

Title: "Electrical Accessory Box"

Description of Invention.

This invention relates to a housing of the kind hereinafter referred to as being "of the kind specified" which is in use mounted in an opening in a panel, such as a panel comprising the inner skin of a cavity wall structure.

5 Such a housing may for example have one or more electrical cables extending into the housing, and a panel with a switch or socket to which the cable is connected, is engaged with housing.

10 According to one aspect of the invention we provide a housing of the kind specified comprising a hollow open ended body defined by a base, a side wall or side walls, an outward extending flange being formed or secured around the open end, the flange in use, engaging a front surface of the panel around the opening in which the housing is mounted, a pair of generally oppositely disposed apertures in the side wall or walls, a pair of fixing elements, each fixing element being mounted in one of the apertures and being movable about an axis generally parallel to a plane containing the open end of the housing, from a first inner position in which at least a major portion of an ear of the fixing element is contained within the housing to permit the housing to be received in the opening in the panel, to a second outer position in which at least the major portion of the ear extends outwardly to engage behind the front surface of the panel, each fixing element having a first co-operating formation which snap interengages with a second co-operating formation of the housing as the fixing element is moved to its second outer position, whereby the fixing element is retained in its second outer position.

25 It will be appreciated that the ears of the fixing elements may engage a rear surface of the panel, or a cut out provided in the thickness of the panel. In each case, the ears engage behind the front surface of the panel.

30 A housing of the kind specified is described in previous specification numbered GB1383504. In this prior proposal resilient means are provided which urge ears towards the open end of the body which thereby retain the ears in their outer position. It has been found however that in practice such

ears can easily become detached from the housing and lost, particularly prior to the housing being mounted in the opening in the panel. By utilising the present invention, the need for any such resilient means is entirely dispensed with thereby enabling a housing to be produced more economically, and
5 furthermore, there is less likelihood of one of the fixing elements becoming detached from the housing, because of the resilient means.

If desired, a retaining means may be provided, for example a protruberence on each fixing element to retain the fixing elements mounted in the apertures. The protruberence may engage in a receiving formation of
10 the housing, the protruberence and receiving formation permitting movement of the fixing element from the first inner to the second outer position.

Preferably, when each of the fixing elements is in the second outer position, the element is movable towards the open end of the body. Thus the first and second co-operating formations and the retaining means, where
15 provided, may also permit movement additional to the pivotal movement of the fixing element.

The fixing elements may include one or more inwardly extending projections which facilitate manual movement of the fixing element towards the open end of the housing, when in the second outer position.

The fixing elements may each be provided with fastener receiving means, such as a threaded insert held fast relative to the respective fixing element, or a threaded bore whereby a fastener such as a screw or bolt may secure a plate such as a switch or socket plate to close the open end of the body. Thus where movement of the fixing elements towards the open end is
20 permitted, the ears of the fixing elements will be drawn towards the open end of the body as the fastener is tightened, thus sandwiching the panel tightly between the ears and the flange.

To permit movement of the fixing elements towards the open end of the housing in a guided manner, guide means may be provided on the housing and
30 on the fixing elements. For example, the fixing elements may have guides which engage with the periphery of the respective aperture in which the fixing element is mounted.

A pair of first co-operating formations may be provided, and each first co-operating formation may provide a guide receiving the periphery of the respective aperture. The first co-operating formation may be comprise a
35 pair of lugs formed integrally with the remainder of the fixing element, each

lug engaging a corresponding side of the aperture which may comprise the second co-operating formation.

5 Preferably the fixing elements are each moulded in a plastics material which permits resilient flexing of the lugs so that as the fixing elements are moved to the second outer position the lugs may deform sufficiently to allow snap interengagement with the respective side of the aperture.

10 The flange around the open end of the housing may comprise a continuous or substantially continuous peripheral flange although if desired a plurality of separate flanges may be provided at spaced locations around the open end. The base and the side wall or one or more of the side walls, may have weakened regions which may be knocked out or cut out by a user of the housing to facilitate cable entry into the housing.

15 Preferably, the fixing elements each have a first abutment means which abuts a second abutment means of the side wall of the housing adjacent the aperture, which abutment means together prevent the fixing elements moving away from the open end of the housing beyond a predetermined limit, at least when the fixing element is in the second position.

20 Thus when inserting a fastener to secure a plate to the housing, the fixing element cannot move away from the fastener beyond the predetermined limit. Preferably, the abutments are positioned such that a short fastener as is commonly supplied with switch and socket plates, can be engaged with each of the fixing elements when at their predetermined limit.

25 In the arrangement of GB 1383504 for example, the resilient means have to provide the entire resistance to movement of the fixing elements away from the open end of the housing, as the fasteners are inserted, which resilient means do not always provide sufficient resistance if for example a thread on the fastener or of the fixing element is rough.

30 The invention will now be described with the aid of the accompanying drawing which shows an exploded perspective view of a housing in accordance with the invention.

Referring to the drawing, a housing 10 of generally box like configuration, has an open end 11 adapted to be closed by a plate, part of which is shown in dotted lines at 13, on which a electrical switch, socket or other electrical gear is mounted. The plate 13 has a pair of openings 14 each of which are adapted to receive a fastener 15 which engages with housing 10 as hereinafter described, to secure the plate 13 to the housing 10.

The housing 10 has a generally square base 16, and a substantially continuous side wall 17, the side wall 17 presenting a generally square open end 11, opposite to the base 16.

The base 16 and the side wall 17 each have weakened regions 18 which may be knocked out by the user of the housing 10 to facilitate cable entry into the housing 10.

Around the open end 11, a peripheral flange 19 is provided which extends outwardly from the side wall 17. The underside 20 of the flange 19, in use, engages the top surface 21 (again shown in dotted lines) of a panel, the panel having an opening 23 in which the housing 10 is mounted. In two opposite sides of the side wall 17, an aperture 24,25 is provided. In each of the apertures 24,25 a fixing element 26 is adapted to be mounted. The fixing elements 26 each comprise a body 27 which when mounted is always received within the interior hollow H of housing 10, and an ear 28. The elements 26 are each movable, as hereinafter described, from a first position in which a major portion of the ear 28 is wholly contained within the housing 10, to a second position in which the ear 28 extends outwardly of the side wall 17 and engages behind the top surface 21 of the panel, about an axis generally parallel with a plane containing the open end 11 of the housing.

Conveniently, each of the fixing elements 26 are, like housing 10, moulded in plastic material, but a metal insert 29 is fitted or moulded into each of the fixing elements 26, the inserts 29 being screw threaded and being adapted to receive the fasteners 15 which secure the plate 13 to the housing 10.

Moulded integrally with the ears 28 of the fixing elements 26 are a pair of first co-operating formations which comprises lugs 30 which extend outwardly. The lugs 30 can be flexed inwardly because they are moulded in suitable plastics material and thus as the fixing elements 26 are moved from the first position to the second position, the lugs 30 can be deformed inwardly sufficiently as they engage the sides (41) of the respective apertures 24,25, which provide corresponding second co-operating formations, to permit the fixing elements 26 to be moved to the second position. As the fixing elements 26 reach the second position, the lugs 30 will clear the sides of the apertures 24,25 and thus spring outwardly under their own resilience, to snap interengage the sides of the apertures 24,25 and thus the fixing elements 26 will be retained in their second positions. At their ends opposite to the lugs 30, the fixing elements each have a pair of bulbous protruberences 31 which can be received within receiving formations 32 provided in tongues 33 at the end of the apertures 24,25 adjacent the base 16 of the housing. The receiving formations 32 each comprise a slot which extends generally in a direction towards the open end 11 of the housing. In order to mount the fixing element with the bulbous protruberences 31 engaged within their respective receiving formations 32, it is necessary to deform the tongues 33 slightly whilst pivoting the fixing element 26 to a particular angle, in order to clear a lip 34 at the free end of tongue 33, and provide a snap retention.

It will be appreciated that because the lugs 30, which comprise first co-operating formations, engage with the sides of the apertures 24 or 25, and because the receiving formations 32 extend towards the open end, that once the fixing elements 26 are in their second positions, movement of each of the fixing elements as a whole towards the open end 11 of the housing is permitted. Thus as the fasteners 15 are tightened, the ears 28 of fixing elements 26 will be drawn towards the flange 19 of the housing to sandwich the panel therebetween to provide a firm fixing for the plate 13.

Each of the fixing elements 26 have a pair of inwardly extending projections 35 to enable a user of the housing to move the fixing elements 26 towards the open end 11 of the housing manually, prior to securing the plate

13 to the housing. This movement towards the open end 11 is achieved in a guided manner as the peripheries of the apertures will be received between the lugs 30 and the body 27 of the fixing elements 26 which provide guide means.

5 However, each fixing element 26 has a first abutment means comprising a pair of laterally outwardly extending projections 36 which projections 36 abut a second abutment means provided by the top surface of a pair of column formations 37 which are arranged either side of and adjacent to the respective aperture 24,25, in which the fixing element 26 is received, when
10 the fixing elements 26 are in their second outer position.

 The abutment means 36,37, will together prevent movement of the fixing elements 26 away from the open end 11 of the housing beyond a predetermined limit.

15 The abutment means 36,37, are positioned so that the protruberances 31 cannot slide from the grooves 32 and also, so that the fixing elements 26 cannot move away from the open end 11 beyond the predetermined limit, as the fasteners 15 are engaged with the fixing elements 26. The predetermined limit is arranged to be a position in which the shortest fastener 15 that is
20 conventionally provided with a switch or socket plate 13, can still be engaged with the fixing elements 26.

 Of course any other appropriate abutment means to achieve this could be employed, which alternative abutment means could restrain movement of the fixing elements when the fixing elements 26 are in their first inner position as well as in their second outer position as described.

25 Various modifications may be made to the housing 10 described without departing from the scope of the invention. For example, the housing 10 need not be of generally square box like shape as described, but could be of generally rectangular box like shape or of any other shape as required eg. round. Instead of a continuous peripheral flange 19, a plurality of separate
30 flanges spaced around the open end 11 of the housing 10 may be provided.

 Instead of each fixing element 26 having moulded intergrally therewith a threaded insert, any other receiving formation such as a threaded bore or may be provided to enable the plate 13 to be secured to the housing 10.

35 Although as described, the housing 10 and each of the fixing elements 26 are preferably moulded in plastics material, of course other materials could be used.

Instead of outwardly extending lugs 30 which co-operate with the sides of the respective apertures 24, 25, any other suitable snap interengagable first and second formations on the fixing elements 26 and the housing 10 could alternatively be provided.

5 The retaining means provided by the bulbous protruberences 31 and receiving formations 32 need not be provided although are preferred, or of course any other suitable retaining means for retaining fixing elements 26 in mounted engagement with the housing 10 both when the fixing elements 26 are in the first and second positions, may alternatively be provided.

10 It can be seen that the lugs 30 are at their outermost ends, chamfered, as indicated at 40.

Further, it can be seen that the periphery of the apertures 24 and 25 are also chamfered as seen at 41.

15 Thus if after mounting a housing 10 in an opening 23 in a panel 21, it is desired to remove the housing, the fixing elements 26 can be moved from their second outer position to the first inner position by levering, for example with a screwdriver. The chamfered surfaces 40 on the lugs 30, and the chamfered surfaces 41 of the second co-operating formation will permit the fixing elements 26 to be released without causing damage to the fixing
20 element 26 or to the periphery of the apertures 24,25.



CLAIMS

1. A housing of the kind specified comprising a hollow open ended body defined by a base, a side wall or side walls, an outward extending flange being formed or secured around the open end, the flange in use, engaging a front surface of the panel around the opening in which the housing is mounted, a pair of generally oppositely disposed apertures in the side wall or walls, a pair of fixing elements, each fixing element being mounted in one of the apertures and being movable about an axis generally parallel to a plane containing the open end of the housing, from a first inner position in which at least a major portion of an ear of the fixing element is contained within the housing to permit the housing to be received in the opening in the panel, to a second outer position in which at least the major portion of the ear extends outwardly to engage behind the front surface of the panel, each fixing element having a first co-operating formation which snap interengages with a second co-operating formation of the housing as the fixing element is moved to its second outer position, whereby the fixing element is retained in its second outer position.
2. A housing according to claim 1 wherein in use, the ears engage behind the front surface of the panel.
3. A housing according to claim 1 or claim 2 wherein a retaining means is provided to retain the fixing elements mounted in the apertures and permit movement of the fixing elements from their first inner to the second outer position.
4. A housing according to claim 3 wherein the retaining means comprises a protuberance on each fixing element and a receiving formation of the body.
5. A housing according to any one of claims 1 to 4 wherein in use, when each of the fixing elements is in the second outer position, each element is movable towards the open end of the body.



6. A housing according to claim 5 wherein the fixing elements include one or more inwardly extending projections which facilitate manual movement of the fixing element towards the open end of the body, when in the second outer position.

5 7. A housing according to claim 5 or claim 6 wherein the fixing elements are each provided with fastener receiving means, whereby a fastener may secure a panel to close the open end of the body.

10 8. A housing according to any one of claims 5 to 8 wherein guide means are provided on the housing and on the fixing elements to permit movement of the fixing elements towards the open end of the body in a guided manner.

9. A housing according to claim 8 wherein the fixing elements have guides which engage with the periphery of the respective aperture in which the fixing element is mounted.

15 10. A housing according to claim 9 wherein a pair of first co-operating formations are provided for each fixing element, each first co-operating formation providing a guide receiving the periphery of the respective aperture.

20 11. A housing according to any one of the preceding claims wherein the first co-operating formations are provided by a pair of lugs formed integrally with the remainder of the fixing element, each lug engaging a corresponding side of the aperture when in the second position, which sides of the apertures comprise the second co-operating formations.

25 12. A housing according to claim 11 wherein the fixing elements are each moulded in a plastics material which permits resilient flexing of the lugs so that as the fixing elements are moved to the second outer position the lugs can deform sufficiently to allow snap interengagement with the respective side of the aperture.

30 13. A housing according to any one of the preceding claims wherein the flange around the open end of the housing comprises a continuous or substantially continuous peripheral flange.



14. A housing according to any one of the preceding claims wherein the side wall or one or more of the side walls and/or the base where provided, has/have weakened regions which may be knocked out or cut out by a user of the housing.

5 15. A housing according to any one of the preceding claims wherein the fixing elements each have a first abutment means which abuts a second abutment means of the side wall of the housing adjacent the aperture, which abutment means together prevent the fixing elements moving away from the open end of the body beyond a predetermined limit, at least when the fixing
10 element is in the second position.

16. A housing substantially as hereinbefore described with reference to and as shown in the accompanying drawings.
