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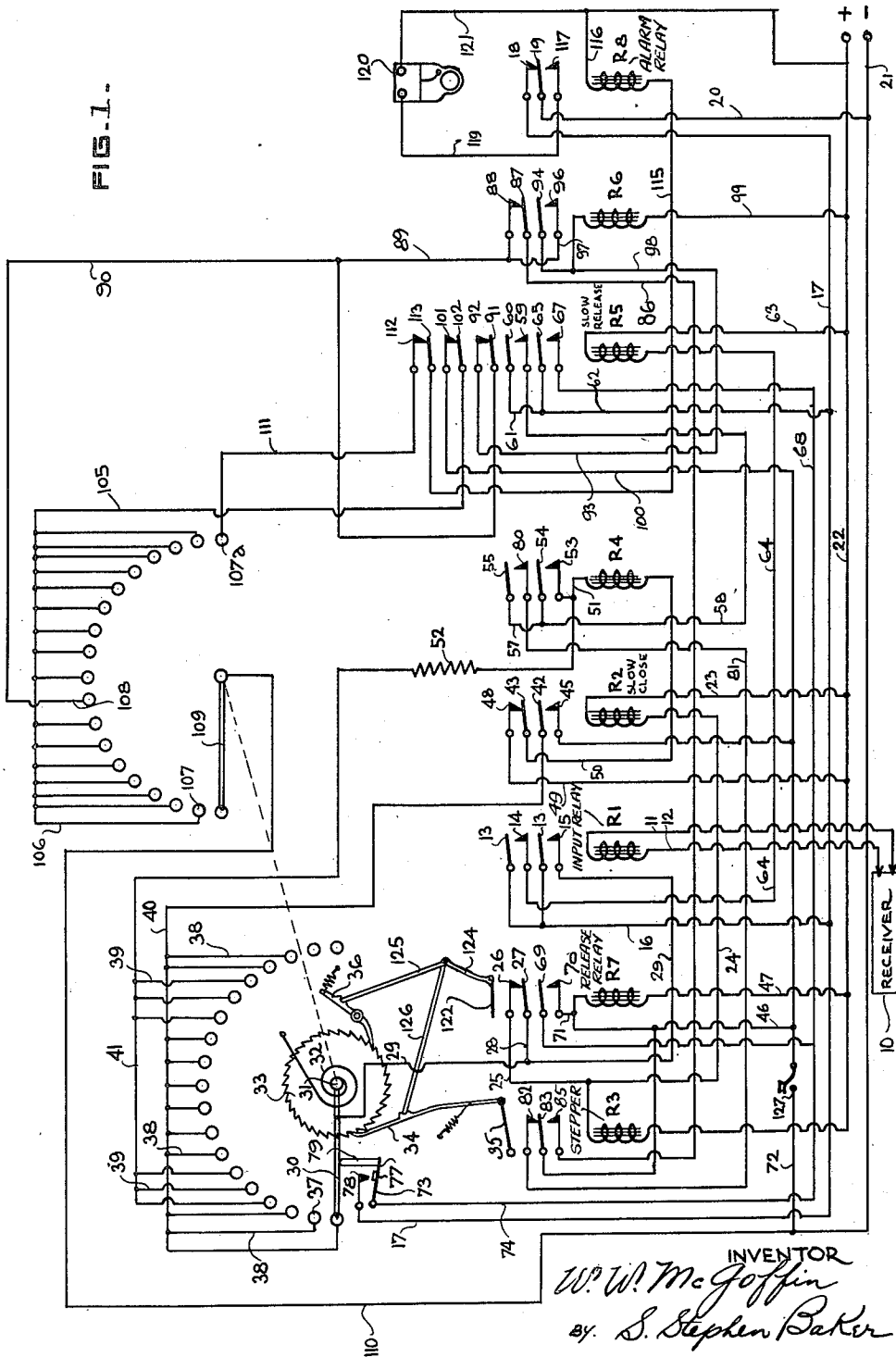
W. W. McGOFFIN

2,446,943

AUTOMATIC RADIO CALL APPARATUS

Filed Oct. 28, 1944

2 Sheets-Sheet 1



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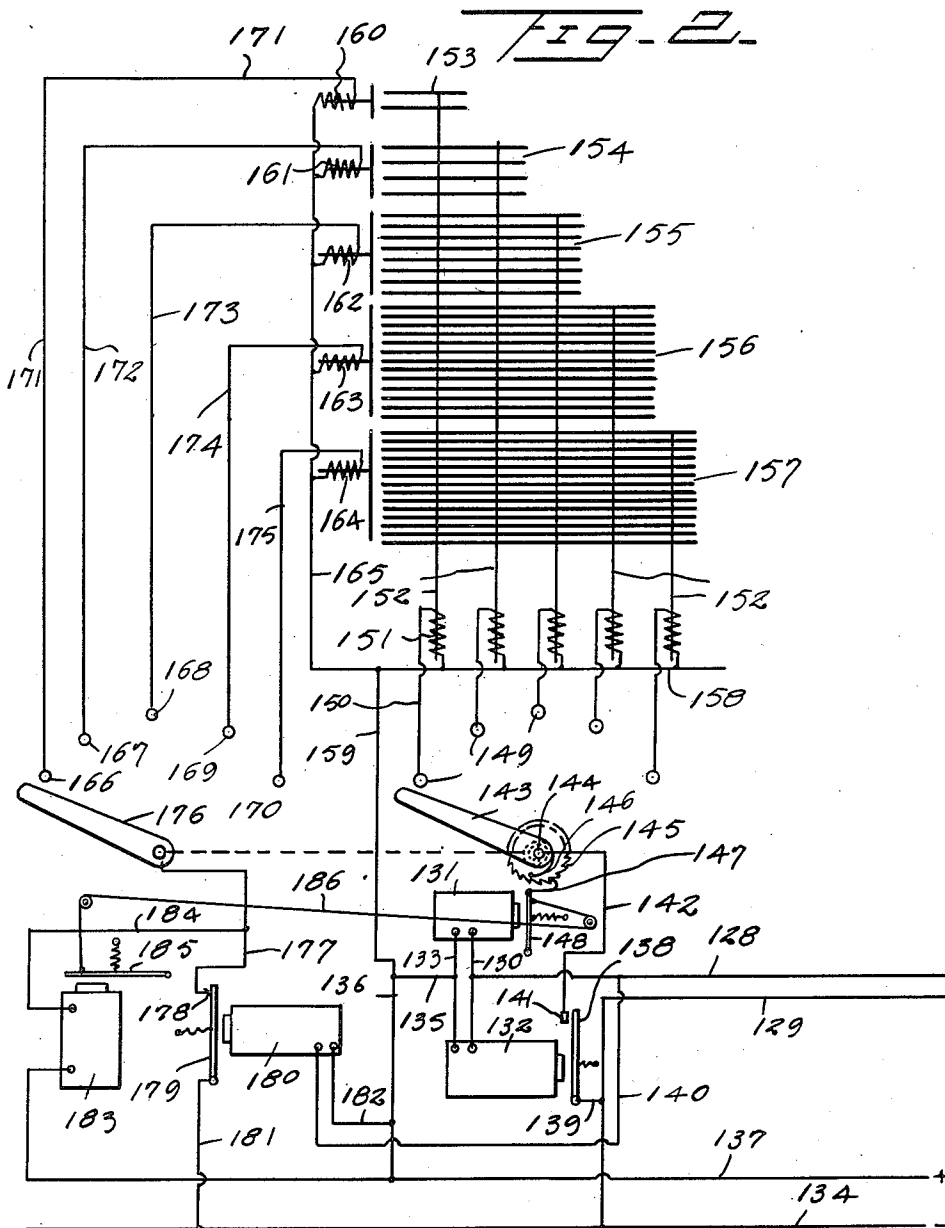
W. W. McGOFFIN

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2 Sheets-Sheet 2



Inventor

W.W. McGoffin

By *Kimmel & Crowell*  
Attorneys

## UNITED STATES PATENT OFFICE

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## AUTOMATIC RADIO CALL APPARATUS

William Walter McGoffin, Olympia, Wash., assignor of one-fifth to S. S. Baker, New York, N. Y.

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This invention relates to a selector of a special type to interpret long and short pulsations, such as the dots and dashes comprising the international Morse code.

An object of this invention is to provide a special selector which is comprised of standard parts embodying a stepper or steppers so interconnected with relays of slow closing and slow opening type with special contact arrangement and connections to thereby form a new unit capable of interpreting dot and dash pulsations.

Another object of this invention is to provide a device which may be preset to any call or letter combination at the will of the operator to give an alarm or operate a local circuit only when the preset combination of pulsations is transmitted to the selector.

A further object of this invention is to provide a selector of a special type that has a very wide tolerance in code speed variation, in which the timing of the dot and dash lengths is not accumulated when a preset arrangement is used.

A further object of this invention is to provide a selector with a preset arrangement that immediately returns to starting position upon receipt of the first pulsation which is not in accordance with the preset combination, and remains at the starting position until another character group of pulsations has started. When the selector has once been stepped up to its final position to operate the local or alarm circuit the selector remains in the final position until manually reset. This selector when not arranged in a preset circuit continues to advance and differentiates in electrical pulsations on the stepper contacts depending on whether or not the selector was pulsed by dot or dash operating circuits to interpret the code, and automatically returning to the starting position immediately on the space or pause which signifies the end of a character or letter.

To the foregoing objects, and others which may hereinafter more fully appear, the invention consists of the novel construction, combination and arrangement of parts, as will be more specifically referred to and illustrated in the accompanying drawings, but it is to be understood that changes, variations, and modifications may be resorted to which fall within the scope of the invention as claimed.

In the drawings:

Fig. 1 is a schematic diagram of an automatic call selector constructed according to one embodiment of this invention.

Figure 2 is a diagrammatic view of the selector arrangement to interpret the code.

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Referring to the drawings and first to Figure 1, the numeral 10 designates a conventional radio receiver which has connected to the output side thereof a relay R1 by means of wires 11 and 12.

The relay R1 has associated therewith a spring-pressed armature 13 which is normally held out of engagement with a pair of contacts 14 and 15. Armature 13 is connected by means of a wire 16 to a wire 17 and the latter is connected at one end to an armature 18 associated with a signal relay R2. Armature 18 is spring-pressed and normally engages a double contact 19 connected by means of a wire 20 to wire 21, which is connected to the negative side of the source of electric current supply. A stepper relay R3 which is adapted to operate a swinging contact arm is connected at one side thereof to a wire 22, and the latter is connected to the positive side of the electric current supply.

A slow acting dash relay R2 is connected at one side thereof to wire 22 by means of a wire 23. The other sides of relays R2 and R3 are connected together by means of a wire 24. Wire 24 has connected thereto one end of a wire 25, which at the opposite end is connected to a contact 26. A spring-pressed armature 27 normally engages contact 26 and is associated with release relay R7. Armature 27 has connected thereto a wire 28, which is connected to a wire 29. Wire 29 at one end thereof is connected to contact 15, and at the other end thereof is electrically connected with a swinging contact wiping arm 30. Arm 30 is mounted on a shaft 31 and shaft 31 is normally biased to rotate in a counterclockwise direction by means of a spring 32.

Shaft 31 has fixed thereon a ratchet 33 and a spring-pressed pawl 34, which is carried by an armature 35 adapted to be drawn towards stepper relay R3 when the latter is energized, is adapted to rotate shaft 31 and swinging arm 30 step by step as relay R3 is energized. Ratchet 33 is held against counterclockwise rotation under the tension of spring 32 by means of a spring-pressed rocking dog 36. Arm 30 is adapted to wipe a plurality of contacts 37, which have connected thereto wires 38 and certain ones of contacts 37 are also adapted to have connected thereto wires 39. The wires 38 and 39 are interchangeable with respect to contacts 37, so that any predetermined sequence of wiring arrangement with respect to wires 38 and 39 may be set up. Wires 38 are connected to a wire 40 and wires 39 are connected to a wire 41. Wires 38 are associated with the dot circuit, whereas wires 39 are associated with the dash circuit. Wire 40

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is connected to a spring-pressed armature 42 which is insulated from a second armature 43 by insulation 44. The two armatures 42 and 43 are spring-pressed away from relay R2 and are drawn toward relay R2 when the latter is energized.

A contact 45 is disposed in a position for engagement with armature 42 when the latter is drawn towards relay R2. Contact 45 has connected therewith one end of wire 46 and the latter is connected to one end of release relay R7. The opposite end of release relay R7 has connected therewith one end of wire 47 and the other end of wire 47 is connected to wire 22.

A contact 48 is disposed in a position to engage armature 43 when relay R2 is de-energized and contact 48 is connected to wire 47 by means of a wire 49. Armature 43 is connected to one side of relay R4 which is a quick acting relay by means of a wire 50. The opposite end of relay R4 is connected by means of a wire 51 to wire 41. A resistance element 52 is interposed in wire 41 for reducing the current voltage to relay R4. Wire 41 is connected to a contact 53, which is normally disengaged from a spring-pressed armature 54.

A second armature 55 is fixed to armature 54, there being insulation 56 between the two armatures 54 and 55. Armatures 54 and 55 are connected together by means of a wire or electric conductor 57, and a wire 58 is connected at one end to wire 57 and at the opposite end to contact 59. Contact 59 is normally disposed in spaced relation to an armature 60 associated with relay R5 and armature 60 has connected thereto one end of a wire 61 which is connected to a wire 62. Wire 62 is also connected to wire 17.

Relay R5 is connected by means of a wire 63 to wire 22 and the opposite side of relay R5 is connected by means of a wire 64 to contact 14. Wire 62 is connected to an armature 65, which is insulated from armature 60 by insulation 66, and is normally disengaged from a contact 67 which has connected thereto one end of a wire 68. The other end of wire 68 is connected to an armature 69 correlated with release relay R7 and normally disposed out of engagement with a contact 70. Contact 70 is connected by means of a wire 71 to a release circuit wire 72.

A spring-pressed rockable switch arm 73 is connected by means of a wire 74 to wire 68, and has mounted on the free end thereof a contact 77. Contact 77 is adapted to engage a stationary contact 78 when switch arm 30 moves upwardly. Contact 78 has connected thereto one end of wire 17.

An insulating member 79 is carried by switch arm 73 and is disposed in a position whereby arm 30 will engage therewith when the latter is in its released or starting position, so as to thereby break the circuit between contacts 77 and 78.

Armature 55 is normally disposed out of engagement with a contact 80, which has one end of a wire 81 connected therewith. Wire 81 is connected at the opposite end to a contact 82 and the latter is disposed in a position for engagement with an armature 83 insulated by insulation 84 from armature 35. Armature 83 has connected thereto one end of wire 72.

A second contact 85 is disposed in normally spaced relation to armature 83 and has connected thereto one end of a wire 86. The opposite end of wire 86 is connected to an armature 87 which is spring-pressed away from relay R6. A contact 88 is disposed in a position to normally engage armature 87 and contact 88 has connected

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thereto one end of a wire 89. The other end of wire 89 is connected to a wire 90. Wire 90 at one end is connected to an armature 91 associated with relay R5.

A contact 92 is disposed in a position to normally engage armature 91 and has connected thereto one end of a wire 93. The opposite end of wire 93 is connected to a second armature 94 correlated with relay R6, and insulated from armature 87 by insulation 95. A contact 96 is disposed in a position normally disengaged from armature 94, and is connected to wire 89 by means of a wire 97. Relay R6 is connected to wire 93 by a wire 98 and the opposite end of relay R6 is connected to positive wire 22 by means of a wire 99.

A wire 100 is connected at one end to wire 48 and the opposite end to a contact 101. Contact 101 is disposed in a position normally engaging an armature 102, which is insulated from armatures 60 and 91 by insulation 103 and 104. Armature 102 has connected thereto one end of a wire 105, and the opposite end of wire 105 is connected to a plurality of adjustable connecting wires 106, which are adapted to adjustable or detachable engagement with a plurality of spaced contacts 107.

Wire 90 is connected at the opposite end thereto to a wire 108, which may be adjustably connected to a selected one of contacts 107. Wire 90 is interposed in the space circuit, whereas wire 105 and wire 106 are interposed in the "no space or interval circuit." A rockable switch arm 109 is mechanically connected with and electrically insulated from shaft 31, being rockable therewith, and arm 109 has connected thereto one end of a wire 110. Wire 110 at the opposite end thereof is connected to wire 21, which is negative side of the current source.

The last one 107<sup>a</sup> of contacts 107 has connected thereto a wire 111. Wire 111 is also connected to a contact 112 normally engaged by an armature 113 associated with relay R5, and insulated from armature 91 by insulation 114. Armature 113 has connected thereto one end of wire 115 and the opposite end of wire 115 is connected to one side of signal relay R8. The opposite side of signal relay R8 is connected by means of a wire 116 to positive wire 22. An armature or switch arm 117 is moveable with armature 18 being insulated therefrom by insulation 118 and armature 117 is connected by means of a wire 119 to an audible signal member 120. The opposite side of signal 120 is connected by means of a wire 121 to positive wire 22.

In order to provide for the automatic return of switch arm 30 at the end of a letter or when an improper signal is received in receiver 10, I have provided a combined armature and lever 122, which is insulated by insulation 123 from armature 69 and is disposed in confronting position with respect to release relay R7. Armature 122 is formed with a lever arm 124 and a pair of push rods 125 and 126 are connected to lever arm 124 and engage dog 36 and pawl 34 respectively. Release relay R7 may have the circuit thereto manually closed by means of a manual switch 127 interposed in wire 72 and normally biased to an open position.

Referring now to Figure 2, there is disclosed a modification of this invention wherein the signal impulses are adapted to be interpreted and imprinted by means of a teletype apparatus, or the like. The signal impulses are transmitted over wires 128 and 129, wire 128 being connected

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to wire 130, which is connected between a stepper relay 131 and a second relay 132.

The opposite sides of relays 131 and 132 are also connected together by means of a wire 133. Wire 129 is connected to negative wire 134 which is connected to a source of current supply, and wire 133 is connected by means of wires 135 and 136 to a positive wire 137. Relay 132 has associated therewith an armature 138 connected by a wire 139 to wire 129, which is connected to wire 134. A contact 141 is disposed in normally spaced relation to armature 138, the latter being spring-pressed to circuit breaking position and contact 141 is connected by means of a wire 142 to a swinging switch arm 143. Arm 143 is secured to a shaft 144, which has fixed thereto a ratchet 145, and ratchet 145 is normally urged to rotate in a counterclockwise direction by means of a spring 146.

A dog 147, which is carried by an armature 148 associated with relay 131, engages ratchet 145 to move switch arm 143 step by step in a clockwise direction. A plurality of contacts 149 are disposed in a position for wiping engagement by switch arm 143 and contacts 149 are connected by means of wires 150 to one side of a plurality of solenoids 151. Solenoids 151 are provided with movable cores 152, which are extended from the solenoids and provide a locking means for a plurality of series of type bars 153, 154, 155, 156 and 157.

The opposite sides of solenoids 152 are connected by means of wires 158 and 159 to wire 136, which is connected to positive wire 137. The type bars 153 to 157 are actuated by means of solenoids 160, 161, 162, 163 and 164, respectively. The solenoids 160 to 164 are connected to wire 159 by means of a wire 165. The opposite ends of solenoids 160 to 164 are connected to spaced contacts 166, 167, 168, 169 and 170 by means of wires 171, 172, 173, 174 and 175, respectively.

A switch arm 176, which is mechanically connected to and insulated from switch arm 143 and shaft 144, is adapted to wipe over contacts 166 to 170, respectively, upon rocking or rotation of shaft 144. Switch arm 176 has a wire 177 connected thereto and wire 177 is connected to a contact 178 normally engaging an armature 179 disposed in confronting position to a relay 180. Armature 179, which is spring-pressed to engage contact 178 is connected by means of a wire 181 to negative wire 134. Relay 180 is connected by means of a wire 182 to wire 128, and is connected by means of a wire 182 to wire 136.

In order to provide for the release of switch arm 143 so that spring 146 may return this arm and also arm 176 to a starting position, I have provided a relay 183 which is connected at one side to wire 137. The other side of relay 183 is connected by a wire 184 to wire 177. A spring-pressed armature 185 is correlated with relay 183 and is mechanically connected by means of a flexible connector or other suitable means 186 to armature 148, so that when armature 185 is drawn in the direction of relay 183 when the latter is energized, armature 148 will be pulled away from relay 131 and pawl 147 will be pulled to a disengaged position with respect to ratchet 145.

In operation this device will function as follows: The impulses are received by receiver 10 and these impulses activate relay R1. On each impulse, that is either a dot or dash impulse, negative potential is set up through armature 13 and contact 14 to relay R5. Relay R5 is a quick closing but slow releasing relay and will stay closed

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so long as impulses are received in receiver 10 in the absence of a letter space. At the same time that relay R5 is energized, stepper relay R3 is energized and after release thereof at the end of an impulse moves stepper switch arm 30 forward one step through spring action. Relay R3 receives negative potential from contact 15, wire 29, wire 28, armature 27, wire 25 and wire 24.

When relay R3 is energized, relay R2, which is a slow closing relay, is also energized, and if the impulse is a dot impulse, the duration of the impulse is not sufficient to activate relay R2 so that negative potential from wire 40 remains broken at contact 45.

#### Dot operation

As shown in Fig. 1, the first three contacts to be engaged by stepper arm 30 are connected with dot circuit wires 38 so that the dot circuit will be energized. Inasmuch as a received dot impulse will not activate relay R2, the negative potential to release relay R7, which flows from wires 38 and wire 40 to armature 42, will be broken as armature 42 is disengaged from contact 45, and relay R7 will not be operated.

#### Dash operation

After stepper switch arm 30 moves forward three steps, it will engage the fourth contact 37 with which the first dash wire 39 is connected. Assuming that, as shown, the next three impulses are dash impulses, relays R1, R5, R4, R2, and R3 will be energized and will operate. Stepper relay R3 will move stepper arm 30 forward three steps in sequence at the termination of each dash impulse.

At the beginning of each impulse on a dash connection, negative potential is continued from stepper arm 30, through wire 38, wire 41, resistor 52, relay R4, armature 43 and contact 48 to positive wire 22. Armature 43 and contact 48 are engaged at this time because the timing relay R2 has not yet closed. Relay R4 closes at the beginning of the dash impulse and continues the negative potential from armature 55 to contact 80, through wire 81 to contact 82 of relay R3. R3 being closed with the impulse, armature 83 is disengaged from contact 82, thus withholding the negative potential from the release relay R7. If the impulse were to be of short duration so that armature 83 engages contact 82 while 55 and 80 are engaged, the release relay R7 is operated.

When relay R2 is operated by a dash impulse, the circuit to release relay R7 is opened by the de-energization of relay R4 which thereupon disengages armature 55 and contact 80. Such de-energization of relay R4 is effected by the disengagement of armature 43 and contact 48 when a dash impulse operates relay R2.

#### Rejection—Dash impulses

Assume that, as shown, the device is set to initially receive three dot impulses, but actually one of these impulses is a dash impulse. When the improper dash impulse is thus received, release relay R7 is energized as follows: Relay R2 will be permitted to close and armature 42 will engage contact 45 so that negative potential to release relay R7 will flow from arm 30, wire 38, wire 40, armature 42, contact 45 and wire 46.

When release relay R7 is energized, stepper dog 34 and holding dog 36 are disengaged from ratchet 33 so that spring 32 will return arm 30 to starting position. At the same time, negative

potential to relays R3 and R2 will be broken by movement of armature 27 away from contact 26. The operation of relay R7 closes armature 69 with contact 70 which electrically locks relay R7 providing a negative return through armature 69, wire 68, armature 73, contacts 77, 78, wire 17. This lock is retained until stepper arm 30 is returned by spring 32 to starting position. In the event the pulsations are still coming in and relay R5 is closed, the electrical lock is still maintained after stepper arm 30 moves armature 73 to circuit breaking position inasmuch as relay R5 will hold armature 65 against contact 67, and negative potential is maintained through wire 68 to wire 62. When the impulses cease, relay R5 will open when a letter space occurs and negative potential to release relay R7 will be broken so that relays R2, R3, R4 will again be set up for operation. This assures that after a reset of the stepper arm, the device will not recommence operation on part of a letter.

#### *Rejection—dot impulse*

Assuming that, as shown in Fig. 1, the device is set to receive three dots followed by three dashes, and the first three impulses are dots so that stepper arm 30 will have moved up three steps as previously described, the next impulses must be dash impulses. If one of the impulses is a dot and arm 30 is in circuit with a dash wire 39, relay R2 will not close, but relay R4 will close and negative potential at the end of such dot will be supplied release relay R7 from wire 62, wire 61, armature 60, contact 59, wire 58, armature 55, contact 80, wire 81, contact 82, armature 83, wire 72 and wire 46, the latter being connected to wire 72. It should be noted that at the end of the dot, relay R3 is released so as to engage contact 82 and armature 83. Relay R7 will then operate as hereinafter described to release arm 30 for operation by spring 31 to starting position.

#### *Space check (relay R6)*

The function of relay R6 is to check the spaces or lack of spaces between characters or combinations of characters and impulses in cooperation with relay R5. Arm 109 is mechanically connected with arm 30, but is insulated therefrom and moves step by step with arm 30. Wires 106, which are in the "no space" circuit are connected to selected contacts 107, and at least one wire 108 is connected to a selected contact 107, as shown in Fig. 1.

Negative potential to release relay R7 is supplied from wire 21, wire 110, arm 109, contact 107, wire 106, wire 105, armature 102, contact 101, wire 100, and wire 46. With no space between the impulses, relay R5 will remain closed so that negative potential is broken between armature 102 and contact 101, and relay R7 does not close.

If a space is made while arm 109 is on "no space" contact 107, negative potential is supplied release relay R7 as follows: Relay R5 will open and armature 102 will engage contact 101.

#### *Space acceptance*

Wire 108 is in the "space" acceptance circuit and when arm 109 engages contact 107 with which wire 108 is connected, if a space is made between impulses relay R5 opens and armature 91 engages contact 92. Negative potential is supplied to relay R6 as follows: Wire 110, arm 109, wire 108, wire 90, armature 91, contact 92, wire 93, wire 98. Relay R6 will close and armature

94 will engage contact 96. Negative circuit will be broken at 87, 88, and as relay R3 is open, armature 83 will be disengaged from contact 85 so that negative potential to release relay R7 will be broken. Thus, at the beginning of the next pulsation, when R3 closes, armature 83 engages contact 85 but relay R7 is not operated because R6 is still closed and the negative circuit is broken between armature 87 and contact 88.

Assuming, however, that there is no space between the impulses when arm 109 is associated with wire 108, the release relay R7 is closed as follows: Negative potential passes from arm 109, wire 108, wire 90, wire 89, contact 88, armature 87, wire 86, contact 85, armature 83, wire 72 and wire 46. This occurs at the beginning of the next impulse which comes in without a sufficient space to allow R5 to release.

What is claimed is:

1. In a signalling system for identifying a transmission of Morse code letters constituting a desired call, the combination of an alarm, electrical circuit means to operate said alarm, a dual selector device connected on the one hand to dot or dash, and on the other hand to interval or space circuits, and operating to effectively advance from a starting position to a position where it closes said electrical circuit means when a complete desired transmission has been received, first relay means for actuating said selector device in the desired advance, second relay means for returning the device to said starting position when an improper signal is received during said transmission, a first time delay relay closing on incoming signals of dash length whereby the operation of said first time delay relay characterizes the reception of a dash as distinguished from a dot, non-operation thereof determining the dot character of the pulsation and being operative to withhold operating power from said second relay means so as to permit the advance of said selector device when said selector device has been set to a dot position, and operation thereof permitting the advance of the selector device when it has been set to a dash position by similarly withholding operating power to said second relay means, a second time delay relay operated by incoming signals and releasing at signal interruptions of space length whereby the release of said second time delay relay characterizes the reception of a space as distinguished from an interval, non-release thereof determining the interval character of the interruption so as to permit the advance of said selector device when it is set to interval position by withholding operating power from said second relay means and operation thereof permitting the selector device to advance when set to space position by similarly withholding operating power from said second relay means whereby both of said time delay relays are operable on said second relay means so as to cause said selector device to be returned to starting position when an improper character or interruption is received.

2. In a signalling system for identifying a transmission of Morse code letters constituting a desired call, the combination of an alarm, electrical circuit means to operate said alarm, a selector device operating to progress in steps from a starting position to a position where it closes said electrical circuit means when a complete predetermined transmission has been received, a release relay for returning said selector device to said starting position when an undesired call

is received, said selector device comprising a first series of switch elements for pre-selecting the desired dot and dash characters, a second series of switch elements for pre-selecting the space and interval interruptions and a pair of mechanically ganged switch arms for progressing along the respective series of switch elements as the proper pulsations from said transmission are applied to said system, a slow closing relay energized by said pulsations and operative to close when a pulsation of dash length is received, said release relay being operated by said slow closing relay through said first series of switch elements according to the pre-selection of said dot and dash characters thereon, a slow releasing relay energized at each received pulsation and operative to open at a signal interruption of space length, said release relay being operated by said slow releasing relay through said second series of switch elements according to the pre-selection of said space and interval interruptions thereon, a spring normally urging said selector device to its starting position when an improper signal component is received during said transmission, a pawl for maintaining said selector device in a progressed position against the action of said spring, said release relay when operated by either said slow closing or slow releasing relay being operable upon said pawl so as to permit the return to starting position of said selector device.

3. In a signalling system for identifying a transmission of Morse code letter pulsations constituting a desired call, the combination of an alarm, electrical circuit means to operate said alarm, a selector device operating to progress in steps from a starting position to a position where it closes said electrical circuit means when a complete predetermined transmission has been received, release relay means for returning said selector device to said starting position when an undesired call is received, said selector device comprising a first series of switch elements for pre-selecting the desired dot and dash characters, a second series of switch elements for pre-selecting the pace and interval interruptions and switch arm means for progressing along the respective series of switch elements as the proper pulsations from said transmission are applied to said system, a slow closing relay energized by said pulsations and operative to close when a pulsation of dash length is received, said release relay means being operated by said slow closing relay through said first series of switch elements according to the pre-selection of said dot and dash characters thereon, a slow releasing relay energized at each received pulsation and operative to open a signal interruption of space length, said release relay means being operated by said slow releasing relay through said second series of switch elements according to the preselection of said space and interval interruptions thereon, non-operation of said slow closing and slow releasing relays respectively determining the dot and interval natures of a received pulsation.

4. In a signalling system for identifying Morse code signal transmissions, the combination of an alarm, electrical circuit means to operate said alarm, a selector device including a spaced series of contacts and operating to effectively progress along said contacts from a starting position to a position where it closes said electrical circuit means when a complete desired transmission has been received, an input circuit for feeding said transmission in the form of impulses to the apparatus, a slow closing timing relay connected

to said input circuit so as to commence operation thereof each time an impulse is fed by said input circuit and whereby closing of said relay characterizes the reception of a dash as distinguished from a dot, a slow releasing timing relay operated by and closing with each said impulse, and opening at signal interruptions of space length whereby the opening of said slow releasing timing relay characterizes the reception of a space as distinguished from an interval, said spaced series of contacts serving as dot, dash, interval and space pre-connection means whereby said selector device may be electrically pre-connected according to the desired progression of signal components, each of said timing relays including electrical contacts for establishing predetermined electrical circuits according to the respective operation or non-operation of each of said timing relays as determined by said fed impulses, said predetermined electrical circuits being formed between said timing relays and said pre-connection means of said selector device during its progressive action, selector device actuating means for driving said selector device in the desired progression until said alarm is operated, release relay means operative on said selector device for returning it to said starting position when an incoming signal component does not correspond to the pre-connection of said selector device, said release relay means having an operating winding included in, so as to be operated by, one of said predetermined electrical circuits according to the pre-connections of said selector device and the respective operation of said timing relays, said one predetermined electrical circuit being formed by said pre-connection means and the electrical contacts of said timing relays when the action of said timing relays as determined by said fed impulses does not correspond to the pre-connections of said selector device, non-operation of said release relay means permitting said desired progression.

5. A signalling system according to claim 4 and including a third relay controlled by said slow closing relay, said third relay having a winding connected through said input circuit and said pre-connection means so as to be energized at each incoming impulse when a dash character is pre-selected and being controlled by said slow closing relay so as to be de-energized when a dash is received, said de-energization thereof withholding operating power from said release means, and a fourth relay controlled by said slow releasing relay, said fourth relay having a winding connected through contacts of said slow releasing relay so as to be energized when a space is pre-selected and occurs in the transmission, the energization of said fourth relay similarly withholding operating power from said release means when said selector device is pre-connected to select spaces.

6. A signalling system according to claim 5 and wherein said selector device comprises two series of switch contacts, one of said series of switch contacts representing the dot and dash circuits of the system whereby the selector device may be pre-connected to select both the dots and dashes in a desired transmission, and the other of said series of switch contacts representing the interval and space circuits of the system whereby the selector device may be pre-connected to select both the intervals and spaces of the desired transmission, and a pair of mechanically linked switch arms for respectively progressing over both series of switch contacts.

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7. A signalling system according to claim 6 and wherein said selector device actuating means comprises another relay, both of said timing relays, and said selector device actuating relay being simultaneously fed by incoming impulses from said input circuit.

8. In a signalling system for identifying a transmission of Morse code letter pulsations constituting a desired call, the combination of an alarm, electrical circuit means to operate said alarm, a selector device operating to progress in steps from a starting position to a position where it closes said electrical circuit means when a complete predetermined transmission has been received, release relay means for returning said selector device to said starting position when an undesired call is received, said selector device comprising a first series of switch elements pre-connected so as to pre-select the desired dot and dash characters, a second series of switch elements pre-connected so as to pre-select the space and interval interruptions and switch arm means for progressing along the respective series of switch elements as the proper pulsations from said transmission are applied to said system, a first timing relay operating to distinguish between received dot and dash impulses, and being operatively connected to said release relay means according to the pre-selection of said dot and dash characters, and a second timing relay operating to distinguish between received space and interval interruptions, and being operatively connected to said release relay means according to the pre-selection of said space and interval interruptions, said first timing relay being a slow closing relay which is energized by received pulsations and has a delay time so that operation or non-operation of said slow closing relay respec-

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tively determines the dot or dash nature of a received pulsation, said second timing relay being a slow releasing relay energized at each received pulsation and having a delay time so that operation or non-operation of said slow releasing relay respectively determines the space or interval nature of an interruption in the signal transmission, a first associated relay cooperating with said first timing relay and operative to withhold operating power to said release relay means when an incoming dot or dash pulsation corresponds to the pre-connections of said first series of switch elements, and a second associated relay cooperating with said second timing relay so as to similarly withhold operating power to said release relay means when an incoming space or interval interruption corresponds to the pre-connections of said second series of switch elements.

WILLIAM WALTER MCGOFFIN.

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