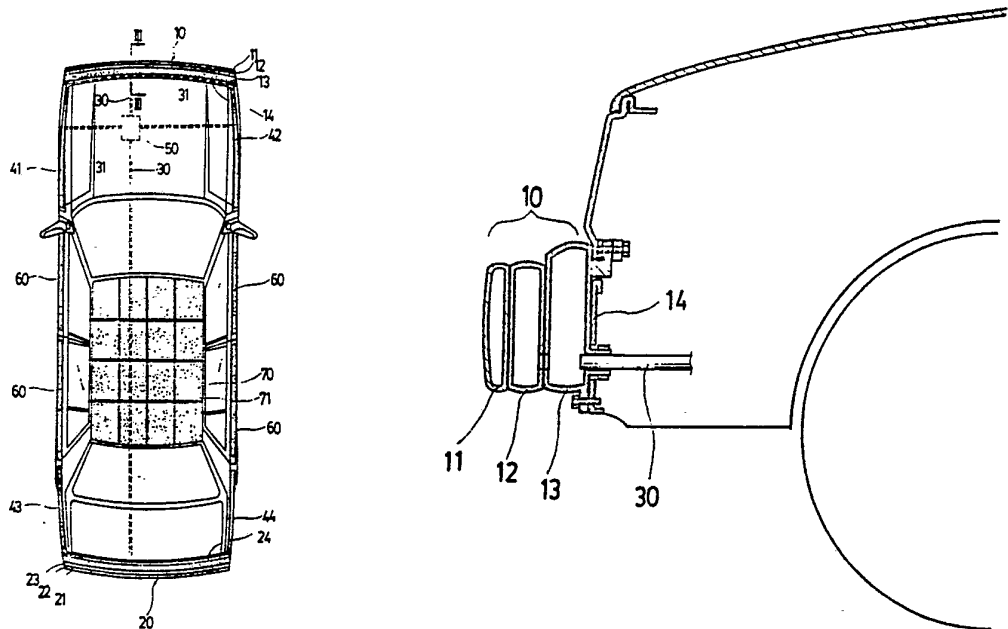




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(54) Title: SHOCK ABSORBER FOR A CAR



(57) Abstract

An apparatus for absorbing and relieving the shock inflicted from outside at the time of collision of a car which covers the majority of the covering portions that may be contacted from outside by tubular air sheets in which pressed air or helium gas is filled. Each of the front and rear bumpers (10, 20) comprises three bumper members (11, 12, 13), each for low, medium and high pressure shock absorption with different volumes and gas capacity. Each of the front and rear bumpers and the left and right side panels (41, 42, 43, 44, 60) are interconnected by longitudinal and transverse gas circulation pipes (30, 31) so that the gas of each air sheet can be dispersed when the shock is inflicted, thereby enhancing the shock absorption effect thereof. The gas circulation tubes are interconnected by a gas circulation controller (50) which controls the circulation of gas.

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## SHOCK ABSORBER FOR A CAR

TECHNICAL FIELD

The present invention relates to a shock absorber for a car, more specifically relates to a shock absorber for a car which the external covering portions that may be contacted from outside such as a roof, the doors and the side panels of front and rear parts as well as the front and rear bumpers of a car are structured with the air sheets filled with compressed air or helium gas, so that a shock inflicted from outside at the time of a collision or an overturn of a car can remarkably be absorbed and relieved.

BACKGROUND ART

Generally in usual car, as is well known, the front and rear bumpers using relief effect of spring or oil pressure are mounted at each of front and rear of a car for absorbing or relieving a shock at the time of collision of a car. However, the bumpers which have a structure as well known have effect at the time of a slight collision, but it was considerably insufficient for protecting the occupants or a car body as for the relief or absorption effect against shock of bumper itself in case of a collision during high speed driving with a car. Further, in case that a car is collided from a side or fallen down and overturned, since a separate apparatus for relieving or absorbing the shock in accordance with such case is not provided not only the body of a car is easily damaged, but also the occupants get hurt due to its shock otherwise become to lose a human life in case of excessively bad.

SUMMARY OF THE INVENTION

Therefore, a primary object of the present invention is to provide a shock absorber for a car which a safety of the occupants is secured as far as possible by allowing a

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shock inflicted with a car to be relieved by absorbing it even in case of overturn due to the collision from a side and a fall as well as a front collision.

Another object of the present invention is to provide  
5 a shock absorber for a car which a shock becoming to receive in time that a car collides is allowed to absorb in a step manner by constructing the front and rear bumpers with three stage structure for the low, medium and high pressure shock absorption, so that the shock absorption effect is remark-  
10 ably enhanced.

A further object of the present invention is to provide a shock absorber for a car which the gas circulation tubes are interconnected among the front and rear bumpers and the right and left side in case that a car is collided from the  
15 front or rear and from the right or left, thereby a puncture caused by an instantaneous shock is prevented and also the shock absorbing effect due to the dispersion of the gas is enhanced further.

The present invention also aims that a helium gas which  
20 is light in specific gravity and has no anxiety of explosion in time of collision is filled into an air sheet formed with tube like shape instead of an air so that, in case that a material of the air sheet is applied with a metal plate having high strength, the matter of weight accompanying with  
25 this application can be solved.

The present invention also intends to provide a shock absorber for a car which almost whole part of the external covering portion of a car is structured with the air sheets and thereby a buoyancy thereof is made to raise so that, in  
30 case that a car is fallen into a water, the drowning of the occupants is allowed to be able to avoid.

The present invention aims also to provide a shock

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absorber for a car which a mechanical noise or the like of an engine is absorbed by the gas filled into the air sheets so that the noise preventing effect is obtained additionally.

5 In order to attain the above objects, the present invention is comprised of front and rear bumpers which are made of some bumper members for the low, medium and high pressure shock absorption filled with an air or gas of predetermined pressure into the interior thereof with the  
10 different thicknesses and gas capacity, air sheets for the side panels at front and rear which a gas of predetermined pressure is filled into the interior thereof by being formed with an identical shape to the side panels at front and rear of existing car, air sheets for doors which a gas of pre-  
15 termined pressure is filled into the interior thereof with an identical shape to the external cover portion of the doors, an air sheet for roof which a gas of predetermined pressure is filled into the interior thereof with an identical shape to the roof, the longitudinal gas circulation  
20 tubes which are arranged longitudinally within the body of a car so that a front bumper member for the medium and high pressure shock absorption and a rear bumper member for the medium and high pressure shock absorption are interconnected so as to be communicated with a gas of interior, lateral  
25 gas circulation tubes which are arranged laterally within the body of a car as to cross each other with said longitudinal gas circulation tubes so that the air sheets for side panels of right and left at front part are interconnected, and a gas circulation control means which is arranged at a  
30 crossing point of said longitudinal gas circulation tubes and said lateral gas circulation tubes so that the circulation of gas is controlled.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of a car showing an embodiment of the present invention.

FIG. 2 is a side view of a car showing an embodiment  
5 of the invention.

FIG. 3 is an enlarged sectional view taken along the lines III-III of FIG. 1.

FIG. 4 is an enlarged sectional view taken along the lines IV-IV of FIG. 2.

10 FIG. 5 is an enlarged sectional view taken along the lines V-V of FIG. 2.

DETAILED DESCRIPTION OF THE INVENTION

Hereafter, the shock absorber for a car of the present invention will be described in detail with reference to the  
15 accompanying drawings. FIG. 1 and FIG. 2 show an embodiment of the present invention, in which a front bumper 10 is mounted at a front part of a car in a condition being supported with a front bumper supporting plate 14 which is constructed with the bumper members 11, 12 and 13 for  
20 the low, medium and high pressure shock absorption being filled with a gas of predetermined pressure into the interior thereof with the different thicknesses and the gas capacity respectively, and similarly a rear bumper 20 which is constructed with the bumper members 21, 22 and 23  
25 for the low, medium and high pressure shock absorption in turn from outside is mounted also at a rear part of the body of a car in a condition being supported with a rear bumper supporting plate 24. The bumper members 11, 21 for low pressure shock absorption of foresaid front and rear  
30 bumpers 10, 20 are made to absorb a relatively light shock because their thicknesses are thin and a gas pressure of interior thereof is low relative to the other bumper members

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12, 13 or 22, 23. The bumper members 12, 13 for the medium and high pressure shock absorption of a front bumper 10 and the bumper members 22, 23 for the medium and high pressure shock absorption of a rear bumper 20 are so made that the gases of interior thereof can be circulated one another by being connected each other with the longitudinal gas circulation tubes 30. Further, the air sheets 41, 42, 43 and 44 for the side panels of corresponding forms thereto are mounted respectively at the side panel portions of the front and rear part of the body of a car, and the air sheets 41, 42 for the side panels of the right and left at front part are so made that the gases of interior thereof can be circulated one another by being connected each other with the lateral gas circulation tube 31.

At a location which said longitudinal gas circulation tubes 31 crosses with said lateral gas circulation tubes 30, a gas circulation control means 50 connected together with these tubes is mounted, so that the air circulation among the front and rear bumpers 10, 20 and the air sheets 41, 42 for the side panels of the right and left are allowed to be able to control or to interrupt. Aforesaid gas circulation control means 50 maintains in usual time the open condition that the longitudinal and the lateral gas circulation tubes 30, 31 are rendered to communicate each other, but in case that, for example, if an air sheet 41 for a side panel of one side were punctured due to a shock from outside, then a valve for automatic control or the similar one could be employed which has a function being capable of instantaneously preventing the compressed gas within another side air sheet 42 or the front and rear bumpers 10, 20 to leak out through the punctured portion.

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In addition, to the all doors of the right and left and to a roof also, the air sheets 60 for doors and an air sheet 70 for a roof filled with the gases into the interiors thereof which have respectively the identical shapes to them are mounted respectively.

As for the foresaid front and rear bumpers 10, 20, a material which the anti-pressure, anti-heat and anti-shock characteristics are excellent and a restoring force to the original state which can be returned instantly into a former condition even if a shock is inflicted is preferable, for example, a special engineering rubber, laminated fiber or the like can be utilized.

As for the air sheets for said side panels, doors and roof, either a materials such as aforesaid bumpers 10, 20 can be utilized, otherwise the empty portions maintained with gas-tight are formed at interior by utilizing a metal plate provided with the external features of existing car as it is, to which empty portions the gases are impregnated, thereby the effect of air sheet can be obtained. Particularly, as an example is shown in FIG. 4, the air sheets 60 for doors and an air sheet 70 for a roof, of which strength can be raised further by arranging the wire nets 61 on the internal surface of the external covers. In addition, for a method for mounting each air sheet as an example is shown in FIG. 5, either the mounting hooks 45 are formed with the material of relatively the strength is high at the peripheral portions of the sheet member, of which corresponding portions at a car body are bent, and they are meshed each other thereby mounted, otherwise a mounting method utilizing the screws or both 46 can be utilized. In case that the air sheets are formed with an elastic material such as a rubber at the portions such as a roof, the side panels or



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the doors, in order that a central portion becomes to expand by a high pressure gas filled into the interior of said sheet, as an example, above the roof is shown in FIG. 1, forming the seam lines 71 for prevention and reinforcement is preferable. The gases which are filled into the interior of each air sheets including the front and rear bumpers 10, 20 should be no explosive and it is preferable as the specific gravity becoming lighter. Therefore, though the filling of air is suitable, further it is preferable to fill a helium gas which possess all of aforesaid conditions.

According to the present invention as aforementioned, since the structure of a bumper is formed with a triple structure for the low, medium and high pressure shock absorption, a relatively light shock can be absorbed at a low pressure shock absorption bumper, in case that a strong shock is inflicted, the stepped shock absorption can be obtained by the low, medium and high pressure shock absorption bumpers, at the same time, at a moment inflicted with a shock, the gas of directly shock receiving portion is dispersed respectively through the lateral and longitudinal gas circulation tubes, thereby the shock absorption effect is remarkably increased.

Further, even if a car is either inflicted with side collision or overturned according to a fall, since the shocks can be minimized by the air sheets which surround the side panels of right and left, the doors and a roof etc., the safety for the occupants in case of car accident can be secured further, and besides the effect of raising a riding feeling can be obtained by absorbing the engine noise of a car with the air sheets surrounding the body of a car. Moreover, by filling a helium gas which a specific gravity is lighter into the interior of the air

sheet, a buoyancy is raised in case that a car is fallen into a water, so that an effect that is capable of preventing the throwing of the occupants is also obtained.

C L A I M S

1. A shock absorber for a car which is comprised of front and rear bumpers(10),(20) structured with the bumper members(11),(12),(13) and (21),(22),(23) for the low, 5 medium and high pressure shock absorption which a gas of predetermined pressure is filled into the interior with each different thickness and gas capacity; the air sheets (41),(42) and (43),(44) for side panels of front and rear which have the identical forms respectively to the side 10 panels of front and rear of existing car, and a gas is filled into the interior thereof; the air sheets for doors which a gas is filled into the interior thereof with the identical forms to each external cover portions of the doors; an air sheet for a roof which a gas is filled into 15 the interior thereof with an identical form to a roof; the longitudinal gas circulation tubes(30) mounted longitudinally within the body of a car and which interconnect the bumper members(12),(13) for the medium and high pressure shock absorption at front with the bumper members 20 (22),(23) for the medium and high pressure shock absorption at rear so that the gases of the interior thereof can be circulated one another; the lateral gas circulation tubes (31) mounted laterally within the body of a car so as to cross with said longitudinal gas circulation tubes (30) 25 and which interconnect the air sheets(41),(42) for the side panels of right and left at front each other so that the gas of the interior thereof can be circulated one another; and a gas circulation control means(50) which controls the gas circulation by being mounted at a 30 crossing point of said longitudinal gas circulation tubes (30) and lateral gas circulation tubes (31).

2. A shock absorber for a car according to claim 1,

wherein said gas which is filled into the front and rear bumpers and each air sheet is a helium gas.

3. A shock absorber for a car according to claim 1, wherein said air sheets for the doors and said air sheet comprise the wire nets for the reinforcement of strength.

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FIG. 1

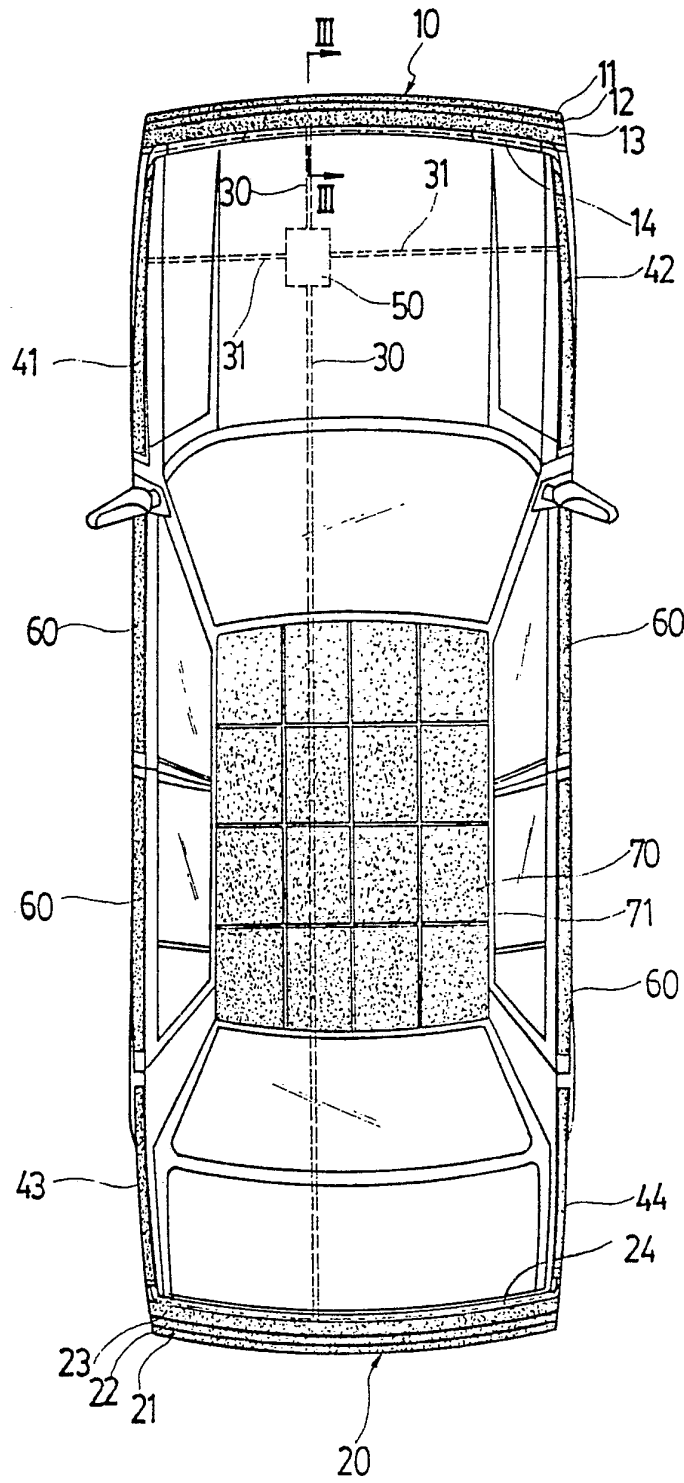


FIG. 2

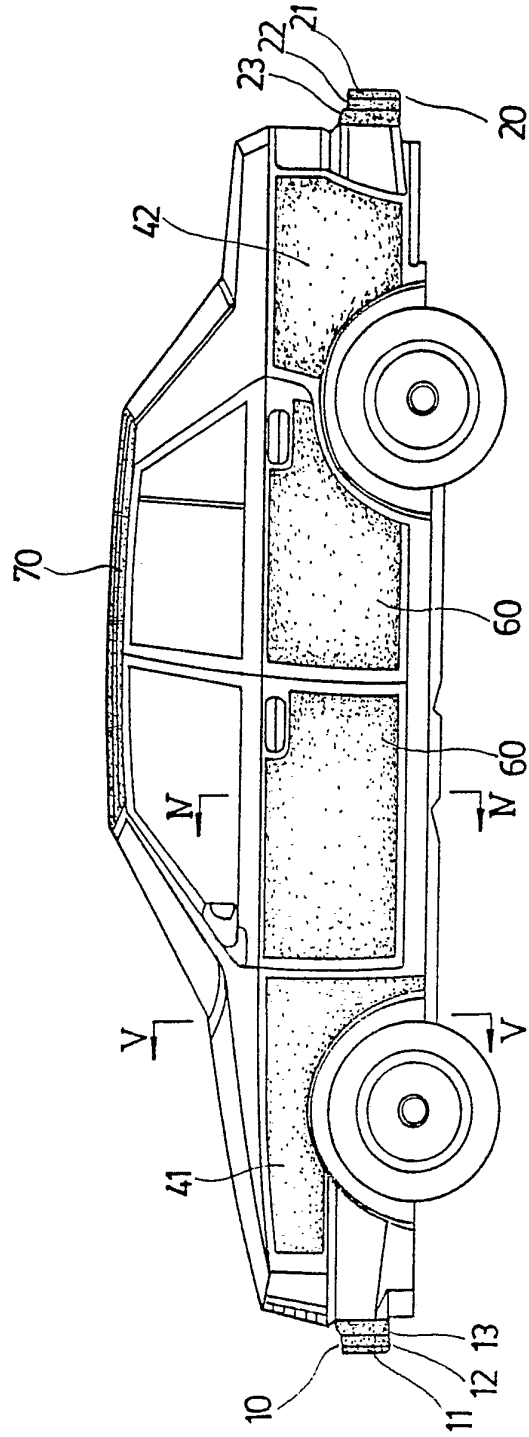
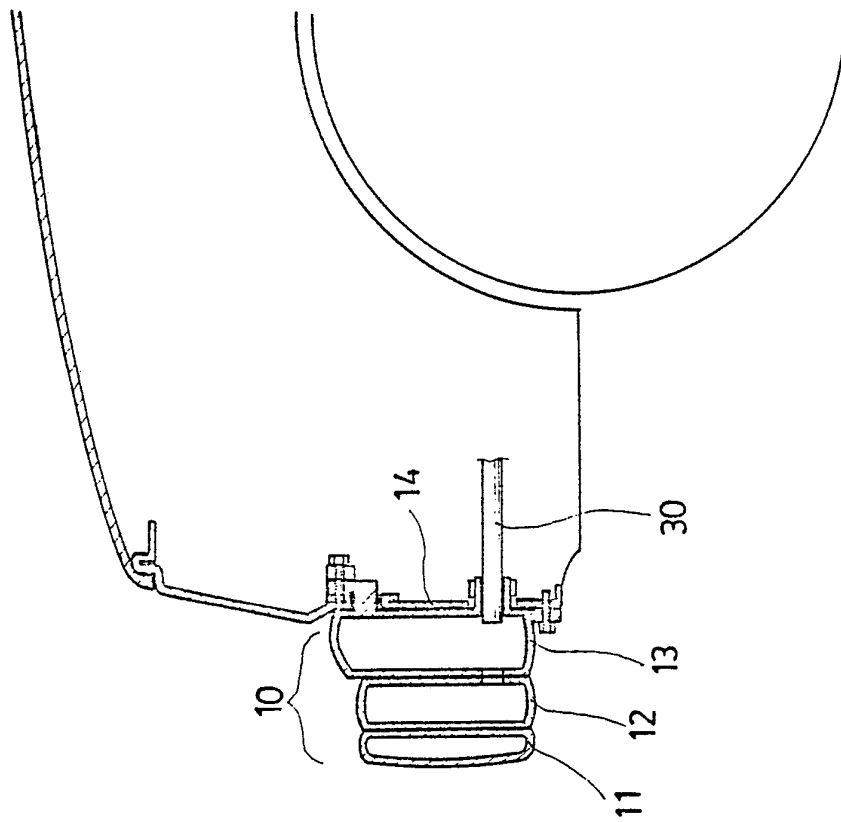
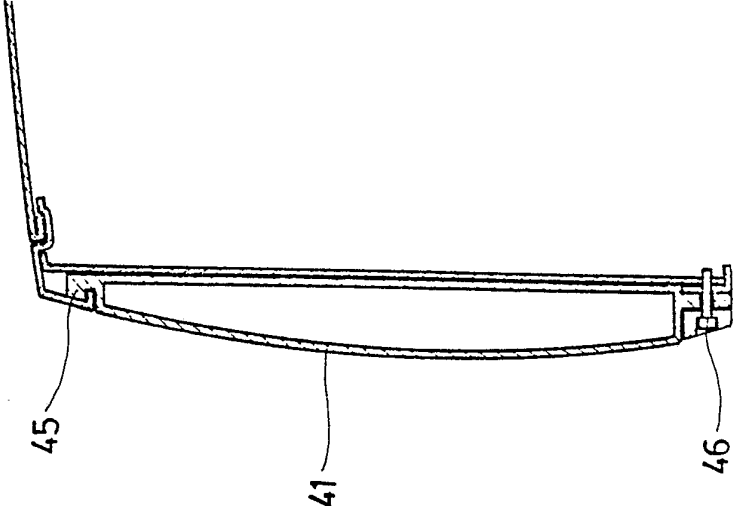


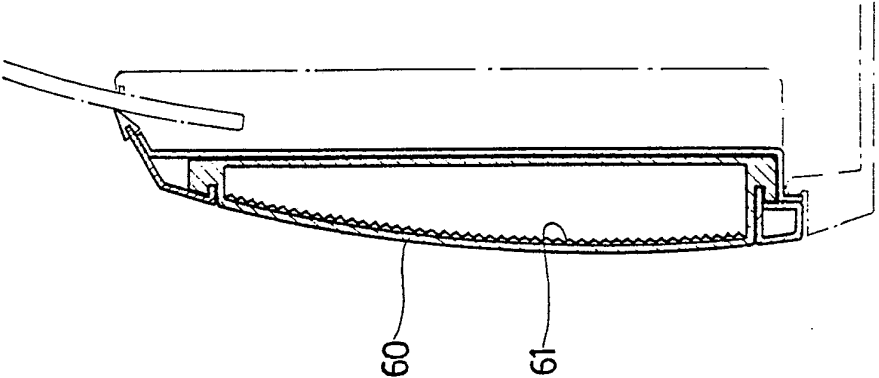
FIG. 3



FIG, 5



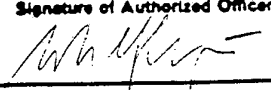
FIG, 4





# INTERNATIONAL SEARCH REPORT

International Application No PCT/KR 88/00021

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) <sup>6</sup>		
According to International Patent Classification (IPC) or to both National Classification and IPC		
IPC <sup>4</sup> : B 60 R 19/20		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched <sup>7</sup>		
Classification System	Classification Symbols	
Int.Cl. <sup>4</sup> :	B 60 R 19/00, 19/02, 19/18, 19/20.	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched <sup>8</sup>		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT<sup>9</sup></b>		
Category <sup>10</sup>	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>
Y	DE, A1, 3 032 444 (APPRICH) 01 April 1982 (01.04.82), see totality.	(1)
Y A	DE, A, 2 020 360 (DAIMLER-BENZ) 11 November 1971 (11.11.71), see fig. 1; page 3, lines 10,11.	(1) (2)
A	DE, B2, 2 320 262 (FIAT) 10 March 1977 (10.03.77), see fig. 1,2.	
A	DE, B2, 2 316 503 (MBB) 15 September 1977 (15.09.77), see fig. 1,2.	
A	DE, A, 2 135 474 (MATSUURA) 10 February 1972 (10.02.72), see totality.	
A	FR, A, 774 896 (TORRALVA) 15 December 1934 (15.12.34), see totality.	
A	US, A, 3 764 174 (TANINECZ) 09 October 1973 (09.10.73), see fig. 2.	
A	US, A, 3 708 194 (AMIT) 02 January 1973 (02.01.73), see fig. 2,3,4.	
<p><sup>10</sup> Special categories of cited documents: -----</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&amp;" document member of the same patent family</p>		
<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
15 December 1988 (15.12.88)	27 December 1988 (27.12.88)	
International Searching Authority	Signature of Authorized Officer	
AUSTRIAN PATENT OFFICE		

Anhang zum internationalen Recherchenbericht über die internationale Patentanmeldung Nr.

In diesem Anhang sind die Mitglieder der Patentfamilien der im obengenannten internationalen Recherchenbericht angeführten Patentdokumente angegeben. Diese Angaben dienen nur zur Unterrichtung und erfolgen ohne Gewähr.

Annex to the International Search Report on International Patent Application No. PCT/KR 88/00021

This Annex lists the patent family members relating to the patent documents cited in the above-mentioned International search report. The Austrian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Annexe au rapport de recherche internationale relatif à la demande de brevet international n°.

La présente annexe indique les membres de la famille de brevets relatifs aux documents de brevets cités dans le rapport de recherche internationale visé ci-dessus. Les renseignements fournis sont donnés à titre indicatif et n'engagent pas la responsabilité de l'Office autrichien des brevets.

Im Recherchenbericht angeführtes Patentdokument Patent document cited in search report Document de brevet cité dans le rapport de recherche	Datum der Veröffentlichung Publication date Date de publication	Mitglied(er) der Patentfamilie Patent family member(s) Membre(s) de la famille de brevets	Datum der Veröffentlichung Publication date Date de publication
DE-A1-3 032 444	01/04/82	None	
DE-A -2 020 360	11/11/71	None	
DE-B2-2 320 262	10/03/77	DE-A1-2 320 262 FR-A1-2 181 973 FR-B1-2 181 973 GB-A -1 386 545 IT-A - 958 764	31/10/73 07/12/73 02/09/77 05/03/75 30/10/73
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DE-A -2 135 474	10/02/72	None	
FR-A - 774 896	15/12/34	None	
US-A -3 764 174	09/10/73	None	
US-A -3 708 194	02/01/73	None	