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(71) Applicant: **Safe S.r.l. Unipersonale**
25046 Cazzago San Martino (BS) (IT)

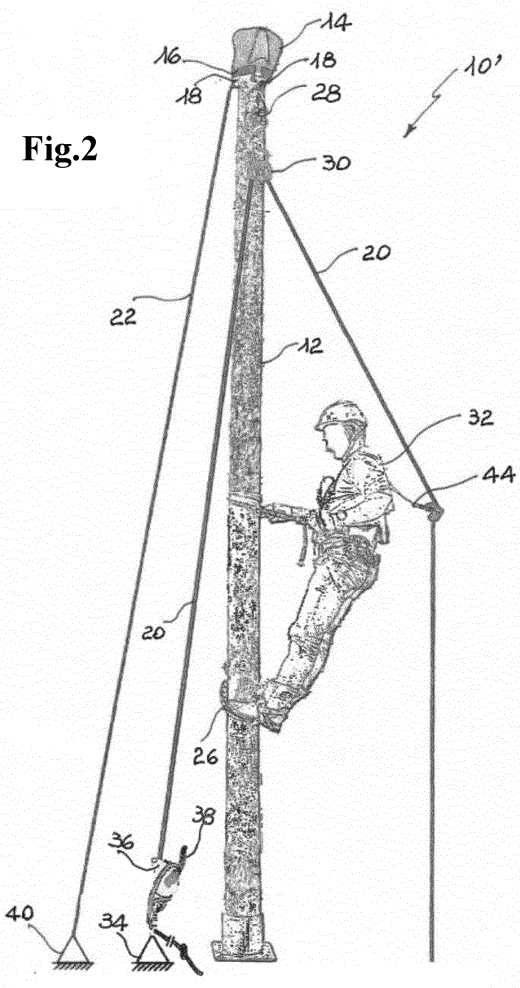
(72) Inventor: **BOSSINI, Carlo**
25046 CAzzago San Martino (BS) (IT)

(74) Representative: **Lecce, Giovanni**
LECCE & CALCIATI S.r.l. Internazionale Brevetti
Via Ariberto 24,
20123 Milan (IT)

(54) **APPARATUS FOR ANCHORING ON VERTICAL PILINGS INTEGRATING A DEVICE FOR IMMEDIATE RESCUING**

(57) An apparatus for anchoring on vertical pilings integrating a device for the immediate rescuing of an injured operator (32), comprising a cup bearing element (14), fitted on the upper end of a pole (12) on which the operator himself/herself rises, provided with a stiffening frame (16) and one or more rings (18) for an ascent rope (20) and for a stabilizing cord (22) anchored to the ground; one of the rings (18) of the cup bearing element (14) is connected to a connector (28), to the lower end of which a pulley (30) is secured on which the same ascent rope (20) slides connected to the harness of the operator (32). One end of said rope (20) is constrained to the ground through an anchor (34), in proximity of which a rescue descender (36) is connected to the same rope.

Fig.2



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Description

[0001] The present invention refers to an apparatus for anchoring on vertical pilings, integrating an immediate rescuing device.

[0002] More specifically, the present invention refers to an apparatus to protect against falls for vertical pilings, equipped with a device to allow the rescue of the operator assigned to activities at height when emergency conditions occur.

[0003] As is well known, on the vertical pilings of overhead telephone lines and electrical outlets, maintenance, inspection or repair work and similar are often necessary, requiring access at height and temporary parking on the pilings themselves by an operator who remains standing or suspended several metres above the ground. It is therefore necessary to provide suitable means and equipment to ensure maximum safety for the operator, while at the same time allowing him a wide freedom of movement.

[0004] Several solutions are known in this regard, which, however, only allow to prevent the operator's falls from the height; in this regard, the aerial or elevating work platforms, typically carried by a vehicle, and the invention described in the Italian patent No. 1,410,923 filed in the name of the same applicant are to be mentioned. The above mentioned solutions, however, entail a major inconvenience, as they do not include means to allow the rescue of an operator who, following a fall, illness or other type of accident, remains suspended at height and is therefore not in a position to descend to the ground autonomously; in such circumstances, on the other hand, the timeliness of the rescue operation is a parameter of fundamental importance in order to prevent the onset of the so-called inert suspension syndrome, a condition also known as harness hang syndrome (HHS), the development of which leads, in the event of failure to intervene, to death due to cardiovascular insufficiency and cerebral ischemia in an average time of 15-20 minutes.

[0005] US 3,647,171 describes a device designed to guide an operator on a vertical piling to the ground by means of a rope that is redirected downwards with a pulley; in this way, rescuers are in a safe position on the ground while the operator is being lowered. From GB 2 376 883 is known a fall arrest equipment including a safety harness to support one person and two ropes attached to the harness. The second rope, which is connected to the first one, can be easily released at the top and attached to a lifeline.

[0006] FR 2 836 635 refers to a mountaineering cable brake capable of causing a high braking force in the event of a fall.

[0007] Another drawback of the well-known solutions refers to a second parameter of fundamental importance, to be considered and kept in mind during the management of an emergency, i.e. protection from risks for the rescuer. The rescuer, in fact, could carry out the rescue manoeuvres of an injured operator who is suspended in his harness only after access at height by means of a kit equipped with a hoist; this kit allows the lifting of an injured person following a fall, the release from the fall arrest device on which the injured person was suspended and the lowering to the ground. This equipment, however, requires to be installed above the injured person and therefore exposes the rescuer to the concrete risk of a fall from a height during the whole time necessary to carry out the manoeuvres.

[0008] The purpose of the present invention is to overcome the drawbacks complained of above.

[0009] More in particular, the purpose of the present invention is to provide an apparatus for anchoring on vertical pilings in which a device is integrated to allow the rescue of the operator in charge of activities at height when emergency conditions occur.

[0010] A further purpose of the invention is to provide an apparatus to protect from possible risks the rescuer who comes to the rescue of an injured and suspended at height operator, in compliance with the reference standards and obligations regarding the implementation of a rescue plan for emergencies that may arise during work on such pilings.

[0011] A further purpose of the invention is to provide an apparatus to allow the rescuer to carry out the rescue intervention of the injured person from the ground.

[0012] Last but not least, the purpose of the invention is to provide the rescuer with an apparatus that allows the rescuer to carry out the rescue operations of the injured operator quickly and easily, without the need of significant physical effort.

[0013] A further purpose of the invention is to provide an apparatus as defined above to ensure a high level of strength and reliability over time, such as to be easily and economically feasible.

[0014] These and other purposes are achieved by the apparatus of the present invention for anchoring on vertical pilings in accordance with the main claim.

[0015] The constructive and functional characteristics of the apparatus for anchoring on vertical pilings object of the present invention will be more clearly comprehensible from the detailed description below in which reference is made to the appended drawings which show a preferred and non-limiting embodiment and wherein:

Figure 1 schematically represents a frontal view of the apparatus for anchoring on vertical pilings according to the known technique;

Figure 2 schematically represents a frontal view of the apparatus for anchoring on vertical pilings integrating the immediate rescue device according to the invention;

Figure 3 schematically represents a frontal view of the same apparatus on which the operator is suspended as a result of a fall or injury;

Figure 4 schematically represents a frontal view of the same apparatus on which the rescuer intervenes from the ground to perform any preliminary lifting ma-

noeuvres of the injured person;

Figure 5 schematically represents a frontal view of the same apparatus on which the rescuer intervenes from the ground to perform the next lowering manoeuvre of the suspended operator;

Figure 6 shows schematically, in front view, the components suitable for carrying out the lifting and subsequent lowering manoeuvres to rescue the injured operator by the rescuer.

[0016] With initial reference to figure 1, an anchor apparatus on vertical pilings, globally corresponding to the solution protected by the same applicant in the aforementioned Italian patent, is indicated with 10 and includes a cup bearing element 14 with stiffening frame 16 and with rings 18 in which the ascent rope 20 and a stabilizing cord 22 with anchor 40 on the ground are inserted and hooked; the cup bearing 14 is fitted on the upper end of the pole, indicated with 12, by means of a telescopic rod or equivalent means. Rope 20 is attached to the operator's harness by means of a guided type fall arrest device 44, shown in Figures 1 and 2, and the operator's ascent along the pole 12 can be facilitated by the use of crampons 26. The apparatus for anchoring on vertical pilings integrating an immediate rescuing device according to the invention is indicated with 10' in Figures 2 and 3, in which the components common with the known solution of Figure 1 are indicated with the same numerical references. In said apparatus 10', one of the rings 18 of the cup bearing element 14 defines the organ for the connection of a connector 28, with rotary anchor designed above all to avoid the accidental twisting of the rope 20, at the lower end of which a pulley 30 is fixed. On said pulley the same rope runs connected to the harness of the operator, schematically shown with 32. A branch of said rope 20 is inserted into a rescue descender 36, preferably installed and secured close to the ground through an anchor 34 and thus easily reached and operated by the rescuer, indicated with 42. Said rescue descender 36 consists of a device conforming to the UNI EN 341 standard, which identifies said devices that can be used in rescue operations where the intervention requires the transport of one or more persons from a higher position to a lower level. The rescue descender 36 includes a lever 38 to control the sliding of the rope 20, the overall length of which is at least equal, or preferably greater, than three times the height of pole 12, in order to be gradually released by the rescuer 42 if necessary and to lead the operator 32 to the ground safely. Once the adjustment of the rope 20 has been carried out, guaranteeing a length of the free branch of the rope downstream of the descender at least equal to the height of the pole, the lever 38 of the descender 36 is placed in the blocking position and, preferably, a safety knot is also made at the free end of the rope to avoid the danger of a possible incorrect assessment of the height of pole 12, on which the maximum lowering distance of the injured operator 32 depends. The stabilization cord 22, one end of which is connected to one of the rings 18 of the cup bearing 14, is tied to the ground through the anchor 40 placed near the anchor 34 of the rope 20.

[0017] Figure 2 illustrates the normal condition in which operator 32 is in the normal working position on pole 12, with one end of the stabilization cord 22 and the rope 20 respectively connected to anchor 40 and descender 36, which in turn is tied to anchor 34; the harness of operator 32 is connected to rope 20, in its part descending from pulley 30 and opposite to that connected to descender 36.

[0018] Figure 3 illustrates, instead, the condition in which the operator 32, for example due to sudden illness, is suspended on the rope 20, detached from pole 12 and immobile; this condition therefore requires the intervention of the rescuer 42, who (see figure 5) operates the lever 38 of the rescue descender 36 moving it forward and backwards in the direction indicated by the arrow "F" and then letting the rope 20 progressively slide in the direction indicated by the arrows "F1".

[0019] As shown in figure 5, the operator 32 is progressively lowered until he touches the ground, thus making it possible to release him from the harness and head him towards the rescue vehicle. All this in terms of total safety also for the rescuer 42, who operates only from the ground and is therefore not forced to carry out any rescue operations at height, with the related risks of an accidental fall.

[0020] According to a further advantageous feature, the present invention foresees, if necessary, the possibility to lift the injured operator 32 before lowering him to the ground, as shown in figure 4; this happens thanks to the provision of a locking handle 24 that interacts with the pulley 30. This manoeuvre may be necessary, for example, if the crampons of the injured operator 32 remain locked in pole 12 and therefore make it impossible to lower the injured operator 32 immediately. The locking handle 24 is installed on the rope branch 20 between the rescue descender 36 and the top of pole 12; a hole on the locking handle 24 allows the pulley 30, through connector 28, to be connected to the free rope branch 20. A hoist is thus created which reduces the force required by the rescuer 42 to lift the injured operator 32. A deviation of the rope 20 is also made, to allow the rescuer 42 to manoeuvre it in better working conditions: in fact, the free branch of the rope 20 now comes from above and the rescuer 42 can use his weight during the lifting manoeuvre of the injured operator 32.

[0021] As may be seen from the above, the advantages which the invention achieves are evident.

[0022] In addition to making it possible and easy to ascend poles 12 and gain stability on them by an operator 32, the apparatus of the present invention integrates an immediate rescue device; this device allows a rescuer 42 to intervene from the ground, therefore in total safety, to bring the necessary help to the operator who is not in conditions of self-management and quickly bring him back to the ground to give him the necessary assistance.

[0023] Despite the invention having been described

above with reference to one of its possible embodiments, given solely by way of a non-limiting example, numerous modifications and variants will appear evident to a person skilled in the art in the light of the above description. The present invention therefore sets out to embrace all the modifications and variants which fall within the sphere and scope of the following claims.

Claims

1. An apparatus for anchoring on vertical pilings integrating a device for the immediate rescuing of an injured operator (32), comprising a cup bearing element (14), fitted on the upper end of a pole (12) on which the operator himself/herself rises, provided with a stiffening frame (16) and one or more rings (18) for an ascent rope (20) and for a stabilizing cord (22) anchored to the ground, **characterized in that** a connector (28) is connected to one of the rings (18) of the cup bearing element (14), to the lower end of which a pulley (30) is secured on which the same ascent rope (20) slides connected to the harness of the operator (32), one end of said rope (20) being inserted into a rescue descender (36).

2. The apparatus according to claim 1, **characterized in that** the rescue descender (36) is constrained to the ground through an anchor (34) which can be operated by a rescuer (42).

3. The apparatus according to claim 2, **characterized in that** the rescue descender (36) comprises a lever (38) suitable for the manual control of the sliding of the rope (20), the overall length of which is at least equal to three times the height of the pole (12) and defines a useful free length for the descent of the injured operator (32) equal to at least the height of the same pole (12).

4. The apparatus according to claim 1, **characterized in that** the stabilizing cord (22), one end of which is connected to one of the rings (18) of the bearing element (14), is constrained to the ground through an anchor (40) placed in a position close to the anchor (34) of the rope (20).

5. The apparatus according to claim 1, **characterized in that** the connector (28) connected to one of the rings (18) of the cup bearing element (14) is provided with a rotary anchor.

6. The apparatus according to claim 1, **characterized in that** it comprises a locking handle (24) interacting with the pulley (30).

7. The apparatus according to claim 6, **characterized in that** the locking handle (24) is installed on the section of the rope (20) comprised between the rescue descender (36) and the top of the pole (12), said locking handle being provided with a hole suitable to connect, by means of the connector 28, the pulley (30) passed through by the free section of the rope (20).

Fig.1

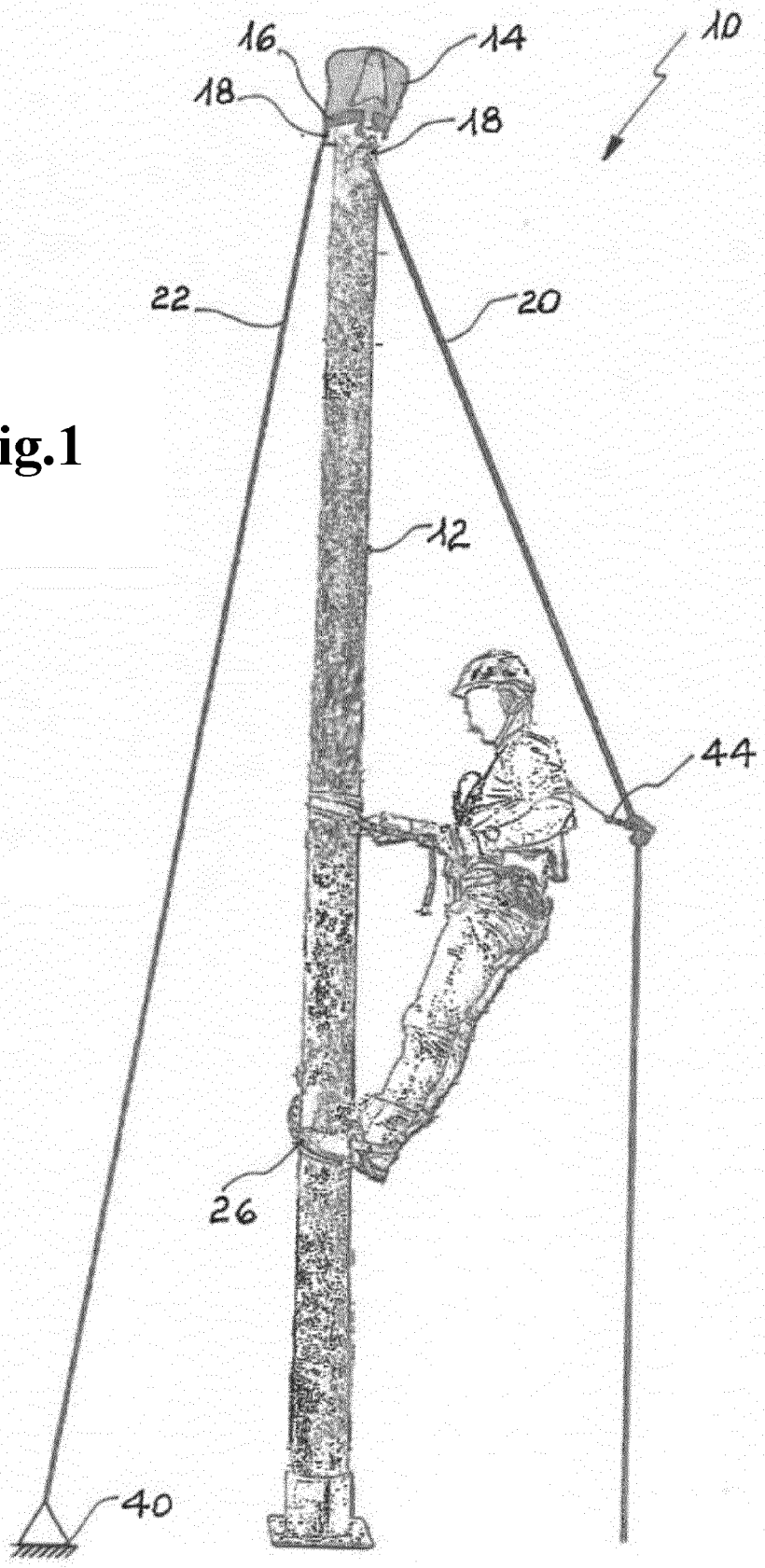


Fig.2

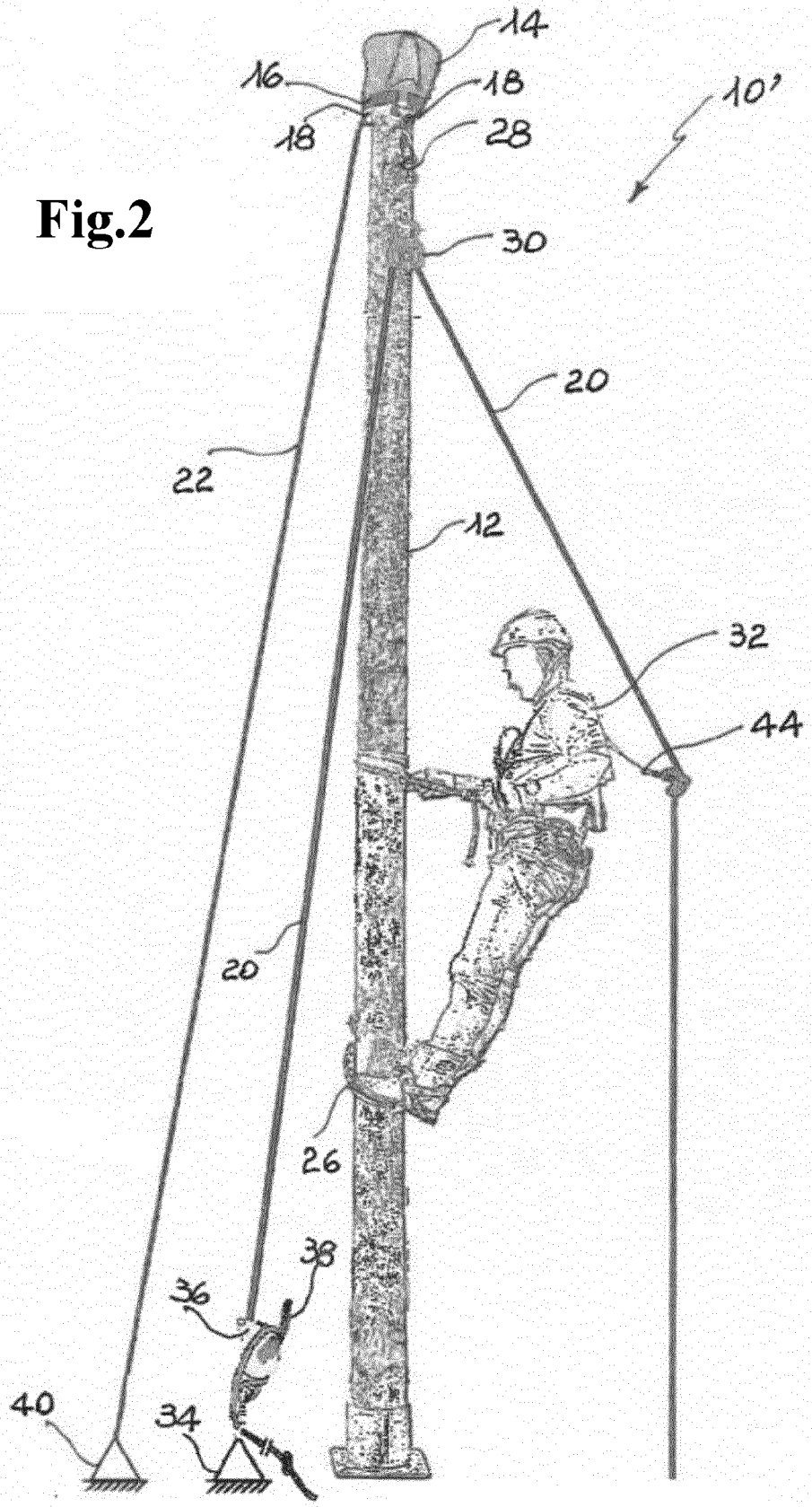


Fig.3

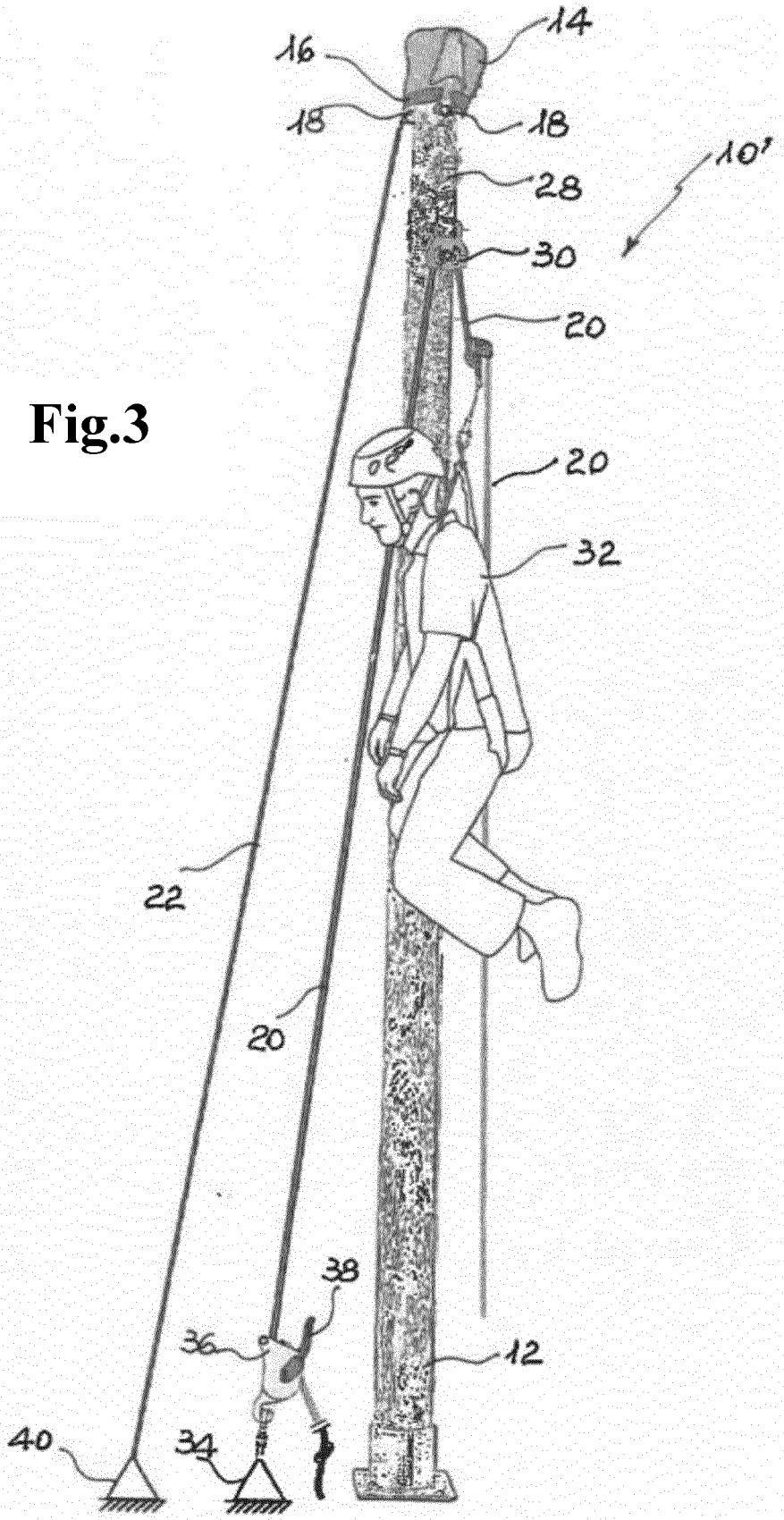


Fig.4

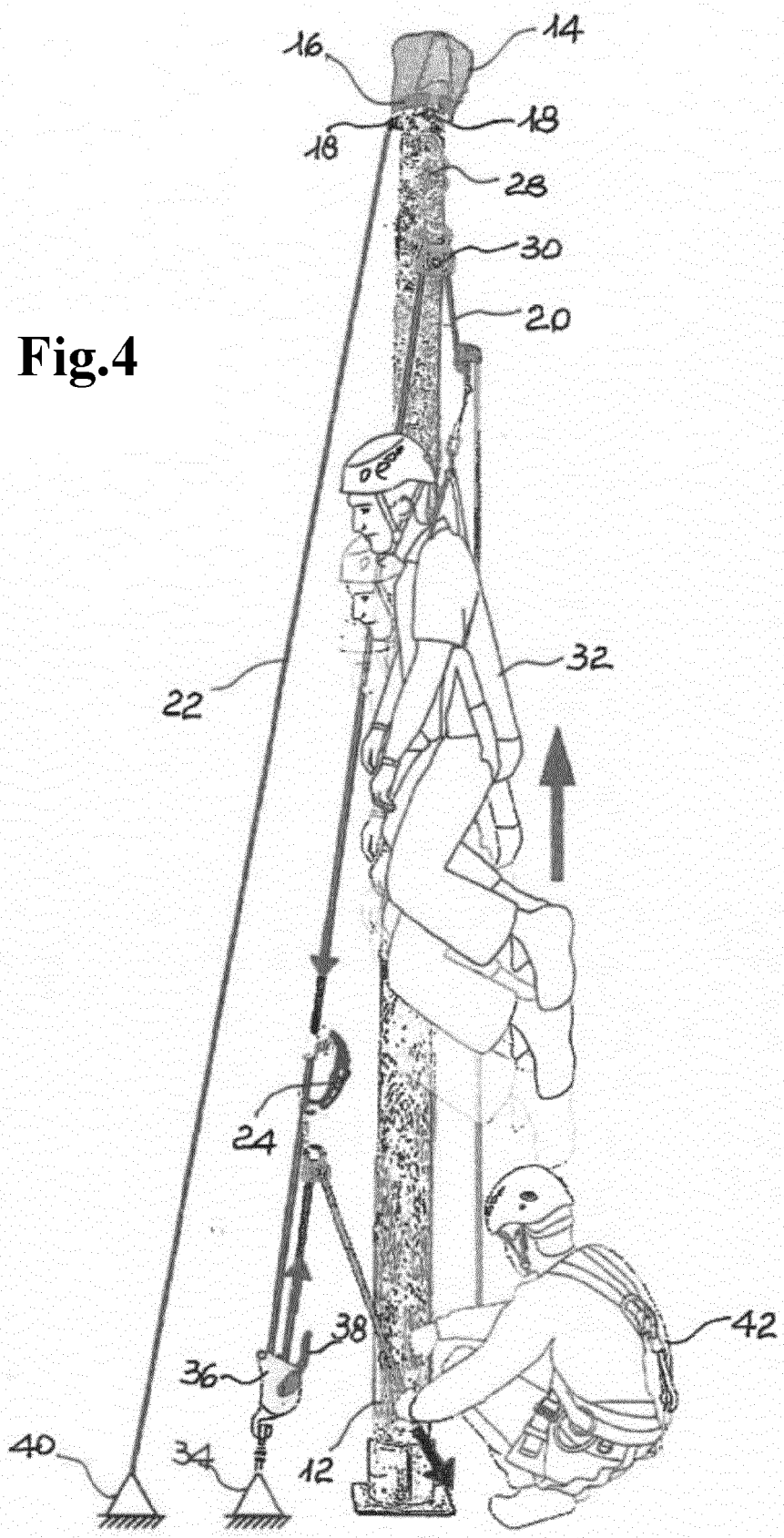


Fig.5

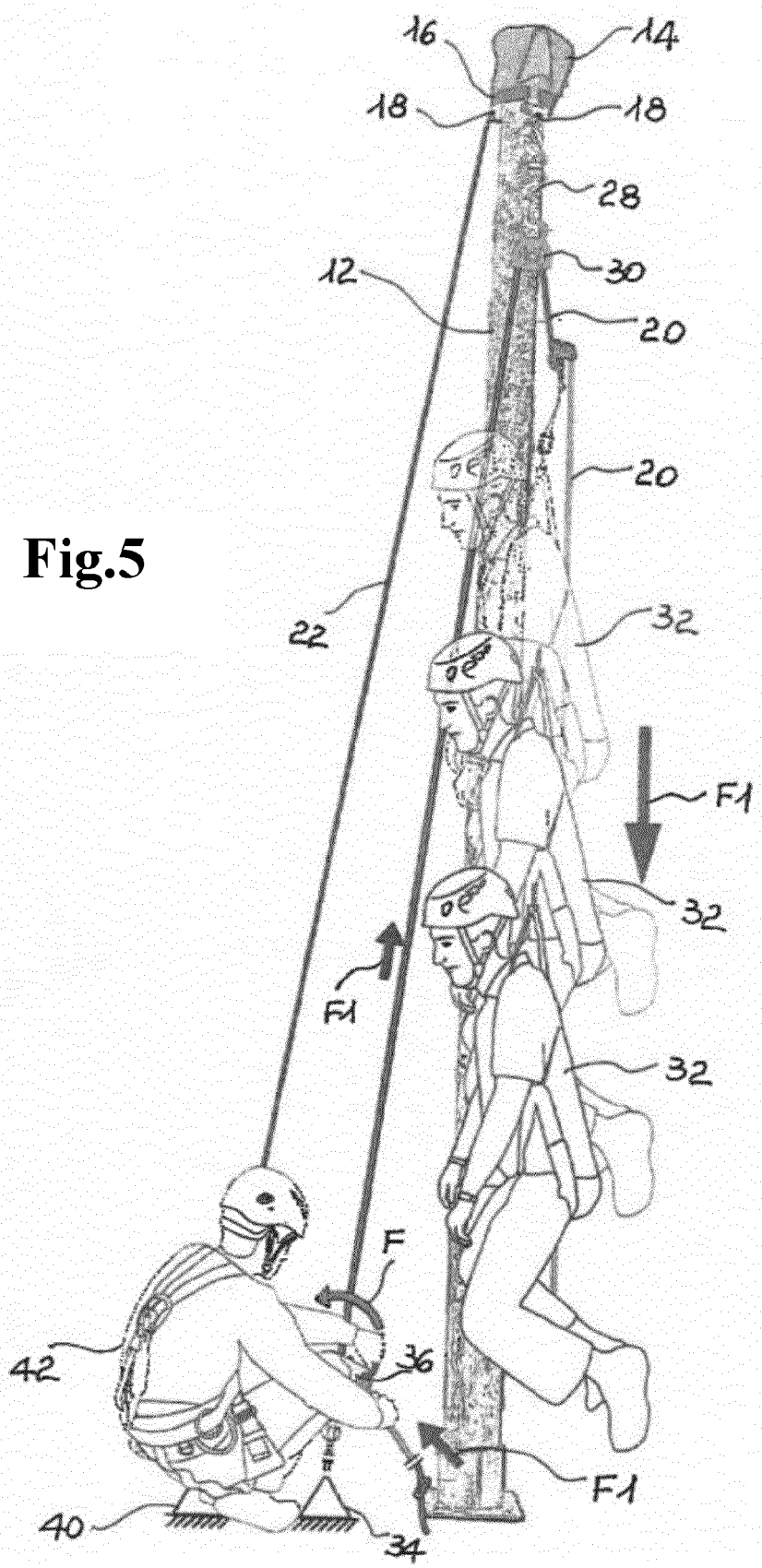
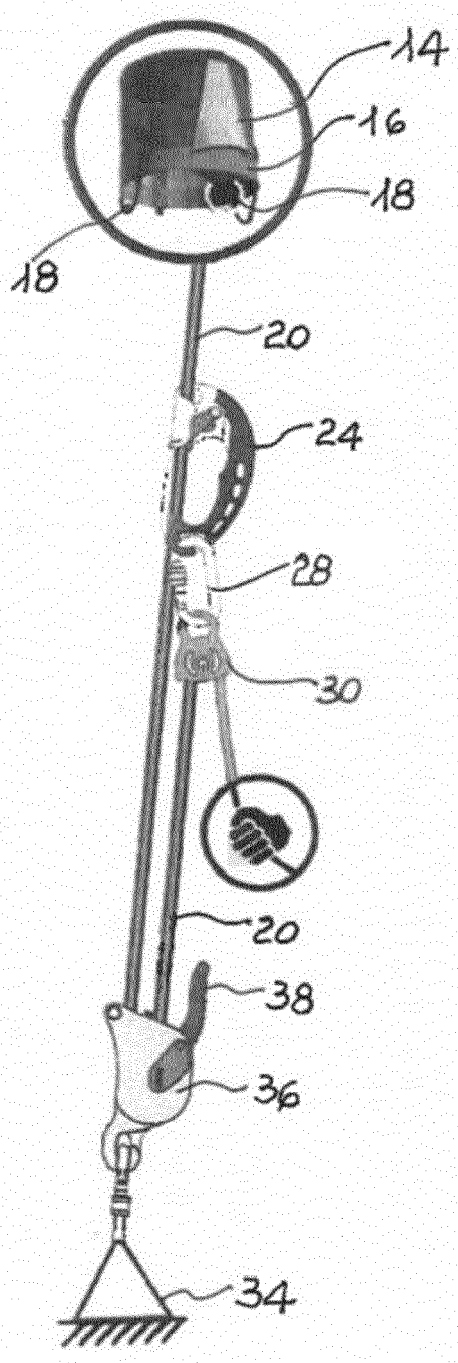


Fig.6



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EUROPEAN SEARCH REPORT

Application Number
EP 20 02 0210

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	US 3 647 171 A (RAFFERTY JOHN E) 7 March 1972 (1972-03-07) * the whole document * -----	1-7	
A	GB 2 376 883 A (PROSPECTS [GB]) 31 December 2002 (2002-12-31) * claims; figures * -----	1-7	
A	FR 2 836 635 A1 (FRECHIN JEAN PAUL [FR]) 5 September 2003 (2003-09-05) * figures * -----	1-7	
			TECHNICAL FIELDS SEARCHED (IPC) A62B A63B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	20 October 2020	Nehrdich, Martin

CATEGORY OF CITED DOCUMENTS

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US 3647171 A	07-03-1972	NONE	
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FR 2836635 A1	05-09-2003	NONE	

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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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- US 3647171 A **[0005]**
- GB 2376883 A **[0005]**
- FR 2836635 **[0006]**