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(54) **FALL PROTECTION**

(57) The invention relates to a device for protection of a fall of a person, which device comprises:

- a pole with a base end and a top end;
- a ground anchor attached to the base end of the pole for anchoring the pole to the ground;
- a safety line arranged to the top end of the pole; and

- at least two elongate support legs each arranged with one end between the base end and the top end of the pole, wherein the elongate support legs extend at a positive angle from the pole in the direction of the base end of the pole.

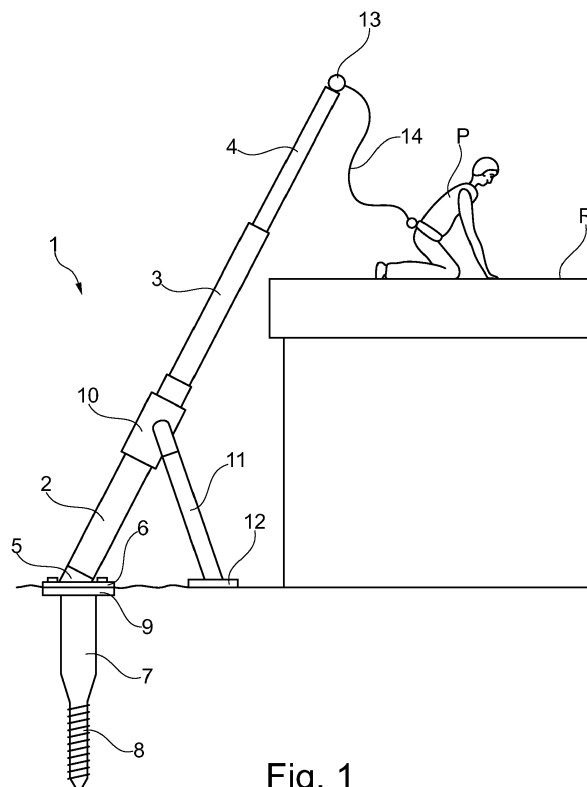


Fig. 1

Description

[0001] The invention relates to a device for protection of a fall of a person, which device comprises:

- a pole with a base end and a top end;
- a ground anchor attached to the base end of the pole for anchoring the pole to the ground;
- a safety line arranged to the top end of the pole.

[0002] Such a device is for example known from US 20140008511. In this publication a device for protection of a fall of a person is disclosed in which a pole is inserted with the base end into a ground anchor embedded into the soil. A boom is attached to the top end of the pole, such that the attachment point for the safety line can be positioned over a roof top or the like, where the person needs to work and needs to be secured.

[0003] The disadvantage of the use of a boom is that the boom can swing away, such that the attachment point is no longer positioned correctly. This could provide a risk for the person being secured to the device.

[0004] Another disadvantage of this prior art, is that the pole needs to be sufficient strong to withstand the bending moment and forces, when a person accidentally hangs with the full weight to the safety line to prevent the person from falling. Especially when the pole is relative long to secure the person at large heights, the bending moment near the base end could become very large, requiring a heavy and strong pole, which hinders the handling of the device.

[0005] A device according to the preamble is also known from ES 2292285. In this publication a device is proposed in which a pole is attached with a base end to the ground floor of a building and is attached with a center portion to a landing floor. As a result, the pole extends upwardly and away from the building, requiring a boom arranged to the top end of the pole.

[0006] It is not always possible to attach a pole to a building and the use of a boom still provides the disadvantage, that the boom can swing away. Again handling of this device according to the prior art is still not easy.

[0007] It is an object of the invention to reduce or even remove the above mentioned disadvantages.

[0008] This object is achieved according to the invention with a device according to the preamble, which device is characterized by at least two elongate support legs each arranged with one end between the base end and the top end of the pole, wherein the elongate support legs extend at a positive angle from the pole in the direction of the base end of the pole.

[0009] With the device according to the invention, the pole is anchored to the ground with a ground anchor, while at least two elongate support legs support the pole, more or less like a tripod. As a result, the pole extends upwardly under an angle with the direction of gravity. This allows one to position the top end of the pole over a roof top or the like, where the person needs to work and needs

to be secured, without the need of an additional boom.

[0010] Furthermore, the use of a ground anchor in combination with the at least two support legs allow for a free-standing device, which is not dependent on the availability of a building to attach the device to, as known from the prior art.

[0011] Also, due to the support legs being attached between the top end and base end of the pole, the pole is supported not only at the base end by the ground anchor, but also at a distance from the base end, which reduces the bending moment in the pole, enabling a lighter construction of the pole, which benefits the handling of the device according to the invention.

[0012] Furthermore, the pole cannot rotate relative to the ground anchor, preferably by a clamp arranged on the ground anchor, but also by the support legs. This ensures, that when a person falls from a roof, or the like, the pole will not rotate and ensure that the person swings back to the roof, such that the person can climb on again.

[0013] In a preferred embodiment of the device according to the invention the pole is telescopic having an outer tube part and at least one inner tube part extending telescopically into the outer tube part, wherein the at least two elongate support legs are arranged to the outer tube part.

[0014] Using a telescopic construction for the pole enables one to reduce the length of the pole by sliding the telescopic parts into each other. Also, the widest part will be adjacent to the bottom end, such that the highest strength can be provided by this part, while, the parts, which are subjected to smaller forces can be reduced in size to slide telescopically into each other.

[0015] An embodiment in which the pole parts are connected like tent poles, by sliding an end of a pole part into the adjacent pole part provides for a simple construction.

[0016] In a further preferred embodiment of the device according to the invention the pole is a fiber reinforced plastic pole. Fiber reinforced plastic, such as for example carbon fiber, provides a relative high strength against a low weight. This further contributes to easy handling of the device according to the invention.

[0017] Yet another embodiment of the device according to the invention further comprises a sleeve, arranged around the pole, wherein the at least two elongate support legs are detachable mounted to the sleeve. The sleeve provides an easy way to mount the at least two legs to the pole. The sleeve could also be arranged displaceable along the pole, such that the angle of the pole with the direction of gravity can be set. This allows for more flexibility in positioning the pole near a building and in positioning the top end of the pole above a roof or the like.

[0018] In another embodiment, the sleeve is fixed to the pole and the legs are length adjustable to compensate for an uneven support base or to adjust the angle of the pole.

[0019] In still a further preferred embodiment of the de-

vice according to the invention the ground anchor is a screw pile comprising a shaft with a helical flange arranged around the shaft and a mounting head arranged to one end of the shaft, wherein the base end of the pole is detachable mounted to the mounting head.

[0020] A screw pile can be arranged in soil by screwing the shaft via the helical flange into the soil. The screw pile provides a solid anchor, even if there is no solid ground to attach the pole to. This enables one to install the device according to the invention on almost any base.

[0021] The ground anchor can also be provided as a pothole in for example a concrete floor, in cases where the device is to be used frequently.

[0022] In yet another embodiment of the device according to the invention the other end of each elongate support leg is provided with a flange for bolting the elongate support legs to the ground.

[0023] These and other features of the invention will be elucidated in conjunction with the accompanying drawings.

Figure 1 shows a schematic view of an embodiment of the device according to the invention.

Figure 2 shows a perspective view of the device according to figure 1 in disassembled state.

Figure 3 shows a second embodiment of the device according to the invention.

Figure 4 shows a detail of the top part of the embodiment of figure 3.

[0024] Figure 1 shows an embodiment 1 of the device according to the invention. This embodiment 1 has a telescopic pole 2, 3, 4. The pole parts 2, 3, 4 can slide telescopically into each other. The outer tube 2 of the pole 2, 3, 4 is provided at the base end 5 with a flange 6. With this flange 6, the pole 2, 3, 4 can be mounted on a concrete floor or the like, or, as shown in the figure, to a screw pile having a shaft 7, a helical flange 8 and a mounting head 9 to which the flange 6 of the pole 2, 3, 4 is mounted. This screw pile 7, 8, 9 provides a stable ground anchor in soil for the pole, such that no stable ground, like a concrete floor is required.

[0025] A sleeve 10 is secured around the outer tube 2 and provides for attachment points for the elongate support legs 11. Each leg 11 has a base plate 12 with which the support legs 11 can abut to the ground and relieve the pole 2, 3, 4 from part of the forces and bending moments.

[0026] The top end of the pole 2, 3, 4 is provided with an eye 13 to which a safety line 14 is attached. This safety line 14 is used to secure a person P working on a roof R of a building.

[0027] Figure 2 shows the device 1 in disassembled state. The parts of the pole 2, 3, 4 are slid into each other, such that a compact part is provided, which is easily handled and transported. Also the sleeve 10 and the elongate support legs 11 can be handled separately.

[0028] The eye 13 is arranged on a bushing 15, which

can be fitted into the open end of the upper part 4 of the pole 2, 3, 4.

[0029] Figure 3 shows a second embodiment 20 of the device according to the invention. This embodiment 20 has a ground anchor 21 arranged in the ground. A foot 22 is inserted into the ground anchor 21. This foot 22 is angled, such that the bottom pole part 23, which is inserted into the foot 22, extends under a positive angle from the ground anchor 21.

[0030] A top pole part 24 is shifted in the bottom pole part 23 and the collar 25 ensures that the top pole part 24 is kept in position relative to the bottom pole part 23.

[0031] Furthermore, a sleeve 26 is attached to the bottom pole part 23, which sleeve 26 allows for attachment of legs 27 via a bayonet fitting 28. At the free end of the leg 27, a foot plate 29 is arranged, which can be adjustable by a thread 30 and a nut 31.

[0032] The foot 22 is kept in position in the ground anchor 21 by a flange 32 arranged to the foot 22, which flange 32 is confined by the flange 33 of the ground anchor 21 and a locking plate 34.

[0033] Figure 4 shows a detail of the top part of the embodiment of figure 3. The top pole part 24 is provided at the bottom with a steel bushing 35 and at a distance with a second steel bushing 36 to which the flange 25 is arranged. These steel bushings 35, 36 provide for a tight fit in the carbon fiber bottom pole part 23 and also ensure that the stress between the top pole part 24 and the bottom pole part 23 is equalized.

[0034] The top end of the top pole part 24 is also provided with a steel bushing 37, which is provided with a loop 38 for attachment of a safety line.

Claims

1. Device for protection of a fall of a person, which device comprises:

- a pole with a base end and a top end;
- a ground anchor attached to the base end of the pole for anchoring the pole to the ground;
- a safety line arranged to the top end of the pole;

characterized by

- at least two elongate support legs each arranged with one end between the base end and the top end of the pole, wherein the elongate support legs extend at a positive angle from the pole in the direction of the base end of the pole.

2. Device according to claim 1, wherein the pole is telescopic having an outer tube part and at least one inner tube part extending telescopically into the outer tube part, wherein the at least two elongate support legs are arranged to the outer tube part.

3. Device according to claim 1 or 2, wherein the pole is a fiber reinforced plastic pole.
4. Device according to any of the preceding claims, further comprising a sleeve, arranged around the pole, wherein the at least two elongate support legs are detachable mounted to the sleeve. 5
5. Device according to any of the preceding claims, wherein the ground anchor is a screw pile comprising a shaft with a helical flange arranged around the shaft and a mounting head arranged to one end of the shaft, wherein the base end of the pole is detachable mounted to the mounting head. 10
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6. Device according to any of the preceding claims, wherein the other end of each elongate support leg is provided with a flange for bolting the elongate support legs to the ground. 20
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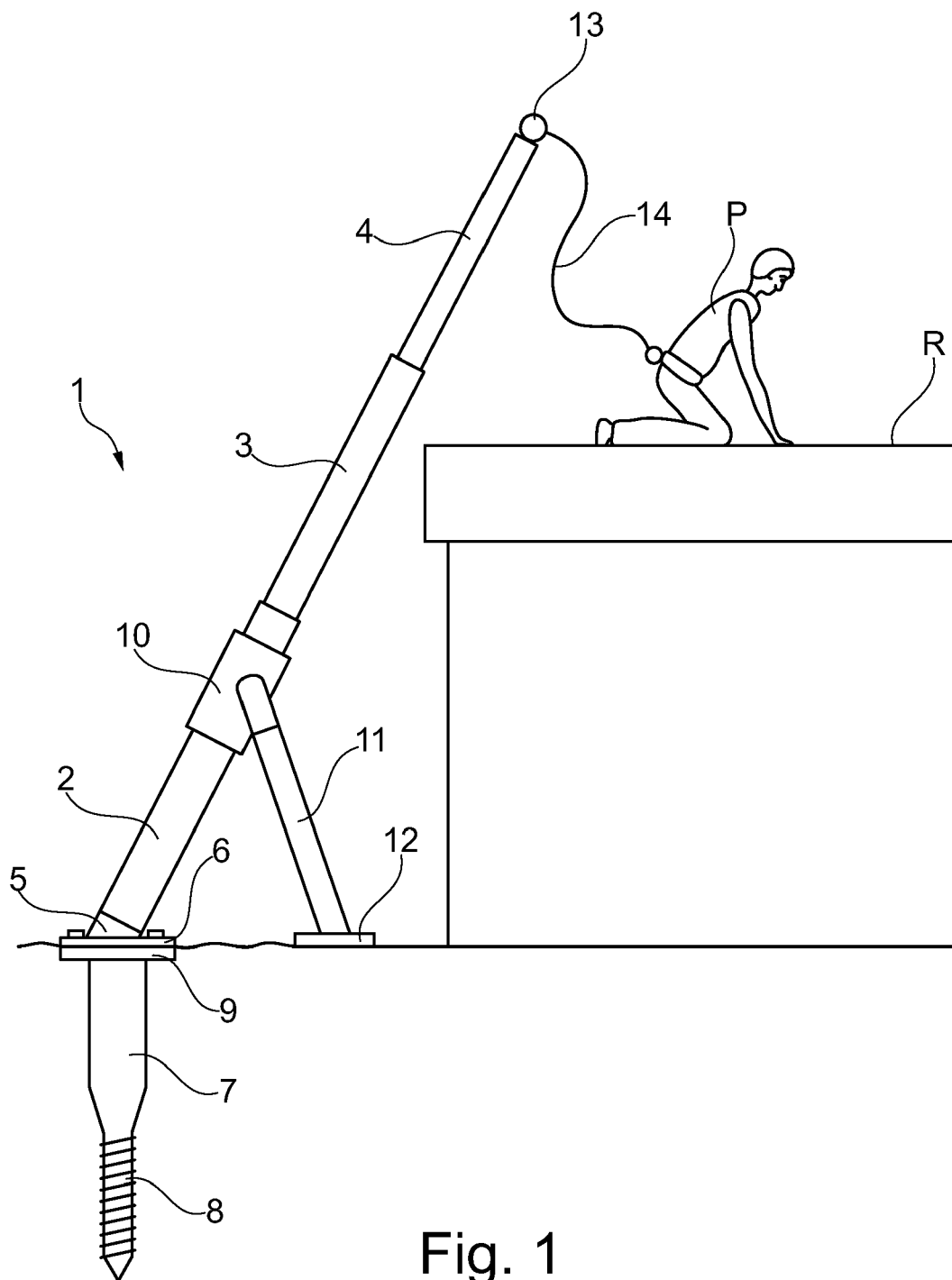


Fig. 1

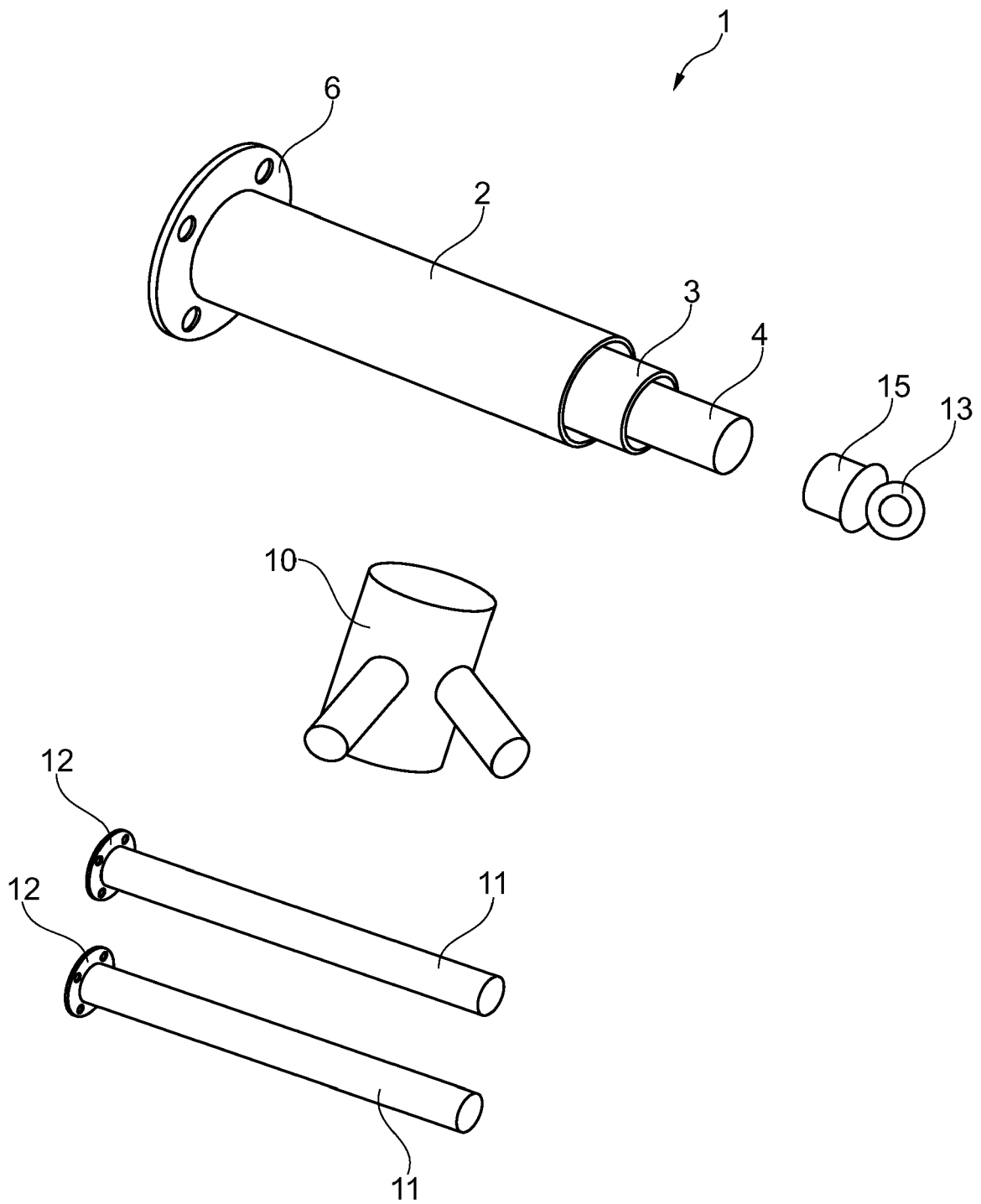


Fig. 2

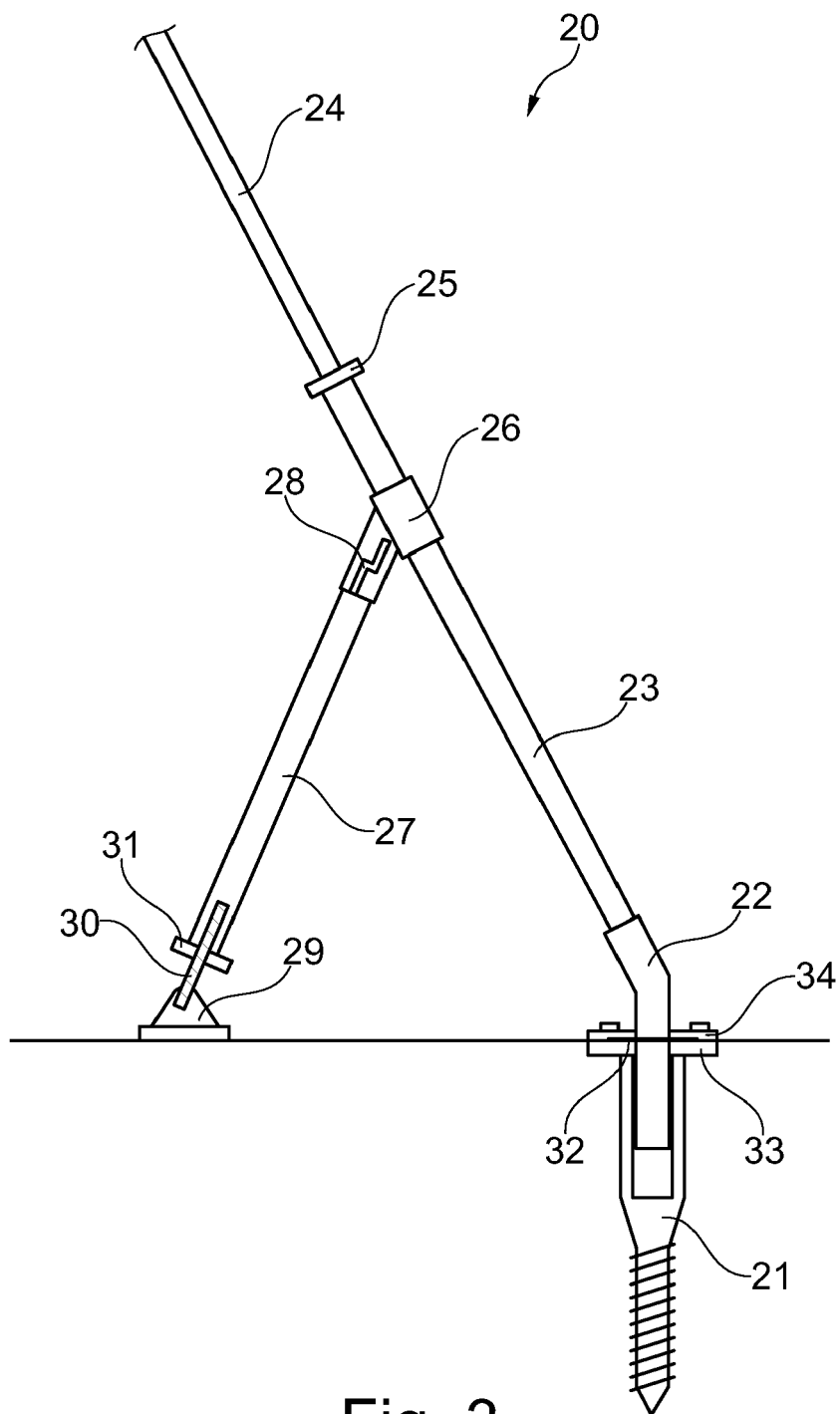


Fig. 3

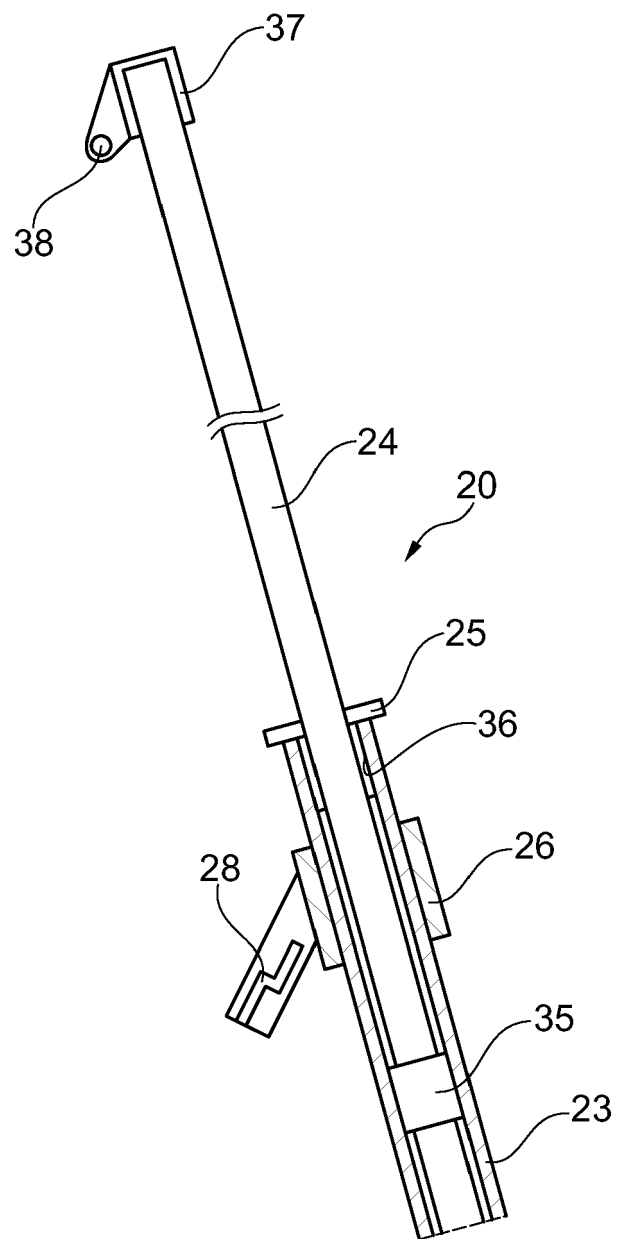


Fig. 4



EUROPEAN SEARCH REPORT

Application Number
EP 16 16 1916

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Y	* figures 1-3 *	5	
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A	GB 2 400 133 A (UNIQUE CONCEPTS LTD [CA]) 6 October 2004 (2004-10-06) * page 1, line 22 - page 2, line 2; figure 3 *	3	TECHNICAL FIELDS SEARCHED (IPC) E04G A62B B66C
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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 29 July 2016	Examiner Baumgärtel, Tim
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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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 16 16 1916

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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