Description

FASTENING ARRANGEMENT

[0001] This invention relates to a fastening arrangement, for example for fastening a plate to a roof.

[0002] When fastening a plate, such as an anchor plate for a safety system, to a roof, toggle fastenings are generally inserted through the plate and the roof in order to engage with a remote surface of the roof so as to allow the toggle fastening to be tightened. One problem with such toggle fastenings, when used in combination with the anchor plate, is that the toggles have to be removed from the threaded fastening, in order to allow the threaded fastening to be passed through an opening in the plate, before being re-applied to the fastening for passing through the roof and fastening the anchor plate to the roof. This can be very awkward and time-consuming for installers and can lead to parts of the fastenings being lost or even damage to part of the roof.

[0003] Embodiments~~It is therefore an object~~ of the present invention seek to provide a fastening arrangement which overcomes, or at least ameliorates, the abovementioned disadvantages.

[0004] According to an embodiment of the present invention there is provided a fastening arrangement comprising: a threaded fastener including a head, a shank and a laterally expandable member; and a bridging member provided on the shank of the fastener, the bridging member having an aperture through which the shank passes, the aperture having a dimension greater than the dimension of the shank but less than the dimension of the head, and an outer dimension greater than a dimension of the laterally expandable member in a first configuration but less than the dimension of the laterally expandable member in a second configuration.

[0005] The laterally expandable member may comprise a toggle member.

[0006] The bridging member may be frustoconical or may be of top-hat configuration.

[0007] A seal may be provided between the head of the threaded fastener and the bridging member.

[0008] A tubular member may be mounted on the shank of the threaded fastener

between the head and the laterally expandable member. The tubular member may be provided internally thereof with a hollow cylinder of insulating material.

[0009] According to an aspect of the present invention there is provided~~The present invention also relates to~~ a combination of a plate provided with at least one aperture and a fastening arrangement ~~as hereinbefore defined passing through the aperture~~comprising: a threaded fastener including a head, a shank and a laterally expandable member; a bridging member provided on the shank of the fastener, the bridging member having an outer dimension that is larger than a dimension of the at least one aperture of the plate so as to engage with material of the plate around the at least one aperture of the plate and an aperture through which the shank passes, the aperture in the bridging member through which the shank passes having a dimension greater than the dimension of the shank but less than the dimension of the head, and the outer dimension of the bridging member being greater than a dimension of the laterally expandable member in a first configuration but less than the dimension of the laterally expandable member in a second configuration; and a tubular member mounted on the shank of the threaded member between the head and the laterally expandable member, wherein the tubular member is provided internally thereof with a hollow cylinder of insulating material.

[0010] The aperture in the plate may have a smaller dimension than the outer dimension of the bridging member.

[0011] An edge region of the at least one aperture may be deformed out of a plane of the plate.

[0012] A seal, such as an O-ring seal, may be provided between the bridging member and the plate.

[0013] The plate and the at least one fastening arrangement may be provided with a protective cover layer.

[0014] For a better understanding of the present invention and to show more clearly how it may be carried into effect reference will now be made, by way of example, to the accompanying drawings in which:

[0015] Figure 1 is a sectional view showing one embodiment of a fastening arrangement according to the present invention; and

[0016] Figure 2 is a cross-sectional view of another embodiment of a fastening arrangement according to the present invention.

[0017] The fastening arrangement shown in Figure 1 comprises a plate 1, for example part of an anchor plate forming part of a safety installation. The plate 1 is formed with a substantially circular aperture, the edge 3 of the aperture being deformed out of the plane of the plate 1 in a direction of a roof to which the plate is to be secured. Alternatively, however, the plate 1 may be planar. The aperture is dimensioned to allow the passage of a fastener, such as a threaded member 5 provided with a toggle member or the like (not shown) in the region of the free end thereof. The threaded member passes through an insert (or bridging member) 7. The insert is substantially annular and has an outer dimension so as to engage with the material of the plate 1 around the aperture and an inner dimension so as to allow a shank 9 of the threaded member to pass through, but not a head