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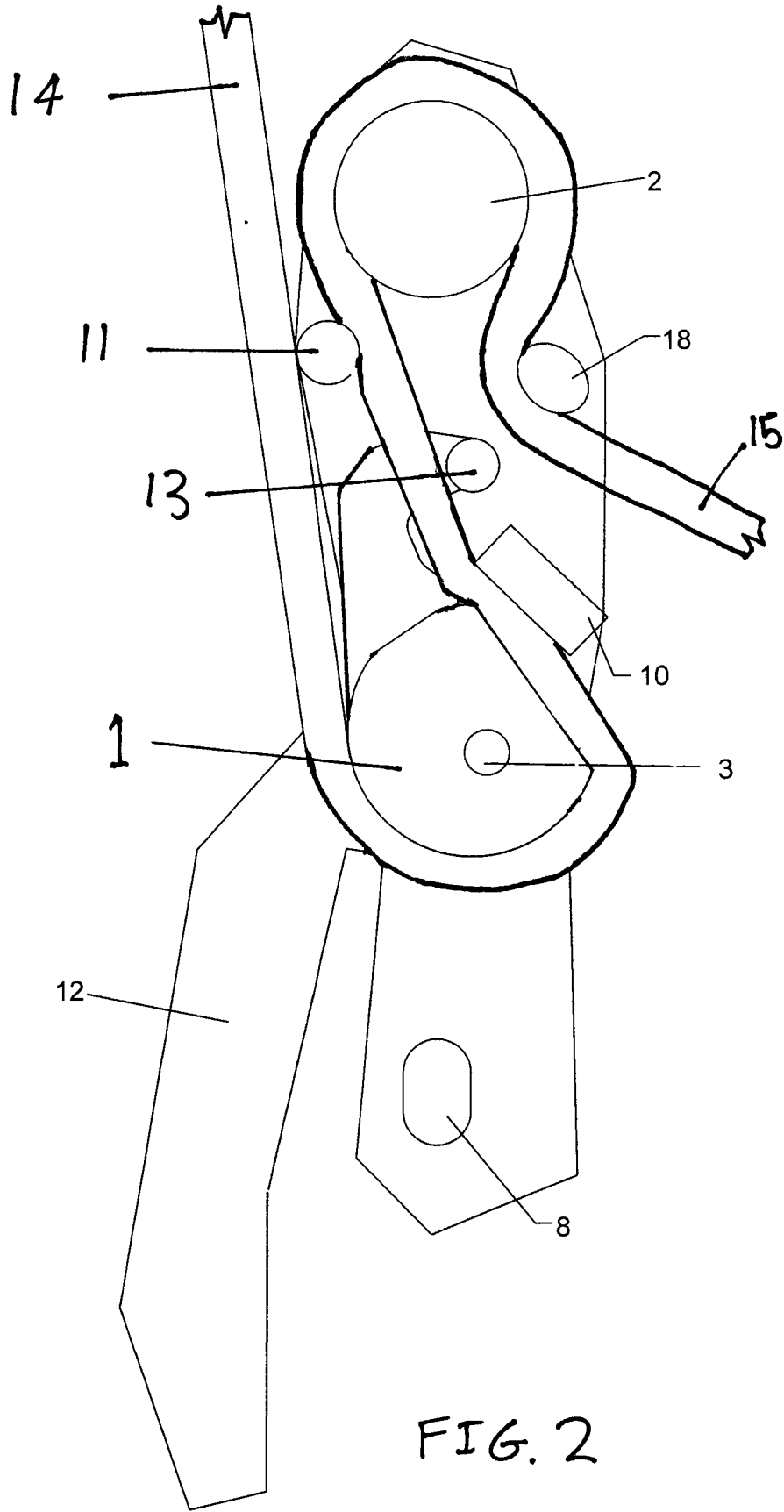


FIG. 2

90 94 80

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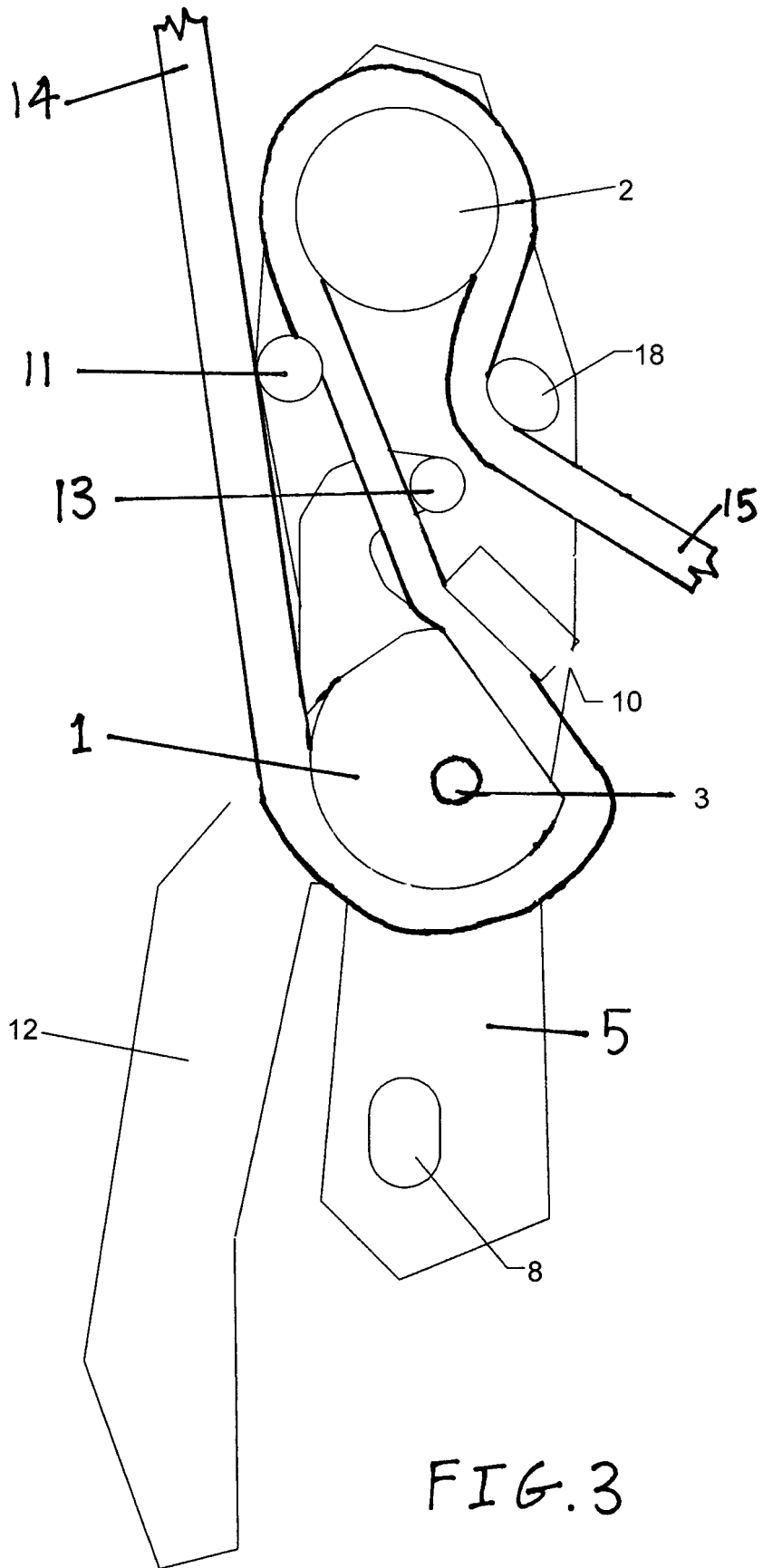


FIG. 3

00 9+ 00

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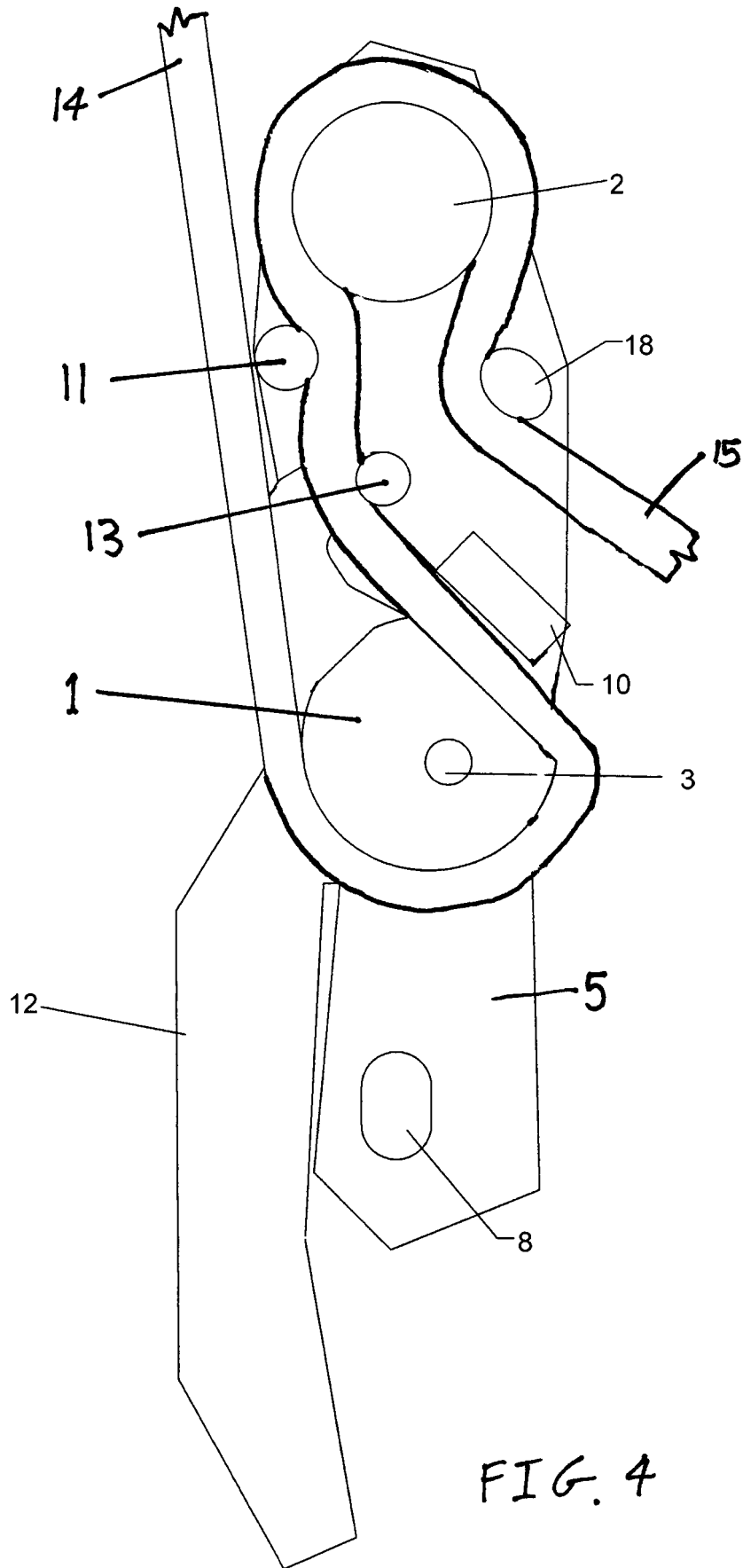


FIG. 4

90 9+ 80

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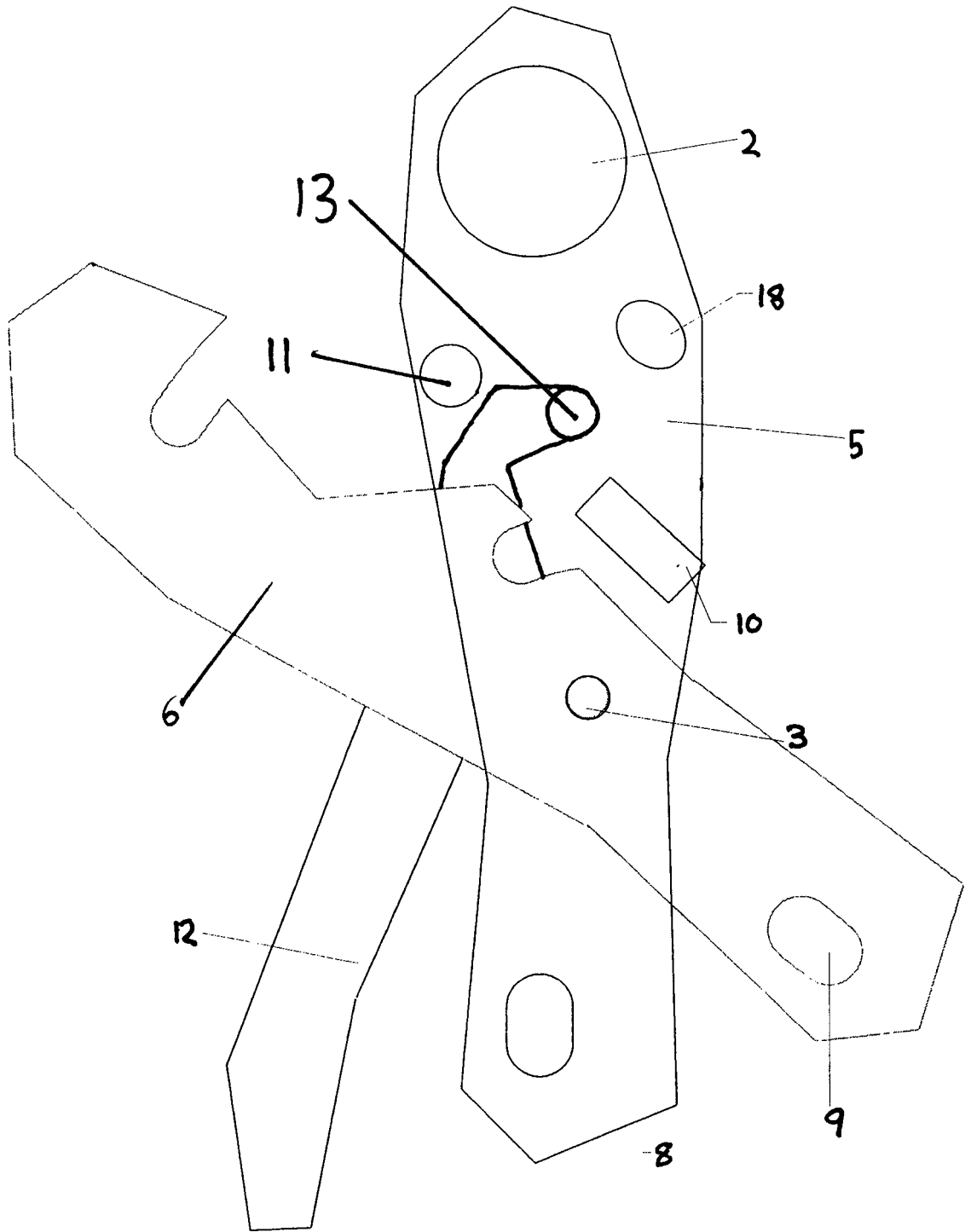
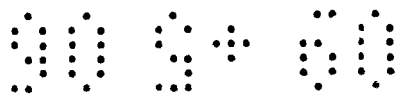


FIG. 5



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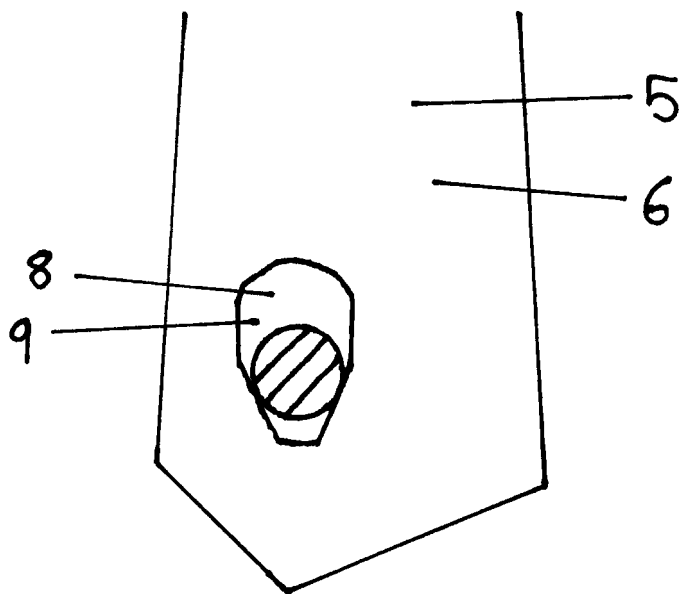


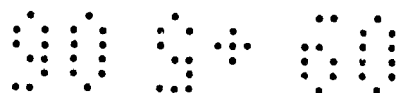
FIG. 6

## Descender

Descenders are well known for abseiling etc. Many descenders consist of a series of frictional surfaces mounted between a pair of substantially parallel plates. To allow the descender to be fitted to the rope at any point along its length one of the plates, usually the uppermost, pivots open. However, in order to provide sufficient friction to control the descent the frictional surfaces must be in close proximity to one another and the rope must take a tightly contorted path between them. As such it can be difficult to thread the rope through the device.

The invention seeks to eliminate this problem by providing a descender which is easy to thread yet still provides adequate friction.

According to the present invention there is provided a descender for controlling the lowering and/or raising of a load on a rope, the descender comprising rope guide means comprising a plurality of rope guide members around which the rope may be passed for guiding and controlling the passage of a rope through the descender and attachment means for attaching the descender to a further rope and/or an object/person to be lowered and/or raised wherein at least one rope guide member of said rope guide means is selectively configurable between a rope loading/unloading position wherein said at least one rope guide member is spaced from said other rope guide members to assist insertion and removal of a rope from the descender and an operative position wherein said at least one rope guide member cooperates with said other rope guide members to guide and control the passage of a rope through the descender.





Preferably the rope guide means includes locking means comprising a first locking member moveable between a rope jamming position wherein the rope is trapped between the locking member and an adjacent abutment and a release position wherein the locking member is spaced from said abutment, the rope guide means being arranged such that the first locking member is urged towards its rope jamming position when a load is applied to a downstream end of the rope, the first locking member being selectively moveable towards its release position in order to selectively control the movement of the rope through the rope guide means.

Preferably, the descender comprises a first mounting plate, a proportion of the rope guide members of the rope guide means being mounted on the first mounting plate and a second mounting plate, the remainder of the rope guide members being mounted on the second mounting plate, said second mounting plate being mounted on the first mounting plate for movement between a rope loading position wherein the rope can be located in the rope guide means and a closed position wherein the second mounting plate covers at least the gap between the first locking member and its adjacent abutment preventing removal of the rope from the locking means.

Preferably the abutment cooperating with the first locking member comprises one of the rope guide members of the rope guide means.

Preferably at least one rope guide member of the rope guide means is mounted on the second mounting plate such that it corresponds with the rope entering the device, the tension in said rope urging said abutment and mounting plate towards the closed position.



Preferably the first locking member is moveable towards its release position by a control lever. Preferably the locking means comprises a second locking member, the second locking member being mounted on and/or actuated by said control lever and being co-operable with a second abutment being mounted on the second mounting plate, the second locking member being moveable between a rope jamming position wherein the rope is trapped between the second locking member and the second abutment and a release position wherein the second locking member is spaced from said second abutment. Preferably the control lever has three operative positions, a first position wherein the rope is trapped between the first locking member and its adjacent abutment and the second locking member is spaced from the second abutment, a second, intermediate, position wherein both the first and second locking members are spaced from their respective abutments to permit passage of the rope through the rope guide means, and a third position wherein the rope is trapped between the second locking member and the second abutment and the first locking member is spaced from its adjacent abutment.

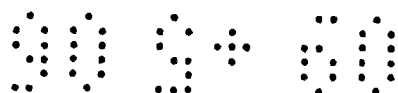
Preferably the first locking member comprising a first cam or eccentric pulley pivotably mounted on the first mounting plate for rotation about a rotational axis normal to said first mounting plate between its rope jamming position and its release position, said adjacent abutment being mounted on and extending from said first mounting plate.

Preferably the attachment means comprises an aperture in the first mounting plate corresponding with a similar aperture in the second mounting plate to allow a connector, such as a karabiner or screwlink, to be inserted through both mounting plates,.



Preferably said apertures have a profile which narrows toward the end furthest from the rope guide means such that when the rope passing through the device is under load said connector is urged into the narrowing section holding said first and second mounting plates in the closed position irrespective of the size of connector.

Alternatively, said first and second apertures may be offset with respect to one another when the first and second mounting plates are in the closed position such that the second mounting plate is urged in a closing direction by a connector inserted through both apertures.



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

Figure 1 is a front view of the descender according to the invention.

Figure 2 is a front view of Fig.1 with the cover plate removed and with the primary braking mechanism in a first operative position to lock the descender onto the rope and the secondary braking mechanism in a first operative position free of the rope.

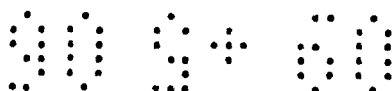
Figure 3 is a front view of Fig.1 with the cover plate removed and with the primary braking mechanism in a second operative position

Figure 4 is a front view of Fig.1 with the cover plate removed and with the primary braking mechanism in a third operative position and the secondary braking mechanism in a second operative position.

Figure 5 is a front view of Fig 1. With the cover plate moved to its rope loading/unloading position.

Figure 6 shows the attachment apertures with a cross section of a connector in place.

A preferred embodiment of the invention comprises a predominantly circular pulley 1 mounted eccentrically with relation to its centre on a spindle 3 secured normally on a flat portion of a first supporting plate 5. A second supporting plate 6 or cover plate is mounted parallel to the first supporting plate 5, the second supporting plate 6 being pivotally movable between a rope loading/unloading position and a closed position to allow rope 7 to be inserted and then retained in



the device. The outer circumferential surface of the first pulley 1 is provided with a groove to retain the rope around the circumferential surface of the pulley.

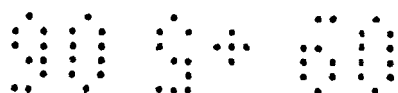
An aperture 8 corresponds with a similar aperture 9 in the second supporting plate 6 to allow a connector 16, such as a karabiner or screw link, to be inserted to connect the device to a person or a secure anchorage point.

A first rope guide member 10 is mounted normally on the first supporting plate 5 adjacent to the pulley 1. A second rope guide member 11 is mounted on the second supporting plate 6 between the pulley 1 and the first bollard 2. A first and second bollard 2,18 are mounted normally on the first supporting plate 5 such that they define between them a substantially s-shaped rope path with the rope 7 passing around pulley 1, between pulley 1 and rope guide member 10, around first bollard 2 then around second bollard 18

A control handle 12 comprising an elongate flat plate is secured to the first pulley 1 parallel to and adjacent to the first supporting plate 5. A third rope guide member or bollard 13 is mounted on the control handle 12, normally to the control handle 12 so that the rope 7 leaving the pulley 1 passes between the bollard 13 and the rope guide member 11.

The first pulley 1, the first rope guide member 10 and control handle 12 together constitute a primary braking mechanism, while the bollard 13 and rope guide member 11 constitute a second braking system.

In use the second supporting plate 6 and rope guide member 11 are moved to their rope loading/unloading position and a rope 7 is threaded anti-clockwise in a U-shape around the pulley 1, moving away from the downstream end 14 of the



rope 7 (i.e. the end of the rope to which the load is to be applied). The rope 7 is then passed between the pulley 1 and the first rope guide member 10. Next the rope 7 passes between the rope guide member 11 and bollard 13, it is then threaded clockwise around the bollard 2 to describe an S-shape before passing the around the bollard 18 and leaving the device.

When a load is applied to a downstream end 14 of the rope 7, the rope 7 passes over the rope guide member 11 urging it and the second supporting plate 6 towards the closed position.

When a load is applied to a downstream end 14 of the rope 7, the frictional force created by the rope 7 around the pulley 1 will cause the pulley 1 of the primary braking mechanism to pivot in a clockwise direction, thus locking rope 7 securely between point surfaces on the pulley 1 and first rope guide member 10.

In order to release the rope 7 the control handle 12 is pressed towards the first and second supporting plates 5,6, moving the pulley in an anti clockwise direction. Once the control handle 12 has been pressed to release the rope 7 the rope can move through the device, with additional friction provided by bollards 2 and 18.

During the release of the primary braking mechanism, further movement of the control handle towards the first and second plates 5,6 moves the bollard 13 towards the rope guide member 11 clamping the rope securely therebetween. Thus, the bollard 13 will allow the device to brake the rope to a complete halt if the control handle is operated in panic.



## Claims

1. A descender for controlling the lowering and/or raising of a load on a rope, the descender comprising rope guide means comprising a plurality of rope guide members around which the rope may be passed for guiding and controlling the passage of a rope through the descender and attachment means for attaching the descender to a further rope and/or an object/person to be lowered and/or raised wherein at least one rope guide member of said rope guide means is selectively configurable between a rope loading/unloading position wherein said at least one rope guide member is spaced from said other rope guide members to assist insertion and removal of a rope from the descender and an operative position wherein said at least one rope guide member cooperates with said other rope guide members to guide and control the passage of a rope through the descender.

2. A descender according to claim 1 wherein the rope guide means includes locking means comprising a first locking member moveable between a rope jamming position wherein the rope is trapped between the locking member and an adjacent abutment and a release position wherein the locking member is spaced from said abutment, the rope guide means being arranged such that the first locking member is urged towards its rope jamming position when a load is applied to a downstream end of the rope, the first locking member being selectively moveable towards its release position in order to selectively control the movement of the rope through the rope guide means.

3. A descender as claimed in any preceding claim wherein the descender comprises a first mounting plate, a proportion of the rope guide members of the rope guide means being mounted on the first mounting plate and a second mounting plate, the remainder of the rope guide members being mounted on the

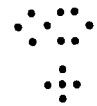
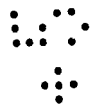
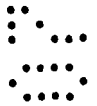
second mounting plate, said second mounting plate being mounted on the first mounting plate for movement between a rope loading position wherein the rope can be located in the rope guide means and a closed position wherein the second mounting plate covers at least the gap between the first locking member and its adjacent abutment preventing removal of the rope from the locking means.

4. A descender according to claim 2 or 3 wherein the first locking member is moveable towards its release position by a control lever.

5. A descender according to claim 2 or 3 wherein the abutment cooperating with the first locking member comprises one of the rope guide members of the rope guide means.

6. A descender according to claim 4 wherein the control lever has three operative positions, a first position wherein the rope is trapped between the first locking member and its adjacent abutment and the second locking member is spaced from the second abutment, a second, intermediate, position wherein both the first and second locking members are spaced from their respective abutments to permit passage of the rope through the rope guide means, and a third position wherein the rope is trapped between the second locking member and the second abutment and the first locking member is spaced from its adjacent abutment.

7. A descender as claimed in any preceding claim wherein the first locking member comprises a first cam or eccentric pulley pivotably mounted on the first mounting plate for rotation about a rotational axis normal to said first mounting plate between its rope jamming position and its release position, said adjacent abutment being mounted on and extending from said first mounting plate.





8. A descender as claimed in any preceding claim wherein at least one rope guide member of the rope guide means is mounted on the second mounting plate such that it corresponds with the rope entering the device, the tension in said rope urging said abutment and mounting plate towards the closed position.

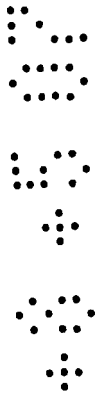
9. A descender as claimed in any preceding claim wherein the locking means comprises a second locking member, the second locking member being mounted on and/or actuated by a control lever and being co-operable with a second abutment being mounted on the second mounting plate, the second locking member being moveable between a rope jamming position wherein the rope is trapped between the second locking member and the second abutment and a release position wherein the second locking member is spaced from the second abutment.

10. A descender as claimed in any preceding claim wherein the attachment means comprises an aperture in the first mounting plate corresponding with a similar aperture in the second mounting plate to allow a connector, such as a karabiner or screwlink, to be inserted through both mounting plates,.

11. A descender according to claim 10 wherein said apertures have a profile which narrows toward the end furthest from the rope guide means such that when the rope passing through the device is under load said connector is urged into the narrowing section holding said first and second mounting plates in the closed position irrespective of the size of connector.

12. A descender according to claim 10 wherein said first and second apertures may be offset with respect to one another when the first and second mounting plates are in the closed position such that the second mounting plate is urged in a closing direction by a connector inserted through both apertures.

13. A descender substantially as herein described with reference to the accompanying drawings.



**Application No:** GB0608991.6  
**Claims searched:** 1-13

**Examiner:** Jason Clee  
**Date of search:** 9 August 2007

**Patents Act 1977: Search Report under Section 17**

**Documents considered to be relevant:**

| Category | Relevant to claims | Identity of document and passage or figure of particular relevance  |
|----------|--------------------|---|
| X        | 1-5, 8, 10         | GB 2256673 A<br>(Alphin Rescue Equipment Ltd) especially note sheaf element 14 attached to plate 10 and sheaf elements 13 and 15 attached to plate 11, fig 3    |
| X        | 1-5 & 8            | US 5076400 A<br>(Petzl SA) especially note the two pulleys (12, 14), one of which (12) is fixed on a base plate (18) and the other (14) on a support plate (30) |
| X        | 1, 2, 4-7, 9 & 10  | GB 2431456 A<br>(Hightec Group Ltd) especially note that movement of handle 12 can aid insertion of the rope  |

**Categories:**

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A62B; A63B

The following online and other databases have been used in the preparation of this search report

Online: WPI & EPODOC

**International Classification:**

| Subclass | Subgroup | Valid From |
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| A63B     | 0029/02  | 01/01/2006 |