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(54) **Lace end connection for wakeboard binding**

(57) The present invention discloses a lace end assembly having a male end connector (106) and a female end connector. The lace end assembly uses an integrated magnet (108) in one connector that interacts with another magnet in the other connector to couple the connectors. The male end connector is adapted to retain a knotted end of a pair of laces (102, 104), such as found

in a wakeboard binding. The female end connector is mounted on the wakeboard binding. The male end connector includes a protrusion (107) that houses a first magnet. The female end connector includes a body portion that houses a second magnet. The female end connector also includes a cavity. The cavity receives the male end connector to allow the magnet to align and link magnetically, thus securing the lace ends to the binding.

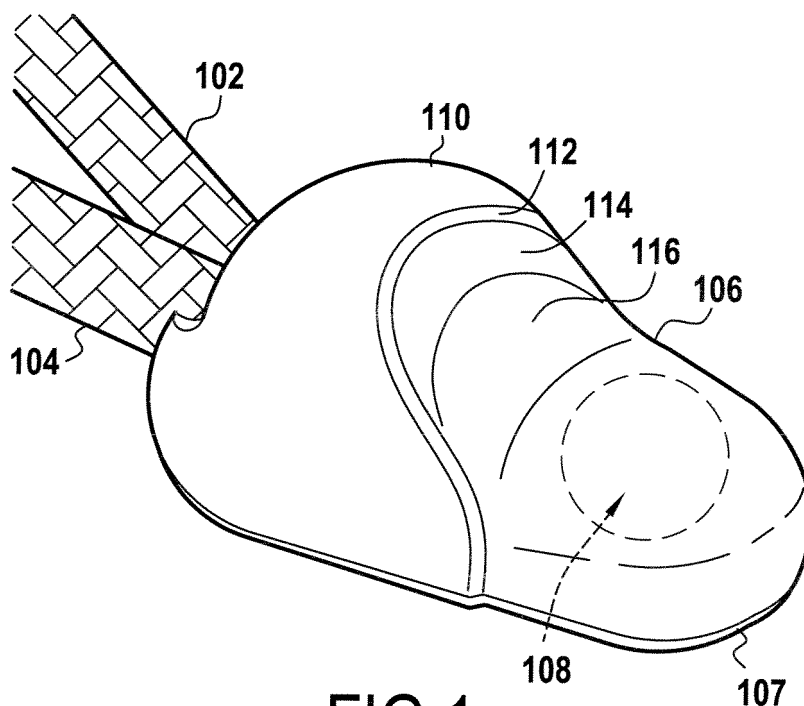


FIG.1

Description

[0001] This application claims priority from provisional patent application no. 60/693,793 filed on June 27, 2005, which is hereby incorporated by reference in its entirety.

Field of the Invention:

[0002] The present invention relates to lace ends. More particularly, the present invention relates to a lace end connection to secure the laces using magnets.

Background of the Invention

[0003] Laces are used in a variety of devices. Laces can provide light, low cost support for holding and securing items. Most notably, laces are tied together to keep shoes on one's feet. Users desire laces that are lightweight and sturdy.

[0004] One drawback with laces is that they can become unraveled over time, use and exposure. Frayed laces make it very hard to secure the laces or to tie them together. Eventually, one has to buy new laces or somehow repair the old ones. Further, laces tend to get caught or untied during physical activities. Some current lace-end designs have a plastic clip that is clipped to the laces on a binding to prevent these shortcomings. The clip, however, tends to become unclipped during use, thereby causing problems.

Summary of the Invention

[0005] Thus, a lace end connection is disclosed that is novel and unobvious over known lace end connections, and solves the problems and shortcoming discussed above. According to the disclosed embodiments, a lace end assembly for securing loose ends of a foot binding is disclosed. The lace end assembly includes a male end connector having means for retaining a knotted end of a pair of laces. The male end connector has a protrusion. The protrusion includes a first magnet. The lace end assembly includes a female end connector having a body portion having a second magnet therein. The body portion forms a second cavity. The second cavity is adapted to receive the protrusion of the male end connector for magnetic holding as a result of interaction between the first and second magnets. The female end is adapted to be mounted to the foot binding.

[0006] The invention also entails a method of securing laces in a foot binding. The method includes passing a pair of laces through an opening in a male end connector of a end assembly. The method also includes knotting ends of the pair of laces. The male end connector has a cavity to retain the knot. The method also includes magnetically linking the male end connector to a female end connector mounted to a foot binding to retain the knotted lace end in place.

[0007] With the male and female components, lace

end connections will not become unclipped or separate during use. The male end connector includes a hole and a cavity to accept the laces. The male end connector also provides a space to hold the knot of the laces in the hole. The male end connector also includes a magnet that has been overmolded.

[0008] The female end connector is stitched into an item to secure the lace end assembly to a product. The female end connector includes a magnet as well. The female end connector is configured to accept the male end connector. The magnets hold the connectors together to prevent the laces from coming loose during use or becoming frayed.

Brief Description of the Drawings

[0009] The accompanying drawings, which are included to provide further understanding of the invention and are incorporated in and further constitute a part of the specification, illustrate embodiments of the present invention. Together with the description, the figures listed below serve to explain and disclose the principles of the invention.

[0010] Figure 1 illustrates a male end connector of a lace end assembly according to the disclosed embodiments.

[0011] Figure 2 illustrates a bottom view of the male end connector of Figure 1.

[0012] Figure 3 illustrates a female end connector of a lace end assembly according to the disclosed embodiments.

[0013] Figure 4 illustrates a side view of the female end connector of Figure 3.

[0014] Figure 5 illustrates a lace end assembly attached to a binding according to the disclosed embodiments.

Detailed Description of the Invention

[0015] Reference will now be made in detail to the embodiments of the present invention. Examples of the embodiments are illustrated in the accompanying drawings.

[0016] Figure 1 depicts a male end connector 106 of a lace end assembly according to the disclosed embodiments. Male end connector 106 may be made of plastic or other materials that are lightweight and durable. Male end connector 106 is broken into several sections that allow connector 106 to be fitted with a female end connector of the lace end assembly, disclosed in greater detail below.

[0017] Laces 102 and 104 have ends that are enclosed by male end connector 106. Laces 102 and 104 may be comprised of known materials used for making laces, such as nylon, cotton, and the like. Laces 102 and 104 may extend away from male end connector to join together as one single item or stay separate. Laces 102 and 104 also may tie together. No matter the configuration or composition, laces 102 and 104 are used to tie

something down, or hold something. Laces 102 and 104 also are used to tie shoes together.

[0018] The present invention enables the ends of laces 102 and 104 to be secured. For example, laces 102 and 104 may be part of a wakeboard binding that acts as a boot for use on wakeboards. Loose lace end can be uncomfortable or pose a safety threat to boarders by flying around or getting caught on equipment. An assembly to secure laces keeps the lace ends from becoming loose or breaking during use. The present invention, however, is not limited to wakeboard bindings, and is applicable to any use where lace ends need to be secured, such as shoes, snowboarding boots, combat boots, sneakers, athletic shoes and the like that employ laces. Thus, in the present invention, a binding refers to any article that uses laces, whereby the lace ends need to be secured.

[0019] Male end connector 106 includes protrusion 107 and upper portion 110. Protrusion 107 is located at the end of male end connector 106 opposite laces 102 and 104. Protrusion 107 has a flat shape that is inserted into the appropriate section of female end connector, disclosed below. The height of protrusion 107 is smaller when compared to other sections of male end connector 106. Protrusion 107 also encloses a magnet 108.

[0020] Protrusion 107 is connected to slope 116, which leads into ridge portion 114. Slope 116 and ridge portion 114 also help secure male end connector 106 into the female end connector. Upper portion 110 connects to ridge portion 114 via slope 112. Upper portion 110 is the highest portion of male end connector 106. Upper portion 110 preferably is large enough to house the ends of laces 102 and 104. Upper portion 110 also may be the part of male end connector 106 that is not placed in contact with a female end portion, as disclosed below.

[0021] Figure 2 depicts a bottom view of male end connector 106 of Figure 1 according to the disclosed embodiments. Male end connector 106 includes all the portions disclosed above as well as cavity 206. Cavity 206 is sized to fit within upper portion 110 and to retain knotted end 202 of laces 102 and 104. Cavity 206 also includes opening 204. Opening 204 preferably is circular in shape, with a diameter large enough to fit the knotted end 202. Opening 204 should be large enough to allow access to knotted end 202. Opening 205 within male end connector 106 allow laces 102 and 104 to enter cavity 206. Opening 205 should be large enough to accommodate knotted end 202.

[0022] Protrusion 107 includes magnet 108, as disclosed above. Thus, male end connector 106 includes magnet 108 to facilitate a connection with a female end connector, and a cavity to enclose lace ends 202.

[0023] Figure 3 depicts a female end connector 300 of a lace end assembly according to the disclosed embodiments. Female end connector 300 is the part of assembly 100 that is attached to the shoe, clothing or other article to which male end connector 106 is to be secured. Female end connector 300 may be attached to the binding, by any means known. For example, female end connector

300 may be attached to fabric using an adhesive, with the fabric then stitched to the binding.

[0024] Female end connector 300 includes aperture 302 along one side. Preferably, aperture 302 is along the widest side of female end connector 300 to fit the wider end of male end connector 106 that is opposite protrusion 107. Aperture 302 acts as a hole in the bottom of female end connector 300. Aperture 302 and female end connector 300 are defined by base 304, which surrounds the connector. Base 304 represents a border for female end connector 300 that is attached to the article.

[0025] Slope 308 tapers up female end connector 300 from base 304 to upper portion 306. Slope 308 may be a gradual slope to accept protrusion 107 and slope 116 of male end connector 106, shown in Figure 1. Upper portion 306 represents the top portion of female end connector 300. Upper portion 306 also houses magnet 310. Magnet 310 corresponds to magnet 108 within male end connector 106. The polarity or configuration of magnet 310 is such that magnet 108 is attracted by the magnetic forces of magnet 130.

[0026] Once aligned, magnets 108 and 310 will couple together to secure male end connector 106 and female end connector 300. Thus, magnet 310 should be located in upper portion 306 so that it aligns with magnet 108 when protrusion 107 is within female end connector 300 for coupling male end connector 106 with female end connector 300.

[0027] Figure 4 depicts a side view of female end connector 300 shown in Figure 3. Base 304, slope 308 and upper portion 306 are shown. Further, aperture 302 is shown as extending out from underneath upper portion 306 to provide a through hole in female end connector 300. Magnet 310 also is shown in female end connector 300.

[0028] Female end connector 300 also includes a cavity 400 that is formed by slope 308 and upper portion 306. Slope 308 extends around the narrower side of base 304 to upper portion 306 to form cavity 400. Aperture 302 and cavity 400 join to provide an open area along the bottom of female end connector 300 that is surrounded by base 304. Thus, protrusion 107, slope 116 and ridge 114 fit inside cavity 400. Male end connector 106 is secured within female end connector 300. Moreover, cavity 400 is of a size to allow magnets 108 and 310 to be aligned with each other. Female end connector 300 is sized to surround the periphery of male end connector 106 so that portions of each connector are connectable.

[0029] Besides the physical fit provided by connectors 106 and 300, the present invention holds the connectors together magnetically as a result of the interaction between magnets 108 and 310. The magnetic forces of the present invention prevents connectors 106 and 300 from being separated, but without the need of plastic connectors, hooks or any other device that may break, be worn down or broken off.

[0030] Thus, when male end connector 106 is secured with female end connector 300, laces, such as laces 102

and 104 shown in Figure 1, may be held in place. Further, the ends of laces 102 and 104 may be prevented from fraying or unraveling. Laces 102 and 104 are not loose so as to get caught on anything or become untied during activities. For example, lace ends of laces for a binding are placed within the lace end assembly to secure the laces. The magnetic coupling provided by connectors 106 and 300 prevent the laces from coming loose.

[0031] Figure 5 depicts a lace end assembly 518 attached to a binding 500. Binding 500 includes binding portion 502, heel portion 506 and sole 504. Portions 502 and 504 may be stitched together, along with sole 504. Preferably, binding 500 is a binding made for sporting activities, particularly, wakeboard activities. Binding 500 may attach to a board or other equipment while the user is wearing binding 500.

[0032] Lace end assembly 518 secures loose ends of laces 102 and 104. Laces 102 and 104, as disclosed above, may tie together to keep binding 500 on the foot of a user. Lace end assembly 518 includes female end connector 300 and male end connector 106 that are coupled magnetically with each other. Magnets, like magnets 108 and 310 disclosed above, secure the connectors to each other. Base 304 extends from female end connector 300 to seat male end connector 106. In other words, male end connector 106 sits within the area defined by base 304 and the cavity defined by female end connector 300.

[0033] Lace end assembly 518 is attached to binding portion 502 by fabric 520. Fabric 520 may be stitched together with binding portion 502. Base 304 is secured to fabric 520 to hold lace end assembly 518 in place.

[0034] As shown in Figure 5, female end connector 300 and male end connector 106 are separate and divided by line 532. When uncoupled, male end connector 106 should not be in contact with binding 500, and is unseated from base 304. Male end connector 106 may be uncoupled from female end connector 300 by simply pressing male end connector 106 into the hole defined by base 304 on fabric 520. Male end connector 106 then may be pulled out from female end connector 300 so that laces 102 and 104 disconnect from binding 500.

[0035] Laces 102 and 104 still have their ends enclosed by male end connector 106 through hole 205. Male end connector 106 also includes a cavity to fit the ends of laces 102 and 104. When a user wishes to remove male end assembly 106 from laces 102 and 104, the knotted ends within male end connector 106 are untied so that each lace can be removed via hole 205.

[0036] In accordance with the above description, the present invention also provides for a method of securing laces in a binding, such as a wakeboard binding. The method can be used by a wearer of the binding that would like to keep the laces from coming loose. Referring to Figures 1-5 above, the method includes passing a pair of laces, such as laces 102 and 104, through opening 205 in male end connector 106 of lace end assembly 518. The method also includes knotting ends of the pair of laces 102 and 104, as shown by knotted end 202

above. Male end connector 106 includes cavity 206 to retain knotted end 202. The method also includes magnetically linking male end connector 106 to female end connector 300 mounted on binding 500 to retain knotted end 202 in place.

[0037] Although the shapes of male end connector 106 and female end connector 300, as well as the overall shape of lace end assembly 518, are as shown above, the embodiments of the present invention are not so limited. The male end connector and female end connector have complementary shapes that may take any form as long as the connectors can engage each other. Further, the cavities within the connectors may be of any shape or size, and are not limited to the cavities disclosed above. The alignment of the magnets also is not limited to being in the middle of the lace end assembly. The magnets may be located within the respective connectors so as the magnets can align with each other. In turn, the connectors and cavities may be any shape or size as long as the magnets are aligned with each other when the lace end assembly is connected.

[0038] Moreover, the present invention may incorporate the magnets in the male end connector and the female end connector in any manner known to those skilled in the art. Figures 1-5 disclose that the magnets are placed in the connectors by overmolding. The embodiments of the present invention are not so limited. The magnets can be made part of the connectors in any way. For example, an alternative may be gluing the magnets to the connectors. The present invention also is not limited to any specific configuration with regard to the type or shape of the magnets.

[0039] While the lace ends are shown as being knotted in a cavity of the male connector for retaining purposes, the lace ends could be secured to the male connector in any known fashion, just as long as they are retained in the connector so that the lace ends can then be secured to the binding. For example, the male connector could have spring clip that would engage the ends of the laces and retain them to the male connector. As another example, the male connector could have a loop that the ends of the laces tie to for retention purposes.

[0040] While one pair of connectors is shown, the binding could have two pairs of connectors, one on each side of the binding to accommodate two sets of lace pairs.

[0041] It will be apparent to those skilled in the art that modifications and variations can be made of the present invention without departing from the spirit or scope of the invention. Thus, it is intended that the present invention covers the modifications and variations of the subject matter disclosed above provided that they come within the scope of the claims and their equivalents.

Claims

1. A lace end assembly for securing loose lace ends of a binding **characterized in that** it comprises:

a male end connector (106) having means for retaining ends of a pair of laces (102, 104), the male end connector having a protrusion (107), the protrusion including a first magnet (108); and a female end connector (300) having a body portion (306) having a second magnet (310) therein, the body portion forming a second cavity (400), the second cavity adapted to receive the protrusion of the male end connector for magnetic holding as a result of interaction between the first and second magnets, the female end connector adapted to be mounted to the binding.

2. The assembly of claim 1, **characterized in that** the binding comprises a shoe, a wakeboard binding or the like or any other article that would use laces for retention purposes. 15

3. The assembly of claim 1, **characterized in that** the retaining means further comprising a male end body having a first cavity (206) sized to retain the knotted end (202), the first cavity including an opening (204) to allow the pair of laces to pass therethrough. 20

4. The assembly of claim 3, **characterized in that** the first cavity (206) is formed in an underside of the male end body. 25

5. The assembly of claim 1, **characterized in that** the female end connector (300) includes a u-shaped extension that extends from the body portion and is sized to surround a portion of a periphery of a male end connector when the female and male end connectors are linked. 30

6. A binding including the lace end assembly of claim 1, **characterized in that** the female end connector (300) is mounted to a portion of the binding. 35

7. The foot binding of claim 6, **characterized in that** the binding is a wakeboard binding. 40

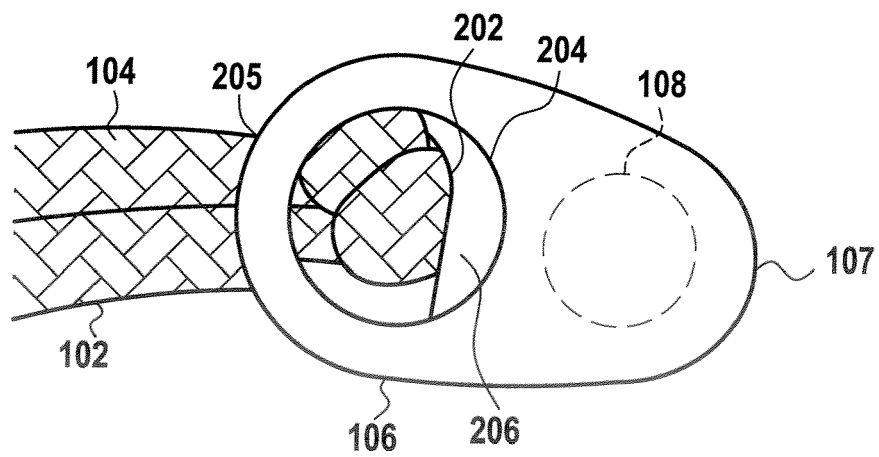
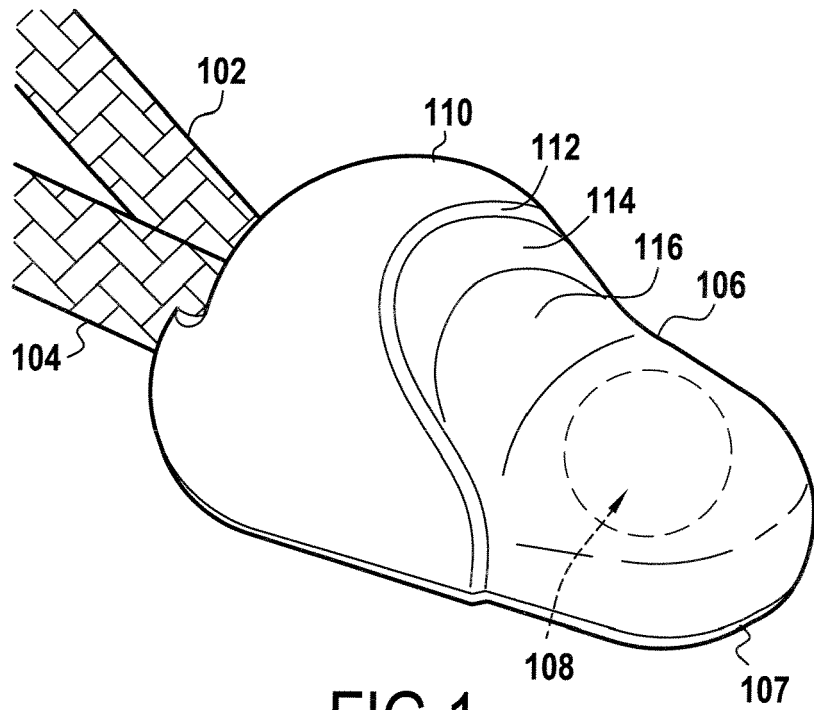
8. The assembly of claim 1, **characterized in that** the male (106) and female (300) ends are molded, and the first (108) and second (310) magnets are respectively overmolded into the male and female end connectors. 45

9. A method of securing laces in a binding **characterized in that** it comprises the steps of: 50
 - securing a pair of laces to a male end connector of a lace end assembly; and
 - magnetically linking the male end connector to a female end connector mounted to a binding to retain the lace ends in place. 55

10. The method of claim 9, **characterized in that** it fur-

ther comprises the step of using the lace end assembly of claim 1 for the securing and magnetic linking steps.

- 5 11. The method of claim 9 or 10, **characterized in that** the lace ends are knotted and the knot is held by the male connector.



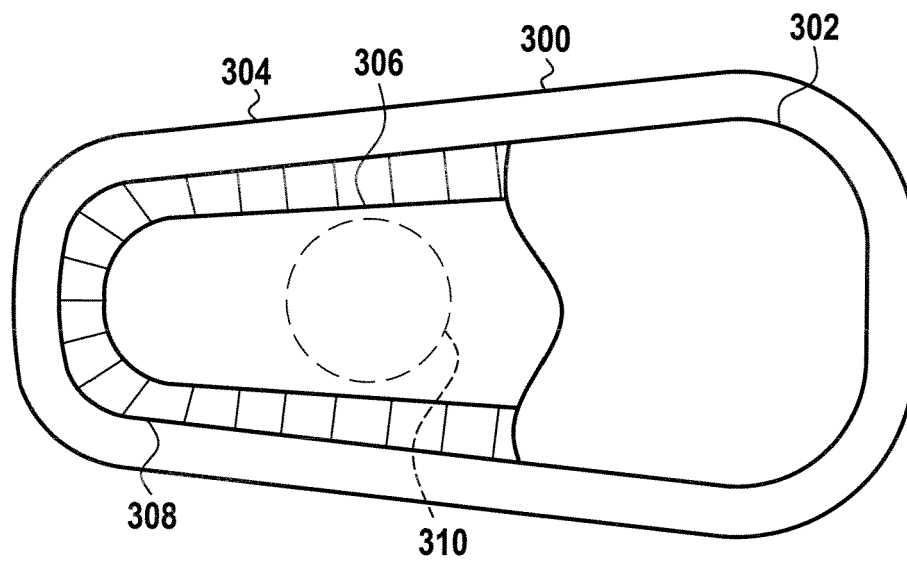


FIG.3

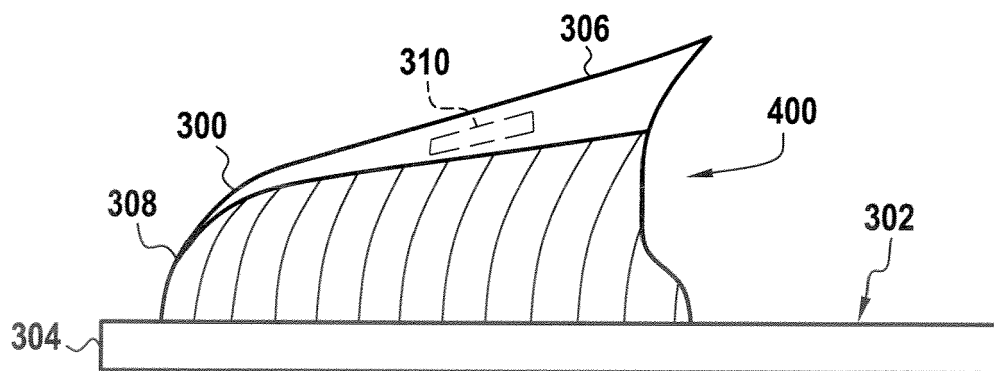


FIG.4

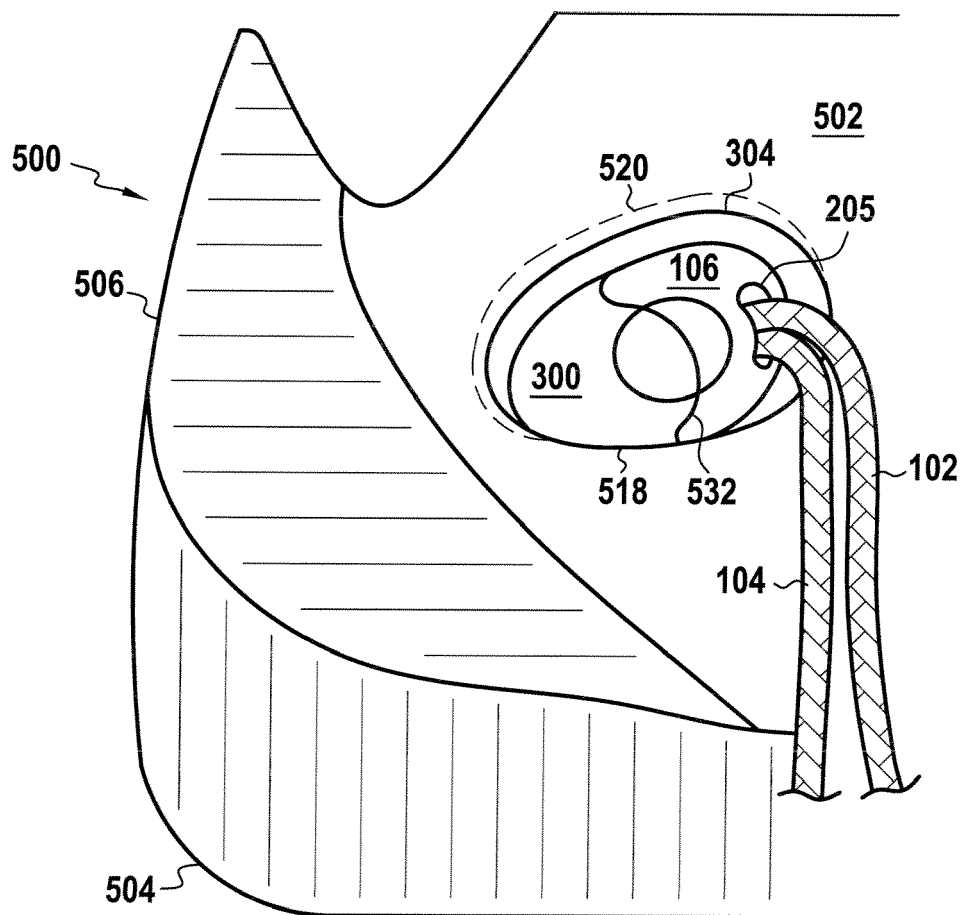


FIG.5



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 11 6167

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Place of search		Date of completion of the search	Examiner	
The Hague		4 August 2006	Cianci, S	
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 06 11 6167

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04-08-2006

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