

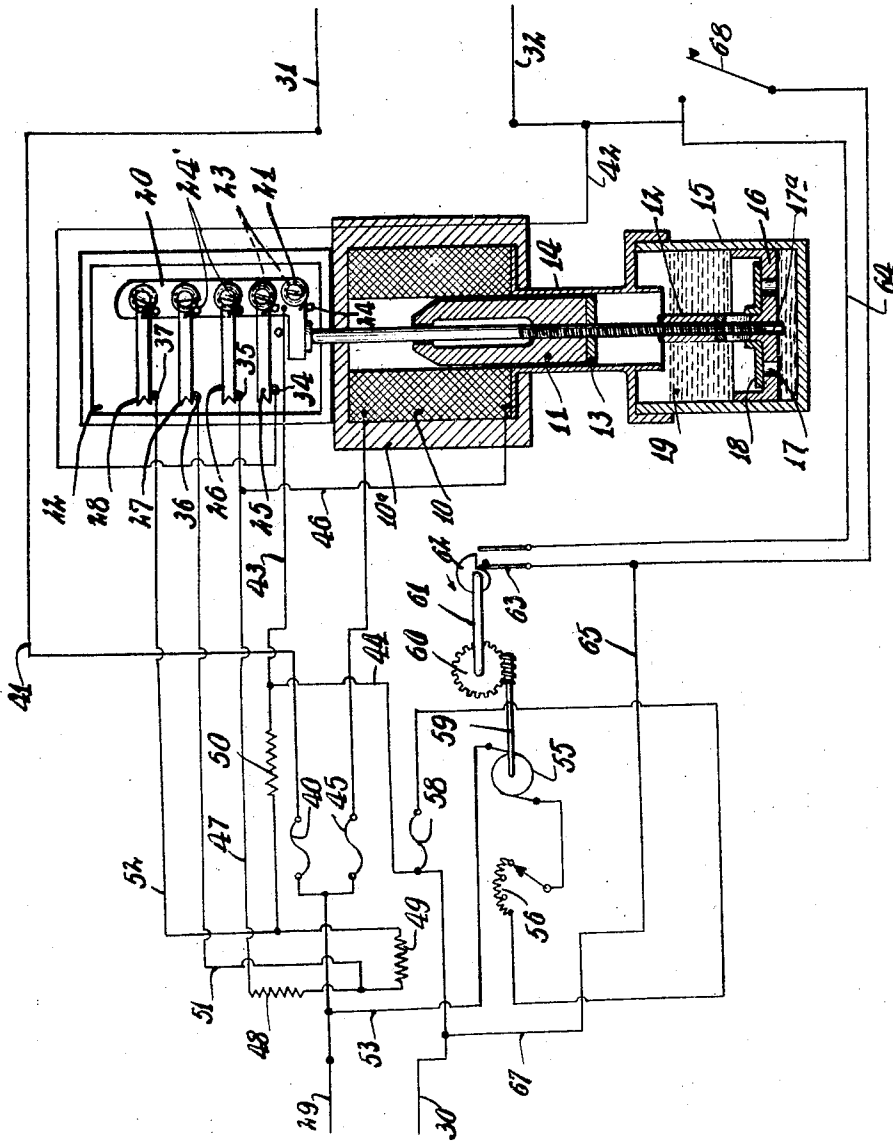
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CIRCUIT CLOSER FOR ELECTRIC ALARMS

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CIRCUIT CLOSER FOR ELECTRIC ALARMS.

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This invention relates to signalling devices for electric alarms, and particularly of the type used on travelling electric cranes around dry docks, shipyards, and overhead travelling cranes used in buildings.

An object of this invention being to provide a signal device which will sound the alarm as soon as the controller of the crane, etc., is advanced to the first step, and thereafter repeat the alarm signal at intervals until the controller is turned to the off position.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawing, and to the appended claims in which the various novel features of the invention are more particularly set forth.

The drawing shows a vertical central partly sectional view of the device in combination with the schematic wiring of the same.

The solenoid 10 has a surrounding iron box frame 10* to complete the magnetic circuit, and its central movable core 11, carrying a trip rod 12 which may be adjustably secured by means of lock nut 13 so as to be capable of being set into higher or lower positions with regard to core 11. The core 11 being housed by a tubular cover 14 supporting a dash pot 15. The lower end of the rod 12 extends into a dash pot 15, and is provided with a rigidly but adjustably attached piston plate 16 having by-pass apertures 17, and a disk 18 loosely mounted on shaft 12 to close apertures 17 when the piston is on the up-stroke, and to allow the passage of the piston liquid through the apertures when the piston is on the down-stroke, thereby obtaining a relatively faster downstroke than the upstroke. A small tapered slot 17^a in the rod 12 allows a normal passage of the dash pot fluid from bottom to the top of the piston. It is advisable to have the liquid of the dash pot preferably of oil 19. An L-lever 20 is pivotally mounted, as at 21 to an insulated panel board 22 depending from frame 10*. Said L-lever 20 has its short end aligning with the top of the rod 12, and is normally maintained in an upright position by the action of a coil spring 23 mounted on the pintle of the pivotal point 21, said coil spring being provided with any suitable tensioning adjusting means. A stop 24 limits the action of the said spring

23. A plurality of horizontal contact levers, as indicated by 25, 26, 27, and 28 are attached to the long end of the L-lever 20 by means of pintle pins and any suitable tensioning means, and auxiliary stops 24' serve as a repose for said contact levers in lowered positions. When the solenoid 10 is energized by a current flowing through its winding, the core is drawn upwards, and the speed of the upwards motion can be regulated by adjusting the piston along different positions of the tapered slot 17^a. As the upward motion progresses the upper end of rod 12 will act against the short end of lever 20 and turn same about its pivot point 21 against the action of spring 23, and of course the levers 25, 26, 27 and 28 will also be moved.

The wires 29 and 30 are connected across the crane's travelling motor's armature, or circuit, so that at the very first step that the crane's controller is opened some current will flow in the lines. The wires 31 and 32 connect to a standard electric alarm, or horn, not shown on the drawing. On the board 22 there are a plurality of contact points 34, 35, 36, and 37, and in the normal position of the levers 25, 26, 27, and 28 they respectively make contact with said contacts. On the drawing the contacts are shown below the levers for clarity in illustrating, but in reality they are making contact. Normally the contacts 34, 35, 36, and 37 hold the levers 25, 26, 27, and 28 from downward motion, but as the upward motion of the solenoid progresses, the L-lever 20 is moved further and further, and the stops 24' on the L-lever are so arranged as to make lever 26 break contact with 35 first, then 27 with 36, and finally 28 with 37, thereafter 25 breaks with 34. Of course, these levers break contact by being moved upwards by the stop 24'.

Turning the controller of the crane to the first step results in a current flowing in the line 29, and 30, as before explained, and also results in ringing the warning alarms, as may be seen by following the path of the current, beginning at 29 passing through fuse 40 and continuing along line 41 to the alarm line 31, returning on line 32, continuing on line 42 until contact 34 and since normally the lever 25 is closed with the contact continuing through lever to the lever grounding wire 43, along 44 to line 30.

The alarm for any desired interval of time may be controlled by the adjustments of rod 12 changing the by-pass 17^a of the

dash pot, which may be clearly seen by following another path taken by the current. Beginning at 29 the current flows through fuse 45 thereafter to the winding of the solenoid, leaving at 46, continuing to contact 35, through lever 26, and along the leads 43, 44, and back to 30. This circuit causes the energizing of the solenoid, and the core of the solenoid will move upwards, the speed depending on the setting of the dash pot, and the distance depending on the adjustment of the rod 12, for when the rod 12 moves the L-lever 20, the contact arms will move off the contacts and result in breaking the circuits just described in which the contacts 34 and 35 were included. The breaking of the circuit including contact 34 will stop the ringing of the alarm, while the breaking of the circuit including contact 35, will result in the current seeking a more difficult path, viz., after leaving the solenoid along lead 46 continuing along 47, through resistance 48, along lead 51, contact 36 and lever 27 which are still contacting due to the position of lever's pin 24', as before explained, and from the lever 27 the circuit continues to 43, 44 and 30. The breaking of the circuit including the contact 36, results in the current seeking a more difficult path, viz. after leaving the solenoid along lead 46 continuing along 47, through resistances 48, 49, lead 52, contact 37 and 28, which are still contacting due to the lever's pin 24' as before explained, and from lever 28 the circuit continues to 43, 44, and 30. The breaking of the circuit including 37 forces the current from lead 46, along 47, through 48, 49, and 50, to 44, and 30. It should be noticed that the current continues flowing through the solenoid, but also that there are additional resistances in series in this circuit. The controller may now be advanced to the second step, etc., until full current is flowing, without danger of hurting the solenoid. Reviewing the happenings thus far, we have; first the controller was off and the apparatus in normal position, viz., solenoid core at bottom of stroke and lever 20 in normal position with all connected levers on respective contacts; second the crane controller was opened to the first step which resulted in the alarm ringing a warning for a few seconds, using the weak current from the first step, and thereafter the solenoid with the dash pot timing, connected a series of resistances in its own winding circuit, preparing the solenoid for the greater strength current resulting from advancing the controller, and finally broke the alarm circuit.

The mechanism designed to repeat the warning signal alarm at intervals is included in another circuit. Starting at 29, continuing along 53, electric motor 55, rheostat 56, fuse 58, and back to 30. The electric

motor is provided with a shaft indicated by 59, and having a speed reduction worm gears 60 provided with a shaft indicated by 61 having a quick release cam 62, to make and break a circuit as at 63. The alarm will ring every time the circuit is closed at 63, which can readily be seen by following the circuit, starting at 29, continuing to 40, 41, and 31, returning at 32, continuing along 64 to 63, 65, and finally 67 to 30. The make and break 63 may be short circuited by hand switch 68, so that the alarm may be manually sounded.

When the crane controller is turned to the off position, the solenoid will return to normal position, due to the weight of the core, the lever 20 will return to the normal position due to the action of the spring 23, and the device will be again in condition for further operation.

While I have illustrated and described my invention with some degree of particularity, I realize that in practice various alterations therein may be made. I therefore reserve the right and privilege of changing the form of the details of construction or otherwise altering the arrangement of the correlated parts without departing from the spirit or the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by United States Letters Patent is:

1. A device of the class described, comprising a panel board, an L-lever pivotally mounted thereon, means for normally maintaining the L-lever in an upright position, a plurality of horizontal contact levers attached to the long arm of the L-lever, by means of pintle pins, stops secured to the L-lever serving as a repose against the contact levers, springs for tensioning the contact levers, the contact arms being engageable with contacts, and the short arm of the L-lever being movable to disconnect the contact arms from said contacts.

2. A device of the class described comprising a panel board, an L-lever pivotally mounted thereon, means for normally maintaining the L-lever in an upright position, a plurality of horizontal contact levers attached to the long arm of the L-lever, by means of pintle pins, stops secured to the L-lever serving as a repose against the contact arms being engageable with contacts, and the short arm of the L-lever being movable to disconnect the contact arms from said contacts, said first mentioned means consisting of tensioning means for the L-lever, and a stop projecting from the panel, coactable with the L-lever.

In testimony whereof I have affixed my signature.

MANUEL T. CABRAL.