to the successive distances of movement of the code member, a detent member cooperating with the notches in the notched member to hold it and its attached code member against retrograde movement between impulses, said detent member being normally out of the path of the notches in the notched member, and being moveably supported within the field of the magnet so as to be attracted thereby into the path of said notches whenever the magnet is energized; the notches and detent member being so shaped that the detent member will remain in retaining position if it is in a notch of the notched member when the magnet is de-energized, whereby the code member will be advanced step by step if the successive movements of the code member agree with the spacing of the notches in the notched member.

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