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- (72) Inventors; and
(71) Applicants : **DICK, Jay-Lee** [CA/CA]; 4780 Eales Road, Mechosin, British Columbia V9C4E1 (CA). **DICK, Jody** [CA/CA]; 4780 Eales Road, Mechosin, British Columbia V9C4E1 (CA).
- (74) Agent: **THOMSON, Gordon**; Suite 204, 1026 Pandora Avenue, Victoria, British Columbia V8V3P6 (CA).
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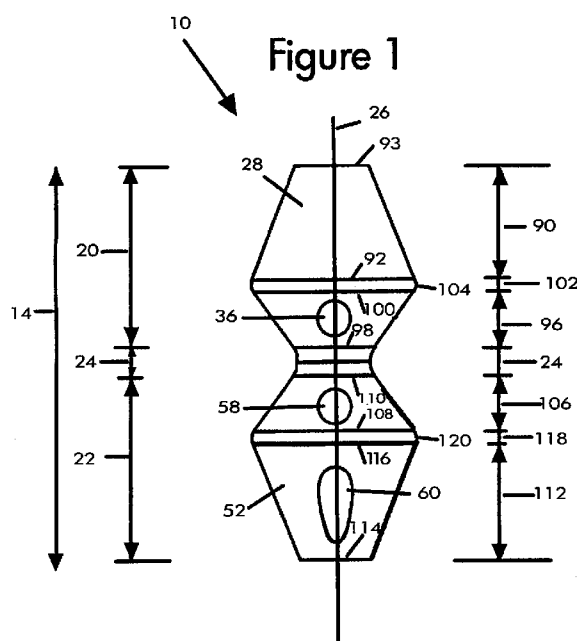
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(54) Title: APPARATUS FOR JOINING A FILAMENT TO AN OBJECT



(57) Abstract: The invention has been designed specifically to eliminate the need to tie conventional knots to secure fishing line to the eye of a fish hook or, using the double ended version, to secure two separate lines together without tying knots in rope or line. The materials used to manufacture this device would be any metal such as brass, stainless steel, copper, plated steel or hard dense plastic. The top of the device has two holes running through on angles from the top and exiting above the neck. Where the holes meet at the top there is a single round open area for the line(s) to enter and exit respectively. The line is wrapped around the neck of the device a total of three revolutions. While holding the wrapped line in place with ones fingers, the line is guided upwardly into a groove under the wrapped line and upwardly through the hole. The line is pulled taut from the top. There is also a double ended version so that two separate lines can be connected using the device.

Description

Title of Invention: APPARATUS FOR JOINING A FILAMENT TO AN OBJECT

Technical Field

- [1] This invention relates to knots and knot tying. More particularly this invention relates to an apparatus for intertwining one or more portions of a cord. Specifically this invention relates to an apparatus for joining a filament to an object.

Background Art

- [2] Fishing lines are typically secured to a fishing hook by knots. However, fishing filament is made of synthetic material and is often difficult to form a knot from such material. Similarly, tying two lengths of fishing line together often results in an insecure knot. Therefore, there is need for an apparatus than can secure a fishing hook or other object to a filament and secure two lengths of a filament together. To the best of our knowledge, there is no such apparatus available.

Disclosure of Invention

Technical Solution

- [3] In order to overcome the problems associated with tying knots in filaments our invention is an apparatus for joining a filament to an object. In one embodiment of the invention the apparatus comprises a body comprising a body top half joined to a body bottom half by a body middle. The filament fixes around the body middle to the body top half. The object fixes to the body bottom half.
- [4] In one embodiment of the invention the body top half comprises an axis, an outside surface, a first filament channel having an axis, a top port, a bottom port and a second filament channel having an axis, a top port and a bottom port. The body bottom half also comprises an axis, an outside surface, a third filament channel having an axis, a top port, a bottom port, a filament groove and a well for permanently accepting said object. To tie the filament to the apparatus the end tip of the filament enters the top port of the first channel, passes downwards through the first channel, exits the bottom port of the first channel and then is wrapped thrice around the body middle portion. This forms a first and a second constricting filament bands. The filament is then passed under the first and the second constricting filament bands, into the bottom port of the second channel and then upwards through the second channel to exit the top port of the second channel so that the filament end tip is visible above the top port of the second channel. When tension is applied between the filament and the apparatus body the first and second constricting filament bands will tighten around the filament thereby fixing the filament to the apparatus body.

- [5] In one embodiment of the invention the body top half comprises a top half top portion and a top half bottom portion. The top half top portion has a base, a tapered cylindrical shape and a truncated top end. The top half bottom portion has a base, a tapered cylindrical shape and a truncated bottom end. Similarly, the body bottom half comprises a bottom half top portion and a bottom half bottom portion. The bottom half top portion has a base, a cylindrical shape and a truncated top end. The bottom half bottom portion has a base, a cylindrical shape and a truncated bottom end.
- [6] In one embodiment of the invention the body middle is disposed between the top half base and the bottom half widened top end. A filament groove is disposed within the body bottom half outside surface to accept the filament and permit it to be placed beneath the constricting bands.
- [7] In another embodiment of the invention there is a well disposed in the bottom surface of the body bottom half to accept an object in permanent fixation. The object is a shaft of a first fish hook.
- [8] In one embodiment the body bottom half has a third filament shaft to a second filament attached to a second fish hook for tying tandem fishing rigs.
- [9] In yet another embodiment of the invention the apparatus is used to join a first filament to a second filament. The apparatus comprises a body comprising a body top third joined to a body bottom third by a body middle third. There is a body first neck between the body top third and the body middle third and there is a body second neck between the body middle third and the body bottom third. The first filament fixes around the body first neck and the second filament fixes around the body second neck thereby joining the first filament to the second filament.
- [10] The various embodiments of the invention will become more apparent from the detailed description set forth below when taken in conjunction with the drawings, in which like elements bear like reference numerals.

[11]

Description Of Drawings

[12]

[13] Figure #1 is a side view of one embodiment of the invention.

[14] Figure #2 is an opposite side view of the embodiment illustrated in Figure #1.

[15] Figure #3 is a cross-sectional side view of the embodiment of the invention illustrated in Figure #1 through axis line 26.

[16] Figure #4 is the view shown in Figure #1 illustrating the pathway of a filament.

[17] Figure #5 is the view shown in Figure #2 illustrating the pathway of a filament.

[18] Figure #6 is the view shown in Figure #3 illustrating the pathway of a filament.

[19] Figure #7 is a view of a filament.

[20] Figure #8 is a top view of one embodiment of the invention.

[21] Figure #9 is a view of one embodiment of the invention attached to an object and filament.

[22] Figure #10 is a side view of a second embodiment of the invention.

[23] Figure #11 is an opposite side view of the embodiment illustrated in Figure #10.

[24] Figure #12 is a cross-sectional side view of the embodiment shown in Figure #10 showing the pathway of a first and second filaments.

Best Mode

[25] Refer now to Figure #1 through to Figure #12. In Figure #1, there is shown a first side view of a first embodiment of our invention 10. Figure #2 shows an second side view of our invention 10 opposite to that shown in Figure #1. Figure #3 shows a cross-sectional side view of the invention 10 through line 26 in Figure #1. Figure #4 shows filament 12 fixed to the invention 10 in the same side view as Figure #1. Figure #5 shows filament 12 fixed to the invention 10 in the same side view as Figure #2. Figure 6 shows filament 12 as it passes through the invention 10 in the same cross-sectional view as Figure #3. Figure #7 shows a filament 12. Figure #8 shows a top view of one embodiment of the invention. Figure #9 shows the invention 10 with filament 12 joined to the body of the invention. The body is attached to an object 16 such as the shaft of a fishing hook.

[26] Our invention 10 comprises a body 14 for joining a filament 12 to an object 16. The body 14 may be machined from a suitable metal such as brass, stainless steel, copper, plated steel or a hard dense plastic material. The body 14 comprises a body top half 20 joined to a body bottom half 22 by a body middle 24. Filament 12 fixes through the body top half 20 and around the body middle 24. The object 16 fixes to the body bottom half 22.

[27] The body top half 20 comprises an vertical axis 26 and an outside surface 28. Within the body top half 20 is a first filament channel 30 having an axis 32. The first filament channel 30 has a top port 34 and a bottom port 36 so that the first filament 12 may pass through the channel 30. The body top half 20 further comprises a second filament channel 38 having an axis 40. The second filament channel 38 has a top port 42 and a bottom port 44 so that the first filament 12 can pass through the second filament channel 38.

[28] The body bottom half 22 comprises an axis 50 and an outside surface 52. Within the body bottom half 22 is a third filament channel 54 having an axis 56. The third filament channel includes a top port 58 and a bottom port 60. The body bottom half further comprises a filament groove 62 and a well 64 for permanently accepting the object 16.

[29] Referring to Figure #7, the filament 12 comprises an end tip 72 and an end portion having a sufficient length 74 for tying to the body 14.

- [30] Referring to Figure #8, there is shown a top view of the top body half 20 having outside surface 28 and inlet portals 34 for the first filament channel and 42 for the second filament channel.
- [31] Referring to Figures #4, #5 and #6 the end tip 72 enters the first filament channel 30 by way of top port 34. The end tip 72 passes downwards through the first filament channel 30 and exits the bottom port 36 of the first filament channel 30. The length 74 is wrapped a first loop 76 and a second loop 78 around the body middle 24. A third loop 80 is commenced and is passed within groove 63 within top half 20 and beneath the first loop 76 and the second loop 78 so that the first loop 76 and the second loop 78 form constricting filament bands around the end portion 70. The end top 72 is then passed into the second filament channel 38 by way of bottom port 44 and exits the channel out of top port 42 so that the end tip 72 is visible above the top port 42.
- [32] Tension is then applied between the body 14 and the filament 12 so that the first loop 76 and the second loop 78 constrict around the filament end portion 70 thereby fixing the filament to the body. As long as there is tension between the body and the filament the filament will remain fixed. The filament can be easily released from the body by pushing an additional length of the filament 12 downwards into the first filament channel 30 thereby loosening the constricting band loops 76 and 78 and releasing the body from the filament.
- [33] Referring to Figure 1, the body top half 20 comprises a top half top portion 90 having a base 92 and a tapered cone shape having a truncated top end 93. The body top half further includes a top half bottom portion 96 having a base 98 and a tapered cone shape having an widened top end 100. Between the top half top portion base 92 and the top half bottom portion widened top end 100 is a middle portion 102 having a curved end surface 104.
- [34] The body bottom half 22 comprises a bottom half top portion 106 having a base 108 and a tapered cone shape. The cone shape has a truncated top end 110. The body bottom half 22 has a bottom portion 112 having a base 114 and a widened top end 116. Between the bottom base 112 and the base 114 is a bottom middle portion 118 having a curved end surface 120.
- [35] The body middle 24 is disposed between the body top half 20 and the body bottom half 24.
- [36] Referring to Figure 2, the body top half 20 top portion 90 truncated top end 94 has a first diameter 130. The top half 20 top portion 90 base 92 has a second diameter 132 that is greater diameter 130 giving the top half 20 top portion 90 its truncated cone shape. The bottom half 22 top portion 106 has a truncated top end 110 having a first diameter 142 and a widened bottom base with a second diameter 144 greater than the first diameter 142 given that portion its truncated cone shape. The top half 20 bottom

portion 96 is similarly dimensioned as the bottom half 22 top portion 106 and the top half 20 top portion 90 is similarly dimensioned as the bottom half 20 bottom portion 112.

[37] Referring to Figure 3, the first filament channel 30 axis 32 is substantially parallel to the body top half 20 outside surface 28. The second filament channel 38 axis 40 is also substantially parallel to the body top half 20 outside surface 28. The third filament channel 54 axis 56 is parallel to the body bottom half 22 axis 50. The filament groove 62 is disposed within the body bottom half 22 outside surface 52 and is contiguous with filament groove 63 disposed within the body top half 20 bottom portion 96 outside surface 28. Well 64 is disposed within the bottom truncated surface 114 of the bottom half 22 bottom portion 112. The well 64 has a depth 65 and accepts object 16 in permanent fixation. One illustration of this fixation is shown in Figure 9. The object is the shaft end of fish hook. The shaft end is inserted into well 64 in a tight frictional fit. The filament 12 may then be tied to body 14 as previously explained herein. The third filament channel 54 may accept a second filament attached to a second fish hook for tying tandem fishing rigs.

[38] Referring to Figure 1, the body top half 20, middle 24 and body bottom half 22 are co-axial on axis 26.

[39] Referring now to Figures #10, #11 and #12 there is shown a second embodiment of our invention 200 for joining a first filament 202 having a first filament end 204 to a second filament 206 having a second filament end 208. The second embodiment comprises a body comprising a body top third portion 212 joined to a body bottom third portion 214 by a body middle third portion 216. Between the body top third portion 212 and the body first middle third portion 216 there is a first neck 220. Between the body bottom third portion 214 and the body middle third portion 216 there is a second neck 222. The body is machined and so the top, bottom and middle body third portions, the first neck and the second neck are co-axial, integral and contiguous. As further explained herein the first filament 202 fixes around the body first neck 220 and the second filament 206 fixes around the body second neck 222 thereby joining the first filament and the second filament together.

[40] The body top third portion 212 comprises an axis 224, a body outside surface 226, a first filament first channel 228 having a channel axis 230, a top port 232 and a bottom port 234. There is also a first filament second channel 236 having a channel axis 238, a top port 240 and a bottom port 242. The body top third portion also comprises a first filament first groove 231 commencing at the first neck 220 and merging with the bottom port 242. The body bottom third portion 214 comprises axis 224 and a body outside surface 244. Within the body bottom third portion is a second filament first channel 246 having a channel axis 248, a top port 250 and a bottom port 252. There is

also a second filament second channel 254 having a channel axis 256, a top port 258 and a bottom port 260. A second filament first groove 261 is disposed within the body bottom third portion. The body middle third portion comprises axis 224, an outside surface 262 and a first filament second groove 264 commencing at the first neck 220 and descending down the outside surface 262 of the body middle third portion to the middle apex 266 of the body middle third portion. There is also a second filament second groove 270 disposed on the outside surface 262 of the body middle third portion disposed diagonally opposite the first filament second groove 271 commencing at the second neck 222 and ascending outside surface of the body middle third portion to the middle apex 266 of the body middle third portion.

[41] Referring to Figure 12, the first filament 202 end 204 enters the top port 232 of the first filament first channel 228. The first filament end 204 passes downwards through the first filament first channel 228 and exists the bottom port 234. The first filament 202 is wrapped around first neck 220 so as for form a first constricting band 280 and a second constricting band 282. A third band 284 is commenced and is wrapped partially around first neck 220. The first filament end 232 is threaded under the first and second constricting bands and is seated in first filament first groove 231. The end 232 then enters the bottom port 242 of the first filament second channel 236 and is threaded through the first filament second channel 236 until it exists the second channel top port 240 so that the end 204 is visibly protruding from the port 240.

[42] Still referring to Figure 12, the second filament 206 end 208 enters the bottom port 252 of the third filament channel 246. The second filament end passes upwards through the second filament third channel 246 and exits the top port 250. The filament is wrapped around second neck 222 to form a fourth constricting band 298 and a fifth constricting band 300. A sixth band 302 is commenced and is wrapped partially around the second neck 222. The second filament end 208 is threaded under the fourth and fifth constricting bands and is seated in the second filament first groove 261. The end 208 then enters the top port 258 of the second filament fourth channel 254 and is threaded through the channel 254 until the end 208 protrudes above the top portal 260.

[43] Tension is applied between the first filament and the second filament so that the first and second constricting filament bands tighten around the first filament and so that the third and fourth constructing filament bands tighten around the second filament thereby fixing the first and second filaments to the body.

[44] While one or more embodiments of the present invention have been illustrated in detail, the skilled artisan will appreciate that modifications and adaptations to those embodiments may be made without departing from the scope of the present invention as set forth in the following claims.

Claims

- [Claim 1] An apparatus for joining a filament to an object, said apparatus comprising a machined body comprising a body top half joined to a body bottom half by a body middle so that said filament fixes around said body middle to said body top half and said object fixes to said body bottom half.
- [Claim 2] The apparatus of claim 1 wherein said body top half comprises:
- a. an axis;
 - b. an outside surface;
 - c. a first filament channel having an axis, a top port and a bottom port;
- and,
- a second filament channel having an axis, a top port and a bottom port.
- [Claim 3] The apparatus of claim 1 where said body bottom half comprises:
- a. an axis;
 - b. an outside surface;
 - c. a third filament channel having an axis, a port and a bottom port;
 - d. a filament groove; and,
- a well for permanently accepting said object.
- [Claim 4] The apparatus of claim 1 wherein said wherein the filament comprises:
- a. an end portion;
 - b. an end tip; and,
 - c. a sufficient length; so that,
- i. said end tip may enter said top port of said first channel;
 - ii. pass downwards through the first channel;
 - iii. exit said bottom port of the first channel;
 - iv. wrap thrice around said body middle portion;
 - v. thereby forming a first and second constricting filament bands;
 - vi. pass under said first and said second constricting filament bands;
 - vii. into said bottom port of said second channel;
 - viii. pass upwards through said second channel; and,
 - ix. exit said top port of the second channel so that the end top is visible above the top port of the second channel.
- [Claim 5] The apparatus of claim 4 wherein tension is applied between the filament and said machined body so that the first and second constricting filament bands tighten around the filament thereby fixing the filament to the body.
- [Claim 6] he apparatus of claim 2 wherein the body top half comprises:

- a. a top half top portion having a base, a tapered cylindrical shape and a truncated top end; and,
- a top half bottom portion having a base, a tapered cylindrical shape and a truncated top end.

- [Claim 7] The apparatus of claim 3 wherein the body bottom half comprises:
- a. a bottom half top portion having a base, a cylindrical shape and a truncated top end; and,
 - b. a bottom half bottom portion having a base, a cylindrical shape and a truncated bottom end.
- [Claim 8] The apparatus of claim 1 wherein said body middle is disposed between said top half base and said bottom half truncated top end.
- [Claim 9] The apparatus of claim 6 wherein said top half top portion truncated top end has a first diameter and said top half top portion base has a second diameter greater than said first diameter so that said top portion cylindrical shape is tapered from bottom to top.
- [Claim 10] The apparatus of claim 7 wherein said bottom half top portion truncated top end has a first diameter and said bottom half top portion base has a second diameter less than said first diameter so that said bottom portion cylindrical shape is tapered from top to bottom.
- [Claim 11] The apparatus of claim 2 wherein said first filament channel axis is substantially parallel to said body top half outside surface.
- [Claim 12] The apparatus of claim 2 wherein said second filament channel axis is substantially parallel to the body top half outside surface.
- [Claim 13] The apparatus of claim 3 wherein said third filament channel axis is parallel to said body bottom half axis.
- [Claim 14] The apparatus of claim 3 wherein said filament groove is disposed within said body bottom half outside surface.
- [Claim 15] The apparatus of claim 2 wherein the body top half and the body bottom half are co-axial.
- [Claim 16] The apparatus of claim 7 wherein said well is disposed within the bottom truncated surface of the bottom half bottom portion.
- [Claim 17] The apparatus of claim 16 wherein said well has a depth from the bottom truncated surface of the bottom half portion to said base of said bottom half bottom portion.
- [Claim 18] The apparatus of claim 17 wherein the well accept the object in permanent fixation.
- [Claim 19] The apparatus of claim 18 wherein the object is a shaft of a first

fish hook.

[Claim 20]

The apparatus of claim 19 wherein the third filament shaft accepts a filament attached to a second fish hook for tying tandem fishing rigs.

[Claim 21]

Apparatus for joining a first filament having a first filament end to a second filament having a second filament end, said apparatus comprising a machined body comprising:

- a. a body top third joined;
- b. to a body bottom third by;
- c. a body middle third;
- d. a body first middle between said body top third and said body middle third;
- e. and a body second middle between said body middle third and said body bottom third;
- f. so that said first filament end fixes around said body first middle;
- and,
- g. said second filament end fixes around said body second middle;
- h. thereby joining said first filament to said second filament.

[Claim 22]

The apparatus of claim 21 wherein the body top third, the body bottom third and the body middle third are co-axial.

[Claim 23]

The apparatus of claim 22 wherein the body top third comprises:

- a. an axis;
- b. a body outside surface;
- c. a first filament channel having a channel axis, a top port and a bottom port; and,
- d. a second filament channel having a channel axis, a top port and a bottom port.

[Claim 24]

The apparatus of claim 23 wherein the body bottom third comprises:

- a. an axis;
- b. a body outside surface;
- c. a third filament channel having a channel axis, a top port and a bottom port; and,
- a fourth filament channel having a channel axis, a top port and a bottom port.

[Claim 25]

The apparatus of claim 24 where said body middle third comprises:

- a. an axis;
- b. an outside surface;
- c. a first filament groove; and,

d. a second filament groove.

[Claim 26]

The apparatus of claim 25 wherein said wherein the first filament end comprises:

- a. a first filament end tip; and,
- b. a sufficient length; so that,
 - i. said first filament end tip may enter said top port of said first filament channel;
 - ii. pass downwards through the first filament channel;
 - iii. exit said bottom port of the first filament channel;
 - iv. wrap thrice around said first middle;
 - v. thereby forming a first and second constricting filament bands;
 - vi. pass under said first and said second constricting filament bands;
 - vii. into said bottom port of said second filament channel;
 - viii. pass upwards through said second filament channel; and,
 - ix. exit said top port of the second filament channel so that said first filament end tip is visible above the top port of the second filament channel.

[Claim 27]

The apparatus of claim 26 wherein said wherein the second filament end comprises:

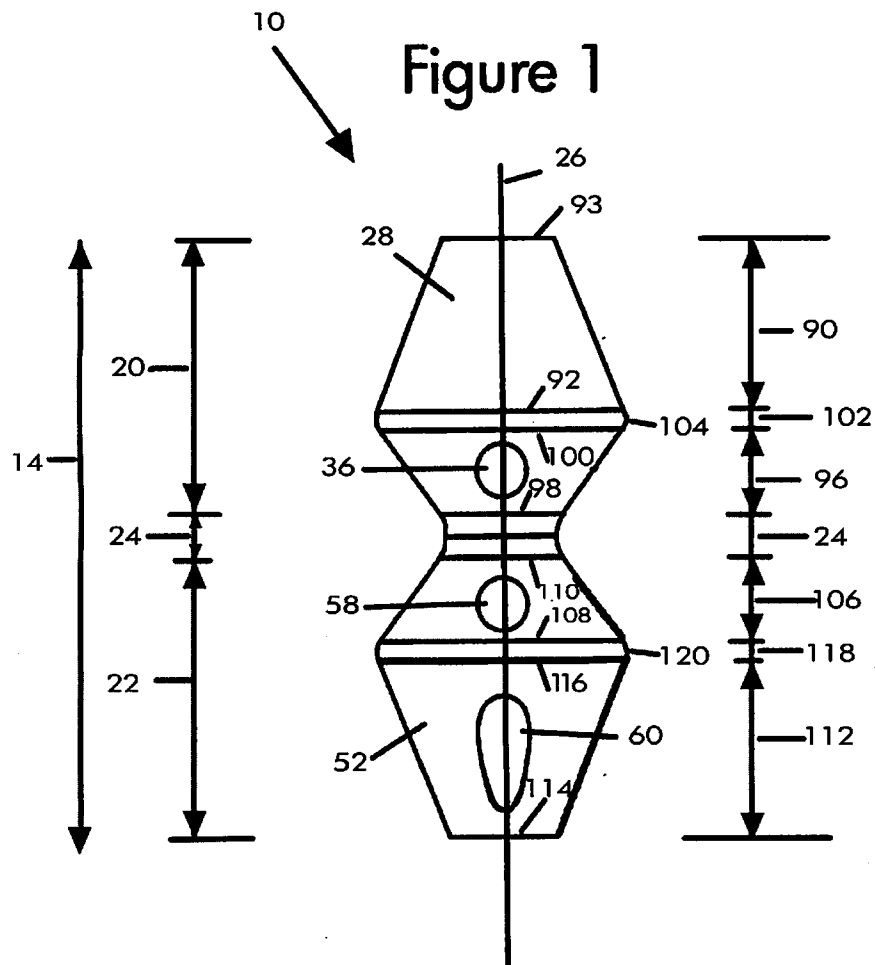
- a. a second filament end tip; and,
- b. a sufficient length; so that,
 - i. said second filament end tip may enter said bottom port of said third filament channel;
 - ii. pass upwards through the third channel;
 - iii. exit said top port of the third filament channel;
 - iv. wrap thrice around said second middle;
 - v. thereby forming a third and fourth constricting filament bands;
 - vi. pass under said third and said fourth constricting filament bands;
 - vii. into said bottom top of said fourth filament channel;
 - viii. pass downwards through said fourth filament channel; and,
 - ix. exit said bottom port of the fourth filament channel so that said second filament end tip is visible below the bottom port of the fourth filament channel.

[Claim 28]

The apparatus of claim 27 wherein tension is applied between the first filament and the second filament so that the first and second constricting filament bands tighten around the first filament and so that the third and fourth constructing filament bands tighten around the second filament thereby fixing the first and second

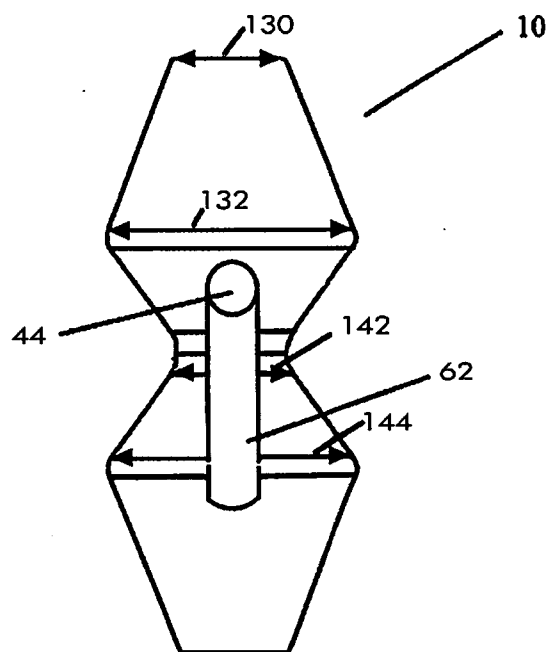
filaments to the body.

[Fig. 1]

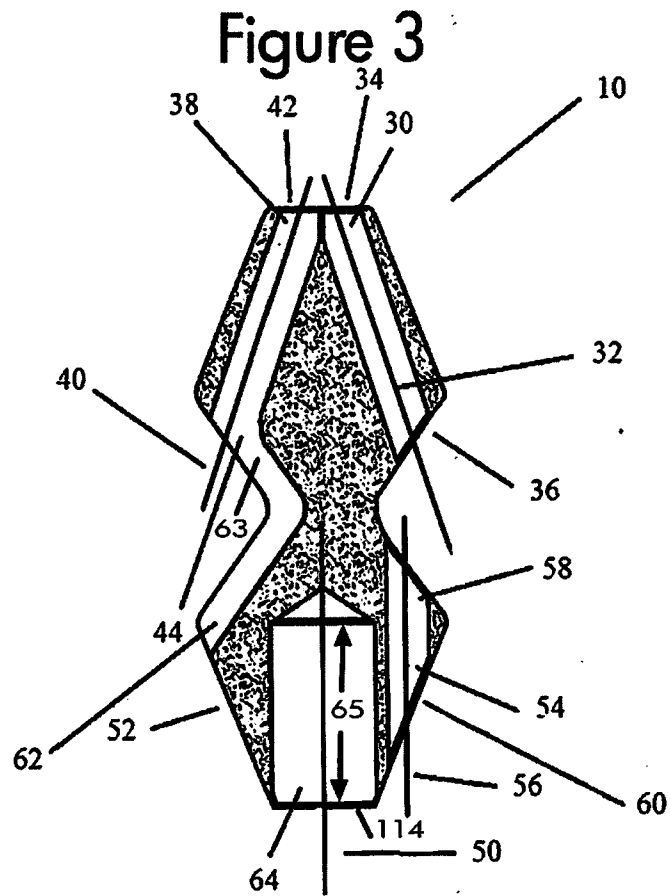


[Fig. 2]

Figure 2

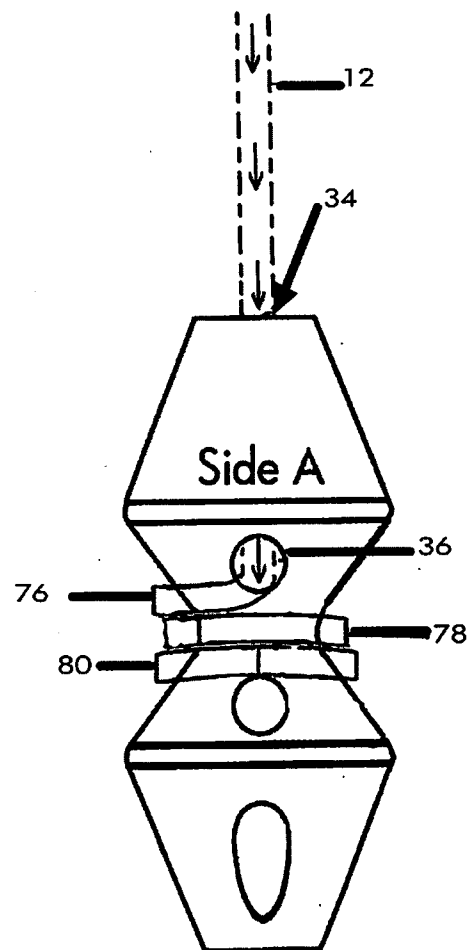


[Fig. 3]



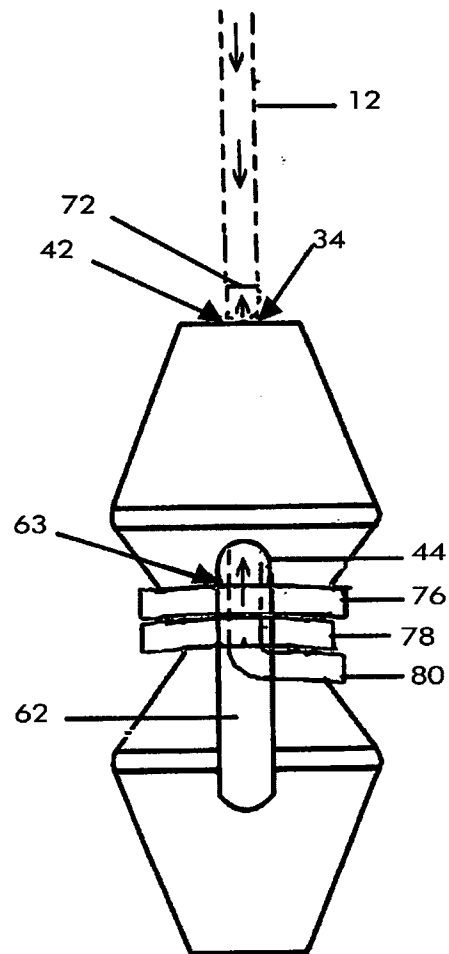
[Fig. 4]

Figure 4



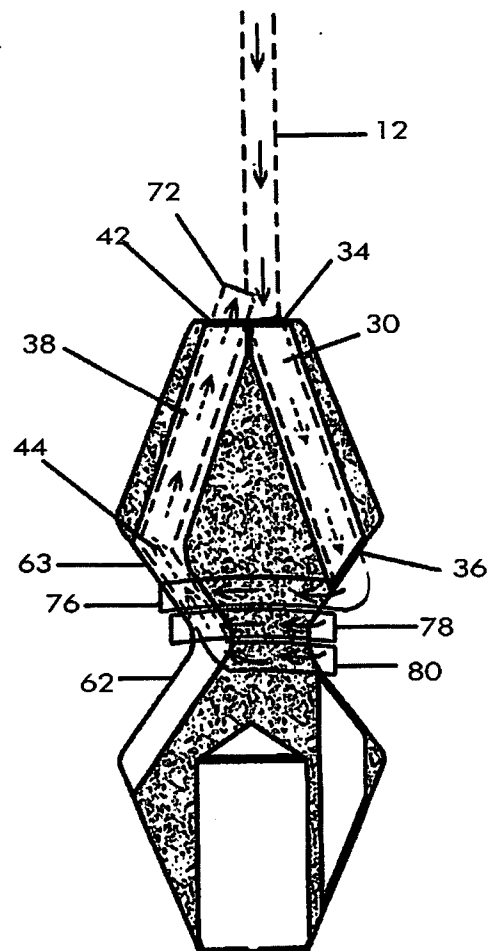
[Fig. 5]

Figure 5



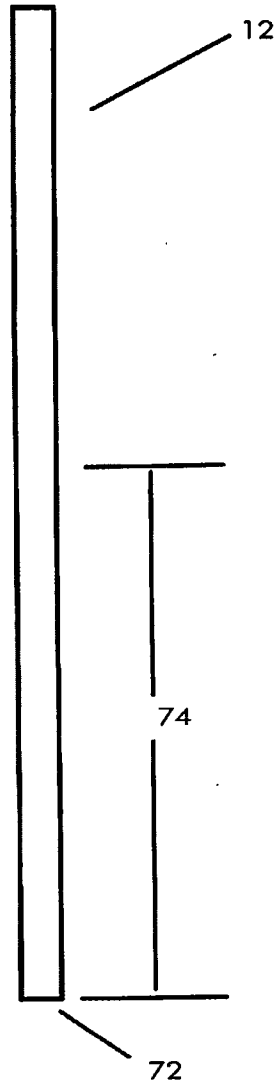
[Fig. 6]

Figure 6



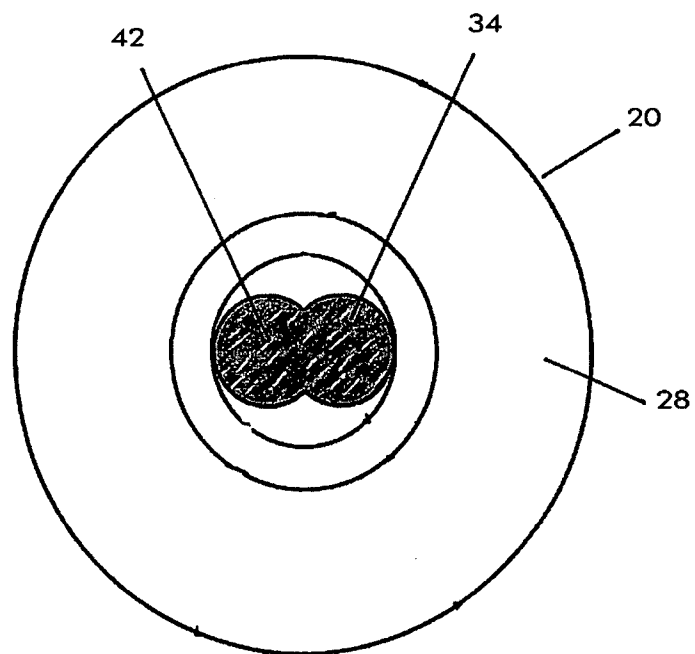
[Fig. 7]

FIGURE 7

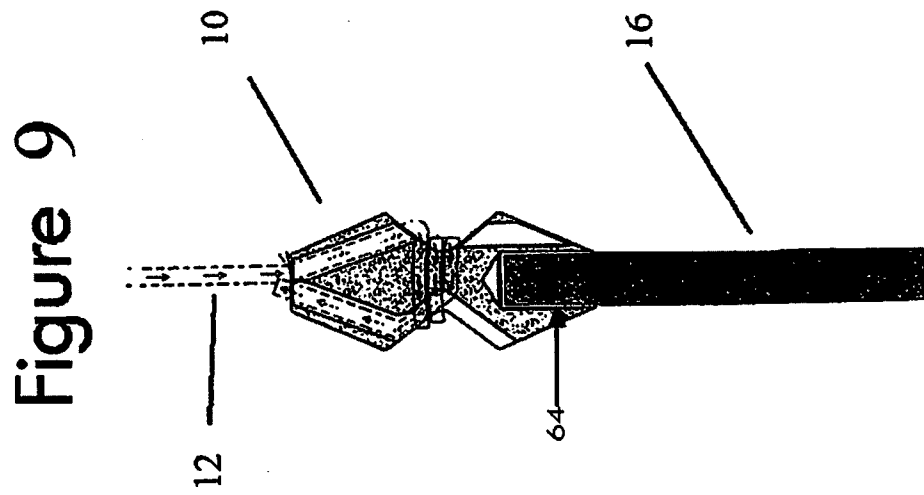


[Fig. 8]

Figure 8

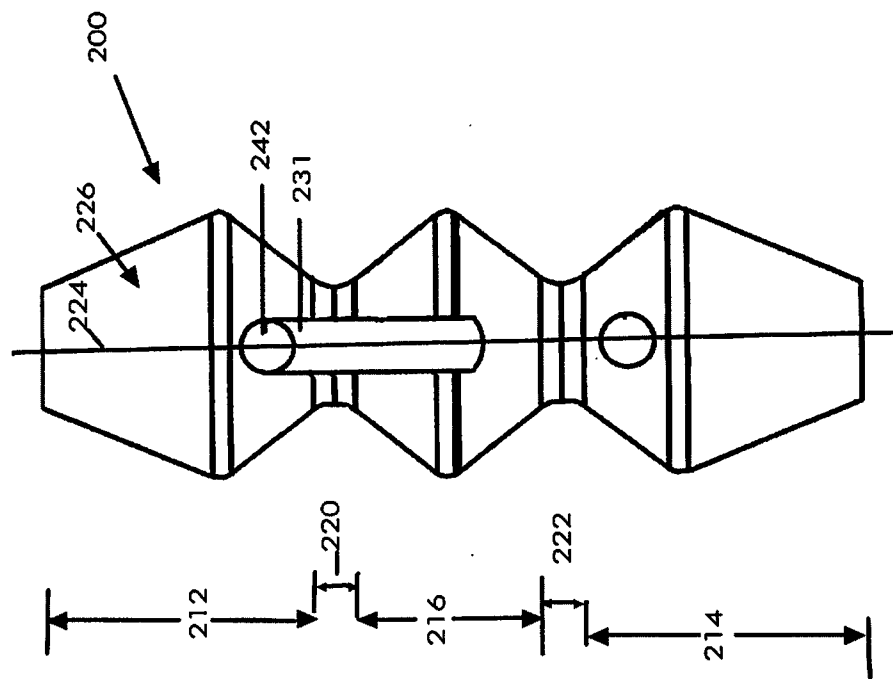


[Fig. 9]



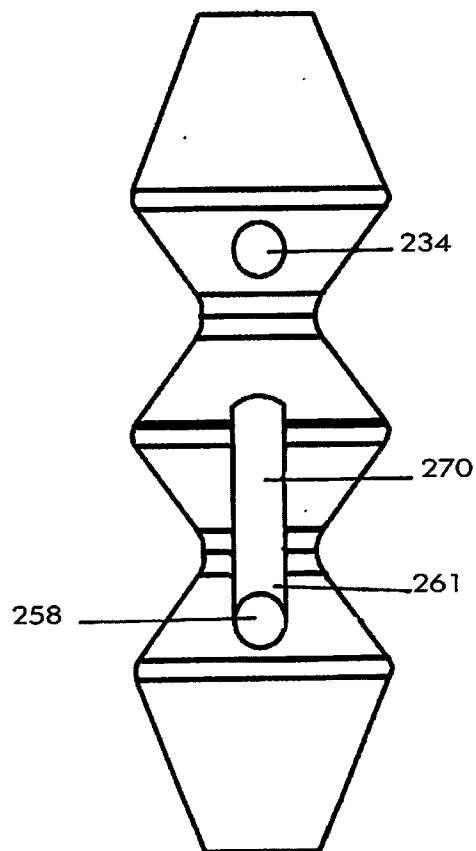
[Fig. 10]

FIGURE #10

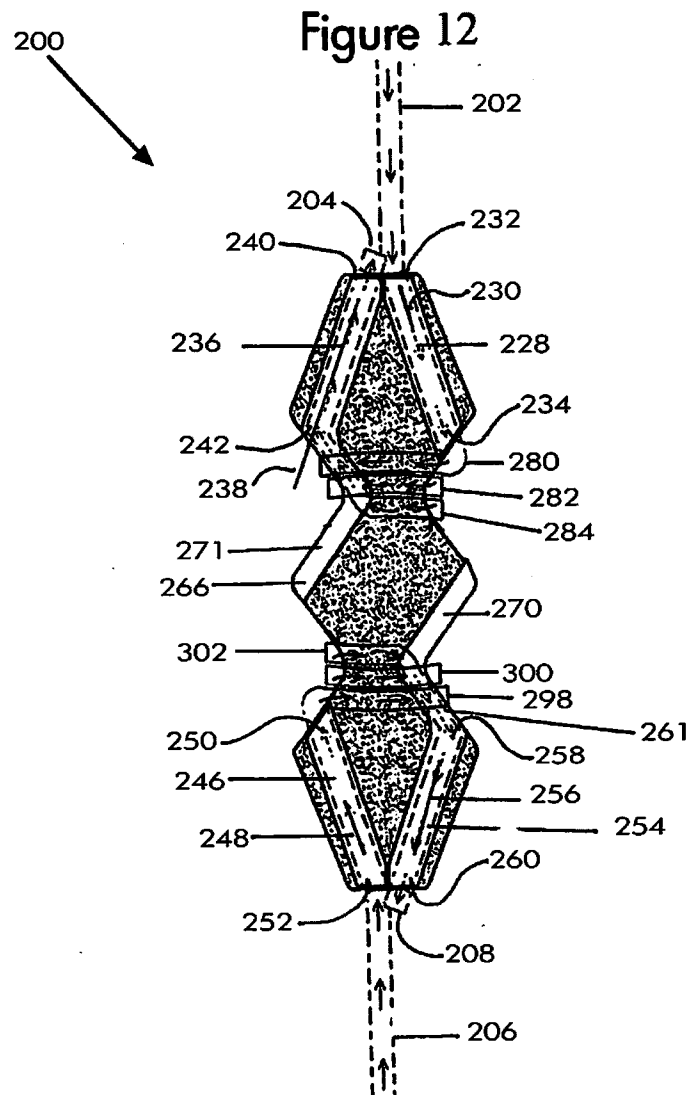


[Fig. 11]

FIGURE 11



[Fig. 12]



INTERNATIONAL SEARCH REPORT

International application No.
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<p>A. CLASSIFICATION OF SUBJECT MATTER</p> <p>IPC: A01K 91/03 (2006.01) , A01K 91/04 (2006.01)</p> <p>According to International Patent Classification (IPC) or to both national classification and IPC</p>																							
<p>B. FIELDS SEARCHED</p> <p>Minimum documentation searched (classification system followed by classification symbols)</p> <p>A01K 91/03 (2006.01) , A01K 91/04 (2006.01)</p> <p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched</p> <p>Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)</p> <p>Databases: EPODOC (Epoque), Total Patent</p> <p>Terms: Join, filament, knot, body, line, connect*, cord</p>																							
<p>C. DOCUMENTS CONSIDERED TO BE RELEVANT</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Category*</th> <th style="width: 60%;">Citation of document, with indication, where appropriate, of the relevant passages</th> <th style="width: 30%;">Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">X</td> <td>CA2596316 A1 (RUSSELL, B. ET AL.) 24 May 2007 (24-05-2007)</td> <td>1 - 4, 6, 7, 11 - 15</td> </tr> <tr> <td style="text-align: center;">Y</td> <td>~ Abstract, Claims, Figs.1 - 5 ~</td> <td>8 - 10, 21 - 27</td> </tr> <tr> <td style="text-align: center;">Y</td> <td>US3102313 A (ARNESON, R.) 03 September 1963 (03-09-1963)</td> <td>8 - 10, 21 - 27</td> </tr> <tr> <td style="text-align: center;">Y</td> <td>~ Figs. 4 - 8, Col. 2, II 51 - Col. 4, II 32 ~</td> <td></td> </tr> <tr> <td style="text-align: center;">A</td> <td>WO02/067671 A1 (KERRY, J.) 06 September 2002 (06-09-2002)</td> <td>1 - 28</td> </tr> <tr> <td style="text-align: center;">A</td> <td>~ Whole Document ~</td> <td></td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	CA2596316 A1 (RUSSELL, B. ET AL.) 24 May 2007 (24-05-2007)	1 - 4, 6, 7, 11 - 15	Y	~ Abstract, Claims, Figs.1 - 5 ~	8 - 10, 21 - 27	Y	US3102313 A (ARNESON, R.) 03 September 1963 (03-09-1963)	8 - 10, 21 - 27	Y	~ Figs. 4 - 8, Col. 2, II 51 - Col. 4, II 32 ~		A	WO02/067671 A1 (KERRY, J.) 06 September 2002 (06-09-2002)	1 - 28	A	~ Whole Document ~	
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<p><input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.</p> <table style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <p>* Special categories of cited documents :</p> <p>“A” document defining the general state of the art which is not considered to be of particular relevance</p> <p>“E” earlier application or patent but published on or after the international filing date</p> <p>“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>“O” document referring to an oral disclosure, use, exhibition or other means</p> <p>“P” document published prior to the international filing date but later than the priority date claimed</p> </td> <td style="width: 50%; vertical-align: top;"> <p>“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>“&” document member of the same patent family</p> </td> </tr> </table>			<p>* Special categories of cited documents :</p> <p>“A” document defining the general state of the art which is not considered to be of particular relevance</p> <p>“E” earlier application or patent but published on or after the international filing date</p> <p>“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>“O” document referring to an oral disclosure, use, exhibition or other means</p> <p>“P” document published prior to the international filing date but later than the priority date claimed</p>	<p>“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>“&” document member of the same patent family</p>																			
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<p>Date of the actual completion of the international search</p> <p>08 November 2011 (08-11-2011)</p>		<p>Date of mailing of the international search report</p> <p>17 November 2011 (17-11-2011)</p>																					
<p>Name and mailing address of the ISA/CA</p> <p>Canadian Intellectual Property Office</p> <p>Place du Portage I, C114 - 1st Floor, Box PCT</p> <p>50 Victoria Street</p> <p>Gatineau, Quebec K1A 0C9</p> <p>Facsimile No.: 001-819-953-2476</p>		<p>Authorized officer</p> <p>Philip Vesely (819) 934-4271</p>																					

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/IB2011/051024

Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	Publication Date
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