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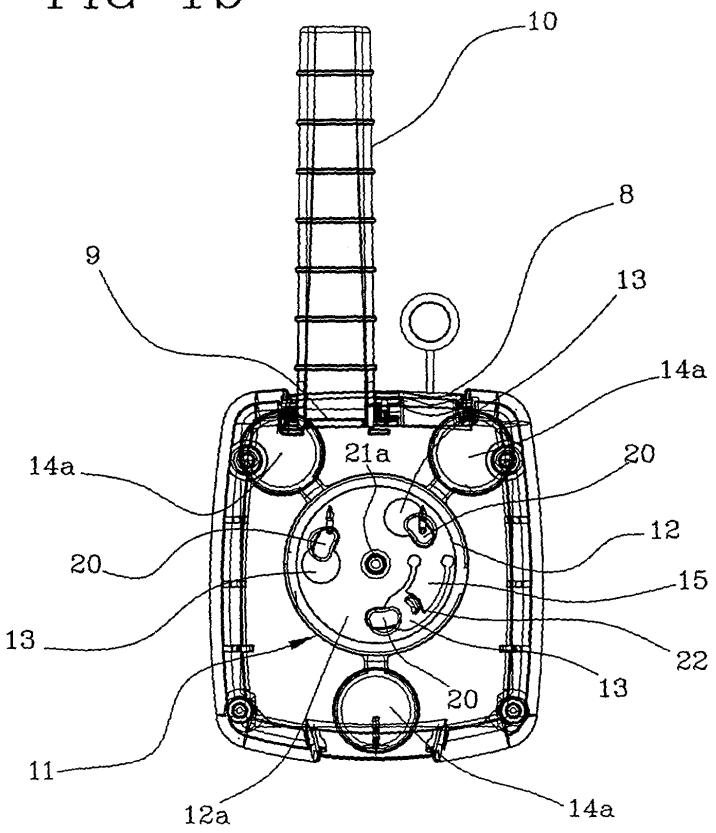
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(54) Communication device for helmets, particularly for motorcyclist helmets

(57) An audio communication device for helmets, comprising: an electronic card (4) for data processing and communication; a supporting element (11) irremovably associable with the outer surface of a respective helmet (A); and a box-shaped body (2) defining a housing space (3) for the electronic card (4); said box-shaped body (2) having connecting means (16) to be removably secured to the supporting element (11) in order to associate the box-shaped body (2) with said supporting element (11) in a separable manner.

FIG 1b



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Description

[0001] The present invention relates to an audio communication device for helmets, in particular helmets worn by motorcyclists.

[0002] It is known that there are on the market different types of devices adapted to allow motorcyclists to communicate with each other, either if said motorcyclists are on the same vehicle or on different vehicles.

[0003] In a presently known type, the audio communication devices consist of one or more electronic cards and an integrated or non-integrated battery that are inserted in a respective container integrated into the helmet. In particular, the containers are disposed in suitable cavities formed in the inner helmet part, generally in a rear portion of the helmet itself.

[0004] The electronic card can be activated in a selective manner and is provided with suitable connectors for interfacing with a microphone and loud-speakers, housed within the helmet as well.

[0005] In addition, the electronic card is associated by means of a suitable connecting cable, with a control box for data reception/emission via radio which is usually housed on the motorcycle and set to feed the card and transmit data by radio to other communication devices or to receive data from mobile phones. In this manner, the driver can communicate via radio with another driver or with a passenger using the same device, or with a mobile phone without diverting his/her attention from driving.

[0006] These devices however have serious drawbacks mainly concerning safety and the helmet structure designed to hold them.

[0007] In fact, it is to be pointed out that the helmet must be suitably shaped for obtaining the appropriate spaces into which the container and the electric cables, for connection between container and microphone/loud speaker for example, are to be housed. Consequently the helmet, weakened by said hollow spaces, could lose its mechanical-strength features, which features are essential for the user's safety in case of accidents.

[0008] In addition, where the helmet structure is modified, a new homologation is required for use of said helmet and this obviously involves additional costs and time for obtaining the necessary authorizations.

[0009] A further drawback is represented by the presence of the connecting cable between the control box and elecronic card. This cable extends from the helmet to the motorcycle and appears to hinder the user's movements during driving and in addition it must be disconnected each time the user must move away from the motorcycle so that the audio communication is broken.

[0010] To eliminate these drawbacks at least partly, communication devices for application to the outside of the helmet have been devised.

[0011] In particular these devices consist of a container into which the electronic card and battery are housed and which can be applied to the outer helmet surface.

[0012] In more detail, the container has a first series of magnets to be associated with a second series of magnets secured to the outer helmet surface, at a rear region thereof. In addition, at least close to a magnet associated with the helmet, a hole is formed in the helmet itself for passage of the connecting cables from the electronic card to the microphone/loud speakers housed within the helmet.

[0013] These devices are not provided with cables for connection with the control box associated with the motorcycle because the electronic components therein present enable direct communication with another helmet, the motorcycle or a mobile phone by means of a wireless transmission system.

[0014] Also this type of communication device however has many drawbacks.

[0015] A first drawback is connected with the helmet structure which in this case too is modified (provided with a hole) to enable a connection between the communication device and the microphone and loud speakers inserted in the helmet.

[0016] In fact, it is to be pointed out that the presence of a through hole for communication between the outside and the helmet inside greatly weakens the rear portion of the helmet itself.

[0017] In addition, a further drawback is represented by the fact that the helmets thus modified for cable passage must necessarily be submitted to homologation to allow marketing of same. In other words, said helmets are to be tested by qualified organisations for approval of the operational qualities of the helmet itself. Therefore, very long times and heavy costs are required for the homologation operations, which will bring about increases in the productions costs of the whole device.

[0018] Another important drawback of all the devices of this nature presently on the market is represented by the fact that the communication devices cannot be used again/recycled in case of replacement of the helmet. In fact, all components associated with the helmet are fastened to said helmet and go lost therewith. In addition, the container holding all the components, although it can be magnetically separated from the helmet, cannot be reused for another helmet of different nature and must be replaced.

[0019] It is therefore apparent that a motorcyclist wishing to change his/her helmet brand and/or design is obliged to purchase a new device dedicated to said new helmet model. At most the above described magnetic-connection devices can be reused for helmets of the same brand and model that have already been homologated and are provided with the hole for passage of the cables and with the engagement magnets.

[0020] Replacement of the electronic components involves high costs almost comparable to those of the helmet itself so that the above described devices are hardly successful with the public.

[0021] Under this situation, the technical task underlying the present invention is to devise an audio commu-

nication device for helmets that is able to substantially obviate the above specified drawbacks.

[0022] Within the scope of this technical task it is an important aim of the invention to devise an audio communication device for helmets that can be applied to a helmet without impairing and/or modifying the helmet structure.

[0023] It is a further aim of the invention to provide an audio communication device for helmets that is versatile, because it can be easily used for any type of helmets, in particular without requiring homologating procedures for use.

[0024] The technical task mentioned and the aims specified are substantially achieved by an audio communication device for helmets that is characterised in that it comprises the features recited in the appended claims.

[0025] The description of a preferred but not exclusive embodiment of an audio communication device for helmets in accordance with the present invention is now given hereinafter, by way of non-limiting example, with reference to the accompanying drawings, in which:

- Figs. 1a and 1b are plan views from top and from bottom respectively, of a communication device in accordance with the invention;
- Figs. 1c and 1d are an elevation side view and a section view respectively, of the communication device in accordance with the invention;
- Figs. 2a and 2b are plan views from top and from bottom respectively, of a lower half-portion of the device shown in Figs. 1a-1d;
- Figs. 2c and 2d are an elevation side view and a section view respectively, of the detail shown in Figs. 2a and 2b;
- Figs. 3a and 3b are plan views from top and from bottom respectively, of an upper half-portion of the device shown in Figs. 1a-1d;
- Figs. 3c and 3d are an elevation side view and a section view respectively of the detail shown in Figs. 3a and 3b;
- Figs. 4a and 4b are plan views from top and from bottom respectively of a support shown in Figs. 1a-1d, to be applied to a helmet;
- Fig. 5 is a perspective view of the audio communication device in accordance with the invention applied to a motorcyclist's helmet.

[0026] In particular, the audio communication device 1 advantageously applies to helmets of any kind, used for motorvehicle driving. However, the present invention can be used with any type of helmet wherein audio communication with another helmet, possibly a motorcycle or a mobile phone is required.

[0027] In more detail, device 1 consists of a box-shaped body 2 internally defining a housing space 3 for reception of an electronic card 4 for data processing and communication. As better shown in Fig. 1a, the box-shaped body 2 has a substantially parallelepiped conformation having a square cross section and rounded edges.

[0028] As shown in Figs. 2a-2c and 3a-3d, the box-shaped body consists of a first and a second halves 2a, 2b each of which is shaped as a shell and has respective peripheral edges suitable for association with each other to define the above mentioned box-shaped body 2. In detail, the first half 2a shown in Figs. 2a-2c, has a substantially concave conformation and defines an external contact surface 5 set, as better clarified in the following, to face an outer surface of a helmet A.

[0029] Likewise, the second half 2b as well has a substantially concave conformation and defines an outer surface 6 opposite to the contact surface 5 of the first half 2a.

[0030] Advantageously, an operating key 7 is present on the outer surface 6 and is fitted in a respective hole formed in said outer surface 6. In detail, key 7 consists of a cylinder that is movable inside the hole close to and away from the housing space 3.

[0031] As mentioned above, the electronic card 4 for data processing and communication is fitted in the box-shaped body 2 and is powered from a battery also housed in the box-shaped body 2 and provided with the necessary autonomy of operation (24 hours for example). In addition, a set of other electronic components (not described as of known type, such as antennas, connections, outlets for battery recharge) are also present, which components are set to transfer audio data through a wireless connection.

[0032] Preferably, the electronic card is designed to communicate through a wireless transmission system of the "Blue Tooth" type, also known and not further described in detail.

[0033] In this way, key 7 acts on a component for activation of card 4 to switch on and enable the functions of audio transmitting data.

[0034] Advantageously, the box-shaped body 2 further has a first bore consisting of a through opening formed in a region close to a connector of the electronic card 4, designed to be associated with an outer power supply to charge the electric battery. Close to the first bore 8 a second bore 9 is formed, from which at least one tubular element 10 made of flexible material emerges, said tubular element being able to bring the inside of helmet A into communication with the box-shaped body 2.

[0035] In detail, the tubular element 10 is set to guide the connection cables from the electronic card 4 to an audio reproduction and acquisition system not shown in the accompanying figures and housed within the helmet (microphone and earphones, for example).

[0036] It is to be noted that the tubular element 10 does not pass through holes or weakened portions made on the outer surface of helmet A. In fact, the tubular element 10 runs along the lower edge of helmet A for insertion into the helmet A itself (as shown in Fig. 5).

[0037] Device 1 further has a supporting element 11 to be irremovably associated with the outer surface of helmet A.

[0038] In particular, the supporting element 11, shown in detail in Figs. 4a-4c, has at least one central plate 12 with a lower surface 12a facing the outer wall of helmet A and an upper surface 12b, opposite to the lower surface 12a, adapted to abut against the above mentioned contact surface 5 of the box-shaped body 2. Preferably, plate 12 has a circular peripheral extension and is provided with at least one through opening 13 and advantageously three through openings 13, better described in the following.

[0039] The supporting element 11 further has at least one adhesive body 14 connected to plate 12 and having an adhesive surface 14a to be secured to the outer wall of helmet A. Advantageously, the supporting element 11 has at least three adhesive bodies 14 that are circumferentially disposed around plate 12, as shown in Figs. 4a and 4b, and each of them has a substantially plate-like conformation and circular peripheral extension.

[0040] The adhesive surface 14a is preferably provided with an adhesive material of known type and therefore not further described in detail, capable of carrying out a firm engagement between the adhesive body 14 and helmet A. It is obvious that a different irremovable engagement system can be also envisaged, provided it does not impair the helmet integrity; for example the adhesive substance can be distributed on some portions of helmet A and subsequently surface 14a is applied to these portions.

[0041] It is also to be observed that each adhesive body 14 has a substantially stiff connecting portion 14b fastening the adhesive body 14 to the peripheral edge of plate 12.

[0042] The above mentioned through openings 13 are formed in plate 12 and disposed in a circumferential path that is concentric with the perimeter extension of plate 12. In more detail, each through opening 13 has a two-lobe conformation in which a first 13a and a second 13b contiguous cavities connected to each other are defined. Advantageously, the first cavity 13a has a larger width than the second cavity 13b; in other words, each through opening 13 is made up of a slot of variable size.

[0043] In addition, plate 12 of the supporting element 11 has an elastic element 15 disposed at one of the mentioned through openings 13. In particular, the elastic element 15 consists of a flat spring 15a formed in plate 12 and defined by two arched grooves 15b parallel to each other and extending away from the first cavity 13a of an opening 13. Under this situation, it can be seen that the flat spring 15a has an abutment edge 15c disposed within the respective first cavity 13a.

[0044] The box-shaped body 2 further has connecting means 16, adapted to be removably engaged to the supporting element 11 so as to associate the box-shaped body 2 with the supporting element 11 in a separable manner.

[0045] In particular, the connecting means 16 is movable in translation relative to the supporting element 11 between a released position at which the upper surface 12b of plate 12 and the contact surface 5 of the box-shaped body 2 can be axially moved close to/away from each other, and a coupled position at which the contact surface 5 is in abutment against the upper surface 12b and fastened thereto.

[0046] Advantageously, the connecting means 15 in the respective coupled position can be engaged by snap-fitting in the supporting element 11, as better clarified in the following. In particular the connecting means 16 consists of at least one portion 17 projecting from the contact surface 5 of the box-shaped body 2 (Fig. 2d).

[0047] Advantageously, three projecting portions 17 circumferentially disposed around a central region 18 of the contact surface 5 are provided and each of them can be inserted in a respective through opening 13.

[0048] In more detail, each projecting portion 17 has an elongated body 19 having a first end 19a associated with the box-shaped body 2 and a second end 19b opposite to the first one 19a. Advantageously, the elongated body 19 has a substantially cylindrical conformation and extends along the same longitudinal axis transverse to the planar extension of the contact surface 5.

[0049] In addition, a protuberance having a greater cross section than the cross section of the elongated body 19 extends on the second end 19b of the elongated body 19. In other words, the protuberance 20 defines a swelling of the second end 19b of the cylindrical body 19 and has a fitting surface 20a facing the contact surface 5 of the box-shaped body 2.

[0050] It is to be noted that the protuberance 20 of each projecting portion 17 seen in cross section has smaller sizes than or the same sizes as the width of the first cavity 13a of the respective opening 13. In this manner, the projecting portion appears to be adapted for insertion along a direction parallel to the longitudinal extension of the projecting portion 17 in the respective opening 13.

[0051] In addition, the protuberance 20 of each projecting portion 17 seen in cross section has greater sizes than the width of the second cavity.

[0052] Under this situation, the projecting portions 17 can be inserted into the respective through openings 13 in such a manner that said protuberance 20 is disposed in correspondance with the lower surface 12a of plate 12. In more detail, the projecting portions 17 are movable between the released position at which the elongated body 19 is disposed in the first cavity 13a, and the coupled position at which the elongated body 19 is disposed in the second cavity 13b to fasten the box-shaped body 2 to the supporting element 11.

[0053] Advantageously, as shown in Fig. 1d, in the above mentioned coupled position of each projecting portion 17, the fitting surface 20a of the protuberance 20 is in abutment against the lower surface 12a of the plate 12 of the supporting element 11 to prevent the projecting portion 17 from being axially pulled out of the respective opening 13, away therefrom.

[0054] In still greater detail, it is to be observed that movement between the released position and the cou-

pled position gives rise to a displacement in rotation of the box-shaped body 2 and therefore of the projecting portions 17 inserted in the respective cavities 13 from the first opening to the second one. During this rotation, as can be seen, the contact surface 5 slides on the upper surface 12b of plate 12.

[0055] Advantageously, the connecting means further has a pin 21 projecting from the box-shaped body 2 and disposed at the above mentioned central region 18. Pin 21 is preferably insertable in a hole 21a formed in plate 12 and set at a central region interposed between the through openings 13. Under this situation, when the contact surface 5 abuts against the upper surface 12b for insertion of the projecting portions 17 into the respective openings 13, pin 21 too is inserted into hole 21a so that it rotates in said hole around its longitudinal axis from the released position to the coupled position and vice versa.

[0056] In this way, the projecting portions 17 too rotate around the longitudinal extension of pin 21 during their movement from the released position to the coupled position and vice versa.

[0057] It is to be observed that the connecting means 16 preferably has an abutment element 22 extending from the box-shaped body 2 to close to one of the projecting portions 17. In particular, the abutment element consists of a substantially arched element and it too is disposed along the circumferential extension of the projecting portions 17.

[0058] Advantageously, in the coupled position of the projecting portions 17, the abutment element 22 is disposed in the first cavity 13a of the through opening 13 and removably abuts against said elastic element 15. In more detail, when the contact surface 5 abuts against the upper surface 12b of plate 12, the abutment element 22 rests on the flat spring 15a that, by effect of the pressure exerted by the abutment element 22, is bent. When the projecting portions 17 are rotated to the respective coupled position, the abutment element slides on spring 15a until it enters the first opening 13a. Under this situation, spring 15a returns to its rest condition and the abutment element 22 abuts against the abutment edge 15c to define a firm engagement by snap-fitting between the box-shaped element 2 and the supporting element 11.

[0059] Assembling of the audio communication device described above mainly as regards structure, is as follows.

[0060] The supporting element 11 is fastened through the adhesive body 14, to the outer surface of helmet A, advantageously at a rear position of said helmet A.

[0061] Subsequently, the box-shaped body 2 is moved close to the supporting element 11 so that the respective contact surface 5 abuts onto the upper surface 12b. Under this situation, the projecting portions 17 are inserted into the respective first cavities 13a of openings 13 and pin 21 is inserted into the central hole 21 (released position).

[0062] Then the box-shaped body 2 is rotated around pin 21 until the projecting portions 17 move from the first cavity 13a to the second cavity 13b (coupled position). In this position the projecting portions 20 cause abutment of the fitting surface 20a onto the lower surface 12a of plate 12 preventing separation of the box-shaped body 2 from the supporting element 11.

[0063] Under this situation, the abutment element 22 appears to bear on the abutment edge 15c of spring 15a preventing the projecting portions 17 to rotate in an opposite direction (release direction) from the second cavity 13b to the first cavity 13a.

[0064] In the coupled position the box-shaped body 2 remains associated with helmet A and connected to the audio reproduction and acquisition system disposed within helmet A, so that the user can communicate with another similar device or a mobile phone. It will be recognised that under this situation the tubular element 10 going out of the box-shaped body 2 passes under the lower and rear edge of helmet A to be then inserted into said helmet A.

[0065] To disengage the box-shaped body 2 from the supporting element 11, a flat tool is inserted which is adapted to act on the flat spring 15a to deform it and enable disengagement, then a rotation is manually applied to the box-shaped body. In this manner, the projecting portions 17 move from the second cavity 13b to the first cavity 13a and the fitting surface 20a is separated from the lower surface 12a.

[0066] Advantageously, under this situation (released position) the box-shaped body 2 can be separated from plate 12.

[0067] The invention achieves important advantages.

[0068] In fact, first of all it will be appreciated that the communication device 1 can be applied to helmet A without being obliged to modify the helmet structure. In other words, the helmet is not holed or weakened because the adhesive body 14 is fastened to the outer surface of helmet A and passage of the tubular element 10 takes place under the edge of helmet A.

[0069] Advantageously, the helmet keeps its features of mechanical strength and must not be submitted to any further homologation process.

[0070] Finally, device 1 is very versatile because it can be applied to any helmet brand or model, being immediately interchangeable and transferable from one helmet to another. In fact, in case of replacement of helmet A, only the supporting element 11 is replaced together with the helmet, the box-shaped element (that actually is the most expensive part of the communication device) being reused because it can be applied to another supporting element. Advantageously, due to the minimum cost of the supporting element, no problems exist for the motorcyclist as regards replacement of the helmet and part of the device.

Claims

1. An audio communication device for helmets, **char-**

acterised in that it comprises:

- an electronic card (4) for data processing and communication;
- a supporting element (11) to be associated with the outer surface of said helmet (A) in an irremovable manner; and
- a box-shaped body (2) defining a housing space (3) for said electronic card (4); said box-shaped body (2) having connecting means (16) for removable engagement with said supporting element (11) in order to associate said box-shaped body (2) with said supporting element (11) in a separable manner.

2. A device as claimed in claim 1, **characterised in that** said supporting element (11) comprises: at least one plate (12) having a lower surface (12a) facing the outer surface of said helmet (A) and an upper surface (12b), opposite to said lower surface (12a), adapted to abut on a contact surface (5) of the box-shaped body (2); and an adhesive body (14) connected to the plate (12) and having an adhesive surface (14a) suitable for fastening to the outer surface of said helmet (A).

3. A device as claimed in claim 2, **characterised in that** said connecting means (16) is movable in translation relative to the supporting element (11) between a released position at which the upper surface (12b) of the plate (12) and the contact surface (5) of the box-shaped body (2) can be moved close to/away from each other and a coupled position at which said contact surface (5) is fastened to the supporting element (11).

4. A device as claimed in the preceding claim, **characterised in that** engagement between said connecting means (16) and said supporting element (11) takes place by snap-fitting.

5. A device as claimed in anyone of claims 2 to 4, **characterised in that** said supporting element (11) comprises at least three adhesive bodies (14) that are circumferentially disposed around the plate (12).

6. A device as claimed in anyone of claims 2 to 5, **characterised in that** said connecting means (16) comprises at least one portion (17) projecting from the contact surface (5) of the box-shaped body (2) and suitable for insertion in a respective through opening (13) formed in said plate (12).

7. A device as claimed in the preceding claim, **characterised in that** it comprises at least three portions (17) projecting from the contact surface (5) of the box-shaped body (2), said portions being circumferentially disposed around a central region (18) of the contact surface (5) and each of them being suitable for insertion in a respective through opening (13).

8. A device as claimed in claim 7, **characterised in that** each projecting portion (17) has: an elongated body (19) having a first end (19a) associated with said box-shaped body (2) and a second end (19b), opposite to the first one (19a), provided with a protuberance (20) the cross section of which is larger than the cross section of said elongated body (19); said protuberance (20) defining a fitting surface (20a) facing the contact surface (5) of the box-shaped body (2).

9. A device as claimed in claim 8, **characterised in that** each through opening (13) formed in the plate (12) has a two-lobe conformation in which a first and a second cavities (13a, 13b) contiguous to each other are defined; the width of said first cavity (13a) being larger than that of the second cavity (13b).

10. A device as claimed in claim 9, **characterised in that** the cross section of said protuberance (20) of each projecting portion (17) is larger than the width of the second cavity (13b).

11. A device as claimed in the preceding claim, **characterised in that** said projecting portions (17) are insertable in the respective through openings (13) and movable between a released position at which the elongated body (19) of each projecting portion (17) is disposed in the first cavity (13a) and the coupled position at which the elongated body (19) is disposed in the second cavity (13b) to fasten the box-shaped body (2) to the supporting element (11).

12. A device as claimed in claim 11, **characterised in that** in the respective coupled position of each projecting surface (17), said fitting surface (20a) of the protuberance (20) abuts on the lower surface (12a) of the plate (12) of the supporting element (11).

13. A device as claimed in anyone of claims 11 and/or 12, **characterised in that** said plate (12) of the supporting element (11) further comprises an elastic element (15) disposed at one of said through openings (13); said connecting means (16) further comprising an abutment element (22) extending from said box-shaped body (2) in the vicinity of one of said projecting portions (17); said abutment element (22) in the coupled position of the projecting portions (17) being disposed in said first cavity (13a) of the through opening (13) and being in removable engagement with said elastic element (15).

14. A device as claimed in anyone of claims 10 to 13, **characterised in that** said connecting means (16) further comprises a pin (21) projecting from said

box-shaped body (2) and disposed at said central region (18); said projecting portions (17) rotating about the longitudinal extension of the pin (21) during movement from the released position to the coupled position and vice versa; said pin (21) being preferably insertable in a hole (21a) formed in said plate (12) and disposed at a central region interposed between said through openings (13) for rotation in said hole (21a) during movement from the released position to the coupled position and vice versa.

15. A device as claimed in anyone of the preceding claims, **characterised in that** it further comprises at least one tubular element (10) associated with said box-shaped body (2) and emerging from said contact surface (5) to bring the box-shaped body (2) into communication with an audio reproduction and acquisition system housed in the helmet (A).

16. A device as claimed in the preceding claim, **characterised in that** said tubular element (10) is made of a flexible material and sets communication between the inside of the helmet (A) and the outside; passage of said tubular element (10) taking place without the presence of holes or weakened portions formed in the outer surface of the helmet (A).

FIG 1a

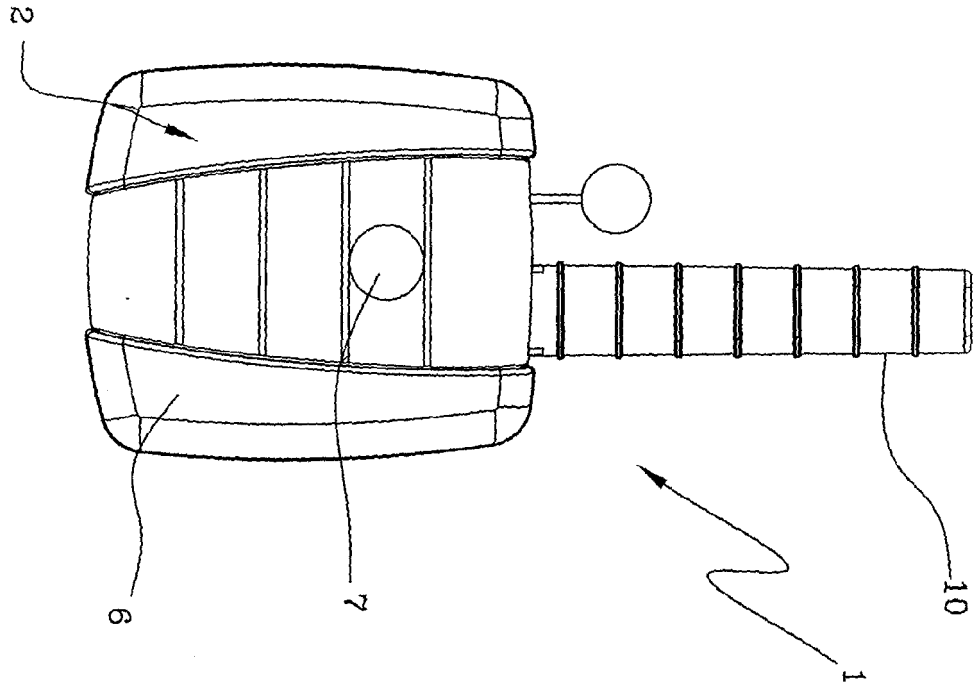


FIG 1b

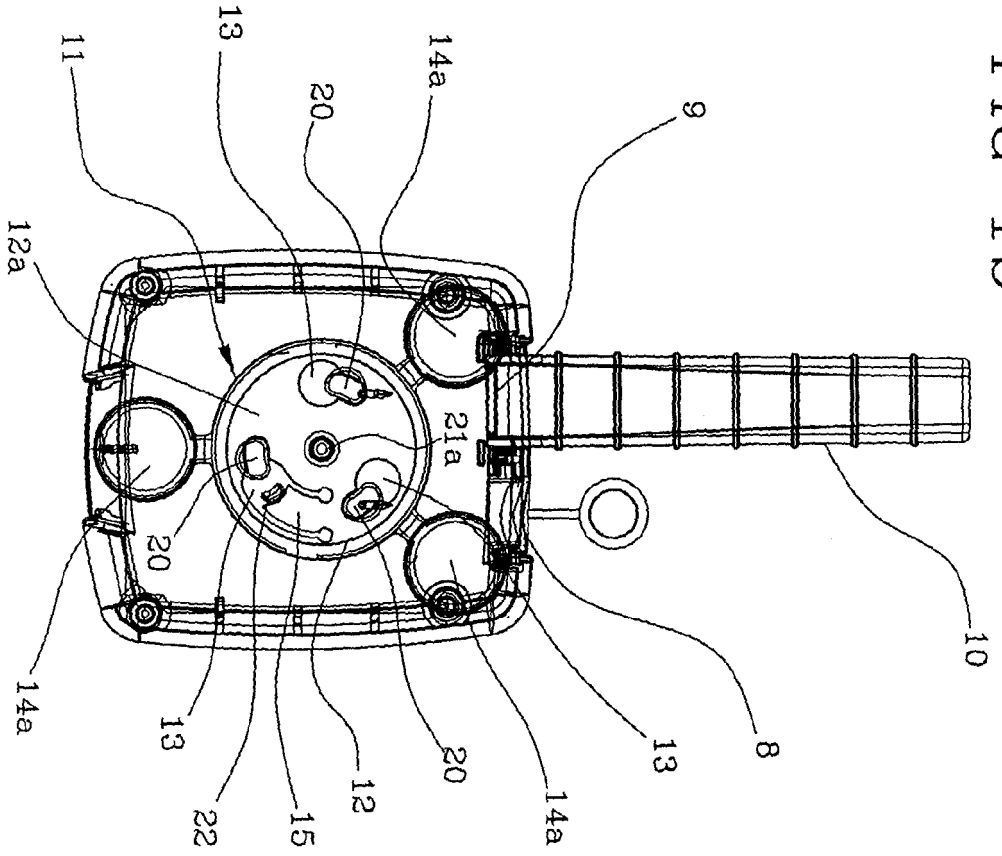


FIG 1c

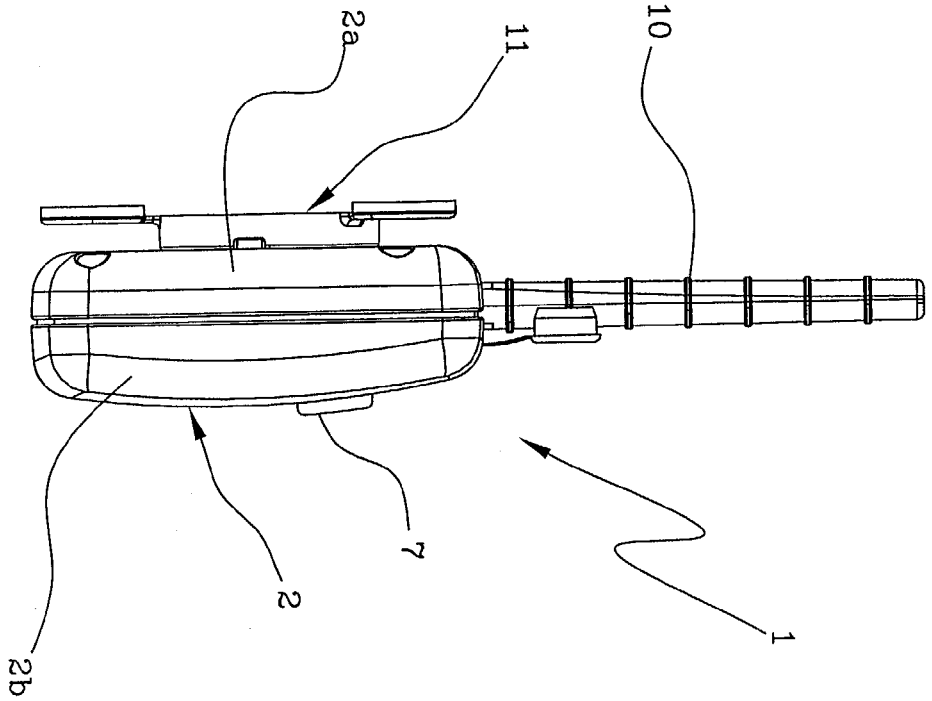


FIG 1d

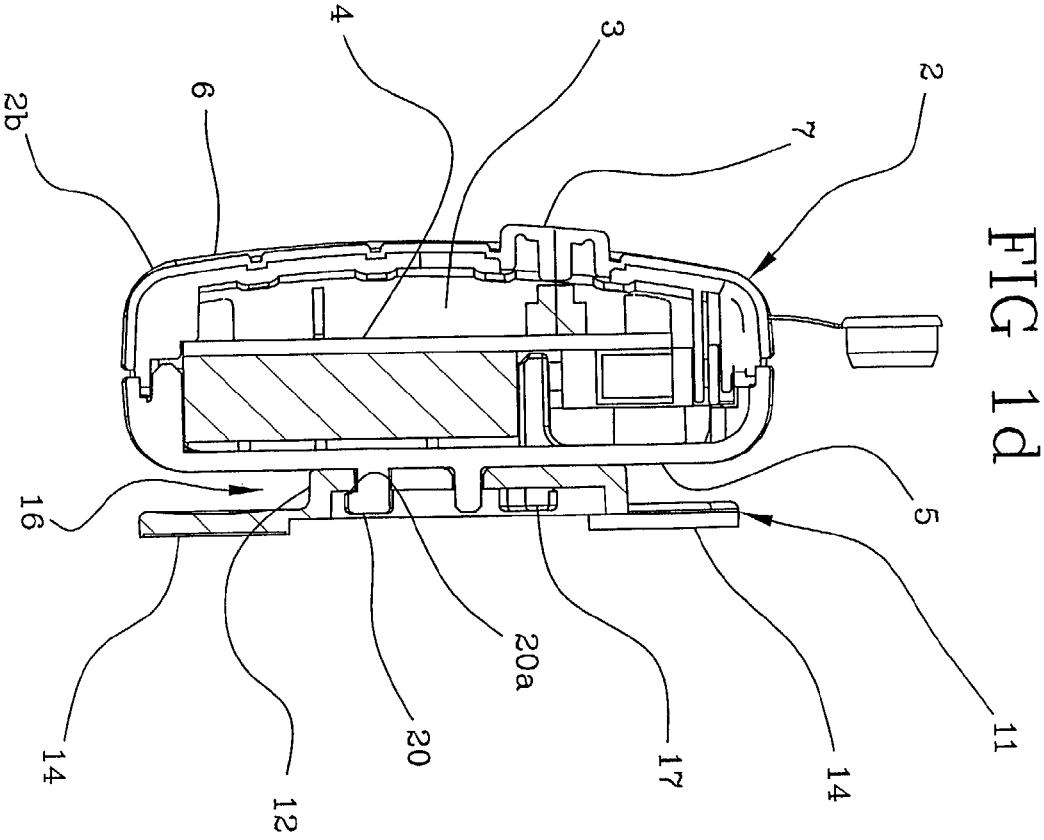


FIG 2a

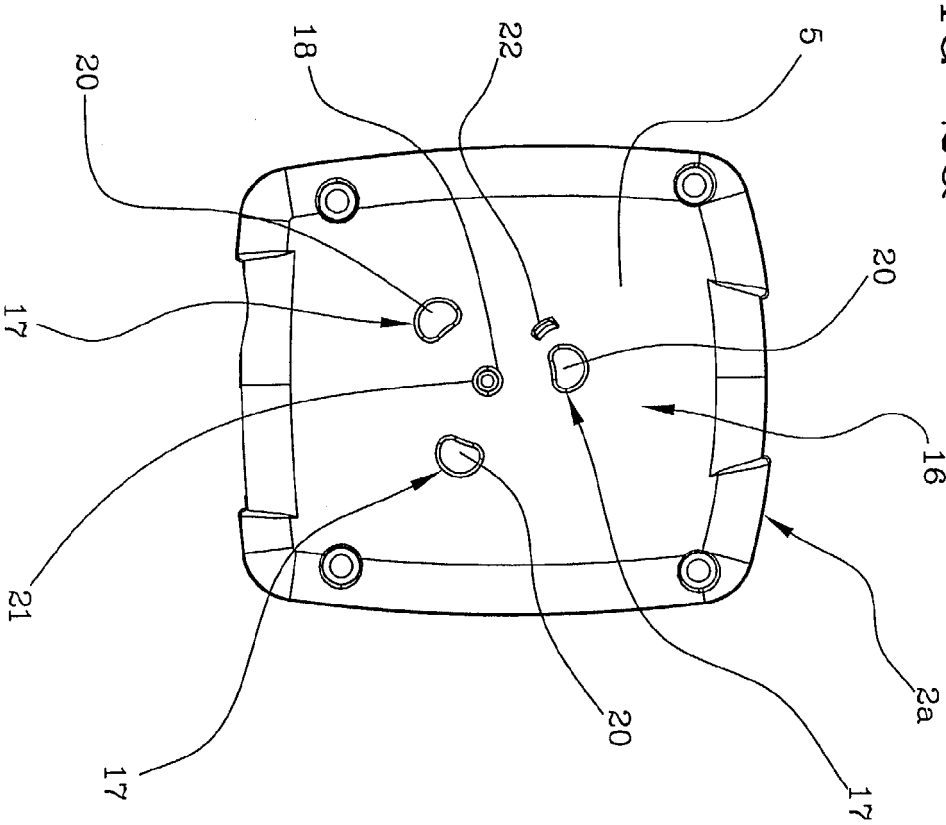


FIG 2b

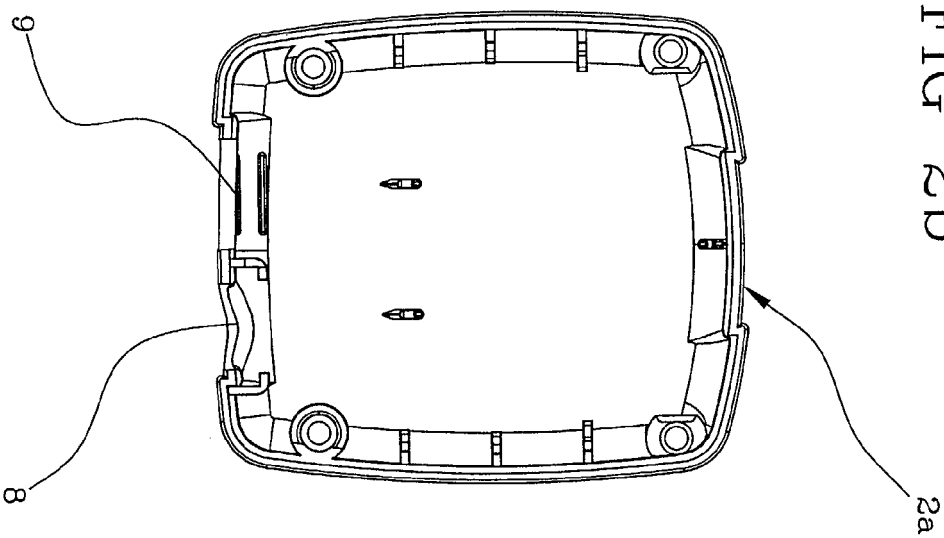


FIG 2c

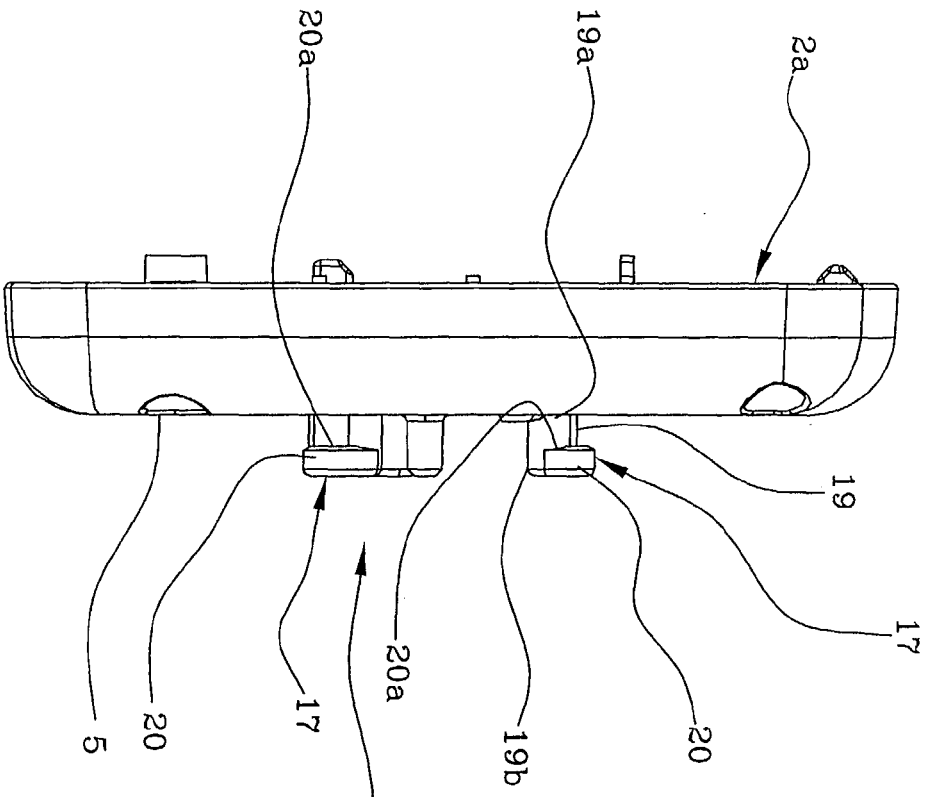
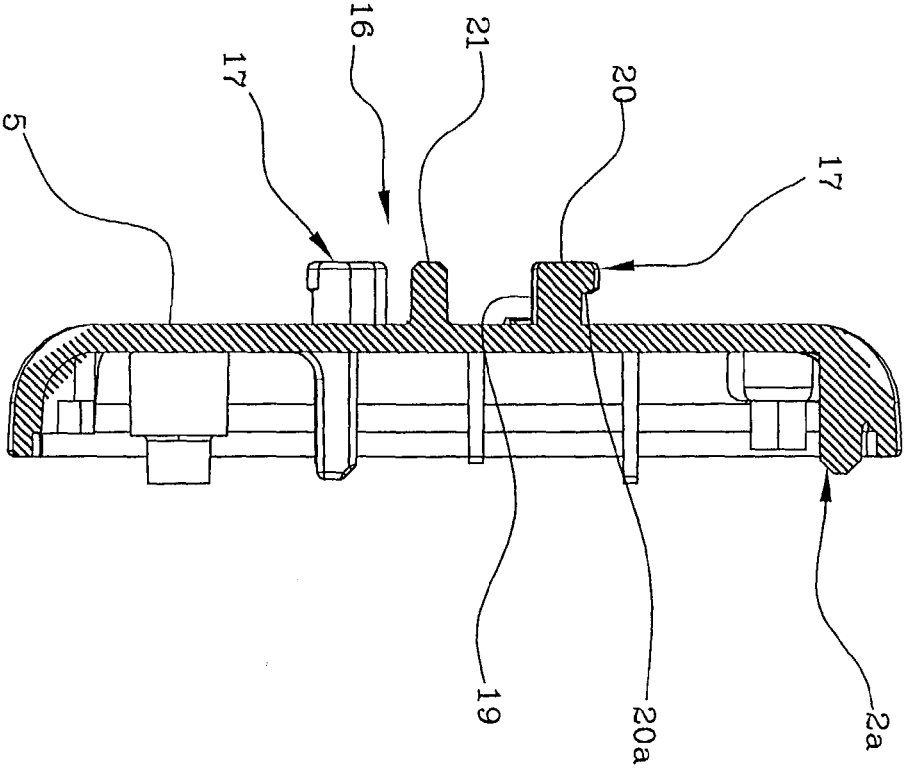


FIG 2d



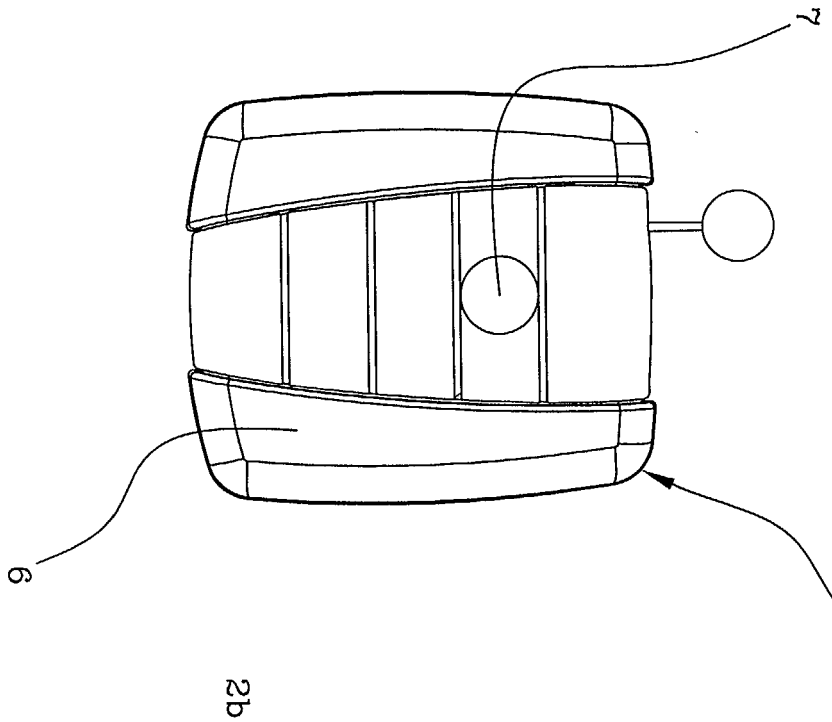


FIG 3a

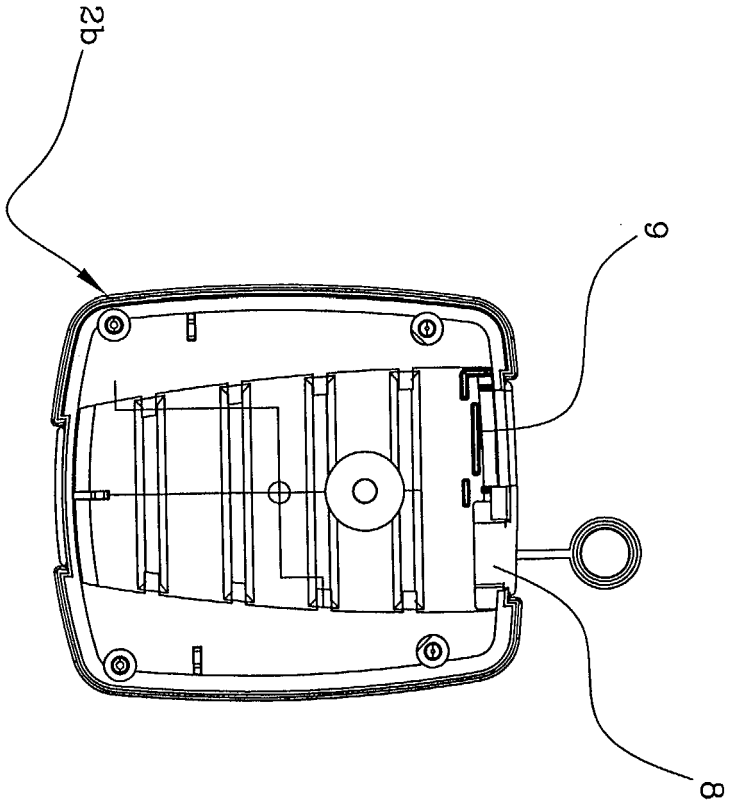


FIG 3b

FIG 3c

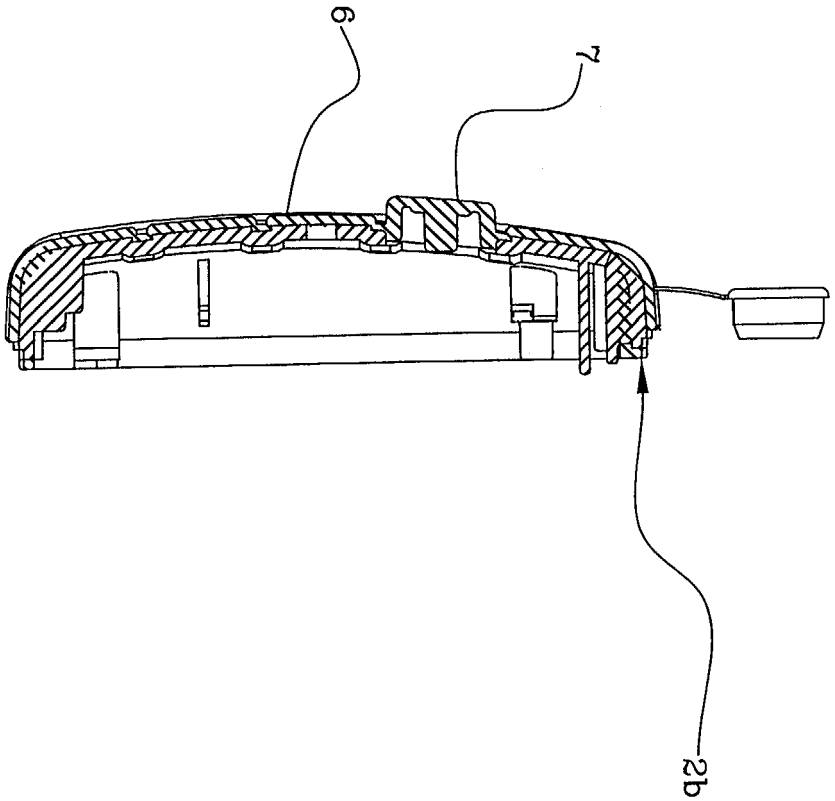


FIG 3d

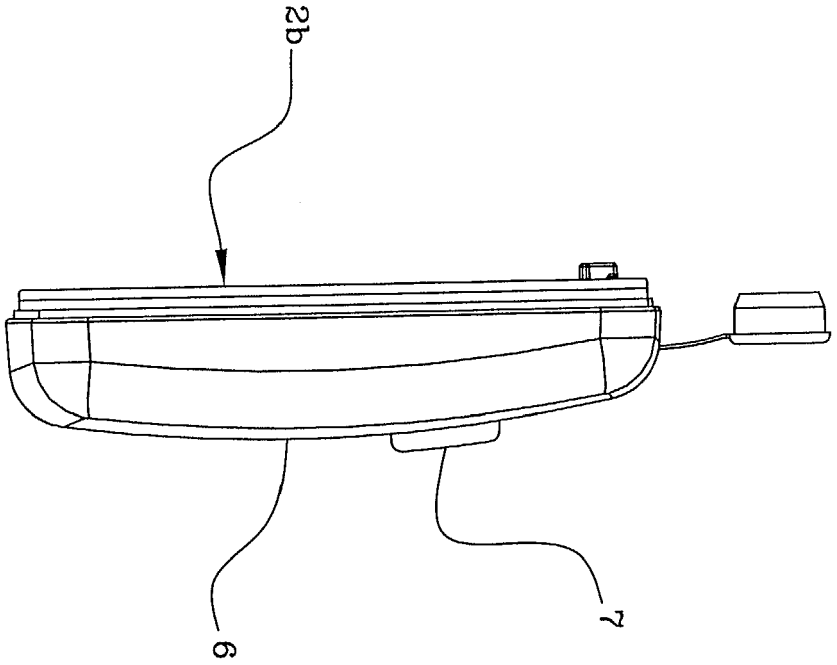


FIG 4b

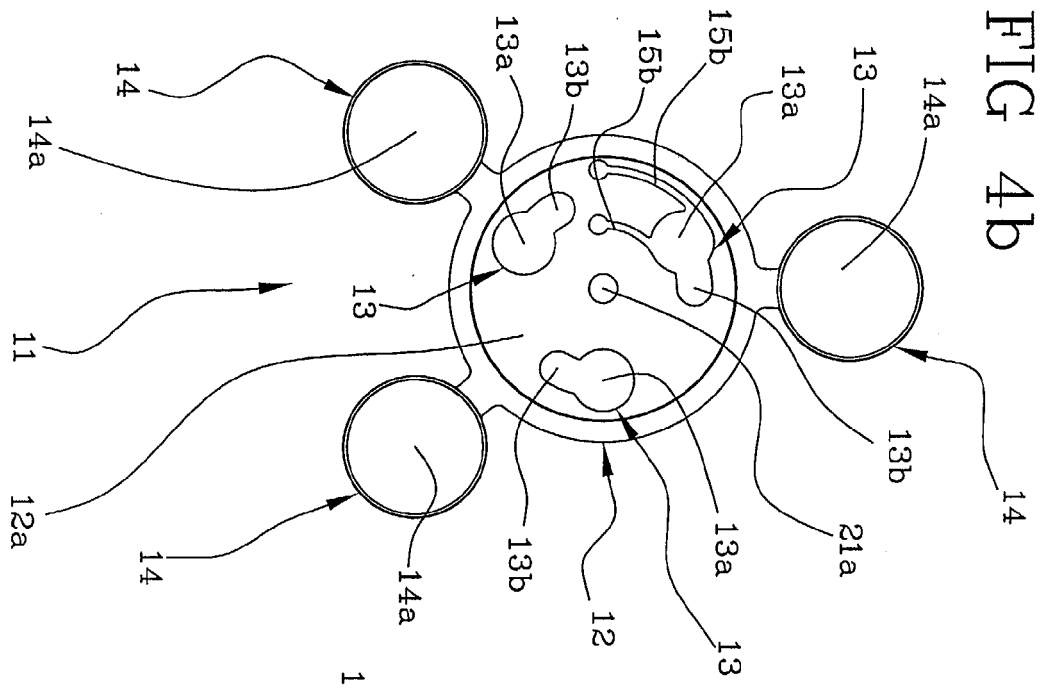


FIG 4c

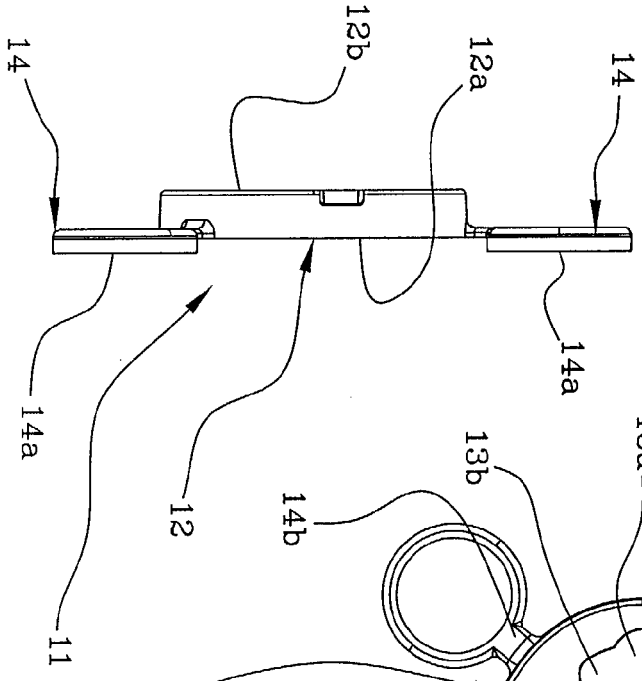


FIG 4a

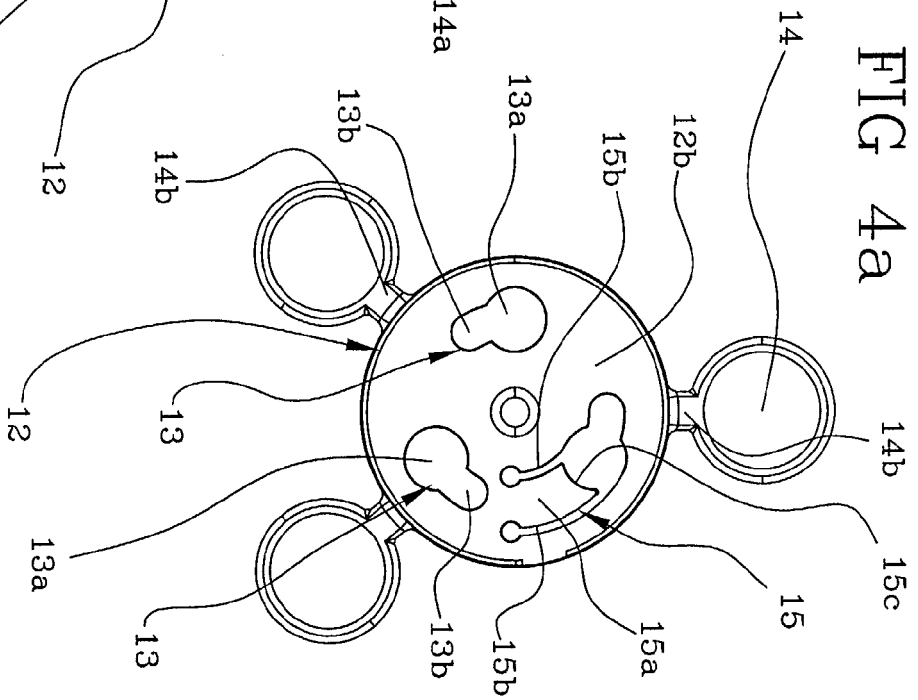
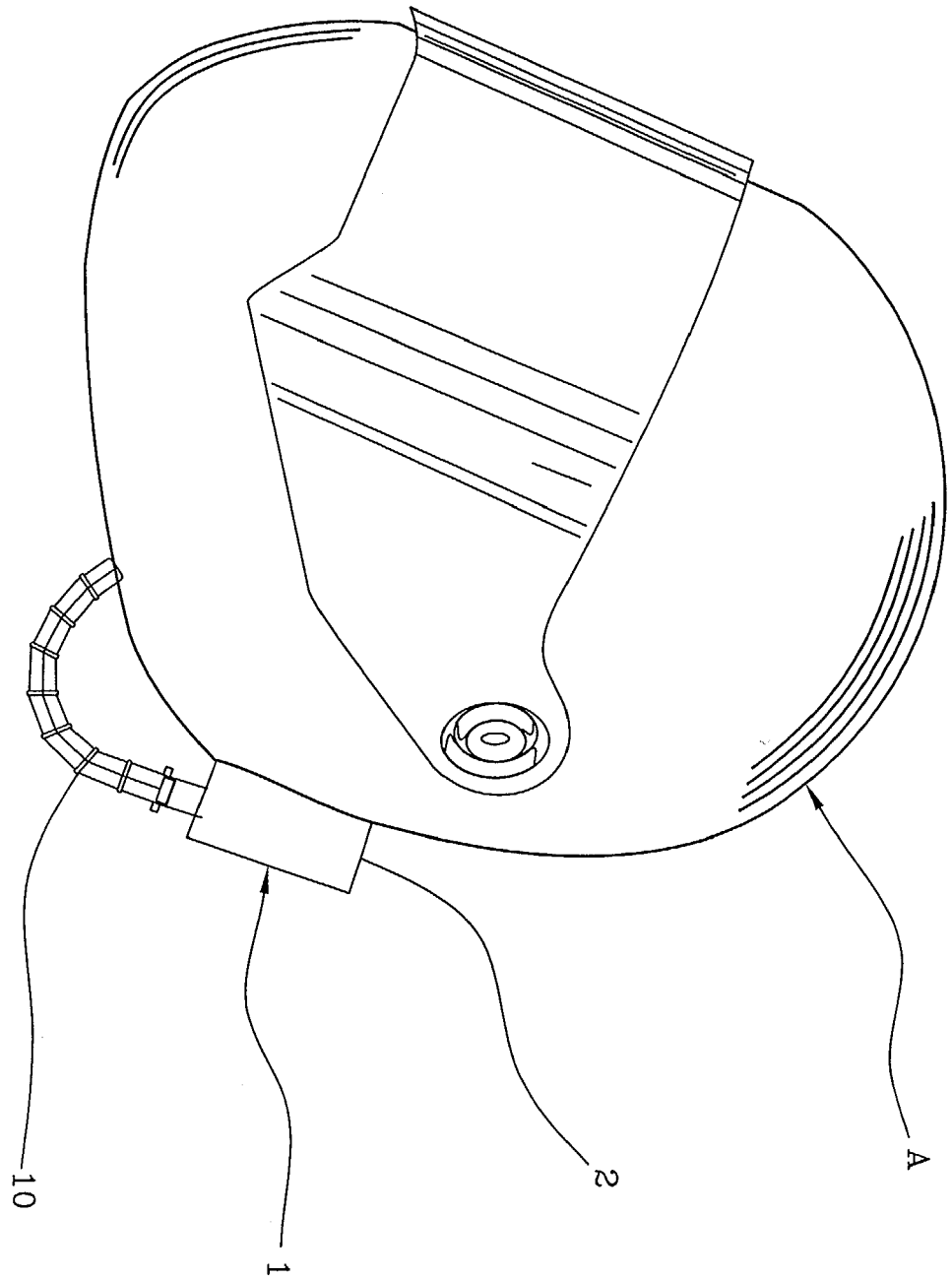


FIG 5



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EUROPEAN SEARCH REPORT

Application Number
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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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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
The Hague	10 January 2006	Bourseau, A-M

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