

Description

Cable support device for switchgear assemblies

The present invention relates to a cable support device for switchgear assemblies. The present invention particularly relates to a cable support device for fixing a plurality of supply cables in a switchgear assembly according to the preamble of claim 1.

Switchgear assemblies, and particularly switchgear assemblies which comprise circuit breaker panels, have a plurality of supply cables which have to be fixed in the switchgear assembly in a suitable manner. The strain relief provided by this ensures that these cables are securely fastened to the actual electrical clamping contacts of the circuit breakers.

In order to fix the individual supply cables for the purpose of strain relief, cable clamps are usually fastened on a base plate of a cable support device in such a way that a supply cable which is passed between the cable clamp and the base plate is clamped. A corresponding number of cable clamps then have to be fastened on the base plate of the cable support device as a function of the number of supply cables. Cable clamps such as these take up a great deal of space on account of their shape, particularly on account of their fastening lugs, and this may lead to problems of space in the switchgear assembly, specifically when there is a large number supply cables. In addition, a large number of different cable clamps and fastening means from different manufacturers are known nowadays, and these also vary as a function of the diameter of the supply cables to be clamped. An engineer therefore has to keep ready a correspondingly large number

of different tools, cable clamps and fastening means when installing the switchgear assembly for fixing the cables, and this makes installation extremely complicated.

The object of the present invention is therefore to provide a cable support device which saves space even with a large number of supply cables and also allows simple installation.

This object is achieved by the cable support device having the features of claim 1.

The cable support device according to the invention clamps the supply cables in a space-saving manner in that the cable support device has a first clamping plate having a clamping area which is largely identical to a base plate, and in that this first clamping plate can be connected to the base plate by at least two bolts in such a way that the supply cables which are passed between the clamping areas of the base plate and the clamping plate are arranged next to one another in layers and fixed. Since the clamping plate is always connected to the base plate by means of the bolts in such a way that the cables are sufficiently fixed, the same cable support device can also be used to fix supply cables with extremely different diameters. Therefore, the same cable support device can be used, for example, in different types of switchgear assemblies, with supply cables with a first diameter being used in a first switchgear assembly, and supply cables with a second diameter being used in another switchgear assembly. Therefore, the same tools and fastening means are always needed for installation, and this makes installation easier.

The cable support device preferably has two guides to which the base plate can be fastened by suitable means, and by which the first clamping plate is routed in such a way that it can move parallel to the base plate. The guides are preferably in the form of parts of the housing of the switchgear assembly, and particularly in the form of rails. The cable support device can thus be prefabricated together with the housing, that is to say the base plate can be fastened to the guides and the clamping plate can be loosely connected to the base plate by means of the bolts. In order to fix the supply lines, they then have to be inserted only between the base plate and the clamping plate which is routed over the guides, and the two plates then have to be firmly connected to one another only by the bolts in such a way that the supply lines are clamped. Outlay on installation of the switchgear assembly is thus significantly reduced since, in this case, no additional installation materials, such as cable clamps or fastening means, have to be kept in order to fix the supply lines.

It is advantageous to provide cable support devices with a plurality of clamping plates when there are a large number of supply lines or when the supply lines have different cable diameters in one type of switchgear assembly. To this end, at least one further clamping plate is provided which has a clamping area which is largely identical to the first clamping plate, and which can be connected to the base plate by the at least two bolts in such a way that the supply cables which are passed between the clamping areas of the first clamping plate and the further clamping plate are arranged next to one another and fixed. The cable support device can then be used to fix supply lines with a first diameter in a first layer between the base plate and the first clamping plate, and to fix

supply lines with a second diameter in a second layer between the first clamping plate and the second clamping plate. In addition, the layers are fitted one directly on top of the other, and this in turn saves space, specifically when there is a large number of supply lines.

If nuts for fastening the bolts, which are preferably in the form of threaded bolts, are provided on the base plate and the clamping plates, a plurality of supply cables may respectively be combined and fixed in layers by the corresponding pair of plates and the bolts. The layers are then subsequently connected to one another by means of further bolts. This allows individual supply cables to be combined and braced to form layers, before they are inserted into the switchgear assembly and fixed there by means of the cable support device.

If the base plate and the further clamping plates have a number of identical perforations for the bolts to pass through, the bolts can be provided at each point on the base plate and the clamping plates in a flexible manner, and these plates can thus be correspondingly connected. It is therefore possible to match the fastening means to the number or to the thickness of the cables, which are to be fixed in one layer between two plates, in a flexible manner.

Further advantageous embodiments and preferred developments of the invention can be found in the subclaims.

The invention and advantageous embodiments of the latter are described in greater detail in the following text with reference to the following figures, in which:

fig.1 shows a switchgear assembly with a first embodiment of the cable support device, and

fig. 2 shows a switchgear assembly with a second embodiment of the cable support device.

Figure 1 shows part of the housing of a switchgear assembly S. Here, the base of the housing of the switchgear assembly S has an opening through which the supply cables L1-L7 of the switchgear assembly S are fed. In the housing itself, these cables L1-L7 are then connected (not shown here) to the corresponding contacts, for example the electrical contacts of the individual circuit breakers of a circuit breaker panel. For the purpose of strain relief, the switchgear assembly S in the exemplary embodiment shown has at the opening a cable support device by means of which the supply cables L1-L7 can be fixed, that is to say can be fastened firmly in the switchgear assembly S.

According to the present invention, the cable support device comprises a base plate G which has a cable clamping area FG. The cable support device also has a first clamping plate M1 which has a clamping area FM1 which is largely identical to the base plate G. The largely identical cable clamping areas FG and FM1 are ultimately determined by the available space in which the supply cables can be passed through the cable support device. These areas FG and FM1 are illustrated in dashed lines in figure 1. Furthermore, at least two bolts B1 and B2 are provided and are preferably in the form of threaded bolts. The first clamping plate M1 can then be connected to the base plate G by these bolts B1 and B2 in such a way that the

supply cables L1, L2, L3 and L4 which are passed between the clamping areas FG and FM1 of the base plate and the clamping plate are arranged next to one another and fixed in this position. Since these supply cables have virtually the same diameter, the supply cables are securely fixed and strain is therefore correspondingly relieved in the switchgear assembly. The plates G and M1 are then connected, for example, by corresponding threads for the threaded bolts being provided on the plates G and M1, and the plates being screwed by means of the threaded bolts, which are passed into the threads, in such a way that the supply cables L1-L4 are clamped between the plates. However, these threads on the plates G and M1 may also be nuts which are fastened to these plates. Furthermore, the plate G or M1 can be connected to the bolts B1 or B2 by the bolts being passed through corresponding perforations in the plates G and M1 and by means of a nut and lock nut being correspondingly firmly connected to that of the plates G or M1. The specific embodiment shown in figure 1 has elongate holes as perforations in the plates G, M1 and M2. These serve mainly to match the position of the bolts to the supply lines to be clamped.

In the embodiment shown in figure 1, a further clamping plate M2 with a clamping area FM2 is provided. It is then therefore possible to fix, that is to say clamp, the supply cables L5-L7 in a second layer between the first clamping plate M1 and the further clamping plate M2. A large number of supply cables can thus also be fixed in the switchgear assembly S by the cable support device in a plurality of layers in a space-saving manner. The various layers can also be used to securely fix cables with a different diameter in different layers. For example, the supply

cables L1-L4 may therefore have a first diameter, and the supply cables L5-L7 may have another diameter.

A further development with further clamping plates for further supply cables is indicated in dashed lines in figure 1. In the example of figure 1, the clamping plates G, M1, M2 etc. are connected to one another by means of the two common bolts B1 and B2. Further bolts may be provided, as indicated in figure 1, in order to additionally connect the plates between the supply lines, which are arranged next to one another, when the clamping areas FG, FM1, FM2 are wide, in order to increase the stability of the fixing means.

Figure 2 shows another exemplary embodiment of the cable support device according to the invention. In this case, a base plate G, a first clamping plate M1 and a further clamping plate M2 are provided. The supply cables L1-L4 are passed between the base plate G and the first clamping plate M1, and the supply cables L5 and L6 are passed between the clamping plate M1 and the clamping plate M2. In contrast to the exemplary embodiment shown in figure 1, four bolts B1-B4 are provided here, along with two nuts MB1 and MB2 on the base plate G and two nuts MB3 and MB4 on the first clamping plate M1. The first clamping plate M1 is connected to the base plate G by means of the bolts B1 and B2 and the nuts MB1 and MB2 in such a way that the supply lines L1-L4 can be correspondingly fixed. The second clamping plate M2 is connected to the first clamping plate M1 by means of the bolts B3 and B4 and the nuts MB3 and MB4 in such a way that the supply lines L5 and L6 are correspondingly fixed. This embodiment then makes it possible, for example firstly, for a first layer of cables, specifically L1-L4 which have a common first diameter, to be fixed in the cable support device, and then for the

next layer with the supply cables L5 and L6 to be fixed. The cables can therefore be fixed in a simplified manner during installation since not all of the cables have to be passed through the cable support device and braced all at once.

As also mentioned in connection with the first exemplary embodiment, a third and also further clamping plates may also be provided in the second exemplary embodiment, these further clamping plates being connected to the adjacent clamping plate by means of correspondingly further bolts.

In addition, the cable support device according to the invention may also comprise a plurality of base plates and clamping plates fastened to them, as indicated in figure 2. In particular, the features of the two described exemplary embodiments which are shown in figures 1 and 2 can also readily be combined with one another. For example, a third clamping plate may therefore be fastened on a second clamping plate by two bolts. This second clamping plate is then fastened on the base plate together with the first clamping plate by means of two further bolts. In addition to the described threaded bolt form, the bolts may also take other suitable forms, for example the form of a clamping bolt. A large number of further exemplary embodiments are therefore feasible provided that the basic principle of the present invention, specifically that of clamping a number of supply cables in layers between plates in a space-saving and simple manner, is satisfied.

Patent claims

1. A cable support device for fixing a plurality of supply cables (L1, L2, L3, L4) in a switchgear assembly (S), having a base plate (G) which has a cable clamping area (FG), characterized in that a first clamping plate (M1) is provided which has a clamping area (FM1) which is largely identical to the base plate (G), and which can be connected to the base plate (G) by at least two bolts (B1, B2) in such a way that the supply cables (L1, L2, L3, L4) which are passed between the clamping areas (FG, FM1) of the base plate and the clamping plate are arranged next to one another and fixed.

2. The cable support device as claimed in claim 1, characterized in that two guides (A1, A2) are provided and arranged in such a way that the base plate (G) can be fastened to said guides by suitable means (GB1, GB2), and in that the first clamping plate (M1) can therefore be routed and moved parallel to the base plate (G).

3. The cable support device as claimed in claim 2, characterized in that the guides (A1, A2) are parts of a housing of the switchgear assembly (S) and are in the form of rails.

4. The cable support device as claimed in one of claims 1 to 3, characterized in that the two bolts (B1, B2) and two further bolts (B3, B4) are threaded bolts.

5. The cable support device as claimed in one of the preceding claims 1 to 4,

characterized in that at least one further clamping plate (M2) is provided which has a clamping area (FM2) which is largely identical to the first clamping plate (M1), and which can be connected to the base plate (G) by the at least two bolts (B1, B2) in such a way that the supply cables (L5, L6, L7) which are passed between the clamping areas (FM1, FM2) of the first clamping plate (M1) and the further clamping plate (M2) are arranged next to one another and fixed.

6. The cable support device as claimed in claim 4, characterized in that the base plate has two nuts (MB1, MB2) for fastening the two bolts (B1, B2), and the first clamping plate (M1) has two nuts (MB3, MB4) for fastening the two further bolts (B3, B4), and in that a further clamping plate (M2) is provided which has a clamping area (FM2) which is largely identical to the first clamping plate (M1), it being possible to connect the further clamping plate (M2) to the first clamping plate (M1) by the two further bolts (B3, B4) in such a way that the supply cables (L5, L6, L7) which are passed between the clamping areas (FM1, FM2) of the first clamping plate (M1) and the further clamping plate (M2) are arranged next to one another and fixed.

7. The cable support device as claimed in one of claims 1 to 6, characterized in that the base plate (G) and the further clamping plates (M1, M2) have a number of identical perforations for bolts (B1, B2, B3, B4) to pass through.

8. The use of the cable support device in switchgear assemblies (S), where the switchgear assembly (S) comprises a circuit breaker panel.