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2,854,544

RELAY

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2 Claims. (Cl. 200—87)

The present invention relates to relays, and more particularly to relays of the type involving an electro-magnetically actuated electric switch.

The primary object of the invention is to provide a relay having switch contact points which are positively separated when the relay is in "off" position.

Another object of the invention is to provide a relay in which the contact points can be opened or closed with a minimum of power.

A further object of the invention is to provide a relay of the class described above which can be interchangeably adjusted to open or close circuits making contacts.

A still further object of the invention is to provide a relay of the class described above which is inexpensive to manufacture, simple to use and completely positive in its action.

Other objects and advantages will become apparent in the following specification when considered in the light of the attached drawings, in which:

Figure 1 is a perspective view of the invention.

Figure 2 is an end elevation of the invention.

Figure 3 is an enlarged perspective view of the armature.

Figure 4 is a side elevation of the invention with the parts rearranged.

Referring now to the drawings in detail wherein like reference characters indicate like parts throughout the several figures, the reference numeral 10 indicates generally a relay constructed in accordance with the invention.

The relay 10 includes a base plate indicated generally at 11 having a flat central portion 12, a perpendicularly extending upright portion 13, and a perpendicularly depending oppositely extending portion 14 integrally formed on the end of the flat central portion 12 opposite the upstanding portion 13. A tongue 15 is struck from the central portion 12 and depends therefrom in parallel relation to the depending portion 14. The tongue 15 is adjacent to and oppositely extending from the upstanding portion 13. A plurality of transversely aligned slots 16 extend perpendicularly through the central portion 12 of the base 11 intermediate the tongue 15 and the depending portion 14 thereof.

An electro-magnet 17 having a core 18 is secured to the upstanding portion 13 by means of a detachable securing element 19. An armature 20 is formed of flat sheet material and is provided with an aligned depending tongue 21 projecting from the lower edge 22 thereof, and a pair of inwardly opening hooks 23 projecting from the opposite terminal ends of the lower edges 22, as best seen in Figure 3. The armature 20 is provided with an upstanding portion 24 of reduced width from the upper end of which extends perpendicularly a wedge tongue 25. A fiber plate 26 formed of dielectric material is secured to the tongue 25 by means of a securing element 27 and has the outer edge thereof formed into a wedge, as at 28.

The tongue 21 and hooks 23 of the armature 20 project through the aligned slots 16 of the base 11 so that

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the lower edge 22 of the armature 20 rests against the upper surface of the central portion 12 of the base 11. The slots 16 in the central portion 12 have sufficient width to permit the armature 20 to pivot back and forth therein.

The tongue 21 and the tongue 15 are each provided with aligned bores 29 and notches 30 to receive opposite ends of a coil tension spring 31 extending therebetween.

A plate 32 is provided with a pair of spaced offset portions 33 which are adapted to engage the hooks 23 to lock the armature 20 to the base 11. The plate 32 is secured to the central portion 12 of the base 11 by means of securing elements 34.

An elongated arcuate stop 35 projects upwardly through an opening 36 in the base 11 and has a foundation plate 37 on its lower end which is secured to the base 11. The stop 35 is positioned to engage the armature 20 so as to limit its movement away from the core 18 of the electro-magnet 17.

A switch support plate 38 is provided with a perpendicularly extending offset portion 39 at one end thereof and is detachably secured to the upstanding portion 13 of the base 11 by means of the securing element 19. The support plate 38 is provided with a pair of bores 40 and the support plate 38 is adapted to be detachably secured to the depending portion 14 of the base 11 by means of securing elements 41.

A switch support plate 42 has the medial portion thereof attached to the offset portion 39 by means of the securing elements 43, as best seen in Figure 1. A double contact switch 44 is secured to the switch support arm 42 and has a pair of contact arms 45 and 46 secured thereto and extending longitudinally thereof.

Referring particularly now to Figure 1, the contact arms 45 and 46 are positioned so that the fiber member 26 is adapted to be moved therebetween upon energization of the electro-magnet 17 so that the contact arms 45 and 46 will be positively separated by the wedge action of the fiber member 26 and held in separated condition until the circuit is broken to the electro-magnet 17. Upon breaking of the circuit to the electromagnet 17 the coil tension spring 31 will pivot the armature 20 away from the electro-magnet 17 into contact with the stop 35.

When it is desired that the relay 10 should have positive circuit making actuation, the plate 38 is detached from the upright portion 13 and is secured to the depending portion 14, as illustrated in Figure 4. The switch support plate 42 is detached from the offset portion 39 and is reattached thereto with the contact end of the switch plate 42 secured to the offset portion 39 by means of the securing element 43. The armature 20 is removed from the central portion 12 of the base 11 by detaching the spring 31 and the securing plate 32. The armature 20 is then rotated 180° on a vertical axis and is reattached to the central portion 12 of the base 11 by using the attachment plate 32 in the same manner as described above. The spring 31 is reattached between the tongue 21 and the tongue 15, all as shown in Figure 4.

With the parts assembled in the position shown in Figure 4, actuation of the relay will cause the armature 20 to move toward the core 18 pulling the fiber member 26 out from between the contact arms 45 and 46 permitting a circuit to flow therebetween. Upon release of the current in the electro-magnet 17 the spring 31 will cause the armature 20 to move to the contact separating position illustrated in Figure 4.

The instant relay 10 is of a nature which will separate the contact arms 45 and 46 breaking the circuit therebetween without the use of excessive power and will maintain the separated condition of the contacts 45 and 46 in such a positive manner that accidental contact therebetween due to vibration, shock, or direct pressure will be most effectively prevented.

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It should be noted that the structure of the present invention is capable of assembly to produce a circuit making or circuit breaking relay without requiring the modification of any of the elements. Obviously, the spring 31 is of the desired tension to produce the above results and can be replaced to suit varying conditions of contact pressures encountered in the trade.

Having thus described the preferred embodiment of the invention, it should be understood that numerous structural modifications and adaptations may be resorted to without departing from the scope of the appended claims.

What is claimed is:

1. A relay comprising a base plate, oppositely extending flanges integrally formed on opposite ends of said base plate and extending perpendicularly therefrom, an electro-magnet detachably secured to one of said flanges and overlying said base plate, a double contact switch, means detachably securing said switch to a selected one of said flanges, an armature, a dielectric wedge mounted on one end of said armature and extending perpendicularly therefrom for engagement between the contacts of said switch, means pivotally securing the other end of said armature to said base plate adjacent said magnet with said wedge extending toward said switch and spring means extending between said armature and said base plate normally biasing said armature away from said electro-magnet.

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2. A relay comprising a base plate, oppositely extending flanges integrally formed on opposite ends of said base plate and extending perpendicularly therefrom, an electro-magnet detachably secured to one of said flanges and overlying said base plate with the axis of said magnet parallel to said base plate, a double contact switch, means detachably securing said switch to a selective one of said flanges, an armature, a perpendicularly extending tongue integrally formed on one end of said armature, means selectively pivotally securing the other end of said armature to said base plate adjacent said magnet, said tongue being in spaced confronting relation to the contacts of said switch, a dielectric wedge mounted on said tongue for engagement between said contacts of said switch, and spring means extending between said armature and said base plate normally biasing said armature away from said electro-magnet.

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