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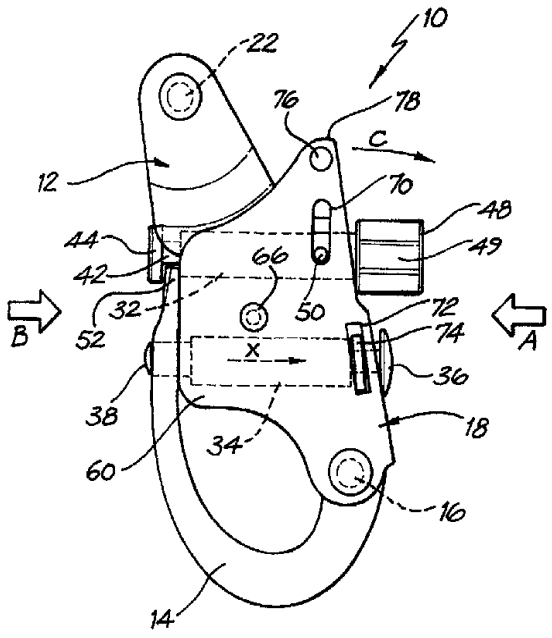
(54) Title: QUICK RELEASE KARABINER

(57) Abstract

A rope engagement device (10) comprises a body portion (12) and a hook portion (14) mounted to the body portion about a pivot (16). The hook portion is adapted to inter-engage with the body portion to define a closed ring adapted to receive a rope passing therethrough. The device includes quick release means such that the hook can pivot away from the body portion to release the rope even when the rope is under load. In particular a bolt (34) means may extend across the body portion, the bolt means being moveable along its longitudinal axis, one end of which defines a projection (38) which is adapted to engage in a through hole defined adjacent the free end of the hook portion, the other end of the bolt means (36) being mounted to a lever (74) rotatably mounted about the pivot.



QUICK RELEASE KARABINER

Field of the Invention

This invention relates to a rope engagement device which may be used for attaching a rope to a harness in the manner of a karabiner, for use in mountaineering, abseiling and the like.

Background of the Invention

A karabiner is a spring loaded clip which can be used to link or attach a rope to a harness. A karabiner comprises a generally pear shaped ring of metal along one side of which there is a hinged gate portion, which is generally spring loaded, so that movement of the free end of the gate portion allows a rope to be inserted inside the ring. A threaded sleeve is usually provided for screwing over the free end of the gate portion to lock the rope into the ring and prevent accidental release of the rope through the gate.

The problem with karabiners is that they cannot be opened to release the rope when they are under load, i.e. when the rope passing through the karabiner is in under tension. While for many applications this is not a particular problem, for certain applications, such as defence applications where soldiers abseil from helicopters or the like on ropes and wish to unclip themselves from their ropes shortly before or as soon as they touch ground, the length of time taken to unclip a karabiner is a problem particularly because they have to wait until they touch ground and their weight is off the rope before they can release themselves from the karabiner.

It is an object of the present invention to alleviate the above mentioned disadvantages and provide a quick release rope engagement device.

Summary of the Invention

The present invention provides a rope engagement device comprising a body portion and a hook portion which is mounted to the body portion about a pivot and which is adapted to inter-engage with the body portion to define a closed ring adapted to receive a rope passing therethrough, the device including quick release means such that the hook can pivot away from the body portion to release the rope even when the rope is under load.

In particular a first rod-like means may extend across the body portion, the first rod means being moveable along its longitudinal axis, one

end of which defines a projection which is adapted to engage in a through hole defined adjacent the free end of the hook, the other end of the rod means being fixed to a lever rotatably mounted about the pivot.

The rod means may be spring loaded to bias it in the direction of engagement in the through hole in the hook.

A second rod like means may extend across the body portion, one end of said means defining an engagement means which is movable between two positions, a first position in which it covers the tip of the free end of the hook and prevents opening of the device, and a second position in which opening of the device is not prevented by the engagement means.

The lever means may be a cover defining two opposed cover plates with a pin extending therebetween, the pin being located distal from the pivot.

A velcro tab, or the like, may be attached to the pin for an operator to tug or pull to cause the cover to turn about the pivot for opening the device.

Brief Description of the Drawings

A specific embodiment of the invention will now be described, by way of example only, and with reference to the accompanying drawings in which:

Figure 1 is a side view of a rope engagement device embodying the present invention;

Figure 2 is a rear view of the rope engagement device of Figure 1 viewed in the direction of arrow A;

Figure 3 is a side view of the device of Figure 1, from the opposite side to that shown in figure 1 and with a cover of the device removed;

Figures 3a and 3a are schematic diagrams illustrating the orientation of a bolt of the device in engagement and non engagement positions respectively;

Figure 4 is a front view of the device of Figure 1 in the direction of the arrow B; and

Figure 5 is a perspective view of the device when open illustrating a velcro tab and a finger grip, in particular.

Detailed Description of a Preferred Embodiment

Referring to the drawings, Figure 1 shows a rope engagement device generally indicated at 10 incorporating a feature which allows quick release of the rope under load. The device includes a cast steel body portion 12 best seen in Figure 3. One end of a cast steel hook 14 is mounted to a lower end the body portion on a pivot pin 16. The hook 14 rotates about the pivot 16 relative to the body portion. The device also includes a cover 18 which is also mounted on the body portion about pivot pin 16. The cover may rotate about the pivot pin 16 relative to the hook and to the body portion. The cover is made of sheet metal such as aluminium or steel.

As is best seen in Figure 4, the upper end of the body portion is generally U shaped in section and defines two opposed parallel plates between which a rod 22 extends. The rod 22 can be used to attach the device to a harness so that the device is fixed relative to a person wearing that harness. The lower end of the body portion also defines two opposed parallel plates. Each plate defines a hole. Pivot pin 16 is mounted in and extends between those holes.

Referring to Figure 3, the centre of the body portion defines an aperture 24 spaced between the two opposed side walls 26, 28 of the centre of the body portion 12. Two bolts 32 and 34 extend across the centre of the body portion of the device. Bolt 34 is movable along its longitudinal axis X relative to the body portion and is biased towards the right side wall 28 by a spring (not shown). The bolt is shown in phantom in Figure 1. The head 36 of the bolt is a flush rivet although other arrangements including a nut and washer can perform the required function of fixing the rod longitudinally relative to the cover 18. The bolt is generally cylindrical although the tip portion 38 is of a reduced diameter compared to the rest of the bolt.

The other bolt 32 extends along and inside a generally cylindrical sleeve 40 which extends between side wall 26 and side wall 28. The bolt 32 is generally cylindrical although, as illustrated in phantom in Figure 1, there is a reduced diameter portion 42 adjacent the end 44 of the bolt. One side of that end of the bolt is machined to define a flat 46 as shown in Figures 3a and 3b. At the opposite end of the bolt there is a knob 48. The knob is generally pear shaped in cross-section defining a tip 49. Projecting radially from the bolt there is a lock pin 50. The sleeve 40 defines an arcuate slot

(not shown) which extends for 90 degrees and allows the pin 50 to turn through 90 degrees and hence the bolt to rotate by the same angle about its axis between the position shown in Figure 1 where the tip of the knob faces out of the page, in a clockwise direction to the position shown in Figures 2 and 5.

Close to the tip of the hook 52 there is a cylindrical through hole 54 best seen in Figures 3 and 4. As discussed above and as shown in Figures 3a, 3b and Figure 3, the end 44 of bolt 36 a flat side 46 machined on its end. This bolt s a locking or engagement means. When the device is in the closed position, as illustrated in Figures 1 and 4, end 38 of the bolt 34 extends through hole 54. Tip 52 of the hook locates behind end 44 of the bolt 32. When the end/flat 46 is in the "upright" position as shown in Figure 3a the tip 52 of the hook is locked behind the end 44 of the bolt to prevent accidental release. This forms the primary locking means of the device. The hook cannot be released unless the end 44 of the bolt is turned through 90 degrees using the knob 48, so that the flat 46 is horizontally oriented as shown in Figure 3b.

Turning to Figures 1 2, and 5, the cover 18 comprises two identical plates 60 and 62 disposed either side of the body portion 12 and end plate 64 extending generally perpendicular to the front and rear portions 60, 62 and joining the two plates together.

A rivet 66 extends from one plate to the other. The rivet extends through the aperture 24 in the body portion and acts as a stop preventing the casing from rotating too far about the pivot pin 16 relative to the body portion.

Referring to Figures 2 and 5 the end plate 64 defines a pear shaped aperture 68 larger than knob 48 to allow the plate and cover to turn about the pivot pin 16 past the knob.

There are two elongate slots 70, 72 in the side 60 of the casing. One slot 70 receives the head of the pin 50 and acts as a secondary locking device to the primary locking means defined by the end of bolt 32.

The second slot and an identical slot on the other plate 62 receives a plate 74 which is mounted about bolt 34 and in conjunction with the flush rivet head 36 fixes the bolt longitudinally relative to the bolt 32. However the plate 74 can move along the slot and this allows and controls the

movement of the longitudinal axis of the bolt relative to the cover 64 to prevent the bolt locking the cover and thus to allow the cover to open.

A pin 38 passes between the opposed faces of the cover and velcro tab 40 (refer to Figure 5 which illustrate the finger grip and velcro tab in particular) can be wrapped around the pin to allow the cover to be pulled to the right by the velcro strap about the pivot 16 in the direction of the arrow C (refer to Figure 1). When not in use, the tab 40 can be used to wrapped around the upper part of the device, covering the twist knob 48 and primary locking means 44/46 thus preventing accidental movement of the cover, thus acting as a further safety lock.

To release the load device quickly, the velcro tab is unwrapped if necessary and the knob 48 is turned to the vertical position shown in Figure 2 to prepare for quick release. At this stage the secondary locking pin 50 is completely disengaged allowing the cover to be pulled in direction C which pulls bolt tip 38 backwards out of the hole 54 in the tip of the hook thus quickly releasing the hook 26.

The hook will release whether there is a load on the rope passing through the hook or not.

This is possible for the following reason, the hinge 15 transfers the load from bolt 36 creating leverage. This leverage enables the cover to be controlled and operated in an instinctive manner by simply using the finger grip 38 or velcro tab.

To lock the device the tip 52 of the hook is rotated towards the end 44 of the bolt. The bolt 32 is pushed backwards in the direction X (Figure 1) and then springs back into hole 28 under action of its biasing spring when aligned with hole 54.

Claims

1. A rope engagement device comprising a body portion and a hook portion which is mounted to the body portion about a pivot and which is adapted to inter-engage with the body portion to define a closed ring adapted to receive a rope passing therethrough, the device including quick release means such that a free end of the hook can pivot away from the body portion to release the rope even when the rope is under load.

2. A rope engagement device as claimed in claim 1 characterised in that a first bolt means extends across the body portion, the first bolt means defining a longitudinal axis, one longitudinal end of the bolt means defining a projection which is adapted to engage in a through hole defined adjacent a free end of the hook portion, an opposite longitudinal end of the bolt means being mounted to a lever rotatably mounted about the pivot.

3. A rope engagement device as claimed in claim 2 characterised in that the first bolt means is displaceable in the direction of its longitudinal axis and is biased in the direction of engagement of the projection in the through hole in the hook.

4. A rope engagement device as claimed in claim 3 characterised in that a second bolt means extends across the body portion, one end of said second bolt means defining an engagement means which is movable between two positions, a first position in which it covers the tip of the free end of the hook and prevents opening of the device, and a second position in which opening of the device is not prevented by the engagement means.

5. A rope engagement device as claimed in any one of claim 2 characterised in that the lever means may be a cover defining two opposed cover plates with a pin extending therebetween, the pin being located distal from the pivot.

6. A rope engagement device as claimed in any one of claim 4 characterised in that the lever means may be a cover defining two opposed cover plates with a pin extending therebetween, the pin being located distal from the pivot.

7. A quick release karabiner comprising a body portion and a hook portion which is mounted to the body portion about a pivot and which is adapted to inter-engage with the body portion to define a closed ring adapted to receive a rope passing therethrough, the device including quick release means such that a free end of the hook can pivot away from the body portion

to release the rope even when the rope is under load, further comprising a first bolt means which extends across the body portion, the first bolt means defining a longitudinal axis and being displaceable in the direction of its longitudinal axis relative to the body portion and wherein one longitudinal end of the bolt means defining a projection which is adapted to engage in a through hole defined adjacent the free end of the hook portion, an opposite longitudinal end of the bolt means being mounted to a lever rotatably mounted about the pivot.

8. A karabiner as claimed in claim 7 characterised in that the first bolt means is spring loaded to bias the other end of the bolt means into the through hole in the hook.

9. A karabiner as claimed in claim 8 characterised in that a second bolt means extends across the body portion, one end of said second bolt means defining an engagement means which is movable between two positions, a first position in which it covers a tip of the free end of the hook and prevents opening of the device, and a second position in which opening of the device is not prevented by the engagement means.

10. A karabiner as claimed in claim 9 characterised in that the lever means is a cover defining two opposed cover plates with a pin extending therebetween, the pin being located distal from the pivot.

11. A karabiner substantially as hereinbefore described with reference to the accompanying drawings.

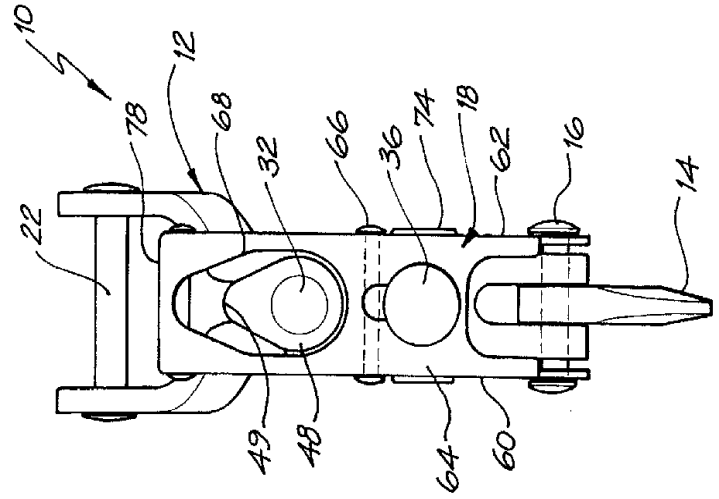

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FIG. 2

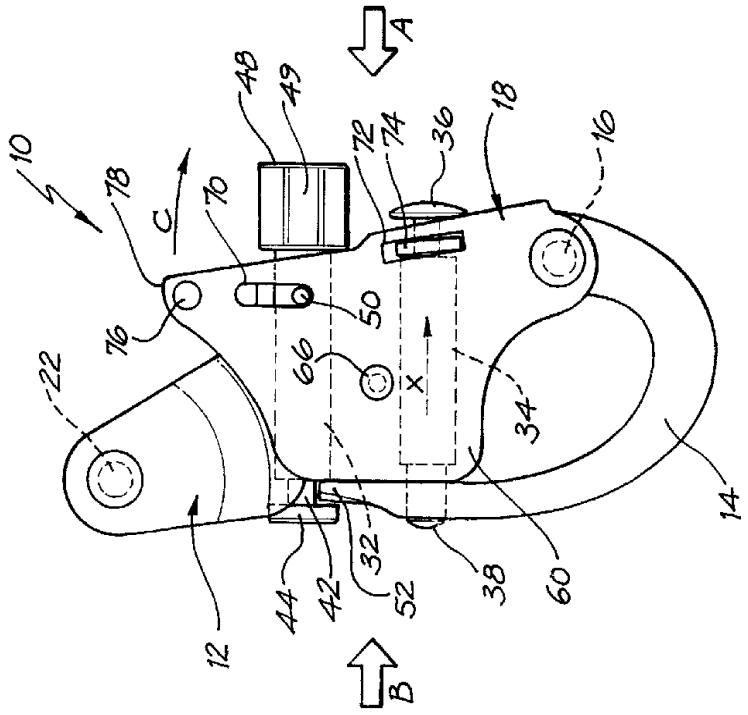
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FIG. 1

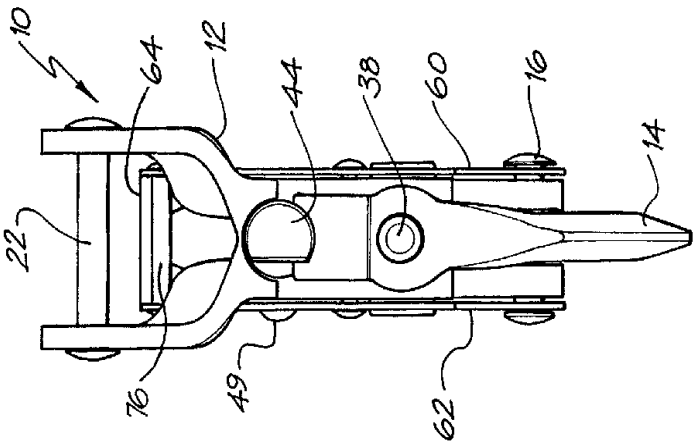

FIG. 4

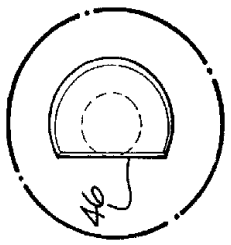

FIG. 3a

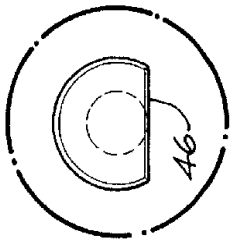

FIG. 3b

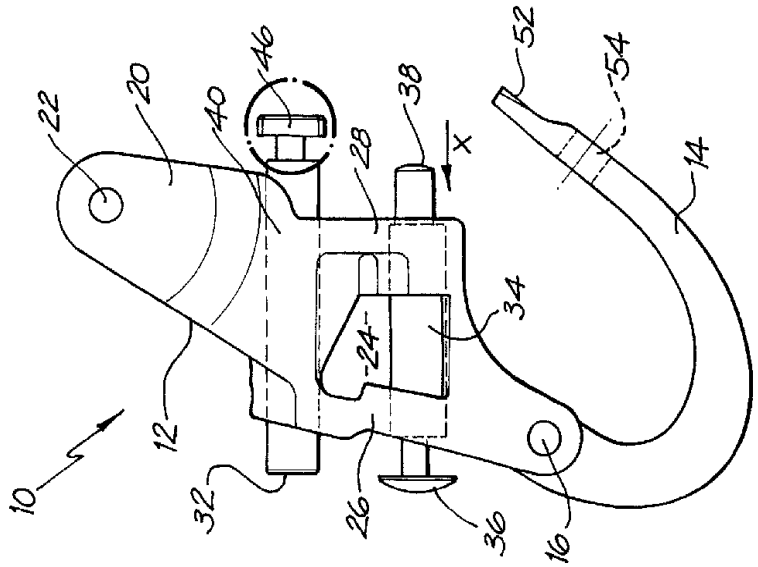

FIG. 3

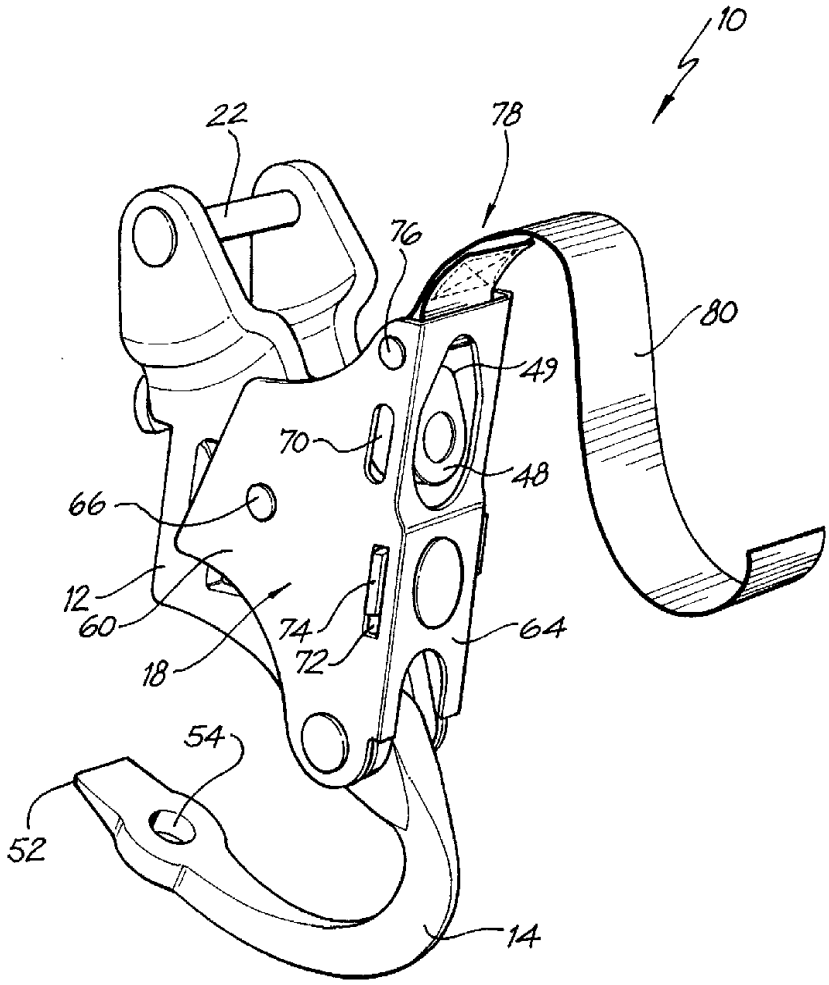

FIG. 5