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HOUSING FOR OPTICAL COMPONENTS

The present invention relates to a housing for optical components according to the preamble of claim 1.

From the not published DE 43 02 837 A1 is known in the art a housing comprising a lower housing portion and a cover for receiving optical components, such as glass fibres, couplers and splices. The housing serves for the protection of the splice and coupling positions of glass-fibre cables and for the accommodation of the necessary reserve lengths of glass fibres, in conjunction with the splice and coupling positions. The housing has a modular construction. Depending on the requirements, a different number of lower housing portions can be stacked in each other. The glass fibres connecting the lower housing portions are each introduced through the housing bottoms. The lower housing portion is provided with holders integrated in the bottom for receiving couplers and splices. During the final assembly, the lower housing portion or several lower housing portions are combined with the cover so to form a housing or a housing unit.

Disadvantageous, in this prior art housing, is the lack of flexibility when fitting the housing with components. The number of possible splices is limited by the holders integrated in the bottom. When the integrated holders are damaged, the complete lower housing portion has to be replaced.

It is therefore the object of the invention to provide a housing for optical components of the type referred to hereinbefore that can flexibly be adjusted and permits accommodation of a larger number of splices.

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The solution of this object is achieved by the characterising features of claim 1. By the configuration of the holders for splices and couplers as separate components to be snap-fitted onto the bottom of the housing, two holders for splices and couplers or one holder for couplers and one holder for splices can be snap-fitted onto the bottom of the housing, depending on the requirements. If, e.g., no couplers are required, two holders for splices can be used. Thus the number of possible splices is doubled. When the holder for couplers is removed from the lower housing portion, a planar coupler can be mounted instead of a second holder for splices. Further, it is possible to snap-fit two holders for couplers onto the lower housing portion. The necessary splices are then obtained by recoat splicing. When a holder for splices and couplers will be damaged, the respective holder can easily be replaced, without replacing the complete lower housing portion.

Further advantageous embodiments of the invention are defined in the further subclaims. By the configuration of the holder for splices of two comb-type sections, between which a plane free area extends transversely over the full width of the holder, the number of possible splices can again be increased. The plane free area between the comb-type sections permits crossings of glass fibres without falling below their admissible bending radii. Further, e.g. for repair splices, additional detour lengths are not required.

By the depression-type configurations at the bottom sides of the holders forming closed channels together with depressions at the bottom of the housing, a single placement of switch wires in parallel to the longitudinal axis of the holder underneath thereof is made possible.

In the following, the invention will be described in more detail, with reference to an embodiment represented in the drawings of a housing for optical components. There are:

- Fig. 1 a top view of the lower housing portion,
Fig. 2 a top view of the holder for splices,



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Fig. 3 a bottom view of the holder for splices, and

Fig. 4 a partial section of the lower housing portion according to line IV-IV in Fig. 1 with not yet snap-fitted holder for splices.

The housing for optical components comprises a lower housing portion 2 and a not shown cover. The lower housing portion 2 is substantially split up into a front entry area 3 with entries and exits 5, 6 for the glass fibres integrated at the front side 4, and a holding-down device 49 above a bottom opening 9 of the lower housing portion 2, into a central area 11 with holders 51, 52 for splices or couplers, respectively, and with curved deflection elements 7, and into a rear area 14 with curved wall portions 15 for guiding the glass fibres and a holding-down device 16, which is disposed above a bottom opening 17 of the lower housing portion 2. The areas 3 and 14 are selected so that the minimum bending radii for the glass fibres are observed when introducing them into the holders 51, 52 for splices or couplers, respectively. From the wall of the narrow side 39 provided in the rear area, the holding-down device 16 above the bottom opening 17 is formed. The bottom opening 9 is formed in the entry area 3 in the same way as the bottom opening 17 of the area 14 and serves for guiding glass fibres in and out, e.g. from another lower housing portion 2.

Between the holders 51, 52 for splices and couplers are provided a pin 41, a bore 42, two elliptically shaped portions 44 and a bore 45, to the border of which a cylindrical wall having the height of the elliptically shaped portions 44 follows, said shaped portions serving for the attachment of the cover and for the attachment to a not shown subrack or for the adaptation of the housing to the installation environment, respectively. In the elliptically shaped portion 44 are provided one bore and a hexagonal depression each. Bores 46 located in the corners of the circumferential wall 47 also serve for the attachment of the cover or to the combination of several lower housing portions 2, respectively. The entry 5 is inte-

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grated in the front side 4 or is configured as a separate component and inserted in the front side 4. Behind the entry 5 is provided a depression 48, into which a strain relief device can be inserted as a separate component. The strain relief device is preferably composed of two plates screwed to each other and having central recesses for the insertion of glass fibres. The bottom openings 9, 17 of the lower housing portion 2 are configured each as portions 60 inclined towards the centre for an optimum guidance of the glass fibres.

From the wall 47 are internally formed holding-down devices 26 serving for a safe guidance of the glass fibres. Between the wall 47 and the holders 51, 52 for splices or couplers, respectively, are each formed two further cable guiding portions 27 providing, together with the holding-down devices 26, for a safe guidance of the glass fibres in the area of the holders 51, 52 for splices or couplers, respectively.

The holders 51, 52 for splices or couplers, respectively, are configured as separate, easily exchangeable components with four latches 55 each that can be snap-fitted in recesses 59 of the bottom of the lower housing portion 2.

The holder 52 for couplers preferably comprises eight guide grooves 24 forming the receiving portions 12 for preferably eight couplers. The guide grooves 24 are interrupted by an approximately centrally arranged free area 25 extending transversely to their longitudinal direction 24, said free area serving for the application of a glue material. The couplers are safely fixed by means of an adhesion film in the guide grooves 24. The free area 24 lies slightly deeper than the deepest point of the guide grooves 24, so that by application of double-sided adhesion foils an additional coupler fixation can be achieved.

The upper side of the holder 51 for splices shown in Figs. 2 to 4 comprises two comb-type sections between which a plane free area 56 extends over the full width of the holder 51. Each comb-type section is composed of webs 53 disposed in parallel to the longitu-

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dinal axis of the holder 51 for splices and having an equidistant spacing to each other. Between two webs 53 each is formed a groove 54 into which the glass fibre together with the splice protection is inserted. The webs 53 are V-shaped at the ends, in order to maintain the minimum bending radii when inserting the glass fibres. The bottom areas of the grooves 54 are at the same height as the plane free area 56. At the side faces are disposed two latches 55 each in the area of the comb-type sections, said latches being snap-fitted into matching recesses 59 in the bottom of the lower housing portion 2. The plane free area 56 is disposed centrally and extends approximately over one fourth to fifth of the total length of the holder 51. The grooves 54 of the two comb-type sections are aligned to each other. By the construction of the holder 51 for splices with two comb-type sections a higher packing density for the placement of the splices and a crossing of fibres without falling below the admissible bending radii are made possible. Further, there is no necessity of additional detour lengths for, e.g., repair splices, where fibre pieces are spliced in for extensions.

On the bottom side of the holder 51 for splices are provided semi-circular depressions 57, the diameter of which approximately corresponds to the diameter of the switch wires. Together with semi-circular depressions 58 formed in the bottom of the lower housing portion 2, closed channels result (Fig. 4) through which the switch wires can individually be passed underneath the holder 51 for splices. The bottom side of the holder 52 for couplers can be configured in an analogous manner to the bottom side of the holder 51 for splices.

By the configuration of the holders 51, 52 for splices or couplers, respectively, as separate components to be snap-fitted on the lower housing portion 2, a variable arrangement of the lower housing portion 2 with splices and couplers is achieved. It is possible, for instance, to configure the housing as a pure splice cassette, by snap-fitting a second holder 51

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for splices into the lower housing portion 2, instead of the holder 52 for couplers. When using planar couplers, e.g., a holder 52 for couplers is not required. When the splices are not placed in a special splice holder, the holder 51 for splices is not required, and a second holder 52 for couplers can be used instead, thus the packing density during assembly in external housing concepts being increased, since then simple constructions with higher numbers of input and output ports are made possible. By the V-shaped configuration of the webs 53 at the ends, an introduction of the glass fibres is possible while observing the minimum bending radii. This is particularly then important, when a glass fibre has to be introduced from the one comb-type section into a groove 54 not aligned therewith of the other comb-type section.

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PATENT CLAIMS

1. A housing for optical components, comprising a lower housing portion and at least one holder for glass fibres, couplers and splices, characterised by that the holder (51, 52) is a separate component and can be snap-fitted onto the bottom of the lower housing portion (2).

2. A housing according to claim 1, characterised by that the upper side of the holder (51) for splices is formed of two spaced, comb-type sections, between which a plane free area (56) extends over the full width of the holder (51).

3. A housing according to claim 2, characterised by that the guide grooves (54) formed by the two comb-type sections are aligned to each other.

4. A housing according to one of claims 1 to 3, characterised by that the webs (53) at the ends are V-shaped.

5. A housing according to claim 2, characterised by that the that bottom areas of the grooves (54) formed by the comb-type sections are at the same level as the plane free area (56).

6. A housing according to one of claims 1 to 3, characterised by that the lower side of the holder (51, 52) comprises depressions (57) extending in parallel to the guide grooves (24, 54), and that depressions (58) are provided on the bottom of the lower housing portion (2), said depressions forming closed channels together with the depressions (57) of the holder (51, 52).

7. A housing according to one of claims 1 to 4, characterised by that the holders (51, 52) for splices or couplers, respectively, comprise two latches (55) each to be snap-fitted in corresponding recesses (59) of the bottom of the lower housing portion.

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