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SELECTIVE CALLING DEVICE

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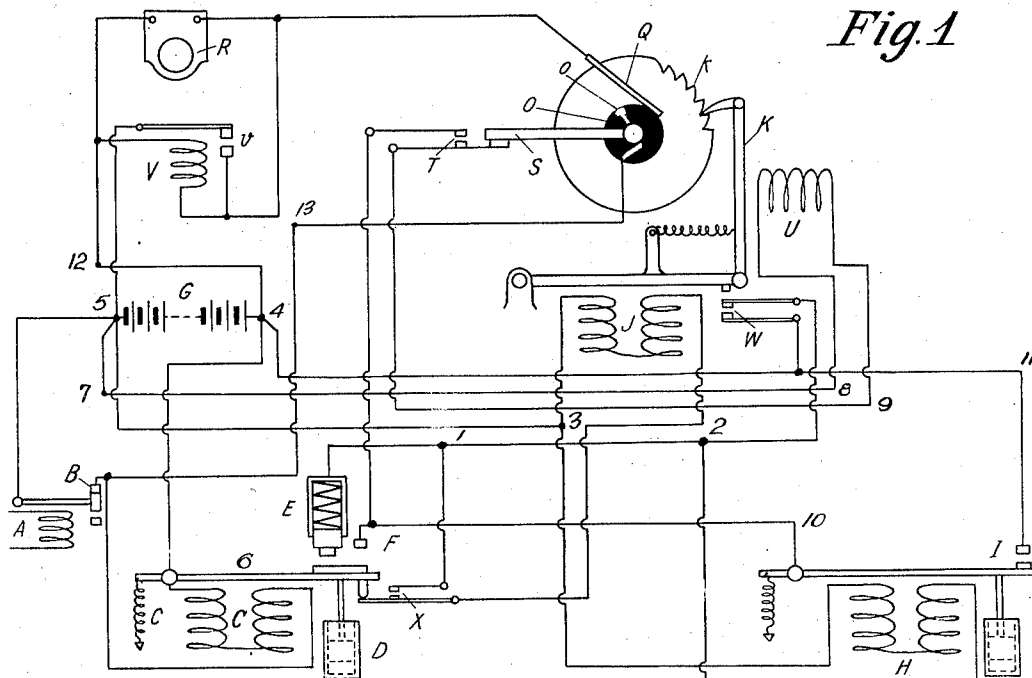
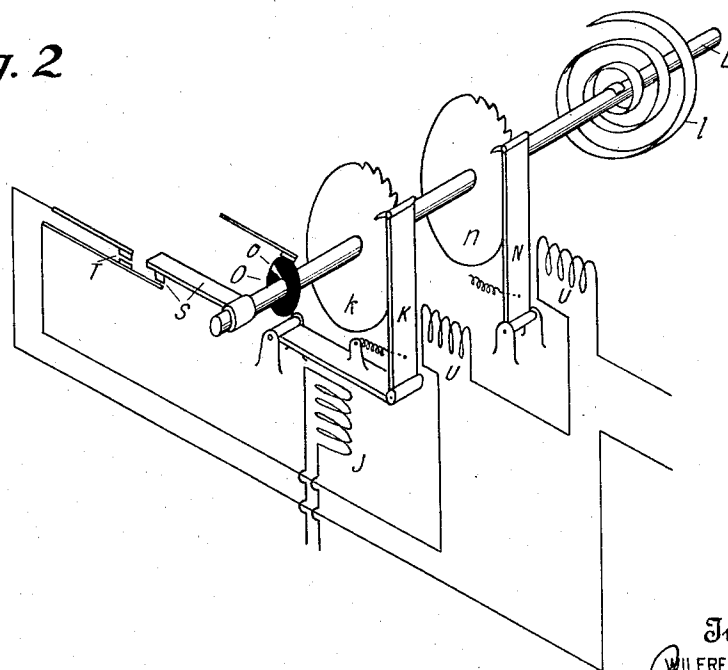


Fig. 1

Fig. 2



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SELECTIVE CALLING DEVICE

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The object of this invention is to provide a device which shall give an alarm on the receipt of a wireless signal consisting of a regular series of dashes of definite length and spacing. In this description it will be assumed for the sake of clarity that the signal which is required to actuate the alarm is a series of three dashes, each of four seconds duration, with a space of one second between consecutive dashes. It is obvious, however, that the device may be so arranged as to give the alarm on the receipt of any other given regular series.

As it is required that the signal to operate the alarm should be capable of being sent by hand, the timing being done by the aid of a watch, it is necessary that there should be some latitude permissible in the length of the dashes and spaces so as to allow for errors in sending. The device is therefore made to respond to dashes of between three and five seconds duration and to spaces of less than two seconds. This allows for an error of one second either way in the length of each dash or space, and it has been found in practice that this degree of latitude is sufficient for hand operating.

According to this invention I provide the armature of a relay with a dashpot which delays the return of the armature to normal on the de-energization of the relay and I arrange two contacts, one having a spring and the other being fixed so that the armature meets the spring contact after the minimum duration of the dash (three seconds) and the fixed contact after the maximum duration (five seconds). To the spring contact is connected a second relay which is also provided with a dashpot and a magnet the armature of which carries a pawl meshing with a ratchet wheel, to the axle of which is secured one end of a spiral spring, the other end of which is secured to a fixed support. On this axle there is also a second ratchet wheel with which meshes a detent pawl. The dashpot of the second relay is so adjusted that the armature will close a contact after a delay equal to the normal time occupied by a dash and a space (five seconds), the arma-

ture being connected to the fixed contact of the first relay.

The ratchet wheel axle carries a contact adapted to complete the circuit of an alarm such as a bell when the wheel has been turned three teeth owing to the magnet being energized on the receipt of three dashes of the correct length. The two pawls can be withdrawn from engagement with the wheels by a second magnet the circuit of which includes a light contact arm so arranged that when the shaft is in its normal position the contact arm is held off a fixed contact and thus the circuit of the second magnet is broken.

The invention is illustrated by the accompanying drawing, Figure 1 of which is a diagram of the connections and Figure 2 a view of part of the mechanism.

A is a signal relay which during the receipt of a signal opens contact B and thus causes the de-energization of a delayed relay C, the armature of which is attached to a dashpot D and is adapted to make contact with a spring contact E and a fixed contact F. It will be seen that as soon as C is energized the contacts E and F are opened, the dashpot being arranged to offer no resistance to a downward movement of the armature. When C is de-energized its restoring spring *c* gradually returns the armature against the resistance of the dashpot. The time elapsing before E and F are closed after the de-energization of C depends only on the tension of *c* and the resistance of D and is independent of the voltage of battery G. Contact E is connected in series with a second delayed action relay H which is provided with a dashpot and return spring as is C, but its armature closes only a single contact I. The dashpot and spring of relay C are so adjusted that contact will be made at E three seconds after the de-energization of C and contact will be made with F five seconds after the de-energization of C, while the dashpot and spring of H are so adjusted that contact will be made at I on a lapse of five seconds, that is, the average time occupied by a dash and a space after de-energization of H. In series also with E is a magnet J whose armature carries a pawl K

meshing with a ratchet wheel *k* on an axle *L* to which is connected one end of a spiral spring *l*, the other end of which is fixed. Fast on *L* is also a second ratchet wheel *n* with which meshes a pawl *N*. The axle *L* has upon it a disk *O* of insulating material, into the circumference of which is let a contact *o*, adapted when the axle is turned through the correct angle by the action of pawl *K* to come beneath an arm *Q* and thus to close the circuit of a bell *R*. On the axle is also an arm *S* which in the normal position of the axle breaks a contact *T* connected to contact *F* and thus breaks the circuit of a magnet *U* which controls the pawls *K* and *M*.

The operation is as follows:—

During the receipt of ordinary Morse signals *C* is never de-energized sufficiently long to enable *E* or *F* to be closed. On the receipt of a dash of three seconds and not more than five seconds duration and forming part of the predetermined signal for operating bell *R* the armature of *C* meets contact *E*, energizing *H* and also *J* by which latter *L* is turned through one tooth. The relay *H* is energized through the following circuit. Starting at the terminal 4 of the battery *G* current flows to the armature 6 thence along the armature to the contact *E*, from *E* along the conductor to the point 2, from the point 2 through the coil of *H* back to the point 3 and from there to the terminal 5 of the battery. The circuit whereby the relay *J* is energized is traced as follows: Starting from the terminal 4 of the battery *G* to the armature 6 of the relay *C*, along the armature 6 to the contact *E*, from the contact *E* along the conductor to the point 1, from the point 1 to the contact *X*, from the contact *X* to the coil *J* and from there to the point 3, and finally from the point 3 to the point 5, thus completing the circuit. The circuit which is closed to ring the bell is as follows: Starting from the terminal *Q* along the conductor to the bell *R*, through the bell *R* along the conductor to the point 12, thence along the conductor to the terminal 4 of the battery *G* through the battery to the terminal 5, thence along the conductor to the contact *B*, and from there to the point 13 along the conductor to the terminal 14. On the receipt of the second and third dashes *L* is turned through two more teeth, *o* arrives beneath *Q* and the bell *R* is rung. Moreover, a magnet *V* is energized and thus closes contacts *v* so that the bell keeps ringing continuously. If a signal persists for more than five seconds contact *F* is closed and therefore magnet *U* is energized which results in pawls *K* and *N* being withdrawn from the ratchet wheels *k* and *n* and therefore spring *l* returns axle *L* to normal. The magnet *U* is energized through the following circuit: Starting at the terminal 5 of the battery *G*, to the point 7, thence along the

conductor to the point 8, through the coil *U*, back to the point 9, along the conductor to the contact *T*, back to the contact *F*, thence along the armature 6 and finally from the armature 6 to the point 4. The delayed action relay *H* takes into account the duration of the space between consecutive dashes. Immediately a dash ends, the contacts *E* of relay *C* open and do not close again until three seconds after the commencement of the next dash. The contacts *E* therefore remain open for the duration of a space between dashes plus three seconds and so relay *H* remains de-energized for this length of time. If the space between dashes is more than 2 seconds then the relay *H* is de-energized for more than 5 seconds and consequently contacts *I* close; the magnet *U* is thereupon energized causing the pawls to be withdrawn from the ratchet wheels, and the axle *L* is returned to its normal position. The circuit for energizing the magnet *U* may be traced as follows: Starting from the terminal 5 of the battery *G* along the conductor point 7, thence along the conductor to the point 8, through the coil *U*, back to the point 9, thence along the conductor to the contact *T*, and from there back to the point *F*, from *F* along the conductor to the point 10, from 10 along the armature to the point *I*, thence along the conductor to the point 11 and from 11 back to the terminal 4 of the battery *G*. In the circuit of magnet *J* and in parallel with contact *E* is a spring contact *W* which is only made when the armature of *J* is attracted. Also the circuit of *J* is completed through contacts *X* which are opened whenever the armature of *C* is attracted. These contacts *W* and *X* are provided as an additional precaution against a false alarm being given by a jamming station or stations.

If there are, say, three or more stations operating the signal relay simultaneously the interval between the dots and dashes of the combined signals becomes so short that contact *B* is only made for extremely short periods, with the result that the full current does not pass through relay *C* and its armature slowly rises with a jerky motion. It is therefore possible under these circumstances for the contact *E* to close rapidly three times in succession which would rotate the ratchet mechanism three teeth and ring the bell. The contacts *X* and *W* prevent this occurring. It will be seen that when *E* is closed causing the pawl *K* to be drawn downwards, the contacts *W* close. These contacts are in parallel with *E* and so hold the pawl down even when contact at *E* is broken. The pawl is not released until the armature of *C* comes right down to its normal position and opens the contacts *X*. Therefore the vibration of the armature of *C* against contact *E* cannot rotate the ratchet mechanism.

Having described my invention, what I claim is:

1. In combination, a signal relay, a first retarded relay device responsive to signal impulses of a predetermined duration, a second retarded relay device responsive to spaces of predetermined duration between successive signal impulses, an actuating device, an indicating device and circuits co-operating with said signal relay and said devices whereby said indicating device is actuated by the action of said first relay on the actuating device, and whereby said indicating device is rendered inoperative by the action of said second relay on said actuating device.
2. In an electrical calling device, a signalling device, a circuit including a pair of contacts normally in open position associated therewith, means including a plurality of spring biased ratchet wheels associated with said contacts, a pawl associated with each of said ratchet wheels, an armature associated with one of said pawls, means including a winding associated with said armature and responsive to a predetermined number of dashes and intervals of predetermined length to impart translatory motion to said last named pawl and means responsive to dashes of greater duration than the predetermined dashes to withdraw said pawls from said ratchet wheels, whereby said wheels are returned to normal position under the influence of said spring.
3. In an electrical calling device the combination of a signalling device, a circuit therefor including a pair of contacts normally in open position, a ratchet wheel adapted to be rotated to close said contacts, a pawl associated with said ratchet wheel, an armature associated with said pawl, a circuit including a winding associated with said armature, means including a delayed action relay responsive to a predetermined number of dashes and intervals of predetermined length to energize said winding to impart translatory movement to said pawl and step by step rotation to said ratchet wheel, means including a second delayed action relay associated with said first named delayed action relay and responsive to intervals of greater duration than the predetermined signals for rendering said pawl inoperative and means to return said ratchet to normal position.
4. In an electrical calling device, a signalling device, actuating means therefor including a ratchet wheel adapted to be rotated in step by step rotation, a pawl operatively associated with said ratchet wheel, an armature associated with said pawl, means including a winding adapted to impart translatory movement to said armature, means including a delayed action relay responsive to a predetermined number of dashes and intervals of predetermined length to energize said winding and means including a second delayed action relay associated with said pawl to return said ratchet wheel to normal position on the reception of signals of a greater duration than the predetermined signals.
5. The combination with an indicating means of signal receiving means including a delayed action relay for actuating said indicating means upon the reception of a given signal composed of a predetermined number of impulses each having predetermined limits of duration and pauses between said impulses each also having predetermined limits of duration and means operatively associated with said delayed action relay for preventing the actuation of said indicating means upon the reception of other than the given signal.
6. The combination with an indicating means of signal receiving means, means including a delayed action relay responsive to signal impulses in said receiving means for actuating said indicating means upon the reception of a given signal comprising a predetermined number of impulses each having predetermined limits of duration and pauses between said impulses each also having predetermined limits of duration and means including said delayed action relay for preventing the actuation of said indicating means upon the reception of other than the given signal.
7. The combination with an indicating means of signal receiving means, means including a delayed action relay responsive to signal impulses in said receiving means for actuating said indicating means upon the reception of a given signal comprising a predetermined number of impulses and pauses therebetween each of predetermined duration, and means operatively interposed between said indicating means and said delayed action relay for preventing the actuation of said indicating means upon the reception of other than the given signal.
8. In an electric calling device, the combination of a delayed action relay having an armature, a circuit including means to impel the operation of the calling device upon receiving signal impulses of predetermined duration, a circuit including means to nullify the effect of previous signals on the impelling means upon reception of an impulse of greater duration, and means to actuate the armature to close the first mentioned circuit on reception of a signal impulse of predetermined duration in a predetermined time interval and to close the other circuit upon reception of an impulse of greater duration in another predetermined time interval.
9. In combination, signal receiving means, an indicating device, an actuating circuit therefor, means adapted to be advanced step by step to close said circuit and actuate said

indicating device, and apparatus including a delayed action magnetic relay operatively associated with the signal receiving means for advancing said means a step upon the reception of a signal impulse of predetermined duration and also to return said means to normal position on the reception of signal impulses of greater duration.

10. In a calling device a receiving circuit, an indicator, mechanism for operating said indicator, a first circuit associated with said receiving circuit, means associated therewith for setting said mechanism in operation on the reception of a signal impulse of predetermined duration, a second circuit associated with said receiving circuit, means operable thereby for returning said mechanism to its normal position on the reception of a signal impulse of greater duration, a third circuit associated with said receiving circuit, means operable thereby for returning said mechanism to normal position when the intervals between impulses are of too long duration, and a fourth circuit for actuating means adapted to prevent the operation of said first named circuit on said mechanism on the reception of signal impulses separated by intervals of too short duration.

11. In a signalling device adapted to be operated by a given number of impulses of a given duration and intervals therebetween of a given duration, the combination of, a signal, means for measuring the length of the received impulses, means for measuring the length of the intervals, storing means, means whereby the first means repeatedly actuates the storing means on the receipt of each impulse of said given duration, means operated by said first and second measuring means on the reception of an impulse longer than said given duration or on the occurrence of an interval longer than said given duration for nullifying the effect of the repeated actuations on said storing means and means operated by the storing means after a given number of repeated operations to actuate said signal.

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