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(54) **Device for tilting a hoop used in basketball**

(57) This is a device for tilting the hoop of a basket used in basketball, which can carry out tilting movements along an axis parallel to the board countered by one or more springs, and tilting movements along an axis per-

pendicular to the board countered by a torsion bar (Fig. 1).

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## Description

**[0001]** The field of this invention concerns a basket for basketball, and in particular a mechanism that allows the hoop of said basket to tilt after an inadvertent load has been applied to it.

**[0002]** Indeed, recently in the field of basketball, baskets have been adopted that elastically absorb any inadvertent loads so as to prevent damaging the structure for fixing the basket and the board to which the basket is fixed.

**[0003]** The accidental loads that can happen are those made by a basketball player when, during the game, he makes a basket by slamming the ball into the hoop, or else when, generally after a slam dunk action, the player grips the hop and clings on to it.

**[0004]** This type of stress on the hoop, if not absorbed and dissipated properly, can lead to a permanent deformation of the hoop and/or the basket, and in more serious cases to the breaking of the board, which is usually made of glass.

**[0005]** There are numerous types of baskets on the market that are pliable or tilting.

**[0006]** Nevertheless they have numerous drawbacks, like for example a complex construction, a high cost, the need for continual maintenance, and the fair to modest results attained.

**[0007]** Such limits and/or drawbacks of pliable baskets have meant that up until now they have had only limited success: in fact they require, after a considerable financial outlay, also continual upkeep and/or lubrication so as not to block (we should remember that many of these baskets are applied to structures in the open air), and frequent calibration operations for maintaining its performance at an acceptable level.

**[0008]** We should point out that recently we have witnessed a more evolved approach to the aspect of safety and to a desire for improved performances from sports equipment.

**[0009]** Also for the above-mentioned reasons a different type of kinematic motion has been adopted for a simpler construction, for safe use and limited maintenance; still, the devices on the market have not satisfactorily met all these requirements.

**[0010]** Current baskets are generally fitted with a spring that allows a hoop, after an excessive load has been applied, to tilt downwards and to later come back up to its horizontal position.

**[0011]** This spring, or another equivalent elastic device, is sufficient to respond to a stress applied to the part of the hoop furthest away from the board, however it is inadequate if the same stress is applied to the intermediate part of the hoop or the part nearest the board.

**[0012]** The purpose of the invention set out in this patent is to overcome the drawbacks explained above and those that are explained further on in this description.

**[0013]** The basket in this patent is essentially composed of a base structure, joined to the board, and a

tilting part to which the hoop is fixed, with the tilting part hinged to the base structure for tilting downwards in an axis parallel to the board, where this movement counteracted by the action of one or more springs, and with the tilting part hinged to the base structure for tilting downwards in an orthogonal axis to the board, with this movement counteracted by the action of a torsion bar.

**[0014]** This configuration is one that provides a simpler construction and a more compact size; nevertheless it is evident that an alternative arrangement of the above-mentioned elastic devices for countering and absorbing any accidental loads has to be considered to be included.

**[0015]** The base structure includes a C-shaped fixed plate, fixed to the board in its centre, and at the free end of the wings of the C-shaped plate, on the upper part, there is a housing for the hinging of a support plate, which is part of the tilting part.

**[0016]** The hinging along an axis parallel to the board between the fixed plate and the support plate allows the hoop to tilt downwards.

**[0017]** It is important that this hinging is placed on the outermost part furthest away from the base structure, so that the tilting of the hoop is comparable to a rotational movement of the hoop through an axis parallel to the board and practically at a tangent to the external profile of the hoop itself.

**[0018]** The movement between the fixed plate and the support plate is countered by an elastic element and in particular by one or more springs. Advantageously, the position of these springs is next to the fixing position between the board and the base structure, further away from the hinging point between the fixed plate and the support plate, because springs can be used with a low value elastic constant.

**[0019]** The basketball hoop is suitably joined in the part near the board to a "front basket plate" that supports it, by means of the interposition of a torsion bar, at the end facing the board of the support plate.

**[0020]** It is important that the axis of the torsion bar is perpendicular to the board and essentially passing through the plane defined by the hoop or just below it. In this way the tilting of the hoop is limited and there is no lateral translation.

**[0021]** To prevent the torsion bar from being subjected to bending stress, the torsion bar is placed inside a tubular piece that practically absorbs all those stresses that act on the hoop, which would work on bending the torsion bar.

**[0022]** This tubular piece unloads the above-mentioned stresses onto the support plate, which is joined to a "fixed front plate" that is parallel to the board and with a central through hole, through which the above-mentioned tubular piece passes.

**[0023]** The support of this tubular piece, at the end opposite the one described of the fixed front plate, takes place using a block, which is also joined to the support plate that has a circular housing, inside which said tubular piece is housed and that proceeds with a concentric

through hole inside which one end of the torsion bar is fixed.

**[0024]** From the structure of the tilting device we can see that the movement of the hoop along an axis perpendicular to the board has the advantage of being carried out by placing the elements that rotate with greater encumbrance around this axis against the outer part (furthest from the board), resulting in a particular compactness of the whole device, including inside the fixed structure.

**[0025]** It is clear from the description above that the two tilting movements, the one with an axis parallel to the board and the other one with an axis perpendicular to the board, very often occur at the same time, making the hoop therefore take on an oblique position with respect to an axis parallel to the board and oblique with respect to an axis perpendicular to the board.

**[0026]** The above-mentioned device can be easily understood from a preferred example, and not limited to this only, with reference to the enclosed diagrams.

**[0027]** Further characteristics and advantages can be found in the detailed description of a particular form, illustrated in the attached designs where:

Fig. 1 shows a perspective view of a basket that is the object of the patent, to be applied to the board (not shown).

Fig. 2 shows the basket in fig. 1 shown from above.

Fig. 3 shows a cross section view of the basket in fig. 2 along the A-A plane fixed in fig. 2.

Fig. 4 shows the basket in fig. 1 with the hoop in an angular position after having tilted downwards in an axis parallel to the board (not shown).

Fig. 5 shows the basket in fig. 1 with the hoop in an angular position after having rotated along an axis perpendicular to the board (not shown).

Fig. 6 shows a detailed view of the base structure of the basket seen from the side to be fixed to the board.

Fig. 7 shows a detailed view from below of the base structure and part of the hoop.

Fig. 8 shows the part that can be seen in fig. 7 where the base structure to be fixed to the board has been removed, allowing the hinged part underneath to be seen.

Fig. 9 shows the part seen in fig. 8 with part of the tilting part removed, allowing a view of the tilting devices.

Fig. 10 shows the part seen in fig. 9 viewed from a different angle.

Fig. 11 shows fig. 8 from a different angle.

Fig. 12 shows the angular cross section view of fig. 3.

Fig. 13 shows an enlargement from a different viewpoint of the cross section of fig. 12.

Fig. 14 shows the cross section of fig. 13 from a different viewpoint, where the torsion bar and the sleeve in which it is housed have been removed for a clearer view.

Fig. 15 shows the part visible in fig. 10 where the

block, in which one end of the torsion bar was housed and fixed, has been removed for a clearer view.

Fig. 16 shows a cross section of fig. 4 along the A-A plane fixed in fig. 2.

**[0028]** With reference to the diagrams, the basket is composed essentially of two parts, the hoop 1 and the relative parts for reinforcing and for holding the net underneath (not shown), and the other support part that when fixed to the board supports the hoop.

**[0029]** The support unit is composed of a fixed part or a base structure 2, which is fixed to the board (not shown) by means of four bolts passing through four holes 3 specially made on the side to be placed against the board.

**[0030]** This base structure 2 is C-shaped, and has housings on the two wings for the hinging 4 of the tilting part 5 of the support assembly.

**[0031]** The tilting part 5, can, under the action of a load applied to the hoop 1, tilt downwards along an axis parallel to the board and passing through the hinges 4 housed in the above-mentioned housings on the free wings of the base structure 2.

**[0032]** These hinges 4 are fixed near the outer part of two flat elements 6, juxtaposed on the inner surface of the wings of the C-shaped base structure 2; these flat parts are joined to one another at the top by a top plate 25, and on the front by a front plate 24, practically closing the space left open between the two wings of the C-shaped base structure 2, both on the top and at the front.

**[0033]** If necessary, the two flat elements 6 and the relative top plate 25 that joins them can be a single element of suitably moulded and folded sheet metal.

**[0034]** A lower casing 7, completes the closure of the support assembly, making the device completely secure from a safety regulations viewpoint.

**[0035]** Underneath the top plate 25, which makes up the top closure of the tilting part, in the part facing the board there are two pins 8 that can rotate, which, following any tilting of the hoop downwards on an axis parallel to the board, are pulled upwards, compressing the mechanical springs 9 on the same axis as them.

**[0036]** This compression of the above-mentioned springs 9 takes place between the lower free end of said pins (suitably threaded, on which a nut has been screwed, not shown) and a striker 10 fixed to the base structure 2 and fitted with holes, in which said pins 8 slide freely, and which act as a stop for the above-mentioned mechanical springs 9.

**[0037]** These pins 8 are threaded at their lower end, thereby providing a regulation of the preload of the springs 9, after the nuts (not shown) have been screwed onto them.

**[0038]** It is clear that following the maximum compression of the springs 9, the striker 10 fixed to the base structure 2 acts also as a stop at the maximum tilting movement of the hoop 1 downwards in an axis parallel to the board.

**[0039]** These pins 8 are hinged 11 on the top, fixed to

a bushing 12 hinged between a flat element 6 of the tilting part and a block 13 fixed to the top plate 25 in the middle on the side that faces the inside of the tilting part 5.

[0040] This small block 13, in addition to having the housings of the hinging of the above-mentioned bushings 12, is also the fixing of an end of the torsion bar 14.

[0041] This torsion bar 14, fixed on one part to said block 13 is also joined to the hoop 1 at its other end by means of a plate, called a "basket front plate" 15.

[0042] To avoid the torsion bar being subjected to flexion stress, it is jacketed inside a sleeve.

[0043] The above-mentioned sleeve, 16 goes through a hole in the front plate 24, which joins the two flat elements 6 of the tilting part 5 at the front, and lies, free to rotate, with its opposite end inside a circular housing 17 in the above-mentioned block.

[0044] This sleeve 16, joined to the end of the torsion bar 14 fixed to the basket front plate 15, follows its rotational movements.

[0045] A metal sheet 18, configured as a semi-circle, which acts as a strengthening element as an underneath support to prop up the hoop it is fixed to, is joined to the basket front plate 15 and projects towards the overhang of the hoop 1.

[0046] This metal sheet 18 ensures a stable fixing of the hoop 1 to the basket front plate 15, and also makes the hoop more robust, preventing any permanent deformations of the hoop itself.

[0047] The basket front plate 15 is placed against the front plate 24, which unites the two flat elements 6 at the front, and rotates joined to the hoop 1, with an axis of rotation that coincides with the axis of the torsion bar 14.

[0048] The rotation of the hoop 1 with an axis that is perpendicular to the board is limited by a stop 19, joined to the front plate 24 and protruding from it, inside a groove of the basket front plate 15, whose ends make up the stop wings for limiting said rotation of the hoop 1.

[0049] To ensure a precise and quick return to the horizontal position of the hoop 1 following rotation along an axis perpendicular to the board, and to allow said rotation only after a fixed minimum stress, there is a striker with a V-shaped groove on the front plate 24 (on the side facing the board) in which a sphere 20 is pushed by a spring 21.

[0050] The sphere 20 and the spring 21 are housed inside a small cylinder 22 that is open on the side of the sphere, a cylinder 22 that is joined to and held at a suitable distance from said sleeve 16 (inside which is housed the torsion bar 14) by a flat spacer 23.

[0051] This cylinder 23 is made to rotate, by means of the flat spacer 23, by the rotation of the lug 16, but because of the initial opposition of the sphere 20 to come out of the housing with the V-shaped groove into which it is pushed by the spring 21, there is the initial necessary resistance to the tilting so that the rotation only occurs after stresses that exceed a certain minimum value.

[0052] This above-mentioned device, composed of the sphere 20 pushed by a spring 21 into a striker or V-

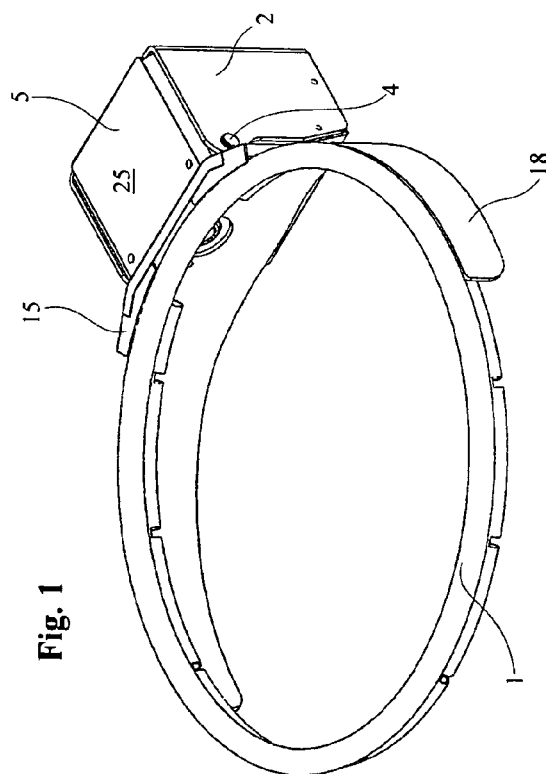
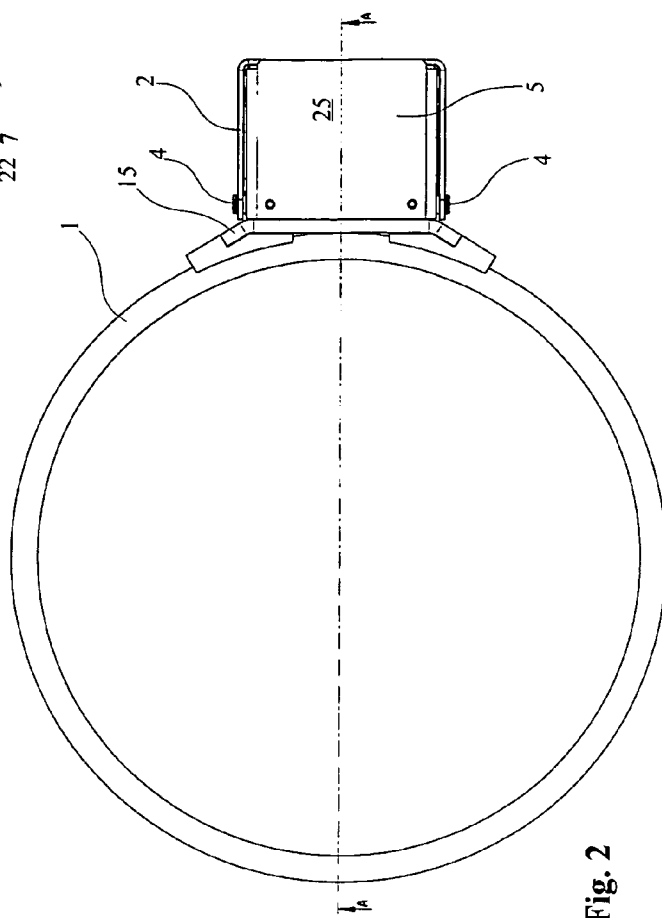
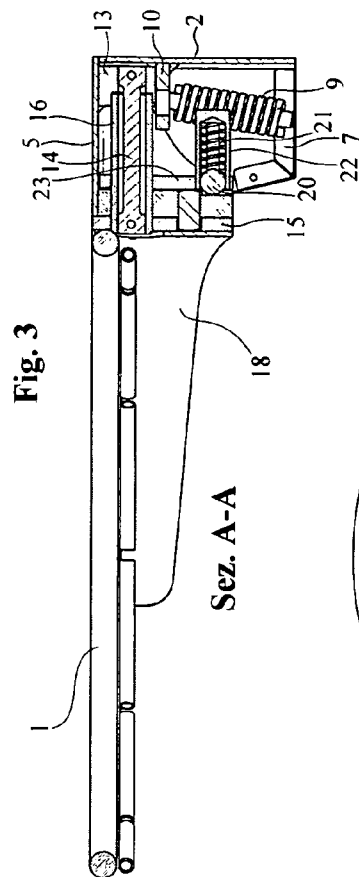
shaped housing, in addition to being a threshold device for the stress exceeding which the tilting of the hoop occurs, it also has the function of quickly and precisely bringing back the basketball hoop to a horizontal position.

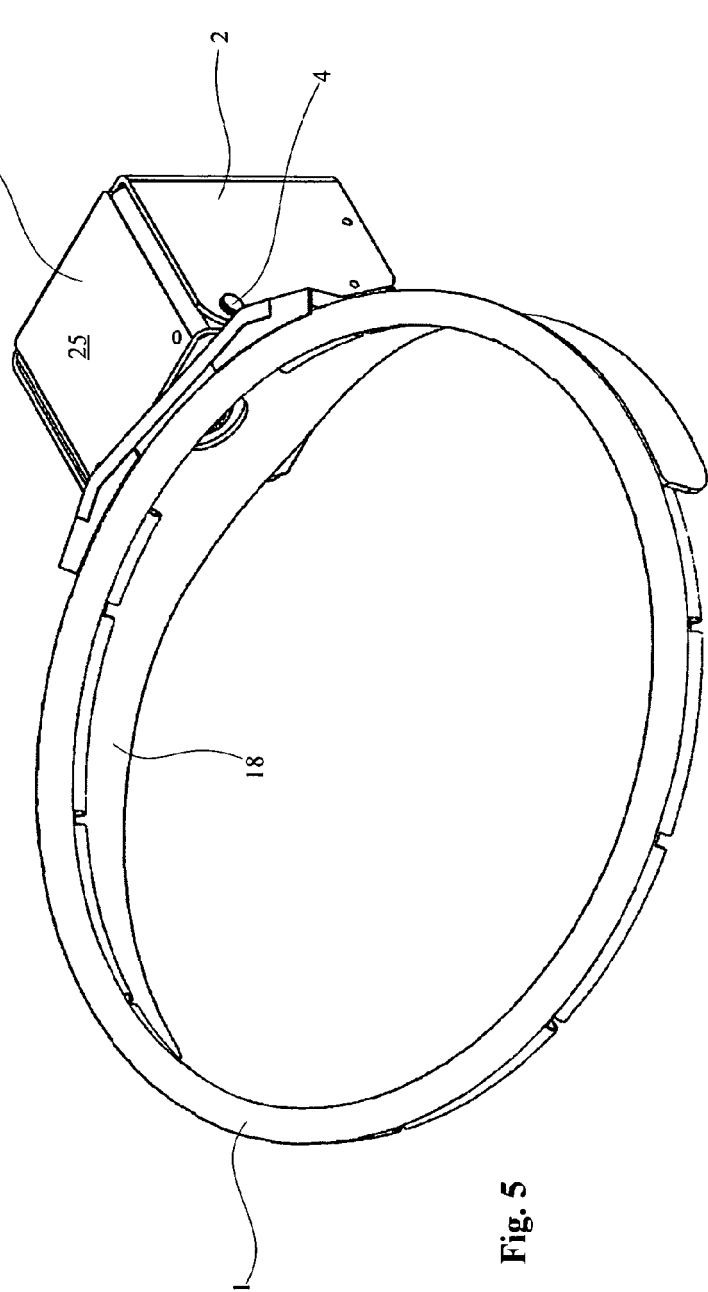
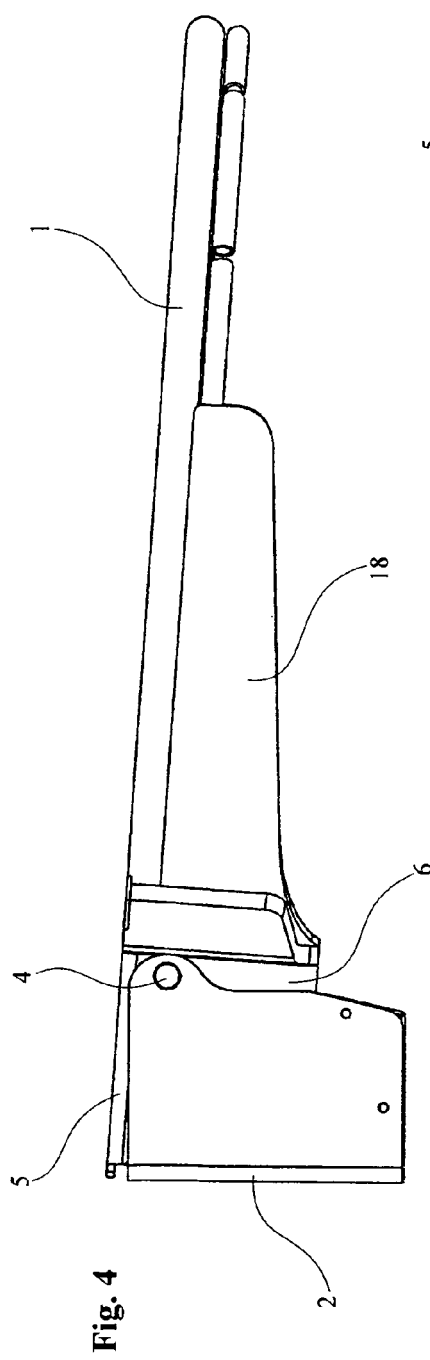
[0053] From the example described above we can appreciate the value of the device in the patent, the compactness, the performance, the ease of adjustment, the safety, the minimal maintenance, the limited shifting or translation of the hoop when tilting.

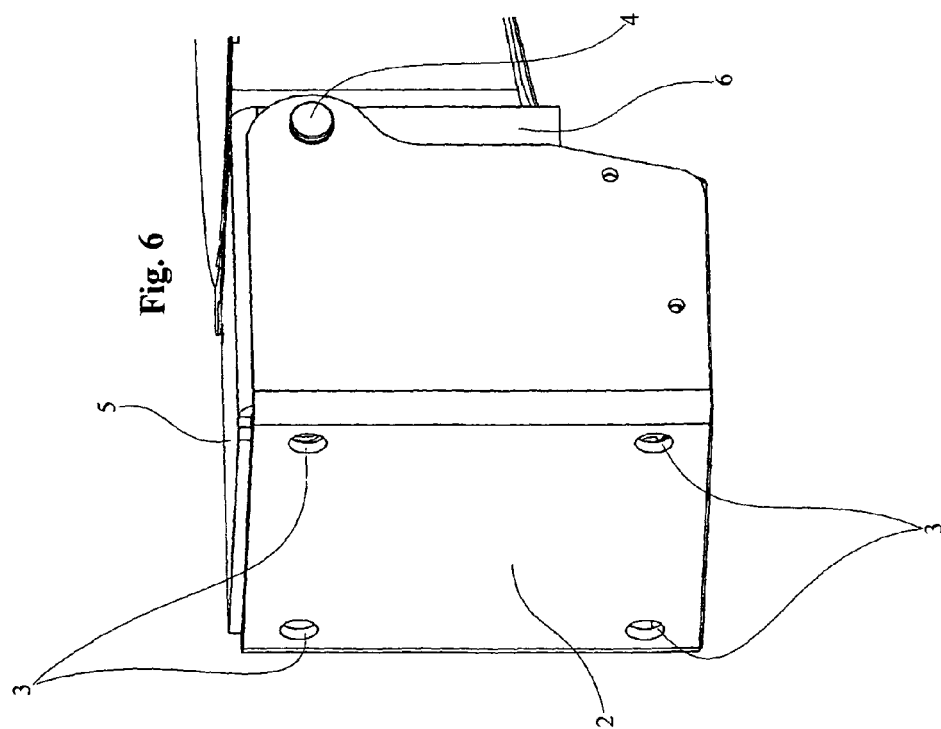
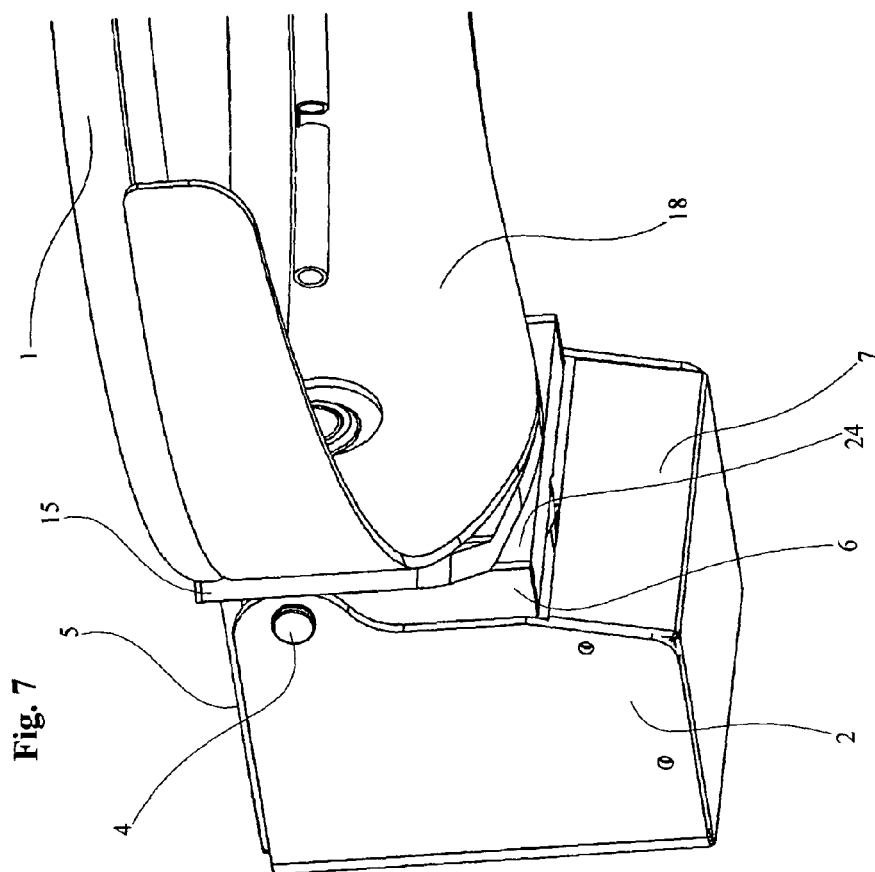
## Claims

1. Device for the tilting of a hoop used in basketball, **characterised by** the fact that it can tilt along an axis parallel to the board countered by one or more springs (9) and that it can tilt along an axis perpendicular to the board counteracted by a torsion bar (14).
2. Device for the tilting of a hoop used in basketball containing a fixed structure (2), and solidly connected to the board to which it is hinged, with an axis parallel to the board, a tilting device (5), opposed in its movement, generated following accidental downward stress on the ring (1), by one or more springs (9), said tilting device (5) comprising a torsion bar (14), arranged with its axis perpendicular to the board, which allows the ring (1) to tilt, with said torsion bar (14) solidly connected on its first end to said tilting device (5) and its second end joined to the ring (1), allowing a tilting of the ring along the axis of the torsion bar (14).
3. Device for the tilting of a hoop used in basketball, according to claim 1 or 2 **characterised by** the fact that the resistance force realised by one or more springs (9) in opposition to the tilting movement with the axis parallel to the board, can be adjusted.
4. Device for the tilting of a hoop used in basketball, according to the previous claim **characterised by** the fact that said adjustment takes place using the initial prestressing of said springs (9).
5. Device for the tilting of a hoop used in basketball, according to claim 1 or 2 **characterised by** the fact that the rotation movement of the ring (1) along an axis perpendicular to the board occurs only when a pre-set value for the stress applied to the ring (1) is exceeded, which can surpass the resistance of a threshold device (20, 21, 22).
6. Device for the tilting of a hoop used in basketball, according to one or more of the previous claims **characterised by** the fact that hinging axis parallel to the board is placed practically at a tangent to the profile of the ring (1).

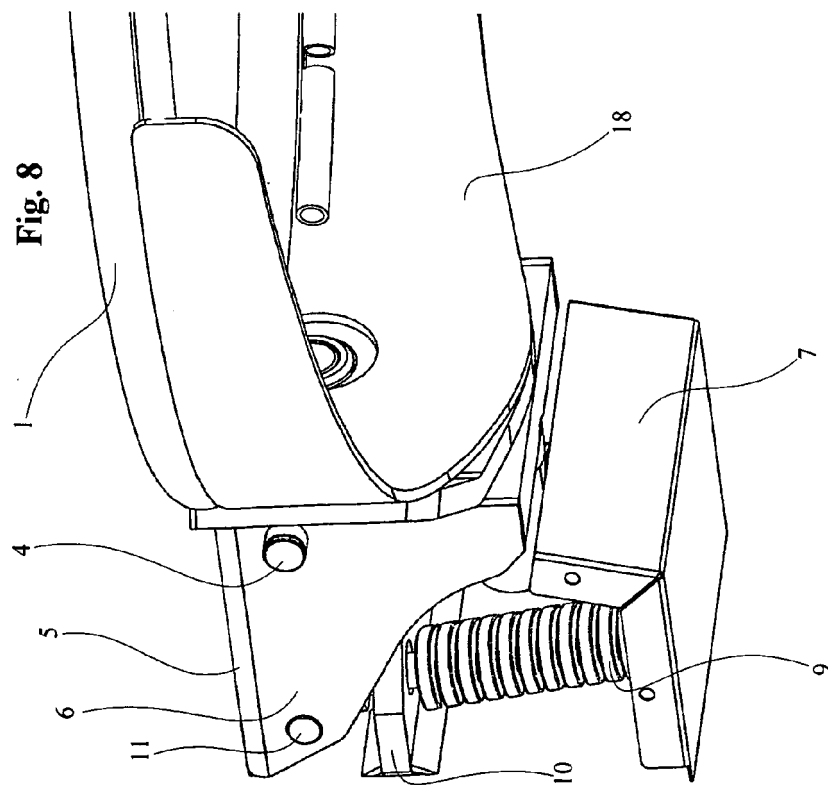
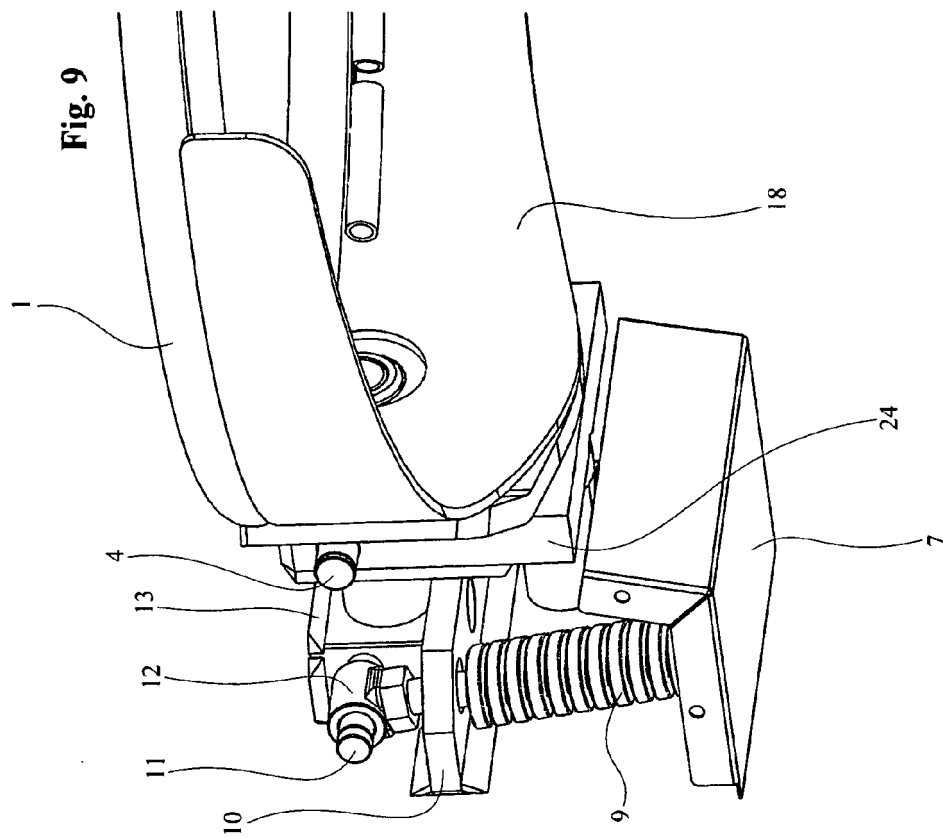
7. Device for the tilting of a hoop used in basketball, according to one or more of the previous claims **characterised by** the fact that the axis perpendicular to the board is placed practically through or just under the profile of the ring (1). 5
8. Device for the tilting of a hoop used in basketball, according to one or more of the previous claims **characterised by** the fact that said threshold device (20, 21, 22), preferably configured as a sphere (20) pushed by a spring (20) inside a striker or V-shaped housing, has the function of quickly and precisely returning the basketball ring (1) back to a horizontal position. 10 15
9. Device for the tilting of a hoop used in basketball, according to one or more of the previous claims **characterised by** the fact that the device is particularly compact, having placed against it on the outside part (further away from the board) of the tilting device (5) the elements that rotate taking up more space along the axis perpendicular to the board. 20 25 30 35 40 45 50 55



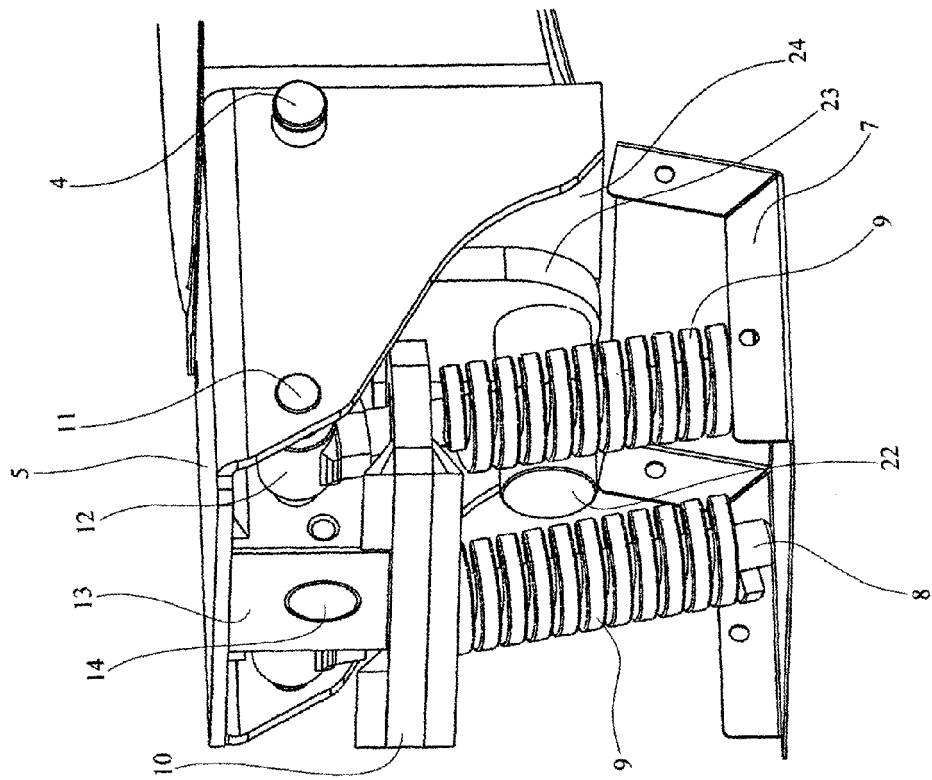




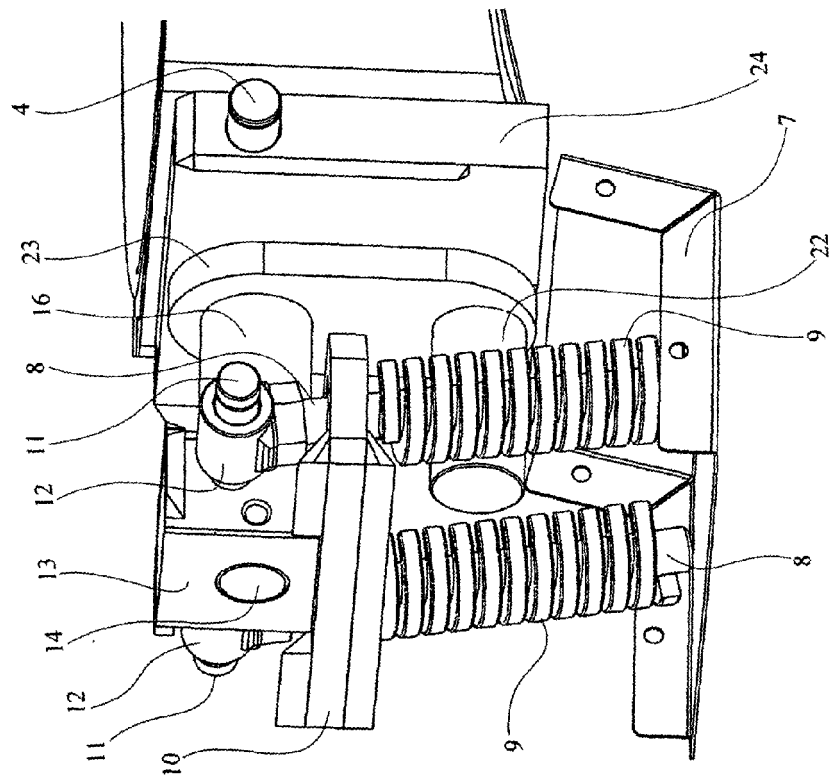


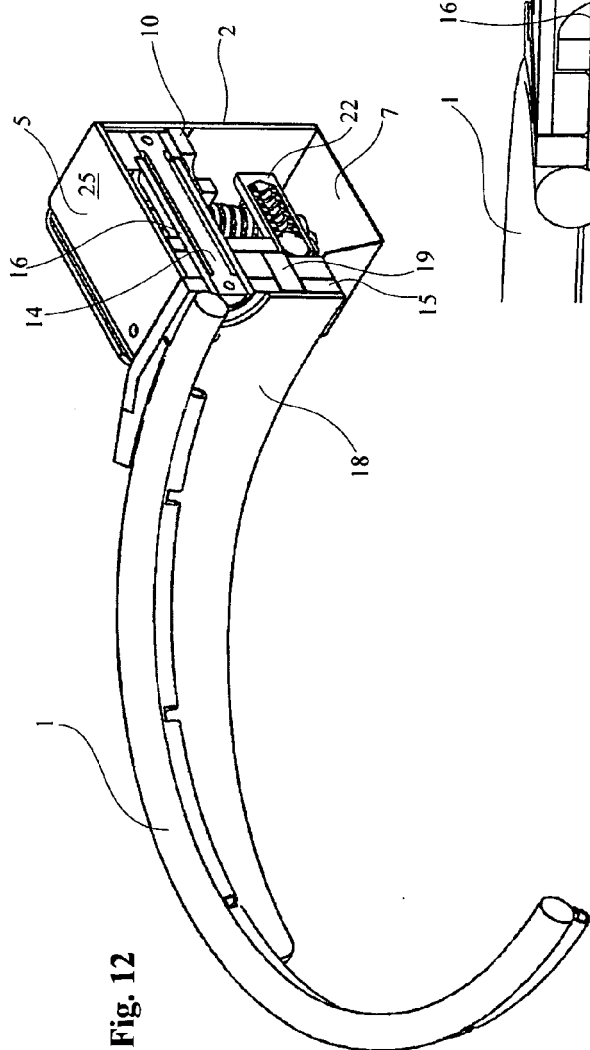


**Fig. 11**

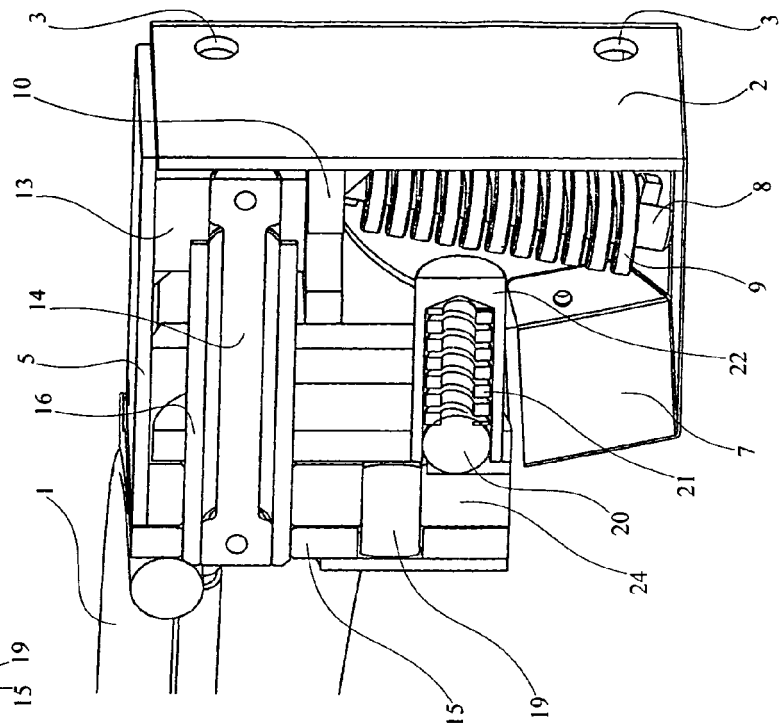


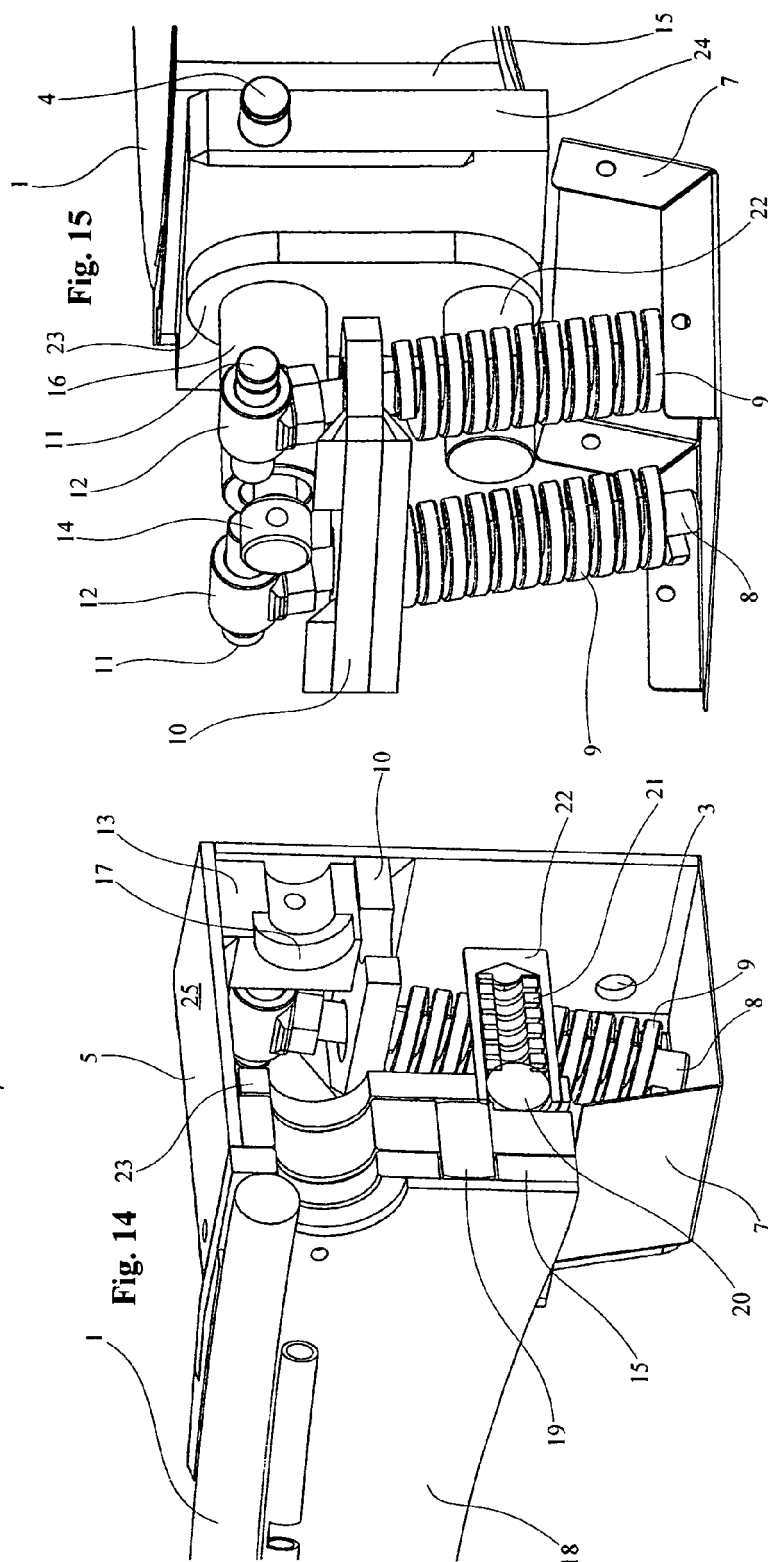
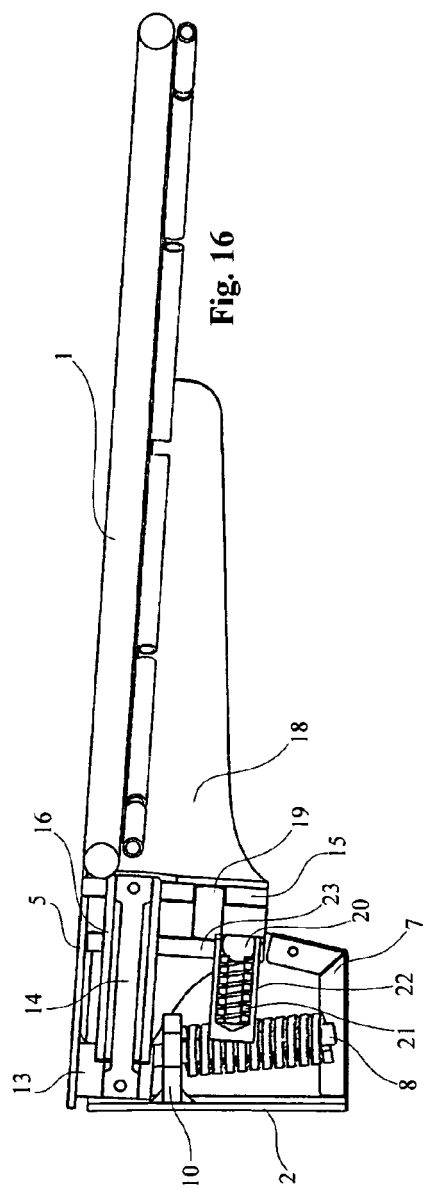
**Fig. 10**





**Fig. 13**







## EUROPEAN SEARCH REPORT

Application Number  
EP 10 00 7823

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2007/167265 A1 (CONNERLEY JAMES J [US]) 19 July 2007 (2007-07-19) * paragraph [0001] * * paragraph [0011] - paragraph [0013] * * paragraph [0027] - paragraph [0028] * * paragraph [0031] - paragraph [0032]; figures *	1-9	INV. A63B63/08
X	US 6 447 409 B1 (SQUIBB NEAL C [US]) 10 September 2002 (2002-09-10)	1	
A	* abstract; figures 1-3,6,7 * -----	2-9	
			TECHNICAL FIELDS SEARCHED (IPC)
			A63B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 28 September 2010	Examiner Michels, Norbert
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... &amp; : member of the same patent family, corresponding document</p>			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 10 00 7823

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
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28-09-2010

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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