Feb. 8, 1949. A. VINCENT 2,461,360

RELAY

Filed Oct. 16, 1943

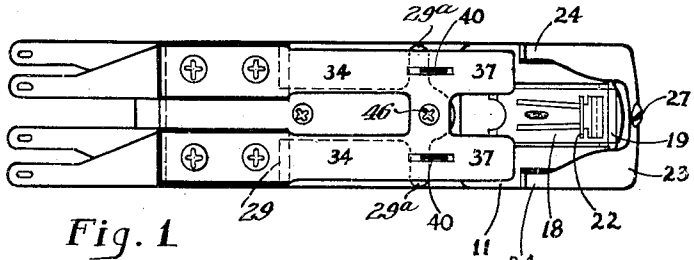


Fig. 1

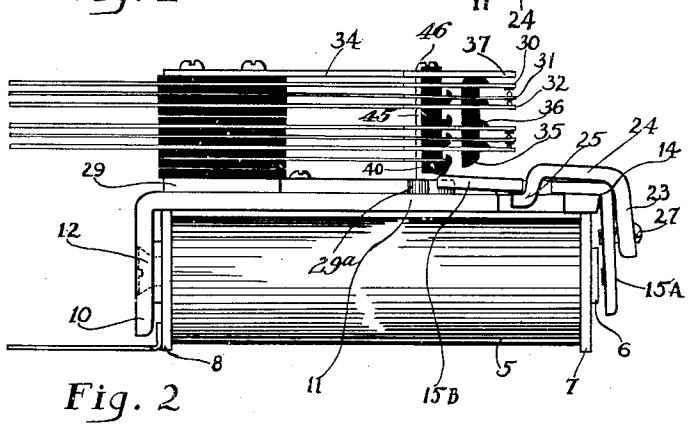


Fig. 2

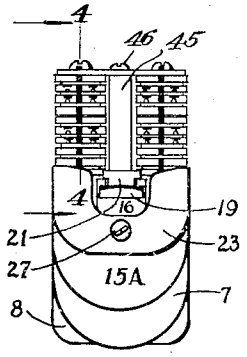


Fig. 3

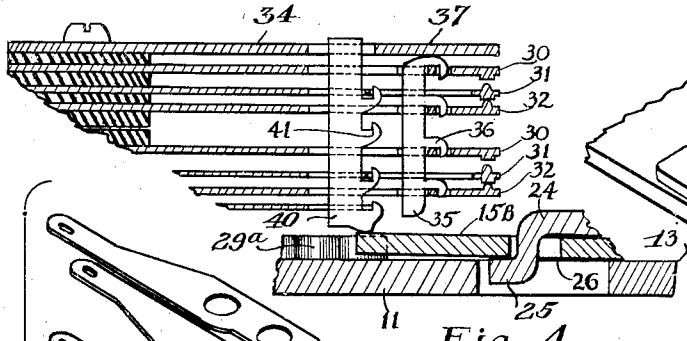


Fig. 4

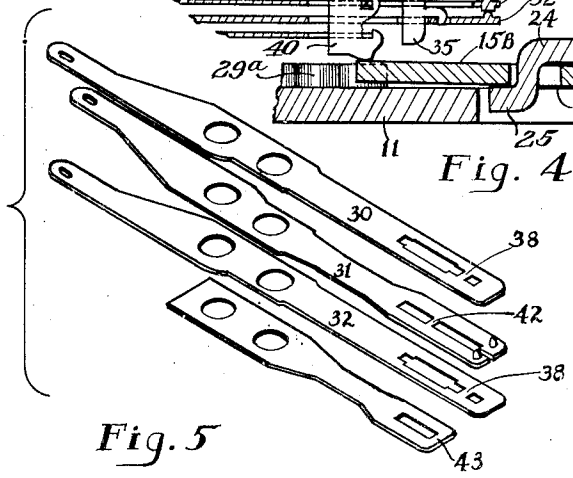


Fig. 5

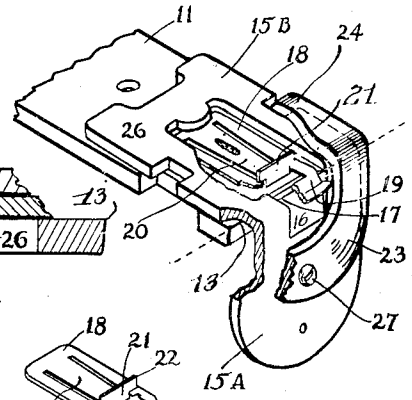


Fig. 6

Fig. 7

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UNITED STATES PATENT OFFICE

2,461,360

RELAY

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5 Claims. (Cl. 175—345)

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This invention relates to relays and the like.

The object of the invention is to provide a relay which is relatively easy to manufacture, which can be quickly adjusted and which is reliable in operation.

The various features of the invention will appear from the detailed description and claims when taken with the drawings in which:

Fig. 1 is a plan view of the relay of this invention;

Fig. 2 is a side elevation; and Fig. 3 is a right end view thereof;

Fig. 4 is a fragmentary sectional view taken substantially on the line 4—4 of Fig. 3, showing particularly the arrangement of the spring assembly in relation to the armature;

Fig. 5 is an exploded perspective view of certain of the springs in the spring assembly;

Fig. 6 is a fragmentary perspective view, particularly showing the mounting of the armature on the frame and the means for releasably retaining the armature on this frame, and also showing the means for adjusting the air gap of the armature; and

Fig. 7 is a perspective view of the armature retainer.

The relay of this invention includes an energizing coil 5 which is removably secured on the core 6, made of suitable magnetic material. The coil 5 may be wound on a spool of insulating material of which only the end plates 7 and 8 are visible, or it may be wound directly on the core 6 in which case the insulating plates 7 and 8 will be mounted directly on the core to position the coil. An L-shaped frame of magnetic material has a short portion 10 mounted on the left end of the core, as illustrated in Fig. 2 and has its long portion 11 substantially equal in length to the core and extending in spaced parallel relation to the right end thereof. While the frame may be mounted on the core in any suitable manner, it is preferably fastened thereto by a screw 12 threaded into the left end of the core, the screw having its head countersunk so that it is substantially flush with the outer face of the frame part 10. The portion 11 of the frame, as shown in Figs. 2 and 6, has its right-hand end machined to provide a corner or bearing 13 on which the inner corner 14 of an angular or folded armature can rock. This armature has a part 15A adapted to swing into and out of contact with the head of the core 6 and has a part 15B which extends generally in the direction of the portion 11 of the magnetic frame and approximately at right angles with respect to part 15A. As shown in Fig. 6, the center of the part 15B of the armature is punched out to accommodate armature retaining means to be described. However, the upright part 15A of the armature has a struck-out tongue 16, positioned so that its corner 17 is in substantial alinement with the inner corner 14 of the armature. It should be mentioned that the right end of the frame is notched to provide clearance for the struck-out tongue 16.

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In order to retain the armature in its proper rocking position, there is welded onto the end portion 11 of the frame, a spring latch 18 of non-magnetic material extending generally lengthwise of the frame. This latch has a lip 19 that fits over the corner 17 of the tongue 16 formed on the armature. This latch resiliently holds the armature on the end of the frame and yet the armature can be readily disengaged from the frame by moving the armature toward the right, as illustrated in Fig. 2. In order to insure that the spring latch will not be sprung beyond its elastic limit in applying the armature to the frame, the latch is provided with a stop. This stop comprises a strip 20 having one end thereof integral with the latch spring but the remainder of the strip is punched from the intermediate portion of the latch. The free end of the strip is formed into an upstanding portion 21 with laterally projecting lugs 22 extending in a position to limit the upward movement of the lip 19. It has been pointed out that the corner 17 on the lip 16 is in alinement with the corner 14 of the armature. By this construction the corner 13 of the relay frame which contacts the inner corner 14 of the armature and the portion of the lip 19 of the retaining latch 18 which engages the corner 17 of the tongue 16 are in alinement so that the armature rocks on a line bearing.

It is frequently desirable to adjust the air gap of the armature and for this purpose there is provided a U-shaped piece 23 having legs 24 folded to conform generally to the angular shape of the armature. The ends 25 of these legs are bent or otherwise shaped to extend through or hook into notches 26 or other suitable receiving means in the armature where they engage the inside surface of the armature portion 15B or the receiving means as the case may be. The base portion of piece 23 is shown provided with a screw 27 threaded into the armature portion 15A so that by loosening or tightening this screw the angularity of the armature and therefore the air gap between the armature and the head of the core may be changed at will.

The end of the part 15A of the armature in

the course of its rocking movement, changes the relation between certain of the contacts of a contact spring assembly. The contact spring assembly comprises an elongated mounting plate **29**, adapted to be secured by screws to the top portion **11** of the frame. On this mounting plate there are secured two stacks of contact spring sets, although it will be understood that this relay is not limited to this arrangement since a single stack of contact springs may be used. Each stack of springs comprises a plurality of sets, each set including a stationary contact spring **30**, an armature spring **31** and the back stationary contact spring **32**. These springs at their left ends are separated from each other and from the mounting plate by strips of insulation, the strips of insulation and the contact springs being secured to the mounting plate by a clamping plate **34**. It will be understood that this clamping plate which is herein illustrated as being of H-shape to clamp two stacks of springs, may have the form of a single strip when only a single stack of contact springs is employed. With either shape of clamping plate, its right end is maintained exactly spaced from the relay frame by a spacing sleeve **45** located between mounting plate **34** and mounting plate **29**. A screw **46** passing through these

engagement with the back contact stationary springs (Fig. 4).

The above rather specific description of one form of the present invention is given solely by the way of example, and is not intended in any manner whatsoever, in a limiting sense. It is also to be understood that various modifications, adaptations and alterations may be applied to meet the requirements of practice, without in any manner departing from the spirit or scope of the present invention, except as limited by the appended claims.

Having thus described my invention, what I claim is:

1. In a relay having a core provided with a coil, a frame associated with said core and having a portion adjacent one end of said core, said portion constituting a line bearing, said frame having a notch therein which interrupts said line bearing, an angular armature having an inner corner and having a struck-out tongue received in said notch and provided with a corner extending in substantial registry with the line bearing of said frame, the inner corner of said armature engaging said line bearing whereby the armature can rock on said frame with respect to said core, and a spring latch having a lip acting

core, frame means for supporting the aforementioned parts, and a folded armature mounted to rock on a portion of said frame relative to said core; a member engaging the armature at each side of the fold therein permitting bending of the armature in order to adjust the air gap between the armature portions with respect to each other and the core.

5. In an electromagnet assembly for a relay of the type including a core, a coil carried by said core, frame means for supporting the aforementioned parts, and an armature folded into two portions extending approximately at right angles to each other; the first of said portions having an opening therein, and a rigid member having a part extending into said opening and provided with another part having engagement with the second portion of said armature in such a manner as to permit changing the angularity of said armature at will.

ANDREW W. VINCENT.

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Certificate of Correction

Patent No. 2,461,360. February 8, 1949.

ANDREW W. VINCENT

It is hereby certified that errors appear in the printed specification of the above numbered patent requiring correction as follows:

Column 5, line 5, before "permitting" insert *for*; lines 7 and 8, strike out the words "portions with respect to each other" and insert the same in line 6, same column, after "armature";

and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 20th day of September, A. D. 1949.

[SEAL]

JOE E. DANIELS,
Assistant Commissioner of Patents.

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