(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 120 164**
B1

(12) # EUROPEAN PATENT SPECIFICATION

(45) Date of publication of patent specification: **21.01.87**

(51) Int. Cl.[4]: **A 62 B 1/16,** A 62 B 35/00, B 63 C 9/26, E 04 G 21/32

(21) Application number: **83307332.3**

(22) Date of filing: **01.12.83**

(54) **Safety harness.**

(30) Priority: **26.01.83 GB 8302161**

(43) Date of publication of application:
03.10.84 Bulletin 84/40

(45) Publication of the grant of the patent:
21.01.87 Bulletin 87/04

(84) Designated Contracting States:
DE FR NL

(56) References cited:
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FR-A-2 126 623
GB-A-1 582 201
GB-A-2 024 749
GB-A-2 060 532
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EP 0 120 164 B1

Courier Press, Leamington Spa, England.

Description

This invention relates to a safety harness including a line for attaching the harness with respect to a fixed structure.

The term "safety harness' is used herein to include articles of apparel, e.g. a jacket, which can act as a safety harness when secured by a line with respect to a fixed structure.

There are many situations where it is desirable or indeed essential for persons to be securely attached to a fixed structure to prevent falling from the structure while having a certain freedom of movement along or about the structure. Examples of such situations are aboard a boat particularly a yacht and when carrying out work high up on building structures.

It is known to provide an elongate guide path element, e.g. a wire lift-line around the periphery of a boat deck, rigidly secured to the fixed structure and to provide a safety harness having fixed to it a lanyard or other securing line which can be hooked at its free end onto the guide path for sliding movement therealong.

British Patent Specification No. 2,024,749 illustrates such a system for use on a yacht, the system being adapted to allow free sliding movement of the lanyard attachment along a peripheral lifeline past intermediate support points thereof.

When two people are connected to the same elongate guide path element, it is often desirable for them to be able to pass one another without complete detachment from the guide path element even momentarily. Hitherto, in yachting applications, this has been achieved by providing two separate lanyards attached to each harness with a hook at the free end of each lanyard to allow one person to hook onto the life-line with one hook on each side of the position where the second person is hooked onto the life-line and then releasing the originally fastened hook to allow continued movement along the life-line in the desired direction. This system of providing two lanyards can also be used to allow a person attached to any strong point by one lanyard to transfer to any other strong point without complete detachment from any such strong point even momentarily. A disadvantage of this system is that one of the two lanyards hangs freely or has to be stowed until required for a traversing operation.

US—A—1,851,080 describes a safety belt having the features of the preamble of the accompanying Claim 1.

The present invention provides safety apparatus comprising a safety harness or an article of apparel as aforesaid having means providing an eyelet, a safety line passing through the eyelet, and a pair of connector devices one at each end of said line, each connector device, e.g. a standard lanyard safety hook, being adapted for engagement with an elongate guide track element or a device slidably mounted thereon or other elongate element which is part of or secured to a fixed structure and being dimensioned so as not to be able to pass through the aforesaid eyelet, characterized by a retaining device for location on or associated with said means providing said eyelet, the retaining device having parts one on each side of the eyelet for receiving and locating a portion of a respective one of said connector devices, when not in use.

The retaining device may comprise a housing having housing portions one on each side of the eyelet for receiving and locating therein a portion of a respective one of said connector devices. Each housing portion may have resilient retaining means projecting inwardly thereof for engaging and retaining the respective connector device when it is engaged in that housing portion. Preferably the housing is made of resilient, preferably plastics, material and is formed with an inward depression in a side wall of each housing portion thereof to form said resilient retaining means. Preferably a pair of opposed inward depressions are formed in opposite side walls of each housing portion. According to a feature of such arrangements, the housing may have a slot in a side wall or in each of a pair of side walls thereof to receive said means on the harness providing said eyelet in order to mount the housing thereon.

An advantage of safety apparatus according to the invention is that during use it can obviate the unattached length of trailing lanyard as in the system described above using two lanyards and, in preferred embodiments, the connector device not in use at the time being, is conveniently stowed.

Safety apparatus according to the invention is readily suitable for use in combination with a load-transfer device as described in British Patent No. 1,582,201 and, for marine applications, in conjunction with safety equipment as disclosed in and as claimed in any claim of British Patent No. 2,024,749.

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

Figure 1 is a diagrammatic front view of a safety apparatus embodying the invention;

Figure 2 is a diagrammatic perspective view of a hook housing element for use with the apparatus of Figure 1;

Figure 3 is a diagrammatic front view of a hook engaged in the housing of Figure 2;

Figure 4 is a plan view of the assembly of Figure 3;

Figure 5 is an end view of the hook housing of Figure 3;

Figure 6 is a diagrammatic perspective view of a load-transfer device and safety line in conjunction with which safety apparatus embodying the invention may be used (a part of one of the wheels of the device being cut-away); and,

Figures 7A to 7D are diagrams illustrating a procedure for two persons, each secured to a safety line by an apparatus embodying the invention, to pass one another.

Referring to Figures 1 to 5 of the drawings, safety apparatus according to the invention comprises a lanyard or other attachment line (10) having secured to each of its free ends a safety hook connector (11, 12). The lanyard (10) passes through an eyelet which is provided for example by a "D" ring, shackle or hook (13) or any similar attachment device through which the lanyard can pass easily, and is connected to a safety harness or a jacket, the relative dimensions of the eyelet (13), lanyard (10) and hooks (11, 12) being such that the lanyard can run freely through the eyelet (13) but the hooks (11, 12) will not pass through the eyelet (13).

The apparatus further includes a hook grip (14) as shown particularly in Figure 2. The hook grip (14) comprises a moulded plastics housing having a generally oblong cross-section which narrows progressively towards the centre of the housing to form a "bow-tie" shape. Pairs of depressions (15, 16) are formed in side walls of the housing (14) adjacent respective opposite ends thereof, the depressions projecting towards each other inwardly of the housing. The hook grip (14) is also formed in its opposite side walls with a pair of aligned slots (17) which are dimensioned so as to receive the D-ring, shackle or hook (13), as shown in Figure 4, whereby the hook grip is mounted on the eyelet member (13) and is retained thereon by the lanyard (10) which passes through the housing and through the eyelet (13).

The wearer of the harness fitted with the safety apparatus attaches himself to a safety line using one of the safety hooks (11, 12) at an end of the lanyard (10), the other hook being conveniently stowed in the hook grip (14) as shown in Figure 3. The safety hook (11) is retained in the hook grip (14) by the corresponding pair of depressions (16) which are resiliently sprung apart as an end portion of the hook (11) is engaged in the respective end of the hook grip (14) to then assume their original position on further insertion of the hook (11) into the hook grip thereby providing a positive restraint of the hook until sufficient force is applied thereto to once again resiliently deform the depressions (16) of the hook grip.

When it is desired to pass another person similarly attached to the same safety line, the hook (11) stowed in the hook grip (14) is withdrawn therefrom and clipped to the safety line on the opposite side of the second person. The originally connected hook (12) is then released and stowed in the opposite end portion of the hook grip (14) to complete the passing operation.

Instead of attaching the safety hooks (11, 12) directly to a safety line, the above apparatus may be used in conjunction with a load-transfer device of the type described in British Patent No. 1,582,201 or in yachting applications with safety equipment as described in British Patent 2,024,749. Figure 6 illustrates such a system. A wire safety line (20) is suspended by U-shaped clips (21) and a load-transfer device (22) is engaged for sliding movement along the wire (20) and is capable of traversing the clips (21) without becoming detached from the wire (20). The load-transfer device comprises two wheels (23, 24) having an annular series of spaced apart radial projections (25, 26); the wheels (23, 24) being mounted for free rotation on a common axle (27) in a spaced apart relation. A connector element (28) is mounted to extend between the wheels for free pivotal movement on the axle (27) and has an aperture (29) for receiving the hook connectors (11, 12) of the apparatus of Figures 1 to 5. A slipper member (30) is positioned between the wheels at a peripheral part thereof. The slipper member has arcuate flanges (31) on opposite sides thereof for engaging in recesses (32, 33) in the wheels (23, 24) respectively such that the wheels can rotate with respect to the slipper member without becoming detached therefrom. The slipper member along its underside has a groove (34) for locating on the wire (20) to slide therealong. This groove may in some embodiments extend around more than half of the wire (20) in order to provide a positive location between the wire and the slipper member.

When during sliding movement along the wire (20) the load-transfer device (22) encounters a supporting clip (21) for the wire, the vertical limbs of the clip engage a pair of projections (25, 26) of the wheels, respectively, causing the wheels to rotate relative to the slipper member (30) thereby allowing the clip (21) to pass through the load-transfer device (22) while the slipper member (30) remains in engagement with the wire (20). In this way the load-transfer device can traverse the supporting clips (21) without becoming detached from the wire (20).

Figure 7 illustrates diagrammatically a procedure for two persons to pass one another, each person being attached to a safety wire (20) by a safety apparatus as shown in Figures 1 to 5 used in conjunction with load-transfer devices as shown in Figure 6. Figure 7A illustrates two load-transfer devices (22) engaged with the same safety wire (20) and each person is attached with respect thereto by a respective lanyard (10) with each safety hook thereof hooked through the aperture (29) in the connector element (28) of the device (22) and with the second hook (12) stowed in the hook grip of the apparatus as shown in Figure 3. In order to pass one another, as shown in Figure 7B, the second set of hooks (12) are removed from their hook grips (14) and clipped onto the connector element (28) of the opposite load-transfer device (22) so that, at that moment, the lanyard (10) associated with each person is clipped onto both load-transfer devices (22). Then as shown in Figure 7C the first set of hooks (11) are released from the load-transfer devices (22) allowing the persons to carry on in their desired directions as shown in Figure 7D with the first set of hooks (11) being stowed in the respective hook clips (14) as illustrated in Figure 3.

It will be appreciated that safety apparatus as illustrated in Figures 1 to 5 can be used to allow a person attached by one lanyard hook to a first

strong point or fixed structure to transfer to a second strong point or fixed structure without complete detachment of both such strong points or fixed structures even momentarily.

Claims

1. Safety apparatus comprising a safety harness or an article of apparel having means providing an eyelet (13), a safety line (10) passing through the eyelet (13), and a pair of connector devices (11, 12) one at each end of said line (10), each connector device being adapted for engagement with an elongate guide track element (20) or a device (22) slidably mounted thereon or other elongate element which is part of or secured to a fixed structure and being dimensioned so as not to be able to pass through the aforesaid eyelet (13), characterized in that a retaining device (14) is provided for location on or associated with said means providing said eyelet (13), the retaining device having parts one on each side of the eyelet for receiving and locating a portion of a respective one of said connector devices (11, 12) when not in use.

2. Safety apparatus according to Claim 1 wherein said retaining device comprises a housing (14) having housing portions one on each side of the eyelet for receiving and locating therein a portion of a respective one of said connector devices (11, 12).

3. Safety apparatus according to Claim 2 wherein each housing portion has resilient retaining means (15, 16) projecting inwardly thereof for engaging and retaining the respective connector device (11, 12) when it is engaged in that housing portion.

4. Safety apparatus according to Claim 3 wherein the housing (14) is made of resilient material and is formed with an inward depression (15, 16) in a side wall of each housing portion thereof to form said resilient retaining means.

5. Safety apparatus according to Claim 4 wherein a pair of opposed inward depressions (15, 16) are formed in opposite side walls of each housing portion.

6. Safety apparatus according to any of Claims 2 to 5, wherein the housing (14) has a slot (17) in a side wall or in each of a pair of side walls thereof to receive said means on the harness providing said eyelet in order to mount the housing thereon.

7. Safety apparatus according to any preceding Claim wherein each connector device is a safety hook (11, 12) for clipping onto a rigid guide line or rail, or an apertured attachment of a device slidably engaged therewith.

8. Safety apparatus according to any preceding Claim including a load-transfer device (22) for location on an elongate member (20) for movement therealong past intermediate fixed attachment points (21) of the elongate member (20) whilst remaining securely located with respect to the elongate member, the load-transfer device comprising at least one rotatable wheel (23, 24) having a series of recesses at spaced locations around its periphery with adjacent recesses being separated by a projecting part (25, 26) of the wheel and a cooperating slipper part (30) mounted on the wheel at a peripheral part thereof to form an integrated structure with the wheel, the slipper part (30) and the projecting parts (25, 26) of the wheel having arcuate interengaging means (31, 32, 33) adapted to allow rotation of the wheel relative to the slipper part whilst the slipper part remains attached to the wheel, the device further including a load attachment part (28) to which said connector devices (11, 12) can be releasably secured.

9. A safety system comprising an elongate member (20) located to define a guide path by attachment means (21), together with safety apparatus according to any preceding Claim.

Patentansprüche

1. Eine Sicherheitsvorrichtung, umfassend ein Sicherheitsgeschirr oder ein Kleidungsstück mit Vorrichtungen, die eine Öse (13), eine Sicherheitsleine (10), die durch die Öse (13) verläuft, und zwei Verbindungsvorrichtungen (11, 12) an jedem Ende der genannten Leine (10) vorsehen, wobei jede Verbindungsvorrichtung zum Eingriff in ein längliches Führungsbahnelement (20) oder eine gleitend daran angebrachte Vorrichtung (22) oder ein anderes längliches Element, das Teil einer festen Konstruktion oder an einer festen Konstruktion befestigt ist, geeignet und so dimensioniert ist, daß sie nicht aus der genannten Öse (13) herausgleitet, dadurch gekennzeichnet, daß eine haltevorrichtung (14) zur Befestigung an oder Verbindung mit der die genannte Öse (13) bildenden Vorrichtung vorgesehen ist, wobei die Haltevorrichtung Teile, eins auf jeder Seite der Öse, für die Aufnahme und Befestigung eines Teils einer entsprechenden der genannten Verbindungsvorrichtungen (11, 12), wenn diese sich nicht in Benutzung befindet, aufweist.

2. Eine Sicherheitsvorrichtung gemäß Anspruch 1, wobei die genannte Haltevorrichtung ein Gehäuse (14) umfaßt, das Gehäuseteile, eins auf jeder Seite der Öse, für die Aufnahme und Befestigung eines Teils einer entsprechenden der genannten Verbindungsvorrichtungen (11, 12) aufweist.

3. Eine Sicherheitsvorrichtung gemäß Anspruch 2, wobei jedes Gehäuseteil nach innen hineinragende elastische Haltevorrichtungen (15, 16) für das Erfassen und Halten der entsprechenden Verbindungsvorrichtung (11, 12), wenn sie mit diesem Gehäuseteil in Eingriff steht, aufweist.

4. Eine Sicherheitsvorrichtung gemäß Anspruch 3, wobei das Gehäuse (14) aus elastischem Material hergestellt und in einer Seitenwand eines jeden Gehäuseteils mit einer nach innen verlaufenden Vertiefung (15, 16) versehen ist, um die genannte elastische Haltevorrichtung zu bilden.

5. Eine Sicherheitsvorrichtung gemäß Anspruch 4, wobei in gegenüberliegenden Seitenwänden eines jeden Gehäuseteils gegenüber-

liegende, nach innen verlaufende Vertiefungen (15, 16) vorgesehen sind.

6. Eine Sicherheitsvorrichtung gemäß irgendeinem der Ansprüche 2 bis 5, wobei das Gehäuse (14) ein Langloch (17) in einer Seitenwand oder in jeder der beiden Seitenwände zur Aufnahme der genannten Vorrichtung am Geschirr aufweist, das die genannte Öse zur Anbringung des Gehäuses bildet.

7. Eine Sicherheitsvorrichtung gemäß irgendeinem der vorstehenden Ansprüche, wobei es sich bei jeder Verbindungsvorrichtung um einen Sicherheitshaken (11, 12) zur Befestigung an einer starren Führungsleine oder Schiene oder einen mit Öffnung versehenen Ansatz einer gleitend damit verbundenen Vorrichtung handelt.

8. Eine Sicherheitsvorrichtung gemäß irgendeinem der vorstehenden Ansprüche, einschließlich einer Lastübertragungsvorrichtung (22) zur Befestigung an einem länglichen Teil (20), um eine Bewegung entlang dieses Teils an dazwischenliegenden festen Befestigungspunkten (21) des länglichen Teils (20) vorbei zu ermöglichen, während diese gegenüber dem länglichen Teil unverändert bleibt, wobei die Lastübertragungsvorrichtung mindestens ein drehbares Rad (23, 24) mit einer Reihe von Ausnehmungen in Abständen an seinem Umfang umfaßt, wobei angrenzende Ausnehmungen durch einen hervorstehenden Teil (25, 26) des Rads voneinander getrennt sind, und ein mitlaufendes Gleitteil (30), das auf dem Rad an einem Umfangsteil desselben unter Bildung eines zusammenhängenden Gefüges mit dem Rad angebracht ist, umfaßt, wobei das Gleitteil (30) und die vorstehenden Teile (25, 26) des Rads gekrümmte ineinander eingreifende Vorrichtungen (31, 32, 33) aufweisen, die so ausgeführt sind, daß eine Drehung des Rads im Verhältnis zum Gleitteil ermöglicht wird, während das Gleitteil am Rad befestigt bleibt, wobei zur Vorrichtung ferner ein Lastbefestigungsteil (28) gehört, an dem die genannten Verbindungsvorrichtungen (11, 12) lösbar befestigt werden können.

9. Eine Sicherheitssystem, das ein längliches Teil (20) umfaßt, das so angeordnet ist, daß es durch die Befestigungsmittel (21) eine Führungsbahn bildet, zusammen mit der Sicherheitsvorrichtung gemäß irgendeinem der vorstehenden Ansprüche.

Revendications

1. Appareil de sécurité comprenant un harnais de sécurité ou un article d'habillement ayant un moyen fournissant un oeillet (13), une ligne de sécurité (10) traversant l'oeillet (13), et une paire de dispositifs connecteurs (11, 12), l'un à chaque extrémité de ladite ligne (10), chaque dispositif connecteur étant adapté à s'engager sur un élément de guidage allongé (20), ou sur un dispositif (22) monté de façon coulissante sur celui-ci, ou sur tout autre élément allongé faisant partie d'une structure fixe ou fixé à celle-ci, et étant dimensionné afin de ne pas être capable de traverser ledit oeillet (13), caractérisé en ce qu'un dispositif de retenue (14) est prévu pour être placé sur ou associé audit moyen fournissant ledit oeillet (13), le dispositif de retenue ayant des parties de part et d'autre de l'oeillet pour recevoir et loger une partie de l'un respectif desdits dispositifs connecteurs (11, 12) lorsqu'il n'est pas utilisé.

2. Appareil de sécurité selon la revendication 1, caractérisé en ce que ledit dipositif de retenue comprend un boîtier (14) ayant des parties de boîtier de part et d'autre de l'oeillet, pour y recevoir et y loger une partie de l'un respectif desdits dispositifs connecteurs (11, 12).

3. Appareil de sécurité selon la revendication 2, caractérisé en ce que chaque partie de boîtier présente un moyen de retenue élastique (15, 16) faisant saillie vers l'intérieur de celui-ci pour s'emboîter sur et retenir le dispositif connecteur respectif (11, 12) lorsqu'il est engagé dans cette partie de boîtier.

4. Appareil de sécurité selon la revendication 3, caractérisé en ce que le boîtier (14) est constitué d'un matériau élastique et en ce qu'il présente un creux orienté vers l'intérieur (15, 16) dans une paroi latérale de chacune de ses parties de boîtier, pour former ledit moyen de retenue élastique.

5. Appareil de sécurité selon la revendication 4, caractérisé en ce qu'une paire de creux opposés orientés vers l'intérieur (15, 16) sont formés dans des parois latérales opposées de chaque partie du boîtier.

6. Appareil de sécurité selon l'une quelconque des revendications 2 à 5, caractérisé en ce que le boîtier (14) présente une fente (17) dans une paroi latérale ou dans chacune d'une paire de parois latérales de celui-ci, pour recevoir ledit moyen sur le harnais fournissant ledit oeillet, afin d'y monter le boîtier.

7. Appareil de sécurité selon l'une quelconque des revendications précédentes, caractérisé en ce que chaque dispositif connecteur est un crochet de sécurité (11, 12) destiné à être accroché sur une ligne ou un rail de guidage rigide, ou à une attache munie d'un orifice d'un dispositif coulissant sur celui-ci.

8. Appareil de sécurité selon l'une quelconque des revendications précédentes, comportant un dispositif de transfert de charge (22) destiné à être placé sur un élément allongé (20) permettant un mouvement le long de celui-ci passant par des points d'attache fixes intermédiaires (21) de l'élément allongé (20) tout en restant fermement relié à l'élément allongé, le dispositif de transfert de charge comprenant au moins une roue tournante (23, 24), ayant une série de creux des emplacements espacés le long de sa périphérie, les creux adjacents étant séparés par une partie en saillie (25, 26) de la roue et une glissière (30) coopérant avec celle-ci, montée sur la roue dans une partie périphérique de celle-ci en formant une structure intégrée avec la roue, la glissière (30) et les parties en saillie (25, 26) du la roue ayant des moyens arqués s'engageant les uns dans les autres (31, 32, 33) adaptés à permettre une rotation de la

roue par rapport à la glissière, alors que la glissière reste fixée à la roue le dispositif comprenant en outre une partie de fixation de charge (28) à laquelle lesdits dispositifs connecteurs (11, 12) peuvent être fixés de façon amovible.

9. Système de sécurité comprenant un élément allongé (20) disposé de façon à définir un trajet de guidage par des moyens d'attache (21), en association à un appareil de sécurité selon l'une des revendications précédentes.

FIG. 1.

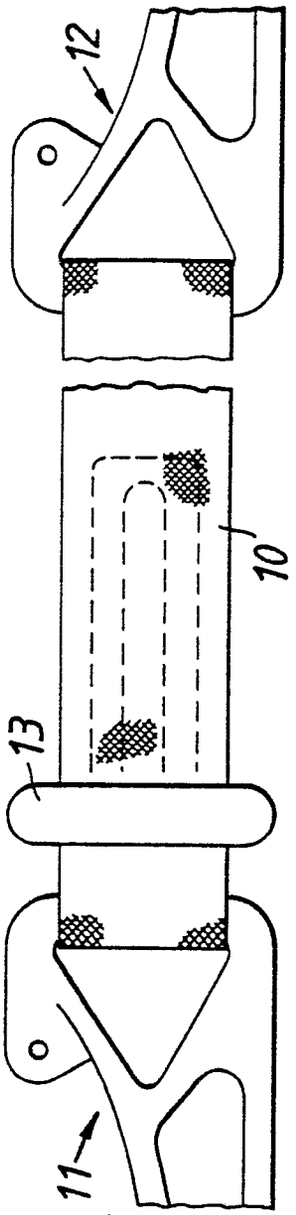


FIG. 2.

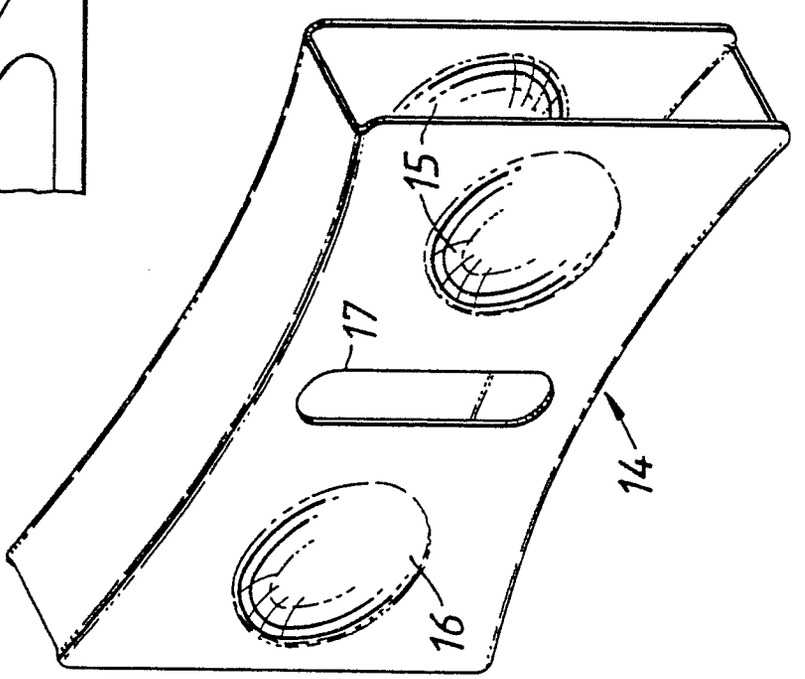


FIG.5.

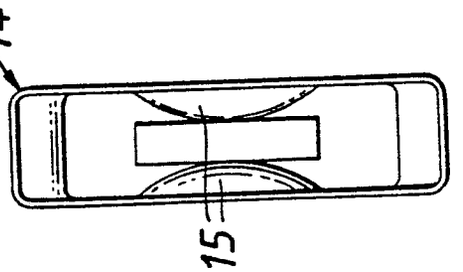


FIG.3.

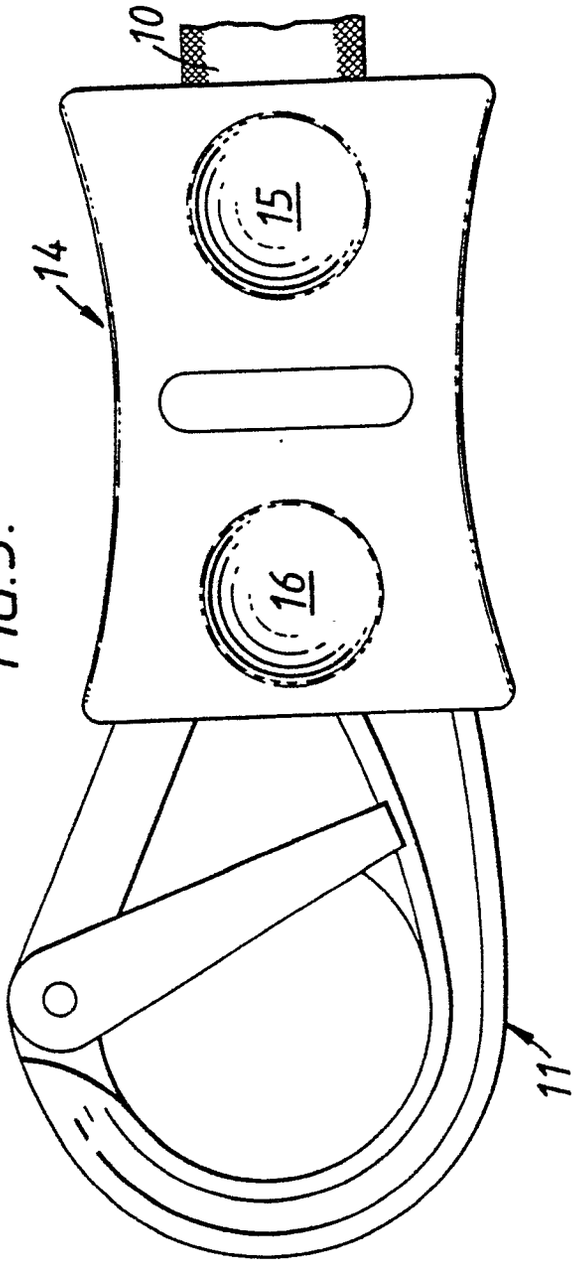


FIG.4.

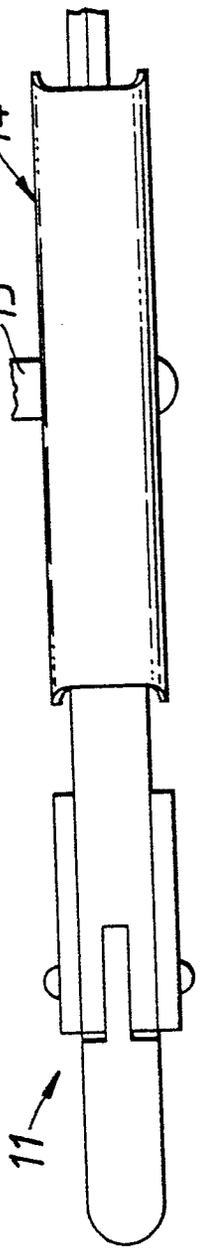
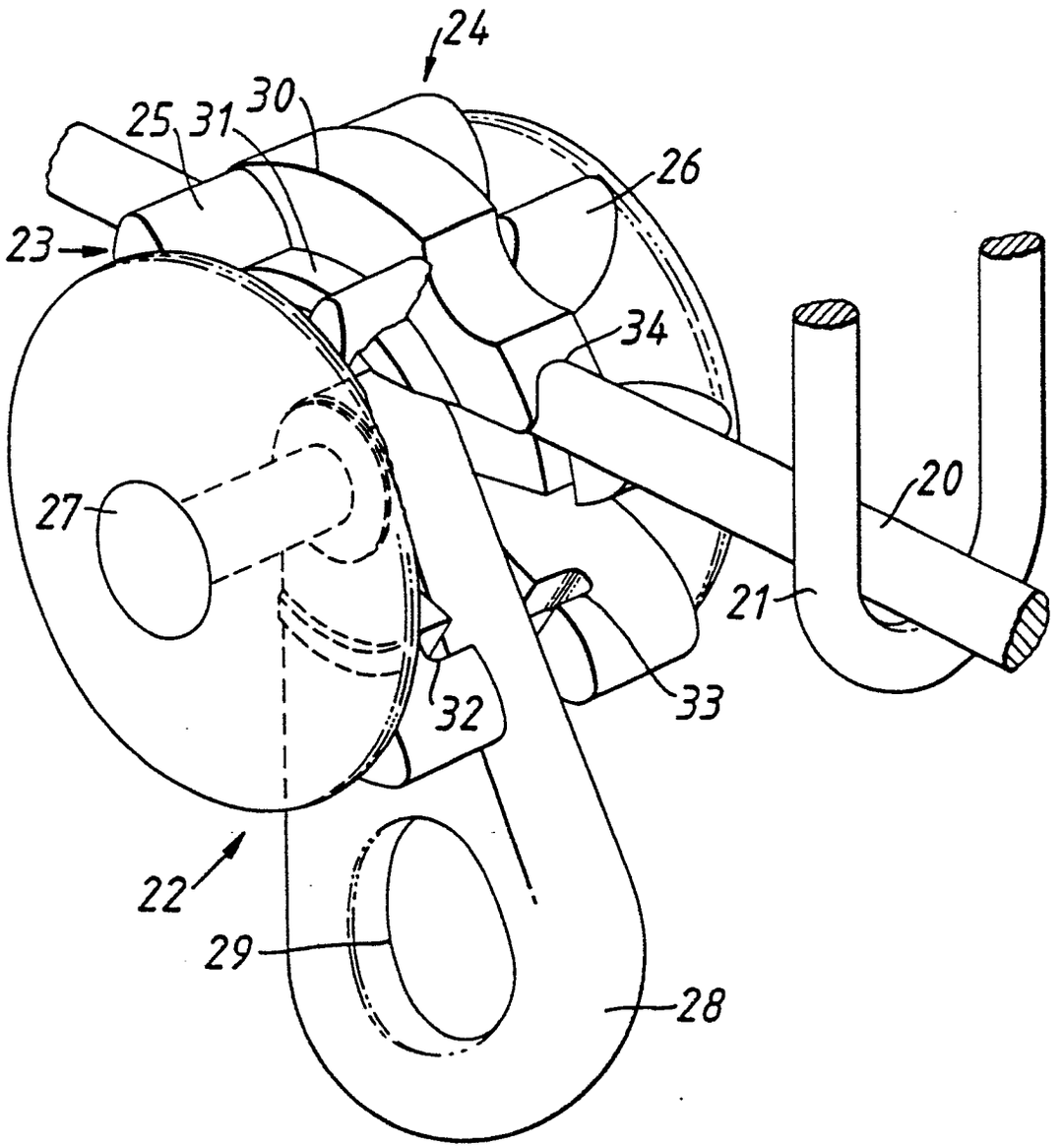


FIG. 6.



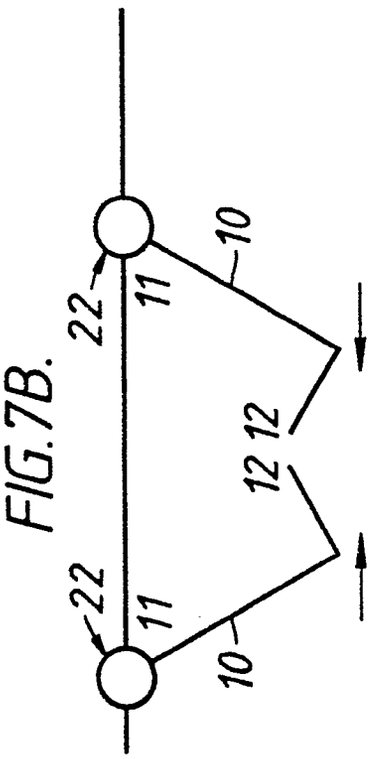


FIG.7B.

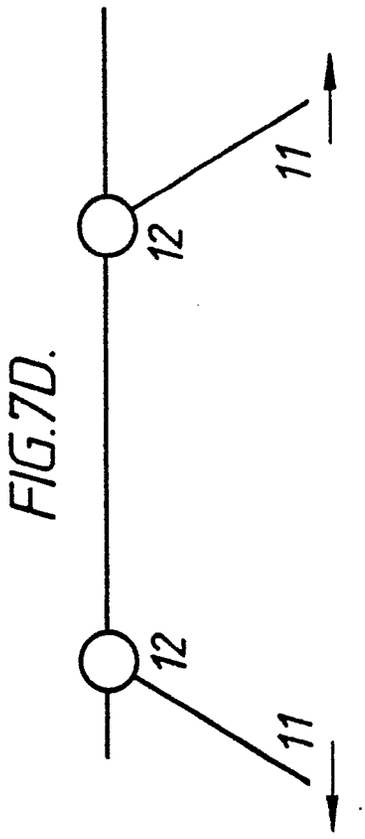


FIG.7D.

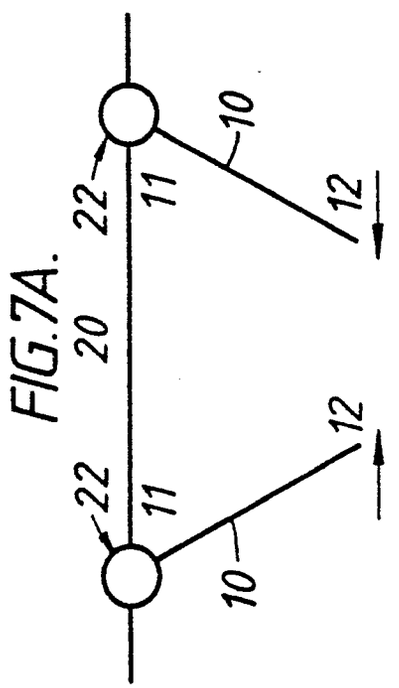


FIG.7A.

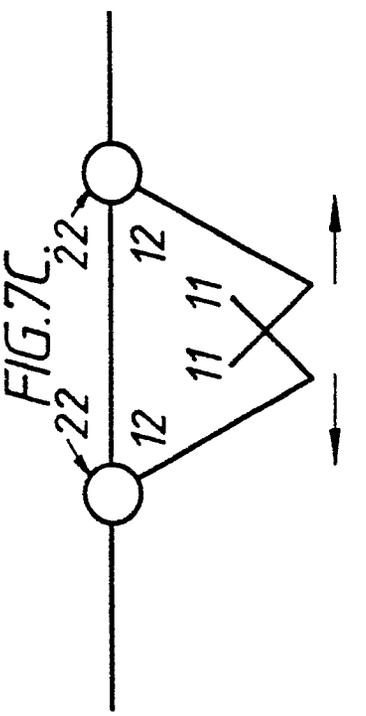


FIG.7C.