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(72) Inventors:
• **BARLERIN, Stéphane**
72470 FATINES (FR)
• **LEHMANN, René**
90766 FÜRTH (DE)
• **BOURI, Youssef**
78180 MONTIGNY LE BRETONNEUX (FR)

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(74) Representative: **INNOV-GROUP**
310, avenue Berthelot
69372 Lyon Cedex 08 (FR)

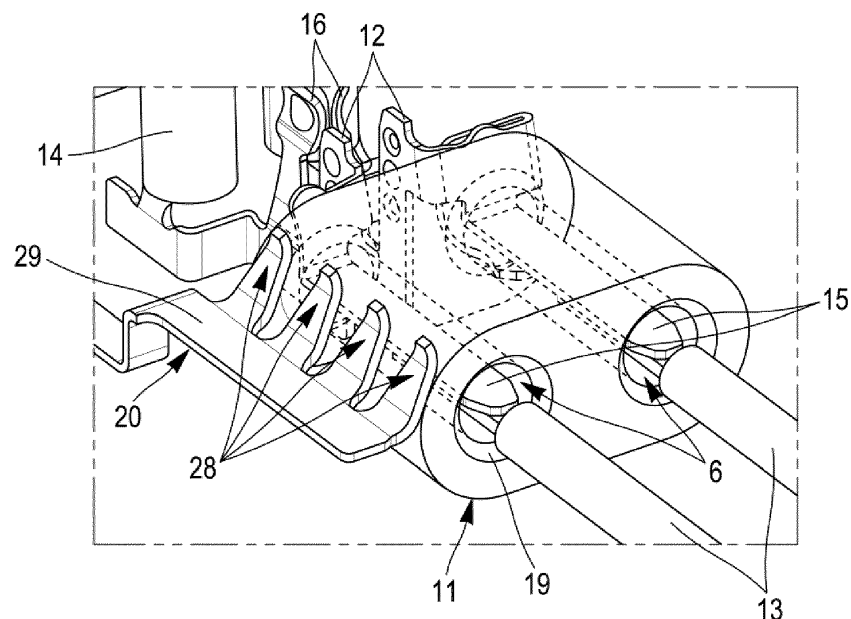
(71) Applicant: **Aptiv Technologies Limited**
14004 St. Michael (BB)

(54) **CONNECTION ASSEMBLY FOR A PASSIVE SAFETY DEVICE AND THAT IS PROTECTED AGAINST ELECTROSTATIC DISCHARGES**

(57) Squib-connection assembly for a motor-vehicle safety device. This connection assembly comprises a squib connector and an airbag connector (3). The airbag connector (3) comprises a casing (8) in which are housed a ferrite block (11), two female contacts (12) that are each respectively electrically connected to one male contact of the squib connector, and at least one third contact (20).

The ferrite block (11) makes contact with at least one of the two female contacts (12) of the airbag connector (3). The third contact (20) makes contact, on the one hand, with the ferrite block (11) and, on the other hand, with a ground contact that is in electrical continuity with the ground of the vehicle.

[Fig. 4]



Description

Technical field

[0001] The invention relates to the field of motor-vehicle connection systems and more particularly to the field of connection systems for passive motor-vehicle safety devices such as airbags, safety belt pre-tensioners, etc., i.e. for the devices referred to as SRSs (safety restraint systems).

Prior art

[0002] In this field, passive safety devices may comprise gas-generating squibs that are fired electronically. In this case, the squib comprises a squib connector, itself coupled to an airbag connector. Throughout this document, the generic term "airbag connector" will be used to refer to a connector connected, via electrical wires, to a control device that triggers a squib, irrespectively of whether the squib is a squib intended to inflate an airbag, to pre-tension a safety belt, or to do something else.

[0003] When a shock exceeds a set acceleration or deceleration threshold, the squib is triggered by the control device, which is programmed to send a signal to the squib to which it is connected, via electrical wires and an airbag connector. The explosion that results engenders a sudden combustion that induces a high gas pressure in a piston (pre-tensioner) or an inflatable bag (airbag).

[0004] It is important to take care to ensure that squibs do not trigger in the absence of a suitable command. In order to avoid untimely triggering, it has already been proposed to filter, for example with ferrites, electrical signals transmitted by the electrical wires connected to a squib and that are not generated by the control device but rather by electromagnetic interference. Specifically, electromagnetic interference is generated in frequency ranges that are generally well filtered by ferrites placed in an airbag connector connected to the electrical wires and coupled to the connector of the squib.

[0005] Reference may for example be made to EP1009070A2, US20130241281A1 or US20130309884 A1 for a description of a connector of this type.

[0006] However, a squib could also trigger under the effect of an electrostatic discharge, especially at the moment at which the airbag connector is coupled to the connector of the squib. In order to avoid this, it has been proposed to equip airbag connectors with a device that short-circuits the contacts of the airbag connector provided that the latter is not coupled to the connector of the squib and that opens during the coupling of these connectors. Reference may for example be made to document EP3116075A1 for a description of a connector of this type.

[0007] Another contribution to the improvement of the protection against potential electrostatic discharges of connection assemblies for passive safety devices as mentioned above is proposed below.

Summary of the invention

[0008] More particularly, a connector according to Claim 1 is proposed.

[0009] By virtue of these provisions, potential electric charge generated, for example, via electrostatic effects in the wires connecting the control device to the airbag connector may be transmitted to the squib body, which itself is connected to ground, by way of the ground contact of the squib, of the third contact and of the ferrite block. It is therefore evacuated without accumulating and without risk of the squib being triggered, during a discharge.

[0010] This connector potentially also comprises one or more of the features of Claims 2 to 5, considered alone or in combination with one or more others.

[0011] According to another aspect, the invention relates to a connection assembly according to Claim 6 for a passive motor-vehicle safety device.

[0012] This connection assembly potentially also comprises one or more of the features of Claims 7 to 9, considered alone or in combination with one or more others.

[0013] According to yet another aspect, the invention relates to a method according to Claim 10 for mounting a connection assembly for a motor-vehicle safety device.

Brief description of the drawings

[0014] Other features, aims and advantages of the aforementioned connection assembly will become apparent on reading the following detailed description, and with reference to the appended drawings, which are given by way of non-limiting example, and in which:

[Fig. 1] schematically shows in perspective an exemplary embodiment of a set of connectors;

[Fig. 2] schematically shows in perspective, without its cover, the airbag connector of the set of connectors that is illustrated in Figure 1; this figure especially shows first and second contacts passing through a ferrite block, and a third contact;

[Fig. 3] schematically shows, seen from above, without the cover, the airbag connector illustrated in Figure 2;

[Fig. 4] is a schematic representation in perspective of the third contact being brought into contact with the ferrite block shown in Figure 2;

[Fig. 5] is a schematic representation in perspective of one of the first and second contacts shown in Figure 2 being brought into contact with the ferrite block;

[Fig. 6] is a schematic representation in perspective of a pair of elastic strips of one of the first and second contacts;

[Fig. 7] is a schematic representation in lateral elevation of the pair of strips illustrated in Figure 6;

[Fig. 8] is a schematic representation seen from above of the pair of strips illustrated in Figures 6 and 7.

Detailed description

[0015] An exemplary embodiment of a set of connectors 1 for a passive motor-vehicle safety device is described below.

[0016] In this embodiment, the set of connectors 1 comprises a squib connector 2 and an airbag connector 3 forming a counter-connector.

[0017] The squib connector 2 comprises a bushing 4 housed in a cavity of a metal squib body 5 connected to the ground of the vehicle, and two squib-connector contacts (not shown in the figures). These two contacts are male contacts each comprising a pin housed in a cavity 7 provided in the bushing 4. In this embodiment, each of the male contacts is electrically insulated from the bushing 4.

[0018] As shown in Figure 1, the airbag connector 3 comprises a casing 8, a cover 9 and a device 10 for ensuring the position of the connectors (connector position assurance or CPA).

[0019] As shown in Figures 2 and 3, the airbag connector 3 furthermore comprises a ferrite block 11, and first and second female contacts 12 that are each respectively designed to couple with a male contact of the squib connector 2. The airbag connector 3 also comprises a third contact 20. The first and second contacts 12 are each electrically connected to a control circuit, via electrical wires 13.

[0020] The first and second contacts 12 and third contact 20 each respectively consist of a conductive metal strip that was cut from a metal sheet, then folded and/or rolled. Each of the first and second contacts 12 and third contact 20 are of a single piece.

[0021] The ferrite block 11 for example has a resistivity comprised between 10^7 and 10^9 ohms.

[0022] As shown in Figures 4 and 5, the ferrite block 11 comprises two parallel passages 6 that extend longitudinally between a front aperture 18 and a rear aperture 19 (the terms "front" and "rear" corresponding, in this document, to the front portion of the airbag connector 3, which portion is coupled to the squib connector 2, and to the far-end portion, via which the electrical wires 13 exit from the airbag connector 3, respectively).

[0023] The first and second contacts 12 of the airbag connector 3 each comprise a contact segment 14 for establishing an electrical contact with a contact of the squib connector 2, a crimping segment 15 for making an electrical connection to the control circuit, a short-circuit contact 16 and an elastic strip 17. The crimping segments 15 and the elastic strip 17 of each of the contacts 12 are each respectively inserted via the front aperture 18 of a passage 6 provided in the ferrite block 11.

[0024] As shown in Figures 5 to 8, the elastic strip 17 of each of the first and second contacts 12 has a lyre shape. In other words, each elastic strip 17 comprises two tongues 21 that extend essentially parallel to each other, between a supporting segment 22 common to both tongues 21, and a free end 23. The supporting segment

22 is folded to 180° with respect to an intermediate segment 24, from which the crimping segment 15 extends. The tongues 21 and the crimping segment 15 are each folded from the supporting segment 22 and from the intermediate segment 24, respectively. The tongues 21 extend longitudinally above the crimping segment 15. Each tongue 21 comprises one tooth 25 that extends transversely with respect to the longitudinal direction of the tongues 21. Each tooth 25 has a contact surface 27 intended to make contact with the interior surface of a passage 6 provided in the ferrite block 11. The tongues 21 are separated by a slit 26. The tongues 21 may move closer to each other elastically, in the space provided by the slit 26, but tend to return elastically to a rest position in which they exert a contact force via the contact surface 27 of each tooth 25.

[0025] Each elastic strip 17 comprises two surfaces 27 of contact with the ferrite block 11. In the embodiment described here, the two contacts 12 make contact with the ferrite block 11 (but in variants, just one of the first and second contacts 12 could make contact with the ferrite block).

[0026] As shown in Figure 4, the third contact 20 comprises four elastic tongues 28 extending from a common segment 29. Each of these tongues 28 is shaped to bear against the external surface of the ferrite block 11. The third contact 20 comprises a plurality of points of contact (for example four points of contact) with the ferrite block 11, in order to improve the electrical continuity between the third contact 20 and the ferrite block 11.

[0027] Thus, potential electric charge generated via electrostatic effects, via removal from or addition to at least one of the first and second contacts, is removed via the tongues 21 of the elastic strips 17, to the ferrite block 11, then via the third contact 20, to the ground of the vehicle. These arrangements protect the squib and prevent it from triggering because of an electrostatic discharge, since electric charge cannot accumulate in a sufficient amount to create a sufficient potential difference, notably between the contacts of the squib connector 2.

[0028] To mount a connection assembly 1 according to the embodiment described above or its variants,

- a squib comprising a ground contact and a squib body 5 that is electrically conductive and connected to the ground of the vehicle is provided;
- a counter-connector 3 comprising a casing 8 in which are housed a ferrite block 11, first and second contacts 12, and a third contact 10 is provided; and
- the first and second contacts 12 are electrically connected to the ground of the vehicle by way of the ground contact of the squib, of the third contact 20 and of the ferrite block 11.

Claims

1. Connector for a passive motor-vehicle safety device,

this connector comprising a casing (8) in which are housed a ferrite block (11), first and second contacts (12) each comprising a segment (15) extending into a passage (6) provided in the ferrite block (11), and a third contact (20),

characterized in that the third contact (20) and at least one of the first and second contacts (12) make contact with the ferrite block (11).

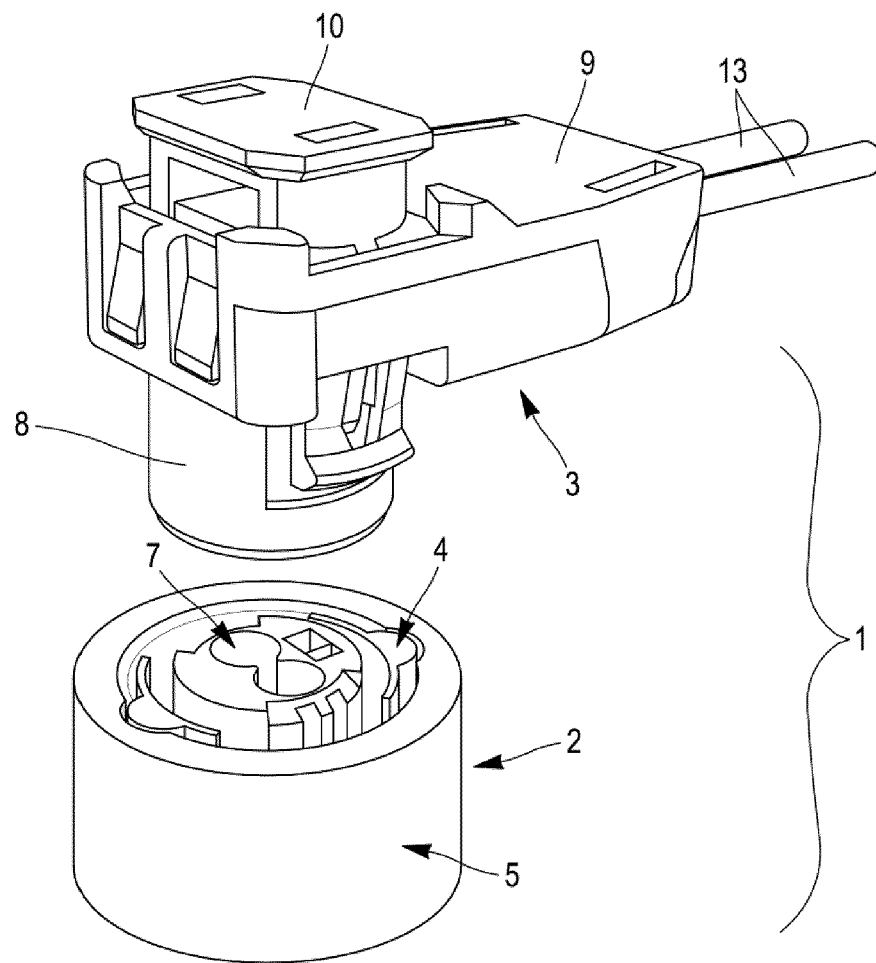
2. Connector according to Claim 1, wherein at least one of the first and second contacts (12) makes contact with an internal wall of a passage (6) provided in the ferrite block (11), and the third contact (20) makes contact with an external wall of the ferrite block (11). 10
3. Connector according to either of Claims 1 and 2, wherein the third contact (20) comprises a plurality of points of contact with the ferrite block (11). 15
4. Connector according to one of Claims 1 to 3, wherein at least one of the first and second contacts (12) comprises at least one elastic strip (17) comprising at least one point of contact (27) with the ferrite block (11). 20
5. Connector according to one of Claims 1 to 4, wherein the ferrite block (11) is made of a material having a resistivity per unit area comprised between 10^7 and 10^9 ohms. 25
6. Connection assembly for a passive motor-vehicle safety device, this assembly comprising, on the one hand, a squib connector (2) housed in an electrically conductive, metal squib body (5) and connected to the ground of the vehicle and, on the other hand, a counter-connector (3), forming a connector according to one of Claims 1 to 5, and coupled to the squib connector (2), wherein the squib connector (2) comprises two contacts that are electrically connected to the squib and a ground contact that is electrically connected to the ground of the vehicle. 30
7. Assembly according to Claim 6, wherein the first and second contacts (12) make contact with the ferrite block (11). 35
8. Assembly according to either of Claims 6 and 7, wherein at least one of the first and second contacts (12) comprises at least one elastic strip (17) comprising at least one point of contact (27) with the ferrite block (11). 40
9. Assembly according to one of Claims 6 to 8, wherein the third contact (20) comprises a plurality of points of contact with the ferrite block (11). 45
10. Method for mounting a connection assembly for a motor-vehicle safety device, wherein: 50

- a squib comprising a squib connector (2) comprising a ground contact connected to the ground of the vehicle is provided;

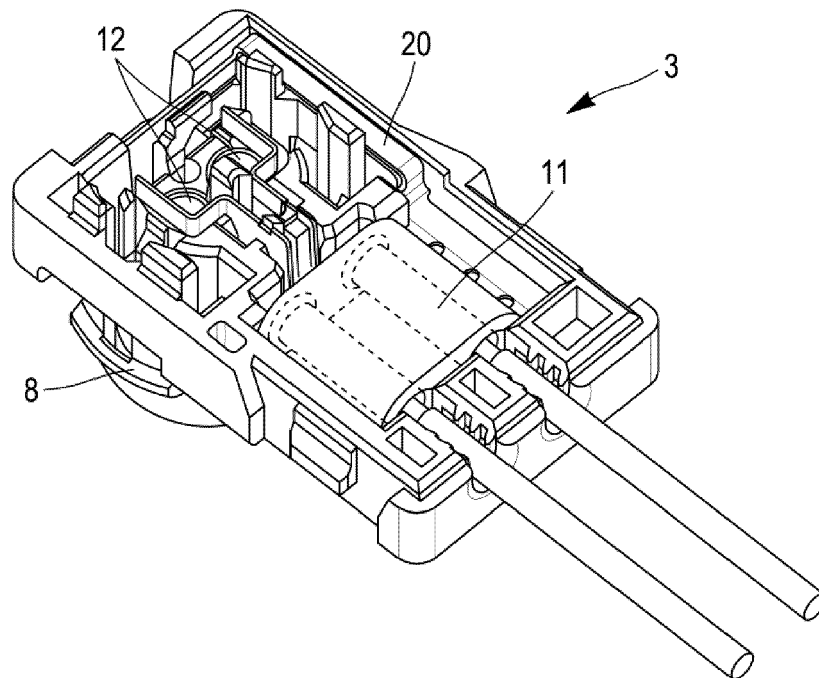
- a counter-connector (3) comprising a casing (8) in which are housed a ferrite block (11), first and second contacts (12), and a third contact (20) is provided;

characterized in that at least one of the first and second contacts (12) is electrically connected to the ground of the vehicle by way of the ground contact of the squib, of the third contact (20) and of the ferrite block (11).

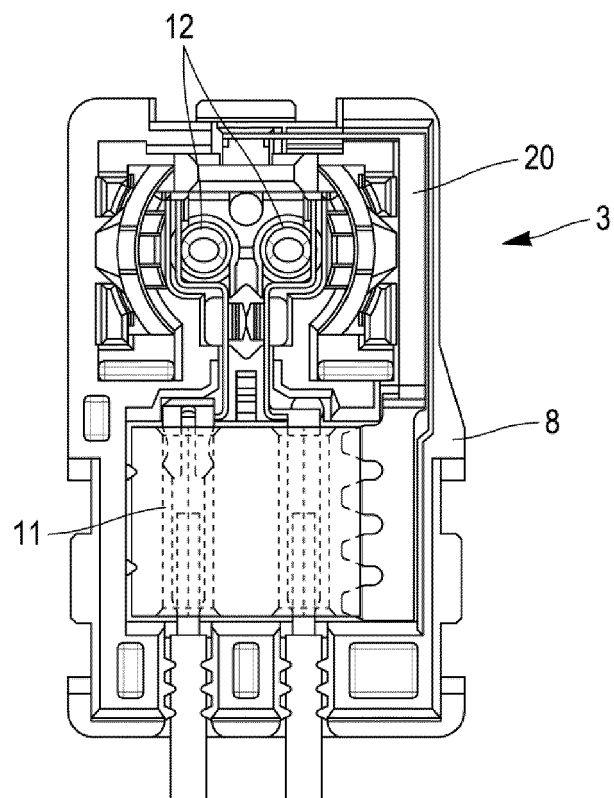
[Fig. 1]



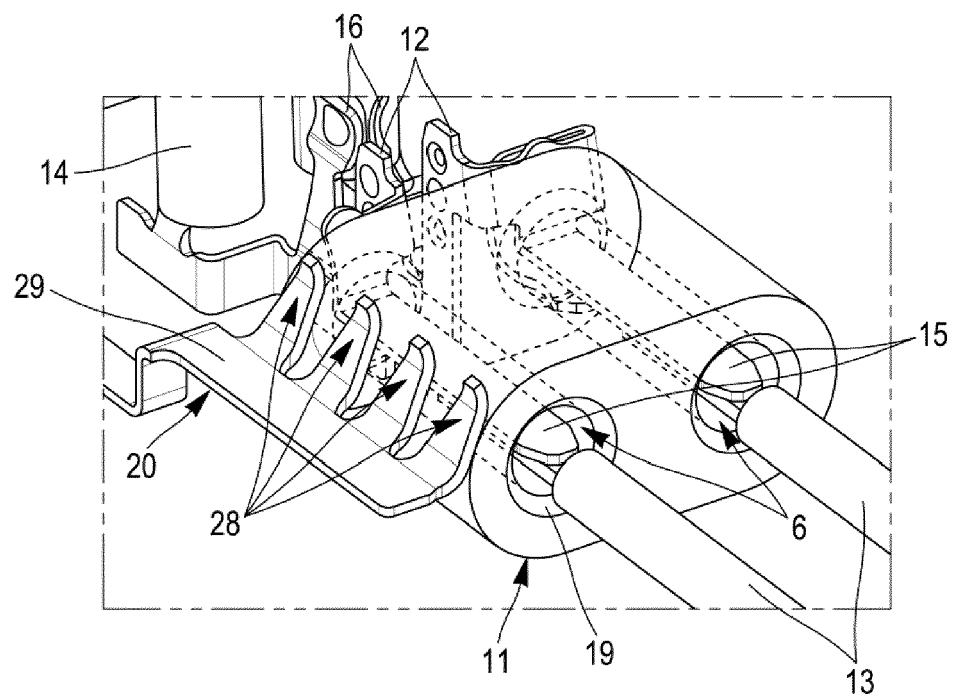
[Fig. 2]



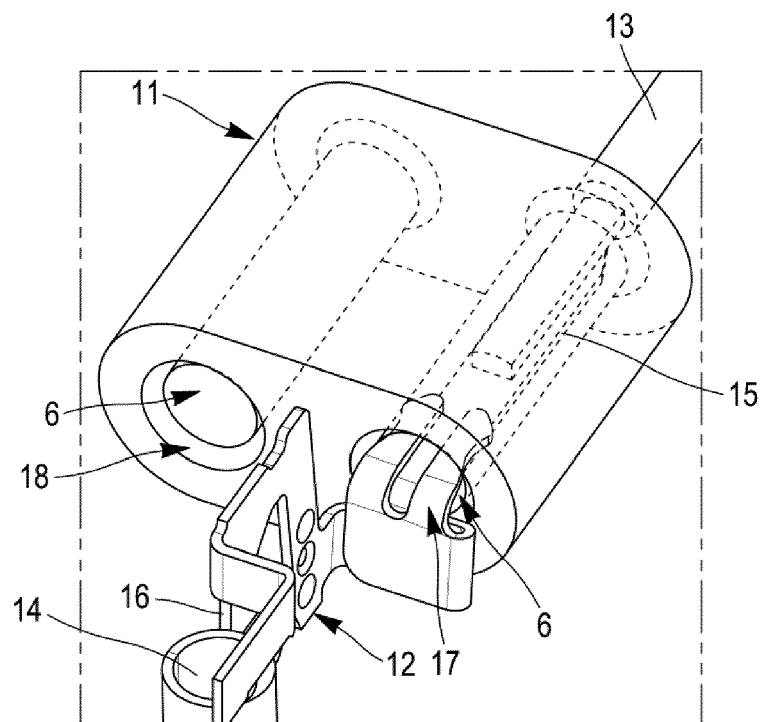
[Fig. 3]



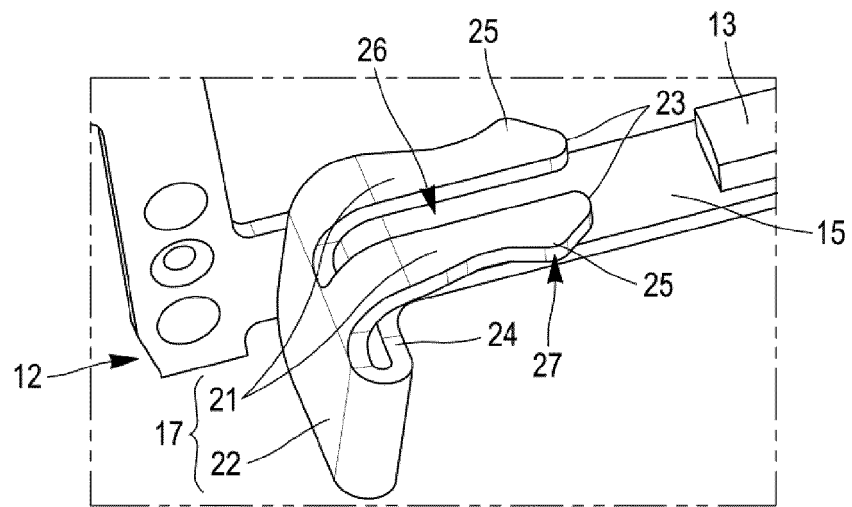
[Fig. 4]



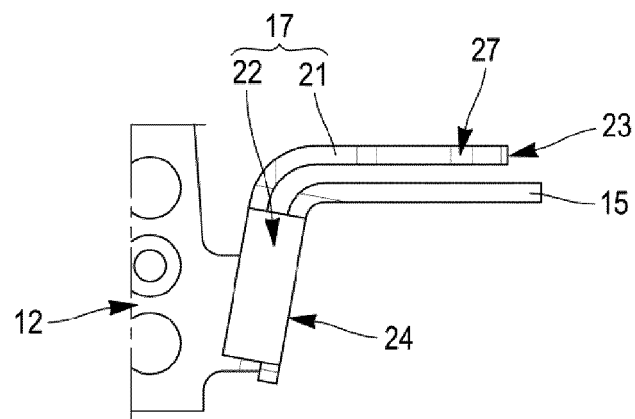
[Fig. 5]



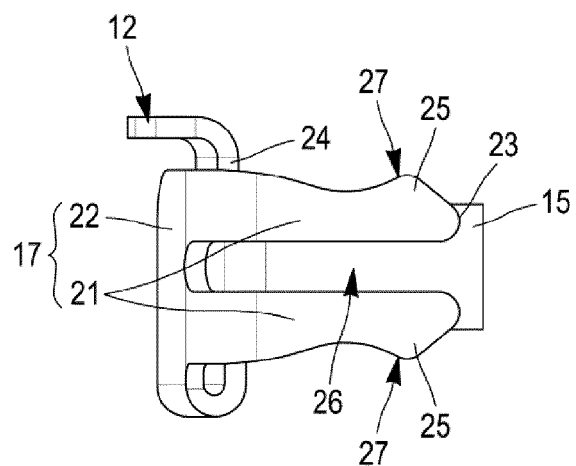
[Fig. 6]



[Fig. 7]



[Fig. 8]





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