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(54) **FUSE HOLDER ASSEMBLY**

(57) Fuse holder assembly. It comprises a casing (1) housing a fuse (2); a grip (3) with a first end (4) rotatably attached to the casing (1), and a second end (5) attached to the casing (1) by means of a removable attachment element (6) such that the grip (3) is rotated to encircle a busbar around which the fuse holder assembly is installed; a guided piece (8) with a housing (9) to receive the fuse (2), and which is removable to allow interchanging the fuse (2), and comprising a positioning spring (10), attached to the guided piece (8) and with two spring ends (11) between which the fuse (2) is housed in the guided piece (8); an upper clamp (12.1) and a lower clamp (12.2) between which the fuse (2) is installed in the casing (1).

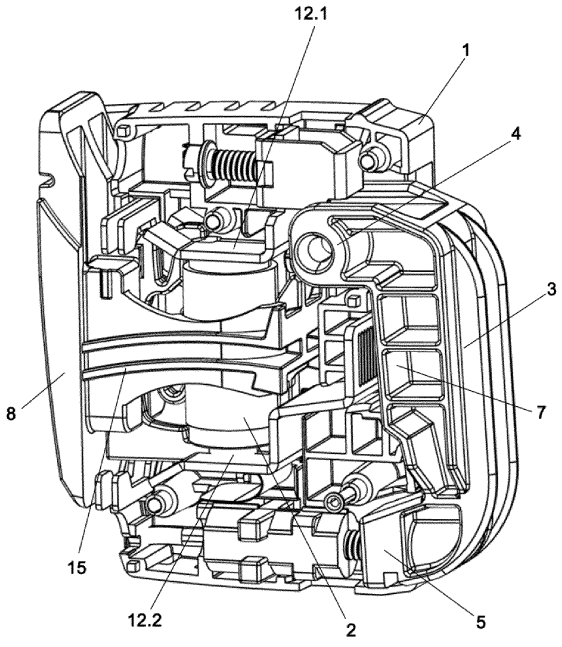

FIG.1

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Description

OBJECT OF THE INVENTION

[0001] The object of the present invention is in the electrical sector. More specifically, it is proposed a fuse holder assembly, also known in the industry as a BUC base, which is preferably configured to house a D02 or D03 fuse.

TECHNICAL PROBLEM TO BE RESOLVED AND BACKGROUND OF THE INVENTION

[0002] Various fuse holder assemblies for NH type fuses, sizes 00, 1, 2, 3 and 4/4c, are known from the state of the art. NH fuses comprise blades and are connected by means of clamps that press the blades on each side of the fuse. In fuse holder assemblies for NH type fuses, said connection is made inside the assembly such that, in order to perform the corresponding installation, the operator simply has to connect the fuse holder assembly in its position and the NH type fuse will thus be correctly installed.

[0003] D02 fuses are connected by length, i.e. by means of plates at each end that press the fuse (which is a cylindrical body). Currently, D02 fuses are installed by means of fuse holders comprising a plate at the rear part which is secured against the busbar on which the fuse holder is to be installed. Likewise, said fuse holders comprise, at their front part, a support for the fuse, which is attached to the plate at the rear part by means of fixing screws (the busbar being between the plate at the rear part and the support at the front part). A technical problem associated with current D02 fuse holders is that they are not on-load opening (i.e. they do not allow the fuse holder to be opened without disconnecting the current).

[0004] Thus, there is currently on the market no fuse holder assembly for D02 fuses that acts as a switch-disconnector-fuse. That is, that allows on-load breaking, guarantees dielectric isolation in the open position and in turn allows a fuse to be used. So far, neither installers nor standardisers have requested it. A change in requirements, which will lead at least one Spanish standardiser to request the installation of fuse holder assemblies for this type of D02 fuses in their equipment, is foreseen.

[0005] Also unknown in the state of the art are fuse holder assemblies for D03 type fuses, which have the same configuration as D02 type fuses but have a different size.

[0006] It is therefore necessary to develop a BUC base (fuse holder assembly) that meets all the requirements for safety and convenience of installation and use that currently apply to existing fuse holder assemblies that are known for another type of fuses, such as those already on the market for NH type fuses.

DESCRIPTION OF THE INVENTION

[0007] The invention relates to a fuse holder assembly, preferably configured to house a D02 type fuse. The proposed fuse holder assembly allows on-load opening (with voltage and current like a circuit breaker), ensures isolation in open position (like a disconnector) and ensures user safety during operation.

[0008] The assembly comprises a casing inside which there is housed the fuse which, when in position, is arranged between two clamps (upper and lower) in contact with said clamps (thus providing electrical contact). In order to be able to change the fuse when necessary, the fuse is mounted on a guided piece to which a positioning spring is attached. The configurations of the guided piece and the positioning spring are such that they allow the fuse to be clamped for comfortable and safe insertion into/removal from the casing. When the guided piece is in its final position in the assembly, the fuse is in its corresponding position between the previously described clamps, which are in contact with flat surfaces (upper and lower) of the fuse.

[0009] Also, since fuse holder assemblies are installed around busbars in the corresponding switchboards, the assembly comprises a grip which is removably attached to the casing. Preferably, the grip comprises an end rotatably attached to the casing, which is the one that allows the grip to rotate to encircle the corresponding busbar. The grip also comprises another end which is attached to the casing by means of a removable attachment element, so as to allow, once the assembly is in position, with the grip arranged around the busbar, the attachment of said end of the grip and the casing, ensuring that the position is fixed.

[0010] Thus, the fuse holder assembly of the present invention acts as a switch-disconnector-fuse, allowing on-load breaking while ensuring dielectric isolation in the open position and allowing the use of the fuse. As described above, the fuse holder assembly is specially designed to install D02 or D03 type fuses.

BRIEF DESCRIPTION OF THE FIGURES

[0011] To complete the description, and for the purpose of helping to make the features of the invention more readily understandable, this description is accompanied by a set of drawings constituting an integral part of the same, which by way of illustration and not limitation represents the following:

Figure 1 shows a perspective view of the fuse holder assembly in which part of the casing has been concealed and the elements inside same can be seen.

Figure 2 shows an exploded view of the fuse holder assembly.

Figure 3 shows a perspective view of the fuse holder

assembly.

Figure 4 shows a grip comprising, in its intermediate section, a spring.

DETAILED DESCRIPTION

[0012] The present invention should not be limited to the embodiment described herein. Other configurations may be carried out by those skilled in the art based on the present description. Accordingly, the scope of the invention is defined by the following claims.

[0013] Figure 1 shows a perspective view of the fuse holder assembly, particularly intended to receive D02 type or D03 type fuses. In this case, a part of the casing (1) of the assembly has been concealed to allow the correct visualisation of the elements that are part of the assembly.

[0014] The described fuse holder assembly comprises the casing (1), inside which a fuse (2) is housed, and said casing (1) comprises a front face with at least one front opening and a rear face with at least one rear opening. It also comprises a grip (3) comprising a first end (4), rotatably attached to a point inside the casing (1), and a second end (5) intended to be attached to the casing (1) by means of a removable attachment element (6). The grip (3) has a configuration such that, when attached to the casing (1), there is a free space between the rear face of the casing (1) and an intermediate section (7) of the grip (3) intended to house a busbar around which the fuse holder assembly is installed. As one skilled in the art would appreciate from the present description, the fuse (2) is a removable and interchangeable piece. Thus, the fuse (2) is not part of the invention as such and any fuse holder assembly, even if it does not house a fuse (2), would fall within the scope of protection of this invention.

[0015] Also forming part of the fuse holder assembly is a guided piece (8), which is a piece with at least one housing (9) to receive the fuse (2), and which is configured to be removably attached to the casing (2), such that, when they are attached, part of the guided piece (8) is housed inside the casing (2), passing through the front opening.

[0016] The design of the guided piece (8) is such that the fuse (2) is supported in the clamps (12.1 and 12.2) by means of the flat surfaces of the fuse (2).

[0017] The guided piece (8) also comprises a positioning spring (10) with two spring ends (11) being arranged in correspondence with the housing (9) such that the fuse (2) housed in the housing (9) is arranged between these two spring ends (11) of the positioning spring (10). There is some clearance between the spring ends (11) and the fuse (2) to allow the fuse (2) to be placed in position in the housing (9) and to be interchanged.

[0018] The assembly also includes an upper clamp (12.1) and a lower clamp (12.2) between which the fuse (2) is installed in the casing (1), as shown in Figures 1 and 2. This configuration allows the fuse to work vertically. This is a great technical advantage compared to the current installation method, in which fuses of this type are placed in the circuit by means of horizontal attachments, and the use of additional connections, screws, etc., is necessary. The clamps (12.1, 12.2) are free of rivets, screws and splices. The major technical advantages are that better energy efficiency can be achieved, risks for the operator and the system during installation/-maintenance operations are reduced, and splice damage is also reduced.

[0019] Figure 2 depicts the fuse holder assembly in an exploded view such that the configuration of each of the individual components that are part of same can be seen more clearly.

[0020] In an exemplary embodiment, the fuse holder assembly also comprises a clamping indicator piece (13) which is at least partially housed in the casing (1) and which has the possibility of movement between a first position in which it is concealed and a second position, when the second end (5) of the grip (3) is attached to the casing (1), in which it is visible. In an exemplary embodiment, in the first position, the clamping indicator piece (13) is concealed in the casing (1), and in the second position, the clamping indicator piece (13) protrudes from the casing (1).

[0021] In a possible embodiment, when the fuse holder assembly is installed on the corresponding busbar, when the second end (5) of the grip (3) is placed in position, it contacts the clamping indicator piece (13), forcing it to move until it protrudes from the casing (1). In this way, the operator can confirm that the grip (3) is correctly placed and that the assembly has been correctly installed by means of the attachment element (6). When the grip (3) is released to remove the fuse holder assembly from the busbar (by removing the second end (5) of the grip (3) from the casing (1)), the clamping indicator piece (13) returns to the first position in which it is concealed.

[0022] To facilitate the assembly of the fuse holder assembly on the corresponding busbar, in an embodiment of the invention, the grip (3) comprises a projection (14) configured to allow the temporary locking (while the operator performs other actions or handles tools) of the assembly on the busbar around which it is to be installed. The operator can therefore leave the assembly "hanging" on the busbar by locking the projection (14) of the grip (3) on the casing (1) around the busbar, such that the assembly is temporarily supported during assembly to free the operator's hands.

[0023] A perspective view of the fuse holder assembly can be seen in Figure 3. In this case, the casing (1), which conceals and protects most of the elements of the assembly, can be seen in its entirety. Part of the guided piece (8) and the grip (3) can also be seen. It can be seen, in the free space between the casing (1) and the intermediate section (7) of the grip (3), part of the lower clamp (12.2) extending from a lower end which is in contact with a lower base of the fuse (2), in the rear part, to an upper end. As can be seen, in the rear part, said lower clamp

(12.2) is partially exposed such that it is the element that is in contact with the corresponding busbar when the fuse holder assembly is installed, with the element ensuring electrical contact between the fuse (2) and the busbar.

[0024] In an exemplary embodiment, shown in Figure 4, the grip (3) comprises, in the intermediate section (7), a spring piece (17) configured to be in contact with the busbar. This embodiment allows the assembly to be installed on busbars of different cross-sections without having to change the grip (3) to perform said installation. In a preferred exemplary embodiment, the grip (3) allows installation on busbars with widths between 4 mm and 6 mm.

[0025] Preferably, the guided piece (8) has at least a first guide element (15) and the casing (1) has at least a second guide element (16) inside same. When the guided piece (8) is inserted through the front opening of the casing (1), said guide elements (15, 16) are in contact and ensure the correct positioning of the guided piece (8) and, therefore, of the fuse (2), in the casing (1).

[0026] In a possible embodiment of the invention, the positioning spring (10) further comprises, at one of the spring ends (11), a flange which prevents the fuse (2) from slipping out of position during manoeuvring (i.e. prevents the fuse from unintentionally becoming detached from the assembly). Thus, it can be seen that the clamps (12.1, 12.2) are configured such that they allow contact with the fuse (2) and, additionally, the upper clamp (12.1) provides space for the flange of the positioning spring (10).

[0027] The distance between the first clamp (12.1) and the second clamp (12.2) and the housing (9) are configured to receive a D02 type or D03 type fuse (2).

Claims

1. A fuse holder assembly comprising a casing (1) inside which a fuse (2) is housed and comprising a front face with at least one front opening and a rear face with at least one rear opening, and **characterised in that** it comprises:

   - a grip (3) comprising a first end (4) rotatably attached to a point inside the casing (1), and a second end (5) intended to be attached to the casing (1) by means of a removable attachment element (6); and wherein the grip (3) has a configuration such that, when attached to the casing (1), there is a free space between the rear face of the casing (1) and an intermediate section (7) of the grip (3) intended to house a busbar around which the fuse holder assembly is installed;
   - a guided piece (8), which is a piece with at least one housing (9) to receive the fuse (2), and which is configured to be removably attached to the casing (1), such that, when they are attached, part of the guided piece (8) is housed inside the casing (2), going through the front opening, and said guided piece (8) comprises a positioning spring (10), attached to the guided piece (8) and with two spring ends (11) being arranged in correspondence with the housing (9) such that the fuse housed in the housing (9) is housed between said two spring ends (11) of the positioning spring (10);
   - an upper clamp (12.1) and a lower clamp (12.2) between which the fuse (2) is installed in the casing (1).

2. The fuse holder assembly according to claim 1, comprising a clamping indicator piece (13) which is at least partially housed in the casing (1) and which has the possibility of movement between a first position in which it is concealed and a second position, when the second end (5) of the grip (3) is attached to the casing (1), in which it is visible.

3. The fuse holder assembly according to claim 2, wherein in the first position, the clamping indicator piece (13) is housed in the casing (1) in its entirety, and in the second position, the clamping indicator piece (13) protrudes from the casing (1).

4. The fuse holder assembly according to any one of the preceding claims, wherein the grip (3) comprises a projection (14) configured to allow the support of the assembly on the busbar around which the assembly is to be installed.

5. The fuse holder assembly according to any one of the preceding claims, wherein the grip (3) comprises, in the intermediate section (7), a spring piece (17) configured to be in contact with the busbar.

6. The fuse holder assembly according to any one of the preceding claims, wherein the guided piece (8) has at least a first guide element (15) and the casing (1) has at least a second guide element (16) inside same, such that, when the guided piece (8) is inserted through the front opening of the casing (1), said guide elements (15, 16) are in contact and ensure the correct positioning of the guided piece (8) and, therefore, of the positioning spring (10) and the fuse (2) in the casing (1).

7. The fuse holder assembly according to any one of the preceding claims, wherein the positioning spring (10) further comprises, at one spring end (11), a flange.

8. The fuse holder assembly according to claim 6, wherein the upper clamp (12.1) comprises a recess intended to receive the flange of the positioning spring (10).

9. The fuse holder assembly according to any one of the preceding claims, wherein the distance between the first clamp (12.1) and the second clamp (12.2), and the housing (9), are configured to receive a D02 type or D03 type fuse (2).

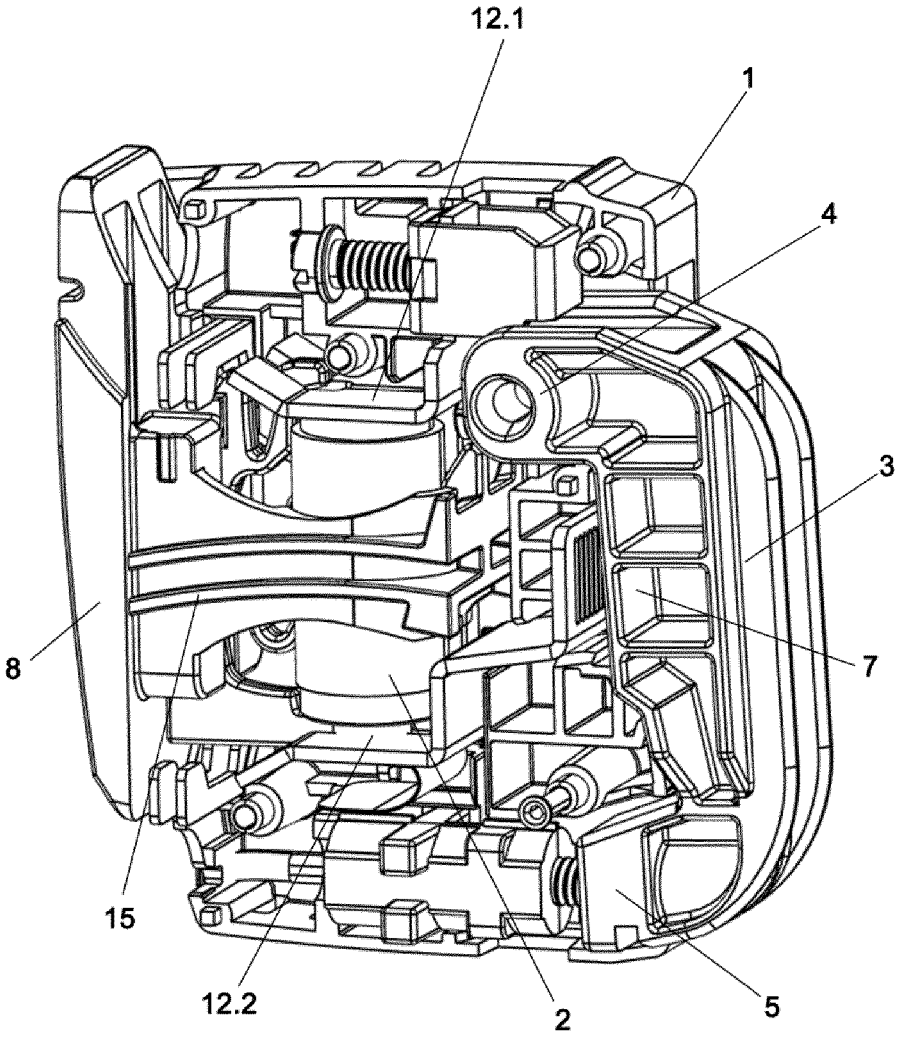

FIG.1

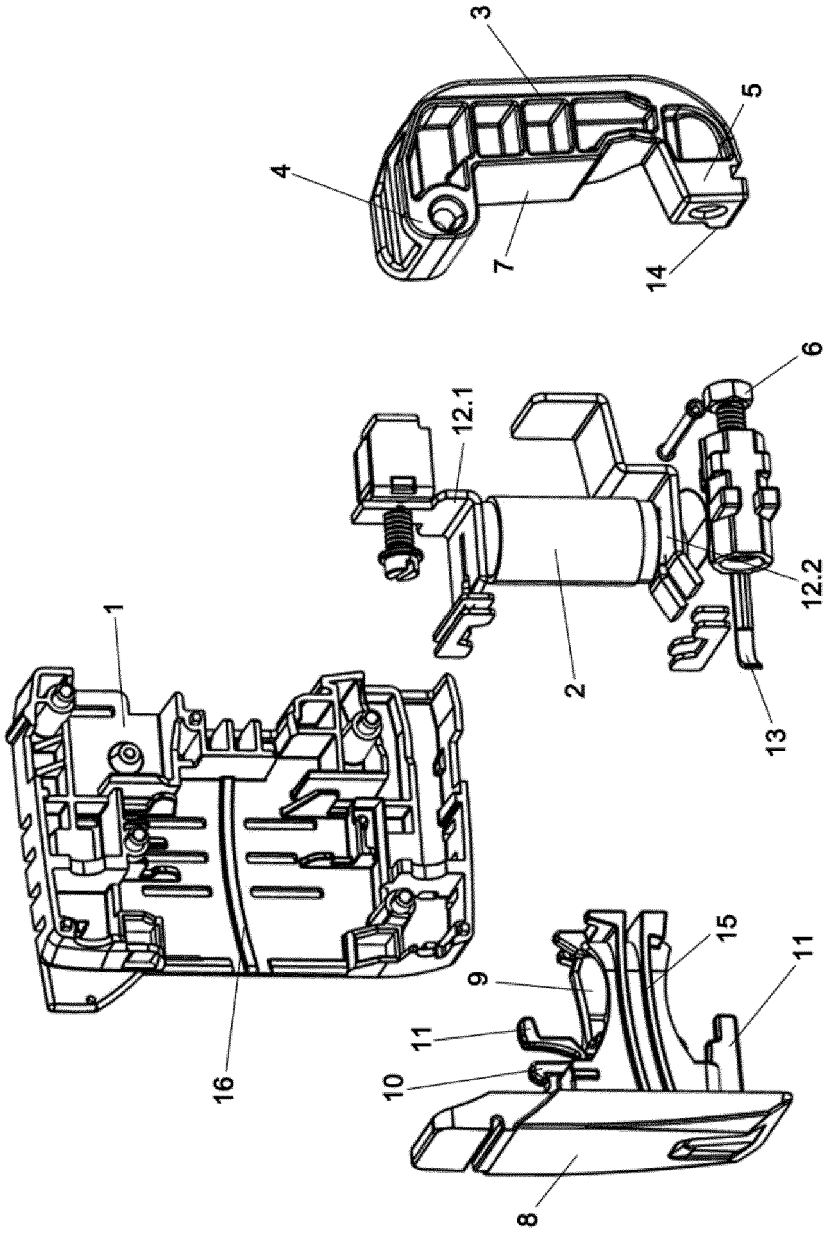

FIG.2

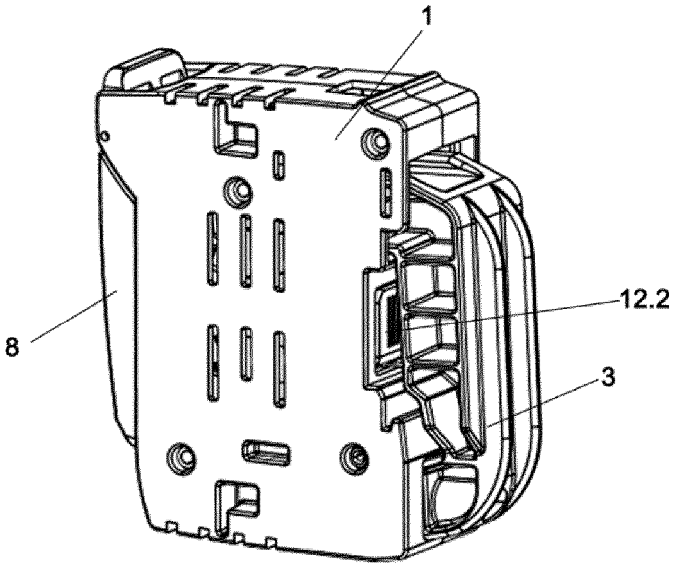

FIG.3

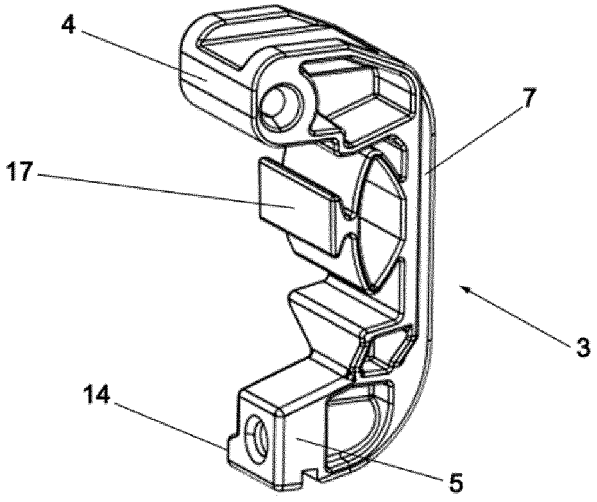

FIG.4

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EUROPEAN SEARCH REPORT

Application Number
EP 24 21 3889

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	US 2005/285710 A1 (BUETTNER ALEX [DE]) 29 December 2005 (2005-12-29) * the whole document *	1-9	INV. H01H85/22 H01H85/54 H01H85/20
Y	ES 1 236 604 U (CASAS SERRANO VICTOR [ES]) 25 October 2019 (2019-10-25) * the whole document *	1,4,6-9	
Y	DE 100 54 169 B4 (WOEHNER GMBH & CO KG [DE]) 21 April 2005 (2005-04-21) * the whole document *	2-5	
A	US 11 139 136 B1 (SCHECKELHOFF ROBERT [US] ET AL) 5 October 2021 (2021-10-05) * the whole document *	1-9	

TECHNICAL FIELDS SEARCHED (IPC)
H01R
H01H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	6 March 2025	Nieto, José Miguel

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 24 21 3889

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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06-03-2025

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82