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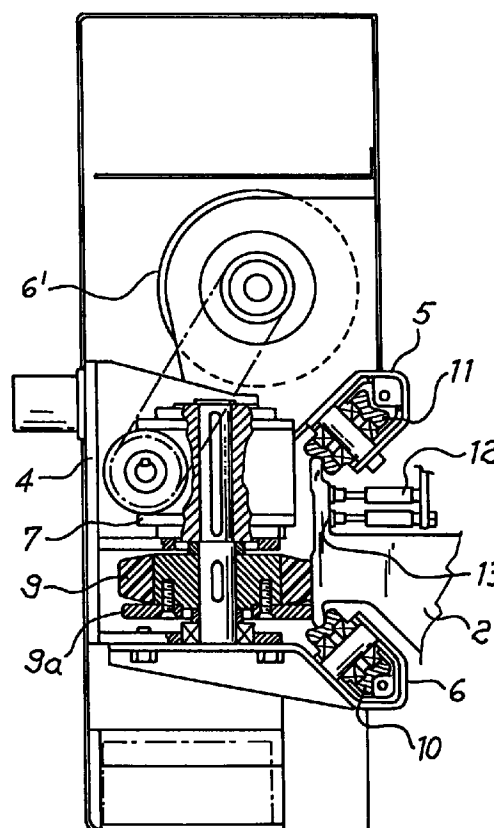
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(54) Motored trolley for wheelchair stair-lift

(57) Motorized trolley (1) of a type cantilevered on a rail (2) and comprising at least two pairs of opposed rollers (10, 11) bearing on the said rail, comprising a means (14-22a) of adjusting the position of the said pairs of rollers in a direction parallel to the said rail.

Fig. 2



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Description

The present invention relates to a motorized trolley of a type hung on a monorail, for use in particular in stair-lifts.

Stair-lift motorized trolleys are known in the art which are cantilevered mounted and run along a monorail by means of a pair of bucking rollers which bear on the opposite edges of the monorail. In general, the trolley is moved along the monorail by separate means - such as, for example, a driving wheel - and the bucking rollers are free to rotate. In these embodiments the driving wheel which bears on the rail is linked to a rigid disk which bears in its turn on the means of transmitting the drive. The driving wheels and transmission disk are housed in the base of a "Y"-shaped support frame while the pair of rollers is fitted to the ends of the arms of the "Y" support frame.

The known trolleys present some problems, in particular when they are used on inclined rails such as in stair-lifts for the disabled where there is a platform for a wheel-chair. One of these problems occurs when the monorail follows the curve of the walls that often have turns with a small radius of curvature.

Another problem occurs when the inclination of the rails varies due to the steepness of the stairs; a further problem is that left-slung trolleys cannot be slung on right-hand rails and vice-versa, so requiring "customized" trolleys for each individual stairs and adding greatly to the cost of the stair-lift.

A further problem is caused by any landings: in this case the trolley must be able to negotiate both horizontal and inclined stretches of rail and turns.

The aim of the present invention is to provide a trolley which can overcome the aforementioned problems in a simple and reliable way, by providing trolleys which can be used on any kind of rail without restriction to the degree of inclination of the rail or whether the trolley is slung to the right or the left, which can be used on both horizontal and inclined tracts of rail and which can be adapted rapidly to the rail in function of the radius of curvature of the same.

These objectives are achieved by the present invention, which relates to a motorized trolley which is slung from a mounted rail and comprises at least two pairs of opposed rollers which bear on opposite edges of the said rail, characterized by comprising a means of adjusting the position of the said pairs of rollers in a direction parallel to the said rail.

According to a preferred aspect of the invention, the bucking rollers engage the rail with a groove angle within the range from 95° to 115° in general, and preferably of 105° to 108°.

According to another aspect of the invention, the rollers of each pair are idle and freely rotate on independent sliders fitted to a support frame by means of an endless screw so that the wheelbase of the rollers can be adjusted.

According to another aspect of the invention, the driving wheels are driven by a motor through reduction gears.

The invention will now be described in more detail, with reference to the attached drawings which are illustrative but not limiting, and in which:

- Fig. 1 is a rail-side lateral view, of a trolley according to the invention;
- Fig. 2 is a transverse section of the trolley of fig. 1;
- Fig. 3 is a lateral view of the trolley from the opposite side of fig. 1 ;
- Fig. 4 is a partially sectioned transverse view of the trolley of the preceding figs.;
- Fig. 5 is an enlarged view of a longitudinal section of the upper pair of opposing rollers of the trolley of the preceding figs.;
- Figs. 6 and 7 are cross-section views of the bucking rollers and their housing;
- Fig. 8 is an exploded schematic view of a pair of rollers with adjustable wheelbase.

As is shown in figs. 1 to 4, the trolley 1 according to the invention comprises a fairing 3 which contains a support frame 4 within which is provided the means of moving the same, viz. a motor 6' and two reduction gearboxes 7, a series of capacitors 8 and the driving wheels 9. The frame 4 is integral with the mounting point 4a on which the load e.g. the stair-lift platform (not shown) is mounted. The frame comprises two arms or bars 5 and 6 whose extremities each house a pair of opposing rollers 10 and 11 bearing on the rail 2 from below and above respectively. A plurality of brushes 12 rubbing against a conductor strip on the rear face of the rail 2 supply current to the driving motor 6'.

As was mentioned above, the trolley according to the invention provides for adjustment of the reciprocal position of the pairs of opposing rollers 10 and 11 in a direction parallel to the rail 2. To achieve this the extremities of the arms 5 and 6 are "U"-shaped and provide a first housing for the pairs of rollers 10 and 11. In their turn the rollers of each pair are idle mounted to rotate freely on sliders 14 (figs. 5 to 7) which are shaped to be a sliding fit in the first housing element and can run along the same.

The means of adjusting the roller position is advantageously a screw means which gives continuous adjustment. Figs. 5 to 7 show the pair of rollers housed in the upper end of the arm 5 of the support frame 4. In this embodiment, the screw means comprises an endless screw 15 turning in threaded hole tapped through a projection 18 located centrally along the extremity 5, and locked at each extremity by nut and lock-nut pair, acting on the face 14a of the slider 14. In a variant, a nut is welded onto one end of the lead screw 15 while the other end is provided with a nut and lock-nut pair per se known in the art.

There is also provided a means for stiffening the complex formed by slider 14 and first housing 5. In par-

ticalar, there is provision for a "U" -section plate 19 which extends between the two walls of the slider 14 and a means of locking such as the nuts and bolts 20 and 20' which bear against the outer sides of the housing 5 through pairs of holes bored through the same. To allow the insertion of the bolts 20' through the slider 14, there are holes 21 provided in the latter which extend longitudinally corresponding to the "U" of the plate 19. Once the slider and, therefore, the pairs of rollers 11 are in position, the nuts and bolts are tightened and give the desired rigidity.

As can be seen from fig.1, only the upper extremity of the arm 5 of the frame 4 is provided with means of increasing rigidity 19 -21 since it is load-bearing and needs higher resistance to flexing.

According to a further embodiment of the invention, shown schematically in fig. 8, the trolley is provided with a means of adjusting the wheelbase - the distance between the axles - of a pair of rollers. In the embodiment shown, the wheelbase of the upper pair of rollers is fixed, while the wheelbase of the lower pair of rollers 10 is variable. To achieve this, the two rollers 10 are mounted on two independent sliders 22, provided with a lower threaded part 22a to engage the endless screw 15, which, in this case, works against the head 6a on the housing cut into the extremity of the arm 6. The distance between the sliders 22 is set on assembly and remains so during any subsequent movement of the pair of rollers which is achieved by rotating the screw 15 in a manner similar to that already described above. This wheelbase can also be changed whenever it is necessary.

It is also possible for the upper rollers too, to be freely mounted on separate sliders to give greater flexibility in use; generally, it has been found sufficient to adjust only the wheelbase of the lower rollers 10 in the majority of cases. In this event, the wheelbase of the upper rollers 11 is between 130 and 160mm and preferably between 145 and 150mm, while that of the lower pair is usually about 130mm.

As can be seen in figs. 6 and 7, the rollers bear against the rail 2 by means of a groove 23 in the centre of the circumference of the rollers. It has been found that the best working conditions for the groove 23 were obtained using a groove angle α greater than 90° and between 95° and 115° . Preferred values of angle α are between 105° and 108° . Furthermore, to reduce friction between the rollers and the rail 2 to a minimum, both the groove and the edge of the rail are curved, with the radius of curvature of the groove being greater than that of the edge of the rail.

As was stated above, the trolley according to the invention can be used with all types of rail. In particular, when the trolley is being assembled onto the rail, the reciprocal position of the pairs of rollers is adjusted depending on the slope, inclination, of the rail, and on whether the rail provides for mounting the trolley on the right (so called right slope) or on the left (so called left slope). In a similar way, the wheelbase of the lower rollers, and optionally of the upper ones, is adjusted to suit the radius of curvature of the rail.

ers, and optionally of the upper ones, is adjusted to suit the radius of curvature of the rail.

During adjustment, care will be taken to ensure that the straight line which connects the points of contact between the rail and roller of two opposed rollers is in the same vertical plane as the centre of the rigid support disk 9a which bears on the traction wheel 9.

Claims

1. A motorized trolley (1) of a type cantilever mounted on a rail (2) and comprising at least two pairs of bucking rollers (10, 11) which bear on opposite sides of the said rail, characterized by comprising a means (5,6,14-22a) of adjusting the position of the said pairs of rollers (10,11) in a direction parallel to the said rail.
2. A trolley according to Claim 1, wherein the said adjusting means are a means of continuous adjustment.
3. A trolley according to Claim 1 or 2, further comprising a means (15-17,22,22a) of adjusting the distance or wheelbase of a pair of rollers.
4. A trolley according to Claim 1 or 2, comprising a support frame (4) for the bucking rollers (10,11) which forms first housing elements (5,6) for the said pairs of rollers, wherein the said means of adjusting a pair of rollers comprises a slider (14), which can move within a said first housing element, on which the said rollers (10,11) freely rotate, as well as an endless screw (15), which engages the said slider, and threaded parts provided on said first housing element.
5. A trolley according to Claim 3, comprising a support frame (4) for the opposing rollers which forms first housing elements for the said pairs of rollers (10,11) wherein the rollers of a pair are mounted idle on separate sliders (22) moving within a first housing element (6), and the means of adjustment comprise an endless screw (15) which engages threaded parts on the said slider (22a) and on the said primary housing element (6a).
6. A trolley according to Claim 4, further comprising means of stiffening (19,20,20a) the complex formed by slider (14) and housing (5).
7. A trolley according to any of the Claims 1 to 6, wherein the part of the roller (10,11) making contact with the said rail (2) is provided with a groove (23) having an angle within the range from 95° to 115° .
8. A trolley according to Claim 7, wherein the said groove angle is within the range of 105° to 108° degrees.

9. A trolley according to any of the preceding claims, comprising two driving wheels (9) driven by a motor (6') and two reduction gears (7).

10. A rail-based stairlift device, characterized by comprising a trolley (1) according to any of the preceding claims.

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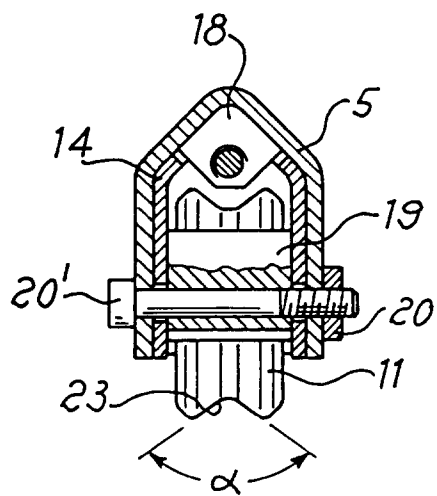
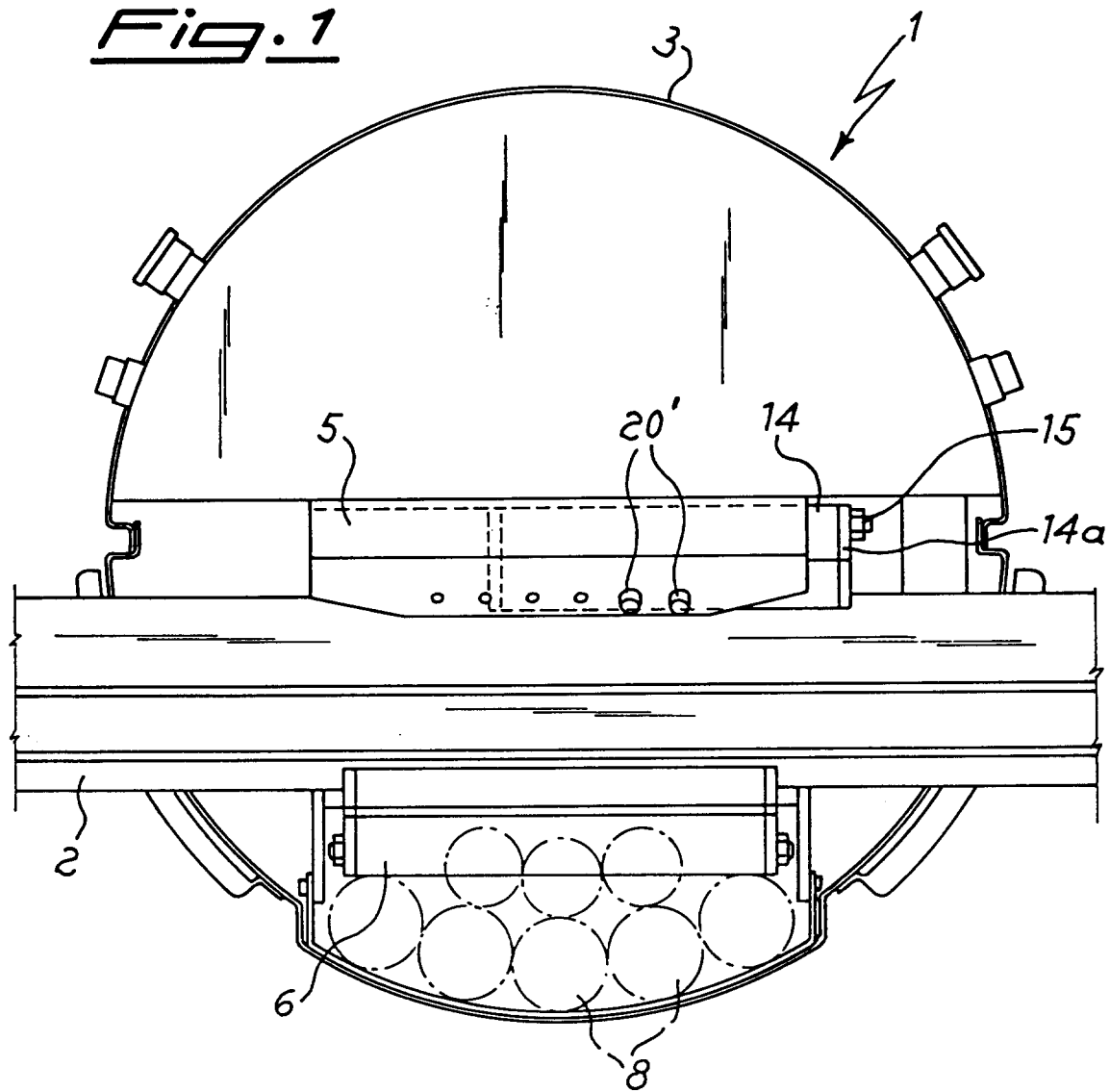


Fig. 3

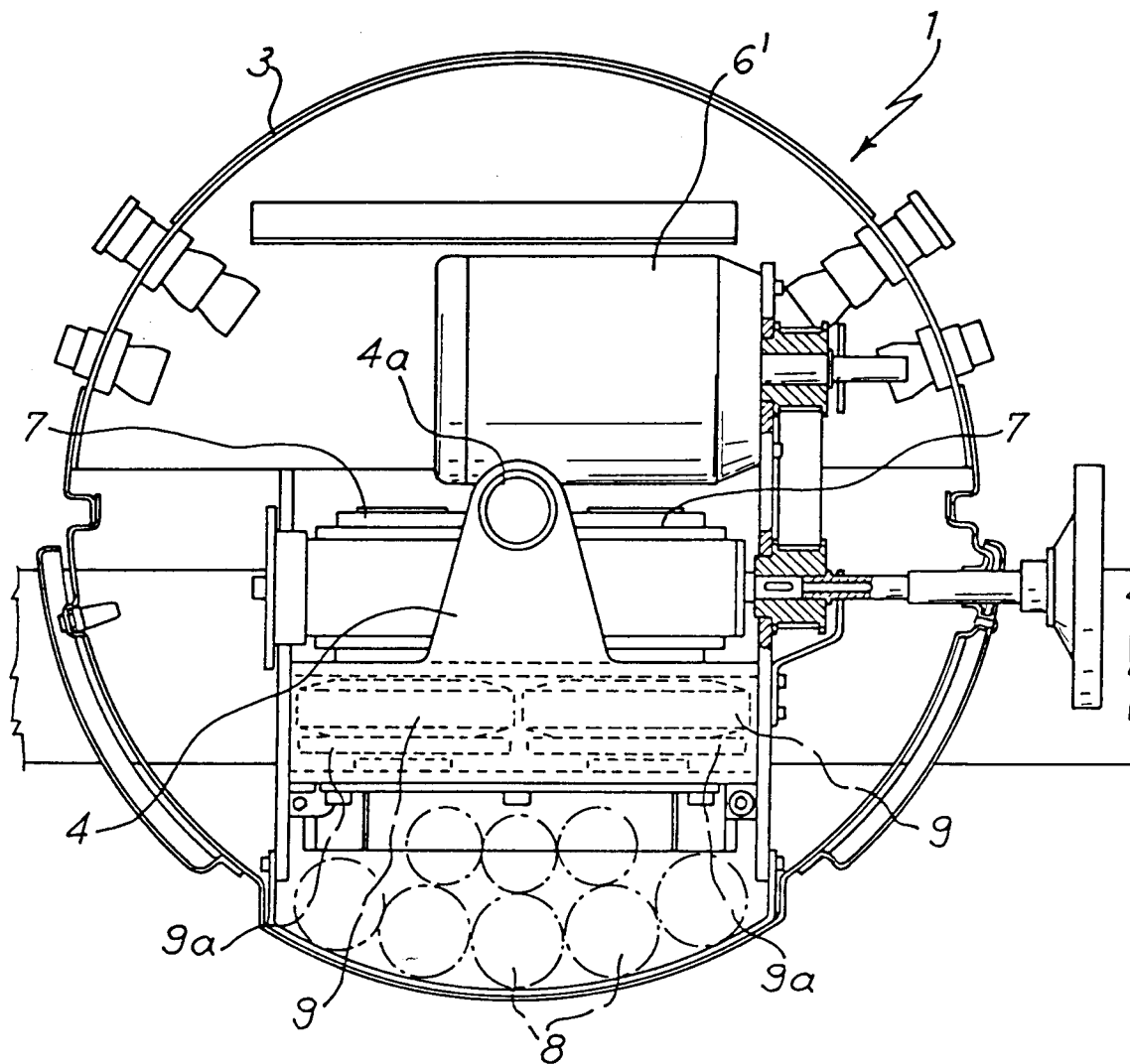


Fig. 4

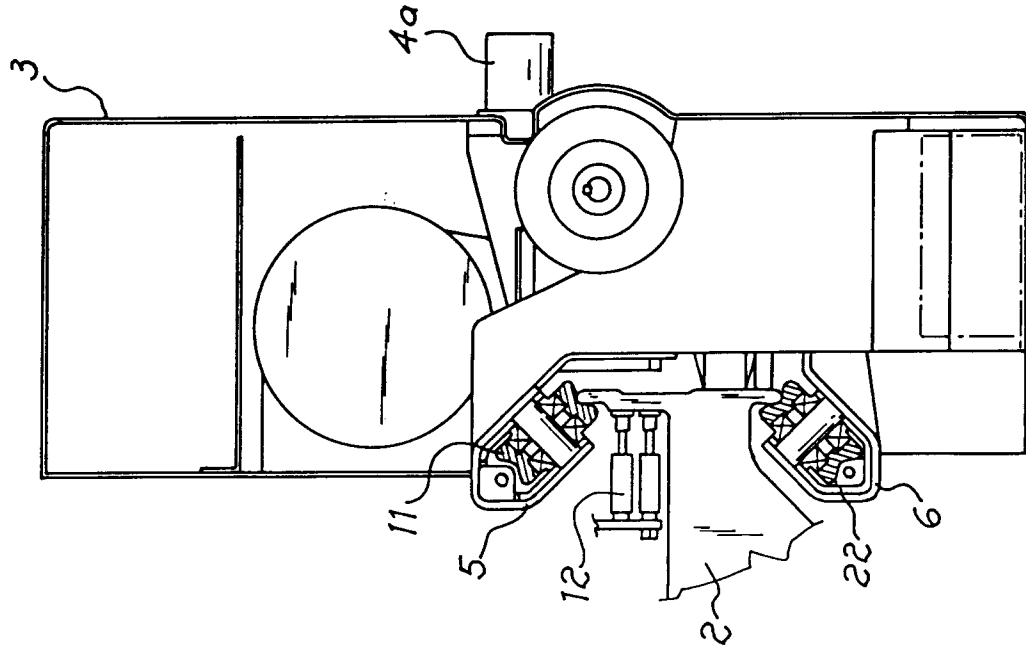


Fig. 2

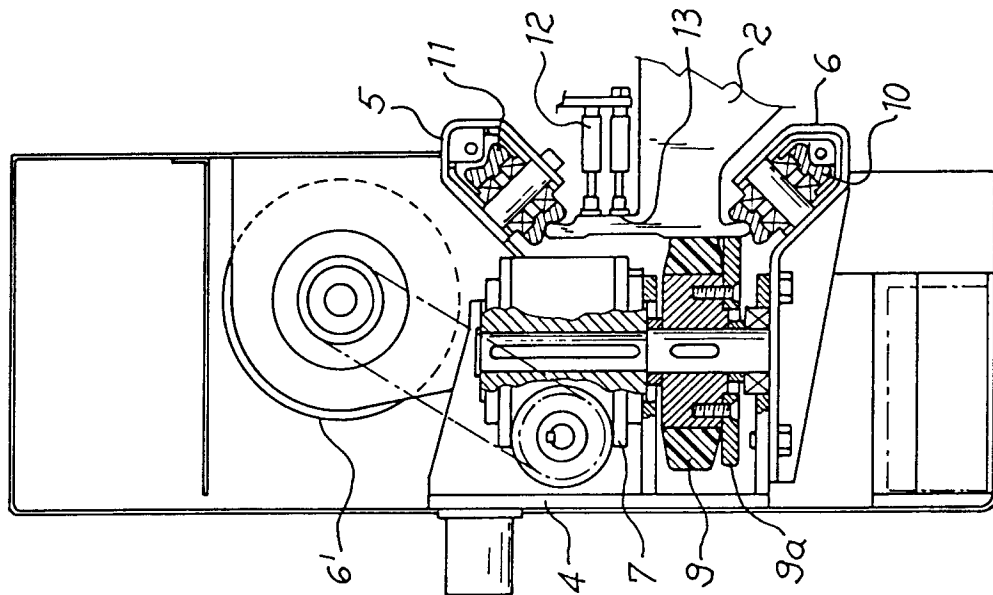


Fig. 5

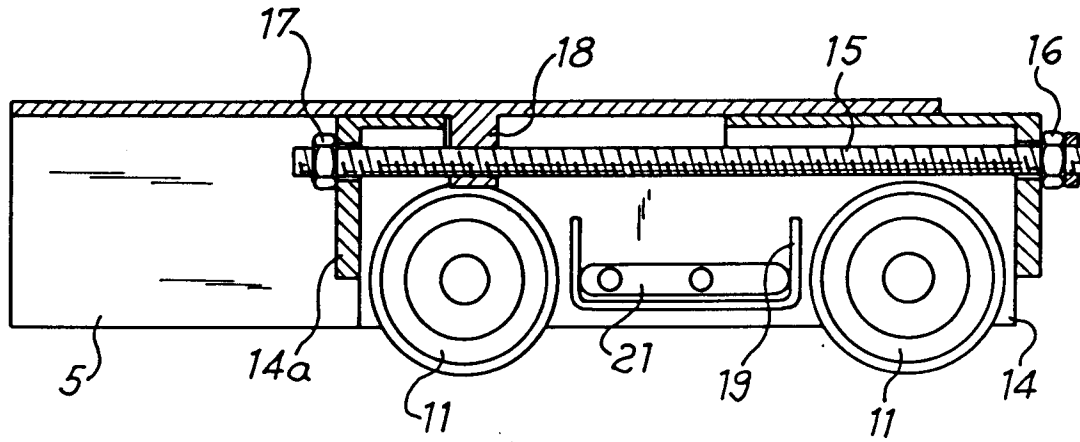


Fig. 7

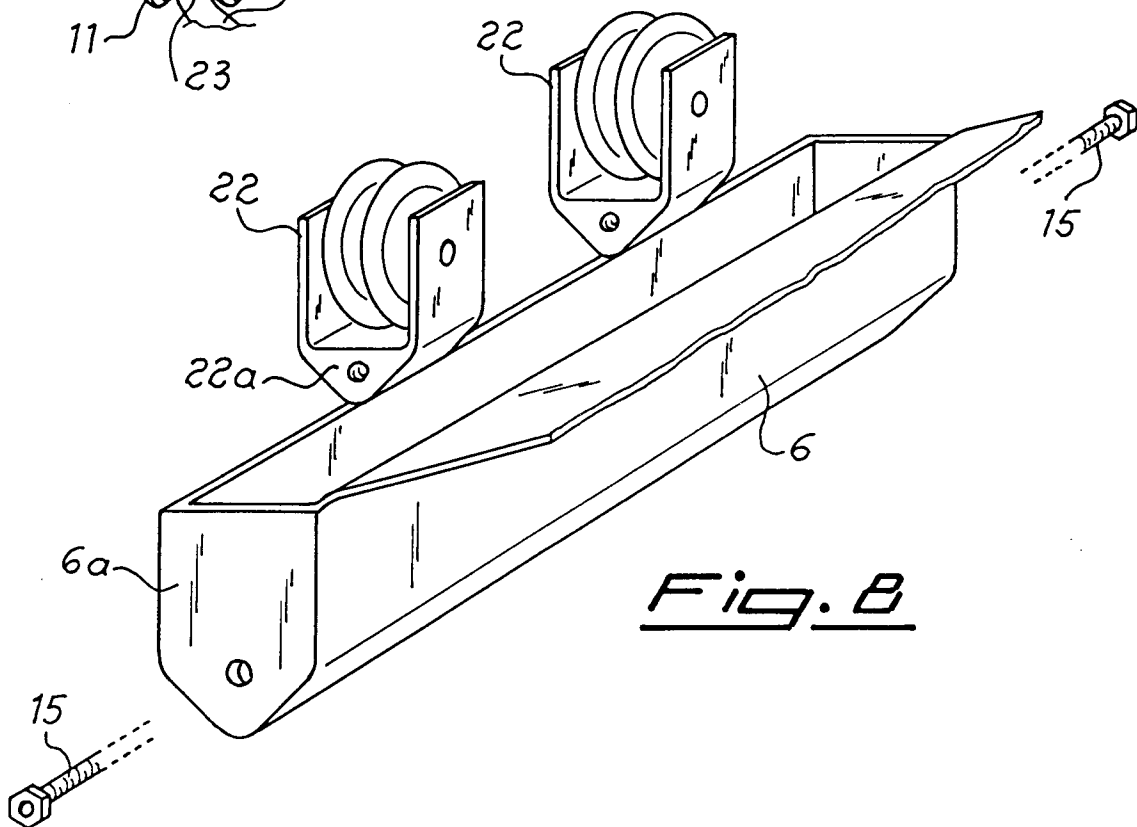
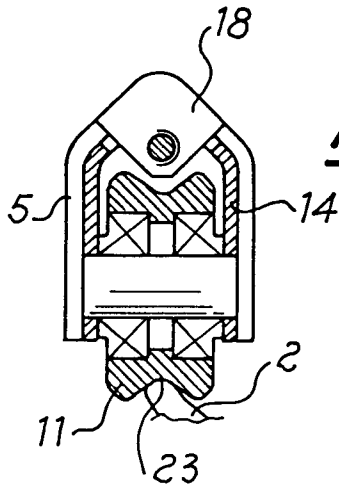


Fig. 8



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EUROPEAN SEARCH REPORT

Application Number

DOCUMENTS CONSIDERED TO BE RELEVANT			EP 96101376.0
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 6)
A	<u>DE - A - 3 334 476</u> (RIGERT) * Fig. 1,3b,3c *	1-3, 9,10	B 66 B 9/08
A	<u>US - A - 3 966 022</u> (CHENEY) * Fig. 3,4 *	7	
A	<u>DE - C - 4 211 870</u> (GRASS) * Fig. 2,3 *	9,10	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl. 6) B 66 B B 66 C
Place of search VIENNA		Date of completion of the search 24-04-1996	Examiner NIMMERRICHTER
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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