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1,779,986

AUTOMATIC CONTROL DEVICE FOR THE OPERATION OF VISUAL AND AUDIBLE SIGNALS

Filed Nov. 24, 1926

3 Sheets-Sheet 1

Fig. 1.

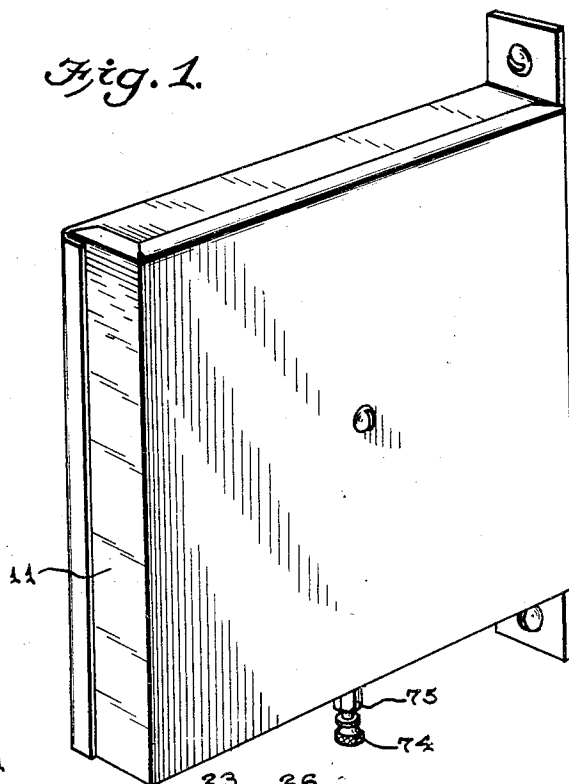
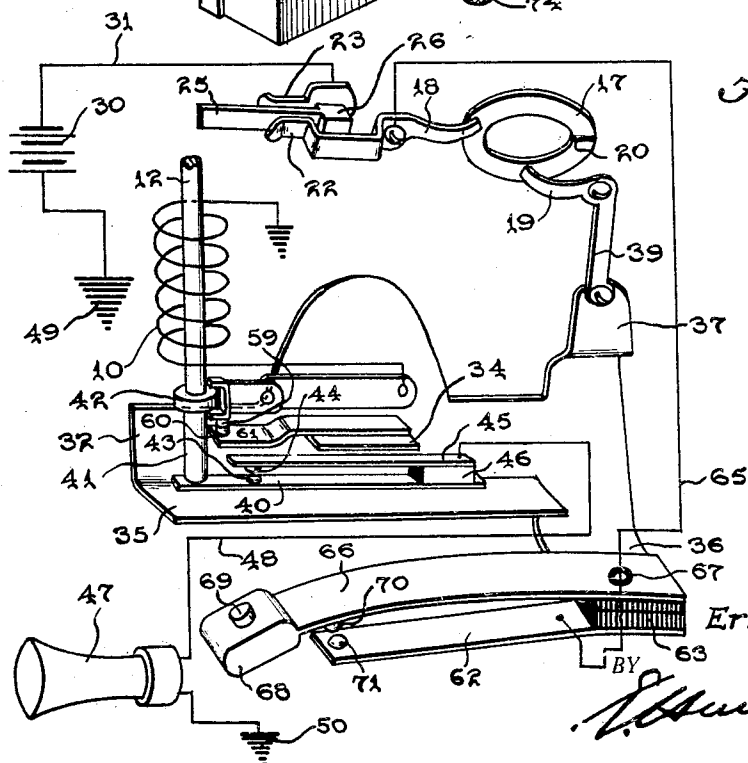


Fig. 7.



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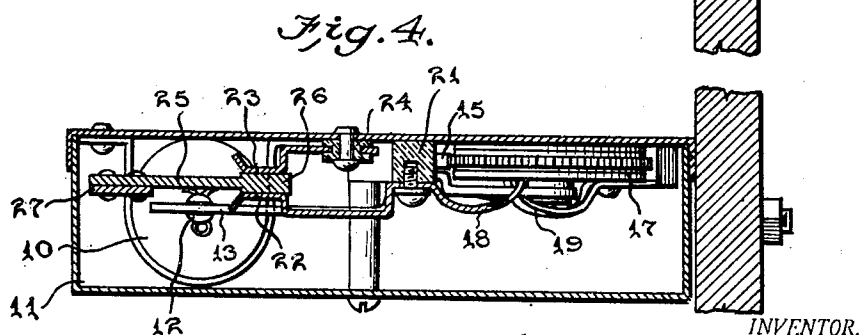
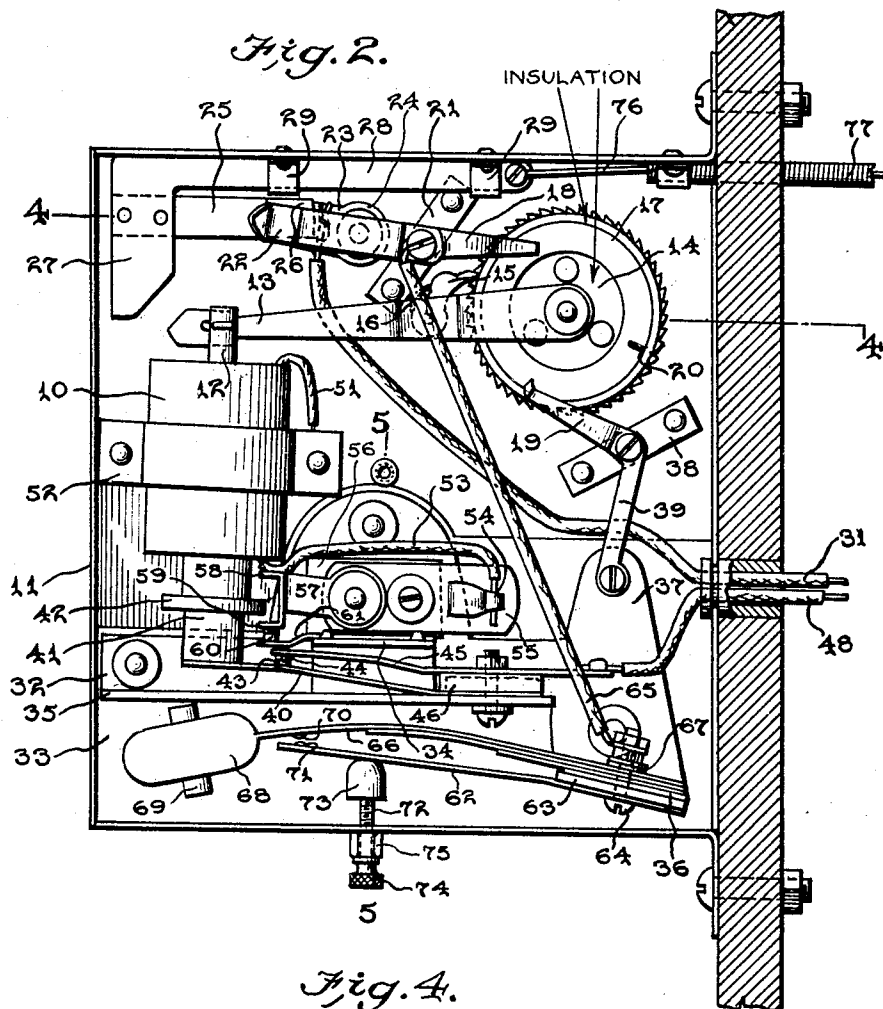
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3 Sheets-Sheet 2



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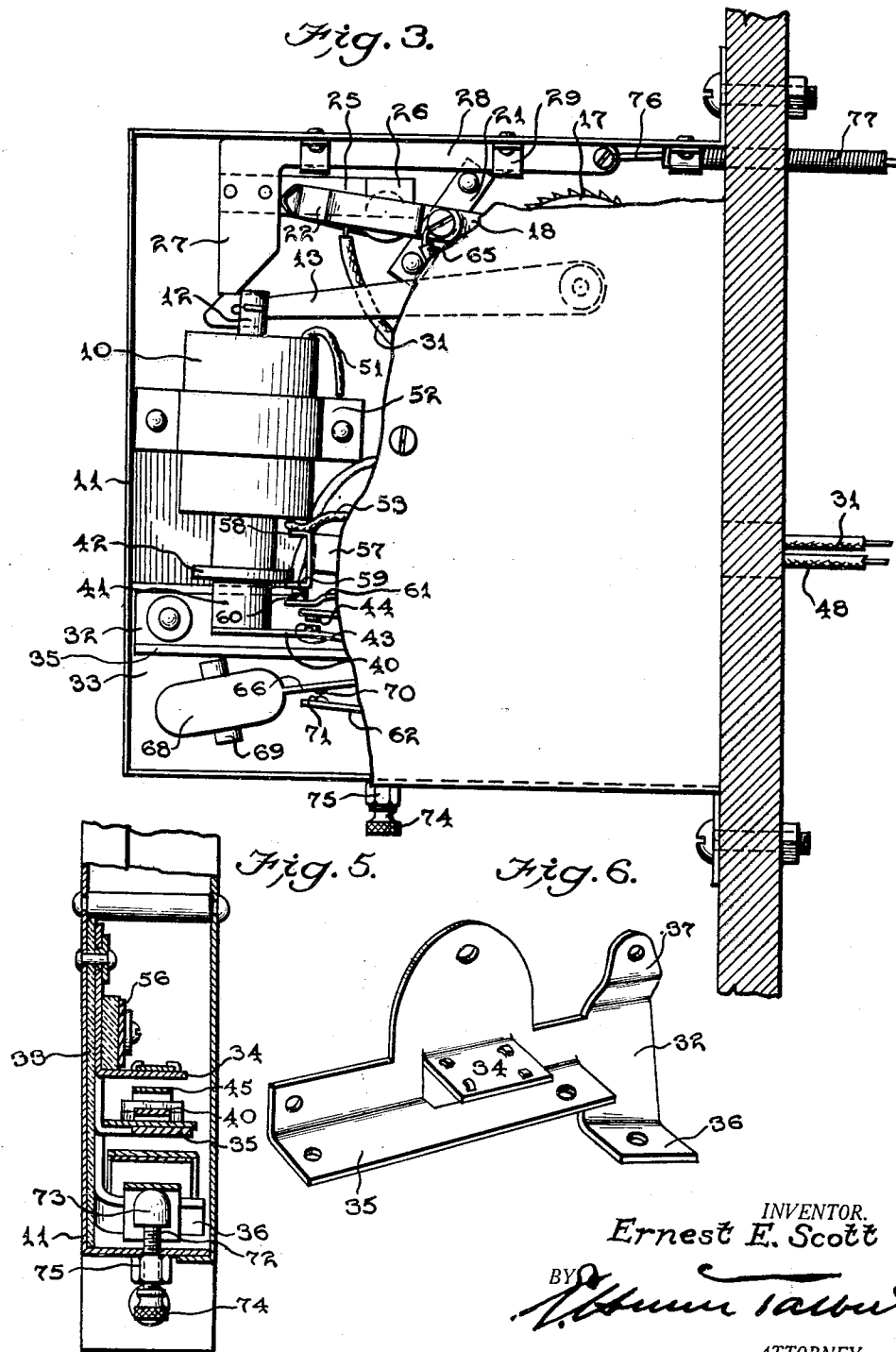
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3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

ERNEST E. SCOTT, OF DENVER, COLORADO, ASSIGNOR TO THE ELECTRIC ALARM CO. INC., A CORPORATION OF COLORADO

AUTOMATIC CONTROL DEVICE FOR THE OPERATION OF VISUAL AND AUDIBLE SIGNALS

Application filed November 24, 1926. Serial No. 150,524.

The object of the invention is to provide a means adapted for interposition in an electric circuit designed for the operation of visual or audible signals, so that the energizing circuit may be closed and the signal thus put into operation when the part to which the device is attached is subjected to vibration of any kind, no matter how slight; to provide a construction in which the concomitant parts are arranged in compact form and readily housed in a small casing; to provide adjusting means whereby the sensitivity of the device may be regulated; and to provide a combined mechanical locking means and circuit breaker, so that the device may be rendered inactive when it is desired that it shall not function.

With this object in view, the invention consists in a construction and combination of parts of which a preferred embodiment is illustrated in the accompanying drawings, wherein:

Figure 1 is a perspective view illustrating the invention.

Figure 2 is an elevational view showing the side cover of the casing removed, the circuit closer being shown in closed position and the mechanical lock in open position.

Figure 3 is a view similar to Figure 2, showing the cover broken away but with the circuit closer in open position and the mechanical lock in closed position.

Figure 4 is a horizontal sectional view on the plane indicated by the line 4—4 of Figure 2.

Figure 5 is a vertical sectional view on the plane indicated by the line 5—5 of Figure 2.

Figure 6 is a perspective view of the bracket plate.

Figure 7 is a diagrammatic view illustrating the various circuits.

The prime actuating medium of the device is a metallic shielded electro-magnet 10 supported at an intermediate point in the casing 11, the magnet being of the solenoid type and provided with a movable plunger 12 having a pin and slot connection at its upper end with an oscillatory lever 13, the latter being pivotally mounted at the axis of a ratchet wheel 14 made of insulating material with its pe-

ripheral teeth engaged by a pawl 15 pivotally mounted on the lever 13 and impelled in the direction of the ratchet wheel by a spring 16. The circuit of the magnet 10 is alternately closed and opened so that the plunger 12 reciprocates and thus oscillates the lever 13, imparting a step by step movement to the ratchet wheel. The ratchet wheel is the signalling circuit control means, being designed to maintain the signalling circuit closed for a specified length of time, that is, during one complete revolution of the ratchet wheel. To this end, it is provided on one face with an annular metallic conductor 17 in contact with which there is disposed a wiper contact 18 and a second wiper contact 19, the former extending to a point adjacent the inner periphery of the conductor 17 and the latter traversing a point adjacent the outer periphery, so that after one revolution, the wiper contact 19 will engage the insulating segment 20 which is set in the annular conductor 17.

The wiper 18 is mounted on an insulating block 21 and the stock of which it is formed is extended, as indicated, to provide a spring contact member 22 which is directly opposite to but spaced from a similar contact member 23 having an insulating mounting 24 on the wall of the casing 11. An arm 25 of insulating material is disposed between the contacts 23 and 22 and at its extremity carries a metallic segment 26. The arm is movable axially, being carried by the pendent nose 27 of the locking bar 28, the latter being carried in slides 29 mounted on the top wall of the casing. In one position of the locking bar, the segment 26 is disengaged from the contacts 22 and 23 but in the other position is engaged with said contacts, so that current from the source, such as the battery 30, may reach the annular conductor 17, the positive terminal of the battery being connected with the contact 23 by a conductor 31.

The bracket plate 32, which is employed for the support of certain oscillatory actuating elements of the device, is secured to one wall of the casing 11, but is insulated therefrom, as by a plate of insulating material 33. The bracket plate is formed with the shelves 34

and 35 of which the latter is materially longer than the former and disposed below and spaced from the former. The plate 32 is also formed with a lateral ear 36 below the plane of the shelf 35 and with an offset ear 37 by means of which electrical connection is effected between the bracket plate and the wiper contact 19, the latter being mounted on an insulating block 38 and a conducting link 39 extending from the point of mounting on the block to the ear 37.

On the shelf 35 there is secured a flat spring member 40 offset from the shelf beyond its point of connection with the latter and extending below the plunger 12, carrying a foot member 41 of insulating material with which the lower end of the plunger may engage, the latter being provided with a disk 42 at its lower end, also of insulating material and radially larger than the plunger to provide a peripheral flange which serves as an element for actuating the means which opens and closes the circuit on the solenoid 10, as hereinafter described. The spring member 40 carries on its upper face a contact 43 normally engaged by a contact 44, the latter being carried on the under face of a flat spring member 45 disposed directly above the spring member 40 and secured in position on the shelf but insulated from the latter as well as from the spring member 40, as by the insulating block 46. The spring member 45 has electrical connection with the signalling device 47 (which in the illustrated embodiment of the invention is a vehicle horn) by means of a conductor 48.

Since the electrical installations in auto vehicles call for the frame of the machine serving as the negative conductor, the illustrated embodiment of the invention shows the battery 30 grounded at 49 and one side of the horn grounded at 50, this arrangement also calling for the grounding of the circuit on the electro-magnet 10 which is accomplished, as illustrated, by engaging the terminal 51 of the magnet winding under one ear of the strap 52 which secures the magnet in position in the casing. The other terminal 53 of the magnet winding is connected at 54 to a metallic plate 55, the latter being mounted on the back face of the bracket plate 32 but insulated from the latter, as shown at 56.

In electrical connection with the plate 55 there is a rocker 57 of which the terminal yoke 58 straddles the flange at the lower end of the plunger 12 provided by the disk 42, so that when the magnet 10 is energized, the flange engages the yoke and moves the rocker in one direction, moving it in the other direction when the magnet is deenergized and the plunger permitted to drop. The yoke itself and rocker constitute the means for alternately energizing and deenergizing the magnet, the yoke on the under face of the lower arm being provided with a contact 59

disposed opposite to and engaging a contact 60 carried by a spring 61, the latter being mounted upon the shelf 34 of the bracket plate 32.

The initial circuit closing means comprises a flat spring 62 disposed below the ear 36 of the bracket plate and secured thereto against an interposed piece of insulating material 63, the screw 64 securing the spring in place being insulated from the ear and serving as a binding post to which the conductor 65 is connected, this conductor shunting the annular conducting plate 17 being secured to the wiper spring or member 18 where it is mounted on the insulating block 21. Nuts engaged with the screws 64 serve as a means for connecting the conductor 65 to the screw and also serve as a means for holding the vibratory spring member 66 attached to the ear, an insulating washer 67 being interposed between the nuts and the vibratory spring. The vibratory spring 66 is composed of a plurality of laminae of varying lengths of which the longest is the uppermost and carries at its outer extremity a weight 68 through which a bumper 69 extends, the bumper protruding beyond the weight both above and below the latter.

Complemental contacts 70 and 71 are carried by the springs 66 and 62 respectively and the position of the latter spring is adjusted by means of a screw post 72 threaded through the lower wall of the casing 11 and provided with an insulated head 73 and with a knurled turning knob 74, the latter being exterior to the casing and serving to elevate and lower the head by the rotation of the screw. Thus the position of the spring 62 is adjusted toward and away from the bottom wall of the casing and the desired adjustment is maintained by means of a lock nut 75 interposed between the head 74 and the case wall.

In the normal positions of the parts, when the device is inactive and when the metallic segment 26 is interposed between the contacts 23 and 22, the annular conducting member 17 has its insulating segment 20 below the wiper contact spring 19. The slightest vibration to which the device is then subjected will cause the vibration of the weight 68 with the resulting engagement of the contacts 70 and 71, thus establishing a circuit on the magnet 10, current leaving the battery 30 and passing over the wire 31, the contact 23, segment 26 and contact 22, thence over the conductor 65 to the spring 62 and thence to the spring 66, from which it passes to the bracket plate 32. With the plunger 12 in the lowered position, the disk 42 effects engagement of the contacts 59 and 60, as in Figure 3, but the weight of the plunger effects separation of the contacts 44 and 43. The current having reached the bracket plate 32, it passes over the spring 61, the contacts 60 and 59 to the

rocker 57 and thence over the pate 55 and lead 53 through the winding of the magnet, leaving the latter by the lead 51 and passing back to the battery through the ground connection. The magnet having thus been energized, the plunger is elevated by the magnetic pull, with the result that the lever 13 is rocked and a slight angular movement imparted to the ratchet wheel 14, this movement being sufficient to shift the insulated segment 20 from under the wiper contact 19. Irrespective of further movement of the vibratory spring 66, a circuit is then established to the magnet which is alternately interrupted by the plunger as the latter is elevated to engage the upper side of the yoke and separate the contacts 59 and 60, the dropping of the plunger reengaging the contacts. But the reciprocation of the plunger imparts a step by step angular movement to the ratchet wheel and as long as the wiper springs 18 and 19 engage the annular conducting ring 17, the magnet circuit is established except for the intermittent breaking due to the operation of the rocker 57, current in this instance passing from the battery to the contact 22 as when the circuit is established by the vibratory spring 66, and passing from this contact to the wiper spring 18, thence to the conducting ring 17, the wiper spring 19, and the conducting link 39, reaching the bracket plate 32, whence it flows back to the battery, as previously described.

The step by step movement imparted to the ratchet wheel by the reciprocation of the plunger advances the insulating segment 20 through a full arc of 360° until it finally passes below the wiper spring 19, when, if the cause of the initial vibration of the weight 68 has been removed so that the contacts 70 and 71 are not in engagement, the circuit on the magnet will be broken. If the cause still remains, however, the engagement of the contacts 70 and 71 will leave the shunt circuit comprising the conductor 65 intact and the cycle will be repeated.

The reciprocation of the plunger 12 is attended with an intermittent opening and closing of the signalling circuit comprising the horn 47 or other signalling device with which the apparatus may be connected, the current for actuating the signalling means passing to the plate 32 as previously described and thence to the spring 40, the contacts 43 and 44, the spring 45 and conductor 48 to the signalling device 47, from which it passes back by the ground connection to the battery. Each time the plunger drops as a result of the opening of the magnetic circuit by the actuation of the rocker, the signalling circuit is opened by the separation of the contacts 43 and 44.

The locking bar 28 is designed for mechanical operation, being connected to a flexible stem 76 enclosed by a flexible tubular mem-

ber in which the stem is slidably movable, the tubular member being preferably a spiral spring with the convolutions in close contact. Obviously, the imparting of an axial movement to the stem will impart longitudinal movement to the locking bar which, if moved in one direction, will disengage the segment 26 from between the contacts 22 and 23 and bring the nose 27 into obstructing position with relation to the plunger 12. Obviously, the movement of the stem in the other direction will shift the nose 27 out of obstructing relation with the plunger and engage the segment 26 with the contacts 22 and 23. The locking bar, aside from interrupting the electric circuit when the segment 26 is disengaged from the contacts 22 and 23, also locks the plunger against reciprocating movements due to the vibration of the machine or other appliance on which the device may be attached, so that the ratchet wheel may never be actuated merely from the movement of the plunger due to exterior causes, to move the insulating segment from under the wiper spring 19.

The invention having been described, what is claimed as new and useful is:

1. A signal control device comprising, in combination, an electromagnet having a movable armature, a bracket of conducting material provided with two shelves, a spring secured to each shelf and electrically connected therewith, a yoke member pivotally attached to the bracket and insulated therefrom, said yoke member carrying a contact adapted to be moved into and out of engagement with a contact on one of said springs, said yoke member and spring forming a switch for controlling the electromagnet, means for interconnecting the armature and the yoke member so that the electromagnet control switch will be moved to open position when the armature moves in response to the energization of the electromagnet and to closed position when the armature is released due to the deenergization of the electromagnet, a contact member secured to the bracket and insulated therefrom, said last named contact cooperating with the spring secured to the other shelf to form a signal control switch biased in closed position by said spring, means for moving the signal control switch to open position when the electromagnet is deenergized, a time limit switch in series with the electromagnet, means operated by the movement of the armature for controlling the time limit switch and a theft protective switch in shunt with the time limit switch.

2. A signal control device for intermittently sounding an alarm comprising, in combination, a normally open time limit circuit closer, one terminal of which is connected with one terminal of a source of electrical energy, a bracket of conducting material, said bracket

having a shelf, a spring of conducting material electrically connected with the shelf, an electromagnet having a winding and a movable core, one end of the winding being grounded, the other terminal of the time limit circuit closer being electrically connected with the bracket, a rocker (57) having two spaced members at one end, the other end of the rocker being pivotally supported by and insulated from the bracket, one end of the electromagnet winding being connected with the rocker, means on the core for projecting between the two spaced members of the rocker for moving the rocker when the core moves, a contact carried by the rocker for engaging the spring when the rocker is in one position, a signal control switch comprising two contact members adapted to move into and out of engagement with each other, one of said members being electrically connected with the bracket and the other insulated therefrom, one of said last named contact members extending into the path of the movable core whereby it will be moved away from the co-operating contact when the electromagnet is deenergized, a theft protective switch in parallel with the time limit circuit breaker and means operated by the movement of the core for moving the time limit circuit breaker.

In testimony whereof he affixes his signature.

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