



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**02.07.2008 Bulletin 2008/27**

(51) Int Cl.:  
**H01Q 1/08 (2006.01) H01Q 1/32 (2006.01)**

(21) Application number: **07111343.5**

(22) Date of filing: **28.06.2007**

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR**  
Designated Extension States:  
**AL BA HR MK RS**

(72) Inventors:  
• **Valente, Giorgio**  
**36010 Cesuna (VI) (IT)**  
• **Salin, Natalino**  
**36031 Dueville (VI) (IT)**

(30) Priority: **20.12.2006 IT VI20060358**

(74) Representative: **Bonini, Ercole**  
**Corso Fogazzaro, 8**  
**36100 Vicenza (IT)**

(71) Applicant: **CALEARO ANTENNE S.P.A.**  
**20121 Milano (IT)**

(54) **Method for separating a projecting body of an antenna from a base and vehicular antenna using said method**

(57) The invention is a method for separating a projecting body (2; 102) of an antenna (1; 100; 200) from a base (5; 105; 205) that can be mutually snapped in and constrained to each other in a coupling direction (X) through the contact of friction areas (8; 108; 208) belonging to electric contact means (3; 103; 203) with undercuts (9; 109; 209) that can be identified on retaining means (4; 104; 204), said method including the following steps: rotating the electric contact means (3; 103; 203) with respect to the retaining means (4; 104; 204) on a rotation plane that is orthogonal to the coupling direction (X) in such a way as to release the friction areas (8; 108; 208) from the undercuts (9; 109; 209); removing the projecting body (2; 102) from the base (5; 105; 205). The release takes place through elastic deformation of the retaining means (4; 104; 204). Vehicular antenna (1; 100; 200) of the type comprising a projecting body (2; 102) that can be snapped in and constrained to a base (5; 105; 205) through the contact of friction areas (8; 108; 208) belonging to electric contact means (3; 103; 203) with undercuts (9; 109; 209) that can be identified on retaining means (4; 104; 204). The lateral surface of the electric contact means (3; 103; 203) presents projecting elements (7; 107; 207) that can be positioned in contact with the retaining means (4; 104; 204) that are compliant to the contact with the projecting elements (7; 107; 207).

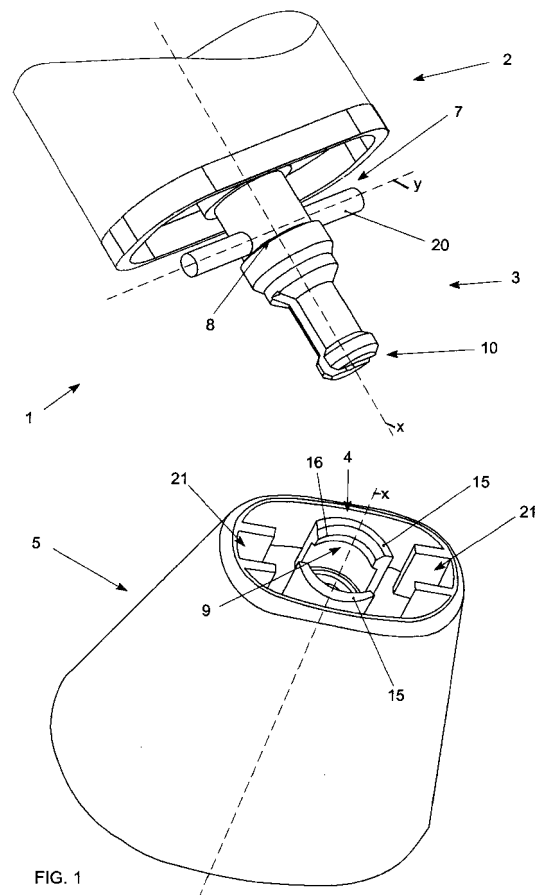


FIG. 1

## Description

**[0001]** The present invention concerns a method for separating the projecting body of an antenna from a base, particularly suited to be applied to vehicular antennas.

**[0002]** The present invention also concerns a vehicular antenna of the type comprising at least one projecting body and a base shaped in such a way as to be able to be separated through the said method.

**[0003]** It is known that vehicular antennas are often used which are constituted by a base associated with the vehicle and by a projecting body, often constituted by a rod, that is constrained to the base generally by screwing.

**[0004]** Said removable constraint is necessary in order to ensure that the user can remove the projecting body from the base in order to comply with the regulations in force or to protect the antenna, for example while transporting the vehicle or when the vehicle passes through a car wash.

**[0005]** In this last situation, in fact, the rotating brushes could damage the antenna irreparably, so that it is advisable to remove the projecting body from the base.

**[0006]** Said known vehicular antennas, though presenting a firm but removable connection between the projecting body and the base, however pose some acknowledged drawbacks.

**[0007]** The first of these drawbacks is constituted by the fact that the projecting body of all these antennas must have a substantially circular cross section, at least in proximity of the base.

**[0008]** Since, in fact, it is not possible to determine the end of the screwing stroke with absolute precision, no other shape would make it possible to obtain the perfect continuity of the external surface of the antenna in proximity of the connection between projecting body and base.

**[0009]** A further drawback of this embodiment lies in that the screwing and unscrewing operations require a given time due to the length of the thread necessary to ensure the resistance of the constraint to the considerable stress to which the antenna is subjected while the vehicle is being used.

**[0010]** In order to overcome these drawbacks, it could be possible to apply a constraint obtained with a bayonet joint between the projecting body and the base of an antenna.

**[0011]** This type of constraint makes it possible to overcome the previously-mentioned drawbacks but has further new weaknesses.

**[0012]** In particular, said constraint could be not sufficiently stable with respect to the stress to which the antenna is subjected.

**[0013]** In this regard, mechanical friction has increased, but it tends to deteriorate progressively over time.

**[0014]** Furthermore, the execution of a bayonet coupling of this type is particularly complex and therefore expensive.

**[0015]** The object of the present invention is to overcome the above-mentioned drawbacks that are typical of the known state of the art.

**[0016]** In particular, it is one object of the present invention to implement a method that allows the projecting body of a vehicular antenna to be separated from the respective base very quickly, without becoming a nuisance for the users.

**[0017]** It is a further object of the present invention to construct a vehicular antenna that allows the projecting body to be constrained to the base with no need for screw means.

**[0018]** It is another object of the present invention to ensure that said constraint is particularly stable and that the construction of the antenna remains rather simple.

**[0019]** It is another, yet not the least aim of the invention to construct a vehicular antenna that ensures the perfect connection, without any superficial non-homogeneity, between the projecting body of the antenna and the base, whatever the profile of the antenna.

**[0020]** The aims described above have been achieved through the implementation of a method for separating the projecting body of an antenna from the respective base according to the contents of the main claim, to which the reader should refer for the sake of brevity.

**[0021]** The other claims concern details of the method that is the subject of the invention, as well as a vehicular antenna that achieves the set objects, too.

**[0022]** Advantageously, the rotation of the electric contact means with respect to the retaining means makes it possible to deform the latter elastically in order to be able to remove the constraint obtained through friction, said constraint being generated between the area with raised profile belonging to the electric contact means and the undercuts belonging to the retaining means and holding the base and the projecting body of the antenna together.

**[0023]** Still advantageously, after said rotary movement, whose amplitude is generally limited, it is possible to remove the projecting body from the base with a single movement in the coupling direction.

**[0024]** At the end of the removal operation, advantageously, the retaining means elastically return to the rest position, thus making it possible to successively restore the constraint between the two parts with a single movement in the coupling direction.

**[0025]** Said constraint, due to the configuration of the electric contact means and of the retaining means, is of the snap-in type and therefore it can be obtained by simply forcing the electric contact means against the retaining means along the coupling direction.

**[0026]** The aforesaid objects and advantages, and others that will be described in greater detail below, are highlighted in the description of preferred embodiments of the invention, provided here as non-restrictive examples, with reference to the attached drawings, wherein:

- Figure 1 is an exploded axonometric view of the vehicular antenna carried out according to the inven-

- tion;
- Figure 2 shows a cross section of a detail of the vehicular antenna that is the subject of the invention;
  - Figure 3 is an exploded axonometric view of a construction variant of the vehicular antenna that is the subject of the invention;
  - Figure 4 is a further exploded view of the vehicular antenna shown in Figure 3;
  - Figure 5 is an exploded axonometric view of a further construction variant of the vehicular antenna that is the subject of the invention;
  - Figure 6 shows a detail of the construction variant shown in Figure 5;
  - Figure 7 shows a detail of the vehicular antenna that is the subject of the invention in operation;
  - Figure 8 shows a detail of the construction variant shown in Figure 3 in operation;
  - Figure 9 shows a detail of the construction variant shown in Figure 5 in operation.

**[0027]** The vehicular antenna that is the subject of the invention is represented in Figures 1 and 2, where it is indicated as a whole by **1** and where it can be observed that it comprises at least one projecting body **2** for receiving/sending radio-frequency signals, provided with electric contact means **3** that can be snapped in and thus constrained to retaining means **4** present in the base **5** of the antenna **1** according to a coupling direction **X**.

**[0028]** According to the invention, the lateral surface of the electric contact means **3** is provided with projecting elements **7** that can be positioned in contact with the retaining means **4**, said retaining means **4** being intrinsically compliant to the contact with the projecting elements **7** in order to allow the separation of the electric contact means **3** from the retaining means **4** when the projecting body **2** is subjected to a torque that tends to set it rotating on a plane that is orthogonal to the coupling direction **X**.

**[0029]** It should be noted that the constraint created between the projecting body **2** and the base **5**, besides being, advantageously, particularly stable, determines a certain mutual position between the projecting body **2** and the base **5**, making it possible, still advantageously, to obtain the continuity of the external surface of the antenna **1** of the invention in the connection point, whatever the profile of the antenna **1**.

**[0030]** It should also be noted that, according to a construction variant of the invention, the retaining means can be identified on the projecting body and the electric contact means can be identified on the base.

**[0031]** It is obvious that said construction variant is totally analogous to the preferred embodiment of the invention described herein, so much that it is not illustrated and described in detail to avoid useless repetitions.

**[0032]** According to a preferred embodiment of the invention described herein, the electric contact means **3** present, on their lateral surface, friction areas **8** that, as shown also in Figure 2, rest against undercuts **9** present

in the retaining means **4**.

**[0033]** This advantageously makes it possible to obtain the constraint of the projecting body **2** to the base **5**, a constraint that according to the invention is removable, as will be illustrated in greater detail below, through the rotary motion of the projecting body **2** that forces the projecting elements **7** against the retaining means **4** in order to expand them as much as needed to release the friction areas **8** from the undercuts **9**.

**[0034]** In the preferred embodiment of the antenna **1** described herein, the projecting body **2** is a rod, but this is not intended to represent a limitation for different embodiments of the invention according to which the projecting body can be a fin or any other element suited to receive/send radio-frequency signals.

**[0035]** As regards the electric contact means **3**, they comprise a shaped male element **10** arranged at the end of the projecting body **2** that is coupled with a shaped female element **11** belonging to the base **5**.

**[0036]** In particular, the shaped female element **11** is provided with a conical cavity **12** that houses at least the terminal section of the shaped male element **10** in order to generate the electric contact.

**[0037]** For this purpose, both the shaped male element **10** and the shaped female element **11** will be at least partially made of an electrically conductive material and furthermore, as can be seen in the figures, the shaped male element **10** has a central slot **13** that makes it elastically compliant in the axial directions.

**[0038]** This allows the shaped male element **10** to penetrate completely the conical cavity **12** of the shaped female element **11** and to generate the desired electric contact.

**[0039]** As regards the retaining means **4**, according to the preferred embodiment of the invention described herein they comprise two or more mainly laminate elements **15** opposing each other and projecting from the base **5** in the coupling direction **X**, in which the undercuts **9** mentioned above are defined.

**[0040]** According to the preferred embodiment of the invention described herein, said laminate elements **15** are defined by curved surfaces with opposing cavities.

**[0041]** Said laminate elements **15** are two and are provided with undercuts **9** constituted by an annular sector **16** protruding from the inner surface of the laminate elements **15**.

**[0042]** Accordingly, the friction area **8** of the electric contact means **3** is constituted by a collar that projects from the lateral surface of the contact means **3** and that, during insertion, presents a shaping **17** shown in detail in Figure 2 that is such as to expand the retaining means **4**, said means being elastically compliant, as already explained.

**[0043]** Once the electric contact means **3** have been inserted inside the retaining means **4**, the same retaining means **4** can return to the rest position by carrying out the constraint described above between the undercuts **9** and the friction areas **8**.

[0044] As regards the projecting means 7, according to the preferred embodiment of the invention described herein, they are constituted by at least one pin 20 projecting in two directions that passes through the electric contact means 3 according to a direction Y orthogonal to the coupling direction X mentioned above.

[0045] Furthermore, the base 5 comprises at least one housing 21 that serves to house a respective end of the pin 20 projecting in two directions.

[0046] The connection between the pin 20 projecting in two directions and the housing 21 advantageously makes it possible to avoid an excessive rotation of the projecting body 2 that may cause the retaining means 4 to break due to the excessive stress to which the projecting elements 7 subject them.

[0047] In this regard, the coupling between the pin 20 and the housings 21 constitutes an end-of-stroke element suited to stop the rotation of the projecting body 2 with respect to the base 5.

[0048] Obviously, the description given above is not intended to represent a limitation for different embodiments of the invention according to which, for example, the retaining means are constituted by a higher number of laminate elements.

[0049] An example of said different embodiment is represented in Figure 3 where the antenna that is the subject of the invention is indicated as a whole by 100 and where it can be observed that the laminate elements 115 are four.

[0050] Also in this case, the undercuts 109 are constituted by an annular sector protruding from the inner surface of the laminate elements 115.

[0051] As regards, on the other hand, the projecting elements 107, these are constituted by a prismatic body 130 positioned above the friction areas 108 and having at least one vertex 131 suited to be inserted between the retaining means 104.

[0052] In particular, all the vertices 131 of the prismatic body 130 fit in the interspaces between the laminate elements 115 of the retaining means 104 in such a way as to force laterally the same laminate elements 115 when the projecting body 102 is set rotating with respect to the base 105.

[0053] Furthermore, also in this case there is an end-of-stroke element suited to stop the rotation, constituted by a pin 123 that develops in the coupling direction X and that fits in a containing way 124 present on the projecting body 102 and illustrated in Figure 4.

[0054] It is evident that during the rotation of the rod 102 with respect to the base 105, the pin 123 comes into contact with the lateral surface of the containing way 124 and thus stops the rotary movement.

[0055] According to a further different embodiment of the invention, represented in Figure 5 and indicated as a whole by 200, the laminate elements 215 are constituted by plane surfaces opposing each other.

[0056] In this case, the undercuts 209, as observed also in the detail of Figures 6 and 9, are constituted by

at least one impression 235 recessed in the inner surface of the laminate elements 215.

[0057] In order to enhance the constraining action exerted by said undercuts 209 on the friction areas 208, a through hole 236 is provided in the laminate elements 215 and below the impressions 235.

[0058] Furthermore, the laminate elements 215 are provided with at least one slot 237 that occupies at least one section of the laminate elements 215 in width, in such a way as to make them elastically compliant as already explained.

[0059] According to said construction variant, the projecting elements 207, constituted by a prismatic body 230 like in the previous case, present at least one vertex 231, constituting the friction areas 208 shown in Figure 5, and at least one edge 232 arranged in contact with the retaining means 204 and in particular with the section of the retaining means 204 made elastically compliant by the slot 237.

[0060] In this case, advantageously, the coupling of the electric contact means 203 to the retaining means 204 takes place owing to the friction present between the vertices 231 of the prismatic body 230 and the lower surface of the impressions 235 at the height of the through holes 236.

[0061] According to the explanation given above, the subject of the invention includes also a method for separating the projecting body 2 of the antenna 1 from the base 5.

[0062] In particular, in operating conditions the projecting body 2 is snapped in and constrained to the base 5, since the electric contact means 3, as previously shown, present some friction areas 8 that rest against undercuts 9 provided in the retaining means themselves.

[0063] This condition is obtained by coupling the projecting body 2 to the base 5 along the coupling direction X so that the particular configuration of the friction areas 8 forces the retaining means 4 to expand elastically.

[0064] After the passage of the friction areas 8, the retaining means 4 return to the rest position by constraining the undercuts 9 to the friction areas 8.

[0065] Figure 7 shows the electric contact means 3 when inserted in the retaining means 4 of the base 5.

[0066] The separation method described above comprises two steps:

- rotating the electric contact means 3 with respect to the retaining means 4 on a rotation plane that is orthogonal to the coupling direction X in such a way as to release the friction areas 8 from the undercuts 9;
- removing the projecting body 2 from the base 5 through a movement in the coupling direction X.

[0067] According to the invention, this method is characterized in that the release of the friction areas 8 from the undercuts 9 takes place due to the elastic deformation of at least one section of the retaining means 4.

**[0068]** In particular, the rotation, which in Figure 8 is indicated as a counterclockwise rotation, makes the projecting elements **7** push on the sides of the laminate elements **15** of the retaining means **4** and forces their expansion owing, for example, to their intrinsic compliance or to a compliance due to structural modifications of the laminate elements themselves.

**[0069]** The housing **21**, furthermore, avoids an excessive rotation of the projecting body **2** that may damage the laminate elements **15** due to excessive stress.

**[0070]** According to the different embodiment of the invention shown in Figures 3 and 4, the release of the electric contact means **103** from the retaining means **104** takes place thanks to the stress generated on the laminate elements **115** by the vertices **131** of the prismatic body **130** constituting the projecting elements **107** of the electric contact means **103**.

**[0071]** In fact, as shown in Figure 9, the rotation of the projecting body **102** with respect to the base **105** generates, as a consequence, a force applied to the sides of the laminate elements **115** by the vertices **131**.

**[0072]** Said force causes the expansion of the laminate elements **115** with the consequent release of the friction areas **108** from the undercuts **109** shown in Figure 3.

**[0073]** Also in this case, the pin **123**, shown in Figure 3, cooperates with the containing way **124**, shown in Figure 4, to prevent an excessive rotation that may damage the laminate elements **115**.

**[0074]** The situation of the embodiment shown in Figure 9 is slightly different.

**[0075]** In this case, as shown in Figure 9, when the projecting body **202** is constrained to the base **205**, at least one pair of opposite vertices **231** is arranged in correspondence with the through holes **236** present in the laminate elements **215** below the impressions **235**.

**[0076]** To obtain the release of said vertices **231** from the impressions **235**, owing to the rotating movement of the projecting body **202** the edges **232** arranged in contact with the laminate elements **215** force the expansion of the sections of the laminate elements **215** made compliant by the slots **237**.

**[0077]** Said expansion allows the prismatic body **230** to be arranged obliquely with respect to the initial position, so that its vertices **231** come out of the through holes **236** present below the impressions **235**, thus releasing the constraint.

**[0078]** In this case, it is thus possible to remove the projecting body **202** from the base **205** of the antenna **200**.

**[0079]** According to this embodiment, the end-of-stroke element is constituted by the walls of the base **205** that prevent an excessive expansion of the sections of the laminate elements **215** provided with the slots **237**.

**[0080]** According to the above, both the vehicular antenna and the method for separating the projecting body of the vehicular antenna from the base achieve the set objects.

**[0081]** In particular, the invention achieves the object

to implement a method that allows the projecting body of a vehicular antenna to be separated from the respective base very quickly, without becoming a nuisance for the users.

**[0082]** The invention also achieves the object to construct a vehicular antenna that allows the projecting body to be constrained to the base with no need for screw means.

**[0083]** The invention also achieves the object to ensure that said constraint is particularly stable and that the construction of the antenna remains rather simple.

**[0084]** The invention finally achieves the object to construct a vehicular antenna that ensures the perfect connection, without any superficial non-homogeneity, between the projecting body of the antenna and the base.

**[0085]** During the construction phase, the vehicular antenna that is the subject of the invention may undergo further changes that, though not illustrated and described herein, shall nonetheless be covered by the present patent, provided that they come within the scope of the claims that follow.

**[0086]** Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

## Claims

1. Method for separating a projecting body (2; 102) of an antenna (1; 100; 200) from a base (5; 105; 205), wherein said projecting body (2; 102) and said base (5; 105; 205) can be mutually constrained with a snap-in action in a coupling direction (X) through the contact between friction areas (8; 108; 208) belonging to electric contact means (3; 103; 203) with undercuts (9; 109; 209) that can be identified in retaining means (4; 104; 204), said method including the following steps:

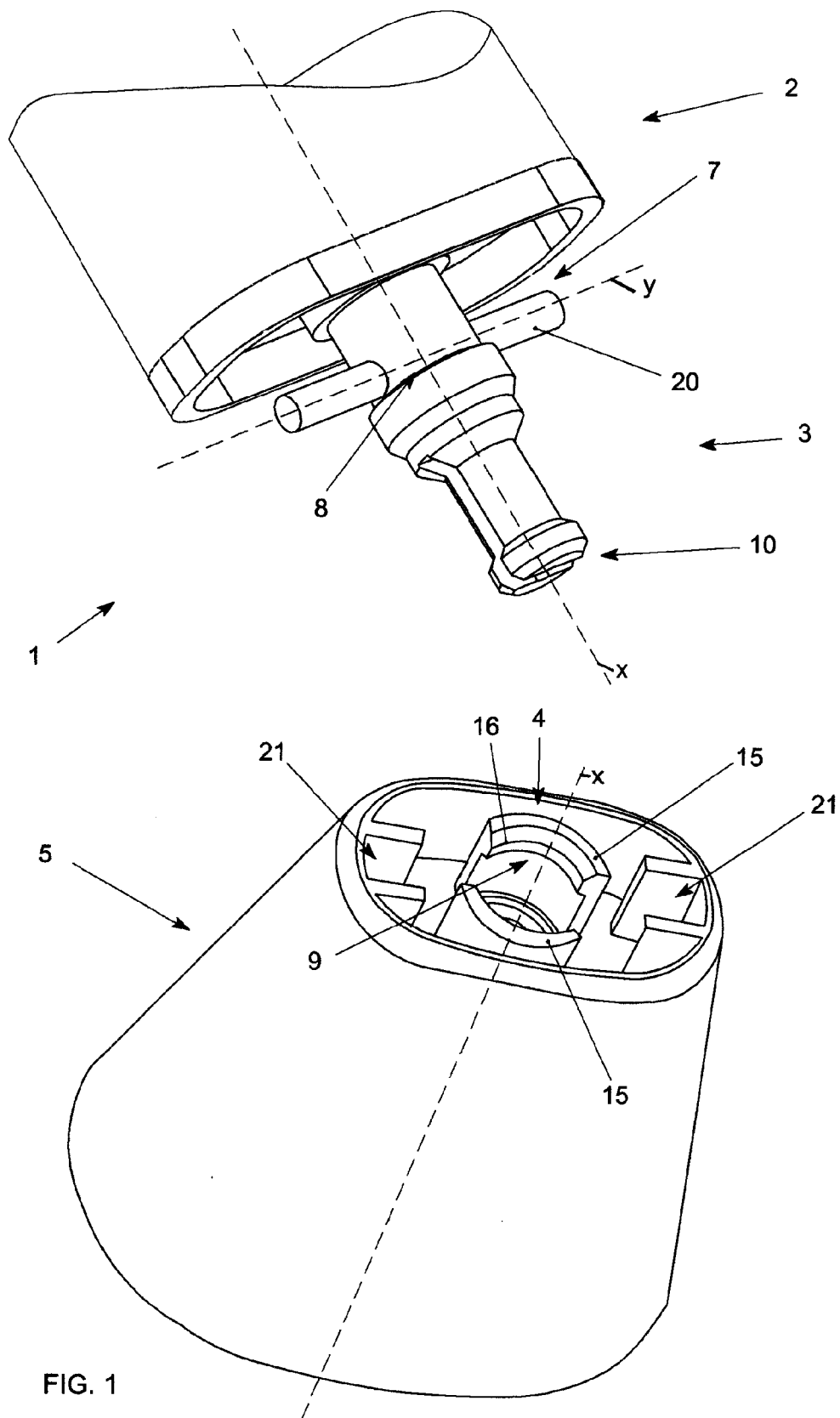
- rotating said electric contact means (3; 103; 203) with respect to said retaining means (4; 104; 204) on a rotation plane that is orthogonal to said coupling direction (X) in such a way as to release said friction areas (8; 108; 208) from said undercuts (9; 109; 209);
- removing said projecting body (2; 102) from said base (5; 105; 205) through a movement in said coupling direction (X),

**characterized in that** said release of said friction areas (8; 108; 208) from said undercuts (9; 109; 209) takes place through elastic deformation of at least one section of said retaining means (4; 104; 204).

2. Method according to claim 1), **characterized in that** said elastic deformation is obtained by forcing projecting elements (7; 107; 207) belonging to the lateral surface of said electric contact means (3; 103; 203) against said section of said retaining means (4; 104; 204). 5
3. Method according to claim 1) or 2), **characterized in that** said electric contact means (3; 103; 203) can be identified on said projecting body (2; 102) and said retaining means (4; 104; 204) can be identified on said base (5; 105; 205). 10
4. Method according to claim 1) or 2), **characterized in that** said electric contact means can be identified on said base and said retaining means can be identified on said projecting body. 15
5. Method according to any of the preceding claims, **characterized in that** said elastic deformation takes place due the intrinsic compliance of said section of said retaining means (4; 104; 204). 20
6. Vehicular antenna (1; 100; 200) of the type comprising at least one projecting body (2; 102) suitable for receiving/sending radio-frequency signals, wherein said projecting body can be snapped in and constrained to a base (5; 105; 205) in a coupling direction (X) through the contact of friction areas (8; 108; 208) belonging to electric contact means (3; 103; 203) with undercuts (9; 109; 209) that can be identified on retaining means (4; 104; 204), **characterized in that** the lateral surface of said electric contact means (3; 103; 203) presents projecting elements (7; 107; 207) that can be positioned in contact with said retaining means (4; 104; 204), wherein said retaining means (4; 104; 204) are compliant to the contact with said projecting elements (7; 107; 207) to allow for separation of said electric contact means (3; 103; 203) from said retaining means (4; 104; 204) when said projecting body (2; 102) is subjected to a torque that tends to set it rotating on a plane that is orthogonal to said coupling direction (X). 25 30 35 40
7. Antenna (1; 100; 200) according to claim 6), **characterized in that** said electric contact means (3; 103; 203) can be identified on said projecting body (2; 102) and said retaining means (4; 104; 204) can be identified on said base (5; 105; 205). 45 50
8. Vehicular antenna (1; 100; 200) according to claim 6) or 7), **characterized in that** said electric contact means (3; 103; 203) comprise a shaped male element (10) arranged at the end of said projecting body (2; 102) and matching with a shaped female element (11) belonging to said base (5; 105; 205). 55
9. Vehicular antenna (1; 100) according to claim 8), **characterized in that** said shaped female element (11) is provided with a conical cavity (12) suited to receive at least one section of said shaped male element (10) in order to generate said electric contact.
10. Vehicular antenna (1; 100; 200) according to any of the claims from 6) to 9), **characterized in that** said retaining means (4; 104; 204) comprise one or more mainly laminate elements (15; 115; 215) opposing one another and projecting from said base (5; 105; 205) in said coupling direction (X), in which said undercuts (9; 109; 209) are defined.
11. Antenna according to claim 6), **characterized in that** said electric contact means can be identified on said base and said retaining means can be identified on said projecting body.
12. Vehicular antenna according to claim 6) or 11), **characterized in that** said electric contact means comprise a shaped female element arranged at the end of said projecting body and matching with a shaped male element belonging to said base.
13. Vehicular antenna according to claim 12), **characterized in that** said shaped female element is provided with a conical cavity suited to receive at least one section of said shaped male element in order to generate said electric contact.
14. Vehicular antenna according to any of the claims from 11) to 13), **characterized in that** said retaining means comprise one or more mainly laminate elements opposing one another and projecting from said projecting body in said coupling direction, in which said undercuts are defined.
15. Vehicular antenna (1; 100) according to claim 10) or 14), **characterized in that** said laminate elements (15; 115) are defined by curved surfaces with opposing concavities.
16. Vehicular antenna (200) according to claim 10) or 14), **characterized in that** said laminate elements (215) are defined by opposing plane surfaces.
17. Vehicular antenna (1; 100) according to claim 15), **characterized in that** said undercuts (9; 109) are constituted by an annular sector (16) projecting from the inner surface of said laminate elements (15; 115).
18. Vehicular antenna (200) according to claim 16), **characterized in that** said undercuts (209) are constituted by at least one impression (235) recessed in the inner surface of said laminate elements (215).
19. Vehicular antenna (200) according to claim 18),

**characterized in that** said laminate elements (215) are provided with a through hole (236) below said impression (235).

20. Vehicular antenna (200) according to claim 18) or 19), **characterized in that** said laminate elements (215) are provided each with at least one slot (237) that occupies at least one section of said laminate elements (215) in width. 5  
10
21. Vehicular antenna (1; 100; 200) according to any of the preceding claims, **characterized in that** said projecting body (2; 102) is a rod. 15
22. Vehicular antenna (1) according to any of the claims from 2) to 21), **characterized in that** said projecting elements (7) are constituted by at least one pin (20) projecting in two directions that passes through said electric contact means (3) in a direction (Y) that is orthogonal to said coupling direction (X). 20
23. Vehicular antenna (1) according to claim 22), **characterized in that** it comprises at least one housing (21) suited to receive a corresponding end of said pin (20) projecting in two directions. 25
24. Vehicular antenna (100) according to any of the claims from 2) to 21), **characterized in that** said projecting elements (107) are constituted by a prismatic body (130) positioned above said friction areas (108) and having at least one vertex (131) suited to be inserted in said retaining means (104). 30
25. Vehicular antenna (200) according to any of the claims from 2) to 21), **characterized in that** said projecting elements (207) are constituted by a prismatic body (230) having at least one vertex (231) constituting said friction areas (208) and having at least one edge (232) arranged in contact with said retaining means (204). 35  
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26. Vehicular antenna (1; 100; 200) according to any of the preceding claims, **characterized in that** it comprises an end-of-stroke element suited to stop the rotation of said projecting body (2; 102) with respect to said base (5; 105; 205). 45
27. Vehicular antenna (100) according to claim 26), **characterized in that** said end-of-stroke element suited to stop the rotation comprises at least one pin (123) belonging to said base (105) and developing in said coupling direction (X), said pin (123) being suited to fit in a containing way (124) present on said projecting body (102). 50  
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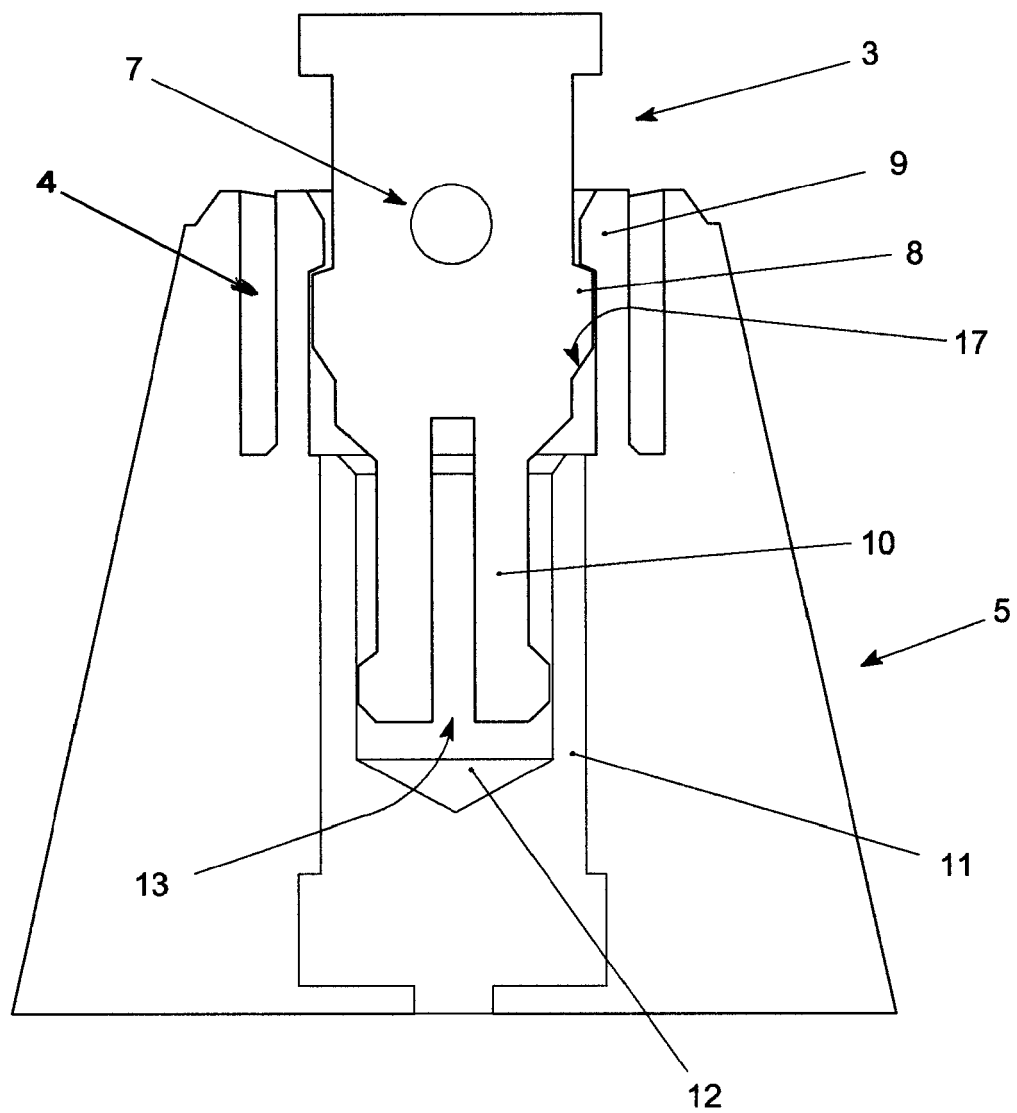


FIG. 2

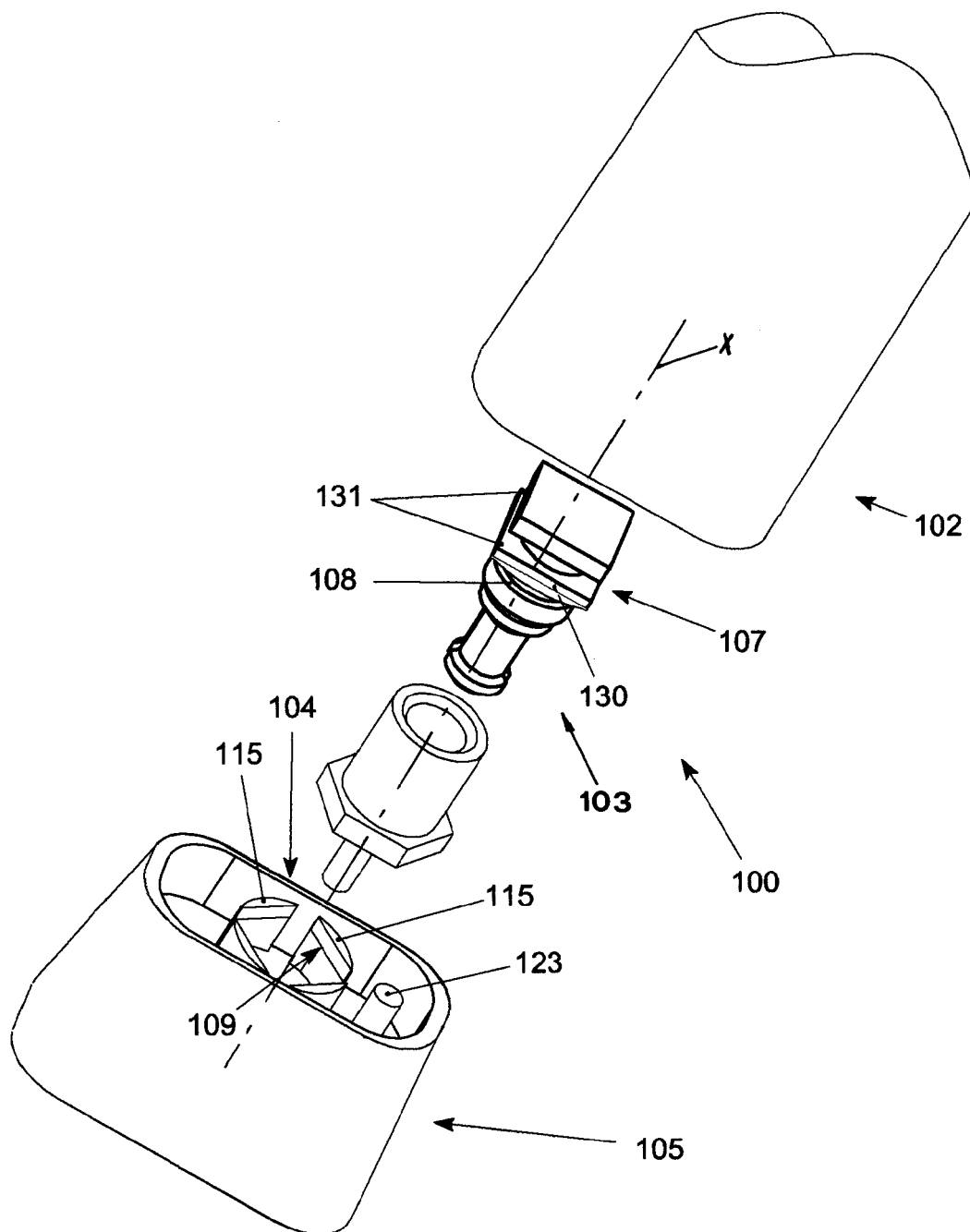


FIG. 3

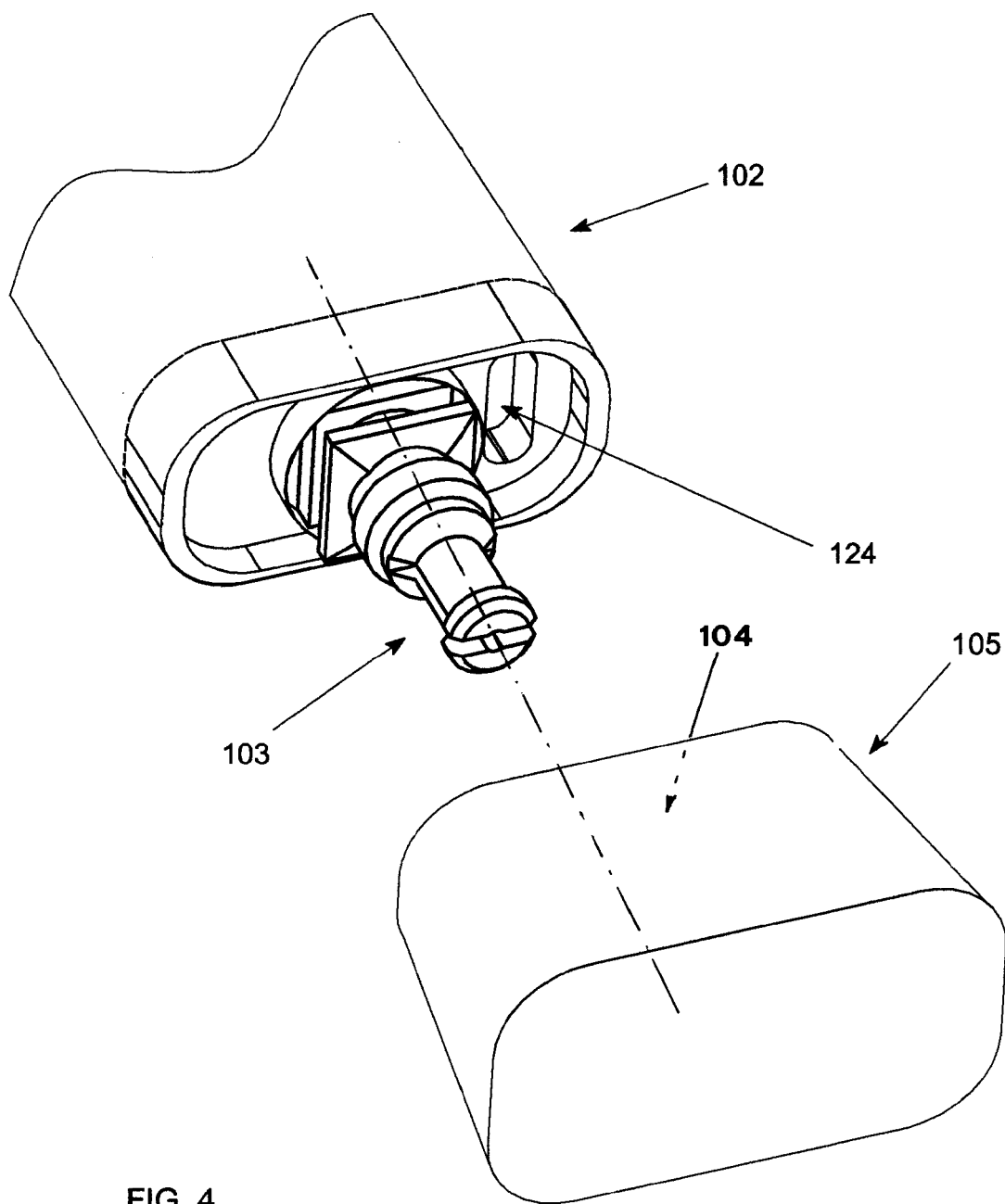


FIG. 4

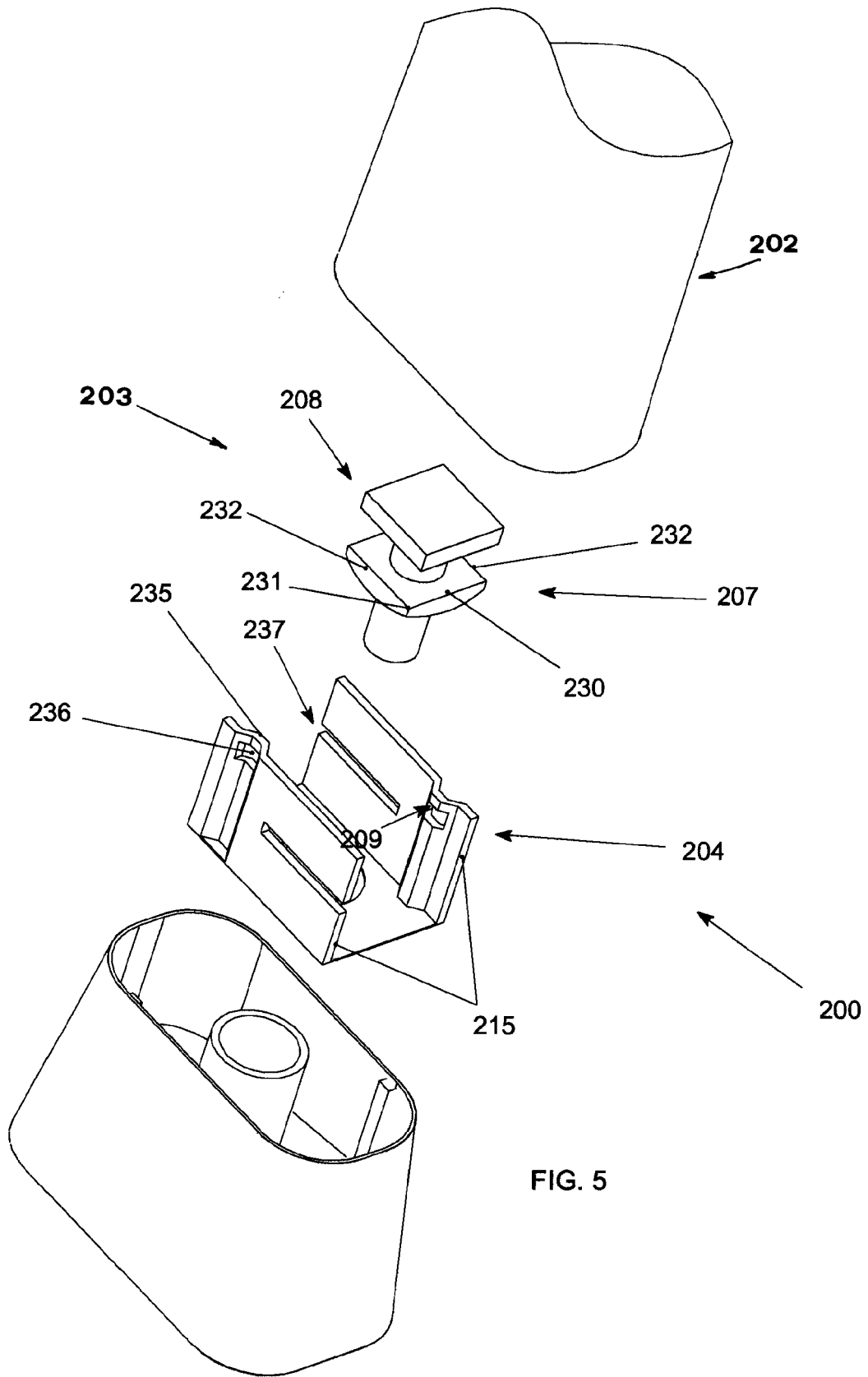


FIG. 5

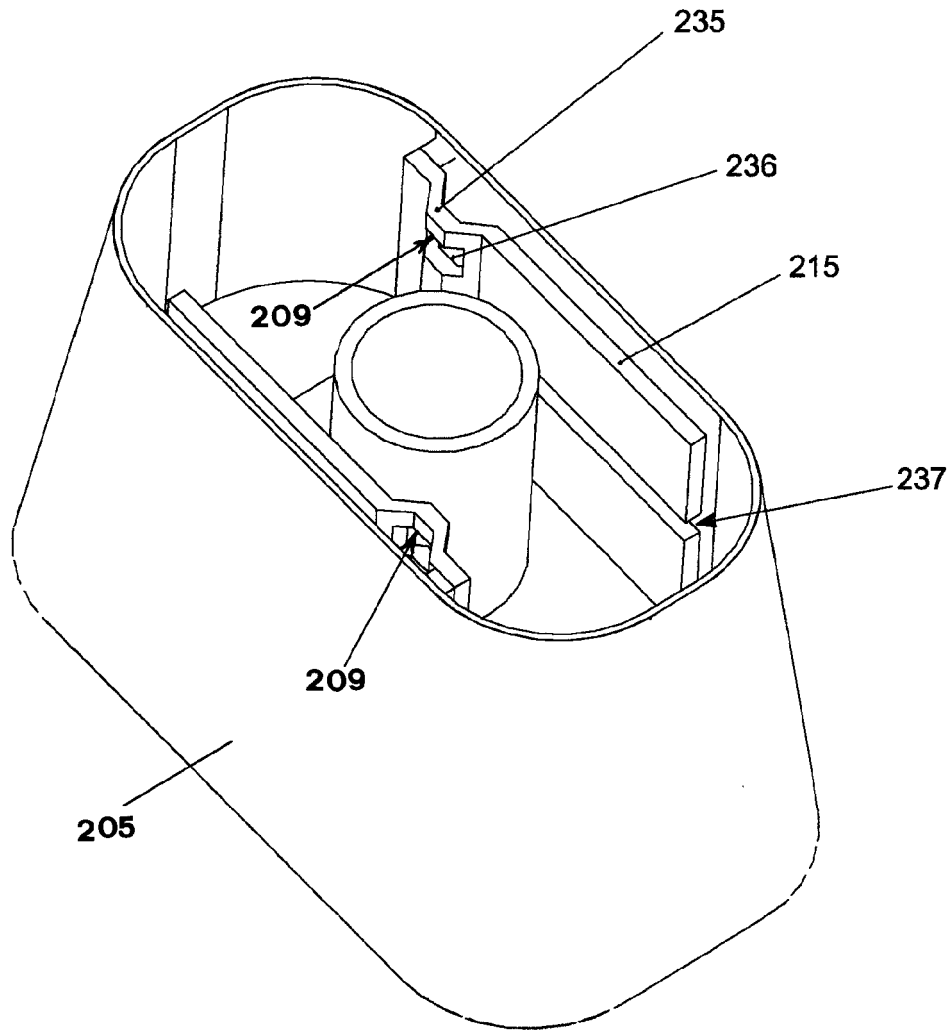


FIG. 6

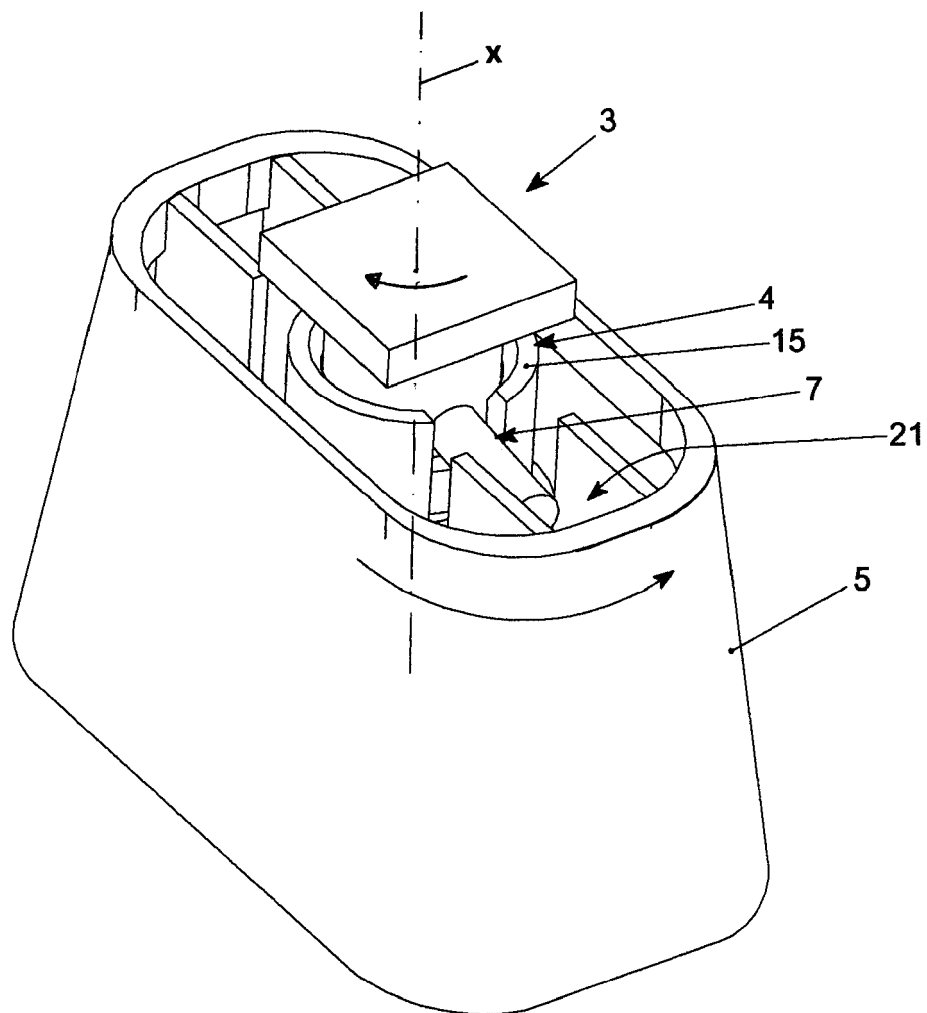


FIG. 7

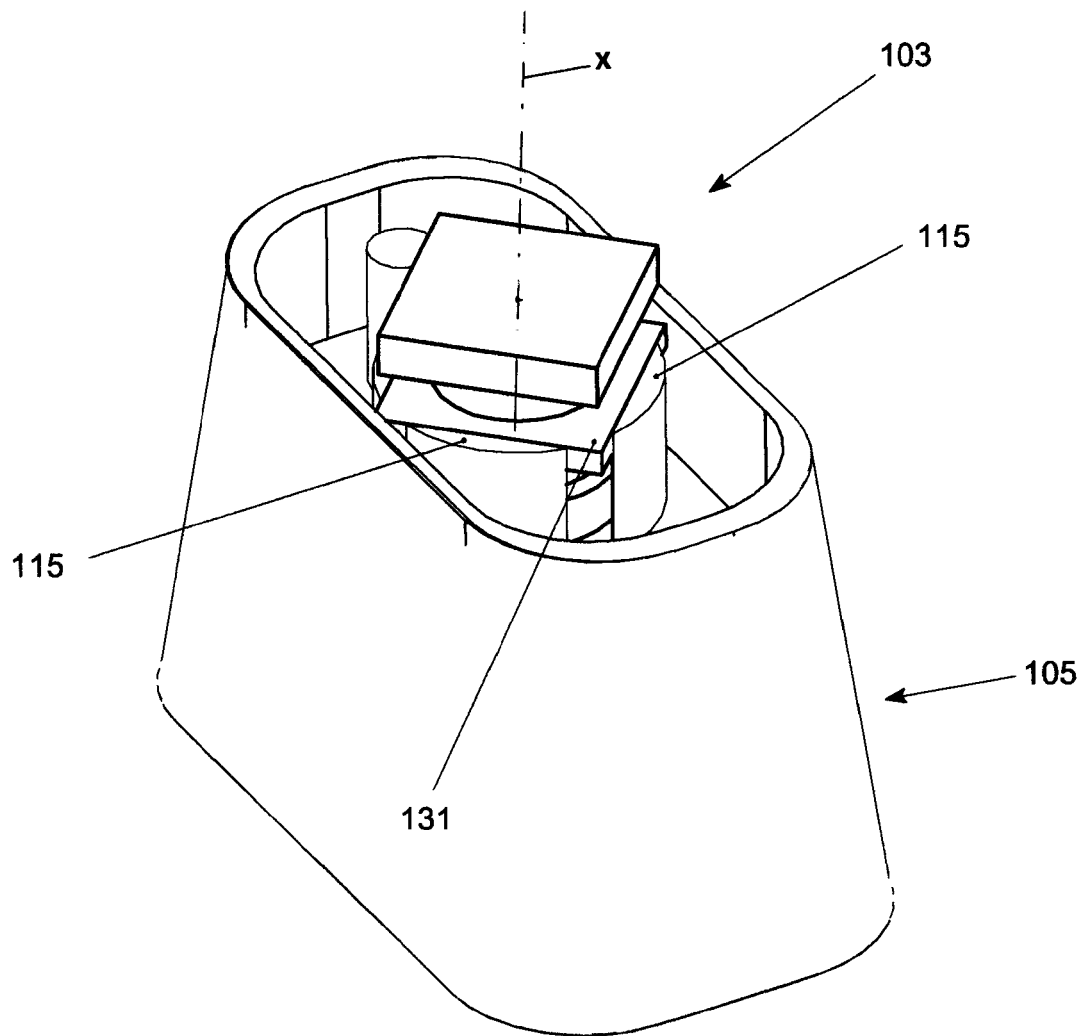


FIG. 8

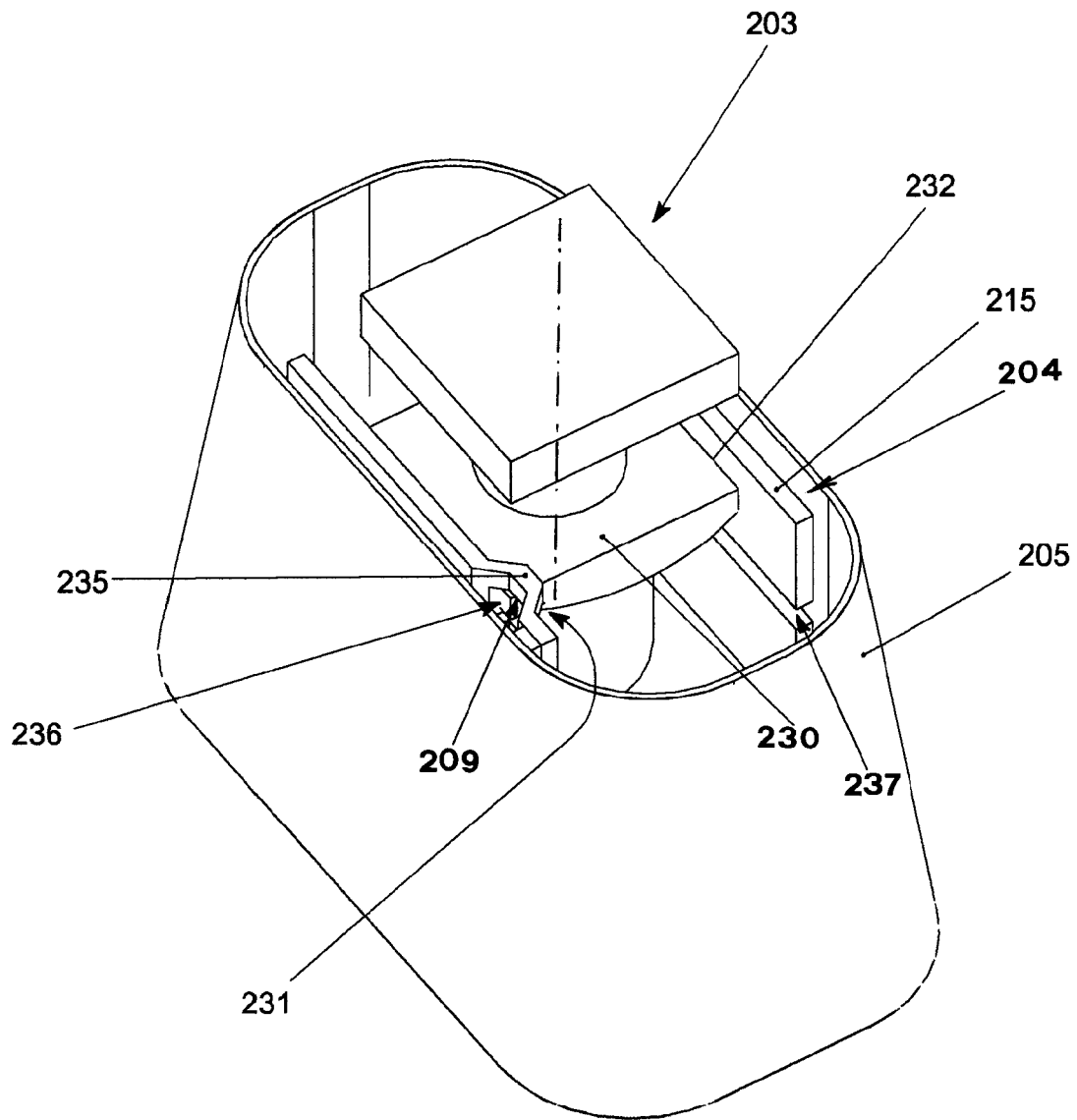


FIG. 9





European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 07 11 1343

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 0 443 172 A (HIRSCHMANN RICHARD GMBH CO [DE]) 28 August 1991 (1991-08-28) * column 4, line 54 - column 6, line 42; figure 2 *	1-27	INV. H01Q1/08 H01Q1/32
A	----- US 3 544 140 A (LANGHECK RICHARD) 1 December 1970 (1970-12-01) * the whole document *	1-27	
A	----- WO 00/10221 A (CALEARO MASSIMO [IT]) 24 February 2000 (2000-02-24) * the whole document *	1-27	
A	----- WO 01/67545 A (GALTRONICS LTD [US]; PRUSS FELIX [IL]; GOLDMAN RUVIM [IL]) 13 September 2001 (2001-09-13) * abstract; figures 10a,14 *	1-27	
			TECHNICAL FIELDS SEARCHED (IPC)
			H01Q
The present search report has been drawn up for all claims			
Place of search <b>Munich</b>		Date of completion of the search <b>27 September 2007</b>	Examiner <b>Johansson, Roland</b>
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	

1  
EPO FORM 1503 03.92 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 07 11 1343

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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27-09-2007

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
EP 0443172	A	28-08-1991	DE	4005029 A1	05-09-1991
US 3544140	A	01-12-1970	DE	1655144 A1	19-05-1971
			FR	2036978 A5	31-12-1970
WO 0010221	A	24-02-2000	AT	263437 T	15-04-2004
			BR	9912919 A	08-05-2001
			CZ	20010456 A3	16-01-2002
			DE	69916080 D1	06-05-2004
			DE	69916080 T2	24-03-2005
			EP	1105933 A1	13-06-2001
			ES	2218999 T3	16-11-2004
			IT	VI980153 A1	11-02-2000
			US	6100852 A	08-08-2000
WO 0167545	A	13-09-2001	AU	4099901 A	17-09-2001
			CN	1451188 A	22-10-2003