

PATENT SPECIFICATION

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(54) IMPROVEMENTS IN OR RELATING TO AN ELECTRICAL DISTRIBUTION ASSEMBLY

(71) We, BONAR, LONG & COMPANY LIMITED, a British Company of East Kingsway Works, Dundee DD4 7RP, Scotland, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

This invention relates to an electrical distribution assembly.

Busbar assemblies for electrical distribution systems frequently include a plurality of switches and fuses and in such assemblies there is very often the possibility of short circuit conditions of a very high order possibly giving rise to very high currents, limited only by the "cut-off" values of the fuse cartridges.

Busbar assemblies have previously been proposed wherein the assemblies are of a very open type and afforded very little protection to an operator during operation and maintenance. The support and protection of horizontal busbar structures and vertically mounted fuse ways in such previously proposed arrangements was such that phase to phase and phase to neutral and earth short circuits could occur unintentionally during operation and maintenance, thereby resulting in partial or complete destruction of the apparatus.

An object of the present invention is to provide an electrical distribution assembly having improved protection for an operator during operation and maintenance of the assembly.

According to the present invention, there is provided an electrical distribution assembly comprising an insulating backboard across which is mounted a plurality of spaced phase busbars; an insulating and shielding base adapted to be located over the busbars and to secure components of a distribution way; a plurality of pairs of contacts for each distribution way and one

of the contacts of each pair being electrically connected to an associated one of the busbars and interphase barrier means associated with each pair of contacts.

An embodiment of the invention will now be described, by way of example, with reference to the accompanying drawings in which:—

Fig. 1 is an exploded perspective view of a busbar assembly in accordance with the invention;

Fig. 2 is a fragmentary vertical section of the assembly of Fig. 1; and

Fig. 3 is a sectional view on the line 3-3 of Fig. 2.

Referring to the drawings, a busbar assembly for use in an electrical distribution system which in its simplest form is referred to herein as the "FI form", comprises a backboard 1 consisting of one or more insulating sheets. Phase busbars 2, spaced vertically from each other, extend horizontally and are fixedly secured to the insulating backboard. The busbars 2 have a thickness which is small in relation to their width and length so that when the busbars 2 are secured to the backboard 1, the busbars have high strength in the vertical plane against the high magnetic forces occasioned by short circuit currents. In addition, the small thickness and relatively large width of each busbar 2 provides a greatly increased surface area as compared with previously proposed arrangements so that heat generated in the busbar system is rapidly dissipated into the backboard 1.

A plurality of distribution ways (one only being shown in Fig. 1) are removably secured against the busbars 2 so that they lie in a vertical disposition adjacent to one another. The base for each distribution way is a moulding 3 of high strength insulating material. The mouldings 3 which extend transversely across the busbars 2 help to increase the mechanical strength of

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the latter against short circuits and assist in heat dissipation and, by covering, and so shielding, the phase busbars, reduce the possibility of the occurrence of short circuits.

5 The moulding 3 of each distribution way accommodates a plurality of pairs of fuse circuit contacts 4, 5 one pair for each busbar. One contact 4 of each pair is a live
10 contact and is L-shaped, the longer leg of the L projecting through an aperture formed in the moulding 3 whilst the shorter leg is secured to its associated busbar 2. The other contact 5 of each pair is secured
15 to the moulding 3 and the outer ends of each pair of contacts 4, 5 are slotted to receive a bridging fuse cartridge in a known manner.

As an addition to the assembly, in the
20 simple FI form, a "live jointing kit" comprises two channel shaped shrouds of insulating material 9 (Fig. 3) and closed end insulating sleeves 10 (Fig. 2), having a tongue which extends from their open end
25 to cover the busbar contact leg of contact 4.

This kit is used in the following manner. The interphase barriers 12 which are friction hinged on the contacts 5 are moved
30 from position 12 to position 11. The channel shaped insulating material shrouds 9, which each have apertures to pass over fuse handles, cartridges and the like, are placed in position on the units adjacent to
35 the one to be "live jointed" and the interphase barriers returned to position 12 to secure the shrouds 9 in position. The closed end sleeves 10 are now placed on the contacts 4 of the unit to be jointed so that
40 live parts are shielded and cabling can take place with safety.

As a further addition to the simple FI form a conversion of a fixed nature, which is referred to herein as the "FIS form",
45 comprises the following components for each distribution way; a channel shaped shroud 6, fixed pillars 7 at top and bottom of the moulding 3 to which the shroud 6 is secured and open end sleeves 8 on the busbar contacts 4 to enclose the major extents
50 of live components, whilst enabling a tongue test ammeter to be used around the fuse cartridge barrels.

As a still further addition, a "live jointing kit" comprising three closed end sleeves 10, as described above, can be supplied for use with the FIS form apparatus. During "live jointing" on FIS form
55 apparatus, the fixed shroud 6 is removed from the distribution way to be jointed.

Open-ended sleeves 8 on the live contacts 4 of the distribution way being jointed are removed and replaced by closed end insulating sleeves 10. In this
65 way all adjacent live components are

shielded from the jointer and cabling to the cable sockets 14 on the "dead" contacts 5 can then take place in safety.

Each contact 5 carries a non-ferrous
70 spacing collar 13 to maintain an outgoing cable clear of the contacts and cable fixings.

In addition, the aforementioned embodiment refers specifically to pairs of contacts carrying fuse cartridges. The invention is equally applicable to arrangements where electrical components other than fuse cartridges are carried by the contacts.

WHAT WE CLAIM IS:—

80 1. An electrical distribution assembly comprising an insulating backboard across which is mounted a plurality of spaced phase busbars; an insulating and shielding base adapted to be located over the busbars and to secure components of a distribution way; a plurality of pairs of contacts for each distribution way and one of the contacts of each pair being electrically connected to an associated one of the busbars and interphase barrier means associated with each pair of contacts.

2. An assembly as claimed in claim 1, in which additional shielding means comprises:—

(a) an insulating channel-shaped shroud having apertures therein to permit passage of the interphase barriers therethrough, said barriers being pivotable to engage and retain the shroud in protective position;
100 and

(b) a closed end insulating sleeve for mounting on, to surround, each contact which is live in use.

3. An assembly as claimed in claim 1
105 or claim 2 in which an insulating channel-shaped shroud is fixedly secured to the base of the distribution way to enclose at least the inner portions of the contacts; and a removable open ended insulating sleeve is provided on a major inner portion of each contact which is not required for contact purposes.

4. An assembly as claimed in any one of the preceding claims in which the busbars are flat and lie in the same plane, the thickness of each busbar transverse to the plane being small compared with the width of the busbar in the plane so that the busbars have greater resistance to bending in the plane than transversely to the plane.

5. An electrical distribution assembly substantially as hereinbefore described with reference to the accompanying drawings.

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(b) a closed end insulating sleeve for mounting on, to surround, each contact which is live in use.

3. An assembly as claimed in claim 1 or claim 2 in which an insulating channel-shaped shroud is fixedly secured to the base of the distribution way to enclose at least the inner portions of the contacts; and a removable open ended insulating sleeve is provided on a major inner portion of each contact which is not required for contact purposes.

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