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(54) **ABSEILING DEVICE FOR BRAKING A LOAD**

(57) The invention relates to an abseiling device for braking a load and in which a rope (4) passes through the abseiling device in a frictionally guided manner, whereby the abseiling device comprises a back plate (2) and a front plate (1), the back plate (2) comprises a part (5) attached swivelling thereto, whereby the part (5) can be swivelled against a spring force for inserting or removing the rope (4) and the part (5), by suspending the load, generates the friction dependent on the weight of the load, the front plate (1) is attached swivelling to the back plate (2) at a first end of the abseiling device between an opened position and a closed position, whereby in the opened position the part (5) is accessible for inserting the rope (4) and in the closed position the part (5) is arranged between the back plate (2) and the front plate (1), the back plate (2) and the front plate (1) each comprise a lower opening (10) arranged adjacent to the swivelling axis and transverse to the pulling direction of the rope (4) and the load, and through which the load can be connected to the abseiling device, whereby when the load is connected through the lower openings (10) but not suspended the front plate (1) can be swivelled into the opened position and by suspending the load the front plate (1) swivels into the closed position.

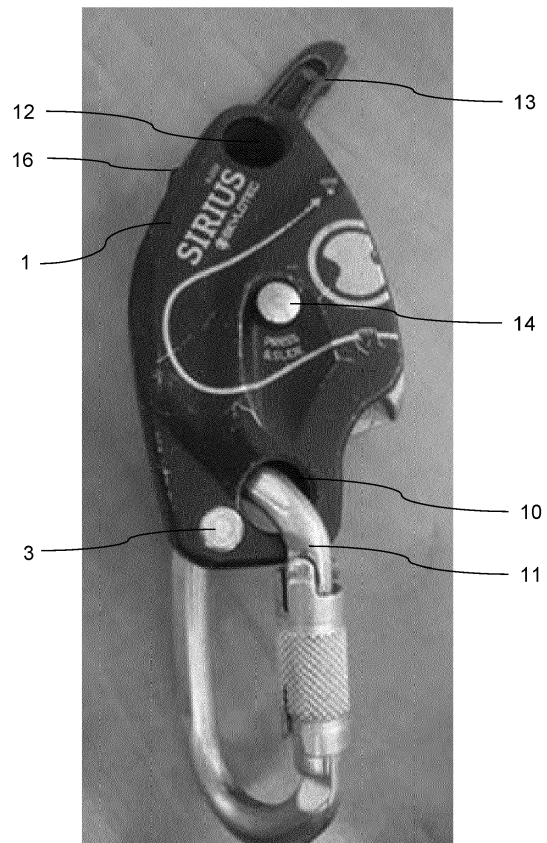


FIG. 1

Description

Technical Field

[0001] The invention relates to an abseiling device for braking a load and in which a rope passes through the abseiling device in a frictionally guided manner, whereby the abseiling device comprises a back plate and a front plate, and the back plate comprises a part attached swivelling thereto, whereby the part can be swivelled against a spring force for inserting or removing the rope and the part, by suspending the load, generates the friction dependent on the weight of the load.

Background Art

[0002] Abseiling devices are known from prior art and are used for braking a load as typically a person guided on and/or connected to a rope. A climbing harness worn by the person is connected by means of a connector such as for example a carabiner to the abseiling device. The rope passes through the abseiling device in a frictionally guided manner. The abseiling device is typically first opened for inserting the rope and thereafter closed when the rope is frictionally held by the abseiling device.

[0003] Today's abseiling devices can be opened while the person is attached to the abseiling device. By opening the abseiling device the rope can be released from friction such that the person is not protected anymore against fall from heights.

Summary of invention

[0004] It is therefore an object of the invention to provide an improved abseiling device, in particular an abseiling device which cannot be opened when a load is suspended thereto.

[0005] The object of the invention is solved by the features of the independent claim. Preferred embodiments are detailed in the dependent claims.

[0006] Thus, the object is solved by an abseiling device for braking a load and in which a rope passes through the abseiling device in a frictionally guided manner, whereby

the abseiling device comprises a back plate and a front plate,

the back plate comprises a part attached swivelling thereto, whereby the part can be swivelled against a spring force for inserting or removing the rope and the part, by suspending the load, generates the friction dependent on the weight of the load,

the front plate is attached swivelling to the back plate at a first end of the abseiling device between an opened position and a closed position, whereby in the opened position the part is accessible for inserting the rope and in the closed position the part is arranged between the back plate and the front plate,

and

the back plate and the front plate each comprise a lower opening arranged adjacent to the swivelling axis and transverse to the pulling direction of the rope and the load, and through which the load can be connected to the abseiling device, whereby, when the load is connected through the lower openings but not suspended, the front plate can be swivelled into the opened position and by suspending the load the front plate swivels into the closed position.

[0007] A key point of the invention is therefore that a carabiner as load can be still connected to the abseiling device when opening the abseiling device, whereby the front plate automatically swivels into the closed position when the load is suspended, so that the rope cannot be removed anymore out of the abseiling device. Thus, by connecting and applying the load to the abseiling device, such that a force in direction of the load results, the front plate basically automatically swivels into the closed position such that the rope cannot be unintentionally removed from the abseiling device. In this regard unintentionally removing does not mean to thread out the rope out of the abseiling device by pulling the rope, but rather that the rope flips from the part respectively from the fictionally held position when the abseiling device is not closed. Thus, once the abseiling device is closed i.e. when the front plate is swivelled onto the back plate, the rope following above definition cannot be unintentionally removed from the abseiling device. In other words, the abseiling device cannot be opened while the person is suspended to the abseiling device. In sum, the proposed abseiling device increases safety for a person connected to the abseiling device so that the person is protected against fall from heights.

[0008] The abseiling device can be used for braking a person as load so that the load may be in the range of 30 to 200 kg, in particular for EN 341. Preferably the load is up to 250 kg according to EN 12841 C or 130 to 310 pounds according to ANSI Z359.4. Thereby, the rope or the abseiling device can be connected to the person, for example via a carabiner to a climbing harness worn by the person. Preferably, the person is connected to the lower opening. The rope passing through the abseiling device in a frictionally guided manner means preferably that first the rope enters the abseiling device, that second an entered part of the rope can be exerted by the abseiling device with a frictional force by pressing the rope via the part in particular against a fixed surface of the abseiling device and that third the rope leaves the abseiling device. Such way the entered part of the rope may run completely within the abseiling device. Depending on the magnitude of a displacement of the swivelling part, a distance between the part and the fixed surface in the region of the rope guide may be increased or reduced. It is also possible for the rope to be deflected, in the region of the section that is guided via the movable part, by the fixed surface, and for the frictional force that is produced at

the deflection point to be of a magnitude that depends on the load. The abseiling device is preferably opened by swivelling the front plate into the opened position for inserting the rope. The rope can then be inserted into the abseiling device, in particular laid around the part to be fictionally held by the part. Thereafter the abseiling device can be closed by swivelling the front plate in the closed position such that the rope is continuously frictionally held by the abseiling device.

[0009] The abseiling device, in particular the front plate and/or the back plate, is preferably made of metal, while other materials are possible as well. Front plate and/or back plate may comprise a flat, elongated and/or oval-like shape having two opposite traverse and two opposite longitudinal sides. The part is preferably attached to the back plate between the two traverse sides, for example in the middle in-between. The friction is preferably sufficient for fixing the rope in respect to the abseiling device, while it may be possible that the friction brakes the rope without stopping the rope in a fixed position relative to the abseiling device. The abseiling device can be used for sports and/or professional purposes, for example for rope access at work and/or in rescue. The rope can be attached to a highest point of a building for example via a connector attached to an anchor fixed onto a structure of the building, with the abseiling device that can be attached to the rope itself. The rope may be a plastic rope, a steel rope, or a fibrous composite rope. The fibrous composite rope may be made with or without fibres made of high-strength materials. Other types of ropes made of any types of metallic materials and fibrous composite materials may also be used with the inventive abseiling device.

[0010] The first end of the abseiling device is preferably arranged at one traverse side of the abseiling device. In the opened position the front plate is preferably swivelled by at least 45°, 90° or 180°, while it may be possible that the front plate can be swivelled by up to 270°. In the closed position the front plate is preferably arranged congruent above the back plate and/or provided congruent to the back plate. The rope can be preferably inserted into the abseiling device at a first longitudinal side. In the closed position, a second, opposite longitudinal side of the abseiling device is preferably completely closed. In the closed position the part is preferably completely arranged and thus shielded between the back plate and the front plate and only accessible at the first longitudinal side. The swivelling axis is preferably arranged adjacent to and/or faces an end respectively a corner of the abseiling device facing both the traverse and longitudinal side. Such way adjacent to the swivelling axis and transverse to the pulling direction of the rope and the load means preferably that the lower opening is arranged on the same traverse side but adjacent to and/or faces an end respectively a corner of the opposite longitudinal side. Such way the lower opening is preferably arranged close to and/or faces the traverse side.

[0011] According to a preferred implementation the

lower opening of the front plate comprises a round shape and the lower opening of the back plate comprises the shape of an elongate hole and/or the lower opening of the front plate overlaps in the opened position and in the closed position different portions of the lower opening of the back plate. With such elongated hole the front plate can be swivelled while for example a carabiner is connected through the lower openings of both the front plate and the back plate.

[0012] In another preferred implementation the swivelling part generates the friction by pressing onto a stationary lower guidance of the back plate. The lower guidance is preferably arranged to guide the rope towards a traverse side of the abseiling device such that the rope can be inserted from the traverse side into the abseiling device. The swivelling part and/or the stationary lower guidance are preferably arranged at the back plate and/or dimensioned such that the rope can be inserted and/or removed between the swivelling part and the stationary lower guidance against the spring force, while on the other side the swivelling part and/or the stationary lower guidance are arranged close enough together for clamping the rope. According to a further preferred implementation the back plate comprises an upper guidance attached thereto at an entrance and/or exit of the rope into the abseiling device, the swivelling part comprises a guiding nose arranged towards the entrance and distant to the back plate and by swivelling the part against the spring force the guiding nose comes closer to the upper guidance to prevent inserting the rope between the upper guidance and the guiding nose. The upper guidance is preferably arranged to guide the rope to enter the abseiling device at a traverse side thereof. Preferably, the stationary lower guidance and the upper guidance are arranged at the same traverse side of the abseiling device. The upper guidance is preferably arranged stationary at the abseiling device. The guiding nose is preferably arranged at a lateral side of the swivelling part, extends towards the upper guidance and/or is arranged preferably only at the lateral side of the swivelling part facing the front plate. By swivelling the part against the spring force the guiding nose prevents inserting the rope between the upper guidance and the guiding nose in a misaligned direction, thereby increases safety of the abseiling device. The upper guidance is preferably arranged far distant from the lower opening than the lower guidance.

[0013] According to another preferred implementation the part comprises a semi-circular guidance for guiding the rope within the abseiling device. The semi-circular guidance preferably comprises lateral guides arranged opposite to each other along the semi-circular guidance and extending away from the abseiling device and/or in a radial view a semi-circular groove for guiding the rope between the entrance at the upper guidance and the lower opening. Preferably the abseiling device, when the back plate and the front plate are arranged overlapping above each other, the abseiling device is closed at the longitudinal side opposite to the entrance for the rope.

Such way the rope is preferably guided in said semi-circular manner around the swivelling part from the entrance at the upper guidance towards an exit arranged at the lower guidance.

[0014] According to a further preferred implementation the back plate and the front plate each comprise an upper opening arranged at a second end opposite to the first end and overlapping in the closed position. Such way the back plate and the front plate, in the closed position, provide a joint opening, for example for connecting a carabiner thereto. With the carabiner connected through the joint opening, the front plate cannot be swivelled away from the back plate so that the abseiling device cannot be opened.

[0015] According to another preferred implementation the abseiling device comprises a lever attached to the back plate at an opposite side to the part configured for swivelling the part against the spring force. The lever allows for easily swivelling the part against the spring force such that the rope can be inserted into the abseiling device and/or for releasing of rope jamming and consequent sliding of the abseiling device under load. The lever preferably comprises a lock, which first needs to be actuated in order to swivel the level to thereby swivel the part.

[0016] According to a further preferred implementation the swivelling axis of the part is provided as a pressable button for locking the front plate in the closed position. If the button is pressed, the front plate can be swivelled away from the back plate. The button is preferably arranged between the traverse and longitudinal sides such that the button can be easily reached and pressed by a user for opening the abseiling device.

[0017] According to another preferred implementation the front plate comprises an inside ramp which presses the button when swivelling the front plate into the closed position. The inside ramp is preferably arranged at the longitudinal side that is swivelled towards the button when closing the front side. Such way the front plate can be closed respectively moved into the closed position without manually pressing the button.

[0018] The object is further addressed by an abseiling arrangement comprising the abseiling device as described before and a connector such as for example a carabiner clipped through the lower openings. The carabiner is preferably connected to a person to secure the person from falling.

Brief description of drawings

[0019] These and other aspects of the invention will be apparent from and elucidated with reference to the embodiment described hereinafter.

[0020] In the drawings:

Fig. 1 shows an abseiling device with a front plate in a closed position according to a preferred embodiment in a schematic view,

Fig. 2 shows the abseiling device of Fig. 1 with the front plate in an opened position according to the preferred embodiment in a schematic view, and

Fig. 3 shows the abseiling device of Fig. 1 with the front plate in a partially opened position according to the preferred embodiment in a schematic perspective view.

10 Description of embodiments

[0021] Fig. 1 shows an abseiling device with a front plate 1 in a closed position according to a preferred embodiment in a schematic view, while Fig. 2 shows the abseiling device of Fig. 1 in an opened position of the front plate 1.

[0022] The abseiling device comprise said front plate 1 and a back plate 2, which according to the top views in Figs. 1 and 2 each comprise an elongated, oval-like shape and are made of metal. As can be seen in Fig. 1, the contours of the front plate 1 and the back plate 2 are identical and are arranged in the depicted closed position congruent to and above each other.

[0023] The front plate 1 is attached swivelling to the back plate 2 by means of a bearing 3 arranged at a lower, first end of the elongated abseiling device. By said bearing 3 the front plate 1 can be swivelled from the closed position of Fig. 1 into the opened position of Fig. 2, showing only a part of the front plate 1. In said opened position a rope 4, shown in Fig. 3 with the abseiling device in a partially opened position can be inserted into abseiling device, to pass through the abseiling device in a frictionally guided manner.

[0024] The back plate 2 therefore comprises a part 5 attached swivelling to the back plate 2. The part 5 comprises a semi-circular guidance 6 and thus support for guiding the rope 4 within the abseiling device, around which the rope 4 can be wound when the front plate 1 is in the opened position, as partially depicted in Fig. 3. The part 6 can be swivelled against a spring force for inserting or removing the rope 4. Fig. 2 shows the part 5 swivelled against the spring force, while Fig. 3 shows the part 5 loaded with spring force and thus generating friction onto the rope 4. In the closed position the part 5 is arranged between the back plate 2 and the front plate 1 such that, when the rope 4 is wound around the part 5, the rope 4 cannot be removed lateral from the guidance 6.

[0025] The back plate 2 further comprises a stationary lower guidance 7, against which the rope 4 is pressed by the part 5 when the abseiling device is suspended by a load such as a person so that friction dependent on the weight of the load is generated. The back plate 2 further comprises an upper stationary guidance 8 attached to the back plate 2 at an area where the rope 4 enters the abseiling device. A guiding nose 9 is arranged at the part 5 oriented towards said entrance and distant to the back plate 2, and, in the closed position, close to the front plate 1. Such way by swivelling the part 5 against the spring

force the guiding nose 9 comes closer to the upper guidance 8 thereby preventing inserting the rope 4 between the upper guidance 8 and the guiding nose 9 in the open position.

[0026] The back plate 2 and the front plate 1 each comprise a lower opening 10, which are each arranged adjacent to the swivelling axis respectively to the bearing 3 and transverse to the pulling direction of the rope 4 and the load. A connector 11 such as a carabiner is connected through both openings 10, to which the person is connected by a climbing harness, not shown, to represent the load. The lower opening 10 of the front plate 1 comprises a round shape and the lower opening 10 of the back plate 2 comprises the shape of an elongate hole. Such way the lower opening 10 of the front plate 1 overlaps in the opened position and in the closed position different portions of the lower opening 10 of the back plate 2, as can be seen in Figs. 1 and 2.

[0027] Thus, as the openings 10 are arranged transverse to the pulling direction of the rope 4 and the load, when the load is connected through the lower openings 10 but not suspended, the front plate 1 can be swivelled into the opened position, as can be seen in Figs. 2 and 3. Such way by suspending the load the front plate 1 swivels into the closed position, as can be imagined from Fig. 2. In further respect to said figure, when the carabiner 11 is pulled downwards, consequently the opening 10 of the front plate 1 is moved downwards until the carabiner 11 lies on the opening on the back plate 2.

[0028] Back plate 2 and the front plate 1 each further comprise an upper opening 12, which is arranged at a second end opposite to the first end. Both upper openings 12 comprise a round shape which overlap in the closed position. The upper opening 12 is provided within the upper stationary guidance 8. For swivelling the part 5 against the spring force and the friction of the rope 4 while loaded, a lever 13 is attached to the back plate 2 at an opposite side to the part 5. The lever 13 comprises a lock 16, which first needs to be actuated in order to swivel the lever 13 to thereby swivel the part 5.

[0029] The swivelling axis of the part 5 is provided as a press button 14, which in the closed position locks the front plate 1 against the back plate 2. The front plate 1 further comprises an inside ramp 15, arranged at an inner side of the front plate 1. The ramp 15 presses the button 14 down when swivelling the front plate 1 into the closed position. Once in the locked position, the button 14 releases in a through hole and locks the front plate, as can be seen in Fig. 1.

[0030] While the invention has been illustrated and described in detail in the drawings and foregoing description, such illustration and description are to be considered illustrative or exemplary and not restrictive; the invention is not limited to the disclosed embodiments. Other variations to be disclosed embodiments can be understood and effected by those skilled in the art in practicing the claimed invention, from a study of the drawings, the disclosure, and the appended claims. In the claims, the word

"comprising" does not exclude other elements or steps, and the indefinite article "a" or "an" does not exclude a plurality. The mere fact that certain measures are recited in mutually different dependent claims does not indicate that a combination of these measures cannot be used to advantage. Any reference signs in the claims should not be construed as limiting scope.

Reference signs list

[0031]

1	front plate
2	back plate
3	bearing
4	rope
5	part
6	semi-circular guidance
7	lower guidance
8	upper guidance
9	guiding nose
10	opening
11	connector, carabiner
12	upper opening
13	lever
14	button
15	ramp
16	lock

Claims

1. Abseiling device for braking a load and in which a rope (4) passes through the abseiling device in a frictionally guided manner, whereby

the abseiling device comprises a back plate (2) and a front plate (1),

the back plate (2) comprises a part (5) attached swivelling thereto, whereby the part (5) can be swivelled against a spring force for inserting or removing the rope (4) and the part (5), by suspending the load, generates the friction dependent on the weight of the load,

the front plate (1) is attached swivelling to the back plate (2) at a first end of the abseiling device between an opened position and a closed position, whereby in the opened position the part (5) is accessible for inserting the rope (4) and in the closed position the part (5) is arranged between the back plate (2) and the front plate (1), and the back plate (2) and the front plate (1) each comprise a lower opening (10) arranged adjacent to the swivelling axis and transverse to the pulling direction of the rope (4) and the load, and through which the load can be connected to the abseiling device, whereby, when the load is connected through the lower openings (10) but not

suspended, the front plate (1) can be swivelled into the opened position and by suspending the load the front plate (1) swivels into the closed position.

vice according to any of the previous claims and a carabiner (11) clipped through the lower openings (10).

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2. Abseiling device according to the previous claim, whereby the lower opening (10) of the front plate (1) comprises a round shape and the lower opening (10) of the back plate (2) comprises the shape of an elongate hole and/or the lower opening (10) of the front plate (1) overlaps in the opened position and in the closed position different portions of the lower opening (10) of the back plate (2).

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3. Abseiling device according to any of the previous claims, whereby the swivelling part (5) generates the friction by pressing onto a stationary lower guidance (7) of the back plate (2).

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4. Abseiling device according to any of the previous claims, whereby the back plate (2) comprises an upper guidance (8) attached thereto at an entrance of the rope (4) into the abseiling device, the part (5) comprises a guiding nose (9) arranged towards the entrance and distant to the back plate (2) and by swivelling the part (5) against the spring force the guiding nose comes closer to the upper guidance (8) to prevent inserting the rope (4) between the upper guidance (8) and the guiding nose (9).

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5. Abseiling device according to any of the previous claims, whereby the part (5) comprises a semi-circular guidance (6) for guiding the rope (4) within the abseiling device.

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6. Abseiling device according to any of the previous claims, whereby the back plate (2) and the front plate (1) each comprise an upper opening (12) arranged at a second end opposite to the first end and overlapping in the closed position.

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7. Abseiling device according to any of the previous claims, comprising a lever (13) attached to the back plate (2) at an opposite side to the part (5) configured for swivelling the part (5) against the spring force and friction of the rope.

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8. Abseiling device according to any of the previous claims, whereby the swivelling axis of the part (5) is provided as a pressable button (14) for locking the front plate (1) in the closed position.

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9. Abseiling device according to the previous claim, whereby the front plate (1) comprise an inside ramp (15) which presses the button when swivelling the front plate (1) into the closed position.

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10. Abseiling arrangement comprising the abseiling de-

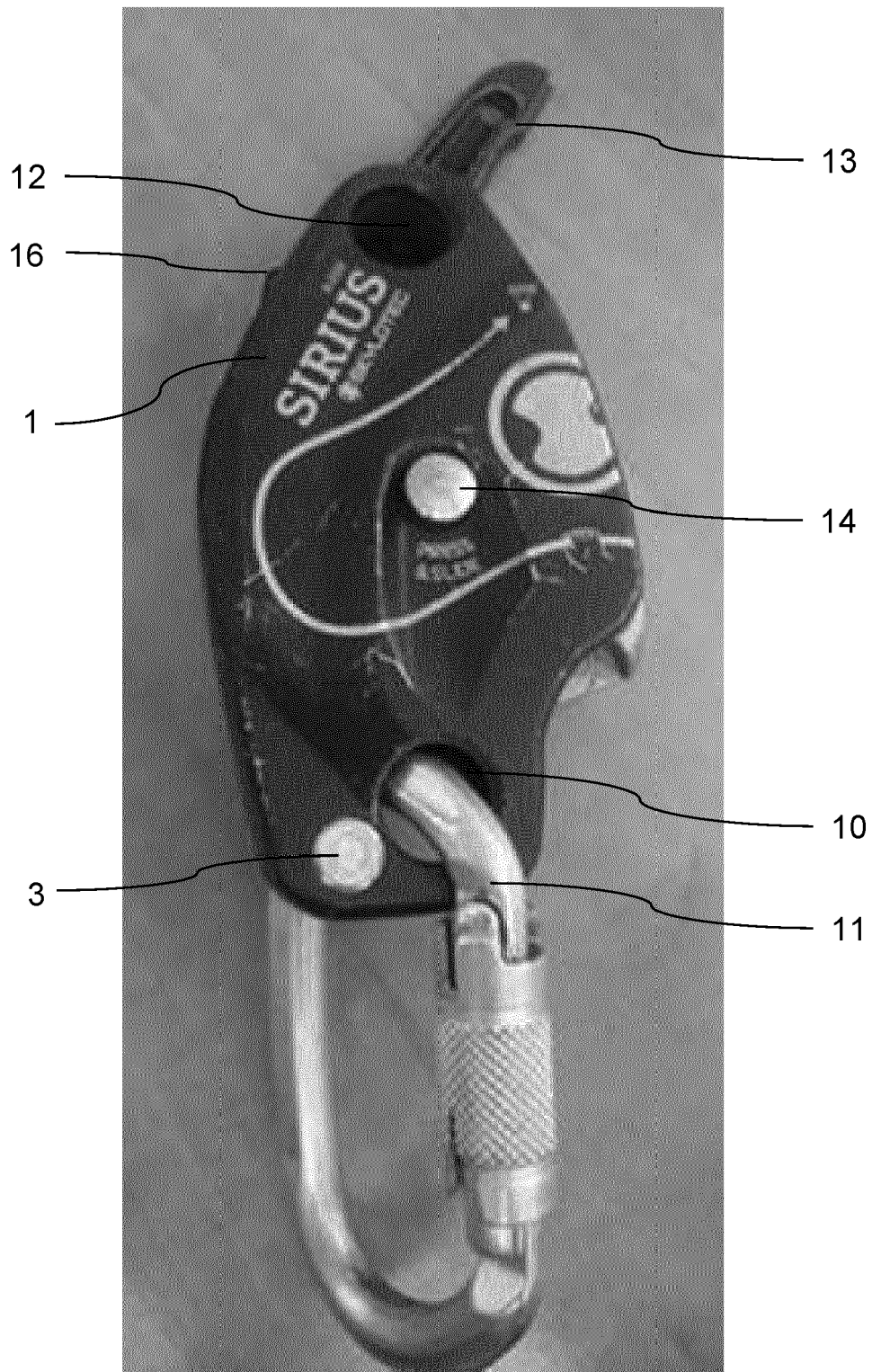


FIG. 1

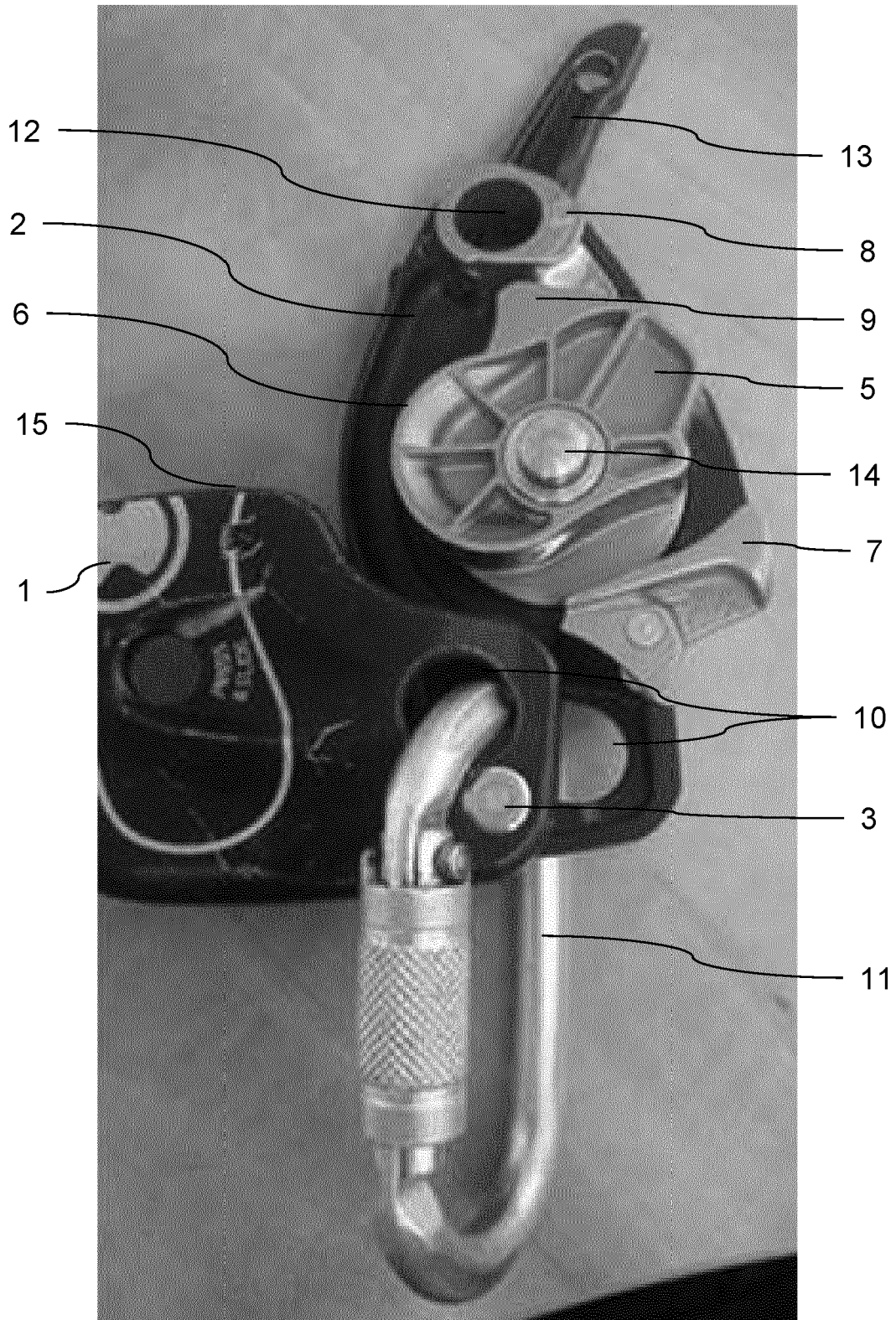


FIG. 2

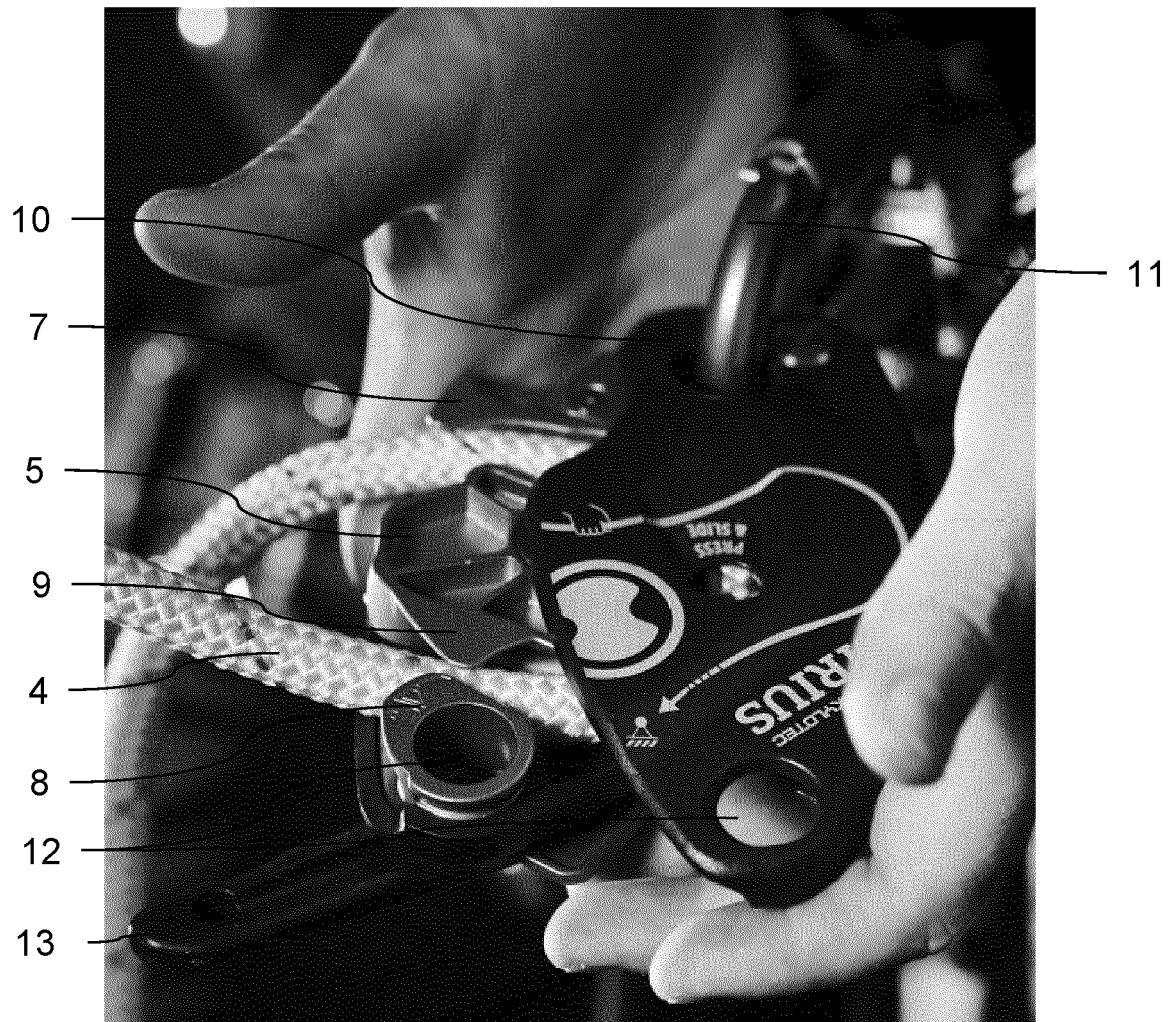


FIG. 3



EUROPEAN SEARCH REPORT

 Application Number
 EP 20 15 1775

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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 24 July 2020	Examiner Paul, Adeline
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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 EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 20 15 1775

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