# United States Patent [19]

**Thornley**

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[54] **ELECTRO-MAGNETIC RELAY ARRANGEMENT**


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[52] **U.S. Cl.** ..... **335/274**, 335/276

[51] **Int. Cl.** ..... **H01f 7/08**

[58] **Field of Search** ..... 335/266, 268, 274, 335/276



[56] **References Cited**

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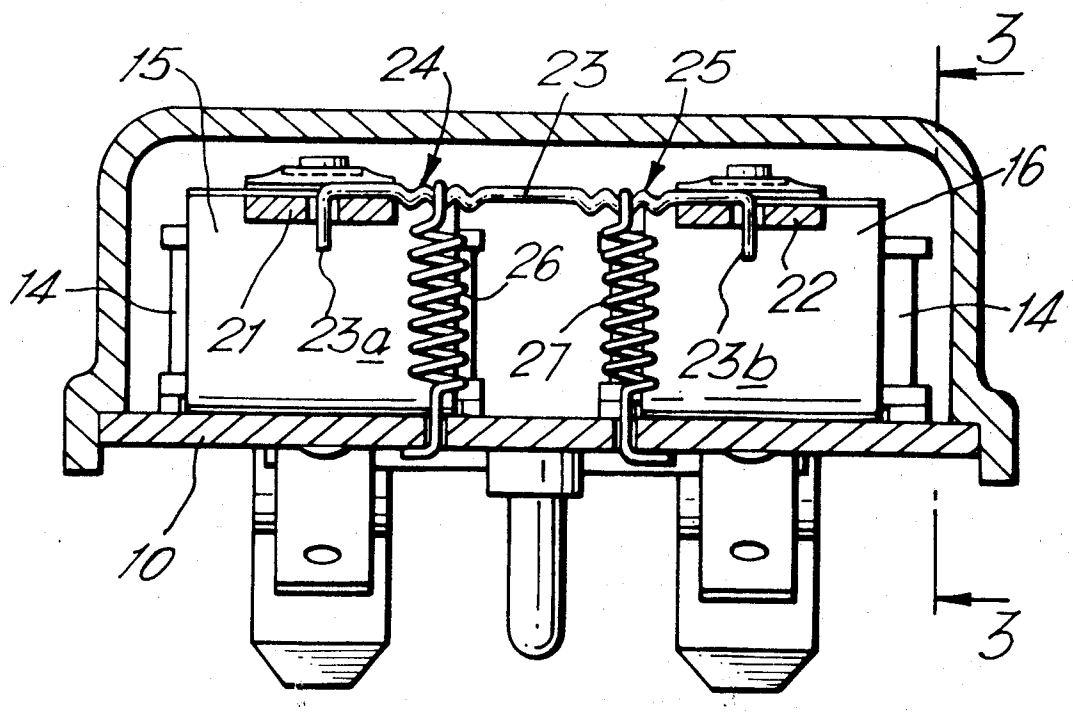
[57] **ABSTRACT**

An electro-magnetic relay arrangement in which a pair of spaced electromagnets are supported on a base and a pair of associated armatures are pivoted relative to the electro-magnets about aligned axes. A rigid wire connects the two armatures to extend parallel to the axes and a pair of springs biasses the armatures away from the electro-magnets, said pair of springs extending between the base and portions of the rigid wire adjacent the respective armatures.


**5 Claims, 3 Drawing Figures**



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2 Sheets-Sheet 1

Fig. 1.

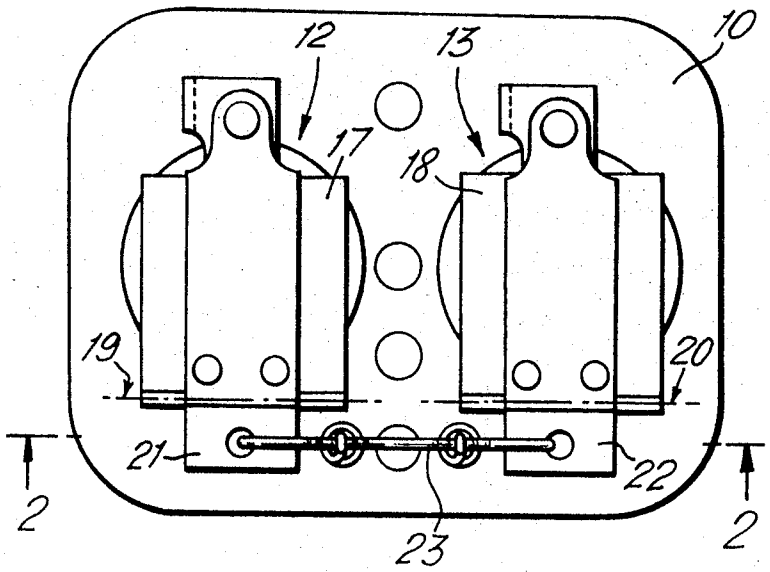


Fig. 2.

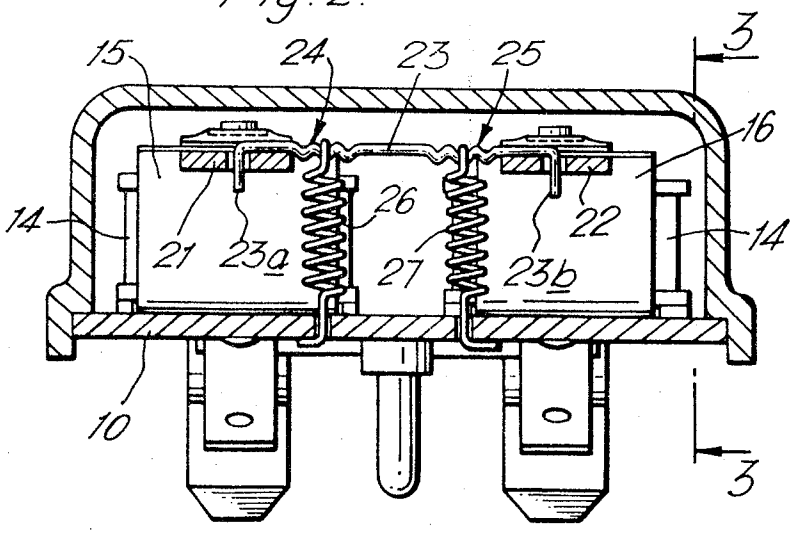
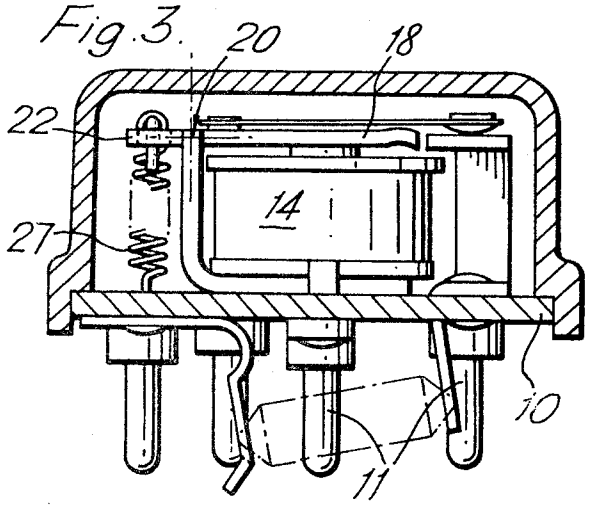



Fig. 3.



# ELECTRO-MAGNETIC RELAY ARRANGEMENT

This invention relates to arrangements of electro-magnetic relays and has as an object to provide such an arrangement in a convenient form.

An electro-magnetic relay arrangement according to the invention comprises a support, a pair of electro-magnets mounted on the support, a pair of armatures each mounted for pivotal movement about an axis towards and away from one of the electro-magnets, said axes being substantially aligned, and means for biassing said armatures away from the respective electro-magnets, said biassing means comprising a member engaging said armatures and extending therebetween substantially parallel to said pivotal axes and a pair of springs in spaced relationship extending transversely of said member and engaging said member and said support.

An example of an arrangement according to the invention will now be described with reference to the accompanying drawing in which:

FIG. 1 is a view of the arrangement with parts removed for clarity,

FIG. 2 is a section on line 2—2 in FIG. 1, and

FIG. 3 is a section on line 3—3 in FIG. 2.

The arrangement has an insulating base **10** which provides a support for terminals **11** and for a pair of electro-magnetic relays **12, 13.** Relays **12, 13** include coils **14** whose axes are in spaced parallel relationship and yokes **15, 16** upon which armatures **17, 18** are mounted for respective pivotal movement about aligned axes **19, 20.**

Armatures **17, 18** respectively include overhung portions **21, 22.** A member **23** in the form of a stiff wire extends between the portions **21, 22** and has downturned ends **23***a*, **23***b* which extend through holes in the respective portions **21, 22.** Member **23** is formed, with a pair of crimped portions **24, 25** which lie in the plane of the axes of the end portions **23***a*, **23***b*. Portions **24, 25** are adjacent the respective armature portions **21, 22** and respectively define three locations for the ends of extension springs **26, 27,** which have their other ends secured to the base **10.** The ends of springs **26, 27** which engage member **23** are formed with loops so that the springs **26, 27** can be selectively engaged in any of the locations provided by crimped portions **24, 25.**



In use, springs **26, 27** serve to bias the armatures **17, 18** against a pull exerted by the electro-magnets **14.** Since member **23** is free to pivot about the portions **21, 22** of armatures **17, 18,** and also since the springs **26, 27** are closely adjacent the armatures **17, 18** downward movement of (say) armature portion **21** as seen in FIG. **2,** does not cause a significant downward movement of crimped portion **25** associated with the other portion **22.** The force applied by spring **27** to armature **18** is not, therefore, significantly altered. Spring **26** exerts very little force on armature **18,** since member **23** is for this purpose acting as a second order lever.

Similarly, movement of either one of the armatures **17, 18** in either direction does not significantly affect the force applied to the other armature by the adjacent spring. The force applied by the springs **26, 27** to armatures **17, 18** is adjustable by altering the points of engagement of the springs with member **23.**

I claim:

**1.** An electro-magnetic relay arrangement comprising a support, a pair of electro-magnets mounted on the support, a pair of armatures each mounted for pivotal movement about an axis towards and away from one of the electromagnets, said axes being substantially aligned, and means for biassing said armatures away from the respective electro-magnets, said biassing means comprising a member engaging said armatures and extending therebetween substantially parallel to said pivotal axes and a pair of springs in spaced relationship extending transversely of said member and engaging said member and said support.

**2.** An arrangement as claimed in claim **1,** wherein the member engaging said armatures is a substantially rigid wire.

**3.** An arrangement as claimed in claim **2,** wherein the wire is provided with a crimped portion adjacent each armature, each said crimped portion providing a plurality of locations for engagement of the respective spring.

**4.** An arrangement as claimed in claim **2,** wherein the wire is provided with turned ends which engage in apertures in the respective armatures and is pivotable relative thereto.

**5.** An arrangement as claimed in claim **4,** wherein the apertures are provided in extensions of the armatures beyond the axes.

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