



Europäisches Patentamt
European Patent Office
Office européen des brevets



Publication number:

0 530 494 A1

12

EUROPEAN PATENT APPLICATION

21 Application number: **92112889.8**

51 Int. Cl.⁵: **E05C 17/04, E05F 1/10**

22 Date of filing: **29.07.92**

30 Priority: **07.08.91 IT TO910637**

71 Applicant: **FIAT AUTO S.p.A.**
Corso Giovanni Agnelli 200
I-10135 Torino(IT)

43 Date of publication of application:
10.03.93 Bulletin 93/10

72 Inventor: **Pastorelli, Bruno**
Via Lancia, 89
I-10141 Torino(IT)

84 Designated Contracting States:
DE ES FR GB IT SE

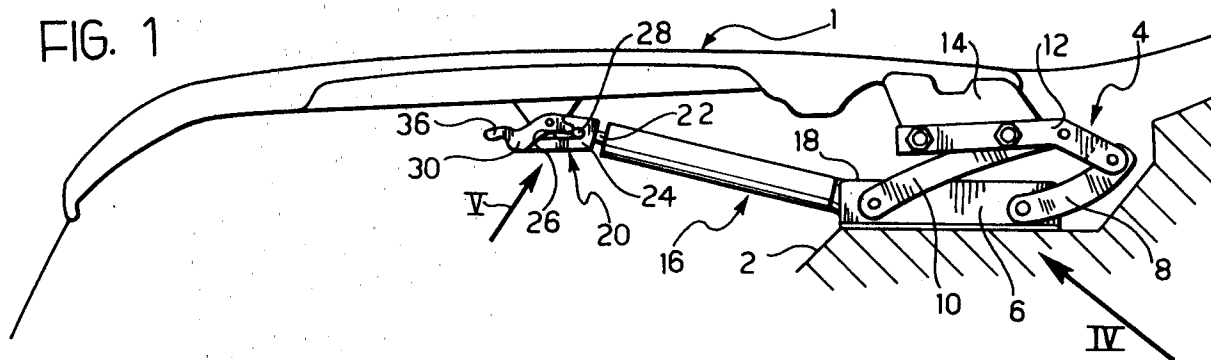
74 Representative: **Quinterno, Giuseppe et al**
c/o Jacobacci-Casetta & Perani S.p.A. Via
Alfieri, 17
I-10121 Torino (IT)

54 **Device for controlling the opening of a door of a vehicle, especially for the bonnet.**

57 The device comprises an articulated quadrilateral mechanism (4) for articulating the door (1) to the body (2) and a gas spring (16) having a first end (18) articulated to the body (2) and a second end (20) articulated to the door (1). The second end (20) of the spring (16) is connected to the door (1) by

means of a sliding coupling (26,28) and a releasable stop mechanism (30) is provided for urging the second end (20) of the spring (16) into a relatively invariable position in relation to its axis of articulation (A) to the door (1).

FIG. 1



EP 0 530 494 A1

This invention relates to a device for controlling the opening of a door of a vehicle, especially for the bonnet of the vehicle.

The invention relates more particularly to a device of the type comprising:

- means for articulating the door to the body,
- at least one telescopic gas spring having a first end articulated to the body and a second end articulated to the door, and
- adjusting means to vary the opening arrangement of the door from a normal open position to a more open position.

By virtue of the devices of the type defined hereinabove, it is possible to obtain two opening arrangements of the door, one normal open arrangement, which, if the device is applied to the bonnet, is sufficient for the normal operations of ordinary checking and maintenance of the components of the engine, and a more open arrangement allowing for greater accessibility for extended maintenance and repair operations.

The object of this invention is to produce a device of the type specified hereinabove which can be operated in a simple manner and is more compact and economical than the devices known hitherto.

This problem is overcome according to the invention by producing a device of the type specified hereinabove, characterised in that the articulation means include an articulated quadrilateral mechanism including two arms, each of which is articulated to the body and to the door, and that the said adjusting means include a sliding coupling between the said second end of the spring and its axis of articulation to the door and a releasable stop mechanism adapted to urge the second end of the spring into a relatively invariable position in relation to its axis of articulation to the door.

By virtue of this solution, it is possible to use a conventional gas spring which does not require substantial structural modification. The gas spring may be disposed in the lateral channels of the bonnet or the lid of the boot, reducing as far as possible the overall dimensions of the device. The manually operable adjusting means allowing for passage from the normal open position to the more open position are situated at the point of articulation of the gas spring to the door and are thus in a readily accessible position.

Other features and advantages of this invention will become clear from the following detailed description with reference to the accompanying drawings, provided purely by way of a non-limiting example, in which:

Figures 1, 2 and 3

are schematic side views of a device according to this invention respectively in the arrangements with the door closed, open in the normal

position and open in the more open position, and

Figures 4 and 5

are perspective views on a larger scale of the parts indicated by the arrows IV and V in Figure 1.

With reference to the drawings, the bonnet of a vehicle, designated by the reference numeral 1, is articulated to the body 2 by means of an articulated quadrilateral mechanism 4. The mechanism 4 comprises a lower flange 6 fixed to the body 2 and to which the lower ends of two arms 8, 10 are articulated. The upper ends of the arms 8, 10 are articulated to an element 12 which is fixed to the bonnet 2 by means of a flange 14.

A pair of telescopic gas springs are interposed between the bonnet 1 and the body 2, only one of which can be seen in the drawings and is designated by the reference numeral 16. Each spring 16 has a first end 18 articulated to the body 2 in the vicinity of the flange 6 and a second end 20 which is articulated to the bonnet 1 in the manner described hereinafter. As can be seen in greater detail in Figure 5, an articulation element 24 formed by a plate having a slot 26 is fixed to the free end of the rod 22 of the air spring 16. The slot 26 is traversed by a pin 28 integral with the bonnet 1. The pin 28 is free to slide along the slot 26 and to rotate relative to the hinge element 24 about its longitudinal axis A which constitutes the axis of articulation of the second end 20 of the air spring 16 to the bonnet 1.

A rocker arm 30 is pivoted on the articulation element 24 and cooperates with a pin spring 32 which holds it in the position shown in Figure 5. The rocker arm 30 has a stop face 34 which bears against the pin 28 and prevents displacement thereof along the slot 26. The rocker arm 30 has an integral actuating component 36 which can be actuated manually in order to oscillate the rocker arm 30 in the direction indicated by the arrows B against the return action of the spring 32. The rocker arm 30 also has a cam surface 38, the function of which will be clear from the following.

The operation of the device will now be described with reference to Figures 1 and 3.

In Figure 1, the device is situated in the arrangement corresponding to the closed position of the door. The pin 28 is located at the end of the slot 26 closer to the rod 22 of the air spring 16 and is held in this position by the rocker arm 30. The articulation element 24 and the pin 28 are nevertheless free to execute a relative rotation about the axis A.

Figure 2 shows the normal open arrangement of the bonnet 1. In this arrangement, the pin 28 and the articulation element 24 are situated in the arrangement illustrated in Figures 1 and 5. The angle

of opening of the bonnet 1 is designated by the letter C and has a value of approximately 60°.

Starting from the arrangement of Figure 2, in order then to open the bonnet 1, the actuating component 36 of the rocker arm 30 is actuated manually, resulting in oscillation of the rocker arm in the directions indicated by the arrows B in Figure 5. In this manner, the pin 28 is free to slide along the slot 26 and is brought to the end of the slot further from the rod 22 of the air spring 16. Upon this movement of the pin 28 with respect to the hinge element 24, the arms 8, 10 execute a further rotation bringing them into the arrangement illustrated in Figure 3. In this arrangement, the angle of opening of the bonnet 1 is designated by the letter D and has a value of approximately 85°.

In order to close the bonnet 1 starting from the more open arrangement, the actuating component 36 of the rocker arm 30 must be actuated, after which it is sufficient to push the bonnet downwards. The pin 28 is thus moved along the slot 26 and cooperates with the cam surface 38 of the rocker arm 30, oscillating it in the direction indicated by the arrows B in Figure 5. When the pin reaches the vicinity of the end of the slot 26 closer to the shaft 22, the rocker arm 30, displaced by the spring 32, returns to the stop position illustrated in Figure 5.

Claims

1. Device for controlling the opening of a door of a vehicle, especially for the bonnet of the vehicle, comprising:

- means (4) for articulating the door (1) to the body (2),
- at least one telescopic gas spring (16) having a first end (18) articulated to the body (2) and a second end (20) articulated to the door (1), and
- adjusting means (26, 30) to vary the opening arrangement of the door (1) from a normal open position to a more open position,

characterised in that the articulation means (4) include an articulated quadrilateral mechanism including two arms (8, 10), each of which is articulated to the body (2) and to the door (1), and that the said adjusting means include a sliding coupling between the said second end (20) of the spring (16) and its axis of articulation (A) to the door (1) and a releasable stop mechanism (30) adapted to urge the second end (20) of the spring (16) into a relatively invariable position in relation to its axis of articulation (A) to the door (1).

2. Device according to claim 1, characterised in that the second end (20) of the gas spring (16)

carries an articulation element (24) having a slot (26) in which a pin (28) fixed to the door (1) is slidably mounted.

3. Device according to claim 2, characterised in that the said stop mechanism comprises a rocker arm (30) pivoted on the articulation element (24) and having a stop face (34) adapted to cooperate with the said pin (28) in order to keep it at one end of the slot (26).

4. Device according to claim 3, characterised in that the stop mechanism comprises resilient means (32) adapted to hold the rocker arm (30) in a position in which its stop face (34) extends transversely to the passage of the pin (28) relative to the hinge element (24).

5. Device according to claim 4, characterised in that the rocker arm (30) has a cam surface (38) which, as a result of the movement of the pin (28) with respect to the slot (26) from the position corresponding to more opening of the door (1) to the position corresponding to normal opening, causes oscillation of the rocker arm (30) against the action of the said resilient means (32).

30

35

40

45

50

55

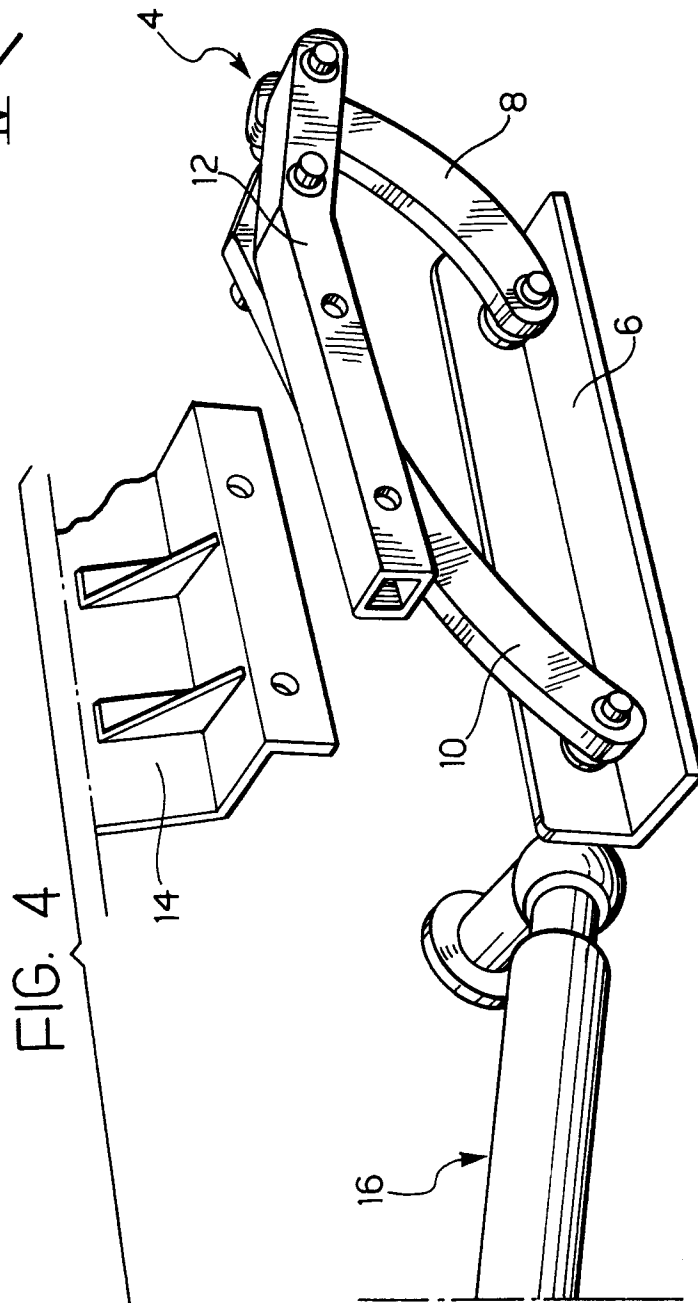
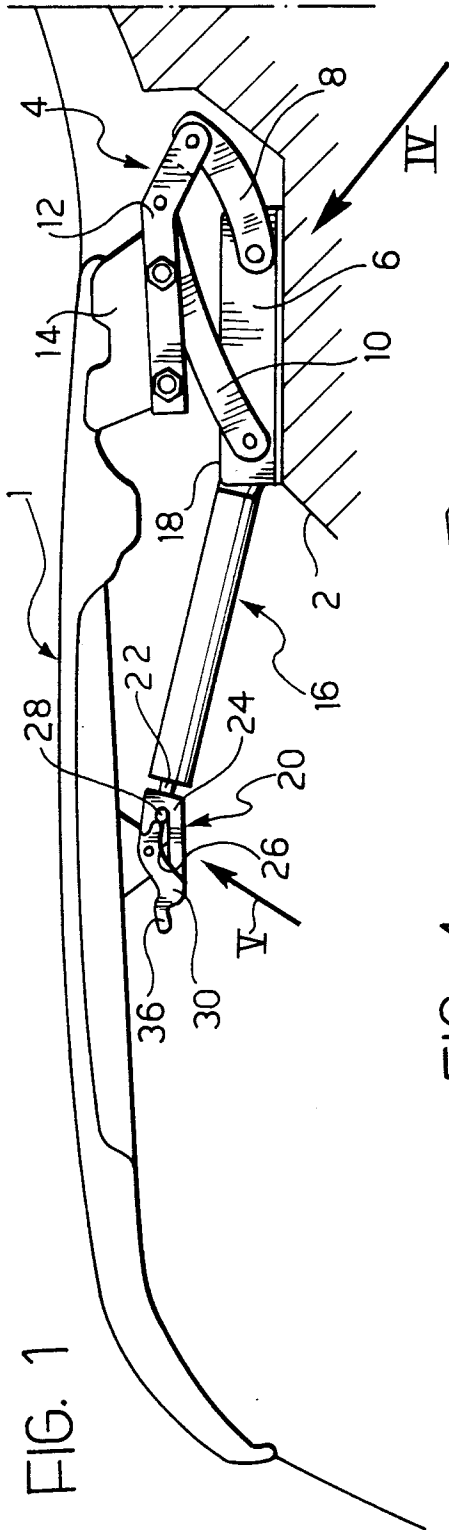


FIG. 2

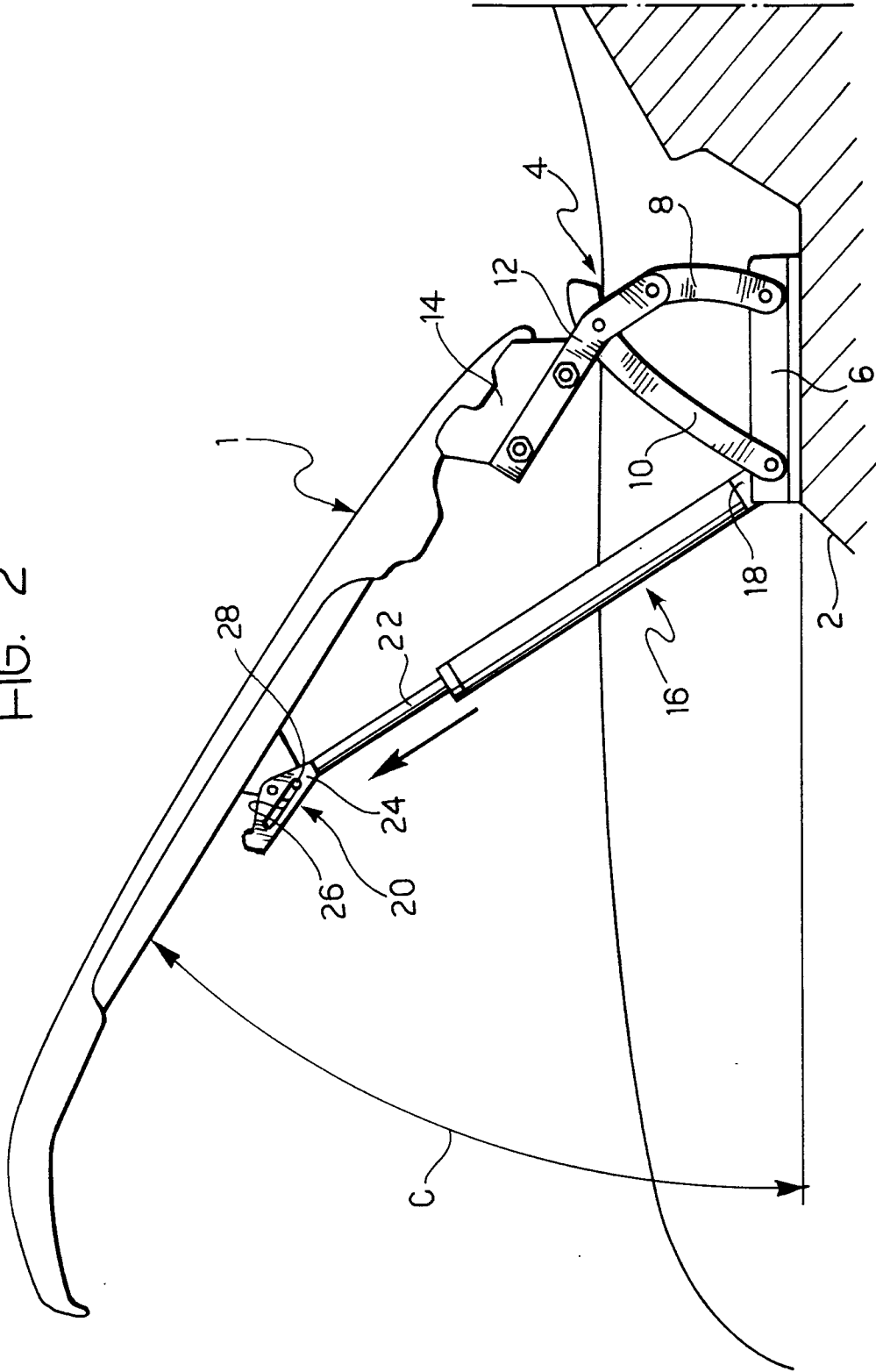


FIG. 3

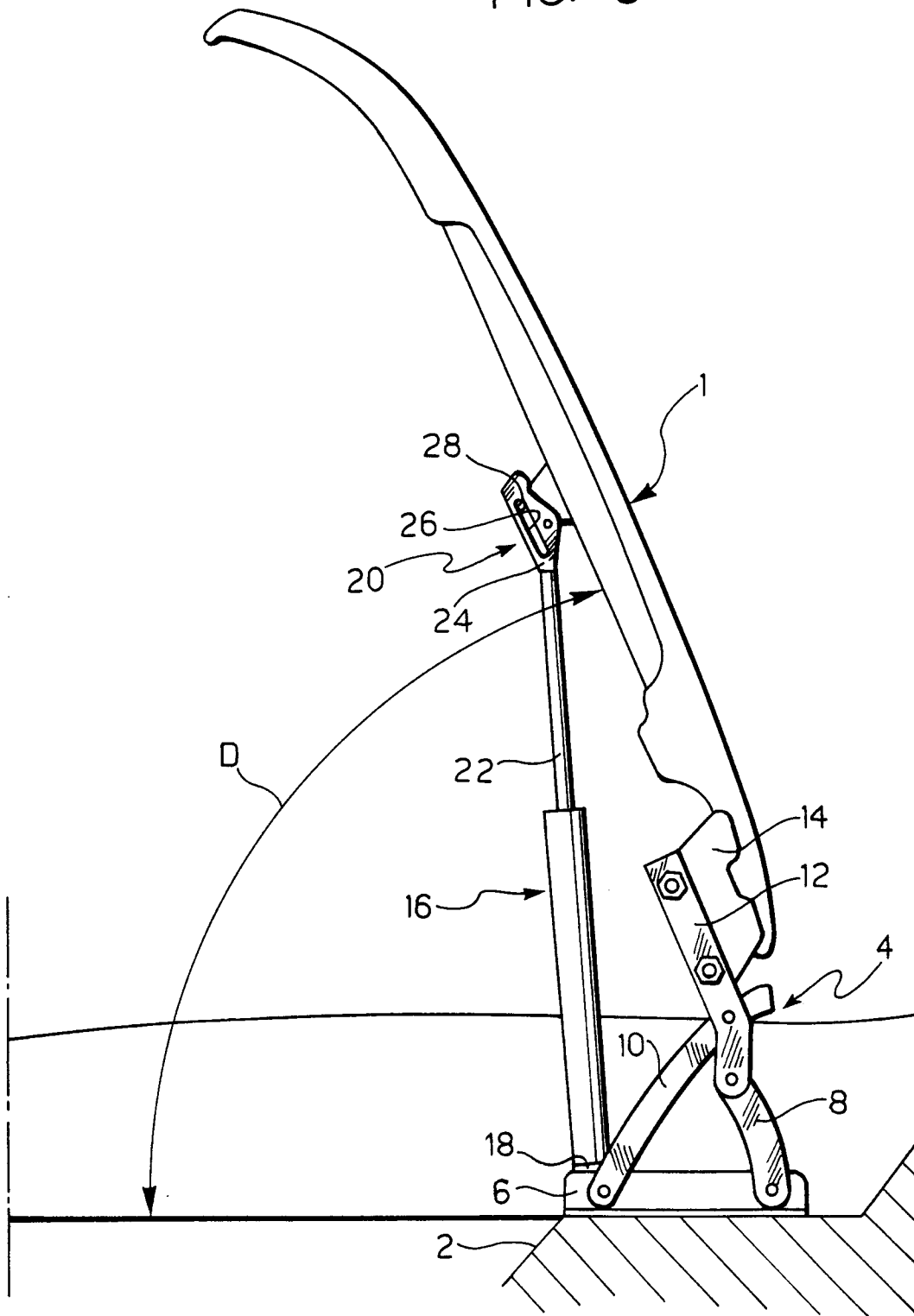
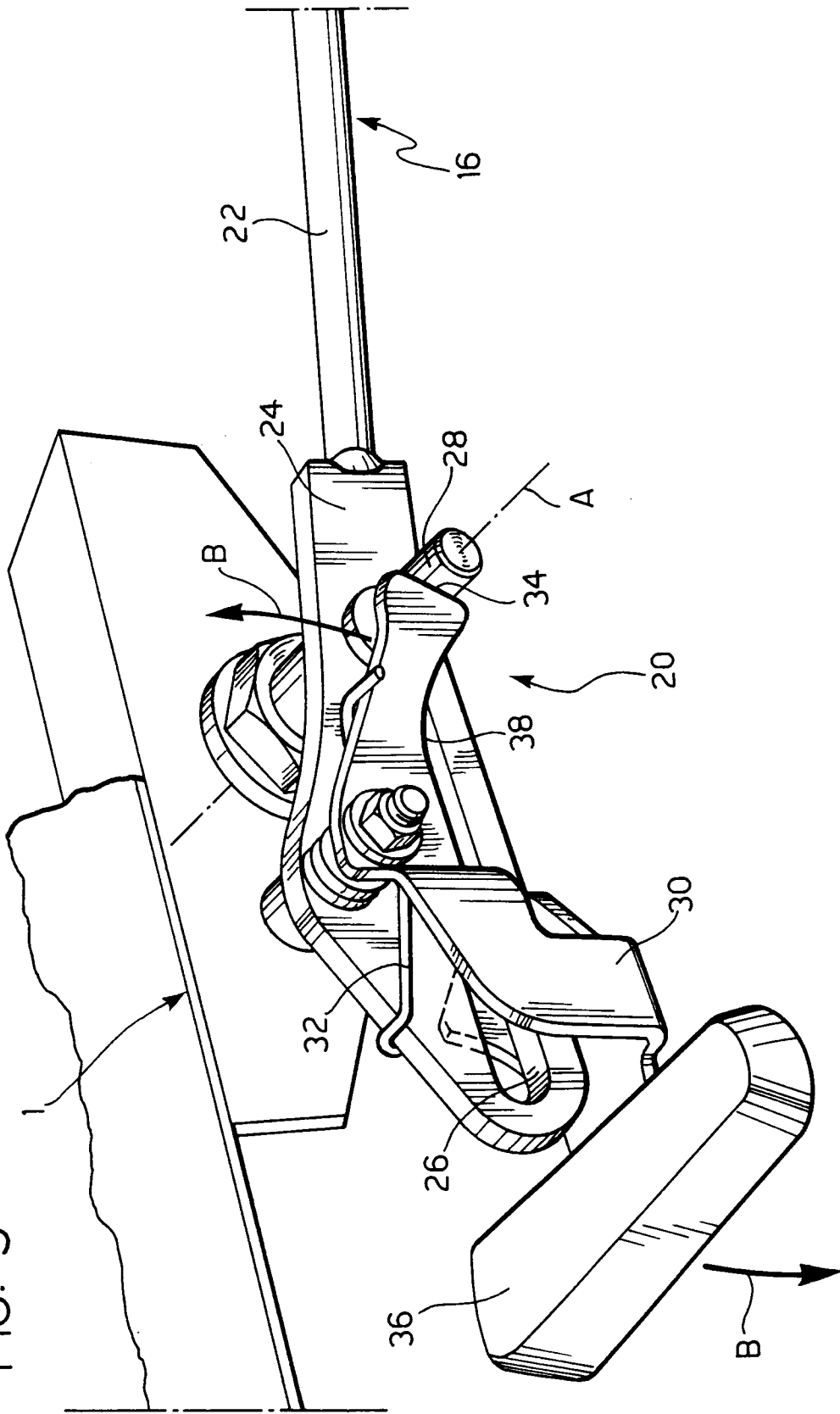


FIG. 5





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.5)
Y	PATENT ABSTRACTS OF JAPAN vol. 7, no. 79 (M-204)(1224) 31 March 1983 & JP-A-58 004 673 (NISSAN JIDOSHA K.K.) 11 January 1983 * abstract *	1	E05C17/04 E05F1/10
Y	DE-A-3 916 739 (BAYERISCHE MOTOREN WERKE AG) * abstract; figures 1-6 *	1	
A	US-A-4 223 420 (YUKIMOTO) * column 1, line 63 - column 2, line 7; figure 1 *	1	
A	US-A-1 650 654 (RETTMAN) * the whole document *	2-5	
A	DE-A-2 850 067 (FUHR) * page 10, last paragraph - page 11, paragraph 1; figures 4-8 *	3	
A	GB-A-999 346 (FORD MOTOR COMPANY LIMITED) * the whole document *	1-5	TECHNICAL FIELDS SEARCHED (Int. Cl.5) E05C E05D E05F
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 24 NOVEMBER 1992	Examiner VAN KESSEL J.
CATEGORY OF CITED DOCUMENTS		I : 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	
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			