April 19, 1938. H. E. ASHWORTH 2,114,895

THERMAL RELAY

Filed Jan. 7, 1937 2 Sheets-Sheet 1

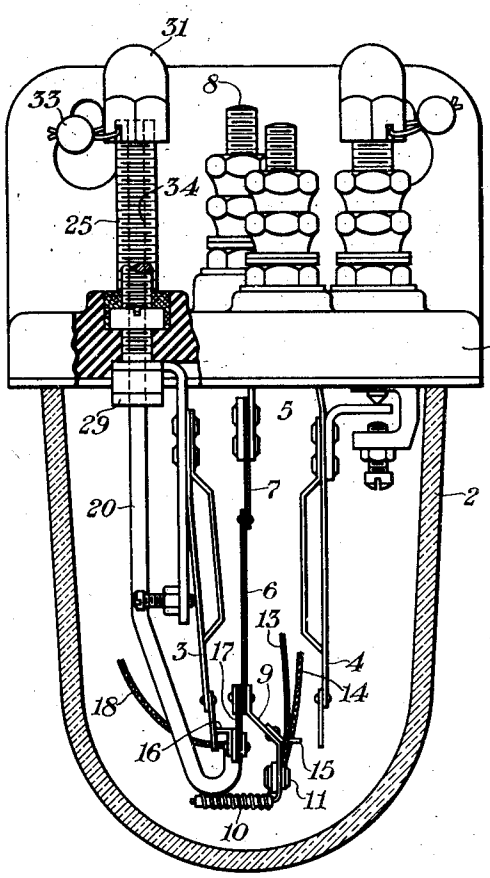


Fig. 1.

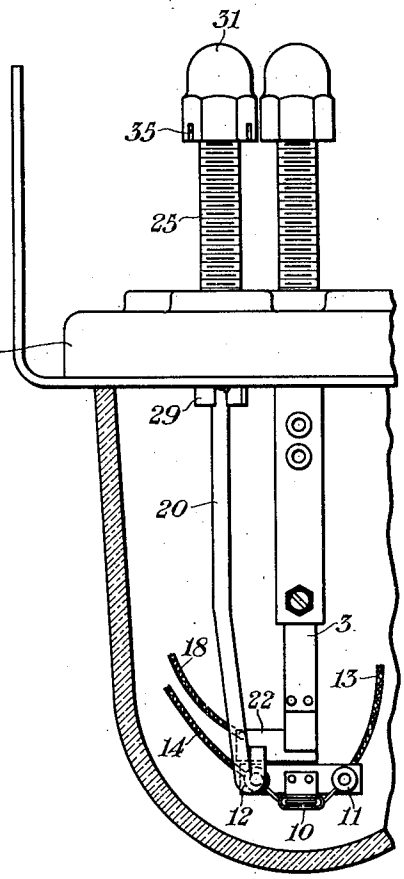


Fig. 2.

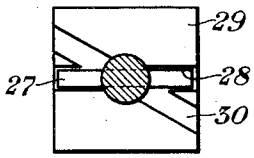


Fig. 5.

INVENTOR
Harry E. Ashworth.
BY
HIS ATTORNEY

April 19, 1938. H. E. ASHWORTH 2,114,895

THERMAL RELAY

Filed Jan. 7, 1937 2 Sheets-Sheet 2

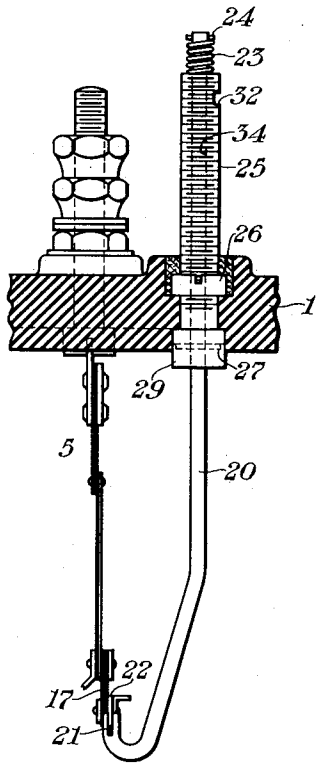


Fig. 3.

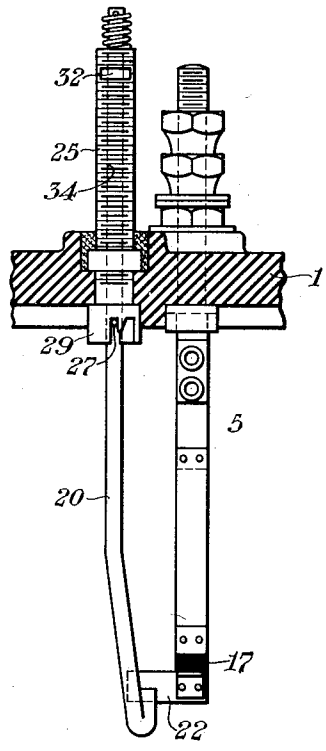


Fig. 4.

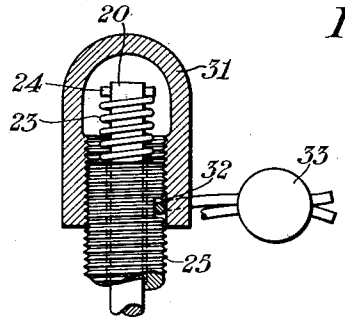


Fig. 6.

INVENTOR
Harry E. Ashworth.
BY
HIS ATTORNEY

Patented Apr. 19, 1938 2,114,895

UNITED STATES PATENT OFFICE

2,114,895

THERMAL RELAY

Harry E. Ashworth, Wilkinsburg, Pa., assignor to The Union Switch & Signal Company, Swissvale, Pa., a corporation of Pennsylvania

Application January 7, 1937, Serial No. 119,437

5 Claims. (Cl. 200—166)

My invention relates to relays and particularly to thermal relays.

One object of my invention is to provide a relay of the type described which has a relatively long operating time.

Another object of my invention is to provide holding means to anchor a movable relay contact against movement so that jarring or rough handling of the relay during shipment will not damage the contact or alter the delicate contact adjustment of the relay.

I will describe one form of relay embodying my invention and will then point out the novel features thereof in claims.

Fig. 1 is a front elevational view of one form of thermal relay embodying my invention and Fig. 2 is a side elevational view of a portion of the relay shown in Fig. 1. Fig. 3 is a rear elevational view illustrating one form of contact holding means also embodying my invention. Fig. 4 is a side elevational view of the apparatus shown in Fig. 3. Fig. 5 is an enlarged bottom view of a portion of the contact holding means, and Fig. 6 is an enlarged view illustrating a protective cap for preventing unauthorized movement of the holding means.

Similar reference characters refer to similar parts in each of the several views.

Referring now to the drawings, particularly to Figs. 1 and 2, the reference character 1 designates a relay top plate to which is clamped in any suitable manner a glass case 2 for enclosing the working parts of the relay. Secured to the top plate 1 by suitable terminal posts are fixed contacts 3 and 4. The contacts 3 and 4 are provided with adjusting mechanisms which will not be described in detail because such mechanisms form no part of my present invention.

The reference character 5 designates a thermal unit which comprises a bimetallic driver 6 anchored at its upper end by a bimetallic compensator 7 to a suitable terminal post 8 which is secured to top plate 1. Supported underneath the lower end of driver 6 by a metallic member 9 is a heating coil 10. The terminals 11 and 12 of the heating coil 10 are suitably insulated from member 9 and are intended to be fastened to suitable terminal posts in the top plate 1 by flexible connectors 13 and 14, respectively. Also secured to the lower end of driver 6 is a contact 15 which is arranged to come into engagement with contact 4, and a contact 16 which is arranged to come into engagement with contact 3. Contact 16 is insulated from driver 6 by insulating block 17 and is provided with a connector 18 which is intended to be secured to a suitable terminal post in the top plate 1. Contact 15 is connected to driver 6 by member 9 so that electrical connection with contact 15 can be made at terminal post 8.

When the relay is in its initial condition, as shown in the drawings, movable contact 16 is in engagement with contact 3 but contact 15—4 is opened. When heating coil 10 is energized, member 9 conducts heat to driver 6 to cause contact 16 to move away from contact 3 and to cause contact 15 to move towards contact 4. At the expiration of a relatively short time interval, contact 16—3 will become opened but, due to the comparatively remote location of heating coil 10 with respect to driver 6, contact 15 will not come into engagement with contact 4 until the expiration of a relatively long time interval. The relay embodying my invention, therefore, provides for a substantially long time interval which, particularly for the control of railway traffic controlling apparatus, has been found to be useful and, in some cases, necessary.

For preventing movement of thermal unit 5 during shipment, I provide a locking member 20 (best illustrated in Figs. 4 and 5) having a slot 21 for engaging with member 22 which is suitably fastened to insulating block 17. Locking member 20 is disposed in a hole 34 extending the entire length of a terminal post 25. Post 25 extends through the top plate 1 and is secured thereto by nut 26. Locking member 20 is held in a raised position by spring 23 acting against pin 24 and the upper end of terminal post 25. When locking member 20 is in its locking position (as shown in the drawings), pin 27 (best illustrated in Fig. 5) engages with slot 28 in an enlarged portion 29 of terminal post 25 so that locking member 20 cannot rotate in post 25. When the relay is to be put in service, locking member 20 is depressed which disengages slot 21 from contact member 22 and pin 27 from slot 28. Member 20 is then rotated counterclockwise until pin 27 is in alignment with slot 30 and then permitted to be returned to its biased position by spring 23, in which position member 20 will be locked against rotation by pin 27 engaging with slot 30. The rotation of locking member 20 places the lower portion of this member in such a position that there will be no interference with the movement of thermal unit 5.

If at any time it is desired to condition the relay for shipment, all that is required is to depress locking member 20, rotate it clockwise until pin 27 coincides with slot 28, and then permit

spring 23 to return member 20 to its biased position. This operation will bring slot 21 into engagement with member 22 so that thermal unit 5 will be held securely.

Pin 24, spring 23, and the upper portion of locking member 20 (best illustrated in Fig. 6) are enclosed in the recessed portion of a nut 31 which is threaded on the upper end of post 25. The nut 31 is provided with castellations 35 which coincide with a recess 32 in post 25 so that unauthorized manipulation of locking member 20 can be prevented by a seal 33.

Although I have herein shown and described only one form of thermal relay embodying my invention, it is understood that various changes and modifications may be made therein within the scope of the appended claims without departing from the spirit and scope of my invention.

Having thus described my invention, what I claim is:

1. In a relay, in combination, a movable contact supporting member anchored at one end to the relay top plate, a locking member mounted in said top plate and rotatable between two angular positions and as well as movable between two longitudinal positions, means for biasing said locking member to one of said longitudinal positions, means effective when said locking member occupies said one longitudinal position for locking said locking member in one or the other of said angular positions, means on said locking member effective when and only when said locking member occupies its one longitudinal position and its one angular position for securing the unanchored end of said contact supporting member against movement relative to said top plate, and means for preventing the unauthorized movement of said locking member.

2. In combination, a relay top plate provided with an aperture, a terminal screw passing through said plate and fixed therein and provided with a longitudinal hole extending the entire length of the screw, a movable contact finger anchored at one end to one side of said top plate, a locking member disposed in said longitudinal hole and capable of being manually operable from the other side of said top plate between two angular positions as well as between two longitudinal positions, means for biasing said member to one of said longitudinal positions, means effective when said locking member occupies said one longitudinal position for locking the member in one or the other of said angular positions, and means on said member effective when and only when said member occupies its one longitudinal position and its one angular position for engaging the other end of said movable contact.

3. In combination, a relay top plate provided with an aperture, a terminal screw passing through said plate and fixed therein and provided with a longitudinal hole extending the entire length of the screw, a movable contact finger anchored at one end to one side of said top plate, a locking member disposed in said longitudinal hole and capable of being manually operable from the other side of said top plate between two angular positions as well as between two longitudinal positions, means for biasing said member to one of said longitudinal positions, means effective when said locking member occupies said one longitudinal position for locking the member in one or the other of said angular positions, means on said member effective when and only when said member occupies its one longitudinal position and its one angular position for engaging the other end of said movable contact, and a cap secured to said terminal post to prevent unauthorized movement of said locking member.

4. In combination, a relay top plate provided with an aperture, a terminal screw passing through said plate and fixed therein and provided with a longitudinal hole extending the entire length of the screw, a movable contact finger anchored at one end to one side of said top plate, a locking member disposed in said longitudinal hole and capable of being manually operable from the other side of said top plate between two angular positions as well as between two longitudinal positions, spring means for biasing said member to one of said longitudinal positions, two recesses in the lower end of said terminal post disposed at an angle to each other, a pin secured to said locking member and capable of fitting in one recess or the other to prevent angular movement of said locking member when the member is in its one longitudinal position, and a slot in the lower end of said locking member effective when and only when the member is in its one angular position and its one longitudinal position for engaging with said contact finger at its unanchored end.

5. The combination with a relay comprising a top plate and a movable contact supporting member secured to said top plate, of means for at times locking said contact supporting member against movement relative to said top plate, said means comprising a locking member mounted in said top plate for rotation between two angular positions and for axial movement between two longitudinal positions, means for biasing said locking member to one of said longitudinal positions, means effective when said locking member occupies said one longitudinal position for locking said locking member in one or the other of its axial positions, and means on said locking member effective when and only when said locking member occupies its one longitudinal position and its one angular position for engaging said contact supporting member in a manner to hold it in a fixed position.

HARRY E. ASHWORTH.