(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
6 October 2005 (06.10.2005)

PCT

(10) International Publication Number
WO 2005/092674 A1

(51) International Patent Classification[7]: B60R 21/20

(21) International Application Number:
PCT/US2005/006488

(22) International Filing Date: 28 February 2005 (28.02.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/550,384 5 March 2004 (05.03.2004) US

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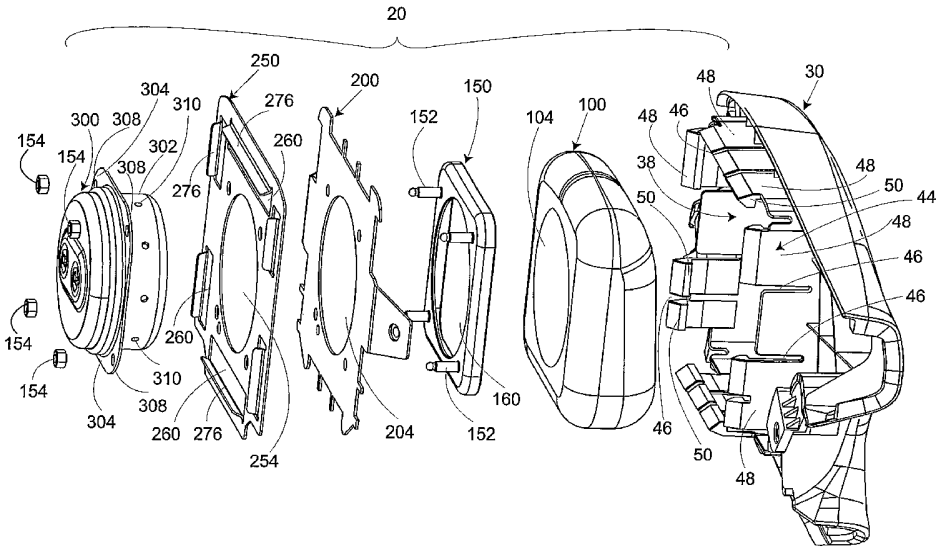
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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: DRIVER AIRBAG MODULE



(57) Abstract: An airbag module (20, 20a) has an inflator (300), a first support member (200 - 200a), a second support member (250, 250a - 250d) and a cover (30) for enclosing an airbag (100). The cover includes a plurality of resilient tabs (48). The tabs are situated about a cavity (38) that receives the airbag (100). A formation having a thickened tip is formed on an end of each tab. The thickened tip is a lock feature (50) that prevents the cover from disengaging from the first and second support members. Each tab and associated lock feature is movable from a rest position to a deflected position upon contact with one of the plates. The first and second support members are disposed about each tab and cooperate to define an effective narrow opening that is smaller than the thick tip. This prevents movement of the thick tip through the first and second support members and the disengagement of the cover from the first and second support members.

WO 2005/092674 A1

Published:
— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

DRIVER AIRBAG MODULE

The present invention relates to airbag modules and more particularly to an airbag module in which the airbag cover is attached to a housing or support member without the need for additional fasteners.

The prior art shows airbag modules in which a housing or support plate is secured to a cover by way of rivets or other similar discrete fasteners. Another type of airbag module introduces a snap-fit connection between the housing and cover. In this type of module the airbag cover typically includes a plurality of deformable members, each of which is urged outwardly upon assembly of the housing to the cover to avoid using the discrete fasteners. Upon full insertion of the cover into or upon the housing, these members snap into a locked position.

The present invention as set forth in Claim 1provides a novel construction in which a housing or support member such as a support plate or cup-shaped housing is secured to a cooperating cover.

Figure 1 is an exploded view of an airbag module of the invention.

Figure 2 is a bottom plan view of an airbag cover.

Figure 3 is a cross-sectional view at section 4 - 4 of Figure 2.

Figure 3a is an enlarged view of a portion of Figure 3.

Figure 4 is a cross-sectional view of the retainer and airbag.

Figure 5 is a plan view of a first support member.

Figure 6 is a cross-sectional view at section 6 - 6 of Figure 5.

Figure 7 shows an interim step in the assembly of an airbag module.

Figures 8 and 9 are various views of support member 250.

Figures 10 and 11 are views of a partially assembled airbag module.

Figure 12 is an enlarged portion of Figure 11.

Figure 13 is a cross-sectional view of an assembled module at section 13 - 13 of Figure 14b.

Figure 14 is a plan view of one support member.

Figure 14a is an isometric view of another support member.

Figure 14b is a plan view of an assembled airbag module.

Figures 15 and 16 show another embodiment of the invention.

Figures 17 – 19 show a further embodiment of the invention.

Figure 1 shows the major components of an airbag module 20 according to the present invention. A cover 30 houses an airbag 100, and a retainer 150 is positioned within the airbag and about an opening in the neck 102 of the airbag. The retainer includes a plurality of extending threaded studs 152. These retainer studs 152 extend out of the neck of the airbag 100 and connect a first or inner support member 200, a second or outer support member 250 and an inflator 300 together. Fasteners such as nuts 154 secure the above-mentioned components together.

A version of the first support member 200 is shown in Figure 1. Each support member is typically a metal stamping and certain features thereof may vary. For example, the first support member 200 shown in Figure 1 has a substantially plate-like appearance, but can have a stamped, recessed center as shown in Figure 6. Similarly, the second or outer plate 250 is representative of the types of plates that can be formed as part of the present invention. For example, the second support member 200, shown in Figure 1, also has a substantially plate-like appearance but can have a stamped, recessed center that nests with the recessed center of the first support member. Using members with the recessed centers reduces the overall depth of the module, if desired. The second support member 250 is shown with a plurality of openings 260, 260a and a plurality of tabs 276 partially covering each opening. In other embodiments the tabs are removed or the number of tabs in relation to the number of openings is varied.

Figure 2 is a plan view of the underside of the bottom of the cover 30 and shows additional features thereof. The cover is configured to engage in a locking manner with and receive one or more support members 200, 200a; 250, 250a. The cover 30 includes some features that are common to the prior art, such as sides 32, a top 34 and a multi-segment tear seam 36 formed in the underside 34a of the top 34. While not a requirement of the invention, it is recent practice in the airbag industry to use

a tear seam 36 that is not visible on the outer surface 34b (see Figure 3) of the top 34 of the cover 30.

The cover has a generally rectangular cavity 38 for receipt of a folded airbag 100 as shown in Figure 1. The folded airbag can be placed into the cavity or the airbag can be folded in-situ within the cavity. The cavity 38 is formed by walls 41, 42, 43, 44, which are a molded integral part or extension of the underside 34a of the airbag cover 30. In the preferred embodiment of the invention the cover is manufactured of a thermoplastic such as nylon, TPO or polyester. Each side or wall 41 - 44 includes at least one groove, slot or space 46 that separates the wall into a plurality of tabs or sections 48 (also see Figure 3). In the preferred embodiment these grooves do not extend the entire height of each wall 41 - 44 (alternatively the grooves could extend the length of the wall). In the figures the tabs 48 form the upper portions of each respective wall 41 - 44 (see Figure 3). Formed on the distal end of each tab 48 is a respective lock feature 50, which in the illustrated embodiment is formed of a thickened section or thick tip at the end of the tab or tab portion of each wall. In the illustrated embodiment, the general shape of each lock feature for a respective tab is similar and differs only in width. Various and dissimilar shaped locking features can be used in the present invention.

Figure 3 is a cross-sectional view of the cover showing the tear seam 36 and a pair of opposing tabs 48 and locking features 50. In the illustrated embodiment the cross-sectional shape of each locking feature is polygonal. Each locking feature 50 includes an engagement surface 52 that extends perpendicularly from an inner wall 54 of a tab 48. The locking feature includes a receiving surface 56, which is oriented at angle A relative to an outer side wall 58 of tab 48 (also see Figure 3a). The inner and outer side walls 54, 58 of each tab 48 are generally parallel to each other. Each lock feature 50 includes a connecting surface or crown 60 that links the surfaces 52, 56. Preferably the contour of surfaces 52, 56, 60 is generally flat. These surfaces, and in particular surfaces 56. 60, can be arcuate giving each locking feature a bulbous shape, as shown by phantom lines 56a, 60a. The mechanical properties of the material used to form the cover and the

dimensions (including the width W, see Figure 2) of each tab 48 are chosen to enable each tab 48 (with its integral locking feature 50) to be pushed radially inward during the installation process.

Figure 4 shows the airbag 100 in a partially folded condition. The airbag 100 includes a neck 102 having an opening or mouth 104. The inflator 300 is positioned in the opening 104 and manipulated so the mounting fasteners 152 extend from a corresponding opening 106 in the airbag 100, located about the center opening 104.

The retainer 150, in Figures 1 and 4, is a thin-walled stamped or drawn part having a peripheral wall or side 156 and a bottom 158. The wall can be removed and the retainer can be flat. The bottom 158 includes a large opening 160 through which at least a portion of the inflator 300 is received and four small openings 159. Four threaded fasteners 152 extend into and through respective openings 106 in the neck of the airbag 100. Opening 160 and opening 104 are about the same size.

Depending upon the particular installation, the airbag 100 can first be folded using any of a number of known techniques to fit within the cavity 38 formed by the walls 41 - 44. The retainer 150 can subsequently be attached to the neck 102. Alternatively, the airbag can first be attached to the retainer, the airbag folded and then the combination of the folded airbag with the retainer therein placed within the central cavity 34 on the underside of the cover. The retainer and airbag are held to the cover by operation of the support members 200, 250. The inflator 300 is then mounted to one or the other of the support members 200; 250 and secured thereto by the nuts 154.

Figures 5 and 6 show the first support member 200a, which is also referred to as an inner housing 200a. The support member 200 preferably comprises stamped steel. In the preferred embodiment the support member 200a is generally plate-like. The support member 200a can be planar as shown in Figure 1 or have a recessed center portion. The first support member 200a of Figures 5 and 6 includes a recessed center portion or a bottom 202 with a circular opening 204 therein giving the support member 200a a cup-shaped form. The bottom 202 includes a plurality of

fastener openings 203, which correspond in number, size and location to the threaded fasteners 152 of the retainer.

Extending upward and radially from the bottom 202 is an inclined, peripheral wall 206, which transitions into a peripheral or upper or plate-like portion 208. The upper portion 208 includes a plurality of axially extending ribs or tabs 210 defining adjacent opening, slots, and apertures 214 therebetween. Each rib 210 is fits in one of the intra-tab grooves or slots 46 of the cover. In Figure 5 the ribs or tabs 210 are generally rectangular in shape. The upper portion 208 includes a plurality of corner ribs or projections 212, which fit in the slightly wider corresponding corner grooves or spaces 46a at the corners of the cavity 38 (see Figure 2) of the cover (formed at the spaces between the respective walls 41 - 44). The support member 200a includes a plurality of wings 220, which extend oppositely from the upper plate-like portion or surface 208. Each wing includes a bore 222, which is threaded or smooth, to aid attachment of the assembled module to a part of the steering wheel such as the hub or hub plate. The root or base of each wing 220 functions as a rib 210.

After the retainer and folded airbag are placed within cavity 38, support member (inner housing) 200a is placed upon the cover 30. The support member 200a is positioned over the cavity 38 and walls 41 – 44 (with the airbag and retainer previously located in the cavity) and lowered onto the cover such that each leg, rib or projection 210, 212 fits within a corresponding one of the intra-tab spaces 46, 46a in the walls 41 - 44 as shown in Figure 7. Figures 2 and 3 identify a number of dimensions, such as WC1, WC2, WC3 and WC4. WC1 and WC2 identify the respective distance between inner facing edges of opposing lock members 50, with the lock members in their respective rest or unstressed condition. Figure 5 shows corresponding dimensions WS1 and WS2, which extend between opposing root edges or surfaces 215 of each opening or slot 214. If WS1 is less than WC1 and if WS2 is less than WC2 the center region of the support member 200a can be lowered onto the walls 41 - 44 of the cover 30 and positioned as described above without deforming any of the locking features 50.

Figure 7 is a top plan view showing the support member 200a seated on the cover 30. Figure 3 is a cross-sectional view of the cover 30 and does not include the support member 200 but does shows two opposing undeflected locking members 50, which retain the configuration as shown therein with or without the first support member 200 in place. The locking features 50 have not been deflected from their rest position by the introduction of the support member 200.

Figure 8 is a top plan view of another embodiment of a second or inner support member 250a ,also called an outer housing. Figure 9 is a cross-sectional view taken through section line 9 - 9 of Figure 8. The second support member or housing 250a performs the same general function as second support member 250 of Figure 1. Member 250a does not include upwardly bent tabs 176. Member 250a is plate-like and can be made from a steel stamping. Member 250a includes a recessed bottom 252 having a central circular opening 254 of the same size as opening 204. The bottom additionally includes a plurality of minor openings 253, which correspond in dimension, shape and location of the fasteners 152.

A radially extending, upwardly disposed wall 256 extends from bottom 252 and transitions into a plate-like portion or outer rim portion 258. The second support member 250a includes a plurality of openings, slots or apertures 260, 260a, which are formed as part of the outer portion 258 and transition wall 256. The layout of the openings 260, 260a in support member 250a corresponds to the geometry of the tabs 48 and lock features 50 of the cover 30. Each of the upper and lower openings 260a is separated by an optional rib or spacer identified by numeral 261. Portions of the rim 258 between the openings 260 function as a rib or spacer as well for openings 260. The upper and lower openings 260a can be replaced by a larger single opening (see Figure 14a) in which case the ribs 261 associated with the openings 260a are not used.

During one method of assembly the second support member 250a; 250 is first lowered onto the first support member 200, which is already in place on the cover 30. The support member 250a; 250 is oriented so that each

opening 260, 260a is positioned about a corresponding lock feature 50 (or group of lock features in the case of a large opening 260b of Figure 14a) with the top or crown 60 of each lock feature 50 extending through a corresponding opening 260; 260a. The support member 250a; 250 is subsequently pushed downward upon the lower support member 200. As the second support member 250a is being pushed upon the plurality of locking features 50, the respective outer edge 272 of each opening 260, 260a engages a corresponding receiving surface 56 of each locking feature 50, pushing the locking feature inwardly to a blocking or locking position in relation to the support member 200. The outer edge 272 acts as a cam pushing a receiving surface of the locking feature 50 inwardly. This cam function is accomplished by the tabs 276 in other embodiments of the second support member.

Dimensions WS3 and WS4 in Figure 8 represent the diameters between outer edges 272 of opposingly positioned openings 260, 260a. Reference is also made to dimensions WC3 and WC4 shown in Figure 2. WC3 and WC4 are the distances between the outer walls 58 of oppositely positioned tabs 48 and locking features 50 with the tabs and locking features in an unstressed condition. The dimensions WS3 and WS4 are less than corresponding dimensions WC3 and WC4. Because of the foreshortened dimensions of WS3 and WS4 relative to dimensions WC3 and WC4, the downward motion of member 250a places the edges 272 against corresponding receiving surfaces 56 of each locking feature 50, urging the locking features 50 inwardly in comparison to their rest positions illustrated in Figure 3. This biased, forced and inwardly directed repositioning of the locking features 50 is shown in Figure 10. As the second support feature 250a is mounted to the cover 30 and the first support member 200, the engagement surface 52 slides over a corresponding surface 242 on the top 208 of support member 200.

During the mounting of each of the support members 200, 250a to the cover, the fasteners 152 are positioned so that they extend through the corresponding openings 203, 253, respectively, in the first and second

support members. When assembled the bottom 204 and wall 206 of the first support member 200 mate or nest with the corresponding bottom 252 and wall 256 of the second support member 250a as shown in Figure 11. If the first and second support members 200, 250 are flat, they mate or nest together with corresponding flat surfaces of the other member.

When the second support member 250, 250a is in place, it narrows the effective open space 274 about each locking feature 50 as shown in Figure 12. This effective opening 274 is defined as the distance between outer-inner facing edge 272 of opening 260/260a of member 250a and the root or edge 215 , which functions as a blocking surface, of each slot 214 of member 200. This effective opening 274 is smaller than the depth D, of each locking feature 50, thereby preventing the cover 30 and the locking features 50 from being pulled away from the support members 200, 250 during the deployment of the airbag. Subsequently, the inflator 300 is mounted to the above components.

The inflator 300 comprises a general cylindrical body 302 and a radially extending flange 304 having a plurality of mounting openings 308 therein. The inflator is positioned within the concentrically oriented openings 254, 204, 160 of the second support member, first support member and the retaining ring. The inflator body 302 extends through the central opening 104 of the airbag. The inflator has a plurality of exit ports 310 through which inflation gas enters into the airbag. The nuts 154 secure the various components together. The final, assembled orientation of the module is shown in Figure 13. The inflator includes one or more initiators 301 of known function and type. The inflator 300 can be mounted first to the support member 200 and the second support member can then be mounted over the inflator flange 304.

Figures 14 - 16 show another embodiment of the invention. Figures 14 and 14a are functionally similar to the embodiment of Figure 8. In the alternate embodiment of Figure 14 the second support member 250b is furnished with a plurality of tabs 276 adjacent each opening 260, 260a. The tabs 276 provide an enlarged pushing or cam surface provided by surface or

edge 272 in Figure 8. The tabs 276 are formed during the stamping of the member 250b as material near a side of each opening 260, 260a (or 260b in Figure 14a) is bent upwardly to forming the tab. The undersurface 278 of each tab 276 defines an engagement surface, which pushes a corresponding locking member 50 inwardly. The support member 250b is mounted to the cover and support member 200 in the same manner described for member 250, 250a. In this embodiment the engagement surface 278 forcibly bears upon the receiving surface 56, thereby providing a larger area of contact with the locking feature than achieved in the earlier embodiment.

Figure 14b is a top view of an assembled module 20a showing first and second support members installed on the cover, and inflator 300 located on the second support member. Figure 14a shows another second support member 250c with tabs 276. The three smaller tabs associated with both sets of openings 260a, in Figure 14, have been replaced with a single wider tab 276 and the smaller openings 260a replaced by a wider opening 260b. During installation, the various locking members 50 that were individually received within the openings 260a are collectively received in the wider opening 260b. Support member 250c includes a recessed bottom 202 but can be made flat as shown with member 250 of Figure 1.

Figures 17 – 19 show an alternate embodiment of the present invention. Figure 18 shows another driver side module 20a including a cover 30a, airbag, retaining ring 150a, first and second support members 200b, 250d respectively and an inflator. In the previous embodiments the flexible tabs 48 and locking features 50 of cover 30 were deflected inwardly by an edge of an opening in the second or outer support member or by a similarly acting engagement surface 278 of a tab 276. This embodiment reconfigures corresponding parts of the module to permit the cover tabs and locking features to move outwardly upon assembly into locked configuration.

The cavity 38 of cover 30a is octagonal shaped in comparison to the rectangular cavity shown in Figures 1 and 2. The cavity as defined by the walls 501 - 508 includes two sets of opposingly placed locking features 50a.

The top portion of walls 501, 503, 505, 507 functions as the flexible tab 48. In this embodiment only two sets of tabs 48 are used. Locking feature 50a is located at a distal end of tabs 48. Each locking feature 50a is generally similar in shape and function to locking feature 50 described above, however, the orientation of the surfaces 56, 52, 60 is reversed. In general, each of the locking features 50a comprises a hook or bulbous end (as did feature 50), which faces outward relative to a corresponding tab. Module 20a additionally includes a retaining ring 150 and airbag (not shown) of substantially the same design as the retaining ring and airbag illustrated above. The inner surface of the retaining ring in contact with the airbag can be flat as opposed to cup-shaped.

The first support member 200b is plate-like and replaces the open-ended slots 214 and ribs 210 of support member 200 with enclosed openings 514 formed in conjunction by the introduction of a peripheral rim 516. As illustrated, support member 200b includes two sets of opposingly situated openings 514, however, each major opening 314 can, if desired, be subdivided into smaller openings by using separation ribs 261 (not shown) in the manner used in Figure 8 for the outer support member 250a. First or inner support member 200b additionally includes the central opening 204, as well as the plurality of mounting openings 203. The dimensions of each opening 514 and the placement of each pair of opposing openings 514 are chosen to fit about corresponding locking features 50a, without moving any locking feature 50a and tab 48 from its rest position. To achieve this placement, the spacing between opposing sets of openings 514 is sufficient to enable member 200b to be seated upon the cover with each of the respective four locking features 50a passing through a corresponding opening 514.

The second or outer support member 250d also comprises another steel plate having a flat body 251 with a central opening 254 and a plurality of mounting openings 253. The support member 250d includes a plurality of upturned shoulders or tabs 276, the underside of each shoulder or tabs 276 defining an engagement surface 278.

Figure 18 is a partial sectional view showing the inner support

member 200a in place on the cover 30a (not shown) about a single locking feature 50a, in this orientation the member 200a is horizontally supported by the cover. In this orientation each tab 48 and locking feature 50a are in their respective rest or non-deflected condition. The outer support member 250d is shown in alignment with locking feature 50a and temporarily spaced apart from member 200a. Subsequently, support member 250d is moved downwardly and seated upon the cover 30a. During this process, surface 287 engages surface 56 of each lock feature 50a and urges the locking features 50a outwardly (see arrow 510) causing each respective tab 48 and locking feature 50a to move outwardly into a covering relationship with regard to the inner support member 200a to achieve a locked or engaged orientation as shown in Figure 19. Subsequently, an inflator such as 300 is mounted upon support member 250d and onto the threaded fasteners 152 whereupon the inflator and the mounting members 200a, 250d are securely fastened to the retaining ring 150. As the parts are tightened together the engagement surface 278 continues to urge each respective locking feature 50a radially outward into its assembled and locked position.

CLAIMS

1. An airbag module (20, 20a) comprising: an inflator (300), a first support member (200, 200a), a second support member (250, 250a –250d) and a cover (30) for enclosing an airbag (100);

the cover includes a plurality of resilient tabs (48), the tabs are situated in a predetermined pattern about a cavity (38) which receives the airbag (100), a formation having a thickened tip is formed on a distal end of each tab, the thickened tip is configured as a lock feature (50) that prevents the cover from disengaging from the first and second support members, each tab and associated lock feature is movable from a rest position to a deflected position upon contact with one of the plates;

the first and second support members are disposed about each tab and configured to cooperatively define an effective narrow opening which is of smaller dimension than the thick tip, thereby preventing movement of the thick tip through the first and second support members and hence the disengagement of the cover from the first and second support members.

2. An airbag module as defined in Claim 1 wherein the first support member (200 - 200a) is configured to be placed upon the cover without moving the tab from its rest position.

3. An airbag module as defined in Claim 2 wherein the second support member (250, 250a - d) is configured to engage each locking feature to move each tab and locking feature from its respective rest position.

4. An airbag module as defined in Claim 2 wherein each locking feature (50) includes an engagement surface (52) that is apart from the first support member at times when each tab is in its respective rest position.

5. An airbag module as defined in Claim 4 wherein the first engagement surface (52) is configured to be moved into a locking position upon contact of the second support member with a respective locking feature.

6. An airbag module as defined in Claim 3 wherein the locking feature is configured to move in one of a first direction and a second opposite direction.

7. An airbag module as defined in Claim 6 wherein the locking feature is configured to move in one of an inward or outward direction.

8. An airbag module as defined in Claim 1 wherein the locking feature is configured to move in one of a first direction and a second opposite direction.

9. An airbag module as defined in Claim 8 wherein the locking feature is configured to move in one of an inward or outward direction.

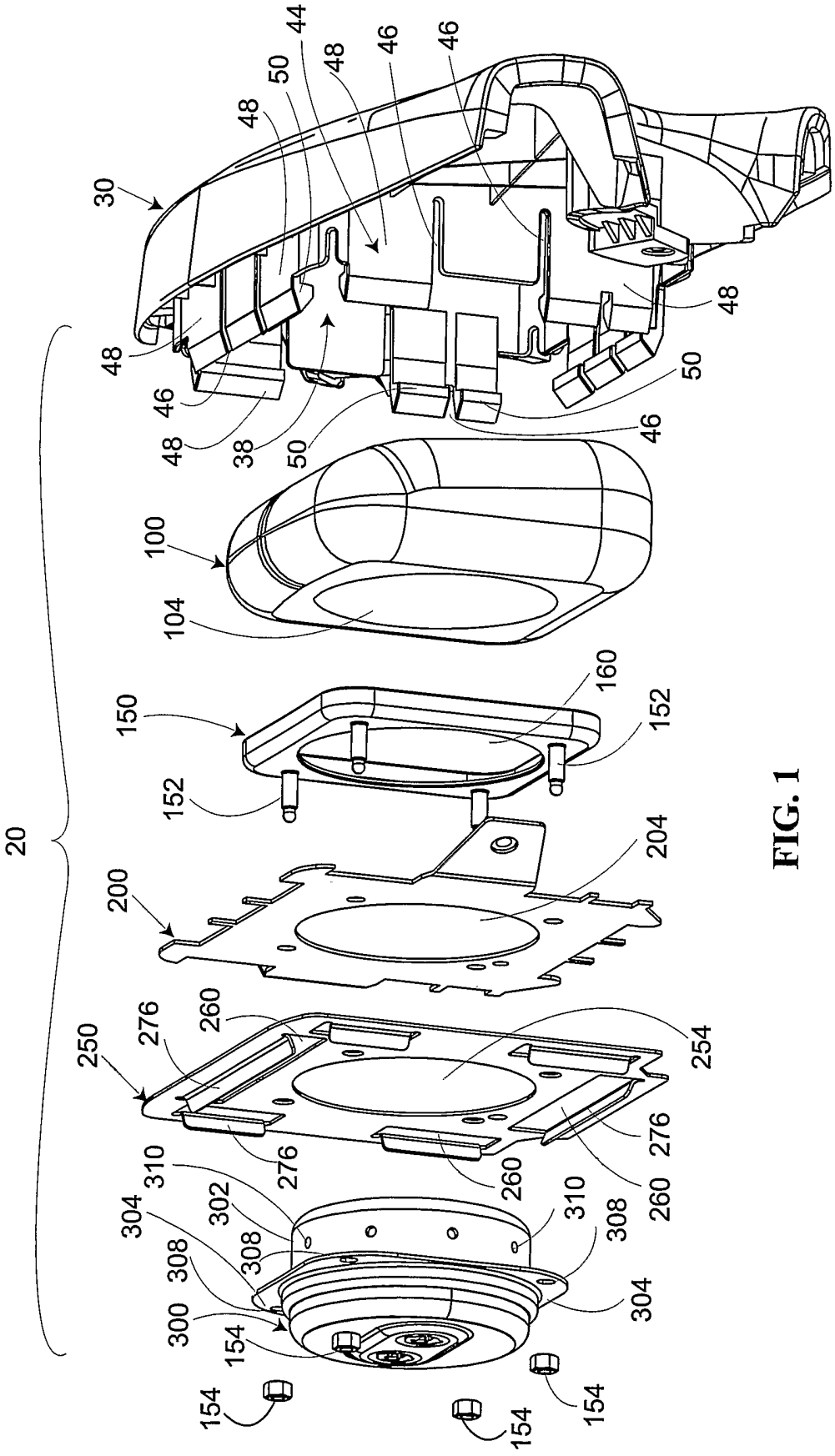

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FIG. 1

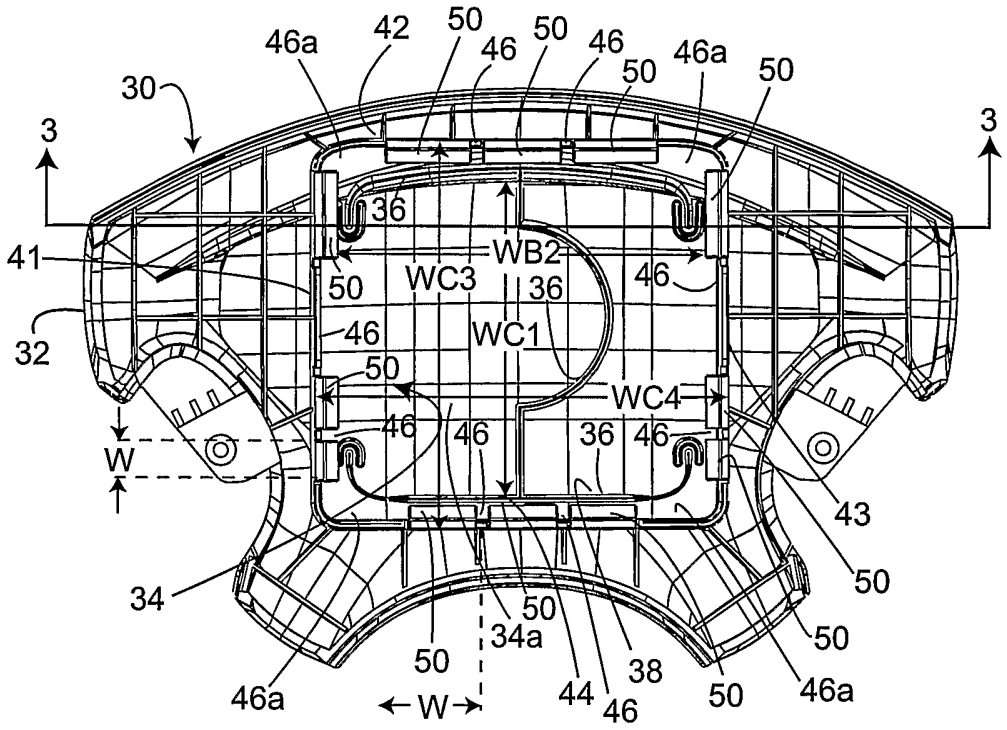


Fig. 2

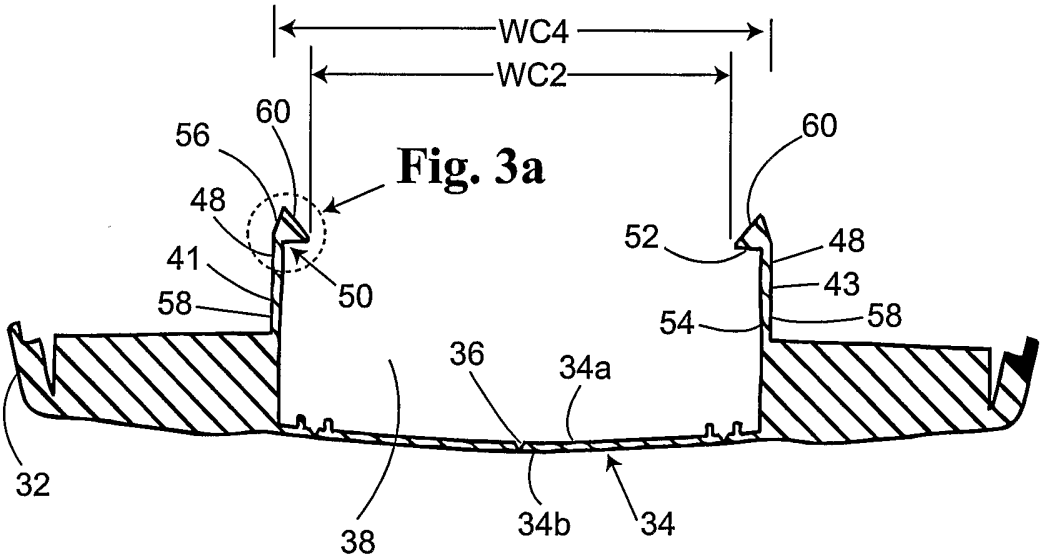


Fig. 3a

Fig. 3

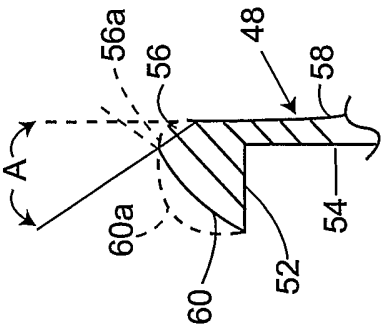


Fig. 3a

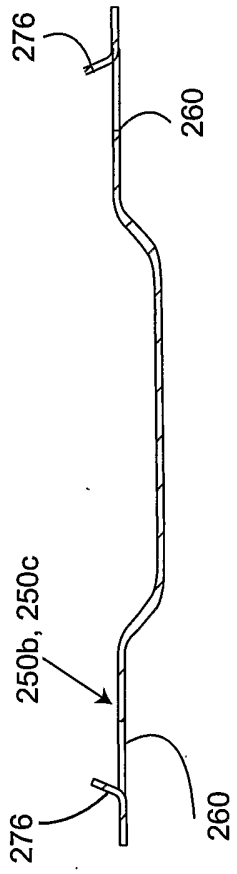


Fig. 15

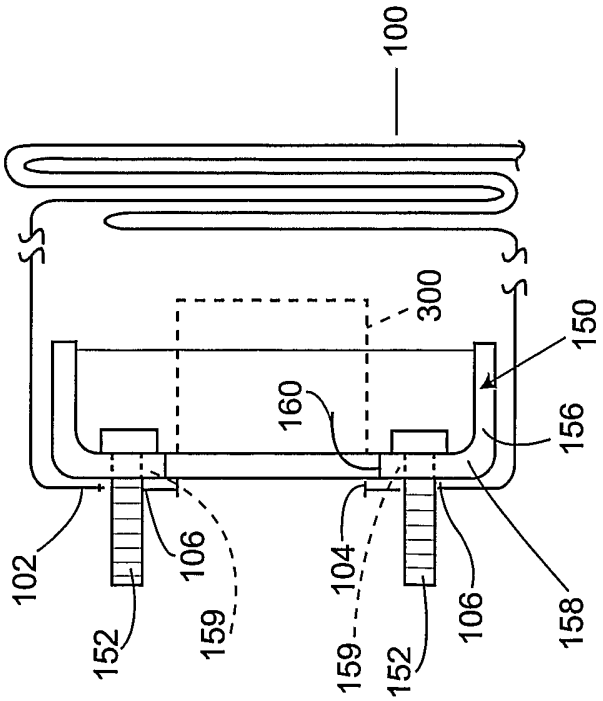


Fig. 4

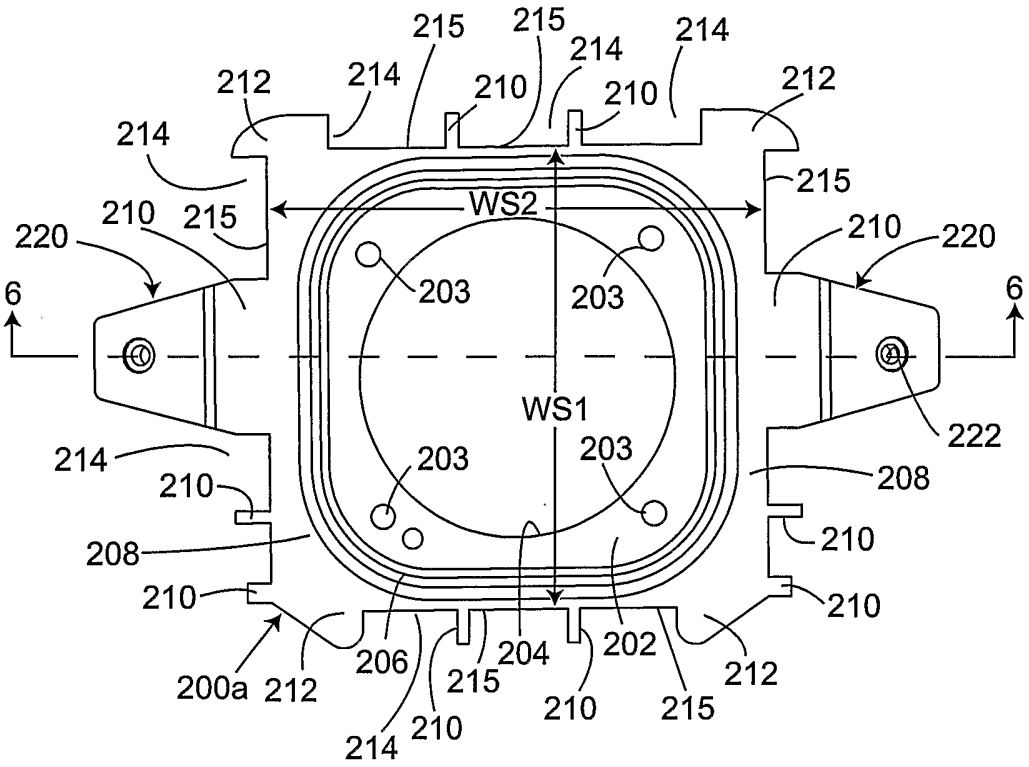

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Fig. 5

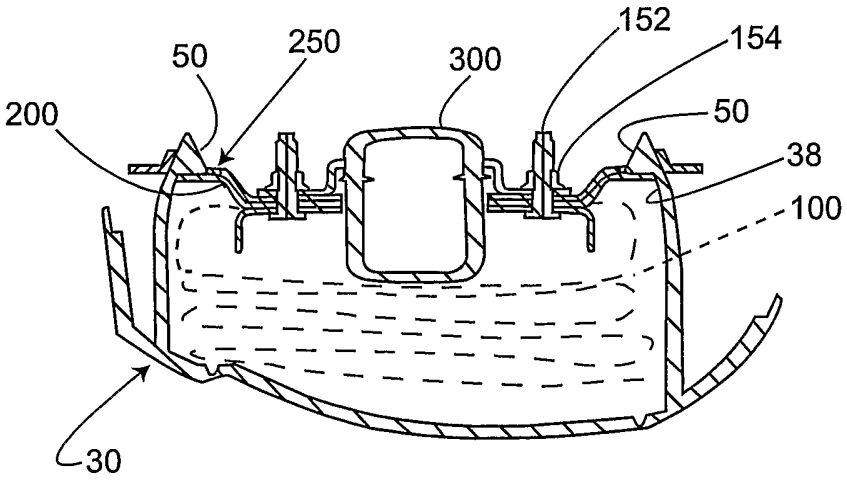

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Fig. 13

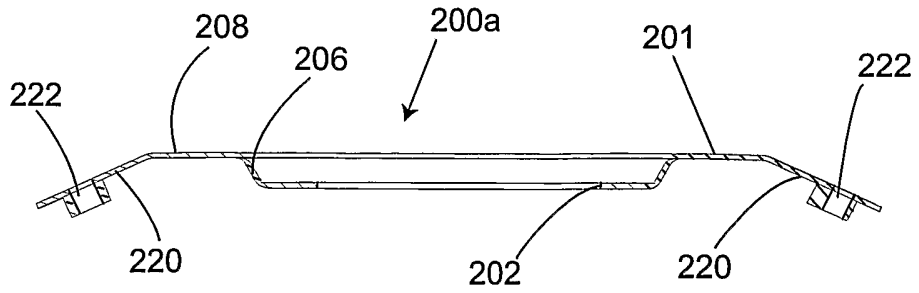

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220

Fig. 6

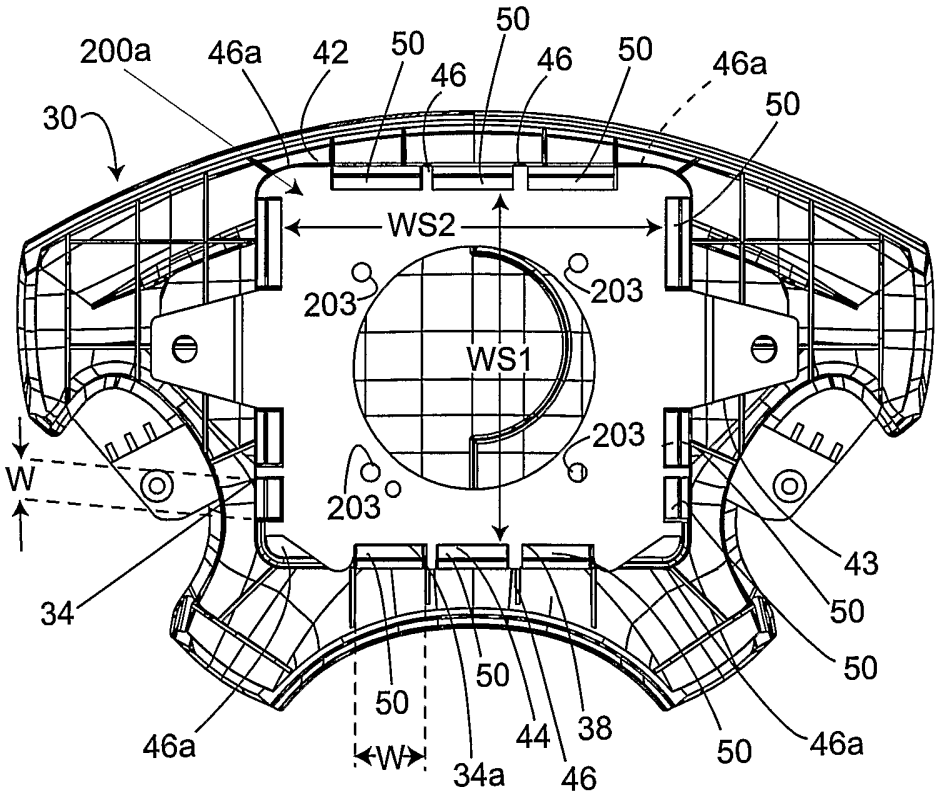

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46
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46a
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30
WS2
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WS1
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203
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50
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50
46a
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44
38
46a
W
34a
46

Fig. 7

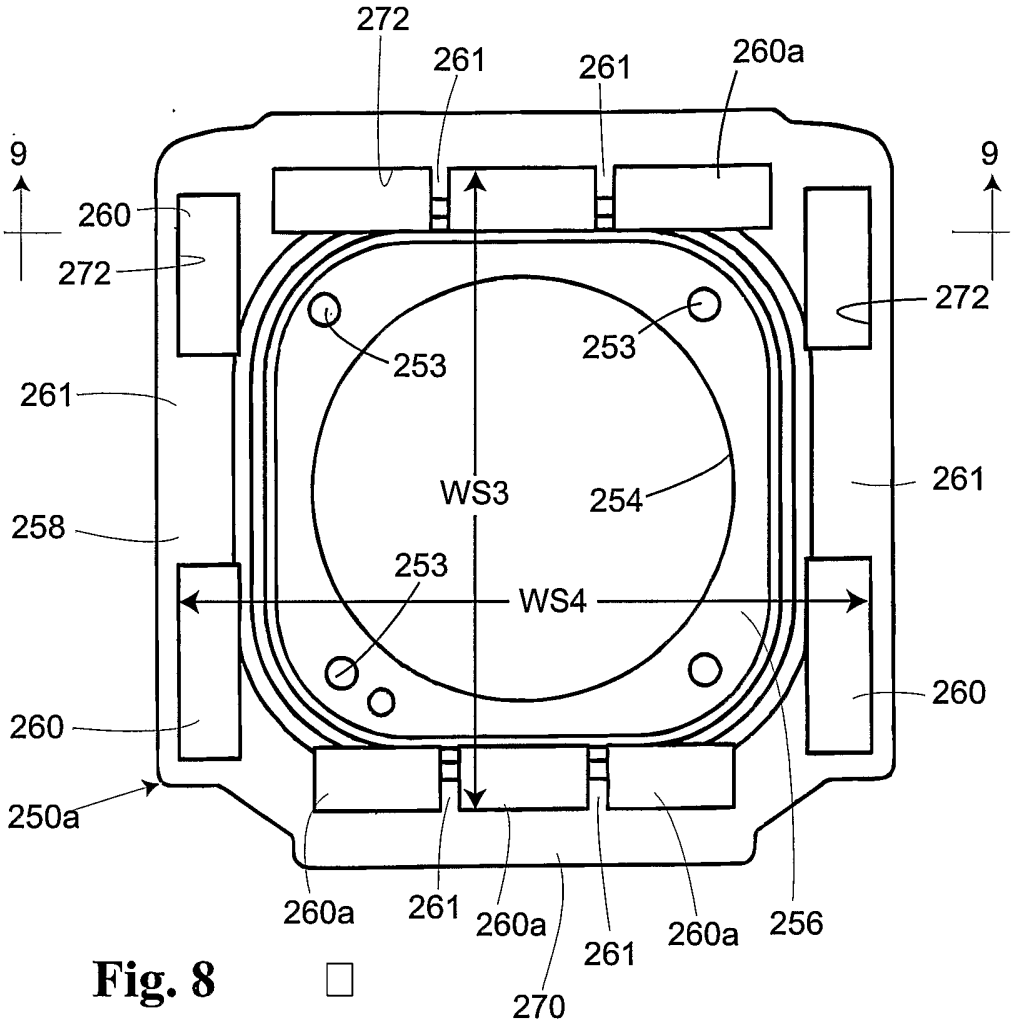

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261
261
260a
9
9
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272
272
253
253
261
WS3
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258
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WS4
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260
250a
260a
261
260a
261
260a
256
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Fig. 8

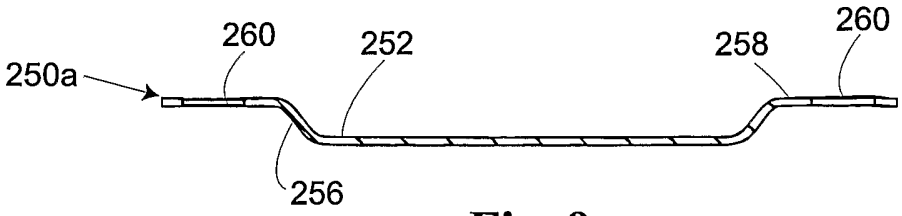

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250a
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Fig. 9

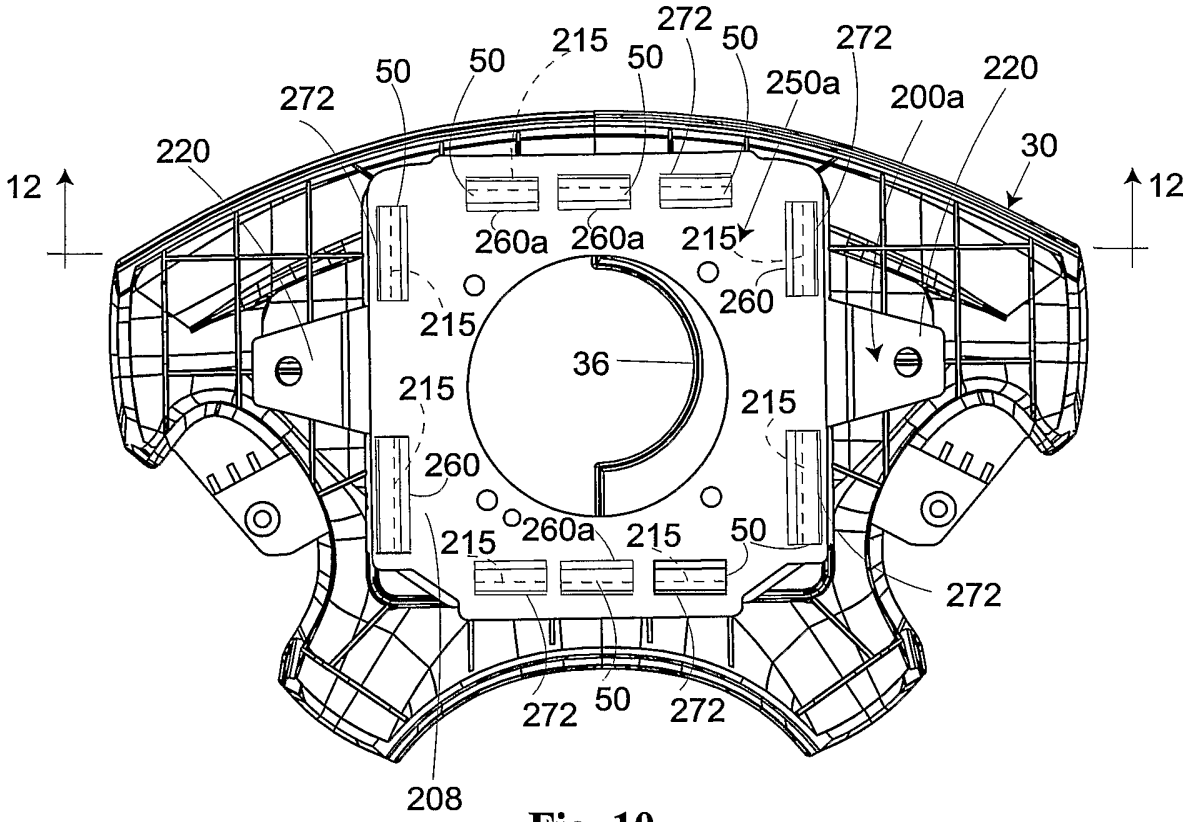


Fig. 10

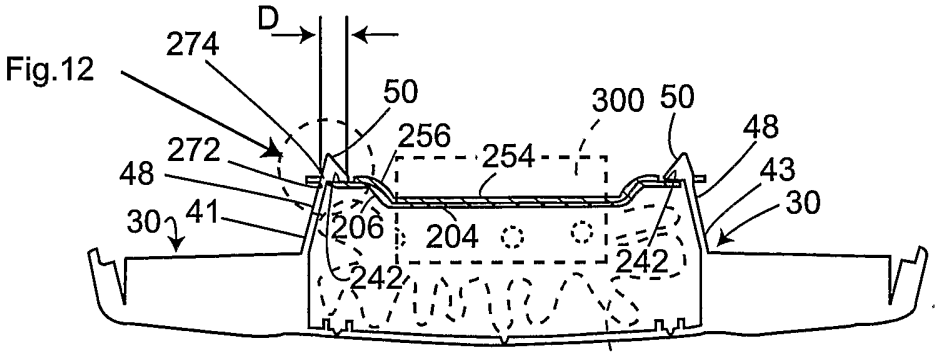


Fig. 11

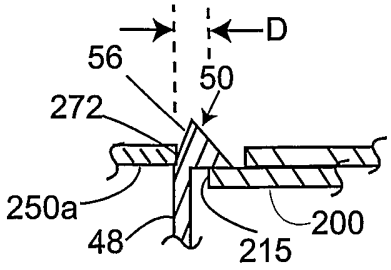


Fig. 12

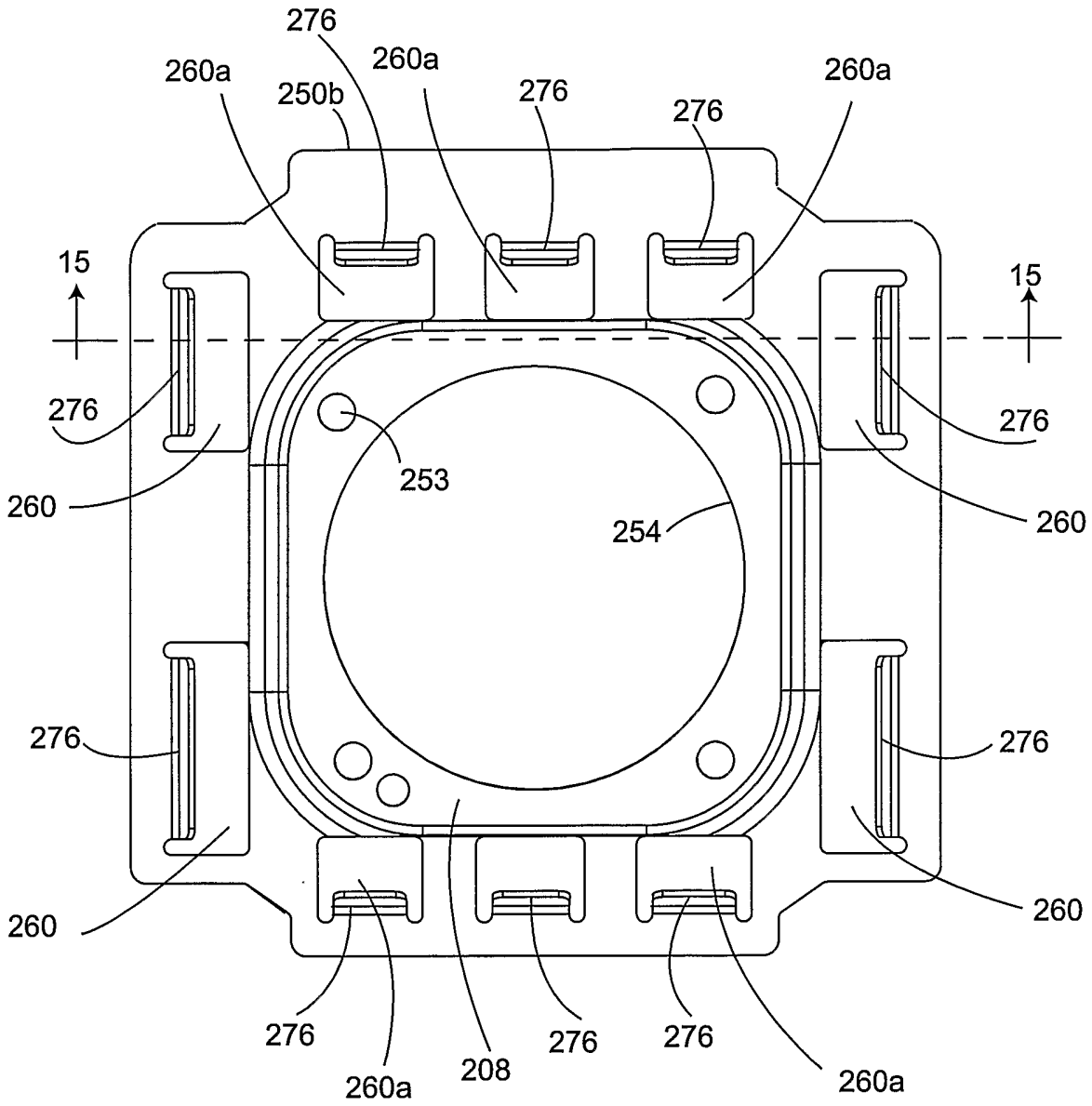

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260a
250b
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260a
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276
260a
208
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276
260a

Fig. 14

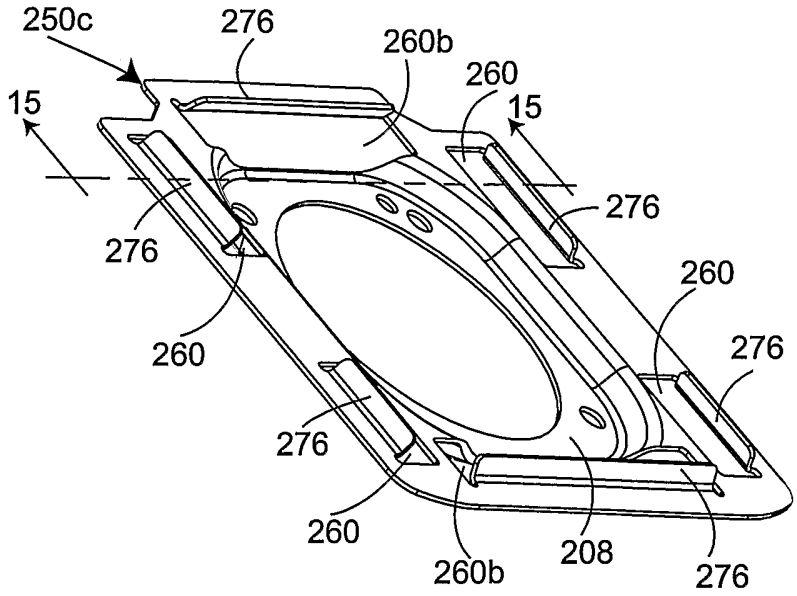


Fig. 14a

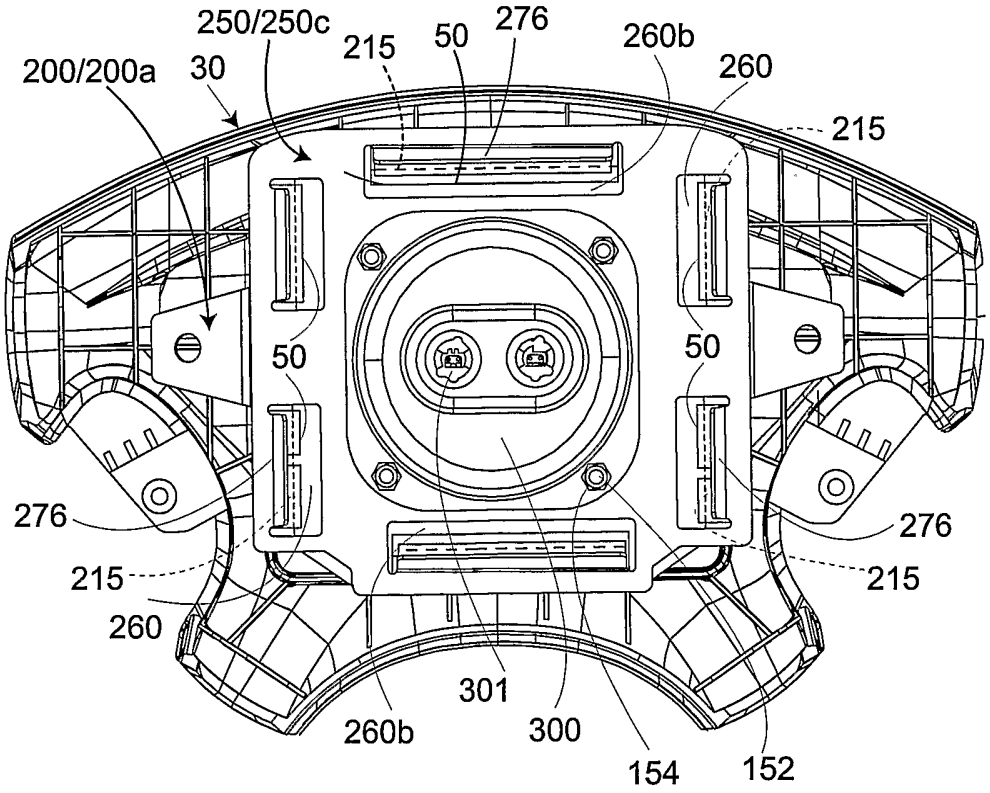
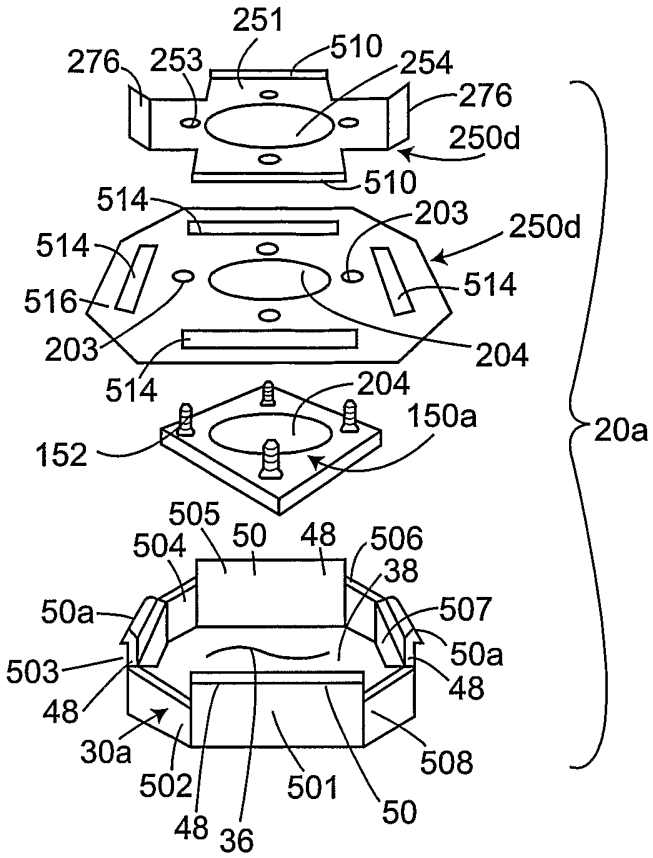


Fig. 14b

Fig. 17



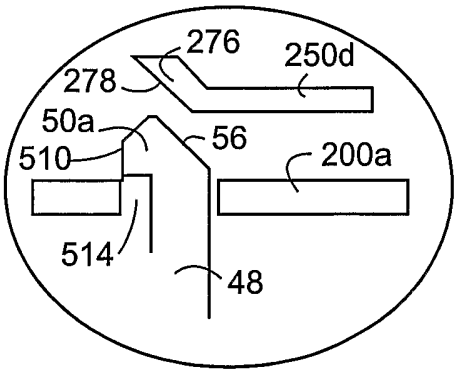


Fig. 18

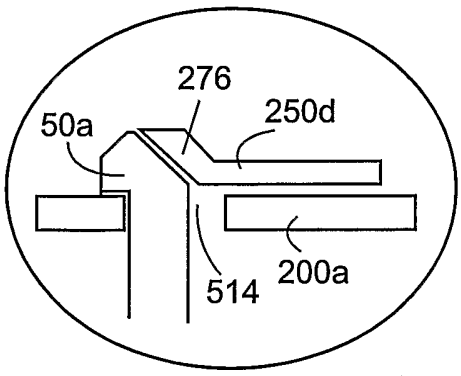


Fig. 19

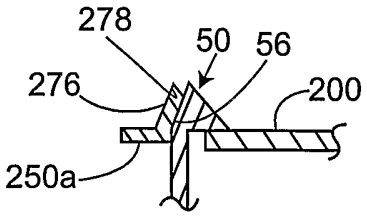


Fig. 16

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2005/006488

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B60R21/20

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B60R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 577 768 A (TAGUCHI ET AL) 26 November 1996 (1996-11-26) column 5, line 53 - column 6, line 6; figure 12 column 7, line 46 - column 8, line 3	1-4
X	US 5 762 361 A (HERRMANN ET AL) 9 June 1998 (1998-06-09) column 6, line 26 - line 56	1-4
X	EP 0 694 442 A (TAKATA VEHICLE SAFETY TECHNOLOGY GMBH) 31 January 1996 (1996-01-31) column 7, line 37 - column 8, line 11; figures 2,3	1-4

-/--

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
23 June 2005	12/07/2005

Name and mailing address of the ISA	Authorized officer
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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2005/006488

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	US 5 505 483 A (TAGUCHI ET AL) 9 April 1996 (1996-04-09) column 5, line 28 - line 46; figures 23-26 column 8, line 54 - column 9, line 25	1-4

INTERNATIONAL SEARCH REPORT

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