G. M. WILLIS.

CIRCUIT CONTROLLING INSTRUMENT.

APPLICATION FILED MAY 17, 1907.

913,086.

Patented Feb. 23, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

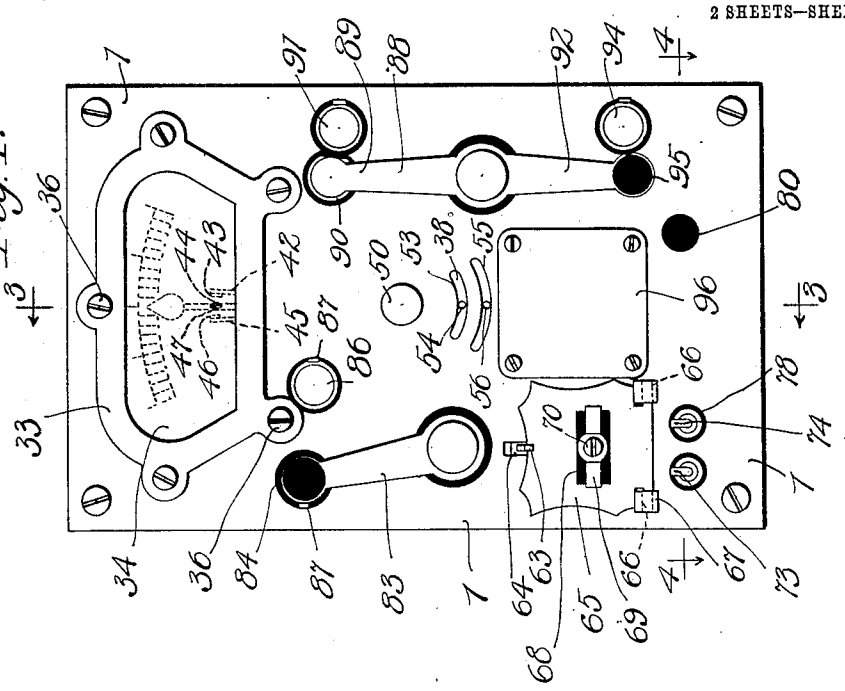
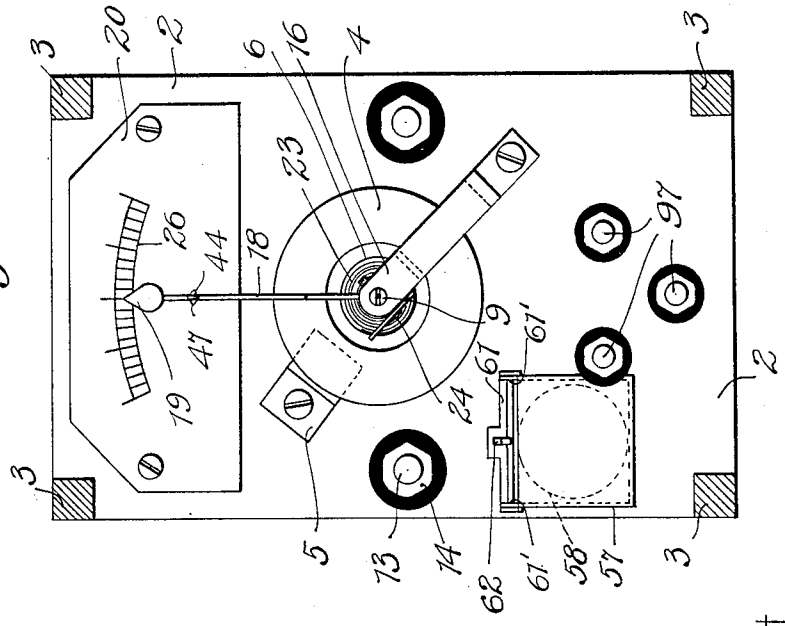


Fig. 2.



Witnesses
George C. Higham.
Leonard W. Novander.

By

Inventor
George M. Willis
Charles A. Brown
Attorney

THE NORRIS PETERS CO., WASHINGTON, D. C.

G. M. WILLIS.

CIRCUIT CONTROLLING INSTRUMENT.

APPLICATION FILED MAY 17, 1907.

913,086. Patented Feb. 23, 1909.

2 SHEETS—SHEET 2.

Fig. 3.

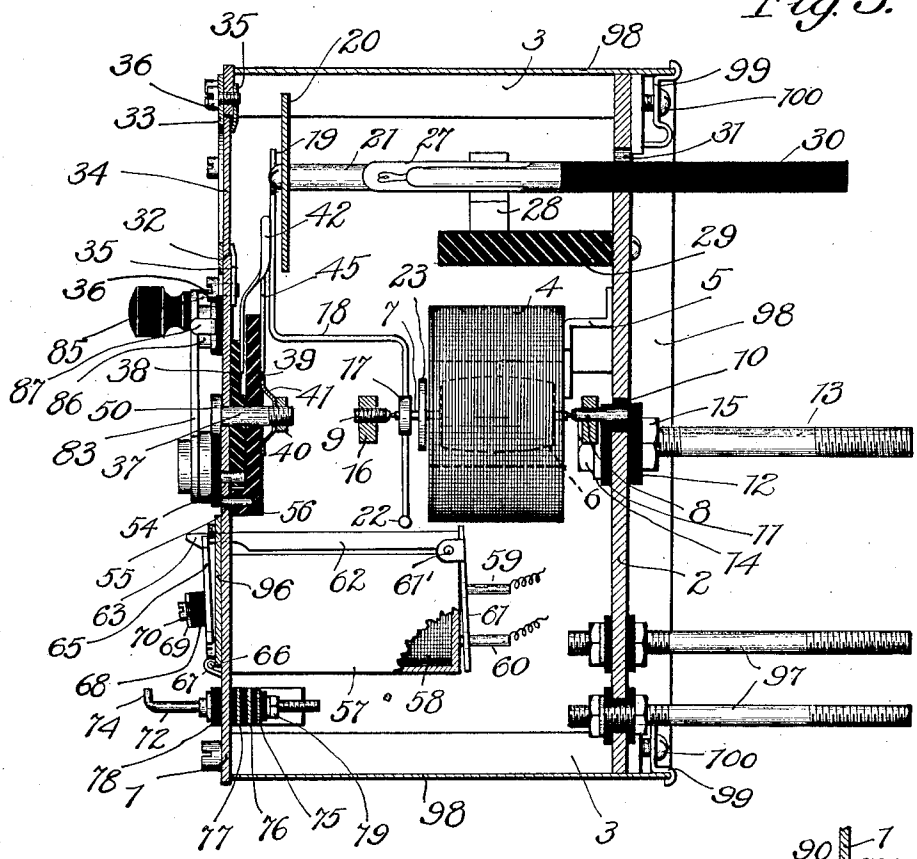


Fig. 4.

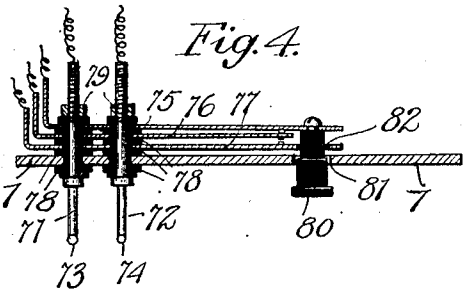


Fig. 6.

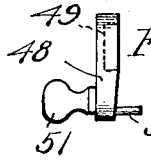


Fig. 7.

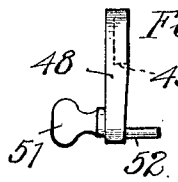
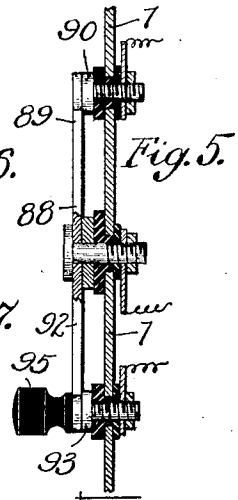


Fig. 5.



Witnesses,
George E. Higham
Leonard W. Novander.

By

Inventor
George M. Willis
Charles A. Brown
Attorney

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

GEORGE M. WILLIS, OF CHICAGO, ILLINOIS.

CIRCUIT-CONTROLLING INSTRUMENT.

No. 913,086. Specification of Letters Patent. Patented Feb. 23, 1909.

Application filed May 17, 1907. Serial No. 374,138.

To all whom it may concern:

Be it known that I, GEORGE M. WILLIS, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Circuit-Controlling Instruments, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to circuit-controlling instruments, particularly to such instruments employed at central stations in connection with burglar alarm circuits, the object being to provide an instrument more compact in arrangement, more simplified and of more efficient operation than central station instruments heretofore used in burglar alarm systems.

My invention is particularly adaptable to the burglar alarm system shown and described in my co-pending application, Serial No. 347,308, filed December 11, 1906, in which a like instrument is diagrammatically shown connected with the main circuit, to be responsive upon changes in resistance or impedance in the circuit to connect into service burglar alarm or other alarm circuits.

The detail construction and arrangement of my improved instrument is shown in the accompanying drawings, in which—

Figure 1 is a front view thereof; Fig. 2 is a front view with the front supporting plate removed: Fig. 3 is a sectional view taken on line 3—3 of Fig. 1; Fig. 4 is a cross-sectional view taken on line 4—4 of Fig. 1, showing signaling key mechanism; Fig. 5 is a sectional view through the circuit changing mechanism shown at the right of Fig. 1; and Figs. 6 and 7 are side views of adjusting keys.

The supporting frame for the various parts comprises the front plate 1, the rear plate 2, connected together by pillars or posts 3, one at each corner. A field coil 4 is supported from a bracket 5 extending from the rear plate 2 and is disposed a slight distance in front of the rear plate, as shown in Fig. 3. Within this field coil is an armature 6 mounted on a spindle 7 pivoted in the rear bearing 8 and in the front bearing 9. The rear bearing is suitably supported from the rear wall 2 but insulated therefrom by a washer 10. A terminal rod 13 passes through the plates 11 and 12 to be insulated from the back plate 2 and is clamped to the back plate by means of the clamping nuts 14 and 15. The front bearing 9 is adjustably supported in the front end of bracket 16 extending from the rear supporting plate 2.

Secured to the forward end of the spindle 7 is a hub 17 carrying the needle 18. The front end of this needle extends upwardly, then forwardly and then upwardly again, its end terminating in the indicating point 19 disposed over the dial plate 20 supported at the front end of rods 21 extending forwardly from the rear wall 2. The rear end of the needle may have a weight 22 attached to its end in order to balance the needle on the pivot spindle. A hair spring 23 tends to keep the needle in a central position, this spring being connected at one end with the spindle 7 and at the other end with the arm 24 extending from the front end of the bearing bracket 16. The dial 20 is transparent or translucent and a scale 26 thereon is illuminated by means of a lamp 27 engaging between contact springs 28 extending upwardly from an insulating post 29 supported from the rear wall 2. To facilitate insertion and replacing of the lamp, it is mounted on a rod 30 of insulating material to be inserted through the opening 31 in the rear wall 2 in order that the lamp may be inserted between the contact springs or withdrawn therefrom. In the cover part 1 over the dial is the opening 32 surrounded at the outside by the escutcheon plate 33 surrounding the glass plate 34 held within the opening 32 by means of clips 35 secured at the inner edge of the opening by the screws 36 which also serve to hold the escutcheon plate in position.

Extending through the center of the front plate is the bolt 37 which serves to hold the revolving frames 38 and 39 in position against the rear of the front plate, a nut 40 engaging the inner end of the bolt and when tightened pressing against the clamping spring 41 engaging the inner frame 39. These frames or washers are of insulating material and extending from the frame 38 is a contact arm or spring 42 terminating at its front end in a platinum contact plate 43 disposed in the arc of travel of the platinum contact point 44 on the needle. From

the frame 39 extends a contact arm 45 whose end terminates in a contact plate 46 disposed in the arc of travel of the contact point 47, also carried by the needle, as best shown in Fig. 1.

Figs. 6 and 7 show keys for engaging with and causing rotation of the frames 38 and 39, respectively, to cause adjustment of contact arms 42 and 45, respectively, with respect to the needle contacts. Each of these keys has the body plate 48 having at its rear end a socket 49 for receiving the head 50 of the bolt 37. At the front upper end of the body plate is the actuating knob 51, and extending from the other side of the plate is a pin 52. The length of key shown in Fig. 6 is such that when the socket 49 thereof engages the bolt head 50 its pin 52 will engage through segmental slot 53 in the front plate 1 and with the hole 54 in the frame 38. The length of the key shown in Fig. 7 is such that its pin 52 will engage in segmental slot 55 through the front plate 1 and in hole 56 in the frame 39. Upon engagement of either adjusting key with the instrument, and upon rotation thereof, the corresponding contact arm can be rotated to adjust its contact plate with reference to the contacts carried by the needle. In practice the field coil is included in the alarm circuit, and upon variation of resistance or reactance in the alarm circuit, the needle will be deflected toward the corresponding contact arm to close a local alarm circuit at the central exchange, as fully described in my co-pending application referred to.

Supported from the front plate 1 near the lower left-hand corner thereof, and extending inwardly therefrom, is a magnetic sheath or frame 57 in which is the energizing coil 58 from which extend the contact terminals 59 and 60. The armature plate 61 is pivoted at the upper rear end of the frame 57 at 61′ and extending forwardly from the armature is the latch lever 62 whose latched end 63 extends out through opening 64 in the front plate to normally engage over the top edge of a shutter 65 pivoted to the outside of the front plate 1 in front of the energizing coil, being for this purpose provided with pivot ends 66 which engage in pivot frames 67 secured to the front of the plate 1. On this shutter is a block 68 of insulating material from which is carried a connecting bar or plate 69 fastened by means of the screw 70, which, however, is insulated from the bar. Extending through the front plate 1 below the shutter are contact rods 71, 72 having upturned contact ends 73 and 74, preferably of platinum, against which ends the connecting plate 69 falls when the shutter is released by the latch bar. The shutter is loosely pivoted in the bearings 67 so that there will be more or less sliding engagement between the plate 69 and the contact ends when the plate strikes the ends, and the contacts are therefore brightened and cleaned to give good electrical connection. The contact rods also serve for holding switch springs 75, 76 and 77 in position against the rear of the plate 1, the rods passing through openings in these springs, which are insulated from each other and from the rod by insulating material 78, the ends of the rod being threaded and engaged by clamping nuts 79. The spring 75 at its end carries an actuating button 80 extending through the opening 81 to the outside of the cover and extending also through the opening 82 in the front end of spring 77. Normally springs 75 and 76 are in engagement, as shown in Fig. 4, but upon depression of the button they become disengaged and spring 77 is carried into engagement with spring 76. Any number of springs and any arrangement thereof, however, could be used.

Directly to the left of the center of the front plate is pivoted a switch lever 83 whose end 84 may engage with terminal buttons 85 or 86, these buttons being provided with stops 87 to prevent overthrow of the lever. At the right of the cover a switch lever 88 is pivoted at its center, the end 89 being adapted for engaging buttons 90, 91 and the end 92 being adapted for engagement with buttons 93 and 94 when the lever is rotated by means of the abutment or head 95. Below the center of the front plate there is also secured a legend plate 96, preferably of celluloid, or other material from which legends can easily be erased, the number of the line with which the instrument is connected being usually inscribed on this plate. Supported in the rear plate 2 are also relative terminals 97 for connecting external circuits with operative parts within the instrument case. To inclose and to protect the parts I provide an inclosing shell 98, preferably of metal, which slips over the rear wall 2 and against the edges of the front wall to entirely inclose the operative parts within, and this inclosing shell is held in place by hook or clip frames 99 hooking over the edge of the shell 98 and bearing against the rear wall, clamping screws 100 engaging the midway point with the clips and with the rear wall 2, so that when they are drawn up, the shell is securely clamped against the front wall. The walls of the inclosing frame are preferably of magnetic material, such as soft iron, in order to protect the operative parts, particularly the needle actuating mechanism, against electrical and magnetic disturbances.

As shown in the copending application referred to, this instrument is intended to be used in connection with alternating current or interrupted current circuits. The drop arm 62 will then be vibrated and will jar the frame of the instrument sufficiently

to prevent sticking of the needle contacts and adjusting arm contacts, which might otherwise happen.

Changes in the exact construction and arrangement of the various parts of my instrument may readily be made without departing from the scope of the invention. I do not, therefore, wish to be confined to the construction and disposition of the parts shown and described, but

I claim as new and desire to secure by Letters Patent:

1. In a device of the class described, the combination of a supporting frame comprising a front wall and a rear wall, a field winding disposed between the supporting walls, an armature pivoted to be influenced upon current flow through the winding, an indicating needle mounted to rotate with the armature, contacts on said needle, a supporting plate pivoted to the rear side of the front plate, a contact arm extending from said supporting plate and terminating in a contact to be engaged by one of the contacts on the needle upon deflection thereof, a second plate also pivoted to the rear side of the front supporting plate, a contact arm extending from said second supporting plate and terminating in a contact to be engaged by the other contact on the needle upon deflection thereof, said needle being disposed between contact arms, and means operable from the outside of the inclosing frame for causing rotation of the supporting frames to cause movement of the contact arms to adjust their contacts with respect to the needle contacts.

2. In a device of the class described, the combination with a front supporting plate, of an indicating needle within the device, means for causing deflection of the needle, a contact on the needle, a supporting plate pivoted to the rear side of the front supporting plate, a contact arm extending from the supporting plate and terminating in a contact adapted to be engaged by the contact on the needle upon deflection thereof, an opening in the front supporting wall registering with the supporting plate, and a key member having a pin for extending through the supporting wall opening and with the supporting plate, rotation of the key causing rotation of the supporting plate and of the contact arm carried thereby to adjust the contact on said arm with respect to the needle contact.

3. In a device of the class described, the combination with an inclosing frame having a front supporting wall, an indicating needle to the rear of the front supporting wall, means within the casing for causing deflection of the needle contacts carried on the needle, a plurality of supporting disks pivoted concentrically to the rear side of the front supporting wall, a contact arm extending from each of the supporting disks and having a contact associated with one of the needle contacts, and means operable from the outside of the front supporting wall for engaging with and causing independent movement of any one of the supporting disks whereby any one of the contact arms may move to adjust its contact with respect to the needle contact.

4. In a device of the class described, the combination of an inclosing frame having a front supporting wall, an indicating needle within the frame for causing deflection of the needle, two supporting disks, a pivot plate extending through the front supporting wall of the inclosing casing and engaging the two supporting disks to retain them against the rear face of the front supporting wall, contacts on the indicating needle, a contact arm extending from each supporting plate and terminating in a contact for engaging with one of the contacts on the indicating needle, an opening in each supporting plate, segmental openings through the front supporting wall registering with the openings in the supporting plates, adjusting keys each having a pivot socket for engaging the head of the pivot bolt, and a pin for extending through the segmental slot and into the opening of the corresponding supporting frame whereby upon rotation of the applied key the supporting frame and contact arm thereon can be rotated to adjust the contact with respect to the needle contact.

5. In a device of the class described, the combination of a supporting frame comprising a front wall and a rear wall, a field winding disposed between the supporting walls, an armature pivoted to be influenced upon current flow through the winding, an indicating needle mounted to be rotated by the armature, contacts on said needle, a supporting plate pivoted within the supporting frame, a contact arm extending from said supporting plate at one side of the needle, a second supporting plate pivoted within the supporting frame, a contact arm extending from said second supporting plate to the other side of the needle, and separable means applicable from the outside of the frame to be brought into engagement with the supporting plates whereby said plates may be independently rotated to cause adjustment of the contact arms extending therefrom.

6. In a device of the class described, the combination of an inclosing frame having a front plate, an indicating needle within the frame, means for causing deflection of the needle, a contact on the needle, a supporting plate rotatably pivoted at the inside of the frame, a contact arm extending from the supporting plate and terminating in a contact adapted to be engaged by the contact

on the needle, an opening in the front supporting wall registering with the supporting plate, and a key member having a pin for extending through the supporting wall opening and into engagement with the supporting plate, rotation of the key causing rotation of the supporting plate and of the contact arm carried thereby to adjust the contact arm with respect to the needle contact.

In witness whereof, I hereunto subscribe my name this 15th day of May A. D. 1907.

GEORGE M. WILLIS.

Witnesses:

CHARLES J. SCHMIDT,

FRED W. KOEHN.