Sept. 4, 1934. L. L. E. CHAUVEAU 1,972,289

AUTOMATIC TRANSMITTER KEY FOR DISTRESS SIGNALS

Filed May 20, 1929 2 Sheets-Sheet 1

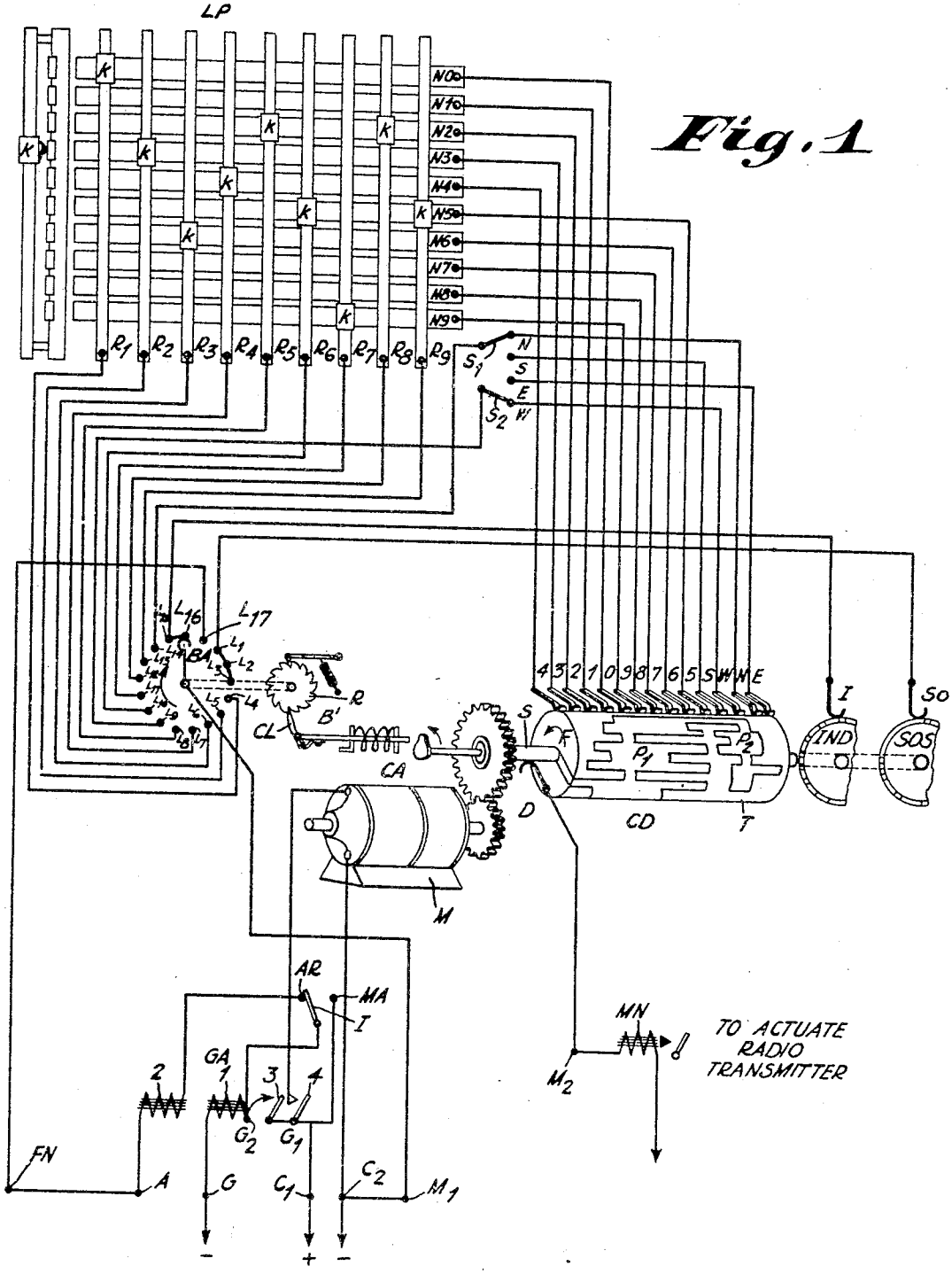

Fig. 1

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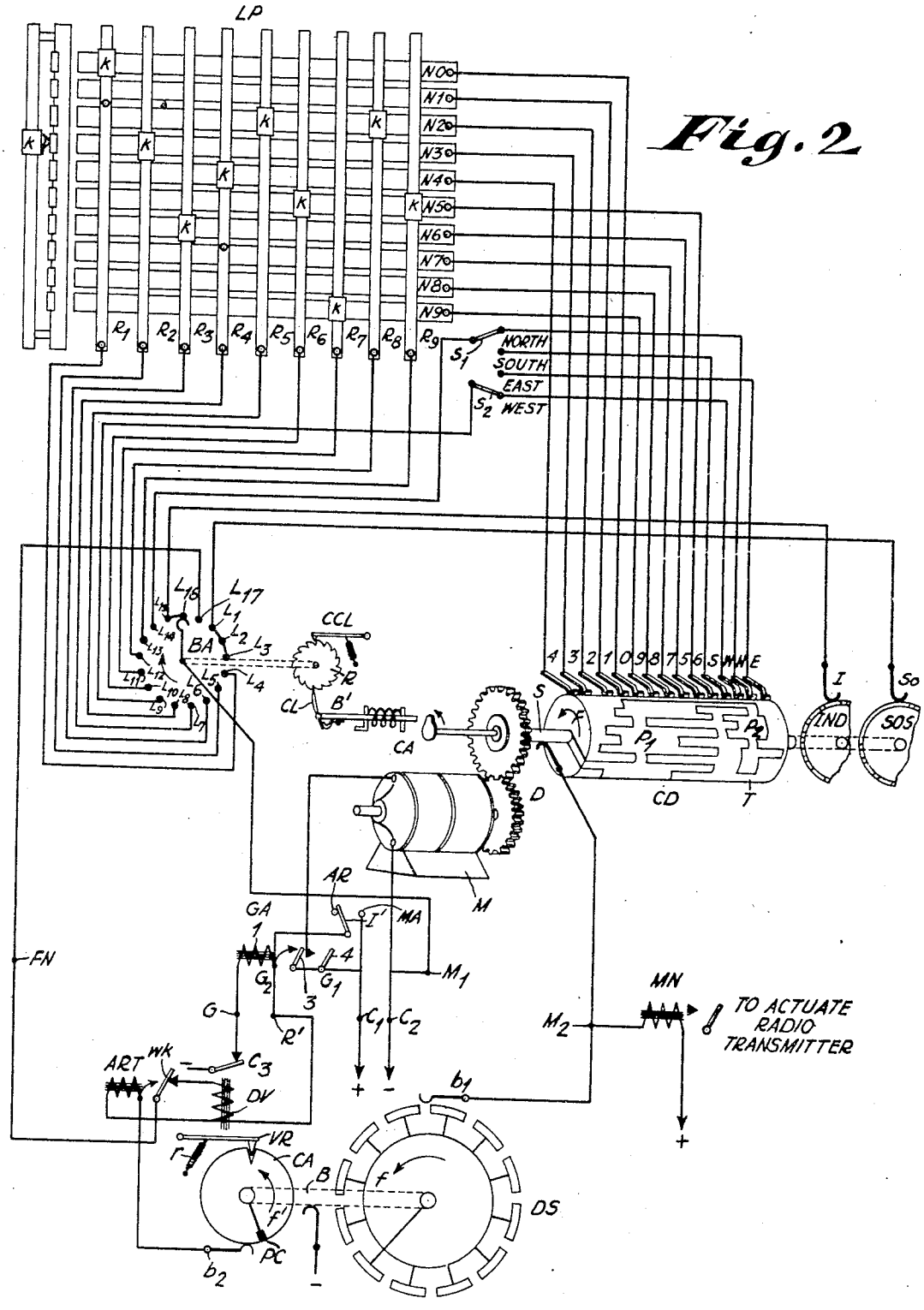

Fig. 2

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AUTOMATIC TRANSMITTER KEY FOR DISTRESS SIGNALS

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Application May 20, 1929, Serial No. 364,617
In France May 19, 1928

3 Claims. (Cl. 177—380)

The present invention relates to improvements upon apparatus disclosed in British Patent No. 303,839, and objects of these improvements are (1) to insure stopping the automatic signalling apparatus in a definite position corresponding to the end of the signal, and (2) to allow of and cause the transmission automatically by said apparatus of another signal as contemplated at the present time by international radio committees.

In what follows, a description is given of one of the improvements here disclosed by way of example and by reference to the accompanying drawings Figure 1 of which gives a schematic illustration of an automatic signalling system of the type disclosed in said above referred to patent including improvements of the present invention; while,

Figure 2 illustrates a modification of the arrangement of Figure 1.

Signalling apparatus of the type involved here includes, see Figure 1, a location plate LP, a code drum CD, an identification disk IND, an S. O. S. disk SOS, and a distributor BA.

The location plate, which serves to transmit the position of the device which is sending the signal, comprises a series of 10 conductors N_0—N_9 corresponding respectively to the digits 0—9. Placed at right angles to these conductors are 9 conductive guide bars R_1—R_9, each of which carries a contact K adapted to contact also with the conductors; the guide bar R_1 corresponds to the "hundreds", R_2 to the "tens" and R_3 to the "units" of the longitude degrees respectively, and R_4 to the "tens" and R_5 to the "units" of the longitude minutes respectively. R_6—R_9 correspond respectively to the "tens" and "units" of degrees and minutes of latitude. The location plate is shown in plan in Figure 1 and, slightly to the left of the plan in said figure in end elevation also.

The location plate is associated with a switch S_1 adapted to contact with either of two contacts North and South and a switch S_2 to contact with either of two contacts East and West.

To indicate the position the different contacts K must be moved along their guide bars so as to contact with the conductors appropriate to the members corresponding to the position of the ship and the switches S_1 and S_2 must be made to contact with the appropriate contacts. The position set up on the location plate as shown in Figure 1 is 036° 42' West 59° 25' North.

The code drum CD comprises an insulated drum T mounted on a shaft S driven by a small motor M through gearing D. This gearing is such that the drum makes one revolution in four seconds which corresponds to a slightly less duration than the manually operated S. O. S. signal.

Around the periphery of the drum T are arranged two metallic members P_1, P_2 shaped as shown and electrically connected to the shaft A.

In contact with one generatrix of the drum are 14 brushes, 0—9 and N. S. E. and W., arranged with respect to the members P_1 and P_2.

The brushes are fixed and the drum being rotatable in the direction of the arrow F, it will be seen that each of the brushes 0—9 will, during one rotation of the drum, contact with parts of the conductors so as to reproduce in Morse code the corresponding digit, for example, the brush 4 makes contact equivalent to 4 dots and a dash, brush 7 two dashes and three dots, etc. Similarly the brush S which corresponds to South will contact for periods equivalent to 3 dots, the brush W corresponding to West making contact equivalent to a dot and 2 dashes.

The identification disk IND comprises a metallic disk having portions corresponding to the name of the ship in Morse code. The space between these portions is filled with insulating material and the disk is mounted on a shaft at one end of the drum CD. A brush I makes contact with the circumference of the disk. The identification disk is separate from the drum T to facilitate construction, the disk, of course, varying for different ships.

The S. O. S. disk is formed similar to the indicating disk but is provided with portions corresponding to the S. O. S. signal; a brush SO contacts with this disk which is so mounted at the end of the shaft as to be easily detachable, so as to allow it to be replaced by "code message" disks, corresponding to a predetermined signal.

The distributor comprises a brush BA fast with a ratchet wheel R. The main shaft S carries a cam CA.

At each revolution of the drum T the cam CA advances the ratchet wheel R one tooth through a connecting rod B_1 and pawl CL. A counter pawl CCL holds the ratchet wheel in its positions. This arrangement is such that after each revolution of the drum the ratchet wheel R and brush BA advance one step. The brush BA is displaced across a series of 17 contacts or a commutator with 17 segments L_1—L_{17}. The first three contacts or segments are connected to the brush SO of the S. O. S. disk, the next five are connected to the bars R_1—R_5 respectively, the

contact L_9 is connected to the switch S_2, contacts L_{10}—L_{13} are connected to the bars R_6—R_9 respectively, contact L_{14} to switch S_1, and contacts L_{15} and L_{16} to the brush I of the identification disk. The purpose of L_{17} will appear hereinafter.

The use of such a distributor has the advantage that the brush BA is stationary during the transmission of signals; contact thereof is therefore assured. The displacement of a brush of one contact over another takes place only at the end of each revolution at a moment when no signal is sent for the developed height of the metallic member P_1 is less than the developed periphery of the drum T and the cam CA is set at an angle such that the displacement of the brush BA takes place at the end of the revolution when all the brushes of the drum and disks are insulated.

The operation of the apparatus is as follows:

Imagine the apparatus including the board BB, the disk BA, drum CD, etc., to be set as shown and that contact L_{17} is out. The motor M is connected to the source of energy connected with terminals C_1, C_2 and drives the shaft S in the direction of the arrow. The brush BA is connected, as shown, by way of M_1 to the negative lead C_2 of the source while the shaft S is connected by way of M_2 and MN to the positive terminal of the source. The cam CA actuates the connecting rod B_1, the ratchet wheel R advances one step, and the brush BA contacts with the contact L_1. In these conditions the brush SO of the S. O. S. disk is connected to the contact while the disk itself is connected to the terminal M_2 through the shaft A. The S. O. S. signal is therefore transmitted once from a radio transmitter, not shown, during the first revolution of the drum CD. At the end of this revolution the cam CA again operates the connecting rod B_1, brush BA passes to contact L_2 and again connects the brush SO, and the S. O. S. signal is transmitted a second time during the second revolution. At the end of this revolution the brush BA passes to contact L_3 and the S. O. S. signal is transmitted a third time.

At the end of the third revolution, the brush BA passes to contact L_4 which is connected to the bar R_1 whose contact is in contact with brush O of the drum T through the conductor N_0. Thus, during the fourth revolution, the digit 0 is transmitted via terminals M_2 and MN. At the end of the fourth revolution, the brush passes to L_5 which is connected to R_2 whose contact is in contact with N_3 connected to brush 3. Thus during the fifth revolution, the digit 3 is transmitted via the terminals M_2 and MN to the radio transmitter.

Thus the transmission continues, the brush advancing one contact at the end of each revolution, the bars R_1 and R_9 and switches S_1 and S_2 are successively put into contact with the terminal M_2 by the distributor and appropriate conductors and drum T. The position signal is thus transmitted.

At the end of the fourteenth revolution, the brush BA passes to the contact L_{15}, the brush I is connected to the terminal M_1, the disk IND being connected to the shaft S and terminal M_2. The name will thus be transmitted during the fifteenth revolution, the same operation occurring during the sixteenth revolution.

It will thus be seen that a complete rotation (except for one step) of the brush BA corresponds to 16 revolutions of the drum T and correctly transmits the distress signal via the terminal M_2.

In order to insure that the motor M, code drum CD, etc., stop at the desired position, that is, when a complete set of calls have been sent out by a complete rotation of the brush A of the distributor, the energizing circuit for the call device may be connected as shown in Figure 1 and may include the control devices and improvements now to be described.

In the device of the patent a source of energy has one terminal connected to the motor directly and the other terminal adapted to be connected thereto by way of one pole of a double pole switch, the other pole of which connects the brush BA to one side of the radio transmitter apparatus, the other side of the radio transmitter apparatus being connected to a brush on the code drum shaft.

In the present application the two-pole circuit-breaker disclosed in the patent is replaced by a single-pole reversing switch I' and as the terminals C1 and C2 are connected with the poles of the source, as shown in Figure 1, the brush BA will be directly united with the terminal M1, the latter being associated with the negative pole of a common source not shown, and terminal M2 with the manipulating key relay MN causing transmission from the radio equipment. The assembly further comprises a guard or holder relay GA having two windings arranged in opposition. The reversing switch I' feeds the relay GA and the latter in turn feeds the motor and the different circuits of the apparatus for the contacts G1 and G2, the latter acting as the holding or blocking contact.

The distributor BA includes, as stated above, an additional contact stud L17 arranged after or at the end of the row of contacts L_1 to L_{16} inclusive described hereinbefore.

When the apparatus is used merely for the transmission of distress signals including the name of the vessel and the position thereof, as described hereinbefore, that is, exclusive of the new signal hereinafter to be mentioned, terminal G is directly united with the negative pole of the source, and terminals A and FN are united between each other as shown in Fig. 1.

The operation of the assembly is then as follows. Shifting the reversing switch I' to the right into the running or operative position on contact MA, coil 1 of relay GA is energized through the circuit from the positive terminal of the source to C1—MA—1—G to the negative terminal of the source. The relay GA being thus excited causes the closing of its contacts. The relay GA is blocked (guarded) by its contact G2 which completes the circuit through 1 from the positive terminal of the source to C_1 to terminal 3 of G_1, G_2 winding 1, G to the negative terminal of the source, while the motor M is fed by way of contact 4 of G1 through the circuit C1, 4, M, C2, with the result that the motor is started up and the apparatus is rendered operative to key a radio transmitter, as described hereinbefore. The motor will continue to run as long as the reverser switch I' remains in position on MA, and if, at some instant or another, the said switch is placed in the stop position on contact AR, relay GA remains energized by its blocking or holding contact G2, which, being closed, connects winding 1 in series with the source by way of C_3, G, 1, G_2, G_3, G_1 and C_1, and the motor continues running. The winding 2 of GA is united with the positive pole and at the instant when the brush BA passes over the contact stud

L17, winding 2 will be energized by the source through a circuit including 2, A, FN, L_{17}, M_1, the source C1, G1, 3, AR and 2, and since both windings 1 and 2 are then simultaneously energized, though in opposition, the apparatus will come to a stop because the armatures 3 and 4 open breaking the motor circuit and the circuit to the windings 1 and 2. It will be noted that this device makes it possible to cause the stopping of the apparatus in a definite position, i. e., a position corresponding to the instant when brush or wiper BA slides over the contact stud L17.

International radio commissions at the present time are contemplating a preliminary alarm signal more particularly suited for the actuation of receiving selectors. This signal would consist of twelve dashes each lasting four seconds, and being separated by intervals of one second. Hence, this alarm signal would take one minute, and it should be sent out before the distress signal proper. The second improvement and object of the present application concerns the addition to the apparatus constituting the object of the main application of a device adapted to insure the dispatching of the said alarm signal.

This device comprises (see Figure 2) a distributor DS directly mounted upon a shaft B revolving at the rate of one rotation per minute, the said shaft being driven by a motor (not shown). This distributor DS comprises twelve conducting contact studs separated by insulating intervals or spacers. This distributor is rotated under a brush or wiper *b*1. The assembly is disposed in such a way that the time of contact between wiper *b*1 and the contact studs will be four seconds separated by intervals of one second. This device is therefore suited to send out the alarm signal.

Upon the shaft B is also mounted a cam CA having a notch wherein engages a lock or pawl VR which stops the movement. The cam CA further bears a small contact PC which in the course of rotation of the shaft comes to make contact with a brush *b*2. The contact PC has a definite position being so chosen that it will strike the brush *b*2 only at the end of each rotation of CA and DS a slight instant before the notch in the cam comes to be placed before or in front of the lock or latch VR.

The lock VR is kept engaged in the cam by the agency of a spring *r*, and disengagement therewith is accomplishable by an electromagnet DV when the latter is energized. The said electromagnet DV when actuated opens the circuit of the winding 1 of the blocking or holding relay GA at C_3. A stopping relay ART is engaged by closing of the contact PC, and the brush *b*2 so as to interrupt the circuit of DV and thereby liberate or release the lock VR.

The operation of the assembly is as follows: The connections are established as shown in Figure 2. It is noted, the wire FN to A in Figure 1 is omitted. In giving the operation it will be assumed that the arm BA has been moved during previous operation to rest on contact L_{17} and the motor M is at rest. When the apparatus is in the stop or inoperative position, that is to say, when BA is positioned upon the contact stud L17, terminal FN is associated with the negative pole through circuit FN, L_{17}, M_1, C_2, and, with the contact of ART being at rest, DV is likewise connected with the negative pole through circuit DV, FN, L_{17}, M_1, C_2. When the reversing switch I' is closed upon the running position MA, terminal R is united with the positive pole and the electromagnet DV is rendered operative through circuit DV, FN, L_{17}, M_1, source C_1, MA, G2 and DV; the latter thus pulls up the pawl or lock VR, and the cam CA and the distributor thus released are caused to rotate. The result is that the keying electromagnet MN is energized by way of studs DS, the shaft B, and brush *b*1. Hence, this electromagnet causes the sending out of the alarm signal.

At the end of rotation of DS and of cam CA, the contact stud PC passes on the brush *b*2, the electromagnet ART is energized by circuit PC, *b*2, ART, R_1, G_2, MA and C_1, and it interrupts the circuit of DV whereby the lock VR is released, so that the latter comes to engage in the notch of the cam CA and stops the transmission of the alarm signal. At the same instant the contact PC passes beyond the brush *b*2. However, the relay ART remains still energized by way of its working contact *wk*, which has moved to the left so that ART receives negative current by way of terminal FN, L_{17}, BA, M_1, C_2 and the negative terminal of the source.

During the sending of this signal by the distributor DS and associated circuits the motor M has remained at rest because winding 1 of GA has remained unenergized since the contact C_3 has been held open by the energized winding DV. Since winding 1 is unenergized contacts 3 and 4 are open and the motor circuit is not complete nor is the holding circuit for winding 1.

After ART has operated and after the circuit of DV has been broken, the contact *c*3 has been closed, the electromagnet GA is excited by its winding 1, GA operates, closes holding circuit contact armature 3 and motor circuit contact 4, and the motor is revolved; the brush BA then passes from contact stud L_{17} to stud L_1, and ART comes to rest because the circuit R', MA, C_1, the positive terminal of the energizing source, M_1, BA, etc., back to ART, is broken at L_{17}. The motor turns and the distress signal is sent out in a way as described hereinbefore and in the patent.

At the end of the distress signal the brush BA comes to be positioned again upon the stud L_{17}. The electromagnet ART is then at rest, the relay DV is energized, and this causes the breaking at contact *c*3 of the circuit of GA and results in the stopping of the motor M. At the same time the cam CA is unlocked so that DS and CA can rotate and the alarm signal is sent out again, and the same cycle is repeated over and over again; indeed, as long as the reversing or throw-over switch I' is in the operating position MA, the alarm signal and the distress signal will be sent out successively and alternately.

Sometimes it is desired to interrupt the signalling operation, that is, to stop signalling after the alarm signal has been sent out and the distress signal has been sent out. To do so, some time after the arm BA leaves the contact L_{17}, but before it reaches the contact L_{17}, switch I' is shifted to the left hand position contact AR.

When the circuit breaker I' is shifted to the position AR the motor circuit remains complete because the relay GA is held in the contact closing position by winding 1, which is energized by the circuit: minus terminal of the source, closed contact 3 of GA, terminal C_1, and the positive terminal of the source. The motor circuit at this time is from C_1, through the closed contact 4 of GA, the motor winding, and back to C_2.

If the circuit through the winding 1 is open

the contacts 3 and 4 of GA will be open and the motor circuit will be broken.

The contact C_3 is open when DV is energized. DV is energized when BA reaches L_{17} because the following circuit through DV is completed: positive terminal of the source, C_1, holding contact 3 of GA, R, the winding of DV, the contact of ART, which is closed, terminal FN, contact L_{17}, arm BA, terminal M_1, terminal C_2, and the minus terminal of the source.

It will thus be seen that this relay, DV, is energized when BA becomes positioned upon contact L_{17} with the result that the motor M is arrested with BA staying in this position. After the opening of C_3 the keepers of GA open the contacts 3 and 4 and DV ceases to be energized since its circuit is broken at 3. All of the relays become deenergized and the entire apparatus comes to rest. The locking means VR drops into the notch in the disk CA, preventing rotation of the disk and the distributor DS.

In this arrangement, therefore, alarm signals followed by distress signals may be sent out continuously and in sequence by merely starting the apparatus as described hereinbefore, and leaving the switch I' in contact with contact MA, or a single alarm signal followed by a single distress signal may be sent out by moving the contact I' into a position bearing on contact AR some time after the distributor DS has stopped rotating and the motor M has started to rotate so that arm BA has left contact L_{17}. It follows, of course, that any desired number of the signalling operations may be completed in sequence before the apparatus is stopped.

It will be understood that this invention may be used separately or in combination with the device in the above referred to patent.

I claim:

1. In an automatic electric distress-signal transmitter apparatus, a distributor comprising a plurality of contacts, a rotatable wiper adapted when rotated to make contact with the contacts, means for forming electric circuits each corresponding to a signal, each of said circuits passing through a contact of the distributor and the wiper, an electric motor for driving said wiper and causing said wiper to bear on all of said contacts in cyclic order, a rotary keying device, a plurality of electric circuits corresponding to supplementary signals, said circuits each including a contact adapted to be closed by rotation of said keying device, means for driving the keying device and simultaneously stopping the motor, and for driving the motor and simultaneously stopping the keying device, and means for stopping the movement of the assembly of the system when the wiper is in a definite position independently of the time when the control means of the said means for stopping have been actuated.

2. In an automatic electric distress-signal transmitter apparatus, a distributor comprising a plurality of contacts, a rotatable wiper adapted to make contact with said contacts, means for forming electric circuits each corresponding to a signal, and each of said circuits being closed through a contact of said distributor and the wiper, an electric motor for rotating said wiper and causing said wiper to bear on each of the contacts in cyclic order, an energizing circuit for said motor, a rotary keying device, an electrical circuit periodically broken to form supplementary signals, said circuit including a contact adapted to be intermittently opened and closed by rotation of said keying device, a rotational body integral with the keying device, an electrical line, means on said body for closing and opening the circuit of said electrical line in a definite position during rotation, a relay associated with a contact on said distributor, a second relay associated with said line, means for stopping rotation of said body immediately after the opening of the said line, the second relay and stopping means being controlled by said relay associated with said distributor, said second relay associated with said electrical line being arranged to open the circuit of the first relay, a third relay whose energizing circuit is controlled by the first relay, said third relay controlling the circuit of the said electric motor, a starting switch, a potential source, means for connecting one pole of the potential-source with the first and the third relay at the same time to energize the same when the switch is positioned upon a certain or definite contact, and means for maintaining energization of the third relay between the times when the switch leaves the said contact and the instant when the wiper of the distributor comes in touch with the contact associated with the first relay.

3. In control apparatus to be used for controlling the driving means for an automatic signalling device and for stopping said driving means at a predetermined position and for sending out alarm signals supplementary to the automatic signals, a source of potential, means for connecting said source of potential to said driving means including a magnetic relay, means for energizing said relay, means for controlling the transmission of said automatic signals and for interrupting connection between said source and said driving means when said automatic signals have been sent including a distributor driven by a motor and arranged to complete a circuit when said distributor reaches a predetermined position of rotation, a second relay connected with said circuit and having means to deenergize said first named relay and deenergize said driving means responsive to the operation of said second relay, means for sending out an alarm signal when said driving means is inoperative, and means responsive to the termination of the alarm signal for rendering said driving means operative and acting to again energize the first relay.

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