

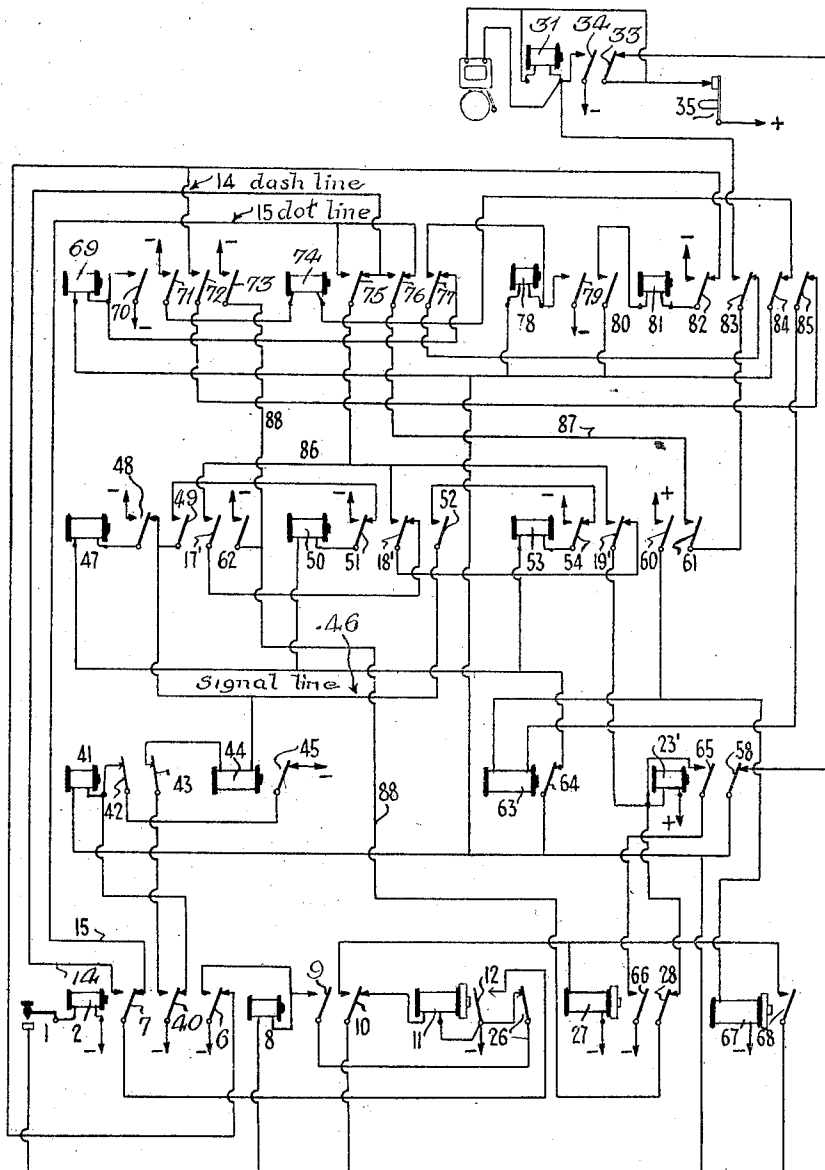
May 17, 1927.

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1,628,653

CALL SELECTOR

Filed June 27, 1923



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CALL SELECTOR.

Application filed June 27, 1923, Serial No. 647,992, and in France July 13, 1922.

The present invention has for its object an application to distress signal reception on ships of call selectors similar to the U. S. patent applications for call selectors filed August 17, 1922, Serial No. 582,546 and 611,537 filed January 8, 1923, by me.

As well known the distress signal consists of the letters S. O. S. of the Morse code (. . . - - - . . .).

Like the apparatus forming the object of the above mentioned applications, the call selector disclosed herein has for its object to cause the actuation of a calling means (bell or the like) in response to the reception of signals, the regular succession of which constitutes the S. O. S. signal in this case.

The single figure of the drawing herewith is a diagrammatic view of a call selector according to my invention.

It comprises therefore first an arrangement for making possible the selection of dots and dashes, in a somewhat similar manner as the one described in my former application and second an arrangement for controlling the order in which the signals are received which arrangement is somewhat similar to the one described in my latter mentioned application.

For this reason in the attached drawing and the following description the elements (relays, contacts, connections) which have already been described in the above mentioned applications are designated by the same reference characters and the new elements are designated by reference characters beginning with 60.

For the purpose of facilitating understanding of the present description, we will briefly repeat what has already been said in the above mentioned applications relative to the control of the order in which the signals arrive.

The signal relay 2 is controlled in response to received signals by means of contact 1 which may be a manually operated key or any other contact suitable for intermediate relays controlled by a receiver for wire or wireless telegraphy.

Upon the receiving of an impulse, magnet 2 will become energized through plus source of electricity from contact key 35. armature 33 and rear contact to armature 58 and rear contact, to relay contact 1, magnet 2 to minus. This, in turn will draw over armatures 7, 40 and 6. Circuit will now be made

from plus to contact key 35, as above, to magnet coil 8, through armature 6 and front contact to minus, energizing magnet 8 and drawing over armatures 9 and 10.

The circuit formerly closed from plus to 35, etc. through armature 10 and rear contact, magnet 11 to minus is now broken at 10. Also, circuit is completed from plus to magnet 8, as above, through armatures 9 and 26 to minus, thereby providing a circuit to magnet 8 independent of armature 6. Thus, magnet 8 holds closed regardless of armature 6. However, slow acting magnet 11 is still energized, even though its circuit has already been broken at 10. After a brief interval, armatures 12 and 26 will be released, thus opening the holding circuit to magnet 8 at 26 and closing the circuit to armature 7 and rear contact through armature 12 and rear contact. The breaking of magnet 8 circuit releases armatures 9 and 10 which break the auxiliary holding circuit to coil 8 again at 9 if armature 6 is at rest and makes the circuit to magnet 11 at 10, respectively, both circuits having already been described. The circuit to magnet 11 being again completed, the armatures 12 and 26 will be drawn up as shown in the drawing, but no current will flow to magnet 8 because its holding circuit is already broken at 9, magnet circuit 8 being also open at 6, as, for example, in the case of a dot. In the case of a dash, magnet 11 would release its armatures before contact 1 were released, and therefore armature 6 would be closed, thereby holding armature 9 closed and magnet circuit 11, through 10, open until contact 1 is released.

It is understood that this action occurs each time contact 1 is closed and that magnet 11 is timed to release its armatures only when contact 1 has opened after the time duration of a dot but during the time duration of a dash.

When contact 1 is closed, armature 7 completes the circuit with wire 14 and when it is open, 7 completes the circuit with 15, and 1 is closed when armature 12 closes for a dash and 1 is open when 12 closes after a dot.

Therefore, when a dot is received and contact 1 is released, an electrical impulse will be sent through dot line wire 15 immediately afterward at the time relay 11 releases armature 12 to close the circuit to armature 7 and rear contact. When a dash is received, an impulse will be sent through dash line

wire 14 beginning about the middle of the length of time the contact is held closed for the dash and ending when contact 1 is released. The purpose of relay 11 is to close the circuit of armature 7 after contact 1 is released for a dot or before it is released for a dash. The line 14 will be called "the dash line" and line 15, "the dot line." We have therefore an arrangement which makes possible the separation of dots and dashes.

The arrangement which is used for controlling the arrival of the signals of the group is as follows:—The signal magnet 2 controls armature 40. For this reason, when the apparatus is at rest, the magnet 41 will be energized through plus to contact 35, armature 33 and rear contact, armature 58 and rear contact, magnet 41, armature 40 and rear contact to minus. When so energized it locks up through armature 42, armature 45 to minus.

Upon the receipt of the first signal, magnet 2 becomes energized and draws over armature 40 to front contact, thus opening the circuit to magnet 41. The circuit comprising plus to 35, 33, 58, armature 64, magnet 47, 48, signal line 46, magnet 44, armature 43 will then be closed at 40 and rear contact to minus, thus energizing magnet 44. However, as soon as 44 is energized, and the circuit from magnet 41 to armature 40 and front contact having already been broken, the circuit comprising from plus 35, 33, 58, magnet 41, armature 42, 45 to minus will be broken at 45 and rear contact. The magnet 41 will become de-energized and open or release armature 43 and the electro-magnet 41 will no longer be energized while relay 2 is energized. It will be seen by this that at the beginning of each signal a short impulse is sent through signal line 46 through the following circuit:—Plus to 35, 33, 58, 64, magnet 47, 48, signal line 46, magnet 44, 43, 40 to minus, until the circuit is broken at 43.

Upon the reception of the first signal, the electro-magnet 47 will be energized by this impulse and therefore lock up through armature 48 and front contact to minus. Through its armature 49 and front contact, the magnet 47 connects the circuit plus to 35, 33, 58, 64, magnet 50, 51 to 49, signal line 46 to magnet 44, to armature 43 which is open. When armature 40 is released it will energize magnet 41 again to close armature 43. Thus, the electro-magnet 50 will respond to the second signal through plus to 64, as above, through magnet 50, 51, 49, signal line 46, magnet 44, 43, upon the second closure of armature 40 to front contact and to minus. The electro-magnet 50 will respond to the second signal to lock up at 51 and to connect through armature 52 the third signal magnet 53 with the line 46 in the same way, and the magnet 53 will operate in the same way at the beginning of the third signal.

It will be seen therefore that the magnets 47, 50 and 53 successively cause each other's operation in accordance with the reception of the signals. For the purpose of insuring the proper functioning of this arrangement it is necessary that the armature 48 be locked in its actuated position and disconnected from the line 46 as soon as the magnet 47 begins to operate. Furthermore, the armature 49 must not close until the end of the operation. The same thing holds true also for the armatures of magnets 50 and 53. The magnet 44 may open the circuit of magnet 41 very early because the armature 43 is opened upon the successive operation of these two magnets and the line 46 is always supplied with current for a sufficiently long time to insure the energization of one of the magnets 47, 50 and 53.

The purpose of the signal magnets 47, 50 and 53 is to connect with the dot line 15 or with the dash line 14 through armatures 75 or 76 one end of a so-called general zero magnet 23'. This magnet is provided for the purpose of opening at 58 the current supply circuit of the apparatus upon the receiving of a false signal. For this purpose the magnet 23' is connected through contacts 19', 18', 17' with the conductor 86 in accordance with the receiving of the signals. As will be set forth more in detail this conductor is connected with the dash line when the desired signal is a dot and vice versa, whereby when a false signal is received (dash instead of dot or vice versa) the magnet 23' is energized and releases to normal the various relays by opening at 58 the common lead to that side of the source of power. On the other hand if the signals received are correct the magnets 47, 50, 53 will operate in the normal manner until the last one is actuated which will cause then the registration of the desired letter. Upon the receiving of the first signal when the first signal magnet 47 is operated the armature 62 will close and connect the line 88 with the minus pole of the current supply source provided for the selector. However, at this time, the differentiating silence magnet 27 is actuated through armature 10 and front contact and this magnet will remain actuated on account of its retarded action during the full duration of a signal as long as the impulses constituting this signal are separated by normal silent periods. However, if an impulse is followed by a silent period which is too long, then the magnet 27 will close its armature 28, whereby through the agency of line 88 and armature 62 the general zero magnet 23' will be operated. It will be seen therefore that if the silent period between two impulses of which one and the same letter is composed is too long, then the apparatus is returned to zero.

It will be seen from the above descrip-

tion that the S. O. S. selector is like the call selector forming the object of U. S. patent applications previously referred to in so far as the selection of dots and dashes and the control of the order in which the impulses constituting one and the same letter are concerned. However, for the purpose of accomplishing the particular object of the S. O. S. selector the following must also be provided:

1°—A "zero letter" relay 63 the purpose of which is to restore to normal the impulse magnets after the receiving of a correct letter.

2°—A second letter relay 69 which operates immediately upon receiving of the first letter if such letter is correct, for the purpose of preparing the different circuits corresponding to the second letter.

3°—A switching magnet 74 which in its resting condition and upon the receiving of the first and third letters suitably connects the contacts of the impulse magnets 47, 50 and 53 with the dash line 14 and the dot line 15 for the purpose of obtaining the combination corresponding to the first and third letters S (. . .). This magnet is energized upon the receipt of the second letter and suitably connects the same contacts for the purpose of obtaining the second letter O (- - -).

4°—A magnet 78 for the third letter which prepares the circuit of the auxiliary third letter magnet 81 at the end of the second letter if such letter was properly received.

5°—An auxiliary magnet 81 for the third letter which upon the beginning of the third letter arranges the circuits so that this third letter if properly received will cause the actuation of the ringing magnet 31.

6°—A differentiating magnet 67 which acts as a supplementary silence magnet and is energized upon the termination of each letter for locking the circuit of the normal silence magnet 27 whereby the silent periods between two letters may be longer than the silent periods between impulses.

The operation of this circuit arrangement is as follows:

During the reception of the first letter of the signal (such as the letter S . . .) the switching magnet 74 is not energized because the circuit magnet 69 which controls armature 71 through plus to 35, 33, 58 magnet 69, 77, 83 is not energized due to the open armature 61. The line 86 is connected through the armature 75 with the dash line 14. In view of the fact that line 86 is connected with the controlling armature 17', 18' and 19' of the impulse magnets 47, 50 and 53 if the letter received is the letter S . . . , then the closing of the armatures of the electro-magnets will progress in a normal manner. On the other hand if one

of the impulses received is a dash, an impulse will be sent over line 14, as already described, 75, 86, one of the armatures 17', 18' or 19', magnet 23' from the plus connection and magnet 23' will become energized and will open by means of armature 58 the various circuits of the selector.

If on the other hand the receiving impulses are dots as they should be, then the armatures will be operated in the normal manner and upon the reception of the third impulse of the first letter the magnet 53 becomes energized and closes the armature 60 whereupon the quick closing but slow opening supplementary silence magnet 67 is energized. This magnet locks up through its armature 68 the circuit of the differentiating silence magnet 27, whereby the latter can not become deenergized upon the cessation of the sending but only after the expiration of a sufficiently long period of time which depends on the adjustment of the magnet 67. This magnet 67 is deenergized through the opening of armature 60 in response to the energization of relay 63 which opens armature 64 and the circuits to magnets 47, 50 and 53. The silent period between two letters may therefore be longer than the silent period between two impulses. The dot line 15 is connected upon the reception of the third signal through the armature 76 of the deenergized magnet 74 and through the conductor 87 with the armature 61. For this reason if the third impulse is a dot (that is to say if it is the correct impulse) then the second letter magnet 69 will become energized (armature 61 is actuated, 83 is at rest and 77 is at rest). The electro-magnet 69 locks up and by closing its armature 71 will cause the energization of the switching magnet 74. This magnet connects the dot line 15 with the armatures 17', 18' and 19' of the impulse magnets 47, 50 and 53 in a manner suitable to control the impulses of the second letter.

At the same time the second letter electromagnet 69 closes its armature 72 whereby through plus to 60, magnet 63, 85, 72 and armature 6 to minus an energizing circuit will be closed for the zero-letter relay 63. The circuit of this magnet is completed through armature 60 and when it becomes energized it opens at its armature 64 the circuit of the magnets 47, 50 and 53 causing the deenergization of these magnets.

It will be seen therefore that if the first letter is correct, then the impulse magnets are returned to normal and the magnets 69 and 74 remain energized whereby the apparatus is prepared for the receiving of the second letter.

If this second letter is correct, then upon the receiving of the third impulse of it (a dash) the supplementary silence magnet 67 will become energized through the armature

60 in the above described manner. In view of the fact that at this time the magnet 74 is energized the dash line 14 is connected through the armatures 76 and 61 which are in operating position, armature 83 which is in normal position and armature 77 which is in operated position with the third letter electromagnet 78. This magnet becomes energized and locks up through its armature 79 and front contact.

The magnet 78 controls in its armature 80 the circuit of the auxiliary third impulse magnet 81. However, the latter does not become energized until the silent period following the second letter because its circuit will be closed through armature 6 of the deenergized receiving magnet 2 and armature 82. The same thing holds good for the circuit of the zero letter magnet 63 which is also controlled through armature 85, armature 72 and by the armature 6 in normal position.

It will be seen that the reception of the third dash of the letter O is registered by means of the magnet 78 but that the apparatus is not returned to normal and the circuits are not arranged for the receiving of the third letter until the silent period following the second letter. This is absolutely necessary between the second and the third letters because if the permutation of the circuits took place, the apparatus would be returned to normal if the receiving of the last dash were prolonged after the permutation because armature 6 would be open.

The magnet 81 locks up through its armature 82 and front contact, drawing over armature 84, thus opening the circuit of the switching magnet 74. This magnet will become deenergized. The dot and dash lines 15 and 14 will now be connected for receiving the letter S in the same manner as at the receiving of the first letter. However, the armature 83 connects the conductor coming from 61 towards the ringing magnet 31 whereby upon the proper receiving of the third letter the ringing magnet 31 becomes energized locks up through its armature 34. The bell will ring. At the same time armature 33 opens the circuits of all the magnets except the magnet 31. The magnets of the selector will therefore become deenergized. The bell will continue to ring until the operator stops it by operating the key 35.

It should be noted that the magnet 81, through armature 85, opens the circuit of the zero letter magnet 63 for the purpose of giving the ringing magnet 31 sufficient time to operate prior to the opening of the armature 61.

Unlike the arrangement disclosed in my second mentioned patent application the ringing magnet 31 is not controlled by the differentiating silence magnet 27. With the receiving signal of a given nature (distress

signal) it is preferable to register this signal just as soon as the impulses are received in correct succession and irrespective of the impulses that may follow even if the spacing is improper. It is better if the calling apparatus gives a wrong danger indication than if it does not respond to a distress signal which is followed by a silent period of insufficient duration.

All false impulses that are produced in the second and the third letter will cause the restoration of the apparatus to its normal position that is to say will place it into condition to receive the first impulse of the first letter. For this purpose the circuits of the electromagnets 69, 74, 78 and 81 corresponding to the second and third letters are opened in 23 and 58 upon the receiving of a false impulse no matter what the position of this impulse might be in the signal.

Upon the registering of the first letter, in response to the operation of the magnet 69, the armature 62 is paralleled by the contact 73 whereby if the silent period between the first and second letters, between the second and third letters or between the impulses of the second or third letters is too long when the differential silence magnet 27 becomes deenergized and connects its contact 28 with the line 88, then the zero magnet becomes energized and the selector is returned to its normal position.

Having described my invention, what I claim is:

1. In a call selector adapted to respond to the distress signal, the combination of impulse responsive means, timing means cooperating therewith for determining the length of an impulse, a plurality of relays cooperating with said timing means, and connections between the relays whereby they respond in predetermined sequence to the impulses of the first letter of the distress signal, switching means cooperating therewith for resetting said relays to respond to the second letter of the distress signal, and for resetting said relays to cause them to respond to the third letter of the distress signal and means for causing the energization of an alarm upon the completion of the third letter of the distress signal.

2. In a call selector adapted to respond to the international distress signal, the combination of impulse responsive means, timing means cooperating therewith for determining the length of an impulse, a plurality of relays and connections therebetween whereby they are operated in sequence in response to the impulses in the first letter of the distress signal, switching means cooperating with said relays for restoring them to initial position at the termination of each letter of the distress signal and for causing them to respond in sequence to next letter, means for causing the energization of an alarm

upon the termination of the proper sequence of signals comprising the distress signal, and means including said relays and timing means for resetting the system to starting position upon the reception of an improper impulse at any stage in the operation thereof.

3. In a call selector adapted to respond to the S. O. S. signal, the combination of impulse responsive means, timing means co-operating therewith for determining the length of an impulse, a plurality of relays and connections therebetween whereby they are operated in predetermined sequence in response to the impulses of the first letter of the distress signal, switching means co-operating therewith for resetting said relays to initial position upon the completion of each letter of the distress signal, system resetting means including said relays and timing means for restoring the system to initial condition upon the reception of an improper impulse at any stage in the operation thereof and means for causing the operation of said system resetting means upon the expiration of a predetermined silent period after the termination of any impulse except that causing operation of the last relay of said plurality.

4. In a call selector adapted to respond to the S. O. S. signal, the combination of impulse responsive means, timing means co-operating therewith for determining the length of an impulse, a plurality of relays and connections between the relays whereby they respond in predetermined sequence to the impulses of each letter of the distress signal, relay resetting means for restoring said relays to initial position after the completion of the reception of each letter of the distress signal, system resetting means including said relays and timing means for restoring the system to starting condition upon the reception of an improper impulse during the reception of the call, a second

letter relay for controlling the connections of said system resetting means in a manner to cause it to respond to impulses of different duration, and said relay being arranged to be operated at the termination of the correct reception of the first letter of the distress signal, third letter switching means for restoring the initial connections of said system resetting means upon the completion of the reception of the second letter of the distress signal, means for causing operation of the system resetting means at the expiration of a predetermined silent period during the reception, means for delaying the operation of said former means to permit a greater silent period separating letters of the distress signal, and means for causing energization of an alarm at the termination of the reception of the distress signal.

5. In a call selector adapted to respond to the call "S. O. S." the combination of impulse responsive means, timing means co-operating therewith for determining the length of an impulse, two conductors co-operating with the timing means to be selectively energized according to the length of received impulses, an additional conductor and means whereby it is energized at the beginning only of each impulse, a plurality of relays and means whereby they are connected in a predetermined sequence to said last named conductor, means for restoring the system to initial condition comprising a relay connected to the conductor energized in response to an impulse of improper duration and means controlled by the last of said relays of said sequence to be energized, for restoring said relays to normal condition and for connecting said system restoring means to the other of said first-named conductors upon the completion of the reception of the first letter of the distress call.

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