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(54) **ANTENNA FOR MOTOR VEHICLES**

ANTENNE FÜR KRAFTFAHRZEUGE

ANTENNE POUR VÉHICULES AUTOMOBILES

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Description

[0001] The present invention relates to an antenna for motor vehicles having an optimized structure and assembly.

[0002] The antenna according to the invention is especially suitable for use in motor vehicles, for example mounted on the roof of a motor vehicle, and will be described here below with reference to said use without however limiting possible applications to other types of vehicles, such as buses, trucks, commercial vehicles, etc..

[0003] As is known in the art, antennas devised for being mounted on the roof or any other external surface of a motor vehicle substantially comprise a functional part, constituted by a plurality of components suitably configured and assembled to each other in such a way as to ensure the mounting and proper functioning of the antenna, and a purely aesthetic part, typically a cover or cap configured for example as a shark fin, which is suitable to be coupled to the functional part, and whose purpose is to guarantee and maintain adequate aesthetic value of the motor vehicle once the antenna has been installed.

[0004] In the development of these antennas, one of the unavoidable objectives is to obtain a solution where the production, assembly of the components and mounting on the motor vehicle are as simple, reliable and cost-effective as possible.

[0005] In particular, as far as the assembly of this type of antenna is concerned, an important aspect regards the mechanical stability of the assembled parts which form its functional part.

[0006] In fact, quite frequently the functional part and the aesthetic part are produced separately, even by different manufacturers, and are then sent separately and assembled together at a later moment, for example during installation on the motor vehicle.

[0007] In this case, therefore, it is even more important to guarantee the stability and mechanical reliability of the assembly of the components making up the functional part which then has to be coupled to the aesthetic part.

[0008] US 2009/066593 A1 discloses an antenna according to the preamble of appended claim 1.

[0009] US 2021/044006 A1 discloses an antenna device for a vehicle, which comprises an outer cover, an inner cover, a mounting base comprising a resin part and a metal part, a radiating element intended to be housed inside the inner cover, and a flexible pad having a shape suitable for being fitted onto the mounting base. During assembly, the inner cover is connected to the resin part of the mounting base by means of screws, with the flexible pad inserted between them.

[0010] KR 102024714 B1 discloses a watertight structure of an antenna attached to a vehicle, which comprises: a dome-shaped upper case having an open bottom; a lower case forming a substrate guide to which an antenna circuit is disposed, the lower case being coupled

with the upper case; and a rubber pad formed to surround the lower case and having a rib compression groove formed along an outer surface of at least one watertight rib.

[0011] US 2010/265147 A1 discloses an antenna apparatus comprising an antenna board which is vertically mounted on a planar antenna base, and a top portion disposed to stride over the antenna board. An antenna element includes the top portion and an antenna pattern formed on the antenna board. An antenna case is fitted in the antenna base.

[0012] Therefore, the aim of the present invention is to provide an antenna for motor vehicles which makes it possible to optimize one or more of the above-mentioned aspects.

[0013] This, as well as others which will become more apparent from the following description, is reached by means of an antenna for motor vehicles whose characteristics are defined in claim 1.

[0014] Particular embodiments are object of the dependent claims and are intended as integral part of the present description.

[0015] Further characteristics and advantages of the invention will become more apparent from the following detailed description of exemplary and non-limiting embodiments, and with reference to the attached drawings, where:

figure 1 is an exploded view of a possible embodiment of the antenna according to the invention;
figure 2 is an underneath view of the outer aesthetic cover illustrated in figure 1;
figures 3-7 illustrate, from different perspectives, some assembly stages of some of the components of the antenna in figure 1.

[0016] It should be noted that in the following detailed description, identical or similar components, from both structural and/or functional points of view, may be indicated with the same or different reference numbers, independently of the fact that they may be shown in different embodiments of the present invention or in distinct parts.

[0017] It should also be noted that, in order to illustrate this invention clearly and concisely, the drawings are not necessarily to scale and certain characteristics of the description may be shown in a rather schematic form.

[0018] Furthermore, when the term "adapted" or "organized" or "configured" or "shaped" or a similar term is used in this document, with reference to any component whatsoever as a whole or to any part whatsoever of a component or a combination of components, it must be understood as meaning and comprising correspondingly the structure and/or configuration and/or shape and/or position.

[0019] Finally in the following description and claims, the ordinal numbers first, second, etc., will be used for greater illustrative clarity and in no way must be under-

stood as limiting for any reason whatsoever; in particular, for example the indication "first coupling means..." does not necessarily imply the presence or specific requirement that there are further "second coupling means", or vice versa, unless said presence is strictly necessary for the correct functioning of the antenna according to the invention, nor that the order must be exactly in the sequence described with reference to the illustrated embodiments.

[0020] Figure 1 is an exploded view illustrating a possible embodiment of the various components of an antenna according to the invention, indicated with the overall reference number 100.

[0021] The antenna 100 according to the invention comprises at least:

- a first cover or inner protection cover 1;
- at least one radiating element 12 which effectively constitutes the element suitable to receive/transmit signals, and is operationally connected to the printed circuit board 10;
- a base or mounting plate 20 which, during installation of the antenna 100, is intended to be connected to a mounting surface of a motor vehicle, for example to its roof;
- at least one gasket 30 which, as will be seen in more detail in the following description, acts both as a holding element and as an assembly element.

[0022] Furthermore, the antenna 100 may comprise a second cover or outer cover 40, which is suitable to externally cover the above mentioned antenna components, and substantially acts as an element of aesthetic covering.

[0023] As illustrated in figure 1, the first cover or inner protection cover 1 is composed of an internally hollow structure, for example made of plastic material, and comprises a first hollow portion 2 intended to accommodate at least partially the at least one radiating element 12.

[0024] As illustrated for ease of illustration only in figure 5, on the upper part 3 of the first hollow portion 2 there is at least one open slit 4 which extends longitudinally from of the rear part 5 towards a front or anterior wall 6 (when the cover 1 is seen from a side view) of said first portion 2.

[0025] Depending on the application requirements, the slit 4 may be a single continuous section which extends along entirely or only part of the upper part of the wall 3 between the rear wall 5 and the front wall 6, or it may be composed of two or more sections separated from each other. Respective flexible clasps can be provided between adjacent separated sections of the slit 4.

[0026] Advantageously, in the antenna 100 according to the invention the inner cover 1 comprises a second portion 7 which extends (when seen from a side view) anteriorly, namely ahead, from the front wall 6 of the first portion 2 and is provided with mechanical coupling means with the gasket 30 as will be seen more in detail

in the following description.

[0027] In particular, in the illustrated embodiment, the second portion 7 comprises a substantially rectilinear wall 8, and the mechanical coupling means with the gasket 30 comprise a pin 9 which protrudes downwardly from the lower free end of the wall 8 itself, and is suitably intended for the mechanical coupling with the gasket 30.

[0028] In its turn, the second outer cover 40 is composed of an internally hollow structure, for example made of plastic material and which, as can be seen in figure 2, comprises means for mechanical coupling with the gasket 30, formed for example by one or more engagement seats 42, in the illustrated embodiment two engagement seats 42.

Furthermore, the outer cover 40 comprises, along its inner edge, a plurality of holes or hollow seats 44 suitable to house fixing screws (not illustrated in the figure) to the mounting plate 20.

[0030] In the embodiment illustrated in the figures, the at least one radiating element comprises a first radiating element 12, a second radiating element 13 and a third radiating element 14.

Furthermore, according to said embodiment, the antenna 100 comprises at least one printed circuit board, and in particular a first printed circuit board 10 and a second printed circuit board 11.

According to said embodiment, the first radiating element 12 is operationally coupled to the first printed circuit board 10, and the second radiating element 13 and the third radiating element 14 are operationally coupled to the second printed circuit board 11.

Clearly, depending on the applications, it is possible to use a different number of radiating elements, for example on the basis of the different types of signals to receive/transmit, as also a different number of printed circuit boards.

For example, it is possible that the electronics necessary for the functioning of one or of each radiating element utilized be placed on the same radiating element, without using separate circuit boards.

In the antenna 100 according to the invention, the mounting plate 20 is made of metallic material, for example Zamak, and comprises, as illustrated more in detail in figure 3, a base 22 from which a first wall 24 rises which defines a housing space 26.

In the example illustrated in the figures, the first wall 24 extends around the entire perimeter of the housing space 26; clearly, it is possible that the first wall 24 extends along only one or more sections and not necessarily along the entire perimeter of the housing space 26.

A plurality of first holes or fixing seats 27 are located along the first wall 24, suitable for fixing, for example by means of screws 15, the or each printed circuit board 10, 11; furthermore, a plurality of second holes or fixing seats 28 are located along the edge of the base 22 outside the first wall 24 suitable for fixing the inner cover 1, for example by means of screws 17, and a third plurality of holes or fixing seats 29 suitable to be

aligned with the holes or hollow seats 44 for fixing the outer cover 40 by means of other fixing screws.

[0038] On the bottom wall of the housing 26, at least a first through hole 21 is provided intended for the insertion of cables, indicated in figure 1 by the overall reference number 50, for the wiring of the various radiating elements 12, 13 and 14, and at least a second through hole 23 provided for example with a sleeve 25 for connecting, with the mechanical coupling means of the antenna 100, and in particular of the mounting plate 20, to the mounting surface of the motor vehicle.

[0039] In the embodiment illustrated in figure 1, said mechanical coupling means comprise for example a gasket 51, a fixing screw 52, a finned washer or ground-washer 54, and a mechanical fixing device or spline device 56.

[0040] The gasket 30 has a substantially flexible structure, made for example of rubber material, for example "Teflabloc Tosi 431" or "Thermolast TP6 HKZ", or of EPDM rubber and, in the illustrated embodiment, is generally shaped like the base of an iron.

[0041] In particular, as can be better seen in figure 4, the gasket 30 comprises a first portion 31 which is shaped in a manner geometrically conjugated with the mounting plate 20 and comprises a through opening 32 suitable to house the first wall 24.

[0042] A second wall 34 rises above the edge of the through opening 32 and is intended to rest upon the external surface of the first wall 24.

[0043] Around the second wall 34, further through openings 36 are provided suitable to be positioned in correspondence of and overlapping with the second and third holes or fixing seats 28 and 29 of the plate 20 itself.

[0044] Advantageously, the gasket 30 comprises a second portion, for ease of illustration illustrated only in figures 4 and 7 with the reference number 35, which extends (when seen from a side view) anteriorly, namely ahead from the first portion 31 and on which mechanical coupling means are provided (hereinafter for the sake of clarity of illustration indicated as the first mechanical coupling means) at least with the inner cover 1, and in particular with the above mentioned corresponding mechanical coupling means of the inner cover 1.

[0045] In particular, in the embodiment illustrated, said mechanical coupling means form integral part of the structure of the gasket 30, in other words they are not additional elements connected to it, and comprise, as for example visible in figures 1 and 4, a housing seat 37, located for example towards the point or front edge 36 of the gasket 30.

[0046] During assembly, and as visible for example in figure 7, the pin 9 of the inner cover 1 is inserted into the seat 37 and is thus mechanically coupled to the gasket 30.

[0047] Usefully, the gasket 30 comprises means for mechanical coupling (hereinafter indicated for the sake of clarity of illustration as second mechanical coupling means) with the second cover or outer cover 40.

[0048] In particular, said second mechanical coupling means form integral part of the structure of the gasket 30, in other words they are not additional elements connected to it, and comprise, as visible for example in figures 1 and 4, two protuberances or engagement teeth 38 which extend above the base of the portion 35 and are configured in such a way as to be each inserted into a corresponding engagement seat 42 of the outer cover 40.

[0049] Conveniently, the gasket 30 is further configured so as to comprise means for mechanical coupling with the mounting plate 20 (hereinafter indicated for the sake of clarity of illustration as third mechanical coupling means).

[0050] In particular, in the embodiment illustrated, as for example visible in figure 6, said third mechanical coupling means form integral part of the structure of the gasket 30, in other words they are not additional elements connected to it, and comprise one or more engagement teeth 39.

[0051] In the embodiment illustrated, as for example visible in figure 7, for example three engagement teeth are provided one of which positioned alongside the front edge of the mounting plate 20 and two alongside the two lateral sides of said plate.

[0052] In practice, according to the embodiment illustrated, during assembly, as visible in figure 4, the printed circuit boards 10, 11 used in the example, are fixed to the first wall 24 of the mounting plate 20, for example by means of the screws 15, with the ends of the cables 50 which pass through the through hole 21 and are connected to the respective circuit boards, for example welded, remaining accommodated in the housing space 26. Each radiating element 12, 13 and 14 is then fixed to the respective circuit board in accordance with methods widely known in the art. It should be noted that it is not strictly necessary to use one or more circuit boards mounted inside the antenna 100; in fact, as mentioned above, the electronics necessary for the functioning of each radiating element used can be integrated into the structure of the element itself, or said electronics can be housed for example in the housing space 26, or again the circuit board or each circuit board can be mounted outside the antenna 100, for example inside the motor vehicle and then operatively connected to one or more radiating elements used in said antenna 100.

[0053] As illustrated in figure 4, it is possible to insert one or more protective elements 18 around the top of one or more of the radiating elements 12, 13 and 14, each made for example of a sponge or a piece of adhesive foam.

[0054] The gasket 30 is then coupled to the mounting plate 20 with the second wall 34 positioned around the first wall 24, and the through openings 36 positioned in correspondence of the second and third holes or fixing seats 28 and 29 of the mounting plate 20.

[0055] As illustrated in figure 6, taking advantage also of the flexibility of the material of which the gasket 30 is made, the engagement teeth 39 are mechanically

hooked to the lower surface of corresponding external edges of the plate 20, while the second portion 35 extends (when seen from a side view) anteriorly, namely ahead, from the first portion 31 coupled to the plate 20.

[0056] The inner cover 1 is then coupled both to the gasket 30 by inserting the pin 9 into its housing seat 37, and to the mounting plate 20 fitting it from above over the cavity of the first hollow portion 2 which houses at least in part each radiating element used and any circuit board(s) used inside the antenna 100.

[0057] In the embodiment illustrated, as visible in figure 5, the inner cover 1 completely houses and protects the radiating elements and any circuit boards used.

[0058] The cover is then screwed onto the mounting plate 20, in particular by means of the fixing screws 17 inserted into the holes or fixing seats 28 provided along the external perimeter of the base 22 of said plate.

[0059] The protective elements 18 contribute to maintaining the radiating elements in the desired position and protect them from accidental shocks and avoid the noise caused by vibrations with the inner cover 1.

[0060] Finally, whenever necessary, the aesthetic outer cover 40 can be assembled to the rest of the components, fitting it over the inner protection cover 1.

[0061] In particular, the outer cover 40 is coupled to the gasket 30 by inserting each protuberance 38 inside a respective engagement seat 42.

[0062] Furthermore, the outer cover 40 is screwed to the mounting plate 20, aligning the holes 44 with the fixing seats 29 and inserting the fixing screws.

[0063] Depending on the applications, it is possible for the upper part of the radiating elements to pass through the one or more slits 4, coming out of the cover 1, so as to take maximum advantage of their height.

[0064] In this case, the protective elements 18 contribute to maintaining the radiating elements in the desired position and protect them from accidental impact with the outer cover 40.

[0065] In order to mount the antenna 100 on a motor vehicle, for example on the roof, the mechanical connection means mentioned previously are used, in other words the gasket 51, fixing screws 52, ground washer 54 and the mechanical fixing device 56.

[0066] Said mechanical connection is implemented according to known embodiments or easily implementable by a person skilled in the art, and anyway not relevant for the scope of the present invention, and therefore not described here in detail.

[0067] In practice, it has been demonstrated how the antenna 100 according to the invention makes it possible to adequately reach the intended aim in that its structure can be easily produced and with more limited costs, thanks in particular to the reduction in size of the mounting base, made typically of metallic material, thus reducing both the cost and overall weight of the antenna. Furthermore, assembly of the parts is functionally simple and effective, thanks in particular to the use of the gasket suitably configured as described above, giving rise to a

mechanically solid and reliable structure. In this way, the functional part of the antenna 100 can be assembled and sent to the installation area even separately from the aesthetic outer cover 40, without running the risk of breakage or even partial disassembly of the components.

[0068] Naturally, without prejudice to the scope of the invention, many variations and implementation details thereof may be applied to the above-described exemplary and non-limiting embodiments, without departing from the scope of protection of the invention as defined in the accompanying claims and include a combination, even partial, of the embodiments illustrated. For example, the number and position of the engagement teeth 39, as also the fixing seats 27, 28, 29, could be varied, etc..

Claims

1. Antenna (100) for a motor vehicle, comprising at least:

- a mounting plate (20) made of a metallic material and devised to be connected to a mounting surface of said motor vehicle;
- at least one radiating element (12);
- a first cover (1) connected to said mounting plate (20), said first cover (1) comprising at least a first hollow portion (2) devised to accommodate inside the first hollow portion (2), at least partially, at least said at least one radiating element (12); and
- a gasket (30) made of a flexible material, the antenna (100) being **characterized in that** said gasket (30) comprises a first portion (31) which is shaped geometrically, conjugated with and is coupled to the mounting plate (20), and a second portion (35) which extends anteriorly from the first portion (31) and on which there are provided at least first mechanical coupling means (37) mechanically coupled with corresponding mechanical coupling means provided on the first cover (1).

2. Antenna (100) according to claim 1, wherein said first mechanical coupling means (37) are integrally realized in the structure of the gasket (30).

3. Antenna (100) according to claim 1 or 2, wherein said first mechanical coupling means (37) comprise at least one housing seat (37) formed on said second portion (35).

4. Antenna (100) according to claim 3, wherein said first cover (1) comprises a second portion (7) which extends anteriorly from an anterior wall (6) of the first hollow portion (2), and said corresponding mechanical coupling means provided on said first cover (1) comprise a pin (9) which protrudes downwardly from

said second portion (7) and is configured to engage into said housing seat (37).

5. Antenna (100) according to one or more of the preceding claims, wherein said gasket (30) comprises second mechanical coupling means (39) with said mounting plate (20), said second mechanical coupling means (39) being integrally realized in the structure of the gasket (30). 5
6. Antenna (100) according to claim 5, wherein said second mechanical coupling means (39) comprise one or more engagement teeth (39) adapted to engage with corresponding outer edges of the mounting plate (20). 10
7. Antenna (100) according to one or more of the preceding claims, comprising a second cover (40) having an internally hollow body adapted to be connected to the mounting plate (20) so as to accommodate inside the internally hollow body at least said first cover (1), and wherein said gasket (30) comprises third mechanical coupling means (38) with corresponding mechanical coupling means (42) provided on said second cover (40). 15
8. Antenna (100) according to claim 7, wherein said third mechanical coupling means (38) are integrally realized in the structure of the second portion (35) of the gasket (30). 20
9. Antenna (100) according to claim 7 or 8, wherein said third mechanical coupling means (38) comprise one or more protuberances (38) and said corresponding mechanical coupling means (42) provided on said second cover (40) comprise one or more engagement seats (42) configured each to receive a corresponding protuberance (38). 25
10. Antenna (100) according to one or more of the preceding claims, wherein on an upper portion (3) of the first hollow portion (2) of the first cover (1) there is provided at least one slit (4) suitable to allow the passage of at least a portion of said at least one radiating element (12). 30

Patentansprüche

1. Antenne (100) für ein Kraftfahrzeug, umfassend mindestens: 50
 - eine Montageplatte (20), die aus einem metallischen Material gefertigt ist und dazu bestimmt ist, um mit einer Montagefläche des Kraftfahrzeugs verbunden zu werden;
 - mindestens ein strahlendes Element (12);
 - eine erste Abdeckung (1), die mit der Monta-

geplatte (20) verbunden ist, die erste Abdeckung (1) umfassend mindestens einen ersten hohlen Abschnitt (2) aufweist, der dazu bestimmt ist, um im Inneren des ersten hohlen Abschnitts (2) mindestens teilweise das mindestens eine strahlende Element (12) aufzunehmen; und

- eine Dichtung (30), die aus einem flexiblen Material gefertigt ist, wobei die Antenne (100) **dadurch gekennzeichnet ist, dass** die Dichtung (30) einen ersten Abschnitt (31), der geometrisch geformt, mit der Montageplatte (20) verbunden und daran gekoppelt ist, und einen zweiten Abschnitt (35), der sich von dem ersten Abschnitt (31) nach vorne erstreckt und an dem mindestens erste mechanische Kopplungseinrichtungen (37) bereitgestellt sind, die mechanisch mit entsprechenden mechanischen Kopplungseinrichtungen gekoppelt sind, die an der ersten Abdeckung (1) bereitgestellt sind, umfasst.

2. Antenne (100) nach Anspruch 1, wobei die ersten mechanischen Kopplungseinrichtungen (37) integral in der Struktur der Dichtung (30) realisiert sind.
3. Antenne (100) nach Anspruch 1 oder 2, wobei die ersten mechanischen Kopplungseinrichtungen (37) mindestens einen Gehäusesitz (37) umfassen, der an dem zweiten Abschnitt (35) gebildet ist.
4. Antenne (100) nach Anspruch 3, wobei die erste Abdeckung (1) einen zweiten Abschnitt (7) umfasst, der sich von einer vorderen Wand (6) des ersten hohlen Abschnitts (2) nach vorne erstreckt, und die entsprechenden mechanischen Kopplungseinrichtungen, die an der ersten Abdeckung (1) bereitgestellt sind, einen Stift (9) umfassen, der von dem zweiten Abschnitt (7) nach unten hervorsteht und konfiguriert ist, um in den Gehäusesitz (37) einzugreifen.
5. Antenne (100) nach einem oder mehreren der vorherigen Ansprüche, wobei die Dichtung (30) zweite mechanische Kopplungseinrichtungen (39) mit der Montageplatte (20) umfasst, wobei die zweiten mechanischen Kopplungseinrichtung (39) integral in der Struktur der Dichtung (30) realisiert ist.
6. Antenne (100) nach Anspruch 5, wobei die zweiten mechanischen Kopplungseinrichtungen (39) einen oder mehrere Eingriffszähne (39) umfassen, die angepasst sind, um mit entsprechenden Außenkanten der Montageplatte (20) einzugreifen.
7. Antenne (100) nach einem oder mehreren der vorherigen Ansprüche, umfassend eine zweite Abdeckung (40), die einen innen hohlen Körper aufweist,

der angepasst ist, um mit der Montageplatte (20) verbunden zu werden, um im Inneren des innen hohlen Körpers zumindest die erste Abdeckung (1) aufzunehmen, und wobei die Dichtung (30) dritte mechanische Kopplungseinrichtungen (38) mit entsprechenden mechanischen Kopplungseinrichtungen (42) umfasst, die an der zweiten Abdeckung (40) bereitgestellt sind.

8. Antenne (100) nach Anspruch 7, wobei die dritten mechanischen Kopplungseinrichtungen (38) integral in der Struktur des zweiten Abschnitts (35) der Dichtung (30) realisiert sind. 10
9. Antenne (100) nach Anspruch 7 oder 8, wobei die dritten mechanischen Kopplungseinrichtungen (38) einen oder mehrere Vorsprünge (38) umfassen und die entsprechenden mechanischen Kopplungseinrichtungen (42), die an der zweiten Abdeckung (40) bereitgestellt sind, einen oder mehrere Eingriffssitze (42) umfassen, die jeweils konfiguriert sind, um einen entsprechenden Vorsprungs (38) aufzunehmen. 15
10. Antenne (100) nach einem oder mehreren der vorherigen Ansprüche, wobei an einem oberen Abschnitt (3) des ersten hohlen Abschnitts (2) der ersten Abdeckung (1) mindestens ein Schlitz (4) bereitgestellt ist, der geeignet ist, um den Durchgang von mindestens einem Abschnitt des mindestens einen strahlenden Elements (12) zu ermöglichen. 20

Revendications

1. Antenne (100) pour véhicule à moteur, comprenant :

- une plaque de montage (20) en matériau métallique conçue pour être reliée à une surface de montage dudit véhicule à moteur ; 40
- au moins un élément rayonnant (12) ;
- un premier couvercle (1) relié à ladite plaque de montage (20), ledit premier couvercle (1) comprenant au moins une première partie creuse (2) conçue pour accueillir à l'intérieur de la première partie creuse (2), au moins en partie, au moins ledit élément rayonnant (12) ; et 45
- un joint (30) en matériau souple, l'antenne (100) étant **caractérisée en ce que** ledit joint (30) comprend une première partie (31) de forme géométrique, conjuguée et couplée à la plaque de montage (20), et une deuxième partie (35) qui s'étend vers l'avant à partir de la première partie (31) et sur laquelle sont prévus au moins les premiers moyens de couplage mécanique (37) couplés mécaniquement aux moyens de couplage mécanique correspondants prévus sur le premier couvercle (1). 50

2. Antenne (100) selon la revendication 1, dans laquelle lesdits premiers moyens de couplage (37) sont complètement réalisés dans la structure du joint (30). 5

3. Antenne (100) selon la revendication 1 ou 2, dans laquelle lesdits premiers moyens de couplage mécaniques (37) comprennent au moins une surface d'appui (37) formée sur ladite deuxième partie (35). 10

4. Antenne (100) selon la revendication 3, dans laquelle ledit premier couvercle (1) comprend une deuxième partie (7) qui s'étend vers l'avant à partir d'une paroi antérieure (6) de la première partie creuse (2), et lesdits moyens de couplage mécanique correspondants prévus sur ledit premier couvercle (1) comprennent une broche (9) qui fait saillie vers le bas à partir de ladite deuxième partie (7) et est configurée pour s'engager dans ladite surface d'appui (37). 15

5. Antenne (100) selon une ou plusieurs des revendications précédentes, dans laquelle ledit joint (30) comprend des deuxième moyens de couplage mécanique (39) avec ladite plaque de montage (20), lesdits deuxième moyens de couplage mécanique (39) étant complètement réalisés dans la structure du joint (30). 20

6. Antenne (100) selon la revendication 5, dans laquelle lesdits deuxième moyens de couplage mécanique (39) comprennent une ou plusieurs dents d'engagement (39) adaptées pour s'engager avec des bords extérieurs correspondants de la plaque de montage (20). 25

7. Antenne (100) selon une ou plusieurs des revendications précédentes, comprenant un deuxième couvercle (40) doté d'un corps creux interne adapté pour être connecté à la plaque de montage (20) de manière à accueillir à l'intérieur du corps creux interne au moins ledit premier couvercle (1), et dans lequel ledit joint (30) comprend des troisième moyens de couplage mécanique (38) avec des moyens de couplage mécanique correspondants (42) fournis sur ledit deuxième couvercle (40). 30

8. Antenne (100) selon la revendication 7, dans laquelle lesdits troisième moyens de couplage (38) sont complètement réalisés dans la structure de la deuxième partie (35) du joint (30). 35

9. Antenne (100) selon la revendication 7 ou 8, dans laquelle lesdits troisième moyens de couplage mécanique (38) comprennent une ou plusieurs protubérances (38) et lesdits moyens de couplage mécanique correspondants (42) prévus sur ledit deuxième couvercle (40) comprennent une ou plusieurs sièges 40

d'appui (42) configurés chacun pour recevoir une saillie correspondante (38).

10. Antenne (100) selon une ou plusieurs des revendications précédentes, dans laquelle sur une partie supérieure (3) de la première partie creuse (2) du premier couvercle (1) est prévue au moins une fente (4) appropriée pour permettre le passage d'au moins une partie dudit au moins un élément rayonnant (12).

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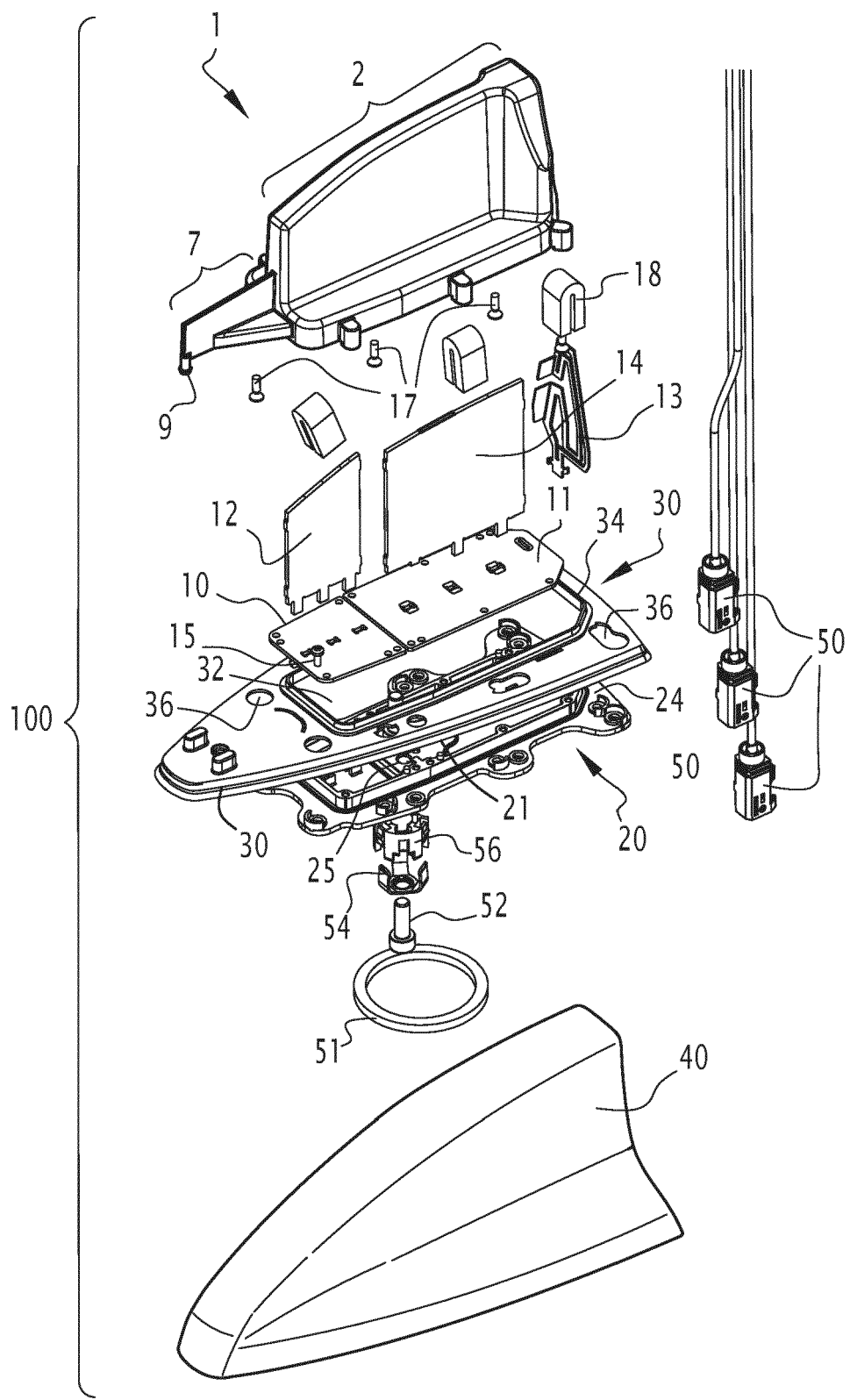


FIG.1

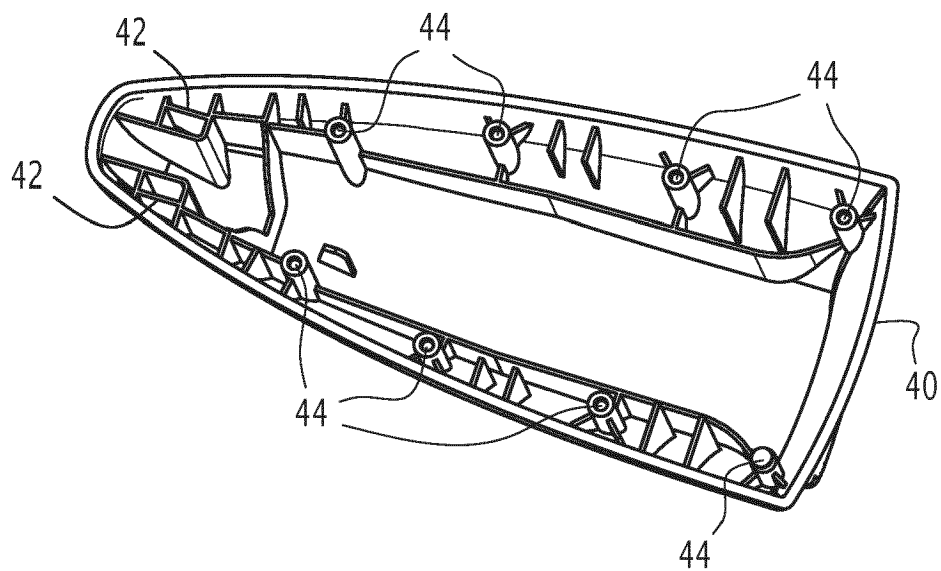


FIG.2

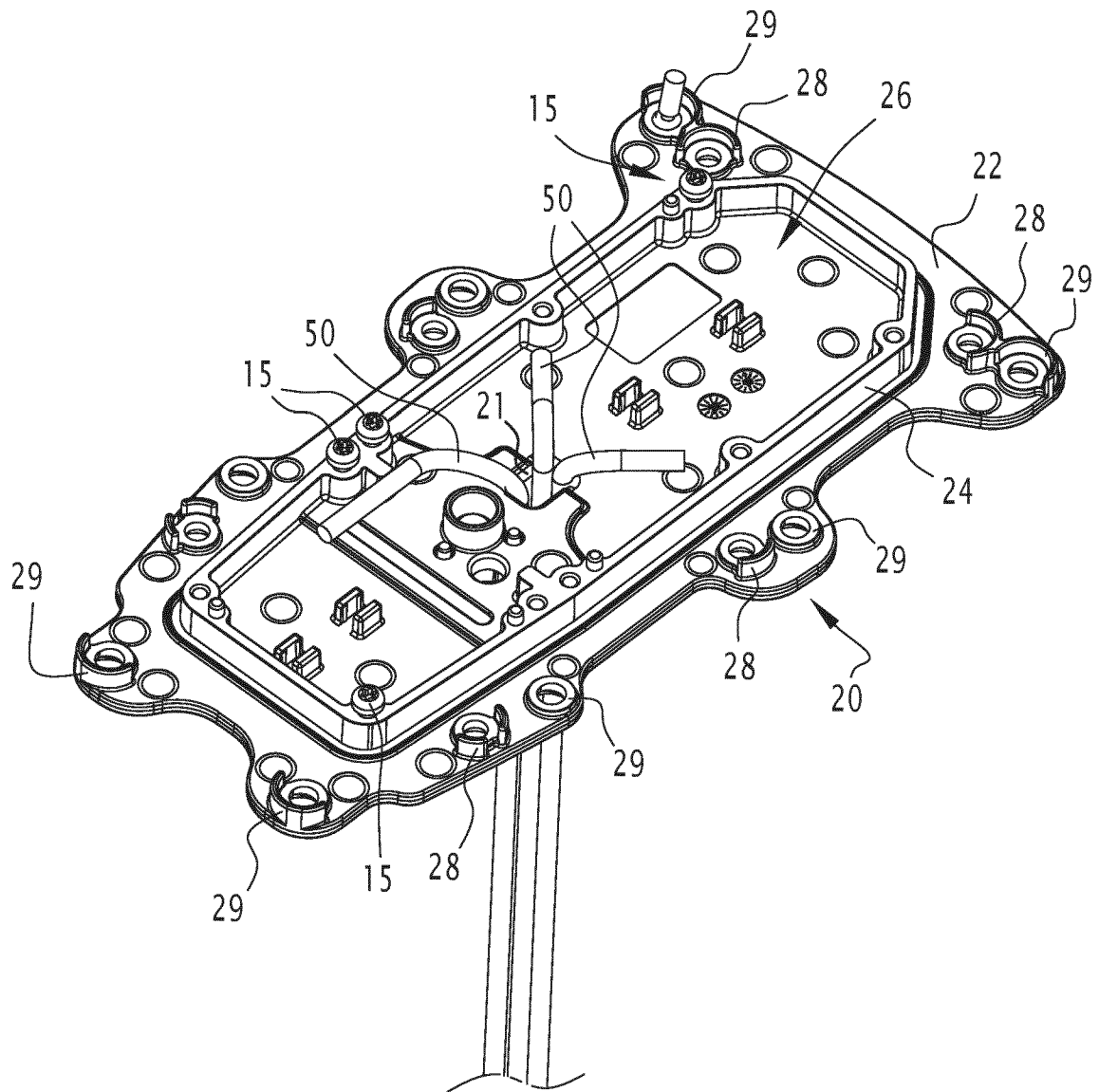


FIG.3

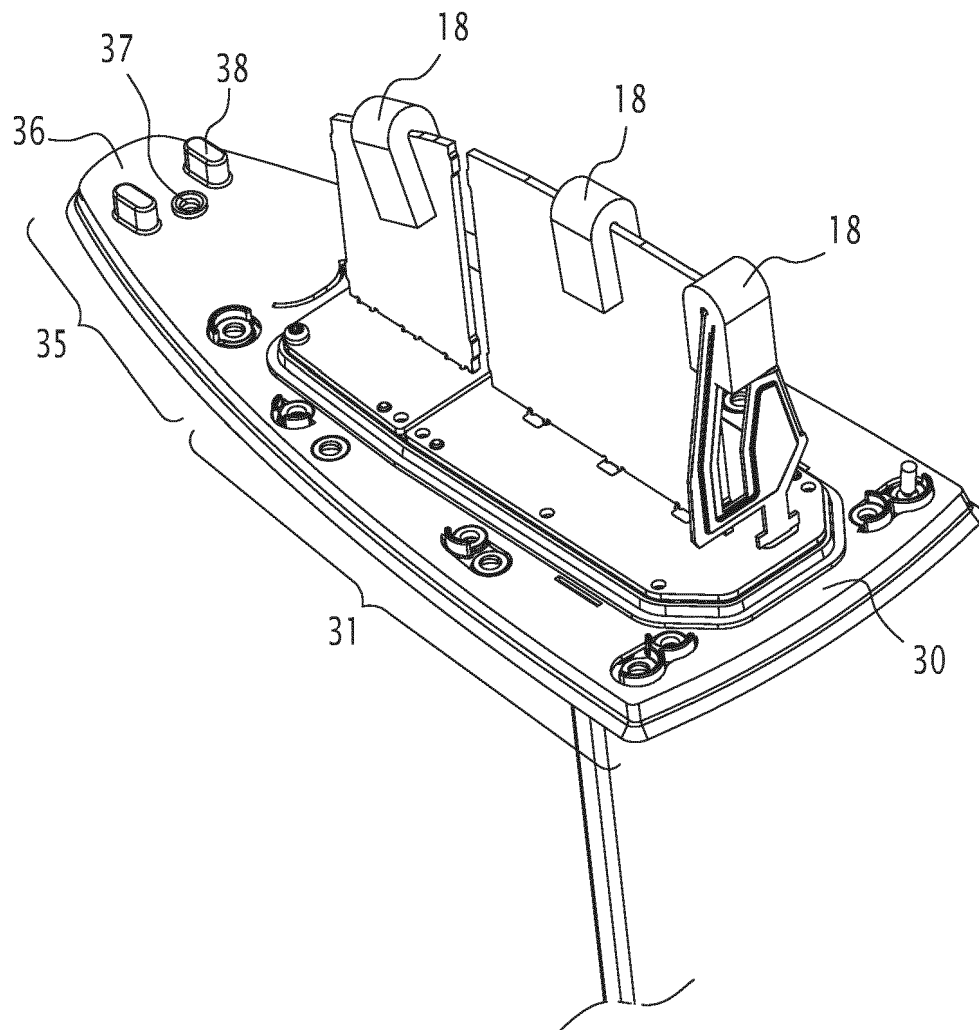


FIG.4

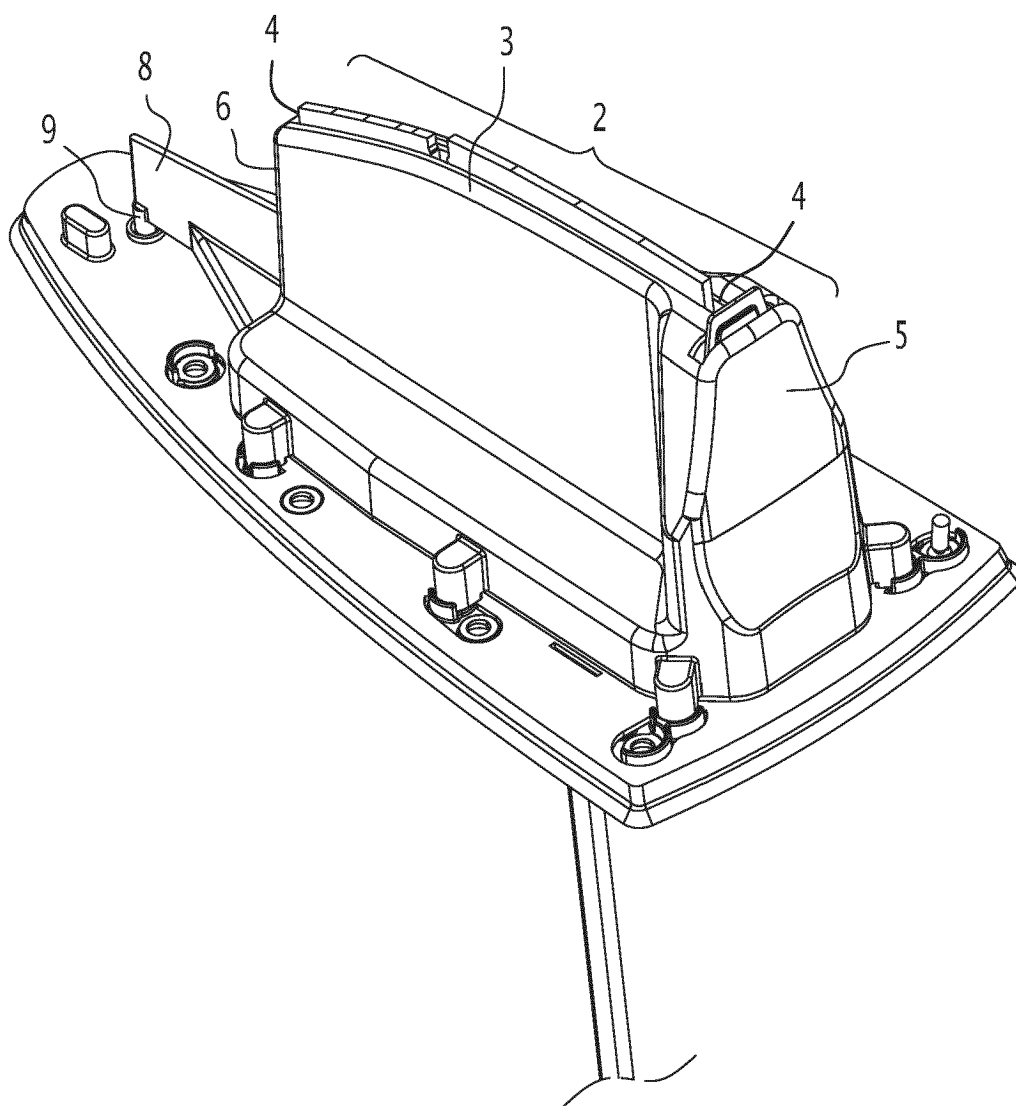


FIG.5

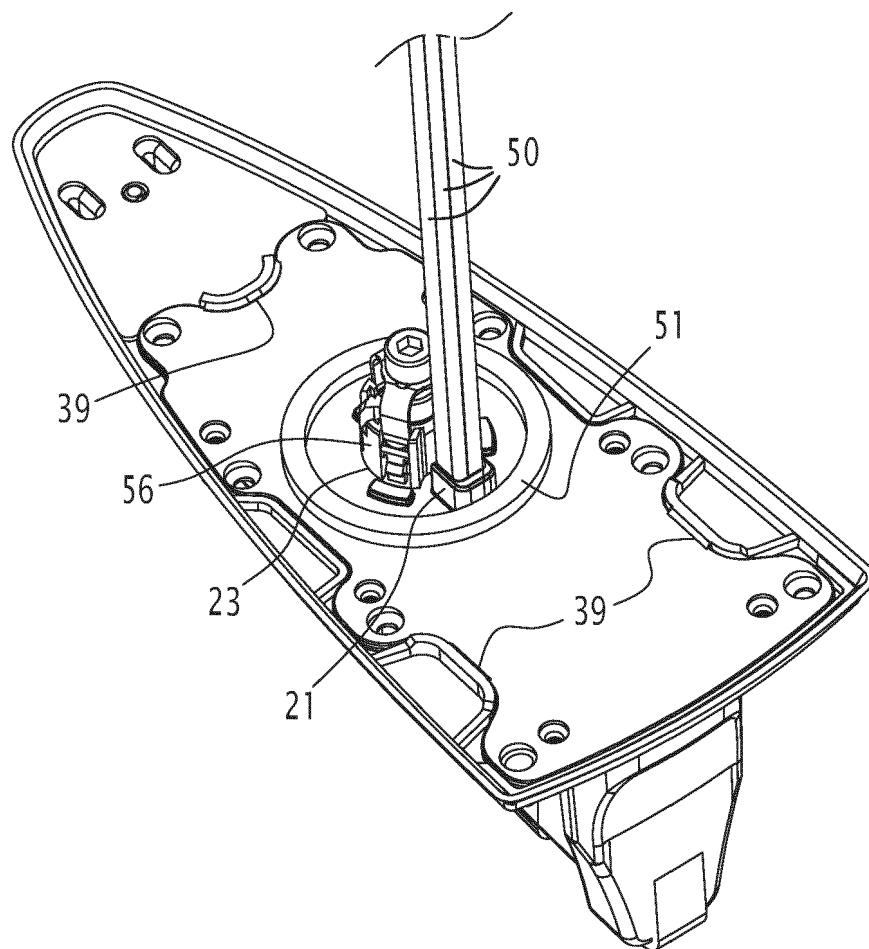


FIG. 6

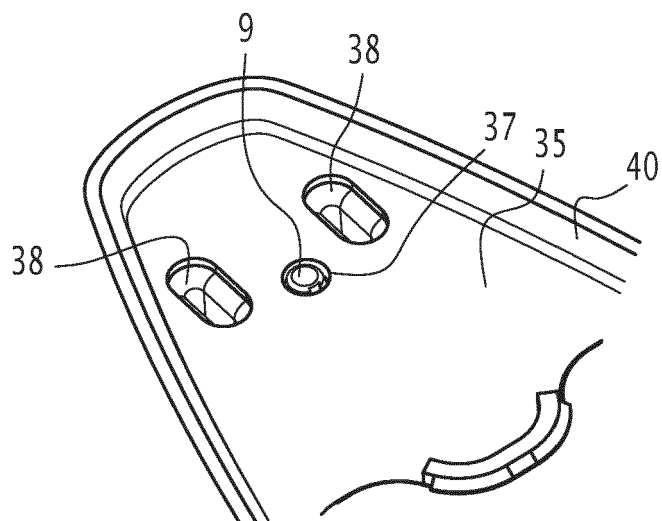


FIG.7

REFERENCES CITED IN THE DESCRIPTION

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