

DIRECCIÓN DE NUEVAS CREACIONES

SOLICITUD FASE NACIONAL - PCT

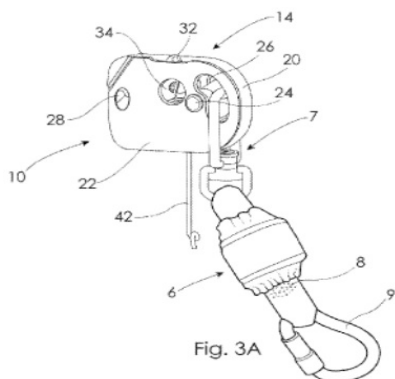


Fig. 3A

1	Título de la Invención (200 caracteres o espacios máximos)		
DISPOSITIVO DE DETENCIÓN DE CAÍDAS			
2	Datos del Solicitante / Titular		
Nombre:	CAPITAL SAFETY GROUP (AUSTRALIA) PTY LIMITED	Dirección Electrónica:	notificaciones.patentes@roclaw.co
Dirección:	95 Derby Street, Silverwater, New South Wales 2128 (AU)	Domicilio/País de constitución:	AUSTRALIA - NEW SOUTH WALES - NEW SOUTH WALES
Identificación:			
☐ CEDULA DE CIUDADANIA ☒ EMPRESA EXTRANJERA ☐ PASAPORTE		☐ CEDULA DE EXTRANJERIA ☐ NIT	

Número: 1037704-											
3	Solicitantes										
<table><tr><td>Apellidos - Nombres o Razón Social</td><td>Tipo</td><td colspan="2">Identificación</td></tr><tr><td>1. CAPITAL SAFETY GROUP (AUSTRALIA) PTY LIMITED</td><td>EE</td><td colspan="2">1037704</td></tr></table>				Apellidos - Nombres o Razón Social	Tipo	Identificación		1. CAPITAL SAFETY GROUP (AUSTRALIA) PTY LIMITED	EE	1037704	
Apellidos - Nombres o Razón Social	Tipo	Identificación									
1. CAPITAL SAFETY GROUP (AUSTRALIA) PTY LIMITED	EE	1037704									
4	Datos del Inventor										
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Identificación:											
☐ CEDULA DE CIUDADANIA		☐ CEDULA DE EXTRANJERIA									
☐ EMPRESA EXTRANJERA		☐ NIT									
☐ PASAPORTE		☒ No Aplica									
Número:		-									
5	Inventor(es)										
<table><tr><td>Apellidos - Nombres</td><td>Domicilio</td></tr><tr><td>1. HWANG Han Young</td><td>AUSTRALIA</td></tr></table>				Apellidos - Nombres	Domicilio	1. HWANG Han Young	AUSTRALIA				
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1. HWANG Han Young	AUSTRALIA										
6	Datos Inventor(es)										
<table><tr><td>País de Residencia</td><td>Departamento/Estado</td><td>Ciudad</td><td>Dirección</td></tr><tr><td>1. AUSTRALIA</td><td>NEW SOUTH WALES</td><td>NEW SOUTH WALES</td><td>80 Ryedale Road, Eastwood, New South Wales 2122 (AU)</td></tr></table>				País de Residencia	Departamento/Estado	Ciudad	Dirección	1. AUSTRALIA	NEW SOUTH WALES	NEW SOUTH WALES	80 Ryedale Road, Eastwood, New South Wales 2122 (AU)
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7	Datos del Representante Legal / Apoderado										

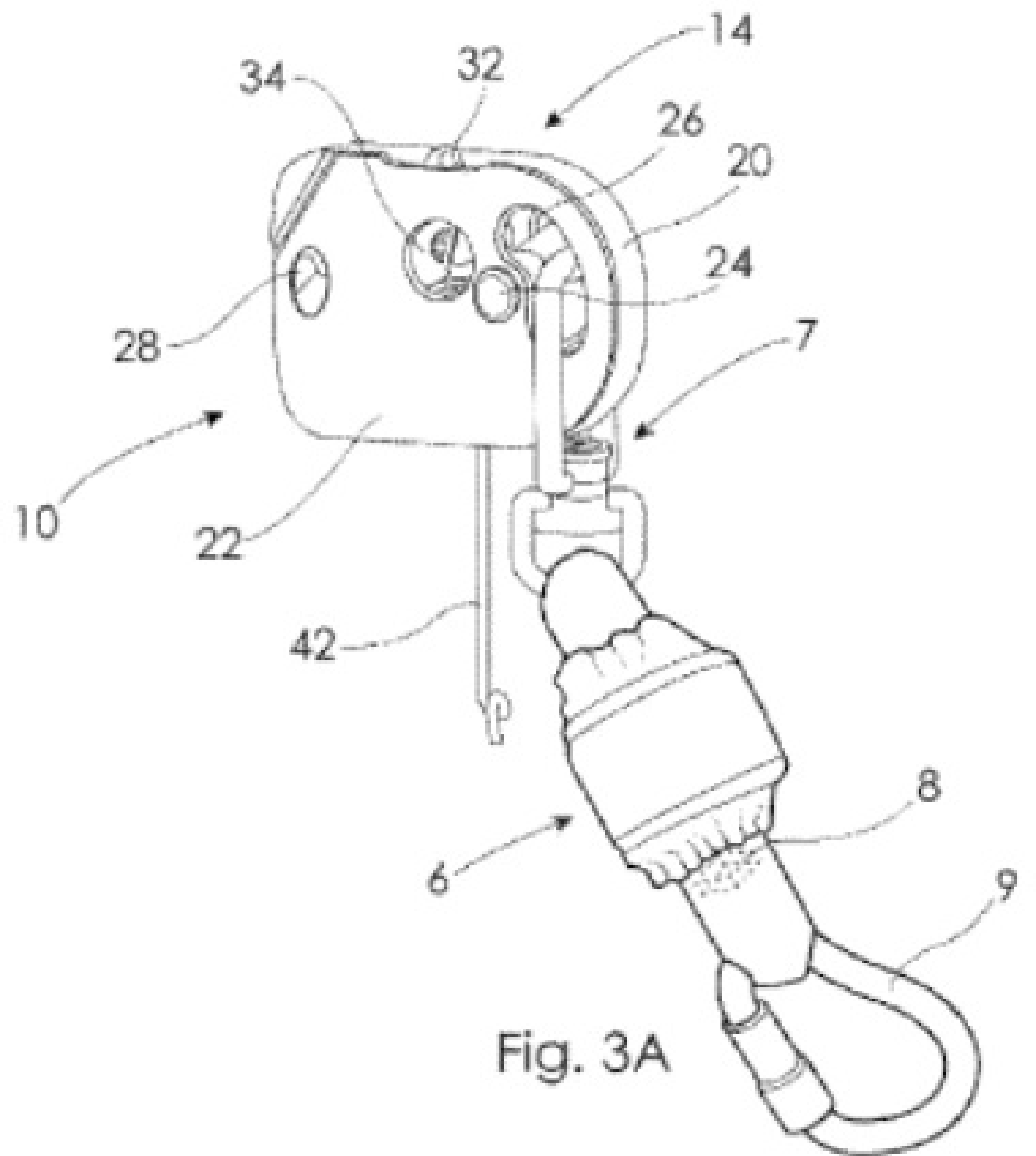
Nombre:	J. IAN RAISBECK	Dirección Electrónica:	notificaciones.patentes@roclaw.co
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Identificación: ☒ CEDULA DE CIUDADANIA ☐ CEDULA DE EXTRANJERIA ☐ EMPRESA EXTRANJERA ☐ NIT ☐ PASAPORTE Número: 79376996-			
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11	Reducción de tasas.		
Declaro que carezco de medios económicos para presentar la solicitud de patente. ☐ SI ☒ NO Nota: En caso de ser persona natural y carecer de medios económicos, y por lo tanto, aplique la reducción de tasas a que se refiere la resolución vigente en tarifas, debe firmar la presente solicitud bajo la gravedad de juramento.			
☐ Micro, pequeñas y medianas empresas ☐ Universidades públicas o privadas			

☐ Entidades sin ánimo de lucro

Debe aportar los documentos que se indican en el numeral 17 de anexos

12	Documentos Anexos
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| <ul style="list-style-type: none">☒ Reivindicaciones☒ Descripción☒ Dibujos y/o Figuras☒ Resumen☐ Certificado Depósito Material Biológico☐ Uso de Conocimiento tradicional☐ Listado de secuencias☒ Artes finales 12 x 12 cm☒ Poderes, si fuere el caso☐ Copia de la primera solicitud si se reivindica prioridad☐ Traducción simple de la primera solicitud, si se reivindica prioridad☒ Otros Anexos |
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DISPOSITIVO DE DETENCIÓN DE CAÍDAS

Campo de la Invención

La presente invención se relaciona con un dispositivo de detención de caídas.

5 Antecedentes de la Invención

La Figura 1 ilustra un sistema de acceso con cuerda común utilizado para el descenso de un usuario 1 en donde un dispositivo de descenso 2 se acopla con una cuerda de trabajo 3 para un descenso controlado, y un dispositivo de detención de caídas 4 se acopla con una cuerda de respaldo 5. Si el dispositivo de descenso 2 u otro equipo asociado falla, el dispositivo de detención de caídas 4 automáticamente frenará la cuerda de respaldo 5 para detener la caída del usuario 1. Existen diversos diseños de dispositivos de detención de caídas los cuales pueden ser generalmente categorizados como seguidores automáticos de manos libres o dispositivos manuales de respaldo.

- 15 En un seguidor automático típico se proporciona una cubierta que tiene una compuerta con bisagras para encerrar la cuerda de respaldo. El seguidor también incluye una grande leva y una palanca con una cabeza de la palanca acoplada al arnés de un usuario a través de una cuerda de seguridad y un mosquetón estilo carabinero. Si el usuario se cae la palanca gira la grande leva la cual frena la cuerda de respaldo dentro de la cubierta.
- 20 Este tipo de seguidor automático sufre de una falla inherente en el diseño en cuanto a que la palanca expuesta en un agarre de pánico puede ser agarrada junto con la cuerda de respaldo para liberar la grande leva sin detener el dispositivo.

- 25 En un dispositivo manual típico se proporciona una leva principal para frenar en donde el mosquetón y la cuerda de seguridad del usuario se encuentran conectados a un cuerpo del dispositivo. El cuerpo incluye una placa de cubierta giratoria la cual puede ser abierta para ubicar el dispositivo de detención de caídas sobre la cuerda de respaldo. El dispositivo manual, en un descenso rápido del usuario, mueve la cubierta en relación con la leva principal para frenar la cuerda. El dispositivo manual también incluye una leva
- 30 secundaria y una palanca que se conectan al mosquetón del usuario de tal manera que el movimiento de la cubierta es promovido por la leva secundaria la cual se acopla a través de la fricción con la cuerda de respaldo. Este estilo de dispositivo manual presenta un peligro de objetos que caen en cuanto a que debe ser separado del mosquetón del usuario cuando se une a la cuerda de respaldo.

- 35 Debe entenderse que cualquier reconocimiento de técnica anterior en esta memoria descriptiva no debe ser tomado como una admisión de que la técnica anterior forma parte del conocimiento general común.

Resumen de la Invención

De acuerdo con un primer aspecto de la presente invención se proporciona un dispositivo de detención de caídas el cual comprende:

5 Un cuerpo adaptado para acoplarse a un usuario a través de un acoplamiento, el cuerpo incluye un cuerpo base y una placa de cubierta móvil la cual en una posición abierta permite la unión del dispositivo de detención de caídas a una cuerda, el cuerpo base y la placa de cubierta juntos definen una apertura cerrada adaptada para retener el acoplamiento en la posición abierta;

10

 Una palanca que incluye una leva principal, la palanca está acoplada de manera giratoria al cuerpo y está colocada para cooperar con el acoplamiento por lo cual durante el funcionamiento del dispositivo de detención de caídas el descenso del usuario hace que el acoplamiento entre en contacto con la palanca la cual gira para efectuar el movimiento de la leva principal para frenar la cuerda que está pasando a través del dispositivo de detención de caídas entre la leva principal y el cuerpo.

15

Preferiblemente la placa de cubierta en una posición cerrada mantiene la retención del acoplamiento, el cuerpo base y la placa de cubierta incluyen ranuras que definen la apertura cerrada. Más preferiblemente, la palanca tiene un extremo abierto y está colocada en relación con la apertura cerrada con la placa de cubierta en la posición cerrada por lo cual el ascenso del usuario proporciona un contacto del acoplamiento con el cuerpo sin hacer contacto con la palanca, dicho contacto con el cuerpo únicamente es efectivo para efectuar el levantamiento del dispositivo de detención de caídas con independencia de la palanca y de la leva principal.

20

25

Preferiblemente, el dispositivo de detención de caídas comprende una leva inercial acoplada de manera giratoria a la palanca próxima a la leva principal y configurada en el descenso rápido del usuario para girar en contacto con la cuerda para iniciar el movimiento giratorio de la palanca para frenar la cuerda con la leva principal.

30

De acuerdo con un segundo aspecto de la invención se proporciona un dispositivo de detención de caídas, el cual comprende:

35 Un cuerpo adaptado para acoplarse a un usuario a través de un acoplamiento;

 Una palanca que incluye una leva principal, la palanca está acoplada de manera giratoria al cuerpo y está colocada para cooperar con el acoplamiento por lo cual durante el funcionamiento el descenso del usuario hace que el acoplamiento entre en contacto con la palanca la cual gira para efectuar el frenado de la cuerda que está pasando a través del dispositivo de detención de caídas entre la leva principal y el cuerpo;

40

Una leva inercial acoplada de manera giratoria a la palanca próxima a la leva principal y configurada en el descenso rápido del usuario para girar en contacto con la cuerda para iniciar el movimiento giratorio de la palanca para frenar la cuerda con la leva principal.

- 5 Preferiblemente, el dispositivo de detención de caídas también comprende una leva secundaria conectada a la palanca por lo cual el agarre de la cuerda y el acoplamiento la una con la otra hace que la cuerda entre en contacto con la leva secundaria girando la palanca para promover el frenado de la cuerda entre la leva principal y el cuerpo. Más preferiblemente, la leva secundaria está conectada de manera giratoria a la palanca y
- 10 desviada para mantener contacto con la cuerda para sostener el dispositivo de detención de caídas en una posición requerida a lo largo de la cuerda. Aún más preferiblemente, el dispositivo de detención de caídas además comprende una cerradura de la leva secundaria conectada a la palanca y colocada para asegurar la leva secundaria en una posición retraída para permitir el movimiento de deslizamiento del dispositivo de
- 15 detención de caídas en ambas direcciones a lo largo de la cuerda.

- Preferiblemente, el dispositivo de detención de caídas comprende una leva de remolque acoplada de manera giratoria al cuerpo para proporcionar contacto con la palanca para girarla y liberar la leva principal asociada de la cuerda para permitir el remolque manual
- 20 del dispositivo de detención de caídas a lo largo de la cuerda en su descenso. Más preferiblemente, la leva de remolque está configurada en relación con la palanca para desacoplarla de la palanca para permitir el frenado de la cuerda a través de la leva principal más allá de un ángulo de pivote predeterminado de la leva de remolque. Aún más preferiblemente, la leva de remolque se conecta a una línea de remolque la cual es
- 25 halada de manera manual para girar la leva de remolque para permitir el remolque del dispositivo de detención de caídas. Todavía aún más preferiblemente, la línea de remolque incluye un fusible mecánico el cual frena en una carga de tracción predeterminada en donde la leva de remolque está desactivada.

- 30 Preferiblemente, el dispositivo de detención de caídas además comprende un elemento acelerador acoplado de manera giratoria al cuerpo y adaptado para acoplar el acoplamiento para acelerar el contacto del acoplamiento con la palanca para el frenado acelerado de la cuerda con la leva principal. Más preferiblemente, el elemento acelerador está acoplado de manera operativa a un miembro de desviado el cual hace que el
- 35 acoplamiento se mantenga en contacto con la palanca.

- Preferiblemente, el cuerpo está configurado con la placa de cubierta en una posición cerrada para alojar sustancialmente por lo menos la leva principal y la palanca. Más preferiblemente, el cuerpo incluye una leva invertida montada de manera móvil al
- 40 cuerpo base para permitir únicamente el cierre de la placa de cubierta hacia la posición cerrada con el dispositivo de detención de caídas orientado correctamente en relación con la cuerda para garantizar el frenado en el descenso.

Preferiblemente, el dispositivo de detención de caídas está conectado de manera integral al acoplamiento. Más preferiblemente, el acoplamiento está en la forma de un conector giratorio.

5 Breve Descripción de las Figuras

Con el fin de lograr un mejor entendimiento de la naturaleza de la presente invención se describirán ahora las incorporaciones preferidas de un dispositivo de detención de caídas, a modo de ejemplo únicamente, con referencia a los dibujos que se acompañan, en los cuales:

- 10 La **Figura 1** es una ilustración esquemática de un sistema de acceso de cuerda común que incluye un dispositivo de detención de caídas;

La **Figura 2** es una vista en perspectiva de un dispositivo de detención de caídas de una incorporación de la invención junto con un acoplamiento;

- 15 Las **Figuras 3A y 3B** son vistas en perspectiva del dispositivo de detención de caídas de la Figura 2 junto con configuraciones de acoplamiento de diferentes longitudes;

Las **Figuras 4A y 4B** son vistas en elevación lateral del dispositivo de detención de caídas de la Figura 2 en las configuraciones cerrada y abierta respectivamente;

La **Figura 5** es una vista en elevación lateral del dispositivo de detención de caídas de las Figuras 4A y 4B con la placa de cubierta retirada para claridad;

- 20 La **Figura 4** es una vista en elevación frontal del dispositivo de detención de caídas mostrado en la Figura 3;

La **Figura 5** es una vista en elevación frontal correspondiente a la Figura 4, pero con elementos adicionales, incluyendo el miembro de leva, retirados;

- 25 Las **Figuras 6A y 6B** son vistas en elevación lateral del dispositivo de detención de caídas de la Figura 5 mostrados en los modos automático y manual respectivamente;

Las **Figuras 7A y 7B** son vistas en elevación lateral del dispositivo de detención de caídas de la Figura 5 en modo automático;

Las **Figuras 8A y 8B** son vistas en elevación lateral del dispositivo de detención de caídas de la Figura 5 en modo manual;

- 30 La **Figura 9** es una ilustración esquemática del dispositivo de detención de caídas de la Figura 5 mostrado en el caso de un “agarre de pánico”;

La **Figura 10** es una vista en perspectiva del dispositivo de detención de caídas de la Figura 5 en una posición invertida;

Las **Figuras 11A y 11B** son vistas en perspectiva de un dispositivo de detención de caídas de otra incorporación de la invención mostrado con la placa de cubierta retirada para claridad;

5 Las **Figuras 12A y 12B** son vistas en elevación lateral del dispositivo de detención de caídas de las Figuras 11A y 11B;

La **Figura 13** es una vista en corte transversal del dispositivo de detención de caídas de las Figuras 11A y 11B mostrado en el modo automático frenando la cuerda.

Descripción Detallada de las Incorporaciones Preferidas

- 10 Tal como se ve mejor en las Figuras 2 y 3A/3B se encuentra un dispositivo de detención de caídas 10 de acuerdo con una incorporación preferida de la presente invención el cual se encuentra acoplado al arnés de un usuario (no mostrado) a través de una configuración de acoplamiento 6. En esta incorporación, la configuración de acoplamiento 6 incluye un acoplamiento en la forma de un conector giratorio 7 conectado de manera integral con el dispositivo de detención de caídas 10. El conector giratorio 7 se encuentra conectado a una cuerda de seguridad 8 corta o larga tal como se muestra en las Figuras 3A y 3B, respectivamente. La cuerda de seguridad 8 está en un extremo opuesto conectada a un mosquetón 9 el cual conecta de manera desmontable a un punto de conexión definido por un anillo en D (no mostrado) unido al arnés.
- 15
- 20 Tal como se ve mejor en las Figuras 4A/B el dispositivo de detención de caídas 10 de acuerdo está diseñado para estar unido a una cuerda de respaldo o línea de seguridad 12. El dispositivo de detención de caídas 10 comprende un cuerpo 14, y una palanca 16 acoplada de manera giratoria al cuerpo 14. La palanca 16 incluye una leva principal 18 la cual en esta incorporación está formada de manera integral con la palanca 16 la cual
- 25 está colocada para cooperar con un acoplamiento, un ejemplo de dicho acoplamiento es la configuración de acoplamiento 6. Durante el funcionamiento, el descenso del usuario hace que el acoplamiento entre en contacto con la palanca 16 la cual gira para efectuar el frenado de la línea de seguridad 12 entre el cuerpo 14 y la leva principal 18.
- 30 El cuerpo 14 incluye un cuerpo base 20 y una placa de cubierta móvil 22 la cual en este ejemplo gira alrededor del cuerpo base 20. La base 14 incluye un eje de pivote 24 alrededor del cual la placa de cubierta 22 gira. El eje de pivote 24 también proporciona un montaje pivotante al cual se encuentra acoplada de manera giratoria la palanca 16. El cuerpo base 20 junto con la placa de cubierta 22 definen una apertura cerrada 26
- 35 diseñada para retener el acoplamiento. El cuerpo base 20 y la placa de cubierta 22 tienen ranuras de tal manera que la apertura 26 se mantiene para conexión al acoplamiento con la placa de cubierta 22 tanto cerrado como abierto según se ilustra en las Figuras 4A y 4B respectivamente.

El cuerpo base 20 incluye un botón de retención 28 el cual retiene la placa de cubierta 22 en la posición cerrada de la Figura 4A. El botón de retención 28 se deprime para liberar la placa de cubierta 22 y permitirle girar alrededor del eje de pivote 24 hacia su posición abierta tal como se muestra en la Figura 4B. Durante el funcionamiento, el ascenso del usuario libera el acoplamiento de la palanca 16 y el acoplamiento hace contacto con el cuerpo 14 alrededor de la apertura 26 para efectuar el levantamiento del dispositivo de detención de caídas 10 con independencia de la palanca 16 y la leva principal 18. Tal como se ve mejor en la Figura 5, la leva principal 18 bajo la influencia de la gravedad gira lejos de la línea de seguridad 12 para un movimiento relativamente libre del dispositivo de detención de caídas 10 a lo largo de la línea de seguridad 12. En esta incorporación, la palanca 16 y la leva principal 18 no se encuentran activamente inclinadas.

El dispositivo de detención de caídas 10 comprende un elemento acelerador 30 acoplado de manera giratoria al cuerpo base 20. El elemento acelerador 30 está inclinado a través de un miembro de desviación en la forma de un resorte de torsión (no mostrado) en una dirección en las manecillas del reloj según se ve en la Figura 5 para mantener el contacto con el acoplamiento. Esto significa que en un descenso rápido de un usuario el acoplamiento es forzado por el elemento acelerador 30 en contacto con la palanca 16 para iniciar el frenado de la línea de seguridad 12 con la leva principal 18. El elemento acelerador 30 evita de esta forma una situación en la cual el dispositivo de detención de caídas 10 se acelera a la misma velocidad que el usuario sin que el acoplamiento entre en contacto con la palanca 16 para efectuar el frenado a través de la leva principal 18.

El dispositivo de detención de caídas 10 también comprende una leva secundaria 32 conectada a la palanca 16. La leva secundaria 32 está diseñada de tal manera que el agarre de la línea de seguridad 12 y el acoplamiento el uno hacia el otro fuerza la línea de seguridad 12 hacia el contacto con la leva secundaria 32. Este contacto con la leva secundaria 32 gira la palanca 16 en una dirección de las manecillas del reloj tal como se muestra en la Figura 6B para promover el frenado de la línea de seguridad 12 entre la leva principal 18 y el cuerpo 16. La leva secundaria 32 en esta incorporación está conectada de manera giratoria a la palanca 16 para permitir el funcionamiento del dispositivo de detención de caídas 10 ya sea en un modo automático o manual tal como se muestra en las Figuras 6A y 6B respectivamente.

El dispositivo de detención de caídas 10 además comprende una cerradura 34 de la leva secundaria montada en la palanca 16 y diseñada para retener la leva secundaria 32 en una posición fija y retraída en el modo automático. La cerradura 34 de la leva secundaria se deprime para liberar la leva secundaria 32 la cual está inclinada para girar hacia afuera de la palanca 16 hacia un acoplamiento por fricción con la línea de seguridad 12 en el modo manual.

En el modo automático tal como se muestra en la Figura 7A, el dispositivo de detención de caídas 10 está libre para deslizarse o flotar tanto en la dirección hacia arriba como en la dirección hacia abajo a lo largo de la línea de seguridad 12. Al moverse hacia arriba a lo

largo de la línea de seguridad 12 el acoplamiento levanta el cuerpo 14 del el dispositivo de detención de caídas 10 sin influenciar el giro de la palanca 16 la cual, bajo la influencia de la gravedad, gira en una dirección contraria a las manecillas del reloj moviendo la leva principal 18 lejos de la línea de seguridad 12. El dispositivo de detención de caídas 10 viaja de manera similar hacia abajo a lo largo de la línea de seguridad 12 sin agarrar la línea de seguridad 12. Al viajar en ambas direcciones la leva secundaria 32 se retrae lejos de la línea de seguridad 12. En el descenso rápido el dispositivo de detención de caídas 10 se activa en donde el elemento acelerador 30 empuja el acoplamiento hacia el contacto con la palanca 16 para rotar la leva principal 18 en una dirección de las manecillas del reloj para efectuar el frenado acelerado de la línea de seguridad 12 con la leva principal 18.

En el modo manual tal como se ilustra en las Figura 8A y 8B, la leva secundaria 32 es desviada hacia la línea de seguridad 12 por medio de liberar o deprimir la cerradura 34 de la leva secundaria. La leva secundaria 32 mantiene de esta forma un acoplamiento por fricción con la línea de seguridad 12 girando la palanca 16 en la dirección de las manecillas del reloj para presionar la leva 18 contra la línea de seguridad 12. Esto significa que el dispositivo de detención de caídas 10 se mantiene estacionario o parqueado en una posición requerida a lo largo de la línea de seguridad 12. La leva secundaria 32 fuerza de esta manera la leva principal 18 para frenar ligeramente la línea de seguridad 12 para parquear de manera efectiva el dispositivo de detención de caídas 10 en una altura requerida. Si el usuario desciende rápidamente o se cae, el acoplamiento hace contacto con la palanca 16 girando la leva principal 18 para frenar la línea de seguridad 12 contra el cuerpo 14.

El dispositivo de detención de caídas 10m, según se encuentra mejor ilustrado en las Figuras 8A y 8B, comprende una leva de remolque 36 acoplada de manera giratoria al cuerpo base 20. La leva de remolque 36 está diseñada en el modo manual para remolcar el dispositivo de detención de caídas 10 hacia abajo a lo largo de la línea de seguridad 12. La leva de remolque 36 está configurada para hacer contacto con una superficie inferior 38 de la palanca 16 para girar la palanca 16 en una dirección contraria a las manecillas del reloj para liberar la leva principal 18 asociada de la línea de seguridad 12. Una línea de remolque 40 se encuentra conectada a la leva de remolque 36 de tal manera que cuando la línea de remolque 40 es halada ésta gira la leva de remolque 36 en la dirección contraria a las manecillas del reloj. La leva de remolque 36 es activada con independencia de la leva principal 18 a través de la línea de remolque 40. La palanca 16 en su superficie inferior 38 tiene una forma en donde la leva de remolque 36 más allá de un ángulo de pivote predeterminado se desacopla de la palanca 16. Hasta el ángulo de pivote predeterminado, la leva de remolque 36 se apoya contra la superficie inferior 38 de la palanca 16 para girar la palanca 16 y liberar la leva principal 18 de la línea de seguridad 12. La leva secundaria 32 en el modo manual mantiene contacto friccional con la línea de seguridad 12 para bajar de manera suave el dispositivo de detención de caídas 10. La línea de remolque 40 incluye un fusible mecánico tal como la cuerda de separación

42 mostrada en la Figura 9. La cuerda de separación 42 se separa del resto de la línea de remolque 40 en una carga de tracción predeterminada en donde la leva de remolque 36 se desactiva. La leva de remolque 36 es desviada en la dirección de las manecillas del reloj a través de un resorte de torsión 43.

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El cuerpo 14 del dispositivo de detención de caídas 10 de esta incorporación aloja la palanca 16 y la leva principal 18 juntas con la mayoría de los demás componentes móviles. La palanca 16 tiene un extremo abierto de tal manera que es únicamente efectiva al girar la leva asociada 18 en contacto con el acoplamiento únicamente en el descenso. Tal como se ilustra en la Figura 9, esto también significa que en el “agarre de pánico” el acoplamiento, o en este ejemplo el mosquetón 43, no entran en contacto con la palanca 16 e influyen la leva principal 18. Por el contrario, la leva secundaria 32 en un “agarre de pánico” hace contacto con la línea de seguridad 12 y gira la palanca 16 y la leva 18 asociada hacia un contacto de frenado con la línea de seguridad 12. El mosquetón 43 se mueve libremente dentro de la apertura con ranuras 26 con el elemento acelerador 30 siendo girado lejos contra su fuerza de desviación.

El dispositivo de detención de caídas 10 tal como se muestra en la Figura 10 está configurado de tal manera que puede ser unido a la línea de seguridad 12 en una única orientación únicamente en donde el frenado de la línea de seguridad 12 se ve afectado en el descenso del dispositivo de detención de caídas 10. Con este fin el cuerpo base 12 es proporcionado con una leva invertida 44 la cual se retrae de manera giratoria con el dispositivo de detención de caídas 10 orientado en la disposición correcta. Con la leva invertida 44 retraída, la placa de cubierta 22 está libre para girar a lo largo del cuerpo base 20 para retención con el botón de retención 28. Si el dispositivo de detención de caídas 10 está orientado de manera incorrecta en relación con la línea de seguridad 12, la leva invertida 44 se extiende desde el cuerpo base 20 tal como se muestra en la Figura 10. Esto significa que la placa de cubierta 22 queda obstruida por la leva invertida 44 no permitiendo el cierre completo de la placa de cubierta 22. Esto alerta consecuentemente al usuario acerca de la orientación incorrecta del dispositivo de detención de caídas 10.

Con el fin de entender aún más la invención, el funcionamiento del dispositivo de detención de caídas 10 preferido involucra los siguientes pasos:

- 35 1. En un medio ambiente seguro, el dispositivo de detención de caídas 10 que está conectado de manera integral a un acoplamiento se conecta al arnés de un usuario a través de una cuerda de seguridad y un mosquetón;
- 40 2. El dispositivo de detención de caídas 10 se abre por medio de deprimir al botón de retención 28 y girar la placa de cubierta 22 en el sentido contrario a las manecillas del reloj para presentar un pasaje alargado para unir o capturar la línea de seguridad 12;

3. La placa de cubierta 22 es girada en una dirección de las manecillas del reloj para cierre alrededor de la línea de seguridad 12;

4. El usuario desciende una cuerda de trabajo utilizando un dispositivo de descenso convencional y depende del dispositivo de detención de caídas 10, típicamente en el modo automático, para funcionar como un dispositivo de seguridad de respaldo;

5. El usuario habiendo descendido a una altura de trabajo requerida puede elegir parquear el dispositivo de detención de caídas 10 en un modo manual en una altura requerida a lo largo de la línea de seguridad 12;

6. El usuario puede remolcar el dispositivo de detención de caídas 10 en el modo manual deslizándolo hacia abajo a lo largo de la línea de seguridad 12 utilizando la línea de remolque 40 y la leva de remolque 36 asociada.

En el evento de una caída o un descenso rápido, el dispositivo de detención de caídas 10 en su modo automático o manual frena o se bloquea contra la línea de seguridad 12 para detener el descenso del usuario. Si la línea de remolque 40 está siendo utilizada con la cuerda de separación 42, la cuerda de separación 42 se separará del resto de la línea de remolque 40 y la leva de remolque 36 se desactivará.

Las Figuras 11 a 13 muestran otra incorporación del dispositivo de detención de caídas de conformidad con la presente invención. El dispositivo de detención de caídas 100 de esta incorporación es esencialmente el mismo que la incorporación anterior excepto por la inclusión de una leva inercial 130. Para facilidad de referencia y con el fin de evitar la repetición, dispositivo de detención de caídas 100 se muestra o es designado para los componentes correspondientes a la incorporación anterior con un "0" adicional. Por ejemplo, la cubierta de este dispositivo de detención de caídas 100 se designa como 140.

Tal como se muestra mejor en las Figura 11A, la leva inercial 130 está conectada de manera giratoria a la palanca 160 en la leva principal 180. La leva inercial 130 gira o se mece alrededor de un pasador de pivote 150 que está fijado a la palanca 160 en la leva principal 180. La leva inercial 130 está configurada en el descenso rápido del usuario para girar hacia el contacto con la cuerda 120 tal como se muestra en la Figura 11B. La leva inercial 130 hace contacto con la cuerda 120 y de esta forma inicia el movimiento giratorio de la palanca 160 y la leva principal 180 asociada para frenar la cuerda 120 con la leva principal 180. La leva inercial 130 puede, por lo tanto, mecerse desde una posición retraída de la Figura 11A para el funcionamiento normal del dispositivo de detención de caídas 100 a una posición extendida de la Figura 11B para activación de la leva principal 180.

Tal como se muestra en las Figuras 12A y 12B el dispositivo de detención de caídas 100 puede funcionar en un modo automático con la leva secundaria 320 en una posición fija y

retraída. En el modo automático el dispositivo de detención de caídas 100 es libre de deslizarse o flotar tanto en la dirección hacia arriba como la dirección hacia abajo a lo largo de la cuerda o la línea de seguridad 120. En el evento de un descenso rápido el cual puede estar asociado con un agarre de pánico, la leva inercial 130, tal como se muestra en la Figura 12B, es mecida hacia afuera de la leva principal 180 debido a la diferencia en inercia en el sistema. La leva inercial 130 incluye dientes tales como los 170 diseñados para hacer contacto y recoger la cuerda 120 e iniciar de esta manera el bloqueo de la leva principal 180. En un descenso rápido, la masa que está cayendo además activa la leva principal 180 para el frenado de la cuerda 120 para detener la caída.

La Figura 13 ilustra el dispositivo de detención de caídas 100 con la cuerda 120 frenada después de un descenso rápido. La leva inercial 130 se ha retraído en una disminución 190 en la palanca 160 en la leva principal 180. La leva inercial 130 en esta posición retraída no hace contacto ni daña la cuerda 120. El dispositivo de detención de caídas 100 está construido de otra forma para funcionar de una manera similar a la incorporación anterior.

Ahora que varias incorporaciones preferidas de la presente invención han sido descritas será aparente para aquellas personas versadas en la materia que el dispositivo de detención de caídas tiene por lo menos las siguientes ventajas:

1. El dispositivo de detención de caídas es retenido en el acoplamiento o el mosquetón y la cuerda de seguridad mientras que está siendo unido o separado de la línea de seguridad eliminando de esta manera un peligro de caída;

2. El dispositivo de detención de caídas puede ser operado en cualquiera de los modos automático o manual y estos modos puede ser intercambiados mientras que está en funcionamiento con relativa facilidad;

3. El dispositivo de detención de caídas elimina los peligros asociados con el “agarre de pánico” por medio de una o de una combinación de las siguientes características de diseño:

- i. El cuerpo aloja la palanca y la leva principal asociada de tal manera que la palanca no puede ser agarrada;
- ii. El mosquetón u otro acoplamiento no son retenidos por la palanca sino que por el contrario entran en contacto o se acoplan a la palanca únicamente en el descenso;
- iii. La leva secundaria en contacto con la línea de seguridad hace que la leva principal entre en contacto de frenado con la línea de seguridad;
- iv. La leva principal puede incluir una leva inercial la cual garantiza el frenado de la cuerda;

4. El dispositivo de detención de caídas puede ser remolcado de manera segura a través de la leva de remolque la cual se activa con independencia de la leva de frenado principal;

5 5. la leva de remolque está diseñada para desactivarse si es halada por pánico.

Aquellas personas versadas en la materia apreciarán que la invención descrita en el presente es susceptible de variación y modificaciones diferentes a aquellas descritas específicamente. Por ejemplo, la forma y la configuración del dispositivo de detención de caídas y sus componentes asociados pueden variar de aquellos descritos siempre y cuando funcione de conformidad con las características esenciales de la invención. El dispositivo de detención de caídas no necesariamente incluye la leva secundaria en cuyo caso funcionaría en el modo automático únicamente. Todas dichas variaciones y modificaciones deben ser consideradas dentro del alcance de la presente invención cuya naturaleza será determinada a partir de la descripción anterior.

Reivindicaciones

1. Un dispositivo de detención de caídas, el cual comprende:

Un cuerpo adaptado para acoplarse a un usuario a través de un acoplamiento, el cuerpo incluye un cuerpo base y una placa de cubierta móvil la cual en una posición abierta permite la unión del dispositivo de detención de caídas a una cuerda, el cuerpo base y la placa de cubierta juntos definen una apertura cerrada adaptada para retener el acoplamiento en la posición abierta;

Una palanca que incluye una leva principal, la palanca está acoplada de manera giratoria al cuerpo y está colocada para cooperar con el acoplamiento por lo cual durante el funcionamiento del dispositivo de detención de caídas el descenso del usuario hace que el acoplamiento entre en contacto con la palanca la cual gira para efectuar el movimiento de la leva principal para frenar la cuerda que está pasando a través del dispositivo de detención de caídas entre la leva principal y el cuerpo.

2. Un dispositivo de detención de caídas según ha sido definido en la reivindicación 1, en donde la placa de cubierta en una posición cerrada mantiene la retención del acoplamiento, el cuerpo base y la placa de cubierta incluyen ranuras que definen la apertura cerrada.

3. Un dispositivo de detención de caídas según ha sido definido en la reivindicación 2, en donde la palanca tiene un extremo abierto y está colocada en relación con la apertura cerrada con la placa de cubierta en la posición cerrada por lo cual el ascenso del usuario proporciona un contacto del acoplamiento con el cuerpo sin hacer contacto con la palanca, dicho contacto con el cuerpo únicamente es efectivo para efectuar el levantamiento del dispositivo de detención de caídas con independencia de la palanca y de la leva principal.

4. Un dispositivo de detención de caídas según ha sido definido en cualquiera de las reivindicaciones anteriores, el cual también comprende una leva inercial acoplada de manera giratoria a la palanca próxima a la leva principal y configurada en el descenso rápido del usuario para girar en contacto con la cuerda para iniciar el movimiento giratorio de la palanca para frenar la cuerda con la leva principal.

5. Un dispositivo de detención de caídas, el cual comprende:

Un cuerpo adaptado para acoplarse a un usuario a través de un acoplamiento;

Una palanca que incluye una leva principal, la palanca está acoplada de manera giratoria al cuerpo y está colocada para cooperar con el acoplamiento por lo cual durante el funcionamiento el descenso del usuario hace que el acoplamiento entre en contacto con la palanca la cual gira para efectuar el frenado de la cuerda que está pasando a través del dispositivo de detención de caídas entre la leva principal y el cuerpo;

Una leva inercial acoplada de manera giratoria a la palanca próxima a la leva principal y configurada en el descenso rápido del usuario para girar en contacto con la cuerda para iniciar el movimiento giratorio de la palanca para frenar la cuerda con la leva principal.

5 6. Un dispositivo de detención de caídas según ha sido definido en cualquiera de las reivindicaciones anteriores, el cual también comprende una leva de remolque acoplada de manera giratoria al cuerpo para proporcionar contacto con la palanca para girarla y liberar la leva principal asociada de la cuerda para permitir el remolque manual del dispositivo de detención de caídas a lo largo de la cuerda en su descenso.

10 7. Un dispositivo de detención de caídas según ha sido definido en la reivindicación 6, en donde la leva de remolque está configurada en relación con la palanca para desacoplarla de la palanca para permitir el frenado de la cuerda a través de la leva principal más allá de un ángulo de pivote predeterminado de la leva de remolque.

15 8. Un dispositivo de detención de caídas según ha sido definido en cualquiera de las reivindicaciones 6 o 7, en donde la leva de remolque se conecta a una línea de remolque la cual es halada de manera manual para girar la leva de remolque para permitir el remolque del dispositivo de detención de caídas.

20 9. Un dispositivo de detención de caídas según ha sido definido en la reivindicación 8, en donde la línea de remolque incluye un fusible mecánico el cual frena en una carga de tracción predeterminada en donde la leva de remolque está desactivada.

25 10. Un dispositivo de detención de caídas según ha sido definido en cualquiera de las reivindicaciones anteriores, el cual también comprende una leva secundaria conectada a la palanca por lo cual el agarre de la cuerda y el acoplamiento la una con la otra hace que la cuerda entre en contacto con la leva secundaria girando la palanca para promover el frenado de la cuerda entre la leva principal y el cuerpo.

30 11. Un dispositivo de detención de caídas según ha sido definido en la reivindicación 10, en donde la leva secundaria está conectada de manera giratoria a la palanca y desviada para mantener contacto con la cuerda para sostener el dispositivo de detención de caídas en una posición requerida a lo largo de la cuerda.

35 12. Un dispositivo de detención de caídas según ha sido definido en cualquiera de las reivindicaciones 10 u 11, el cual además comprende una cerradura de la leva secundaria conectada a la palanca y colocada para asegurar la leva secundaria en una posición retraída para permitir el movimiento de deslizamiento del dispositivo de detención de caídas en ambas direcciones a lo largo de la cuerda.

40 13. Un dispositivo de detención de caídas según ha sido definido en cualquiera de las reivindicaciones anteriores, el cual también comprende un elemento acelerador

acoplado de manera giratoria al cuerpo y adaptado para acoplar el acoplamiento para acelerar el contacto del acoplamiento con la palanca para el frenado acelerado de la cuerda con la leva principal.

- 5 14. Un dispositivo de detención de caídas según ha sido definido en la reivindicación 13, en donde el elemento acelerador está acoplado de manera operativa a un miembro de desviado el cual hace que el acoplamiento se mantenga en contacto con la palanca.
- 10 15. Un dispositivo de detención de caídas según ha sido definido en cualquiera de las reivindicaciones 2 o 3, en donde cuerpo está configurado con la placa de cubierta en una posición cerrada para alojar sustancialmente por lo menos la leva principal y la palanca.
- 15 16. Un dispositivo de detención de caídas según ha sido definido en la reivindicación 15, en donde el cuerpo incluye una leva invertida montada de manera móvil al cuerpo base para permitir únicamente el cierre de la placa de cubierta hacia la posición cerrada con el dispositivo de detención de caídas orientado correctamente en relación con la cuerda para garantizar el frenado en el descenso.
- 20 17. Un dispositivo de detención de caídas según ha sido definido en cualquiera de las reivindicaciones anteriores, en donde el dispositivo de detención de caídas está conectado de manera integral al acoplamiento.
- 25 18. Un dispositivo de detención de caídas según ha sido definido en cualquiera de las reivindicaciones anteriores, en donde el acoplamiento está en la forma de un conector giratorio.

ASSIGNMENT

NAME OF THE INVENTOR(S)

by means of this document and in consideration of the payment by the Assignee to the Assignor of a good and valuable consideration, assign(s) to

NAME OF THE ASSIGNEE

A Corporation organized under the laws of

GOVERNING LAWS OF THE ASSIGNEE

Domiciled in

DOMICILE OF THE ASSIGNEE

(hereinafter referred to as the "ASSIGNEE")., All my (our) rights, title and interest in and to my (our) invention for a new and useful improvement entitled and as fully set forth and described in:

NAME OF THE INVENTION

Contained in PCT International Application No.:

PCT INTERNATIONAL APPLICATION NO.

So far as the Republic of Colombia is concerned.

CESION

HWANG, Han Young

por medio de la presente y a cambio del pago de una contraprestación económica, cedo (cedemos) a

CAPITAL SAFETY GROUP (AUSTRALIA) PTY LIMITED

una Sociedad organizada bajo las leyes de

Australia

domiciliada en

New South Wales, Australia

(de ahora en adelante el "CESIONARIO")., todos mis (nuestros) derechos, título e interés sobre mi (nuestra) invención tal como describe en:

FALL ARRESTER

Contenida en la Solicitud Internacional PCT No.

PCT/AU2014/000635

En lo que concierne a la República de Colombia.

Place and date:

BALMAIN, AUSTRALIA 2016 JAN 05


Han Young Hwang

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PATENT COOPERATION TREATY

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Melbourne, Victoria 3000
Australia

PCT

NOTIFICATION OF TRANSMITTAL OF
INTERNATIONAL PRELIMINARY
REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Rule 71.1)

Date of mailing
(day/month/year) 25 May 2015

Applicant's or agent's file reference
1000221

IMPORTANT NOTIFICATION

International application No.
PCT/AU2014/000635

International filing date (day/month/year)
19 June 2014

Priority date (day/month/year)
28 June 2013

Applicant
CAPITAL SAFETY GROUP (AUSTRALIA) PTY LIMITED

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translations to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the *PCT Applicant's Guide*.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed invention is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

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PATENT COOPERATION TREATY
PCT
INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 1000221	FOR FURTHER ACTION		See Form PCT/IPEA/416
International application No. PCT/AU2014/000635	International filing date (<i>day/month/year</i>) 19 June 2014	Priority date (<i>day/month/year</i>) 28 June 2013	
International Patent Classification (IPC) or national classification and IPC A62B 35/00 (2006.01) A62B 1/06 (2006.01) A63B 29/02 (2006.01) A63B 27/00 (2006.01)			
Applicant CAPITAL SAFETY GROUP (AUSTRALIA) PTY LIMITED			
1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36. 2. This REPORT consists of a total of 4 sheets, including this cover sheet. 3. This report is also accompanied by ANNEXES, comprising: a. ☒ (<i>sent to the applicant and to the International Bureau</i>) a total of 15 sheets, as follows: ☒ sheets of the description, claims and/or drawings which have been amended and/or sheets containing rectifications authorized by this Authority, unless those sheets were superseded or cancelled, and any accompanying letters (see Rules 46.5, 66.8, 70.16, 91.2, and Section 607 of the Administrative Instructions). ☐ sheets containing rectifications not taken into account by this Authority because they were not available at the time when this Authority began to draw up this report, and any accompanying letters (Rules 66.4<i>bis</i>, 70.2(e), 70.16 and 91.2). ☐ Superseded sheets and any accompanying letters, where this Authority either considers that the superseding sheets contain an amendment that goes beyond the disclosure in the international application as filed, or the superseding sheets were not accompanied by a letter indicating the basis for the amendments in the application filed, as indicated in item 4 of Box No. I and the Supplemental Box (see Rule 70.16(b)). b. ☐ (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see paragraph 3<i>bis</i> of Annex C of the Administrative Instructions).			
4. This report contains indications relating to the following items: ☒ Box No. I Basis of the report ☐ Box No. II Priority ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability ☐ Box No. IV Lack of unity of invention ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement ☐ Box No. VI Certain documents cited ☐ Box No. VII Certain defects in the international application ☐ Box No. VIII Certain observations on the international application			
Date of submission of the demand 28 April 2015		Date of completion of this report 25 May 2015	
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA Email address: pct@ipaaustralia.gov.au		Authorised officer Yew-Seng How AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No. 0262832945	

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/AU2014/000635

Box No. I

Basis of the report

1. With regard to the language, this report has been established on the basis of:

☒

The international application in the language in which it was filed:

☐

A translation of the international application into , which is the language of a translation furnished for the purposes of:

☐

international search (under Rules 12.3(a) and 23.1 (b)).

☐

publication of the international application (under Rule 12.4(a)).

☐

international preliminary examination (Rules 55.2(a) and/or 55.3(a) and (b)).

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:☐

the international application as originally filed/furnished, or

☒

the description: pages 1, 4-11 , as originally filed/furnished

pages 2 , received by this Authority on 28 April 2015 with the letter of 28 April 2015

pages 3-3a , received by this Authority on 21 May 2015 with the letter of 21 May 2015

☒

the claims: pages , as originally filed/furnished

pages , as amended (together with any statement) under Article 19,

pages 12-14 , received by this Authority on 28 April 2015 with the letter of 28 April 2015

☒

the drawings: pages 1-13-13/13 , as originally filed/furnished

pages , received by this Authority on with the letter of

☐

a sequence listing - see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:☐

the description, pages

☐

the claims, Nos.

☐

the drawings, sheets/figs

☐

the sequence listing (specify):

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since either they are considered to go beyond the disclosure as filed, or they were not accompanied by a letter indicating the basis for the amendments in the application as filed, as indicated in the Supplemental Box (Rules 70.2(c) and (c-bis)):☐

the description, pages

☐

the claims, Nos.

☐

the drawings, sheets/figs

☐

the sequence listing (specify):

5. ☐ This report has been established:☐

taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rules 66.1(d-bis) and 70.2(e)).

☐

without taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rules 66.4bis and 70.2(e)).

6. With regard to top-up searches (Rules 66.1ter and 70.2(f)):

☒

A top-up search was carried out by this Authority on 18 May 2015.

☐

Additional relevant documents have been discovered during the top-up search.

☐

No top-up search was carried out by this Authority because it would serve no useful purpose.

7. ☐ Supplementary international search report(s) from Authority(ies) has/have been received and taken into account in establishing this report (Rule 45bis.8(b) and (c)).

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International Application No.
PCT/AU2014/000635

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims 1-18	YES
	Claims NONE	NO
Inventive step (IS)	Claims 1-18	YES
	Claims NONE	NO
Industrial applicability (IA)	Claims 1-18	YES
	Claims NONE	NO

2. CITATIONS AND EXPLANATIONS:

CITATIONS

D1: KONG Italy, Work Positioning: Back-Up #802 fall arrester, Product Information Sheets [retrieved on 23 July 2014] Retrieved from the Internet <URL:https://web.archive.org/web/20130310133553/http://www.kong.it/instructions/I_KONG_BACK_UP.pdf> published on 10 March 2013 as per Wayback Machine

D2: KONG Back Up 7/16 Rope Grab [retrieved on 23 July 2014] Retrieved from the Internet <URL:https://web.archive.org/web/20130326063028/http://www.patrollersupply.com/equipment/item_2611.asp> published on 26 March 2013 as per Wayback Machine

D3: KONG #802 Back-Up, published 17 March 2011, [retrieved on 23 July 2014] Retrieved from the Internet <URL:<http://www.usrigging.com/pdfs/Kong802Back-Up.pdf>>

D4: Camp Safety Goblin Fall-Arrest Device Technical Information Sheet, published 27 September 2012, [retrieved on 23 July 2014] Retrieved from the Internet <URL:<http://www.abaris.co.uk/back-up-devices/camp-goblin-fall-arrester.htm>>

D5: US 5316103 A (BELL et al) 31 May 1994

D6: US 6056086 A (GORTAN et al) 02 May 2000

D7: US 5860493 A (CHERPITEL) 19 January 1999

D8: IRATA NEWS, Back-up tests Lithuania interim report, published 22 May 2012, [retrieved on 23 July 2014] retrieved from the Internet <URL:<http://www.irata.org/pdf%20downloads/100kg%20Abseil%20Position%20Drop%20Test%20V3.pdf>>

D9: Safetec Duck R, published 27 June 2013, [retrieved on 23 July 2014] retrieved from the Internet <URL:<http://www.access-techniques.com/stec-duck-r-the-new-shunt/>>

D10: ISC: International Safety Components Ltd RED Rope Brab Backup device w/ Popper tow cord <URL:https://web.archive.org/web/20130218232812/http://www.patrollersupply.com/equipment/item_4140.asp> published on 18 February 2013 as per Wayback Machine.

D11: US 5934408 A (FLUX) 10 August 1999

D12: US 2011/0186388 A1 (SUDALE et al) 04 August 2011

NOVELTY (N)

Claims 1-18 meet the criteria set forth in PCT Article 33(2) for novelty. The prior art published before the priority date does not disclose a fall arrester comprising a body including a base body and a moveable cover plate, the base body and the cover plate together defining a closed opening adapted to retain a coupling in the open position, and a lever including a primary cam whereby the coupling is urged into contact with the lever which pivots to effect movement of the primary cam (claim 1); a fall arrester comprising a body, and a lever including a primary cam whereby the coupling is urged into contact with the lever which pivots to effect braking of rope between the primary cam and the body, and an inertia cam pivotally coupled to the lever proximate the primary cam to initiate pivotal movement of the lever for braking of the rope with the primary cam (**claim 5**). Appended **claims 2-4, 6-18** add further features to those defined in either **claim 1** or **claim 5**, and therefore these claims are also novel.

Therefore the subject matter of these claims is new and meets the requirements of Article 33(2) of the PCT with regard to novelty.

INVENTIVE STEP (IS)

Claims 1-18 meet the criteria set forth in PCT Article 33(3) with regard to the requirement of Inventive Step. The prior art does not obviously suggest to a person skilled in the art the features of a fall arrester comprising a body including a base body and a moveable cover plate, the base body and the cover plate together defining a closed opening adapted to retain a coupling in the open position, and a lever including a primary cam whereby the coupling is urged into contact with the lever which pivots to effect movement of the primary cam (**claim 1**); a fall arrester comprising a body, and a lever including a primary cam whereby the coupling is urged into contact with the lever which pivots to effect braking of rope between the primary cam and the body, and an inertia cam pivotally coupled to the lever proximate the primary cam to initiate pivotal movement of the lever for braking of the rope with the primary cam (**claim 5**).

D1-D3 are the closest prior art, whereby the fall arrester comprises a base body, a moveable cover plate and a lever including a primary cam. However, the fall arrester of **D1-D3** does not provide any motivation for or suggestion to a person skilled in the art to modify the arrangements of the lever, the primary cam, the coupling and the moveable plate to obtain a fall arrester whereby the base body and the cover plate together defining a closed opening adapted to retain a coupling in the open position (**claim 1**); a fall arrester whereby an inertia cam is pivotally coupled to the lever proximate the primary cam to initiate pivotal movement of the lever for braking of the rope with the primary cam (**claim 5**).

Appended **claims 2-4, 6-18** embody further aspects of the inventive concept and therefore also meet the requirements of Article 33(3) of the PCT.

Therefore the subject matter of these claims is not obvious and meets the requirements of Article 33(3) of the PCT with regard to inventive step.

INDUSTRIAL APPLICABILITY (IA)

The invention defined in the claims is considered to meet the requirements of Industrial Applicability under Article 33(4) of the PCT because it can be made by, or used in, industry.



28 April 2015

Telephone Contact : David Clark
Speed Dial 527

The Commissioner of Patents
IP Australia
PO Box 200
WODEN ACT 2606

Dear Madam

Capital Safety Group (Australia) Pty Limited
International Patent Application PCT/AU2014/000635
Title FALL ARRESTER
Our Ref 1000221

We refer to an International Search Report (ISR) and Written Opinion dated 30 July 2014 having issued for this application.

We enclose a Demand together with a Statement of Amendments which summarises amendments to the specification and in particular the claims. These amendments are in response to the ISR and Written Opinion and are intended to more clearly define the invention and distinguish from the referenced prior art.

It should be noted that the claim set is limited to two independent claims, namely:

1. Claim 1 which is further limited to the features of dependent claims 12 (in part) and 18;
2. Claim 5 which includes the features of claims 1 and 2 as published.

Claim 1 as amended distinguishes from the referenced prior art insofar as the fall arrester as now claimed defines:

1. a body including a base body and a moveable cover plate which in an open position provides for attachment of the fall arrester to a rope, the base body and the cover plate together defining a closed opening adapted to retain the coupling in the open position;
2. a lever including a primary cam, the lever pivotally coupled to the body and arranged to co-operate with a coupling whereby in operation of the fall arrester descent of the user urges the coupling into contact with the lever which pivots to effect movement of the primary cam for braking of the rope passing through the fall arrester between the primary cam and the body.

The reference prior art fails to disclose a fall arrester having a base body and cover plate together defining a closed opening adapted to retain the coupling in the open

position which allows for attachment of the fall arrester to a rope. For example, the back-up device of D1 to D3 when in the open position for insertion of the rope into the back-up device does not provide a closed opening which retains the carabiner. This characterising feature of the present invention as now claimed is important in avoiding a "dropped objects hazard", see for example the present specification at page 1 lines 23 to 31.

The referenced prior art also fails to disclose a lever including a primary cam which functions as now claimed. For example, the back-up device of D1 to D3 fails to disclose a primary cam included in a lever which cooperates with a coupling to effect movement of the primary cam for braking of the rope. Rather, the carabiner of D3 cooperates with to "slightly engage the larger lever against the rope to keep the Back-Up from sliding under its own weight when there is no load on it". The smaller of the two levers of D1 to D3 provides braking of the back-up device along the rope independent of the larger lever and without operating with the carabiner or other couplings. The Back-Up device of D1 to D3 is admitted in the applicant's specification under the "Background to the Invention" at page 1 lines 23 to 31.

The combination of features as now defined in claim 1 are important in operation of the fall arrester. This is emphasised throughout the specification where, for example at:

1. page 5 lines 23 to 27 "The base body 20 together with the cover plate 22 define a closed opening 26 designed to retain the coupling. The base body 20 and the cover plate 22 are slotted so that the opening 26 is maintained for connection to the coupling with the cover plate 22 both closed and open as illustrated in figures 4A and 4B respectively";
2. page 8 lines 5 to 7 "The lever 16 is open-ended so that it is only effective in pivoting of the associated cam 18 on contact with the coupling in rapid descent only";
3. page 8 lines 28 and 29 "In a safe environment, the fall arrester 10 which is integrally connected to a coupling is connected to a user's harness via a lanyard an carabiner" and page 10 lines 17 and 18 where "The fall arrester is retained on the coupling or carabiner and lanyard whilst being attached or detached from the safety line thus eliminating a drop hazard".

In relation to independent claim 5 we note that the authorised officer is of the opinion that claim 2 as published being limited to "an inertial cam pivotally coupled to the lever approximate the primary cam" is novel in light of the referenced prior art. The combination of features as now defined by independent claim 5 is important in operation of the claimed invention. The specification as published emphasises these characterising features where, for example:

1. at page 9 lines 22 to 30 "The inertial 130 is configured on rapid descent of a user to pivot into contact with the rope 120 as shown in figure 11B. The inertial cam 130 contacts the rope and thus initiates pivotal movement of the lever 160 and the associated primary cam 180 for braking of the rope 120 with the primary cam 180";
2. at page 10 lines 1 to 5 "In the event of rapid descent which may be associated with a panic grip, the inertial cam 130 as shown in figure 12B is swung outward of the primary cam 180 due to the inertia difference in the system. The inertial

28 April 2015

-3-

cam 130 includes teeth such as 170 designed to contact and pick up the rope 120 and thus initiate locking of the primary cam 180".

Favourable reconsideration of this application is requested.

Respectfully
PHILLIPS ORMONDE FITZPATRICK

A handwritten signature in black ink, appearing to read "Graham H. Curran". The signature is fluid and cursive, with a large initial 'G'.

DGC

It is to be understood that any acknowledgement of prior art in this specification is not to be taken as an admission that this prior art forms part of the common general knowledge.

5 **Summary of the Invention**

According to a first aspect of the present invention there is provided a fall arrester comprising:

10 a body adapted to couple to a user via a coupling, the body including a base body and a moveable cover plate which in an open position provides for attachment of the fall arrester to a rope, the base body and the cover plate together defining a closed opening adapted to retain the coupling in the open position;

15 a lever including a primary cam, the lever pivotally coupled to the body and arranged to cooperate with the coupling whereby in operation of the fall arrester descent of the user urges the coupling into contact with the lever which pivots to effect movement of the primary cam for braking of the rope passing through the fall arrester between the primary cam and the body.

20 Preferably the cover plate in a closed position maintains retention of the coupling, the base body and the cover plate including slots which define the closed opening. More preferably the lever is open-ended and positioned relative to the closed opening with the cover plate in the closed position whereby ascent of the user provides contact of the coupling with the body without contacting the lever, said contact with the body only being effective in to effect raising of the fall arrestor independent of the lever and the primary cam.

25 Preferably the fall arrester also comprises an inertial cam pivotally coupled to the lever proximate the primary cam and configured on rapid descent of the user to pivot into contact with the rope to initiate pivotal movement of the lever for braking of the rope with the primary cam.

30 According to a second aspect of the invention there is provided a fall arrester comprising:

a body adapted to couple to a user via a coupling;

Claims

1. A fall arrester comprising:
- 5 a body adapted to couple to a user via a coupling, the body including a base body and a moveable cover plate which in an open position provides for attachment of the fall arrester to a rope, the base body and the cover plate together defining a closed opening adapted to retain the coupling in the open position;
- 10 a lever including a primary cam, the lever pivotally coupled to the body and arranged to cooperate with the coupling whereby in operation of the fall arrester descent of the user urges the coupling into contact with the lever which pivots to effect movement of the primary cam for braking of the rope passing through the fall arrester between the primary cam and the body.
- 15 2. A fall arrester as defined in claim 1 wherein the cover plate in a closed position maintains retention of the coupling, the base body and the cover plate including slots which define the closed opening.
- 20 3. A fall arrester as defined in claim 2 wherein the lever is open-ended and positioned relative to the closed opening with the cover plate in the closed position whereby ascent of the user provides contact of the coupling with the body without contacting the lever, said contact with the body only being effective in to effect raising of the fall arrestor independent of the lever and the primary cam.
- 25 4. A fall arrester as defined in any one of the preceding claims also comprising an inertial cam pivotally coupled to the lever proximate the primary cam and configured on rapid descent of the user to pivot into contact with the rope to initiate pivotal movement of the lever for braking of the rope with the primary cam.
- 30 5. A fall arrester comprising:
- a body adapted to couple to a user via a coupling;

a lever including a primary cam, the lever pivotally coupled to the body and arranged to cooperate with the coupling whereby in operation descent of the user urges the coupling into contact with the lever which pivots to effect braking of rope passing through the fall arrester between the primary cam and the body

an inertial cam pivotally coupled to the lever proximate the primary cam and configured on rapid descent of the user to pivot into contact with the rope to initiate pivotal movement of the lever for braking of the rope with the primary cam.

10

6. A fall arrester as defined in any one of the preceding claims also comprising a tow cam pivotally coupled to the body to provide contact with the lever to pivot it and release the associated primary cam from the rope to permit manual towing of the fall arrester along the rope on its descent.

15

7. A fall arrester as defined in claim 6 wherein the tow cam is configured relative to the lever to disengage from the lever to permit braking of the rope via the primary cam beyond a predetermined pivot angle of the tow cam.

20

8. A fall arrester as defined in either of claims 6 or 7 wherein the tow cam connects to a tow line which is manually pulled to pivot the tow cam to allow towing of the fall arrester.

25

9. A fall arrester as defined in claim 8 wherein the tow line includes a mechanical fuse which breaks at a predetermined pull load wherein the tow cam is deactivated.

30

10. A fall arrester as defined in any one of the preceding claims also comprising a secondary cam connected to the lever whereby gripping the rope and the coupling toward one another urges the rope into contact with the secondary cam pivoting the lever to promote braking of the rope between the primary cam and the body.

11. A fall arrester as defined in claim 10 wherein the secondary cam is pivotally connected to the lever and biased to maintain contact with the rope to hold the fall arrester at a required position along the rope.
- 5 12. A fall arrester as defined in either of claims 10 or 11 further comprising a secondary cam lock connected to the lever and arranged to lock the secondary cam in a retracted position to permit sliding movement of the fall arrester in both directions along the rope.
- 10 13. A fall arrester as defined in any one of the preceding claims also comprising an accelerator element pivotally coupled to the body and adapted to engage the coupling to accelerate contact of the coupling with the lever for accelerated braking of the rope with the primary cam.
- 15 14. A fall arrester as defined in claim 13 wherein the accelerator element is operatively coupled to a biasing member which urges the coupling to maintain contact with the lever.
- 20 15. A fall arrester as defined in either of claims 2 or 3 wherein the body is configured with the cover plate in the closed position to substantially house at least the primary cam and the lever.
- 25 16. A fall arrester as defined in claim 15 wherein the body includes an inverted cam movably mounted to the base body to only permit closure of the cover plate into the closed position with the fall arrester correctly oriented relative to the rope to ensure braking on descent.
- 30 17. A fall arrester as defined in any one of the preceding claims wherein the fall arrester is integrally connected to the coupling.
18. A fall arrester as defined in any one of the preceding claims wherein the coupling is in the form of a swivel connector.

It is to be understood that any acknowledgement of prior art in this specification is not to be taken as an admission that this prior art forms part of the common general knowledge.

5 Summary of the Invention

According to a first aspect of the present invention there is provided a fall arrester comprising:

10 a body adapted to couple to a user via a coupling, the body including a base body and a moveable cover plate which in an open position provides for attachment of the fall arrester to a rope, the base body and the cover plate together defining a closed opening adapted to retain the coupling in the open position;

15 a lever including a primary cam, the lever pivotally coupled to the body and arranged to cooperate with the coupling whereby in operation of the fall arrester descent of the user urges the coupling into contact with the lever which pivots to effect movement of the primary cam for braking of the rope passing through the fall arrester between the primary cam and the body.

20 Preferably the cover plate in a closed position maintains retention of the coupling, the base body and the cover plate including slots which define the closed opening. More preferably the lever is open-ended and positioned relative to the closed opening with the cover plate in the closed position whereby ascent of the user provides contact of the coupling with the body without contacting the lever, said contact with the body only being effective in to effect raising of the fall arrestor independent of the lever and the primary cam.

25 Preferably the fall arrester also comprises an inertial cam pivotally coupled to the lever proximate the primary cam and configured on rapid descent of the user to pivot into contact with the rope to initiate pivotal movement of the lever for braking of the rope with the primary cam.

30 According to a second aspect of the invention there is provided a fall arrester comprising:

a body adapted to couple to a user via a coupling;

Claims

1. A fall arrester comprising:

5 | a body adapted to couple to a user via a coupling, the body including a base body and a moveable cover plate which in an open position provides for attachment of the fall arrester to a rope, the base body and the cover plate together defining a closed opening adapted to retain the coupling in the open position;

10 | a lever including a primary cam, the lever pivotally coupled to the body and arranged to cooperate with the coupling whereby in operation of the fall arrester descent of the user urges the coupling into contact with the lever which pivots to effect movement of the primary cam for braking of the rope passing through the fall arrester between the primary cam and the body.

15 | 2. A fall arrester as defined in claim 1 wherein the cover plate in a closed position maintains retention of the coupling, the base body and the cover plate including slots which define the closed opening.

20 | 3. A fall arrester as defined in claim 2 wherein the lever is open-ended and positioned relative to the closed opening with the cover plate in the closed position whereby ascent of the user provides contact of the coupling with the body without contacting the lever, said contact with the body only being effective in to effect raising of the fall arrestor independent of the lever and the primary cam.

25 | 4. A fall arrester as defined in any one of the preceding claims also comprising an inertial cam pivotally coupled to the lever proximate the primary cam and configured on rapid descent of the user to pivot into contact with the rope to initiate pivotal movement of the lever for braking of the rope with the primary cam.

30 |

5. A fall arrester comprising:

a body adapted to couple to a user via a coupling;

- 5 a lever including a primary cam, the lever pivotally coupled to the body and arranged to cooperate with the coupling whereby in operation descent of the user urges the coupling into contact with the lever which pivots to effect braking of rope passing through the fall arrester between the primary cam and the body
- 10 an inertial cam pivotally coupled to the lever proximate the primary cam and configured on rapid descent of the user to pivot into contact with the rope to initiate pivotal movement of the lever for braking of the rope with the primary cam.
- 15 6. A fall arrester as defined in any one of the preceding claims also comprising a tow cam pivotally coupled to the body to provide contact with the lever to pivot it and release the associated primary cam from the rope to permit manual towing of the fall arrester along the rope on its descent.
- 20 7. A fall arrester as defined in claim 6 wherein the tow cam is configured relative to the lever to disengage from the lever to permit braking of the rope via the primary cam beyond a predetermined pivot angle of the tow cam.
- 25 8. A fall arrester as defined in either of claims 6 or 7 wherein the tow cam connects to a tow line which is manually pulled to pivot the tow cam to allow towing of the fall arrester.
- 30 9. A fall arrester as defined in claim 8 wherein the tow line includes a mechanical fuse which breaks at a predetermined pull load wherein the tow cam is deactivated.
10. A fall arrester as defined in any one of the preceding claims also comprising a secondary cam connected to the lever whereby gripping the rope and the coupling toward one another urges the rope into contact with the secondary cam pivoting the lever to promote braking of the rope between the primary cam and the body.

11. A fall arrester as defined in claim 10 wherein the secondary cam is pivotally connected to the lever and biased to maintain contact with the rope to hold the fall arrester at a required position along the rope.
12. A fall arrester as defined in either of claims 10 or 11 further comprising a secondary cam lock connected to the lever and arranged to lock the secondary cam in a retracted position to permit sliding movement of the fall arrester in both directions along the rope.
13. A fall arrester as defined in any one of the preceding claims also comprising an accelerator element pivotally coupled to the body and adapted to engage the coupling to accelerate contact of the coupling with the lever for accelerated braking of the rope with the primary cam.
14. A fall arrester as defined in claim 13 wherein the accelerator element is operatively coupled to a biasing member which urges the coupling to maintain contact with the lever.
15. A fall arrester as defined in either of claims 2 or 3 wherein the body is configured with the cover plate in the closed position to substantially house at least the primary cam and the lever.
16. A fall arrester as defined in claim 15 wherein the body includes an inverted cam movably mounted to the base body to only permit closure of the cover plate into the closed position with the fall arrester correctly oriented relative to the rope to ensure braking on descent.
17. A fall arrester as defined in any one of the preceding claims wherein the fall arrester is integrally connected to the coupling.
18. A fall arrester as defined in any one of the preceding claims wherein the coupling is in the form of a swivel connector.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 1000221	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/AU2014/000635	International filing date (<i>day/month/year</i>) 19 June 2014	(Earliest) Priority Date (<i>day/month/year</i>) 28 June 2013
Applicant CAPITAL SAFETY GROUP (AUSTRALIA) PTY LIMITED		
This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau. This international search report consists of a total of 7 sheets. ☐ It is also accompanied by a copy of each prior art document cited in this report.		
1. Basis of the report a. With regard to the language, the international search was carried out on the basis of: ☒ The international application in the language in which it was filed. ☐ A translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)). b. ☐ This international search report has been established taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rule 43.6bis(a)). c. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, see Box No. I. 2. ☐ Certain claims were found unsearchable (See Box No. II). 3. ☐ Unity of invention is lacking (See Box No. III). 4. With regard to the title, ☒ the text is approved as submitted by the applicant. ☐ the text has been established by this Authority to read as follows: 5. With regard to the abstract, ☐ the text is approved as submitted by the applicant. ☒ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority. 6. With regard to the drawings, a. the figure of the drawings to be published with the abstract is Figure No. 3A ☒ as suggested by the applicant. ☐ as selected by this Authority, because the applicant failed to suggest a figure. ☐ as selected by this Authority, because this figure better characterizes the invention. b. ☐ none of the figures is to be published with the abstract.		

Box No. IV Text of the Abstract (Continuation of item 5 of the first sheet)

The present invention relates broadly to a fall arrester 10 attached to a user's harness via a coupling arrangement 6. The fall arrester 10 is designed to be attached to a backup rope or safety line 12. The fall arrester 10 comprises a body 14, and a lever 16 pivotally coupled to the body 14. The lever 16 includes a primary cam 18 which is arranged to co-operate with the coupling arrangement 6. In operation, descent of the user urges the coupling arrangement 6 into contact with the lever 16 which pivots to effect braking of the safety line 12 between the body 14 and the primary cam 18.

Some preferred embodiments include an inertial cam to initiate pivotal movement of the lever for braking of the rope with the primary cam; a tow cam connected to a tow line which includes a mechanical fuse; a secondary cam connected to the lever whereby panic gripping the rope and the coupling toward one another promotes braking of the rope between the primary cam and the body; an accelerator element to accelerate contact of the coupling with the lever; and an inverted cam to ensure correct orientation of the fall arrester.

INTERNATIONAL SEARCH REPORT

 International application No.
PCT/AU2014/000635

A. CLASSIFICATION OF SUBJECT MATTER

A62B 35/00 (2006.01) A62B 1/06 (2006.01) A63B 29/02 (2006.01) A63B 27/00 (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)

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)

EPODOC, WPI; IPC/CPC Marks A62B1, A62B35, A63B27, A63B29 and Keywords: fall arrester, descender, grab, backup, rope, cord, cable, cam, lever, pivot, secondary, inertia, tow, tug and similar terms.

TXTUS0, TXTUS1, TXTUS2, TXTUS3, TXTUS4, TXTUS5, TXTEP1, TXTGB1, TXTWO1, TXTAU1, TXTCA1, TXTSG1 and Keywords: fall arrester, descender, grab, backup, rope, cord, cable, cam, lever, pivot, secondary, tow, tug and similar terms.

Espacenet/Google Patents/Google: Inventor/Applicant searches conducted, and keywords: fall arrester, backup, cam/lever/rope and similar terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	Documents are listed in the continuation of Box C	



Further documents are listed in the continuation of Box C



See patent family annex

* "A"	Special categories of cited documents: document defining the general state of the art which is not considered to be of particular relevance	"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
"E"	earlier application or patent but published on or after the international filing date	"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
"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)	"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
"O"	document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family
"P"	document published prior to the international filing date but later than the priority date claimed		
Date of the actual completion of the international search 30 July 2014		Date of mailing of the international search report 30 July 2014	
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA Email address: pct@ipaustalia.gov.au		Authorised officer Yew-Seng How AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No. 0262832945	

INTERNATIONAL SEARCH REPORT		International application No.
C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		PCT/AU2014/000635
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	KONG Italy, Work Positioning: Back-Up #802 fall arrester, Product Information Sheets [retrieved on 23 July 2014] Retrieved from the Internet <URL: https://web.archive.org/web/20130310133553/http://www.kong.it/instructions/I_KONG_BACK_UP.pdf > published on 10 March 2013 as per Wayback Machine Pgs 26-33, 82-90 Pgs 26-33, 82-90	1-5, 7-9, 11-12, 16-22 6, 10
X Y	KONG Back Up 7/16 Rope Grab [retrieved on 23 July 2014] Retrieved from the Internet <URL: https://web.archive.org/web/20130326063028/http://www.patrollersupply.com/equipment/item_2611.asp > published on 26 March 2013 as per Wayback Machine Whole document Whole document	1-5, 7-9, 11-12, 16-22 6, 10
X Y	KONG #802 Back-Up, published 17 March 2011, [retrieved on 23 July 2014] Retrieved from the Internet <URL: http://www.usrigging.com/pdfs/Kong802Back-Up.pdf > Whole document Whole document	1-5, 7-9, 11-12, 16-22 6, 10
X	Camp Safety Goblin Fall-Arrest Device Technical Information Sheet, published 27 September 2012, [retrieved on 23 July 2014] Retrieved from the Internet <URL: http://www.abaris.co.uk/back-up-devices/camp-goblin-fall-arrester.htm > Whole document	1-2, 11, 18-19, 21-22
X	US 5316103 A (BELL et al) 31 May 1994 Figs 1-6; Col 5 Lines 27-46	1-2, 11, 18-19, 21-22
X	US 6056086 A (GORTAN et al) 02 May 2000 Figs 1-4; Col 4 Lines 17-19, 56-60	1-2, 11, 18-19, 21-22
X	US 5860493 A (CHERPITEL) 19 January 1999 Figs 1-17; Col 3 Lines 12-15, Col 4 Lines 3-7, Col 5 Lines 12-14	1-2, 11, 18-19, 21-22
X Y	IRATA NEWS, Back-up tests Lithuania interim report, published 22 May 2012, [retrieved on 23 July 2014] retrieved from the Internet <URL: http://www.irata.org/pdf/%20downloads/100kg%20Abseil%20Position%20Drop%20Test%20V3.pdf > Section on S.Tec Duck R Section on S.Tec Duck R	1-5, 7-9, 11, 18-22 6, 10
X Y	Safetec Duck R, published 27 June 2013, [retrieved on 23 July 2014] retrieved from the Internet <URL: http://www.access-techniques.com/stec-duck-r-the-new-shunt/ > Whole document Whole document	1-5, 7-9, 11, 18-22 6, 10
X Y	ISC: International Safety Components Ltd RED Rope Brab Backup device w/ Popper tow cord <URL: https://web.archive.org/web/20130218232812/http://www.patrollersupply.com/equipment/item_4140.asp > published on 18 February 2013 as per Wayback Machine. Whole document Whole document	1-2, 11, 18-19, 21-22 6, 10
X	US 5934408 A (FLUX) 10 August 1999 Figs 5-8; Col 1 Lines 46-47, Col 5 Line 29 - Col 6 Line 37	1-2, 11, 13-15, 18-19, 21-22
Form PCT/ISA/210 (fifth sheet) (July 2009)		

INTERNATIONAL SEARCH REPORT		International application No.	
Information on patent family members		PCT/AU2014/000635	
This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.			
Patent Document/s Cited in Search Report		Patent Family Member/s	
Publication Number	Publication Date	Publication Number	Publication Date
US 5316103 A	31 May 1994	CA 2113944 A1	23 Jul 1994
US 6056086 A	02 May 2000	AU 3698397 A	09 Feb 1998
		AU 729685 B2	08 Feb 2001
		BR 9702343 A	28 Dec 1999
		CA 2231722 A1	22 Jan 1998
		CN 1197401 A	28 Oct 1998
		EP 0859648 A1	26 Aug 1998
		EP 0859648 B1	25 Jun 2003
		FR 2751233 A1	23 Jan 1998
		FR 2751233 B1	09 Oct 1998
		JP H11512958 A	09 Nov 1999
		JP 3262279 B2	04 Mar 2002
		PL 325518 A1	03 Aug 1998
		PL 184120 B1	30 Sep 2002
		WO 9802210 A1	22 Jan 1998
US 5860493 A	19 January 1999	CA 2198027 A1	19 Aug 1998
		EP 0752255 A1	08 Jan 1997
		EP 0752255 B1	29 Nov 2000
		EP 0752255 B2	30 Jun 2004
		FR 2736273 A1	10 Jan 1997
US 5934408 A	10 August 1999	AU 693602 B2	02 Jul 1998
		AU 3525495 A	09 Apr 1996
Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.			

INTERNATIONAL SEARCH REPORT Information on patent family members		International application No. PCT/AU2014/000635	
This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.			
Patent Document/s Cited in Search Report		Patent Family Member/s	
Publication Number	Publication Date	Publication Number	Publication Date
		CA 2200211 A1	28 Mar 1996
		EP 0782469 A1	09 Jul 1997
		EP 0782469 B1	23 Dec 1998
		GB 2293193 A	20 Mar 1996
		JP H10511011 A	27 Oct 1998
		WO 9609089 A1	28 Mar 1996
US 2011/0186388 A1	04 August 2011	CA 2735381 A1	11 Mar 2010
		EP 2326391 A1	01 Jun 2011
		WO 2010026201 A1	11 Mar 2010
End of Annex			
Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001. Form PCT/ISA/210 (Family Annex)(July 2009)			

PATENT COOPERATION TREATY

From the:
INTERNATIONAL SEARCHING AUTHORITY

To:

PHILLIPS ORMONDE FITZPATRICK
LEVEL 21, 22 & 23
367 Collins Street
Melbourne, Victoria 3000
Australia

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing (*day/month/year*)
30 July 2014

Applicant's or agent's file reference
1000221

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/AU2014/000635

International filing date (*day/month/year*)
19 June 2014

Priority date (*day/month/year*)
28 June 2013

International Patent Classification (IPC) or both national classification and IPC
A62B 35/00 (2006.01) A62B 1/06 (2006.01) A63B 29/02 (2006.01) A63B 27/00 (2006.01)

Applicant
CAPITAL SAFETY GROUP (AUSTRALIA) PTY LIMITED

1. This opinion contains indications relating to the following items:

- | | |
|---|---|
| ☒ Box No. I | Basis of the opinion |
| ☐ Box No. II | Priority |
| ☐ Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| ☐ Box No. IV | Lack of unity of invention |
| ☒ Box No. V | Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement |
| ☐ Box No. VI | Certain documents cited |
| ☐ Box No. VII | Certain defects in the international application |
| ☐ Box No. VIII | Certain observations on the international application |

Apr. 28, 2015
Article 34 Amendment
D

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA

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AUSTRALIA
Email address: pct@ipaustalia.gov.au

Date of completion of this opinion
30 July 2014

Authorised Officer

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Telephone No. 0262832945

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/AU2014/000635

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - ☒ The international application in the language in which it was filed
 - ☐ A translation of the international application into, , which is the language of a translation furnished for the purposes of international search (under Rules 12.3(a) and 23.1(b)).
2. ☐ This opinion has been established taking into account **the rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished:
 - a. (means)
 - ☐ on paper
 - ☐ in electronic form
 - b. (time)
 - ☐ in the international application as filed
 - ☐ together with the international application in electronic form
 - ☐ subsequently to this Authority for the purposes of search
4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International Application No.

PCT/AU2014/000635

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims 2-10, 12-17, 20	YES
	Claims 1, 11, 18-19, 21-22	NO
Inventive step (IS)	Claims NONE	YES
	Claims 1-22	NO
Industrial applicability (IA)	Claims 1-22	YES
	Claims NONE	NO

2. CITATIONS AND EXPLANATIONS:

CITATIONS

D1: KONG Italy, Work Positioning: Back-Up #802 fall arrester, Product Information Sheets [retrieved on 23 July 2014] Retrieved from the Internet <URL:https://web.archive.org/web/20130310133553/http://www.kong.it/instructions/I_KONG_BACK_UP.pdf> published on 10 March 2013 as per Wayback Machine

D2: KONG Back Up 7/16 Rope Grab [retrieved on 23 July 2014] Retrieved from the Internet <URL:https://web.archive.org/web/20130326063028/http://www.patrollersupply.com/equipment/item_2611.asp> published on 26 March 2013 as per Wayback Machine

D3: KONG #802 Back-Up, published 17 March 2011, [retrieved on 23 July 2014] Retrieved from the Internet <URL:<http://www.usrigging.com/pdfs/Kong802Back-Up.pdf>>

D4: Camp Safety Goblin Fall-Arrest Device Technical Information Sheet, published 27 September 2012, [retrieved on 23 July 2014] Retrieved from the Internet <URL:<http://www.abaris.co.uk/back-up-devices/camp-goblin-fall-arrester.htm>>

D5: US 5316103 A (BELL et al) 31 May 1994

D6: US 6056086 A (GORTAN et al) 02 May 2000

D7: US 5860493 A (CHERPITEL) 19 January 1999

D8: IRATA NEWS, Back-up tests Lithuania interim report, published 22 May 2012, [retrieved on 23 July 2014] retrieved from the Internet <URL:<http://www.irata.org/pdf/%20downloads/100kg%20Abseil%20Position%20Drop%20Test%20V3.pdf>>

D9: Safetec Duck R, published 27 June 2013, [retrieved on 23 July 2014] retrieved from the Internet <URL:<http://www.access-techniques.com/stec-duck-r-the-new-shunt/>>

D10: ISC: International Safety Components Ltd RED Rope Brab Backup device w/ Popper tow cord <URL:https://web.archive.org/web/20130218232812/http://www.patrollersupply.com/equipment/item_4140.asp> published on 18 February 2013 as per Wayback Machine.

D11: US 5934408 A (FLUX) 10 August 1999

D12: US 2011/0186388 A1 (SUDALE et al) 04 August 2011

NOVELTY (N)

Claims 1, 11, 18-19, 21-22 are not novel.

Claims 1, 11, 18-19, 21-22 are not novel in view of **D1** as follow:

Claim 1: D1 (See product information from Kong Italy) discloses:

A fall arrester comprising:

a body adapted to couple to a user via a coupling;

a lever including a primary cam, the lever pivotally coupled to the body and arranged to cooperate with the coupling whereby in operation descent of the user urges the coupling into contact with the lever which pivots to effect braking of rope passing through the fall arrester between the primary cam and the body.

Claim 11: see closed opening of the body adapted to retain the coupling.

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Claims 18-19: see base body and movable cover plate which provides for attachment of the fall arrester to the rope; primary cam and lever are housed in the body when the cover plate is closed.

Claim 21: see fall arrester integrally connected to the coupling.

Claim 22: D1: Fig 3: see swivel connection of the coupling.

D2-D3 similarly disclose the subject matter of claims **1, 11, 18-19, 21**.

Claims 1, 18, 21 are also not novel in view of **D4** (See product information of Goblin fall-arrest device), which similarly discloses a fall arrester comprising a body, a coupling, a primary cam, a lever, and similar braking operation on the rope; a movable cover plate; and integral connection to a coupling. Similar objections also apply to **D5** (see cover plate (28); coupling (24)).

Claims 1, 21 are also not novel in view of **D6-D9**, which similarly disclose a fall arrester comprising a body, a coupling, a primary cam, a lever, and similar braking operation on the rope; and inherently discloses integral connection to a coupling.

Therefore **claims 1, 11, 18-19, 21-22** are not novel and do not comply with the requirements of Article 33(2) of the PCT.

None of the cited art discloses the subject matter of an inertia cam pivotally coupled to the lever (**claim 2**); a tow cam pivotally couple to the body to pivot the lever (**claims 3-10**); contact of the coupling with the body independent of the lever (**claim 12**); a secondary cam connected to the lever to promote rope brake when the rope and the coupling are grabbed (**claims 13-15**); an accelerator element (**claims 16-17**); an inverted cam (**claim 20**).

Therefore **claims 2-10, 12-17, 20** are novel and meet the requirements of Article 33(2) of the PCT with regard to novelty.

INVENTIVE STEP (IS)

Claims 1-22 lack an inventive step.

Claims 1, 11, 18-19, 21-22 lack novelty and are therefore considered to lack an inventive step in view of the disclosures in documents **D1-D9** as previously shown.

In addition, features of **claim 11** (body with closed opening), **claims 18-19** (movable cover plate; housing of cam and lever in the body), **claim 22** (swivel coupling) are well-known common general knowledge in the art or design choices that are typical in devices of this type and which would be available to a person skilled in the art, and these claims lack an inventive step when compared (in view of common general knowledge in the art) to each of the documents **D2-D3** (claim 22), **D4-D5** (claims 11, 19, 22) or **D6-D9** (claims 11, 18-19, 22).

In addition, features of **claims 1, 11, 18-19, 21-22** also lack an inventive step when compared to each of **D10-D12** in view of common general knowledge in the art, since these documents disclose fall arresters, and features of rope braking and lever cams are considered well-known in the art.

Furthermore, **claims 2-10, 12-17, 20** add only features that are either disclosed in **D1-D12** or common general knowledge in the art, and which therefore cannot contribute to providing a patentable invention. For example:

Claim 2: the claim is distinct from **D1-D12** in that the fall arrester also comprises an inertial cam to initiate pivotal movement of the lever for braking of the rope with the primary cam.

D6 (Figs 1-4; Col 3 Line 35 – Col 5 Line 8) discloses a fall arrester comprising a body (1), a coupling, a primary cam (7), a lever (15), and similar braking operation on the rope (2) as previously discussed.

D6 (Col 4 Lines 39-46) further discloses a roller 10 that immediately detects sudden acceleration of the falling movement of the fall arrester, and whose speed of rotation increases until the resistant torque to which it is subjected surmounts the opposing resistant torque of the primary cam 7, which results in the primary cam 7 pivoting and tightly engaging the rope 2.

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Therefore, the roller 10 of **D6** assists in the initiation of the movement of the lever for braking of the rope with the primary cam. Hence, it would be clearly obvious to a person skilled in the art that this difference resides only in an arrangement which is a mere technical equivalent, and one could be substituted for the other without changing the way the invention works.

In addition, the inertial cam is at best a workshop improvement over **D1-D5, D7-D12**, since all these devices allow braking of the rope with the primary cam on rapid descent. It is well known in the art that these fall arrest devices typically have a biasing in the form of a spring which pivots the primary cam towards the rope to maintain slight contact without binding, thus allowing movements both up and down the rope. The inertial cam basically has a similar function to maintain contact with the rope without causing binding during normal movements. Hence, the inertial cam is at best a workshop improvement over the biasing devices well known in the art that facilitates contact of the primary cam with the rope without binding during normal movement.

Claims 3-5, 7-9: the claims are distinct from **D1-D3, D8-D9** in that the fall arrester also comprises a tow cam pivotally coupled to the body to provide contact with the lever to pivot it and release the associated primary cam to permit manual towing.

D1-D3, D8-D9 disclose fall arresters with a body, a primary cam and a lever as previously discussed.

D1-D3, D8-D9 further disclose fall arresters that can be used as a positioning device with a tow/tug cord for manual towing. Therefore, the use of a tow cam to pivot the lever is at best a workshop improvement over the fall arresters of **D1-D3, D8-D9** which also allow manual towing for positioning purposes.

Claims 6, 10: the claims are further distinct from **D1-D3, D8-D9** in that the tow line includes a mechanical fuse which breaks at a predetermined load.

D10 (see whole document on ISC RED back-up device) discloses a fall arrester that can be used as a positioning device with a tow/tug cord for manual towing, which further includes a mechanical fuse (breakaway tow-cord) which breaks at a predetermined pull load.

It is considered that a person skilled in the art, in seeking a solution to effective rope braking during manual towing in a panic situation as taught in **D10** be motivated in light of common general knowledge in the art to combine the features of the fall arresters of each of **D1-D3, D8-D9** with the mechanical fuse of **D10**, and arrive at a solution which provides the same technical function as the claimed invention.

Claims 12, 16-17: the claims are further distinct from **D1-D3** in that contact of the coupling with the body to effect raising of the fall arrester is independent of the lever and the primary cam; and an accelerator element is coupled to a biasing member to urge the coupling to maintain contact with the lever.

However, this difference resides in an arrangement that is merely a matter of design choice or a workshop improvement in light of the common general technical knowledge in the art, since the arrangement of **D1-D3** similarly allows the fall arrester to move in a **free mode** when ascending, and the lever-coupling arrangement of **D1-D3** similarly maintains contact in the event of a fall.

Claims 13-15: the claims are further distinct from **D11** in that the arrester further comprises a secondary cam connected to the lever to promote rope brake when the rope and the coupling are gripped.

D11 discloses a fall arrester (Figs 5-8) comprising a body (39), a coupling (Col 5 Line 29: safety hook), a primary cam (40), a lever (segment of cam 40 is a lever) whereby descent of the user urges the coupling into contact with the lever which pivots to effect braking of cable (10) passing through the fall arrester (Col 6 Lines 21-27).

D11 additionally discloses a slider member 46 which provides an additional safety feature such that it can be manually pressed downwardly to act on the locking member 40 through the projecting finger 47. Therefore, if a person grabs hold of the fall arrester in an emergency, it will cause the downward movement of the slider member 46 (Col 6 Lines 28-37).

Therefore, the secondary cam of the claimed invention is at best a technical equivalent to the slider member 46 of **D11**, since both mechanisms promote braking of the safety line when a person grabs the arrester in a panic situation.

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D11 also discloses that the slider member 46 allows sliding movement of the arrester in both directions along the safety line and is biased to maintain contact with the safety line at a required position along the safety line (Figs 7-8, Col 5 Line 37 – Col 6 Line 11).

Although **D11** does not disclose a secondary cam lock, it is considered that the feature of a lock to retract a cam to permit sliding movement of a fall arrester is well known in the art and is a matter of design choice which would be available for use by the person skilled in the art. This choice provides the known benefit of preventing unintentional binding of the safety line when the slider member 46 of **D11** is accidentally depressed. Therefore, a person skilled in the art would arrive at this solution by a routine and non-inventive process in light of the slider member 46 of **D11**.

Claim 20: the claimed invention is further distinct from **D1-D3, D8-D9, D12** in that the body includes an inverted cam to only permit closure of the cover plate into the closed position when the fall arrested is correctly oriented.

However, this difference resides in an arrangement that is merely a matter of design choice to ensure a correct orientation of the fall arrester, which is well-known common general technical knowledge in the art, and which therefore also lacks an inventive step.

D1-D3 also discloses arrangements to ensure a correct orientation (see especially **D3**) of the fall arrester, whereby all of the pictographs are upright when rigged properly; if rigged incorrectly, the back-up arrester will not grip the rope at all and will immediately slide down the rope.

D8-D9 also discloses arrangements to ensure a correct orientation of the fall arrester (see arrow orientation).

D12 (Para 0038) also discloses arrangements to ensure a correct orientation of the fall arrester.

Hence, the subject matter of **claims 1-22** is obvious and does not meet the requirements of Article 33(3) of the PCT with regard to inventive step.

INDUSTRIAL APPLICABILITY (IA)

The invention defined in the claims is considered to meet the requirements of Industrial Applicability under Article 33(4) of the PCT because it can be made by, or used in, industry.



phillips ormonde fitzpatrick
intellectual property

21 May 2015

Telephone Contact : David Clark
Speed Dial 527

The Commissioner of Patents
IP Australia
PO Box 200
WODEN ACT 2606

Dear Madam

Capital Safety Group (Australia) Pty Limited
International Patent Application PCT/AU2014/000635
Title FALL ARRESTER
Our Ref 1000221

We refer to our telephone discussion with your office on 21 May 2015.

We also enclose a Statement of Amendments correcting page numbering of page 3 and 3a.

Respectfully
PHILLIPS ORMONDE FITZPATRICK

DGC

>patent & trade marks attorneys

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a lever including a primary cam, the lever pivotally coupled to the body and arranged to cooperate with the coupling whereby in operation descent of the user urges the coupling into contact with the lever which pivots to effect braking of rope passing through the fall arrester between the primary cam and the body

- 5 an inertial cam pivotally coupled to the lever proximate the primary cam and configured on rapid descent of the user to pivot into contact with the rope to initiate pivotal movement of the lever for braking of the rope with the primary cam.

- Preferably the fall arrester also comprises a secondary cam connected to the lever
10 whereby gripping the rope and the coupling toward one another urges the rope into contact with the secondary cam pivoting the lever to promote braking of the rope between the primary cam and the body. More preferably the secondary cam is pivotally connected to the lever and biased to maintain contact with the rope to hold the fall arrester at a required position along the rope. Even more preferably the fall
15 arrester further comprises a secondary cam lock connected to the lever and arranged to lock the secondary cam in a retracted position to permit sliding movement of the fall arrester in both directions along the rope.

- Preferably the fall arrester additionally comprises a tow cam pivotally coupled to the
20 body to provide contact with the lever to pivot it and release the associated primary cam from the rope to permit manual towing of the fall arrester along the rope on its descent. More preferably the tow cam is configured relative to the lever to disengage from the lever to permit braking of the rope via the primary cam beyond a predetermined pivot angle of the tow cam. Even more preferably the tow cam
25 connects to a tow line which is manually pulled to pivot the tow cam to allow towing of the fall arrester. Still more preferably the tow line includes a mechanical fuse which breaks at a predetermined pull load wherein the tow cam is deactivated.

- Preferably the fall arrester still also comprises an accelerator element pivotally
30 coupled to the body and adapted to engage the coupling to accelerate contact of the coupling with the lever for accelerated braking of the rope with the primary cam. More preferably the accelerator element is operatively coupled to a biasing member which urges the coupling to maintain contact with the lever.

3a

Preferably the body is configured with the cover plate in a closed position to substantially house at least the primary cam and the lever. More preferably the body includes an inverted cam movably mounted to the base body to only permit closure of the cover plate into the closed position with the fall arrester correctly oriented relative to the rope to ensure braking on descent.

5

Preferably the fall arrester is integrally connected to the coupling. More preferably the coupling is in the form of a swivel connector.

a lever including a primary cam, the lever pivotally coupled to the body and arranged to cooperate with the coupling whereby in operation descent of the user urges the coupling into contact with the lever which pivots to effect braking of rope passing through the fall arrester between the primary cam and the body

5 an inertial cam pivotally coupled to the lever proximate the primary cam and configured on rapid descent of the user to pivot into contact with the rope to initiate pivotal movement of the lever for braking of the rope with the primary cam.

10 Preferably the fall arrester also comprises a secondary cam connected to the lever whereby gripping the rope and the coupling toward one another urges the rope into contact with the secondary cam pivoting the lever to promote braking of the rope between the primary cam and the body. More preferably the secondary cam is pivotally connected to the lever and biased to maintain contact with the rope to hold the fall arrester at a required position along the rope. Even more preferably the fall
15 arrester further comprises a secondary cam lock connected to the lever and arranged to lock the secondary cam in a retracted position to permit sliding movement of the fall arrester in both directions along the rope.

20 Preferably the fall arrester additionally comprises a tow cam pivotally coupled to the body to provide contact with the lever to pivot it and release the associated primary cam from the rope to permit manual towing of the fall arrester along the rope on its descent. More preferably the tow cam is configured relative to the lever to disengage from the lever to permit braking of the rope via the primary cam beyond a predetermined pivot angle of the tow cam. Even more preferably the tow cam
25 connects to a tow line which is manually pulled to pivot the tow cam to allow towing of the fall arrester. Still more preferably the tow line includes a mechanical fuse which breaks at a predetermined pull load wherein the tow cam is deactivated.

30 Preferably the fall arrester still also comprises an accelerator element pivotally coupled to the body and adapted to engage the coupling to accelerate contact of the coupling with the lever for accelerated braking of the rope with the primary cam. More preferably the accelerator element is operatively coupled to a biasing member which urges the coupling to maintain contact with the lever.

3a

Preferably the body is configured with the cover plate in a closed position to substantially house at least the primary cam and the lever. More preferably the body includes an inverted cam movably mounted to the base body to only permit closure of the cover plate into the closed position with the fall arrester correctly oriented relative to the rope to ensure braking on descent.

Preferably the fall arrester is integrally connected to the coupling. More preferably the coupling is in the form of a swivel connector.



phillips ormonde fitzpatrick
intellectual property

28 April 2015

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Speed Dial 527

The Commissioner of Patents
IP Australia
PO Box 200
WODEN ACT 2606

Dear Madam

Capital Safety Group (Australia) Pty Limited
International Patent Application PCT/AU2014/000635
Title FALL ARRESTER
Our Ref 1000221

We refer to an International Search Report (ISR) and Written Opinion dated 30 July 2014 having issued for this application.

We enclose a Demand together with a Statement of Amendments which summarises amendments to the specification and in particular the claims. These amendments are in response to the ISR and Written Opinion and are intended to more clearly define the invention and distinguish from the referenced prior art.

It should be noted that the claim set is limited to two independent claims, namely:

1. Claim 1 which is further limited to the features of dependent claims 12 (in part) and 18;
2. Claim 5 which includes the features of claims 1 and 2 as published.

Claim 1 as amended distinguishes from the referenced prior art insofar as the fall arrester as now claimed defines:

1. a body including a base body and a moveable cover plate which in an open position provides for attachment of the fall arrester to a rope, the base body and the cover plate together defining a closed opening adapted to retain the coupling in the open position;
2. a lever including a primary cam, the lever pivotally coupled to the body and arranged to co-operate with a coupling whereby in operation of the fall arrester descent of the user urges the coupling into contact with the lever which pivots to effect movement of the primary cam for braking of the rope passing through the fall arrester between the primary cam and the body.

The reference prior art fails to disclose a fall arrester having a base body and cover plate together defining a closed opening adapted to retain the coupling in the open

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position which allows for attachment of the fall arrester to a rope. For example, the back-up device of D1 to D3 when in the open position for insertion of the rope into the back-up device does not provide a closed opening which retains the carabiner. This characterising feature of the present invention as now claimed is important in avoiding a "dropped objects hazard", see for example the present specification at page 1 lines 23 to 31.

The referenced prior art also fails to disclose a lever including a primary cam which functions as now claimed. For example, the back-up device of D1 to D3 fails to disclose a primary cam included in a lever which cooperates with a coupling to effect movement of the primary cam for braking of the rope. Rather, the carabiner of D3 cooperates with to "slightly engage the larger lever against the rope to keep the Back-Up from sliding under its own weight when there is no load on it". The smaller of the two levers of D1 to D3 provides braking of the back-up device along the rope independent of the larger lever and without operating with the carabiner or other couplings. The Back-Up device of D1 to D3 is admitted in the applicant's specification under the "Background to the Invention" at page 1 lines 23 to 31.

The combination of features as now defined in claim 1 are important in operation of the fall arrester. This is emphasised throughout the specification where, for example at:

1. page 5 lines 23 to 27 "The base body 20 together with the cover plate 22 define a closed opening 26 designed to retain the coupling. The base body 20 and the cover plate 22 are slotted so that the opening 26 is maintained for connection to the coupling with the cover plate 22 both closed and open as illustrated in figures 4A and 4B respectively";
2. page 8 lines 5 to 7 "The lever 16 is open-ended so that it is only effective in pivoting of the associated cam 18 on contact with the coupling in rapid descent only";
3. page 8 lines 28 and 29 "In a safe environment, the fall arrester 10 which is integrally connected to a coupling is connected to a user's harness via a lanyard an carabiner" and page 10 lines 17 and 18 where "The fall arrester is retained on the coupling or carabiner and lanyard whilst being attached or detached from the safety line thus eliminating a drop hazard".

In relation to independent claim 5 we note that the authorised officer is of the opinion that claim 2 as published being limited to "an inertial cam pivotally coupled to the lever approximate the primary cam" is novel in light of the referenced prior art. The combination of features as now defined by independent claim 5 is important in operation of the claimed invention. The specification as published emphasises these characterising features where, for example:

1. at page 9 lines 22 to 30 "The inertial 130 is configured on rapid descent of a user to pivot into contact with the rope 120 as shown in figure 11B. The inertial cam 130 contacts the rope and thus initiates pivotal movement of the lever 160 and the associated primary cam 180 for braking of the rope 120 with the primary cam 180";
2. at page 10 lines 1 to 5 "In the event of rapid descent which may be associated with a panic grip, the inertial cam 130 as shown in figure 12B is swung outward of the primary cam 180 due to the inertia difference in the system. The inertial

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cam 130 includes teeth such as 170 designed to contact and pick up the rope 120 and thus initiate locking of the primary cam 180".

Favourable reconsideration of this application is requested.

Respectfully
PHILLIPS ORMONDE FITZPATRICK

A handwritten signature in cursive script, appearing to read "Graham H. Owen".

DGC

28 April 2015

Capital Safety Group (Australia) Pty Limited
International Patent Application PCT/AU2014/000635
Title FALL ARRESTER
Our Ref 1000221

STATEMENT OF AMENDMENTS

1. Delete pages 2 and 3 presently on file and replace with new pages 2, 3 and 3a filed in duplicate. The duplicate copy is a marked up copy showing amendments.
2. Delete all claims pages presently on file and replace with new claims pages 12, 13 and 14 filed in duplicate. The duplicate copy is a marked up copy showing amendments.

Respectfully
PHILLIPS ORMONDE FITZPATRICK

A handwritten signature in black ink, appearing to read 'Graham H. Cowen', written in a cursive style.

DGC:DEA

It is to be understood that any acknowledgement of prior art in this specification is not to be taken as an admission that this prior art forms part of the common general knowledge.

5 Summary of the Invention

According to a first aspect of the present invention there is provided a fall arrester comprising:

10 a body adapted to couple to a user via a coupling, the body including a base body and a moveable cover plate which in an open position provides for attachment of the fall arrester to a rope, the base body and the cover plate together defining a closed opening adapted to retain the coupling in the open position;

15 a lever including a primary cam, the lever pivotally coupled to the body and arranged to cooperate with the coupling whereby in operation of the fall arrester descent of the user urges the coupling into contact with the lever which pivots to effect movement of the primary cam for braking of the rope passing through the fall arrester between the primary cam and the body.

20 Preferably the cover plate in a closed position maintains retention of the coupling, the base body and the cover plate including slots which define the closed opening. More preferably the lever is open-ended and positioned relative to the closed opening with the cover plate in the closed position whereby ascent of the user provides contact of the coupling with the body without contacting the lever, said contact with the body only being effective in to effect raising of the fall arrestor independent of the lever and the primary cam.

25 Preferably the fall arrester also comprises an inertial cam pivotally coupled to the lever proximate the primary cam and configured on rapid descent of the user to pivot into contact with the rope to initiate pivotal movement of the lever for braking of the rope with the primary cam.

30 According to a second aspect of the invention there is provided a fall arrester comprising:

a body adapted to couple to a user via a coupling;

a lever including a primary cam, the lever pivotally coupled to the body and arranged to cooperate with the coupling whereby in operation descent of the user urges the coupling into contact with the lever which pivots to effect braking of rope passing through the fall arrester between the primary cam and the body

5 an inertial cam pivotally coupled to the lever proximate the primary cam and configured on rapid descent of the user to pivot into contact with the rope to initiate pivotal movement of the lever for braking of the rope with the primary cam.

10 Preferably the fall arrester also comprises a secondary cam connected to the lever whereby gripping the rope and the coupling toward one another urges the rope into contact with the secondary cam pivoting the lever to promote braking of the rope between the primary cam and the body. More preferably the secondary cam is pivotally connected to the lever and biased to maintain contact with the rope to hold the fall arrester at a required position along the rope. Even more preferably the fall
15 arrester further comprises a secondary cam lock connected to the lever and arranged to lock the secondary cam in a retracted position to permit sliding movement of the fall arrester in both directions along the rope.

20 Preferably the fall arrester additionally comprises a tow cam pivotally coupled to the body to provide contact with the lever to pivot it and release the associated primary cam from the rope to permit manual towing of the fall arrester along the rope on its descent. More preferably the tow cam is configured relative to the lever to disengage from the lever to permit braking of the rope via the primary cam beyond a predetermined pivot angle of the tow cam. Even more preferably the tow cam
25 connects to a tow line which is manually pulled to pivot the tow cam to allow towing of the fall arrester. Still more preferably the tow line includes a mechanical fuse which breaks at a predetermined pull load wherein the tow cam is deactivated.

30 Preferably the fall arrester still also comprises an accelerator element pivotally coupled to the body and adapted to engage the coupling to accelerate contact of the coupling with the lever for accelerated braking of the rope with the primary cam. More preferably the accelerator element is operatively coupled to a biasing member which urges the coupling to maintain contact with the lever.

Preferably the body is configured with the cover plate in a closed position to substantially house at least the primary cam and the lever. More preferably the body includes an inverted cam movably mounted to the base body to only permit closure of the cover plate into the closed position with the fall arrester correctly oriented relative to the rope to ensure braking on descent.

5

Preferably the fall arrester is integrally connected to the coupling. More preferably the coupling is in the form of a swivel connector.

Claims

1. A fall arrester comprising:

5 | a body adapted to couple to a user via a coupling, the body including a base body and a moveable cover plate which in an open position provides for attachment of the fall arrester to a rope, the base body and the cover plate together defining a closed opening adapted to retain the coupling in the open position;

10 | a lever including a primary cam, the lever pivotally coupled to the body and arranged to cooperate with the coupling whereby in operation of the fall arrester descent of the user urges the coupling into contact with the lever which pivots to effect movement of the primary cam for braking of the rope passing through the fall arrester between the primary cam and the body.

15 | 2. A fall arrester as defined in claim 1 wherein the cover plate in a closed position maintains retention of the coupling, the base body and the cover plate including slots which define the closed opening.

20 | 3. A fall arrester as defined in claim 2 wherein the lever is open-ended and positioned relative to the closed opening with the cover plate in the closed position whereby ascent of the user provides contact of the coupling with the body without contacting the lever, said contact with the body only being effective in to effect raising of the fall arrestor independent of the lever and the primary cam.

25 | 4. A fall arrester as defined in any one of the preceding claims also comprising an inertial cam pivotally coupled to the lever proximate the primary cam and configured on rapid descent of the user to pivot into contact with the rope to initiate pivotal movement of the lever for braking of the rope with the primary cam.

30 |

5. A fall arrester comprising:

a body adapted to couple to a user via a coupling;

a lever including a primary cam, the lever pivotally coupled to the body and arranged to cooperate with the coupling whereby in operation descent of the user urges the coupling into contact with the lever which pivots to effect braking of rope passing through the fall arrester between the primary cam and the body

an inertial cam pivotally coupled to the lever proximate the primary cam and configured on rapid descent of the user to pivot into contact with the rope to initiate pivotal movement of the lever for braking of the rope with the primary cam.

6. A fall arrester as defined in any one of the preceding claims also comprising a tow cam pivotally coupled to the body to provide contact with the lever to pivot it and release the associated primary cam from the rope to permit manual towing of the fall arrester along the rope on its descent.

7. A fall arrester as defined in claim 6 wherein the tow cam is configured relative to the lever to disengage from the lever to permit braking of the rope via the primary cam beyond a predetermined pivot angle of the tow cam.

8. A fall arrester as defined in either of claims 6 or 7 wherein the tow cam connects to a tow line which is manually pulled to pivot the tow cam to allow towing of the fall arrester.

9. A fall arrester as defined in claim 8 wherein the tow line includes a mechanical fuse which breaks at a predetermined pull load wherein the tow cam is deactivated.

10. A fall arrester as defined in any one of the preceding claims also comprising a secondary cam connected to the lever whereby gripping the rope and the coupling toward one another urges the rope into contact with the secondary cam pivoting the lever to promote braking of the rope between the primary cam and the body.

11. A fall arrester as defined in claim 10 wherein the secondary cam is pivotally connected to the lever and biased to maintain contact with the rope to hold the fall arrester at a required position along the rope.
- 5 | 12. A fall arrester as defined in either of claims 10 or 11 further comprising a secondary cam lock connected to the lever and arranged to lock the secondary cam in a retracted position to permit sliding movement of the fall arrester in both directions along the rope.
- 10 | 13. A fall arrester as defined in any one of the preceding claims also comprising an accelerator element pivotally coupled to the body and adapted to engage the coupling to accelerate contact of the coupling with the lever for accelerated braking of the rope with the primary cam.
- 15 | 14. A fall arrester as defined in claim 13 wherein the accelerator element is operatively coupled to a biasing member which urges the coupling to maintain contact with the lever.
- 20 | 15. A fall arrester as defined in either of claims 2 or 3 wherein the body is configured with the cover plate in the closed position to substantially house at least the primary cam and the lever.
- 25 | 16. A fall arrester as defined in claim 15 wherein the body includes an inverted cam movably mounted to the base body to only permit closure of the cover plate into the closed position with the fall arrester correctly oriented relative to the rope to ensure braking on descent.
17. A fall arrester as defined in any one of the preceding claims wherein the fall arrester is integrally connected to the coupling.
- 30 | 18. A fall arrester as defined in any one of the preceding claims wherein the coupling is in the form of a swivel connector.

It is to be understood that any acknowledgement of prior art in this specification is not to be taken as an admission that this prior art forms part of the common general knowledge.

5 Summary of the Invention

According to a first aspect of the present invention there is provided a fall arrester comprising:

10 a body adapted to couple to a user via a coupling, the body including a base body and a moveable cover plate which in an open position provides for attachment of the fall arrester to a rope, the base body and the cover plate together defining a closed opening adapted to retain the coupling in the open position;

15 a lever including a primary cam, the lever pivotally coupled to the body and arranged to cooperate with the coupling whereby in operation of the fall arrester descent of the user urges the coupling into contact with the lever which pivots to effect movement of the primary cam for braking of the rope passing through the fall arrester between the primary cam and the body.

20 Preferably the cover plate in a closed position maintains retention of the coupling, the base body and the cover plate including slots which define the closed opening. More preferably the lever is open-ended and positioned relative to the closed opening with the cover plate in the closed position whereby ascent of the user provides contact of the coupling with the body without contacting the lever, said contact with the body only being effective in to effect raising of the fall arrestor independent of the lever and the primary cam.

25 Preferably the fall arrester also comprises an inertial cam pivotally coupled to the lever proximate the primary cam and configured on rapid descent of the user to pivot into contact with the rope to initiate pivotal movement of the lever for braking of the rope with the primary cam.

30 According to a second aspect of the invention there is provided a fall arrester comprising:

a body adapted to couple to a user via a coupling;

a lever including a primary cam, the lever pivotally coupled to the body and arranged to cooperate with the coupling whereby in operation descent of the user urges the coupling into contact with the lever which pivots to effect braking of rope passing through the fall arrester between the primary cam and the body

- 5 an inertial cam pivotally coupled to the lever proximate the primary cam and configured on rapid descent of the user to pivot into contact with the rope to initiate pivotal movement of the lever for braking of the rope with the primary cam.

- 10 Preferably the fall arrester also comprises a secondary cam connected to the lever whereby gripping the rope and the coupling toward one another urges the rope into contact with the secondary cam pivoting the lever to promote braking of the rope between the primary cam and the body. More preferably the secondary cam is pivotally connected to the lever and biased to maintain contact with the rope to hold the fall arrester at a required position along the rope. Even more preferably the fall
15 arrester further comprises a secondary cam lock connected to the lever and arranged to lock the secondary cam in a retracted position to permit sliding movement of the fall arrester in both directions along the rope.

- 20 Preferably the fall arrester additionally comprises a tow cam pivotally coupled to the body to provide contact with the lever to pivot it and release the associated primary cam from the rope to permit manual towing of the fall arrester along the rope on its descent. More preferably the tow cam is configured relative to the lever to disengage from the lever to permit braking of the rope via the primary cam beyond a predetermined pivot angle of the tow cam. Even more preferably the tow cam
25 connects to a tow line which is manually pulled to pivot the tow cam to allow towing of the fall arrester. Still more preferably the tow line includes a mechanical fuse which breaks at a predetermined pull load wherein the tow cam is deactivated.

- 30 Preferably the fall arrester still also comprises an accelerator element pivotally coupled to the body and adapted to engage the coupling to accelerate contact of the coupling with the lever for accelerated braking of the rope with the primary cam. More preferably the accelerator element is operatively coupled to a biasing member which urges the coupling to maintain contact with the lever.

Preferably the body is configured with the cover plate in a closed position to substantially house at least the primary cam and the lever. More preferably the body includes an inverted cam movably mounted to the base body to only permit closure of the cover plate into the closed position with the fall arrester correctly oriented relative to the rope to ensure braking on descent.

5

Preferably the fall arrester is integrally connected to the coupling. More preferably the coupling is in the form of a swivel connector.

Claims

1. A fall arrester comprising:
5 a body adapted to couple to a user via a coupling, the body including a base body and a moveable cover plate which in an open position provides for attachment of the fall arrester to a rope, the base body and the cover plate together defining a closed opening adapted to retain the coupling in the open position;
10 a lever including a primary cam, the lever pivotally coupled to the body and arranged to cooperate with the coupling whereby in operation of the fall arrester descent of the user urges the coupling into contact with the lever which pivots to effect movement of the primary cam for braking of the rope passing through the fall arrester between the primary cam and the body.
- 15 2. A fall arrester as defined in claim 1 wherein the cover plate in a closed position maintains retention of the coupling, the base body and the cover plate including slots which define the closed opening.
- 20 3. A fall arrester as defined in claim 2 wherein the lever is open-ended and positioned relative to the closed opening with the cover plate in the closed position whereby ascent of the user provides contact of the coupling with the body without contacting the lever, said contact with the body only being effective in to effect raising of the fall arrestor independent of the lever and the primary cam.
- 25 4. A fall arrester as defined in any one of the preceding claims also comprising an inertial cam pivotally coupled to the lever proximate the primary cam and configured on rapid descent of the user to pivot into contact with the rope to initiate pivotal movement of the lever for braking of the rope with the primary cam.
- 30 5. A fall arrester comprising:
a body adapted to couple to a user via a coupling;

a lever including a primary cam, the lever pivotally coupled to the body and arranged to cooperate with the coupling whereby in operation descent of the user urges the coupling into contact with the lever which pivots to effect braking of rope passing through the fall arrester between the primary cam and the body

an inertial cam pivotally coupled to the lever proximate the primary cam and configured on rapid descent of the user to pivot into contact with the rope to initiate pivotal movement of the lever for braking of the rope with the primary cam.

10

6. A fall arrester as defined in any one of the preceding claims also comprising a tow cam pivotally coupled to the body to provide contact with the lever to pivot it and release the associated primary cam from the rope to permit manual towing of the fall arrester along the rope on its descent.

15

7. A fall arrester as defined in claim 6 wherein the tow cam is configured relative to the lever to disengage from the lever to permit braking of the rope via the primary cam beyond a predetermined pivot angle of the tow cam.

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8. A fall arrester as defined in either of claims 6 or 7 wherein the tow cam connects to a tow line which is manually pulled to pivot the tow cam to allow towing of the fall arrester.

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9. A fall arrester as defined in claim 8 wherein the tow line includes a mechanical fuse which breaks at a predetermined pull load wherein the tow cam is deactivated.

30

10. A fall arrester as defined in any one of the preceding claims also comprising a secondary cam connected to the lever whereby gripping the rope and the coupling toward one another urges the rope into contact with the secondary cam pivoting the lever to promote braking of the rope between the primary cam and the body.

11. A fall arrester as defined in claim 10 wherein the secondary cam is pivotally connected to the lever and biased to maintain contact with the rope to hold the fall arrester at a required position along the rope.
- 5 12. A fall arrester as defined in either of claims 10 or 11 further comprising a secondary cam lock connected to the lever and arranged to lock the secondary cam in a retracted position to permit sliding movement of the fall arrester in both directions along the rope.
- 10 13. A fall arrester as defined in any one of the preceding claims also comprising an accelerator element pivotally coupled to the body and adapted to engage the coupling to accelerate contact of the coupling with the lever for accelerated braking of the rope with the primary cam.
- 15 14. A fall arrester as defined in claim 13 wherein the accelerator element is operatively coupled to a biasing member which urges the coupling to maintain contact with the lever.
- 20 15. A fall arrester as defined in either of claims 2 or 3 wherein the body is configured with the cover plate in the closed position to substantially house at least the primary cam and the lever.
- 25 16. A fall arrester as defined in claim 15 wherein the body includes an inverted cam movably mounted to the base body to only permit closure of the cover plate into the closed position with the fall arrester correctly oriented relative to the rope to ensure braking on descent.
- 30 17. A fall arrester as defined in any one of the preceding claims wherein the fall arrester is integrally connected to the coupling.
18. A fall arrester as defined in any one of the preceding claims wherein the coupling is in the form of a swivel connector.



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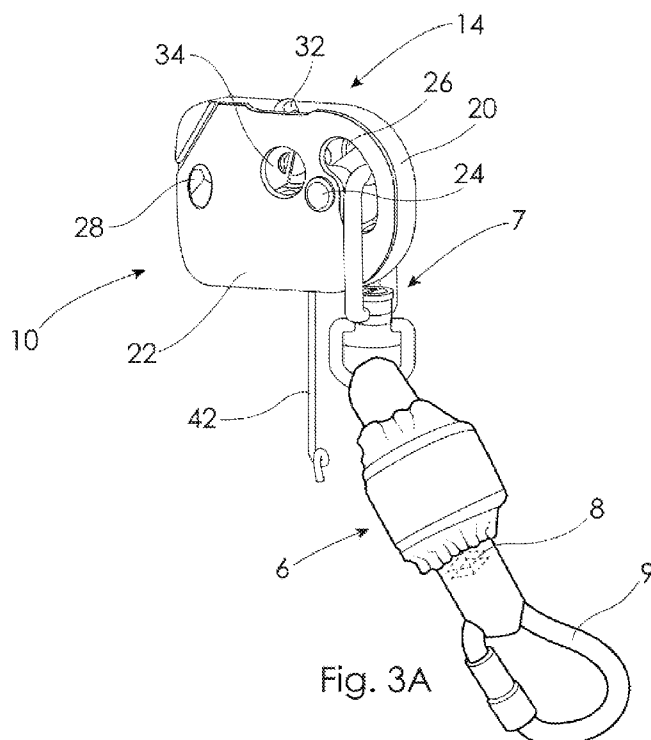
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(54) Title: FALL ARRESTER



(57) Abstract: The present invention relates broadly to a fall arrester (10) attached to a user's harness via a coupling arrangement (6). The fall arrester (10) is designed to be attached to a backup rope or safety line (12). The fall arrester 10 (comprises a body (14), and a lever (16) pivotally coupled to the body (14). The lever (16) includes a primary cam (18) which is arranged to co-operate with the coupling arrangement (6). In operation, descent of the user urges the coupling arrangement (6) into contact with the lever 16 which pivots to effect braking of the safety line (12) between the body (14) and the primary cam (18). Some preferred embodiments include an inertial cam to initiate pivotal movement of the lever for braking of the rope with the primary cam; a tow cam connected to a tow line which includes a mechanical fuse; a secondary cam connected to the lever whereby panic gripping the rope and the coupling toward one another promotes braking of the rope between the primary cam and the body; an accelerator element to accelerate contact of the coupling with the lever; and an inverted cam to ensure correct orientation of the fall arrester.

FALL ARRESTER

Field of the Invention

5 The present invention relates broadly to a fall arrester.

Background to the Invention

Figure 1 illustrates a common rope access system used for descent of a user 1 where a descender device 2 engages a working rope 3 for controlled descent, and a fall
10 arrester 4 engages a backup rope 5. If the descender device 2 or other associated equipment fails, the fall arrester 4 automatically brakes on the backup rope 5 to arrest fall of the user 1. There are various fall arrester designs which can be generally categorised as either automatic hands-free followers or back-up manual devices.

15 In a typical automatic follower there is provided a housing having a hinged gate for enclosing the backup rope. The follower also includes a large cam and lever with a head of the lever coupled to a user's harness via a lanyard and carabiner-style snap hook. If the user falls the lever pivots the large cam which brakes the backup rope within the housing. This type of automatic follower suffers from an inherent design
20 fault in that the exposed lever in a panic grab can be gripped together with the backup rope to release the large cam without arresting the device.

In a typical manual device there is provided a primary cam for braking where the user's carabiner and lanyard is connected to a body of the device. The body includes
25 a pivoting cover plate which can be opened for locating the fall arrester on the backup rope. The manual device, on rapid descent of a user, rocks the housing relative to the primary cam for braking of the rope. The manual device also includes a secondary cam and lever which connects to the user's carabiner so that rocking of the housing is promoted by the secondary cam which frictionally engages the backup
30 rope. This style of manual device presents a dropped objects hazard in that it must be detached from the user's carabiner when attaching to the backup rope.

It is to be understood that any acknowledgement of prior art in this specification is not to be taken as an admission that this prior art forms part of the common general knowledge.

5 **Summary of the Invention**

According to a first aspect of the present invention there is provided a fall arrester comprising:

a body adapted to couple to a user via a coupling;

10 a lever including a primary cam, the lever pivotally coupled to the body and arranged to cooperate with the coupling whereby in operation descent of the user urges the coupling into contact with the lever which pivots to effect braking of rope passing through the fall arrester between the primary cam and the body.

15 Preferably the fall arrester also comprises an inertial cam pivotally coupled to the lever proximate the primary cam and configured on rapid descent of the user to pivot into contact with the rope to initiate pivotal movement of the lever for braking of the rope with the primary cam.

20 According to a second aspect of the invention there is provided a fall arrester comprising:

a body adapted to receive a rope;

a lever including a primary cam arranged to brake the rope on descent of the fall arrester, the lever pivotally coupled to the body;

25 a tow cam movably coupled to the body and configured to contact the lever to pivot it and release the primary cam from the rope to permit manual towing of the fall arrester along the rope during its descent.

30 Preferably the body includes a closed opening adapted to retain the coupling. More preferably the lever is positioned relative to the closed opening whereby ascent of the user provides contact of the coupling with the body to effect raising of the fall arrestor independent of the lever and the primary cam.

Preferably the fall arrester also comprises a secondary cam connected to the lever whereby gripping the rope and the coupling toward one another urges the rope into

contact with the secondary cam pivoting the lever to promote braking of the rope between the primary cam and the body. More preferably the secondary cam is pivotally connected to the lever and biased to maintain contact with the rope to hold the fall arrester at a required position along the rope. Even more preferably the fall
5 arrester further comprises a secondary cam lock connected to the lever and arranged to lock the secondary cam in a retracted position to permit sliding movement of the fall arrester in both directions along the rope.

Preferably the fall arrester additionally comprises a tow cam pivotally coupled to the
10 body to provide contact with the lever to pivot it and release the associated primary cam from the rope to permit manual towing of the fall arrester along the rope on its descent. More preferably the tow cam is configured relative to the lever to disengage from the lever to permit braking of the rope via the primary cam beyond a predetermined pivot angle of the tow cam. Even more preferably the tow cam
15 connects to a tow line which is manually pulled to pivot the tow cam to allow towing of the fall arrester. Still more preferably the tow line includes a mechanical fuse which breaks at a predetermined pull load wherein the tow cam is deactivated.

Preferably the fall arrester still also comprises an accelerator element pivotally
20 coupled to the body and adapted to engage the coupling to accelerate contact of the coupling with the lever for accelerated braking of the rope with the primary cam. More preferably the accelerator element is operatively coupled to a biasing member which urges the coupling to maintain contact with the lever.

Preferably the body includes a base body and a movable cover plate which in an
25 open position provides for attachment of the fall arrester to the rope. More preferably the body is configured with the cover plate in a closed position to substantially house at least the primary cam and the lever. Even more preferably the body includes an inverted cam movably mounted to the base body to only permit closure of the cover
30 plate into the closed position with the fall arrester correctly oriented relative to the rope to ensure braking on descent.

Preferably the fall arrester is integrally connected to the coupling. More preferably the coupling is in the form of a swivel connector.

Brief Description of the Figures

In order to achieve a better understanding of the nature of the present invention preferred embodiments of a fall arrester will now be described, by way of example
5 only, with reference to the accompanying drawings in which:

Figure 1 is a schematic illustration of a common rope access system including a fall arrester;

10 **Figure 2** is a perspective view of a fall arrester of an embodiment of the invention together with a coupling;

Figures 3A and 3B are perspective views of the fall arrester of figure 2 together with different length coupling arrangements;

Figures 4A and 4B are side elevational views of the fall arrester of figure 2 in closed and open configurations respectively;

15 **Figure 5** is a side elevational view of the fall arrester of the embodiment of figures 4A and 4B with the cover plate removed for clarity;

Figures 6A and 6B are side elevational views of the fall arrester of figure 5 shown in automatic and manual modes respectively;

20 **Figures 7A and 7B** are side elevational views of the fall arrester of figure 5 in the automatic mode;

Figures 8A and 8B are side elevational views of the fall arrester of figure 5 in the manual mode;

Figure 9 is a schematic illustration of the fall arrester of figure 5 shown in the case of a "panic grip";

25 **Figure 10** is a perspective view of the fall arrester of figure 5 in an inverted position.

Figures 11A and 11B are perspective views of a fall arrester of another embodiment of the invention shown with the cover plate removed for clarity;

Figures 12A and 12B are side elevational views of the fall arrester of figures 11A and 11B;

30 **Figure 13** is a cross-sectioned view of the fall arrester of figures 11A and 11B shown in the automatic mode braking the rope.

Detailed Description of the Preferred Embodiments

As best shown in figures 2 and 3A/3B there is a fall arrester 10 according to a preferred embodiment of the present invention which is coupled to a user's harness (not shown) via a coupling arrangement 6. In this embodiment the coupling arrangement 6 includes a coupling in the form of a swivel connector 7 connected integral with the fall arrester 10. The swivel connector 7 is connected to either a short or long lanyard 8 as shown in figures 3A and 3B, respectively. The lanyard 8 is at an opposite end connected to a carabiner 9 which detachably connects to a connection point defined by a D-ring (not shown) attached to the harness.

As best shown in figures 4A/B and 5 the fall arrester 10 is designed to be attached to a backup rope or safety line 12. The fall arrester 10 comprises a body 14, and a lever 16 pivotally coupled to the body 14. The lever 16 includes a primary cam 18 which in this embodiment is formed integral with the lever 16 which is arranged to co-operate with a coupling, an example of such a coupling being the coupling arrangement 6. In operation, descent of the user urges the coupling into contact with the lever 16 which pivots to effect braking of the safety line 12 between the body 14 and the primary cam 18.

The body 14 includes a base body 20 and a moveable cover plate 22 which in this example pivots about the base body 20. The base 14 includes a pivot axle 24 about which the cover plate 22 pivots. The pivot axle 24 also provides a pivotal mount to which the lever 16 is pivotally coupled. The base body 20 together with the cover plate 22 define a closed opening 26 designed to retain the coupling. The base body 20 and the cover plate 22 are slotted so that the opening 26 is maintained for connection to the coupling with the cover plate 22 both closed and open as illustrated in figures 4A and 4B respectively.

The base body 20 includes a retaining button 28 which retains the cover plate 22 in the closed position of figure 4A. The retaining button 28 is depressed to release the cover plate 22 and allow it to pivot about the pivot axle 24 into its open position as shown in figure 4B. In operation, ascent of the user releases the coupling from the lever 16 and the coupling contacts the body 14 about the opening 26 to effect raising of the fall arrester 10 independent of the lever 16 and the primary cam 18. As best

illustrated in figure 5, the primary cam 18 under the influence of gravity pivots away from the safety line 12 for relatively free movement of the fall arrester 10 along the safety line 12. In this embodiment the lever 16 and primary cam 18 are otherwise not actively biased.

5

The fall arrester 10 further comprises an accelerator element 30 pivotally coupled to the base body 20. The accelerator element 30 is biased via a biasing member in the form of a torsion spring (not shown) in a clockwise direction as viewed in figure 5 to maintain contact with the coupling. This means that on rapid descent of a user the coupling is forced by the accelerator element 30 into contact with the lever 16 to initiate braking of the safety line 12 with the primary cam 18. The accelerator element 30 thus avoids a situation where the fall arrester 10 accelerates at the same rate as the user without the coupling contacting the lever 16 to effect braking via the primary cam 18.

15

The fall arrester 10 also comprises a secondary cam 32 connected to the lever 16. The secondary cam 32 is designed so that gripping the safety line 12 and the coupling toward one another forces the safety line 12 into contact with the secondary cam 32. This contact with the secondary cam 32 pivots the lever 16 in a clockwise direction as shown in figure 6B to promote braking of the safety line 12 between the primary cam 18 and the body 16. The secondary cam 32 in this embodiment is pivotally connected to the lever 16 to permit operation of the fall arrester 10 in either an automatic or manual mode as shown in figures 6A and 6B respectively.

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25

The fall arrester 10 further comprises a secondary cam lock 34 mounted on the lever 16 and designed to retain the secondary cam 32 in a fixed and retracted position in the automatic mode. The secondary cam lock 34 is depressed to release the secondary cam 32 which is biased to pivot outwardly of the lever 16 into frictional engagement with the safety line 12 in the manual mode.

30

In the automatic mode as shown in figure 7A the fall arrester 10 is free to slide or float in both upward and downward directions along the safety line 12. In moving upwardly along the safety line 12 the coupling lifts the body 14 of the arrester 10 without influencing pivoting of the lever 16 which under the influence of gravity pivots in an

anti-clockwise direction moving the primary cam 18 away from the safety line 12. The fall arrester 10 similarly travels downwardly along the safety line 12 without gripping the safety line 12. In travelling in both directions the secondary cam 32 is retracted clear of the safety line 12. In rapid descent the fall arrester 10 is activated wherein
5 the accelerator element 30 pushes the coupling into contact with the lever 16 to rotate the primary cam 18 in a clockwise direction to effect accelerated braking of the safety line 12 with the primary cam 18.

In the manual mode as illustrated in figures 8A and 8B the secondary cam 32 is
10 biased toward the safety line 12 by releasing or depressing the secondary cam lock 34. The secondary cam 32 thus maintains frictional engagement with the safety line 12 pivoting the lever 16 in a clockwise direction to press cam 18 against the safety line 12. This means that the fall arrester 10 is held stationary or parked at a required position along the safety line 12. The secondary cam 32 thus forces the primary cam
15 18 to lightly brake the safety line 12 to effectively park the fall arrester 10 at a required height. If the user rapidly descends or falls the coupling contacts the lever 16 pivoting the primary cam 18 to brake the safety line 12 against the body 14.

The fall arrester 10 as best illustrated in figures 8A and 8B also comprises a tow cam
20 36 pivotally coupled to the base body 20. The tow cam 36 is designed in the manual mode to tow the fall arrester 10 downwardly along the safety line 12. The tow cam 36 is configured to contact an underside surface 38 of the lever 16 to pivot the lever 16 in an anti-clockwise direction to release the associated primary cam 18 from the safety line 12. A tow line 40 is connected to the tow cam 36 so that when the tow line 40 is
25 pulled it pivots the tow cam 36 in the anti-clockwise direction. The tow cam 36 is actuated independent of the primary cam 18 via the tow line 40. The lever 16 at its underside surface 38 is shaped wherein the tow cam 36 beyond a predetermined pivot angle disengages from the lever 16. Up until the predetermined pivot angle, the tow cam 36 bears against the underlying surface 38 of the lever 16 to pivot the lever
30 16 and release the primary cam 18 from the safety line 12. The secondary cam 32 in the manual mode maintains frictional contact with the safety line 12 for smooth lowering of the fall arrester 10. The tow line 40 includes a mechanical fuse such as the breakaway cord 42 shown in figure 9. The breakaway cord 42 detaches from the

remainder of the tow line 40 at a predetermined pull load wherein the tow cam 36 is deactivated. The tow cam 36 is biased in a clockwise direction via torsion spring 43.

5 The body 14 of the fall arrester 10 of this embodiment houses the lever 16 and primary cam 18 together with the majority of the other moving components. The lever 16 is open-ended so that it is only effective in pivoting of the associated cam 18 on contact with the coupling in descent only. As illustrated in figure 9, this also means that in a “panic grip” the coupling or in this example the carabiner 43 does not contact the lever 16 and influence the primary cam 18. Rather, the secondary cam 32 in a
10 “panic grip” contacts the safety line 12 and pivots the lever 16 and the associated cam 18 into braking contact with the safety line 12. The carabiner 43 moves freely within the slotted opening 26 with the accelerator element 30 being pivoted away against its biasing force.

15 The fall arrester 10 as shown in figure 10 is configured so that it can be attached to the safety line 12 in a single orientation only wherein braking of the safety line 12 is effected on descent of the fall arrester 10. For this purpose the base body 20 is provided with an invert cam 44 which pivotally retracts with the fall arrester 10 oriented in the correct disposition. With the invert cam 44 retracted, the cover plate
20 22 is free to pivot across the base body 20 for retention with the button retainer 28. If the fall arrester 10 is incorrectly oriented relative to the safety line 12, the invert cam 44 extends from the base body 20 as shown in figure 10. This means the cover plate 22 is obstructed by the invert cam 44 not permitting full closure of the cover plate 22. This consequently alerts the user to incorrect orientation of the fall arrester 10.

25

In order to further understand the invention, operation of the preferred fall arrester 10 involves the following steps:

1. In a safe environment, the fall arrester 10 which is integrally connected to a coupling is connected to a user's harness via a lanyard and carabiner;
- 30 2. The fall arrester 10 is opened by depressing the retainer button 28 and pivoting the cover plate 22 anti-clockwise to present an elongate passage for attaching or capturing the safety line 12;
3. The cover plate 22 is pivoted in a clockwise direction for closure about the safety line 12;

4. The user descends a working rope using a conventional descender device and relies upon the fall arrester 10, typically in the automatic mode, to function as a backup safety device;
5. The user having descended to a required working height can elect to park the fall arrester 10 in a manual mode at a required height along the safety line 12;
6. The user can tow the fall arrester 10 in the manual mode sliding it downwardly along the safety line 12 using the tow line 40 and associated tow cam 36.

10 In the event of a fall or rapid descent, the fall arrester 10 in either its automatic or manual mode brakes or locks against the safety line 12 to arrest descent of the user. If the tow line 40 is being used with the breakaway cord 42, the breakaway cord 42 will detach from the remainder of the tow line 40 and the tow cam 36 will be deactivated.

- 15 Figures 11 to 13 show another embodiment of a fall arrester according to the present invention. The fall arrester 100 of this embodiment is essentially the same as the preceding embodiment except for the inclusion of an inertial cam 130. For ease of reference and in order to avoid repetition the fall arrester 100 is for corresponding components to the preceding embodiment shown or designated with an additional "0".
- 20 For example, the housing of this fall arrester 100 is designated as 140.

As best shown in figure 11A the inertial cam 130 is pivotally connected to the lever 160 at the primary cam 180. The inertial cam 130 pivots or swings about pivot pin 150 fixed to the lever 160 at the primary cam 180. The inertial cam 130 is configured

25 on rapid descent of a user to pivot into contact with the rope 120 as shown in figure 11B. The inertial cam 130 contacts the rope 120 and thus initiates pivotal movement of the lever 160 and the associated primary cam 180 for braking of the rope 120 with the primary cam 180. The inertial cam 130 can thus swing from a retracted position of figure 11A for normal operation of the fall arrester 100 to an extended position of

30 figure 11B for activation of the primary cam 180.

As shown in figures 12A and 12B the fall arrester 100 can operate in an automatic mode with the secondary cam 320 in a fixed and retracted position. In the automatic mode the fall arrester 100 is free to slide or float in both upward and downward

directions along the rope or safety line 120. In the event of rapid descent which may be associated with a panic grip, the inertial cam 130 as shown in figure 12B is swung outward of the primary cam 180 due to the inertia difference in the system. The inertial cam 130 includes teeth such as 170 designed to contact and pick up the rope 120 and thus initiate locking of the primary cam 180. In rapid descent the falling mass further activates the primary cam 180 for braking of the rope 120 to arrest the fall.

Figure 13 depicts the fall arrester 100 with the rope 120 braked following rapid descent. Inertial cam 130 has retracted into a rebate 190 in the lever 160 at the primary cam 180. The inertial cam 130 in this retracted position does not contact or damage the rope 120. The fall arrester 100 is otherwise constructed to operate in a similar manner to the preceding embodiment.

Now that several preferred embodiments of the present invention have been described it will be apparent to those skilled in the art that the fall arrester has at least the following advantages:

1. The fall arrester is retained on the coupling or carabiner and lanyard whilst being attached or detached from the safety line thus eliminating a drop hazard;
2. The fall arrester can be operated in either an automatic or manual mode and these modes can be switched whilst in operation with relative ease;
3. The fall arrester eliminates hazards associated with a "panic grip" by one or a combination of the following design features:
 - i. The body houses the lever and associated primary cam so that the lever cannot be grasped;
 - ii. The carabiner or other coupling is not retained by the lever but rather contacts or engages the lever on descent only;
 - iii. The secondary cam on contact with the safety line urges the primary cam into braking contact with the safety line;
 - iv. The primary cam may include an inertial cam which ensures braking of the rope;
4. The fall arrester can be safely towed via the tow cam which is activated independent of the primary braking cam;
5. The tow cam is designed to deactivate if over pulled by panic.

Those skilled in the art will appreciate that the invention described herein is susceptible to variation and modifications other than those specifically described. For example, the shape and configuration of the fall arrester and its associated components may vary from that described provided it functions in accordance with the essential characteristics of the invention. The fall arrester need not necessarily include the secondary cam in which case it would function in the automatic mode only. All such variations and modifications are to be considered within the scope of the present invention the nature of which is to be determined from the foregoing description.

Claims

1. A fall arrester comprising:
 - a body adapted to couple to a user via a coupling;
 - a lever including a primary cam, the lever pivotally coupled to the body
- 5 and arranged to cooperate with the coupling whereby in operation descent of the user urges the coupling into contact with the lever which pivots to effect braking of rope passing through the fall arrester between the primary cam and the body.
- 10 2. A fall arrester as defined in claim 1 also comprising an inertial cam pivotally coupled to the lever proximate the primary cam and configured on rapid descent of the user to pivot into contact with the rope to initiate pivotal movement of the lever for braking of the rope with the primary cam.
- 15 3. A fall arrester as defined in either of claims 1 or 2 also comprising a tow cam pivotally coupled to the body to provide contact with the lever to pivot it and release the associated primary cam from the rope to permit manual towing of the fall arrester along the rope on its descent.
- 20 4. A fall arrester as defined in claim 3 wherein the tow cam is configured relative to the lever to disengage from the lever to permit braking of the rope via the primary cam beyond a predetermined pivot angle of the tow cam.
- 25 5. A fall arrester as defined in either of claims 3 or 4 wherein the tow cam connects to a tow line which is manually pulled to pivot the tow cam to allow towing of the fall arrester.
- 30 6. A fall arrester as defined in claim 5 wherein the tow line includes a mechanical fuse which breaks at a predetermined pull load wherein the tow cam is deactivated.
- 35 7. A fall arrester comprising:
 - a body adapted to receive a rope;
 - a lever including a primary cam arranged to brake the rope on descent of the fall arrester, the lever pivotally coupled to the body;

a tow cam movably coupled to the body and configured to contact the lever to pivot it and release the primary cam from the rope to permit manual towing of the fall arrester along the rope during its descent.

- 5 8. A fall arrester as defined in claim 7 wherein the tow cam is configured relative to the lever to disengage from the lever to permit braking of the rope via the primary cam beyond a predetermined pivot angle of the tow cam.
- 10 9. A fall arrester as defined in either of claims 7 or 8 wherein the tow cam connects to a tow line which is manually pulled to pivot the tow cam to allow towing of the fall arrester.
- 15 10. A fall arrester as defined in claim 9 wherein the tow line includes a mechanical fuse which breaks at a predetermined pull load wherein the tow cam is deactivated.
- 20 11. A fall arrester as defined in any one of the preceding claims wherein the body includes a closed opening adapted to retain the coupling.
- 25 12. A fall arrester as defined in claim 11 wherein the lever is positioned relative to the closed opening whereby ascent of the user provides contact of the coupling with the body to effect raising of the fall arrestor independent of the lever and the primary cam.
- 30 13. A fall arrester as defined in any one of the preceding claims also comprising a secondary cam connected to the lever whereby gripping the rope and the coupling toward one another urges the rope into contact with the secondary cam pivoting the lever to promote braking of the rope between the primary cam and the body.
14. A fall arrester as defined in claim 13 wherein the secondary cam is pivotally connected to the lever and biased to maintain contact with the rope to hold the fall arrester at a required position along the rope.

15. A fall arrester as defined in either of claims 13 or 14 further comprising a secondary cam lock connected to the lever and arranged to lock the secondary cam in a retracted position to permit sliding movement of the fall arrester in both directions along the rope.

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16. A fall arrester as defined in any one of the preceding claims also comprising an accelerator element pivotally coupled to the body and adapted to engage the coupling to accelerate contact of the coupling with the lever for accelerated braking of the rope with the primary cam.

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17. A fall arrester as defined in claim 16 wherein the accelerator element is operatively coupled to a biasing member which urges the coupling to maintain contact with the lever.

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18. A fall arrester as defined in any one of the preceding claims wherein the body includes a base body and a movable cover plate which in an open position provides for attachment of the fall arrester to the rope.

20

19. A fall arrester as defined in claim 18 wherein the body is configured with the cover plate in a closed position to substantially house at least the primary cam and the lever.

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20. A fall arrester as defined in either of claims 18 or 19 wherein the body includes an inverted cam movably mounted to the base body to only permit closure of the cover plate into the closed position with the fall arrester correctly oriented relative to the rope to ensure braking on descent.

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21. A fall arrester as defined in any one of the preceding claims wherein the fall arrester is integrally connected to the coupling.

22. A fall arrester as defined in any one of the preceding claims wherein the coupling is in the form of a swivel connector.

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Prior Art
Fig. 1

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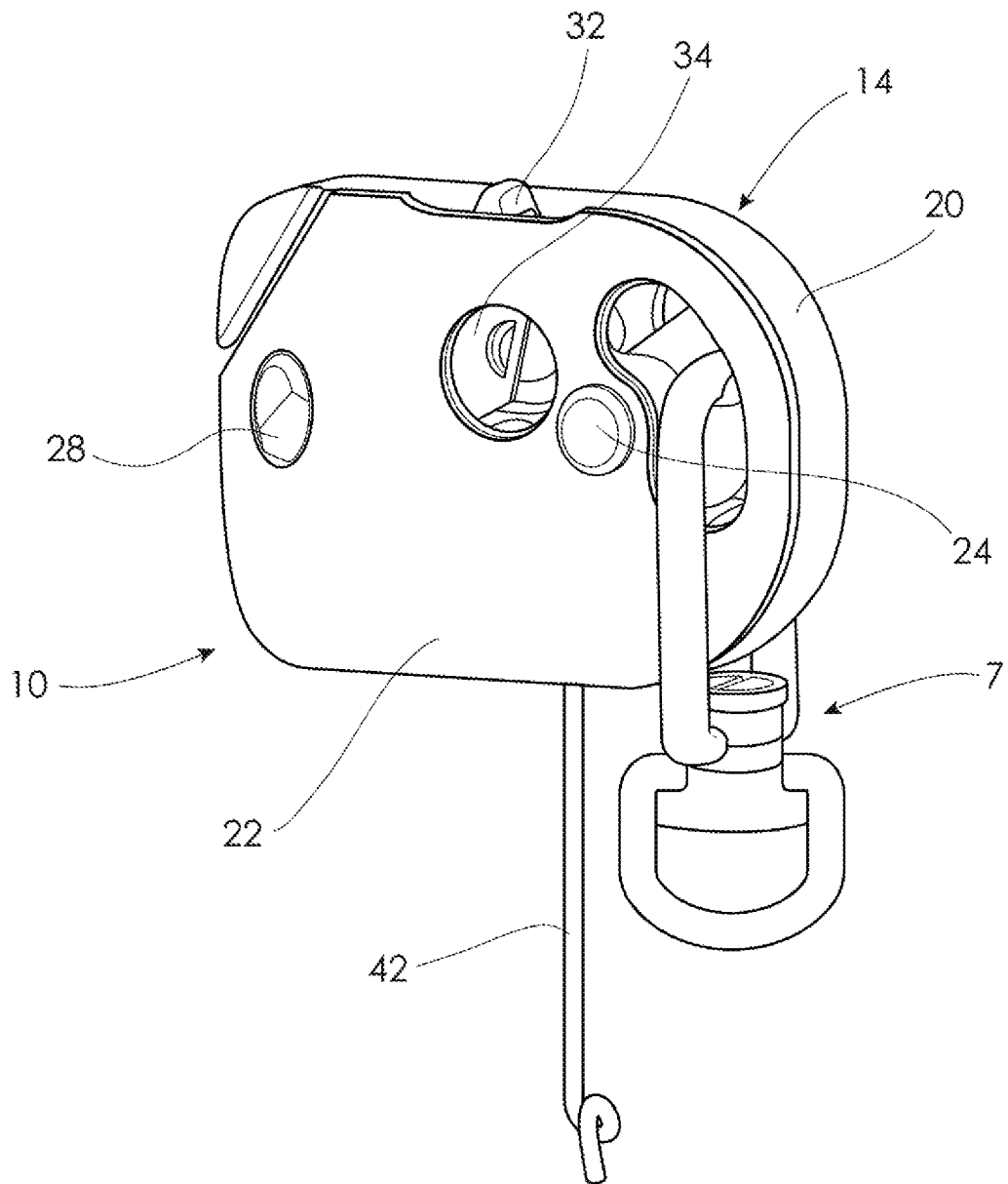
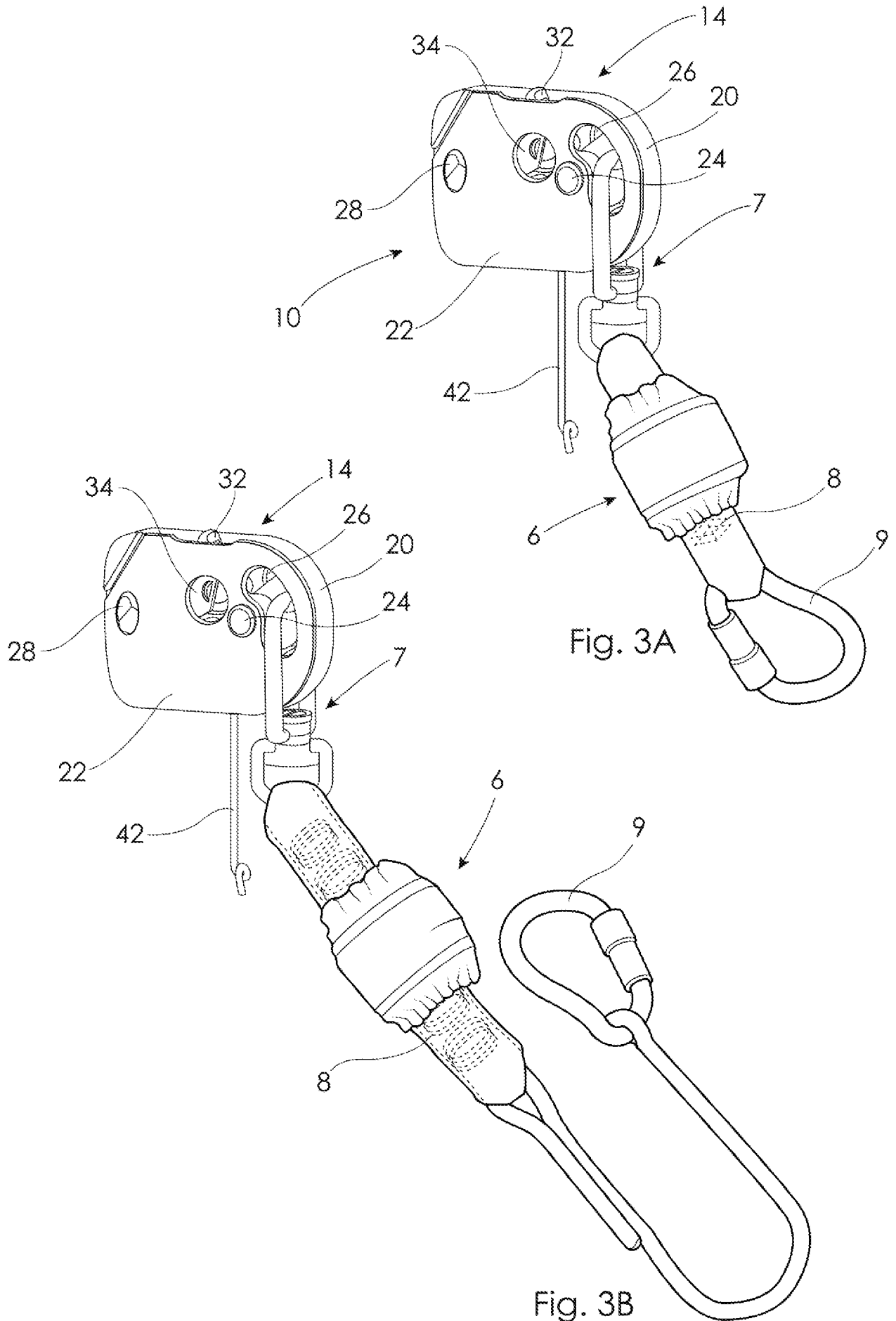


Fig. 2

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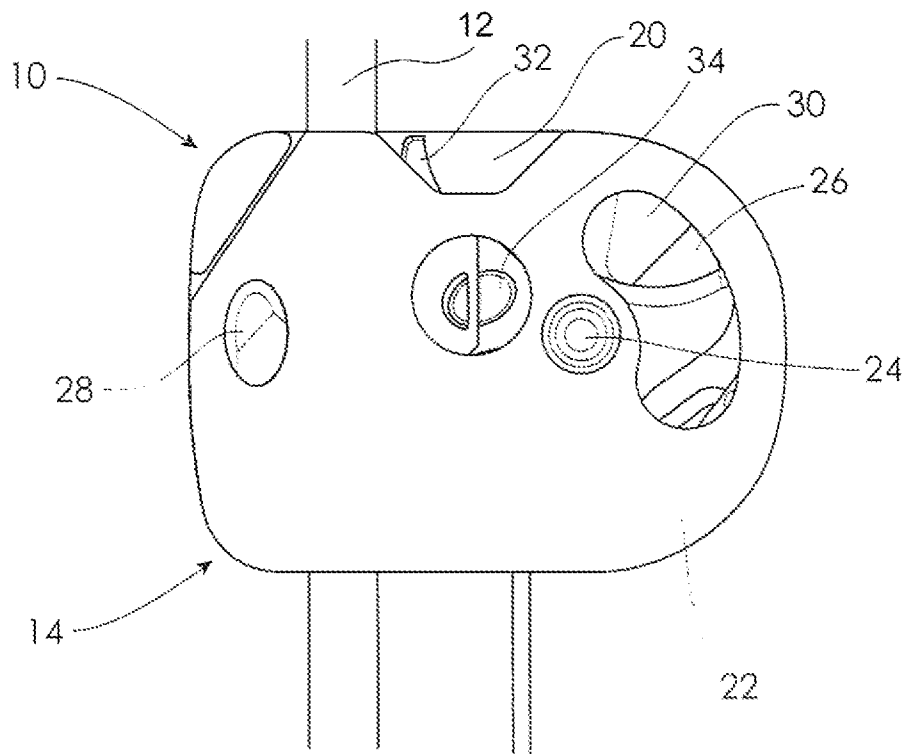


Fig. 4A

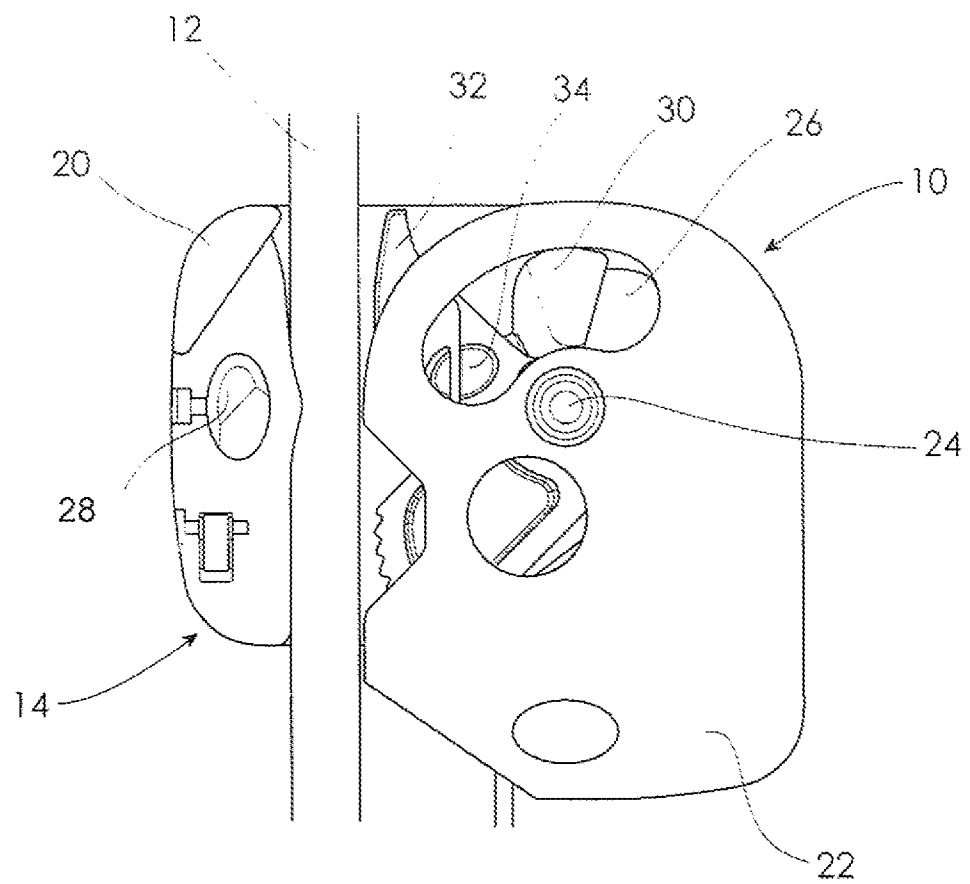


Fig. 4B

5/13

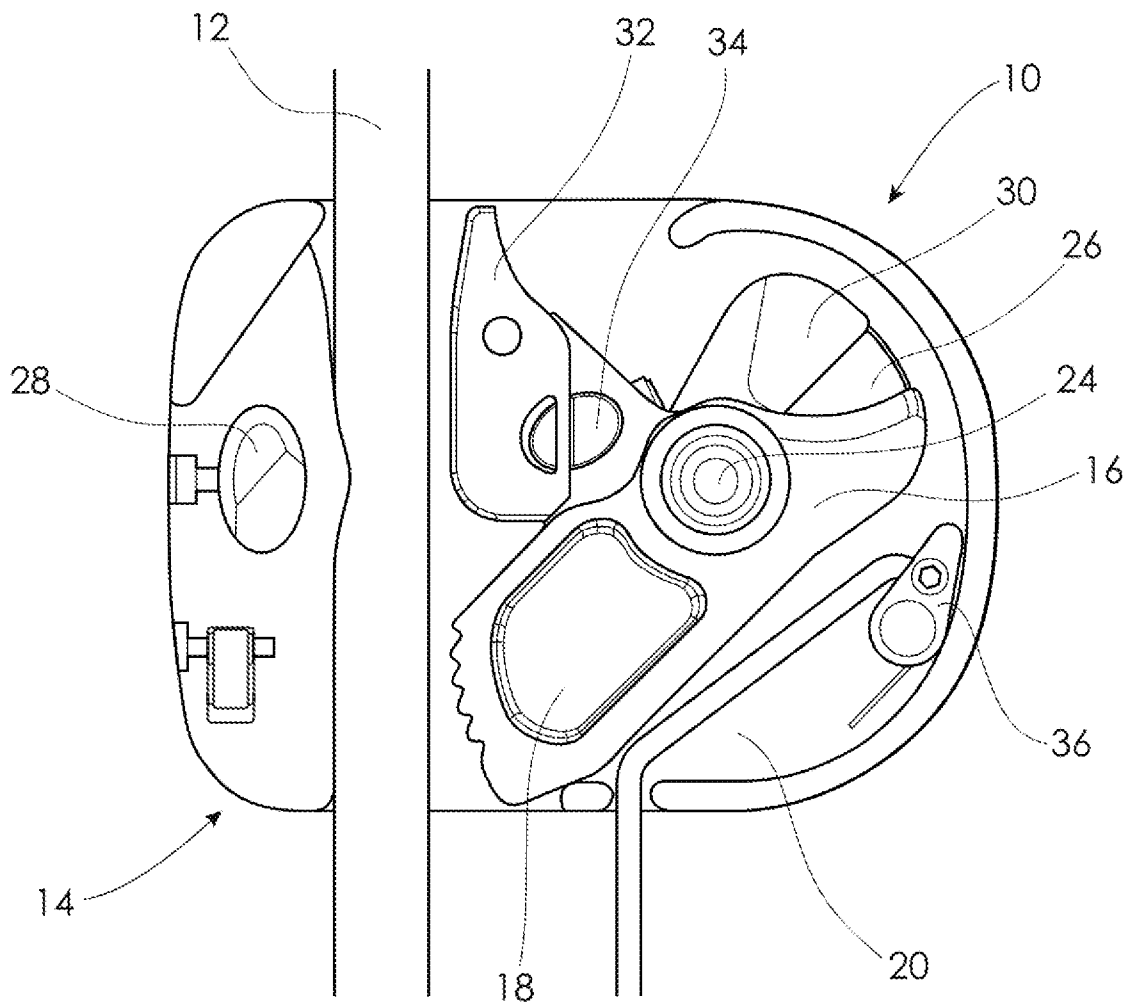


Fig. 5

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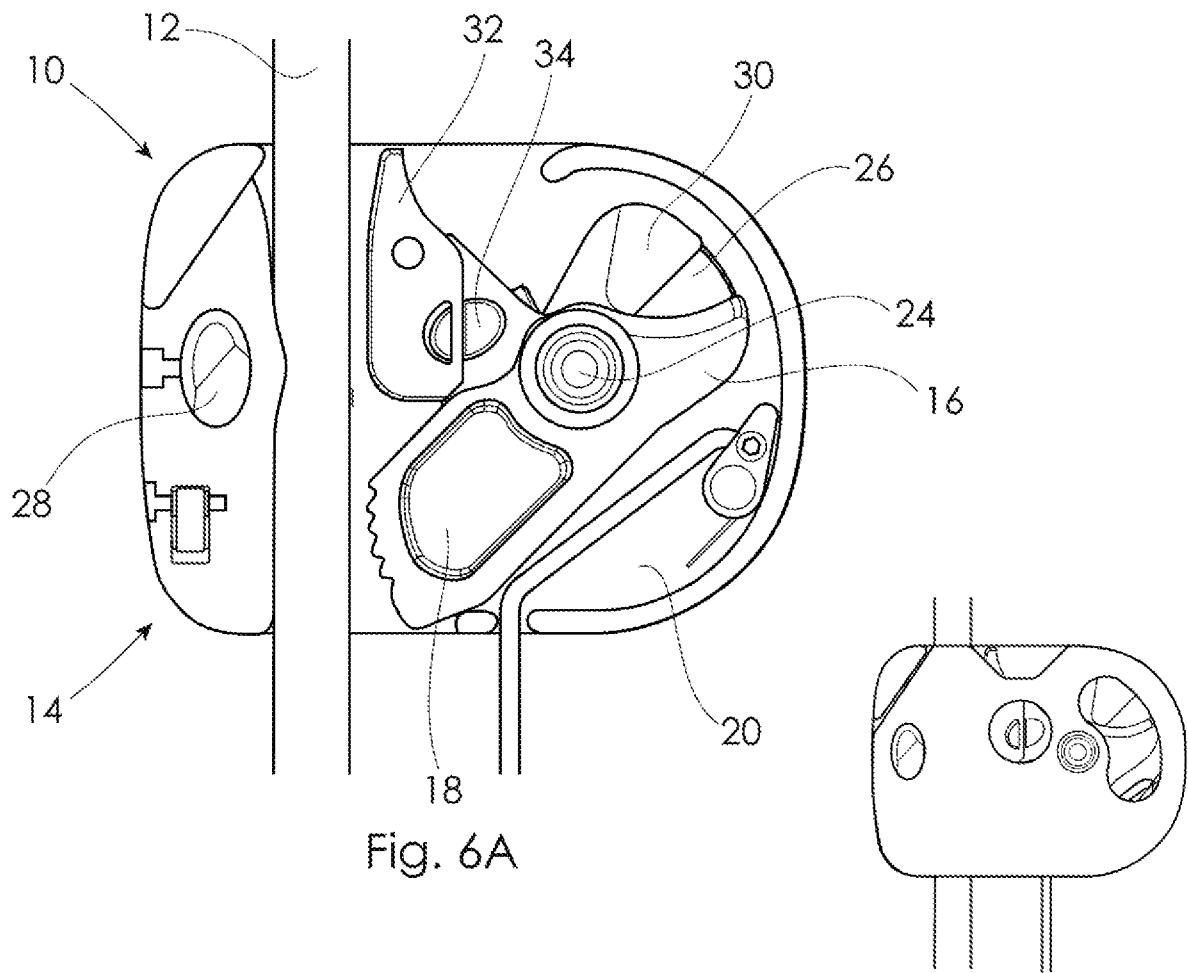


Fig. 6A

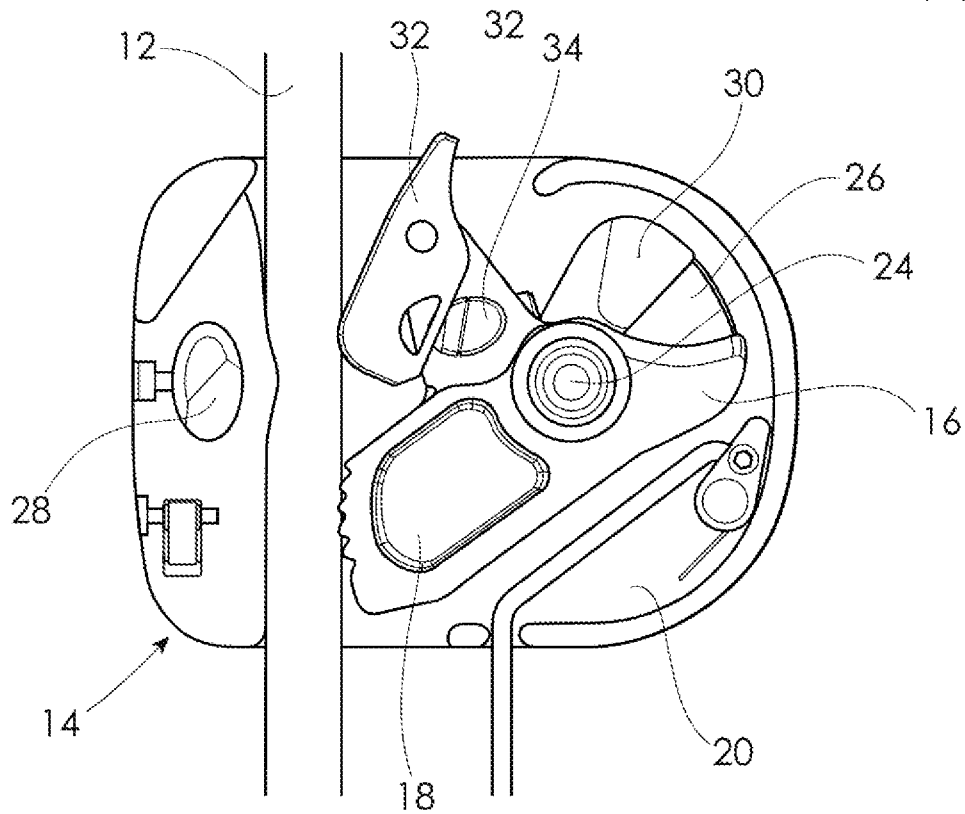


Fig. 6B

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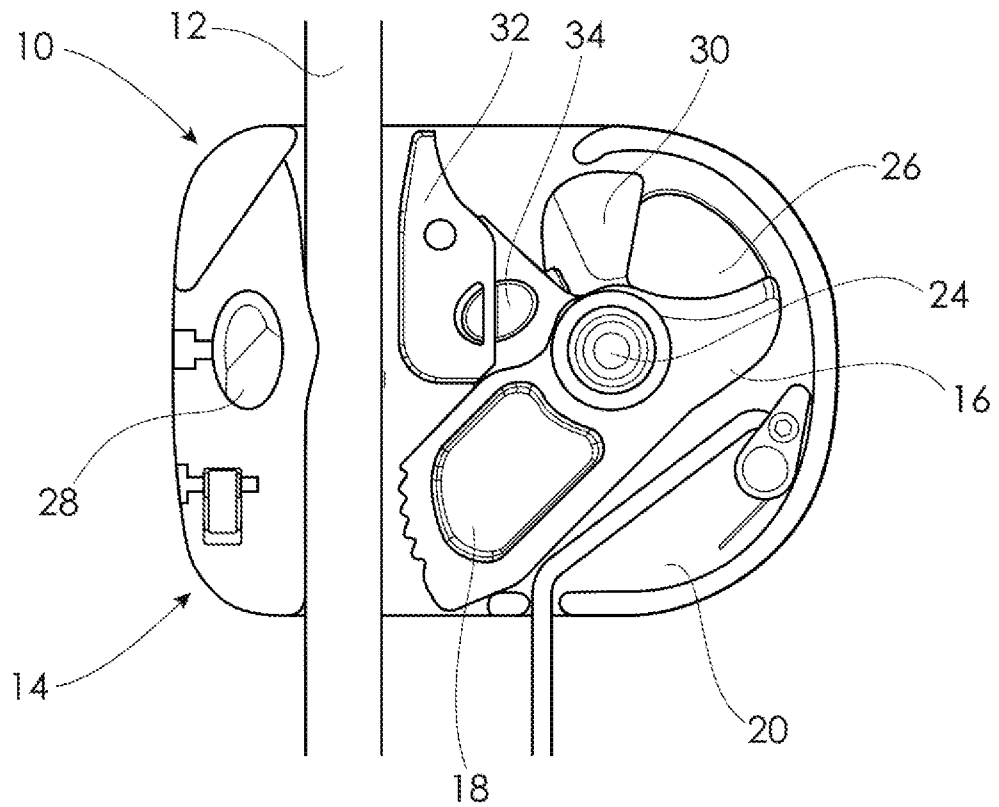


Fig. 7A

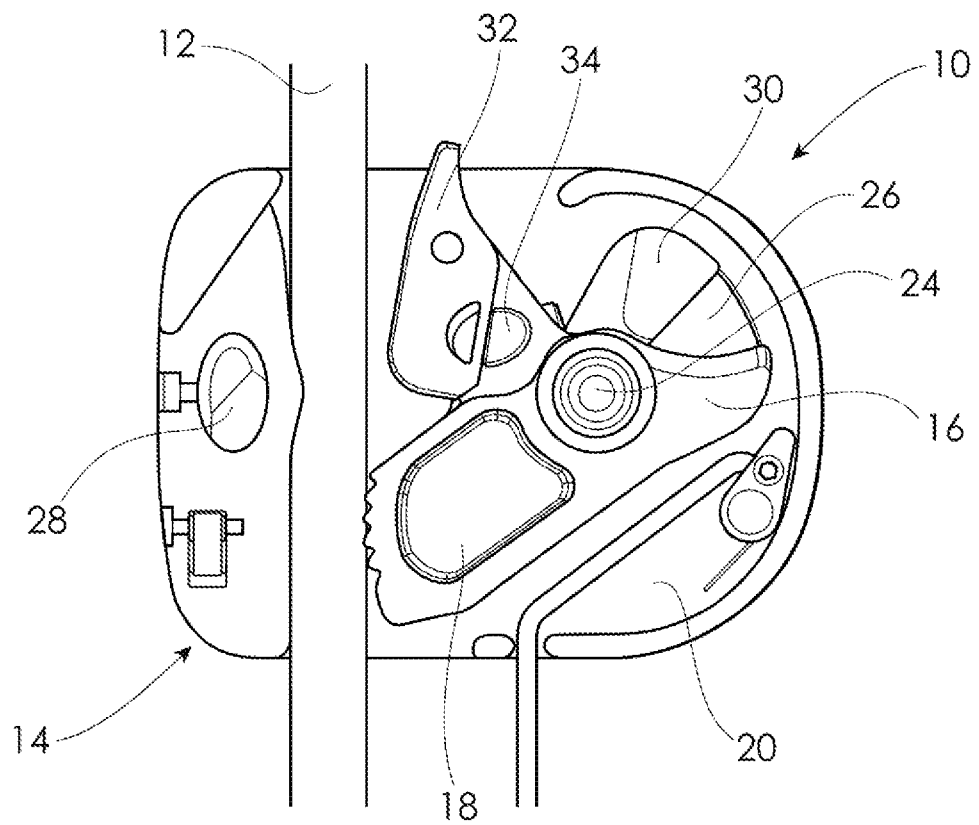


Fig. 7B

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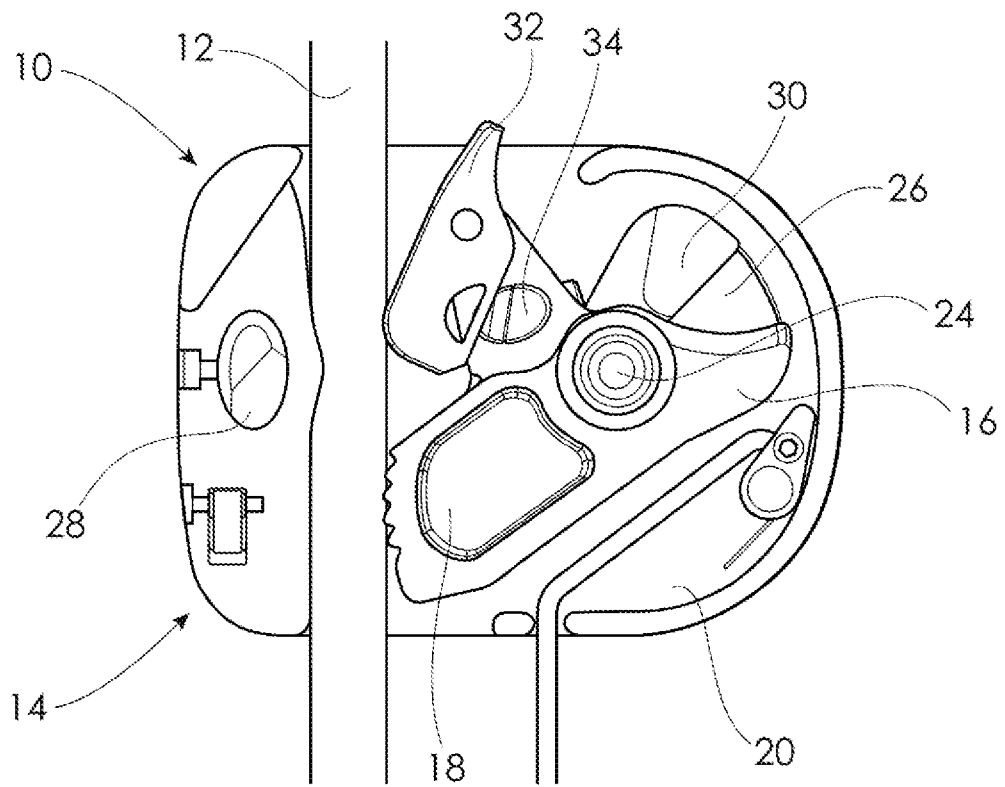


Fig. 8A

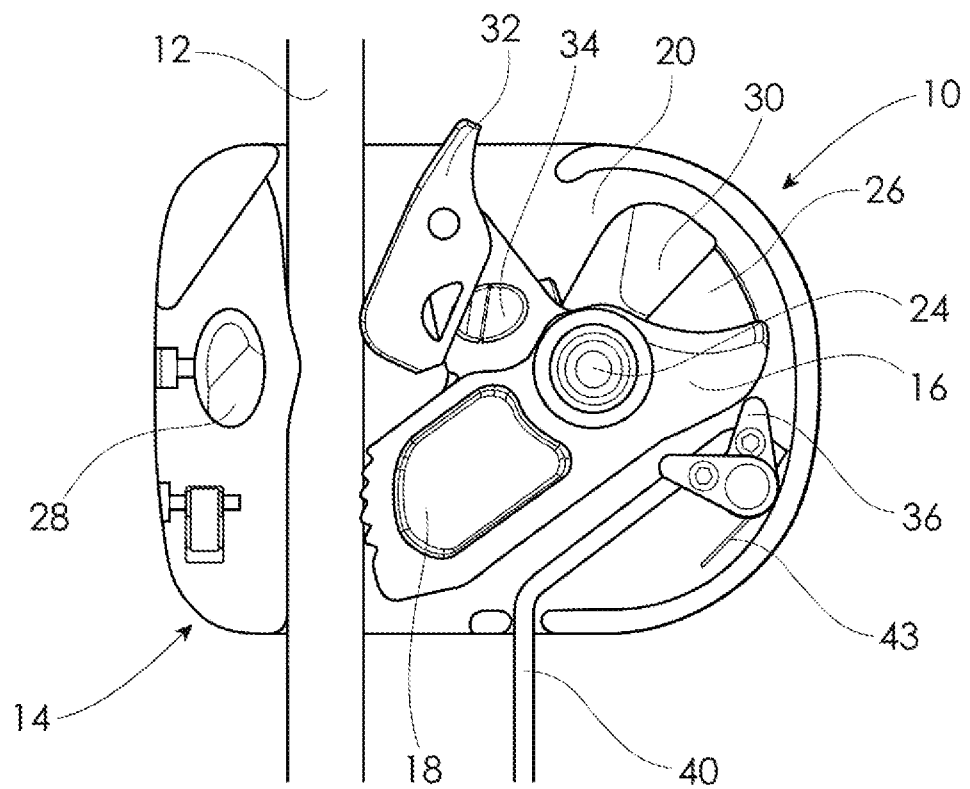


Fig. 8B

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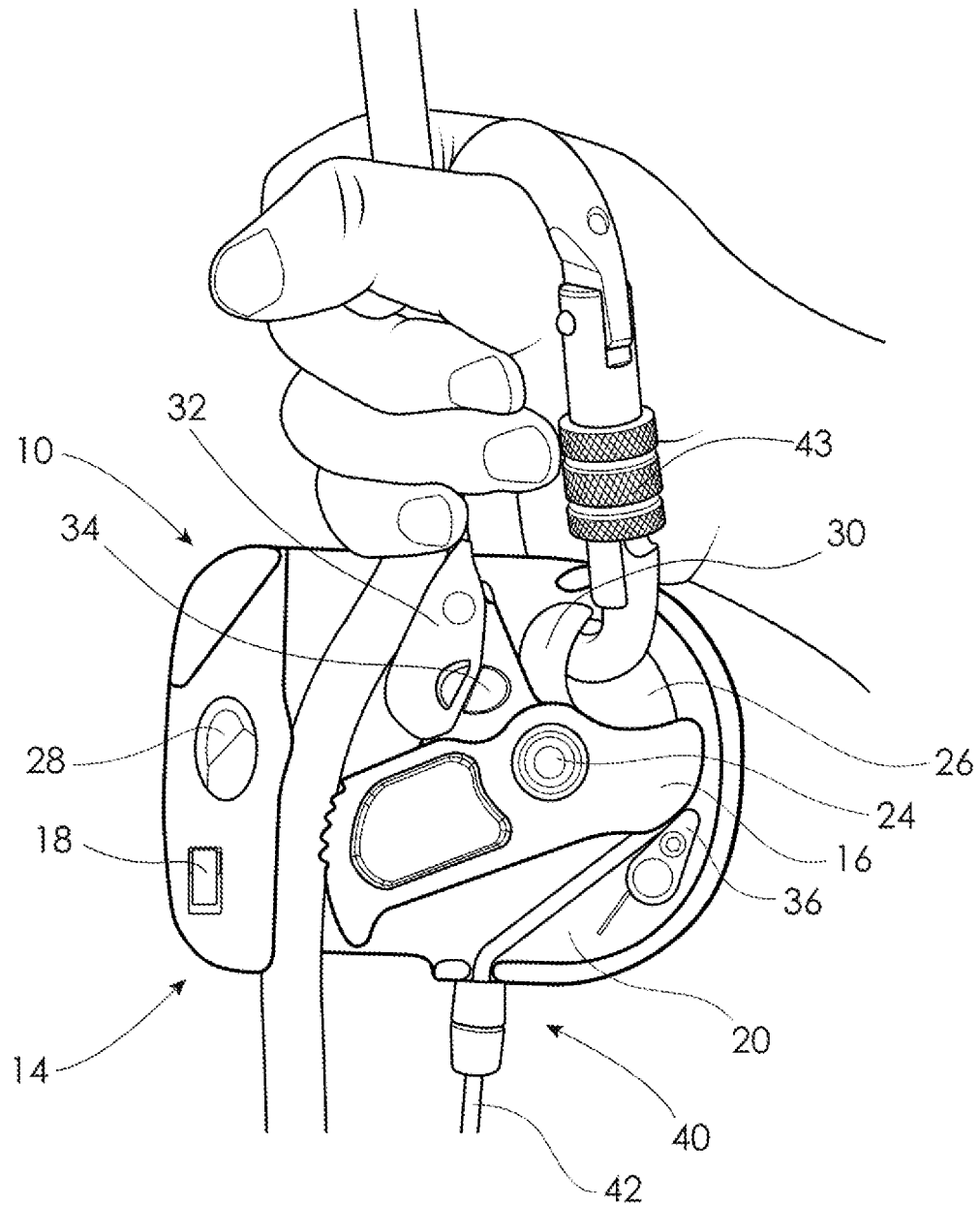


Fig. 9

10/13

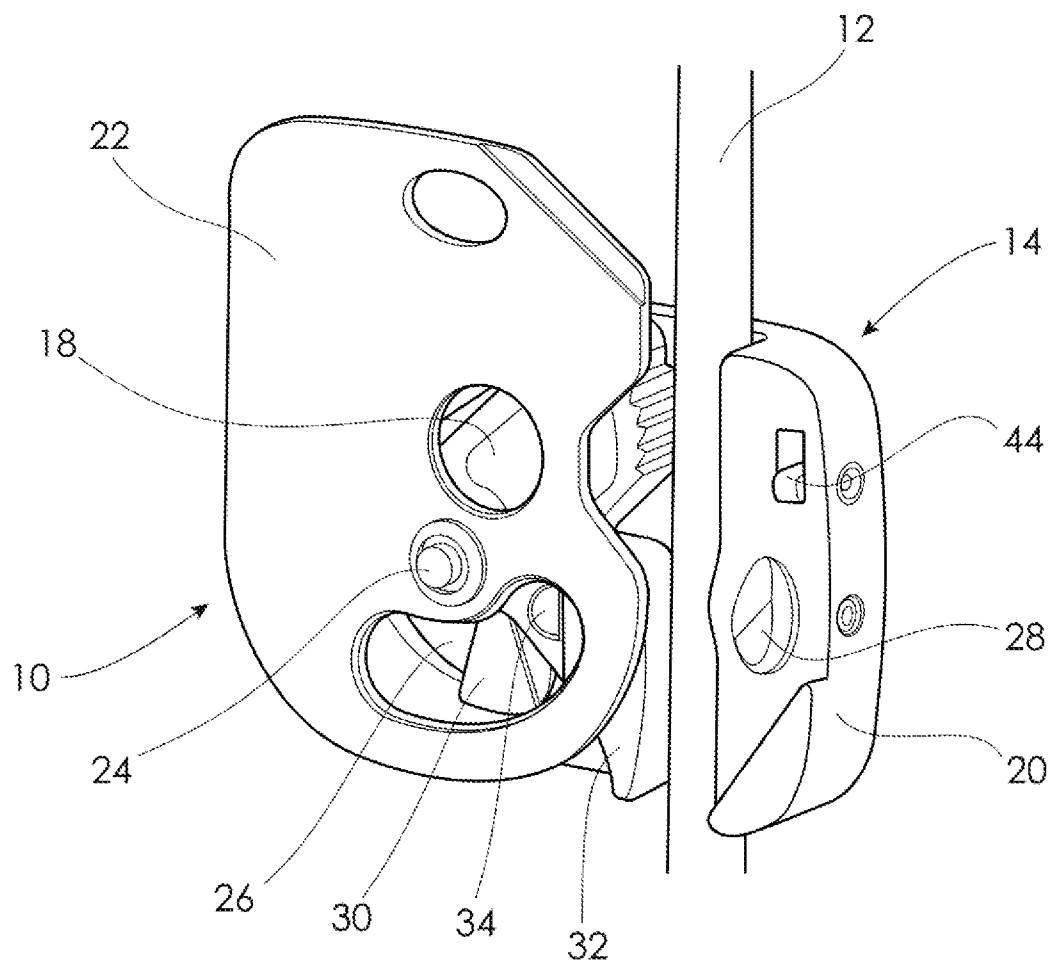
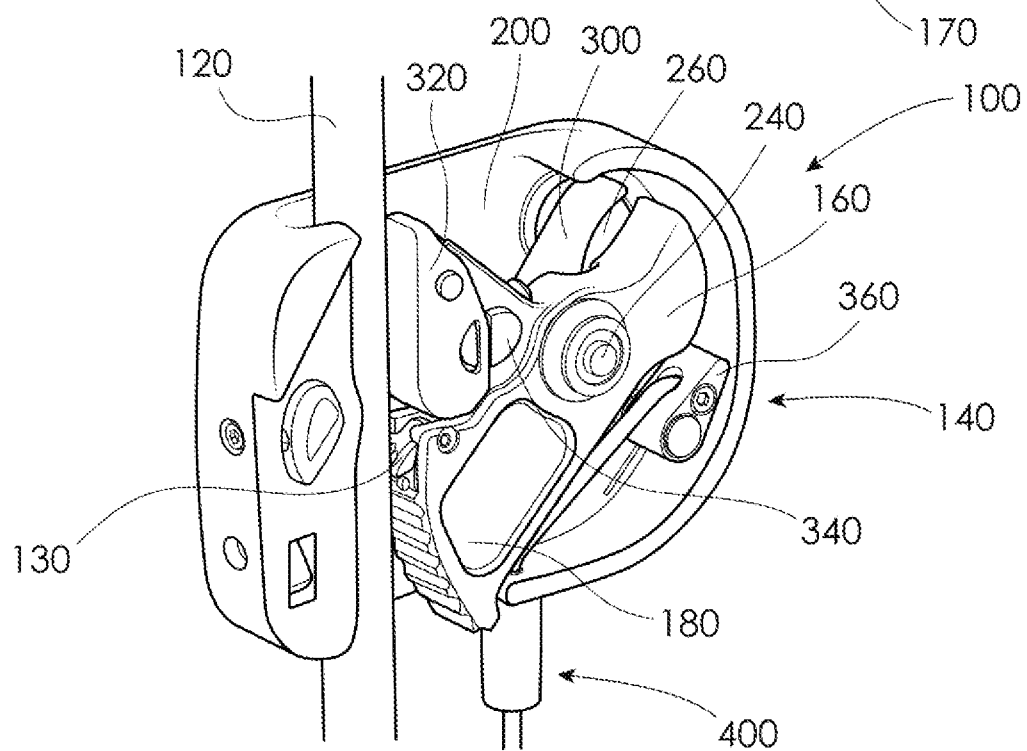
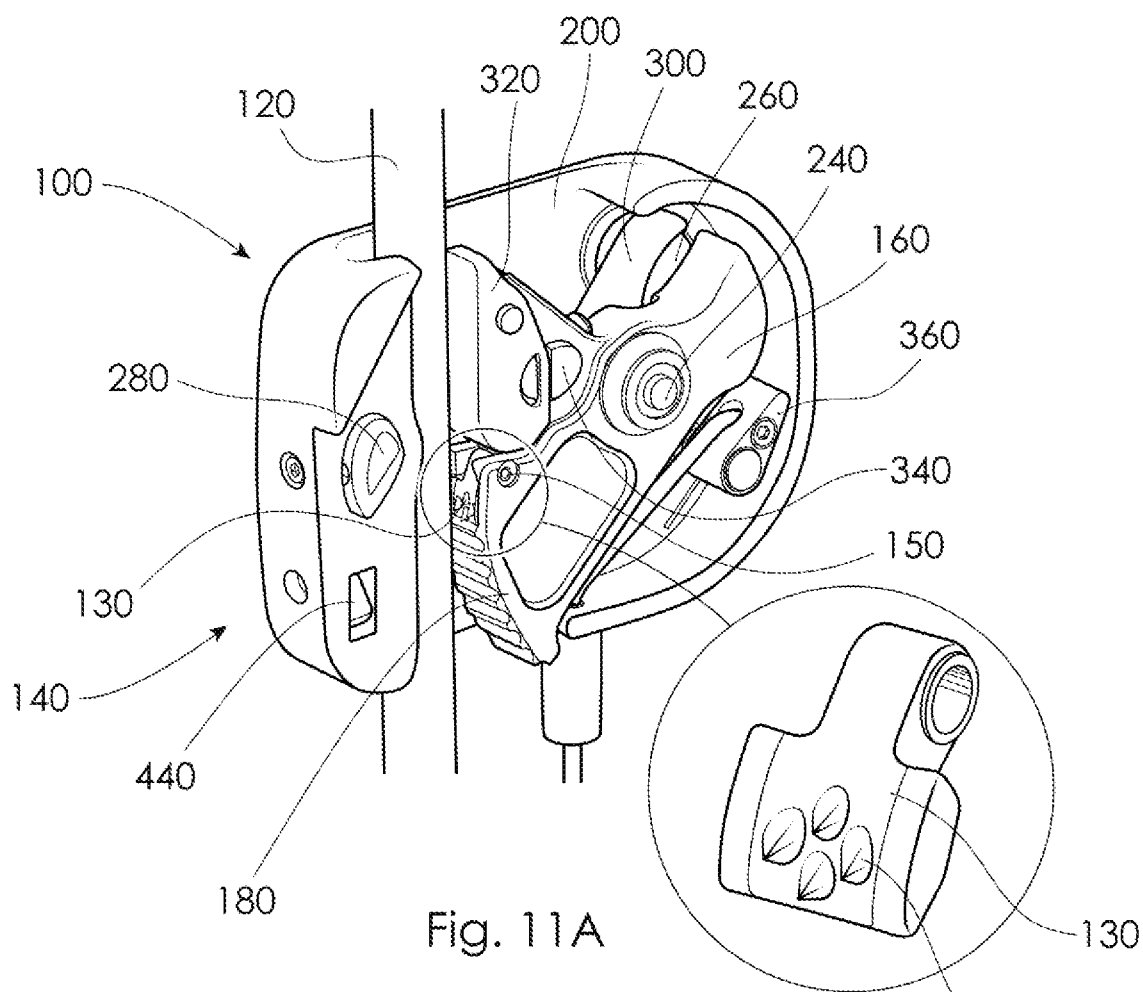


Fig. 10

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12/13

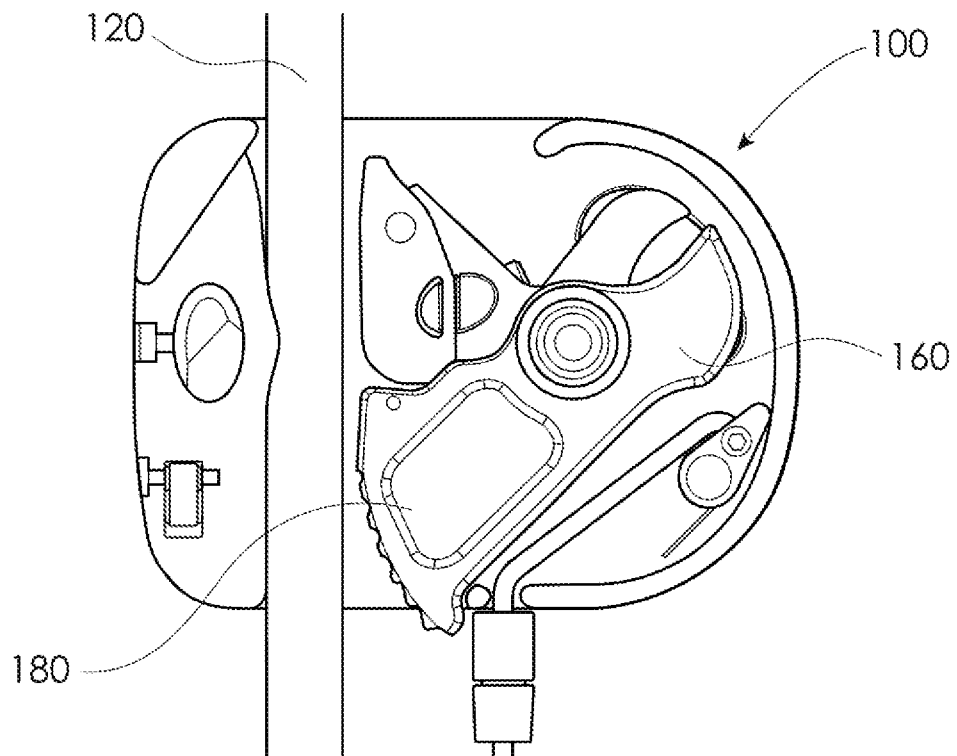


Fig. 12A

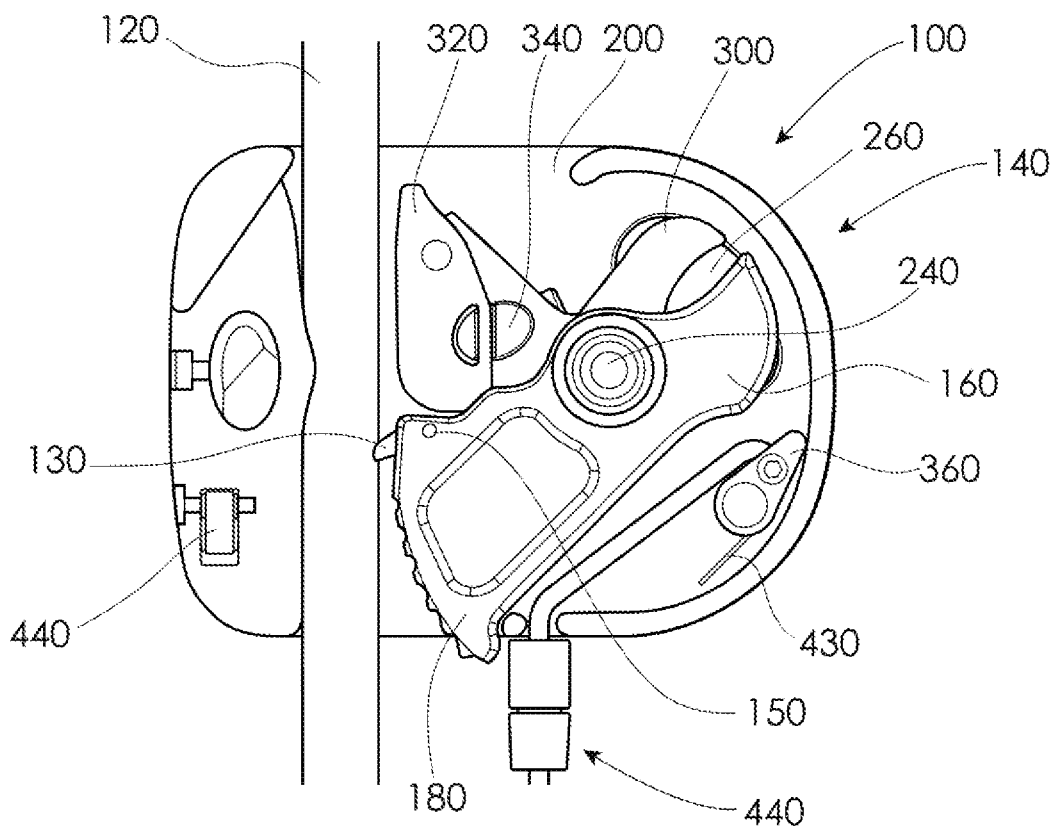


Fig. 12B

13/13

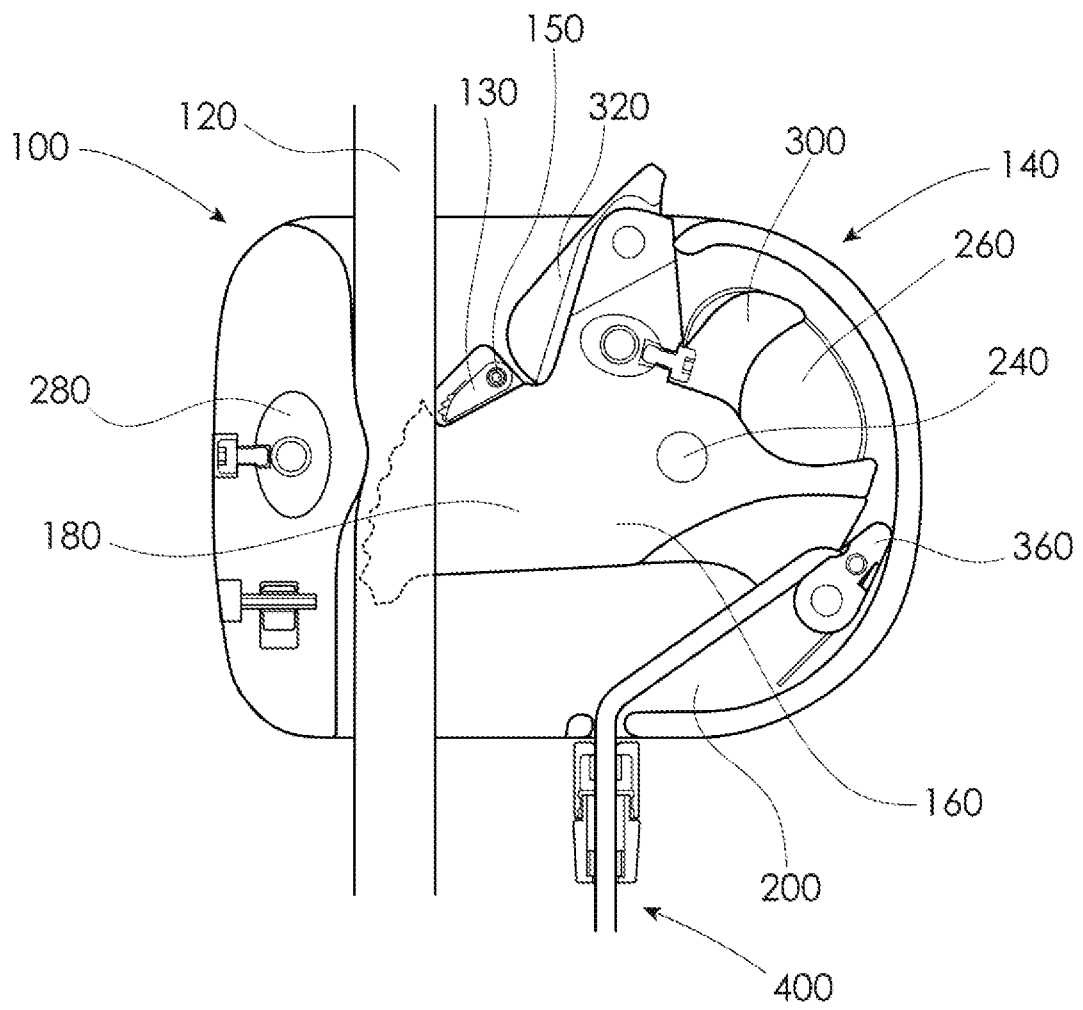


Fig. 13

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2014/000635

A. CLASSIFICATION OF SUBJECT MATTER

A62B 35/00 (2006.01) A62B 1/06 (2006.01) A63B 29/02 (2006.01) A63B 27/00 (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)

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)

EPODOC, WPI; IPC/CPC Marks A62B1, A62B35, A63B27, A63B29 and Keywords: fall arrester, descender, grab, backup, rope, cord, cable, cam, lever, pivot, secondary, inertia, tow, tug and similar terms.

TXTUS0, TXTUS1, TXTUS2, TXTUS3, TXTUS4, TXTUS5, TXTEP1, TXTGB1, TXTWO1, TXTAU1, TXTCA1, TXTSG1 and Keywords: fall arrester, descender, grab, backup, rope, cord, cable, cam, lever, pivot, secondary, tow, tug and similar terms.

Espacenet/Google Patents/Google: Inventor/Applicant searches conducted, and keywords: fall arrester, backup, cam/lever/rope and similar terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	Documents are listed in the continuation of Box C	

☒ 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	"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
"E" earlier application or patent but published on or after the international filing date	"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
"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)	"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
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search
30 July 2014

Date of mailing of the international search report
30 July 2014

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Telephone No. 0262832945

INTERNATIONAL SEARCH REPORT		International application No.
C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		PCT/AU2014/000635
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	KONG Italy, Work Positioning: Back-Up #802 fall arrester, Product Information Sheets [retrieved on 23 July 2014] Retrieved from the Internet <URL: https://web.archive.org/web/20130310133553/http://www.kong.it/instructions/I_KONG_BACK_UP.pdf > published on 10 March 2013 as per Wayback Machine Pgs 26-33, 82-90 Pgs 26-33, 82-90	1-5, 7-9, 11-12, 16-22 6, 10
X Y	KONG Back Up 7/16 Rope Grab [retrieved on 23 July 2014] Retrieved from the Internet <URL: https://web.archive.org/web/20130326063028/http://www.patrollersupply.com/equipment/item_2611.asp > published on 26 March 2013 as per Wayback Machine Whole document Whole document	1-5, 7-9, 11-12, 16-22 6, 10
X Y	KONG #802 Back-Up, published 17 March 2011, [retrieved on 23 July 2014] Retrieved from the Internet <URL: http://www.usrigging.com/pdfs/Kong802Back-Up.pdf > Whole document Whole document	1-5, 7-9, 11-12, 16-22 6, 10
X	Camp Safety Goblin Fall-Arrest Device Technical Information Sheet, published 27 September 2012, [retrieved on 23 July 2014] Retrieved from the Internet <URL: http://www.sbaris.co.uk/back-up-devices/camp-goblin-fall-arrester.htm > Whole document	1-2, 11, 18-19, 21-22
X	US 5316103 A (BELL et al) 31 May 1994 Figs 1-6; Col 5 Lines 27-46	1-2, 11, 18-19, 21-22
X	US 6056086 A (GORTAN et al) 02 May 2000 Figs 1-4; Col 4 Lines 17-19, 56-60	1-2, 11, 18-19, 21-22
X	US 5860493 A (CHERPITEL) 19 January 1999 Figs 1-17; Col 3 Lines 12-15, Col 4 Lines 3-7, Col 5 Lines 12-14	1-2, 11, 18-19, 21-22
X Y	IRATA NEWS, Back-up tests Lithuania interim report, published 22 May 2012, [retrieved on 23 July 2014] retrieved from the Internet <URL: http://www.irata.org/pdf%20downloads/100kg%20Abseil%20Position%20Drop%20Test%20V3.pdf > Section on S.Tec Duck R Section on S.Tec Duck R	1-5, 7-9, 11, 18-22 6, 10
X Y	Safetec Duck R, published 27 June 2013, [retrieved on 23 July 2014] retrieved from the Internet <URL: http://www.access-techniques.com/stec-duck-r-the-new-shunt/ > Whole document Whole document	1-5, 7-9, 11, 18-22 6, 10
X Y	ISC: International Safety Components Ltd RED Rope Grab Backup device w/ Popper tow cord <URL: https://web.archive.org/web/20130218232812/http://www.patrollersupply.com/equipment/item_4140.asp > published on 18 February 2013 as per Wayback Machine. Whole document Whole document	1-2, 11, 18-19, 21-22 6, 10
X	US 5934408 A (FLUX) 10 August 1999 Figs 5-8; Col 1 Lines 46-47, Col 5 Line 29 - Col 6 Line 37	1-2, 11, 13-15, 18-19, 21-22

INTERNATIONAL SEARCH REPORT		International application No.
C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		PCT/AU2014/000635
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2011/0186388 A1 (SUDALE et al) 04 August 2011 Abstract; Figs 1-3; Para 0038	1-2, 11, 18-22
Form PCT/ISA/210 (fifth sheet) (July 2009)		

INTERNATIONAL SEARCH REPORT		International application No.	
Information on patent family members		PCT/AU2014/000635	
This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.			
Patent Document/s Cited in Search Report		Patent Family Member/s	
Publication Number	Publication Date	Publication Number	Publication Date
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		EP 0752255 B2	30 Jun 2004
		FR 2736273 A1	10 Jan 1997
US 5934408 A	10 August 1999	AU 693602 B2	02 Jul 1998
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Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.			

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INTERNATIONAL SEARCH REPORT Information on patent family members		International application No. PCT/AU2014/000635	
This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.			
Patent Document/s Cited in Search Report		Patent Family Member/s	
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		EP 2326391 A1	01 Jun 2011
		WO 2010026201 A1	11 Mar 2010
End of Annex			
Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001. Form PCT/ISA/210 (Family Annex)(July 2009)			

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Poder

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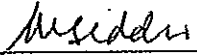
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Name/Nombre: Michael D. Biddle

Signature/Firma: 

Date/Fecha: 11 / 1 / 2012
(Day/Month/Year)

City/Country/Ciudad,País: Sydney, AUSTRALIA

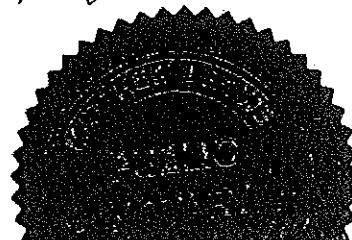
I, Matthew John Rowe, Notary of Parramatta,
NSW, Australia

Witnessed the execution of and verified the
identity of the said Michael D. Biddle

On 11 January 2012

{01203965}


Matthew John Rowe
Solicitor & Notary Public



Resumen

La presente invención se relaciona ampliamente con un dispositivo de detención de caídas 10 unido al arnés de un usuario a través de una configuración de acoplamiento 6. El dispositivo de detención de caídas 10 está diseñado para ser unido a una cuerda de respaldo o una línea de seguridad 12. El dispositivo de detención de caídas 10 comprende un cuerpo 14, y una palanca 16 acoplada de manera giratoria al cuerpo 14. La palanca 16 incluye una leva principal 18 la cual está colocada para cooperar con la configuración de acoplamiento 6. Durante el funcionamiento, el descenso del usuario hace que la configuración de acoplamiento 6 entre en contacto con la palanca 16 la cual gira para efectuar el frenado de la línea de seguridad 12 entre el cuerpo 14 y la leva principal 18.

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Arte previo

Fig. 1

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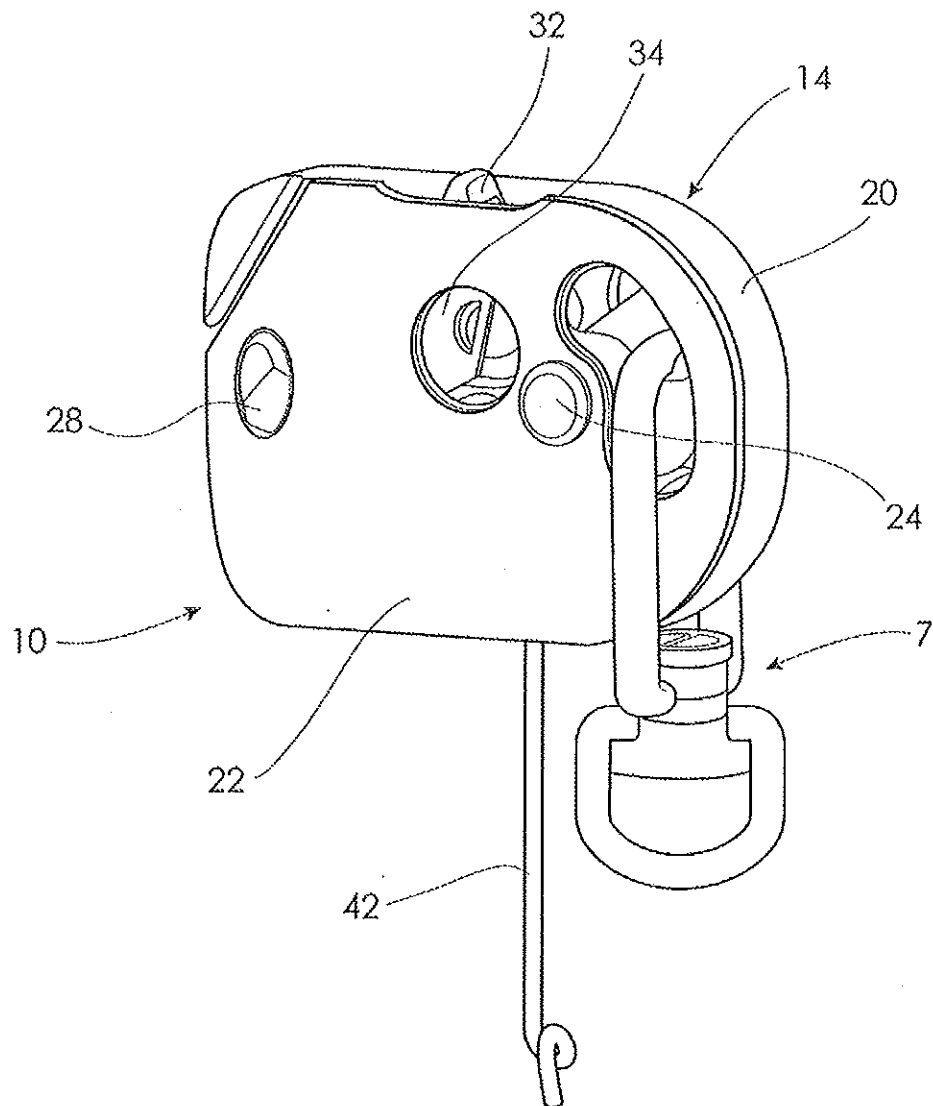
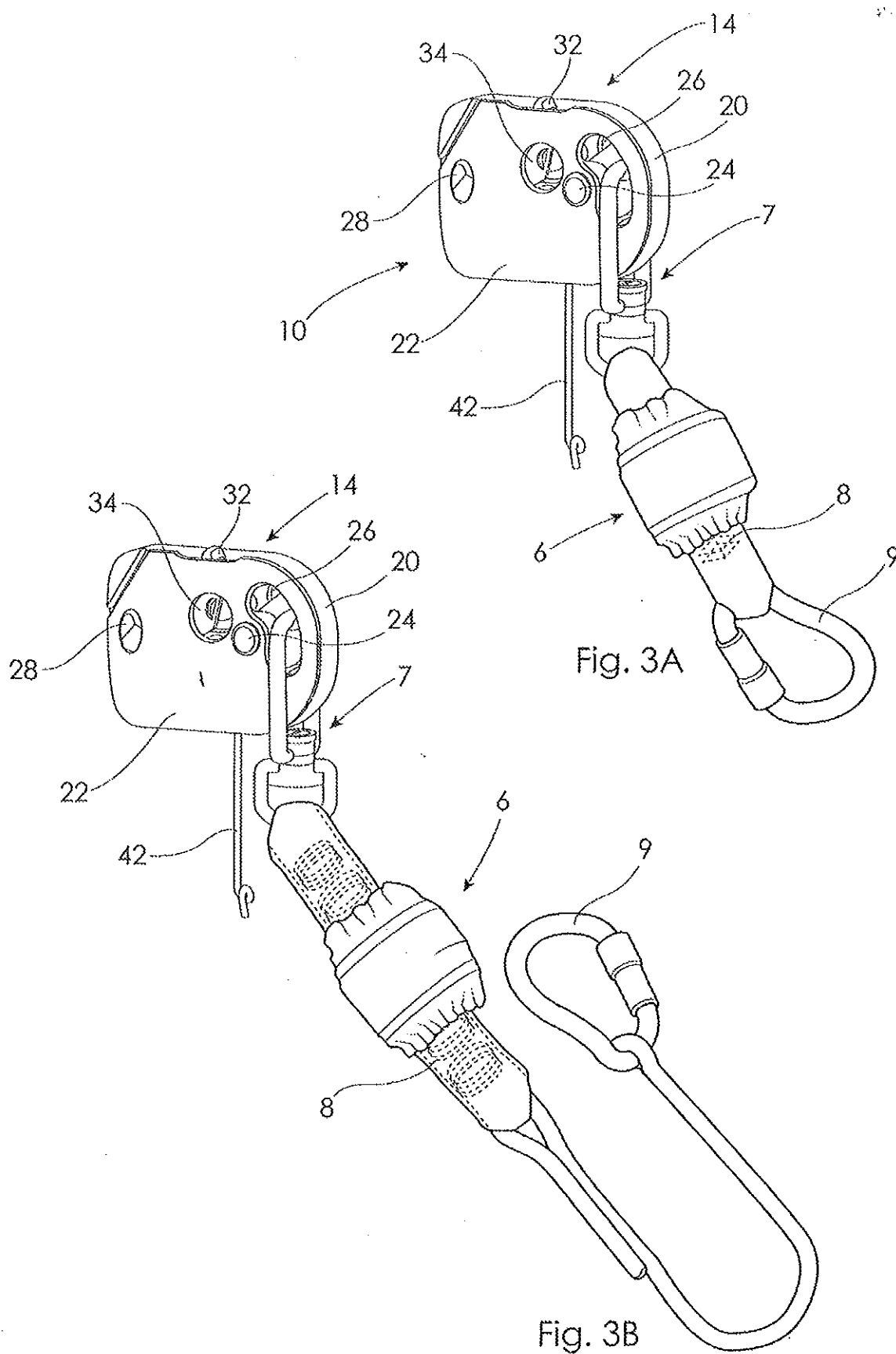


Fig. 2

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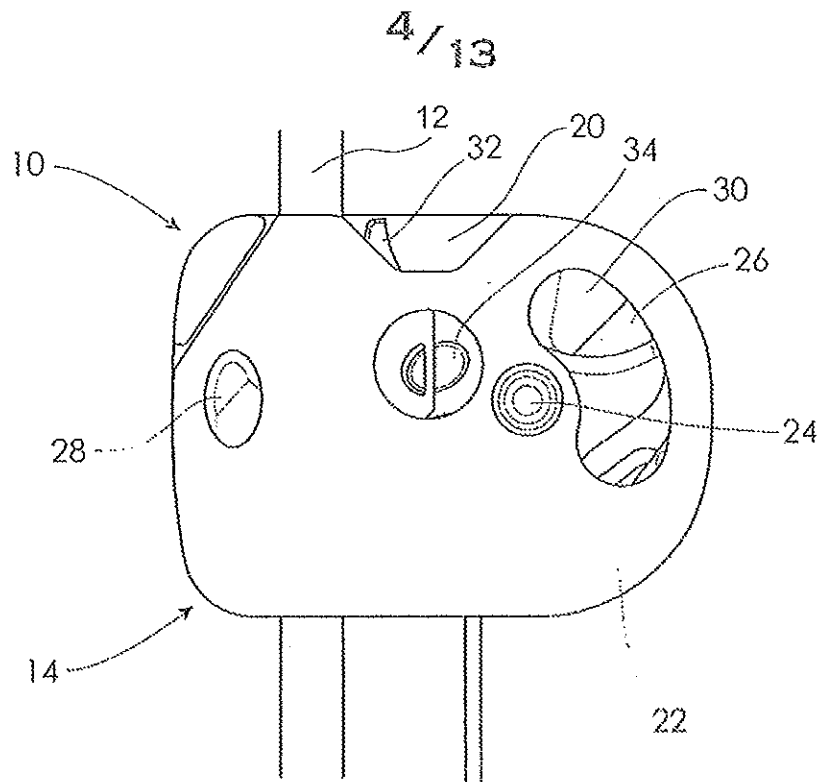


Fig. 4A

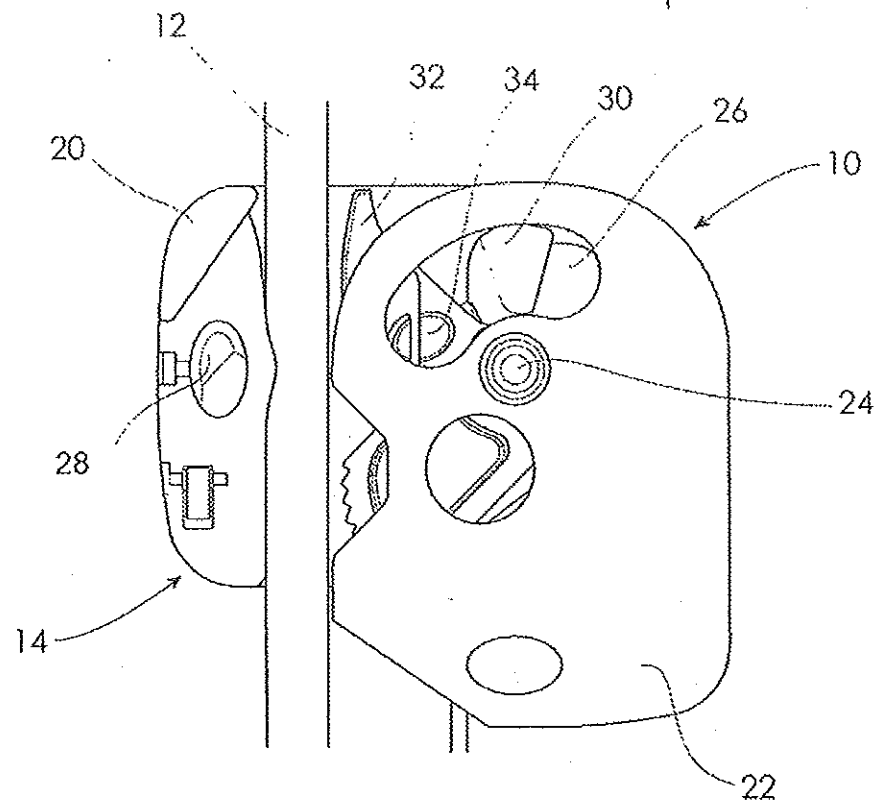


Fig. 4B

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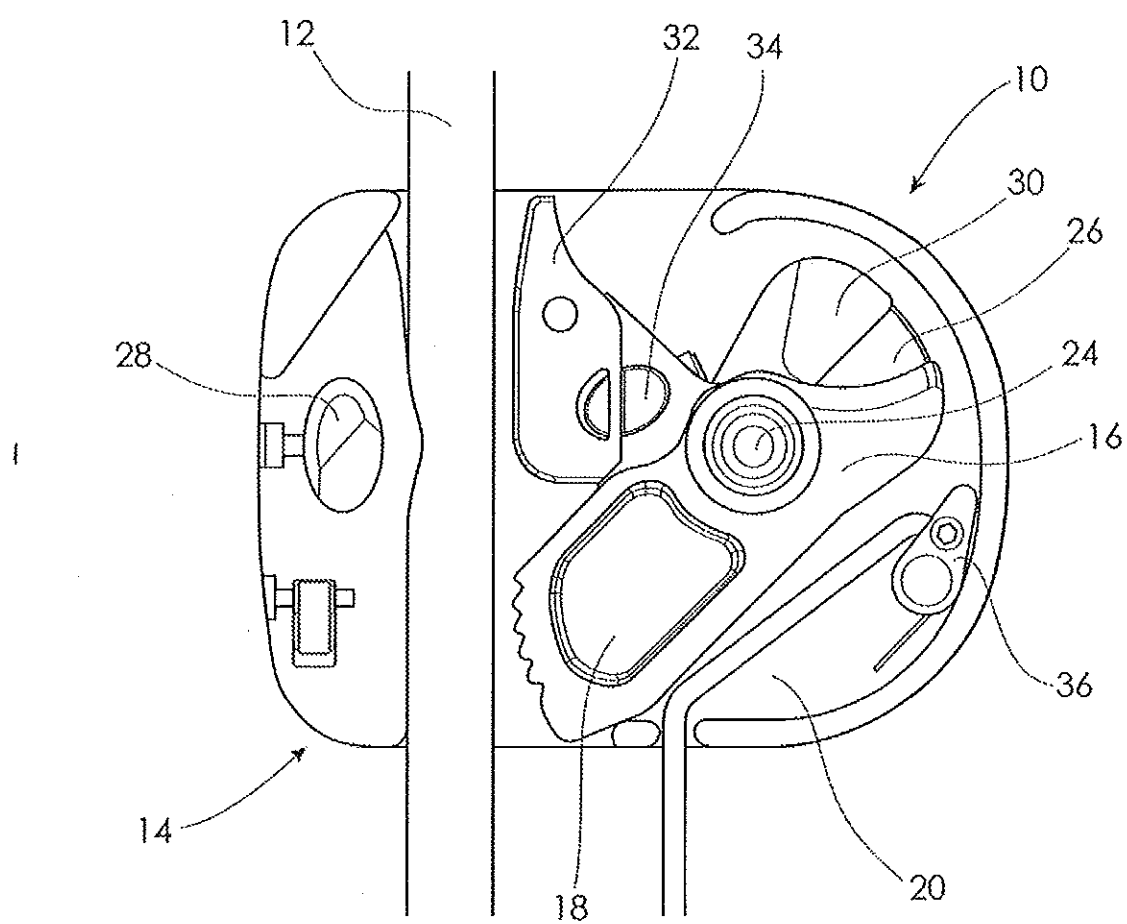
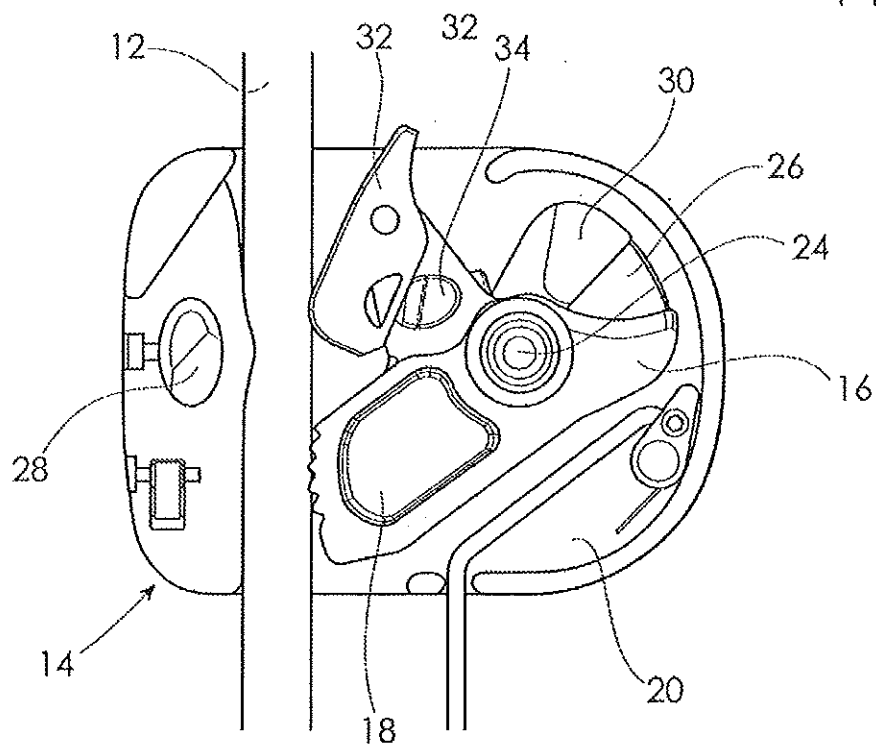
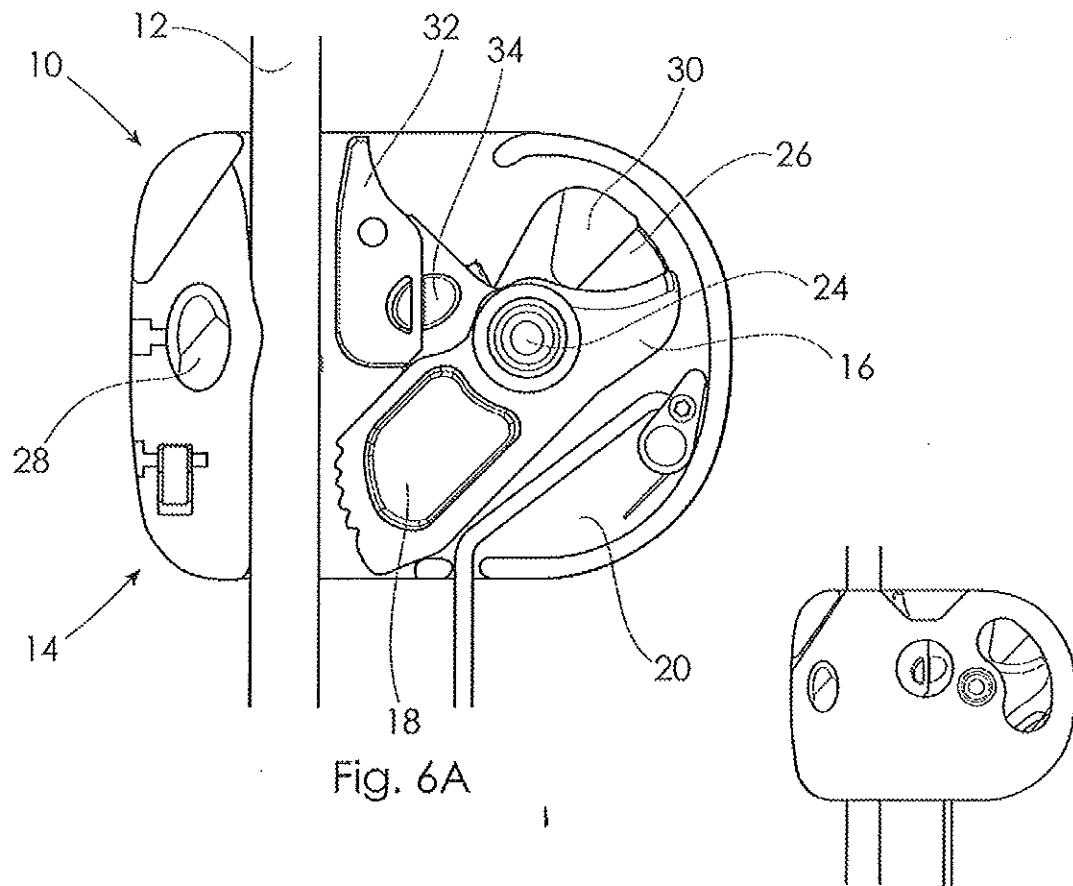


Fig. 5

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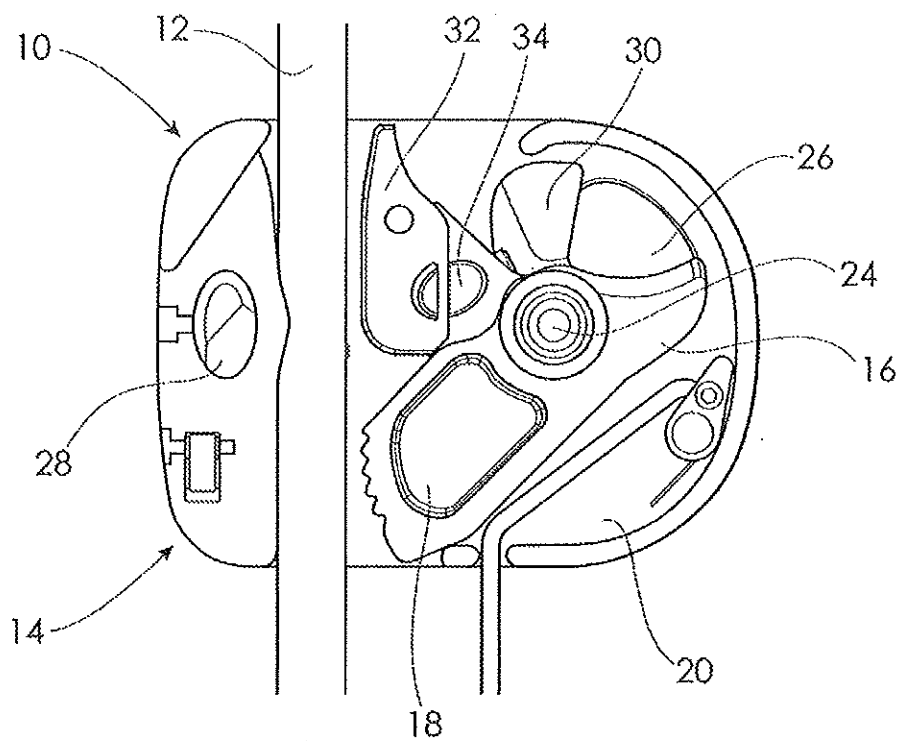


Fig. 7A

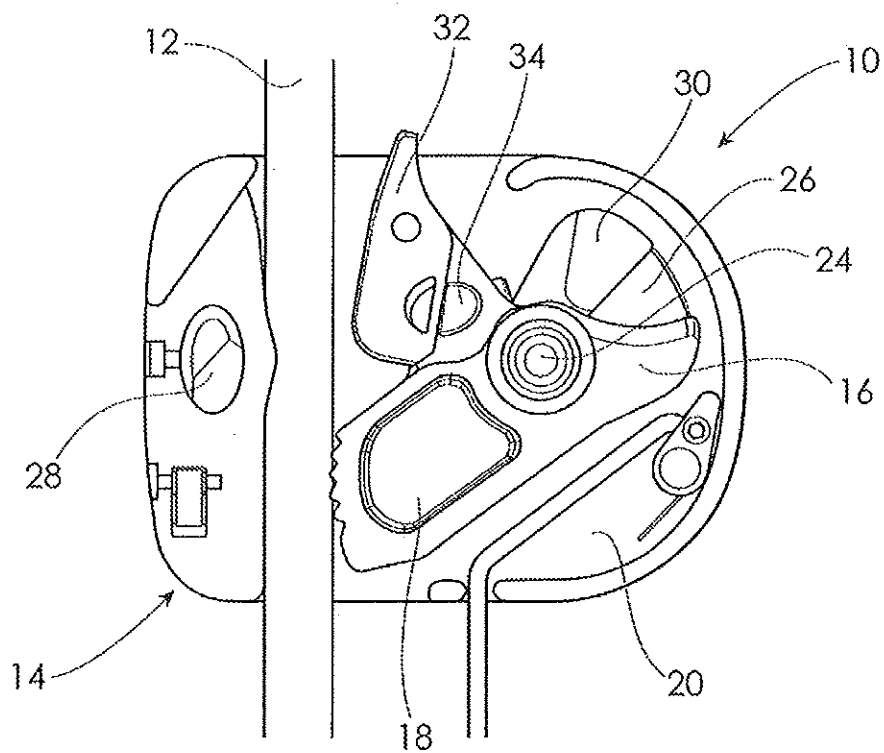


Fig. 7B

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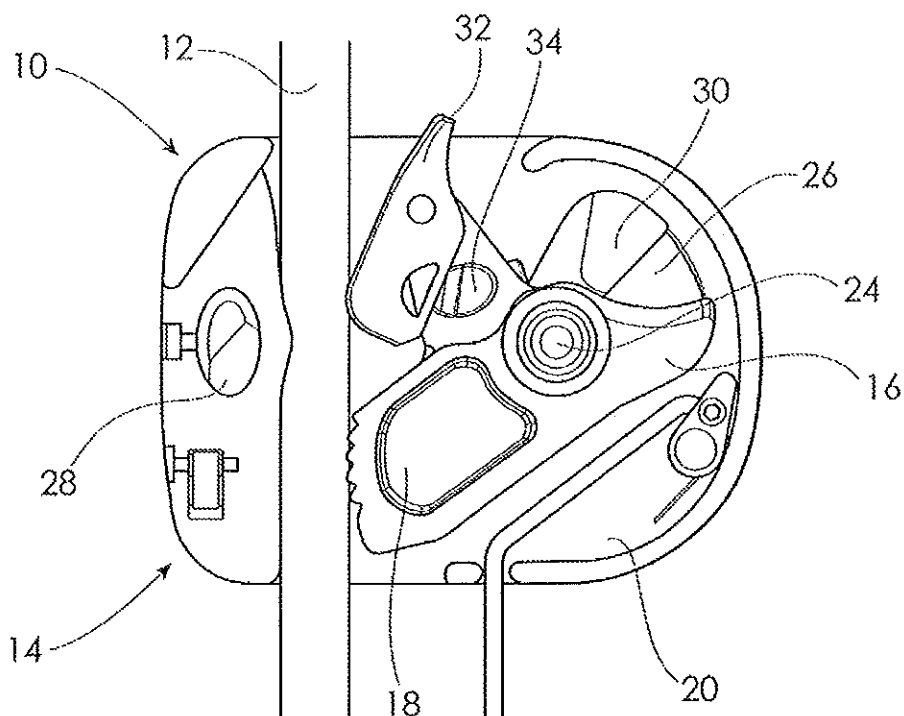


Fig. 8A

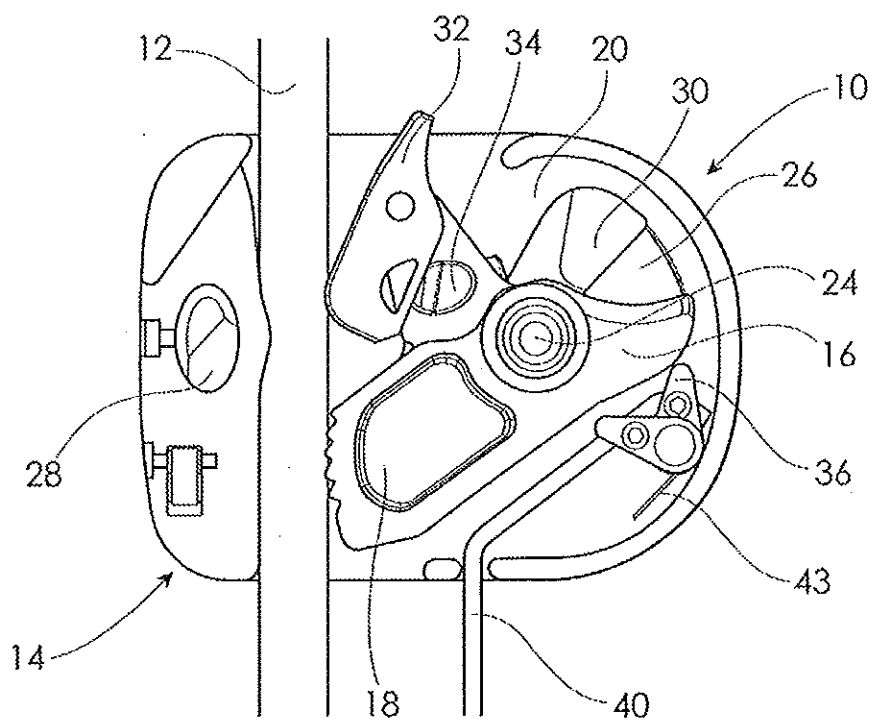


Fig. 8B

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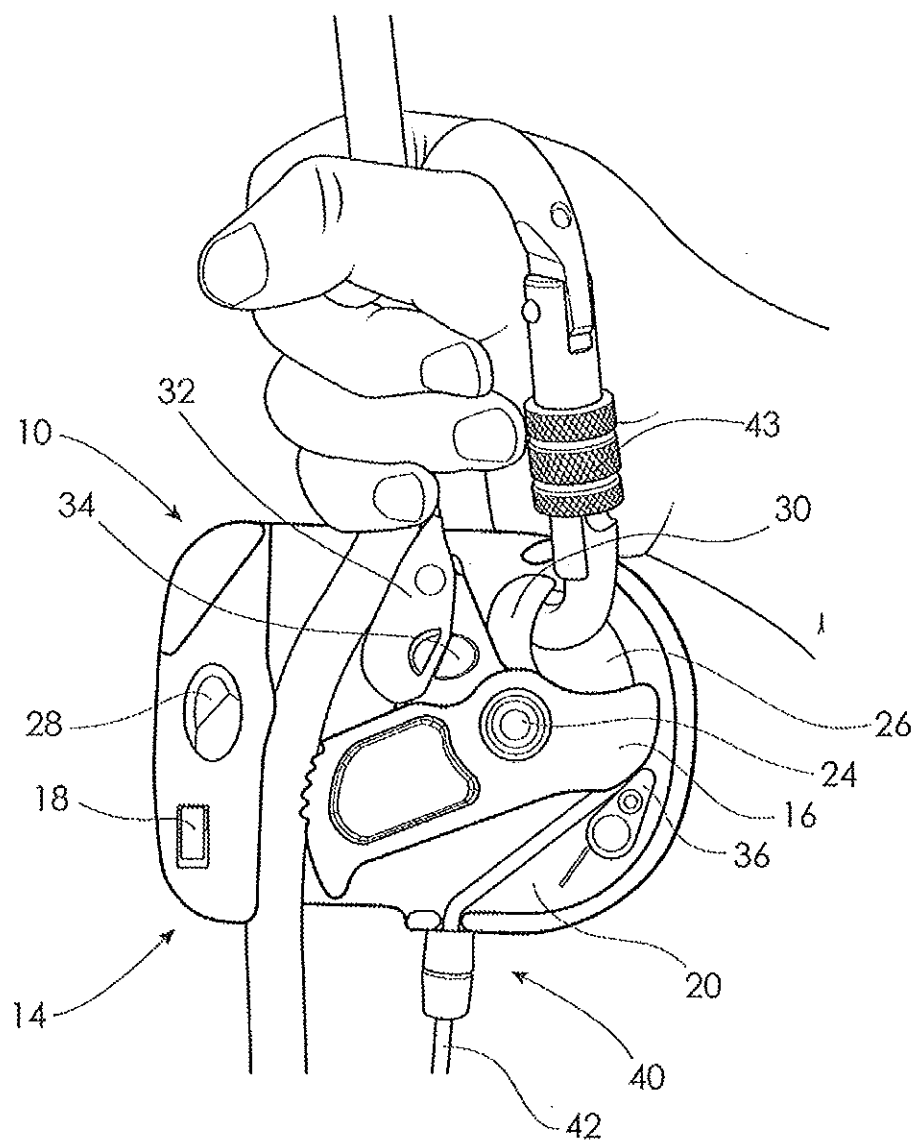


Fig. 9

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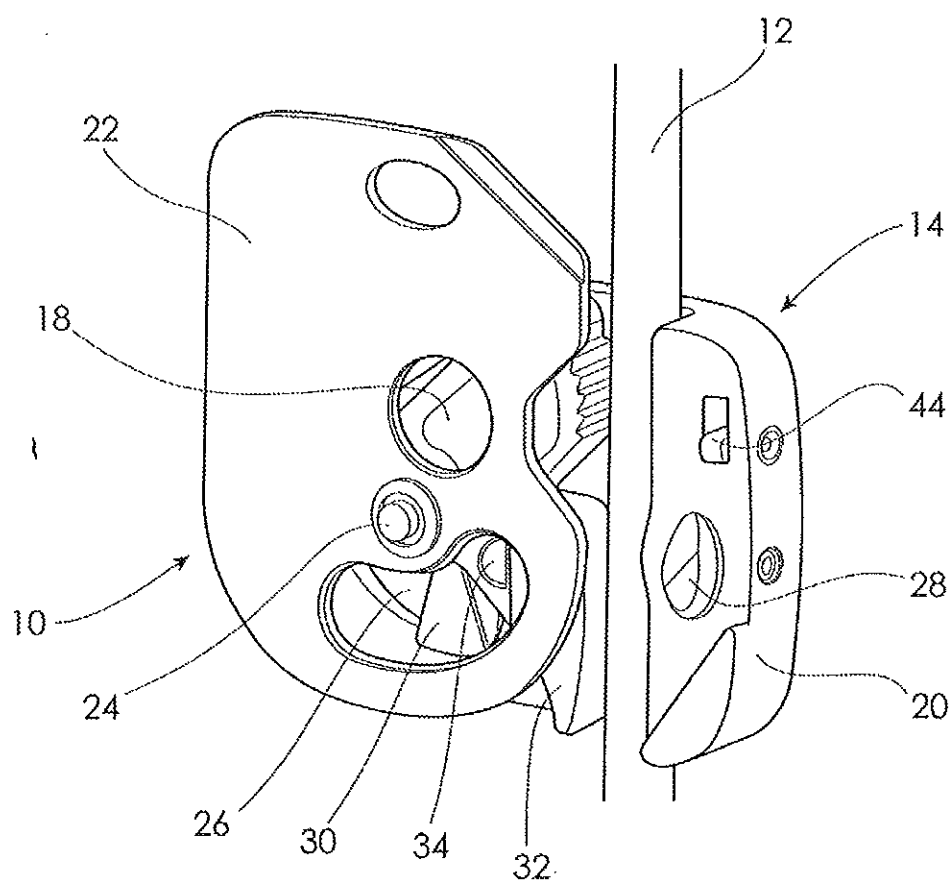
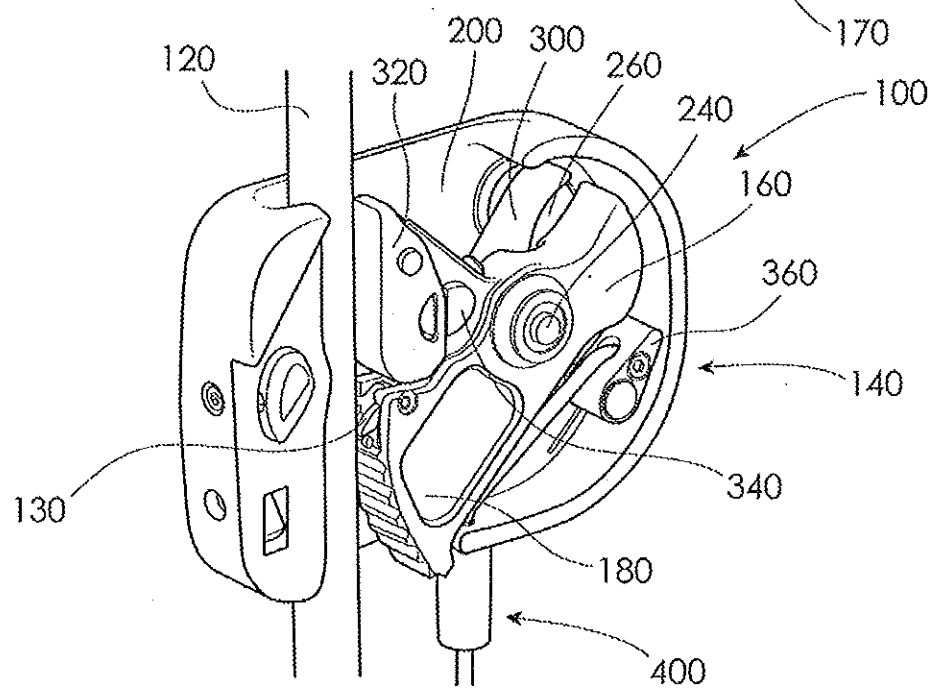
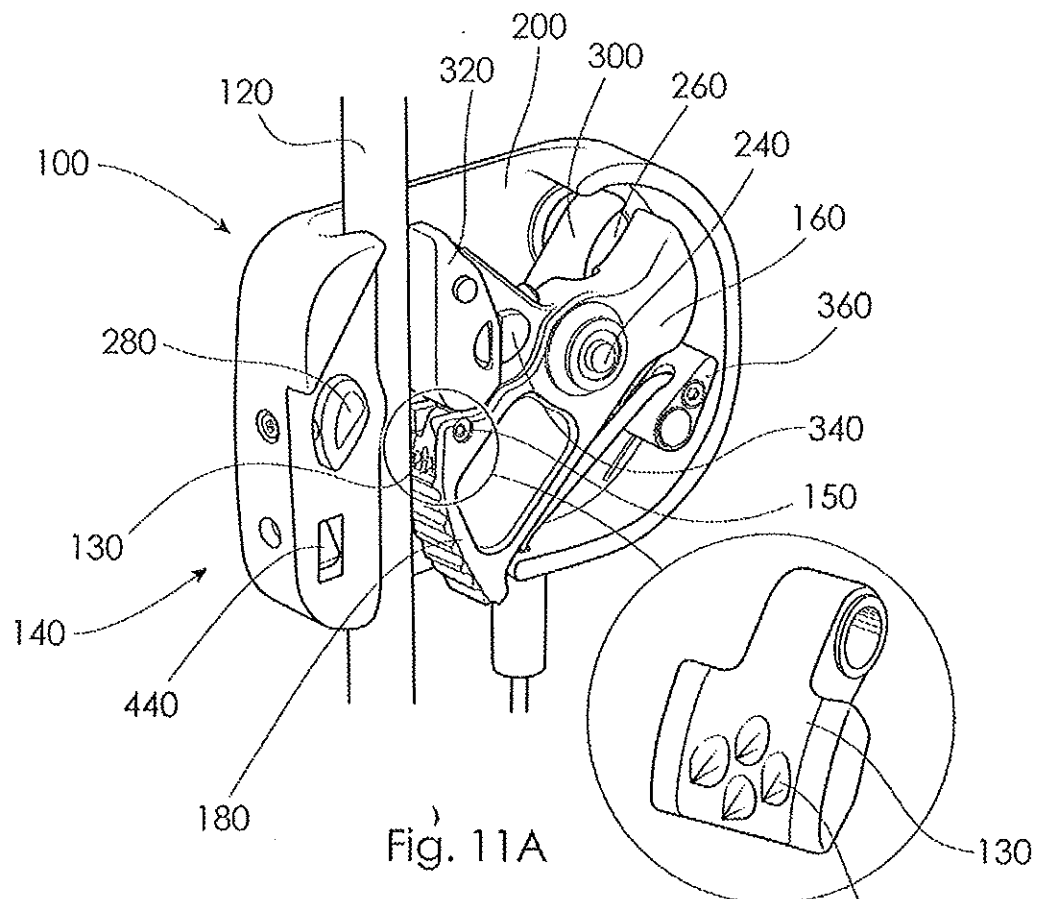


Fig. 10

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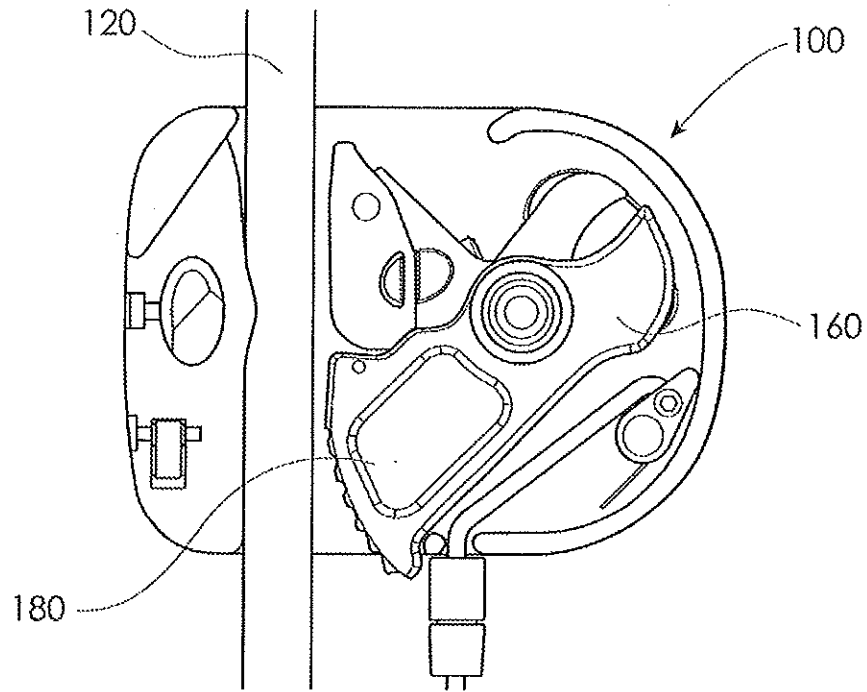


Fig. 12A

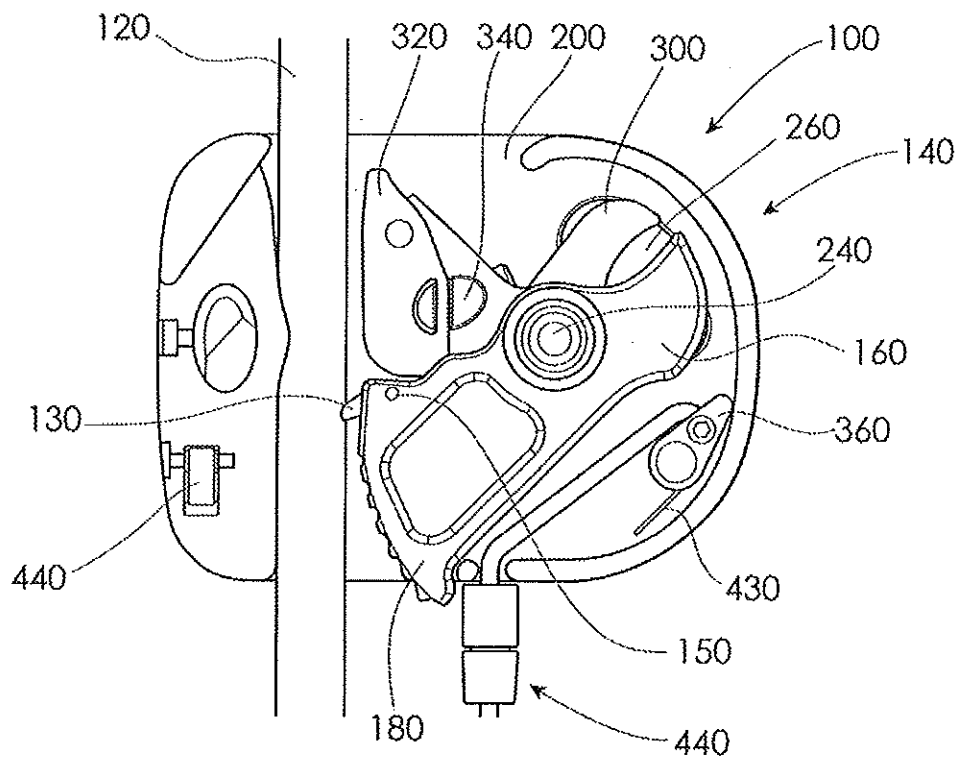


Fig. 12B

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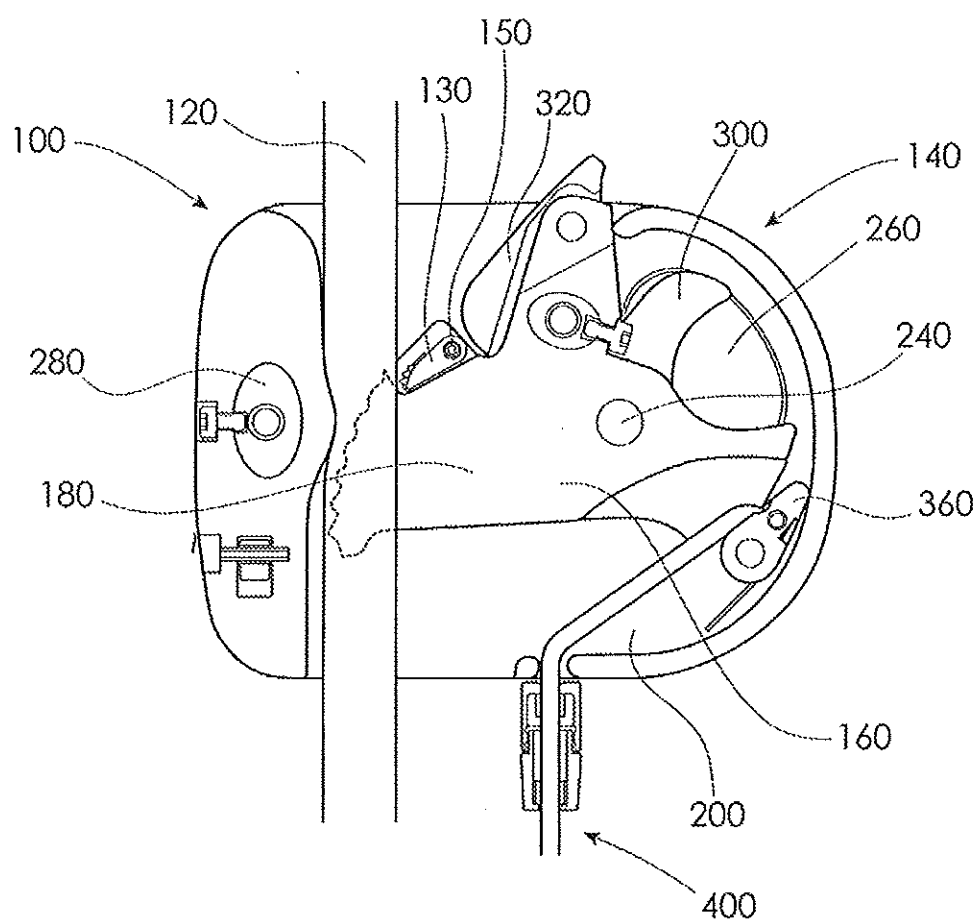


Fig. 13