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DESCRIPTION

[0001] The invention relates to a footlet provided with a heel portion, a toe portion, and a middle portion located between the heel portion and the toe portion, which middle portion comprises lateral sides that extend between the heel portion and the toe portion on either side, said footlet being manufactured completely by means of reciprocating knitting.

[0002] Such a footlet is known from WO2008072048A1 and is used for partly covering a person's foot. The footlet, when worn, extends over the heel and the lower side of the foot and over the toes. The middle portion then also extends somewhat along the lateral sides of the foot. The upper side of the foot is not covered by the footlet. When open shoes are worn, the footlet is hidden from view by the shoe and affords the wearer a comfortable feeling.

[0003] It is a disadvantage of the known footlet that there is a risk of the footlet being shifted off the foot during walking by the frictional contact between the heel portion and the inner side of the shoe, which is undesirable.

[0004] The invention has for its object to provide a footlet that is easy to manufacture and that remains firmly in contact with the foot during use.

[0005] This object is achieved with the footlet according to the invention in that only the heel portion is provided with a thread that comprises an anti-slip agent, which thread is incorporated in the heel portion by reciprocating knitting.

[0006] A footlet with an increased coefficient of friction between a person's foot and the heel portion is achieved in a simple manner by means of the thread provided with an anti-slip agent and incorporated in the heel portion by knitting, so that the risk of the footlet sliding off the foot is reduced. Since the footlet is manufactured by continuous reciprocating knitting, a footlet is obtained as an uninterrupted whole without stitched seams, and the footlet is provided with its thread comprising an anti-slip agent during the very manufacturing process thereof.

[0007] It is noted that footlets are known wherein an anti-slip agent is provided at the inner side, for example by spraying or painting, or wherein a strip of anti-slip material is provided by gluing. The application of an anti-slip agent in this manner requires an additional manufacturing step, which renders the footlet comparatively expensive. It also involves a risk that a footlet inadvertently fails to be provided with the anti-slip agent during the additional manufacturing step. Furthermore, the anti-slip agent is provided at a distance from the upper side of the heel portion in this case, so that the section of the heel portion located between the upper side thereof and the anti-slip agent can still slide down.

[0008] It has to be noted that EP0632972A1 discloses a foot-covering innersole comprising two parts in the manner of pocket-type heels, which face each other and are joined as one piece by a middle zone, and by an elastic border which is made and knitted to the said two

parts directly and as one piece on the circular machine which operates with reciprocating motion. The elastic border is made up of two elastic parts which can be connected to each other to form an annular elastic border on the entire border of the manufactured article.

[0009] It has also to be noted that WO03008685A1 discloses a method for producing hosiery items with hold-up effect, whereby during the formation of the top, rows of knitting or portions of rows of knitting of the top are formed by means of at least one bare elastomer thread. The bare elastomer thread is knitted so as to be exposed at least partially on the side of the top of the hosiery item that is designed to face the user's skin. The rows of knitting or portions of rows of knitting made of bare elastomer, by protruding on the inner side of the top, increase the adhesion of the top to the skin of the user, obtaining a hold-up effect for the hosiery item. The rows of knitting extends over the total annular inner side of the top.

[0010] An embodiment of the footlet according to the invention is characterized in that the anti-slip agent comprises an elastomer, such as silicones.

[0011] Silicones can be in contact with the foot for long periods without causing irritation. In addition, silicones are flexible so that they can be readily deformed along with the footlet when the latter is slid over a person's foot. The coefficient of friction can be increased also by means of alternative elastomers.

[0012] A further embodiment of the footlet according to the invention is characterized in that the anti-slip agent is provided on a carrier thread of a natural or synthetic material.

[0013] It is possible in this manner to manufacture comparatively thin carrier threads provided with, for example, silicones.

[0014] The carrier thread may be, for example, of nylon or cotton of, for example, 22 decitex. The carrier thread / silicone ratio may be, for example, 50/50.

[0015] A further advantage of the use of a carrier thread is that the carrier thread can be manufactured from a cheaper material than the anti-slip agent, so that the cost of the thread comprising the anti-slip agent is comparatively low.

[0016] A further embodiment of the footlet according to the invention is characterized in that the heel portion is provided with a knitted edge portion forming a collar, said edge portion being provided with the thread comprising the anti-slip agent.

[0017] Since the edge portion is provided with the thread comprising the anti-slip agent, it is prevented that the edge portion, and accordingly the entire heel portion, will slide relative to the foot.

[0018] A further embodiment of the footlet according to the invention is characterized in that the edge portion is folded over such that the edge portion comprises a first edge sub-portion

facing the toe portion and a second edge sub-portion remote from the toe portion.

[0019] Such a folded edge portion provides a comparatively thick, sturdy collar.

[0020] A further embodiment of the footlet according to the invention is characterized in that of the edge portion only the first edge sub-portion facing the toe portion is provided with the thread comprising the anti-slip agent.

[0021] The coefficient of friction between the foot and the first edge sub-portion is enlarged thereby. The second edge sub-portion, which is not provided with the anti-slip agent, can move relative to the inner side of the shoe with a comparatively low coefficient of friction during walking.

[0022] A further embodiment of the footlet according to the invention is characterized in that the heel portion is knitted at least in part with at least two threads, wherein one of the at least two threads is the thread comprising the anti-slip agent.

[0023] The use of more than one thread leads to a desired thickness of the collar. The other one of the at least two threads, moreover, may be provided with another desired property of the heel portion.

[0024] A further embodiment of the footlet according to the invention is characterized in that another one of said at least two threads is an elastic thread.

[0025] Since the elastic thread and the thread comprising the anti-slip agent are jointly knitted, the relevant heel portion is simultaneously provided with elastic and anti-slip properties.

[0026] A further embodiment of the footlet according to the invention is characterized in that the thread comprising the anti-slip agent is located mainly at a side of the heel portion facing the toe portion, while another one of the at least two threads is located mainly at a side of the heel portion remote from the toe portion.

[0027] In this manner only the side of the heel portion facing the toe portion is given the anti-slip agent that increases the coefficient of friction.

[0028] A further embodiment of the footlet according to the invention is characterized in that the thread comprising the anti-slip agent is provided over a portion of the heel.

[0029] The thread comprising the anti-slip agent may be provided in the edge portion or at a distance thereto in the heel portion. The desired position can be determined experimentally.

[0030] The invention will now be explained in more detail with reference to a drawing, in which:

Figure 1 is a perspective view of a footlet according to the invention;

Figure 2 is a side elevation of the footlet of figure 1 provided around a person's foot, said foot being present in a shoe; and

Figures 3A-3C, 4A-4C and 5A-5B are partial cross-sectional views of various embodiments of a heel portion of a footlet according to the invention.

[0031] Corresponding parts have been given the same reference numerals in the figures.

[0032] Figure 1 shows a footlet 1 according to the invention manufactured on a knitting machine with reciprocating knitting movements only.

[0033] The footlet 1 is provided with a heel portion 2, a middle portion 4 connected to the heel portion 2 via lines 3 formed by knitting, and a toe portion 6 connected to the middle portion 4 via lines 5 formed by knitting. The desired shape of the footlet 1 can be obtained through increasing and decreasing during the reciprocating knitting process. The middle portion 4 comprises lateral sides 7, 8 that extend between the heel portion 2 and the toe portion 6 on either side. The footlet 1 is further provided with a first edge sub-portion 9 located adjacent the heel portion 2 and a second edge sub-portion 10 located adjacent the toe portion 6. A method of manufacturing such a footlet 1 is described in WO2008072048A1.

[0034] Figure 2 shows a person's foot 11 fitted with the footlet 1 of figure 1. The heel portion 2 is laid around the heel of the foot 11 here. The toe portion 6 lies over the toes of the foot 11. The middle portion 4 extends with a bottom portion 12 along the lower side of the foot 11 and with lateral portions 13, 14 along the lateral sides of the foot 11. The foot 11 lies with the footlet 1 around it inside a shoe 15 of which only a portion is shown for reasons of clarity.

[0035] The heel portion 2 is provided with a thread (see figures 3A, 3B) comprising an anti-slip agent, preferably over an edge portion 16, which thread was provided during the knitting of the footlet 1. The thread comprising an anti-slip agent was provided in the heel portion 2 by means of knitting. The thread is preferably composed of a carrier thread of a natural or synthetic material, such as cotton or nylon, on which silicones were provided as the anti-slip agent.

[0036] The thread preferably has a substantially circular cross-section, the carrier thread having a first diameter and the total thread comprising the anti-slip agent having a larger, second diameter. The ratio of the first diameter to the second diameter is such that the surface area of the cross-section of the carrier thread accounts for approximately half the surface area of the cross-section of the complete thread comprising the anti-slip agent.

[0037] The manufacture of such a thread comprising an anti-slip agent is known per se and will accordingly not be dealt with in any detail.

[0038] The figures 3A-3C show three different embodiments of the footlet 1 wherein the heel portion 2 is provided with a knitted edge portion 16 that constitutes a collar. The edge portion 16 is folded over such that the edge portion 16 comprises a first edge sub-portion 17 facing the toe portion 6 and a second edge sub-portion 18 remote from the toe portion 6. During knitting of the edge portion 16, the second edge sub-portion 18 is knitted first and after that the first edge sub-portion 17. As soon as the first edge sub-portion 17 has been formed, the end 19 of the second edge sub-portion 18 is joined to the end 20 of the first edge sub-portion 17 by knitting. Then the remaining portion of the heel portion 2 and the footlet 1 is knitted.

[0039] In the embodiment of the footlet 1 shown in figure 3A, the thread comprising the anti-slip agent and an elastic thread are knitted simultaneously with the knitting of the second edge sub-portion 18 and the first edge sub-portion 17. The elastic thread is made of, for example, a polyurethane such as Lycra, Elastan, Dorlastan or Spandex. The elastic thread leads to the creation of an elastic edge portion 16 by which the footlet 1 is pressed against the foot 11. The anti-slip agent, such as silicones, effectively prevents slipping between the foot 11 and the edge portion 16, i.e. the heel portion 2 joined thereto.

[0040] In the embodiment of the footlet 1 shown in figure 3B, the thread comprising the anti-slip agent and the elastic thread are knitted simultaneously with the knitting of the first edge sub-portion 17 only. For the second edge sub-portion 18 only the elastic thread is used.

[0041] Less silicone material is necessary in this way. In addition, the thread comprising the anti-slip agent lies against the foot 11 only, whereas the comparatively smooth elastic thread lies against the inner side of the shoe 15.

[0042] In the embodiment of the footlet 1 shown in figure 3C, a portion 21 located at a distance to the edge portion 16 is knitted either with the thread comprising the anti-slip agent only or with the thread comprising the anti-slip agent and the thread with which the rest of the heel portion 2 is knitted. This thread may be of nylon, cotton or any other material, as desired.

[0043] If the portion 21 is knitted with more than one thread, this is preferably done such that the thread comprising the anti-slip agent is located mainly at a side of the heel portion 2 that faces the toe portion 6 while the other thread is mainly located at a side of the heel portion 2 remote from the toe portion 6. Such a knitting technique is known per se and will accordingly not be explained in any detail.

[0044] The figures 4A-4C show three alternative embodiments of the footlet 1 wherein the heel portion 2 is provided with a knitted edge portion 26 that forms a collar. The edge portion 26 is folded over such that the edge portion 26 comprises a first edge sub-portion 27 facing the toe portion 6 and a second edge sub-portion 28 remote from the toe portion 6. During knitting of the edge portion 26, the first edge sub-portion 27 is knitted first and after that the second edge sub-portion 28. As soon as the second edge sub-portion 28 has been formed, the end 29 of the first edge sub-portion 27 is joined to the end 30 of the second edge sub-portion 28 by knitting. Then the remaining portion of the heel portion 2 and the footlet 1 is knitted.

[0045] In the embodiment of the footlet 1 shown in figure 4A, the thread comprising the anti-slip agent and an elastic thread are knitted simultaneously with the knitting of the first edge sub-portion 27 and the second edge sub-portion 28.

[0046] In the embodiment of the footlet 1 shown in figure 4B, the thread comprising the anti-slip agent and the elastic thread are knitted simultaneously with the knitting of the first edge sub-portion 27 only. For the second edge sub-portion 28 the elastic thread is only used.

[0047] In the embodiment of the footlet 1 shown in figure 4C, a portion 31 located at a distance to the edge portion 26 is knitted either with the thread comprising the anti-slip agent only or with the thread comprising the anti-slip agent and the thread with which the rest of the heel portion 2 is knitted.

[0048] The figures 5A-5B show two further embodiments of the footlet 1 wherein the heel portion 2 is provided with a knitted edge portion 36 that comprises a single edge sub-portion 37 that forms a collar.

[0049] In the embodiment of the footlet 1 shown in figure 5A, the thread comprising the anti-slip agent and an elastic thread are knitted simultaneously with the knitting of the edge sub-portion 37.

[0050] In the embodiment of the footlet 1 shown in figure 5B, a portion 41 located at a distance to the edge portion 36 is knitted either with the thread comprising the anti-slip agent only or with the thread comprising the anti-slip agent and the thread with which the rest of the heel portion 2 is knitted.

[0051] It is also possible to manufacture the footlet 1 entirely or partly by means of circular knitting. This has the disadvantage, however, that stitched seams are unavoidable.

[0052] It is possible to use alternative materials instead of silicones.

List of reference numerals

[0053]

1.
footlet
2.
heel portion
3.
line formed by knitting
- 4.

- middle portion
- 5. line formed by knitting
- 6. toe portion
- 7. lateral side
- 8. lateral side
- 9. edge portion
- 10. edge portion
- 11. foot
- 12. bottom portion
- 13. lateral portion
- 14. lateral portion
- 15. shoe
- 16. edge portion
- 17. first edge sub-portion
- 18. second edge sub-portion
- 19. end
- 20. end
- 21. portion
- 26. edge portion
- 27. first edge sub-portion
- 28. second edge sub-portion
- 29. end
- 30.

- end
- 31. portion
- 36. edge portion
- 37. edge sub-portion
- 41. portion

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- [WO2008072048A1 \[0002\] \[0033\]](#)
- [EP0632972A1 \[0008\]](#)
- [WO03008685A1 \[0009\]](#)

Patentkrav

1. Fodlet (1) forsynet med en hældel (2), en tådel (6) og en midterdel (4) placeret mellem hældelen (2) og tådelen (6), hvilken midterdel (4) omfatter
5 laterale sider, der strækker sig mellem hældelen (2) og tådelen (6) på hver side, hvor nævnte fodlet (1) er fremstillet fuldkommen ved hjælp af frem- og tilbagegående strikning, **kendetegnet ved at** kun hældelen (2) er forsynet med en tråd, der omfatter et skridsikert middel, hvilken tråd er inkorporeret i hældelen (2) ved frem- og tilbagegående strikning.
- 10
2. Fodlet (1) ifølge krav 1, **kendetegnet ved at** det skridsikre middel omfatter en elastomer, såsom silikone.
3. Fodlet (1) ifølge krav 1 eller 2, **kendetegnet ved at** det skridsikre middel er
15 tilvejebragt på en bærertråd af et naturligt eller syntetisk materiale.
4. Fodlet (1) ifølge et hvilket som helst af de foregående krav, **kendetegnet ved at** hældelen (2) er forsynet med en strikket kantdel, der danner en krave, hvor nævnte kantdel er forsynet med tråden omfattende det skridsikre middel.
- 20
5. Fodlet (1) ifølge krav 4, **kendetegnet ved at** nævnte kantdel er foldet over, således at kantdelen omfatter en første kantunderdel, der vender mod tådelen (6), og en anden kantunderdel væk fra tådelen (6).
- 25 6. Fodlet (1) ifølge krav 5, **kendetegnet ved at** kun den første kantunderdel, der vender mod tådelen (6), af kantdelen, er forsynet med tråden omfattende det skridsikre middel.

7. Fodlet (1) ifølge et hvilket som helst af de foregående krav, **kendetegnet ved at** hældelen (2) er strikket mindst delvist med mindst to tråde, hvor en af nævnte mindst to tråde er tråden omfattende det skridsikre middel.

5 8. Fodlet (1) ifølge krav 7, **kendetegnet ved at** en anden af nævnte mindst to tråde er en elastisk tråd.

9. Fodlet (1) ifølge krav 7 eller 8, **kendetegnet ved at** tråden omfattende det skridsikre middel er placeret hovedsageligt ved en side af hældelen (2), der
10 vender mod tådelen (6), mens en anden af de mindst to tråde er placeret hovedsageligt ved en side af hældelen (2) væk fra tådelen (6).

10. Fodlet (1) ifølge et hvilket som helst af de foregående krav, **kendetegnet ved at** tråden omfattende det skridsikre middel er tilvejebragt over en del af
15 hælen.

DRAWINGS

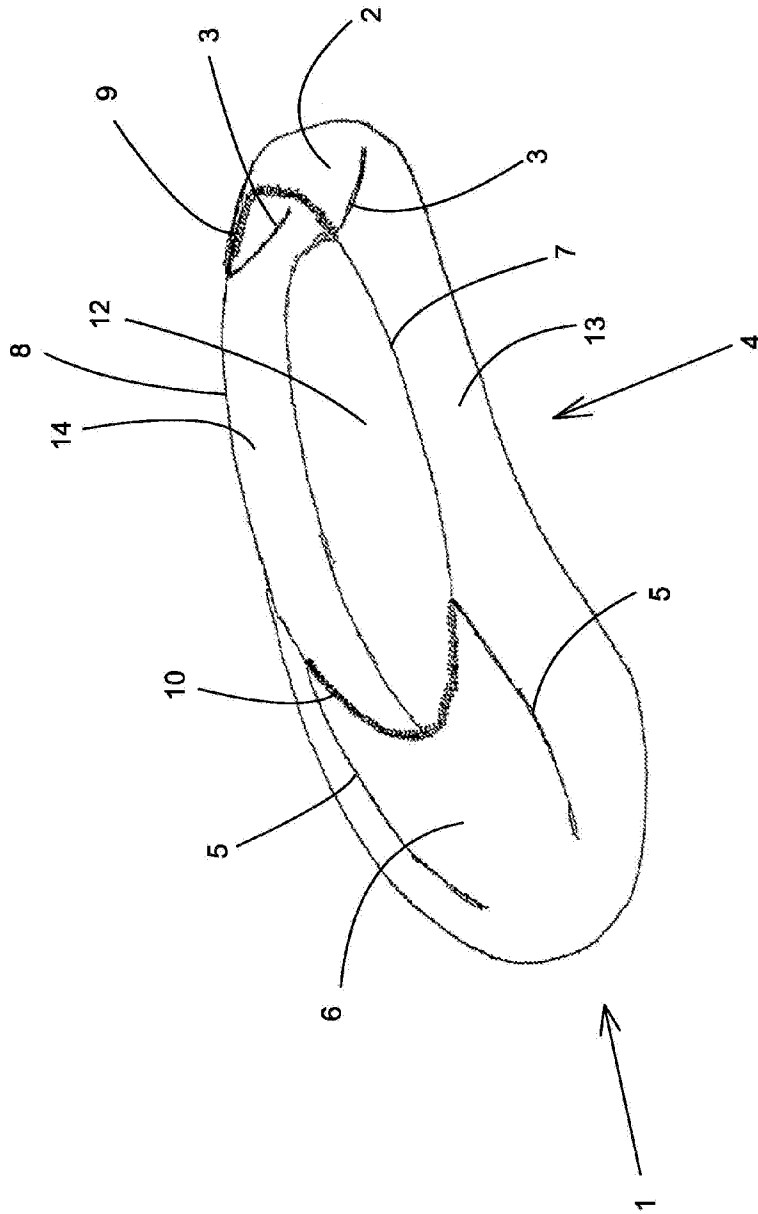


Fig. 1

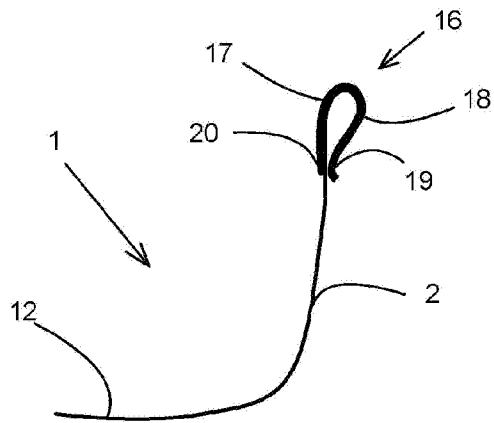


Fig. 3A

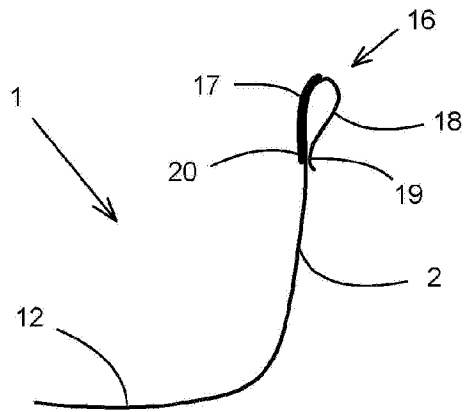


Fig. 3B

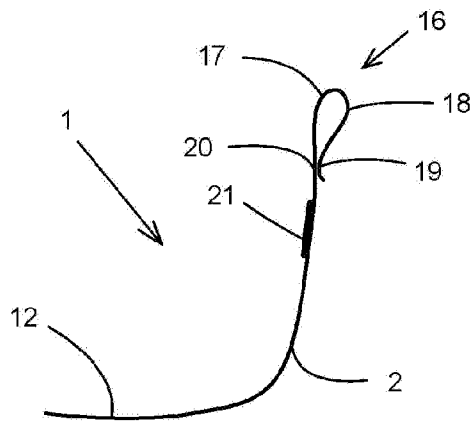


Fig. 3C

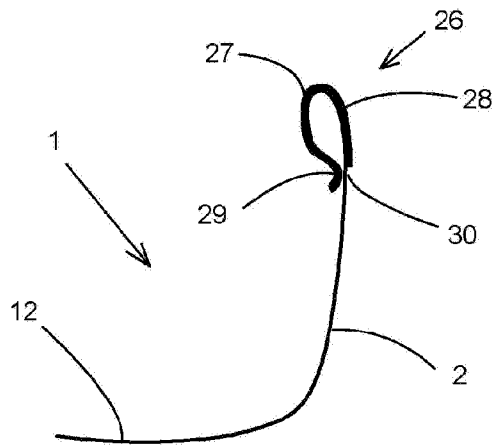


Fig. 4A

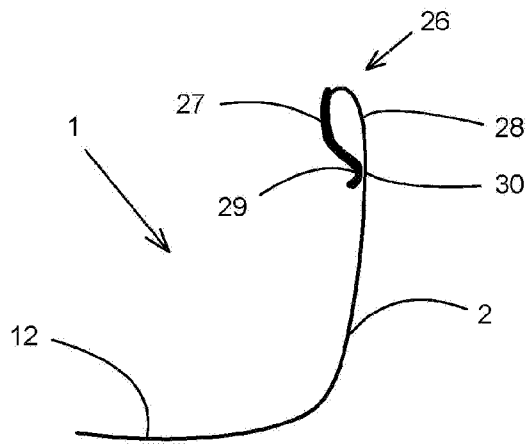


Fig. 4B

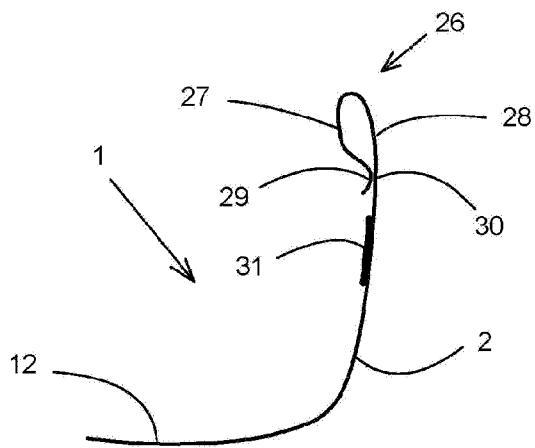


Fig. 4C

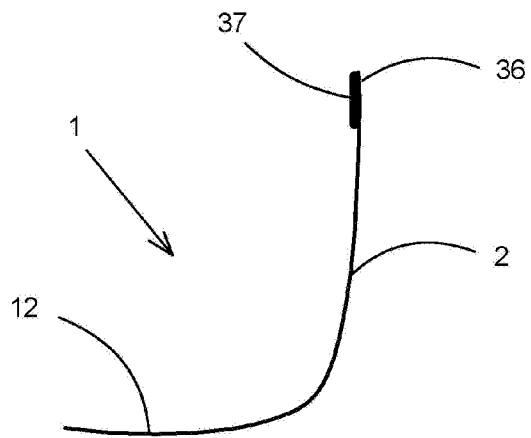


Fig. 5A

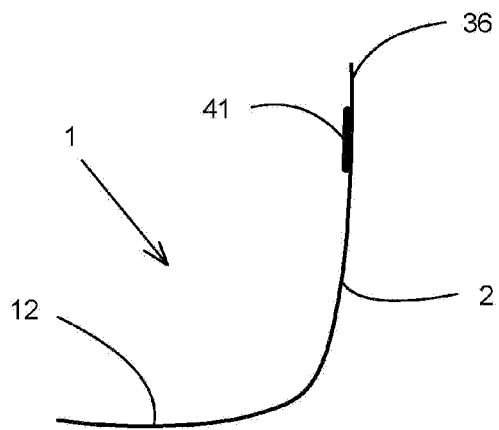


Fig. 5B