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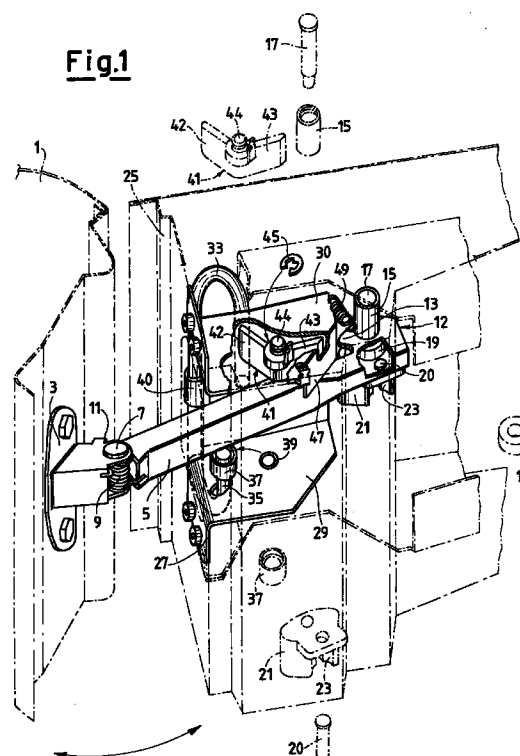
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(54) **A device for controlling the opening and closing of a motor vehicle door**

(57) In a device for controlling the opening and closing of a motor vehicle door or hatchback door, particularly the rear door of a commercial vehicle, a tie rod (5) is elastically hinged to the vehicle body and cooperating with a support (27) fitted on the vehicle door (25). The non-hinged end portion (12) of the tie rod (5) provides engagement and guiding means (13, 15, 19, 21) adapted for cooperating with further engagement and guiding means (33, 37, 40, 41, 47) located on the door support (27) and capable of keeping the end portion (12) of the tie rod (5) engaged with the door support (27) throughout the whole controlled opening stroke of the door (25), and of disengaging the end portion (12) of the tie rod from the support (27) during the first part of the closing stroke of the door.



EP 0 808 981 A2

Description

The present invention relates to a device for controlling the opening and closing of a motor vehicle door or hatchback door, particularly rear doors of commercial vehicles.

Generally, the back door or hatchback door of commercial vehicles is fitted with a tie rod that does not allow the door to open wider than 90°, and at the same time acts as a stopping means to prevent the door from closing unadvisedly.

Where it is required, for any reason, to open the door wider, the tie rod has to be unhooked manually so as to release the door which will be free to swing open up to its full range of motion until it reaches the opening angle allowed by the vehicle body.

However, the said unhooking operation is not free of inconveniences, as it is necessary to use both hands, one for pushing the door open and the other for unhooking the tie rod.

Moreover, the tie rod is often covered with grease to facilitate it in sliding, which requires the use of a suitable protection to avoid being dirtied, such as a glove or a rag.

It is an object of the present invention to provide a device capable of overcoming the above prior art drawbacks.

In accordance with one aspect of the invention as claimed, this object is accomplished by the provision of a device for controlling the opening and closing of a door or hatchback door, particularly for rear doors of commercial vehicles, as claimed in claim 1.

In order that the present invention may be well understood there will now be described a preferred non-limiting embodiment thereof, given by way of example, reference being made to the accompanying drawings, in which:

FIG. 1 is a partially sectioned and exploded perspective view of a device in accordance with the present invention; and
FIGS. 2 to 11 respectively show various positions reached by the device in operation.

With reference to the drawings, numeral 1 designates a part of the body of a motor vehicle, in particular a commercial vehicle, to which a tie rod 5 made of C-shaped contoured sheet metal is attached by means of a bracket 3. Tie rod 5 is hinged to bracket 3 by means of a pin 7 and is urged by a spring 9 against an abutment 11 formed in the bracket, so as to reach a predetermined angle with respect to the bracket, as will be more apparent hereinafter.

The end portion 12 of tie rod 5 is shaped as a hook 13. On the outer upper face of end portion 12 the tie rod bears a first roller 15 rotatably mounted on a riveted pin 17. Fitted within the space formed by the C-shaped end portion 12 and also rotatably mounted on pin 17 is a second roller 19, of larger diameter with respect to the

first roller 15. The lower outer face of said end portion 12 bears a support member 21 fixed by riveted pins 17 and 20. Support member 21 forms a semi-circular contoured seat 23.

A flat support 27 is fixed to the door frame 25 facing the bracket 3. Flat support 27 is provided with upper and lower tongues 29, 30 orientated at a 90° angle and forming therebetween a guiding passage for the end portion 12 of the tie rod 5.

A torsion spring 33 is fixed to the front side of flat support 27 facing the bracket 3. The lower end portion 35 of torsion spring 33 supports a third roller 33 rotatably mounted by means of an elastic ring 39. Torsion spring 33 is kept in position by a folded part 40 of flat support 27.

A lever 41 composed of a first and second blades 42, 43 forming an open V facing the base of flat support 27 is mounted for oscillation within the upper tongue 30 by means of a pin 44 fixed to the apex of said V and a C-spring 45 at a distance such to allow the passage of the first roller 15 between the same lever and the base of flat support 27. Said tongue 30 further provides a guiding portion 47 folded at a 90° angle with respect to said upper tongue and oriented such that its extension encounters the flat part of flat support 27 at an acute angle. A traction spring 49 is connected to the lever 41 and the guiding portion 47 in order to keep the blade 43 with its end portion pressed against said guiding portion 47, whilst the end portion of blade 42 is pressed against the base of flat support 27.

Operation of the device according to the present invention is as follows, as shown with reference to FIGS. 2 to 11.

In the closed position (FIG. 2), the tie rod 5 is inserted between the tongues 29 and 30 of flat support 27 and urged against the wall of door 25 under the bias of spring 9. When the door 25 is opened in the direction of arrow H (FIG. 3), the end portion 12 of the tie rod moves in the direction of arrow K bearing against roller 19, until roller 19 engages the V-shaped lever 41, thereby lifting up blade 42 against the action of spring 49.

Moving further along in the direction of arrow K, the hook 13 on the end portion 12 of tie rod 5 comes into engagement with the folded part 40 of flat support 27, while roller 37 on the end portion 35 of spring 33 enters the seat 23 of support 21 (FIG. 6). In this way, the door is locked in its open position at about a 90° angle. At the same time, the lever 41 is returned to its original location under the action of spring 49, with blade 42 abutting the base of flat support 27. Obviously, if it is desired to attain a wider opening, e.g. at 95°, it is sufficient to prolong tie rod 5 accordingly.

At this point, in order to open the door further, disengaging it from the tie rod 5, the door has to be pushed in its closing direction to a slight extent so as to bring the end portion 12 in the position illustrated in FIG. 7. In this position, roller 15 is on top of the blade 42 of lever 41, and roller 37 is unhooked from seat 23 and is now facing

hook 13. From this position, by opening the door 25 again in the direction of arrow H, the end portion 12 of the tie rod will first reach the position shown in FIG. 10, getting over roller 37, and then in the position shown in FIG. 11, where it comes out of the flat support 27, releasing the door 25. The tie rod 5 so rests on the abutment 11 such that it can once again be engaged by the flat support 27 when closing the door.

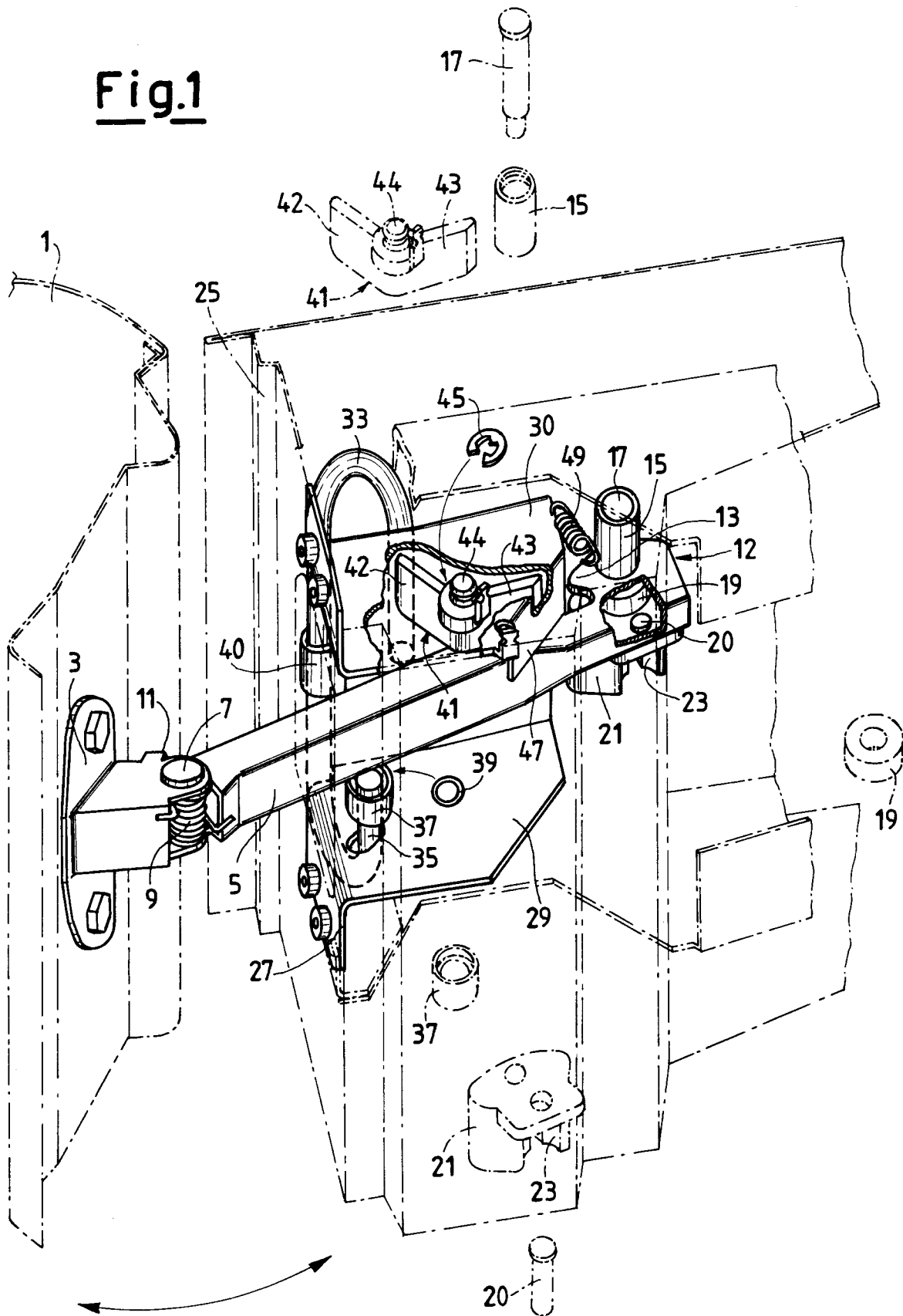
To close the door definitely, it is sufficient to continue the previously undertaken closing stroke, in which case the end portion 12 will be guided by the guiding part 47 with which roller 15 comes in contact (FIGS. 8 and 9), until it passes over lever 41, returning in the rest position shown in FIG. 2.

As apparent, the tie rod of the door can be unhooked automatically by means of a simple and reliable device, without the need of intervening manually on the tie rod.

Claims

1. A device for controlling the opening and closing of a motor vehicle door or hatchback door, particularly the rear door of a commercial vehicle, adapted for engaging said door throughout an opening and closing angle comprised between a minimum of a few degrees and a maximum of at least 90°, for locking said door in its fully open position, and for disengaging said door beyond said maximum opening angle allowed by the device, said device comprising a tie rod elastically hinged to the vehicle body and cooperating with a support (27) fitted on the vehicle door (25), characterised in that the non-hinged end portion (12) of the tie rod (5) provides engagement and guiding means (13, 15, 19, 21) adapted for cooperating with engagement and guiding means (33, 37, 40, 41, 47) located on said support (27) and capable of keeping said end portion (12) of the tie rod (5) engaged with said support (27) throughout the whole controlled opening stroke of the door (25), and of disengaging said end portion of the tie rod from the door support during the first part of the closing stroke of said door.
2. A device as claimed in claim 1, characterised in that the engagement and guiding means fitted on the end portion (12) of the tie rod consist of
 - a hook (13) formed in the contour of the tie rod, first and second coaxial rollers (15, 19) of different diameter, and
 - a support (21) providing a semi-circular seat (23) adapted for accommodating a roller (37) of compatible diameter.
3. A device as claimed in claim 1 and 2, characterised in that the end portion (12) of the tie rod (5) has a C-shaped contour and that said roller of greater diameter (19) is housed within said C-shaped contour.
4. A device as claimed in claim 1, characterised in that the support (27) fixed to the door is flat and provides two upper and lower tongues (29, 30) orientated at a 90° angle and forming a guide for the end portion (12) of said tie rod.
5. A device as claimed in claims 1 and 2, characterised in that said engagement and guiding means fitted on said support consists of
 - a torsion spring (33) provided with a roller (37) adapted for cooperating with said seat (23) on said support (21),
 - a lever (41) kept in position by elastic means and adapted for cooperating with said first roller (15) and a guiding portion (47) of said upper tongue (30) folded at a 90° angle with respect to said upper tongue and oriented such that its extension encounters a the flat part of said support (27) at an acute angle, and
 - a folded part (40) holding said spring (33) and adapted for engaging the hook (13) of said end portion (12).
6. A device as claimed in claims 4 and 5, characterised in that said lever (41) is so shaped as to form an open V facing the base of said support (27), said lever being mounted for oscillation to said upper tongue (30) at such a distance from the base and the guiding part (47) as to allow the passage of said first roller (15).
7. A device as claimed in claims 4 to 7, characterised in that said elastic member (49) keeps one end portion of said lever (41) against the base of said support (27) and the other end portion against the guiding part (47).
8. A device as claimed in claim 1, characterised in that the tie rod, when not resting against the door (25), is urged against an abutment (11) by means of an elastic member (9).
9. A device as claimed in claims 1 to 8, characterised in that during the opening movement of said door (25), the first roller (15) is arranged to pass under the lever (41) lifting it from the base of said support (27), whilst during the closing movement of said door, said first roller is arranged to pass over said lever (41), detaching it from said guiding part (47).
10. A device as claimed in claims 1 to 8, characterised in that in the locked open door position the hook (13) is engaged with the folded part (47) and that the roller (37) of spring (33) is inserted in the seat (23) of said support (21).

Fig.1



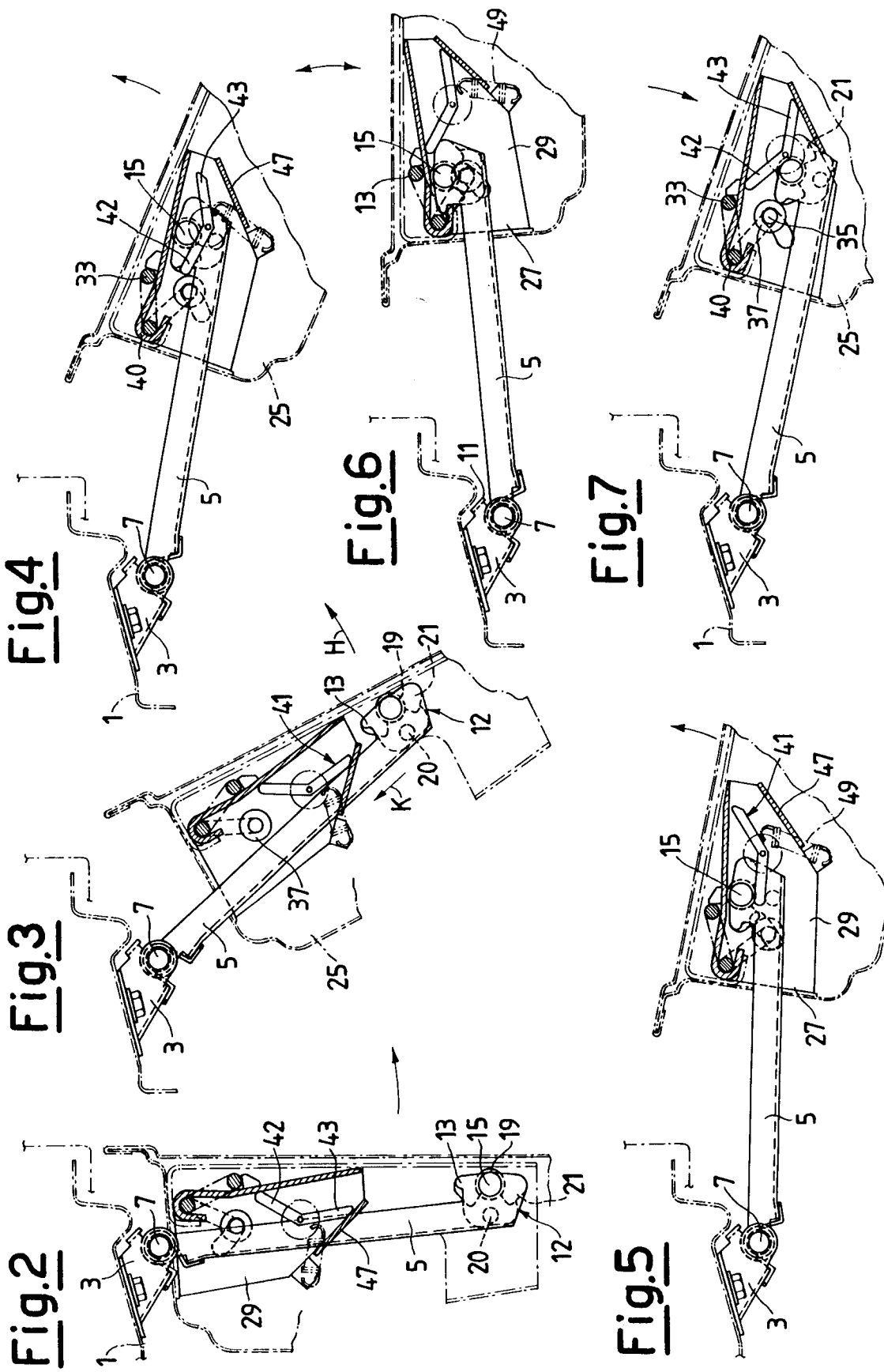


Fig.8

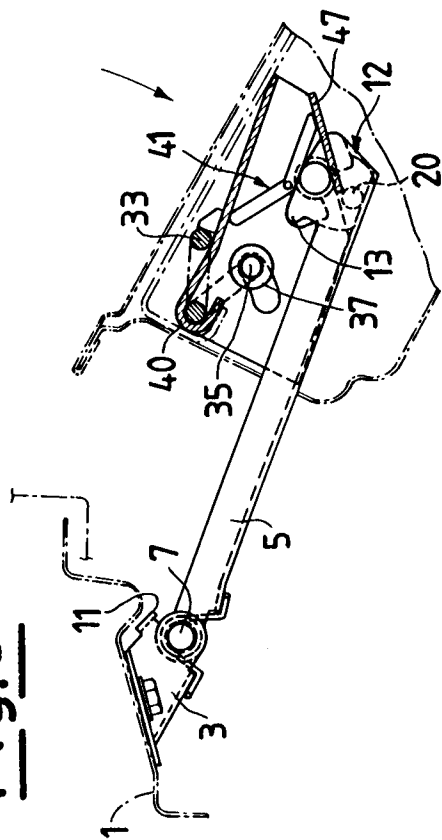


Fig.9

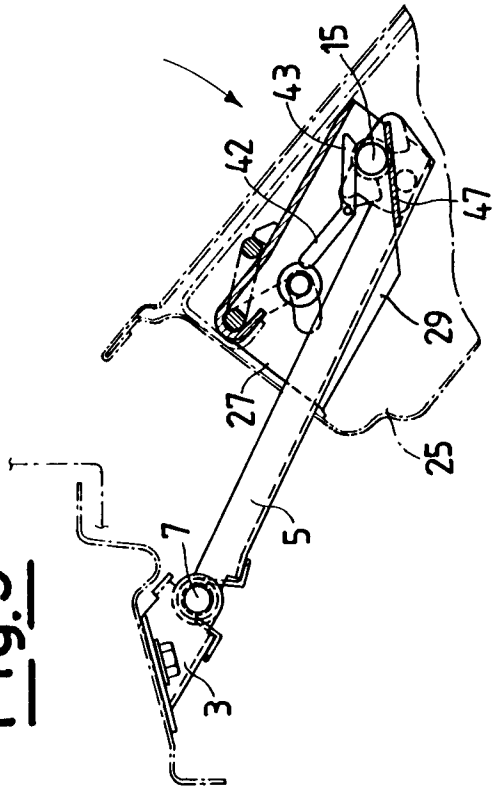


Fig.10

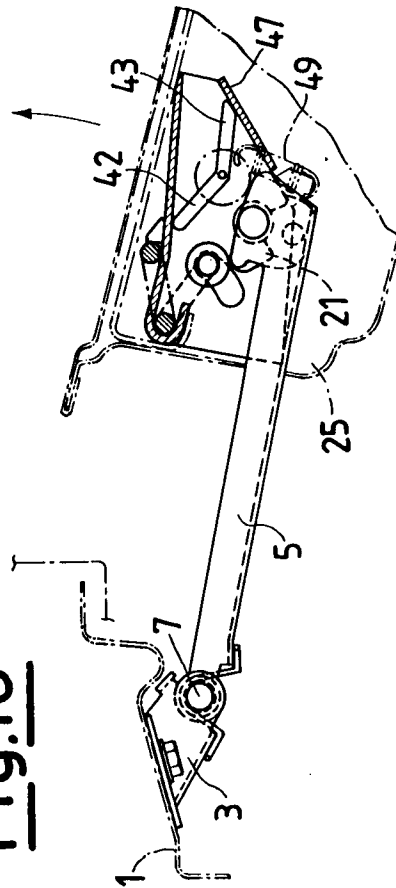


Fig.11

