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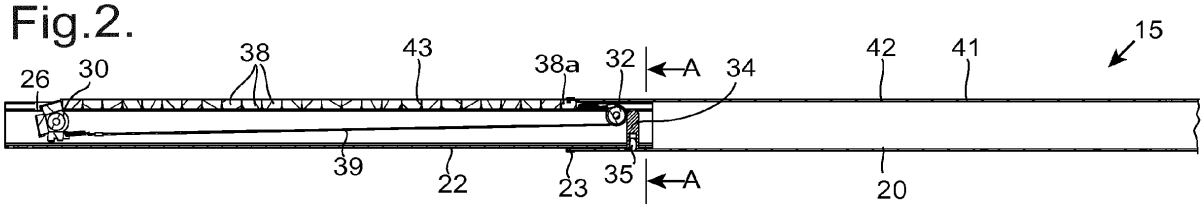
(54) Telescopic gantry

(57) A gantry (10) includes a telescopic support rail (15) which comprises an outer member (20) and an inner member (22) each having an upper surface. The inner member (22) is telescopically movable relative to the outer member (20) so as to project from one end of it. The inner member (22) also comprises two spaced-apart wheels (30, 32), and a chain of links (38) forming part of an endless chain (36) that extends around the two wheels (30, 32), one link (38a) being fixed to the end of the outer member (20), such that the links (38) along the top of the inner member (22) define a substantially continuous surface (43) aligned with the upper surface (42) of the outer member (20).

Fig.2.



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Description

[0001] This invention relates to a gantry whereby a hoist may be used to transfer a person, and in particular to a gantry which is telescopic.

[0002] A gantry provides a support rail supported by a base that rests on the floor. The use of a gantry with a hoist to support a disabled person is well known. For example such a gantry may be set up so the support rail extends over both a person's bed and an adjacent wheelchair, the person may be lifted using the hoist, the hoist then slid along the support rail of the gantry to transfer the person between the bed and the wheelchair, and then the hoist used to lower the person to the new position. Such a hoist may be supported by a carriage which rests on and is supported by the top of the support rail. In this situation, use of a telescopic support rail may lead to a problem, in that the carriage may encounter a step in moving between telescopic parts of the support rail.

[0003] According to the present invention there is provided a gantry with a telescopic support rail, the support rail comprising an outer member and an inner member each having an upper surface, the inner member being telescopically movable relative to the outer member so as to project from a first end of the outer member; wherein the inner member also comprises two spaced-apart wheels, and a chain of links forming part of an endless chain that extends around the two spaced-apart wheels, one link being fixed to the first end of the outer member, such that when the inner member projects from the outer member, those links that extend along the upper surface of the inner member define a substantially continuous surface aligned with the upper surface of the outer member.

[0004] Both the inner member and the outer member may be of generally tubular structure. For example they may be of extruded aluminium.

[0005] Each link of the chain may define plane faces to abut adjacent links of the chain. The plane faces may be inclined with respect to a plane perpendicular to the length of the chain, for example by between 10° and 20°, such as 15°. This ensures that as a carriage moves along the support rail, the load is transferred gradually between one link and the next. The links of the chain may be of metal, or of an engineering plastic such as nylon (polyamide) or ABS (acrylonitrile butadiene styrene).

[0006] The inner member may define a recess or trough along its upper surface within which the chain locates.

[0007] The outer member may define a shallow recess along its upper surface, and in this case each link may define such a shallow recess, to ensure continuity along the length of the support rail.

[0008] The invention will now be further and more particularly described, by way of example only, and with reference to the accompanying drawings in which:

Figure 1 shows a perspective view of a gantry which incorporates a telescopic support rail;

Figure 2 shows a longitudinal sectional view of the telescopic support rail of figure 1;

Figure 3 shows a side view of the of the telescopic support rail of figure 1, in which, as regards the inner member, only those components relating to the chain are shown;

Figure 4 shows an exploded view of the telescopic support rail of figure 1;

Figure 5 shows a cross-sectional view on the line A-A of figure 1;

Figure 6 shows a plan view, a side view, and an end view of a link of the chain; and

Figure 7 shows a plan view, a side view, and an end view of the end link of the chain.

[0009] Referring to figure 1, a gantry 10 consists of two vertically arranged support bars 12 each standing on a footplate 14 which may for example be of length 1.0 m. Each support bar 12 may for example be of height 2.2 m, and this height may be adjustable, for example between 2.1 m and 2.4 m. At the top, the support bars 12 are interconnected by a telescopic support rail 15, which may for example be adjustable to lengths between 2.0 m and 3.0 m. In use a carriage 16 is supported on the top of the support rail 15, the carriage 16 carrying a hook 18 below the support rail 15 to which a portable hoist can be connected.

[0010] This gantry 10 is shown by way of example only, and it will be appreciated that a gantry might have a different shape of support at the ends of the telescopic support rail 15; for example the ends of the telescopic support rail 15 might be supported by A-shaped supports. It will also be appreciated that the support bars 12 or the A-shaped supports, as the case may be, may be telescopic, for ease of transport.

[0011] Referring now to figures 2 and 4, the telescopic support rail 15 consists of a tubular outer member 20 and a tubular inner member 22. The tubular inner member 22 can slide within the tubular outer member 20 so that the length of the support rail 15 can be adjusted. In figure 4 the broken lines indicate how the components are assembled; as shown in figure 4, the ends of the telescopic support rail 15 which fit together are provided with end caps 23 and 24. The inner member 22 defines a rectangular recess or trough 25 along its upper surface, and there are rectangular apertures 26 and 27 near the opposite ends of this recess or trough 25 in the base of the recess or trough 25. A wide pulley wheel 30 is mounted on a bracket 31 at the outer end of the inner member 22, and a narrow pulley wheel 32 is mounted on a bracket 33 at the opposite end of the inner member 22, so in each case the pulley wheel 30 or 32 is aligned with the corresponding apertures 26 or 27. The wide pulley wheel 30 is below the aperture 26, whereas the narrow pulley wheel 32 projects through the aperture 27. In addition, a support rod 34 locates between the sides of the bracket 33. The top end of the support rod 34 contacts the top of

the inner member 22, while the bottom end of the support rod 34 rests on the bottom of the tubular outer member 20. A spring-loaded pin 35 projects from the bottom end of the support rod 34, projecting through a corresponding hole in the tubular outer member 20. The outer member 20 is provided with a number of holes along its length (typically no more than twenty) through which the spring-loaded pin 35 may project, so the telescopic support rail 15 can be locked at predetermined lengths.

[0012] Referring also to figure 3, a continuous loop 36 extends around the wide pulley wheel 30 and the narrow pulley wheel 32. The loop 36 consists of twenty eight plastic links 38 and a flexible cable 39 which links the two end links 38; in the position shown in figures 2 and 4, the plastic links 38 locate within the rectangular recess or trough 25, the last few links 38 passing around the wide pulley wheel 30, and the flexible cable 39 passes around the narrow pulley wheel 32. As shown in figure 3, the plastic links 38 are linked together by linking pieces 40. As shown in figure 2, one end link 38a is fixed to the end of the outer member 20. Figures 2 and 3 show the telescopic support rail at its maximum elongation.

[0013] Referring now to figure 5, this shows the telescopic support rail 15 in cross-section. The upper wall 41 of the outer member 20 forms a slightly concave running surface 42 for the carriage 16 (see figure 1).

[0014] The thickness of the links 38 is equal to the height of the running surface 42 above the bottom of the recess or trough 25. Consequently the chain of links 38 forms a continuation of the running surface 42.

[0015] Referring now to figure 6, the top figure shows a plan view of a link 38, the middle figure shows a side view (in the direction of arrow B), and the bottom figure shows an end view (in the direction of arrow C). Each link 38 defines, on its upper surface, a concave surface 43 matching the shape of the running surface 42. In plan view the upper surface 43 is a parallelogram: the ends of each link 38 define plane surfaces which are inclined at 15° to a perpendicular from the length-wise direction. The lower part of each link 38 defines aligned pairs of projecting stub axles 44. The linking pieces 40 (see figures 3 and 4) connect the projecting stub axles 44 of adjacent links 38.

[0016] Referring now to figure 7, the top figure shows a plan view of an end link 38a, the middle figure shows a side view (in the direction of arrow D), and the bottom figure shows an end view (in the direction of arrow E). One end part of each end link 38a is exactly equivalent to a link 38, defining a concave surface 43 on its upper surface to match the shape of the running surface 42 and to match the concave surface 43 on the adjacent link 38, and defining an aligned pair of projecting stub axles 44. The other end part of each end link 38a is of reduced thickness, so that it can fit into end of the outer element 20, so that part defines a generally concave surface 46 corresponding to the inside of the wall 41 forming the running surface 42. In addition, it defines a projecting stub 48 whose height corresponds to the thickness of the wall 41 and which, when assembled, locates in a corresponding hole 50 in the wall 41 (see figure 4).

[0017] Hence, in use, the surfaces 43 of the end link 38a and of the links 38 form a continuation of the running surface 42 of the outer element 20. Consequently the carriage 16 can move freely along the upper surface of the telescopic support rail 15 without encountering any steps. Because the mating end faces of adjacent links 38 are inclined to the perpendicular from the longitudinal axis, the weight of the carriage 16 is transferred gradually from one link 38 to the next as the carriage 16 moves along the telescopic support rail 15.

[0018] If it is necessary to change the length of the gantry 10, this can readily be achieved by sliding the inner element 22 into the outer element 20. The end link 38a connected to the end of the outer element 20 does not move, so as the inner element 22 is moved into the outer element 22, starting from the position of maximum extension shown in figure 2, the links 38 at the left-hand end (as shown) pass around the wide pulley 30 so they are inside the inner element 22, while at the right-hand end (as shown) the flexible cable 39 passes around the narrow pulley 32. Hence, for a range of different lengths of the gantry 10, the appropriate number of links 38 are provided within the recess or trough 25 to provide a continuation of the running surface 42 along the top surface of the inner element 22, while the other links 38 are within the inner element 22.

Claims

1. A gantry (10) with a telescopic support rail (15), the support rail (15) comprising an outer member (20) and an inner member (22) each having an upper surface, the inner member (22) being telescopically movable relative to the outer member (20) so as to project from a first end of the outer member (20); ***characterised in that*** the inner member (22) also comprises two spaced-apart wheels (30, 32), and a chain of links (38) forming part of an endless chain (36) that extends around the two spaced-apart wheels (30, 32), one link (38) being fixed to the first end of the outer member (20), such that when the inner member (22) projects from the outer member (20), those links (38) that extend along the upper surface of the inner member (22) define a substantially continuous surface aligned with the upper surface of the outer member (20).

2. A gantry (10) as claimed in claim 1 wherein both the inner member (22) and the outer member (20) are of generally tubular structure.

3. A gantry (10) as claimed in claim 2 wherein both the inner member (22) and the outer member (20) are of extruded aluminium.

4. A gantry (10) as claimed in any one of the preceding claims wherein each link (38) of the chain defines plane faces to abut adjacent links of the chain.

5. A gantry (10) as claimed in claim 4 wherein the plane faces are inclined with respect to a plane perpendicular to the length of the chain.

6. A gantry (10) as claimed in any one of the preceding claims wherein the links (38) of the chain (36) are of metal, or of an engineering plastic such as nylon (polyamide) or ABS (acrylonitrile butadiene styrene).

7. A gantry (10) as claimed in any one of the preceding claims wherein the inner member (22) defines a recess or trough (25) along its upper surface within which the chain (36) locates.

8. A gantry (10) as claimed in any one of the preceding claims wherein both the outer member (20) and the links (38) of the chain (36) define a concave running surface (42, 43).

Fig.1.

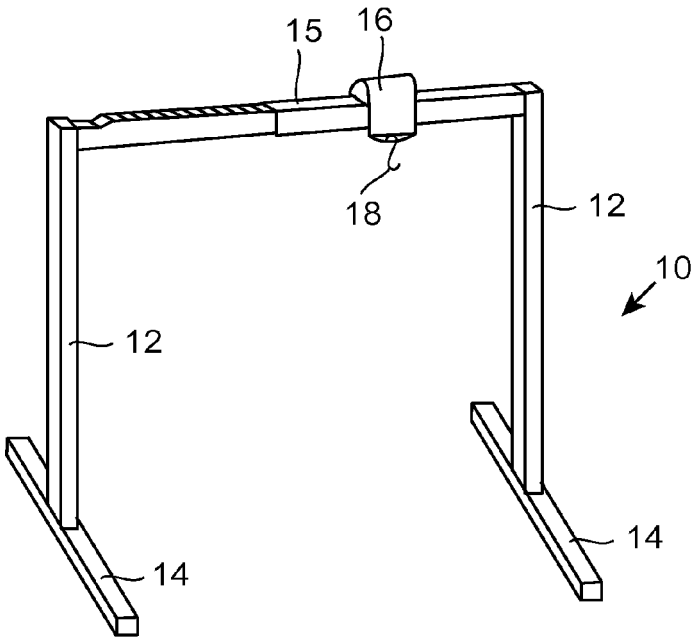
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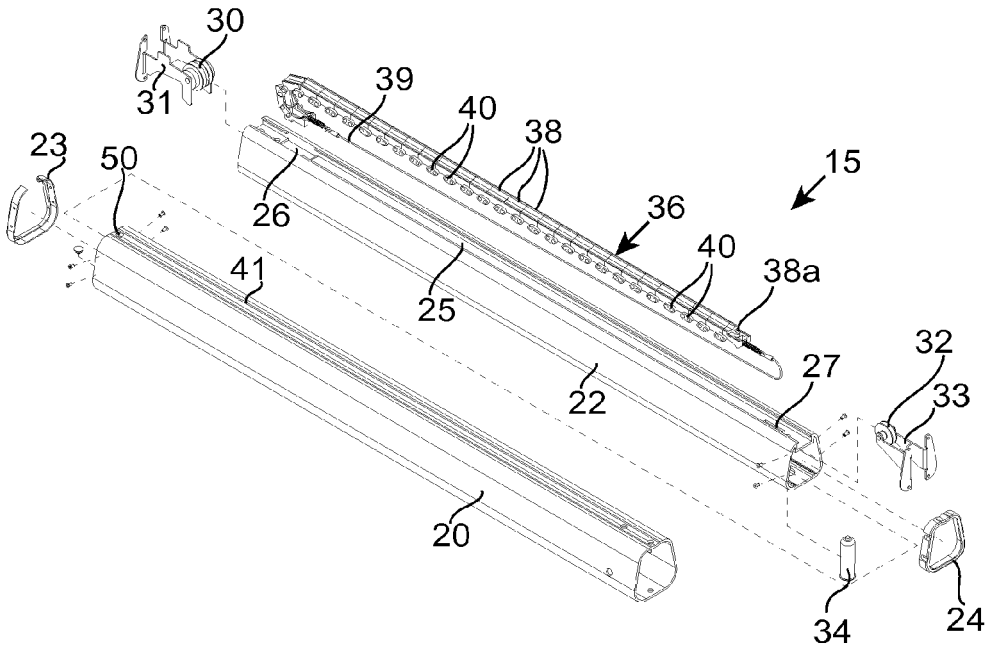
Fig.4.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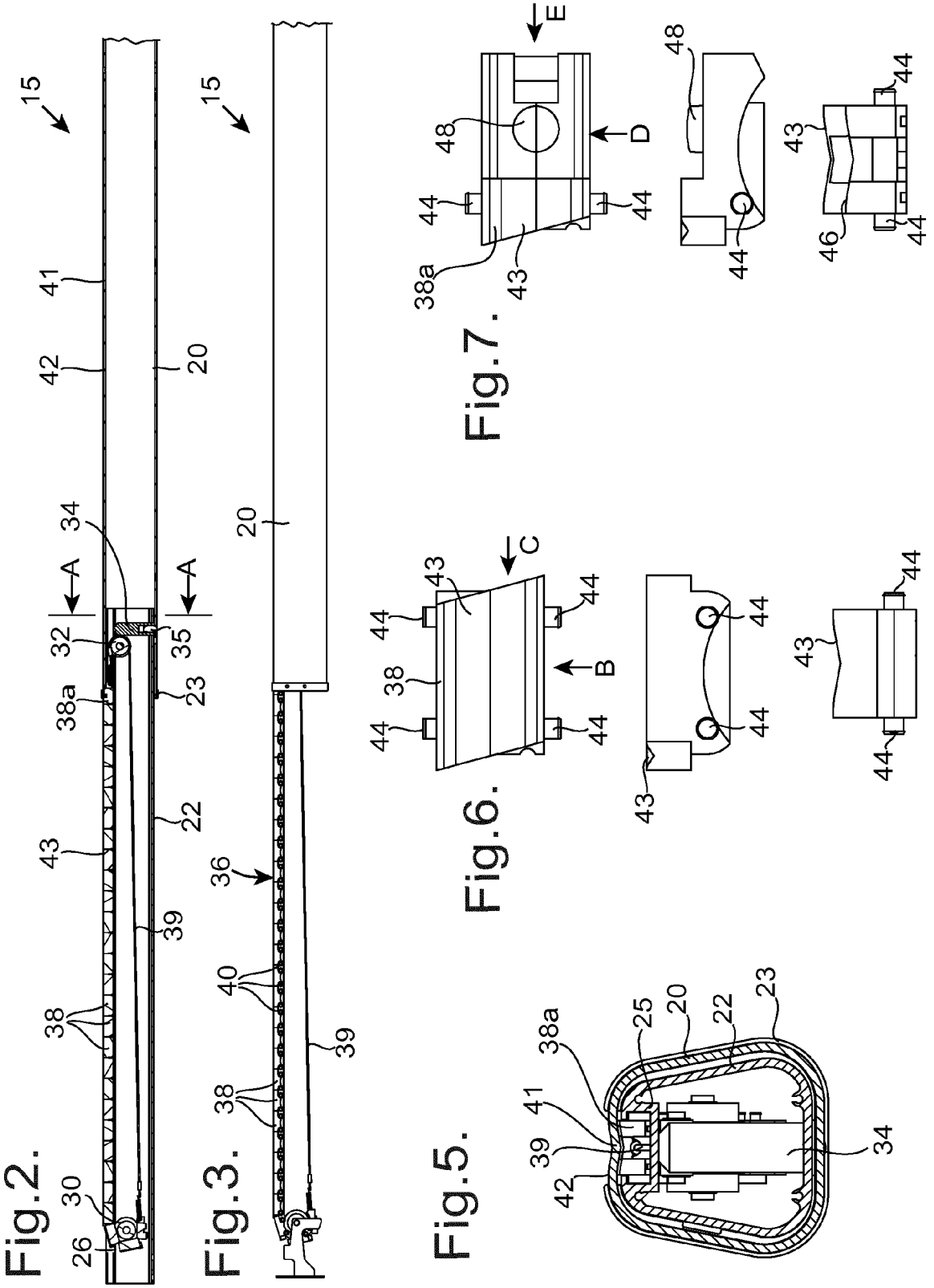
Fig.2.
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Fig.3.
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Fig.5.
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Fig.6.
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Fig.7.
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EUROPEAN SEARCH REPORT

Application Number
EP 13 18 5873

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TECHNICAL FIELDS SEARCHED (IPC)

B66C
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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	13 December 2013	Özsoy, Sevda

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