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(54) Window winder with single arm and rail, for automobile vehicles

(57) Window winder with single arm and rail, for automobile vehicles, with an arm (1) and a toothed sector (2), with a rail (5) in which a drive slide (6) travels. A support member (7), totally symmetrical in relation to its main shaft has two pairs of three lugs. The shaft (12) of

the arm is situated on the median line (m, m') of the segment that connects the end movement limits of the drive slide. The slide (12) has a lower slider, into which a roller (14) on the end of the arm fits.

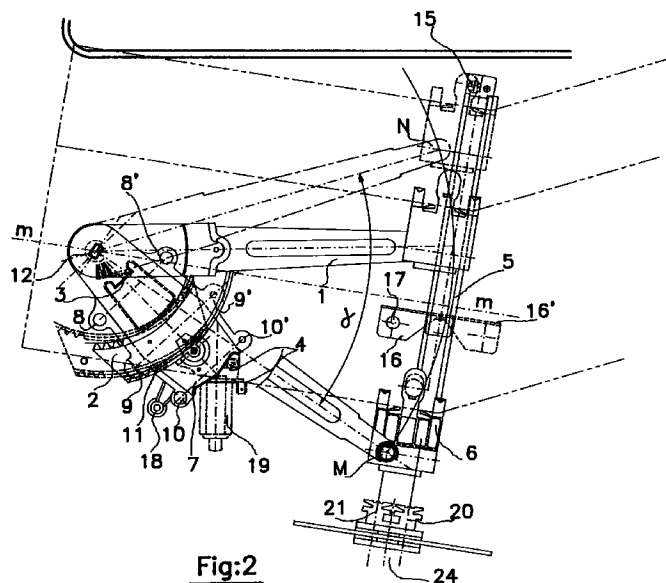


Fig:2

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Description

This invention relates to a window winder or regulator with a single arm and rail, for automobile vehicles.

In automobile vehicles, and more particularly in their rear doors, the window panes usually have one of several irregular shapes, which means a real problem for guiding them during the opening and/or closing movement. It is common to recur to the use of a type of window winder with a rail with a window pane anchoring or fixing plate of the largest possible dimensions in order to provide the proper stability.

In other cases, window winders with X-shaped or parallelogram arms are used, although in these cases, the doors must be provided with internal guides for the glass pane.

The problem in both cases is that the solutions mentioned are both costly and complicated, especially in the last two cases considered, as the doors have to be provided with the corresponding internal guides.

It is an object of this invention to provide a combined arrangement of a rail with a drive plate moved by an arm similar to that of a window winder or window regulator, while at the same time completely solving the problems mentioned above.

Another object of the invention is an arrangement that uses very simple components which are easy to make

Another object of the invention is an arrangement which includes very reliable components, interchangeable from one side to the other, and with very low production and in-door assembly costs.

For the putting into practice of these objectives, the unit dealt with by the invention is composed of a traditional window winder drive, with an arm and a toothed sector with a compensating spring, as well as stops for the arm included on a support plate, and also a rail along which the window drive element moves. The window can be connected to the drive element by different means, as will be described later, and the general drive can be either manual or electrical.

One of the characteristics of the invention consists of the assembly support plate itself, which is obtained by stamping or press forming and is totally symmetrical in relation to its main shaft and has six symmetrical lugs, with three at each side of the said main shaft. Bolts or nuts can be inserted into or welded to these lugs, corresponding to the side (right or left-hand) of the door into which the assembly is to be fitted, since they must be matched up to and coincide exactly with the drill holes in the doors in order to receive the mechanisms in question.

The toothed sector of the mechanism is characterized because it is obtained by direct cutting on a band of a determined width in terms of the length or development it must have, and with a pitch which is as limited as possible according to the design required.

The band has the same dimension as the toothed sector, with the corresponding cuts being made in it, in

such a way that the nature of these cuts means that on the outer edge their useful toothed area stands out, while on the interior the cut opposite this toothed area stands out, with which there is a total useful exploitation of the material.

Another of the essential characteristics of the assembly is the fact that the spin axis of the arm is situated on the median line of the segment that joins the end displacement or movement points of the drive slide, which in turn are situated parallel to the axis of the rail, and also that the said spin axis must be as far as possible away from the rail as the door structure permits, with the aim of making the deflection of the arc created by the end of the arm the minimum possible.

Moreover, the drive slide, usually obtained by the injection of a thermoplastic resin, has a slide with a transverse circular cross section on its lower edge, with a roller housed at the end of the said arm being able to move inside this slider.

In this way, its circular movement is converted into linear movement on the rail to the drive slide for the window. From this, the advantage can be deduced, as explained previously, of keeping the deflection to the least possible, in order to situate the pushing point of the roller as near as possible to the displacement axis for the glass.

The drive slide for the window can be connected to the glass window pane by direct fast-on clipping, by fastening by means of bolts to the bottom of the window pane or by any other system, as will be explained in detail later, with reference to the drawings which are attached.

If the self-clipping type of drive slide is used, it must have four runners, aligned in two pairs of two and symmetrical in relation to the displacement axis. These runners will move on the inside of the rail, with two on one side and the other two on the other side, while also having the necessary elastic elements to prevent unpleasant noises.

When the drive slide is fastened by bolts to the bottom of the glass window pane, it will have a pair of runners on the main axis and will be valid for both right-hand and left-hand operation indifferently. In this case, and given that the runners can be designed in such a way that they go at the ends, the glass can be provided with complete stability.

The rail along which the drive slide travels is a cold rolled profile of a double "C" section, perfectly calibrated along the whole of its length so as to achieve the necessary stiffness. Its upper part will be perforated so as to insert a bolt or nut which secures it to the upper part of the door, and, by means of a lower support connected to the rail by riveting or welding, it will be connected to the lower part of the door.

This rail is designed in such a way that if the drill hole in the door does not coincide with the axis of the rail, it allows the symmetrical position to be taken by simply turning it through 180° in order to fix the rail to the door, as will be appreciated later in the drawings.

The advantages that the arrangement in the invention offers are multiple, apart from those already pointed out, and can be summed up as follows:

- The absence of guides in the inside of the doors.
- It is possible to assemble the rail and the window glass in one initial operation and to assemble the drive later, if this should be necessary because of the method.
- The assembly is silent, as opposed to the typical "clicking" effect, due to the fact that it does not have any loose or flexible parts.
- The number of component parts needed for its construction is very low and it is not necessary to produce symmetrical components.
- The drive plate, as it does not have a traction cable on the inside of the rail, is much sturdier and therefore gives greater stability to the system.
- All the component elements, with the exception of the motor reducer in the case of the electrical drive, are capable of being used in either right-hand or left-hand window winders by simply changing the order of the subassembly of two of its subassemblies, the plate and the arm-sector.

All these and other details of the invention can be appreciated more clearly on the sheets of drawings which are attached, in which, for guidance purposes only, the following are represented:

- Figure 1 is a general view of the window winder assembly in accordance with the invention.
- Figure 2 is a view from the right of Figure 1, showing the drive element and the rail.
- Figures 3, 4 and 5 show the connection between the drive slide and the window glass by clipping onto the window itself.
- Figures 6 and 7 illustrate the connection by fastening the drive slide to the bottom of the window glass by means of bolting them together.

Referring now to Figures 1 and 2, the window winder or window regulator can be observed, with the arm (1) and the toothed sector (2) with its useful toothed area (11) and the rear cut-out, represented but not numbered, as well as the compensating spring (3) and the stops (4) for the arm (1) included in the support plate (7). The rail (5) in which the drive element (6) for the window glass moves can also be appreciated.

The drive for this system can be either manual (18) or electrical (19), so that the arm (1) is moved between the ends (N) and (M) when the toothed sector is operated by either of these means, moving it through the angle (α).

The support plate is provided with the three pairs of lugs (8, 9, 10) and (8', 9', 10') arranged symmetrically in relation to their main axis, for the insertion of the bolts or nuts.

The shaft (12) of the arm is situated on the median

line (m-m) of the segment that connects the ends (M, N) of the displacement of the slide (6) situated parallel to the axis of the slide (5).

The end of the arm (1) includes the roller (14) that traces a determining arc for the deflection (24), together with the drive element (6) on driving this latter, as can be appreciated in Figure 1, as the roller is housed in the slider (13) of the slide (6).

The rail (5) is fixed to the door by means of the upper bolt (15) and the lower support (16) and bolt (17). In those cases in which the drill hole in the door does not coincide with the axis of the rail (5), the latter takes the symmetrical position by turning it through 180°, which can be observed in Figure 2, in which it would be turned from the position (16) to that of position (16').

Looking now at Figures 3, 4 and 5, it is possible to appreciate the drive slide (6) clipped to the window glass (23) by inserting the glass (23), as well as the roller (14) housed and moving inside the slider (13), in which it moves in accordance with an angle (β). The slide (6) is provided with four lugs (20, 21) aligned in two pairs of two, which move inside the rail (5).

Figures 6 and 7 represent the slide fixed to the bottom of the window glass by means of bolts, while also having the slider (13) and the roller (14) which is received and displaceable and also moves through an angle (β). In this specific case, the runners (22) are situated centrally and can be carried out at a variable distance from each other in order to achieve the greatest stability of the glass. In this way, and in accordance with what can be appreciated in Figure 7, the two runners (22) can be arranged separately from each other by the distance that is considered convenient.

It is important to point out, once having described the nature and advantages of this invention, its non-restrictive character, inasmuch as changes in the shape, materials or dimensions of its constituent parts will not in any way alter its essence, as long as they do not mean a substantial variation of the whole assembly.

Claims

1. Window winder with single arm and rail, for automobile vehicles, which has an arm (1) and a toothed sector (2) provided with a compressing spring (3) and stops (4) for the said arm included on a support plate (7), as well as a rail (5) on which the drive element (6) for the window glass (23) moves, with the said element (6) being connected to the end of the arm (1), which is characterized by:

- a support plate (7) which is totally symmetrical in relation to its main shaft and which has six lugs (8, 9, 10) and (8', 9', 10') arranged symmetrically in two groups of three in relation to the said axis,
- the toothed sector (2) obtained by direct cutting on a band of an appropriate width in terms of the length or development which it has to have,

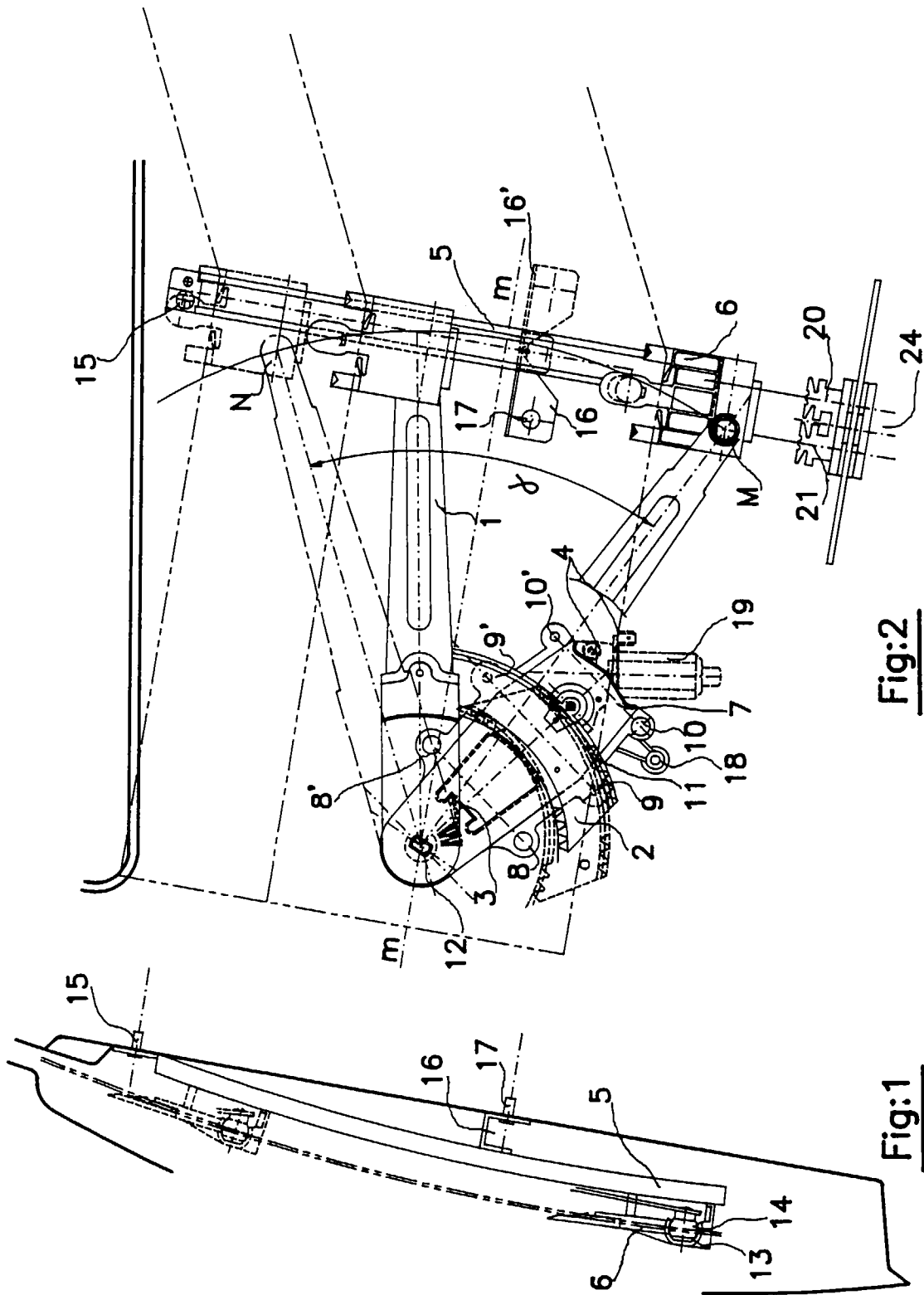
with the useful toothed area (11) on its outer edge and, on its inner edge, the cut opposite the said toothed area,

- the shaft (12) of the arm (1) is situated on the median line (m, m') of the segment that connects the end points (M, N), of the displacement of the drive slide (6), parallel to the axis of the rail (5),
- a drive slide (6) with a slider (13) close to its lower edge that presents a circular transverse cross section and in which a roller (14) is fitted in the free end of the arm (1) through a front opening in the said slider.

2. Window winder with single arm and rail, for automobile vehicles, in accordance with claim 1, characterized in that when a drive slide (6) clipped together to the window glass (23) is used, the slide has four runners (20, 21) in two pairs of two, symmetrically arranged in relation to the displacement axis and which will travel or move inside the rail (5), depending on which hand it corresponds to, with the runners (20) towards the left and the runners (21) towards the right.

3. Window winder with single arm and rail, for automobile vehicles, in accordance with claim 1, characterized in that when the window glass (23) is fixed to the slide (6) by means of bolts, the slide has a pair of runners (22) on the main axis that can be used for both right-hand and left-hand operation.

4. Window winder with single arm and rail, for automobile vehicles, in accordance with claim 1, characterized in that the rail is a cold rolled profile with a double "C" cross section and a wide base and low wing (26) height, with the ends (27) of the said arms being parallel to the base, which has its upper part perforated in order to insert a bolt or nut (15) for fastening to the upper part of the door, while also having a lower support (16) joined to the slide by riveting or welding for fixing to a lower area of the door.



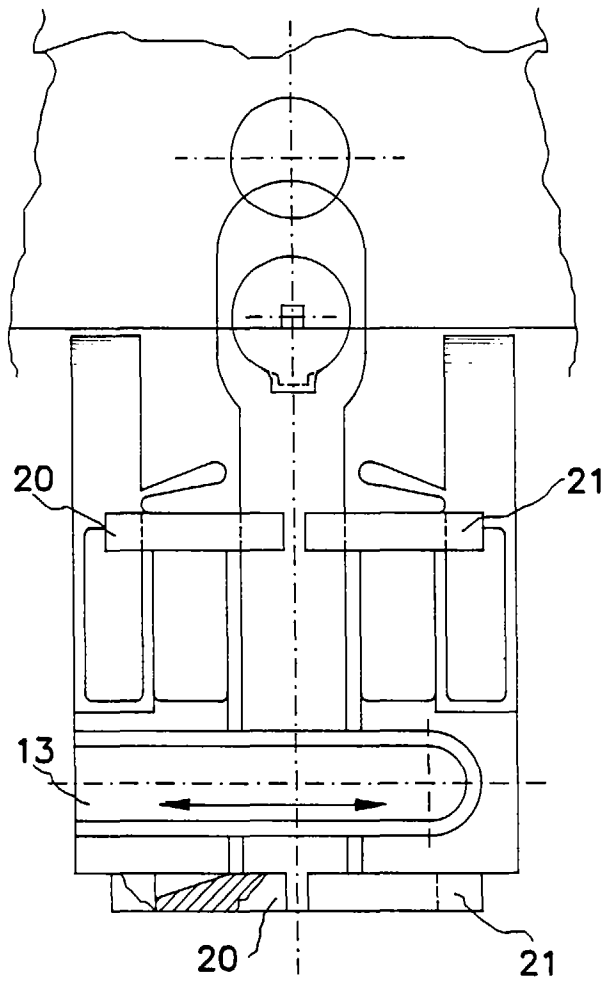


Fig:3

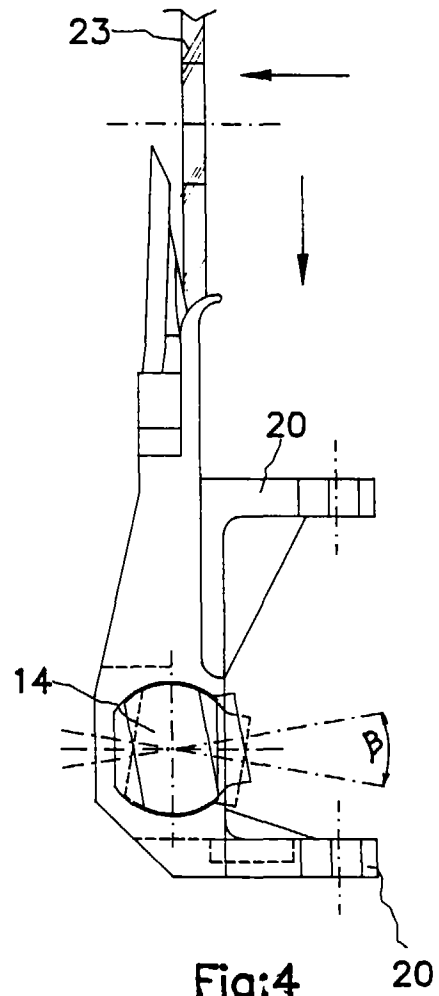


Fig:4

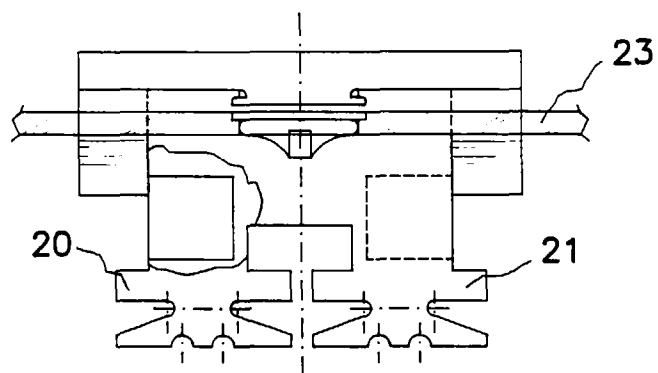
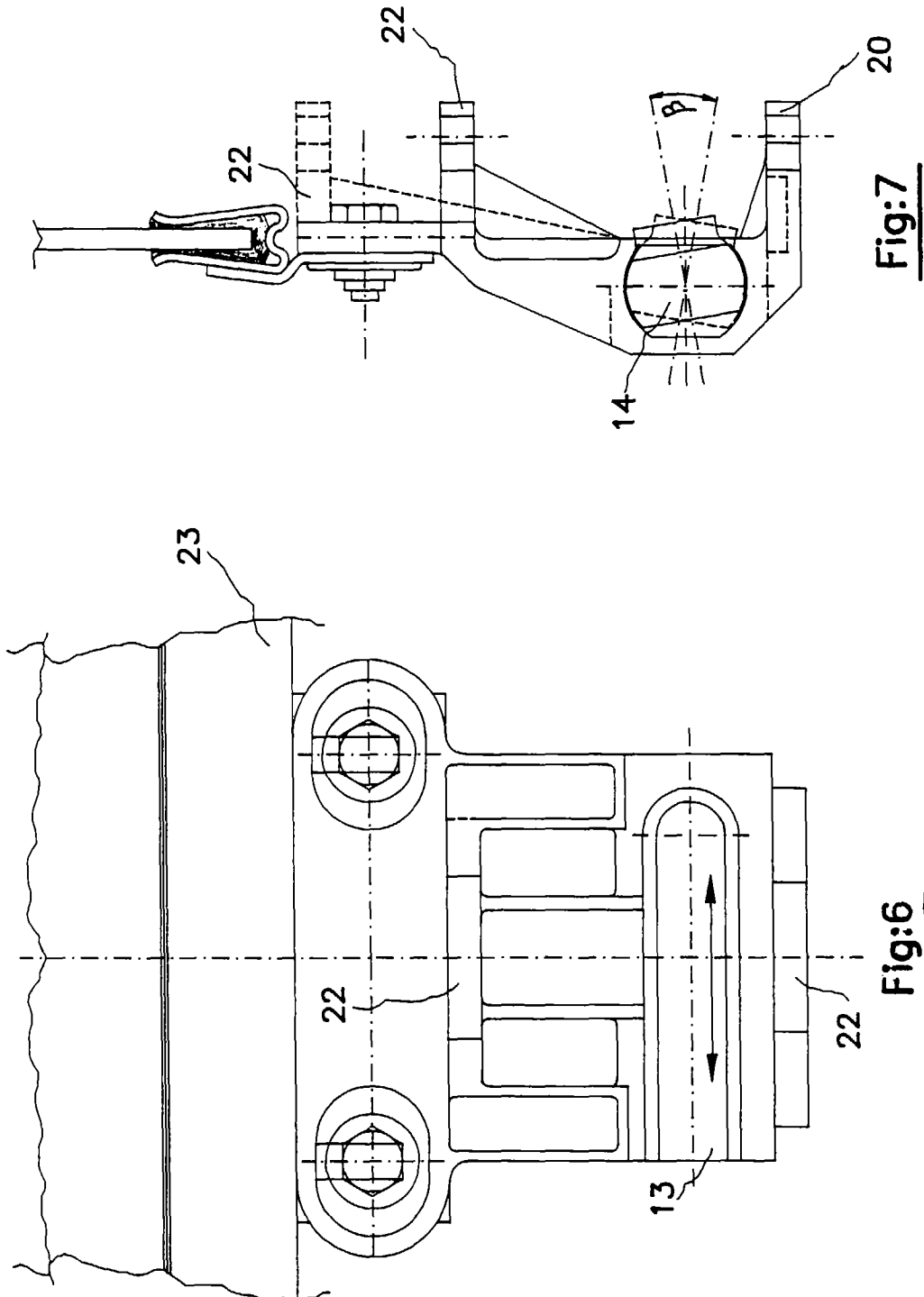


Fig:5





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EUROPEAN SEARCH REPORT

Application Number
EP 96 50 0007

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)
A	US 2 763 508 A (GELFAND ET AL) * column 3, line 74 - column 4, line 21 * * column 5, line 37 - line 40; figure 1 * -----	1	E05F11/44
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			E05F B60J
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 21 June 1996	Examiner VAN KESSEL J.
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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