

RAIL MOUNTED ELECTRICAL DEVICES

This invention relates to electrical devices of the kind which are arranged to be mounted, in use, in a side-by-side relationship on a carrier rail, for example, devices such as isolators, miniature circuit breakers, fuse units and residual current devices which may be mounted side-by-side on a metal carrier rail of the consumer unit of a domestic electrical supply system.

A known form of rail mounted electrical device includes an electrically insulating housing shaped at one side to engage a carrier rail. The housing has, at said one side, a dove-tail shaped transversely extending recess within which the rail is gripped in use. One side of the recess is defined by a latch member movable relative to the housing to permit snap-on engagement and disengagement of the housing and the rail, and the latch member is resiliently biased relative to the housing in a direction to reduce the width of the recess and thus to grip the rail in use.

Where one of the known devices is utilized alone then it is necessary to hold the latch member in a retracted position against the action of its resilient bias, while manipulating the device to disengage it from the rail. Such a mode of operation is inconvenient, but it will be realised that where a device comprises two or more units physically secured together, for handling as a unitary structure, as would be the case with two or more ganged isolators, then it is extremely difficult to hold two or more latches in their retracted position while manipulating the unitary structure relative to the rail.

In an attempt to overcome this problem it has previously been proposed to incorporate into each device a catch element movable manually, transversely relative to the latch member and cooperating with the housing to permit locking of the latch member in a retracted position. The provision of such a catch member simplifies operation by permitting latch members to be locked in their retracted positions but of course increases the complexity, and therefore cost of each unit. It is an object of the present invention to provide a rail mounted electrical device wherein the aforementioned problem is minimised in a simple and convenient manner.

In accordance with the present invention there is provided an electrical device for rail mounting comprising a housing having a rail receiving recess therein, one edge of said recess being defined by an end region of a latch member movable relative to the housing in a direction transverse to the recess, resilient means biasing the latch member to move relative to the housing in a direction to reduce the width of said recess, and, interengagable surfaces on an integral lateral protrusion on said latch member and said housing respectively which, when the latch member is retracted to a predetermined position against the action of said resilient means, cooperate to retain the latch member in said retracted position, said cooperation being such that the latch member can be released for movement under the action of said resilient means by a movement of the latch member relative to the housing in a direction transverse to the direction of movement of the latch member under the action of said resilient means.

Desirably said latch member is resiliently deformable to permit said movement to disengage said surfaces.

One example of the invention is illustrated in the accompanying drawings wherein;

Figure 1 is a side elevation view, partly in section, illustrating a switching device and the rail upon which the device is to be mounted,

Figure 2 is a plan view of the latch member of the device of Figure 1 to an enlarged scale,

Figure 3 is a sectional view on the line 3-3 in Figure 2,

Figure 4 is a view in the direction of arrow A in Figure 2,

Figure 5 is an enlarged sectional view of the portion of the housing which receives the latch member,

Figure 6 is a view similar to Figure 5 illustrating the latch member in an operative position, and

Figure 7 is a view similar to Figure 6 illustrating the latch member in a retracted position, it being noted that in Figures 6 and 7 the spring biasing the latch member to move relative to the housing is omitted for clarity.

Referring to the drawings, the rail 11 upon which electrical devices are to be mounted is an elongate, shallow metal channel the upstanding sides of which are bent outwardly to form coplanar outwardly extending flanges 12 although it is to be understood that any rail complying with European Standard EN 50 022 may be utilized. The electrical devices for mounting on the rail 11 each include a moulded synthetic resin housing 13 having a transverse groove or recess 14 in its rear face. The two opposite edges of the groove 14 are under-cut to receive the flanges

12 of the rail 11, one edge of the groove 14 being defined by an integral portion 15 of the housing overlying the base of the groove 14, and the opposite edge of the groove being defined by an end region 17 of a moulded synthetic resin latch member 16.

The latch member 16 extends within a passage 18 defined by the housing and is movable relative to the housing transverse to the groove 14 in a plane parallel to the plane of the base of the groove 14. A helically wound compression spring 19 housed within the passage 18 acts between the housing 13 and the latch member 16 to urge the latch member 16 to slide relative to the housing towards the housing portion 15, that is to say in a direction to reduce the width of the groove. It will be recognised that when the rail 11 is received in the groove 14, with one flange 12 beneath the portion 15 of the housing, and the other flange 12 beneath the end region 17 of the latch member 16 then the spring 19 driving the latch member 16 against the flange 12 of the rail 11 causes the rail to be gripped in the groove 14 thereby securely fixing the housing 13 to the rail 11.

The latch member 16 is generally in the form of an elongate rectangular strip having a centrally disposed longitudinally extending slot 21 therein. The helical compression spring 19 is received within the slot 21, the end of the slot 21 adjacent the end region 17 of the latch member having a locating formation 22 which is received within one end of the spring 19. The diameter of the spring 19 exceeds the thickness of the member 16 so that the convolutions of the spring 19 protrude on opposite sides of the latch member 16. The wall of the passage 18 is cut away on both sides at 24 (see Figure 5) to accommodate the protruding portions of the spring, and the end of the spring remote from

the end of the passage 18 the restoring action of the spring 19 will cause the protrusion 29 to engage the shoulder 31. In order to release the latch member for movement under the action of the spring 19 the latch member would be moved bodily laterally, or tilted laterally, relative to the passage 18 against the action of the spring 19 to disengage the protrusion 29 from the shoulder 31 whereafter the restoring action of the spring 19 will move the latch member 16 lengthwise of the passage, and laterally within the passage to cause the protrusion 29 to re-engage in the recess 32.

It will be recognised that the operation of the unit carrying the latch member is not of relevance to the operation of the latch member. Such a latch member may be applied to, for example, isolators, miniature circuit breakers, residual current devices, and fuse units all of which may be required to be mounted side-by-side on the carrier rail of a consumer unit in a domestic power supply system. It will be recognised that where a pair of units are physically interconnected, and are to be handled as a unitary structure, then the facility for automatic locking of the latch members in their retracted position is particularly convenient, since the latch members of each of the units can be moved to their retracted positions individually prior to manipulation of the unitary structure to remove it from a carrier rail 11.

The outwardly presented face of the end region 17 of the latch member of each unit will, as shown in the drawings, be chamfered such that snap engagement of each unit with a rail is possible. Thus it is not necessary manually to retract a latch member 16 to permit engagement of a unit on a rail. When engaging the unit with a rail the housing portion 15 will be hooked over the flange 12 at one edge of a rail and the

unit will then be pivotted about that flange 12 to engage the chamfered face of the end region 17 of the latch with the opposite flange 12 of the rail whereupon further pressure of the unit towards the rail will "cam" the latch member against the action of its spring 19 until such time as the end region 17 clears the free edge of the flange 12 whereupon the spring 19 will drive the end region 17 of the latch member 16 behind the flange 12 thus locking the unit onto the rail.

It will be recognised that the invention is not restricted to use in consumer units, and may find application wherever electrical units are to be rail mounted.

CLAIMS

1        An electrical device for rail mounting comprising a housing having a rail receiving recess therein, one edge of said recess being defined by an end region of a latch member movable relative to the housing in a direction transverse to the recess, resilient means biasing the latch member to move relative to the housing in a direction to reduce the width of said recess, and, interengagable surfaces on an integral lateral protrusion on said latch member and said housing respectively which, when the latch member is retracted to a predetermined position against the action of said resilient means, cooperate to retain the latch member in said retracted position, said cooperation being such that the latch member can be released for movement under the action of said resilient means by a movement of the latch member relative to the housing in a direction transverse to the direction of movement of the latch member under the action of said resilient means.

2        A device as claimed in claim 1 wherein said latch member is resiliently deformable to permit said movement to disengage said surfaces.

3.        An electrical device substantially as hereinbefore described with reference to the accompanying drawings.

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