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(54) **Fall arrest safety net**

Auffangsicherheitsnetz

Filet de sécurité contre les chutes

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Description

Technical field

[0001] The present invention relates to a safety net having an attachment device for securing to a construction element particularly for use as a fall arrest apparatus.

Background of the Invention

[0002] When working at elevated positions, in order to protect anyone below the working position, a safety apparatus should be provided to arrest a fall of debris. Typically a safety net may be suspended just below the working height and fastened, for example, to free standing columns or to end-securing fixtures mounted to a wall. US3527319 describes a rectangular safety net with a plurality of eyes integral with the net, and spaced about its periphery. A line has opposing first and second ends, first and second line portions of the line being disposed adjacent the first and second ends respectively, and an intermediate portion of the line is located between the first and second line portions. The line may extend through the eyes in a ring to support the periphery of the net.

[0003] However for permanent fall arrest protection, for instance in engineering facilities having overhead fittings, maintaining a suspended safety net to span the entire overhead area may not be appropriate due to the construction of the facility, the working height, the obstruction it would cause, or its cost. There is therefore a need for an improved safety apparatus which addresses these drawbacks, is relatively inexpensive to manufacture and easy to install. It is an object of the present invention to address this need or, more generally, to provide an improved safety net.

Disclosure of the Invention

[0004] According to one aspect of the present invention there is provided a safety net assembly comprising: a bag constructed of wire mesh, the bag having an open mouth, the bag including a plurality of eyes integral with the wire mesh and spaced circumferentially about the mouth;

an elongate line having opposing first and second ends, first and second line portions of the line being disposed adjacent the first and second ends respectively, an intermediate portion of the line located between the first and second line portions, and a choker fitting having two faces; a plurality openings in the choker fitting which extend between the two faces, an end-securing fixture on the choker fitting, the first portion of the line extending through the eyes for drawing the mouth closed, and wherein either:

(a) the first portion of the line is connected in a ring by the choker fitting with the first end is fixed to the end-securing fixture, and the intermediate portion extends through at least one of the openings in the choker fitting, or

(b) a fastener is fixed to the first end of the line for connecting the first end to the end-securing fixture and the intermediate portion extends through at least two of the openings in the choker fitting.

[0005] The first portion of the line provides an elongate flexible member, and while the first portion of the line may be continuous, it may alternatively be interrupted by fasteners, links, or the like, connected to adjacent ends of the line and which can be separated so that the ring may be broken as needed in some installations of the net (which are discussed below).

[0006] Preferably the intermediate portion extends through the openings in the choker fitting so that a loop in the line protrudes from each of the faces of the choker fitting, each loop spanning between two of the openings. It will be apparent that two openings will be sufficient for connection in this manner, however most preferably the openings include three openings through which the line passes sequentially, the loops being connected through one of the openings. Once the line is tensioned to reduce the size of the one or more loops this connection serves to effectively lock the line with respect to the choker, while still allowing it to be released by manipulating the line back through the openings.

[0007] Preferably the line further comprises a terminal eye formed on the second end of the line. The assembly preferably further comprises a hook fastener received in the terminal eye.

[0008] Preferably the two faces of the choker fitting comprise opposing faces of a planar part of the choker fitting, the end-securing fixture comprising a line-receiving aperture having an axis disposed in the plane of the planar part and the first end of the line includes an end-securing fixture thereon, whereby the first portion is received in the line-receiving aperture and the end-securing fixture is sized so as not to pass through the line-receiving aperture.

[0009] Preferably the wire mesh bag is formed from a length of wire with fastenings joining portions of the length of wire, the length of wire extending from the closed end toward the mouth and being turned back upon itself to form the eyes at the mouth and corresponding eyes at the closed end, each eye at the mouth being fixed by a respective one of said fastenings to the adjacent eye on either side thereof, and each eye at the closed end being fixed by a respective one of said fastenings to the adjacent eye on either side thereof to form the bag.

[0010] The fastenings that join two portions of the length of wire and are preferably all of like type, most preferably being ferrules which are crimped or moulded in place.

[0011] Preferably the fastenings joining the eyes at the closed end are more closely spaced along the length of

wire than the fastenings joining the eyes at the mouth.

[0012] In still another aspect the invention provides a method of securing apparatus mounted overhead upon a construction member, the method comprising:

providing a safety net assembly substantially as described above;

introducing the apparatus through the mouth so as to at least partially enclose the apparatus in the wire mesh bag;

manipulating the choker fitting and line to close the mouth;

looping the second portion about the construction member, and

connecting the first portion and the second end by means of a hook fastener.

[0013] This invention provides a safety net assembly which is effective and efficient in operational use, providing for ready installation and removal as needed. The net has an overall simple design which minimizes manufacturing costs and maximizes performance. A fall arrest net can be required to absorb significant energy in use, and it has been found that this design offers an ability to spread impact loads. In particular, it is believed that the loops formed about the mouth of the bag provide a degree of movement and avoid highly localised loading stress raisers.

Brief Description **of the** Drawings

[0014] Preferred forms of the present invention will now be described by way of example with reference to the accompanying drawings, wherein:

Fig. 1 is pictorial view of a first exemplary embodiment of the fall arrest safety net assembly of the invention in a collapsed state ready to receive an item of value;

Fig. 2 is a plan view of a web of mesh from which the fall arrest safety net assembly Fig. 1 is formed;

Fig. 3 is a plan view of the fall arrest safety net assembly of Fig. 1;

Figs. 4, 5 and 6 are orthogonal end, front and side views respectively of the choker fitting of the fall arrest safety net assembly of Fig. 1;

Fig. 7 is an exploded pictorial view of a second exemplary embodiment of the fall arrest safety net assembly of the invention;

Fig. 8 is an exploded pictorial view of a third exemplary embodiment of the fall arrest safety net assembly of the invention;

Fig. 9 is schematic pictorial view of a fourth exemplary embodiment of the fall arrest safety net of the invention, and

Fig. 10 is schematic view of an alternative embodiment of the fall arrest safety net assembly of the invention installed in use.

Description of the Preferred Embodiments

[0015] Referring to Fig. 1 and 2 of the drawings, a first embodiment of a safety net assembly includes a bag 1 having a narrow closed end 2 and a broader opposing open mouth 3 in which an opening 4 is provided for receiving an apparatus to be secured, such as a light fitting 50 (shown in Fig. 7) mounted overhead on a member such as a beam 51. A line 33 passes in a ring through the eyes 12 of the mouth 3 and cooperates with a choker fitting 52 to draw together the eyes 12 to close the opening 4. An end of the line 33 is looped around the beam 51 to secure the assembly in place.

[0016] In the first embodiment illustrated the mesh may be made from a length of wire 5 which may be continuous (i.e. a single length) or discontinuous (for instance, including end-to-end joints) and which provides a degree of flexibility and resilience to the bag 1, allowing it to be expanded in a direction transverse to the lay of the wire so as to accommodate apparatus of varying size, while being readily collapsible. The bag 1 is made from a panel of mesh 10, shown in Fig. 2, which is curved or folded about a longitudinal axis 8; the transversely opposing edges 6, 7 of the mesh 10 are then joined to produce the substantially tapered bag-like form (shown in Fig 1 in its collapsed or relaxed state).

[0017] The mesh 10 is a non-woven type in which portions of the length of wire 5 are joined by fastenings in the form of ferrules 9a, 9b, 9c, 9d at nodes of the mesh. The length of wire 5 extends generally longitudinally and is turned back upon itself and joined by ferrules 9c to form eyes 11 at the first edge 23 of the mesh 10, and by ferrules 9d to form the eyes 12 at the longitudinally opposing second edge 22 of the mesh 10. Fastenings in the form of ferrules 9b join the adjacent eyes 12 along the second edge 22 and ferrules 9a join the adjacent eyes 11 along the along the first edge 23.

[0018] The mesh 10 may be conveniently manufactured by winding the length of wire 5 between pegs 27 spaced apart in two parallel lines, the lines being spaced apart in the longitudinal direction (relative to the mesh 10). The length of wire 5 is wound about the pegs in a zigzag pattern, alternating in direction when it is turned back upon itself around each peg 27.

[0019] To then form the bag 1 from the mesh 10 of Fig. 2, the mesh 10 is removed from the pegs 27 curved about

the longitudinal axis 8. Portions 14 and 15 of the outermost first edge eyes 11 are then joined by a ferrule (not shown) such that each eye 11 is fixed by a ferrule to the adjacent eye on either side thereof. In like manner the ends 16, 17 of the length of wire 5 are joined by a ferrule (not shown) such that each eye 12 along the second edge 22 is fixed by a ferrule to the adjacent eye on either side thereof. In addition a further ferrule (not shown) joins portions 18 and 19 on opposing transverse edges of the mesh 10 to form the substantially axisymmetrical bag 1. As best seen in Fig. 3, all the eyes 11 are joined in a first ring 29 to form a closed end of the bag 1. All the eyes 12 are joined in a second ring 30 which forms the opening 4.

[0020] To produce a bag 1 shaped to taper outwardly from the closed end 2 toward the open mouth 3, the transverse dimension of the second edge 22 exceeds that of the first edge 23. To achieve this, the eyes 12 are larger than the eyes 11 and the ferrules 9a joining the eyes 11 are spaced more closely apart (by dimension 24 measured along the length of wire 5) than the ferrules 9b joining the eyes 12 on the second edge 22 (which are spaced by dimension 25 measured along the length of wire 5).

[0021] A first embodiment of the choker fitting 52, shown in detail in Figs 4-6, may be formed from a substantially rectangular stainless steel sheet having opposing faces 53, 54. On one side of the choker fitting 52 is an end-securing fixture 55 which defines a line-receiving aperture 63, while on the opposite side are three circular openings 56, 57, 58 sized to receive the line 33. The opening 57 may be proximate a corner of the sheet, with the openings 56, 58 spaced at the same radial distance from opening 57 and at the same distance from their respective orthogonal edges 59, 60. Formed in the choker fitting 52, as by a slitting/pressing operation, the end-securing fixture 55 includes integral U-shaped arms 61, 62 projecting either side from faces 53, 54 and thereby spanning and defining the aperture 63. Formed in this manner the aperture 63 has an axis 64 disposed in the plane of the planar member. Adjacent the innermost arm 62 is a through-extending aperture 65 which is substantially D-shaped. On the front face 53 are textual indicia 80 including an "Expiry date" marking 81 located adjacent a blank area 82 where a date can be permanently marked, by engraving, etching, stamping or the like, to notify users of the end of the working life of the product.

[0022] The line 33 has a first end 70 adjacent to which a bead-shaped ferrule or like fitting 71 is fixed. The fitting 71 is disposed in the aperture 65, while the first end 70 extends through the line-receiving aperture 63, the end-securing fixture being larger than the aperture 63 so as to thereby fix the first end the choker fitting 52. A second end 72 of the line 33 opposing the first end 70 includes a terminal eye 73 formed as by an eye splice or by a loop fixed by a ferrule, or like fastener.

[0023] A first portion 74 of the line 33 adjacent the first terminal end 70 extends from the end-securing fixture 55 in a ring through the eyes 12 for drawing the mouth 3 closed. A second portion 78 of the line 33 extends from the choker fitting 52 to the second end 72.

[0024] An intermediate portion 75 of the line 33 is located between the first and second line portions 74, 78, and passes sequentially through the openings 56, 57 and 58 in the choker fitting. As shown in dashed outline in Fig. 6, a first loop 76 of the line extends through the openings 57, 58 to protrude from of the face 53, while a second like loop 77 extending between openings 56 and 57 protrudes from the opposing face 54.

[0025] The line 3 and the length of wire 5 may be twisted stainless steel wire cables for corrosion resistance. Similarly the other components, such as the ferrules 9a, 9b, 9c, 9d and the hook fastener are also formed of stainless steel.

[0026] Fig. 7 shows an exploded view of a second embodiment of the safety net assembly, wherein the bag 101 is assembled from a folded main panel 90 and two like end panels 91. The panels 90, 91 are each formed of a flexible wire mesh, and may each be formed initially each from a respective single length of wire joined at nodes of the mesh by ferrules, or moulded beads etc. The main panel 90 is a rectangular panel folded in a curve and includes rows of eyes 92, 93 along longitudinally opposite transverse edges which, when the panel 90 is folded in a curve as shown are brought together to form opposing sides of the mouth 4, the curved central section of panel 90 forming the closed end 2. The panels 91 have a row of eyes 94 along one edge and are shaped with an arcuate opposing edge complementary to the form of the panel 90. Each end panels 90 is fixed about its peripheral edge, as by ferules or the like, to a long edge of the panel 91, such that the rows of eyes 92, 93, 94 are generally coplanar, the eyes being spaced about the periphery of the mouth 4.

[0027] The line 133 and choker 152 shown in Fig. 7 are generally like that of the first embodiment, but with a differing connection between the terminal end 70 of first line portion 74 and the choker 152. A fastener 120, such as a hook fastener, or carabiner with a spring-closed gate, is fixed to the end of the first line section 74, as by a permanent eye 164 formed on the end 70. The wire comprising the eye 164 may pass through an aperture formed in the fastener 12, as shown such that the fastener is permanently fixed to the line. A circular aperture 163 extends between the opposing sides of the choker 152. The fastener 120 is received in the aperture 163 which thus provides the end-securing fixture in this embodiment. In like manner to the first embodiment, the line 33 passes from the choker fitting 152 through the eyes 92, 93, 94 and back to the choker fitting 152, for drawing the mouth 3 of the bag 101 closed.

[0028] A third embodiment of the invention is shown in Fig. 8 and includes panels 90, 91, 111 each formed from a flexible wire mesh. The panels 111, like the panels 91 the second embodiment, have a row of eyes 94 along one edge and are shaped with an arcuate opposing edge complementary to the form of the panel 90. The panel 111 further includes a slit 112 in the fabric of the mesh

(where adjacent wire loops are disconnected). The slit 112 extends longitudinally down from the row of eyes 94 to an intermediate position in the panel. The end panel 111 is otherwise of like construction to the panels 91 and is fixed about its peripheral edge to a long edge of the panel 91, in like manner to the second embodiment. The line 33 and choker 52 of the third embodiment are generally like that of the first embodiment, but the ring-shaped first portion 74 has a fastener 110 connected in the line 33, allowing the ring to be opened and closed. As shown, the fastener 110 may be a carabiner joining permanent eyes formed in the first portion 74.

[0029] In a fourth embodiment the net of the invention, shown in Fig. 9, is formed from a single generally rectangular panel of flexible wire mesh. Like the second and third embodiments, a folded central part of the panel forms the closed end 2 and the opposing short edges of the panel bound the periphery of the open mouth 3, the line 33 passing from the choker fitting 52 through the eyes 92, 93 and back to the choker fitting 52, for drawing the mouth 3 closed. The two halves of the long edge on one side of the panel are connected by join line 115. The two halves 116, 117 of the opposing long edge of the panel are not joined, and define a slit 112 extending from the mouth 3 down one side of the bag toward the closed end 2, in like manner to the third embodiment of Fig. 8.

[0030] In use, as best seen in Fig. 10, the components of the light fitting 50 are first introduced through the open mouth 3 thereby substantially enclosing the light fitting in the bag 1. By then manipulating the choker fitting to draw the line through the openings 56, 57, 58 the ring-shaped first line portion 74 is reduced in size to close the mouth 3. The second portion 78 of the line 33 is then looped about the construction member 51. A hook fastener 88 (such as a carabiner having a hinged gate and screw closure) is inserted through the terminal eye 73 and through the ring-shaped first line portion 74 to secure the assembly. When the third embodiment is used a member 113 (such as the power cable shown in phantom in Figs. 9 and 10) which protrudes through the bag may be received in the split 112, while still closing the mouth 3. The fastener 110 is positioned proximate the slit 112 and opened to break open the ring and allow entry of the member 113 into the slit 112. By reconnecting the fastener 110, the mouth can then be drawn closed, to the same degree as the second embodiment, substantially enclosing the light fitting 50.

[0031] Aspects of the present invention have been described by way of example only and it should be appreciated that modifications and additions may be made thereto without departing from the scope thereof, as defined in the appended claims.

Claims

1. A fall arrest safety net assembly comprising:

a bag (1) constructed of wire mesh, the bag having an open mouth (3), the bag including a plurality of eyes (12) integral with the wire mesh and spaced circumferentially about the mouth;
an elongate line (33) having opposing first and second ends (70, 72), first and second line portions (74, 78) of the line being disposed adjacent the first and second ends respectively, an intermediate portion (75) of the line located between the first and second line portions, and
a choker fitting (52) having two faces (53, 54);
a plurality openings (56-58) in the choker fitting which extend between the two faces, an end-securing fixture (55) on the choker fitting, the first portion of the line extending through the eyes for drawing the mouth closed, and wherein either:

(a) the first portion of the line is connected in a ring by the choker fitting, the first end is fixed to the end-securing fixture, and the intermediate portion extends through at least one of the openings in the choker fitting, or
(b) a fastener (120) is fixed to the first end of the line for connecting the first end to the end-securing fixture and the intermediate portion extends through at least two of the openings in the choker fitting.

2. The fall arrest safety net assembly of claim 1 wherein the intermediate portion (75) extends through the openings (56-58) in the choker fitting so that a loop (76, 77) in the line protrudes from each of the faces (53, 54) of the choker fitting.

3. The fall arrest safety net assembly of claim 1 or claim 2 wherein the openings include three openings (56-58) through which the line passes sequentially so that a loop (76, 77) in the line protrudes from each of the faces of the choker fitting.

4. The fall arrest safety net assembly of any one of claims 1 to 3 wherein the line further comprises a terminal eye (73) formed on the second end of the line.

5. The fall arrest safety net assembly of claim 4 wherein the assembly further comprises a hook fastener (88) received in the terminal eye.

6. The fall arrest safety net assembly of any one of claims 1 to 5 wherein the two faces of the choker fitting comprise opposing faces of a planar part of the choker fitting, the end-securing fixture comprising a line-receiving aperture having an axis (64) disposed in the plane of the planar part and the first end of the line includes an end-securing fixture (71) ther-

eon, whereby the first portion is received in the line-receiving aperture and the end-securing fixture is sized so as not to pass through the line-receiving aperture (63).

7. The fall arrest safety net assembly of claim 1 wherein the bag has a closed end (2) opposing the open mouth (3) and a slit (112) is provided in the mesh, the slit extending from the open mouth toward the closed end and wherein fastening means (110) are provided in the first portion of the line for opening and re-closing the ring.

8. The fall arrest safety net assembly of any one of claims 1 to 6 wherein the wire mesh bag has a closed end opposing the open mouth and is formed from a length of wire with fastenings (9a, 9b, 9c, 9d) joining portions of the length of wire, the length of wire extending from the closed end toward the mouth and being turned back upon itself to form the eyes at the mouth and corresponding eyes at the closed end, each eye at the mouth being fixed by a respective one of said fastenings to the adjacent eye on either side thereof, and each eye at the closed end being fixed by a respective one of said fastenings to the adjacent eye on either side thereof to form the bag.

9. The fall arrest safety net assembly of claim 8 wherein the fastenings joining the eyes at the closed end are more closely spaced along the length of wire than the fastenings joining the eyes at the mouth.

10. The fall arrest safety net assembly of any one of claims 1 to 9 wherein one of the faces of the choker fitting includes a date marking (80) located adjacent a blank area (82) where a date can be permanently marked.

11. The fall arrest safety net assembly of any one of claims 1 to 11 wherein the wire mesh bag is formed from a rectangular main mesh panel (90)and a pair of end panels (91), said plurality of eyes including first and second rows of eyes formed in opposing transverse edges of the main panel, opposing longitudinal edges of the main panel extending between the transverse edges, the end panels comprising third and fourth rows of eyes along an edge of each end panel, wherein each end panel is fixed to a respective one of the longitudinal edges of the main panel.

12. A method of securing apparatus mounted overhead upon a construction member, the method comprising:

providing a fall arrest safety net assembly substantially as claimed in any one of claims 1 to 11;
introducing the apparatus through the mouth so as to at least partially enclose the apparatus in the wire mesh bag;
manipulating the choker fitting and line to close the mouth;
looping the second portion about the construction member, and
connecting the first portion and the second end by means of a fastener.

Patentansprüche

1. Sturzauffang-Sicherheitsnetzbaugruppe, die Folgendes umfasst:

einen Beutel (1), der aus Drahtgeflecht aufgebaut ist, wobei der Beutel eine offene Mündung (3) hat, wobei der Beutel mehrere Ösen (12) einschließt, die integral mit dem Drahtgeflecht und mit Zwischenraum in Umfangsrichtung um die Mündung angeordnet sind,
eine längliche Leine (33), die ein erstes und ein entgegengesetztes zweites Ende (70, 72) hat, wobei eine erster und ein zweiter Leinenabschnitt (74, 78) der Leine jeweils angrenzend an das erste beziehungsweise das zweite Ende angeordnet sind, wobei ein Zwischenabschnitt (75) der Leine zwischen dem ersten und dem zweiten Leinenabschnitt angeordnet ist,
einen Drosselbeschlag (52), der zwei Flächen (53, 54), mehrere Öffnungen (56-58) in dem Drosselbeschlag, die sich zwischen den zwei Flächen erstrecken, und eine Endbefestigungsvorrichtung (55) an dem Drosselbeschlag hat, wobei sich der erste Abschnitt der Leine durch die Ösen erstreckt, um die Mündung zuzuziehen, und wobei entweder:

(a) der erste Abschnitt der Leine durch den Drosselbeschlag in einem Ring verbunden ist, das erste Ende an der Endbefestigungsvorrichtung befestigt ist und sich der Zwischenabschnitt durch wenigstens eine der Öffnungen in dem Drosselbeschlag erstreckt oder
(b) ein Befestigungselement (120) an dem ersten Ende der Leine befestigt ist, um das erste Ende mit der Endbefestigungsvorrichtung zu verbinden, und sich der Zwischenabschnitt durch wenigstens zwei der Öffnungen in dem Drosselbeschlag erstreckt.

2. Sturzauffang-Sicherheitsnetzbaugruppe nach Anspruch 1, wobei sich der Zwischenabschnitt (75) so durch die Öffnungen (56-58) in dem Drosselbeschlag erstreckt, das eine Schlaufe (76, 77) in der Leine von jeder der Flächen (53, 54) des Drosselbeschlags vorspringt.

3. Sturzauffang-Sicherheitsnetzbaugruppe nach Anspruch 1 oder Anspruch 2, wobei die Öffnungen drei Öffnungen (56-58) einschließen, durch welche die Leine nacheinander hindurchgeht, so dass eine Schlaufe (76, 77) in der Leine von jeder der Flächen des Drosselbeschlags vorspringt.

4. Sturzauffang-Sicherheitsnetzbaugruppe nach einem der Ansprüche 1 bis 3, wobei die Leine ferner eine Abschlussöse (73) umfasst, die an dem zweiten Ende der Leine geformt ist.

5. Sturzauffang-Sicherheitsnetzbaugruppe nach Anspruch 4, wobei die Baugruppe ferner ein Hakenbefestigungselement (88) umfasst, das in der Abschlussöse aufgenommen wird.

6. Sturzauffang-Sicherheitsnetzbaugruppe nach einem der Ansprüche 1 bis 5, wobei die zwei Flächen des Drosselbeschlags entgegengesetzte Flächen eines ebenen Teils des Drosselbeschlags umfassen, die Endbefestigungsvorrichtung eine Leinenaufnahmeöffnung umfasst, die eine Achse (64) hat, die in der Ebene des ebenen Teils angeordnet ist, und das erste Ende der Leine eine Endbefestigungsvorrichtung (71) an demselben einschließt, wodurch der erste Abschnitt in der Leinenaufnahmeöffnung aufgenommen wird und die Endbefestigungsvorrichtung so bemessen ist, dass sie nicht durch die Leinenaufnahmeöffnung (63) hindurchgeht.

7. Sturzauffang-Sicherheitsnetzbaugruppe nach Anspruch 1, wobei der Beutel ein der offenen Mündung (3) gegenüberliegendes geschlossenes Ende (2) hat und ein Schlitz (112) in dem Geflecht bereitgestellt wird, wobei sich der Schlitz von der offenen Mündung zu dem geschlossenen Ende hin erstreckt und wobei in dem ersten Abschnitt der Leine Befestigungsmittel (110) zum Öffnen und Schließen des Rings bereitgestellt werden.

8. Sturzauffang-Sicherheitsnetzbaugruppe nach einem der Ansprüche 1 bis 6, wobei der Drahtgeflechtbeutel ein der offenen Mündung gegenüberliegendes geschlossenes Ende hat und aus einer Drahtlänge geformt ist, wobei Befestigungen (9a, 9b, 9c, 9d), Abschnitte der Drahtlänge verbinden, wobei sich die Drahtlänge von dem geschlossenen Ende zu der Mündung hin erstreckt und an sich selbst zurückgeführt wird, um die Ösen an der Mündung und entsprechende Ösen an dem geschlossenen Ende zu bilden, wobei jede Öse an der Mündung durch eine jeweilige der Befestigungen an der benachbarten Öse auf beiden Seiten derselben befestigt ist und jede Öse an dem geschlossenen Ende durch eine jeweilige der Befestigungen an der benachbarten Öse auf beiden Seiten derselben befestigt ist, um den Beutel zu formen.

9. Sturzauffang-Sicherheitsnetzbaugruppe nach Anspruch 8, wobei die Befestigungen, welche die Ösen an dem geschlossenen Ende verbinden, mit engerem Zwischenraum entlang der Drahtlänge angeordnet sind als die Befestigungen, welche die Ösen an der Mündung verbinden.

10. Sturzauffang-Sicherheitsnetzbaugruppe nach einem der Ansprüche 1 bis 9, wobei eine der Flächen des Drosselbeschlages eine Datumsmarkierung (80) einschließt, die angrenzend an einen leeren Bereich (82) angeordnet ist, wo ein Datum dauerhaft markiert werden kann.

11. Sturzauffang-Sicherheitsnetzbaugruppe nach einem der Ansprüche 1 bis 10, wobei der Drahtgeflechtbeutel aus einer rechteckigen Geflechthauptbahn (90) und einem Paar von Endbahnen (91) geformt ist, wobei die mehreren Ösen eine erste und eine zweite Reihe von Ösen einschließen, die in gegenüberliegenden Querkanten der Hauptbahn geformt sind, wobei sich gegenüberliegende Längskanten der Hauptbahn zwischen den Querkanten erstrecken, wobei die Endbahnen eine dritte und eine vierte Reihe von Ösen entlang einer Kante jeder Endbahn umfassen, wobei jede Endbahn an einer jeweiligen der Längskanten der Hauptbahn befestigt ist.

12. Verfahren zum Sichern einer hängend an einem Konstruktionselement angebrachten Vorrichtung, wobei das Verfahren Folgendes umfasst
das Bereitstellen einer Sturzauffang-Sicherheitsnetzbaugruppe nach einem der Ansprüche 1 bis 11,
das Einführen der Vorrichtung durch die Mündung, um so die Vorrichtung wenigstens teilweise in dem Drahtgeflechtbeutel zu umschließen,
das Manipulieren des Drosselbeschlags und der Leine, um die Mündung zu schließen,
das Schlingen des zweiten Abschnitts um das Konstruktionselement und
das Verbinden des ersten Abschnitts und des zweiten Endes mit Hilfe eines Befestigungselements.

Revendications

1. Assemblage de filet de sécurité contre les chutes, comprenant :

un sac (1), composé d'un treillis métallique, le sac comportant une embouchure ouverte (3), le sac englobant plusieurs oeillets (12) faisant partie intégrante du treillis métallique et espacés circonférentiellement autour de l' embouchure ; une ligne allongée (33), comportant des première et deuxième extrémités opposées (70, 72), des première et deuxième parties de ligne (74,

78) de la ligne étant agencées respectivement adjacentes aux première et deuxième extrémités, une partie intermédiaire (75) de la ligne étant agencée entre les première et deuxième parties de ligne ; et
un raccord d'étranglement (52), comportant deux faces (53, 54), plusieurs ouvertures (56-58) dans le raccord d'étranglement s'étendant entre les deux faces, une monture de fixation d'extrémité (55) sur le raccord d'étranglement, la première partie de la ligne s'étendant à travers les oeillets pour entrainer la fermeture de l'embouchure, et dans lequel, ou bien :

(a) la première partie de la ligne est connectée en un anneau par le raccord d'étranglement, la première extrémité étant fixée sur la monture de fixation d'extrémité et la partie intermédiaire s'étendant à travers au moins une des ouvertures dans le raccord d' étranglement ; ou bien
(b) un moyen de fixation (120) est fixé sur la première extrémité de la ligne pour connecter la première extrémité à la monture de fixation d'extrémité, la partie intermédiaire s'étendant à travers au moins deux des ouvertures dans le raccord d'étranglement.

2. Assemblage de filet de sécurité contre les chutes selon la revendication 1, dans lequel la partie intermédiaire (75) s'étend à travers les ouvertures (56-58) dans le raccord d'étranglement, de sorte qu'une boucle (76, 77) dans la ligne déborde à partir de chacune des faces (53, 54) du raccord d'étranglement.

3. Assemblage de filet de sécurité contre les chutes selon les revendications 1 ou 2, dans lequel les ouvertures englobent trois ouvertures (56-58) à travers lesquelles la ligne passe de manière séquentielle, de sorte qu'une boucle (76, 77) dans la ligne déborde de chacune des faces du raccord d'étranglement.

4. Assemblage de filet de sécurité contre les chutes selon l'une quelconque des revendications 1 à 3, dans lequel la ligne comprend en outre un oeillet d'extrémité (73) formé sur la deuxième extrémité de la ligne.

5. Assemblage de filet de sécurité contre les chutes selon la revendication 4, dans lequel l'assemblage comprend en outre un moyen de fixation à crochet (88) reçu dans l'oeillet d'extrémité.

6. Assemblage de filet de sécurité contre les chutes selon l'une quelconque des revendications 1 à 5, dans lequel les deux faces du raccord d'étranglement comprennent des faces opposées d'une partie plane du raccord d'étranglement, la monture de fixation d'extrémité comprenant une ouverture de réception de la ligne, comportant un axe (64) disposé dans le plan de la partie plane, la première extrémité de la ligne englobant une monture de fixation d'extrémité (71) qui y est agencée, la première partie étant ainsi reçue dans l'ouverture de réception de la ligne et la monture de fixation d'extrémité étant dimensionnée de sorte à ne pas passer à travers l'ouverture de réception de la ligne (63).

7. Assemblage de filet de sécurité contre les chutes selon la revendication 1, dans lequel le sac comporte une extrémité fermée (2) opposée à l'embouchure ouverte (3), une fente (112) étant agencée dans le treillis, la fente s'étendant de l'embouchure ouverte vers l'extrémité fermée, et des moyens de fixation (110) étant agencés dans la première partie de la ligne pour ouvrir et refermer l'anneau.

8. Assemblage de filet de sécurité contre les chutes selon l'une quelconque des revendications 1 à 6, dans lequel le sac en treillis métallique comporte une extrémité fermée opposée à l'embouchure ouverte et est formé à partir d'une longueur de fil, des fixations (9a, 9b, 9c, 9d) reliant des parties de la longueur de fil, la longueur de fil s'étendant de l'extrémité ouverte vers l'embouchure et étant retournée sur elle-même, de sorte à former les oeillets au niveau de l'embouchure et des oeillets correspondants au niveau de l'extrémité fermée, chaque oeillet au niveau de l'embouchure étant fixé par une fixation respective desdites fixations sur l'oeillet adjacent sur chacun de ses côtés, et chaque oeillet au niveau de l'extrémité fermée étant fixé par une fixation respective desdites fixations sur l'oeillet adjacent sur chacun de ses côtés pour former le sac.

9. Assemblage de filet de sécurité contre les chutes selon la revendication 8, dans lequel les fixations reliant les oeillets au niveau de l'extrémité fermée sont espacées plus étroitement le long de la longueur de fil que les fixations reliant les oeillets au niveau de l'embouchure.

10. Assemblage de filet de sécurité contre les chutes selon l'une quelconque des revendications 1 à 9, dans lequel une des faces du raccord d'étranglement englobe un marquage de la date (80), agencé près d'une zone vierge (82), où une date peut être marquée de manière permanente.

11. Assemblage de filet de sécurité contre les chutes selon l'une quelconque des revendications 1 à 10, dans lequel le sac en treillis métallique est formé à partir d'un panneau de treillis rectangulaire principal (90) et d'une paire de panneaux d'extrémité (91),

lesdits plusieurs oeillets englobant des première et deuxième rangées d'oeillets formées dans des bords transversaux opposés du panneau principal, opposés aux bords longitudinaux du panneau principal s'étendant entre les bords transversaux, les panneaux d'extrémité comprenant des troisième et quatrième rangées d'oeillets le long d'un bord de chaque panneau d'extrémité, chaque panneau d'extrémité étant fixé sur un bord respectif des bords longitudinaux du panneau principal.

12. Procédé de fixation d'un appareil, monté par suspension sur un élément de construction, comprenant les étapes ci-dessous :

fourniture d'un assemblage de filet de sécurité contre les chutes, conforme pour l'essentiel à l'une quelconque des revendications 1 à 11 ;
introduction de l'appareil à travers l'embouchure, de sorte à renfermer au moins partiellement l'appareil dans le sac en treillis métallique ;
manipulation du raccord d'étranglement et de la ligne pour fermer l'embouchure ;
enroulement en boucle de la deuxième partie autour de l'élément de construction ; et
connexion de la première partie et de la deuxième extrémité par l'intermédiaire d'un moyen de fixation.

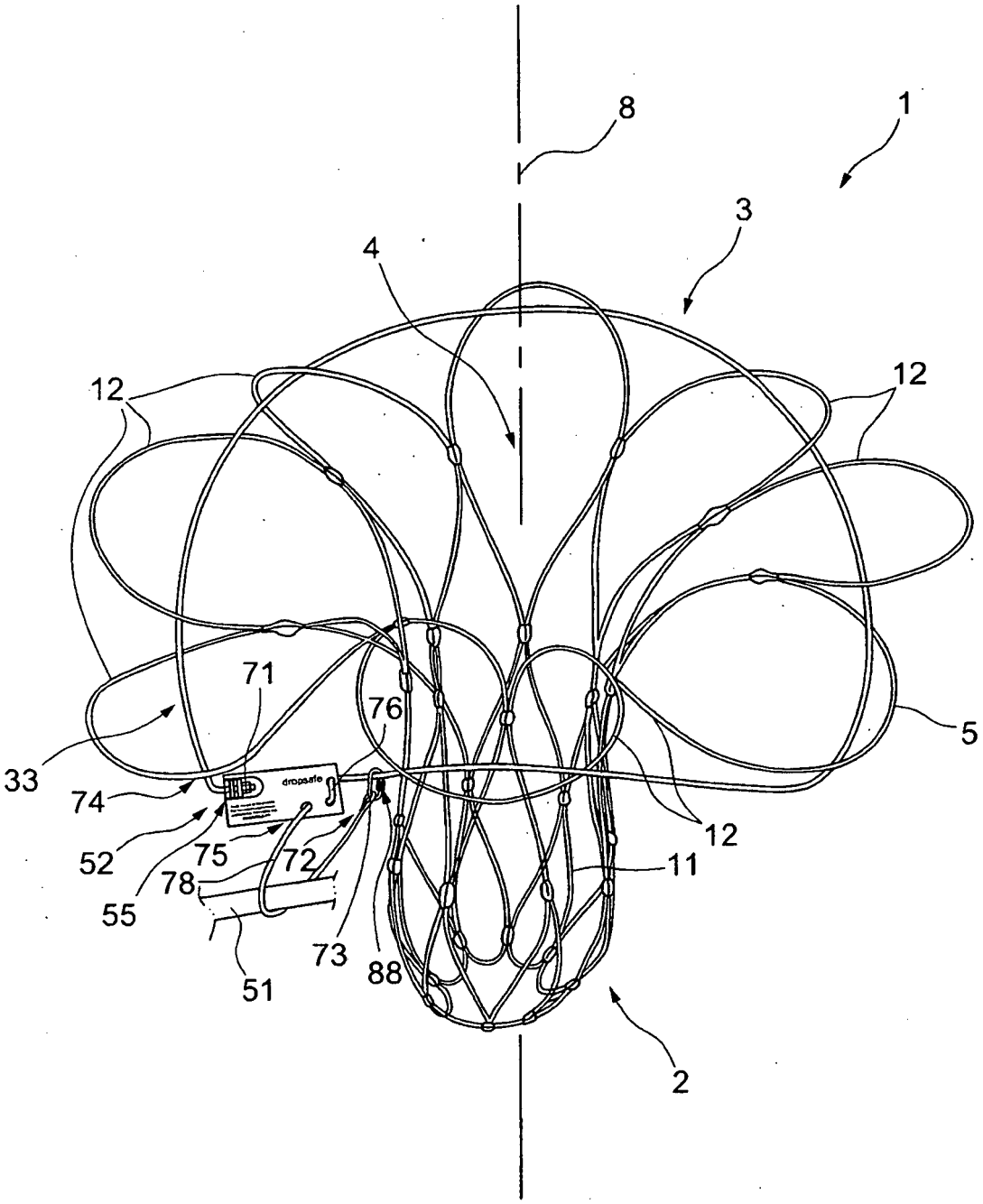
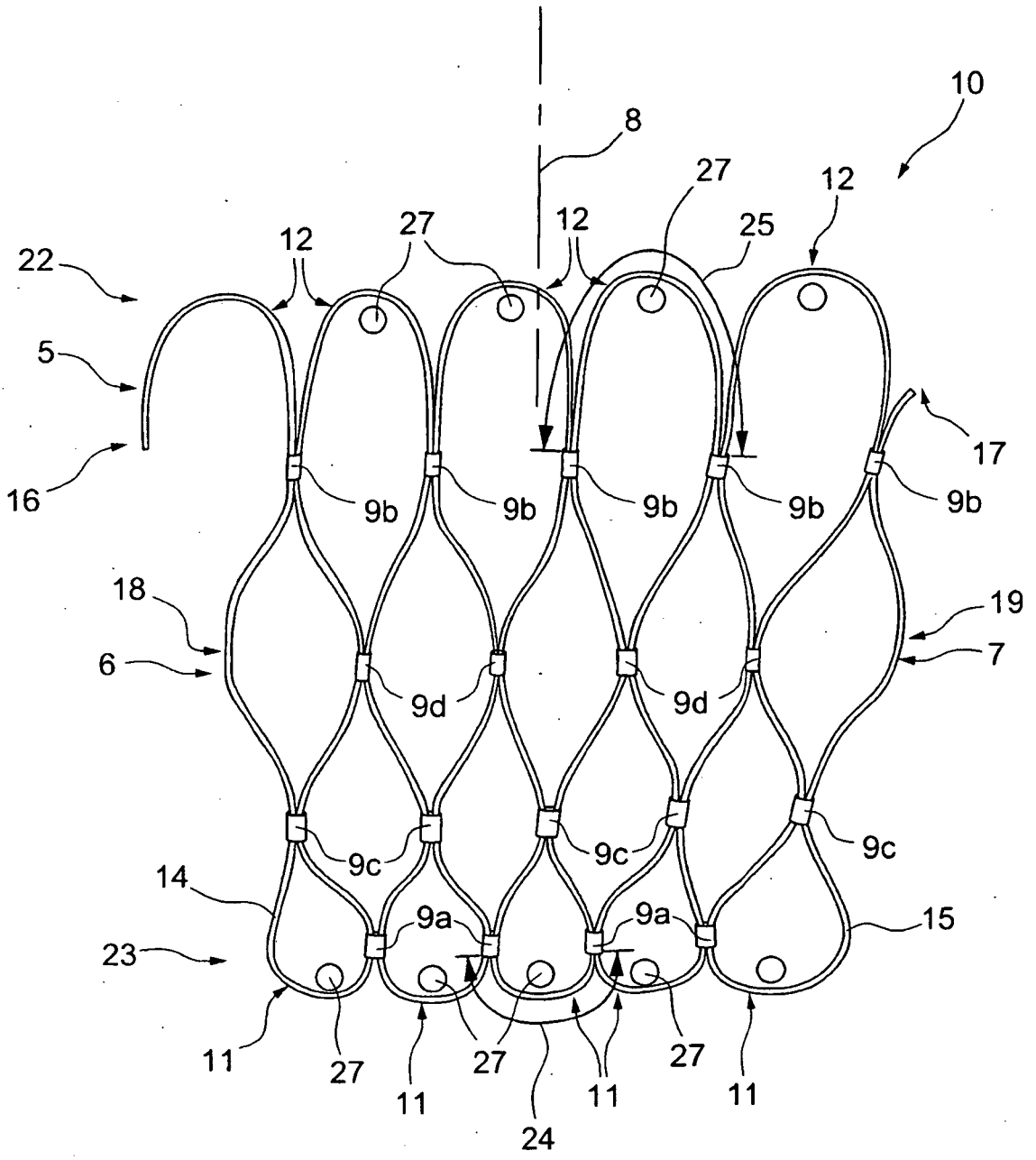


FIG.1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16
17
9b
9b
9b
9b
9b
18
19
6
7
9d
9d
9c
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FIG.2

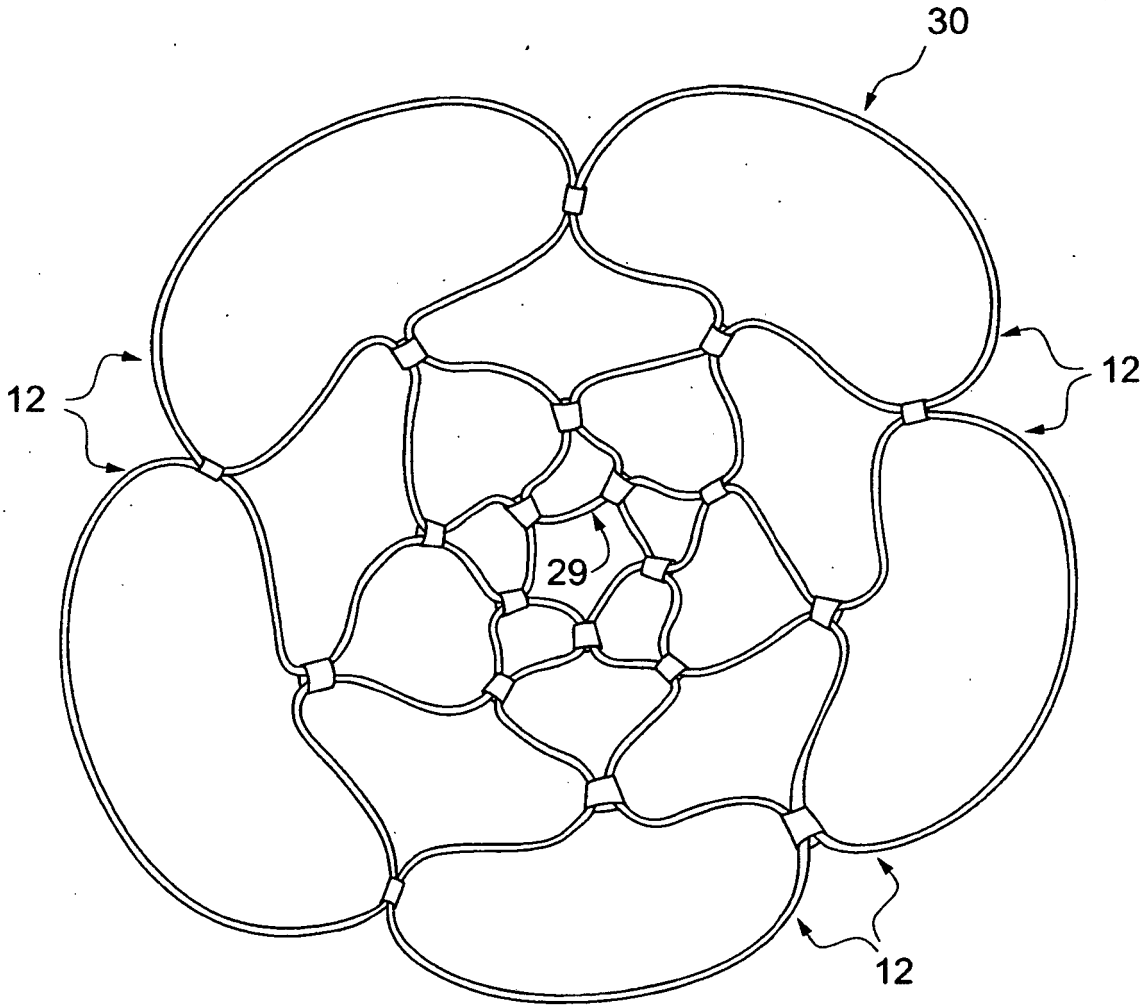

FIG.3

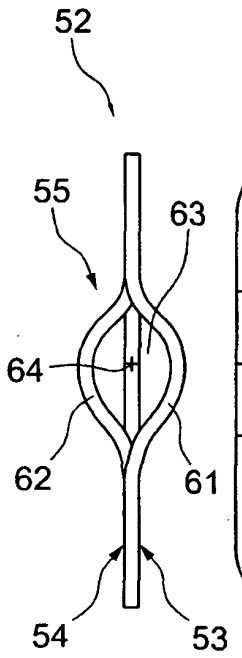

FIG.4

FIG.5

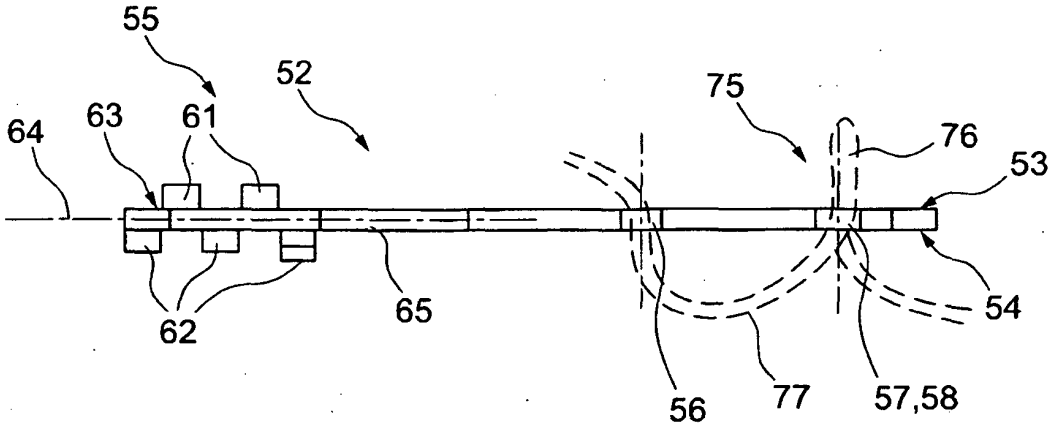

FIG.6

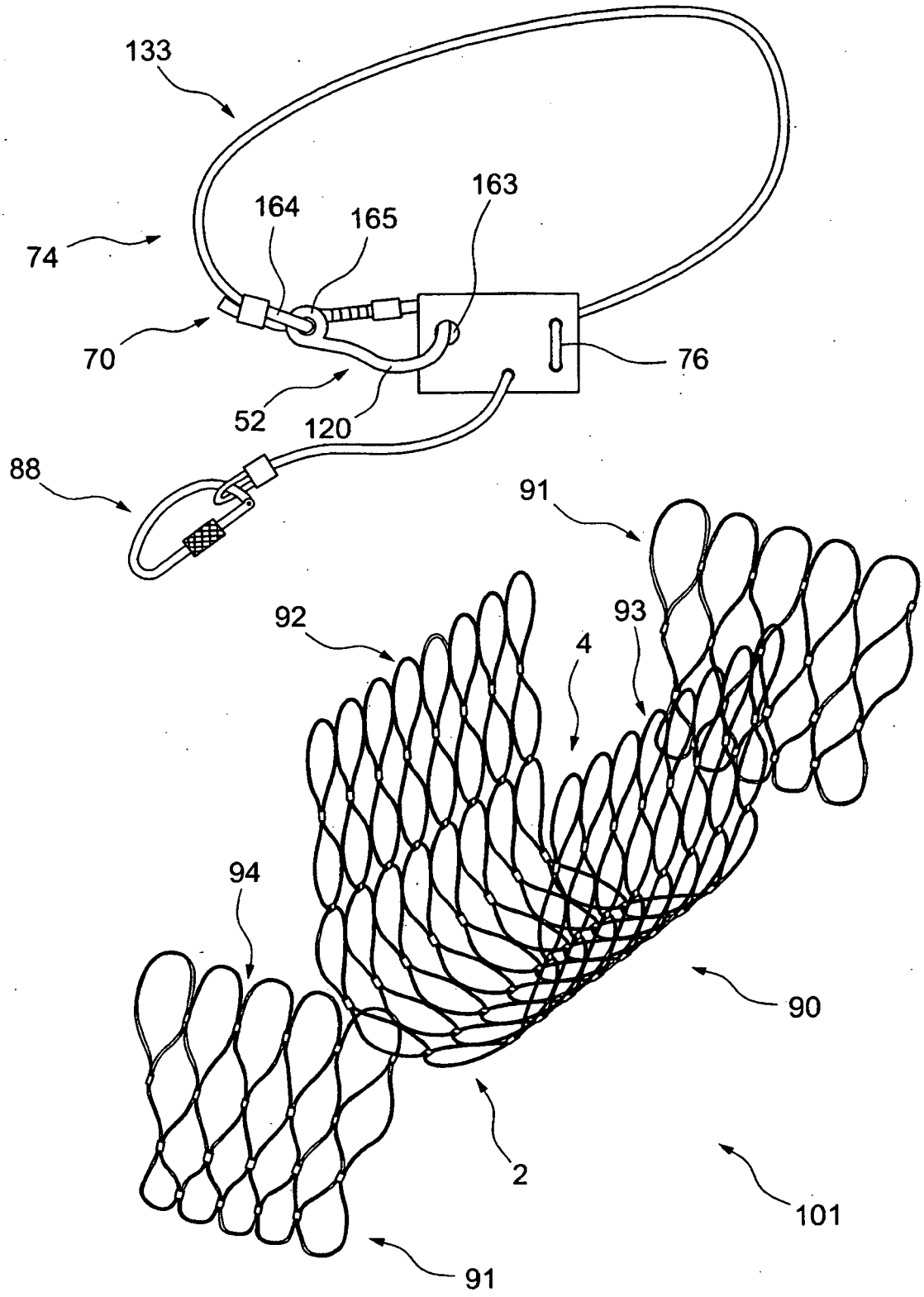

FIG.7

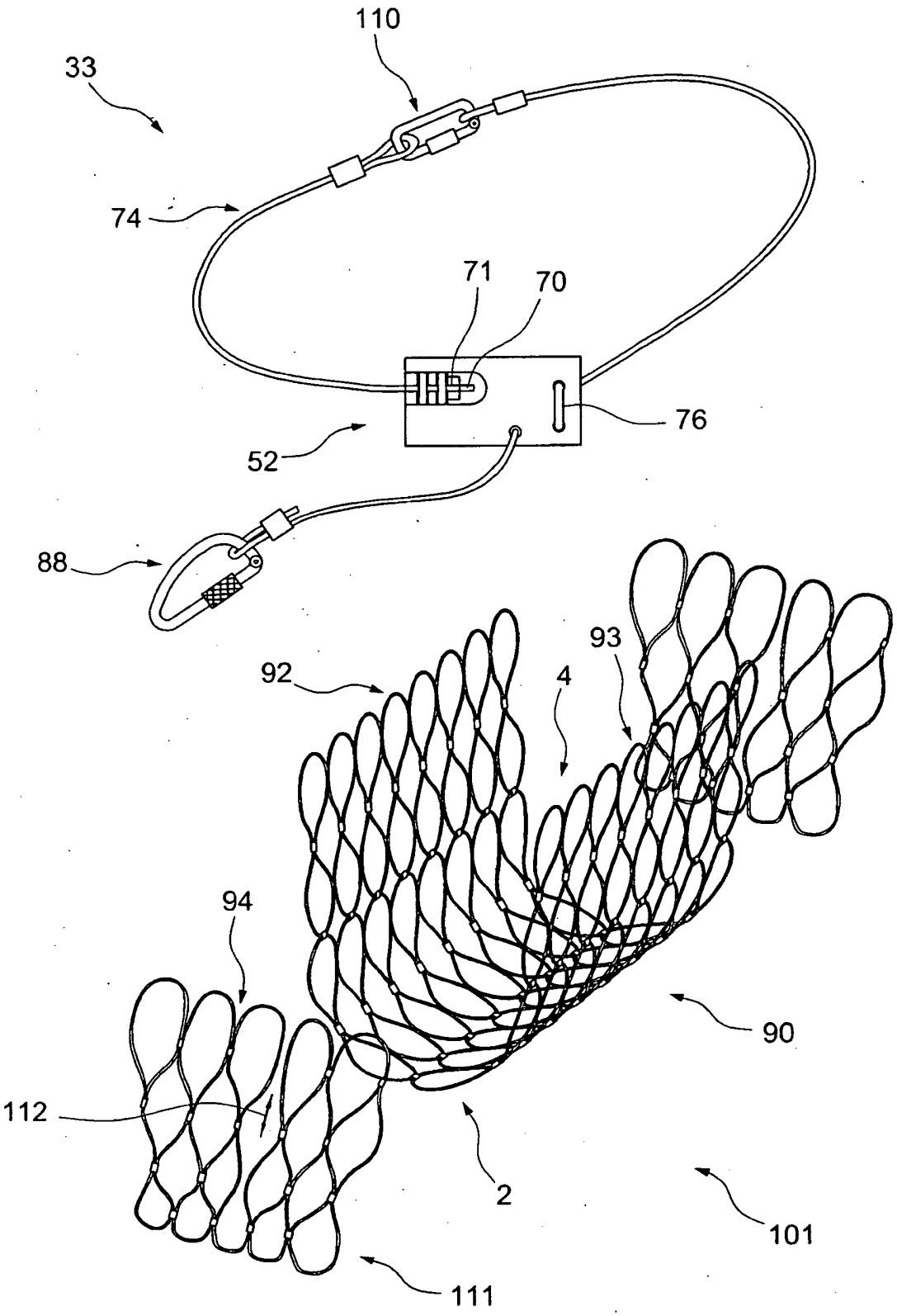

FIG.8

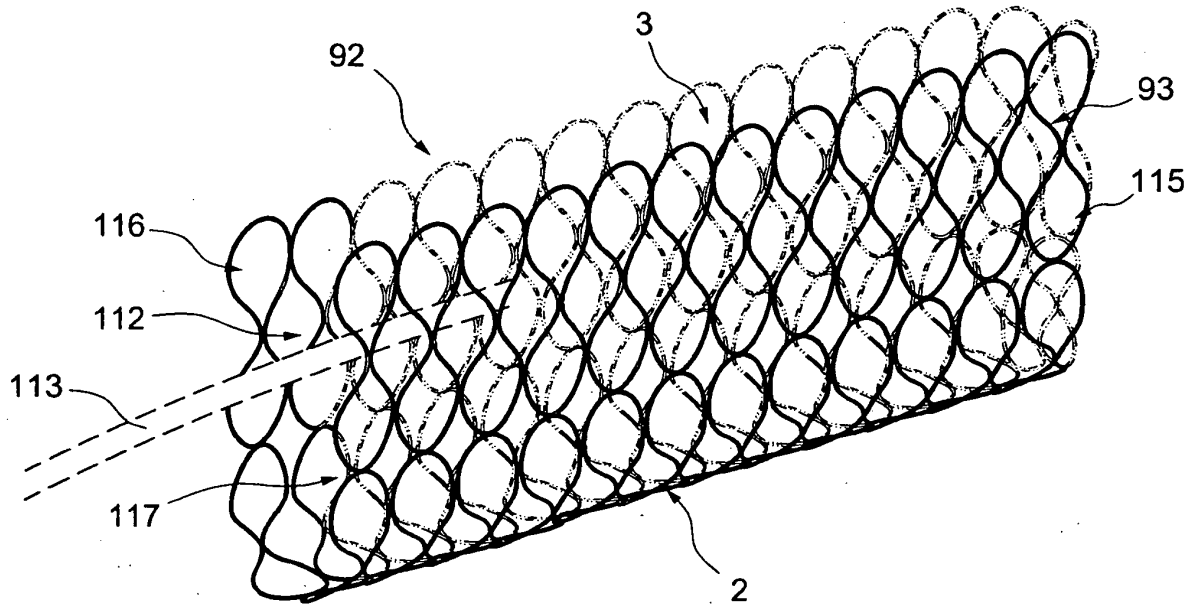

FIG.9

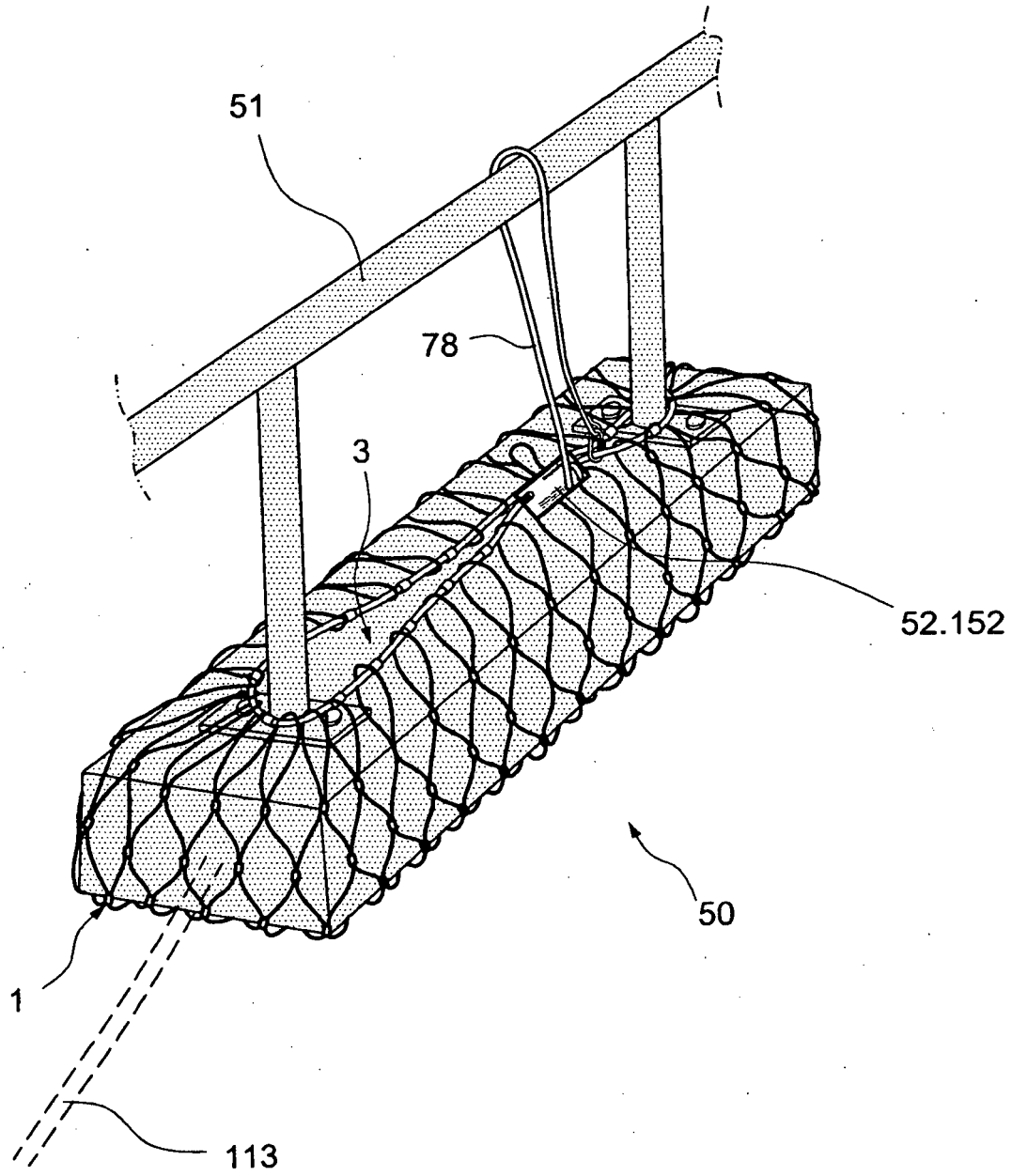

FIG.10

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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