Oct. 3, 1944. H. A. STICKEL 2,359,494

SELECTIVE SIGNAL DEVICE

Filed March 24, 1943 2 Sheets-Sheet 1

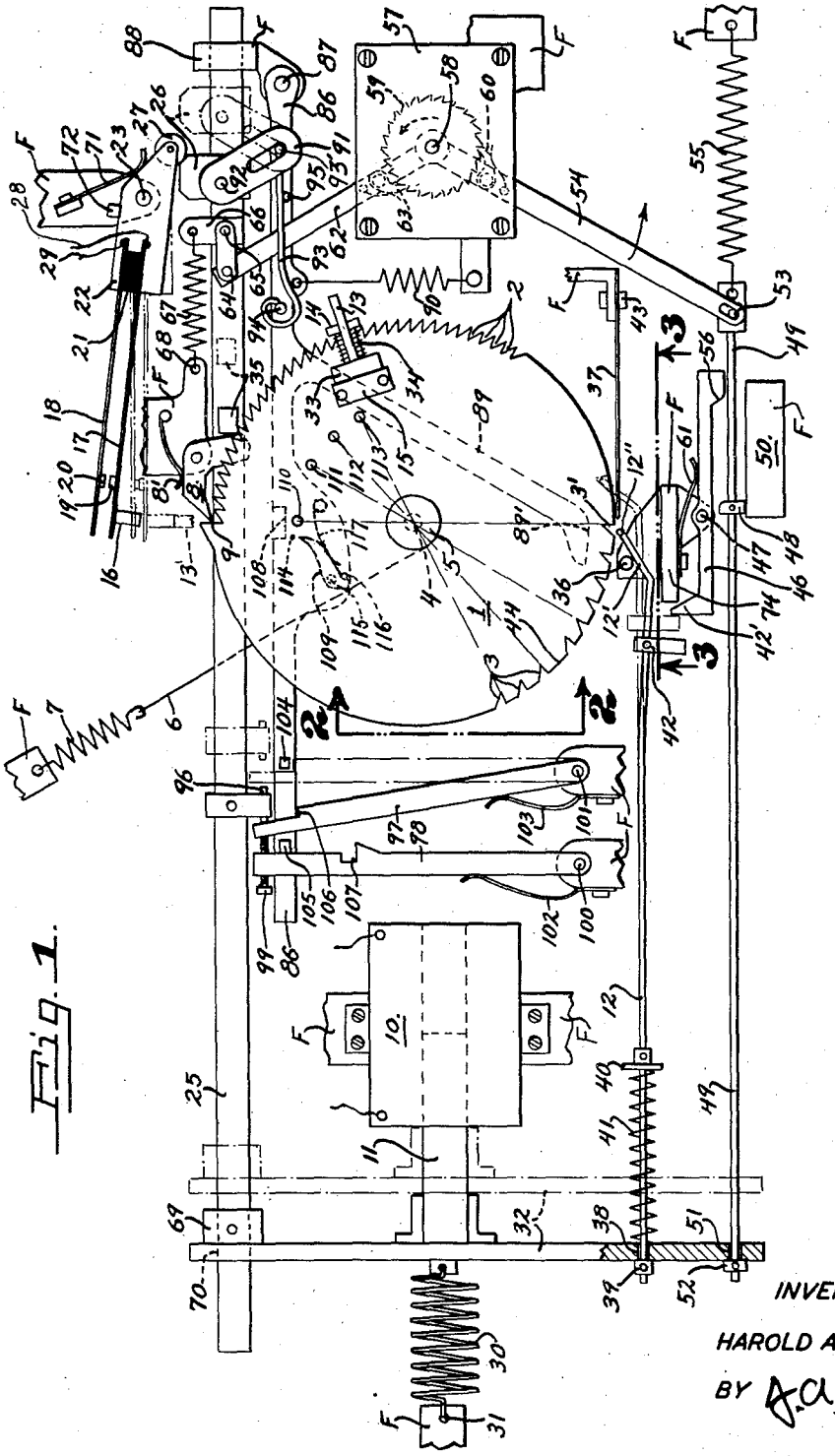

Fig. 1.

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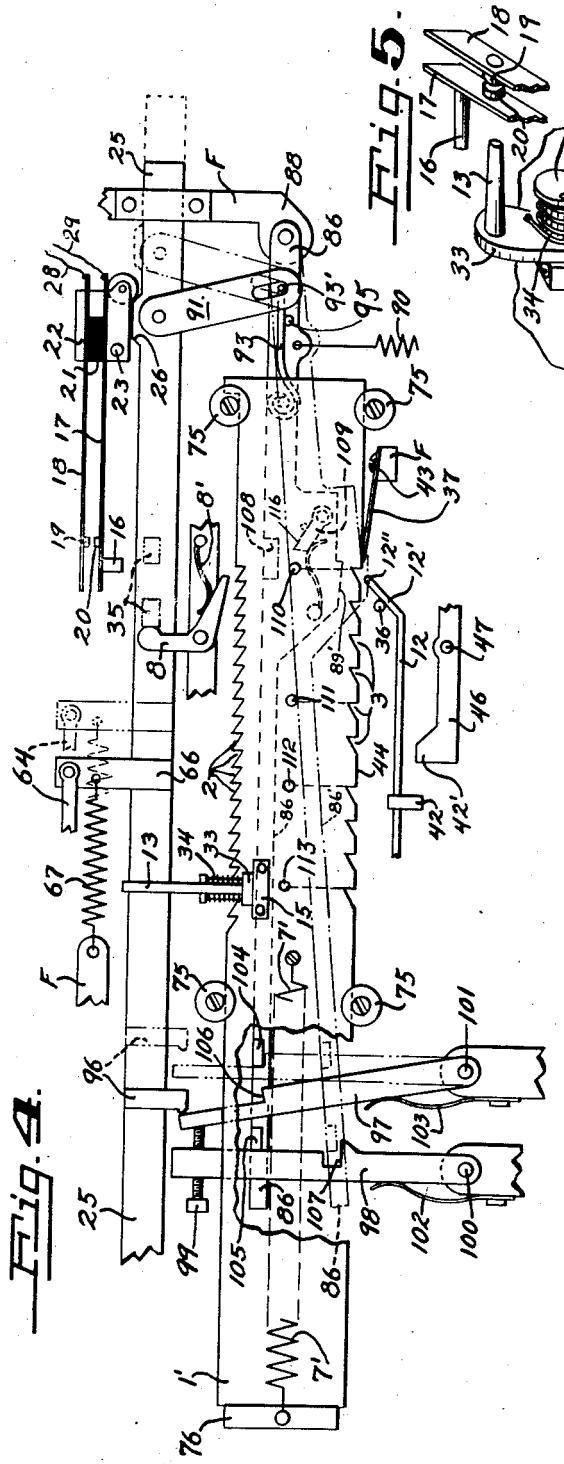

Fig. 4.

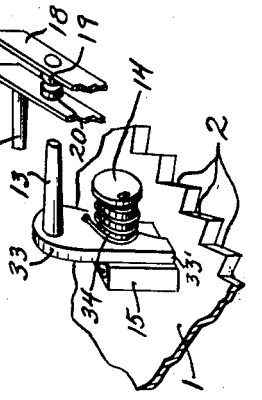

Fig. 5.

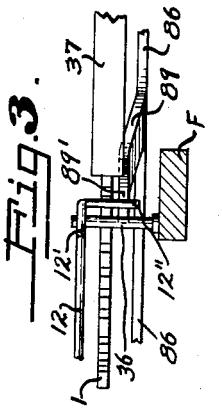

Fig. 3.

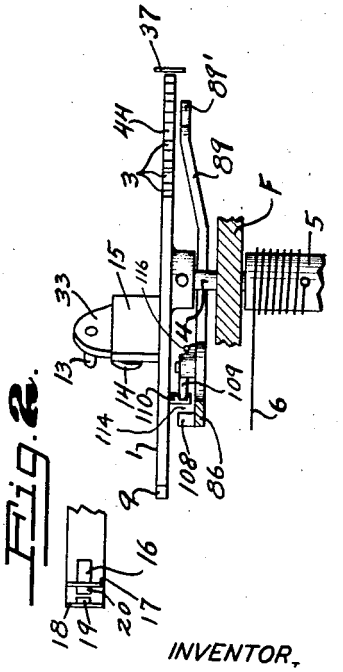

Fig. 2.

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Patented Oct. 3, 1944 2,359,494

UNITED STATES PATENT OFFICE

2,359,494

SELECTIVE SIGNAL DEVICE

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Application March 24, 1943, Serial No. 480,299

10 Claims. (Cl. 177—332)

This invention relates to electrical selective signal devices of the type operated by a succession of different length or duration of electrical impulses, such as the so-called dot and dash contacts, and which instrument may be arranged to operate a bell or other signal circuit only when a predetermined arrangement of dot and dash impulses are sent through it.

The invention has for its principal object an improved selective mechanism capable of selectively responding to a manually sent electric impulse code comprising several letters of the Morse code or other spaced groups of various dot and dash electrical impulses.

Specific features and advantages of the invention will appear in the accompanying drawings and following description.

This application is a continuation in part of my copending patent application of same title filed under Serial No. 435,700 on March 21, 1942 and takes the place of the same.

In the drawings:

Fig. 1 is a plan view somewhat diagrammatically arranged showing the main features of the invention.

Fig. 2 is a fragmentary cross section of Fig. 1 as seen from the line 2—2 thereof.

Fig. 3 is a fragmentary cross section of Fig. 1 as seen from the line 3—3 thereof.

Fig. 4 is a fragmentary plan view showing the use of a code and ratchet plate instead of the wheel or disk used in Fig. 1.

Fig. 5 is a perspective view of the spring pivoted contact making arm.

The device may be said to consist of a suitable frame F in which is mounted a revolvable or movable code element, which in Fig. 1, takes the form of a disk 1 with about half of its peripheral edge formed with simple ratchet teeth 2, and the opposite half notched (ratchet tooth fashion) with specially or unequally spaced notches 3 representing the desired dot and dash code to which this particular instrument can only respond to. This disk is secured to a revolvably mounted shaft 4 preferably having a small hub 5 secured to which and around which is wound a string 6, flexible band, or chain, and with its free end secured to a tensioned spring 7 so that the shaft and therefore the code disk will always tend to rotate clockwise under the tension of the spring until stopped by a spring pawl 8 urged by a spring 8' into engagement with the ratchet teeth of the disk, or if the pawl be raised, until the disk is stopped by a final stop lug 9, at the end of the ratchet teeth. Any other spring return arrangement for disk 1 may be used.

The correct electric dot and dash impulses sent to the instrument energize an electro-magnet 10 provided with suitably supported movable armature 11 which carries a spring wire finger 12 so arranged that it falls into one of the code notches at each electrical impulse energizing the magnet and forcibly pushes the disk around a distance equal to the spacing of the code notches, and the disk is held from revolving in the opposite direction by the spring pawl 8 engaging the ratchet teeth 2 so that by repeated impulses the code disk is thus revolved until a laterally projecting arm 13 pivotally spring mounted at 14 to a boss 15 secured onto the upper side of the disk, is revolved to a point in alignment with a projection 16 on one of a pair of spring contact arms (17, 18 as shown in dotted lines 13').

The arm 13 will only arrive at the correct point if the code impulse arrangement is correct for the angular setting of the arm on the particular code disk, for if the predetermined code impulses as required for the particular code disk are not completed or an extra impulse or two are given, or the predetermined time interval between impulses, or a longer one between groups of such impulses (such as Morse letters) are not correct, the arm 13 will either be short of its required angular destination or beyond it or the spring pawl 8 will be thrown out and disk 1 returned to starting point. Contact arms 17, 18 carry contacts 19, 20 at their ends adjacent the code disk 1 and are secured adjacent their opposite ends to insulating blocks 21, 22 and pivoted at 23 to swing bodily toward the code disk, so that if code disk contact making arm 13 is in the final correct position and no more impulses are sent, certain timing mechanism (to be later described) moves rod 25 to the left and which rod carries a cam block 26 from dotted to full line position and strikes a roller 27 carried by block 22 and forces the contact arm assemblage to swing on pivot 23 against the action of a return spring 71 and move projection 16 against the outer (then aligned) end of arm 13 to thereby close contacts 19, 20 to complete the signal circuit through arms 17, 18 and flexible circuit connections 28, 29 secured to their opposite ends, and after which the further movement of rod 25 to the left causes a tripping lug 35 to be carried from dotted to full line position to trip pawl 8 from engagement with the ratchet teeth so that the code disk at once returns to starting position through action of spring 7.

Magnet 10 is suitably secured to the frame of the instrument and may be of any type, but is shown in the drawings as a solenoid with its movable core 11 normally retracted as by a strong spring 30 anchored at 31, and a yoke or arm 32 carries the spring finger 12 and rod 25. Portions of the frame of the instrument to which the various fixed pivots and mounting are made are designated F in the drawings.

Contact making arm 13 is round, as will best be seen in the perspective view Fig. 5, and so also

is projection 16, and arm 13 is pivotally mounted on boss 15 so as to swing downwardly out of the way of projection 16 upon striking the same from a too far advanced position of the disk due to the disk having been advanced beyond the final position for the correct code. To this end arm 13 takes the form of a crank with a vertical portion 33 pivoted to a pin 14 projecting from boss 15, and around which pin is a small wire spring 34 hooked over the edge of 33 in a manner urging the arm 13 to swing contra-clockwise (Fig. 5) until the heel 33' contacts disk 1, yet freely permits the arm 13 to swing downward (clockwise) to pass under projection 16 when returning with the disk 1 from too far an advanced position. No signal is sent upon such a return underside contact of arm 13 with projection 16 as it does not force the spring contact arm 17, 18 together which carry the contact points.

Spring wire finger 12 is bent toward disk 1 as at 12' and downwardly at right angles (as at 12'') in Fig. 3, to fit into the code notches, and the wire is biased in direction to spring into the code notches of the disk when pushed to the right by the action of the magnet 10 to the dotted position, but when retracted to the full line position is pulled clear of engagement with the code disk by striking a fixed pin 36 secured to the frame of the instrument. When moved to the right by the magnet the bent down portion 12'' of the spring wire finger after entering the adjacent code notch 3' carries the notch to the right to the dotted position and the engaging portion 12'' passes under the free end of a leaf spring 37 which bears against the edge of the code disk as shown, so that when the finger 12 is retracted it must lift this spring and cannot again reenter this notch as the disk will be held in the advanced position by the ratchet pawl 8. Spring 37 is anchored at 43 to the frame of the instrument.

In the actuation of the magnet, wire finger 12 is not positively pushed along, but is slidably connected to yoke 32 as indicated at 38 and formed with a head 39 at its outer end and provided with a collar at 40 and a coiled compression spring 41 around the finger between the yoke 32 and the collar, tending to urge the finger to operate the code disk but normally prevented from doing so by the stronger spring 30 of the movable core holding it and the yoke retracted and pulling finger 12 to outer position clearing the code disk, as shown in Fig. 1.

When the yoke 32 moves inwardly (to the right) to the dotted line position it moves further than required to carry the code finger 12 a distance to operate the code disk one notch, but as the finger is only moved to the right under the force of spring 41 it engages a code notch and turns the code disk a circumferential distance equal to two of the ratchet teeth 2 and further movement of the finger is arrested by a stop 42 carried by the finger, striking movable stop 42', and if the electric impulse energizing the magnet is a short one corresponding to a "dot" of the code, the code finger will go no further but will almost instantly be retracted again by the outward movement of the yoke as the current impulse ceases. However, should the current impulse be a long one corresponding to a "dash" of the code, finger stop 42 will remain in contact with movable stop 42' until the timing mechanism (to be described) moves the stop out of the way of the finger stop 42 to thus permit the finger to advance the engaged code notch to a further point equal to one more of the ratchet teeth, or three in all for a dash impulse, and but two teeth for a dot impulse.

Thus, the movement of the code disk one "dot" notch moves the ratchet teeth 2 a distance of two teeth in relation to pawl 8, and if held too long would have moved the ratchet three teeth, whereas for "dash" signals the spacing of the code notches is made to give a total of three ratchet teeth advance upon holding of the magnet circuit closed for the "dash" impulse. Such a dash spacing of the notches is indicated at 44, and when the notch just preceding it is engaged by the finger 12 the impulse must be held until stop 42' moves out of the way and the disk is further advanced to bring the next notch into engaging position, otherwise, if a dot impulse only were made and the finger retracted, the next time the finger moved forward it would find no code notch in position to receive it but would ride over the outerside of spring 37, and thus the code could not be completed.

The advantage of having the disk holding ratchet teeth 2 in the relation of two equalling one dot impulse in rotatary travel of the disk, and a dash impulse moving the disk a distance equal to three of the ratchet teeth, will be evident, as it prevents pyramiding of wrong impulses to equal the total of the correct impulses, and is one of the distinct advantages of the invention, while the covering of the code notches as by the spring 37 is another important feature as it insures that once a code notch has been advanced by movement of finger 12 the finger can never re-enter it.

From the foregoing it will be seen that, with a proper angular relation of contact making arm 13 to the particular group of short and long code impulse notches, it will be necessary that they all be operated in proper succession, or else the sum total of ratchet teeth displaced will be too little or too great and the arm 33 will not align with the signal circuit closing projection 16.

However, while the proper sequence of the dot and dash impulses to form the complete code for which the disk is notched is necessary in order for the instrument to give a signal, and the length of time each dot impulse is held is also vital as a dot will turn into a dash if held too long, the length of the pause after each dot or dash impulse is equally important, as the ratchet pawl will be kicked off by the timing mechanism to allow the code wheel 1 to reverse to the starting position, as explained below, and all as disclosed in my copending previously filed case of which this is a continuation in part. Besides this, in the present construction additional means is provided to not only permit but actually require a longer than normal pause at certain desired points in the code, say, as between several groups of dot and/or dash impulses, such as would be necessary to represent several letters of the Morse code such as the group H A S

(. . . . . — . . .)

or any other group of more or less letters or arbitrary sub-groups for which there is room on the rim of the code wheel or disk 1 to form the required number of notches.

The notches 3 in the code disk shown in the drawings are arranged for the letters H A S as above shown in Morse code except that the long pauses between letters do not appear in the notching as these pauses are taken care of by

certain pins 110, 111, 112, 113 cooperating with stops 108 and 109 on a special lever or pivoted arm 86 as will be later explained.

The action of the timing means which controls the movement of rod 25 and stop 42' will now be explained.

Movable stop 42' is carried on one end of a lever 46 pivoted at 47 to a fixed point, and this lever is operated to swing stop 42' out of the path of stop 42 by means of a tripping lug 48 carried by a longitudinally movable rod 49 guided as by a block 50 and which rod passes loosely as at 51 through the yoke 32 and is provided with a head 52 so that upon retraction of the yoke by the heavy spring 30 rod 49 and its trip lug 48 will always be carried back to starting point. The opposite end of rod 49 is pivotally connected as at 53 to a ratchet arm 54 and also to a tension spring 55, of less strength than spring 30, which tends to pull the rod to the right and move lug 48 until it strikes the rounded end 56 of lever 46 and moves swing stop 42' downward to clear stop 42. When the magnet 10 is not energized, rod 49 being pulled all the way to the left by the yoke, return spring 30 overcomes the force of spring 55, but when the yoke moves to the right upon energizing the magnet it releases contact with the head 52 of the rod and permits spring 55 to both pull the rod along and also swing the ratchet lever 54. However, ratchet lever 54 is prevented from moving except under control of a timing clockwork indicated at 57 or other timing device.

Clockwork 57 is suitably secured to the frame of the instrument and may be any ordinary escapement or governor controlled clockwork (with the usual energizing spring omitted) and to a suitable shaft 58 of which a fine ratchet or milled edge wheel or disk 59 is secured so that when any force is evenly applied to turn the wheel in direction of the arrow, it will turn but slowly under control of the clockwork.

Ratchet arm 54 is freely pivoted around shaft 58 and carries a spring pressed ratchet pawl 60 bearing against the milled edge of the wheel, and the pull of tension spring 55 therefore (when permitted by the inward movement of yoke 32 from head 52 of rod 49) can only slowly pull the rod 49 along toward the right, and after a predetermined time interval traveling lug 48 will trip the end 56 of lever 47 and move swing stop 42' down and so permit the then compressed spring 41 to urge the finger 12 forward to revolve the code disk 1 a distance equal to one more of the ratchet teeth 2. At this point stop 42 will strike a fixed stop 74.

Preferably a small compression spring 61 is provided to normally urge lever 47 to position shown in Fig. 1, though if the parts are correctly made the lever will always swing back to this position when the magnet armature is retracted.

To control and time the movement of sliding rod 25 a similar connection to the clockwork is used as described for rod 49, in that another ratchet arm is used 62 also freely pivoted at its inner end around the shaft 58 and provided with a spring pressed pawl 63, while pivoted to the outer end of the arm is a link 64 in turn pivoted at 65 to a lug 66 secured to rod 25 so that rod 25 can only move longitudinally to the left under control of the clockwork by also swinging the ratchet arm 62. Rod 25 is normally urged to slide to the left by the action of a tension spring 67 secured at one end to lug 66 and anchored to the frame at the other end as at 68. From this construction it will be evident that after rod 25 is forcibly and almost instantly pushed to the right by the inward movement of the armature yoke 32 pressing against a nut or lug 69 preferably adjustably secured to rod 25, it will remain in the inward position as the yoke moves out again over the rod which extends freely through the yoke at 70, but the rod will at once slowly start back again through the force of spring 67 but only at a speed of travel as determined by the clockwork. Thus, the rod 25 will start back after each code impulse, but will never reach the point to trip the ratchet 8 during the normal pauses between code impulses, but in event of too long a delay between impulses, or after the complete code has been sent and the armature yoke stays in the retracted full line position, in a few seconds (as predetermined by the adjustment of the clockwork) the rod 25 will have moved outward again (to the left) for tripping lug 35 to have tripped the pawl 8 from engagement with the ratchet teeth 2, and whereupon spring 7 will have at once revolved the code disk 1 back to starting point with its final stop lug 9 against the end of the pawl 8 as shown in Fig. 1.

It should be noted, however, that during the return movement of rod 25 and just before tripping lug 35 reaches the pawl 8 cam-block 26 has reached roller 27 and forced the contact arms to swing downward so that if the code sent was correct and arm 13 was in proper position, projection 16 of arm 17 would have been forced against it to close the signal circuit (and which of course might operate a bell, or a lamp, or both, or any other device desired). After cam-block 26 passes roller 27 a spring 71 returns the contact arm assemblage to initial position with block 22 against a fixed stop block 72.

The provision requiring extra long pauses between certain predetermined groups of dot and/or dash or mixed impulses or Morse code letters mentioned on page 2 hereof, is met in the present disclosure by the use of a lever or arm 86 extending under the code disk 1 substantially parallel to slidable clock controlled rod 25, and which lever is pivoted at one end at 87 to a fixed portion or extension 88 of a part of the frame F of the instrument and with its other end free to swing. A branch or Y extension arm 89 of the lever 86 passes across below the disk 1 and has its outer end 89' bent up to be quite close to the disk 1 and is so formed that when the lever is swung inwardly or toward the center of disk 1 the end of the Y arm will move outward toward the code notches of the disk and form an obstruction preventing the entrance of the end 12'' of the disk revolving finger 12 until this obstruction is removed by the lever 86 being swung back again, (though the lever is normally urged by a light tension spring 90 to swing inwardly).

The swinging of lever 86 is carried out under time control by a spring link connection to slidable rod 25 comprising a slotted link 91 pivoted at 92 to cam-block 26 and engaging in its slot the upturned end 93' of a wire spring 93 which is preferably formed with a coil as shown to make it more resilient, and which is firmly anchored at its other end to lever 86 as at 94. A stop pin 95 projects from the lever to limit the flexing of the outer end of the spring. The slotted link 91 is of such a length that it must occupy an angular position at both ends of the sliding movement of rod 25— and as respectively shown in full and dotted lines, so that when in either extreme po-

sition it will be pulling on the end 93' of the spring and hence resiliently pulling the lever to full line position against the weaker force of spring 90. As the rod 25 slides and permits the link 91 to project at right angles it releases spring 93 (to stop at pin 95) and permits spring 90 to swing lever 86 inward or toward the center of the instrument and its extension 89 to block off the code notches of the disk so that the wire finger 12 cannot enter therein. Means is provided for locking lever 86 in either extreme position of swinging. This means takes the form of two latch bars 97, 98, an adjustable latch tripping screw 96 carried by slidable rod 25 for tripping latch 97, and an adjustable latch tripping screw 99 carried by latch 98. Both latch bars are pivoted to the frame F as at 100 and 101 respectively and both provided with light return springs 102, 103 respectively for urging them against stop pins 104, 105 respectively, projecting from lever 86.

Pins 104 and 105 are preferably rectangular and latch bar 97 is formed with a shoulder 106 cooperating with pin 104 to lock lever 86 in outer position, and latch bar 98 is formed with a shouldered recess 107 cooperating with pin 105 to lock lever 86 in inner position with its extension 89 blocking off the code disk notches.

Besides the above features, lever 86 is provided with a pair of adjacent stops 108, 109, (the latter being pivotally mounted), and which cooperate with pins 110, 111, 112, 113 which project downwardly from the under side of the code disk 1 for the purpose of determining the extra long pauses between groups of code contact impulses (letters of the More code) as will be later explained.

In the operation of the instrument the time controlled outward movement of rod 25 is such that arm 89 does not swing to position for blocking off the code notches of the disk until a certain predetermined time interval has passed corresponding to the maximum time allowed for the interval between regular consecutive contacts—say 1½ seconds—and at which moment rod 25 has moved far enough to cause the point of adjustable tripping screw 96 to strike the end of and releases latch 97 which normally locks lever 86 in the full line position shown in the drawings against the pull of its tension spring 90, as link 91 has by that time become extended substantially at right angles to rod 25 and released its pull on spring 93, and thus permits lever 86 to swing away from rod 25 and move extension 89 over to substantial alignment with the edge of disk 1 to block-off entrance of the end of wire finger 12 into any more of the code notches, and when in such position lever 86 is again locked in place by the second latch 98, until further movement of tripping screw 96 forces the outer end of latch 97 along until it contacts a similar adjustable tripping screw 99 projecting from latch 98 and trips this latch to permit lever 86 to fly back to the first locked position with latch 97 and thereby withdraw the extension 89 from code-notch blocking position. The force which causes lever 86 to fly back again is from spring 93 which by that time is again under tension by reason of the angular extension of link 91 which will have moved to the full line position of Fig. 1 and overcome the feebler pull of spring 90 in the opposite direction.

Substantially simultaneously with the return of lever 86 to the position shown in Fig. 1, tripping lug 35 carried by rod 25 will have reached ratchet pawl 8 and tripped it so that the code disk will also fly back to starting point.

Pins 110, 111, 112, 113 are arranged on disk 1 at points diametrically opposite the termination of each group of code notches or Morse letter groups as indicated by the dotted lines extending from each pin, and immediately upon the termination of each group one of the pins will be directly in front of lug 108 of lever 86 so as to stop said lever from flying to code blocking position even if latch bar 97 has been released and thus both permits and requires a longer time interval between such letter groups of impulses than the much shorter time interval between impulses within any group, for with a pin 110 directly opposite stop lug 108 the pin is also directly in front of stop 109 so that if the pause were too short and the next impulse were sent the code disk could only be advanced a distance equal to one ratchet tooth as the clearance from the pin to stop 109 provides, and then the next code notch engagement could not be made as the finger 12 would not be in position to enter, hence the pause must be long enough for latch 97 to be tripped by the clock controlled movement of rod 25 so that lever 86 will move in to bring its lug 108 in contact with the pin, and thereby also open a path 114 between lug 108 and stop 109 for the pin to pass if the next impulse is sent within the final time limit for the longer pause and which will be when latch 98 is tripped and lever 86 flies back to starting point as shown in the drawings, for of course the moment this next impulse is sent within the predetermined maximum and minimum time limit pin 110 will pass through path 114, as lever 86 will have sprung over to locked position with latch notch 107. If the long pause is too long the tripping of latch 98 and ratchet pawl 8 will break the code by returning the code disk to starting point.

Stop 109 on lever 86 is pivotally mounted to the lever as at 115 and normally urged to position against a little pin 116 by a light spring 117. This construction permits the stop 109 to swing out of the way of the pins 110 to 113 when the disk 1 revolves back to starting point.

From a consideration of the operation of the various parts as above described it might be thought that since a large number of these instruments will be at various stations all on the same circuit though each with a differently notched code disk, that if one were coded for two dashes, and another for three dots, that since these two codes both represent an angular displacement of the code disk equal to six of the ratchet teeth of the disk, that in sending the code for two dashes it would also move the disk of the three dot station the same angular distance, as the long contact for the dash signals would urge the dot notch of the latter station one more ratchet tooth ahead—or three teeth for the two dash impulses, or a total of six ratchet teeth, and that hence both stations would close the signal circuit. However, this would not be the case, for the first dash contact received by the three dot station would urge its code disk three ratchet teeth ahead, and when the wire finger portion 12'' pulled back out of the notch from under spring 37 for the next stroke it would find no notch in place to receive it, as the dot notches are spaced for two ratchet teeth and since the long dash contact displaced the disk three teeth, the finger would be resting on top of the rim between a pair of dot notches, as the next notch which it would normally engage (for a dot contact) would be advanced one tooth and therefore covered over by spring 37. Hence, no mat-

ter how many further impulses were sent this disk would not move any further and finally at the end of the code being sent, would spin back to starting position.

Also, from the preceding description it will be seen that not only must the pauses between all regular impulses be no longer than prescribed by the timing mechanism, but that the longer pauses between groups of regular impulses must neither be longer nor shorter than the limits prescribed, or the code will not go through, as the instrument can only respond when all these factors are correct for the particular code disk used on the instrument.

In considering the above description and the drawings, attention is called to the fact that in the drawings, all operating parts have been spread out substantially in one plane so as to make the operation of the device and its description easily understandable. Whereas in fact the parts are closely grouped with some under the others, and the rods and levers, are variously shaped and compound to secure the required movements, all in order to get a compact instrument; as in a watch wherein the elements all overlap one another though the entire mechanism may be shown in one plane. Also to be noted is that while the disk **1** is shown as a ratchet wheel as well as a code notched wheel, this is but a simple way of showing that they must move as a unit, though each may be a separate wheel attached to the same shaft or otherwise positively connected for simultaneous movement, and accordingly they may be of any size and both the code notches as well as the ratchet teeth may extend any distance around the periphery, or all the way around the wheels.

Also while I show a code wheel operating finger **12'** having different distances of movement through use of a timed removable stop, no limitation is to be implied thereby as additional movable stops may be used to secure further movements of the finger for longer dashes if desired as code characters.

Also to be noted is that any form of movable magnet armature may be used, and the form of the various elements may be considerably changed to meet the compactness of the mounting desired.

Also to be noted is, that the code notches of the disk **1** actually form teeth or projections against which the pushing finger engages, and hence any projecting teeth or pins spaced in the manner shown for the notches will for some purposes be the equivalent of the "notches" set out in my claims, though the simple notches provide for easy covering by leaf spring **37** to prevent re-entry of the finger, or when a wrong duration of impulse is sent.

To change the code of any station, a differently notched code disk may easily be substituted for the one in the set. If groups of impulses or Morse letters are to be handled by the instrument the required long pause pins on the disk will be spaced accordingly.

While the invention as above described uses a notched ratchet disk as the progressively movable code element, the same result may be secured by using a simple flat plate notched along the edge and also provided with ratchet teeth along the same or opposite edge. Such a substitution will operate with all of the other features and delay clockwork movements, as previously described, and is shown in Fig. 4. This figure only shows the substitute plate for the notched disk and some of the previously described associated operating members and will therefore require no lengthy description.

In Fig. 4 the substitute elements are designated by the same numerals. Hence **1'** is an elongated flat plate mounted for easy longitudinal movement between four small grooved supporting rollers **75**. This plate takes the place of the disk **1** of Fig. 1 and is notched along one edge for the desired code at **3** and **44** as described for the disk, and provided along the opposite edge with the ratchet teeth **2** same as for the disk **1**. The plate is normally pulled to the left by a spring **7'** which corresponds to spring **7** of Fig. 1, to an initial or starting position against a fixed stop **76** (corresponding to stop **9** of Fig. 1).

Ratchet **8** operates on teeth **2**, and finger **12** on code notches **3** to gradually advance the contact making arm **13** to the right with the movements of the plate to bring it into alignment with the contact arm projection **16**. In this showing the pivotal spring mounting of arm **13** is the reverse of that shown in Fig. 5 to permit opposite direction of swinging upon reverse movement of the plate from an over advanced position. As this modified form shown in Fig. 4 operates the same as the disk arrangement of Fig. 1 described, no repetition appears necessary.

Since the movable code element **1** or **1'** may be either a disk or a plate as above described, the words plate or element used in the appended claims as designating this element are to be taken to mean either form or other equivalent of this element.

Having thus described my invention, and two ways of carrying it out, what I claim is:

1. In a selective signal device of the type adapted to be operated by a predetermined succession of dot and dash electric impulses, a movably mounted plate provided with code notches spaced along its edge, a reciprocable element arranged to engage said notches successively and move the plate, electrical impulse operated means for reciprocating said element, means normally limiting the movement of said element and corresponding movement of said plate, and time controlled means rendering the limiting means ineffective when a prolonged impulse is applied to said element and whereby a greater movement of said element and plate is effected, and means covering the moved notches against re-engagement by said element when once moved.

2. In a selective signal device of the type adapted to be operated by a predetermined succession of dot and dash electric impulses, a movably mounted plate provided with code notches spaced along its edge, a reciprocable element arranged to engage said notches successively and move the plate, electrical impulse operated means for reciprocating said element, means normally limiting the movement of said element and corresponding movement of said plate, and time controlled means rendering the limiting means ineffective when a prolonged impulse is applied to said element and whereby a greater movement of said element and plate is effected, and a leaf spring covering the moved notches against re-engagement by said element when once moved arranged to permit withdrawal of said element from a moved code notch by preventing re-entry thereof.

3. In a selective signal device having a movable element adapted to be advanced step by step by successive dot and dash electric impulses, a series of code notches spaced along said element

and taking the form of ratchet teeth variously spaced to respectively correspond with the dot and dash impulses, a reciprocably mounted spring pawl arranged to successively engage said notches to advance said element as the pawl is reciprocated, means normally limiting the advancing movement of the pawl a distance corresponding to the shortest spacing or dot of said code notches, and time controlled means permitting a further advance of said pawl and said element so that the total movement equals the spacing of a dash notch, but the spacing of said dot notches not being an aliquot part of the spacing of the dash notches, and a resiliently mounted cover closing off said code notches against a reentry of said spring pawl into a notch when once moved.

4. In a selective signal device having a movable element adapted to be advanced step by step by successive dot and dash electric impulses, a series of code notches variously spaced along said element corresponding respectively to said dot and dash impulses, electric dot and dash impulse operated reciprocable means arranged to engage said code notches successively to advance said element correspondingly upon one way movement of said means, means blocking engagement of said reciprocable means with the succeeding code notch unless the previously advanced notch was advanced a distance corresponding with its spacing value as a dot or dash notch, and time controlled means determining a relatively long pause between predetermined groups of dot and dash impulses before engagement of said reciprocable means with the code notch of the next group can be made.

5. In a selective signal device having a movable element adapted to be advanced step by step by successive dot and dash electric impulses, a series of code notches variously spaced along said element corresponding respectively to said dot and dash impulses, electric dot and dash impulse operated reciprocable means arranged to engage said code notches successively to advance said element correspondingly upon one way movement of said means, means blocking engagement of said reciprocable means with the succeeding code notch unless the previously advanced notch was advanced a distance corresponding with its spacing value as a dot or dash notch, and time controlled means determining a relatively long pause between predetermined groups of dot and dash impulses before engagement of said reciprocable means with the notch of the next group can be made, and means returning said movable element to starting position upon the predetermined length of the pause between groups being exceeded.

6. In a selective signal device having a movable element adapted to be advanced step by step by successive dot and dash electric impulses, a series of code notches variously spaced along said element corresponding respectively to said dot and dash impulses, electric dot and dash impulse operated reciprocable means arranged to engage said code notches successively to advance said element correspondingly upon one way movement of said means, means blocking engagement of said reciprocable means with the succeeding code notch unless the previously advanced notch was advanced a distance corresponding with its spacing value as a dot or dash notch, and time controlled means blocking off engagement of said reciprocable means with the next code notch for determining the maximum length of pause permitted between dot or dash impulses before engagement of said reciprocable means with the next code notch is made.

7. In a selective signal device having a movable element adapted to be advanced step by step by successive dot and dash electric impulses, a series of code notches variously spaced along said element corresponding respectively to said dot and dash impulses, electric dot and dash impulse operated reciprocable means arranged to engage said code notches successively to advance said element correspondingly upon one way movement of said means, time controlled means interfering with the proper advance of said element if any of the pauses between code impulses exceed a predetermined length of time, and means requiring a longer pause between predetermined groups of code signals before said element can be further advanced.

8. In a selective signal device having a movable element adapted to be advanced step by step by successive dot and dash electric impulses, a series of code notches variously spaced along said element corresponding respectively to said dot and dash impulses, electric dot and dash impulse operated reciprocable means arranged to engage said code notches successively to advance said element correspondingly upon one way movement of said means, time controlled means interfering with the proper advance of said element if any of the pauses between code impulses exceed a predetermined length of time, and means requiring a longer pause between predetermined groups of code signals before said element can be further advanced, and means for automatically returning said movable element to starting point upon one of such longer pauses exceeding a predetermined time interval.

9. In an electric selective code signal receiving device having a movable element carrying a signal operating contact member and adapted to be advanced step by step by dot and dash electric impulses of the Morse code type to bring said contact to signal operating position, time controlled means predetermining a maximum length of the pauses between individual impulses interfering with further proper advance of the element if the time is exceeded, and time controlled means requiring a predetermined longer pause between groups of such dot and dash impulses operative to prevent completing of the code if exceeded and returning said movable element to starting point.

10. In a selective signal device of the type adapted to be operated by a predetermined succession of dot and dash electric impulses, a revolvably mounted disk provided with dot and dash code notches spaced along its edge, a reciprocable element arranged to engage said notches successively and advance the disk, a ratchet wheel rim arranged to revolve with said disk, and a pawl arranged to normally engage the teeth of the ratchet against retrograde movement of said disk, means blocking said reciprocable element from engaging another code notch following a wrong code impulse, and time controlled means for releasing said pawl operated after a predetermined time period following each impulse sufficiently long so as to hold the disk locked at its point of greatest advancement until the entire code has gone through whether or not it be the correct code.

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