

June 12, 1951

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2,556,716

RELAY

Filed April 25, 1947

FIG. 1

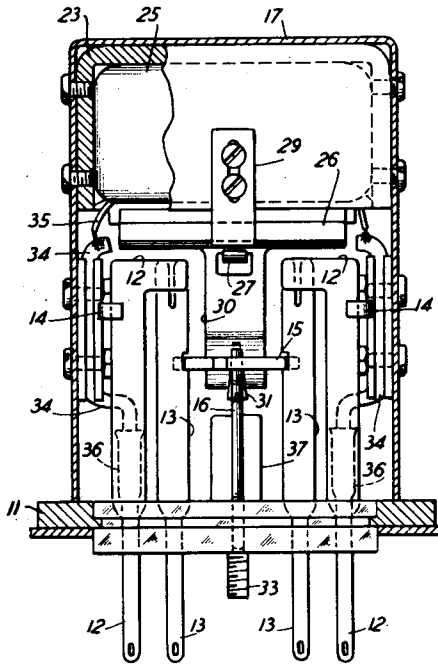


FIG. 2

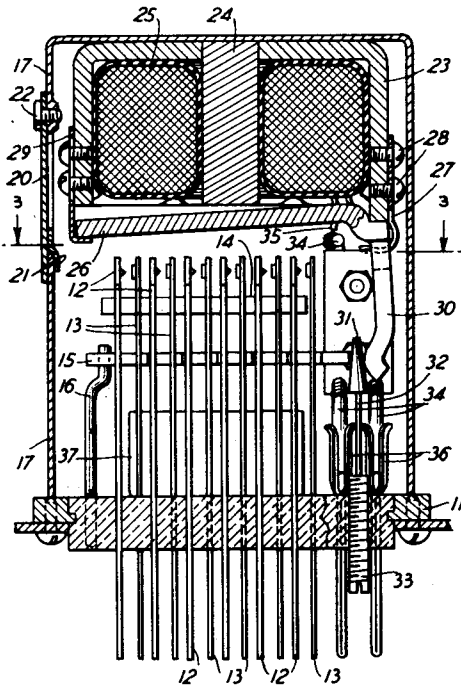


FIG. 4

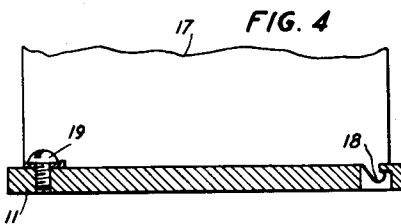
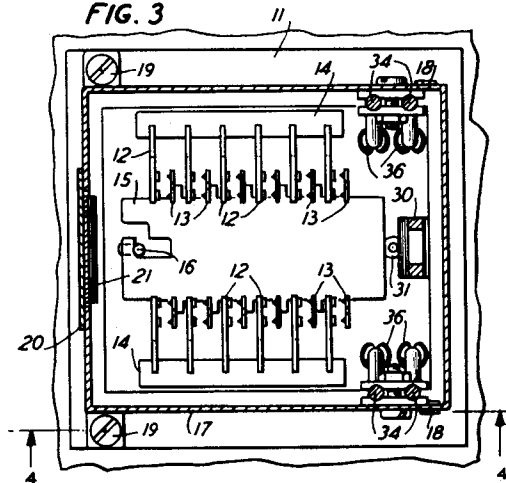


FIG. 3



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2,556,716

RELAY

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Application April 25, 1947, Serial No. 743,981

4 Claims. (Cl. 200—104)

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This invention relates to electromagnetic switching devices.

An object of the invention is to provide a relay protected against damage and yet readily accessible for maintenance.

Another object of the invention is to provide a relay in which the operating gaps may be adjusted without removal of the protective cover.

Another object of the invention is to provide a relay in which the contact springs are mounted so as to prevent the entrance of dust from the terminal side of the mounting.

A further object of the invention is to provide for ready interchangeability of the relay coil windings without changing the circuit wiring.

Other objects and advantages will become apparent during the course of the following description.

In general, the relay comprises a ceramic, glass, or plastic base in which sets of contact springs are embedded. The contact ends of the fixed springs are held in position by cards of insulating material and the movable springs are operable by a card of insulating material. A tubular cover member surrounds the springs and has its lower end attachable to the base. The operating magnet is supported above the spring assembly in the upper end of the cover member and may form a closure for the upper end of the cover. The core of the magnet extends perpendicularly to the direction of movement of the springs, and the armature, therefore, also acts at right angles to the direction of movement of the springs thereby reducing vibration. The armature has an operating lever extending at right angles therefrom, the free end of which engages a tapered stud-gap adjuster which, in turn, bears against the end of the spring-operating card. The coil of the magnet has depending plug members which are insertable into jacks molded into the base member so that the magnet and cover may be readily detached from the base as a unit.

The features of the invention will be readily understood from the following detailed description made with reference to the accompanying drawing in which:

Fig. 1 shows a partial cross-section of the front elevation of a relay embodying the features of the invention;

Fig. 2 shows a partial cross-section of the side elevation;

Fig. 3 shows a top cross-section along 3—3 of Fig. 2; and

Fig. 4 shows a fragmentary side elevation along 4—4 of Fig. 3.

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In a ceramic, plastic, or glass base 11, a plurality of contact springs 12 and 13 are embedded. The fixed, L-shaped contact springs 12 are maintained relatively stationary by the insertion of their upper portions into the teeth of a card 14 of insulating material. The movable contact-springs 13 are bifurcated to provide double contact with the springs 12, and are notched to provide an interlocking engagement with teeth on an insulating actuating card 15. Lateral movement of the contact-actuating member 15 is limited by a card stop 16, also embedded in the base.

A cover 17 is removably attached to base 11 by means of two cover projections 18 engaging notches in the base as best disclosed in Fig. 4 and by two screws 19 engaging tapped holes in the base.

A removable closure member 20 in cover 17 is attached by means of a tang 21 and a screw 22, thereby providing ready access to the working elements of the relay for maintenance.

Attached to the cover 17, in any suitable manner, is a pot type magnet 23 with a central core 24. A coil 25 supported on core 24 serves to operate a rectangular armature 26 which is held in pivotal contact with return path member 23 by means of a hooked spring 27. Screws 28 threaded into tapped holes in member 23 engage a slot in the spring 27 to provide that the tension of said spring be adjustable. A back-stop 29 is provided at the opposite edge of armature 26 and is similarly mounted in order to permit adjustment of the armature gap.

The armature 26 has an integral angularly extending lever 30 which actuates card 15 through an intermediate tapered separator 31. This separator is attached through a wire spring 32 to an adjusting screw 33 which engages a tapped hole in base 11 and is adjustable from the outside of the base.

The separator is allowed lateral movement by virtue of its flexible spring mounting, and may be adjusted longitudinally by means of screw 33 to control the card gap between armature lever 30 and card 15.

Also insulatedly mounted on each side of the cover 17 are two upper terminal connectors 34 which at their upper ends are connected to the coil winding terminals 35, and at their lower ends mate with lower terminal connectors 36 embedded in base member 11. Figs. 2 and 3 show two mating pairs of said terminal connectors mounted on each side of the cover to provide for double-wound relays. In the single-wound relay depicted, only two of the four mating pairs are utilized.

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In operation, the energization of the coil 25 causes the armature 26 to pivot about the line of contact with member 23. As a result lever 30 is forced against separator 31 in a direction substantially perpendicular to the spring movement. Pressure from the separator causes a lateral movement of card 15, thereby bringing the active springs 13 into contact with passive springs 12.

A contact protection condenser and resistance may be affixed to the base in the space between the sets of contact springs as at 37 in the drawing and connected across the coil winding in the well-known manner.

It may be seen from the nature of the construction that upon release of screws 19, the cover may be disengaged from the base at 18 and lifted therefrom. The electromagnet and armature lever will remain within the cover and the winding terminal plugs 34 will be disengaged from the terminal jacks 36 thereby permitting ready accessibility to the operating parts and also allowing for the interchanging of the relay coil windings without changing the circuit wiring.

As many possible embodiments may be made of the above invention and as many changes might be made in the embodiment above set forth, it is to be understood that all matter hereinbefore set forth, or shown in the accompanying drawing, is to be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. In a relay, a base of insulating material, a plurality of contact springs mounted therein, a cover surrounding said springs and detachably secured at one end to said base, a core, an energizing coil supported on said core, upper terminal connectors joined to the terminals of said coil, lower terminal connectors mounted in said base and detachably connected to said upper terminal connectors, a magnetic member surrounding said coil and supported in the end of said cover, an armature, and means controlled by said armature to move certain of said contact springs with respect to others of said springs.

2. In a relay, a base of insulating material, a plurality of contact springs mounted therein, a cover surrounding said springs and detachably secured at one end to said base, and an electromagnet supported in the other end of said cover, said electromagnet having an armature provided with a lever for operating said contact springs, a contact actuating element controlled by said lever to move certain of said contact springs with respect to others of said springs, a means for adjustably separating said lever and said contact actuating element comprising a screw threaded into said base, a flexible rod attached to said

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screw and a tapered separator affixed to said flexible rod and intermediate the contact actuating element and the armature lever.

3. In a relay, a base of insulating material, a plurality of contact springs mounted therein, a cover surrounding said springs and detachably secured at one end to said base, a core, an energizing coil supported on said core, a magnetic member surrounding said coil and supported in the end of said cover, an armature having a lever, a contact actuating card controlled by said lever to move certain of said contact springs with respect to others of said springs, a means for adjustably separating said lever and said card comprising a screw threaded into said base, a flexible rod attached to said screw and a tapered separator affixed to said flexible rod and intermediate the contact actuating card and the armature lever.

4. In a relay, a base of insulating material, a plurality of contact springs mounted therein, a cover surrounding said springs and detachably secured at one end to said base, a core, an energizing coil supported on said core, upper terminal connectors joined to the terminals of said coil, lower terminal connectors mounted on said base and detachably connected to said upper terminal connectors, a magnetic member surrounding said coil and supported at the end of said cover, an armature having a lever, a contact actuating card controlled by said lever to move certain of said contact springs with respect to others of said springs, a means for adjustably separating said lever and said actuating card comprising a screw threaded into said base, a flexible rod attached to said screw and a tapered separator affixed to said flexible rod and intermediate the contact actuating card and the armature lever.

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