

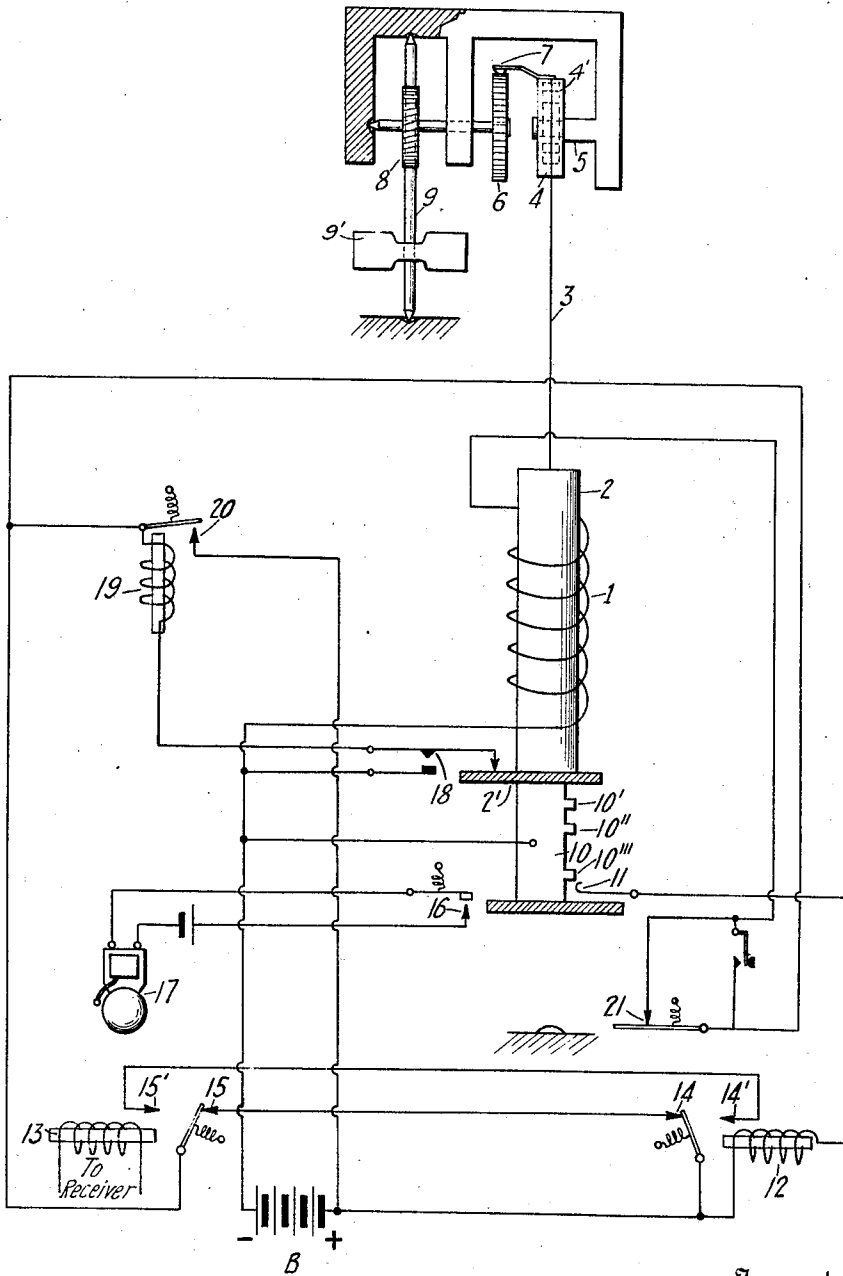
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CALLING DEVICE

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CALLING DEVICE.

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The present invention relates to an apparatus belonging to the category of selective calling devices. The particular object of the invention is to cause the actuation of a call indicating device such as a lamp, bell, etc., in response to a series of signals having a predetermined duration and succeeding each other at predetermined time intervals, such as, a letter or combination of letters, or numbers, of the Morse code. This apparatus is particularly applicable to receiving stations for wireless or wire telegraphy or telephony.

The apparatus comprises an element movable preferably at a uniform speed to traverse a certain course for causing the operation of the call. At different points of the said course corresponding to the selected series of signals, the movable element causes the operation of a switch which maintains a restoring magnet of the movable element deenergized during the time intervals corresponding to the silent periods of the selected series of call signals. During the rest of the time, the received signals maintain the magnet in the deenergized condition. If the operation caused by the movable element and the action of the signals received do not correspond, i. e. if the series of signals received is not the one for which the apparatus is adjusted, the movable element is restored to its normal position of waiting condition, and the calling element is not actuated.

The invention will be more readily understood by means of the drawing in which the single figure shows by way of illustration one embodiment of the invention.

In the drawing an electromagnet 1 of the plunger type is provided with a core 2 of soft iron suspended at the end of a string 3. The string may be wound on a drum 4 rotatable around a shaft 5. The drum 4 is provided with a restoring spring 4' such as a coiled spring having one end connected to the drum and the other to the shaft. The adjustment of the arrangement is such that when the electromagnet 1 is not energized, its core 2 descends and through the agency of the string 3 causes drum 4 to rotate. However, when the electromagnet 1 is energized, the core 2 rises, the spring rotates the drum in the opposite direction, and the string is wound on the drum. It will be seen, therefore, that the weight of the core 2 overcomes the spring of the drum 4, but

the spring has sufficient power to lift the string when it is not pulled by the weight of the core 2 being applied thereto.

When the drum rotates in one direction under the control of the weight of core 2, it moves with it a toothed wheel 6 through the agency of a pawl 7. The toothed wheel is mounted on a common shaft with a pinion 8. Through the agency of a worm on shaft 9, the pinion actuates a fan 9'.

When the core 2 rises and the drum 4 is rotated in the other direction by its spring, the pawl 7 slides back over the teeth of wheel 6. The operation is the same as in the usual ratchet and pawl arrangement. When the pawl 7 moves in one direction it can drive the ratchet wheel 6, but when it moves in the opposite direction it slides over the teeth of wheel 6 imparting no motion thereto. As a result of this, the regulator comprising the fan and the parts connected thereto affects the speed of the core 2 only during the descent of the latter, the rising due to magnetization of the core being substantially instantaneous.

The core 2 carries a controller 10 having a certain number of contact shoulders 10', 10'', 10''' which may be engaged by a brush 11 to close a circuit for the control relay 12. These shoulders constitute the key of the apparatus and correspond to the calling signal. They are arranged in such a manner that, the contact 11 is closed through a battery B during the silent or spacing periods corresponding to the calling signal sent by the calling station.

The sending of the signal by the calling station actuates the relay signal 13 connected to the receiver whereby, when the letter corresponds to the arrangement of the shoulders on member 10, the relays 12 and 13 are successively actuated. This is accomplished in such a manner that there is no interruption in the action of the relays 12 and 13, the relay 12 being in actuated condition when the magnet 13 is in normal condition, and vice versa.

The relay 12 controls the contacts 14, 14' and the relay 13 the contact 15, 15'. These contacts are mounted and so connected that both of the relays 12 and 13 must cooperate to close the battery circuit through the electromagnet 1. If both relays 12 and 13 are deenergized the circuit of the electromagnet 1 is closed, the normally closed circuit being as follows: plus pole of battery

B, contact 14, contact 15, contact 21, winding of electromagnet 1, to negative pole of battery B. In this case the relay or electromagnet 1 holds its core 2 in the position indicated in the drawing.

If one of relays 12 and 13 is energized and the other deenergized, the circuit of relay 1 is open.

When a signal pulse is received, it will energize the relay 13 causing a breaking of contact 15 and a making of contact 15'. The circuit of magnet 1 is thereby opened and the core 2 begins to descend. If the letter sent corresponds to the projections of 10, immediately after the first signal the relay 13 is deenergized. At this point in order to prevent this action from closing the circuit of magnet 1, the projection 10''' making contact with brush 11 closes the circuit of relay 12 during the silent period separating the first two impulses of the letter sent out, thus keeping the circuit of magnet 1 still open. The circuit for energizing relay 12 is as follows: plus pole of battery B, relay 12, brush 11, projection 10''', conductor connected to controller 10, to negative pole of battery B. After this silent period, relay 12 is deenergized and 13 energized by the next signal pulse. This operation continues during the sending of the letter, the core 2 continuing its descent until a projection 2' of it closes contact 16 which actuates the indicator or calling bell 17.

If the letter sent out to actuate the relay 13 does not correspond to the projections of controller 10, then during the descent of the core 2 the projections of member 10 close contact with brush 11 during the sending of one of the impulses of which the letter is composed. In this case, the relays 12 and 13 are simultaneously actuated, the magnet 1 being energized through the following circuit: plus pole of battery B, contact 14', contact 15', contact 21, winding of electromagnet 1, to negative pole of battery B. The core 2 will then rise to normal or initial position as shown in the drawing. In view of the fact that the regulator is decoupled during this movement, the core will rise very rapidly.

In order to insure the rising of the core to the upper end of its course, a magnet 19 is provided in parallel with magnet 1. In the present case, the magnet 19 is energized at the same time that magnet 1 is energized as follows: plus pole of battery B, contacts 14 and 15 (or contact 14' and 15'), relay 19, contact 18, to negative pole of battery B. As a result of the energization of relay 19, contact 20 will be closed to directly connect the incoming ends of magnets 19 and 1 to the plus pole of the battery without passing through the contacts of relays 12 and 13. This latter circuit will be as follows: plus pole of battery B, contact 20, contact 21,

winding of electromagnet 1, to negative pole of battery B. The core of magnet 1 will, therefore, rise to its limit, no matter how relays 12 and 13 are operated during this time. When it reaches the end of its course, the projection 2' opens the contact 18 so that the operation of magnet 1 is again under control of the relays 12 and 13. The apparatus is now in condition to receive a new signal.

It should be understood that the construction of the apparatus may be modified, and substitutions may be made without departing from the spirit of the invention.

The movable element may have the form of a body which is caused to perform a uniform rotary movement instead of the plunger movement hereinbefore described. The calling bell may be maintained actuated until stopped by the operator, either by means of any well known type of electrical or mechanical control, such as the provision of an additional contact 21 which opens the circuit of magnet 1 and which is actuated by the core reaching the lower limit of its course. When this happens the circuit of the winding of magnet 1 is open and the plunger 2 will remain at its lowermost position till the key 22 which is in parallel to contact 21 is manually closed. When the operator has heard the bell 17, he will operate key 22 which will energize the magnet 1 thru contact 20 of relay 19 and cause the plunger to be lifted to its initial and uppermost position ready for the next call signal. The air governor used for maintaining a substantially constant speed during the descent, as well as the connection between this air governor and the movable element, may be replaced by an analogous arrangement (dash-pot, oil governor, fly-wheel, etc.). Obviously the action produced by relative movement of the parts 10 and 11 also may be secured by relative movement of the other parts of the structure. The part 10 may be replaceable by templets or keys of suitable configuration to render the apparatus responsive to different calls at the will of the operator.

Having described my invention, what I claim is:

1. In selective call receiving systems, the combination of a plunger mounted to descend by gravity a certain distance during a period corresponding to the call, means for governing speed of descent of said plunger, holding and resetting means for normally preventing travel of said plunger and for resetting the same, a controller cooperating with said plunger and having portions corresponding to a succession of signals of given duration and spacing, means responsive to signals, means whereby said controller and said signal responsive means cooperate to render said holding and resetting means inoper-

ative when the controller and signal responsive means supplement each other.

2. In selective call receiving systems, the combination of a plunger mounted to descend by gravity a certain distance during a period corresponding to the call, governing means for regulating the speed of descent of said plunger, means for connecting said governing means to said plunger when said plunger is traversing its course, resetting and holding means for causing said plunger to retrace its course and normally preventing travel of the plunger, a controller corresponding to the call connected to said plunger, means responsive to signals, means for causing said controller and signal responsive means to cooperate to render said resetting and holding means inoperative when said controller and said signal responsive means supplement each other.

3. In selective call receiving systems, the combination of a plunger mounted to descend by gravity a certain distance during a period corresponding to the call, governing means for governing the descent of said plunger, a normally closed circuit including a coil cooperating with said plunger for preventing its descent, a controller corresponding to the call connected to said plunger, means responsive to signals, means for causing said controller and signal responsive means to cooperate to maintain an open circuit when the controller and signal responsive means supplement each other.

4. In a calling device for operation under the action of signals formed by short and long electrical impulses, said impulses being combined in any desired manner to produce

a signal, the combination of a signal relay controlled by received impulses, a movable element having shoulders corresponding to the signal to be selected, means governing the movement of said element, a control relay and means whereby the control relay is operated by said shoulders, and an electromagnet for restoring the movable element to its initial position, said relays being arranged to close the circuit of said electromagnet whenever the incoming signal does not supplement the operations of said second means by the shoulders of said movable element.

5. In a calling device for operation under the action of signals formed by short and long electrical impulses, said impulses being combined in any desired manner to produce a signal, the combination of a signal relay controlled by received impulses, a movable element having shoulders corresponding to the signal to be selected, means governing the movement of said element, a control relay and means whereby the control relay is operated by said shoulders, an electromagnet for restoring the movable element to its initial position, said relays being arranged to close the circuit of said electromagnet whenever the incoming signal does not supplement the operations of said second means by the shoulders of said movable element, and a supplementary relay for insuring the positive return of the movable element to its initial position in case of wrong signal independent of any signal received during its return.

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