

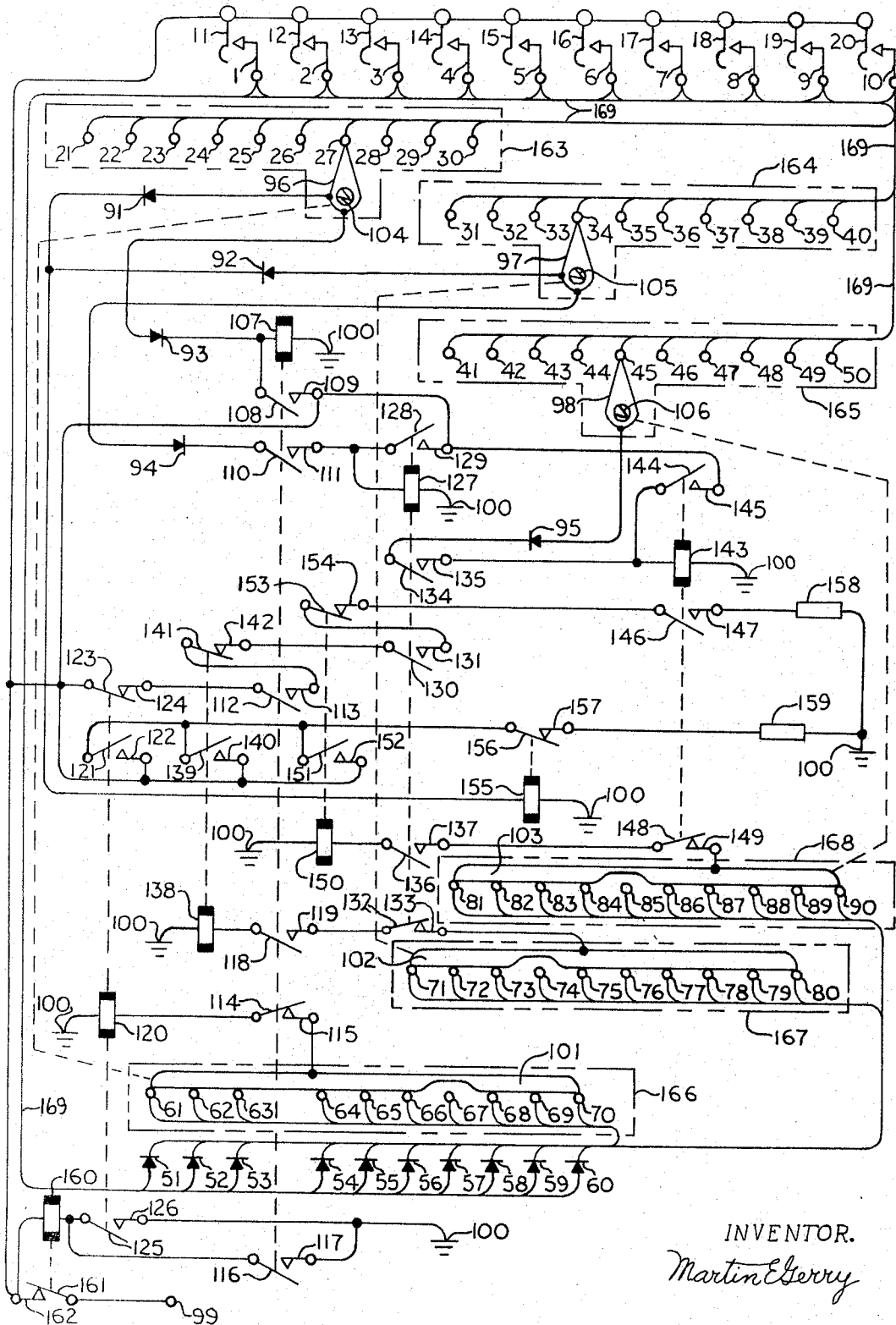
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ELECTRICAL COMBINATION SELECTOR

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ELECTRICAL COMBINATION SELECTOR

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The invention relates to improvements in an electrical combination selection system, the object of the improvements being the positive identification of a specific code by permitting the combination selector to select the required code and by a reciprocal code selector circuit disapprove and exclude all other codes excepting the required code. Likewise, a system in which sets of acceptable codes may be selected, all other sets simultaneously excluded. The invention also relates to a novel manner in setting up receiver and transmitter units to the same code and even though the code thus set up is not known by the person setting up such code the combination of receiver and transmitter working together permits the electrical combination selector system to respond to the code set up by the random code mechanism.

One form of the invention is illustrated in the accompanying drawing in which:

FIGURE 1 is a schematic diagram of a push button electrical combination selector embodying this invention.

The push button electrical combination selector mechanism, FIGURE 1, is comprised of various electrical and mechanical parts working in combination and cooperation with each other to produce one preset code combination out of a possible thousand combinations and ascertains that all other codes excepting the specific code set-up are discriminated against and rejected. The particular code set-up illustrated by FIGURE 1 is 7-4-5. The first digit 7 is produced by the setting of selector arm 96 of coding switch 163 and selector arm 101 of inverse coding switch 166 by virtue of rotating of directional keyway 104 grooved in an insulating shaft on which said arms 96 and 101 are mounted, so that said selector arm 96 makes electrical contact and cooperates with stationary contact 27 of coding switch 163 and selector arm 101 of inverse coding switch 166 makes electrical contact and cooperates with stationary contacts 61, 62, 63, 64, 65, 66, 68, 69, 70 of said inverse coding switch 166, thereby encoding the first digit 7 of the aforementioned code 7-4-5; similarly FIGURE 1 shows the second code digit 4 set up by virtue of selector arm 97 of coding switch 164 and selector arm 102 of inverse coding switch 167 being rotated by means of directional keyway 105 grooved in an insulating shaft on which said arms 97 and 102 are mounted so that said selector arm 97 makes electrical contact and cooperates with stationary contact 34 of coding switch 164 and selector arm 102 makes electrical contact and cooperates with stationary contacts 71, 72, 73, 75, 76, 77, 78, 79, 80 of said inverse coding switch 167, thereby encoding the second digit 4 of the aforementioned code 7-4-5; similarly FIGURE 1 shows the third code digit 5 set up by virtue of selector arm 98 of coding switch 165 and selector arm 103 of inverse coding switch 168 being rotated by directional keyway 106 grooved in an insulating shaft on which said arms 98 and 103 are mounted so that said selector arm 98 makes electrical contact and cooperates with stationary contact 45 of coding switch 165 and selector arm 103 makes electrical contact and cooperates with stationary contacts 81, 82, 83, 84, 86, 87, 88, 89, 90 of said inverse coding switch 168, thereby encoding the third digit 5 of the aforementioned code 7-4-5.

The parts diagrammed in FIGURE 1 are electrically interconnected in the following manner: Moving con-

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tacts 11, 12, 13, 14, 15, 16, 17, 18, 19, 20 of push buttons 1-11, 2-12, 3-13, 4-14, 5-15, 6-16, 7-17, 8-18, 9-19, 10-20, are electrically connected to stationary contact 162 of time delay relay 160, to movable contact 123 of relay 120, to stationary contact 122 of relay 120, to stationary contact 140 of relay 138, and to stationary contact 152 of relay 150. Stationary contact 1 of push button 1-11, is electrically connected by means of wire harness 169 to stationary contact 21 of coding switch 163, to stationary contact 31 of coding switch 164, to stationary contact 41 of coding switch 165, and through diode 51 to stationary contact 61 of inverse coding switch 166, to stationary contact 71 of inverse coding switch 167, and to stationary contact 81 of inverse coding switch 168. Stationary contact 2 of push button 2-12, is electrically connected by means of wire harness 169 to stationary contact 22 of coding switch 163, to stationary contact 32 of coding switch 164, to stationary contact 42 of coding switch 165, and through diode 52 to stationary contact 62 of inverse coding switch 166, to stationary contact 72 of inverse coding switch 167, and to stationary contact 82 of inverse coding switch 168. Stationary contact 3 of push button 3-13 is electrically connected by means of wire harness 169 to stationary contact 23 of coding switch 163, to stationary contact 33 of coding switch 164, to stationary contact 43 of coding switch 165, and through diode 53 to stationary contact 63 of inverse coding switch 166, to stationary contact 73 of inverse coding switch 167, and to stationary contact 83 of inverse coding switch 168. Stationary contact 4 of push button 4-14 is electrically connected by means of wire harness 169 to stationary contact 24 of coding switch 163, to stationary contact 34 of coding switch 164, to stationary contact 44 of coding switch 165, and through diode 54 to stationary contact 64 of inverse coding switch 166, to stationary contact 74 of inverse coding switch 167, and to stationary contact 84 of inverse coding switch 168. Stationary contact 5 of push button 5-15 is electrically connected by means of wire harness 169 to stationary contact 25 of coding switch 163, to stationary contact 35 of coding switch 164, to stationary contact 45 of coding switch 165, and through diode 55 to stationary contact 65 of inverse coding switch 166, to stationary contact 75 of inverse coding switch 167, and to stationary contact 85 of inverse coding switch 168. Stationary contact 6 of push button 6-16 is electrically connected by means of wire harness 169 to stationary contact 26 of coding switch 163, to stationary contact 36 of coding switch 164, to stationary contact 46 of coding switch 165, and through diode 56 to stationary contact 66 of inverse coding switch 166, to stationary contact 76 of inverse coding switch 167, and to stationary contact 86 of inverse coding switch 168. Stationary contact 7 of push button 7-17 is electrically connected by means of wire harness 169 to stationary contact 27 of coding switch 163, to stationary contact 37 of coding switch 164, to stationary contact 47 of coding switch 165, and through diode 57 to stationary contact 67 of inverse coding switch 166, to stationary contact 77 of inverse coding switch 167, and to stationary contact 87 of inverse coding switch 168. Stationary contact 8 of push button 8-18 is electrically connected by means of wire harness 169 to stationary contact 28 of coding switch 163, to stationary contact 38 of coding switch 164, to stationary contact 48 of coding switch 165, and through diode 58 to stationary contact 68 of inverse coding switch 166, to stationary contact 78 of inverse coding switch 167, and to stationary contact 88 of inverse coding switch 168. Stationary contact 9 of push button 9-19 is electrically connected by means of wire harness 169 to stationary contact 29 of coding switch 163, to stationary contact

39 of coding switch 164, to stationary contact 49 of coding switch 165, and through diode 59 to stationary contact 69 of inverse coding switch 166, to stationary contact 79 of inverse coding switch 167, and to stationary contact 89 of inverse coding switch 168. Stationary contact 10 of push button 10-20 is electrically connected by means of wire harness 169 to stationary contact 30 of coding switch 163, to stationary contact 40 of coding switch 164, to stationary contact 50 of coding switch 165, and through diode 60 to stationary contact 70 of inverse coding switch 166, to stationary contact 80 of inverse coding switch 167, and to stationary contact 90 of inverse coding switch 168. Selector arm 96 of coding switch 163 is electrically connected through diode 91 to one side of the coil of relay 155 while selector arm 97 of coding switch 164 is electrically connected through diode 92 to the same side of the coil of relay 155 while the other side of the coil of relay 155 is electrically connected to the ground return of direct current power input means 100. Selector arm 96 of coding switch 163 is electrically connected through diode 93 of the coil of relay 107 in parallel with movable contact 108 of relay 107. Selector arm 97 of coding switch 164 is electrically connected through diode 94 in series with movable contact 110 of relay 107. Selector arm 98 of coding switch 165 is electrically connected through diode 95 in series with movable contact 134 of relay 127. Stationary contacts 109 of relay 107, 129 of relay 127, and 145 of relay 143 are electrically connected in parallel stationary contact 162 of relay 150. Stationary contact 111 of relay 107 is electrically connected in parallel with movable contact 128 of relay 127 and one side of the coil of relay 127. Stationary contact 135 of relay 127 is electrically connected in parallel with movable contact 144 and coil of relay 143. The other sides of the coils of relays 107, 127, and 143 are electrically connected to the common ground return of direct current input power means 100. Stationary contact 115 of relay 107 is electrically connected to selector arm 101 of inverse coding switch 166 and normally cooperates with and makes electrical contact with movable contact 114 of said relay 107, which is electrically connected to one side of relay coil 120, the other side of said relay coil 120 being electrically connected to direct current power input common ground return 100. Stationary contact 133 of relay 127 is electrically connected to selector arm 102 of inverse coding switch 167 and normally cooperates with and makes electrical contact with movable contact 132 of said relay 127 which is in series with stationary contact 119 of relay 107; movable contact 118 of said relay 107 is in series with and makes electrical connection to one side of relay coil 138, the other side of said relay coil 138 being electrically connected to ground return of direct current input power means 100. Stationary contact 149 of relay 143 is electrically connected to selector arm 103 of inverse coding switch 168 and normally cooperates with and makes electrical contact with movable contact 148 of said relay 143 which is electrically connected to stationary contact 137 of relay 127; movable contact 136 of relay 127 is electrically connected to one side of relay coil 150, the other side of said relay coil 150 being electrically connected to ground return of direct current input power means 100. The hot side of the direct current input power means 99 is electrically connected to movable contact 161 of time delay relay 160 which normally cooperates with and makes electrical contact with stationary contact 162 of time delay relay 160, said stationary contact 162 being electrically connected to one side of coil of time delay relay 160. The other side of the coil of time delay relay 160 is electrically connected to movable contact 125 of relay 120 in parallel with movable contact 116 of relay 107, while stationary contact 126 of relay 120 is electrically connected in parallel with stationary contact 117 of relay 107 and both said con-

tacts 126 and 117 are connected to the ground return of direct current input power means 100. Movable contact 121 of relay 120, movable contact 139 of relay 138, and movable contact 151 of relay 150 are electrically connected in parallel to each other and said contacts 121, 139, and 151 are electrically connected to movable contact 156 of relay 155 which normally cooperates with and makes electrical contact with stationary contact 157 of said relay 155 which is electrically connected to one side of alarm indicator 159, other side of said alarm indicator 159 being electrically connected to ground return of direct current input power means 100. Movable contact 123 of relay 120 is connected to stationary contact 162 of relay 160 and normally cooperates with and makes electrical contact with stationary contact 124 of relay 120 which is electrically connected to movable contact 112 of relay 107; stationary contact 113 of relay 107 is electrically connected to movable contact 141 of relay 138 and said contact 141 normally cooperates with and makes electrical contact with stationary contact 142 of relay 138 which is electrically connected to movable contact 130 of relay 127; stationary contact 131 of relay 127 is electrically connected to movable contact 153 of relay 150 and said contact 153 normally cooperates with and makes electrical contact with stationary contact 154 of relay 150 which is electrically connected to movable contact 146 of relay 143; stationary contact 147 of relay 143 is electrically connected to one side of an electromechanical or electronic code acceptance device 158, the other side of said device 158 being electrically connected to the ground return of the direct current input power means 100.

The push button electrical combination selector mechanism, FIGURE 1 is manually operated by sequentially operating the aforementioned push buttons. Correct code yield is achieved by operating push buttons 7-17, 4-14, 5-15 in sequence. When movable push button contact 17 is operated so that it momentarily cooperates with and makes electrical contact with stationary push button contact 7, direct current flows from direct current power input means 99, through said cooperating contacts 7-17, through cable harness 169, through contact 27 cooperating with selector arm 96 of coding switch 163 and at this point branches off into two branches; one branch current flowing in direction of low forward resistance through diode 91 into one side of relay 155 and then into ground return of direct current power input means 100, thus energizing relay 155 and pulling open normally cooperating contact pair 156-157 disabling alarm indicator 159; the other branch current flowing in direction of low forward resistance through diode 93 into coil of relay 107 and into ground return of direct current power input means 100, thus energizing relay 107, pulling closed contact pair 108 and 109 so that they cooperate with each other and thus hold relay coil 107 energized, by virtue of electrical energy from hot side of direct current input power means 99 being present on contact 109, pulling contact pair 112 and 113 together so they cooperate with each other, pulling contact pair 116 and 117 together so they cooperate with each other, pulling contact pair 110-111 together so they cooperate with each other and enable a closed electrical path to relay coil 127, opening normally cooperating contact pair 114 and 115 to disable the operation of relay 120, and operate contact pair 118-119 so that they cooperate with each other causing relay coil 138 to be energized since current will flow from hot side of direct current power input means 99 through the momentarily cooperating push-button contact pair 7-17, in forward direction through diode 57 via cable harness 169 to cooperating contacts 77 and 102 of inverse coding switch 167, through normally cooperating contact pair 132-133, through contact pair 118-119 which now cooperate with each other, through relay coil 138, and to ground return of direct current

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input power means 100 thusly electrically energizing relay 138, causing contact pair 139-140 to cooperate with each other and normally closed cooperating contact pair 141-142 to open and cease to cooperate with each other; simultaneously power from the hot side of direct current input power means 99 flows through normally cooperating contact pair 161-162 through relay coil 160, through the now cooperating contact pair 116-117 to ground return direct current input power means 100 to energize time delay relay 160 which will remain energized for the duration of a specific preset period of time to permit the rest of the code to be injected and subsequent to such period of time will automatically deenergize itself thus resetting above mentioned components to their normal positions as shown in FIGURE 1.

When movable push button contact 14 is operated so that it momentarily cooperates with and makes electrical contact with stationary push button contact 4, direct current flows from direct current input power means 99 through cooperating contact pair 161-162, through cable harness 169, through contact 34 cooperating with selector arm 97 of coding switch 164 and at this point branches off into two branches; one branch current flowing in direction of low forward resistance through diode 92 into one side of relay coil 155 and then into ground return of direct current power input means 100, thus maintaining relay coil 155 in the previously energized state and maintaining contact pair 156-157 in an open or non-cooperating state, thereby maintaining alarm indicator 159 in a disabled or non-operating state; the other branch current flowing in direction of low forward resistance through diode 94, through the now cooperating contact pair 110-111 into coil of relay 127 and into ground return of direct current power input means 100, thus energizing coil 127, pulling closed contact pair 128 and 129 so that they cooperate with each other and thus hold relay coil 127 energized by virtue of electrical energy from the hot side of the direct current power input means 99 being present on contact 129, pulling contact pair 130 and 131 together so they cooperate with each other, pulling contact pair 134 and 135 together so they cooperate with each other and enable a closed electrical path to relay coil 143, open normally cooperating contacts 132 and 133 so that previously energized relay coil 138 will be deenergized and released thus opening cooperating contact pair 139 and 140 and returning to normal contact pair 141 and 142 so that they again cooperate with each other, and pulling together of contact pair 136 and 137 so they cooperate with each other thus enabling relay coil 150; simultaneously current will flow in a forward direction through diode 54 via cable harness 169 to cooperating contacts 84 and 103 of the inverse coding switch 168, through normally cooperating contact pair 148-149, through contact pair 136-137 which now cooperate with each other, through relay coil 150, and to ground return of direct current input power means 100 thusly electrically energizing relay 150, causing contact pair 151-152 to cooperate with each other and normally closed cooperating contact pair 153-154 to open and cease to cooperate with each other.

When movable push button contact 15 is operated so that it momentarily cooperates with and makes electrical contact with stationary push button contact 5, direct current flows from direct current input power means 99, through cable harness 169, through contact 45 cooperating with selector arm 98 of coding switch 165, in direction of low forward resistance of diode 95, through the now cooperating contacts 134 and 135 into one side of relay coil 143 the other side of relay coil 143 being connected to ground return of direct current power input means 100 thusly energizing relay 143, causing contact pair 144 and 145 to cooperate with each other thus providing holding power to relay 143 inasmuch as the hot side of direct current input power means 99 is connected to said contact 145 through cooperating contact

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pair 161 and 162, pulling normally cooperating contact pair 148-149 open so that they cease to cooperate with each other thus breaking the electrical path to relay coil 150 and thereby disabling relay 150 which in turn opens previously cooperating contact pair 151 and 152 so that they cease to cooperate with each other and thereby remove the hot side of direct current input power means 99 from alarm indicator 159 thus disabling said alarm indicator 159, while contact pair 153 and 154 previously caused to cease to cooperate are restored to their normally closed state so that they again cooperate with each other, while contact pair 146 and 147 are pulled together due to electrical energizing of relay 143 so they cooperate with each other and make electrical connection to one side of code acceptance device 158 the other side of said device 158 being electrically connected to ground return of direct current power input means 100, permitting code acceptance device 158 to receive electrical power and hence to operate.

When the push button electrical combination selector mechanism, FIGURE 1, is manually operated by pushing any of the aforementioned push buttons for a code digit other than the aforementioned preset digits or when a digit is operated out-of-sequence, current will flow from the hot side of direct current input power means 99 through cooperating contact pair 161 and 162, through cable harness 169, through the forward direction of the diodes 51, 52, 53, 54, 55, 56, 58, 59, 60 causing an electrical current to flow through contacts 61, 62, 63, 64, 65, 66, 68, 69, 70 which cooperate with selector arm 101 of inverse coding switch 166, causing a current to flow through normally closed and cooperating contact pair 114 and 115 into one side of relay coil 120 the other side of said relay coil 120 being connected to the ground return of direct current input power means 100, thereby electrically energizing relay 120, causing contact pair 125 and 126 to cooperate with each other which causes power to be applied to time delay relay 160 through cooperating contacts 161 and 162 and cooperating contacts 125 and 126, causes contacts 121 and 122 to cooperate with each other and make electrical connection to alarm indicator 159 by virtue of current flow through said alarm indicator 159 through normally cooperating contact pair 156 and 157, and energizing said alarm indicator 159, and opening cooperating contact pair 123 and 124 so that they cease to cooperate thus opening the electrical path to code acceptance device 158, preventing said code acceptance device 158 from being electrically energized. The circuit is automatically restored to its normal position as in FIGURE 1, when the preset delay time of time delay relay 160 has elapsed. Should the first digit be correctly selected and the second digit be improper or out of sequence, by operating of aforementioned push buttons, direct current will flow through diodes 51, 52, 53, 55, 56, 57, 58, 59, 60 through contacts 71, 72, 73, 75, 76, 77, 78, 79, 80 cooperating with selector arm 102 of inverse coding switch 167 through normally cooperating contacts 132 and 133 and now cooperating contacts 118 and 119 providing an electrical path to relay coil 138 thus energizing relay coil 138, causing contact pair 139 and 140 to cooperate with each other and causing power to be applied to alarm indicator 159 through normally cooperating contact pair 156 and 157, electrically energizing said alarm indicator 159, and holding said alarm indicator 159 energized for the specific period of time that time delay relay 160 remains energized, said time delay relay 160 having previously been electrically energized through flow of current through cooperating contact pairs 161 and 162 in series with relay coil 160 which is in series with the previously activated relay coil 107 which had caused contact pair 116 and 117 to cooperate with each other thusly holding energized said time delay relay 160 for a specific period of time. At the same time normally cooperating contact pair 141 and 142 is opened thus ceasing to cooperate with each

other due to the energizing of relay 138, causing the electrical path to the code acceptance device 158 to be open and electrically discontinuous. Should the first and second digits be correctly selected and the third digit be incorrect, by operating the aforementioned push buttons, direct current will flow through diodes 51, 52, 53, 54, 56, 57, 58, 59, 60 through contacts 81, 82, 83, 84, 86, 87, 88, 89, 90 cooperating with selector arm 103 of inverse coding switch 168, through normally cooperating contacts 148 and 149, and now cooperating contacts 136 and 137 providing an electrical path to relay coil 150 thus energizing relay coil 150, causing contact pair 151 and 152 to cooperate with each other and causing power to be applied to alarm indicator 159 through normally cooperating contact pair 156 and 157, electrically energizing said alarm indicator 159, and holding said alarm indicator 159 energized for the specific period of time that time delay relay 160 remains energized, said time delay relay 160 having previously been electrically energized through flow of current through cooperating contact pair 161 and 162 in series with relay coil 160 which is in series with the previously activated relay coil 107 which had caused contact pair 116 and 117 to cooperate with each other thusly holding energized said time delay relay 160 for a specific period of time. At the same time normally cooperating contact pair 153 and 154 is opened thus ceasing to cooperate with each other due to the energizing of relay 150, causing the electrical path to the code acceptance device 158 to be open and electrically discontinuous.

Electrical combination selector mechanisms, combination selector systems in themselves have been invented and are not claimed broadly; however the features and principles underlying the invention described above in connection with specific exemplifications will suggest to those skilled in the art many other modifications thereof. It is accordingly desired that the appended claims shall not be limited to any specific feature or details thereof.

I claim:

1. In an electrical combination selector, the combination of

a first coding means, responsive to a plural number of push buttons and a power means, comprising

a plural number of coding switches, presettable to a predetermined code, each with a selector arm and a plural number of stationary contacts corresponding to the said plural number of push buttons,

a plural number of relays corresponding to the said plural number of coding switches,

a second coding means, responsive to said plural number of push buttons and the said power means, comprising

a plural number of inverse coding switches, presettable to all codes excepting the said predetermined code, each said inverse coding switch having a plural number of stationary contacts corresponding to said plural number of push buttons and a selector means which simultaneously cooperates with all said stationary contacts of the said inverse coding switch except one,

a plural number of relays corresponding to said plural number of inverse coding switches,

a code acceptance means responsive to said first coding means, and

an alarm means responsive to said second coding means.

2. The first and second coding means as in claim 1, in combination with

a time delay resetting means responsive to said first and second coding means.

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