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(54) **Support base for an antenna and method for assembling said support base on the bodywork of a vehicle**

(57) Support base for a vehicle antenna, which comprises a support structure (3) with a bottom contact zone (4) able to come into bearing contact with the external surface (5) of the bodywork (6) of a vehicle and provided with a projecting element (7) intended to be inserted into a connecting hole (8) formed in the bodywork (6) itself. The support base (2) also comprises fixing means (10)

for rigidly connecting the support structure (3) to the bodywork (6), and temporary fastening means (11) for retaining the support structure (3) joined to the bodywork (6) during assembly of the support base (2), which comprise a pair of elastically yielding elements (12) mounted in diametrically opposite positions on the projecting element (7).

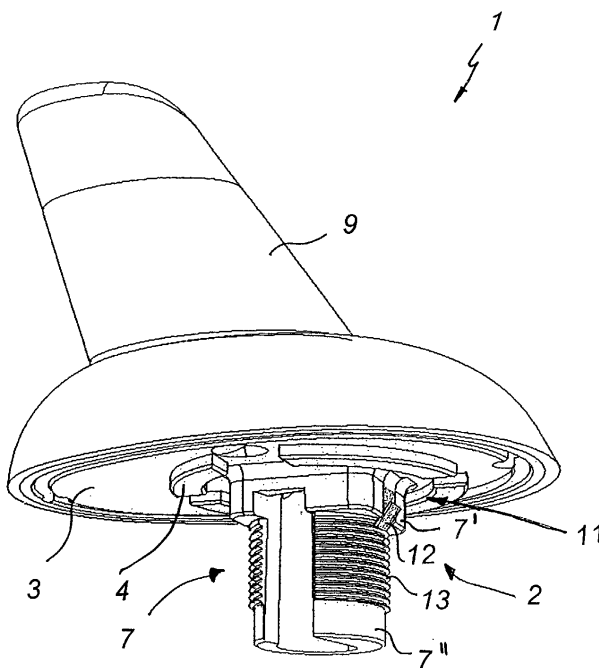


FIG. 1

Description

Field of the invention

[0001] The present invention relates to a support base for an antenna and a method for assembling said support base on the bodywork of a vehicle.

[0002] The support base in question is advantageously intended to be mounted on the bodywork or on the chassis of any vehicle for road travel, such as, for example, a motor car, a lorry or a heavy goods vehicle.

Background art

[0003] It is known that the antennae currently used in the sector of road vehicles are generally composed of a support base fixed to the bodywork of the vehicle and a fixed or removable part which forms the actual receiving/transmitting part of the antenna and which is moreover formed by a rod.

[0004] The support base is traditionally composed of a support structure provided with a bottom contact zone intended to come into bearing contact with the bodywork of the vehicle. A projecting element extends from the abovementioned contact zone and may be inserted into a corresponding opening formed in the bodywork so as to allow connection to the latter with the aid of suitable fixing means.

[0005] As is known, the support structure may be arranged inside the vehicle, keeping the projecting element directed from the inside towards the outside of the vehicle or may be arranged on the external bodywork and directed towards the inside of the vehicle.

[0006] In any case, for both of the abovementioned arrangements, the fixing means are generally composed of screw/nut-screw coupling systems associated with the projecting element.

[0007] This fact means that, during assembly of the antenna on the bodywork of the vehicle, it is necessary to retain the support structure on the bodywork until the said structure is rigidly connected by fixing means.

[0008] At present, for the assembly of the antenna base in the case where the support structure is arranged on the external surface of the bodywork, a first operator must keep the support structure in the correct position, while a second operator must secure it on the bodywork of the vehicle using fixing means.

[0009] This is extremely wasteful both in terms of the time required for assembly of each individual antenna base and in terms of use of labour.

[0010] In order to overcome this drawback, assembly methods which envisage insertion of the projecting element inside the hole of the bodywork with a certain interference have been developed.

[0011] Owing to the friction which is exerted between the profile of the hole and the projecting element, it is possible to secure the support structure on the bodywork with a force sufficient to allow subsequent fixing

thereof using the fixing means.

[0012] This solution, however, in practice has proved not to be entirely satisfactory since it requires formation of the hole in the bodywork and production of the projecting element with minimum tolerances.

[0013] In fact, for structural and constructional reasons, the bodywork and the support structure must be made of particularly hard materials. Consequently, the interference between the hole and the projecting element, in order to allow the latter to be inserted with a constant compressive force which is not excessive for the operator must have a very small value, probably of the order of a few hundredths of a millimetre. This requires a precision as regards the production of the contact bodies and an accuracy in the formation of the holes, which greatly penalises the entire antenna production process.

[0014] On the other hand, if the normal tolerances of the antenna production processes are adopted, it is possible that the support structure may not enter with interference inside the hole, therefore not allowing temporary securing thereof on the bodywork or the operator may have to exert an excessive pushing force in order to be able to insert the projecting element inside the hole.

[0015] In the case where, on the other hand, the support structure is arranged inside the vehicle, the German patent DE A 4336191 discloses a method for assembly of the support base which uses a support structure having a plastic sleeve which is provided with an elastically yielding shaped lug and is mounted around the projecting element. When the projecting element is inserted inside the hole formed in the bodywork of the vehicle, the abovementioned lug is deformed so as to overcome the profile of the hole and no longer allows return of the projecting element which therefore remains fastened, together with the support structure, to the bodywork of the vehicle.

[0016] At present, however, for aesthetic and constructional reasons, the support bases are mounted on the outside of the vehicle and therefore do not allow the use of the technical solution described briefly hereinabove.

[0017] Moreover, generally the size and shape of the projecting element and the hole are determined by the car manufacturers who do not allow for sufficient space in order to be able to fix around the projecting element a plastic sleeve with a deformable lug.

Summary of the invention

[0018] The main object of the present invention is therefore to eliminate the drawbacks of the prior art mentioned above, by providing an antenna support base which allows provisional fastening onto the bodywork of the vehicle to be performed during assembly.

[0019] Another particular object of the present invention is that of providing an assembly method which al-

lows the installation of the support base on any type of vehicle by a single operator.

[0020] A further object of the present invention is that of providing an assembly method which is simple and operationally entirely reliable.

[0021] These and other objects are achieved by the support base for a vehicle antenna according to the present invention which comprises a support structure with a bottom contact zone intended to come into bearing contact with the external surface of the bodywork of a vehicle and provided with a projecting element intended to be inserted into a connecting hole formed in the bodywork, and fixing means for rigidly connecting the support structure to the bodywork; as well as temporary fastening means for retaining the support structure joined to the bodywork during assembly of the support base on the bodywork with the aid of the fixing means. According to the invention, the temporary fixing means comprise at least one elastically yielding element mounted on the projecting element.

[0022] Owing to this arrangement, it is possible to mount the antennae on vehicles very rapidly and with very low costs from an installation point of view.

Brief description of the drawings

[0023] Further features and advantages of the invention will appear more clearly with reference to the detailed description of several preferred, but not exclusive, embodiments according to the invention, illustrated by way of a non-limiting example with the aid of the accompanying plates of drawings, in which:

FIG. 1 shows a first perspective view of the support base according to the present invention;
 FIG. 2 shows a second perspective view of the support base in question;
 FIG. 3 shows a side view of the support base in question;
 FIG. 4 shows a front view of the support base in question;
 FIG. 5 shows a view of the support structure of the support base in question;
 FIG. 6 shows a perspective view of an enlarged detail of Fig. 2.

Detailed description of a preferred example of embodiment

[0024] With reference to the accompanying drawings, 1 denotes in its entirety an antenna for vehicles and 2 the support base of the antenna according to the present invention.

[0025] The latter is suitable for being installed advantageously on any type of vehicle and, in particular, on vehicles intended for road travel, such as, for example, motor cars, lorries, articulated lorries or the like.

[0026] Traditionally, in fact, antennae 1 are installed

on these vehicles in order to allow the operation of radio equipment, satellite navigation systems (GPS) or receiving/transmitting apparatus such as cellular phones, CB radio systems or the like.

[0027] For this purpose, the antennae 1 are generally composed of the support base 2 which can be secured to the vehicle bodywork and the actual transmitting part generally consisting of a rod-like element, of the fixed or removable type, not shown in detail in the example shown in the accompanying figures since it is of a type known per se.

[0028] The support base 2 is in turn composed of a support structure 3 provided with a bottom contact zone 4 intended to come into contact with the external surface 5 of the bodywork 6 of a vehicle. A projecting element 7 extends from the bottom contact zone 4 and is intended to be inserted inside a connecting hole 8 formed in the bodywork 6.

[0029] It is pointed out that the aforementioned rod-shaped element, in the accompanying figures, is hidden underneath a covering element 9 mounted on the support structure 3.

[0030] The support base 2 is also provided with fixing means 10 for rigidly connecting the bottom contact zone 4 to the bodywork 6 and temporary fastening means 11 for retaining the support structure 3 joined to the bodywork 6 during assembly of the support base 2.

[0031] According to the invention, the temporary fastening means 11 comprise an elastically yielding element 12 mounted on the projecting element 7.

[0032] In greater detail, in accordance with a preferred embodiment of the present invention, the projecting element 7 is provided with a first parallelepiped-shaped portion 7' and a second cylindrical-shaped portion 7'' which is mounted as a continuation of the first portion 7' and has externally a thread 13 for effecting the connection with the fixing means 10.

[0033] As is known, in accordance with the current production standards adopted by motor-car manufacturers, the width d of the second portion 7'' is substantially equal to the length L of one side of the first portion 7'. These dimensions are therefore to be regarded as generally standardized and compulsory for antenna manufacturers 1.

[0034] The elastically yielding element 12 may be advantageously obtained by means of a pair of elongated metal plates which are mounted inside seats 14 formed in diametrically opposite positions of the first portion 7' of the projecting element 7. Each plate 12 is provided with an end part 15 which is folded onto itself so as to define a concavity 16 which is directed towards the internal surface 5' of the bodywork 6 when the element 7 is inserted into the hole 8 (see Fig. 6).

[0035] Advantageously, during production of the antenna bases 2, a certain interference may be envisaged in order to allow locking engagement of the plate 12 inside the respective seat 14.

[0036] Functionally speaking, when the projecting el-

element 7 is inserted into the hole 8, the end part 15 firstly is compressed, being closed onto itself until it passes beyond the thickness of the bodywork 6, following which, once the bodywork has come into bearing contact with the bottom contact zone 4, it widens out again, preventing the projecting element 7 from coming out.

[0037] In greater detail, the terminal edge 17 of the plate 12 prevents the projecting element 7 from coming out by locking against the internal surface 5' of the bodywork 6. This allows the support base 2 joined to the bodywork of the vehicle 6 to be retained until the operator rigidly connects the projecting element 7 to the bodywork 5 with the aid of the fixing means 10 which advantageously may also simply consist of a nut 18 able to be screwed onto the thread 13.

[0038] The present invention also relates to a method for assembling the support base 2 on the bodywork 6 of a vehicle.

[0039] According to the invention, this method comprises a step involving positioning of the support structure 3 on the bodywork 6 of the vehicle with the bottom contact zone 4 making contact with the external surface 5 thereof and with the projecting element 7 inserted inside the connecting hole 8, a step involving compression of the support structure 3 on the bodywork 6 in order to activate the temporary fastening means 11 so as to retain the support structure 3 joined to the bodywork 6 and finally a step involving rigid connection of the bottom contact zone 4 to the external surface 5 of the bodywork 5 using the fixing means 10.

[0040] The fixing step advantageously consists in screwing of the nut 18 onto the thread 13 of the second portion 7" of the projecting element 7.

[0041] From an operational point of view, the compressive force which the operator must exert on the support structure 3 must be able to overcome the resistive elastic force of the end part 15 - folded onto itself - of the plate 12 which is mounted inside the seat 14 of the projecting element 7.

[0042] The invention thus conceived therefore achieves the predefined objects.

[0043] Obviously, the invention may assume, in its practical embodiment, also forms and configurations different from that illustrated above without, thereby, departing from the present scope of protection.

[0044] Moreover, all the details may be replaced by technically equivalent elements, and the dimensions, forms and materials used may be of any kind in accordance with the requirements.

Claims

1. Support base for a vehicle antenna, comprising:

- a support structure (3) with a bottom contact zone (4) intended to come into bearing contact with the external surface (5) of the bodywork

(6) of a vehicle and provided with a projecting element (7) intended to be inserted into a connecting hole (8) formed in the said bodywork (6);

- fixing means (10) for rigidly connecting said support structure (3) to said bodywork (6);
- temporary fastening means (11) for retaining said support structure (3) joined to said bodywork (6) during assembly of the support base (2) on the bodywork (6) using said fixing means (10); said temporary fastening means (11) comprising at least one elastically yielding element (12) mounted on said projecting element (7).

2. Support base according to Claim 1, **characterized in that** said elastically yielding element (12) consists of a plate with an end part (15) which is folded onto itself, deformable and able to define a concavity (16) directed towards the internal surface (5') of the bodywork (6) when said projecting element (7) is inserted into said connecting hole (8).

3. Support base according to any one of the preceding claims, **characterized in that** said projecting element (7) is provided with a first parallelepiped-shaped portion (7') on which a second, substantially cylindrical-shaped, threaded portion (7'') is fixed.

4. Support base according to Claim 3, **characterized in that** the width (d) of said second portion (7'') is substantially equal to the length (L) of one side of said first portion (7').

5. Support base according to Claim 1, **characterized in that** said elastically yielding element (12) is mounted inside a seat (14) formed in said projecting element (7).

6. Support base according to Claims 5 and 3, **characterized in that** said seat (14) is formed in said first portion (7') of said projecting element (7).

7. Support base according to Claim 3, **characterized in that** said plate (12) has an elongated shape and is made of metallic material.

8. Support base according to Claim 1, **characterized in that** it comprises at least two elastically yielding elements (12) mounted on said projecting element (7) in diametrically opposite positions.

9. Support base according to Claim 3, **characterized in that** the terminal edge (17) of said plate (12) is able to engage against the bodywork (6) of said vehicle when said projecting element (7) is inserted inside said hole (8).

10. Method for assembling, on the bodywork of a vehi-

cle, a support base provided with a support structure (3) having a bottom contact zone (4) provided with a projecting element (7), **characterized in that** it comprises the following operating steps:

- positioning of the support structure (3) on the bodywork (6) of a vehicle with the bottom contact zone (4) in contact with the external surface (5) thereof and with the projecting element (7) inserted inside a connecting hole (8) formed in the bodywork (6);
- compression of said support structure (3) against the external surface (5) of said bodywork (6) in order to activate temporary fastening means (11) so as to retain said support structure (3) on said bodywork (6);
- rigid connection of said support structure (3) to said bodywork (6) using fixing means (10).

11. Assembly method according to Claim 10, **characterized in that** said fixing step substantially consists in screwing of a nut (18) onto a threaded portion (13) of said projecting element (7).

12. Assembly method according to Claim 10, **characterized in that** the application of said compressive force is able to overcome the resistive elastic force of a plate (12) mounted on said projecting element (7) and provided with an end part (15) folded onto itself and extending projecting from the projecting element (7).

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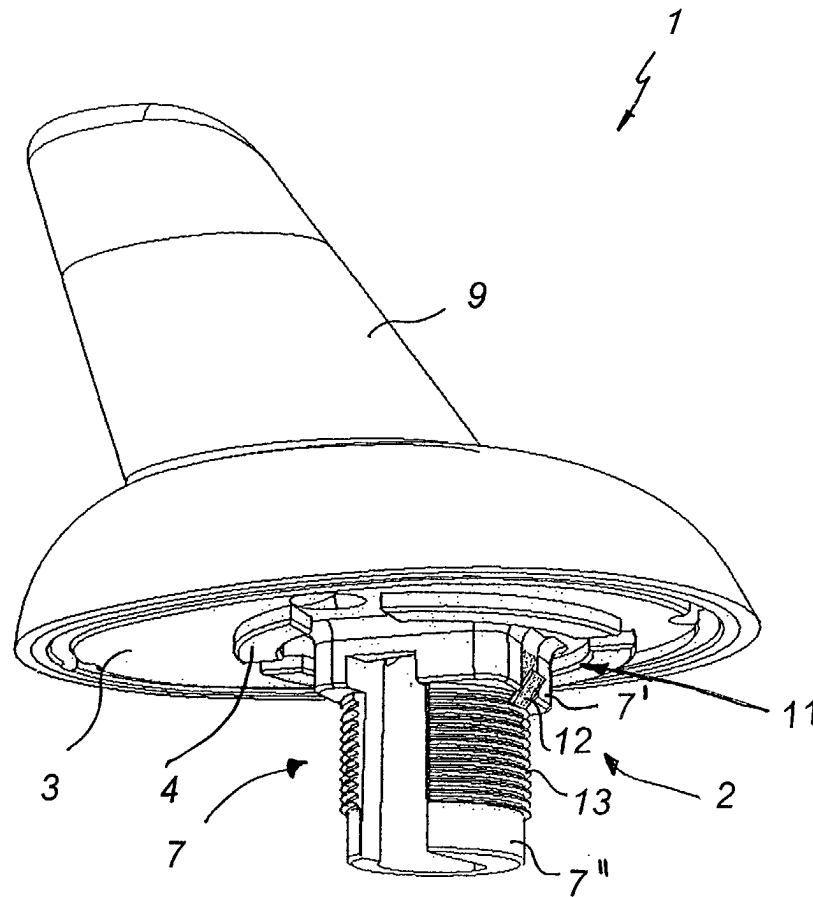
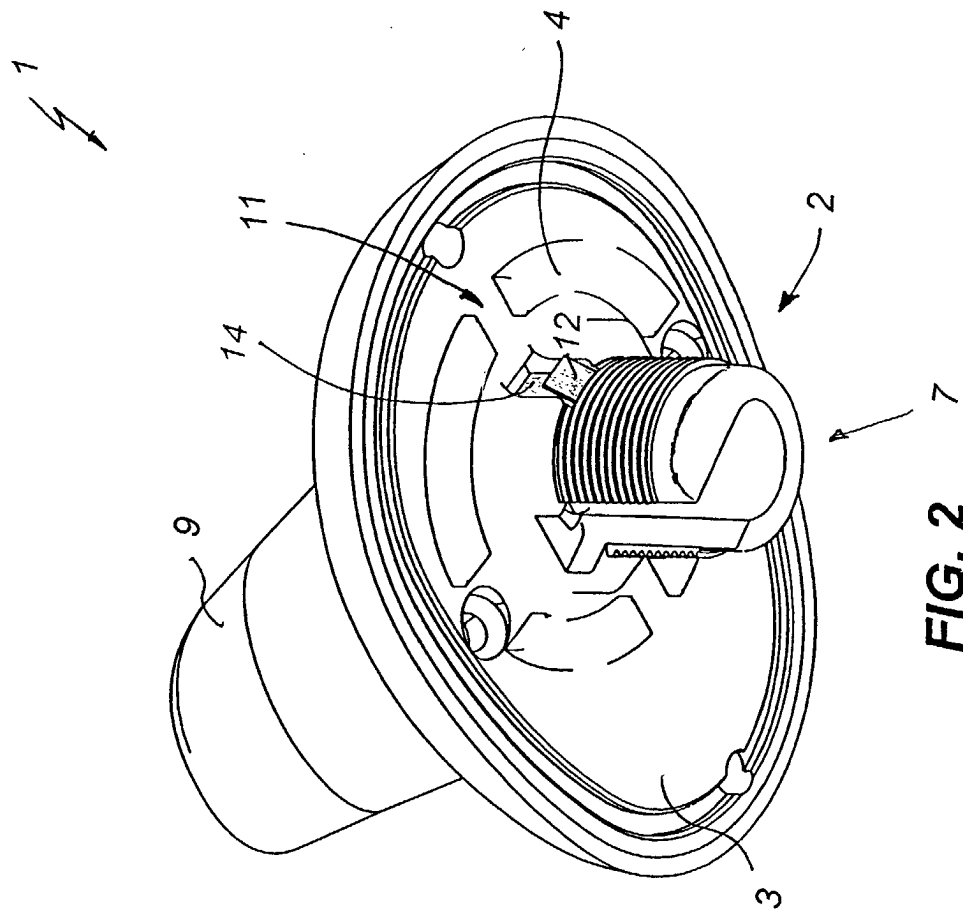


FIG. 1



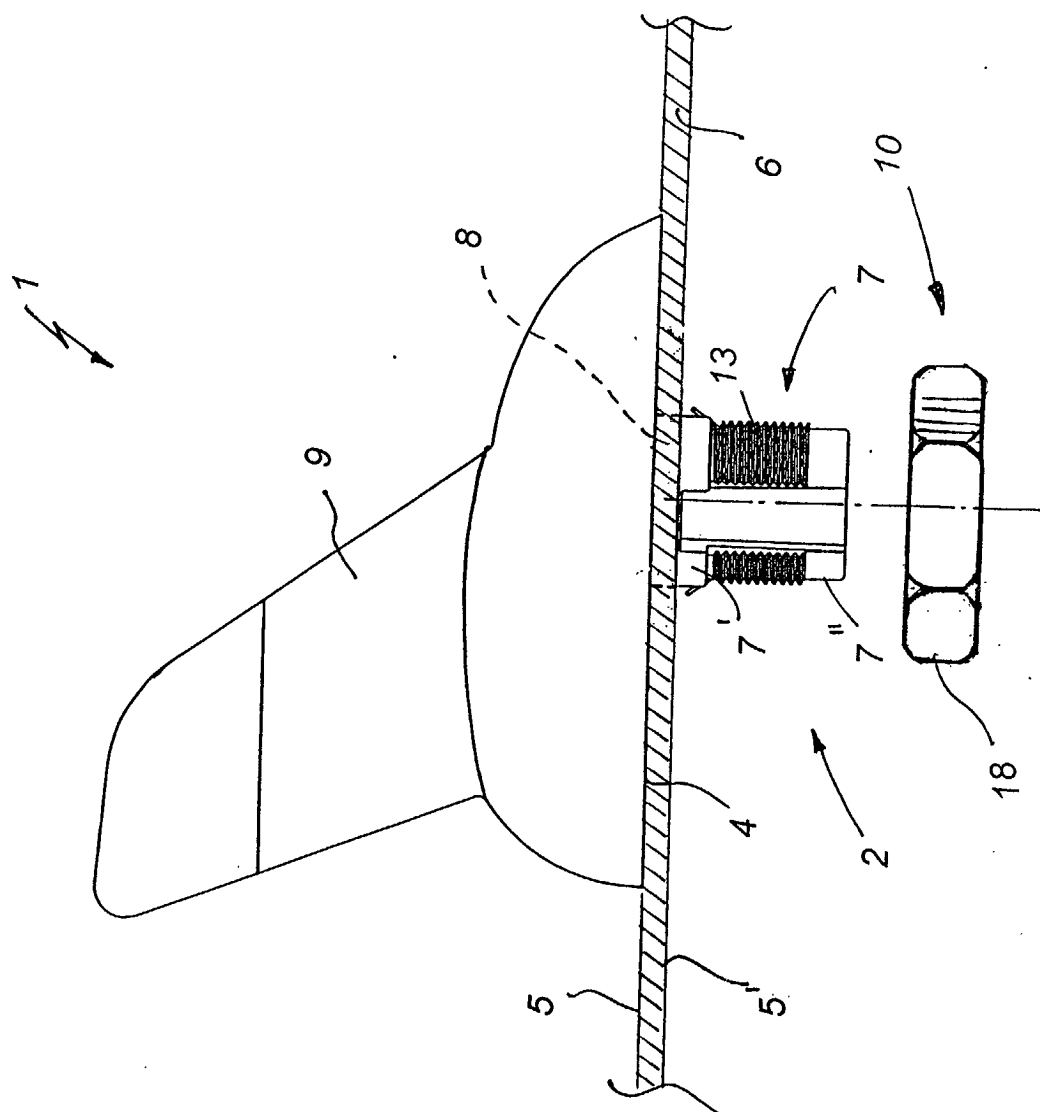


FIG. 3

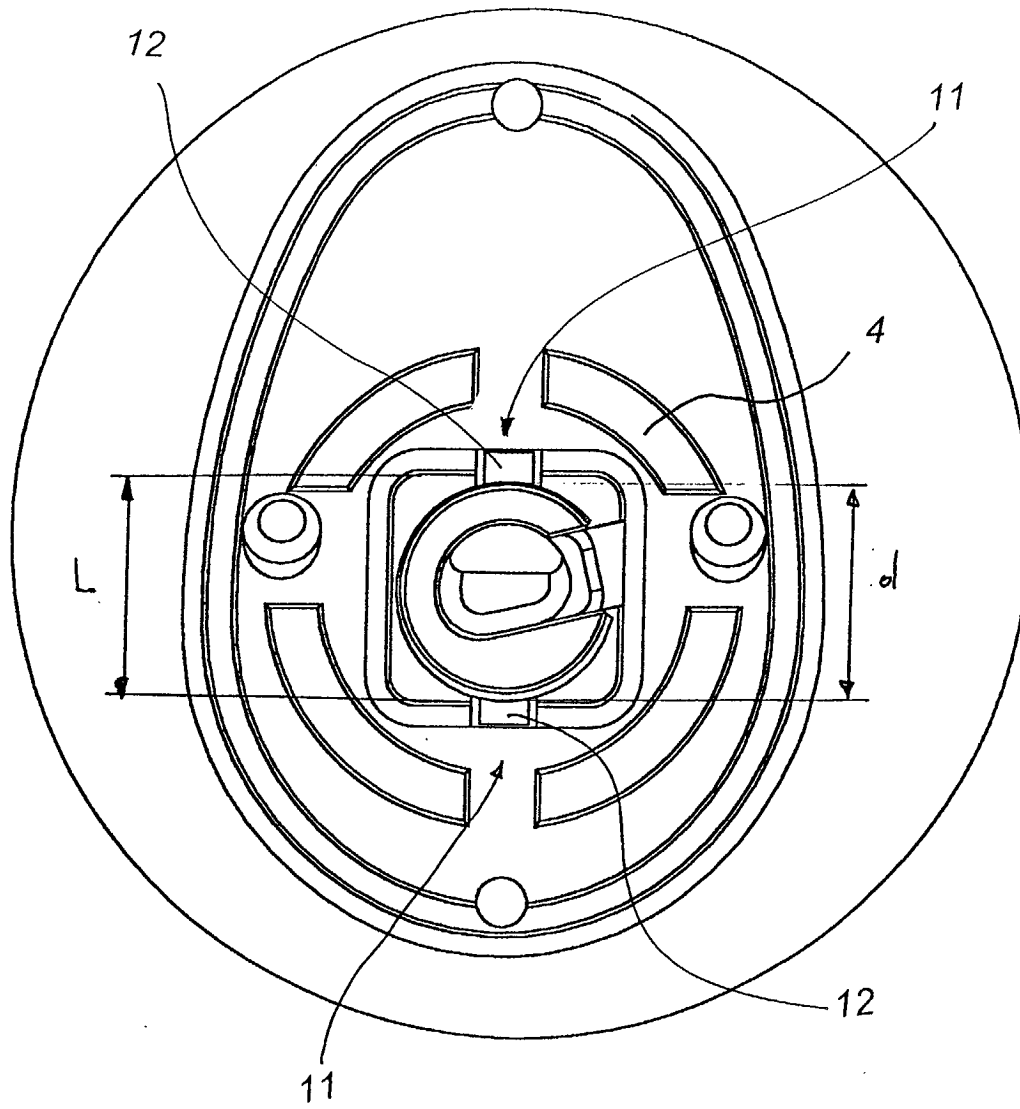


FIG. 4

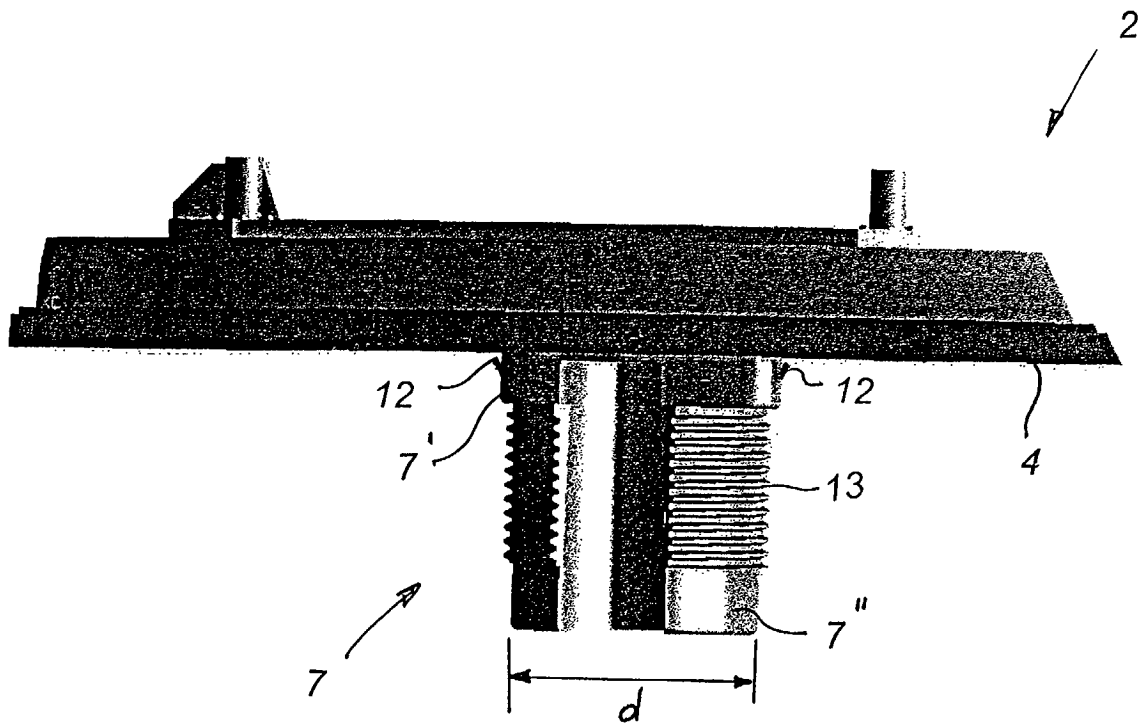


FIG. 5

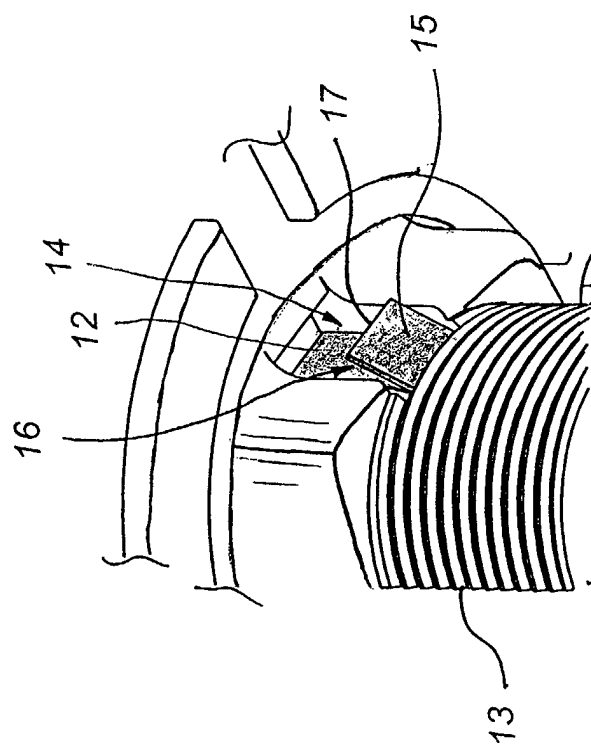


FIG. 6



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 02 00 1460

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			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
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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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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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