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(54) **Hinge**

(57) The invention relates to a hinge, comprising:
- a first hinge leaf;
- a second hinge leaf rotatable around a rotation axis relative to the first hinge leaf;
- rising means with a first rising part arranged fixedly on the first hinge leaf and a second rising part arranged coaxially with the first rising part and with the rotation axis,
* wherein the second rising part is axially displaceable relative to the first rising part,
* wherein the second rising part is also coupled displace-

ably to the second hinge leaf, and
* wherein co-acting rising surfaces are provided between the first and second rising parts such that, through rotation of the two rising parts relative to each other, the rising parts are displaced axially of each other; and

- spring means arranged between the second hinge leaf and the second rising part for the purpose of urging the second rising part in axial direction toward the first rising part.

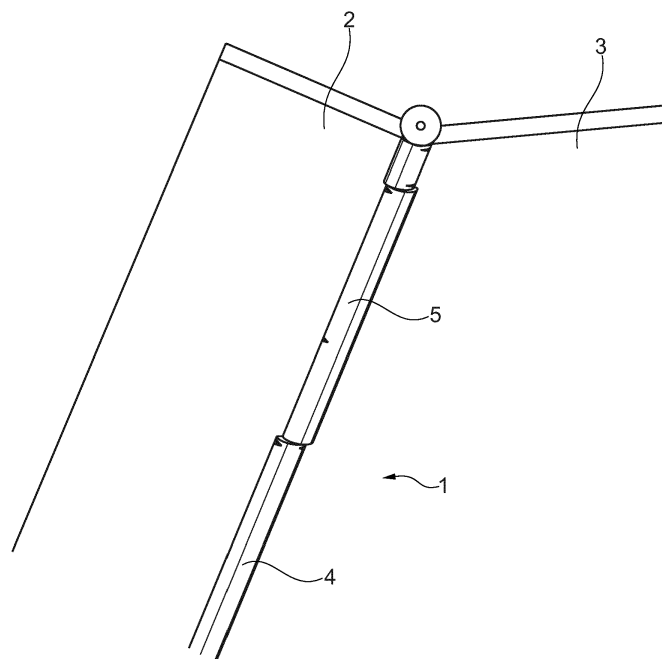


Fig. 1

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Description

[0001] The invention relates to a hinge, in particular a door hinge, suitable for application in public spaces such as swimming pool changing rooms, campsite toilet areas, theatres and cinemas.

[0002] Hinges used in such applications have to satisfy a number of requirements. An important requirement is that such a hinge is safe for fingers. This means that no spaces in which a finger can become caught are created or are present in the hinge during pivoting.

[0003] It is further desirable that no openings are present in the hinge through which it is possible to look into for instance a changing cubicle or toilet cubicle from outside.

[0004] It is in addition recommended that a hinge be self-closing in such applications. A door will hereby shut automatically. It is however not desirable here for this self-closing to take place at great speed, thereby closing the door with a loud bang.

[0005] Finally, there is an aesthetic desire to be able to swing a door shut in the same plane as the surrounding wall using a hinge which meets the above stated requirements, thereby creating one smooth surface. This in contrast to hinges wherein doors close as lipped doors.

[0006] Different hinges are known in the prior art for the above-mentioned applications, and are also referred to as self-closing hinges.

[0007] NL 2000469 thus describes a self-closing hinge with two hinge leaves, each provided with a rising surface. When the hinge is pivoted open, the hinge leaf which is connected to the door will move upward. As soon as the door is released, the hinge leaf will, due to the weight of the door, slide back downward along the rising surface and simultaneously rotate, whereby the door will close automatically.

[0008] The drawback of this construction is that the door gathers speed as it closes and comes to a stop with a bang against the door post. In addition, this construction is only suitable for lipped doors and will move upward as the hinge rotates, this not always being aesthetic.

[0009] Further described for the purpose of preventing a finger becoming caught in the hinge of NL 2000469 is that a protective cover is arranged over the hinge.

[0010] US 2009265889 describes a door hinge with an integrated spring for closing a door. Provided in this hinge is a torsion spring which is coupled via a coupling to the hinge leaves of the hinge. When this hinge is opened the torsion spring will build up tension until the hinge has been opened through a determined angle. The coupling will then disconnect.

[0011] When the hinge is closed, the spring energy of the torsion spring will only be released within the above stated determined angle. In order to now prevent a door still slamming shut too hard, a hydraulic damper is further accommodated in the hinge.

[0012] The drawback of US 2009265889 is however that the self-closing function of the hinge is not available

over the whole angle of pivot. In addition, the construction of this hinge is complex and expensive due to the large number of components.

[0013] WO 2004029395 further describes a hinge constructed from two different tubular extrusion profiles. Arranged tangentially on each extrusion part is a flange of U-shaped cross-section in which a wall panel or door panel can be inserted. The hinge pins of this hinge are arranged on the outermost ends.

[0014] The advantage of this hinge is that, irrespective of the position of the hinge, there is no viewing opening available at all.

[0015] A drawback is however that there is no space in the hinge for a self-closing mechanism, and that two separate extrusion profiles are used to assemble one hinge.

[0016] It is now an object of the invention to provide a hinge, wherein the above stated drawbacks are reduced or even obviated while it is possible to comply as far as possible with the stated wishes.

[0017] This object is achieved with a hinge according to the invention, the hinge comprising:

- a first hinge leaf;
- a second hinge leaf rotatable around a rotation axis relative to the first hinge leaf;
- rising means with a first rising part arranged fixedly on the first hinge leaf and a second rising part arranged coaxially with the first rising part and with the rotation axis,

* wherein the second rising part is axially displaceable relative to the first rising part,

* wherein the second rising part is also coupled displaceably to the second hinge leaf, and

* wherein co-acting rising surfaces are provided between the first and second rising parts such that, through rotation of the two rising parts relative to each other, the rising parts are displaced axially of each other; and

- spring means arranged between the second hinge leaf and the second rising part for the purpose of urging the second rising part in axial direction toward the first rising part.

[0018] In the hinge according to the invention the hinge leaves remain stationary as seen in axial direction of the rotation axis because the second rising part can displace axially relative to the second hinge leaf. In addition, the spring means ensure that the second rising part is urged in axial direction, thereby resulting in a simple and therefore inexpensive construction.

[0019] Because the second rising part is urged toward the first rising part, it will displace along the rising surface and thereby rotate. Since the second rising part is coupled to the second hinge leaf, the second hinge leaf will thereby also rotate relative to the first hinge leaf, whereby

a self-closing hinge is obtained.

[0020] The hinge can moreover be easily provided with a covering housing because there is only an axial displacement of the second rising part relative to the second hinge leaf.

[0021] In a preferred embodiment of the hinge according to the invention the spring means comprise a gas spring, which gas spring is provided with a damper for damping the end of the stroke of the gas spring.

[0022] A gas spring can easily be used because the spring means act axially on the second rising part. Gas springs are moreover known wherein a so-called soft-close function is added. This means that the gas spring is damped at the end of its stroke, whereby the gas spring reaches its end position slowly in the final part of the stroke. The hinge will hereby rotate more slowly in the final part of the stroke and a door arranged on the hinge will for instance close gently without appreciable noise. Rubber stop caps will for instance also be subjected to less load because the door closes more gently.

[0023] In a further preferred embodiment of the hinge according to the invention the first and the second rising parts are cylindrical parts which slide telescopically in each other, wherein the rising surfaces are provided as two co-acting spiral-shaped grooves which are each arranged on a cylindrical surface of the rising parts.

[0024] A compact construction of the hinge can be obtained by the telescopic construction in combination with the co-acting spiral-shaped grooves, whereby a hinge according to the invention will be similar to known hinges in respect of dimensions.

[0025] An additional advantage of the co-acting spiral-shaped grooves is that the first and second rising parts can only be taken apart by means of a rotation. In the case the hinge is mounted between a wall and a door, this means that the door cannot be detached simply by lifting the door.

[0026] In yet another preferred embodiment of the hinge according to the invention the second hinge leaf comprises a cylindrical tubular housing, which cylindrical tubular housing is provided on the inner surface with longitudinal guide grooves, and wherein the second rising part is provided on the outer side with longitudinal guide ribs and slides telescopically in the cylindrical housing.

[0027] A reliable guiding is obtained by means of the cylindrical housing with second rising part guided telescopically therein. The cylindrical housing of the second hinge leaf moreover screens the moving rising part, whereby the hinge at the same time becomes safe for fingers.

[0028] Not giving the guide ribs the same thickness and arranging them asymmetrically makes it possible to ensure that the hinge can only be mounted in one way, thereby minimizing errors during mounting.

[0029] In a further embodiment of the hinge according to the invention the first and second hinge leaf are formed from an identical extrusion profile with a cylindrical, tubular part and a flange arranged tangentially on the tu-

bular part for the purpose of mounting the hinge on a wall or door.

[0030] The production costs for the hinge remain low through the use of the same identical extrusion profile for both hinge leaves. The tangential attachment of the flange to the tubular part further ensures that the hinge can rotate through 180° while it is arranged between for instance a wall and a door.

[0031] These and other features of the invention are further elucidated with reference to the accompanying drawings.

Figure 1 shows a perspective view of an embodiment of a hinge according to the invention.

Figure 2 shows the hinge according to figure 1 with exploded parts.

Figures 3A and 3B show the hinge according to figure 1 with partially exploded parts in two different positions.

[0032] Figure 1 shows a perspective view of an embodiment of a hinge 1 according to the invention. This hinge is arranged between a wall part 2 and a door part 3.

[0033] Hinge 1 has a first hinge leaf 4 to which wall part 2 is attached and a second hinge leaf 5 on which door part 3 is arranged.

[0034] As will be apparent from figure 2, which shows the hinge according to figure 1 with exploded parts, both hinge leaves 4, 5 are made from an identical extrusion profile. Arranged on the tubular body of extrusion profile 4, 5 is a flange 6 with which hinge leaves 4, 5 can be mounted on a wall part 2 or door part.

[0035] Mounted in the end surface of hinge leaf 4 is a first rising part 7, wherein a collar 8 prevents rising part 7 sliding too far into extrusion profile 4. The protruding part of rising part 7 is provided with a spiral-shaped groove 9 which co-acts with spiral-shaped groove 10 arranged on the inner side of the second rising part 11.

[0036] Longitudinal ribs 12 are provided on the outer side of the second rising part 11. Arranged in the second hinge leaf 5 in the tubular part of profile 5 is a guide bush 13 which is provided on the inner side with longitudinal grooves 14. The second rising part 11 can hereby slide telescopically in the second hinge leaf 5 while it is coupled for the purpose of rotation to hinge leaf 5. Guide bush 13 is further provided with a collar 16 so that guide bush 13 cannot slide too far into profile 5.

[0037] Guide bush 13 and hinge leaf 5 can optionally be embodied as one whole, although embodiment in two parts makes it possible to select a suitable material for guide bush 13 which provides for a good guiding, while extrusion profile 5 can be made of for instance aluminium.

[0038] Further provided between the second rising part 11 and the guide bush is a gas spring 15 which urges the second rising part 11 toward the first rising part 7.

[0039] Figures 3A and 3B show the hinge according to figure 1 with partially exploded parts in two different positions. Because the operation of the hinge cannot be

seen from outside in the fully mounted situation, in figures 3A and 3B the second hinge leaf 5 is axially displaced over a fixed distance together with guide bush 13. Collar 16 of guide bush 13 normally lies against collar 8 of the first rising part 7.

[0040] Figure 3A shows the starting position of hinge 1. Flange 6 of the second hinge leaf 5 is directed upward here and flange 6 of the first hinge leaf 4 is directed downward.

[0041] When door 3 is now opened, the second hinge leaf 5 will rotate, whereby the second rising part 11 will also rotate. Owing to the spiral-shaped grooves 9, 10 the second rising part 11 will hereby also displace axially and slide telescopically in guide bush 13, whereby gas spring 15 will also be compressed.

[0042] When door 3 is released, gas spring 15 will press the second rising part 11 back again and the second hinge leaf 5 will rotate back again to the position as shown in figure 3A.

[0043] By selecting a gas spring 15 wherein the final part of the stroke is damped, a damping of the closing of door 3 can thus also be obtained.

3. Hinge as claimed in claim 1 or 2, wherein the first and the second rising parts are cylindrical parts which slide telescopically in each other, wherein the rising surfaces are provided as two co-acting spiral-shaped grooves which are each arranged on a cylindrical surface of the rising parts.

4. Hinge as claimed in any of the foregoing claims, wherein the second hinge leaf comprises a cylindrical tubular housing, which cylindrical tubular housing is provided on the inner surface with longitudinal guide grooves, and wherein the second rising part is provided on the outer side with longitudinal guide ribs and slides telescopically in the cylindrical housing.

5. Hinge as claimed in any of the foregoing claims, wherein the first and second hinge leaf are formed from an identical extrusion profile with a cylindrical, tubular part and a flange arranged tangentially on the tubular part for the purpose of mounting the hinge on a wall or door.

Claims

1. Hinge, comprising:

- a first hinge leaf;
 - a second hinge leaf rotatable around a rotation axis relative to the first hinge leaf;
 - rising means with a first rising part arranged fixedly on the first hinge leaf and a second rising part arranged coaxially with the first rising part and with the rotation axis,
- * wherein the second rising part is axially displaceable relative to the first rising part,
 - * wherein the second rising part is also coupled displaceably to the second hinge leaf, and
 - * wherein co-acting rising surfaces are provided between the first and second rising parts such that, through rotation of the two rising parts relative to each other, the rising parts are displaced axially of each other; and
- spring means arranged between the second hinge leaf and the second rising part for the purpose of urging the second rising part in axial direction toward the first rising part.

2. Hinge as claimed in claim 1, wherein the spring means comprise a gas spring, which gas spring is provided with a damper for damping the end of the stroke of the gas spring.

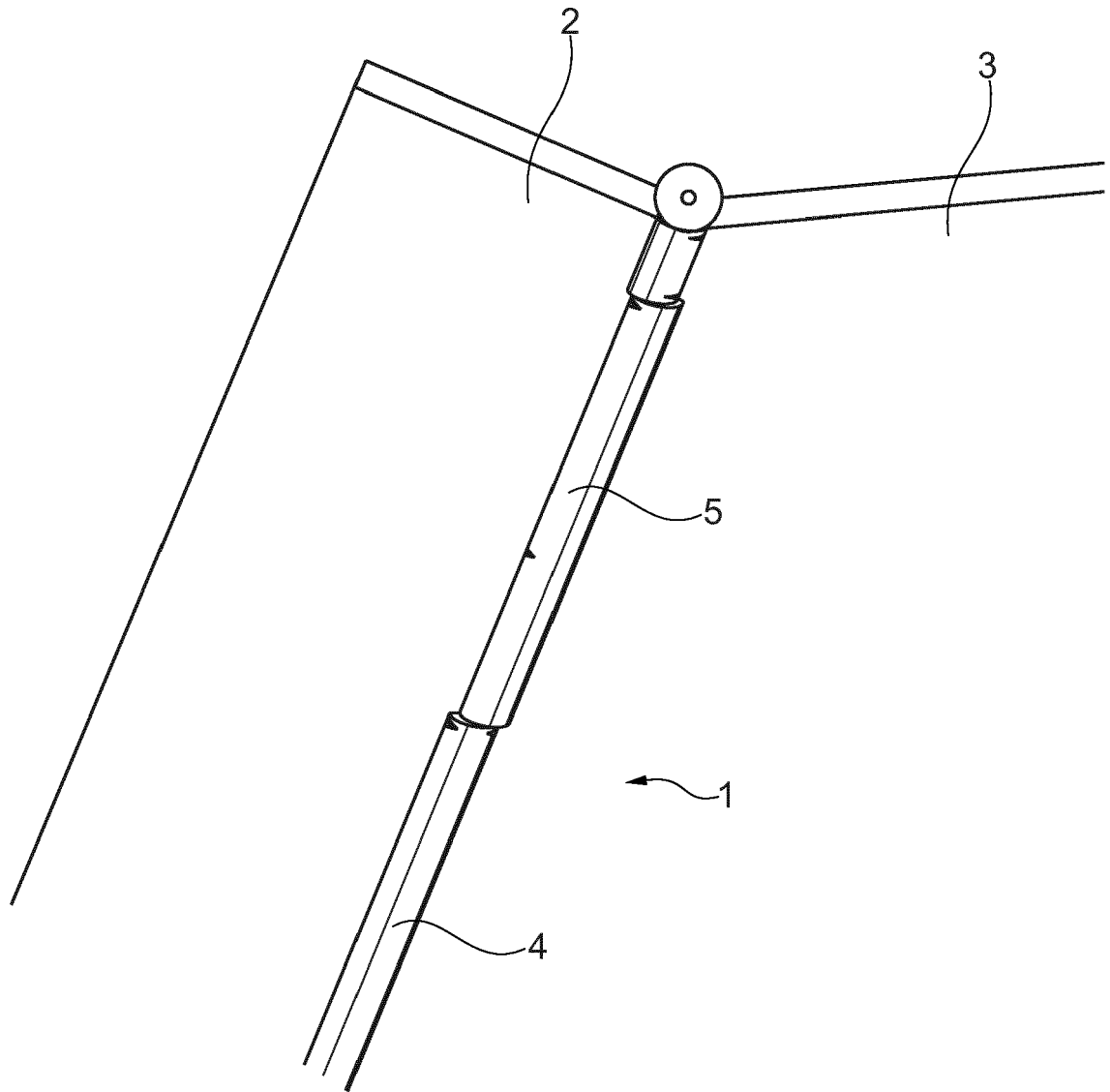


Fig. 1

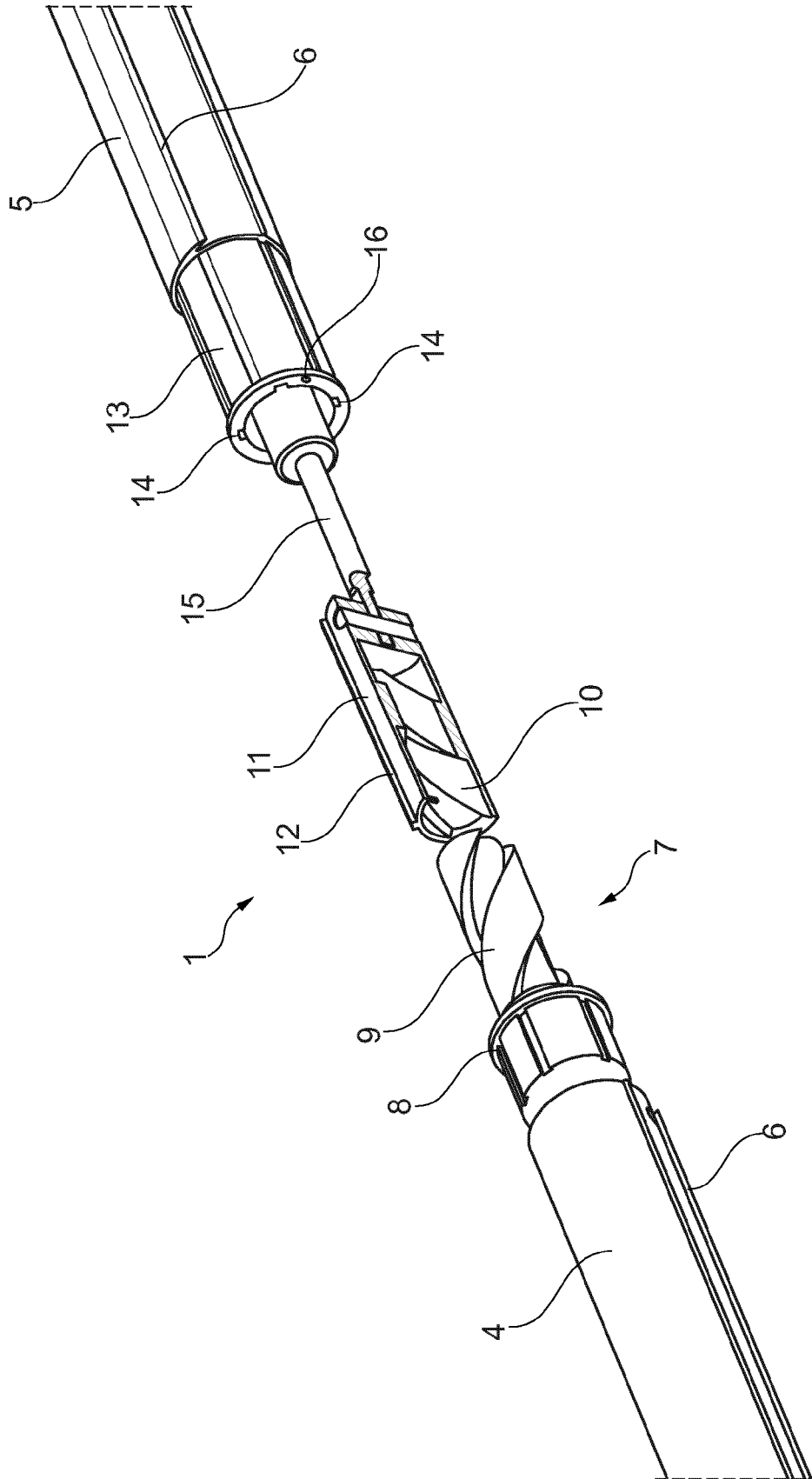
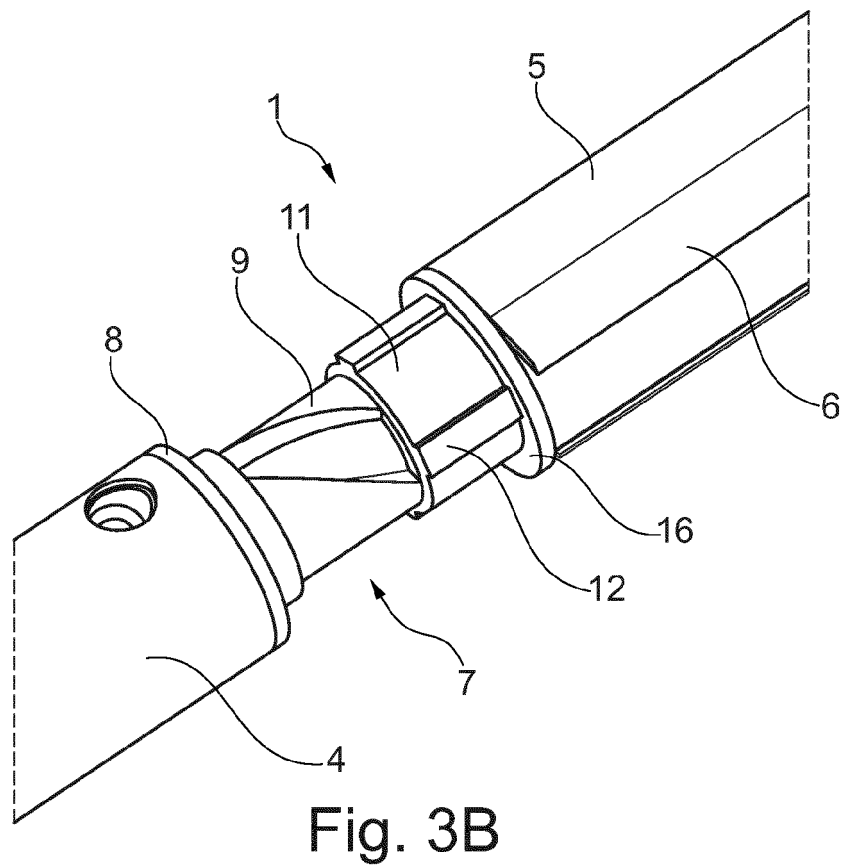
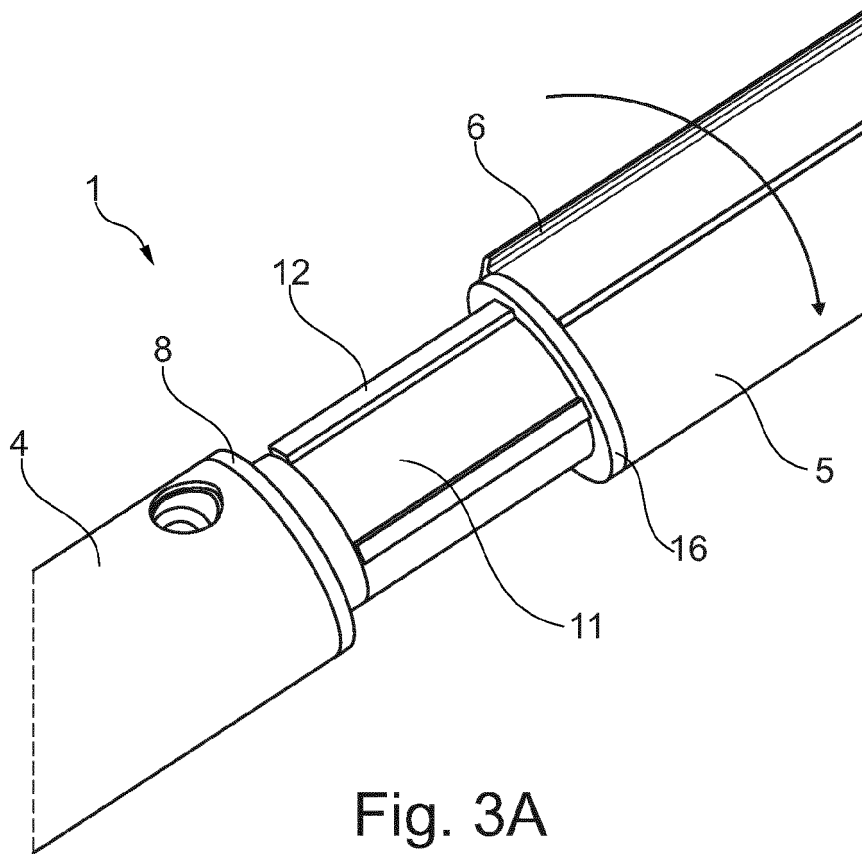


Fig. 2





EUROPEAN SEARCH REPORT

Application Number
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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2006/230573 A1 (KAO CHING C [TW] KAO CHING CHIH [TW]) 19 October 2006 (2006-10-19)	1,2,4,5	INV. E05F1/06 E05F1/12
A	* paragraph [0030] - paragraph [0045]; claims 1-11; figures 3-9 *	3	
X	WO 01/66894 A1 (SOLE TECK INC [KR]; MIN BYOUNG DUK [KR]) 13 September 2001 (2001-09-13)	1,3-5	
A	* page 7, line 14 - page 10, line 10; figures 1-4 *	2	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			E05F
Place of search		Date of completion of the search	Examiner
The Hague		8 May 2015	Berote, Marc
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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ON EUROPEAN PATENT APPLICATION NO.**

EP 14 19 6133

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2006230573 A1	19-10-2006	NONE	
WO 0166894 A1	13-09-2001	KR 200190938 Y1 WO 0166894 A1	01-08-2000 13-09-2001

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EPO FORM P0459

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- NL 2000469 [0007] [0009]
- US 2009265889 A [0010] [0012]
- WO 2004029395 A [0013]