



(11) **EP 2 619 121 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
18.12.2024 Bulletin 2024/51

(21) Application number: **11827106.3**

(22) Date of filing: **19.01.2011**

(51) International Patent Classification (IPC):
B66B 7/06 (2006.01) **D07B 1/22** (2006.01)
D07B 5/04 (2006.01) **D03D 1/00** (2006.01)
D03D 15/58 (2021.01)

(52) Cooperative Patent Classification (CPC):
B66B 7/062; D03D 1/0094; D03D 15/58;
D07B 5/045; D07B 2201/20903; D07B 2501/2007;
D10B 2101/20; D10B 2401/063

(86) International application number:
PCT/US2011/021602

(87) International publication number:
WO 2012/039781 (29.03.2012 Gazette 2012/13)

(54) **Tension member for an elevator having at least one traction surface comprising exposed weave fibers**

Zugmittel für einen Aufzug mit mindestens einer Zugfläche mit freiliegenden Gewebefasern

Elément de tension d'ascenseur doté au moins d'une surface de traction comprenant des fibres d'armure exposées

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR

(30) Priority: **20.09.2010 PCT/US2010/049433**

(43) Date of publication of application:
31.07.2013 Bulletin 2013/31

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Description

BACKGROUND

[0001] There are a variety of uses of elongated load carrying members such as round ropes or flat belts. One such use is to suspend the loads in elevator systems. The load carrying members are used for driving or propulsion in elevator systems. Round steel ropes have been the industry standard for many years. More recently flat belts including a plurality of tension member cords substantially retained in a jacket have been used in elevator systems. While there are advantages associated with such belts in an elevator system, there are also challenges presented.

[0002] For example, one challenge presented by some elevator belts is achieving a desired amount of traction between the belt and a traction sheave that causes movement of the belt and thus the elevator car. Different approaches have been suggested to achieve particular traction characteristics on a surface of an elevator belt. One approach is shown in the Published International Application WO 2005/094255. In that document, a jacket includes a roughened surface to provide desired friction characteristics.

[0003] Other challenges are associated with the techniques used to apply the jacket to the belt. Some such techniques result in features that are believed to be a cause of noise during elevator operation. Adding a jacket layer also adds cost and manufacturing complexities.

[0004] US 3,148,710 discloses a belting fabric made up of a plurality of substantially uncrimped parallel warps, a plurality of substantially uncrimped parallel wefts positioned above and below the warps and transverse thereto, the wefts above and below the warps being in non-opposition in the fabric, at least two binders positioned between each of the adjacent warps and interlacing the wefts above and below the warps in alternating sequence with at least one of the binders between each of the adjacent warps interlacing wefts other than those interlaced by another hinder between the same adjacent warps, the intersections of the binders between each of the adjacent warps being located alternately above and below the centerline of the warps, the space between said adjacent warps being greater than the compressed diameter of the individual binders between the adjacent warps and less than twice the compressed diameter of said individual binders between the adjacent warps, the tension of the binders in the fabric holding said hinder intersections in firm contact with the adjacent warps and being of such magnitude that an increase in the hinder tension produced by the extension of the fabric in the direction of the warps beyond the extension produced by the normal working tension will introduce a mutual embedding and crimping of the warps and wefts and a mutual embedding and crimping of the warps and hinder intersections, the binders in the fabric having a modulus at least as great as the modulus of the warps in the fabric.

[0005] GB 848 005A discloses multi-ply vinyl conveyor, elevator, or transmission belting, i.e., belting made of two or more layers of textile material with an interlayer or interlayers and covers of fire-resisting vinyl polymer material. In its multi-ply vinyl conveyor, elevator, or transmission belting, the warp threads of the textile plies consist at least in part of high-tensile, viscose rayon continuous-filament yarn and the weft threads consist at least in part of jute. GB 848 005A is disclosing the preamble of the independent claims.

[0006] GB 1 559 380 A discloses a belt carcass comprising a ply formed of warp yarns and weft yarns, wherein predominantly each of such yarns is formed of a plurality of composite units of filament and staple fiber components with a respective filament component being twisted with the staple fiber component of each such composite unit, the filament component being of substantially smaller cross-sectional area than the staple fiber component and being twisted therewith so as to predominantly expose the staple fibers in that composite unit.

[0007] Embodiments of the invention may solve one or more of the problems of the art, with the solutions set forth in the independent claims and refinements as recited in the dependent claims.

SUMMARY

[0008] An elongated elevator load bearing according to the invention is disclosed in claim 1.

[0009] A method of making an elongated load bearing member according to the invention is disclosed in claim 8.

[0010] Particular embodiments of the method may include any of the following optional features, alone or in combination:

- At least partially covering the tension elements with the weave fibers that have a thickness sufficient to prevent the tension elements from contacting a component that the traction surface engages.
- At least partially covering the tension elements using a weave pattern that comprises a predetermined spacing between the weave fibers that establishes a surface area of coverage over the tension elements sufficient to prevent the tension elements from contacting a component that the traction surface engages.
- The weave fibers may comprise yarn and sizing.
- The weave fibers may comprise yarn impregnated with an elastomer material.
- The tension elements may be at least partially coated with an adhesive coating prior to the weaving.
- The weave fibers may have a first outside dimension and the tension member have a second, larger outside dimension.

[0011] The various features and advantages of the disclosed examples will become apparent to those skilled in the art from the following detailed description. The

drawings that accompany the detailed description can be briefly described as follows.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012]

Figure 1 schematically shows selected portions of an example elevator system.

Figure 2 diagrammatically illustrates an example load bearing member having weave fibers that are woven together with tension elements.

Figure 3 schematically shows one example weave pattern that includes weave fibers in more than one direction.

Figure 4 schematically shows another example that includes tension elements distributed throughout a woven belt.

DETAILED DESCRIPTION

[0013] Figure 1 schematically shows selected portions of an example traction elevator system 20. The illustrated example is for discussion purposes only. Features of the elevator system 20 that are not required for an understanding of the present invention (e.g. guide rails, safeties, etc.) are not shown or discussed. Those skilled in the art will appreciate that the present invention could be used in a variety of elevator system configurations and not only the specific example shown in this Figure. This example includes an elevator car 22 coupled with a counterweight 24 by one or more elongated elevator load bearing members 30 in a 1:1 roping arrangement. Other roping arrangements, such as 2:1 or greater, are possible. The weight of the elevator car 22 and counterweight 24 is suspended by the elongated elevator load bearing members 30.

[0014] A traction sheave 31 A causes desired movement of the elongated elevator load bearing members 30 to achieve desired movement and placement of the elevator car 22 within the hoistway. The illustrated example elevator system 20 includes a deflector pulley 31B as seen in Figure 1 that also engages the elongated elevator load bearing members 30. Other examples include one or more idler or diverter pulleys on the car 22, the counterweight 24 or both (for example to provide an overslung or underslung roping arrangement) that also engage the elongated elevator load bearing members 30.

[0015] Figure 2 illustrates an example elongated elevator load bearing member 30. This example includes a plurality of tension elements 32. As can be appreciated from the drawing, the tension elements 32 are arranged generally parallel to each other and extend in a longitudinal direction that establishes a length dimension of the elongated elevator load bearing member 30. A plurality of weave fibers 34 are woven together with the tension elements 32. In this example, the weave fibers 34 and the tension elements 32 are woven together into a fabric

that maintains the tension elements 32 in a desired orientation relative to each other. In other words, the weave fibers 34 substantially retain the tension elements 32 in position. The phrase "substantially retained" means that the weave fibers 34 sufficiently engage the tension elements 32 such that the tension elements 32 do not pull out of the weave and remain substantially stationary relative to the weave fibers 34 in use (e.g., when the elongated elevator load bearing member 30 is subject to a load encountered during use in an elevator system 20 with, potentially, an additional factor of safety). The weave fibers 34 in this example have a length that is transverse to the length or longitudinal direction of the tension elements 32.

[0016] The example load bearing member 30 includes an exterior, traction surface 36 on at least one side of the load bearing member 30. The traction surface 36 is established by exposed weave fibers 34. An "exposed" weave fiber 34 in most embodiments will not be exposed along its entire length. The weave fibers 34 are woven into the woven fabric of the load bearing member 30 so that portions of each fiber will be beneath other weave fibers 34 or the tension elements 32.

[0017] In the illustrated example, all of the weave fibers 34 are exposed on the exterior, traction surface 36. In some examples, the layers of the weave or the arrangement of the weave fibers 34 leaves at least some of the weave fibers 34 covered over by other weave fibers 34. In such examples, only some of the weave fibers are exposed and establish the exterior, traction surface.

[0018] The tension elements 32 are the primary load bearing structure of the elevator load bearing member 30. In some examples, the weave fibers 34 do not support the weight of the elevator car 22 or counterweight 24. Nevertheless, the weave fibers 34 do form part of the load path. The weave fibers 34 directly transmit the traction forces between the traction sheave 31 and the elevator load bearing member 30 to the tension elements 32 because the weave fibers 34 are exposed at the traction surface 36.

[0019] The weave fibers 34 in some examples prevent the tension elements 32 from contacting any component that the traction surface 36 engages. For example, the tension elements 32 will not contact a surface on the traction sheave 31 as the load bearing member 30 wraps at least partially about the traction sheave 31. The size of the weave fibers 34, the material of the weave fibers 34, the pattern of the weave fibers 34 or a combination of these is selected to ensure the desired spacing between the tension elements 32 and the traction surface 36 so that the tension elements 32 are protected from direct engagement with a component such as the traction sheave 31. The weave fibers 34 in some examples cover more than 50% of the surface area of the tension elements 32 that faces in the same direction as the traction surface 36.

[0020] The tension elements 32 comprise a first material and the weave fibers 34 comprise a second, different

material. In the illustrated example, the weave fibers 34 have a much smaller thickness or cross-sectional dimension compared to that of the tension elements 32. The tension elements 32 are metallic, such as drawn steel, and the weave fibers 34 comprise non-metallic materials, such as polymers for example. The illustrated example tension elements 32 in Figure 2 comprise metal cords each comprising wound wires.

[0021] As a result of the weaving process in this example, each tension element 32 remains in a generally planar orientation along its length while the weave fibers 34 are in various locations along the length of each weave fiber 34. The weave fibers 34 are of a lighter weight compared to the tension elements 32 and the weave fibers 34 are manipulated during the weaving process to conform about the exterior of the tension elements. Each of the weave fibers 34 may be partially wrapped over the top (according to the drawing) of one of the tension elements, beneath an adjacent tension element 32 and over the top of the next. In some examples, the tension elements 32 are held under tension during the weaving process, which keeps the tension elements 32 straight along the portion of their length with which the weave fibers 34 are being woven together.

[0022] In the illustrated example, all of the tension elements 32 are aligned with each other in a generally parallel and generally co-planar arrangement. The weave fibers 34 maintain that desired alignment while allowing the load bearing member 30 to bend around sheaves in an elevator system. The weave fibers 34 maintain the desired relative orientations of the tension members 32 without requiring any external coating or jacket over the load bearing member 30.

[0023] In some examples, the weave fibers 34 include or comprise an elastomer material that is useful for establishing the traction surface 36. One example includes establishing weave fibers 34 of a desired material and then coating or impregnating the fibers with the elastomer material. Another example includes making each of the weave fibers 34 out of a plurality of filaments and including filaments made of the selected elastomer material within each of the weave fibers 34. One example elastomer material comprises a urethane. Thermoplastic polyurethane is used in one example.

[0024] In some examples, the weave fibers 34 comprise yarn that is treated with a known sizing material. The sizing in some examples enhances the ability to weave the tension elements 32 and weave fibers together. The sizing in some examples enhances a wear characteristic of the weave fibers 34 such as minimizing fretting or fraying of the weave fibers during use in an elevator system. The sizing in some examples provides a desired traction characteristic on the traction surface 36.

[0025] A variety of different weave patterns can be used to weave together the weave fibers 34 and the tension elements 32. Figure 2 shows one such example pattern of the weave fibers 34. In this example, the weave fibers 34 that are exposed on the exterior, traction surface

36 are aligned generally parallel to each other and generally perpendicular to the longitudinal direction of the tension elements 32.

[0026] Figure 3 schematically illustrates another example weave pattern partially expanded to show the relative orientation of the weave fibers 34 relative to each other (the completed assembly would have weave fibers 34 and tension elements 32 much closer together similar to those shown in Figure 2). In this example, some of the weave fibers 34a are arranged generally perpendicular to the longitudinal direction or length of the tension elements 32. Others of the weave fibers 34b are arranged generally parallel to the tension elements 32 and generally perpendicular to the weave fibers 34a. As can be appreciated by comparing Figure 2 to Figure 3, the example weave pattern of Figure 3 will have a slightly different characteristic on the traction surface 36 when the weave fibers 34b are included in a position where they are exposed on the traction surface 36. In another example, the weave fibers 34b are maintained only in spaces between the tension elements 32 and are not exposed so they do not have an impact on the contour or texture of the traction surface 36.

[0027] One feature of the example of Figure 3 is that each of the tension elements 32 includes a coating 40. In one example, the coating 40 is a protective coating to prevent corrosion of the material of the tension elements 32. In another example, the coating 40 comprises an adhesive that facilitates the suitable positioning of, or bonding between, the weave fibers 34 and the exterior surface of the tension elements 32. Still another example coating 40 comprises an elastomer that may be useful for protecting the material of the tension elements 32 during use in an elevator system. An elastomer coating 40 can also be useful for suitably positioning, or bonding, the weave fibers 34 in place with respect to the tension elements 32 if for example such a coating 40 is heated after the woven fabric is established.

[0028] In the example of Figure 2, each tension element 32 comprises a plurality of wires formed into strands 32A that are then wound together into a single cord. In that example, each tension element 32 comprises a plurality of individual load bearing strands 32A or wires, for example. In the example shown in Figure 4, the tension elements 32 are distributed throughout the weave. The tension elements 32 in this example may be of the same size and characteristic as the individual wires or strands within a wound cord such as those included in the example of Figure 2. The tension elements 32 in an example like Figure 4 may also be of a larger size.

[0029] One example configuration like that shown in Figure 4 includes discreet metal wires as the tension elements 32. In one such example, the metal wires have an outside diameter that is approximately equal to the outside diameter of the weave fibers 34. In another example, the weave fibers 34 have a smaller diameter compared to that of the tension elements 32.

[0030] The disclosed examples provide a woven fabric

as a basis for an elevator load bearing member. They provide the ability to realize an elevator load bearing member having a plurality of tension elements without requiring an application of a secondary or jacket material. Eliminating the requirement for a secondary coating or jacket enhances the economies of some manufacturing processes and eliminates features of such jackets that have come to be recognized as sources of challenges or drawbacks when they are in use in an elevator system.

[0031] One feature of the disclosed examples is that using a weave to maintain the tension elements 32 in a desired position relative to each other instead of using a jacket provides more damping compared to the viscoelastic behavior present with urethane jackets. Providing more damping by using a weave instead of a jacket can reduce noise levels during elevator system operation.

[0032] The preceding description is exemplary rather than limiting in nature. The scope of legal protection given to this invention can only be determined by the following claims.

Claims

1. An elongated elevator load bearing member (30) of a traction elevator system (20), comprising:

a plurality of tension elements (32) that extend along a length of the load bearing member (30); and
a plurality of weave fibers (34) transverse to the tension elements (32) and woven with the tension elements (32), the weave fibers (34) maintaining a desired spacing and alignment of the tension elements (32) relative to each other, the weave fibers (34) at least partially covering the tension elements (32), the tension elements (32) comprise a first material and the weave fibers (34) comprise a second, different material, wherein the tension elements (32) are at least partially coated with an elastomer material

characterized in that the weave fibers (34) being exposed and establishing an exterior, traction surface (36) of the load bearing member (30), **in that** the tension elements (32) comprise metal and the weave fibers (34) are non-metallic.

2. The elongated elevator load bearing member (30) of claim 1, wherein the weave fibers (34) have a thickness sufficient to prevent the tension elements (32) from contacting a component that the traction surface (36) engages.
3. The elongated elevator load bearing member (30) of claim 1 or 2, wherein weave fibers (34) are arranged in a pattern that comprises a predetermined spacing between the weave fibers (34) that estab-

lishes a surface area of coverage over the tension elements (32) sufficient to prevent the tension elements (32) from contacting a component that the traction surface (36) engages.

4. The elongated elevator load bearing member (30) of any of claims 1 to 3, wherein the weave fibers (34) comprise yarn and sizing.
5. The elongated elevator load bearing member (30) of any of claims 1 to 4, wherein the weave fibers (34) comprise yarn impregnated with an elastomer material.
6. The elongated elevator load bearing member (30) of any of claims 1 to 5, wherein the tension elements (32) are at least partially coated with an adhesive coating on the tension elements (32), the weave fibers (34) contacting the adhesive coating.
7. The elongated elevator load bearing member (30) of any of claims 1 to 6, wherein the weave fibers (34) have a first outside dimension and the tension members (32) have a second, larger outside dimension.
8. A method of making an elongated elevator load bearing member (30) of a traction elevator system (20), comprising the steps of:
 - providing a plurality of tension elements (32); and
 - weaving a plurality of weave fibers (34) together with the tension elements (32) to thereby
 - (i) maintain a desired spacing and alignment of the tension elements (32) relative to each other,
 - (ii) at least partially cover the tension elements (32), and
 - (iii) establish an exterior, traction surface (36) of the load bearing member (30) comprising exposed ones of the weave fibers (34), at least partially coating the tension elements (32) with an elastomer prior to the weaving,

wherein the tension elements (32) comprise a first material and the weave fibers (34) comprise a second, different material, and wherein the tension elements (32) comprise metal and the weave fibers (34) are non-metallic.
9. The method of claim 8, comprising at least partially covering the tension elements (32) with the weave fibers (34) that have a thickness sufficient to prevent the tension elements (32) from contacting a component that the traction surface (36) engages.

10. The method of claim 8, comprising
at least partially covering the tension elements (32)
using a weave pattern that comprises a predeter-
mined spacing between the weave fibers (34) that
establishes a surface area of coverage over the ten-
sion elements (32) sufficient to prevent the tension
elements (32) from contacting a component that the
traction surface (36) engages.
11. The method of any of claims 9 to 10, wherein the
tension elements (32) are at least partially coated
with an adhesive coating prior to the weaving.

Patentansprüche

1. Längliches, lasttragendes Aufzugselement (30) ei-
nes Traktionsaufzugsystems (20), umfassend:

eine Vielzahl von Zugelementen (32), die sich
entlang einer Länge des lasttragenden Ele-
ments (30) erstrecken; und

eine Vielzahl von Webfasern (34), die quer zu
den Zugelementen (32) verlaufen und mit den
Zugelementen (32) verwoben sind, wobei die
Webfasern (34) einen gewünschten Abstand
und eine gewünschte Ausrichtung der Zugele-
mente (32) relativ zueinander aufrechterhalten,
wobei die Webfasern (34) die Zugelemente (32)
mindestens teilweise abdecken, wobei die Zu-
gelemente (32) ein erstes Material umfassen
und die Webfasern (34) ein zweites, anderes
Material umfassen, wobei die Zugelemente (32)
mindestens teilweise mit einem Elastomerma-
terial beschichtet sind, **dadurch gekennzeich-**
net, dass die Webfasern (34) freiliegen und eine
äußere Traktionsfläche (36) des lasttragenden
Elements (30) aufbauen, in dem die Zugelemen-
te (32) Metall umfassen und die Webfasern (34)
nicht metallisch sind.

2. Längliches, lasttragendes Aufzugselement (30)
nach Anspruch 1, wobei die Webfasern (34) eine
Dicke aufweisen, die ausreicht, um zu verhindern,
dass die Zugelemente (32) mit einer Komponente in
Kontakt kommen, mit der die Traktionsfläche (36) in
Eingriff steht.

3. Längliches, lasttragendes Aufzugselement (30)
nach Anspruch 1 oder 2, wobei die Webfasern (34)
in einem Muster angeordnet sind, das einen vorbe-
stimmten Abstand zwischen den Webfasern (34)
umfasst, der eine Fläche der Abdeckung über den
Zugelementen (32) aufbaut, die ausreicht, um zu
verhindern, dass die Zugelemente (32) mit einer
Komponente in Kontakt kommen, mit der die Trak-
tionsfläche (36) in Eingriff steht.

4. Längliches, lasttragendes Aufzugselement (30)
nach einem der Ansprüche 1 bis 3, wobei die Web-
fasern (34) Garn und Leimung umfassen.

5. Längliches, lasttragendes Aufzugselement (30)
nach einem der Ansprüche 1 bis 4, wobei die Web-
fasern (34) Garn umfassen und mit einem Elasto-
mermaterial imprägniert sind.

6. Längliches, lasttragendes Aufzugselement (30)
nach einem der Ansprüche 1 bis 5, wobei die Zug-
elemente (32) mindestens teilweise mit einer Klebe-
beschichtung auf den Zugelementen (32) beschich-
tet sind, wobei die Webfasern (34) mit der Klebebe-
schichtung in Kontakt stehen.

7. Längliches, lasttragendes Aufzugselement (30)
nach einem der Ansprüche 1 bis 6, wobei die Web-
fasern (34) eine erste Außenabmessung aufweisen
und die Zugelemente (32) eine zweite, größere Au-
ßenabmessung aufweisen.

8. Verfahren zum Herstellen eines länglichen, lasttra-
genden Aufzugselements (30) eines Traktionsauf-
zugsystems (20), umfassend die folgenden Schritte:

Bereitstellen einer Vielzahl von Zugelementen
(32); und

Verweben einer Vielzahl von Webfasern (34) mit
den Zugelementen (32), um dadurch

(i) einen gewünschten Abstand und eine ge-
wünschte Ausrichtung der Zugelemente
(32) relativ zueinander aufrechtzuerhalten,
(ii) die Zugelemente (32) mindestens teil-
weise zu abdecken und
(iii) eine äußere Traktionsfläche (36) des
lasttragenden Elements (30) umfassend
freiliegende Webfasern (34) aufzubauen,

mindestens teilweises Beschichten der Zugele-
mente (32) mit einem Elastomer vor dem We-
ben,

wobei die Zugelemente (32) ein erstes Material
umfassen und die Webfasern (34) ein zweites,
anderes Material umfassen, und
wobei die Zugelemente (32) Metall umfassen
und die Webfasern (34) nicht metallisch sind.

9. Verfahren nach Anspruch 8, umfassend
mindestens teilweises Abdecken der Zugelemente
(32) mit den Webfasern (34), welche eine Dicke auf-
weisen, die ausreicht, um zu verhindern, dass die
Zugelemente (32) mit einer Komponente in Kontakt
kommen, mit der die Traktionsfläche (36) in Eingriff
steht.

10. Verfahren nach Anspruch 8, umfassend

mindestens teilweises Abdecken der Zugelemente (32) unter Verwendung eines Webmusters, das einen vorbestimmten Abstand zwischen den Webfasern (34) umfasst, der eine Fläche der Abdeckung über den Zugelementen (32) aufbaut, die ausreicht, um zu verhindern, dass die Zugelemente (32) mit einer Komponente in Kontakt kommen, mit der die Traktionsfläche (36) in Eingriff steht.

11. Verfahren nach einem der Ansprüche 9 bis 10, wobei die Zugelemente (32) vor dem Weben mindestens teilweise mit einer Klebebeschichtung beschichtet werden.

Revendications

1. Élément de support de charge d'ascenseur allongé (30) d'un système d'ascenseur à traction (20), comprenant :

une pluralité d'éléments de tension (32) qui se prolongent le long d'une longueur de l'élément de support de charge (30) ; et
une pluralité de fibres d'armure (34) transversales aux éléments de tension (32) et tissées avec les éléments de tension (32), les fibres d'armure (34) maintenant un espacement et un alignement souhaités des éléments de tension (32) les uns par rapport aux autres, les fibres d'armure (34) recouvrant au moins partiellement les éléments de tension (32), les éléments de tension (32) comprenant un premier matériau et les fibres d'armure (34) comprenant un second matériau différent, dans lequel les éléments de tension (32) sont au moins partiellement revêtus d'un matériau élastomère **caractérisé en ce que** les fibres d'armure (34) sont exposées et établissent une surface de traction (36) extérieure de l'élément de support de charge (30), **en ce que** les éléments de tension (32) comprennent du métal et les fibres d'armure (34) sont non métalliques.

2. Élément de support de charge d'ascenseur allongé (30) selon la revendication 1, dans lequel les fibres d'armure (34) ont une épaisseur suffisante pour empêcher les éléments de tension (32) d'entrer en contact avec un composant avec lequel la surface de traction (36) vient en prise.

3. Élément de support de charge d'ascenseur allongé (30) selon la revendication 1 ou 2, dans lequel les fibres d'armure (34) sont agencées selon un motif qui comprend un espacement prédéterminé entre les fibres d'armure (34) qui établit une zone de surface de couverture sur les éléments de tension (32) suffisante pour empêcher les éléments de tension

(32) d'entrer en contact avec un composant avec lequel la surface de traction (36) vient en prise.

4. Élément de support de charge d'ascenseur allongé (30) selon l'une quelconque des revendications 1 à 3, dans lequel les fibres d'armure (34) comprennent du fil et de l'ensimage.

5. Élément de support de charge d'ascenseur allongé (30) selon l'une quelconque des revendications 1 à 4, dans lequel les fibres d'armure (34) comprennent du fil imprégné d'un matériau élastomère.

6. Élément de support de charge d'ascenseur allongé (30) selon l'une quelconque des revendications 1 à 5, dans lequel les éléments de tension (32) sont au moins partiellement revêtus d'un revêtement adhésif sur les éléments de tension (32), les fibres d'armure (34) entrant en contact avec le revêtement adhésif.

7. Élément de support de charge d'ascenseur allongé (30) selon l'une quelconque des revendications 1 à 6, dans lequel les fibres d'armure (34) ont une première dimension extérieure et les éléments de tension (32) ont une seconde dimension extérieure plus grande.

8. Procédé de fabrication d'un élément de support de charge d'ascenseur allongé (30) d'un système d'ascenseur à traction (20), comprenant les étapes suivantes :

la fourniture d'une pluralité d'éléments de tension (32) ; et
le tissage d'une pluralité de fibres d'armure (34) avec les éléments de tension (32) pour ainsi

- (i) maintenir un espacement et un alignement souhaités des éléments de tension (32) les uns par rapport aux autres,
(ii) recouvrir au moins partiellement les éléments de tension (32), et
(iii) établir une surface de traction (36) extérieure de l'élément de support de charge (30) comprenant des fibres exposées parmi les fibres d'armure (34),

le revêtement au moins partiel des éléments de tension (32) avec un élastomère avant le tissage, dans lequel les éléments de tension (32) comprennent un premier matériau et les fibres d'armure (34) comprennent un second matériau différent, et dans lequel les éléments de tension (32) comprennent du métal et les fibres d'armure (34) sont non métalliques.

9. Procédé selon la revendication 8, comprenant le revêtement au moins partiel des éléments de tension (32) avec les fibres d'armure (34) qui ont une épaisseur suffisante pour empêcher les éléments de tension (32) d'entrer en contact avec un composant avec lequel la surface de traction (36) vient en prise. 5
10. Procédé selon la revendication 8, comprenant le revêtement au moins partiel des éléments de tension (32) à l'aide d'un motif d'armure qui comprend un espacement prédéterminé entre les fibres d'armure (34) qui établit une zone de surface de couverture sur les éléments de tension (32) suffisante pour empêcher les éléments de tension (32) d'entrer en contact avec un composant avec lequel la surface de traction (36) vient en prise. 10 15
11. Procédé selon l'une quelconque des revendications 9 à 10, dans lequel les éléments de tension (32) sont au moins partiellement revêtus d'un revêtement adhésif avant le tissage. 20

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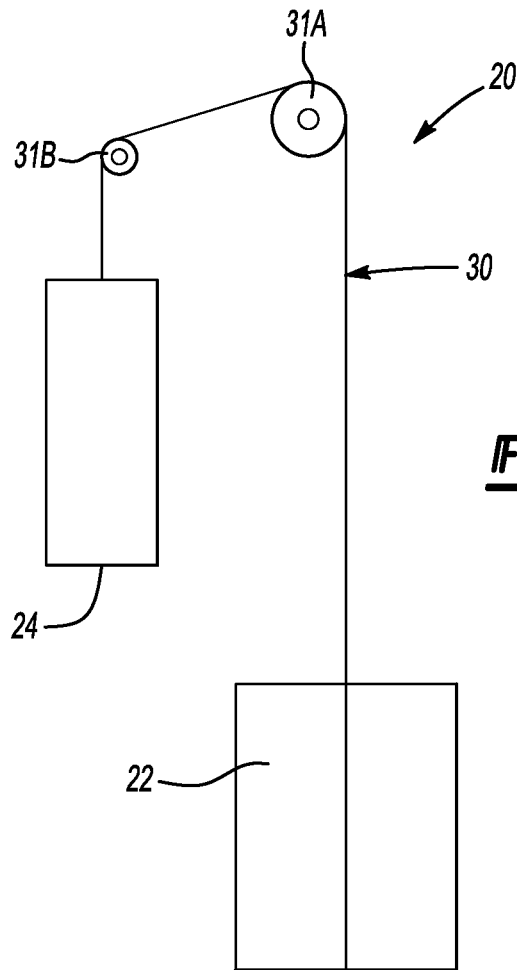


Fig-1

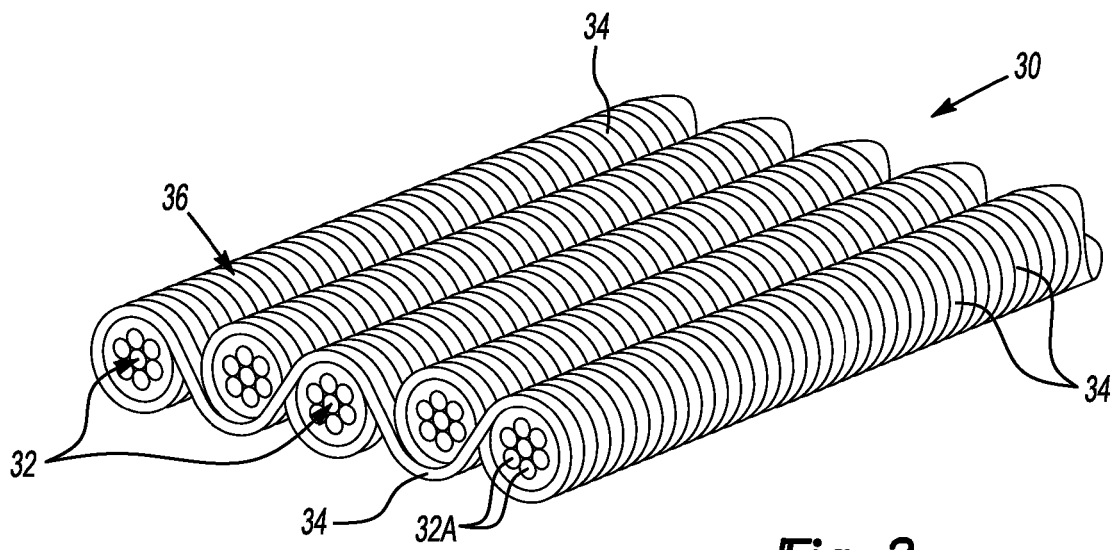


Fig-2

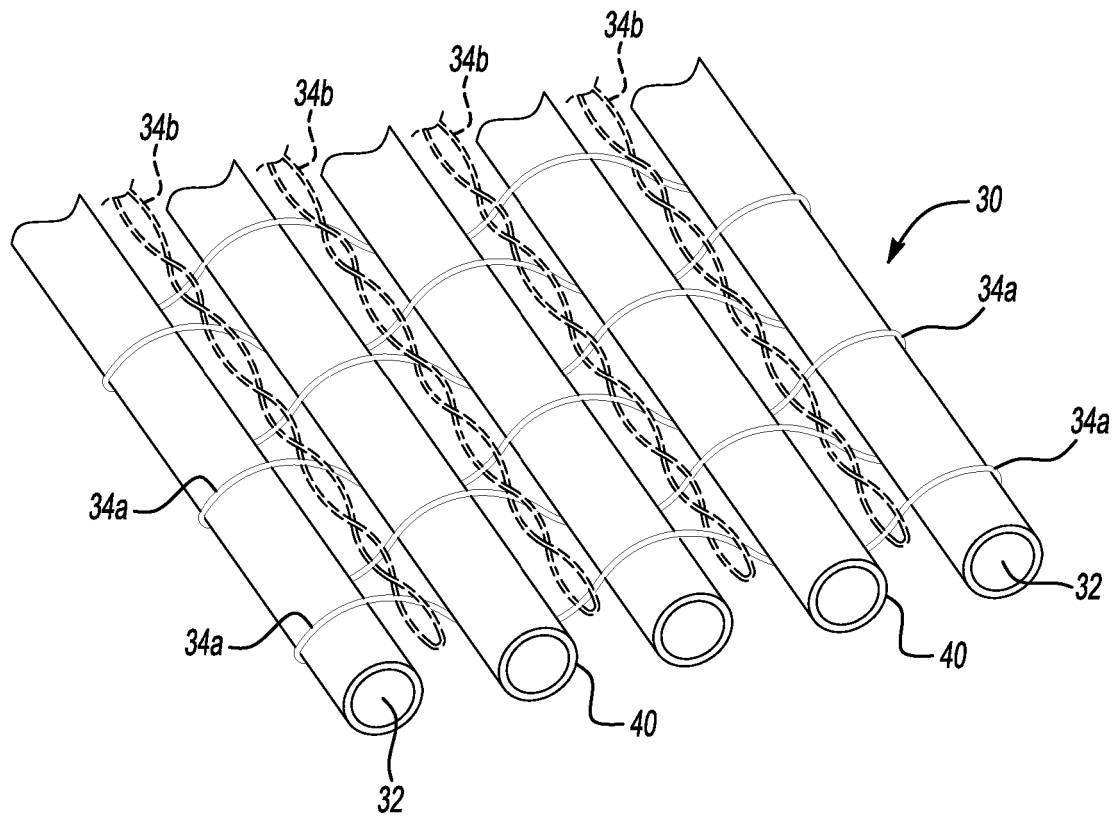


Fig-3

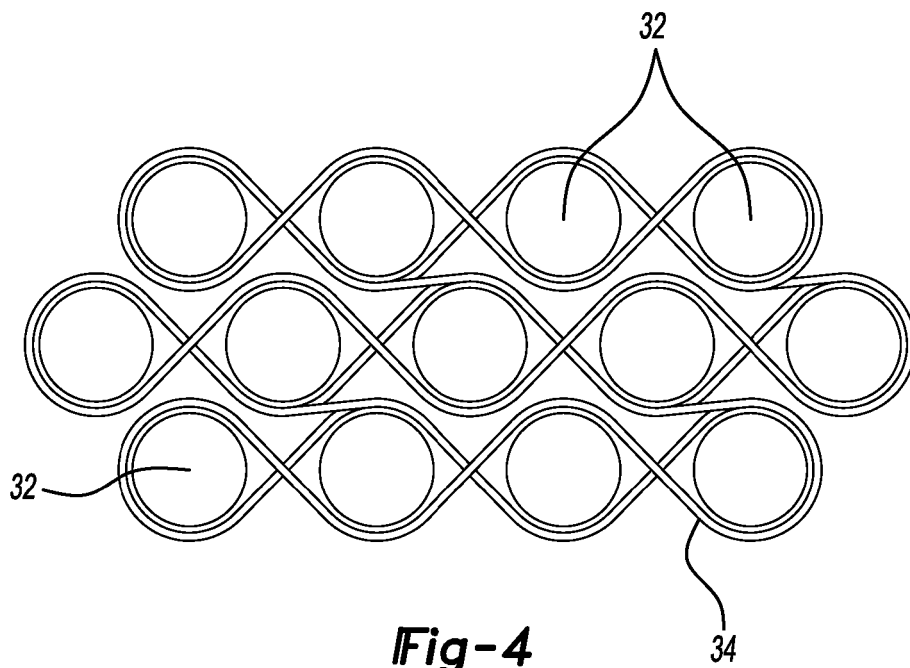


Fig-4

REFERENCES CITED IN THE DESCRIPTION

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