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(56) Documents Cited:
EP 1228930 A2
EP 0855316 A1
WO 2002/079008 A1
US 6450529 B1
US 6293581 B1
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US 20020105174 A1

(58) Field of Search:
UK CL (Edition V) **B7B**
INT CL^7 **B60R**
Other: **ONLINE: WPI, EPODOC, JAPIO**

(54) Abstract Title: **Air bag gas generator mounting arrangement**

(57) An air bag with a tubular gas inlet (33, figure 2) in part of one edge is provided with a gas generator (53, figure 5) and an internal gas deflector 15 which is located within the gas inlet. The gas generator is supported on a support element 1 which is provided with a mounting arrangement 2,3,4 to mount the support element to a vehicle and spaced-apart support components 8,11 engaging the gas generator. One of the support components encircles the neck of the air bag gas inlet (see figure 4) trapping the neck of the air bag against the exterior of part of the gas deflector, and also provides a protector located on the exterior of the air bag adjacent the gas deflector. The gas deflector may be made of a deformable plastics material and is intended to protect the neck of the air bag and the support element from the forces produced by the expanding gas.

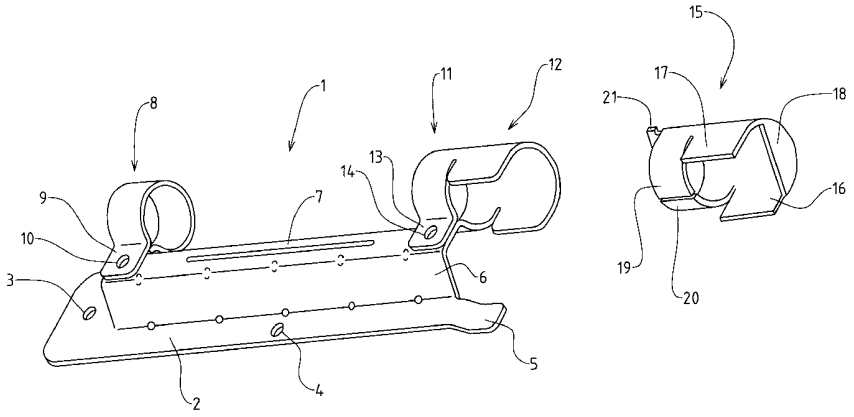

FIG 1

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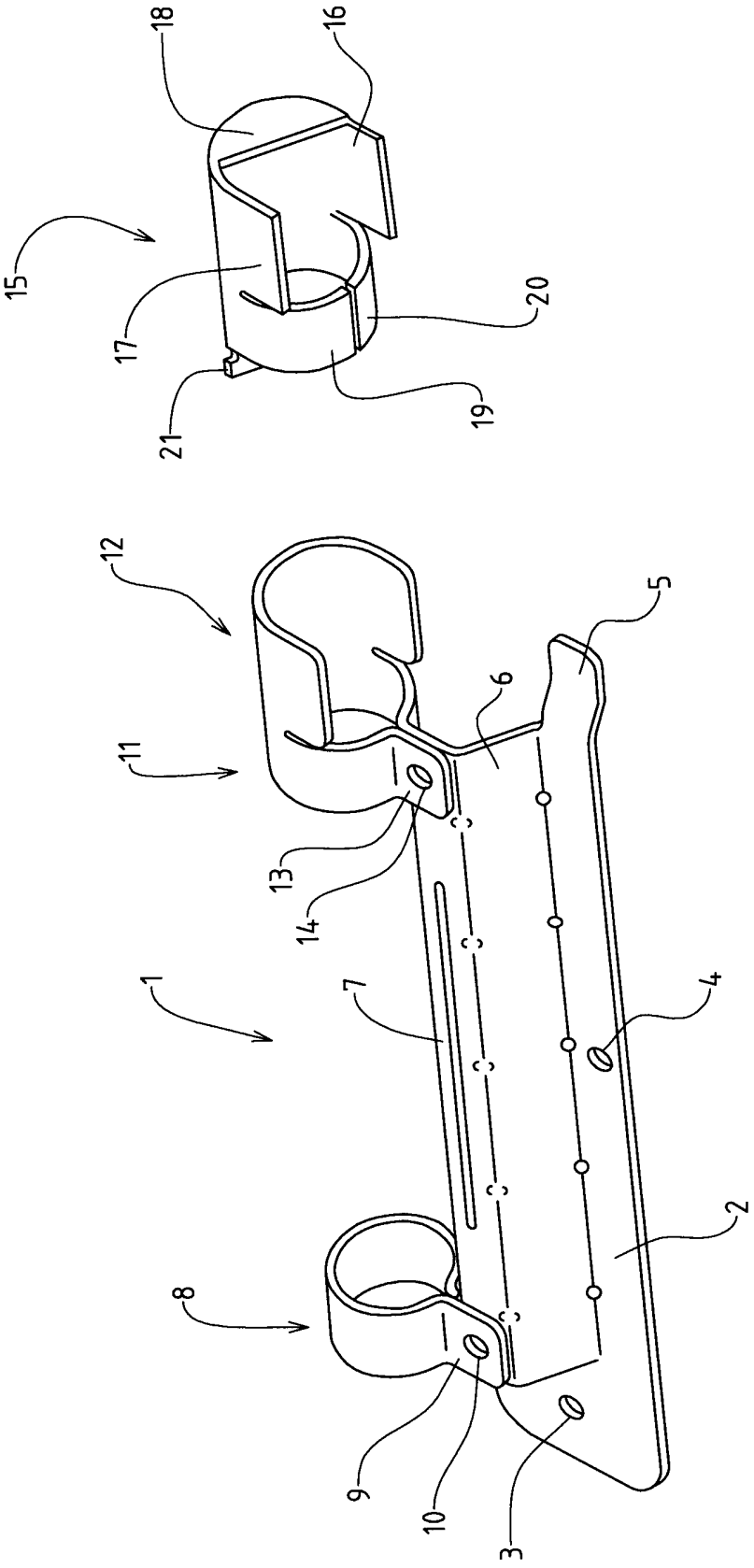

FIG 1

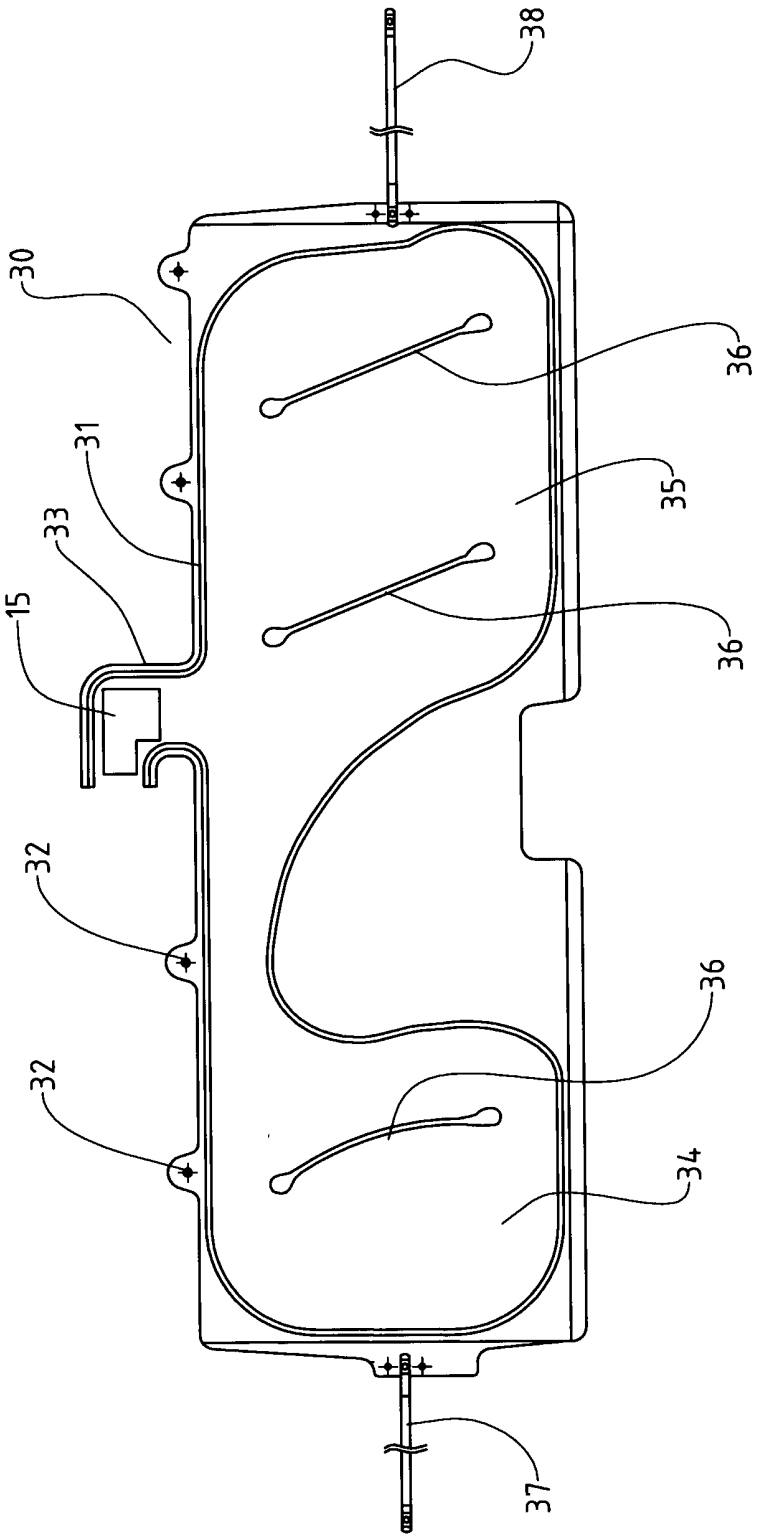

FIG 2

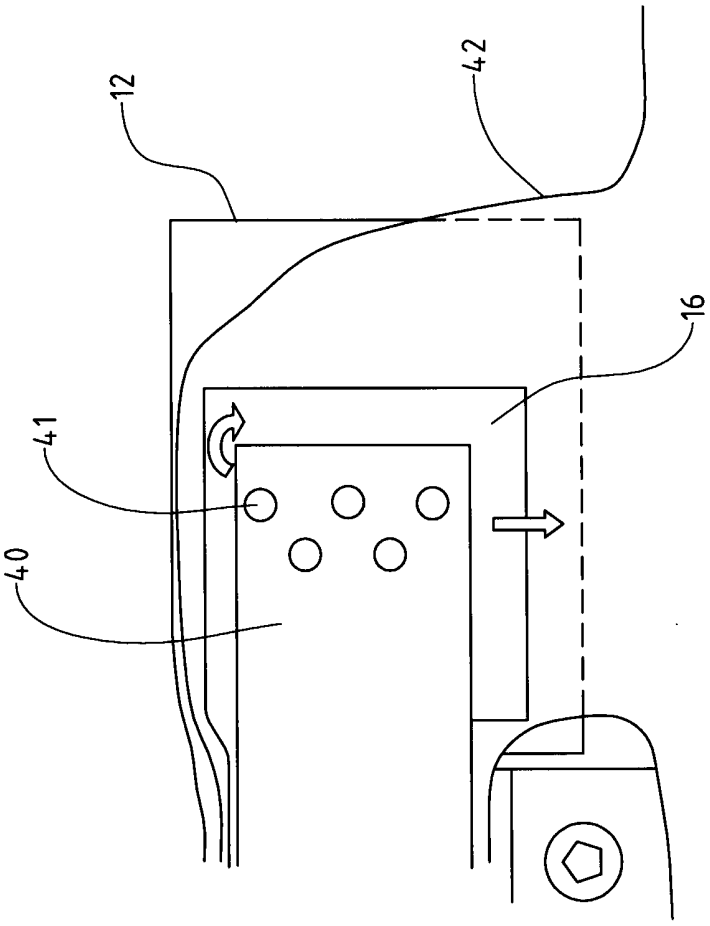

FIG 4

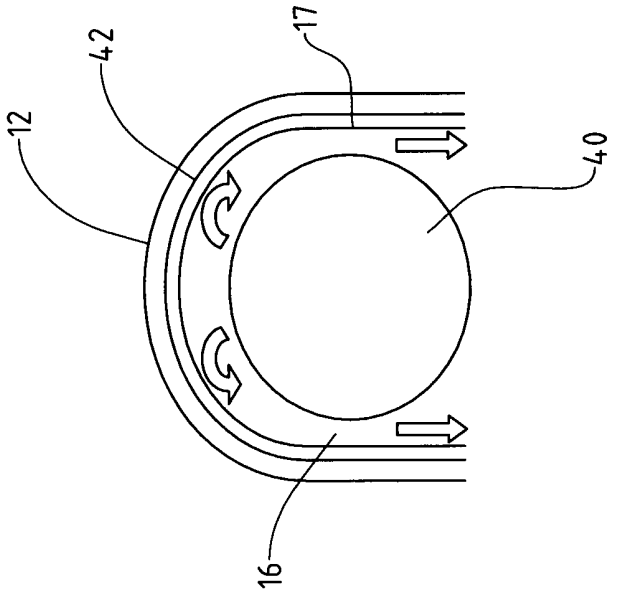

FIG 3

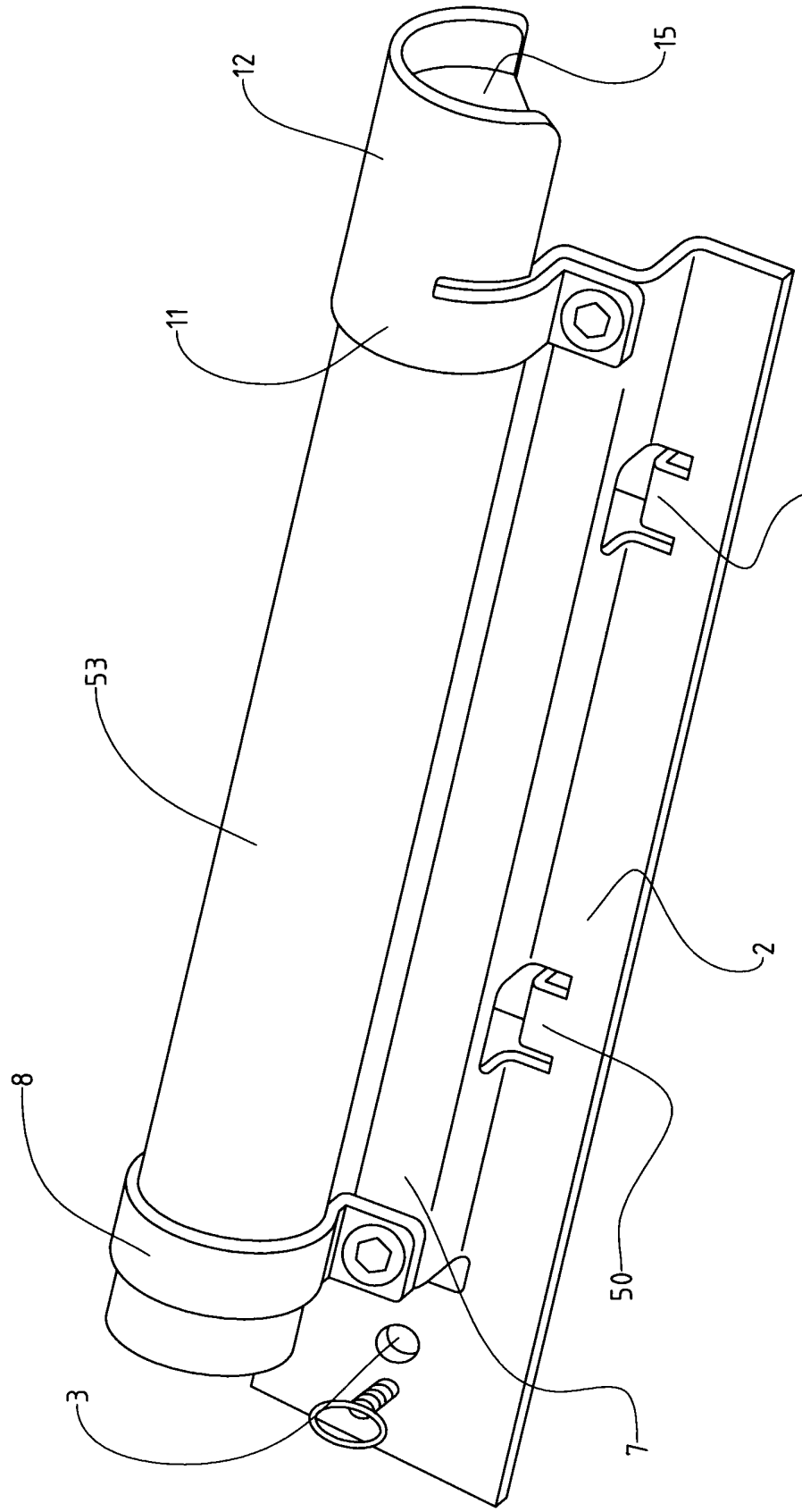

FIG 5

DESCRIPTION OF INVENTION

"IMPROVEMENTS IN OR RELATING TO AN AIR-BAG"

THE PRESENT INVENTION relates to an air-bag, and more particularly relates to an air-bag, to be mounted in a vehicle, which is to be provided with a gas generator unit mounted to supply gas to a gas inlet provided in a central region of one edge of the air-bag.

Air-bags of many different designs have been proposed before for use in motor vehicles, to be inflated in the event that an accident should occur to provide protection for an occupant of the vehicle. The present invention relates to one particular type of air-bag, which is an air-bag having an edge portion with a gas inlet provided in a central region of the edge portion.

One example of an air-bag of this type is a so-called inflatable curtain. An inflatable curtain is, conventionally, initially stored within a recess or housing which extends above the side doors of the motor vehicle. In the event that an accident, particularly a side-impact or roll-over should occur, the inflatable curtain is inflated to extend downwardly from the roof to be located between an occupant of the vehicle and the adjacent doors. The air-bag thus forms a curtain which covers the windows provided in the doors, minimising the risk of injury occurring to an occupant of the vehicle.

Typically such an inflatable curtain has the upper edge of the inflatable curtain secured to a recess or housing provided in the roof of the vehicle which initially accommodates the air-bag in an folded state.

Some types of inflatable curtain are provided with gas generators located either at the forward end, or at the rearward end of the curtain, ejecting gas into a gas flow duct which extends the whole length of the curtain and provides gas to various inflatable regions of the inflatable curtain.

As it is desired to ensure that an inflatable curtain, when it is inflated, is inflated rapidly, it has also been proposed to provide to gas generator unit which injects gas into an inlet provided in a central part of the upper edge of the inflatable curtain.

According to this invention there is provided an air-bag, the air-bag having a tubular gas inlet in part of one edge of the air-bag, the air-bag being provided with a gas generator and internal gas deflector, the internal gas deflector being located within the gas inlet of the air-bag, the gas generator being supported on a support element, the support element being provided with a mounting arrangement to mount the support element to a motor vehicle and spaced-apart support components engaging the gas generator, one support component encircling the neck of the air-bag and trapping the neck of the air-bag against the exterior of part of the inner gas deflector, the inner gas deflector being positioned to receive gas from the gas generator, part of the said one support forming a protector located on the exterior of the air-bag adjacent the inner deflector.

Preferably the inner deflector is formed of a deformable material.

Conveniently the inner deflector is formed of a plastics material.

Preferably the gas generator has a terminal portion which extends into the inner deflector, the terminal portion being provided with a plurality of gas outlet apertures.

Advantageously the mounting arrangement is a mounting plate provided with mounting elements, the mounting plate carrying a cantilevered support arm, the support arm carrying the said support components to support the gas generator.

Conveniently each support component is in the form of a ring having a tab provided at one end thereof to be secured to a support plate by means of a bolt.

Advantageously the protector is in the form of an inverted "U"-sectioned extension formed integrally with one said ring.

Preferably the inner deflector is in the form of an inverted channel having, at one end, depending side-walls and having, at the other end, the side-walls deflected inwardly to form a ring.

In order that the invention may be more readily understood, and so that further features thereof may be appreciated, the invention will now be described, by way of example, with reference to the accompanying drawings in which:

FIGURE 1 is a perspective exploded view illustrating a gas generator support and a gas deflector,

FIGURE 2 is a diagrammatic view of an air-bag illustrating the gas deflector of Figure 1 in position,

FIGURE 3 is a sectional view of a fully assembled air-bag,

FIGURE 4 is an alternate sectional view of the fully assembled air-bag, and

FIGURE 5 is a perspective view of an alternative gas generator support and a deflector, illustrating the gas generator in position.

Referring initially to Figure 1 of the accompanying drawings, a gas generator support 1 is configured to receive an elongate cylindrical gas generator which has a plurality of gas outlet apertures provided in a terminal region thereof. The gas generator support comprises a substantially planar mounting plate 2 of "L"-shape, the plate 2 being provided with two mounting apertures 3, 4 to receive mounting bolts or the like. One end of the elongate arm of the "L" is deflected to form a mounting tongue 5. The mounting apertures and mounting tongue form mounting components, the components being spaced-apart so that the mounting plate 2 may be firmly mounted in position. The mounting plate 2 carries a cantilevered arm 6 which extends from one side edge of the long arm "L". The cantilevered arm 6 carries a support plate 7. The support plate 7 is substantially parallel to, but spaced from the plane of the mounting plate 2. One end of the support plate carries a first mounting ring 8 formed integrally with the support plate 7, the ring 8 having a

terminal lug 9 provided with an aperture 10 which, when the ring is in position, is co-aligned with a corresponding aperture in the support plate 7 to receive a nut and bolt to enable the ring 8 to be tightened in position.

The other end of the support plate 7 carries an integral mounting ring 11 and protector 12. The rings 8 and 11 are spaced-apart. The mounting ring 11 is again formed integrally with the support plate 7 and is provided with a terminal lug 13 having an aperture 14 which is to be co-aligned with a corresponding aperture formed in the support plate 7 to receive a nut to enable the mounting ring 11 to be tightened in position. The mounting rings may engage spaced-apart regions of a cylindrical gas generator to hold the gas generator firmly in position.

The mounting ring 11 carries an integral protector 12 in the form of an inverted "U"-shaped projection which extends from the upper part of the mounting ring 11, in a direction away from the first mounting ring 8.

An inner gas deflector 15 is provided. The gas deflector 15 comprises an inverted channel having, at one end, two spaced-apart depending side-walls 16, 17, part of the channel between the depending side-walls being closed by an upper transverse end wall 18. The channel is of inverted "U"-shaped configuration. At the other end of the channel a region is provided where the side-walls are curved inwardly 19, 20 to form a ring. The upper-most part of the channel extends beyond the ring 19 to form a lug 21.

It is intended that the gas deflector 15 should be inserted within a "neck" provided on an air-bag, and the combination of the inner deflector and the neck of the air-bag will be clamped by the mounting ring 11 to a terminal part of a gas generator so that a gas outlet region of the gas generator extends into the

interior of the gas deflector 15, and the fabric of the neck of the air-bag is trapped sealingly between the ring 19, 20 of the deflector 15 and the mounting ring 11. The lug 21 is positioned to be engaged by the mounting ring 11 to prevent the inner gas deflector 15 from moving axially.

Figure 2 illustrates an air-bag 30 formed of two inter-connected layers of fabric having a substantially straight upper edge 31, that upper edge being provided with a plurality of mounting lugs 32 by means of which the air-bag may be mounted in position in a motor vehicle. A central part of the upper edge 30 is provided with a protruding "L"-shaped tubular neck 33 which is the gas inlet for the air-bag. A gas deflector 15 of the type disclosed above is illustrated in position within the neck 33. The ring 19, 20 is at the open end of the neck. The depending side-walls 16, 17 are in a region of the neck which communicates with the interior of the air-bag. The side-walls 16, 17 engage with the layers of fabric to hold the layers apart to facilitate the flow of gas into the air-bag and to protect the fabric from the gas flow which may be very aggressive. The neck 33 communicates with two inflatable regions 34, 35 defined within the air-bag, each of these regions being divided into a plurality of separate inflatable cells by means of seams 36 which secure together the two layers of fabric which respectively form the front and rear of the illustrated air-bag.

A first mounting strap 37 extends from one end of the air-bag, and may be connected to a mounting point provided, for example, on the "C"-Post of a motor vehicle. A further mounting strap 38 extends from the other end of the air-bag and may extend to, for example, a mounting point provided on the "A"-Post of the motor vehicle. The air-bag shown in Figure 2 is provided merely by way of example of one type of air-bag which may be utilised in conjunction with the gas generator support and gas deflector shown in Figure 1.

It can be seen from Figures 3 and 4 that when the gas generator support and deflector of Figure 1 are provided in combination with an air-bag such as that shown in Figure 2, a terminal part 40 of a gas generator, which is provided with a plurality of gas outlet holes 41, extends into the region within the inner gas deflector 15 between the depending walls 16, 17. The inner gas deflector 15 is thus located between the gas generator and the fabric 42 of the air-bag itself. The outer protector 12 extends outside the fabric, providing a desired degree of protection.

The inner deflector 15 may be formed of metal, or may be formed of a plastics material. It is preferable that the inner deflector may deform slightly under any forces applied thereto by gas emerging through the gas outlet apertures 41 provided on the gas generator 40. In this way the gas will not apply excessive force to the gas generator support 1.

The protector 12 prevents the inner deflector 15 from deforming excessively and also protects the fabric of the air-bag in the region of the neck 33.

Figure 5 illustrates an alternative embodiment of the invention in which the "L"-shaped support plate 2 is provided with a single aperture 3 to receive a bolt and two deflected tabs 50, 51 adapted to be accommodated within corresponding apertures formed in the motor vehicle to facilitate the mounting of the arrangement in position. The support plate 7 is shown supporting a cylindrical gas generator 53 which is held in place by the support rings 8 and 11. The inner gas deflector 15 is illustrated, but the air-bag itself is omitted for the sake of clarity of illustration.

In the present Specification "comprises" means "includes or consists of" and "comprising" means "including or consisting of".

The features disclosed in the foregoing description, or the following Claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately, or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

CLAIMS:

1. An air-bag, the air-bag having a tubular gas inlet in part of one edge of the air-bag, the air-bag being provided with a gas generator and internal gas deflector, the internal gas deflector being located within the gas inlet of the air-bag, the gas generator being supported on a support element, the support element being provided with a mounting arrangement to mount the support element to a motor vehicle and spaced-apart support components engaging the gas generator, one support component encircling the neck of the air-bag and trapping the neck of the air-bag against the exterior of part of the inner gas deflector, the inner gas deflector being positioned to receive gas from the gas generator, part of the said one support forming a protector located on the exterior of the air-bag adjacent the inner deflector.

2. An air-bag according to Claim 1 wherein the inner deflector is formed of a deformable material.

3. An air-bag according to Claim 1 or 2 wherein the inner deflector is formed of a plastics material.

4. An air-bag according to any one of the preceding Claims wherein the gas generator has a terminal portion which extends into the inner deflector, the terminal portion being provided with a plurality of gas outlet apertures.

5. An air-bag according to any one of the preceding Claims wherein the mounting arrangement is a mounting plate provided with mounting elements,

the mounting plate carrying a cantilevered support arm, the support arm carrying the said support components to support the gas generator.

6. An air-bag according to Claim 5 wherein each support component is in the form of a ring having a tab provided at one end thereof to be secured to a support plate by means of a bolt.

7. An air-bag according to Claim 6 wherein the protector is in the form of an inverted "U"-sectioned extension formed integrally with one said ring.

8. An air-bag according to any one of the preceding Claims wherein the inner deflector is in the form of an inverted channel having, at one end, depending side-walls and having, at the other end, the side-walls deflected inwardly to form a ring.

9. An air-bag substantially as herein described with reference to and as shown in Figures 1 to 4 of the accompanying drawings.

10. An air-bag substantially as herein described with reference to and as shown in Figures 1 to 4 of the accompanying drawings as modified by Figure 5 of the accompanying drawings.

11. Any novel feature or combination of features disclosed herein.

Amendments to the claims have been filed as follows :

1. An air-bag, the air-bag having a tubular gas inlet in a central part of the upper edge of the air-bag, the air-bag being provided with a gas generator and internal gas deflector, the internal gas deflector being located within the gas inlet of the air-bag, the gas generator being supported on a support element, the support element being provided with a mounting arrangement to mount the support element to a motor vehicle and spaced-apart support components engaging the gas generator, one support component encircling the neck of the air-bag and trapping the neck of the air-bag against the exterior of part of the internal gas deflector, the internal gas deflector being positioned to receive gas from the gas generator, part of the said one support forming a protector located on the exterior of the air-bag adjacent the internal gas deflector.

2. An air-bag according to Claim 1 wherein the internal gas deflector is formed of a deformable material.

3. An air-bag according to Claim 1 or 2 wherein the internal gas deflector is formed of a plastics material.

4. An air-bag according to any one of the preceding Claims wherein the gas generator has a terminal portion which extends into the internal gas deflector, the terminal portion being provided with a plurality of gas outlet apertures.

5. An air-bag according to any one of the preceding Claims wherein the mounting arrangement is a mounting plate provided with mounting elements,

the mounting plate carrying a cantilevered support arm, the support arm carrying the said support components to support the gas generator.

6. An air-bag according to Claim 5 wherein each support component is in the form of a ring having a tab provided at one end thereof to be secured to a support plate by means of a bolt.

7. An air-bag according to Claim 6 wherein the protector is in the form of an inverted "U"-sectioned extension formed integrally with one said ring.

8. An air-bag according to any one of the preceding Claims wherein the internal gas deflector is in the form of an inverted channel having, at one end, depending side-walls and having, at the other end, the side-walls deflected inwardly to form a ring.

9. An air-bag substantially as herein described with reference to and as shown in Figures 1 to 4 of the accompanying drawings.

10. An air-bag substantially as herein described with reference to and as shown in Figures 1 to 4 of the accompanying drawings as modified by Figure 5 of the accompanying drawings.

11. Any novel feature or combination of features disclosed herein.

INVESTOR IN PEOPLE

Application No:	GB 0302304.1	**Examiner:**	Peter Gardiner
Claims searched:	1 to 8	**Date of search:**	9 April 2003

Patents Act 1977 : Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance	
X,Y	X: 1,4 Y: 5,6	EP 0855316 A1	(TOYODA) See figures 7 to 12 in particular.
Y	5,6	US 6224089 B1	(UCHIYAMA) See figure 3 in particular.
A		EP 1228930 A2	(TOYODA) See figure 3 in particular.
A		WO 02/079008 A1	(TRW) See figure 1 in particular.
A		US 20020105174 A1	(TANASE) See figure 1 in particular.
A		US 6450529 B1	(KALANDEK) See figures 4 and 5 in particular.
A		US 6293581 B1	(SAITA) See figure 7 in particular.

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC[V]:

B7B

Worldwide search of patent documents classified in the following areas of the IPC[7]:

B60R

The following online and other databases have been used in the preparation of this search report:

WPI, EPODOC, JAPIO