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(72) Inventors:
• **GREGIANIN, Mr. Francesco**
I-31057 Silea (Treviso) (IT)
• **MUNARIN, Mr. Marco**
I-31038 Paese (Treviso) (IT)

(74) Representative: **Marchitelli, Mauro Buzzi, Notaro & Antonielli d'Oulx**
Corso Vittorio Emanuele II, 6
10123 Torino (IT)

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(71) Applicants:
• **OSRAM GmbH**
80807 München (DE)
• **OSRAM S.P.A. - SOCIETA' RIUNITE OSRAM EDISON CLERICI**
20126 Milano (IT)
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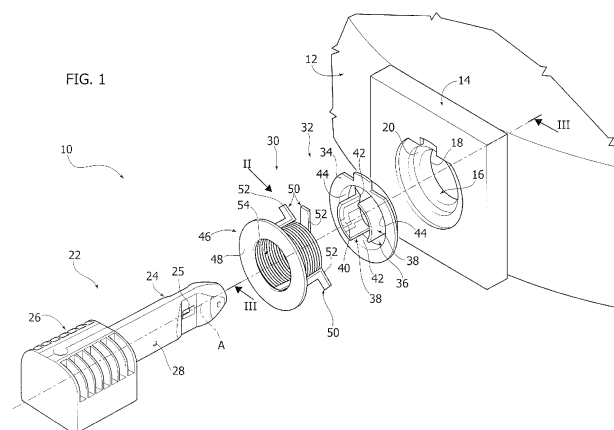
(54) **UNIVERSAL ADAPTER DEVICE FOR VEHICLE HEADLIGHTS AND HEADLIGHT ASSEMBLY INCLUDING THIS ADAPTER DEVICE**

(57) A universal adapter device for vehicle headlights, comprising:

- a fastening ring (32) comprising an annular rim (34) and a fixing portion (36) located within said annular rim (34) and configured to be engaged by a lamp (22),
- a connecting element (46) comprising an outer annular flange (48) and at least one pair of flexible arms (50) extending axially from said outer annular flange (48), wherein said arms (50) are configured to be inserted

through said fastening ring (32) and having respective hook-shaped ends (52) for engaging an inner edge (18) of an opening (16) for a headlight (12), and

- a helical spring (54) carried by said connecting element (46) and located radially outside said arms (50) with a first end (56) resting on said annular outer flange (48) of the connecting element (46) and a second end (58) configured to elastically press said fastening ring (32) against an outer edge (20) of said opening (16).



Description

Technical field

[0001] The description refers to vehicle headlights.

[0002] One or more embodiments may concern a universal adapter device for mounting retrofit lamps on vehicle headlights.

[0003] One or more embodiments may concern a headlight assembly for vehicles provided with a universal adapter device.

Technological background

[0004] In the field of vehicle headlights, the use of lighting devices using one or more solid-state light radiation sources, for example LEDs, is becoming increasingly widespread.

[0005] Lamp manufacturers for vehicle headlights are developing lamps provided with LED light radiation sources that can be used as retrofit lamps in vehicle headlights designed to use incandescent lamps.

[0006] One of the problems encountered in the development of retrofit lamps for vehicle headlights is that different car manufacturers use different systems for fixing lamps on onto headlights.

[0007] Headlights for vehicles designed to use H7 incandescent lamps can be provided with a rear opening through which the bulb of an H7 lamp is inserted.

[0008] A first problem encountered in developing a retrofit lamp for vehicle headlights compatible with different vehicle models is that the diameter of the opening for the lamp varies according to vehicle models. For example, the inner diameter of the opening for mounting the lamp in vehicle headlights can range from 20.4 mm to 28.4 mm for a series of common vehicle models in the European market.

[0009] A second problem is that the fixing system of the lamp to the headlights of the vehicles varies according to the different vehicle models.

Object and summary

[0010] One or more embodiments aim to provide an adapter device for mounting a retrofit lamp onto vehicle headlights of different models.

[0011] According to one or more embodiments, this object can be achieved by an adapter device having the characteristics referred to in the following claims.

[0012] One or more embodiments can also concern a headlight assembly for vehicles provided with a universal adapter device.

[0013] The claims form an integral part of the technical disclosure provided here in relation to embodiments.

Brief description of the figures

[0014] One or more embodiments will be now de-

scribed, by way of non-limiting example, with reference to the attached figures, wherein:

- Figure 1 is an exploded perspective view of a headlight assembly for vehicles,
- Figure 2 is a perspective view of a part of an adapter device indicated by the arrow II in Figure 1, and
- Figure 3 is a cross-section of an embodiment of an adapter device in the mounted configuration on a vehicle headlight.

[0015] It will be appreciated that, for clarity and simplicity of illustration, the various figures may not be reproduced on the same scale.

Detailed description

[0016] The following description illustrates various specific details in order to provide a thorough understanding of various examples of embodiments. The embodiments can be obtained without one or more of the specific details, or with other methods, components, materials, etc. In other cases, known structures, materials or operations are not illustrated or described in detail so that the various aspects of the embodiments and not rendered unclear.

[0017] The reference to "an embodiment" in the context of the present description indicates that a particular configuration, structure or characteristic described in relation to the embodiment is included in at least one embodiment. Thus, sentences such as "in an embodiment", which may be present at various points in the present description, do not necessarily refer to exactly the same embodiment. Moreover, particular configurations, structures or characteristics can be combined in any suitable way in one or more embodiments.

[0018] The references used here are provided simply for convenience and, therefore, do not define the field of protection or the scope of the embodiments.

[0019] In Figure 1, a headlight assembly for vehicles is indicated - in its entirety - by 10. The headlight assembly 10 may comprise a headlight 12 of the type designed and manufactured to operate with incandescent lamps, for example, of the H7 type. The headlight 12 can be of any known type and may comprise a rear section 14 having an opening 16 for mounting a lamp. The opening 16 may have an inner edge 18 facing the inside of the headlight 12 and an outer edge 20 facing the outside of the headlight 12.

[0020] In Figure 1, numeral 22 indicates a retrofit lamp designed to be mounted on the headlight 12. In one or more embodiments, the retrofit lamp 22 may comprise an elongated portion 24 that extends along a longitudinal axis A. In one or more embodiments, the elongated portion 24 of the lamp 22 may carry one or more electrically-powered light radiation sources 25 at one of its distal ends. The electrically-powered light radiation sources 25 can be solid-state light radiation sources, for example,

LEDs. In one or more embodiments, the lamp 22 may comprise a base 26 containing electronic components for powering and driving the light radiation sources 25. In one or more embodiments the lamp 22 may comprise fixing pins 28 radially protruding from the elongated portion 24, configured to cooperate with a bayonet fixing element for connecting the lamp 22 to the rear portion 14 of the lamp 12.

[0021] In one or more embodiments the headlight assembly 10 may comprise a universal adapter device 30, which allows the same lamp 22 to be mounted on different headlight models 12.

[0022] In one or more embodiments, the adaptor device 30 may comprise a fastening ring 32. In one or more embodiments, the fastening ring 32 may comprise an annular rim 34.

[0023] In one or more embodiments, the fastening ring 32 may comprise a fixing portion 36 located inside the annular rim 34. The fixing portion 36 may be configured to be engaged by the elongated portion 24 of the lamp 22.

[0024] In one or more embodiments, the fixing portion 36 may comprise two cylindrical sectors 38 located within the annular rim 34. In one or more embodiments, the cylindrical sectors 38 may be formed in a single piece with the annular rim 34. In one or more embodiments, the fastening ring 32 may be formed of printed sheet metal.

[0025] In one or more embodiments, the cylindrical sectors 38 may have respective inner surfaces on which respective engagement formations 40 may be formed. In one or more embodiments, the inner surfaces of the cylindrical sectors 38 may be sectors of cylindrical surfaces coaxial with the axis A and with a diameter such as to receive the elongated portion 24 of the lamp 22 with little clearance.

[0026] In one or more embodiments, the engagement formations 40 may be bayonet engagement formations configured to be engaged by respective radial pins 28 of the lamp 22.

[0027] In one or more embodiments, the cylindrical sectors 38 may be spaced apart from each another in a circumferential direction by two diametrically opposite windows 42 located inside the annular rim 34. In one or more embodiments, the cylindrical sectors 38 may be symmetrical with respect to a plane passing through the longitudinal axis A. In one or more embodiments, respective grooves 44 may be formed between the annular rim 34 and the cylindrical sectors 38.

[0028] In one or more embodiments, the adapter device 30 may comprise a connecting element 46 configured to fix the fastening ring 32 to the opening 16. In one or more embodiments, the connecting element 46 may allow the fastening ring 32 to be fixed to the opening 16 of the headlights 12 with any diameter and thickness.

[0029] As illustrated in greater detail in Figure 2, in one or more embodiments, the connecting element 46 may comprise an outer annular flange 48 and at least one pair of flexible arms 50 that extend axially from the outer an-

nular flange 48. In one or more embodiments, the connecting element 46 may comprise four flexible arms 50. In one or more embodiments, the flexible arms 50 and the outer annular flange 48 may be formed in a single piece of plastic material. In one or more embodiments, the flexible arms 50 may have respective hook-shaped ends 52 configured to engage the first edge 18 of the opening 16.

[0030] In one or more embodiments, the adapter device 30 can include a helical spring 54 arranged coaxially with the axis A. In one or more embodiments, the helical spring 54 is carried by the connecting element 46 and is located radially outside the flexible arms 50. In one or more embodiments, the helical spring 54 may have a first end 56 which rests against the outer annular flange 48 and a second end 58, which is configured to elastically press the fastening ring 32 against the outer edge 20 of the opening 16.

[0031] The adapter device 30 can be mounted on the rear portion 14 of a headlight 12, as illustrated in Figure 3. The fastening ring 32 may be positioned coaxially with the opening 16, supported against the outer edge 20 of the opening 16. The flexible arms 50 of the connecting element 46 may be inserted through the windows 42 of the fastening ring 32 and through the opening 16. In one or more embodiments, two arms 50 extend through each of the windows 42. The hook-shaped ends 52 of the flexible arms 50 can engage the inner edge 18 of the opening 16. The helical spring 54 is axially compressed between the outer annular flange 48 of the connecting element 46 and the fastening ring 32. In one or more embodiments, the second end 58 of the helical spring 54 is housed in the grooves 44 formed between the cylindrical sectors 38 and the annular rim 34 of the fastening ring 32. The hook-shaped ends 52 of the arms 50 axially retain the connecting element 46 with respect to the rear portion 14 of the headlight 12 against the elastic action of the spring 54. The spring 54 elastically presses the fastening ring 32 against the outer edge 20 of the opening 16. The flexible arms 50 may be radially deformed to allow the hook-shaped ends 52 to pass through the fastening ring 32 and through the opening 16.

[0032] In the assembled position illustrated in Figure 3, the fastening ring 32 is fixed to the rear portion 14 of the headlight 12.

[0033] The elongated portion 24 of the lamp 22 can be inserted in the direction of the longitudinal axis A within the cylindrical sectors 38 of the fastening ring 32. The lamp 22 can be fixed to the fastening ring 32 by means of the radial pins 28 of the elongated portion 24, which can engage the bayonet engagement formations 40 formed on the inner surfaces of the cylindrical sectors 38.

[0034] It is understood that the connecting element 46 can allow the fastening of the adapter ring 32 to rear portions of headlights with openings 16 of different diameters and with different depths. In particular, the connecting element 46 may allow the fastening of the adapter ring 32 to openings 16 with a variable diameter in a range

between 20.4 mm and 28.4 mm, which is the variation range of the diameter of the openings for lamps for most vehicle headlights on the market.

[0035] The connecting element 46 can, therefore, allow mounting of the fastening ring 32 onto headlights for vehicles of different models.

[0036] The adapter device 30 can, therefore, allow mounting of an LED retrofit lamp on a variety of headlights for vehicles designed to receive H7 incandescent lamps.

[0037] One or more embodiments may, therefore, concern a universal adapter device (e.g. 30) for vehicle headlights (e.g. 12), comprising:

- a fastening ring (e.g. 32) comprising an annular rim (e.g. 34) and a fixing portion (e.g. 36) located within said annular rim (e.g. 34) and configured to be engaged by a lamp (e.g. 22),
- a connecting element (e.g. 46) comprising an outer annular flange (e.g. 48) and at least one pair of flexible arms (e.g. 50) that extend axially from said outer annular flange (e.g. 48), wherein said arms (e.g. 50) are configured to be inserted through said fastening ring (e.g. 32) and have respective hook-shaped ends (e.g. 52) for engaging an inner edge (e.g. 18) of an opening (e.g. 16) for a headlight (e.g. 12), and
- a helical spring (e.g. 54) carried by said connecting element (e.g. 46) and located radially outside said arms (e.g. 50), with a first end (e.g. 56) that rests on said annular outer flange (e.g. 48) of the connecting element (e.g. 46), and a second end (e.g. 58) configured to elastically press said fastening ring (e.g. 32) against an outer edge (e.g. 20) of said opening (e.g. 16).

[0038] In one or more embodiments, said fixing portion (e.g. 36) may comprise two cylindrical sectors (e.g. 38) located inside with respect to said annular rim (e.g. 34) and having respective inner surfaces on which fastening formations (e.g. 40) for fixing a lamp (e.g. 22) are formed.

[0039] In one or more embodiments, said cylindrical sectors (e.g. 38) may be spaced apart from each other in a circumferential direction by two diametrically opposite windows (e.g. 42), in which said arms (for example, 50) may extend through said windows (for example, 42).

[0040] In one or more embodiments, at least two arms (e.g. 50) may extend through each of said windows (e.g. 42).

[0041] In one or more embodiments, respective grooves (e.g. 44) may be formed between said cylindrical sectors (e.g. 38) and said annular rim (e.g. 34) of said fastening ring (e.g. 32), within which said second end (e.g. 58) of said helical spring (e.g. 54) is inserted.

[0042] In one or more embodiments, said fixing formations (e.g. 40) can comprise at least two bayonet engagement formations (e.g. 40) configured to cooperate with respective radial pins (e.g. 28) projecting from an elongated portion (e.g. 24) of a lamp (e.g. 22).

[0043] One or more embodiments may concern a

headlight assembly (e.g. 10), which may include:

- a headlight (e.g. 12) having a rear portion (e.g. 14) having an opening (e.g. 16) for mounting a lamp (e.g. 22), wherein said opening (e.g. 16) has an inner edge (e.g. 18) and an outer edge (e.g. 20),
- a fastening ring (e.g. 32) having an annular rim (e.g. 34) and a fixing portion (e.g. 36) configured to be engaged by a lamp (e.g. 22),
- a connecting element (e.g. 46) that secures said fastening ring (e.g. 32) to said opening (e.g. 16), wherein the connecting element (e.g. 46) comprises an outer annular flange (e.g. 48) and at least one pair of flexible arms (e.g. 50) that extend axially from said outer annular flange (e.g. 48), wherein said flexible arms (e.g. 50) are inserted through said fastening ring (e.g. 32) and have respective hook-shaped ends (e.g. 52) that engage said inner edge (e.g. 18) of said opening (e.g. 16),
- a helical spring (e.g. 54) carried by said connecting element (e.g. 46) and located radially outside said arms (e.g. 50) with a first end (e.g. 56) resting on said annular outer flange (e.g. 48) of the connecting element (e.g. 46) and a second end (e.g. 58) that elastically presses said fastening ring (e.g. 32) against said outer edge (e.g. 20) of said opening (e.g. 16), and
- a lamp (e.g. 22) having an elongated portion (e.g. 24) engaging said fixing portion (e.g. 36) of said fastening ring (e.g. 32).

[0044] Without prejudice to the underlying principles of the invention, the details of construction and the embodiments may vary, even significantly, with respect to those illustrated here, purely by way of non-limiting example, without departing from the scope of the invention.

[0045] This field of protection is defined by the attached claims.

LIST OF REFERENCE SIGNS

headlight assembly	10
headlight	12
rear section	14
opening	16
inner edge	18
outer edge	20
retrofit lamp	22
elongated portion	24
longitudinal axis	A
electrically-powered light radiation sources	25
base	26
fixing pins	28
universal adapter device	30
fastening ring	32
annular rim	34

(continued)

fastening portion	36
cylindrical sectors	38
engagement formations	40
slots	44
connecting element	46
outer annular flange	48
flexible arms	50
hook-shaped end	52
helical spring	54
first end	56
second end	58

Claims

1. A universal adapter device for vehicle headlights, comprising:

- a fastening ring (32) comprising an annular rim (34) and a fixing portion (36) located within said annular rim (34) and configured to be engaged by a lamp (22),

- a connecting element (46) comprising an outer annular flange (48) and at least one pair of flexible arms (50) extending axially from said outer annular flange (48), wherein said arms (50) are configured to be inserted through said fastening ring (32) and having respective hook-shaped ends (52) for engaging an inner edge (18) of an opening (16) for a headlight (12), and

- a helical spring (54) carried by said connecting element (46) and located radially outside said arms (50) with a first end (56) resting on said annular outer flange (48) of the connecting element (46) and a second end (58) configured to elastically press said fastening ring (32) against an outer edge (20) of said opening (16).

2. A device according to claim 1, wherein said fixing portion (36) comprises two cylindrical sectors (38) located inside with respect to said annular rim (34) and having respective inner surfaces on which fastening formations (40) for fixing a lamp (22) are formed.

3. A device according to claim 2, wherein said cylindrical sectors (38) are spaced apart from each other in a circumferential direction by two diametrically opposite windows (42), wherein said arms (50) extend through said windows (42).

4. A device according to claim 2, comprising at least two arms (50) extending through each of said windows (42).

5. A device according to claim 2, wherein respective grooves (44) are formed between said cylindrical sectors (38) and said annular rim (34) of said fastening ring (32), into which said second end (58) of said helical spring (54) is inserted.

6. A device according to claim 1 or claim 2, wherein said fastening formations (40) comprise at least two bayonet engagement formations configured to cooperate with respective radial pins (28) protruding from an elongated portion (24) of a lamp (22).

7. A headlight assembly comprising:

- a headlight (12) having a rear portion (14) having an opening (16) for mounting a lamp (22), wherein said opening (16) has an inner edge (18) and an outer edge (20),

- a fastening ring (32) having an annular rim (34) and a fixing portion (36) configured to be engaged by a lamp (22),

- a connecting element (46) that secures said fastening ring (32) to said opening (16), wherein the connecting element (46) comprises an outer annular flange (48) and at least one pair of flexible arms (50) extending axially from said outer annular flange (48), wherein said flexible arms (50) are inserted through said fastening ring (32) and have respective hook-shaped ends (52) that engage said inner edge (18) of said opening (16),

- a helical spring (54) carried by said connecting element (46) and located radially outside said arms (50) with a first end (56) resting on said outer annular flange (48) of the connecting element (46) and a second end (58) that elastically presses said fastening ring (32) against said outer edge (20) of said opening (16), and

- a lamp (22) having an elongated portion (24) that engages said fixing portion (36) of said fastening ring (32).

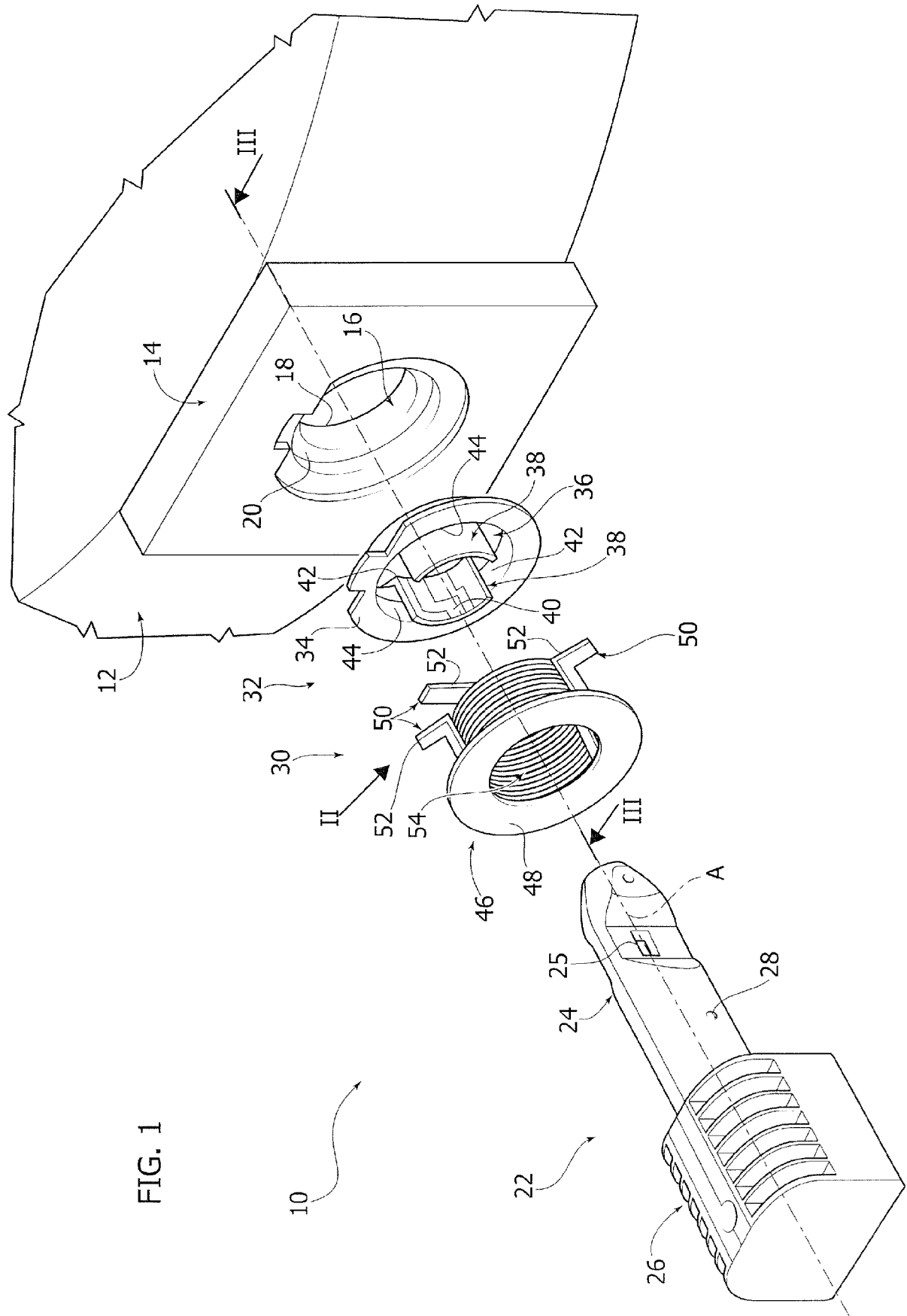


FIG. 1

FIG. 3

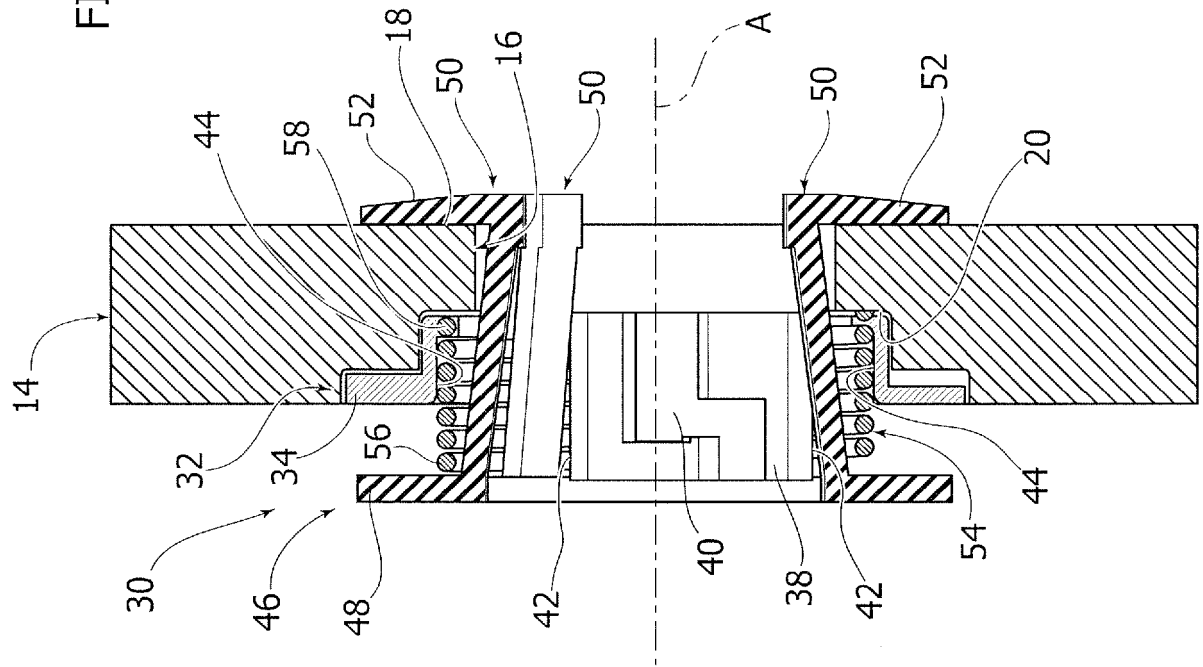
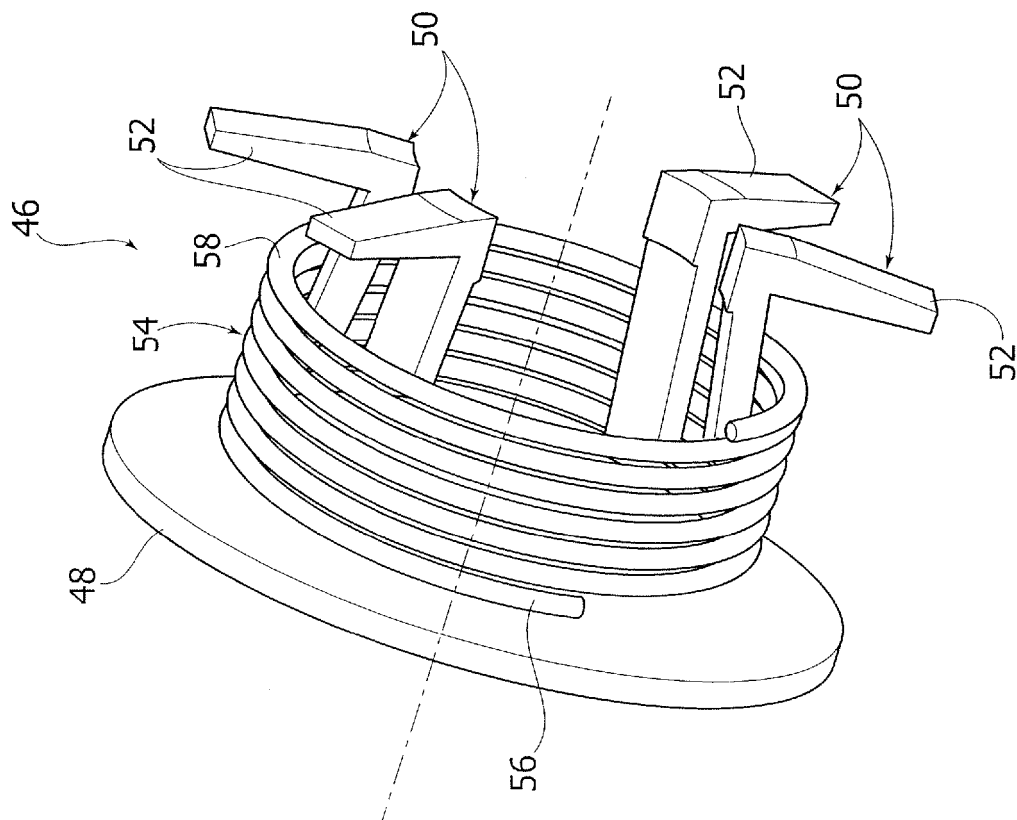


FIG. 2





EUROPEAN SEARCH REPORT

Application Number
EP 18 17 7908

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			TECHNICAL FIELDS SEARCHED (IPC)
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CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 18 17 7908

5 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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