

SPECIFICATION

Improvements relating to mounting of circuit breakers

5 This invention is concerned with improvements relating to the mounting of circuit breakers.

A convention circuit breaker (hereinafter referred to as a circuit breaker of the kind specified) is

10 provided on an underside thereof with a mounting recess bounded at one side edge portion by an inwardly-turned lip, providing a fixed re-entrant surface. An opposite side edge portion of the recess is bounded by a straight side edge, from which a

15 wedge-shaped retaining member is spring-urged to project a short distance into the recess. In such a circuit breaker, the retaining member is on the same side of an axial plane of the circuit breaker as the connector by which external wiring is connected

20 thereto: conversely, the fixed re-entrant surface is on the same side of plane as the bus-bar by which the circuit breaker is connected to a supply of electricity.

Conventionally, circuit breakers of the kind specified are mounted on a mounting rail conventionally termed a "DIN-RAIL", which comprises parallel, upwardly-facing flanges provided with narrow out-turned lips. The re-entrant surface is engaged beneath one of the lips with the underside of the circuit

30 breaker inclined relative to the rail, and the circuit breaker is moved angularly so as to cause the retaining member to engage the other lip, the profile of the retaining member causing it to be momentarily depressed as it passes behind said other lip. The circuit breaker is then clamped to a conventional bus bar, supported in relation to the rail.

When it is required to remove one circuit breaker from an array of circuit breakers from the rail, the retaining member is manually retracted, and the

40 circuit breaker is tilted to permit lateral movement of the circuit breaker relative to the rail to disengage the fixed reaction surface from the rail. This necessitates the temporary removal of the bus bar, and this is inconvenient since it involves disruption of the connection of all the other circuit breakers and of the isolator with the bus bar. This is inconvenient and it is one of the various objects of this invention to provide a rail for the mounting of such conventional circuit breaker, by the use of which this disadvantage

50 may be avoided.

When it is necessary to remove one circuit breaker from an array of circuit breakers on the rail, it is merely necessary to loosen the connection between said on circuit breaker and the bus bar, and withdraw

55 the circuit breaker laterally away from the bus bar without requiring movement of the circuit breaker as would necessitate disruption of the connection of the other circuit breakers with the bus bar.

Preferably however, the rail comprises a second

60 flange extending parallel to said single flange, said second flange extending only for a short distance lengthwise of the rail for a distance sufficient only to accommodate a conventional isolator, which in turn provides increased stability for the bus-bar, and for

65 the array of circuit breakers.

According to this invention there is provided a mounting assembly upon which an array of circuit breakers of the kind specified may be mounted, said assembly comprising:

- 70 (a) a mounting rail comprising a flat, elongate base, and a mounting flange extending from the base the full operative length of the mounting rail along one side thereof, said mounting flange comprising an out-turned lip extending parallel to the longitudinal axis of the base; and
- 75 (b) a bus bar extending parallel to the longitudinal axis of the base;
- the construction and arrangement being such that a circuit breaker of the kind specified may be secured
- 80 to the mounting assembly against displacement therefrom by engagement of a terminal of the circuit breaker with the bus bar and with the retaining member in engagement with the underside of the lip of the flange, and may be released from the mounting
- 85 assembly by release of said terminal from the bus bar, and by effecting linear movement of the circuit breaker away from the bus bar in a direction parallel to the plane of the base and at right angles to the longitudinal axis of the base.

90 In this manner, when it is necessary to remove one circuit breaker from an array of circuit breakers mounted on the assembly, it is merely necessary to loosen the connection between said one circuit breaker and the bus bar, and withdraw the circuit breaker laterally away from the bus bar without requiring movement of the circuit breaker as would necessitate disruption of the connection of the other circuit breakers with the bus bar.

Preferably however, the rail comprises a second

100 mounting flange extending parallel to the first said mounting flange, said second flange extending only for a short distance lengthwise of the rail, sufficient only to accommodate a conventional isolator, said second flange comprising an outwardly-turned lip.

105 According to this invention there is also provided a mounting assembly upon which an array of circuit breakers of the kind specified may be mounted, said assembly comprising:

- (a) a mounting rail comprising a flat, elongate
- 110 base, a first mounting flange extending from the base the full operative length of the rails, and a second mounting flange extending from the base parallel to the first mounting flange a short distance only lengthwise of the rail, both flanges comprising mutually outwardly-turned lips;

- (b) a bus bar extending parallel to the longitudinal axis of the base.

There will now be given a detailed description, to be read with reference to the accompanying drawings, of a mounting assembly which is a preferred embodiment of this invention and which has been selected to illustrate this invention by way of example.

In the accompanying drawings:

125 *Figure 1* is a side elevation of a circuit breaker of the kind specified;

Figure 2 is a plan view of a mounting rail of the mounting assembly which is the preferred embodiment of this invention;

130 *Figure 3* is a sectional view of the mounting rail,

taken on the line III-III of Figure 2; and

Figure 4 is a plan view of the mounting assembly, showing the position occupied hereon by a conventional isolator, circuit breakers and bus-bar.

- 5 Figure 1 illustrates a conventional circuit breaker in particular a circuit breaker of the kind specified, and which is provided on an underside thereof with a mounting recess 6.

One side edge of the recess is bounded by an inwardly-protruding lip 8, which provides a fixed re-entrant surface 10, and an opposite side edge 11 of the recess is straight-edged.

The circuit breaker is provided with a retaining member comprising a wedge-shaped nose 12, said retaining member being spring urged so that said nose 12 normally extends into the mounting recess 6, as is shown in Figure 1. The retaining member is however provided with a tail 14 by which the retaining member may be withdrawn, against the action of its spring, to withdraw the nose 12 from the recess.

The circuit breaker also comprises connector means 18 on the same side of the circuit breaker as the lip 8, by which the circuit breaker may be connected to a bus-bar, and connector means 16, on the same side of the circuit breaker as the retaining member, by which an outlet wire may be connected to the circuit breaker.

Such a circuit breaker is conventionally mounted on a "DIN-RAIL" comprising two parallel flanges provided with out-turned lips: the re-entrant surface 10 of the lip 8 is engaged beneath one of the lips, and the circuit breaker is pressed against the other lip, the nose 12 of the retaining member being depressed, allowing the nose to pass around, and beneath the other lip. The connector means 18 is then secured to a bus-bar.

To dismount the circuit breaker from the "DIN-RAIL" the tail 14 is retracted (in the direction A, Figure 1) allowing the circuit breaker to be rotated in the angular direction B (Figure 1) prior to lateral movement of the circuit breaker as a whole in the direction C towards the bus-bar to remove the lip 8 from the DIN-RAIL: this requires the previous removal of the bus-bar from the connector means 18, and a consequent disruption of all the circuit breakers connected to said bus-bar.

The mounting assembly which is the preferred embodiment of this invention comprises an elongate mounting rail 20 secured to and extending between support brackets 22, 22. The mounting rail 20 comprises a flat base and a first mounting flange 24 extending the full operative length of the mounting rail, and a second mounting flange 26 extending only a short distance lengthwise of the rail. The two flanges 24 and 26 lie in parallel planes, and each is provided with an outwardly-turned lip portion 25, 27 respectively, said lip portions extending generally parallel to the base 21.

In the use of the mounting rail, the support brackets 22, 22 are bolted in position, at a position adjacent to a support post 30.

In the use of the mounting assembly, a conventional isolator 36, having a mounting recess and spring-urged retaining member similar to those

provided on the circuit breaker, is secured to and extends between the rails 24 and 26 in a conventional manner. A conventional bus-bar 32 is connected to the isolator and to the post 30, so as to extend alongside the rail on the side thereof opposite to that side from which the rail 24 extends.

Thus, conventional circuit breakers of the kind illustrated in Figure 1 may be mounted on the mounting rail 20 by firstly, engaging the retaining member beneath the lip 24, and resting the opposite underside of the circuit breaker against the flat base of the rail 20. The connector means 18 may be secured to the bus-bar, providing for a two-point connection of the circuit breaker to the mounting assembly. In addition, side contact between adjacent circuit breakers, extending in a direction away from the isolator, will improve the stability of mounting of the circuit breakers.

When it is desired to remove one of the circuit breakers from the mounting assembly, it is merely necessary to loosen the connector 18, and to withdraw the circuit breaker in the direction A, Figures 1 and 4, from the mounting rail without disturbance to adjacent circuit breakers or the bus bar. Similarly, a replacement circuit breaker may be mounted on the mounting rail, between existing circuit breakers, without disturbance to such adjacent circuit breakers.

If desired, the mounting rail may be provided by modifying a conventional DIN-RAIL, by removing a portion of one of the flanges thereof, retaining a single flange which extends the full operative length of the rail, and a second flange which extends a short distance length-wise of the rail.

Alternatively, as in the preferred embodiment, the mounting rail may be pressed from metal sheet, the flange 26 and lip thereof being formed as a chevron.

105 CLAIMS

1. A mounting assembly upon which an array of circuit breakers of the kind specified may be mounted, said assembly comprising:

- 110 (a) a mounting rail comprising a flat, elongate base, and a mounting flange extending from the base the full operative length of the mounting rail along one side thereof, said mounting flange comprising an out-turned lip extending parallel to the longitudinal axis of the base; and

115 (a) a bus bar extending parallel to the longitudinal axis of the base;

the construction and arrangement being such that a circuit breaker of the kind specified may be secured to the mounting assembly against displacement therefrom by engagement of a terminal of the circuit breaker with the bus bar and with the retaining member in engagement with the underside of the lip of the flange, and may be released from the mounting assembly by the release of said terminal from the bus bar, and by effecting linear movement of the circuit breaker away from the bus bar in a direction parallel to the plane of the base and at right angles to the longitudinal axis of the base.

130 2. A mounting assembly according to Claim 1



taken on the line III-III of Figure 2; and

Figure 4 is a plan view of the mounting assembly, showing the position occupied hereon by a conventional isolator, circuit breakers and bus-bar.

- 5 Figure 1 illustrates a conventional circuit breaker in particular a circuit breaker of the kind specified, and which is provided on an underside thereof with a mounting recess 6.

- One side edge of the recess is bounded by an inwardly-protruding lip 8, which provides a fixed re-entrant surface 10, and an opposite side edge 11 of the recess is straight-edged.

- The circuit breaker is provided with a retaining member comprising a wedge-shaped nose 12, said retaining member being spring urged so that said nose 12 normally extends into the mounting recess 6, as is shown in Figure 1. The retaining member is however provided with a tail 14 by which the retaining member may be withdrawn, against the action of its spring, to withdraw the nose 12 from the recess.

- The circuit breaker also comprises connector means 18 on the same side of the circuit breaker as the lip 8, by which the circuit breaker may be connected to a bus-bar, and connector means 16, on the same side of the circuit breaker as the retaining member, by which an outlet wire may be connected to the circuit breaker.

- Such a circuit breaker is conventionally mounted on a "DIN-RAIL" comprising two parallel flanges provided with out-turned lips: the re-entrant surface 10 of the lip 8 is engaged beneath one of the lips, and the circuit breaker is pressed against the other lip, the nose 12 of the retaining member being depressed, allowing the nose to pass around, and beneath the other lip. The connector means 18 is then secured to a bus-bar.

- To dismount the circuit breaker from the "DIN-RAIL" the tail 14 is retracted (in the direction A, Figure 1) allowing the circuit breaker to be rotated in the angular direction B (Figure 1) prior to lateral movement of the circuit breaker as a whole in the direction C towards the bus-bar to remove the lip 8 from the DIN-RAIL: this requires the previous removal of the bus-bar from the connector means 18, and a consequent disruption of all the circuit breakers connected to said bus-bar.

- The mounting assembly which is the preferred embodiment of this invention comprises an elongate mounting rail 20 secured to and extending between support brackets 22, 22. The mounting rail 20 comprises a flat base and a first mounting flange 24, extending the full operative length of the mounting rail, and a second mounting flange 26 extending only a short distance lengthwise of the rail. The two flanges 24 and 26 lie in parallel planes, and each is provided with an outwardly-turned lip portion 25, 27 respectively, said lip portions extending generally parallel to the base 21.

- In the use of the mounting rail, the support brackets 22, 22 are bolted in position, at a position adjacent to a support post 30.

- In the use of the mounting assembly, a conventional isolator 36, having a mounting recess and spring-urged retaining member similar to those

provided on the circuit breaker, is secured to and extends between the rails 24 and 26 in a conventional manner. A conventional bus-bar 32 is connected to the isolator and to the post 30, so as to extend alongside the rail on the side thereof opposite to that side from which the rail 24 extends.

- Thus, conventional circuit breakers of the kind illustrated in Figure 1 may be mounted on the mounting rail 20 by firstly, engaging the retaining member beneath the lip 24, and resting the opposite underside of the circuit breaker against the flat base of the rail 20. The connector means 18 may be secured to the bus-bar, providing for a two-point connection of the circuit breaker to the mounting assembly. In addition, side contact between adjacent circuit breakers, extending in a direction away from the isolator, will improve the stability of mounting of the circuit breakers.

- When it is desired to remove one of the circuit breakers from the mounting assembly, it is merely necessary to loosen the connector 18, and to withdraw the circuit breaker in the direction A, Figures 1 and 4, from the mounting rail without disturbance to adjacent circuit breakers or the bus bar. Similarly, a replacement circuit breaker may be mounted on the mounting rail, between existing circuit breakers, without disturbance to such adjacent circuit breakers.

- If desired, the mounting rail may be provided by modifying a conventional DIN-RAIL, by removing a portion of one of the flanges thereof, retaining a single flange which extends the full operative length of the rail, and a second flange which extends a short distance length-wise of the rail.

- Alternatively, as in the preferred embodiment, the mounting rail may be pressed from metal sheet, the flange 26 and lip thereof being formed as a chevron.

105 CLAIMS

1. A mounting assembly upon which an array of circuit breakers of the kind specified may be mounted, said assembly comprising:

- 110 (a) a mounting rail comprising a flat, elongate base, and a mounting flange extending from the base the full operative length of the mounting rail along one side thereof, said mounting flange comprising an out-turned lip extending parallel to the longitudinal axis of the base; and

- 115 (a) a bus bar extending parallel to the longitudinal axis of the base;

- the construction and arrangement being such that a circuit breaker of the kind specified may be secured to the mounting assembly against displacement therefrom by engagement of a terminal of the circuit breaker with the bus bar and with the retaining member in engagement with the underside of the lip of the flange, and may be released from the mounting assembly by the release of said terminal from the bus bar, and by effecting linear movement of the circuit breaker away from the bus bar in a direction parallel to the plane of the base and at right angles to the longitudinal axis of the base.

- 130 2. A mounting assembly according to Claim 1



(16)

- wherein the rail comprises a second mounting flange extending parallel to the first said mounting flange, said second flange extending only for a short distance lengthwise of the rail, said second flange
- 5 comprising an outwardly-turned lip.
3. A mounting rail assembly according to Claim 2 wherein said second flange extends lengthwise of the mounting rail a distance sufficient only to accommodate an isolator.
- 10 4. A mounting assembly upon which an array of circuit breakers of the kind specified may be mounted, said assembly comprising:
- (a) a mounting rail comprising a flat, elongate base, a first mounting flange extending from the
- 15 base the full operative length of the rails, and a second mounting flange extending from the base parallel to the first mounting flange a short distance only lengthwise of the rail, both flanges comprising mutually outwardly-turned lips;
- 20 (b) a bus bar extending parallel to the longitudinal axis of the base.
5. A mounting assembly according to Claim 4 wherein the bus bar extends parallel to the longitudinal axis of the mounting rail on the side thereof
- 25 opposite to that side along which the single flange extends.
6. A mounting assembly for an array of circuit breakers of the kind specified, constructed and arranged substantially as hereinbefore described
- 30 with reference to the accompanying drawings.