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(54) A device for supporting a sling of an invalid hoist

(57) The invention relates to a device for supporting a sling of an invalid hoist, said device including means for suspending the sling in the device, and means for angular displacement of a patient suspended in the sling, wherein the suspension means comprises a first and a second set of suspension straps, and the angular displacement means includes winding means for winding of the first set and unwinding the second set of suspension straps or vice versa. By this invention, angular displacement of a patient suspended in the sling may be provided in an entirely different manner than previously known since the device comprises a number of straps that may be wound or unwound in order to change the angular position the patient suspended in the sling.

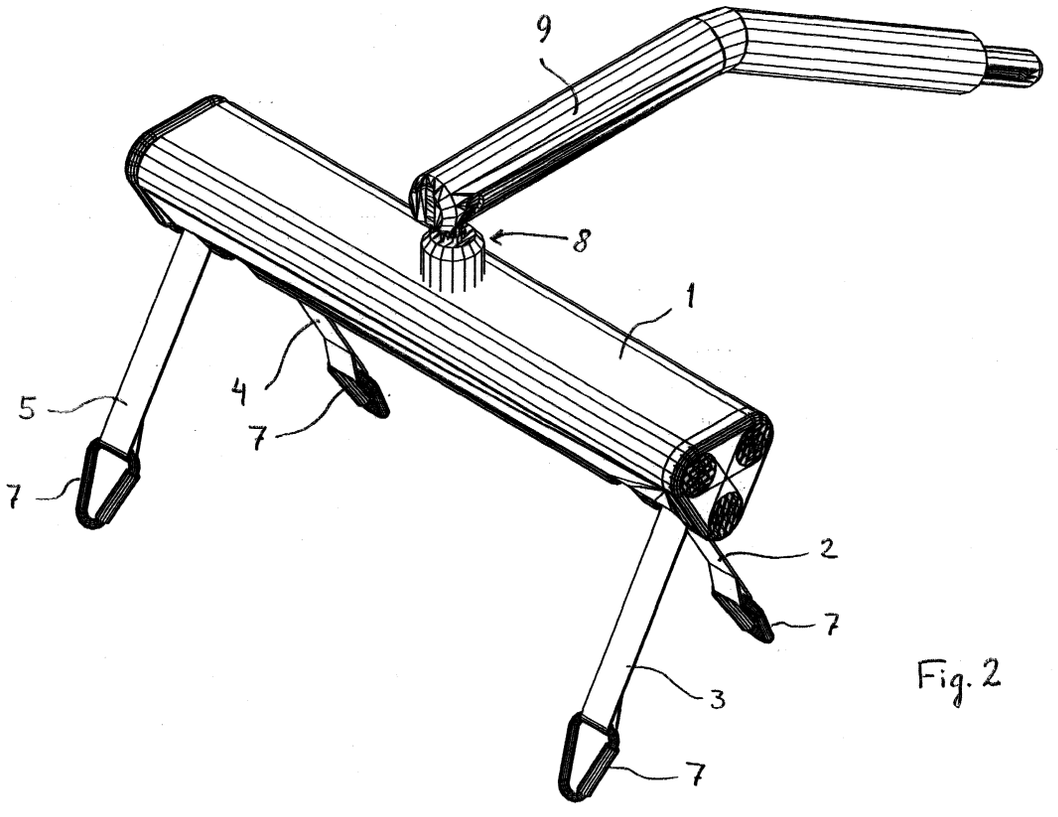

Fig. 2

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Description

[0001] The present invention relates to a device for supporting a sling of an invalid hoist, said device including means for suspending the sling in the device, and means for angular displacement of a patient suspended in the sling.

[0002] A device for supporting a sling is known from GB-A-2 184 706 or GB-A-2 272 679. This device comprises a sling frame which is angularly displaceable around a horizontal axis. The frame is suspended from the lifting arm of an invalid hoist. The device consists of a sling hanger support with two spaced sling attachment points on one side of a horizontal pivot axis and one sling attachment point on the other side. The sling hanger has a hand grip at one end and may be pivoted around the horizontal axis by an operator by moving the handle of the frame. The sling support is provided with frictional restraints for control of the pivotal movement. Hereby, the disposition of the patient can be changed whilst suspended in the sling. By this device, the operator must use a certain amount of power to overcome the frictional restraint and to pivot the sling support and the patient suspended in the sling. The handle is situated in an unfortunate position and it may be difficult to get a proper grip on the handle. This may be uncomfortable for the operator and could result in overload or even injuries to the back.

[0003] The sling frame device is displaceable around a vertical axis relative to the lifting arm. This bearing may be loaded with a torque load since the centre of gravity of the load suspended in the bearing is not necessarily directly below the bearing. This loading wears out the vertical bearing and may cause damage to the vertical bearing.

[0004] In EP-A2-0 895 768, a sling support of the type mentioned above is known where a rotary drive means is provided for pivoting the sling support. The drive means is a somewhat bulky attachment on one of the bearings of the sling hanger support and the sling hanger. This takes up a lot of space around the sling and the patient. By this solution, a reduction is achieved in the manual force required to overcome the frictional restraint and to pivot the patient in the sling. However, the bending load on the vertical bearing still exists and since the motor drive is only attached to one of the pivotal points of the horizontal axis, there is a risk of twisting the sling hanger which may result in an extremely uncomfortable and undignified situation for the patient suspended in the sling.

[0005] On this basis, it is the object of the present invention to provide a device for supporting a sling of an invalid hoist which is easy to operate and which overcomes the above-mentioned drawbacks with the sling hanger devices known in the art.

[0006] This object has been achieved by a device of the initially mentioned kind wherein the suspension means comprises a first and a second set of suspension straps, and the angular displacement means includes winding means for winding of the first set and unwinding the second set of suspension straps or vice versa.

[0007] By the invention, the angular displacement function is achieved in an entirely different manner than previously known since the sling support comprises a number of straps that may be wound or unwound in order to change the angular position the patient suspended in the sling. The straps are arranged in sets where the front end of the sling is suspended from a first set of straps and the rear end of the sling from the second set of straps. The angular displacement around a horizontal axis is provided by elongating, i.e. unwinding, a first set of straps and/or shortening, i.e. winding up a second set of straps. Due to the flexibility of the straps, the sling and its load will automatically align itself with the vertical attachment point irrespective of the angular position. A device according to the invention may be used in connection with various lifting devices for handling of patients. The device is situated above the sling and does not take up space around the sling. This means that the sling may be easier to operate.

[0008] In the preferred embodiment, the winding means comprises driving means connected to a rotation axis for simultaneous winding of one set of straps whilst unwinding the other set. Hereby, a simple and reliable angular displacement means is provided where the angular displacement is controlled by a predetermined extension and shortening of the straps.

[0009] Preferably, the rotation axis is provided with a winding roller for each strap in the suspension means and features the straps of the first set wound in one direction around the axis and the straps of the second set in the other direction. Hereby, a particularly simple winding mechanism is provided.

[0010] At least one of the sets of straps comprises two straps spaced apart in the device. In a preferred embodiment, two straps are provided in each set of straps and the first pair of straps is spaced wider apart than the second pair of straps. Hereby, the traverse position of the straps is chosen in order to provide a stabile suspension of the sling when loaded. Alternatively, the first set of straps could comprise one strap positioned at the centre of the device and the second set of two straps positioned at the end portions of the device.

[0011] In the preferred embodiment, the winding means are enclosed in an elongated housing provided with connection means for attaching the device in a lifting device such as a hoist. Such a spreader bar arrangement may be adapted to various lifting arrangements. The connection means could be a connection rod which is part of the lifting arm in a standing lift having different modules for adapting the lifting arm to particular tasks.

[0012] Preferably, the connection means comprises a universal joint. Hereby, a device according to the invention is freely moveable and angularly displaceable around a vertical axis. Moreover, no torque or side loads are transmitted to the lifting arm.

[0013] In a preferred embodiment, the elongated housing is generally triangular in a cross-sectional shape with smooth edges and corners, said housing having openings in a first side, through which the first set of straps penetrate and openings in a second side, through which the second set of straps penetrate. Hereby, a spreader bar housing is provided which is resistant to bending while being elegantly designed with smooth edges preventing injuries to the patient.

[0014] In the preferred embodiment, operating means are arranged on the housing for controlling the operation of the drive means. These operating means may comprise a lever or buttons for changing the angular position into a first and second direction around the horizontal axis. The operating means may preferably be provided on the side surface of the triangular housing pointing downwards. This makes it possible for the operator as well as the patient him- or herself to operate the device. By positioning the operating means centrally, the risk of activating the controls by accident is reduced.

[0015] In the preferred embodiment of the invention, the drive means comprises an electrical motor and preferably also an associated electrical energy supply and operating means. Moreover, the energy supply is preferably a rechargeable battery. In order to ensure balance in the device, the motor and the battery are arranged in the housing on each side of the connection means. This means that a compact driving packet is provided allowing for a compact design of a device according to the invention.

[0016] The invention will be described in detail below with reference to the accompanying drawings, in which

Fig. 1 is a schematic, perspective view of an embodiment of the invention,

fig. 2 is a perspective view of a second embodiment of the invention,

fig. 3 is a perspective rear-view of a device according to the invention,

fig. 4 is the same in a perspective front view, and

fig. 5 is a schematic, perspective view of the internal details of a device according to a preferred embodiment of the invention.

[0017] In figure 1, a device according to the invention is shown. The device comprises a housing 1 which constitutes a spreader bar. From the housing 1, two sets of straps 2, 4; 3, 5 extend downwards in different directions. The straps 2-5 are attached to a sling 6 in which a person may be suspended and e.g. transported to another location via suitable buckles. In figure 1, the device is suspended from a lifting arrangement such as a track mounted in the ceiling.

[0018] In figure 2, another embodiment of a device according to the invention is shown. Here, the housing is provided with a universal joint 8 for attaching the device to a lifting arm 9 or to a utility module for the lifting arm, so that an existing hoist of a suitable type, such as the type of hoist that may be converted from a patient hoist to a stand-up hoist, may be extended to other kinds of use.

[0019] The housing 1 of the device is generally triangular in shape with a generally horizontal upper surface at the centre of which the universal joint 8 is provided. The triangular housing 1 is provided with rounded edges for both aesthetic and practical reasons. As shown in figure 3, the housing 1 is provided with openings 12, 13 at the lower parts of the two side sections for the straps 2-5. In figure 3, the device is shown from one side and in figure 4 the device is shown from the other side.

[0020] As it can be seen in figure 3, the operating means 10 are provided at the centre of the side surface. The operating means 10 preferably consist of two buttons for angular disposition of the sling 6 in one direction each. At this side, the first set of straps 2, 4 passes through the inner openings 13 whereas the second set of straps 3, 5 passes through the outer openings 12 (see also fig. 4). The first set of straps 2, 4 spaced further apart is attached to the leg end of the sling 6 (see fig. 1) and the second set of straps 3, 5 is attached to the head end of the sling 6.

[0021] Inside the housing 1, the driving means 11 for winding and unwinding the straps 2-5 are arranged. These driving means 11 are shown in detail in figure 5.

[0022] As can be seen in fig. 5, the driving means comprise a motor 15 which drives a rotation axis 14 through a gearbox 16. This rotation axis 14 extends through the lower part of the housing 1 and may preferably be supported at both ends of the housing 1 (not shown). At each end section of the rotation axis 14, two sets of winding stations 17, 18 are arranged. These winding stations are defined by rollers or disks on the rotation axis 14. At the outer winding stations 17, the outer straps 3, 5 are wound up around the winding station 17 when the rotation axis 14 is turned in one direction. The inner straps 2, 4 are attached to the inner winding stations 18 and are being unwound when the rotation axis 14 is turned in said one direction. Hereby, a simultaneous winding/unwinding may be performed in the same operation by a single rotation axis 14 and a single drive means 15. The motor 15 is an electrical motor. The gear box 16 is designed in such a way that the motor/gearbox arrangement takes up only a minimum amount of space. Inside the housing 1, a battery (not shown) may be provided together with the motor on each side of the centre of the housing. The operation means 10 may be provided in the front of the gear box at the central section in order to obtain a compact layout of the means for driving and operating a device according to the invention.

[0023] By the invention, it is realised that alterations may be made. The housing may be shaped in may different cross-sectional forms and other drive means such as manually driven rotation means may be provided. These and other alterations may be performed without departing from the scope of the invention as defined in

the claims.

Claims

1. A device for supporting a sling of an invalid hoist, said device including

   means for suspending the sling in the device, and
   means for angular displacement of a patient suspended in the sling,

   characterised by

   the suspension means comprising a first and a second set of suspension straps, and
   the angular displacement means including winding means for winding of the first set and unwinding the second set of suspension straps or vice versa.

2. A device according to claim 1, wherein the winding means comprises drive means connected to a rotation axis for simultaneous winding of one set of straps whilst unwinding the other set.

3. A device according to claim 2, wherein the rotation axis is provided with a winding roller for each strap in the suspension means and where the straps of the first set are wound in one direction around the axis and the straps of the second set in the other direction.

4. A device according to any of the preceding claims, wherein at least one of the sets of straps comprises two straps spaced apart in the device.

5. A device according to any of the preceding claims, wherein the first set of straps comprises one strap positioned in the centre of the device and the second set comprises two straps positioned at the end portions of the device.

6. A device according to any of claims 1 to 4, wherein there are two straps in each set of straps and that the first pair of straps is spaced wider apart than the second pair of straps.

7. A device according to any of claims 1 to 6, wherein the winding means are enclosed in an elongated housing provided with connection means for attaching the device in a lifting device such as a hoist.

8. A device according to claim 7, wherein the connection means comprises a universal joint.

9. A device according to claim 7 or 8, wherein the elongated housing is generally triangular in a cross-sectional shape with smooth edges and corners, said housing having openings in a first side, through which the first set of straps penetrate and openings in a second side, through which the second set of straps penetrate.

10. A device according to any of claims 7 to 9, wherein operating means are arranged on the housing for controlling the operation of the driving means.

11. A device according to any of claims 2 to 10, wherein the driving means comprises an electrical motor and preferably also an associated electrical energy supply and operating means.

12. A device according to claim 11, wherein the energy supply is a rechargeable battery.

13. A device according to claim 12, wherein the motor and the battery are arranged in the housing on each side of the connection means.

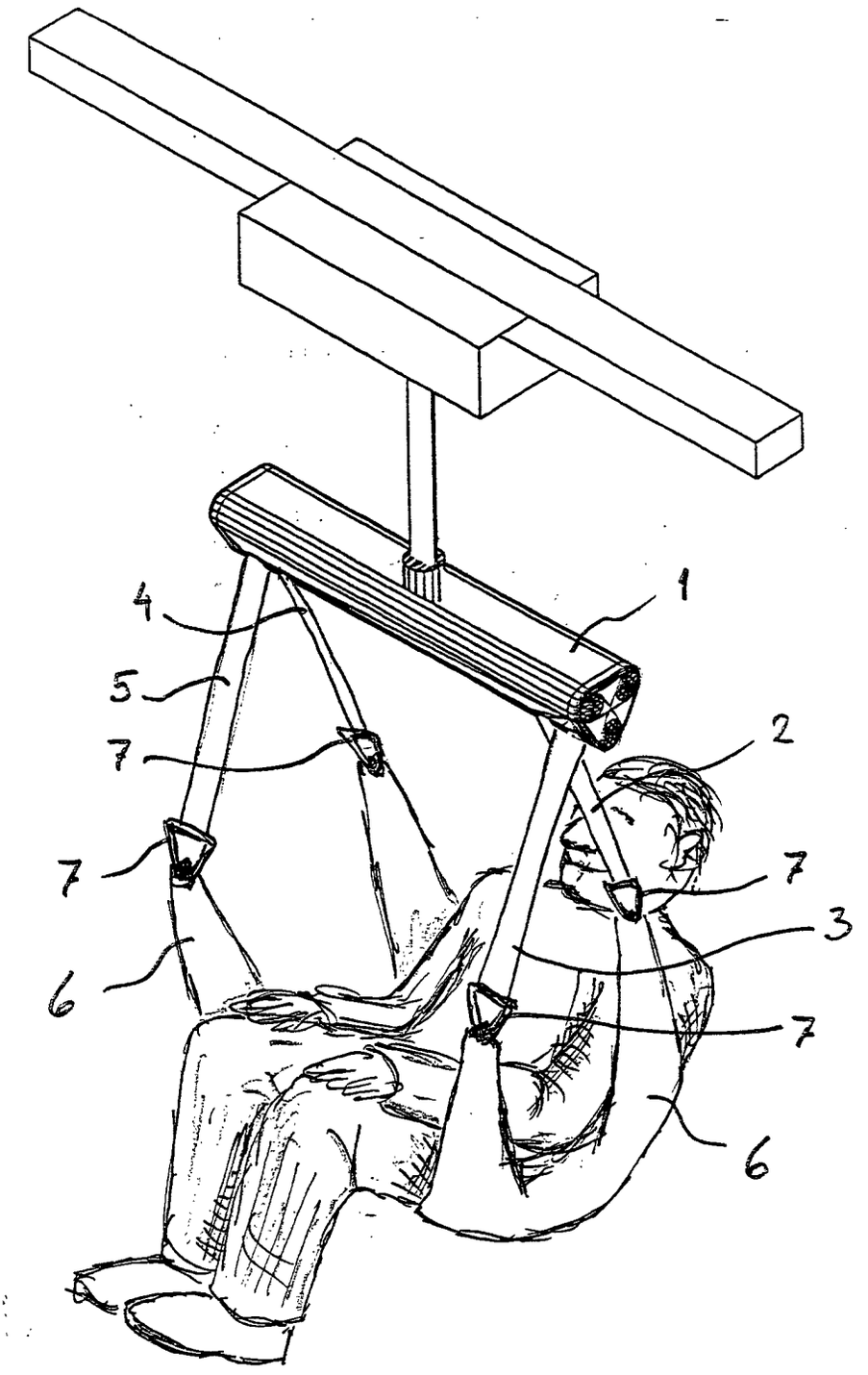

Fig. 1

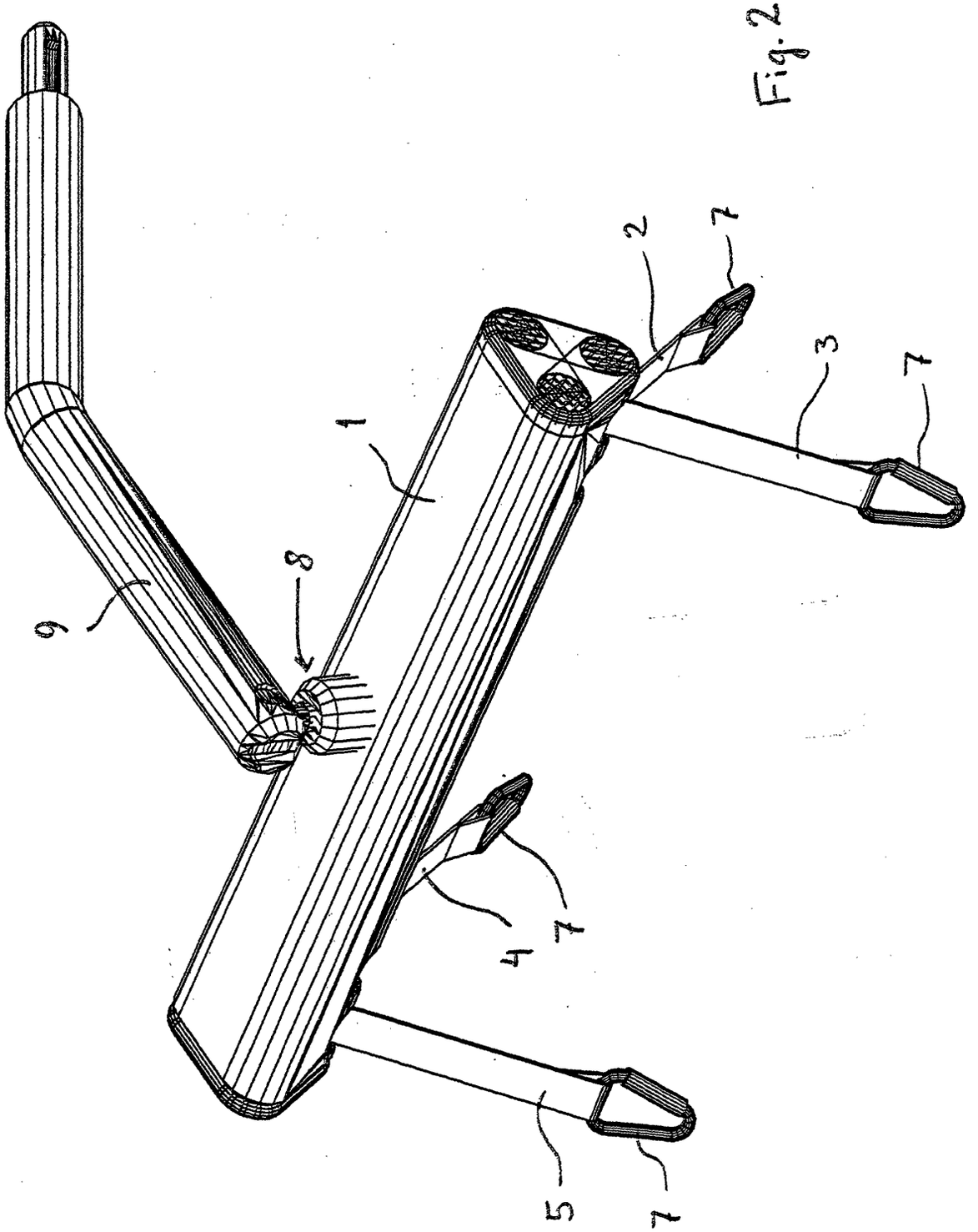

Fig. 2

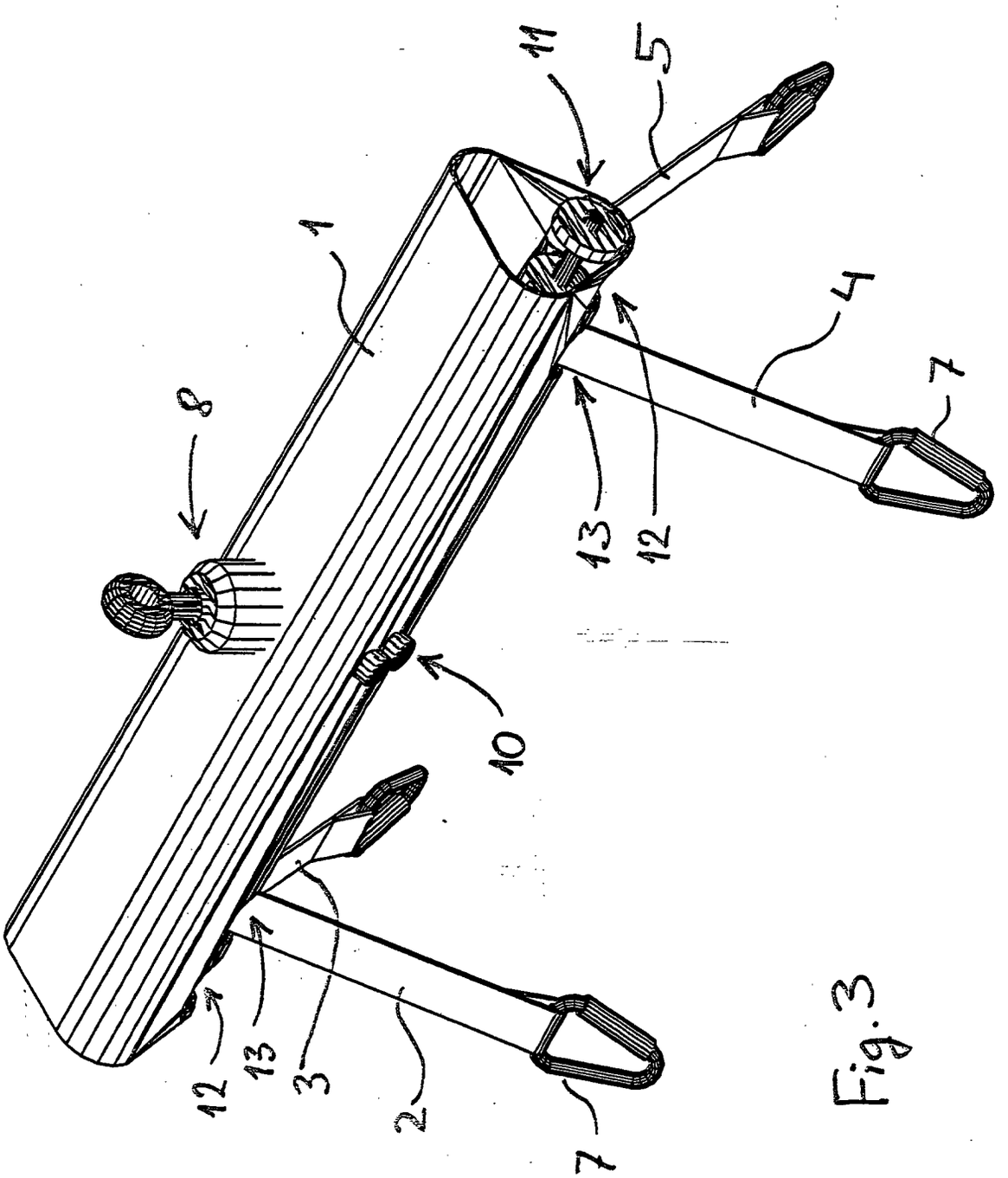

Fig. 3

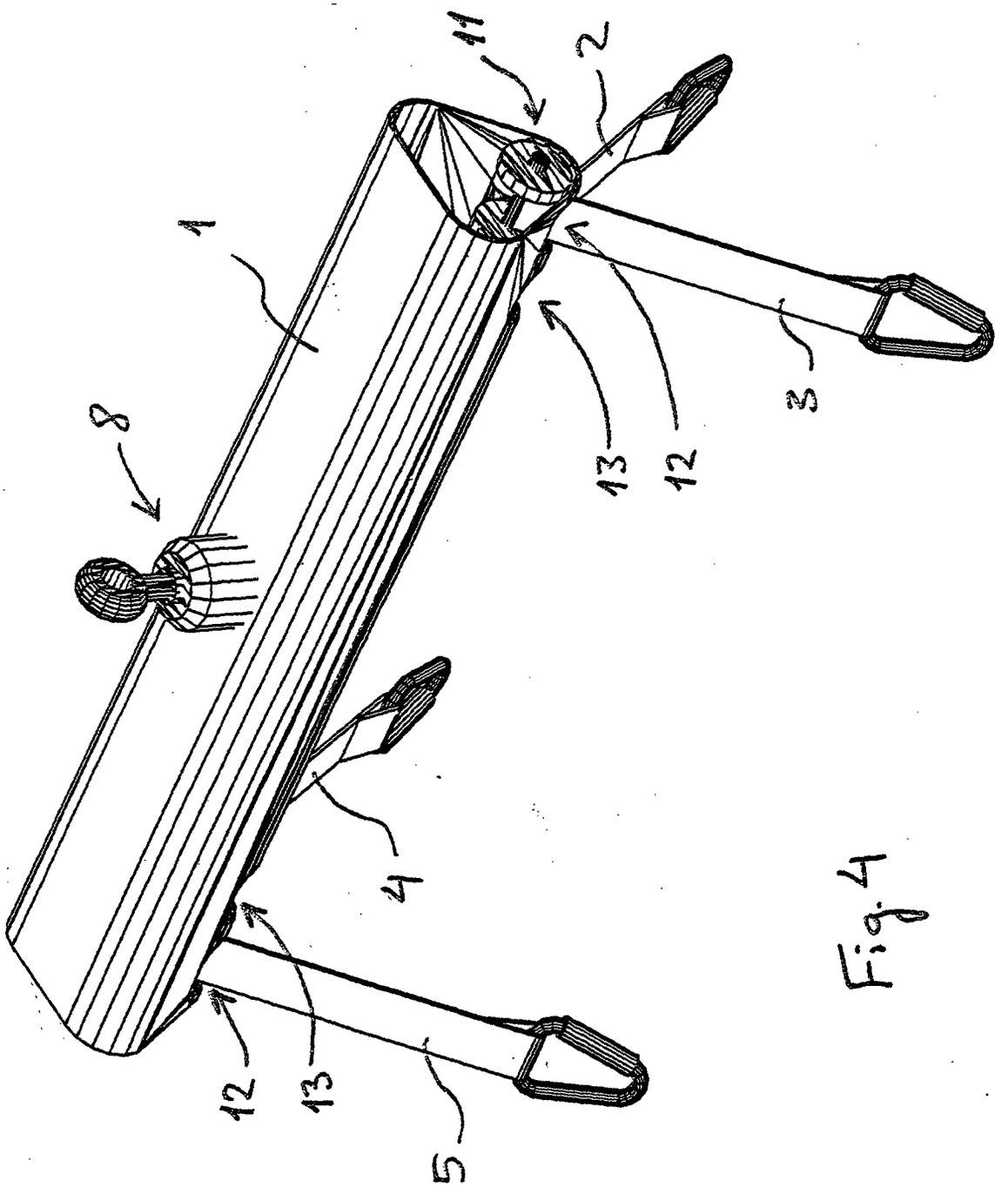

Fig. 4

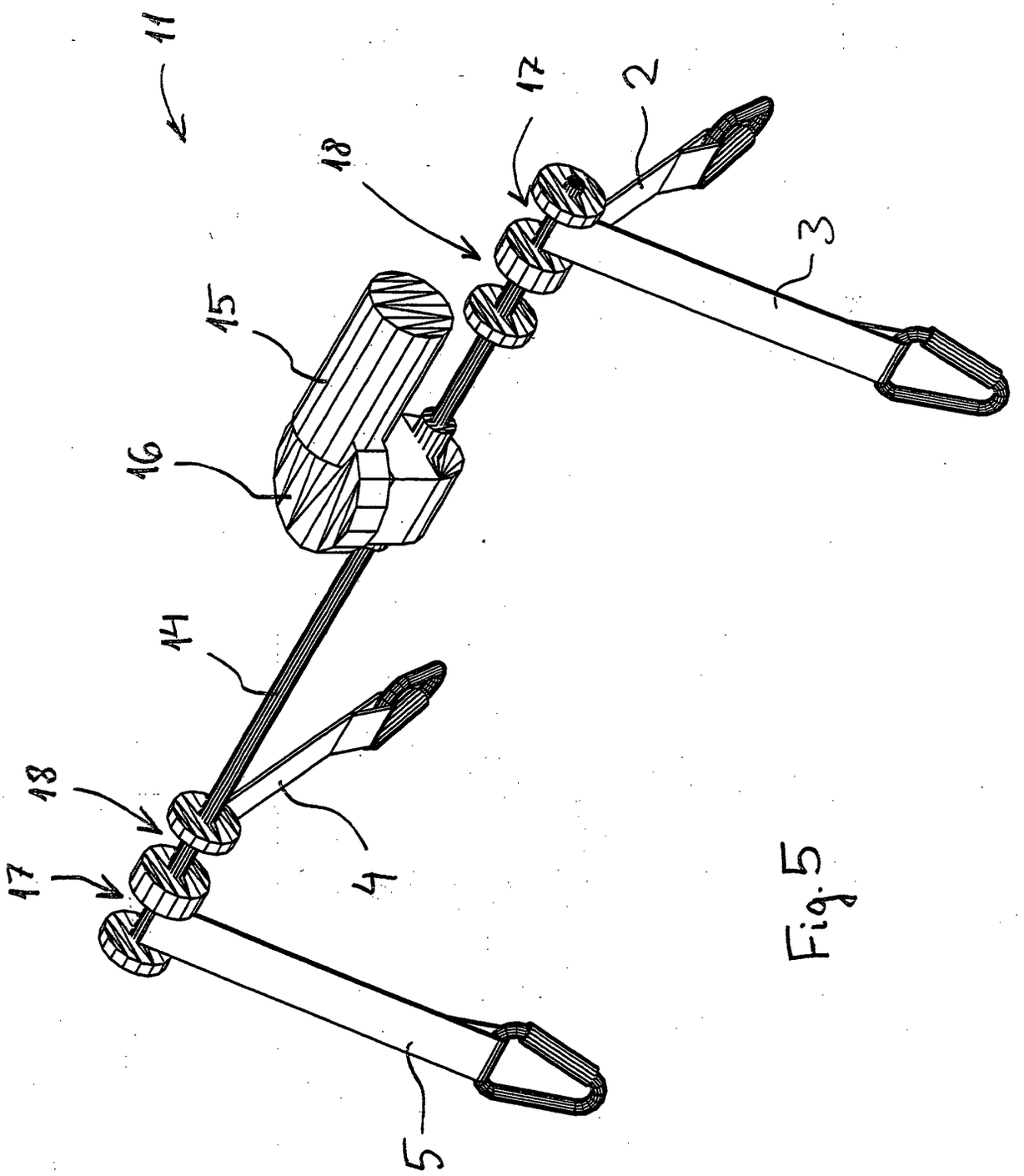

Fig. 5

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Application Number
EP 00 20 1324

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	12 September 2000	Baert, F

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EUROPEAN SEARCH REPORT

Application Number
EP 00 20 1324

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