United States Patent

Olley

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[54] ELECTRICAL RELAYS

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[51] **Int. Cl.** **H01h 1/06**

[58] **Field of Search** ..... 335/197, 198, 188, 132, 202; 200/153 LA, 166 BC, 166 M, 16 R, 158

[56] **References Cited**

UNITED STATES PATENTS

2,152,450	3/1939	Arcelon	200/158
2,621,267	12/1952	Cripe	335/188
2,838,622	6/1958	Bachi	200/153 LA
3,249,725	5/1966	Hutt et al	200/153 LA

FOREIGN PATENTS OR APPLICATIONS

200,132	1/1923	Great Britain	335/197

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[57] **ABSTRACT**

An electrical relay is provided in which by a simple manual adjustment external to the relay casing the pairs of contacts can be changed from a make combination to a break combination and vice versa. An operating member in the form of a circular rod is provided for each pair of contacts and is linearly movable on movement of the relay armature. Each rod is provided with two cams arranged at diametrically opposite positions on the rod and spaced apart a distance equal to the stroke of the armature. A spring carrying the moving contact of the pair has a cam follower which when the electromagnet is in one condition engages a cam and when the electromagnet is in the other condition engages the surface of the rod. Rotation of the rod through 180 degrees reverses the engagement of the cam and surface of the rod. The rods project a short distance beyond the casing and are slotted for screw-driver adjustment.

4 Claims, 2 Drawing Figures

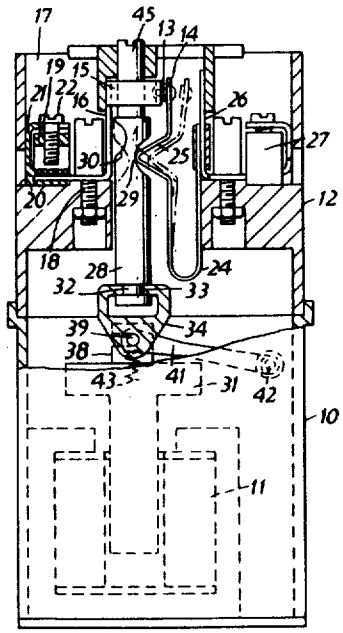


FIG. 1.

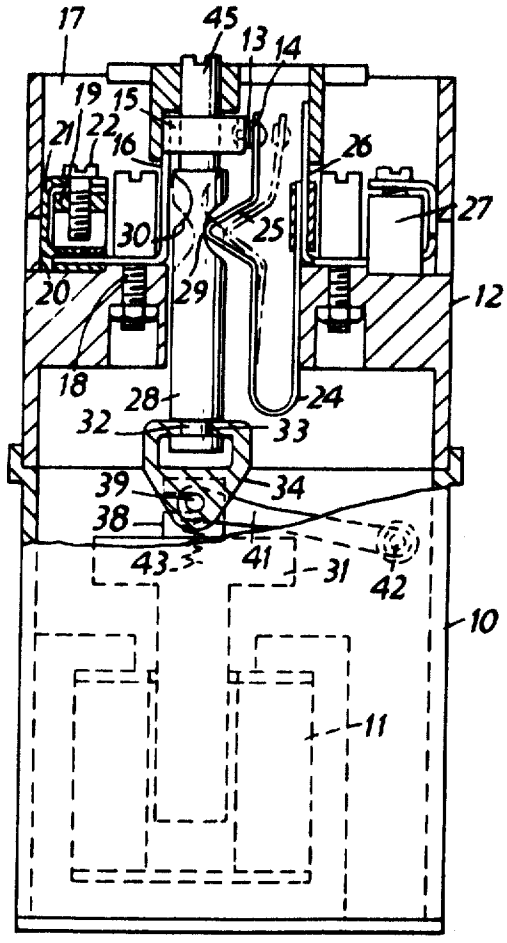
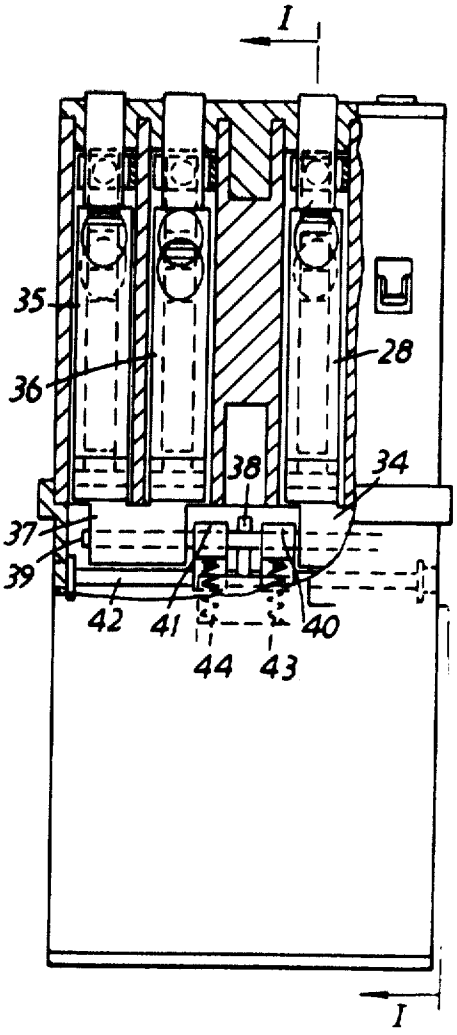


FIG. 2.



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ELECTRICAL RELAYS

The present invention relates to electrical relays and is more particularly concerned with the contact operating mechanism for such relays.

Electrical relays are required to have a very wide range of contact operating combinations when energized, e.g. make contacts or break contacts, according to the use to which the relay is put. This makes it difficult for the manufacturer to provide a standard all-purpose relay.

The object of the present invention is to provide a standard electrical relay in which the contact operating mechanism can be readily adjusted to give different contact operating combinations.

According to the invention, in an electrical relay comprising an electromagnet having an armature and at least one pair of contacts, an operating member of insulating material is provided for said pair of contacts or for each pair of contacts, said operating member or members being linearly movable in response to movement of said armature on energization and de-energization of said electromagnet and the operating member or each operating member is manually adjustable from one position relative to the associated pair of contacts to a second position relative to the associated pair of contacts, the operating member in one position being adapted to control the associated pair of contacts to form a break combination whereas in the second position the operating member is adapted to control the associated pair of contacts to form a make combination.

The invention will be better understood from the following description of two embodiments taken in conjunction with the accompanying drawings comprising FIGS. 1 and 2.

In the drawings

FIG. 1 shows a part-sectional view of the preferred embodiment of the invention taken along the line 2—2 of FIG. 2, and FIG. 2 shows a part-sectional side view of the second embodiment.

Referring to FIGS. 1 and 2, the relay comprises a lower housing **10** for locating an electromagnetic **11** and an upper housing **12** for locating a contact operating mechanism, the upper housing **12** being positioned above the electromagnet housing **11** and suitably secured thereto by means not shown. The contact-operating mechanism is fabricated from a suitable plastics material and includes four pairs of contacts of which one is shown in full in FIG. 1. Each pair of contacts comprises a fixed contact **13** and a movable contact **14**. The fixed contact **13** is carried by a collar **15** to which is secured an electrically conducting strip **16**. The conducting strip **16** is mounted within a recess **17** in the upper housing **12** by means of the bolt **18**, and extends into a socket **19**. Electrical connection is made to the conducting strip by a cable (not shown) which is introduced through an aperture **20** in the upper housing, adjacent to the socket **19**. The end of the cable is maintained in firm engagement with the conducting strip **16** by means of a U-shaped clamping member **21**, the end of the cable being engaged between an inner surface of the socket **19** and one limb of the clamping member **21**, pressure between the two being ensured by a screw **22** which passes through the other limb of the clamping member and into a tapped hole in the socket.

The movable contact **14** of the pair of contacts is carried by a U-shaped electrically conducting spring contact blade **24** which has a V-shaped projection **25** in one limb of the U. The contact blade **24** is secured to a conducting strip **26** which extends to a terminal **27** by which electrical connection is made to the contact blade **24**, the arrangement for securing the conducting strip **26** and the construction of the terminal **27** being the same as described for conducting strip **16**. Operation of the contact blade **24** to open and close the contacts is effected by a circular rod **28** of insulating material provided with two cam surfaces which comprise cut-out portions or depressions **29, 30** at diametrically opposite positions on the rod, the roots of the depressions being spaced apart a distance equal to the stroke of the armature **31** of the electromagnet.

The upper end of the circular rod **28** passes through the collar **15** whereas the lower end is provided with a circumferential groove **32** which fits in an open-end slot **33** in a stirrup **34**. A pair of adjacent rods is located in oppositely arranged slots in a single stirrup as shown in FIG. 2 where the rods **35** and **36** are shown mounted in the stirrup **37**. The upper surface of the T-shaped armature **31** is provided with a hook member **38** which engages with a spindle **39** which passes through holes in the two stirrups **34** and **37** and through two arms **40** and **41** which are pivotally mounted on spindle **42**. Springs **43** and **44** have their lower ends secured to a fixed portion of the apparatus, for instance the coil cheek of the electromagnet, and the upper ends act on the arms **40** and **41** thereby tending to rotate the arms in a clockwise direction as seen in FIG. 1.

As shown in FIGS. 1 and 2, the relay is in its de-energized condition and the springs **43** and **44** acting through the arms **40** and **41** maintain the rods in the uppermost position. As regards the rod **28**, the V-shaped portion **25** of the contact blade **24** rests in the root of the depression in the circular rod **28** so that contacts **13** and **14** engage. When the electromagnet is energized the armature **31** descends and carries with it the operating member **34** thereby causing downward movement of the two associated rods. The V-shaped portion **25** of the contact blade **24** associated with rod **28** therefore rides out of the depression and contacts **13** and **14** separate, so that a break combination is obtained. However, if the operating rod **24** is rotated through **180°** the V-shaped portion **25** of the contact blade **24** will then rest on the circumference of the rod in the de-energized condition of the relay and contacts **13** and **14** will be separated. This position is shown in dotted lines in FIG. **1**. In this case, when the electromagnet is energized and the rod **28** moves downwardly, the V-shaped portion **25** of the contact blade **24** descends into the depression and contacts **13** and **14** will be closed, giving a make combination. It will therefore be understood that a change from a make combination to a break combination is very easily effected by rotating the operating rod **24** through **180°** and, to facilitate this, the end of the rod at the upper surface of the contact operating mechanism is slotted at **45** for screwdriver operation.

It will thus be seen that the invention enables a variety of contact combinations to be obtained by making a simple adjustment to a standard relay without the necessity of providing a number of different items for adding to the relay to attain the different combinations.

It will be appreciated that the invention is not limited to the particular embodiments shown and is not limited to the use of the particular form of electromagnet shown. Further, the invention is not limited to the use of a circular rod for the operating member and a square section rod could equally well be used.

I claim

1. An electrical relay comprising an electromagnet, an armature for said electromagnet, at least one pair of contacts, an operating rod for each pair of contacts, first and second cam surfaces on said operating rod, said cam surfaces being located at angularly displaced positions on the rod and spaced apart along the rod by a distance equal to the stroke of the armature, a cam follower provided on the moving contact on a pair of contacts, means responsive to movement of said armature for linearly moving said rod and means for manually rotating said operating rod from one position relative to said moving contact to a second position relative to said moving contact, whereby with the operating rod adjusted to said one position the interaction of said first cam surface with said cam follower on movement of said operating rod provides a break combination and with the operating rod adjusted to said second position the interaction of said second cam surface with said cam follower on movement of said operating rod provides a make combination.

2. An electrical relay as claimed in claim 1 and comprising a casing for said relay, one end of each of said operating rods projecting beyond said casing to enable said operating rods to be rotated from the outside of the casing.

3. An electrical relay as claimed in claim 1 and comprising in addition cut-outs in said rod, the cam follower in one condition of the electromagnet engaging the rod in a cut-out and in the other condition of the electromagnet engaging the circumference of the rod.

4. An electrical relay as claimed in claim 1 and comprising in addition a plurality of operating rods and associated pairs of contacts, a plurality of stirrups, adjacent pairs of operating rods being rotatably secured in said stirrups, a spindle on which said stirrups are mounted, a hook member attached to said armature and engaging said spindle and spring biasing means for returning said armature to a predetermined position on de-energization of said electromagnet.

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