Nov. 13, 1951 L. W. DROEL 2,574,549

ELECTRICAL RELAY

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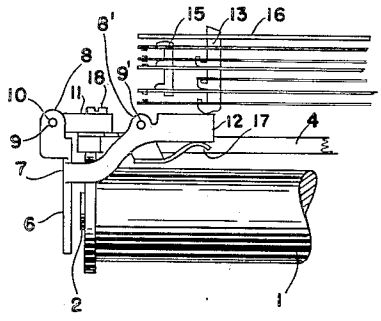


FIG. 2

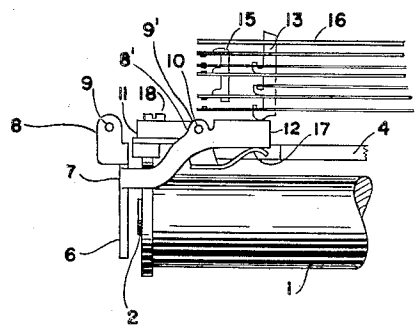


FIG. 3

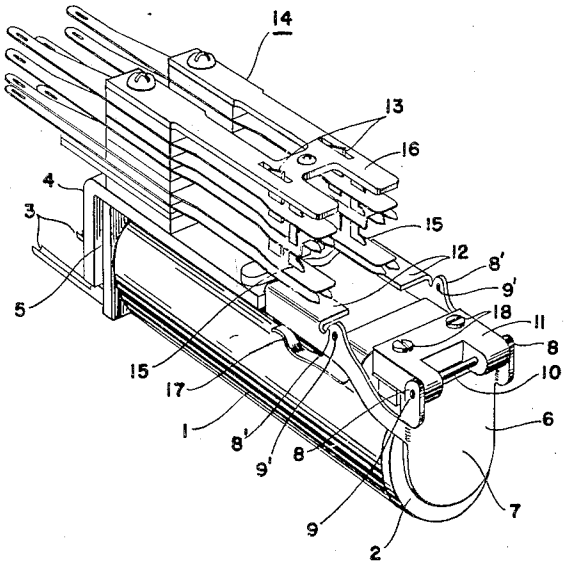


FIG. 1

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ELECTRICAL RELAY

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6 Claims. (Cl. 200—104)

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My invention relates to improvements in electrical relays, and particularly to electrical relays of the type known as telephone relays.

In relays of the telephone type, the armature is usually of a generally L-shaped configuration, and is pivoted (as, for example, by a knife-edge member) about an axis near the intersection of the two sides of the L. When current is passed through the electromagnet of such a relay, one arm of the L is attracted to the pole piece and the resulting movement of the other arm of the L is utilized to operate electrical contact springs which make or break electrical circuits. The generally L-shaped armature, in short, is a lever with an arm on each side of a fulcrum. It is well-known in the telephone art that the location of the fulcrum relative to the armature may be chosen by the relay designer to produce a relay in which the ratio of effective lever arm lengths is optimum for a given application. It is also well known that this ratio may lie between 2.5 to 1 and 3 to 1 for pulse repeating relays and general telephone relay functions, and may be 1 to 1 for relays having a long release delay characteristic. However, prior to my invention, telephone relays having a given ratio of lever arm lengths have not been interchangeable with relays having other ratios.

It is accordingly an object of my invention to provide a relay of the telephone type in which the ratio of lever arm lengths may be quickly and easily changed after assembly.

It is another object of my invention to provide a relay which may serve in various applications requiring different ratios of lever arm lengths.

It is another object of my invention to provide a relay which may serve in various circumstances without requiring the addition or elimination of parts.

Broadly speaking, I accomplish these objects by providing means for changing the position of the armature fulcrum point relative to the armature, thereby offering the user a choice of ratios of lever arm lengths. I most easily obtain the changeable fulcrum point feature of my invention by providing, in a relay, a pivot pin, an armature having more than one set of aligned holes, and a pivot pin mounting member having a hole and being adapted to be placed in a number of positions, the hole being aligned in each position with one of the sets of holes in the armature. The pivot pin may be inserted in any aligned group of holes, thereby selecting one of the available ratios of lever arm lengths.

Further objects and advantages of my invention will become apparent as the following description proceeds and the features of novelty which characterize my invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

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For a better understanding of my invention, reference may be had to the accompanying drawing in which Figure 1 is a three-quarter view of one embodiment of my invention applied to a telephone relay; Figure 2 shows how this embodiment may be arranged to produce a lever arm ratio of about 2.5 to 1; and Figure 3 shows how the same embodiment may be arranged to produce a lever arm ratio of about 1 to 1.

In the illustrated embodiment there is provided an electromagnet 1 having a pole face 2 and terminals 3 (see Figure 1). The electromagnet is fastened to a frame 4 at 5. Opposite pole face 2 is one lever arm 6 of armature 7. Armature portion 7 has suitably formed projections 8 having holes 9 therein. Passing through holes 9 is pivot pin 10, which is in turn supported by pivot pin mounting 11. The second lever arm 12 of armature 7 is bifurcated and its ends bear against contact spring lifters 13, and the latter operate against the springs of contact spring assembly 14. Overtravel is prevented by spring stop 15 and clamping plate 16. Pressure from the springs returns the armature to its unoperated position, and overtravel in this direction is prevented by backstop 17.

It will be noted that mounting member 11 is attached to frame 4 by screws 18. To change the ratio of armature-lever arm lengths from that shown in Fig. 2 to that shown in Fig. 3, pivot pin 10 is removed, screws 18 loosened, the position of mounting member 11 reversed, screws 18 tightened, and pivot pin 10 reinstalled by passing it through openings 9' in ears or projections 8' associated with or integral with the arms of bifurcated portion or arm 12 of the armature 7.

While I have shown and described a specific embodiment of my invention, other modifications will be readily apparent to those skilled in the art. I do not, therefore, desire my invention to be limited to the specific arrangement shown and described. For example, the supporting frame and armature may be of any suitable shape or configuration. Moreover, mounting member 11 may be integral with frame 4 and have a plurality of holes or pivot points disposed at suitable locations. I intend in the appended claims to cover all modifications within the spirit and scope of my invention.

What is claimed is:

1. In a relay including an electromagnet, a frame associated with said electromagnet, a con-

tact spring assembly carried by said frame, and a generally L-shaped armature for operating said spring assembly responsive to the energization of said electromagnet, the combination therewith of an armature mounting member having a passage extending therethrough normal to the axis of said electromagnet, and means for mounting said member on said frame in one of two positions along a line parallel to said axis whereby said passage is disposed in one of two spaced-apart positions, said armature being provided at two different locations with spaced-apart openings disposed for alignment with said passage in the respective positions of said member, and a pivot pin extending through said passage and the openings corresponding with the chosen position of said passage.

2. In a relay including an electromagnet, a frame for mounting said electromagnet, a contact spring assembly carried by said frame, and an armature for operating said spring assembly responsive to the energization of said electromagnet, the combination therewith of means for mounting said armature on said frame, said mounting means comprising a member positionable in one of a plurality of positions relative to said frame and said armature, and means for pivotally mounting said armature on said member at any one of said plurality of positions, whereby the ratio of lever arm lengths of said armature may be changed to suit the application in which said relay is to be used.

3. A relay including a frame, an electromagnet and a contact spring assembly both carried by said frame, armature means generally in the form of a lever having two arms for attraction by said electromagnet and actuation of said spring assembly respectively, said armature means being pivotally supported by said frame intermediate said two arms and said pivotal support being displaceable from one location to another along said armature means so that a desired one of a plurality of ratios of lever arm lengths may be made effective for said armature means.

4. A relay including a frame, an electromagnet and a contact spring assembly both carried by said frame, armature means generally in the form of a pivoted lever having two arms for attraction by said electromagnet and actuation of said spring assembly respectively, pivot means at a plurality of locations along said armature means intermediate said two arms, corresponding means for supporting said pivot means at a plurality of locations along said frame, and

means for operatively connecting said pivot means and said supporting means at one of said locations so that a desired one of a plurality of ratios of lever arm lengths may be made effective for said armature means.

5. A relay including a frame, an electromagnet mounted on said frame and having a pole piece, a contact spring assembly carried by said frame and extending generally parallel to said electromagnet, an armature generally in the form of an L-shaped lever having two arms, one disposed opposite said pole piece to be attracted thereby and the other disposed adjacent said spring assembly to actuate the same, said armature being pivotally supported by said frame intermediate said two arms and said pivotal support being displaceable from one location to another along said armature so that a desired one of a plurality of ratios of lever arm lengths may be made effective for said armature.

6. A relay including a frame, an electromagnet mounted on said frame and having a pole piece, a contact spring assembly carried by said frame and extending generally parallel to said electromagnet, an armature generally in the form of an L-shaped pivoted lever having two arms, one disposed opposite said pole piece to be attracted thereby and the other disposed adjacent said spring assembly to actuate the same, pivot means at a plurality of locations along said armature intermediate said two arms, corresponding means for supporting said pivot means at a plurality of locations along said frame and means for operatively connecting said pivot means and said supporting means at one of said locations so that a desired one of a plurality of ratios of lever arm lengths may be made effective for said armature.

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