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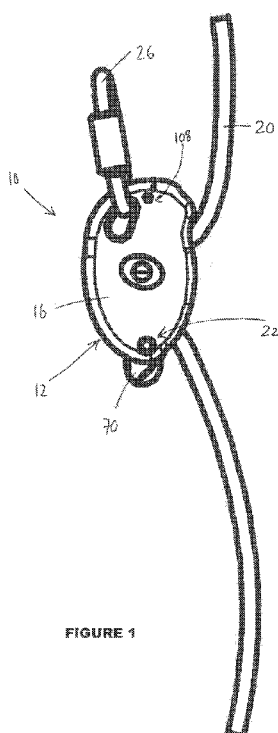


FIGURE 1

(57) Abstract: The invention provides a descender (10). The descender (10) includes a body (12) having a base portion (14) and a cover portion (16) which define a passage (18) therebetween for receiving a flexible elongate member (20) displaceably therethrough; and a connecting arrangement (22) for interconnecting the base and cover portions (14, 16) of the body (12) and allowing displacement thereof between a closed condition and an open access condition wherein the flexible elongate member (20) may be placed into the passage (18). A first aperture (24) is defined in the cover portion (16) which is configured to receive a loop-like connecting member (26) therein, a second aperture (28) is defined in the base portion (14) which is configured to be in register with the first aperture (24) in the closed condition for allowing the loop-like connecting member (26) to be received by both first and second apertures (24, 28) in operation, and a slot (30) is defined in a side region (32) of the base portion (14) and configured to lead into the second aperture (28) for allowing a user to separate and remove the loop-like member (26) from the base portion (14). The descender (10) further includes a controller (34) for controlling displacement of the flexible elongate member (20) through the passage (18) when a person or object connected thereto is descended.



A DESCENDER

TECHNICAL FIELD

This invention relates to a descender. In particular, this invention relates to a descender for assisting in descending of a person or object along a rope. The
5 descender can be used for rope access work and mountain climbing activities.

SUMMARY OF THE INVENTION

According to a first aspect of the invention, there is provided a descender including: -

10 a body having a base portion and a cover portion which define a passage therebetween for receiving a flexible elongate member displaceably therethrough;

a connecting arrangement for interconnecting the base and cover portions of the body and allowing displacement thereof between a closed condition and an open access condition wherein the flexible elongate member may be placed into the
15 passage;

a first aperture defined in the cover portion which is configured to receive a loop-like connecting member therein;

a second aperture defined in the base portion which is configured to be in register with the first aperture in the closed condition for allowing the loop-like
20 connecting member to be received by both first and second apertures in operation;

a slot defined in a side region of the base portion and configured to lead into the second aperture for allowing a user to separate and remove the loop-like member from the base portion; and

a controller for controlling displacement of the flexible elongate member
25 through the passage when a person or object connected thereto is descended.

The flexible elongate member may be in the form of a rope, cord, cable or the like typically being used for hauling, hoisting or climbing purposes, preferably being a rope.

The loop-like connecting member may be in the form of a carabiner.

The descender may be manufactured from any suitable metal such as steel.

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The passage may be sized and/or shaped to receive the rope in a snug fitting manner. In particular, the passage may have a width in the range of 10mm to 20mm, preferably being 13mm.

10 The connecting arrangement may include male-female engagement formations defined on inner side walls of the cover and base portions of the body. The male-female engagement formations may be sized and/or shaped to receive each other in a press fit manner. The engagement formations may be configured to permit pivotal displacement between the base and cover portions between the
15 closed and open conditions. The connecting arrangement may further include a pin which may extend between and interconnect the base and cover portions and allow pivotal displacement therebetween. The pin may be configured to be received by corresponding apertures in the base and cover portions in the region of the male-female engagement formations.

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 The first aperture may have a generally elongate shape and may define a broader portion and a narrower portion for receiving the carabiner in a loose fit and a tight fit, respectively. The broader portion may be sized so as to permit displacement of the carabiner through the first aperture, preferably providing a loose fit
25 therebetween. The broader portion may have a width in the range of 15mm to 25mm, preferably being about 20mm. The narrower portion may be sized so as to inhibit displacement of the carabiner through the first aperture, preferably providing a tight fit therebetween. The narrower portion may have a width in the range of 13mm to 23mm, preferably being about 18mm. In particular, the narrower portion of the first

aperture may be configured to facilitate retention of the cover portion in the closed condition when the carabiner is received therein.

The second aperture may have a generally elongate shape and may have a width or diameter in the range of 10mm to 14mm, preferably being about 12mm. The second aperture may be sized, shaped and/or configured to correspond generally to the size, shape and/or configuration of the first aperture, preferably having corresponding broader and narrower portions.

The slot may be configured to extend from the side region of the base portion into the broader portion of the second aperture. The slot may be sized, shaped and/or configured to allow displacement of the base portion and the cover portion between the open and closed conditions when a carabiner is received by the broader portions of the first and second apertures. The slot may have a width in the range of 10mm to 18mm, preferably being about 14mm. It is to be appreciated that in order to release the carabiner from the base portion, the carabiner need not be opened and may be simply moved through and out of the slot.

A retaining member may be provided for retaining the cover portion in the closed condition. The retaining member may include a releasable latch. The releasable latch may include an actuating member connected thereto for allowing operation of the retaining member, preferably allowing releasing thereof for permitting displacement of the cover portion towards the open access condition. The actuating member may be configured to extend through an access aperture defined in the cover portion for allowing user access to the actuating member. The actuating member may be in the form of a button. It is to be appreciated that in order to allow displacement of the cover portion relative the base portion, the button must be pressed while displacing the carabiner towards the broader portion of the first and second apertures defined in the cover portion and base portion, respectively.

A fastening arrangement may be provided for allowing the base and cover portions of the body to be fastened together in the closed condition so as to prevent tampering with the orientation of the rope in the closed condition. The fastening arrangement may include corresponding screw-threaded apertures which extend through the base and cover portions respectively, for receiving a screw-threaded fastener therethrough. The screw-threaded apertures may be configured to align with each other when the base and cover portions are in the closed condition.

According to a second aspect of the invention, there is provided a controller for a descender including a body having a base portion and a cover portion which define a passage therebetween for receiving a flexible elongate member displaceably therethrough and a connecting arrangement for interconnecting the base and cover portions of the body and allowing displacement thereof between a closed condition and an open access condition wherein the flexible elongate member may be placed into the passage, the controller including: -

a friction regulating member for regulating frictional force imparted onto the flexible elongate member while being displaced through the passage; and

a displacement arrangement for allowing displacement of the friction regulating member between a first locked condition wherein the frictional force imparted onto the flexible elongate member is sufficient to inhibit displacement thereof through the passage, a release condition wherein the frictional force imparted onto the flexible elongate member is sufficient to allow displacement thereof through the passage and a second locked condition.

The friction regulating member may be mounted, preferably displaceably, on an inner side wall of the base portion defining the passage. The friction regulating member may be in the form of a cam which may be positioned so as to permit contact between an outer circumferential surface thereof and the elongate flexible member, typically in the form of a rope, when the rope is seated in the passage. In particular, the cam may be pivotably mounted on the side wall for allowing pivotal displacement thereof in operation. The outer circumferential surface of the cam may

be shaped so as to permit a variation in frictional force imparted onto the rope during pivotal displacement of the cam relative the base portion. In particular, the outer circumferential surface of the cam may include a protrusion which may be configured to define a squeezing zone between the cam and side walls of the passage for allowing the rope to be squeezed therebetween in use. Further, the outer circumferential surface of the cam may include one or more recessed regions which may be sized, shaped and/or configured to receive the rope, at least partially, therein and permit displacement of the rope through the passage during the release condition.

A biasing assembly may be provided for biasing the cam towards the first locked condition. The biasing assembly may include a spring which is configured to be received by a hole extending through the cam, preferably extending between opposing sides thereof. The biasing assembly may further include a contact member arranged at one end of the spring which is configured to be urged out of the hole by the spring and come into contact with the base portion. In particular, the contact member may be in the form of ball which is configured to be urged partially into a complementally shaped recess defined in the base portion when the hole and the complementary recess are in alignment in the first locked condition. The biasing assembly may yet further include a tube member which may be sized, shaped and/or configured to fit between the spring and side walls of the hole for guiding the displacement of the spring and the contact member during displacement of the cam. It is to be appreciated that the biasing assembly serves to cause the cam to jump back into the first locked condition when a user lets go of the descender.

The displacement arrangement may include a lever which may be pivotably mounted on the body, preferably being mounted on an outer side wall of the base portion. The displacement arrangement may further include a connecting member, preferably in the form of a connecting rod, for interconnecting the lever and the cam such that displacement of the lever relative the base portion causes displacement of the cam relative the body. The displacement arrangement may further include a first biasing means for biasing the lever toward a neutral position wherein the lever is in

lay flat abutment with the outer side wall of the base portion. The first biasing means may be in the form of a spring arrangement, preferably being a torsional spring arrangement. The displacement arrangement may be configured to allow displacement of the cam between the first locked condition, wherein the lever is in the neutral position, toward the release condition wherein the lever is in a partially extended position and further toward the second locked condition wherein the lever is in a fully extended position.

A gripping zone may be defined on a portion of the outer circumferential surface of the cam for allowing a user to displace the cam with a finger, preferably a thumb. The gripping zone may be shaped and/or configured to protrude out of the body during the closed condition for allowing a user access thereto in operation.

The cam may include heat dissipating means, preferably in the form of fins, for allowing heat to be dissipated therefrom during operation. The fins may be configured to extend between and interconnect a central point of the cam and the outer circumferential surface thereof. It is to be appreciated that the friction between the rope and the cam during displacement of the rope through the passage in operation causes a significant amount of heat to be generated which may reduce the life span of the cam.

A spacer member may be mounted on the body, preferably being mounted on an outer side wall of the base portion, for spacing the body away from a surface or edge when the body is lying thereon, thereby allowing a user to displace the lever relative the body. In particular, the spacer member may be in the form of a generally elongate ridge which may extend along a length of the base portion.

According to a third aspect of the invention, there is provided an inhibitor for a descender including a body having a base portion and a cover portion which define a passage therebetween for receiving a flexible elongate member displaceably

therethrough, a connecting arrangement for interconnecting the base and cover portions of the body and allowing displacement thereof between a closed condition and an open access condition wherein the flexible elongate member may be placed into the passage and a controller for controlling displacement of the flexible elongate member through the passage when a person or object connected thereto is descended, the inhibitor including: -

a gripping member mounted in the passage for inhibiting displacement of the flexible elongate member relative the passage in an incorrect direction.

The gripping member may be mounted, preferably displaceably, on an inner side wall of the base portion defining the passage. The gripping member may be pivotably mounted on the side wall in the vicinity of the controller, preferably being in the form of a cam, for allowing pivotal displacement between an inoperative neutral condition wherein displacement of the flexible elongate member, typically in the form of a rope, through the passage in one direction is permitted and an operative gripping condition wherein displacement of the rope in an opposite direction causes the gripping member to grip, rotate and force the rope against the cam thereby inhibiting further displacement thereof through the passage in the opposite direction. The gripping member may have a generally L-shape, a height of the L-shape preferably being configured to force the rope against the cam in the operating gripping condition and a base of the L-shape preferably being configured to facilitate gripping of the rope during displacement thereof through the passage in the opposite direction. The gripping member may include a gripping formation for further facilitating gripping of the rope. The gripping formation may be in the form of any suitable formation such as a plurality of ridges, protrusions or teeth, preferably being a plurality of spine-like members extending away from the height of the L-shape. More particularly, the spine-like members may extend away from the gripping member at an angle for allowing the rope to slide over the spine-like members when displaced in one direction and to be gripped or hooked by the spine-like members when displaced in the opposite direction. It is to be appreciated that the inhibitor serves to inhibit displacement of the rope relative the passage typically when it has

been placed into the passage the incorrect way around and a person or object connected to an opposing end region of the rope, falls from an elevated position.

BRIEF DESCRIPTION OF THE DRAWINGS

5 A descender, controller and inhibitor in accordance with the invention will now be described by way of the following, non-limiting examples with reference to the accompanying drawings.

In the drawings: -

10 Figure 1 is a plan view of the descender in accordance with a first aspect of the invention;

Figure 2 is a plan view of a portion of the descender;

Figure 3 is a three-dimensional exploded view of the descender;

15 Figure 4 is a plan view of the base portion of the body of the descender showing a lever in a neutral position corresponding to a first locked condition;

Figure 5 is a plan view of the base portion of the body of the descender showing the lever in a partially extended position corresponding to a released condition;

20 Figure 6 is a plan view of the base portion of the body of the descender showing the lever in a fully extended position corresponding to a second locked position;

Figure 7 is an enlarged three-dimensional schematic of a part of a controller in accordance with a second aspect of the invention;

Figure 8 is a three-dimensional view showing a rear view of the base portion;

25 Figure 9 is a side view of the descender lying on an edge during operation;

Figure 10 is a plan view of the body in an operative gripping condition when a rope is positioned in the passage the incorrect way around.

DETAILED DESCRIPTION OF THE INVENTION

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Referring now to a first embodiment of the invention as shown in the drawings, reference numeral **10** refers generally to a descender in accordance with the invention. The descender **10** includes a body **12** having a base portion **14** and a cover portion **16** which define a passage **18** therebetween for receiving a flexible elongate member in the form of a rope **20** displaceably therethrough, a connecting arrangement **22** for interconnecting the base and cover portions **14** and **16**, of the body **12** and allowing displacement thereof between a closed condition and an open access condition wherein the rope **20** may be placed into the passage **18**, a first aperture **24** defined in the cover portion **16** which is configured to receive a loop-like connecting member in the form of a carabiner **26** therein, a second aperture **28** defined in the base portion **14** which is configured to be in register with the first aperture **24** in the closed condition for allowing the carabiner **26** to be received by both first and second apertures **24** and **28** in operation, a slot **30** defined in a side region **32** of the base portion **14** and configured to lead into the second aperture **28** for allowing a user to separate and remove the carabiner from the base portion **14**, a controller **34** for controlling displacement of the rope **20** through the passage **18** when a person or object (not shown) connected thereto is descended.

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The descender **10** is manufactured from steel.

The passage **18** is sized and shaped to receive rope **20** in a snug fitting manner. In particular, the passage **18** has a width of 13mm.

The connecting arrangement **22** includes male-female engagement formations **36.1** and **36.2** defined on inner side walls **38** and **40** of the base and cover portions of the body, respectively. The male-female engagement formations **36** are sized and shaped to receive each other in a press fit manner. The engagement formations **36** are configured to permit pivotal displacement between the base and cover portions **14** and **16** between the closed and open conditions. The connecting arrangement **22** includes a pin **23** which extends between and interconnects the base and cover portions **14** and **16**, respectively, and allow pivotal displacement therebetween. The pin **23** is configured to be received by corresponding apertures **25** in the base and cover portions in the region of the male-female engagement formations **36**.

The first aperture **24** has a generally elongate shape and defines a broader portion **42** and a narrower portion **44** for receiving the carabiner **26** in a loose fit and a tight fit, respectively. The broader portion **42** is sized so as to permit displacement of the carabiner **26** through the first aperture **24**, typically providing a loose fit therebetween. The broader portion **42** has a width of about 20mm. The narrower portion **44** is sized so as to inhibit displacement of the carabiner **26** through the first aperture **24**, typically providing a tight fit therebetween. The narrower portion **44** has a width of about 18mm. In particular, the narrower portion **44** of the first aperture **24** is configured to facilitate retention of the cover portion **16** in the closed condition when the carabiner **26** is received therein.

The second aperture **28** has a generally elongate shape and has a width in the range of 10mm to 14mm, typically being 12mm. The second aperture **28** is sized, shaped and configured to correspond generally to the size, shape and configuration of the first aperture, typically having corresponding broader and narrower portions **46** and **48**, respectively.

The slot **30** is configured to extend from the side region **32** of the base portion **14** into the broader portion **46** of the second aperture **28**. The slot **30** is sized,

shaped and configured to allow displacement of the base portion **16** and the cover portion **16** between the open and closed conditions when a carabiner **26** is received by the broader portions **42** and **46** of the first and second apertures **24** and **28**, respectively. The slot **30** has a width in the range of 10mm to 18mm, typically being 14mm. It is to be appreciated that in order to release the carabiner **26** from the base portion **14**, the carabiner **26** need not be opened and may be simply moved through and out of the slot **30**.

A retaining member **50** is provided for retaining the cover portion **16** in the operative closed condition. The retaining member **50** includes a releasable latch (not shown) and an actuating member **52** connected to the releasable latch for allowing operation of the retaining member **50**, typically allowing releasing thereof for allowing displacement of the cover portion **16** towards the open access condition. The actuating member **52** is configured to extend through an access aperture **54** defined in the cover portion **16** for allowing user access to the actuating member **52**. The actuating member **52** is in the form of a button **56**. It is to be appreciated that in order to allow displacement of the cover portion **16** relative the base portion **12**, the button **56** must be pressed while displacing the carabiner **26** towards the broader portions **42** and **46** of the first and second apertures **24** and **28** defined in the base and cover portions **14** and **16**, respectively.

A fastening arrangement **108** is provided for allowing the base and cover portions **14** and **16** of the body **12** to be fastened together in the closed condition so as to prevent tampering with the orientation of the rope **20** in the closed condition. The fastening arrangement **108** includes corresponding screw-threaded apertures **110** and **112** which extend through the base and cover portions **14** and **16**, respectively, for receiving a screw-threaded fastener (not shown) therethrough. The screw-threaded apertures **110** and **112** are configured to align with each other when the base and cover portions **14** and **16** are in the closed condition.

Referring now to a second embodiment of the invention, reference numeral **34** generally depicts a controller for a descender **10**, the descender **10** including a body **12** having a base portion **14** and a cover portion **16** which define a passage **18** therebetween for receiving a flexible elongate member in the form of a rope **20** displaceably therethrough and a connecting arrangement **22** for interconnecting the base and cover portions **14** and **16** of the body **12**, respectively, and allowing displacement thereof between a closed condition and an open access condition wherein the rope **20** may be placed into the passage. The controller **34** includes a friction regulating member in the form of a cam **58** for regulating frictional force imparted onto the rope **20** while being displaced through the passage **18** and a displacement arrangement **60** for allowing displacement of the cam **58** between a first locked condition wherein the frictional force imparted onto the rope **20** is sufficient to inhibit displacement thereof through the passage **18**, a release condition wherein the frictional force imparted onto the rope **20** is sufficient to allow displacement thereof through the passage **18** and a second locked condition.

The cam **58** is mounted displaceably on the inner side wall **38** of the base portion **14** defining the passage **18**. The cam **58** is positioned so as to permit contact between an outer circumferential surface **62** thereof and the rope **20** when the rope **20** is seated in the passage **18**. In particular, the cam **58** is pivotably mounted on the side wall **38** for allowing pivotal displacement thereof in operation. The outer circumferential surface **62** of the cam **58** is shaped so as to permit a variation in frictional force imparted onto the rope **20** during pivotal displacement of the cam **58** relative the base portion **14**. In particular, the outer side surface **62** of the cam **58** includes a protrusion **64** which is configured to define a squeezing zone **66** between the cam **58** and side walls **67** of the passage **18** for allowing the rope **20** to be squeezed therebetween in use. Further, the outer side surface **62** of the cam **58** includes one or more recessed regions **68** which are sized, shaped and configured to receive the rope **20**, at least partially, therein and permit displacement of the rope **20** through the passage **18** during the release condition.

A biasing assembly **96** is provided for biasing the cam **58** towards the first locked condition. The biasing assembly **96** includes a spring **98** which is configured to be received by a hole **100** extending through the cam **58**, typically extending between opposing sides thereof. The biasing assembly **96** further includes a contact member in the form of a ball **102** arranged at one end of the spring **98** which is configured to be urged out of the hole **100** by the spring and come into contact with the base portion **14**. In particular, the ball **102** is configured to be urged partially into a complementally shaped recess **104** defined in the base portion **14** when the hole **100** and the complementary recess **104** are in alignment in the first locked condition. The biasing assembly **96** yet further includes a tube member **106** which is sized, shaped and configured to fit between the spring **98** and side walls of the hole (not shown) for guiding the displacement of the spring **98** and the ball **102** during displacement of the cam **58** relative the base portion **14**. It is to be appreciated that the biasing assembly **96** serves to cause the cam **58** to jump back into the first locked condition when a user lets go of the descender **10**.

The displacement arrangement **60** includes a lever **70** which is pivotably mounted on the body **12**, typically being mounted on an outer side wall **72** of the base portion **14**. The displacement arrangement **60** includes a connecting member in the form of a connecting rod **74** for interconnecting the lever **70** and the cam **58** such that displacement of the lever **70** relative the base portion **14** causes displacement of the cam **58** relative the body **12**. The displacement arrangement **60** further includes a biasing means in the form of a spring arrangement (not shown) for biasing the lever **70** toward a neutral position wherein the lever **70** is in lay flat abutment with the outer side wall **72** of the base portion **14**. The spring arrangement (not shown) is in the form of a torsional spring arrangement (not shown). The displacement arrangement **60** is configured to allow displacement of the cam **58** between the first locked condition, wherein the lever **70** is in the neutral position, toward the release condition wherein the lever **70** is in a partially extended position and further toward the second locked condition wherein the lever **70** is in a fully extended position.

A gripping zone **76** is defined on a portion of the outer circumferential surface **62** of the cam **58** for allowing a user to displace the cam **58** with a finger, typically a thumb. The gripping zone **76** is shaped and configured to protrude out of the body **12** during the closed condition for allowing a user access thereto in operation.

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The cam **58** includes heat dissipating means in the form of fins **78** for allowing heat to be dissipated therefrom during operation. The fins **78** are configured to extend between and interconnect a central point of the cam **58** and the outer circumferential surface **68** thereof. It is to be appreciated that friction between the rope **20** and the cam **58** during displacement of the rope **20** through the passage **18** in operation causes a significant amount of heat to be generated which may reduce the life span of the cam **58**.

A spacer member in the form of a ridge **80** is mounted on the body **12**, typically being mounted on the outer side wall **72** of the base portion **14**, for spacing the body **12** away from an edge **82** and allowing a user to operate and displace the lever **70** when the body **12** is lying on the edge **82**. In particular, the ridge **80** is generally elongate and extends along a length of the base portion **14**.

Referring now to a third embodiment of the invention, reference numeral **84** generally depicts an inhibitor for a descender, the descender including a body **12** having a base portion **14** and a cover portion **16** which define a passage **18** therebetween for receiving a flexible elongate member in the form of a rope **20** displaceably therethrough, a connecting arrangement **22** for interconnecting the base and cover portions **14** and **16** of the body **12**, respectively, and allowing displacement thereof between a closed condition and an open access condition wherein the rope **20** may be placed into the passage **18** and a controller **34** for controlling displacement of the rope **20** through the passage **18** when a person or object (not shown) connected thereto is descended. The inhibitor **84** includes a gripping member **86** mounted in the passage **18** for inhibiting displacement of the rope **20** relative the passage **18** in an incorrect direction. The gripping member **86** is

displaceably mounted on the inner side wall **38** of the base portion **14** defining the passage **18**. The gripping member **86** is rotatably mounted on the side wall **38** in the vicinity of the cam **58** for allowing rotation between an inoperative neutral condition wherein displacement of the rope **20** through the passage **18** in one direction is permitted and an operative gripping condition wherein displacement of the rope **20** in an opposite direction causes the gripping member **86** to grip, rotate and force the rope **20** against the cam **58**, thereby inhibiting further displacement thereof through the passage **18** in the opposite direction. The gripping member **86** has a generally L-shape, a height **88** of the L-shape typically being configured to force the rope **20** against the cam **58** in the operating gripping condition and a base **90** of the L-shape typically being configured to facilitate gripping of the rope **20** during displacement thereof through the passage **18** in the opposite direction. The gripping member **86** includes a gripping formation **92** for further facilitating gripping of the rope **20**. The gripping formation **92** is in the form of any suitable formation such as a plurality of ridges, protrusions or teeth, typically being a plurality of spine-like members **94** extending away from the height **88** of the L-shape. More particularly, the spine-like members **94** extend away from the gripping member **86** at an angle for allowing the rope **20** to slide over the spine-like members **94** when displaced in one direction and to be hooked by the spine-like members **94** when displaced in the opposite direction. It is to be appreciated that the inhibitor **84** serves to inhibit displacement of the rope **20** relative the passage **18** typically when it has been placed into the passage **18** the incorrect way around and a person or object (not shown) connected to an opposing end region (not shown) of the rope **20**, falls from an elevated position.

It is, of course, to be appreciated that the descender in accordance with the invention is not limited to the precise constructional and functional details as hereinbefore described with reference to the accompanying drawings and which may be varied as desired.

The inventor believes the descender in accordance with the invention to be advantageous in that it allows a user to insert and remove a rope from the descender

without completely disconnecting the descender from the carabiner. This feature prevents dropping of and consequent damage to the descender in use.

5 The inventor believes the controller for the descender to be advantageous in that it remains in a locked condition when a user is merely hanging on the rope. Further, the controller provides a safety mechanism in that in order to facilitate movement, i.e. displacement of the rope through the passage, controlled operation of the lever is required to move it into the release condition.

10 The inventor believes the inhibitor for the descender to be advantageous in that it is capable of arresting a fall when the rope is inserted into the passage incorrectly. The inhibitor accommodates beginners who may potentially place the rope incorrectly inside the passage which would usually lead to a fall.

CLAIMS

1. A descender which includes: -

a body having a base portion and a cover portion which define a passage
therebetween for receiving a flexible elongate member displaceably therethrough;

a connecting arrangement for interconnecting the base and cover portions of the body and allowing displacement thereof between a closed condition and an open access condition wherein the flexible elongate member may be placed into the passage;

a first aperture defined in the cover portion which is configured to receive a loop-like connecting member therein;

a second aperture defined in the base portion which is configured to be in register with the first aperture in the closed condition for allowing the loop-like connecting member to be received by both first and second apertures in operation;

a slot defined in a side region of the base portion and configured to lead into the second aperture for allowing a user to separate and remove the loop-like member from the base portion; and

a controller for controlling displacement of the flexible elongate member through the passage when a person or object connected thereto is descended.

2. A descender as claimed in claim 1 wherein the first aperture has a generally elongate shape and defines a broader portion and a narrower portion for receiving the loop-like connecting member in a loose fit and a tight fit, respectively and wherein the narrower portion is configured to facilitate retention of the cover portion in the closed condition.

3. A descender as claimed in any one or more of the preceding claims wherein the second aperture is sized, shaped and configured to correspond to a size, shape and configuration of the first aperture and wherein the slot is sized, shaped and

configured to allow displacement of the base portion and the cover portion between the open and closed conditions when a loop-like connecting member is received by broader portions of the first and second apertures.

5 4. A descender as claimed in any one or more of the preceding claims wherein a retaining member is provided for retaining the cover portion in the closed condition.

5. A controller for a descender including a body having a base portion and a cover portion which define a passage therebetween for receiving a flexible elongate member displaceably therethrough and a connecting arrangement for interconnecting the base and cover portions of the body, and allowing displacement thereof between a closed condition and an open access condition wherein the rope may be placed into the passage, the controller including: -

15 a friction regulating member for regulating frictional force imparted onto a flexible elongate member while being displaced through the passage; and

a displacement arrangement for allowing displacement of the friction regulating member between a first locked condition wherein the frictional force imparted onto the flexible elongate member is sufficient to inhibit displacement thereof through the passage, a release condition wherein the frictional force imparted onto the flexible elongate member is sufficient to allow displacement thereof through the passage and a second locked condition.

6. A controller as claimed in claim 5 wherein the friction regulating member is mounted displaceably on an inner side wall of the base portion defining the passage.

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7. A controller as claimed in claim 6 wherein the friction regulating member is mounted pivotally on the inner side wall of the base portion defining the passage.

8. A controller as claimed in any one or more of the preceding claims 5 to 7 wherein the friction regulating member is in the form of a cam.

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9. A controller as claimed in claim 8 wherein an outer circumferential surface of the cam is shaped so as to permit a variation in friction force imparted onto the flexible elongate member during pivotal displacement thereof relative the base portion.

10. A controller as claimed in claim 9 wherein the outer circumferential surface of the cam includes a protrusion which is configured to define a squeezing zone between the cam and side walls of the passage for allowing the rope to be squeezed therebetween in use.

11. A controller as claimed in claims 9 or 10 wherein the outer circumferential surface of the cam includes one or more recessed regions which are sized, shaped and configured to receive the flexible elongate member, at least partially, therein and permit displacement thereof through the passage during the release condition.

12. A controller as claimed in any one or more of the preceding claims 5 to 11 wherein the displacement arrangement includes a lever which is pivotably mounted on the body.

13. A controller as claimed in claim 12 wherein the displacement arrangement includes a connecting member for interconnecting the lever and the cam such that displacement of the lever relative the base portion causes displacement of the cam relative the body.

14. A controller as claimed in claim 12 or 13 wherein the displacement arrangement includes a biasing means for biasing the lever toward a neutral position wherein the lever is in lay flat abutment with the outer side wall of the base portion.

15. A controller as claimed in any one or more of the claims 12 to 14 wherein the displacement arrangement is configured to allow displacement of the cam between the first locked condition, wherein the lever is in the neutral position, toward the release condition wherein the lever is in a partially extended position and further
5 toward the second locked condition wherein the lever is in a fully extended position.

16. A controller as claimed in any one or more of the claims 8 to 15 wherein a gripping zone is defined on a portion of the outer circumferential surface of the cam for allowing a user to displace the cam with a finger.

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17. A controller as claimed in any one or more of the claims 8 to 16 wherein the cam includes heat dissipating means for allowing heat to be dissipated therefrom during operation.

15 18. A controller as claimed in claim 17 wherein the heat dissipating means is in the form of fins.

19. A controller as claimed in any one or more of the claims 6 to 18 wherein a spacer member is mounted on the body for spacing the body away from a surface or
20 edge when the body is lying thereon, thereby allowing a user to displace the lever relative the body.

20. An inhibitor for a descender including a body having a base portion and a cover portion which define a passage therebetween for receiving a flexible elongate member displaceably therethrough, a connecting arrangement for interconnecting
25 the base and cover portions of the body and allowing displacement thereof between a closed condition and an open access condition wherein the flexible elongate member may be placed into the passage and a controller for controlling displacement of the flexible elongate member through the passage when a person or
30 object connected thereto is descended, the inhibitor including: -

a gripping member mounted in the passage for inhibiting displacement of the flexible elongate member relative the passage in an incorrect direction.

21. An inhibitor as claimed in claim 20 wherein the gripping member is
5 displaceably mounted on the inner side wall of the base portion defining the passage.

22. An inhibitor as claimed in claim 21 wherein the gripping member is pivotably
mounted on the side wall in the vicinity of the controller, for allowing pivotal
10 displacement between an inoperative neutral condition wherein displacement of the flexible elongate member through the passage in one direction is permitted and an operative gripping condition wherein displacement of the flexible elongate member in an opposite direction causes the gripping member to grip, rotate and force the flexible elongate member against the cam thereby inhibiting further displacement
15 thereof through the passage in the opposite direction.

23. An inhibitor as claimed in claim 21 or 22 wherein the gripping member has a generally L-shape, a height of the L-shape being configured to force the rope against the cam in the operating gripping condition and a base of the L-shape being
20 configured to facilitate gripping of the rope during displacement thereof through the passage in the opposite direction.

24. An inhibitor as claimed in any one or more of the claims 21 to 23 wherein the gripping member includes a gripping formation for further facilitating gripping of the
25 flexible elongate member.

25. An inhibitor as claimed in claim 24 wherein the gripping formation is configured to allow the flexible elongate member to slide thereover when displaced in one direction and to be gripped thereby when displaced in the opposite direction.

26. A descender, according to the invention, substantially as hereinbefore described or exemplified.

27. A controller, according to the invention, substantially as hereinbefore described or exemplified.

5

28. An inhibitor, according to the invention, substantially as hereinbefore described or exemplified.

FIGURE 1

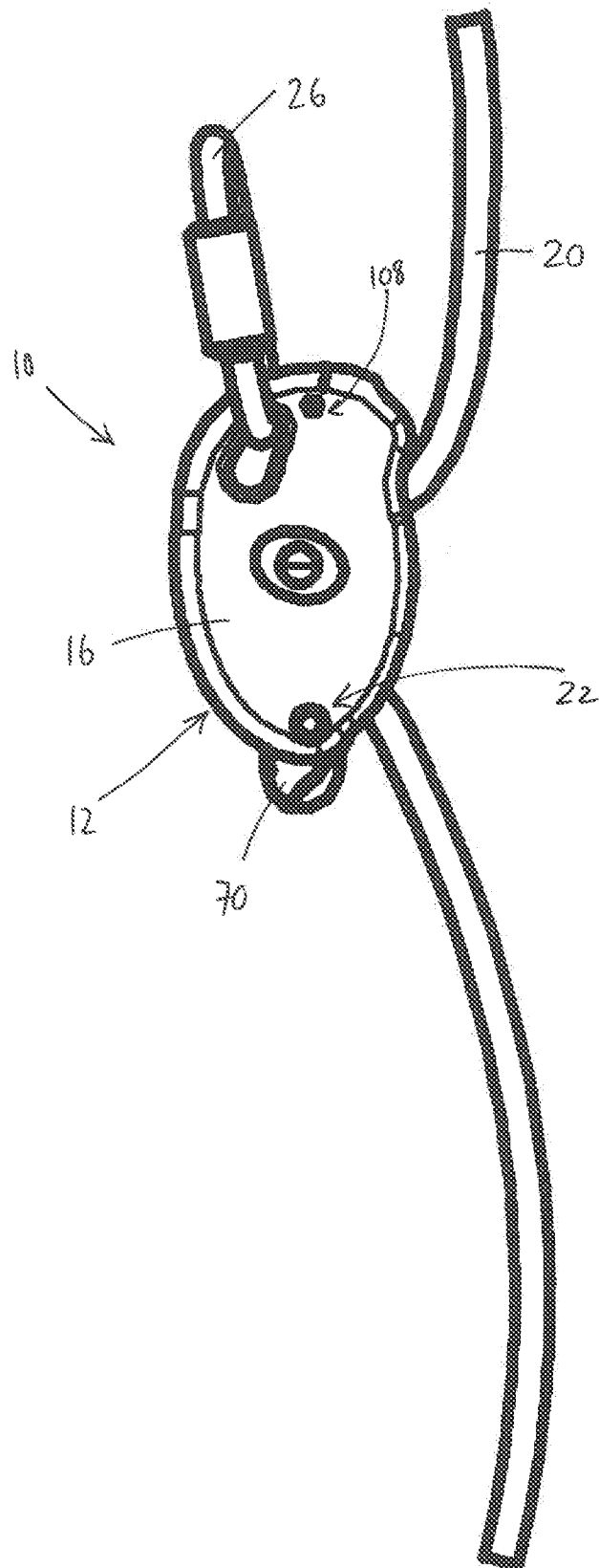


FIGURE 2

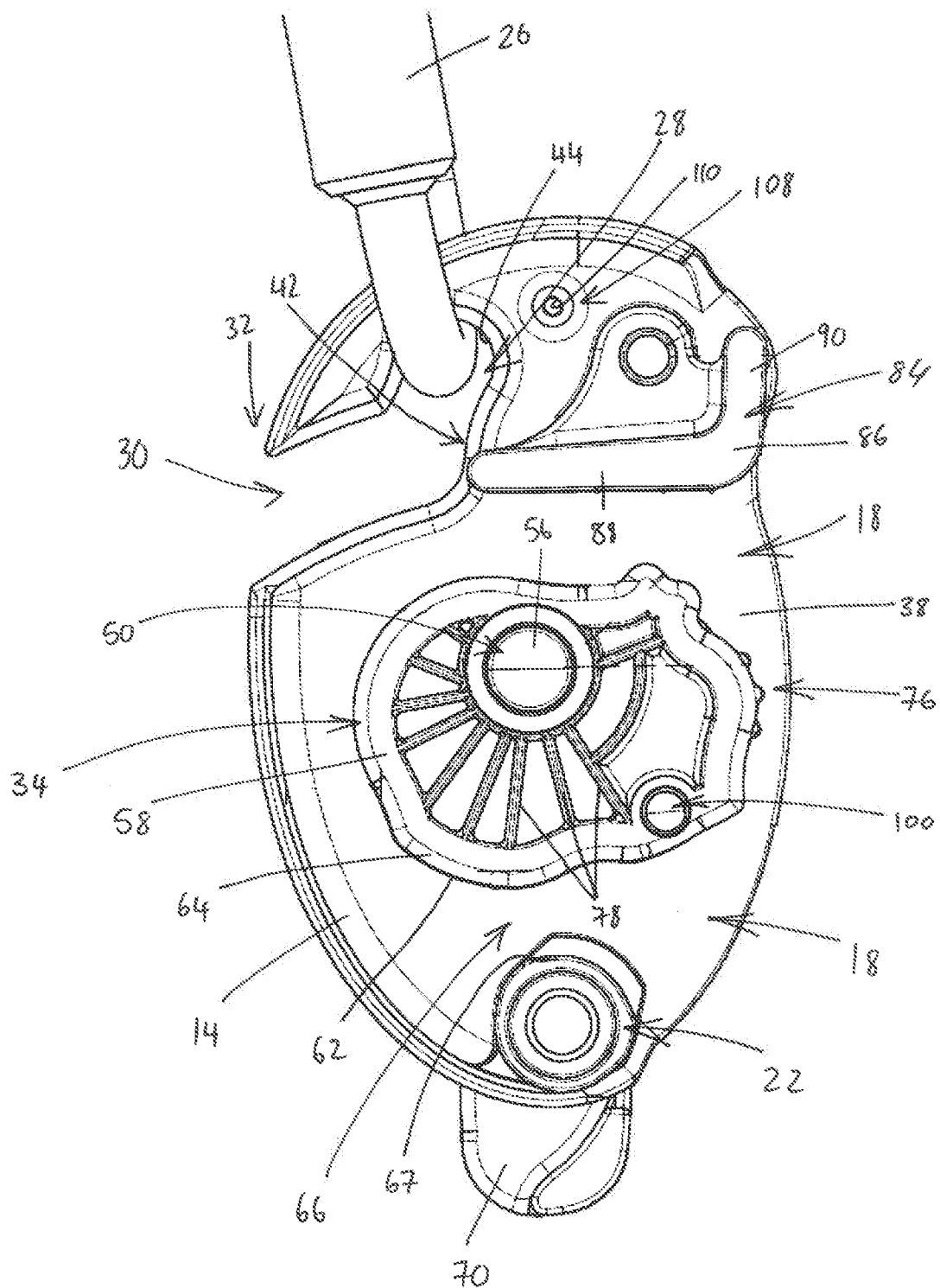


FIGURE 3

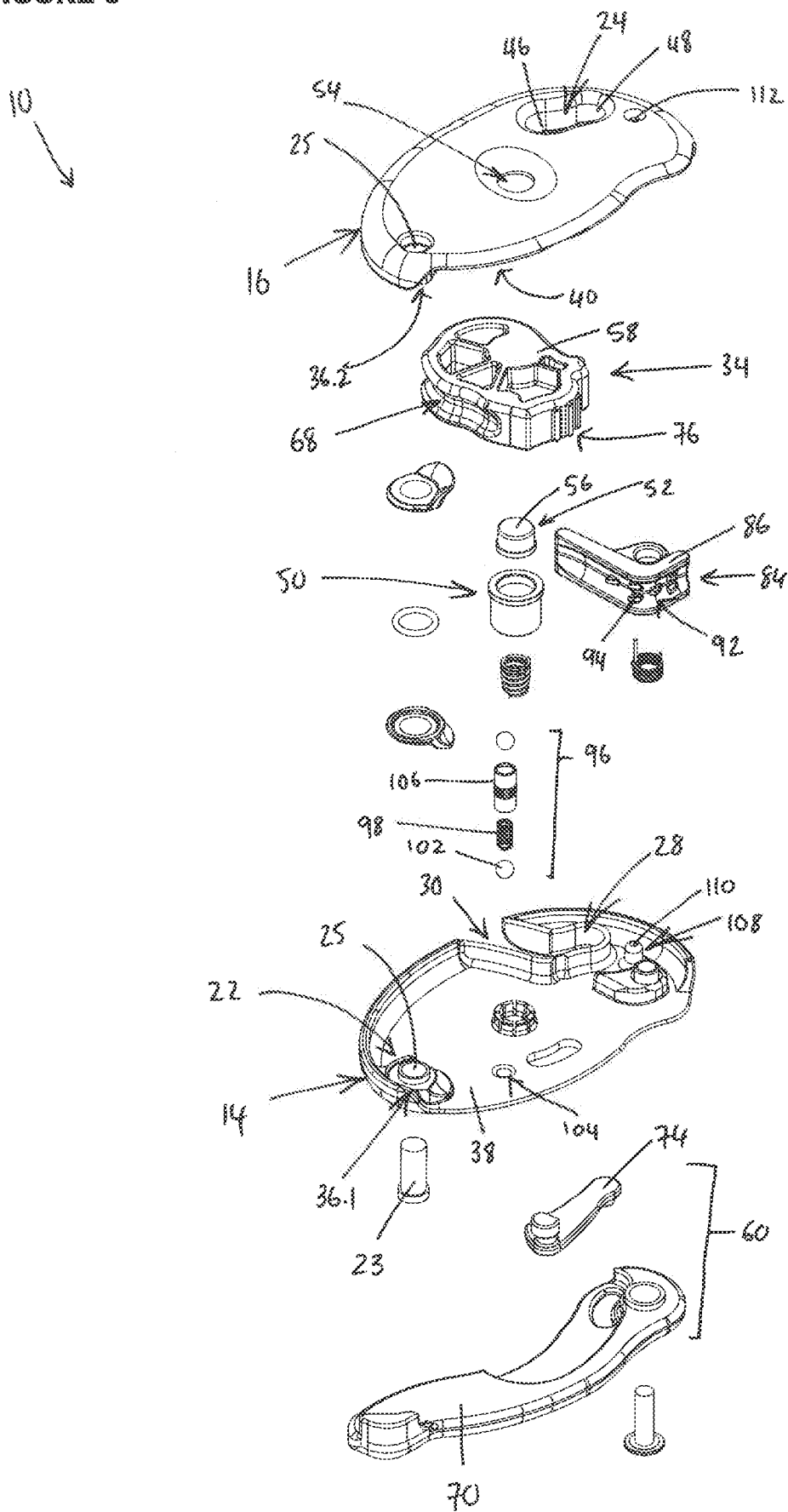


FIGURE 4

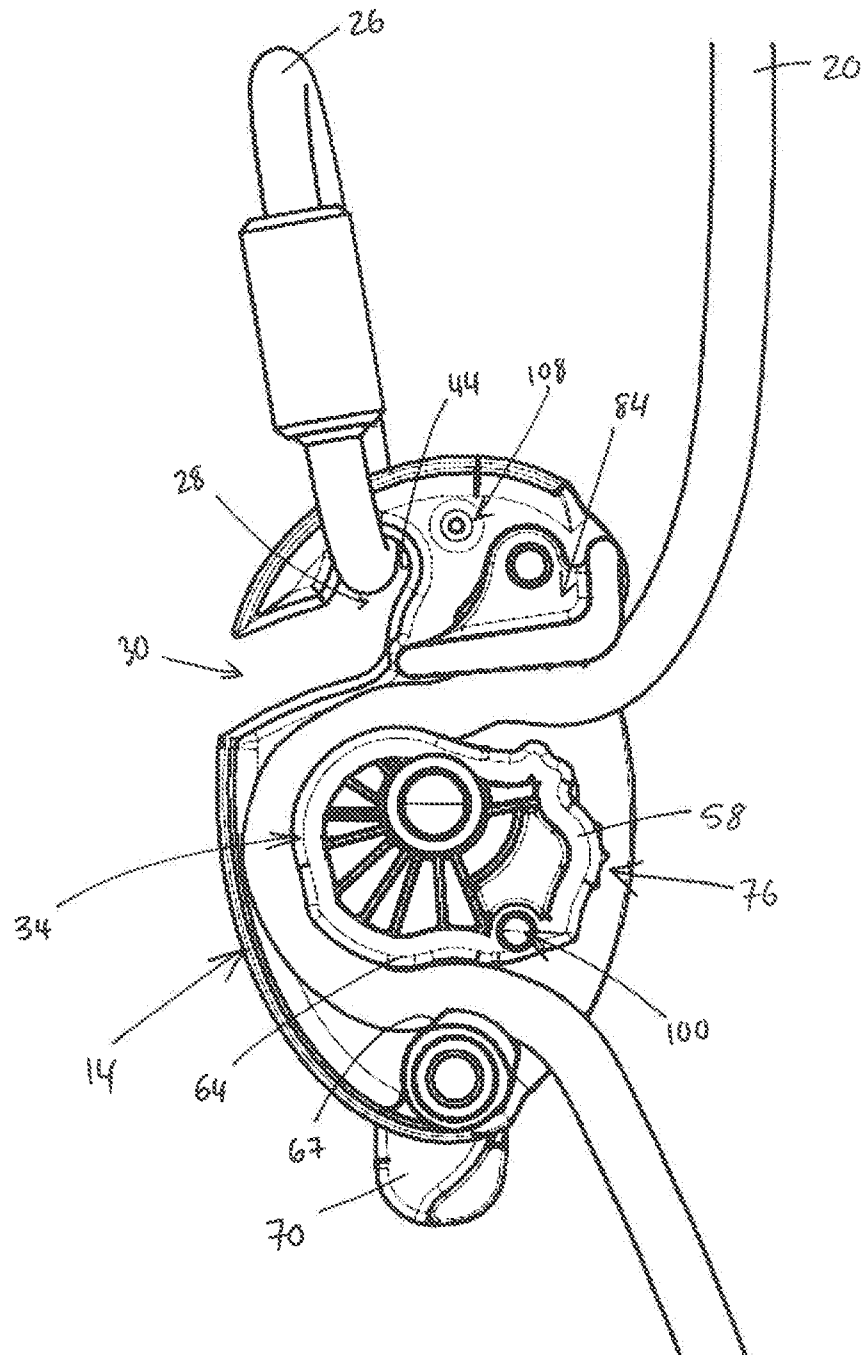


FIGURE 5

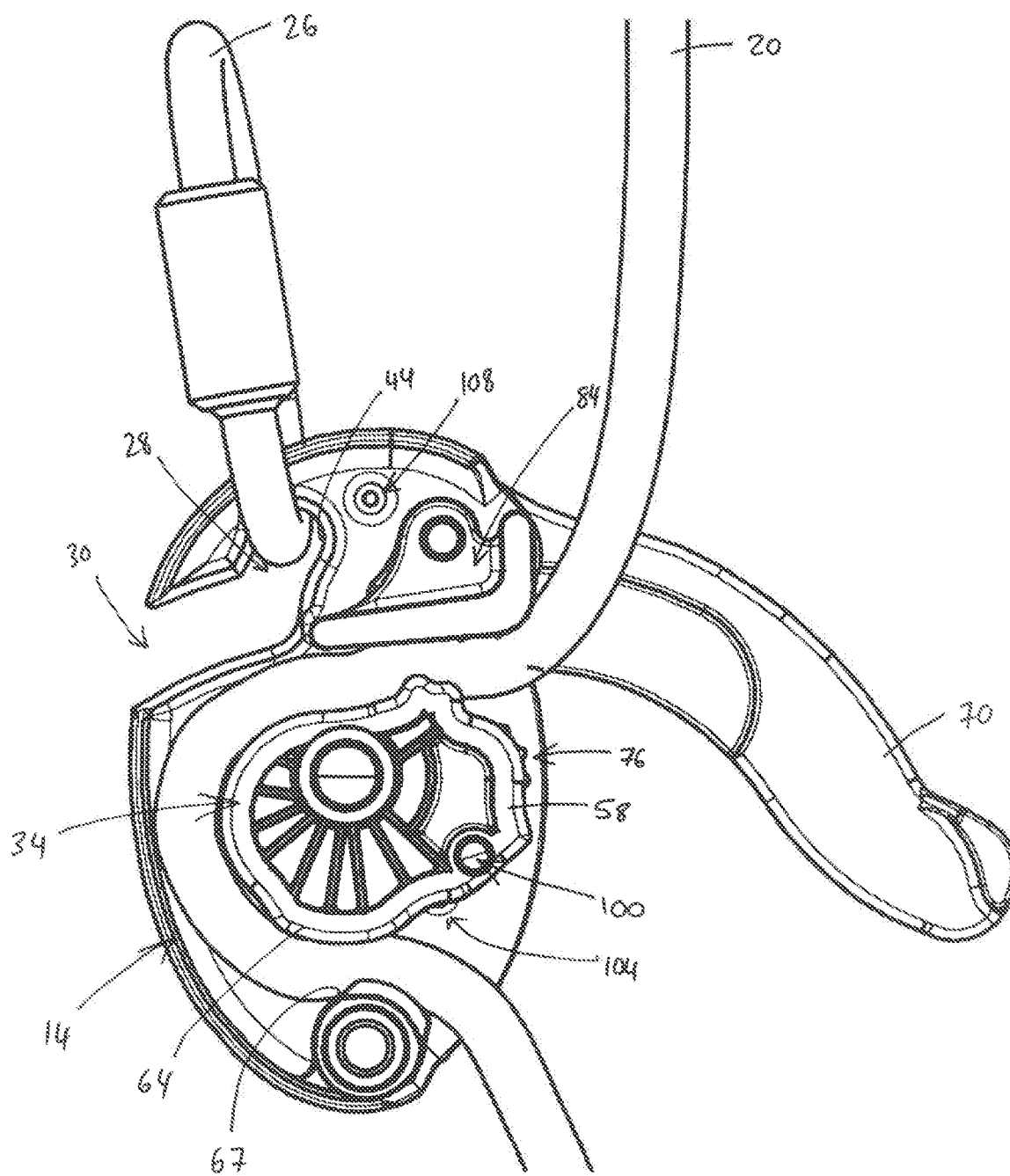


FIGURE 6

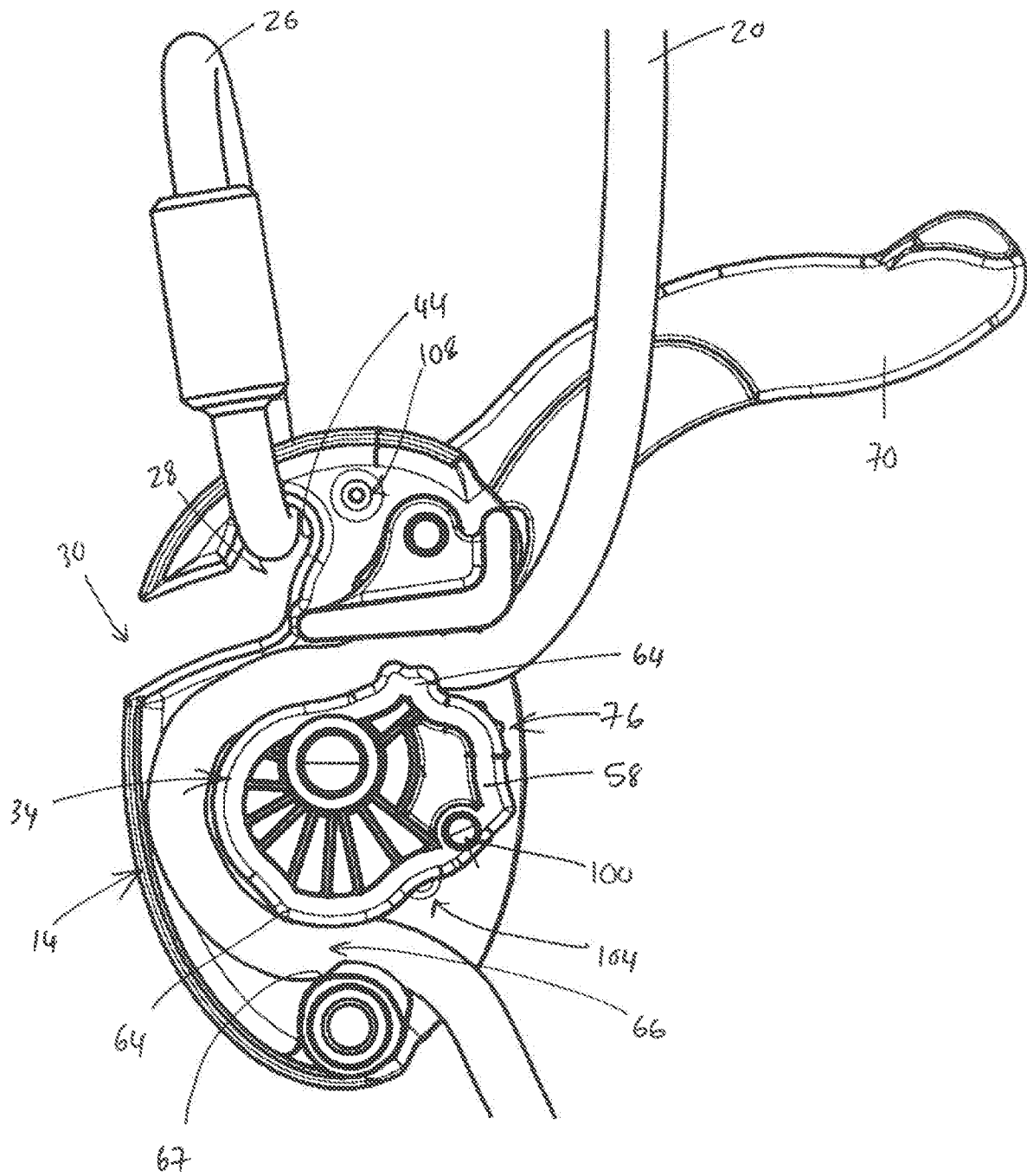


FIGURE 7

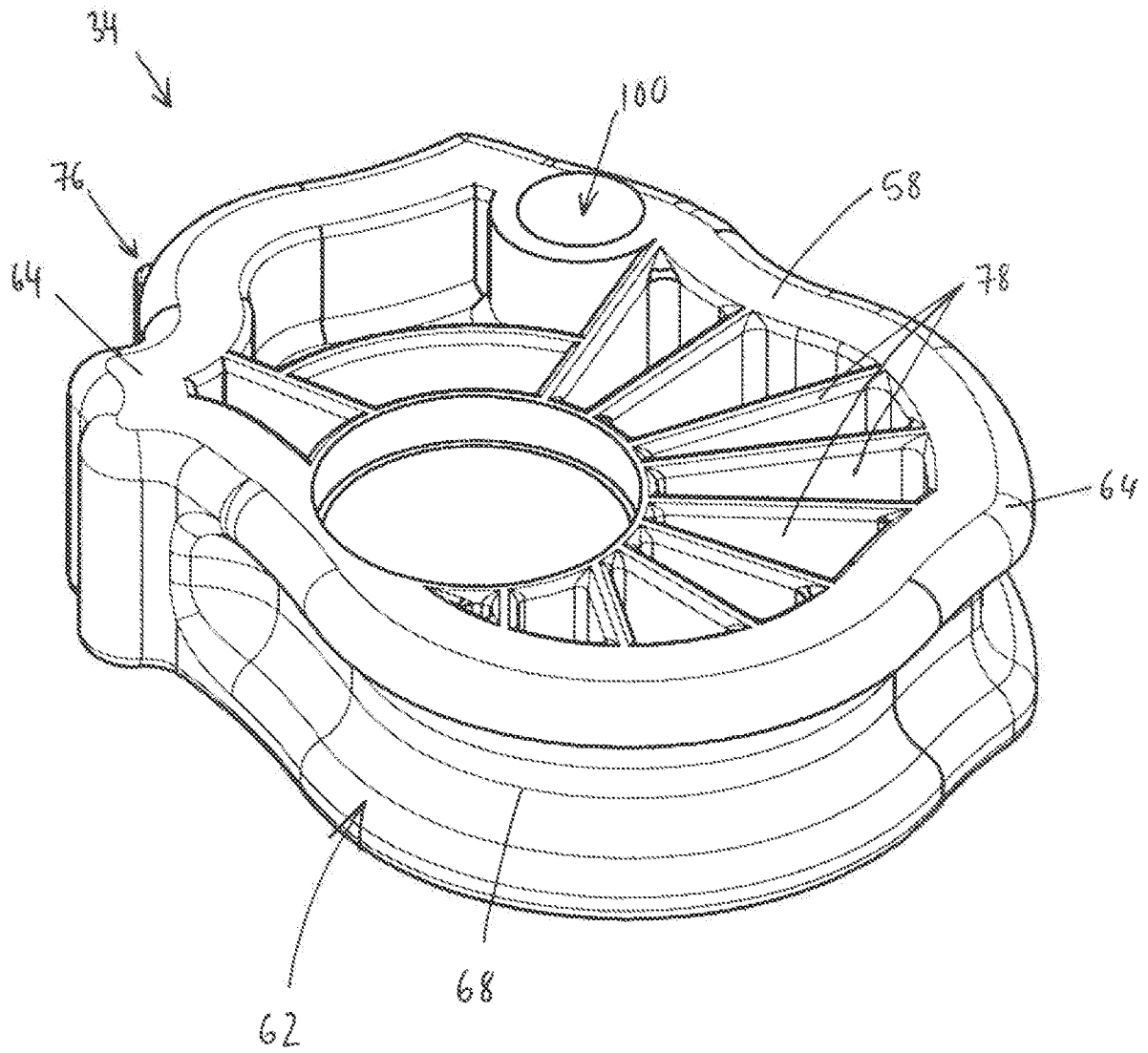


FIGURE 8

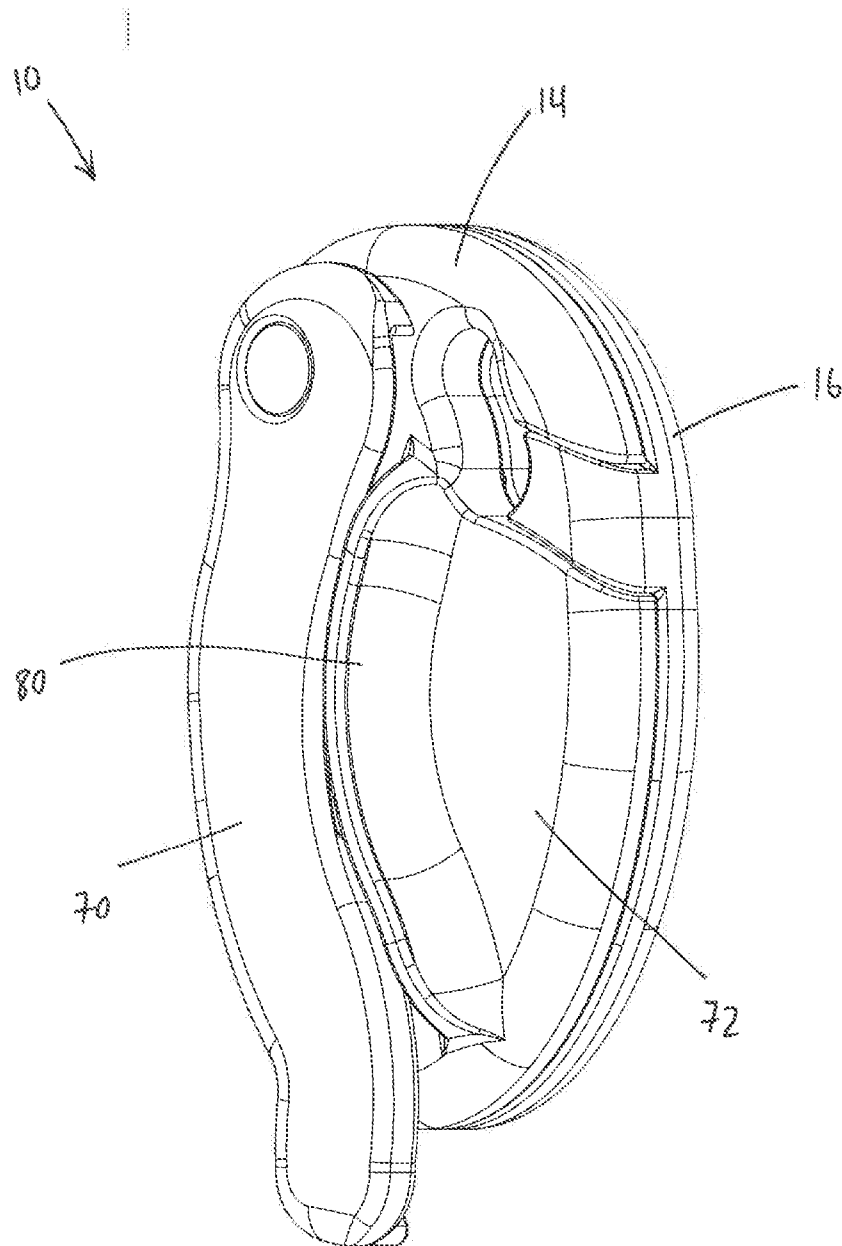
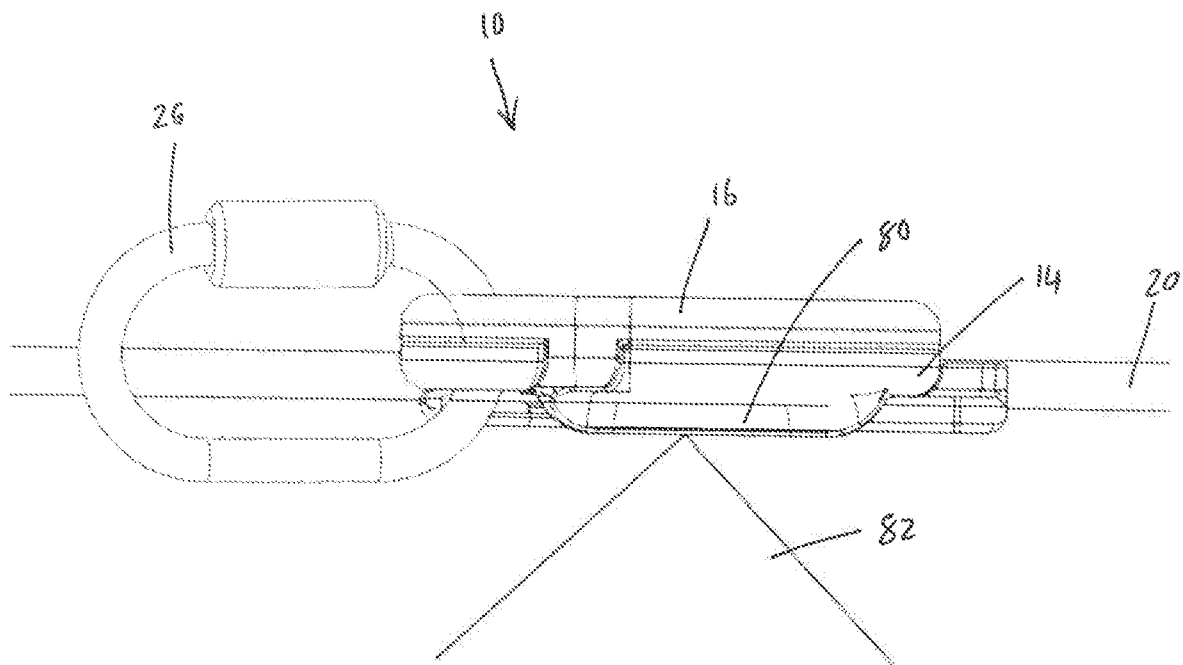


FIGURE 9



INTERNATIONAL SEARCH REPORT

International application No.

PCT / ZA 2018/050026

A. CLASSIFICATION OF SUBJECT MATTER IPC: A62B 1/14 (2006.01) According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) A62B Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) WPIAP, EPODOC, Fulltext databases		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2016228730 A1 (CHAUMONTET et al.) 11 August 2016 (11.08.2016) whole document	5-15, 19
Y		1, 4, 16-18
Y	GB 2044414 A (PETZL et al.) 15 October 1980 (15.10.1980) whole document	1, 4
Y	US 5845894 A (PETZL et al.) 08 December 1998 (08.12.1998) Fig. 13, 14	16-18
X	US 5360083 A (HEDE) 01 November 1994 (01.11.1994) whole document	20-22, 24, 25
Y		23
Y	US 2012012800 A1 (CHAUMONTET) 19 January 2012 (19.01.2012) Fig. 3, 4	23
☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 21 February 2019 (21.02.2019)		Date of mailing of the international search report 22 February 2019 (22.02.2019)
Name and mailing address of the ISA/AT Austrian Patent Office Dresdner Straße 87, A-1200 Vienna Facsimile No. +43 / 1 / 534 24-535		Authorized officer FELLNER T. Telephone No. +43 / 1 / 534 24-345

INTERNATIONAL SEARCH REPORT

International application No.

PCT / ZA 2018/050026

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6155384 A (PAGLIOLI) 05 December 2000 (05.12.2000) Fig. 5	23

INTERNATIONAL SEARCH REPORT

International application No.

PCT / ZA 2018/050026

Box No. II	Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)
This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons: 1. ☐ Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely: 2. ☒ Claims Nos.: 26-28 because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically: Claims 26-28 do not define any technical features, they merely contain references to the description and/or the drawings. According to Rule 6.2(a) PCT, claims should not contain such references except where absolutely necessary, which is not the case here. 3. ☐ Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).	
Box No. III	Observations where unity of invention is lacking (Continuation of item 3 of first sheet)
This International Searching Authority found multiple inventions in this international application, as follows: 1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims. 2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees. 3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.: 4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: Remark on Protest ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee. ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation. ☐ No protest accompanied the payment of additional search fees.	

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT / ZA 2018/050026

Patent document cited in search report			Patent family member(s)			Publication date
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			EP	A1	3056248	2016-08-17
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			EP	A1	0803268	1997-10-29
			JP	A	H1036086	1998-02-10
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			CZ	A3	9701158	1997-11-12
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			ES	T3	2096897	1997-03-16
			FR	A1	2696647	1994-04-15
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			FR	A1	2962724	2012-01-20
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			AU	A1	2011203579	2012-02-02
			ES	T3	2411472	2013-07-05
			US	A1	2012012800	2012-01-19
US	A	6155384	US	A	6155384	2000-12-05
			AU	A	4354096	1997-07-28
			EP	A1	1009487	2000-06-21
			WO	A1	9724159	1997-07-10
			DE	T2	69528396	2003-06-05
			AT	T	224755	2002-10-15
			CA	A1	2241369	1997-07-10
			ES	T3	2181807	2003-03-01