(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number : **0 564 139 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number : **93302161.0**

(22) Date of filing : **22.03.93**

(51) Int. Cl.[5] : **A61G 7/10**

(30) Priority : **01.04.92 GB 9207126**

(43) Date of publication of application :
06.10.93 Bulletin 93/40

(84) Designated Contracting States :
DE FR NL SE

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(54) Bath seat.

(57) A bath seat comprises a support frame structure 1 which rests in a bath tub, a seat member 5 and an articulated support linkage 6 supporting the seat member 5 from the frame structure 1. In use the seat member 5 lowers, under the weight of a seated user, against a spring force urging the seat member 5 towards a raised resting position. The seat member 5 is additionally supported by a resiliently compressive supportive strut 17, this strut compressing as the seat member 5 lowers to provide a varying component of said spring force which is mainly provided by spring units such as 20 acting between the structure 1 and the strut 17.

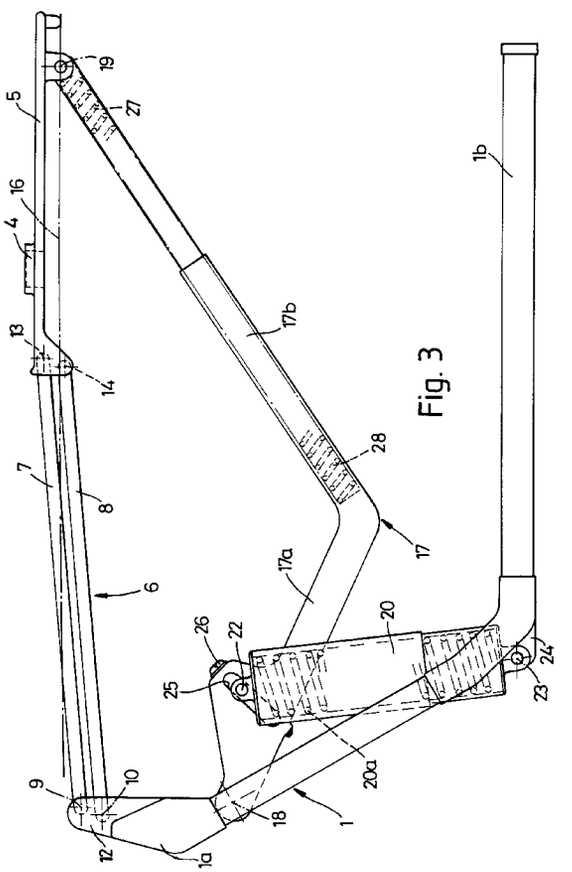

Fig. 3

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The invention relates to a bath seat of the type which rests in or on a bath tub and has a seat member which, under the weight of a seated user, lowers into the bath water against a spring force urging the seat member towards a raised resting position.

Bath seats of this type are in common use, particularly by disabled and elderly infirm persons, mainly in domestic bathrooms. They have the advantage that they can readily be designed not to require fixing in position so that they merely have to be placed in or on the bath tub when required and, after use, are easily removed leaving the bath tub free for normal use.

Such bath seats are known in which the seat member is supported from a support frame structure, which rests in or on the bath tub, by an articulated linkage. However, with these the raising spring torque applied to the linkage and the gravitational lowering torque can vary differently during heightwise movement of the seat member, and the invention has for an object to provide a construction which enables this disadvantage to be at least materially reduced.

A bath seat according to the invention is characterized in that the spring force urging the seat member towards the seat-raised position is at least in part provided by a resiliently compressive supportive strut which compresses as the seat member lowers.

The strut member may be telescopic and contain a compression spring which tends to extend the strut, or it may be a so-called gas spring strut comprising a sealed piston-and-cylinder assembly filled with gas under pressure. Preferably the compressible strut member directly supports the seat member and provides a varying supplemental spring force which supplements a main spring force provided by a main spring unit or units, and the latter desirably act(s) through the strut member. Alternatively, the compressible strut member may provide the total spring force urging the seat member towards the raised position.

The effect of the spring force is desirably adjustable so that it can be preset to suit the weight of the user. The bath seat preferably employs a parallelogram-type support linkage which is spring loaded to the seat-raised position relatively to the support frame of the seat. This linkage may comprise straight closely-spaced links with supporting pivots disposed at or towards the top of the support frame of the seat, specifically at or about the level of the rim of the bath tub.

The bath seat may incorporate motorised lifting means operative to apply a force in the upward direction to the seat member. These motorised lifting means need only provide a relatively small lifting force which supplements the spring force against which the seat member is lowered. Thus a self-contained electrical lifting means can be utilised which occupies a small space and requires very little battery power.

The invention will now be further described with reference to the accompanying drawings which illustrate, by way of example, two illustrative embodiments of the invention. In the drawings:

Fig. 1 is a plan view of a preferred embodiment; shown in the fully-lowered bathing condition;

Fig. 2 is a corresponding side view;

Fig. 3 is a similar side view but showing the fully-raised resting position; and

Fig. 4 is a diagrammatic side view of the other embodiment.

The bath seat illustrated in Figs. 1 to 3 comprises a support structure frame 1 adapted to rest in a bath tub 2 (partially shown in section in Fig. 2) and a seat member structure comprising a moulded plastics seat member 3 (shown diagrammatically in Fig. 2 and omitted from the other two figures) and a supporting platform seat member 5. The seat member 3 is mounted on a rotary "turntable" bearing 4 above the platform 5 which is supported on the frame 1 by a parallelogram-type support linkage 6. At each side a pair of closely-spaced, straight links 7 and 8 providing the linkage 6 are at the rear ends pivotally supported, at 9 and 10 respectively, between laterally spaced pairs of pivot lugs 12 on a top cross member 1a of the frame 1. The forward ends of the links 7 and 8 are pivotally attached to the rear of the seat platform 5, at 13 and 14 respectively.

As can be seen from the drawings the frame 1 sits in the bath tub 2 with spaced tubular side members 1b of the frame 1 resting on the bottom 15 of the bath tub 2. To provide the parallelogram form of the linkage 6 the spacing of the fixed supporting pivots 9,10 is the same as the spacing of the pivots 13,14 at the seat platform 5, and the links 7 and 8 are of equal length.

The drawings illustrate the seat member 3 in both the resting fully-raised position (Fig.3) in which the platform 5 is above the rim 16 of the bath tub 2, and the fully-lowered bathing position (Fig. 2) in which the platform 5 nests within the frame 1 between the side members 1b close to the bottom 15 of the bath tub 2. Thus the frame 1 takes up no depth and the maximum depth of water is available for bathing.

A centrally disposed and cranked strut member 17 has a rear limb 17a anchored to the frame 1 at a pivot 18 at an intermediate height position, and a forward limb 17b which is anchored at a pivot 19 to the platform seat member 5 below and near the front of the latter. Two compression spring units 20 and 21 are disposed symmetrically on opposite sides of the cranked strut 17, these acting between a pivot cross bar 22 and lower pivots such as 23 at a cross member 24 of the frame 1. The cross bar 22 is secured to the strut limb 17a at an adjustment slot 25, along which the bar 22 is movable by means of an adjusting screw 26. This adjusts the main spring force which is provid-

ed by the spring units 20,21 and acts on the platform 5 through the strut 17 to urge the seat member structure 3,5 towards the raised resting position.

The strut limb 17b is telescopic and houses a compression spring 27 tending to extend the strut, whereby the latter is resiliently compressible and the spring 27 provides a supplemental spring force which supplements that of the spring units 20,21 to provide the total inherent spring force urging the seat towards the raised resting position. Each of the spring units 20 and 21 comprises a telescopic casing which shrouds a helical compression spring such as 20a.

The rotary support of the seat member 3 on the bearing 4 enables it to be turned on the platform 5 to facilitate a disabled user entering or leaving the seat from either side of the bath tub 2, when the seat member structure 3,5 is in the fully-raised resting position illustrated in Fig. 3. With the user seated the seat member 3 is returned to the position illustrated and the weight of the user overcomes the spring units 21,22 and the extending spring force of the strut 17, so that the latter is compressed and the seat member 3 lowers into the bath tub 2 until the fully-lowered bathing position illustrated in Fig. 2 is reached with the user seated in the bath water.

The main spring force of the units 20,21 is adjusted at the slot 25 to suit the weight of the user and provide a low differential force which the latter exerts, by legs and/or arms, in order to control heightwise movement of the seat. Thus the rate of descent of the seat member is user controllable, and after bathing the application of said differential force results in the seat member 2 rising at a controllable rate to the fully-raised position of Fig. 3.

The geometry of the spring arrangement which has been described and which is illustrated in the drawings is such that the total upward spring force acting at the seat member varies as the gravitational lowering force, with a seated user, fairly closely throughout the full range of seat movement. As the linkage movement during lowering results in a lower raising torque from the spring units 20,21 applied to the strut 17, the compression of the latter results in a greater supplemental force from the spring 28. Such variation in the raising torque as occurs generally matches the variation in gravity weight lowering torque, and hence the user senses substantially no variation in the effective spring raising force throughout the range of seat movement.

The bath seat illustrated in Fig. 4 utilises a resiliently compressible strut 117, in the form of a gas spring, and in this figure the reference numerals used for corresponding parts are increased by "100" as compared with those used in the earlier figures. The compression of the gas strut 117 in this case provides the total spring force urging the seat platform 105 to the raised resting position, and only significant differences between the two embodiments will now be described. Pairs of cranked pivotal links 107 and 108 provide the linkage 106 with the rear ends again being pivotally supported, at 109 and 110 respectively, between laterally spaced pivot brackets such as 112 at the top of the frame 101. However, the forward ends of the links 107 and 108 are now pivotally attached to the lower side of the seat platform 105, at 113 and 114 respectively.

Whilst the frame 101 again sits on the bottom 115 of the bath tub 102, it is additionally supported (by means not shown and which are adjustable to suit the bath tub with which the seat is used) on the rim 116. Imaginary lines joining the fixed linkage pivots 109,110 and the pivots 113,114 at the seat platform 105 remain horizonal at all times, with the pivots 109,110 disposed just above the rim 116 of the tub 102.

Fig. 4 illustrates the seat member 103 in both the resting fully-raised position, as shown in broken lines and in which the pivots 113,114 are at about the level of the rim 116 so that the seat member 103 is above the rim, and in the fully-lowered bathing position in which the links 107,108 nest within the frame 101 to rest on the bottom 115 of the bath tub 102. Thus the frame 1 again takes up no depth and the maximum depth of water is available for bathing.

The forward end of the gas spring or strut member 117 is anchored at a pivot 119 to the link 107, rather than to the seat platform 105, so that the strut acts on the linkage 106 to urge the seat towards the fully-raised resting position in which the seat member 103 is disposed just above the top of the bath tub 102.

In this case the force of the gas spring 117 is adjustable to suit the weight of the user and provide a low differential force which the user exerts to control heightwise movement of the seat. For this adjustment the pivot 118 is movable along adjustment slots such as 125 in the brackets 112 of the frame 101, again being fixed in preset adjusted position by end lock nuts (not shown) which are slackened off for adjustment. Anchorage of the gas spring strut 117 at an intermediate height position to the frame 101 and at the forward end at an intermediate position relatively to the fixed and movable pivots of the linkage 106, so that it is downwardly inclined from the frame 101 and reaches an almost horizontal position in the fully-raised position, provides an arrangement in which the upward spring torque applied to the linkage 106 varies as the gravitational lowering torque, with a seated user, fairly closely throughout the full range of seat member movement.

In each embodiment the frame 1 (101) rests in the bath tub 2 (102) so that the seat can readily be lifted out of the way to enable normal use of the bath tub. The rotary mounting of the seat member 3 (103) facilitates use of the seat, particularly by a partially-disabled user, without attendant assistance. Furthermore, the parallelogram support linkage 6 (106)

maintains a constant orientation of the seat member 3 (103) at all levels and lowers that member 3 (103) backwards towards the frame 1 (101) so that maximum utilization of the length of the bath tub for bathing is achieved.

Claims

1. A bath seat which rests in or on a bath tub and has a seat member supported on an articulated support linkage and which in use lowers under the weight of a seated user against a spring force urging the seat member towards a raised resting position, characterized in that the spring force is at least in part provided by a resiliently compressible supportive strut member which compresses as the seat member lowers.

2. A bath seat according to claim 1, wherein the strut directly supports the seat member and is pivotally connected to a support structure of the seat which rests in or on the bath tub.

3. A bath seat according to claim 2, wherein the strut is of cranked form and supports the seat member from below and adjacent the front thereof.

4. A bath seat according to claim 3, wherein the support linkage is of parallelogram form and supports the seat member at the rear thereof.

5. A bath seat according to any one of the preceding claims, wherein the strut provides a varying supplemental spring force which supplements the force of a main spring unit or units.

6. A bath seat according to any one of claims 2 to 4 and claim 5, wherein the main spring force acts on the seat member through the strut.

7. A bath seat according to claim 5 or claim 6, wherein the main spring force is adjustable to suit the weight of an intended user.

8. A bath seat according to claim 7, wherein a pivotal attachment of a main compression spring or springs to the strut is adjustable to adjust the main spring force.

9. A bath seat according to claim 9, wherein the strut is connected between the support linkage and a support structure of the seat which rests in or on the bath tub.

10. A bath seat according to any one of the preceding claims, wherein the strut has a telescopic section which houses a compression spring tending to extend the strut.

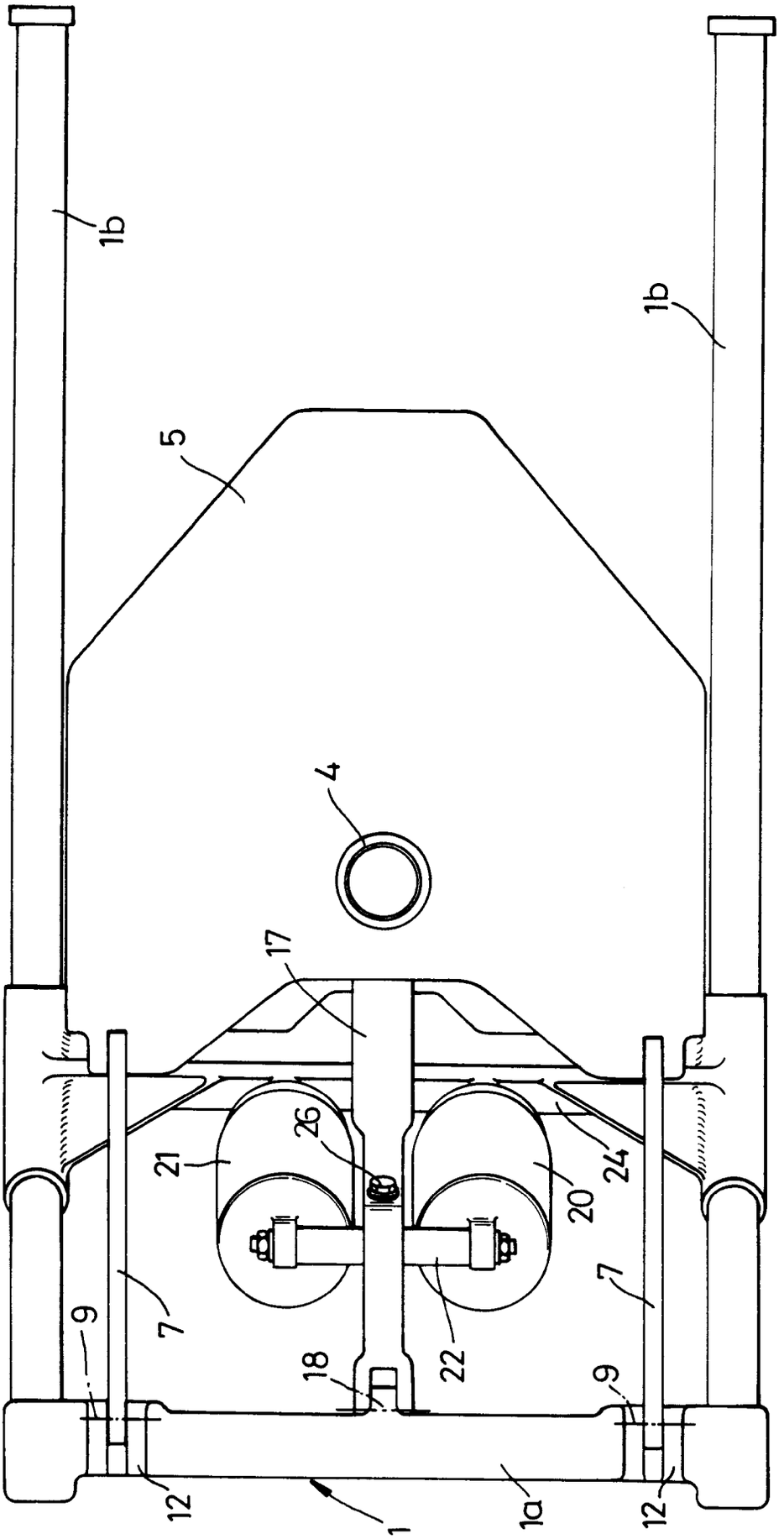
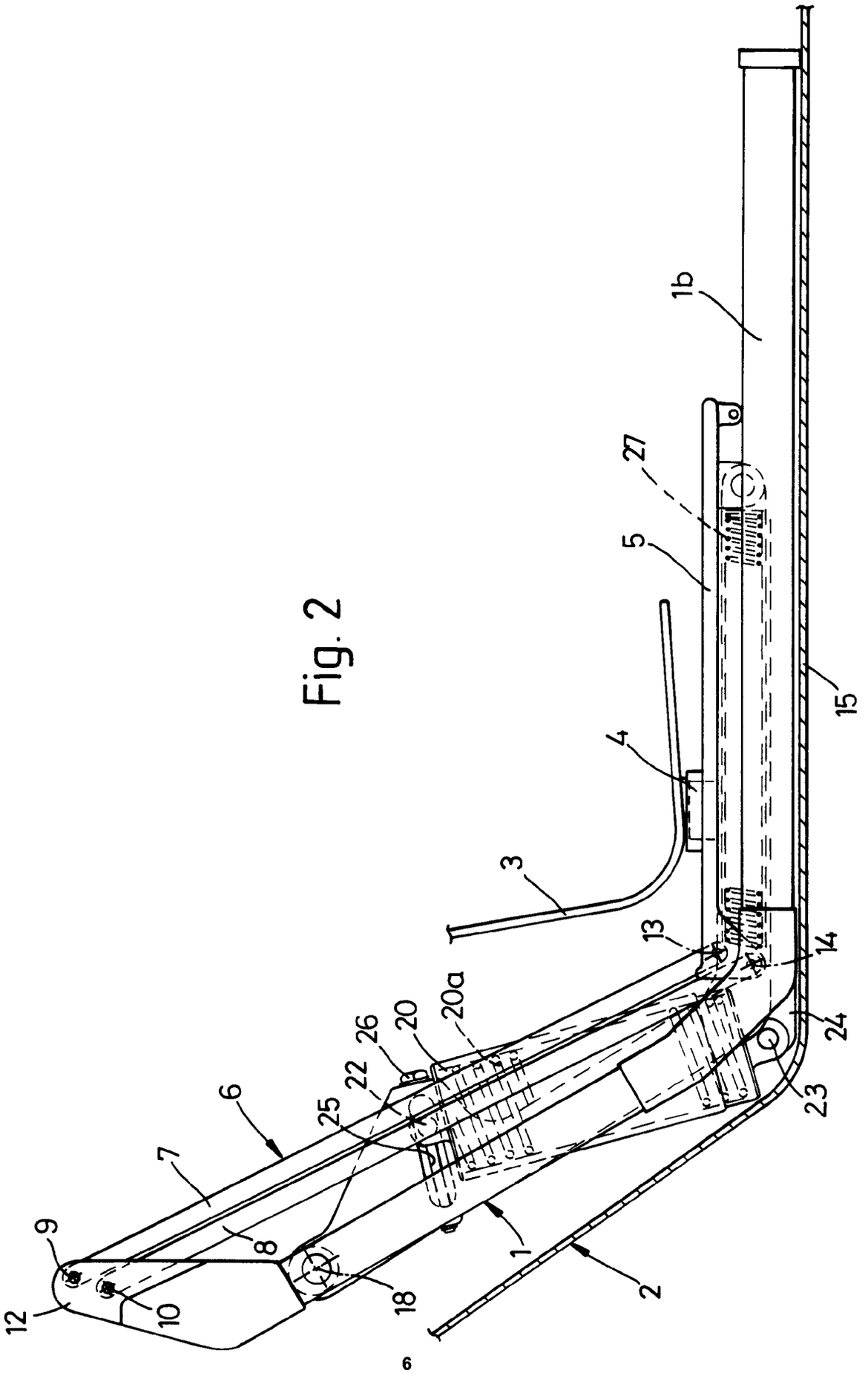


Fig. 1

Fig. 2



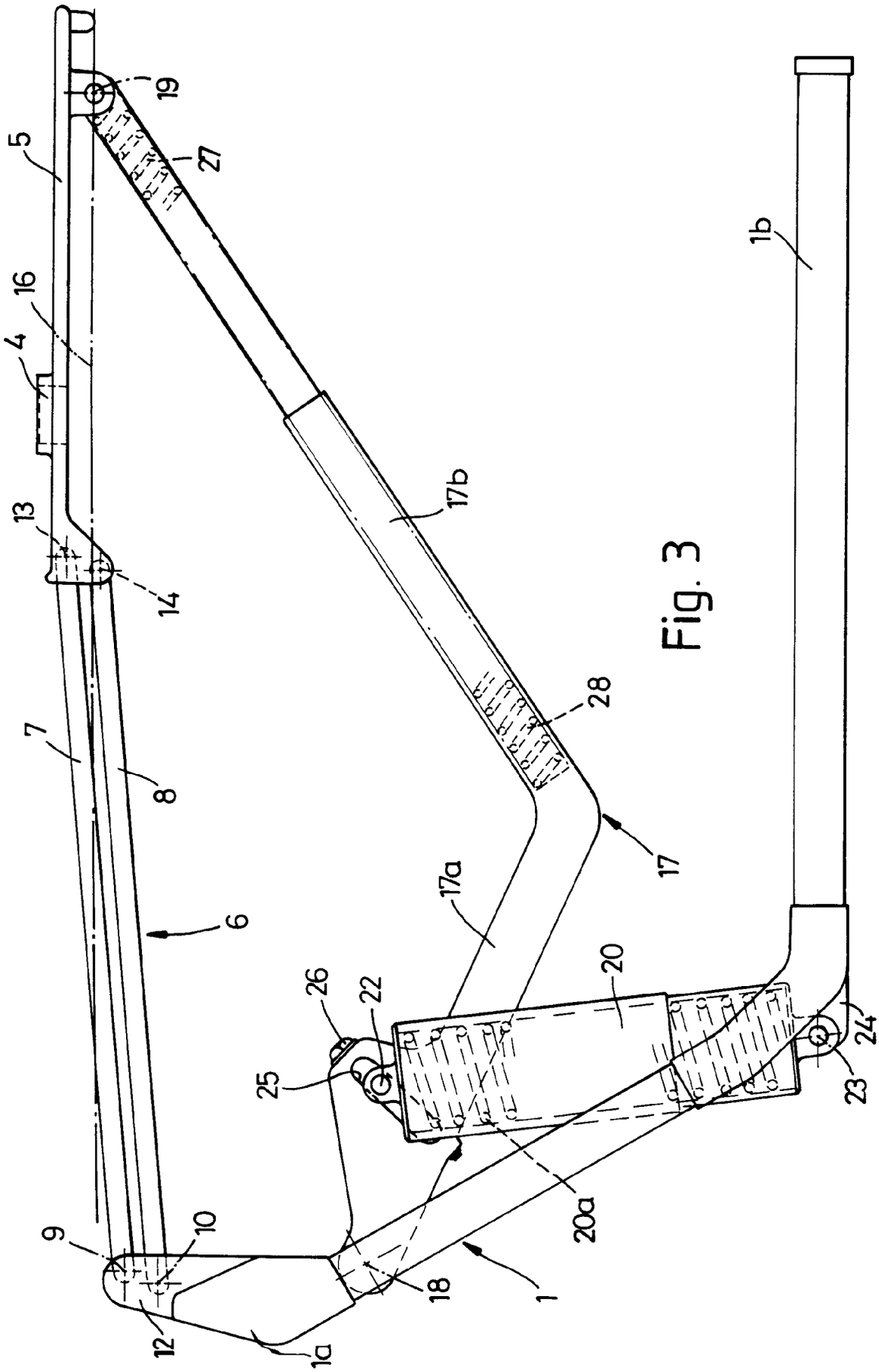

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Fig. 3

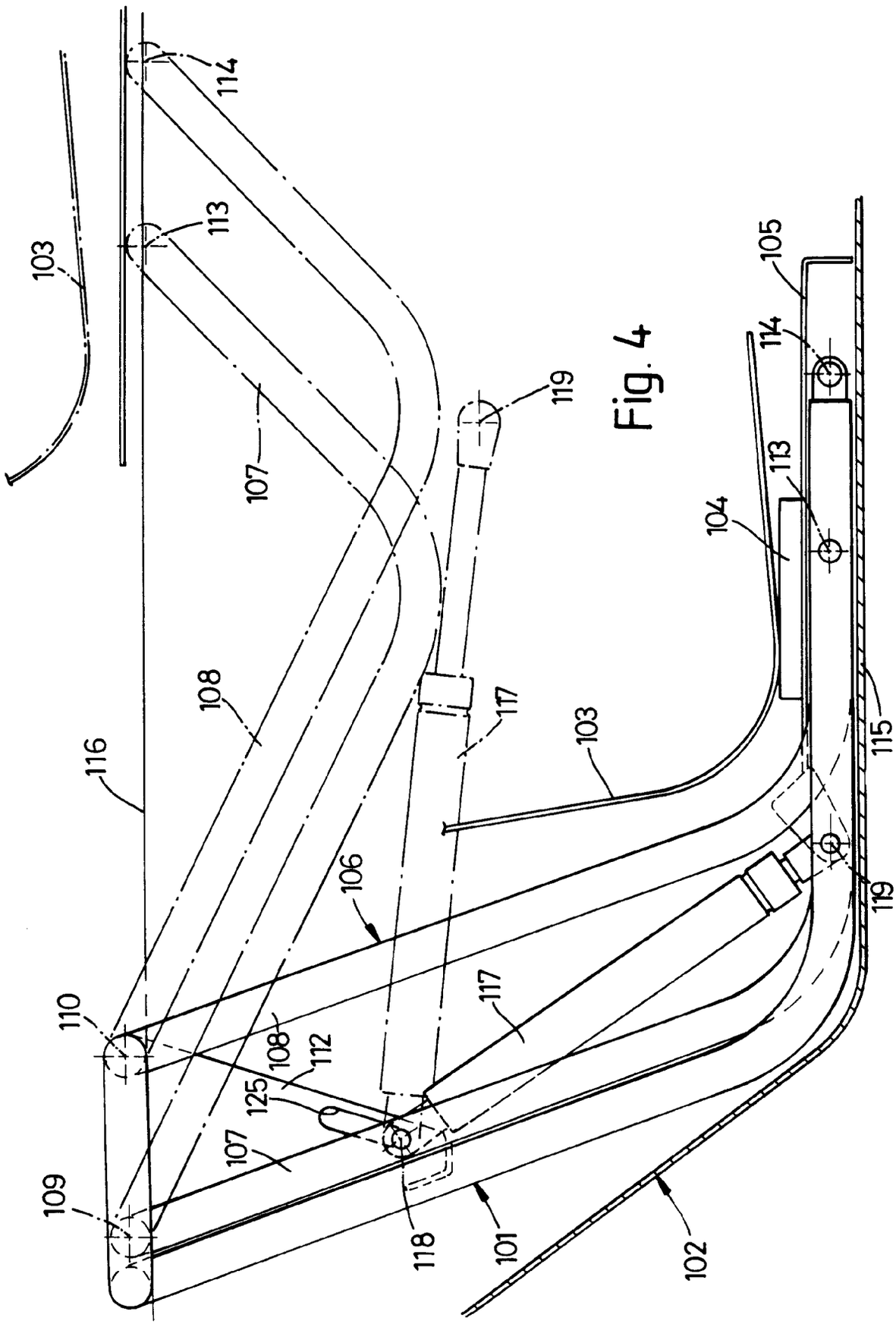
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Fig. 4

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EUROPEAN SEARCH REPORT

Application Number

EP 93 30 2161

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.5)
Y	US-A-3 091 778 (GROSS) * column 3, line 52 - column 4, line 4; figures 1,2,5,6 * ---	1,2,4,5, 7-10	A61G7/10
Y	DE-A-2 730 305 (MESSERLI) * the whole document * -----	1,2,4,5, 7-10	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			A61G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	04 JUNE 1993	BAERT F.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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