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(54) **DEVICE FOR PROTECTING AGAINST FRICTION FOR PROFESSIONAL ROPES FOR VERTICAL WORK**

(57) The invention relates to a device (1) for protecting against friction, for professional ropes (6) for professional vertical works, which comprises a supporting platform (2) that is fixed on a roof (3), the supporting platform (2) comprising an upper longitudinal protective piece (4) and a lower longitudinal protective piece (5), which are parallel to each other and have a round-cornered L-shaped cross section, the tops of both pieces (4, 5) being covered with a protective material (14) designed to act as a support for the ropes (6), wherein the supporting platform (2) is formed by a rigid rectangular board, the front side of which incorporates the lower longitudinal protective piece (5), which completely covers said front side. The supporting platform (2) incorporates a central support (7) that is formed by a vertical partition (71) attached at both sides to respective arched brackets that are designed to: (a) establish a grip (8) for the user; and (b) adjust the slope of the vertical partition (71) that forms a raised surface parallel to the front side of the supporting platform (2) and on which the upper longitudinal protective piece (4) is incorporated.

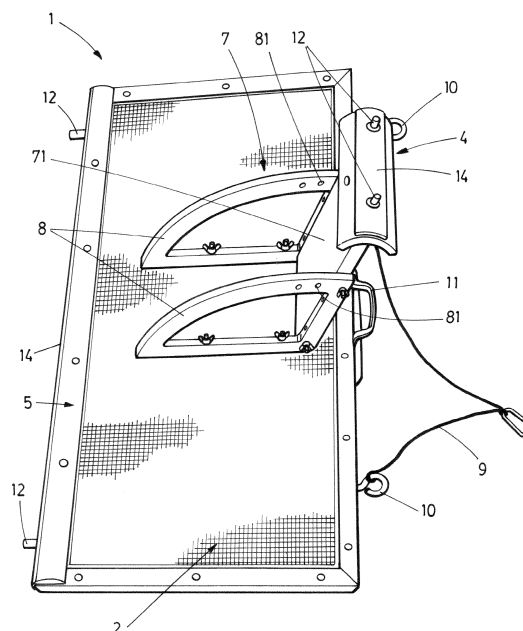


FIG.1

Description

[0001] The present invention, as expressed in the statement of the present descriptive report, refers to a device for protecting against friction for professional ropes for vertical work in accordance with the claims accompanying the present descriptive report.

Technical sector

[0002] The field of application of the present invention is framed within the sector of the industry dedicated to the manufacture of safety elements in the prevention of occupational hazards, focusing particularly on the field of those intended for the protection of professional ropes intended for work at height and/or verticals, or rope protectors. Although rope protectors are not part of personal protective equipment (PPE), they are a very important part of workers' safety, as the rope itself is not protected, and requires accessories to prevent friction or cuts that might cause an accident at work.

State of the art of the invention

[0003] As it is known, in vertical or high works in which the workers hang, directly or by means of some support, hung from one or more ropes whose upper end is held somewhere in the roof of the building in which the work is being done, these ropes have their most critical point in the point that they rub with the edge of the roof, which, depending on the material in which it is made, can have a sharp and very cutting edge, therefore, this point must be protected to minimize the rubbing and to avoid accidents.

[0004] In the current rope protectors of this type that are known, there are basically two different types: (a) individual rope protectors; and (b) rigid metal articulated protectors.

The individual rope protectors, which are flexible, are mainly manufactured with canvases joined at their ends by Velcro®, which wrap around the rope for protection. Example: flexible MODEL PROTEC C45N brand PETZL, catalogue 2017 where it is described that, to protect a fixed rope in a friction zone, a light and resistant PVC cover with velcro closure and clip is used to hold it easily. This protector is the most used and although there are firms that market it very resistant, there are many work situations in which it cannot be used. In fact, some international companies have banned this protection system due to a serious accident three years ago on an oil platform where a worker died where his rope was cut even with this protector in place. Finally, it should be noted that this protector does not allow lateral movements. The rigid metal hinged protectors are mostly limited to be placed in places where the support or surface is not damaged. For example, these protectors cannot be placed on soft materials such as mortar, wood, or even delicate materials. In the state of the art, an example of this type of

protector is the PETZL brand CATERPILLAR P68 whose description says that, in order to protect a moving rope from a friction zone, the modules must be joined by mail-lons. It also does not allow for lateral movements.

[0005] The technical problems posed by the current protectors when working on a sloping roof with a cutting edge are as follows. The flexible protectors have an important limitation, which is that they are only allowed to be used on fixed ropes, and therefore totally forbidden to make lateral movements as this would increase their ease of deterioration. On the other hand, these protectors suffer a significant deterioration since most of them are not resistant at all, and in sharp edges they are usually damaged. On the other hand, they hide the rope, so it is also not known whether it is damaged or not. Another problem is that they tend to move around, and can leave the rope exposed at the point where it rubs against the deck. Finally, in the case of the rigid articulated protectors, most of them are metallic, hard protectors that save the rope but damage the surface where they are placed. No lateral movements are allowed.

[0006] In that sense, it is worth mentioning that, by document U201400222, of which the applicant is the owner, there is a semi-rigid antifriction rope protector in the form of a specific edge for professional ropes used in vertical and high altitude work, which, although it is more efficient than the two types of flexible and rigid articulated rope protectors described above, as it consists of a semi-rigid "L" piece of pressed cardboard externally reinforced by a polyester tape on which the rope rests, has many aspects that can be improved on by the present invention, which it solves in a superb and effective manner, and whose essential characteristics are substantially different.

[0007] On the other hand, document EP1191165(A1) describes a rope slide device for vertical work, specifically designed to rest on the upper edge of a wall, on the front of a roofing element or similar, in order to provide a support point for a rope at the point where the rope changes its trajectory, between the vertical segment running downwards towards a worker suspended from it to perform work on the wall or facade and the anchorage point for that rope, characterized by the fact that such a rope slide device comprises an elongated, relatively flat body, intended to rest on the wall, with such a length that it can distribute the load of a worker's weight to prevent damage to the wall, made of a relatively soft material for this very reason, such as plastic or wood, and so that this elongated body is equipped in the middle of its upper face with a rope guide; although opposite to the guide and on the front edge of the body there is also an anti-friction element on which the rope will rest at its point of inflection.

[0008] The aim of the present invention is therefore to provide an improved rope protector that avoids the disadvantages of both types by developing a totally different device that protects both the rope, to ensure the safety of the worker, and the surface on which the protector is

placed, since the pressure that the ropes produce on it in this type of work can also cause damage to it, especially when it comes to delicate materials. This object is resolved by the mechanism of claim 1. Other practical achievements of the invention are described in the claim's dependent on it.

Description of the invention

[0009] The object of the invention is centred on a device which is intended to serve as protection for the ropes of vertical work or work at height, particularly lifting work on sloping roofs, from the friction they suffer at the edges of the roofs, due to the type of material and configuration of the said roofs combined with the weight and tension exerted on the ropes. To this end, it consists essentially of a platform for supporting the roof with two longitudinal protective pieces with blunt edges covered with protective material, one upper and one lower, on which the ropes rest, so that the pressure they exert as a result of the work is distributed between the two pieces and the effect of friction between the rope and the surface on which it rests is minimized. This object is also resolved with the mechanism of claim 1. Other practical and/or preferred achievements of the invention are described in the claim's dependent on it.

[0010] The main advantages provided by the friction protection device for professional rope access work, as described in the claims accompanying this description, is that the platform is based on force decomposition. The main advantage is that the weight of the worker does not fall on the edge where he is doing his work, and that this is distributed over the entire surface of the platform, and especially on the upper protection piece, on which the ropes initially rest. In addition, the device can take on different positions depending on the inclination of the roof.

[0011] It also has a position for places that have no inclination, but have a sharp or weak edge. On the other hand, and due to its design, it allows lateral movements, specifically thanks to the fact that there are metal stops at the ends of the upper and lower protective piece so that the rope does not fall out of place. In addition, it does not damage the cover as its base is lined with non-slip rubber. The present invention describes two strong grips for performing the exit with safety and comfort. Finally, the platform is foldable and can be carried by a handle.

[0012] All the advantages described above allow safe work on exits with dangerous drop-offs, such as sloping roofs made of tiles, metal or wooden roofs or any others that have sharp edges that pose a serious danger to the development of the work to be done.

[0013] Throughout the description and claims, the word "comprises" and its variants are not intended to exclude other technical features, components or steps. For the experts in the field, other objects, advantages and characteristics of the invention will result partly from the invention and partly from the practice of the invention.

The following examples and drawings are provided for illustration purposes and are not intended to restrict the present invention. Furthermore, the invention covers all possible combinations of particular and preferred realizations indicated here.

Brief description of the drawings

[0014] The following is a very brief description of a series of drawings that help to better understand the invention and that are expressly related to a realization of the said invention, which is illustrated as a non-limitative example of it.

Figure number 1 shows an upper lateral perspective view of an example of the friction protection device for professional ropes for vertical works that are the object of the invention, appreciating the main parts and elements that it comprises, as well as the configuration and arrangement of these.

Figure number 2. - Shows a perspective view of the example of the device, according to the invention, shown in figure 1, represented in the phase of use by an operator on a deck, appreciating the way in which the ropes rest on it.

Figure number 3. - Shows a perspective view of an example of the upper protector that includes the device of the invention, and that is capable of being used independently of the platform, appreciating its configuration and the possible additional elements that it includes.

Detailed explanation of a mode of realization of the invention

[0015] As can be seen in the attached figures, the device (1) friction protector for professional ropes for vertical works, object of the present invention, comprises a support platform (2), which is fastened on the deck (3) which, logically, does not form part of the object of the invention. The platform (2) is equipped with two longitudinal protective pieces (4, 5), an upper protective piece (4) and a lower protective piece (5), which are parallel to each other, and which has an "L" section configuration with a blunt edge, covered at the top with a protective material (14), preferably polyester, on which the ropes (6) rest.

[0016] In this practical implementation, the platform (2) is made up of a rectangular rigid board, with the lower base lined with an anti-slip material, on whose front side it incorporates the lower protective piece (5), covering the whole length of this rigid board of the said platform (2), and on whose upper part it incorporates a central support (7) which defines a raised surface parallel to this front side on which it incorporates the upper protective piece (4). On the support platform (2), the front side, as shown in FIG. 2, means the side closest to the operator

when the device (1) is in operation.

[0017] The bracket (7) incorporating the upper protective piece (4) is adjustable to vary its inclination relative to the platform (2) as appropriate to the inclination of the roof. In addition, in a practical implementation, the platform (2) includes grips (8) to facilitate the exit of the operator in safety. Thus, the central support (7) consists of a vertical partition (71) attached on both sides to two arched gussets with various perforations (81) which allow the fixing position of the partition to be varied in order to regulate its inclination, and which, at the same time, constitute the grips (8).

[0018] In a practical implementation not limited, the platform (2) has a means of fastening (9, 10) to fix it to the deck (3), preferably consisting of a safety rope or chain (9) attached to it by means of two anchors (10). In another practical implementation, the platform (2) is foldable and is equipped with a carrying handle (11).

[0019] On the other hand, still in another practical realization, the upper protective piece (4) and the lower protective piece (5) have two side stops (12) at their ends to allow lateral movements of the rope (6) and limit its travel.

[0020] Optionally, the upper protective part (4) can be removed from the central support (7) and used independently of the platform (2). In this case, the upper protection piece (4) is fixed to the support by means of two screws, which are also part of the side stops (12).

Finally, in an unrestricted practical realization, the upper protective piece (4), when removable, has its own means of attachment (13, 13'), which includes in its preferred realization a perforated extension (13) emerging from its upper surface, to be screwed to the deck (3) and, optionally, also by a small safety rope (13').

Claims

1. A device (1) for rope protection (6) for professionals engaged in vertical work, comprising a support platform (2) which is fixed to a deck (3); where this support platform (2) comprises an upper longitudinal protection piece (4) and a lower longitudinal protection piece (5), parallel to each other, and has an "L" section with the blunt edge, both pieces (4,5) being covered at the top with a protective material (14) configured to act as support for the ropes (6); where, in addition, the support platform (2) comprises a rigid rectangular board, on the front side of which it incorporates the lower longitudinal protection piece (5) which completely covers this front side; and which is **characterized by** the fact that the support platform (2) incorporates a central support (7) which is made up of a vertical partition (71) attached on both sides to two arched gussets which are configured to: (a) establish a grip (8) for the operator; and (b) regulate the inclination of this vertical partition (71) which configures a raised surface parallel to the front side of

the support platform (2) on which the upper longitudinal protection piece (4) is incorporated.

2. The device (1) according to claim 1 where the board that forms the support platform (2) has the lower base lined with anti-slip material.
3. The device (1) in accordance with any of the above claims where the support platform (2) has a means of fastening (9,10) to fix it to the deck (3).
4. The device (1) in accordance with claim 3 where the means of fastening the platform (2) consists of a safety rope (9) attached to it by means of anchors (10).
5. The device (1) in accordance with any of the above claims where the platform (2) is foldable and is provided with a handle (11) for transport.
6. The device (1) according to any of the previous claims where the upper longitudinal protective piece (4) and the lower longitudinal protective piece (5) have two lateral stops (12) at their ends that allow lateral movements of the rope (6) limiting its travel.
7. The device (1) in accordance with any of the above claims where the upper protective piece (4) is removable and capable of being used independently of the platform (2).
8. The device (1) in accordance with Claims 6 or 7 where the upper longitudinal protection piece (4) is fixed by means of a plurality of screws which, in turn, are configured as lateral stops (12) at their ends that allow lateral movements of the rope (6) limiting its travel.
9. The device (1) in accordance with Claims 7 or 8 where the upper longitudinal protective piece (4) includes its own means of attachment (13, 13').

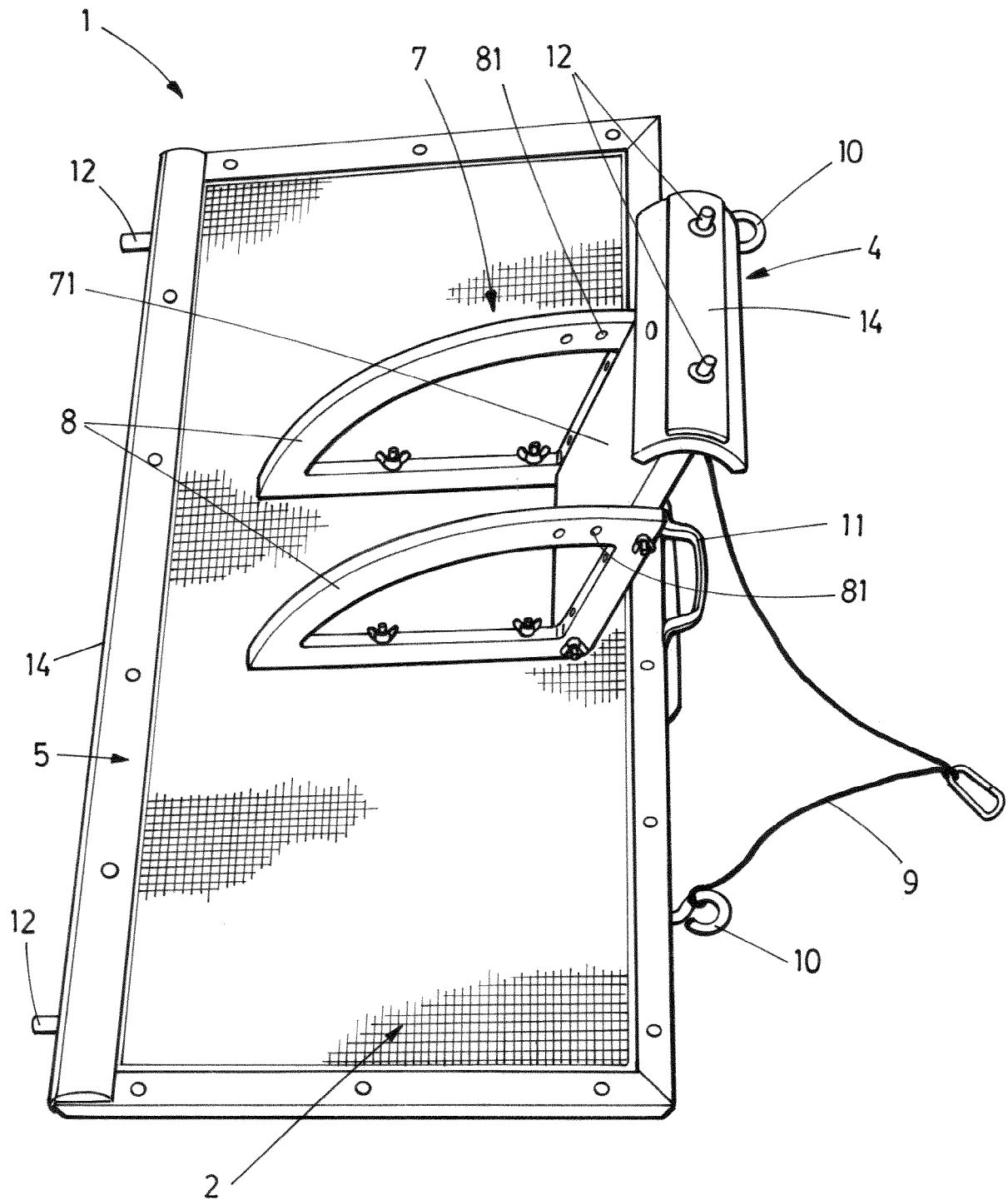


FIG.1

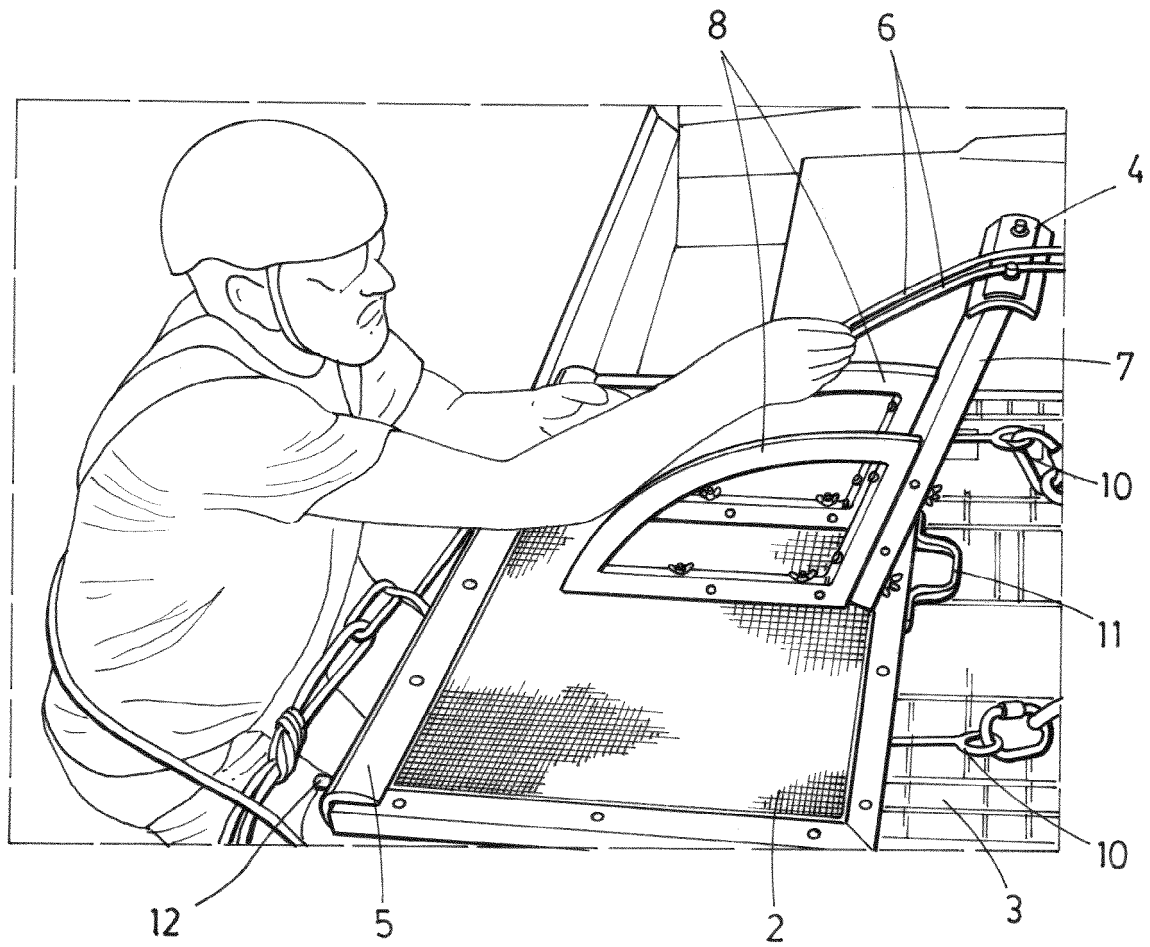


FIG. 2

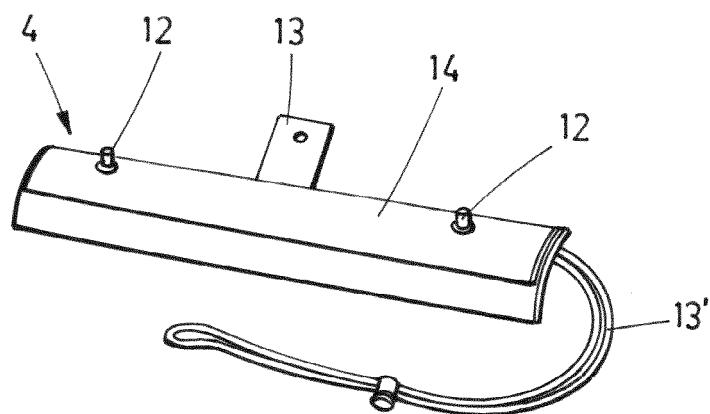


FIG. 3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2019/070285

A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
E04G, B66C, B65H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Internet

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, WPI, INVENES

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1191165 A1 (LOBO JIMENEZ FERNANDO) 27/03/2002, page 3, paragraph 14 - 20; figures 1 - 3	1 - 9
A	ES 1121455U U (HERNANDEZ RODRIGUEZ JOSE LUIS) 04/09/2014, page 3, line 33 - page 4, line 17; figure 2	1 - 9
A	US 5474271 A (RAYMOND PETER T) 12/12/1995, column 4, line 43 - column 6, line 49; figures 1, 2 and 5	1 - 9
A	Rope Rescue Systems Testing - Main/Belay (Back-Up) Failures. 06/03/2015 Retrieved from Internet <URL: https://www.youtube.com/watch?v=-43vf8SDs4M >	1 - 9

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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"E" earlier document but published on or after the international filing date	
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"O" document referring to an oral disclosure use, exhibition, or other means.	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other documents, such combination being obvious to a person skilled in the art
"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

Date of the actual completion of the international search
12/07/2019

Date of mailing of the international search report
(19/07/2019)

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INTERNATIONAL SEARCH REPORT

International application No.

Information on patent family members

PCT/ES2019/070285

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----- US5474271 A	----- 12.12.1995	----- NONE	----- -----
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES2019/070285

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CLASSIFICATION OF SUBJECT MATTER

E04G3/30 (2006.01)

E04G5/04 (2006.01)

B66C1/12 (2006.01)

B65H57/00 (2006.01)

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 1191165 A1 [0007]