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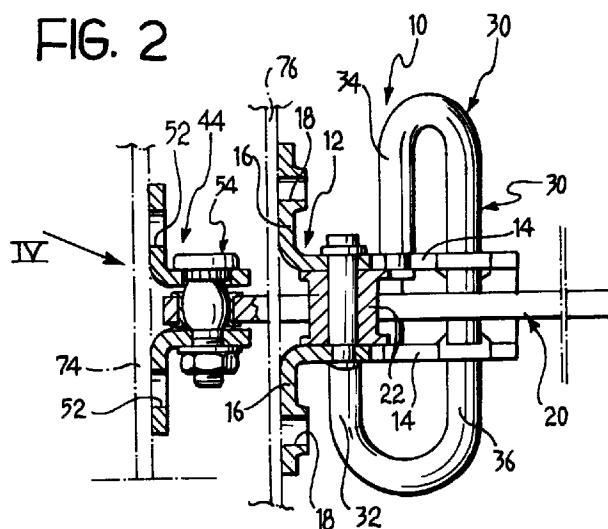
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(54) **A device for restraining a vehicle door in a partially or fully open position**

(57) A device for restraining a vehicle door in a partially or fully open position comprises a tie-rod (20) clamped between a pair of rollers (22, 24) carried by a base (12). A fixing support (44) articulated to one end of the tie-rod (20) carries an articulation element (54). The articulation element (54) is formed so as to permit a relative pivoting movement between the tie-rod (20) and the fixing support (44) about an axis substantially perpendicular to the articulation axis (72).

FIG. 2



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Description

The present invention relates to a device for restraining a vehicle door in a partially or fully open position, of the type having the characteristics which are the subject of the preamble to the main claim.

A device of this type is known from the Applicant's document FR-A-2 714 928 which describes a restraining device comprising a base carrying a pair of rollers between which a tie-rod is clamped resiliently. The tie-rod has a cam profile having locating seats and cooperating with one of the rollers. In restraining devices of the type defined above, the base with the respective rollers is generally fixed to the door, whereas one end of the tie-rod is connected to a pillar of the body by means of a fixing support which is articulated to the tie-rod about an axis parallel to the axes of the rollers.

With the known devices, it has been noticed that there is a certain difficulty in mounting the device on the vehicle because the tolerances of size and shape between the door and the door-frame lead to a misalignment between the seats for the fixing of the base and of the support of the restraining device.

In order to overcome these problems, the object of the present invention is a device having the characteristics forming the subject of Claim 1.

Characteristics and advantages of the invention will become clear in the course of the following detailed description, given purely by way of non-limiting example, with reference to the appended drawings, in which:

Figure 1 is a perspective view of a device according to the present invention,

Figure 2 is a section taken on the line II-II of Figure 1,

Figure 3 is a plan view taken on the arrow III of Figure 1, and

Figure 4 is a detail of the portion indicated by the arrow IV in Figure 2, on an enlarged scale.

With reference to the drawings, a device for restraining a vehicle door in a partially or fully open position is indicated 10. The device 10 comprises a base 12, constituted by a blanked and bent sheet-metal element having two parallel, spaced-apart walls 14 having respective flanges 16 in which fixing holes 18 are formed.

A blanked sheet-metal tie-rod 20 disposed in the open space defined between the two walls 14 is clamped between a pair of rollers 22, 24. A first roller 22 is mounted rotatably on a pin 26 fixed between the two walls 14 of the base 12. The second roller 24 is mounted rotatably on an end portion of a metal-rod torsion spring 30 carried by the base 12. The spring 30 has a first straight portion 32 on which the roller 24 is

mounted and a second straight portion 34 which bears against the side of an opening formed in one of the walls 14. The two portions 32, 34 are connected to a third straight portion 36.

The tie-rod 20 has a surface 38 with a cam profile in which a series of locating seats 40 is formed. The surface 38 is urged against the first roller 22 by a resilient force produced by the spring 30. This resilient force is applied by the second roller 24 to a surface 42 of the tie-rod 20 opposite the cam surface 38. The tie-rod 20 can adopt various positions of stable equilibrium relative to the base 12 according to the seat 40 engaged by the roller 22 at the time in question. The various positions correspond to various degrees of opening of the vehicle door.

One end of the tie-rod 20 is articulated to a fixing support 44 constituted by a blanked and bent sheet-metal element. The support 44 has two parallel and spaced-apart walls 46 connected by a back portion 48. Each of the walls 46 has a flange 50 with a fixing hole 52. The support 44 carries an articulation element 54 having a head 56, a spherical portion 58, and a threaded shank 60. Beneath the head 56, the articulation element 54 has a knurled portion 62 which is driven into a hole 64 in one of the walls 46. A nut 61 engages the threaded shank 60 and restrains the articulation element 54 in the base 12 axially.

The spherical portion 58 of the articulation element 54 engages a bush 64 of plastics material which is fixed in a hole 66 in the tie-rod 20. The bush 64 has two flanges 68 which engage opposed flat surfaces of the tie-rod 20. One of the two flanges 68 is formed by hot-heading of the bush after it has been inserted in the hole 66. The bush 64 has a hole 70 which is cylindrical in the undeformed condition. The spherical portion 58 of the articulation element 54 and the hole 70 in the bush 64 may, according to the coupling tolerances between these two elements, be engaged with slight clearance or with slight interference. In both cases, the tie-rod 20 is free to perform an adjustment movement about an axis perpendicular to the articulation axis 72. This enables the tie-rod 20 and the fixing support 44 to be arranged at a relative inclination of a few degrees, for example, of the order of $\pm 3^\circ$ relative to a central position. This adjustment capability is extremely useful during the mounting of the device on a vehicle.

As shown in Figure 2, the fixing support 44 is intended to be fixed to the door-frame 74 of a vehicle body, whereas the base 12 is intended to be fixed to the door 76. Mounting is carried out by means of screws which engage the fixing holes 18 and 52. The ability to adjust the relative angular positions of the tie-rod 20 and the fixing support 44 compensates for the tolerances and errors in the relative positioning of the door and the door-frame along three axes X, Y and Z. The device 10 can thus be mounted easily, even when there are errors of parallelism between the mounting planes, errors between the fixing axes, or misalignments of the fixing

points along the vertical axis Z, etc.

Claims

1. A device for restraining a vehicle door in a partially or fully open position, comprising:
 - a tie-rod (20) with a cam profile (38) in which at least two locating seats (40) are formed,

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 - a base (12) having a pair of rollers (22, 24) which have parallel axes and are urged resiliently towards one another, and between which the tie-rod (20) is clamped, one of the rollers (22) cooperating with the seats (40) of the cam profile (38) in order to define at least a first and a second stable position of the tie-rod (20) relative to the base (12), corresponding to various degrees of opening of the door, and

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 - a fixing support (44) connected to an end of the tie-rod (20) by means of an articulation element (54) with an axis (72) substantially parallel to the axes of the rollers (22, 24),

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characterized in that the articulation element (54) is formed so as to permit a relative pivoting movement between the tie-rod (20) and the fixing support (44) about an axis substantially perpendicular to the articulation axis (72).

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2. A device according to Claim 1, characterized in that the articulation element (54) comprises a portion (58) with a spherical profile which engages a bush (64) of plastics material fixed in a hole (66) in the tie-rod (20).

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3. A device according to Claim 2, characterized in that the bush (64) has a pair of flanges (68) which engage opposed flat surfaces of the tie-rod (20).

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4. A device according to Claim 1, characterized in that the articulation element (54) has a knurled portion (62) which is driven into a hole (66) in the support (44).

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5. A device according to Claim 4, characterized in that the articulation element (54) has a threaded shank (60) which is engaged by a clamping nut (61).

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FIG. 1

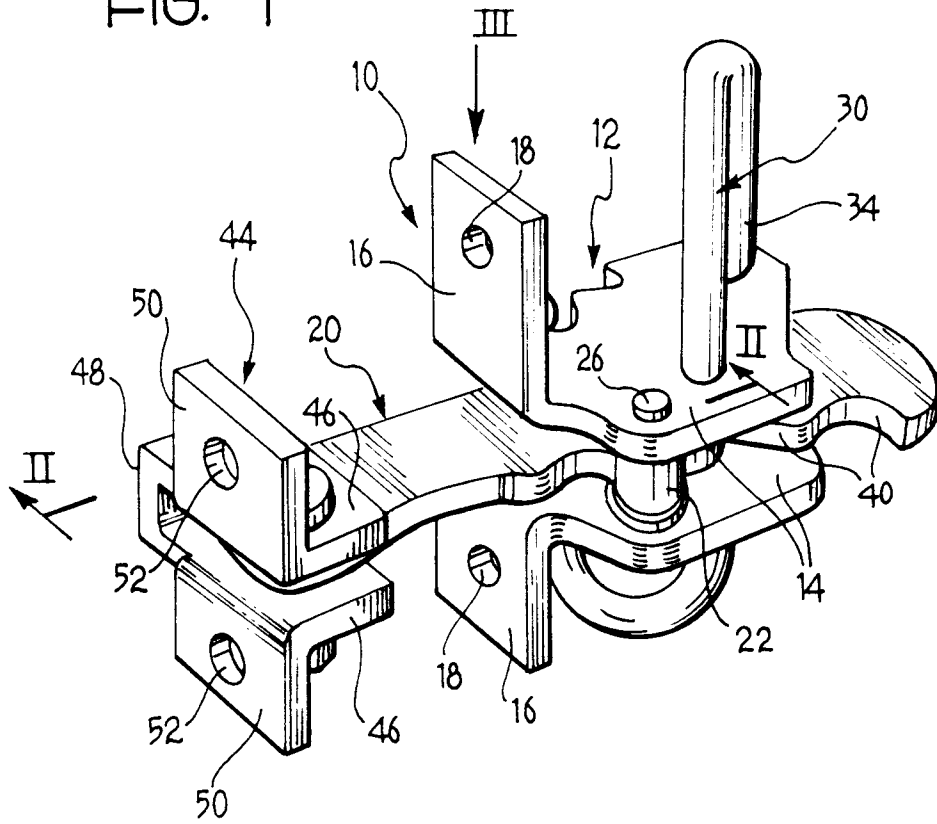


FIG. 2

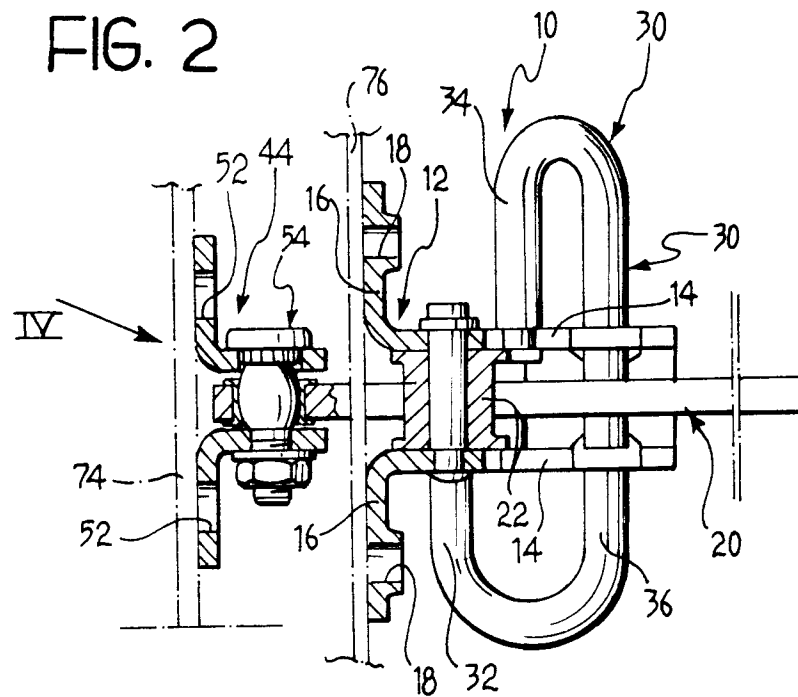


FIG. 3

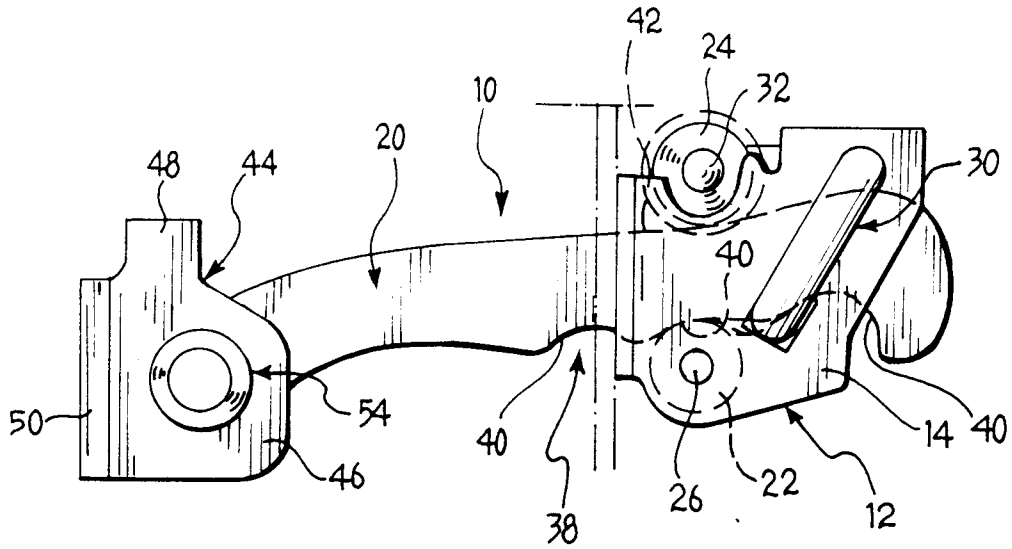
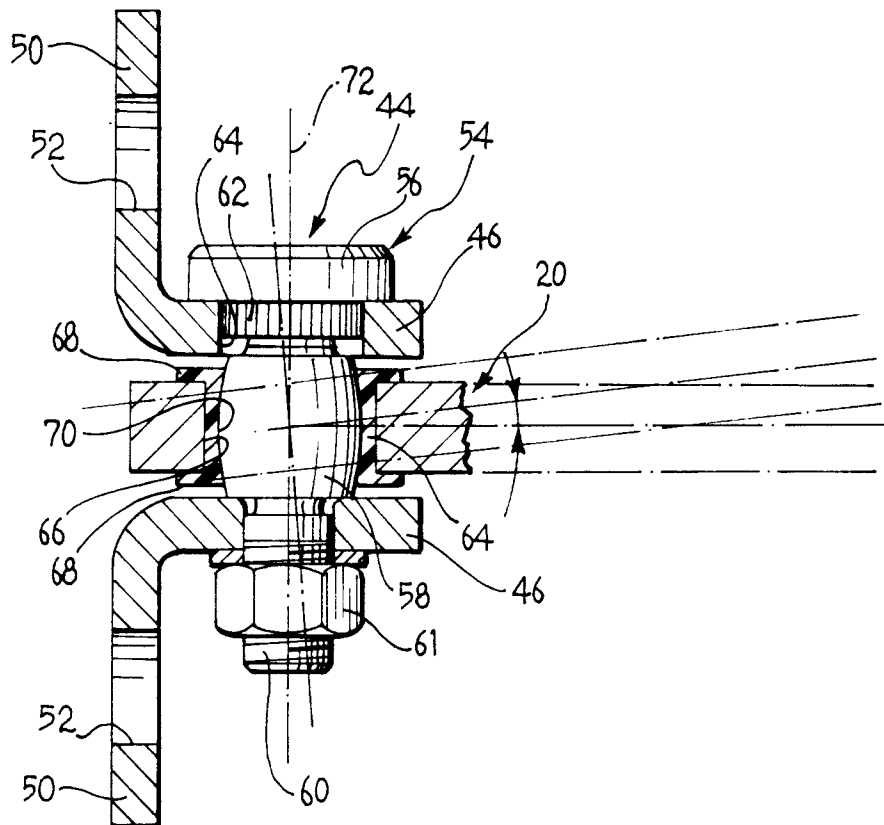


FIG. 4





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EUROPEAN SEARCH REPORT

Application Number
EP 96 83 0515

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y	DE 295 00 053 U (GAMMASTAMP) * the whole document *	1	E05C17/20
Y	US 2 715 746 A (P. H. TRAVIS) * column 3, line 54-59; figures 2,3 *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			E05C
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
BERLIN		17 March 1997	Krabel, A
CATEGORY OF CITED DOCUMENTS 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 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 & : member of the same patent family, corresponding document			

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