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(54) **A POST FOR A FOOTREST OF A WHEELCHAIR OR SHOWER CHAIR, AND A CORRESPONDING FOOTREST AND A WHEELCHAIR OR SHOWER CHAIR**

(57) The present invention relates to a post (10) for holding a heel-support strap of a footrest of a wheelchair or shower chair, the post having an elongated extension along an axis (X-X). The post (10) comprises an upper portion (20) for receiving a heel-support strap, and a lower portion (30) for connecting the post to a footrest. Further, the post has a bendable portion (25) with a shape that makes the post bendable at the bendable portion (25). The invention further relates to a footrest comprising such a post and a shower chair or wheelchair comprising such a footrest.

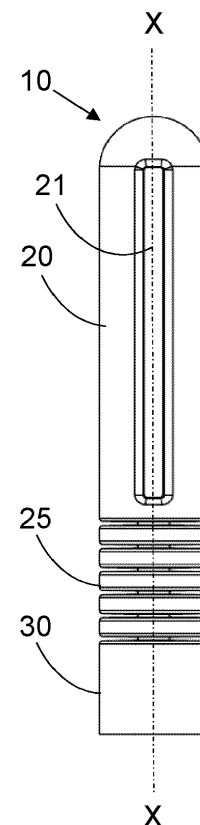


Fig. 4a

Description

Technical field

[0001] The present invention relates generally to a post for a footrest of a wheelchair or shower chair, a footrest comprising such a post and a wheelchair or shower chair comprising such a footrest.

Background art

[0002] Wheelchairs and shower chairs are often equipped with two footrests, each footrest being adapted to support a foot of the user of the wheelchair or shower chair. A shower chair may also be called mobile shower commode or shower commode chair. Said footrests are mounted at the front of the chair, below a seat of the chair and at either side of the chair, in order to fit a normal position of the user's feet, when the user sits on the seat of the chair. Each footrest has a footrest plate on which the user's foot is positioned.

[0003] As shown in US patent 4463985 each footrest may also have a heel-support strap, which purpose is to support the user's heel so that the foot does not slip off the footrest backwards. For this reason, the heel-support strap is positioned at the rear of the footrest plate and above the footrest plate. The strap is connected to metallic posts at each end, the metallic posts being connected to the footrest plate. The strap is telescopically arranged around the metallic post at each end, and the metallic post is realized by a screw and nut combination.

[0004] When using metallic posts for securing the heel-support straps, there has been complaints from users that they hurt their feet against the metallic posts, when for example entering the wheel chair. In order to solve this problem, the footrest presented in European patent EP 2384729 has posts with an upper part made of a flexible plastic material and a lower part that is made of a harder material for fastening the post to the footrest plate. When a user would accidentally hit such a post, the post will flex and thereby it is avoided that the user gets hurt, at least on the upper part of the post.

[0005] However, there is still a need of other different posts for footrests. For example, such a post as in EP 2384729 needs to be manufactured in at least two different materials, one flexible material for the upper part and one rigid material for fastening to the footrest plate.

Summary of invention

[0006] It is an object of the invention to address at least some of the problems and issues outlined above. It is an object of embodiments of the invention to achieve a post for a footrest for a wheelchair or shower chair that can keep a heel-support strap in position at normal use of the footrest but that can flex when being exerted to high strain from e.g. accidental hits from a user's foot. It is possible to achieve these objects and others by using a post, a

footrest and a wheelchair or shower chair as defined in the attached independent claims.

[0007] According to an aspect of the invention, a post for a footrest of a wheelchair or shower chair is described that has a lower portion for attachment to a footrest and an upper portion adapted to receive a heel-support strap. Further, the post has a bendable portion with a shape that makes the post bendable at the bendable portion. Hereby it is achieved that the post bends when getting accidentally hit by the user and the user avoids injuries from hitting a hard, rigid post. Further, by making the post bendable using a shape that makes it bendable instead of a material that makes it bendable as in prior art, the post can be manufactured in one and the same material. Further, at least a part of the bendable portion has a smaller cross-sectional area than a cross-sectional area of the lower portion and also than a cross-sectional area of the upper portion. As the cross-sectional area is smaller in the bendable portion, a smaller cross-sectional area at the bendable portion means that the post is more prone to bending here than at the other portions of the post.

[0008] According to an embodiment, the bendable portion has an accordion shape. i.e. it has first sections with a diameter perpendicular to an extension axis of the post, the diameter being smaller than the diameter that the rest of the post has. The first sections are separated by second sections having a larger diameter than the first sections. The second section may have the same diameter as the rest of the post. Such an accordion shape has proven to provide a durable bendable portion that is bended in a controlled way when being exerted to high strain.

[0009] According to another aspect, a footrest for a wheelchair or shower chair is provided, which footrest comprises a footrest plate and at least one post as described above fastened to the footrest plate by using an attachment device such as a screw. The footrest further comprises a heel-support strap that is attached with one end to the upper portion of one such post. The other end of the heel-support strap may be attached to a similar post or it may be attached to a footrest rod that connects the footrest plate to the rest of the wheelchair or shower chair.

[0010] According to an embodiment, the post has an oblong opening in its upper portion for receiving the end of the heel-support strap. The end of the heel-support strap is then passed through the oblong opening and fastened to a section of the heel-support strap which has not been passed through the opening via Velcro® fastening means attached to the end and to the section.

[0011] According to another aspect, a wheelchair or shower chair is provided, comprising a footrest as described above with at least one post as described above.

[0012] Further possible features and benefits of this solution will become apparent from the detailed description below.

Brief description of drawings

[0013] The invention is now described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view of a shower chair equipped with two footrests according to embodiments of the invention.

Fig. 2 is an enlarged perspective view of the two footrests of the shower chair of fig. 1 when attached to the shower chair.

Fig. 3 is a perspective view of a footrest according to embodiments of the invention.

Fig. 4a is a side view of a post for holding a heel-support strap of a footrest according to embodiments of the invention.

Fig. 4b is a front view of the post of fig. 4a.

Fig. 4c is a cross-sectional view along section A-A of the post of fig. 4b.

Fig. 4d is a view from below of the post of fig. 4a.

Fig. 5 is an enlarged view of a part of fig. 4b, showing the accordion shape according to embodiments in more detail.

Fig. 6 is an enlarged view of the cross-sectional view of fig. 4c showing the accordion shape and the lower portion in more detail, according to an embodiment.

Description of embodiments

[0014] In the following, a detailed description of different embodiments of the invention is described.

[0015] Fig. 1 shows an example of a shower chair 100 having two footrests 1 according to an embodiment of the invention. The shower chair 100 comprises a seat 102 and a backrest 101. The shower chair 100 further comprises a framework 103 connecting the seat 102 to the backrest 101 and holding the shower chair 100 up. To the lowest part of the framework 103 there are wheels 104 attached. Further, the footrests 1 are attached to the framework 103 at a lower front part of the shower chair 100 in order to fit a user's respective left and right foot when a user sits on the seat 102. Even though the shown chair is a shower chair, the invention is also applicable to a wheelchair.

[0016] In the close-up view of fig. 2 it is shown that the footrests 1 each has a footrest plate 2 onto which the user is to put his/her respective left or right foot. Each footrest plate 2 is connected to a respective rod 4, which rods 4 connect the footrests 1 to the framework 103 of

the shower chair 100. Each footrest 1 further has a heel-support strap 5, aka heel strap, to avoid that the user's foot slips off the footrest plate 2 backwards. The heel strap 5 is connected with one end to the rod 4. The footrest 1 further has a post 10 that is connected to a part of the footrest plate 2 distal to where the heel strap 5 connects with the rod 4. In an alternative embodiment, each footrest may have two posts 10 fastened to the footrest plate at opposite end parts of the footrest plate 2. In this alternative embodiment, the heel strap extends between the two posts instead of between the rod 4 and the post 10. The post 10 (or two posts as in the alternative embodiment) is/are arranged at a back part of the footrest plate 2, i.e. the part closest to the framework 103 of the chair.

[0017] Fig. 3 shows one footrest 1 not yet connected to a shower chair 100 or to a wheelchair. One end of the heel strap 5 is attached to the rod 4 by surrounding the periphery of part of the rod 4. The opposite end of the heel strap 5 is thread through an oblong opening 21 (see fig. 4a) of an upper part 20 of the post 10 and folded back around a half of the circumference of the post 10, and attached to a part of the heel strap 5 that has not been thread through the oblong opening 21. The attachment of the heel strap 5 to itself may be via Velcro® fasteners attached to the opposite end and to the part not thread through the oblong opening 21. Hereby the heel strap 5 can be easily released from the post 10 if for some reason the heel strap is not to be used.

[0018] The footrest plate 2 is further equipped with a hole 6 at the position where the post 10 is situated. The footrest further has an attachment device 7 for connecting the post to the footrest plate. Fig. 3 shows the post 10 and the attachment device 7 in an exploded view so that the hole 6 is visible. When connected, the attachment device 7 is fed through the hole 6 and into a corresponding bore 32 (see fig. 4c) of the post 10. The attachment device 7 may be a screw and the bore 32 may have a threading 33 (see fig. 6) corresponding to a threading of the screw 7.

[0019] Figs. 4a-4d show an embodiment of the post 10 for holding a heel strap 5 of a footrest 1 of a wheelchair or shower chair according to the invention. The post 10 has an elongated extension along an axis X-X. The post 10 comprises an upper portion 20 for receiving a heel strap 5, and a lower portion 30 for connecting the post to a footrest plate. Further, the post has a bendable portion 25 with a shape that makes the post bendable at the bendable portion.

[0020] In other words, the shape of the bendable portion is selected so that the post in a mechanical way becomes bendable at the bendable portion. In yet other words, the post is in a mechanical way weakened to bending forces at the bendable portion. The shape of the bendable portion 25 is different from a shape of portions of the post that are outside of the bendable portion, for example different from a shape of the upper portion 20 and different from a shape of the lower portion 30. The

bendable portion 25 extends along a part of a whole length of the post.

[0021] By such an arrangement, if a user of the wheelchair or shower chair accidentally hits the post with for example a foot, the post will flex and the user's foot will not get hurt, or at least such a hit will result in much less pain for the user than if the post would have been rigid. Further, by making the post with a bendable portion that has a shape that makes the post bendable, instead of making a post which upper part is of a flexible plastic material, the whole post can be made in one and the same material, which will result in a less complicated and thereby more cost-efficient post. When the post has a part that is made of a flexible plastic material, as in EP 2384729 there has to be another stiffer material at the lower portion in order to securely connect the post to the footrest plate.

[0022] At least a part of the bendable portion 25 has a smaller cross-sectional area than a cross-sectional area of the lower portion 30 and than a cross-sectional area of the upper portion 20. According to an embodiment, at least a part of the bendable portion 25 has a smaller cross-sectional area than the lower portion 30 and also the upper portion 20. As the cross-sectional area is smaller in the bendable portion, a smaller cross-sectional area at the bendable portion means that the post is more prone to bending here than at the other portions of the post, in other words, the bendable portion has a shape that makes the post bendable at the bendable portion. This is especially true when the material is the same at the bendable portion and the lower portion, or that the material is stiffer at the lower portion than at the bendable portion. The cross-sectional area is an area perpendicular to the axis X-X.

[0023] According to an embodiment, the bendable portion 25 and at least a portion of the lower portion 30 are made of the same material.

[0024] According to an embodiment, and as mentioned in relation to fig. 3, the upper part 20 presents an oblong opening 21 for receiving the heel-support strap 5. Preferably, the oblong opening 21 has a length that is larger than a width of the heel-support strap 5 that is to be inserted into the oblong opening 21. Hereby the heel-support strap does not have to be folded to be inserted into the opening.

[0025] According to another embodiment, the bendable portion 25 is arranged between the upper portion 20 and the lower portion 30. Hereby, the bending of the post will take place shortly above an upper surface of the footrest plate 2. The oblong opening 21 preferably ends before the bendable portion 25 starts, in a direction along the longitudinal axis X-X.

[0026] In the embodiment of the figures, the shape of the bendable portion 25 is an accordion-shape extending along the axis X-X. However, other shapes may apply that makes the post bend in the bendable portion due to its shape. An accordion shape has shown to be good for achieving a controlled bending and at the same time have

good durability. The accordion-shape is preferably arranged concentric with the longitudinal axis X-X.

[0027] According to an embodiment, the post 10 is made of a material that is substantially non-flexible, i.e. non-elastic. That the material of the post is non-elastic signifies that the material has non-elastic properties. The non-elastic material may be a plastic non-elastic material, preferably a thermoplastic material.

[0028] Further, as shown in fig. 4c and 4d, and as mentioned in relation to fig. 3, the lower portion 30 of the post presents a bore 32 for receiving a fastening device 7 connecting the post 10 to the footrest plate 2. The bore 32 enters the post 10 from the underside, i.e. it extends parallel to and preferably coaxial with the axis X-X.

[0029] Further, as shown in fig. 4c and in fig. 6, the bore 32 may have an internal threading 33 for receiving a fastening device 7 realized as a screw adapted to connect the post to a footrest. In other words, when the fastening device is a screw, the screw is fed through the hole 6 of the footrest plate 2 and into the bore 32 where it is screwed into the bore via a co-operation between the internal threading 33 of the bore 32 and a corresponding threading of the screw 7. The internal threading 33 may be made in the same substantially non-flexible material as the rest of the post. As an alternative, to create an even stronger connection, the internal threading 33 may be part of a threading insert made of metal, such as brass. In this alternative, the threading insert is fastened e.g. casted to the post 10, in the bore 32.

[0030] The post shown in the figures have a circular cross-section (see fig. 4d). However, other cross-sectional shapes may be used, such as a square-shaped cross-section or other polygonal shape.

[0031] Fig. 5 shows a close-up view of a part of the accordion-shaped embodiment of the bendable portion 25, and fig. 6 shows, except for a close-up view of the accordion-shaped portion, also an embodiment of the lower portion 30.

[0032] The accordion-shaped bendable portion 25 may be made up from a plurality of first sections 26 having a first length l_1 in a direction perpendicular to the axis X-X. The plurality of first sections 26 are mutually separated by a plurality of second sections 27 having a second length l_2 perpendicular to the axis X-X. The first length l_1 is smaller than the second length l_2 . Further, the first length l_1 is smaller than a third length l_3 of the post perpendicular to the axis X-X outside the bendable portion 25, for example at the lower portion 30. According to the embodiment shown in the figures, the third length l_3 is the same as the second length l_2 . According to an alternative, the first length l_1 may be different for different first sections 26 of the bendable portion 25. Also or alternatively, the second length l_2 may be different for different second sections 27.

[0033] According to an embodiment, the first sections 26 each has a first width w_1 parallel to the axis X-X, and the second sections 27 each has a second width w_2 parallel to the axis X-X. The second width w_2 is larger than

the first width w_1 . According to an alternative, the first width w_1 may be different for different first sections 26 of the bendable portion 25. Also or alternatively, the second width w_2 may be different for different second sections 27. For example, there may be shorter second widths at the second sections that are situated in the middle of the bendable portion than for the second sections closest to the upper portion 20 and the lower portion 30, in order to facilitate bending in the middle.

[0034] According to another embodiment, the second sections 27 are tapered in a direction away from the axis X-X. Preferably, the second sections are only slightly tapered, so that a side of a first second section has an angle α towards a side of another second section facing the side of the first second section. By such a tapering of the second sections, the bending will be easier performed at the accordion-shaped portion.

[0035] According to an alternative of the accordion-shaped embodiment, the bendable portion 25 is made bendable by being tapered in the axial direction from both the upper portion 20 and the lower portion 30 towards a middle of the bendable portion.

[0036] Although the description above contains a plurality of specificities, these should not be construed as limiting the scope of the concept described herein but as merely providing illustrations of some exemplifying embodiments of the described concept. It will be appreciated that the scope of the presently described concept fully encompasses other embodiments which may become obvious to those skilled in the art, and that the scope of the presently described concept is accordingly not to be limited. Reference to an element in the singular is not intended to mean "one and only one" unless explicitly so stated, but rather "one or more." All structural and functional equivalents to the elements of the above-described embodiments that are known to those of ordinary skill in the art are expressly incorporated herein by reference and are intended to be encompassed hereby. Moreover, it is not necessary for an embodiment to address each and every problem sought to be solved by the presently described concept, for it to be encompassed hereby.

Claims

1. A post (10) for holding a heel-support strap of a footrest of a wheelchair or shower chair, the post having an elongated extension along an axis (X-X), the post (10) comprising:

an upper portion (20) for receiving a heel-support strap, and
a lower portion (30) for connecting the post to a footrest, **characterized in that** the post has a bendable portion (25) with a shape that makes the post bendable at the bendable portion, wherein at least a part of the bendable portion (25) has a smaller cross-sectional area than a

cross-sectional area of the lower portion (30) and also than a cross-sectional area of the upper portion (20).

2. Post according to claim 1, wherein the bendable portion (25) and at least a portion of the lower portion (30) are made of the same material.
3. Post (10) according to any of claims 1-2, wherein the bendable portion (25) is arranged between the upper portion (20) and the lower portion (30).
4. Post (10) according to any of the preceding claims, wherein the shape of the bendable portion (25) is an accordion-shape extending along the axis (X-X).
5. Post (10) according to claim 4, wherein the accordion-shaped bendable portion (25) is made up from a plurality of first sections (26) having a first length (l_1) perpendicular to the axis (X-X) and being mutually separated by a plurality of second sections (27) having a second length (l_2) perpendicular to the axis (X-X), the second length (l_2) being larger than the first length (l_1).
6. Post (10) according to claim 5, wherein the first sections (26) have a first width (w_1) parallel to the axis (X-X), and the second sections (27) have a second width (w_2) parallel to the axis (X-X), and the second width (w_2) is larger than the first width (w_1).
7. Post (10) according to any of claims 5-6, wherein the second sections (27) are tapered in a direction away from the axis (X-X).
8. Post (10) according to any of the preceding claims, wherein the post (10) is made of a material that is substantially non-elastic.
9. Post (10) according to claim 8, wherein the substantially non-elastic material is a plastic non-elastic material, preferably a thermoplastic material.
10. Post (10) according to any of the preceding claims, wherein the lower portion (30) presents a bore (32) for receiving a fastening device (7) that is to connect the post to a footrest plate.
11. Post (10) according to claim 10, wherein the bore (32) has an internal threading (33) for receiving a fastening device (7) realized as a screw adapted to connect the post to a footrest plate.
12. Post (10) according to any of the preceding claims, wherein the upper part (20) presents an oblong opening (21) for receiving a heel-support strap (5).
13. Footrest (1) for a wheelchair or a shower chair, the

footrest (1) comprising:

a footrest plate (2),
a post (10) according to any of claims 1-12,
which lower portion (30) is fastened to the foot- 5
rest plate (2), and
a heel-support strap (5) connected at one end
to the upper portion (20) of the post (10).

14. Wheelchair or shower chair (100) comprising at least 10
one footrest (1) according to claim 13.

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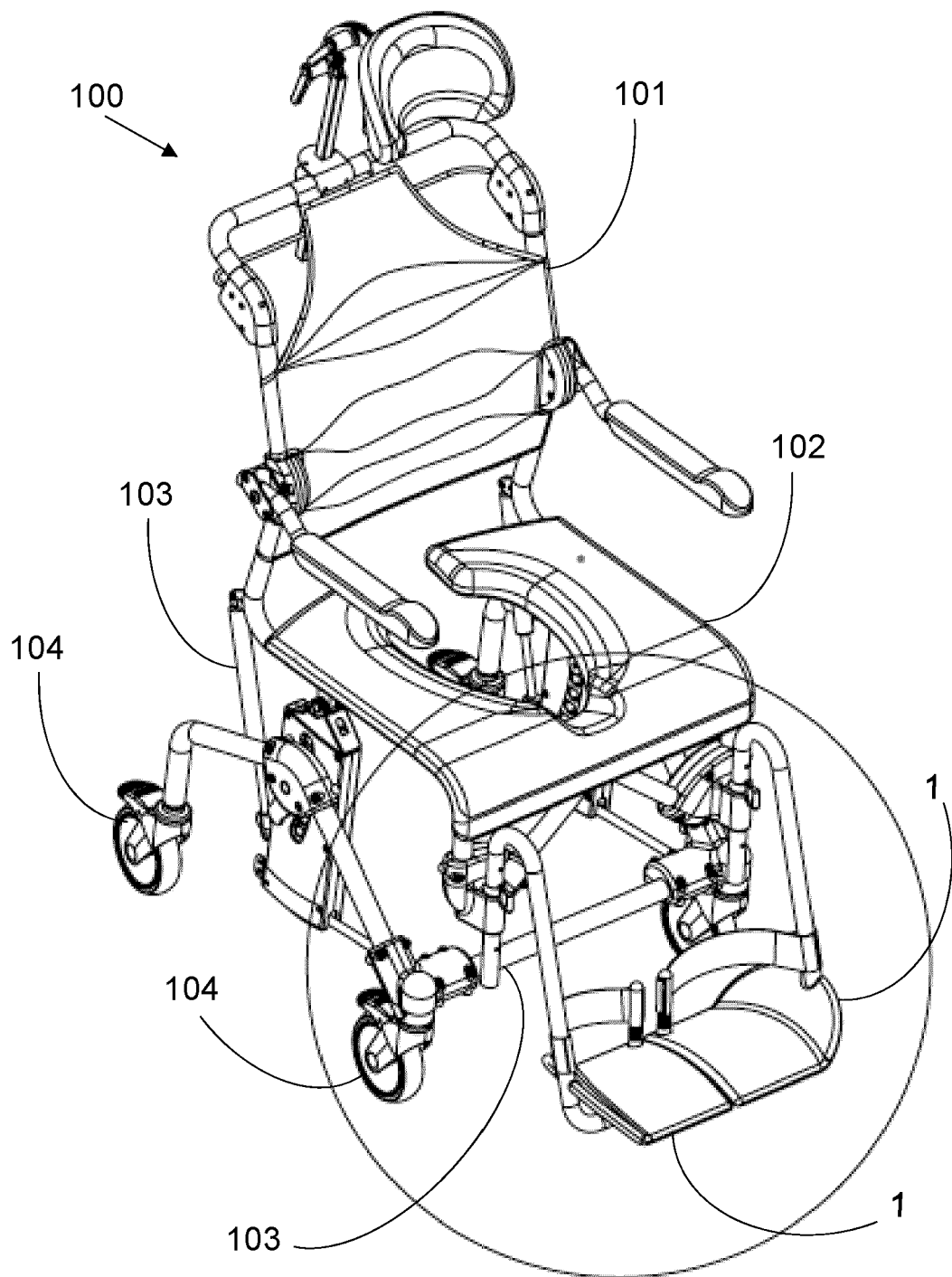


Fig. 1

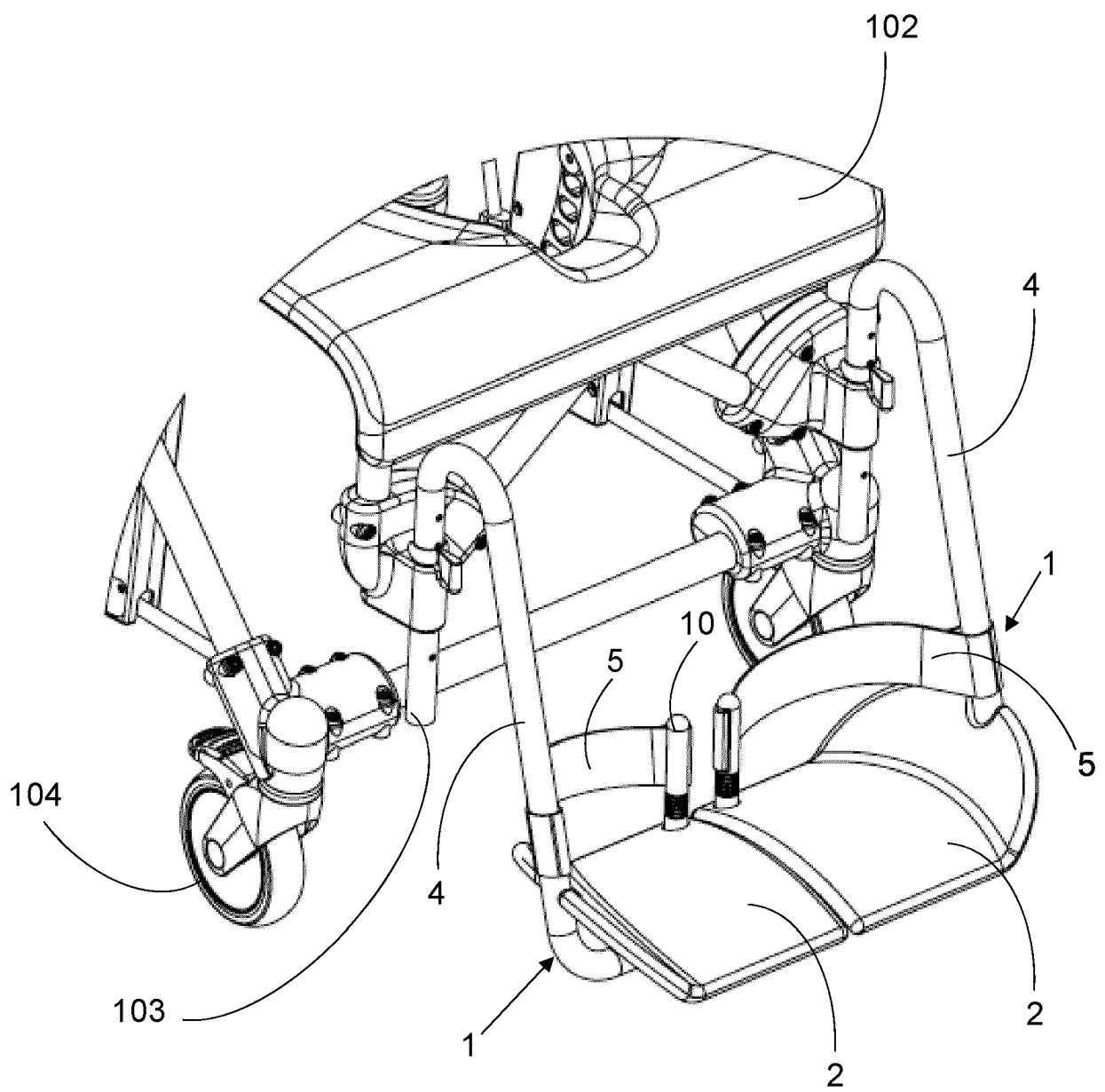


Fig. 2

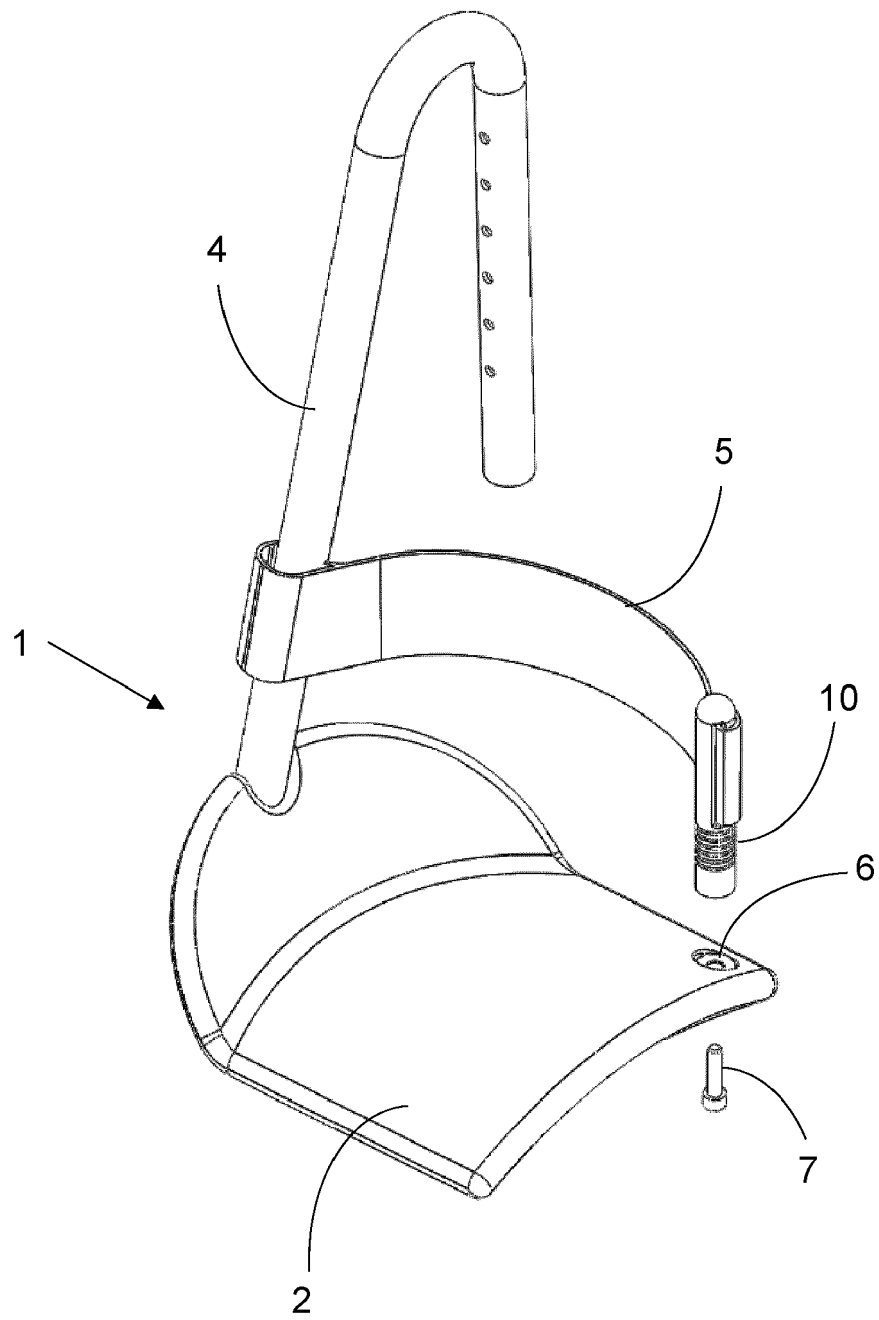


Fig. 3

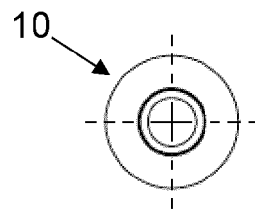


Fig. 4d

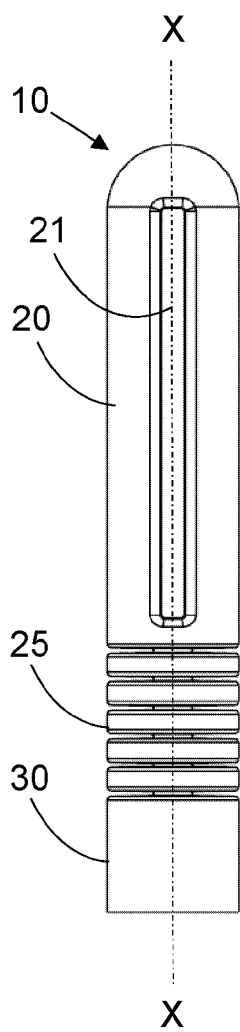


Fig. 4a

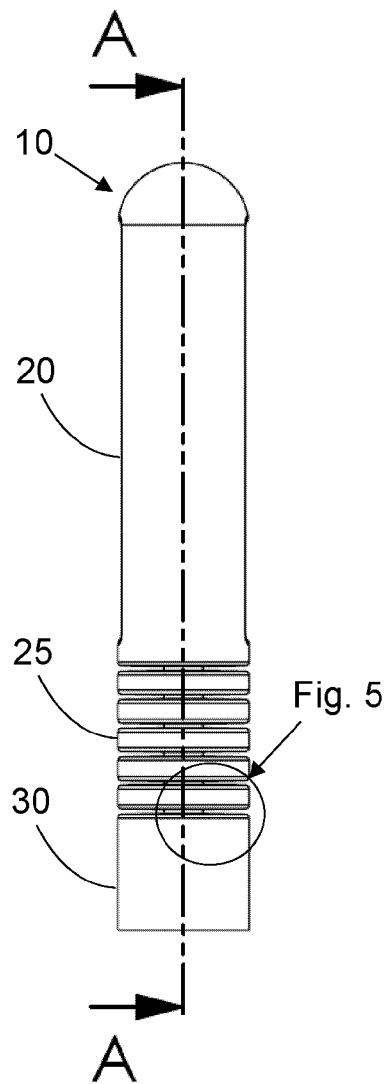


Fig. 4b

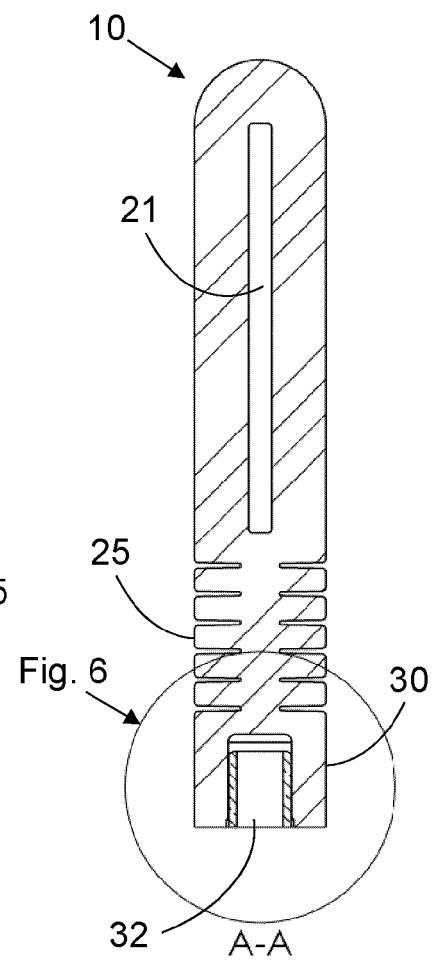


Fig. 4c

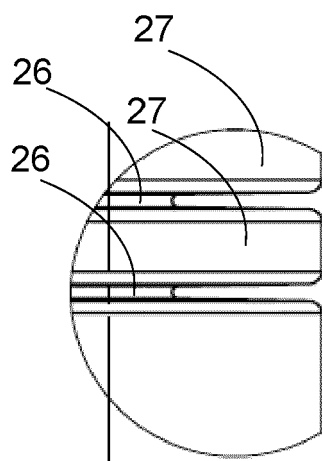


Fig. 5

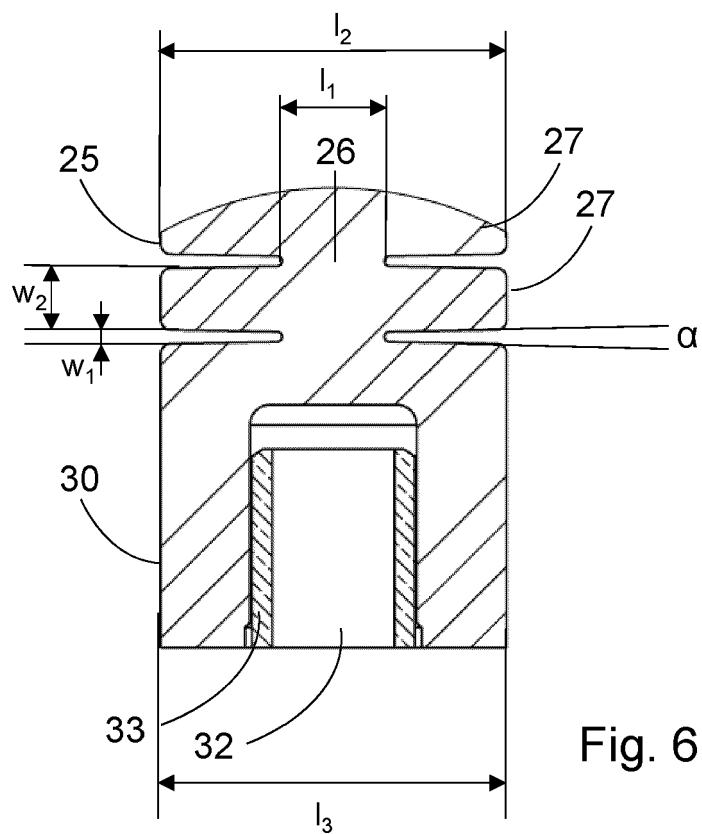


Fig. 6



EUROPEAN SEARCH REPORT

 Application Number
 EP 20 19 7474

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 8 February 2021	Examiner Kousouretas, Ioannis
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 EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 20 19 7474

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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