(19) DANMARK

(10) **DK/EP 2848829 T3**

(12) Oversættelse af europæisk patentskrift

Patent- og Varemærkestyrelsen

(51) Int.Cl.: ***F 16 B 45/02 (2006.01)***

(45) Oversættelsen bekendtgjort den: **2017-09-18**

(80) Dato for Den Europæiske Patentmyndigheds bekendtgørelse om meddelelse af patentet: **2017-05-31**

(86) Europæisk ansøgning nr.: **14002775.6**

(86) Europæisk indleveringsdag: **2014-08-07**

(87) Den europæiske ansøgnings publiceringsdag: **2015-03-18**

(30) Prioritet: **2013-09-11 DE 202013008111 U**

(84) Designerede stater: **AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR**

(73) Patenthaver: **Skylotec GmbH, Im Mühlengrund 6-8, 56566 Neuwied, Tyskland**

(72) Opfinder: **RINKLAKE, Kai, Auf der Gasse 11, 56567 Neuwied, Tyskland**
**Jungmann, Lukas, Lavanter Strasse 47A, 9900 Lienz, Østrig**
**Schwingshackl, Ulrich, Andreas-Hofer-Str. 10, 39057 Eppan a.d. Weinstrasse, Italien**
**Probst, Myriam, Auf der Rohr 9-11, 50667 Köln, Tyskland**

(74) Fuldmægtig i Danmark: **Zacco Denmark A/S, Arne Jacobsens Allé 15, 2300 København S, Danmark**

(54) Benævnelse: **Twist-/trilock-karabinhage**

(56) Fremdragne publikationer:
**EP-A1- 0 826 890**
**DE-U1- 29 610 293**
**FR-A5- 2 146 704**

## Description

**[0001]** The invention relates to a carabiner with a main body containing a gate opening, a gate part which can be received in the gate opening and which is connected at one end swivellingly with the main body and a locking device which, in a locked position, locks the gate part together with the main body, thus preventing a swivelling of the gate part. The locking device has an operating section which is rotated around the longitudinal axis of the gate part, thereby enabling a swivelling movement of the gate.

**[0002]** A carabiner with a locking device is known from the publication EP 2 397 708 A1. In this case the locking device comprises two locking levers, mounted in a rocking manner, in each case arranged in a groove-formed depression in the outer side of the gate part, which in the locked position in each case engage, with one end, in a recess of the main body and as a result lock the gate part to the main body. The gate part cannot then be swivelled into the inner region formed by the main body. An opening of the carabiner is thus not possible in the locked position. In order to unlock the gate part it is necessary to press the two locking levers to operate them, as a result of which the ends of the locking levers are swivelled out of the recesses of the main body. One disadvantage of this carabiner is that in order to unlock the locking element the two locking elements need to be pressed in simultaneously to operate them. This can be problematic if the carabiner is being used when climbing, where in certain situations it is possible only with difficulty to reach the two locking elements simultaneously with one hand.

**[0003]** Operation of the locking device is simpler in the case of known twist-lock carabiners, in which an operating section of the locking device is twisted around the

longitudinal axis of the gate part in order to release the locking and enable a swivelling of the gate part into the inner region of the main body. A sleeve surrounding the gate part, which comprises the operating section, is thereby so long that it extends beyond the point of connection between gate part and main body. However, it contains an opening which makes it possible to open the carabiner by swivelling the gate part after rotating the sleeve around the gate part. However, it has been found that in certain climbing situations the unlocking of a twist-lock carabiner can also be problematic.

**[0004]** The publication DE 296 10 293 U1 describes a carabiner with a securing sleeve mounted moveably on a gate which, in order to unlock the gate is, selectively, axially displaceable in both directions while being rotated.

**[0005]** In view of the problems described, it is the object of the present invention to provide a carabiner which can be unlocked simply and reliably but which at the same time cannot open accidentally and as a result offers sufficient security, even in climbing applications.

**[0006]** This problem is solved through a further development of the described twist-lock carabiner which is substantially characterised in that the operating section is configured, starting out from the locked position, to be rotatable in a clockwise direction into a first rotation position and in an anticlockwise direction into a second rotation position, wherein a swivelling of the gate part is enabled in both rotation positions.

**[0007]** The carabiner thus has a first pre-loading part which is pre-loadable through twisting in a clockwise direction and a second pre-loading part which is pre-loadable through twisting in an anticlockwise direction. After twisting the operating section in a clockwise direction, the first pre-

loading part can force the locking device back into the locked position and after twisting the operating section in an anticlockwise direction the second pre-loading part can force the locking device back into the locked position.

**[0008]** The invention is based on the knowledge that, when climbing, a carabiner is not necessarily always arranged in the same position when it is grasped with a hand in order to unlock and open it. If a conventional twist-lock carabiner is arranged so as to be rotated relative to its usual position, the user will initially try to unlock the carabiner by rotating it in the usual direction, which is in this case incorrect. This costs time and adversely affects operating comfort. In contrast, the carabiner according to the invention can be unlocked through rotation in both directions of rotation, so that in any position of the carabiner the first rotation attempt on the part of the user leads to the desired unlocking.

**[0009]** In addition, left-handers usually prefer the opposite rotating movement to right-handers, since due to motor circumstances a right hand can perform rotating and screwing movements easily in an anticlockwise direction whereas a left hand can perform rotating and screwing movements easily in a clockwise direction. As a result, this problem can be solved in that twist-lock carabiners are manufactured for right-handers which can be opened by rotating the operating section in an anticlockwise direction while twist-lock carabiners are manufactured for left-handers which can be opened by rotating the operating section in a clockwise direction. However, this is very costly. In contrast, the carabiner according to the invention can be used with a high degree of operating comfort by both left-handers and right-handers.

**[0010]** In order to prevent an accidental opening of the locked carabiner it has proved advantageous if the locking device is forced from the first and/or the second rotation position into the locked position by means of at least one of the pre-loading parts, preferably a spring, in particular a torsion spring. In other words, the locking device is rotated back into the locked position by means of the pre-loading part which has been pre-loaded by the user through twisting as soon as an operating element arranged in a rotation position is released. Consequently, in its unoperated state the locking device is always in the locked position, in which an accidental swivelling of the gate part is prevented. This increases safety, in particular for climbing applications.

**[0011]** Preferably, the first pre-loading part and the second pre-loading part are in each case also pre-loaded in the locked position, whereby the two pre-loads act contrary to one another (directed in a clockwise direction and in an anticlockwise direction), but are approximately equal in amount, so that without the external application of force the operating section remains in the locked position. This stabilises the position of the operating section.

**[0012]** In other words, the pre-loads of the first and second pre-loading parts are matched such that the locking device is forced into the locked position from both rotation positions. In a particularly preferred embodiment, the two pre-loading parts are two torsion springs installed opposite one another (offset by 180°), of which one torsion spring is tensioned and the other relaxed when the operating section is twisted. Whereas in the locked position both torsion springs force the operating section in opposite directions of rotation with approximately the same amount of force, so that the operating section remains

in the locked position, after the operating section has been twisted into one of the rotation positions, the amount of the pre-load of one torsion spring outweighs the amount of the pre-load of the other torsion spring, which leads to a resultant force which forces the operating section back into the locked position.

**[0013]** Preferably, the angle of rotation by which the operating section needs to be rotated from the locked position into the first rotation position is greater than 30°, preferably greater than 60°, in particular around 90° or more, while the angle of rotation by which the operating section needs to be rotated from the locked position into the second rotation position is greater than -30°, preferably greater than -60°, in particular around -90° or more. A large angle of rotation prevents an accidental unlocking of the gate part.

**[0014]** The pre-load of the two torsion springs in the locked position is preferably matched to the angle of rotation. If, in the locked position, the torsion springs are in each case pre-loaded by exactly the angle of rotation, in the two rotation positions one of the torsion springs is completely relaxed, while the other torsion spring is pre-loaded by around twice the amount in comparison with the locked position. Preferably, in the locked position the two torsion springs are therefore in each case pre-loaded in opposite directions of rotation by an angle which is somewhat greater than the angle of rotation (more than 5% greater but less than 50% greater). This leads to an easy yet stable operability of the operating section and in the unoperated state leads to a rapid return of the operating section into the locked position.

**[0015]** In a preferred embodiment of the invention, the locking device has a locking section which can be rotated

together with the operating section which, in the locked position, interacts with a contact surface of the main body and as a result prevents a swivelling of the gate part, and which in both rotation positions is rotated around the contact surface and as a result enables a swivelling of the gate part. The locking section and operating section are preferably formed as a single part. The contact surface of the main body can be a projecting edge of the gate opening of the main body which is overlapped by the locking section. In the locked position, the contact surface of the main body lies in the swivelling path of the locking section, so that the locking section and the contact surface of the main body come into contact with one another if the user attempts to swivel [the gate] starting out from the locked position.

**[0016]** By rotating the operating section (both in a clockwise direction into the first rotation position and also in an anticlockwise direction into the second rotation position), the locking section is rotated such that the contact surface of the main body no longer lies in the swivelling path of the locking section – the gate part is unlocked and can be swivelled.

**[0017]** Preferably, the operating section and preferably also the locking section are parts of a sleeve surrounding the gate part. This protects the interior of the gate part against dirt. In addition, the sleeve which preferably completely surrounds the gate part offers a large gripping surface for the user, which makes it easy to grasp the operating section of the sleeve. This increases operating comfort.

**[0018]** Alternatively or additionally, the locking section has an edge section of the sleeve projecting in the direction of the main body, wherein the sleeve is

preferably formed in a single part and comprises both the operating section and also the locking section.

**[0019]** The operating comfort of the carabiner is further increased through a first shoulder of the sleeve limiting rotation in a clockwise direction and a second shoulder of the sleeve limiting rotation in an anticlockwise direction. The shoulders can be projecting edge sections of the sleeve at the end of the sleeve opposite the locking section which come to rest against a contact surface of the gate part in a circumferential direction on rotation into the first or the second rotation position, so that further rotation is prevented.

**[0020]** In order to achieve a simple and economical manufacture of the carabiner according to the invention, the torsion springs can surround the gate part and can in each case be coupled to the gate part on the one hand and coupled to the sleeve on the other hand. In order to move the locking device from the locked position into one of the rotation positions, the sleeve is thus grasped by the operating section and twisted around the gate part, as a result of which the torsion springs are pre-loaded.

**[0021]** In a further, particularly preferred embodiment, the operating section is also, additionally, designed to be axially displaceable in the longitudinal direction of the gate part. An axial displaceability of the operating section is for example provided in known tri-lock carabiners. In such tri-lock carabiners, three independent movement sequences must be performed in order to open the carabiner: sliding the operating section in the longitudinal direction of the gate part, twisting the operating section around the longitudinal axis of the gate part and swivelling the gate part in the direction of the interior of the main body. This makes tri-lock carabiners

particularly safe, since an accidental opening of the carabiner is ruled out due to the triple safeguard.

**[0022]** Preferably, in the carabiner according to the invention the operating section is axially displaceable from a first locked position which blocks twisting of the operating section into a second locked position in which twisting of the operating section is enabled. A swivelling of the gate part is blocked both in the first locked position and also in the second locked position. The operating section thus first needs to be displaced axially from the first locked position into the second locked position, and starting out from the second locked position can be twisted both in a clockwise direction and also in an anticlockwise direction in order to enable a swivelling of the gate part and thus an opening of the carabiner. In this embodiment the second locked position thus corresponds to the locked position described above. For this purpose, the locking device can have a contact section which is axially displaceable together with the operating section and which, in the first locked position, rests against a contact surface of the gate part and/or the main body in a circumferential direction and as a result prevents a rotation of the operating section or a rotation of the sleeve. In a particularly preferred embodiment, the contact section has a groove formed in an edge of the sleeve in which a pin carrying the contact surface engages in the first locked position. By axially displacing the sleeve into the second locked position, the pin is moved out of the groove, so that in the second locked position the sleeve can be rotated around the longitudinal axis of the gate part.

**[0023]** An accidental opening of the carabiner can be prevented by means of a further pre-loading part,

preferably a compression spring, which forces the operating section or the sleeve from the second locked position into the first locked position. In its unoperated state the locking device is thus automatically moved into the second locked position or held in the second locked position. If the locking device is in the first or the second rotation position, the first or the second pre-loading part first moves the sleeve into the second locked position, whereupon the further pre-loading part moves the sleeve into the first locked position.

**[0024]** The invention is explained in the following by way of example with reference to the enclosed drawings, to which reference is made in order to explain details which are important to the invention and which are not expressly pointed out in the above description, wherein:

Fig. 1 shows a first embodiment of a twist-lock carabiner according to the invention in the locked position, wherein a part of the sleeve has been omitted to allow a clear illustration of the locking device,

Fig. 2 shows a side view of the embodiment illustrated in Fig. 1 in different positions, namely the locked position S (left), the first and the second rotation positions D1, D2 before swivelling of the gate part (centre) and the first and the second rotation position following swivelling of the gate part (right),

Fig. 3 shows a second embodiment of a carabiner according to the invention in the locked position,

wherein a part of the sleeve has been omitted to allow a clear illustration of the locking device,

Fig. 4 shows a side view of the embodiment illustrated in Fig. 3 in different positions of the locking device, namely the first locked position S1 (left), the second locked position S2 (centre left), the first and the second rotation position D1, D2 before swivelling of the gate part (centre right) and the first and the second rotation position following swivelling of the gate part (right).

**[0025]** Fig. 1 shows a first embodiment of a carabiner 100 according to the invention. The carabiner 100 comprises a main body 10 in the form of a curved profile element, the two free ends of which, spaced at a distance opposite one another, form a gate opening which receives a gate part 20. The gate opening can be closed by means of the gate part 20 which is in the form of a short, straight profile element. The gate part 20 is connected swivellingly at one of its ends with one end of the main body by means of a pin.

**[0026]** In Fig. 1 the carabiner is shown in a locked position S in which a swivelling of the gate part 20 in the direction of the interior of the main body 10 is prevented by a locking device 30. The locking device 30 has a locking section 34 which is connected with the gate part 20 and can be swivelled with this which in the locked position S overlaps a projecting edge on the other end of the main body 10 and therefore comes to rest against a contact surface 12 of the projecting edges if, starting out from the locked position S, a user attempts to swivel the gate part inwards. In other words, the contact surface 12 of the main body lies in the swivelling path of the locking

section 34 of the gate part 20, so that a swivelling is not possible in the locked position S.

**[0027]** In order to enable a swivelling of the gate part 20, the user first needs to operate an operating section 32 of the locking device 30, after operating which the contact surface 12 of the main body no long presents an obstacle for the locking section 34 of the locking device 30.

**[0028]** The operating section 32 and the locking section 34 are in the form of a sleeve 35 surrounding the gate part 20, which is shown particularly clearly in Fig. 2. In Fig. 1 a part of the sleeve 35 facing the interior of the main body has been omitted for the sake of clarity, so that a view into the space surrounded by the sleeve is opened up in Fig. 1.

**[0029]** Starting out from the locked position S, by rotating the operating section 32 in a clockwise direction U around the longitudinal axis A of the gate part 20 the locking device 30 can be moved into a first rotation position D1 and by rotating it in an anticlockwise direction U' it can be moved into a second rotation position D2, whereby in each case a swivelling of the gate part is enabled since, together with the operating section 32, the sleeve 35 and with this also the locking section 34 is rotated until the locking section 34 has been rotated out of its blocking position. These rotation positions D1 and D2 are shown in the centre in Fig. 2. In the present case the clockwise direction U is defined as being the direction of rotation in which, starting out from the position S in Fig. 2, the sleeve is rotated into the position D1 in Fig. 2 (view from below in Fig. 2, left hands usually twist in this direction of rotation). In contrast, the anticlockwise direction U' is defined as being the direction of rotation in which, starting out from the position S in Fig. 2, the sleeve is

rotated into the position D2 in Fig. 2 (view from below in Fig. 2, right hands usually twist in this direction of rotation).

**[0030]** As can be seen from the illustrations in Fig. 2, the angle of rotation between the locked position S and the first rotation position D1 is around 90°, while the angle of rotation between the locked position S and the second rotation position D2 is around -90°. In these rotation positions, the gate part 20 with the upwardly projecting sleeve 35 can in each case be swivelled to the side past the downwardly projecting section 12 of the main body 10. An excessive rotation of the operating section 34 beyond the two rotation positions D1, D2 is prevented through two downwardly projecting shoulders 41, 42, of which, on reaching the first rotation position D1, the first shoulder 41 interacts with a projecting pin of the gate part 20 in order to prevent a further rotation and, on reaching the second rotation position D2, the second shoulder 42 interacts with the projecting pin of the gate part 20 in order to prevent a further rotation. On the one hand this prevents the rotation mechanism from being damaged and on the other hand this indicates to the user that the unlocking position has been reached.

**[0031]** Through the interaction of two torsion springs 36, 38 installed opposite one another (offset by 180°), the locking device 30 is forced out of each of the two rotation positions D1, D2 back into the locked position S. The two torsion springs 36, 38 in each case surround the gate part 20 and are coupled to the gate part 20 on the one hand and to the sleeve 35 on the other hand, so that after the sleeve 35 has been rotated around the gate part 20 they force the sleeve and thus the locking section 34 back into the locked position 34.

**[0032]** In the locked position S the amounts of the pre-loads of the two torsion springs 36, 38 correspond to one another, so that as a result of their being installed so as to act in contrary directions no resultant rotational force is produced - the locking device 30 remains in the locked position S. After the sleeve has been twisted around the gate part 20, the pre-load of one torsion spring 36 outweighs that of the other torsion spring 38, so that a resultant force is produced which forces the sleeve back into the locked position S, since the two torsion springs are arranged opposite one another such that when the operating section is rotated around the axis A one torsion spring is tensioned while the other is relaxed.

**[0033]** Instead of the torsion springs, other pre-loading parts, for example other springs, can be used.

**[0034]** An alternative embodiment of a carabiner 200 according to the invention is shown in Figures 3 and 4. This alternative embodiment is designed as a tri-lock carabiner, the operating element 32 of which needs to be not only twisted and swivelled but also slid in an axial direction in order to open the carabiner 200. For this reason, the second embodiment prevents an unintentional opening of the carabiner in a particularly reliable manner.

**[0035]** In the second embodiment, the entire sleeve 35 is mounted so as to slide in an axial direction. In a first locked position S1, which is shown on the left in Fig. 4 and in which no external force acts on the operating element 34, the sleeve 35 is forced by a further spring 39 to rest against a laterally projecting pin 45 of the gate part. In the first locked position S1, a rotation of the sleeve 35 is prevented in that the sleeve has, at the opposite end to the locking section 34, a contact section 43 in the form of a lower edge of the sleeve in which a

groove 44 is inset which is matched to the dimension of the pin 45. Through the further spring 39, the groove 44 is forced into engagement with the pin 45, as a result of which a rotation of the sleeve is prevented. The further spring 39 is in the form of a compression spring, like the other pre-loading parts 36, 38 surrounds the gate part 20, and is surrounded by the sleeve 35 and as a result protected against damage. A different pre-loading part can be provided instead of the compression spring 39.

**[0036]** In order to open the gate part 20, starting out from the first locked position S1 the sleeve 35 is pushed in an axial direction against the pre-loading force of the compression spring 39 until the pin 45 has been guided out of the groove 44. The carabiner is then in a second locked position S2, in which a rotation of the sleeve is enabled, but not a swivelling of the gate part 35. The sleeve is then twisted around the gate part 35, in a clockwise direction U or in an anticlockwise direction U', until the locking device is in the first or second rotation position D1, D2. An opening of the gate part 20 is enabled in the two rotation positions D1, D2.

**[0037]** The invention is not limited to the embodiments described above. Different pre-loading elements can be used instead of the springs. Furthermore, the locking mechanism used to lock the gate part and main body can be of different design.

## Patentkrav

**1.** Karabinhage (100, 200) med et basiselement (10), der har en snapåbning, en snapdel (20), som kan optages i snapåbningen, og som ved en ende er forbundet svingbart med basiselementet (10), og en låseindretning (30), som i en spærrestilling (S) låser snapdelen (20) sammen med basiselementet (10) og derved forhindrer en svingning af snapdelen, hvor låseindretningen omfatter en aktiveringssektion (32), som kan drejes rundt om snapdelens (20) længdeakse (A) med henblik på låsning, hvor aktiveringssektionen (32) er indrettet, så den kan dreje udgående fra spærrestillingen (S) i urets retning til en første drejestilling (D1) og imod urets retning (U') til en anden drejestilling (D2), hvor der i begge drejestillinger er frigivet en svingning af snapdelen (20), **kendetegnet ved** en første forspændingsdel (36), der kan forspændes ved drejning i urets retning, og en anden forspændingsdel (38), der kan forspændes ved drejning imod urets retning.

**2.** Karabinhage ifølge krav 1, **kendetegnet ved, at** låseindretningen (30) tvinges fra den første og/eller den anden drejestilling til spærrestillingen ved hjælp af den første og/eller den anden forspændingsdel (36, 38), foretrukket en fjeder, især en drejefjeder.

**3.** Karabinhage ifølge krav 1 eller 2, **kendetegnet ved, at** forspændingerne af den første og anden forspændingsdel (36, 38) er tilpasset på en sådan måde, at låseindretningen (30) tvinges fra begge drejestillinger ind i spærrestillingen.

**4.** Karabinhage ifølge et af de foregående krav, **kendetegnet ved** to modsat indbyggede drejefjedre, hvoraf den ene drejefjeder spændes og den anden afspændes ved en drejning af aktiveringssektionen (32).

**5.** Karabinhage ifølge et af de foregående krav, **kendetegnet ved, at** låseindretningen har en låsesektion (34), som kan drejes sammen med aktiveringssektionen, og som i spærrestillingen samvirker med en kontaktflade (12) af basiselementet og derved forhindrer en svingning af snapdelen (20), og som i begge drejestillinger er drejet rundt om kontaktfladen (12) og derved

frigiver en svingning af snapdelen.

**6.** Karabinhage ifølge et af de foregående krav, **kendetegnet ved, at** aktiveringssektionen (32) og foretrukket låsesektionen (34) er dele af et hylster (35), der er rundtgående omkring snapdelen.

**7.** Karabinhage ifølge krav 6, **kendetegnet ved, at** låsesektionen (34) er en randsektion af hylsteret (35), der rager ud i retning mod basiselementet (10).

**8.** Karabinhage ifølge krav 6 eller 7, **kendetegnet ved** en første afsats (41) af hylsteret, der begrænser en drejning i urets retning, og en anden afsats (42) af hylsteret (35), der begrænser en drejning imod urets retning.

**9.** Karabinhage ifølge et af kravene 6 til 8, **kendetegnet ved, at** drejefjedrene (36, 38) går rundt omkring snapdelen og hver især er forbundet dels med snapdelen (20) og dels med hylsteret (35).

**10.** Karabinhage ifølge et af de foregående krav, **kendetegnet ved, at** aktiveringssektionen (32) er indrettet, så den kan forskydes aksialt i snapdelens (20) længderetning (A).

**11.** Karabinhage ifølge krav 10, **kendetegnet ved** en aksial forskydelighed af aktiveringssektionen (32) fra en første spærrestilling (S1), der spærrer drejningen af aktiveringssektionen, til en anden spærrestilling (S2), der frigiver drejningen af aktiveringssektionen.

**12.** Karabinhage ifølge krav 11, **kendetegnet ved, at** låseindretningen (30) har en anlægssektion (43), som kan forskydes aksialt sammen med aktiveringssektionen (32), og som i den første spærrestilling (S1) i omkredsretningen ligger an mod en kontaktflade af snapdelen (20) og derved forhindrer en drejning af aktiveringssektionen (32).

**13.** Karabinhage ifølge krav 12, **kendetegnet ved, at** anlægssektionen (43) har en not (44), som er udformet i en rand af hylsteret, og som en stift (45) af snapdelen (20), der omfatter kontaktfladen, i den første spærrestilling (S1)

griber ind i.

**14.** Karabinhage ifølge et af kravene 11 til 13, **kendetegnet ved** en forspændingsdel (39), foretrukket en fjeder, særligt foretrukket en trykfeder, som tvinger aktiveringssektionen (32) fra den anden spærrestilling (S2) til den første spærrestilling (S1).

Fig. 1

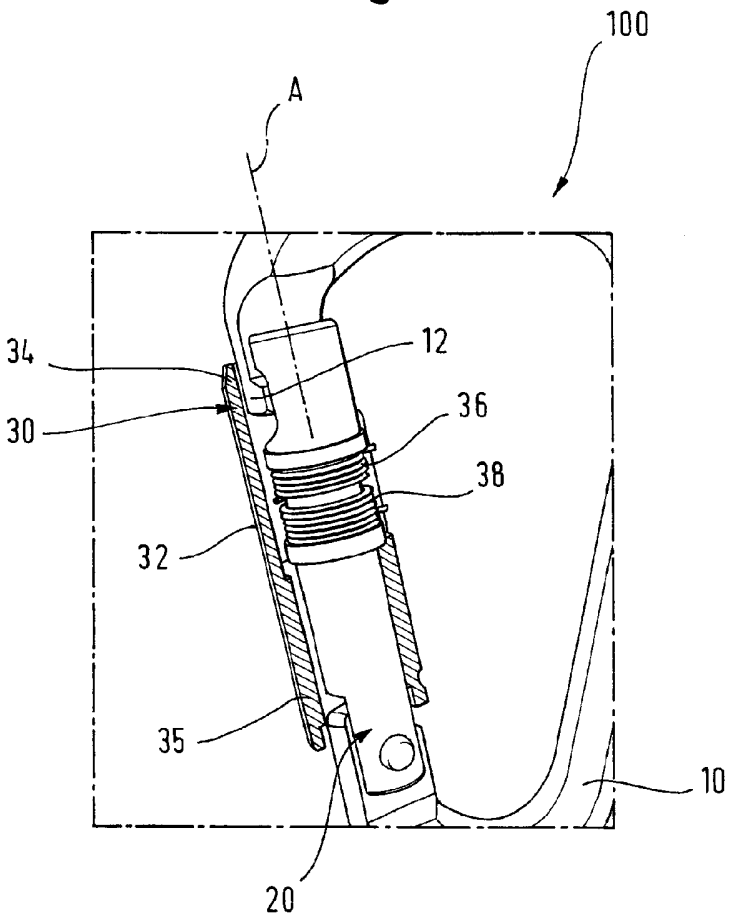

Fig. 2

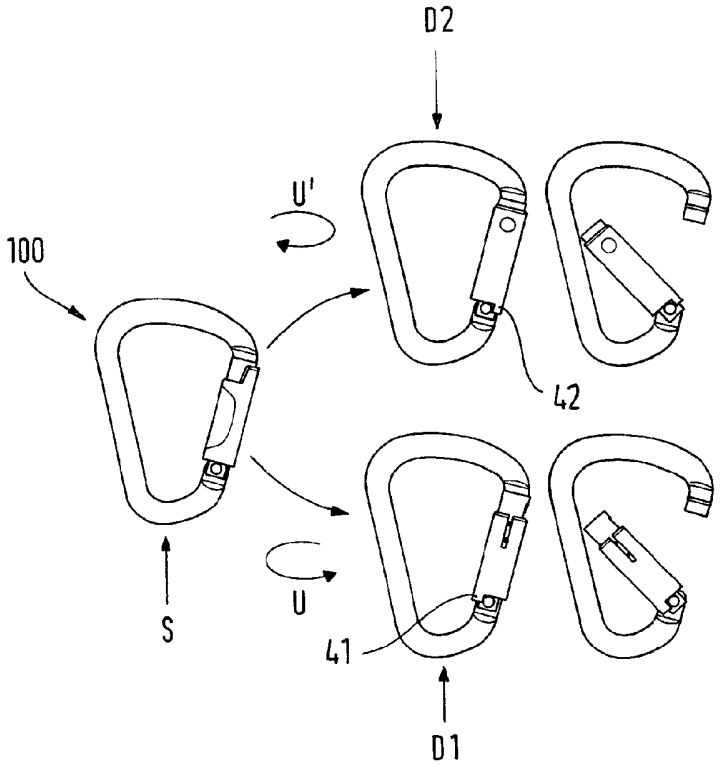

Fig. 3

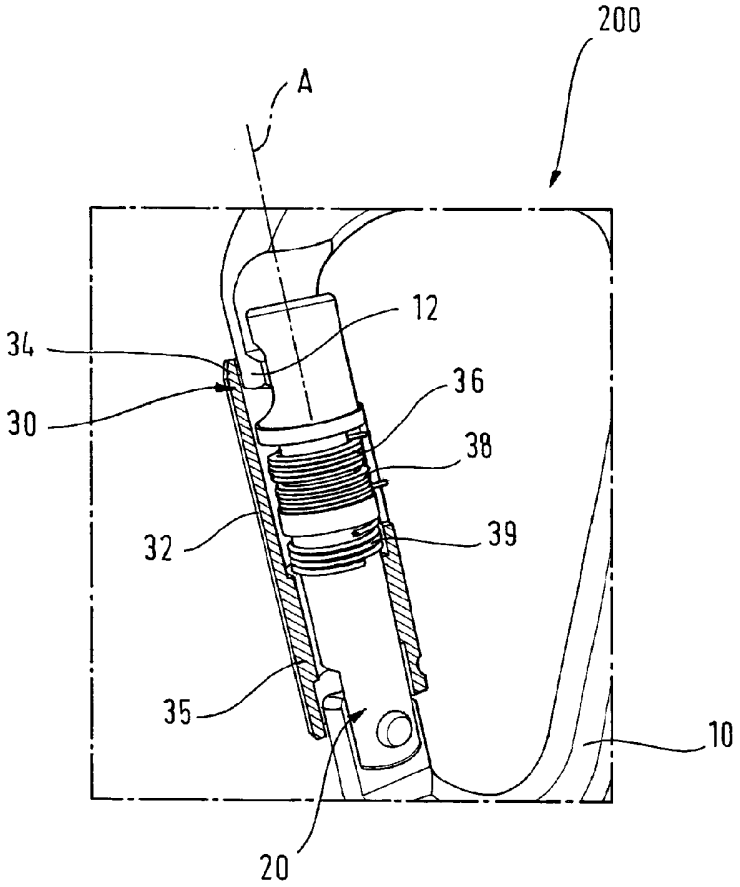

Fig. 4