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(54) A knitted filament

(57) A knitted filament (10), which may be in the form of a dental floss, comprises a first thread (12) of a non-elastomeric material, and a second thread (14) of an elastomeric material, knitted together. The filament (10) can be formed by knitting the threads together using a single needle (16) to knit each thread alternatively through a loop formed by the other thread.

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Description

This invention relates to knitted filaments. More specifically, but not exclusively, it relates to knitted dental floss.

Published International Specification No. WO93/32683 discloses a knitted dental floss, comprising a plurality of elastic threads and one non-elastic thread.

According to one aspect of the present invention there is provided a knitted filament comprising no more than two yarns knitted together. The filament is advantageously a knitted dental floss.

The filament may comprise at least one yarn of an elastomeric material. Preferably, the filament comprises a first yarn of an elastomeric material and a second yarn of a non-elastomeric material. The first yarn may be formed of a spandex material, such as lycra (Registered Trade Mark). The second yarn may be formed of nylon and/or polyethylene, preferably ultra high molecular weight polyethylene.

Preferably, the filament comprises a single row knitted filament.

According to another aspect of this invention there is provided a method of forming a filament comprising knitting together no more than two yarns. The filament is advantageously a dental floss.

Preferably, the method involves the use of a single needle, preferably a latch needle to knit each thread alternatively through a loop formed by the other thread.

The yarns may be alternately fed to the needle by a knitting head, which may comprise first and second thread supply members, each said thread supply member being arranged to supply a respective one of the two threads. The thread supply members are preferably in the form of shuttle extensions on the knitting head. The knitting head is preferably adapted to move in a reciprocating motion to feed the threads alternately to the needle. The reciprocating motion may be rotary.

Conveniently, the filament is formed by the use of a single needle on a multi-needle knitting machine.

An embodiment of the invention will now be described by way of example with reference to the accompanying drawings in which:

Fig. 1 is a schematic representation of a filament;

Fig. 2A to 2D are schematic representations showing a method of knitting the filament shown in Fig. 1; and

Fig. 3 is a diagramatic representation of a knitting head

Referring to Fig. 1, there is shown a knitted filament 10 which comprises a first yarn 12 of an elastomeric material, and a second yarn 14 of a non-elastomeric material. The filament 10 can be in the form of a knitted dental floss, by selecting appropriate threads 12, 14, and is referred to in this description hereinafter as the knitted floss 10. For example, the first yarn 12 may be spandex, for example yarn sold under the Trade Mark LYCRA and the second yarn 14 can be ultra high molecular weight polyethylene, such as those sold under the Trade Mark DYNEEMA.

As can be seen from Fig. 1, the yarns 12,14 are continuous threads which are knitted into each other to form an elongate filament, which will constitute the knitted floss 10, when completed. It will be appreciated that Fig. 1 shows only a small portion of the entire knitted floss 10.

Referring to Figs. 2A to 2D, there is shown four steps in the method for forming the floss shown in Fig. 1. A latch needle 16 is used to carry out the method, and comprises a hook region 18, and a latch 20, both of which are connected to a shank 22, the latch 20 being pivotally mounted to the shank 22 at pivot 23.

The steps shown in Figs. 2A to 2D commence after a length of the floss 10 has already been formed, in a manner which would be readily apparent to the skilled person after reading the following description.

In Fig. 2A, the latch needle 16 extends through a loop 12A formed by the yarn 12, which is arranged around the shank 22 of the needle 16. The needle 16 begins to move upwardly, as shown by the arrow A.

Fig. 2A also shows a knitting head 24, through which the yarns 12, 14 are threaded. The knitting head 24 performs a reciprocating motion, for example by rotating in a plane perpendicular to the plane of the paper to arrange each yarn 12, 14 alternately in line with the needle 16, for collection thereby as is explained below.

As the needle 16 moves up it collects the yarn 14 around the hook region 18 thereof, as shown in Fig. 2B.

The needle 16 then descends as shown in Fig. 2C, pulling the yarn 14 through the loop 12A. As the needle descends, the latch 20 is closed (indicated by the arrow B) by the loop 12A to enable the thread 14 to be pulled through the loop 12A. As this happens a further loop 14A is formed, as shown in Fig. 2D.

The needle 16 then returns to the position shown in Fig. 2A in the direction indicated by arrow D and, as it does so, the latch 20 opens, as indicated by the arrow E. The loop 14A moves to a position around the shank 22 (in a similar position to the loop 12A around the shank 22 in Fig. 2A) and the floss 10 moves downwardly, as indicated by the arrow F. The cycle of Figs. 2A to 2D is then repeated, with the needle 16 collecting the thread 12 instead of the yarn 14 around the hook 18. Thus, by continuously repeating this cycle the yarns 12,14 are knitted into the dental floss 10 in the form of an elongate filament.

Fig. 3 shows a diagrammatic representation of an example of a rotary reciprocating knitting head 24 arranged above a plurality of needles 16. The head 24 comprises a plurality of shuttle extensions 26, each defining two apertures 28. Numeral 12 designates one of the threads and shows its path through the machine via

one of the shuttle extensions 26. Only one such thread is shown for clarity. The other thread passes in a similar manner through the head 24 via an adjacent shuttle extensions 26.

The knitting head 24 shown in Fig. 3 can be used for other types of knitting for other purposes, as well as the knitting described above. In the present case, the head 24 is reciprocally rotated about its central axis which lies parallel to the plane of the paper so that the yarns 12, 14 are alternately fed to the needle 16.

Various modifications can be made without departing from the scope of the invention.

Whilst endeavouring in the foregoing specification to draw attention to those features of the invention believed to be of particular importance it should be understood that the Applicant claims protection in respect of any patentable feature or combination of features hereinbefore referred to and/or shown in the drawings whether or not particular emphasis has been placed thereon.

Claims

1. A knitted filament characterised by no more than two yarns knitted together.

2. A knitted filament according to claim 1 characterised in that it is in the form of a knitted dental floss.

3. A knitted filament according to claim 1 or 2 characterised by at least one yarn of an elastomeric material.

4. A knitted filament according to any preceding claim characterised by a first yarn of an elastomeric material and a second yarn of a non-elastomeric material.

5. A knitted filament according to claim 4 characterised in that the elastomeric yarn is formed of a spandex material.

6. A knitted filament according to claim 4 or 5 characterised in that the non-elastomeric yarn is formed of nylon and/or polyethylene.

7. A knitted filament according to claim 6 characterised in that the polyethylene is ultra high molecular weight polyethylene.

8. A knitted filament according to any preceding claim characterised by a single row knitted filament.

9. A method of forming a filament characterised by knitting together no more than two yarns.

10. A method according to claim 9 characterised in that the filament is a dental floss.

11. A method according to claim 9 or 10 characterised in that the method involves the use of a single needle to knit each yarn alternately through a loop formed by the other yarn.

12. A method according to claim 11 characterised in that the needle is a latch needle.

13. A method according to claim 11 or 12 characterised in that the yarns are alternately fed to the needle by a knitting head comprising first and second thread supply members each being arranged to supply a respective one of the two threads, wherein the knitting head can move in a reciprocating motion to feed the threads alternately to the needle.

14. A method according to claim 13 characterised in that the thread supply members comprise shuttle extensions.

15. A method according to any of claims 9 to 14 characterised in that the filament is formed by the use of a single needle on a multi-needle knitting machine.

16. A method according to any of claims 9 to 14 characterised in that the filament is formed by the use of a single needle on a single needle knitting machine.

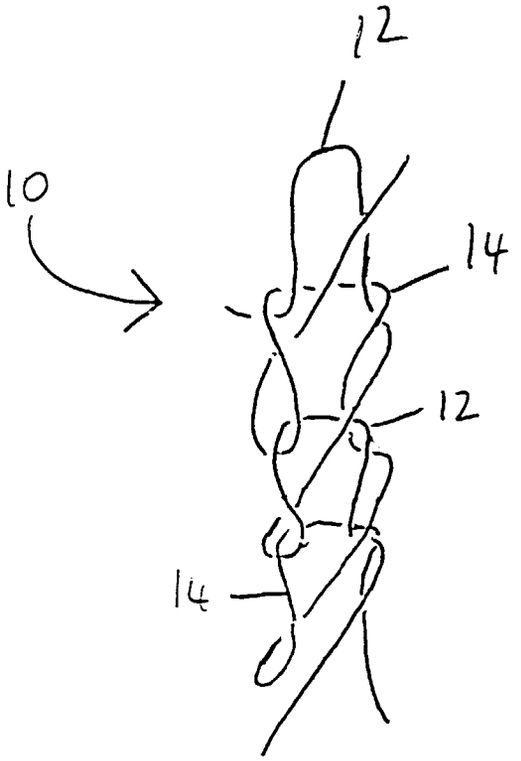
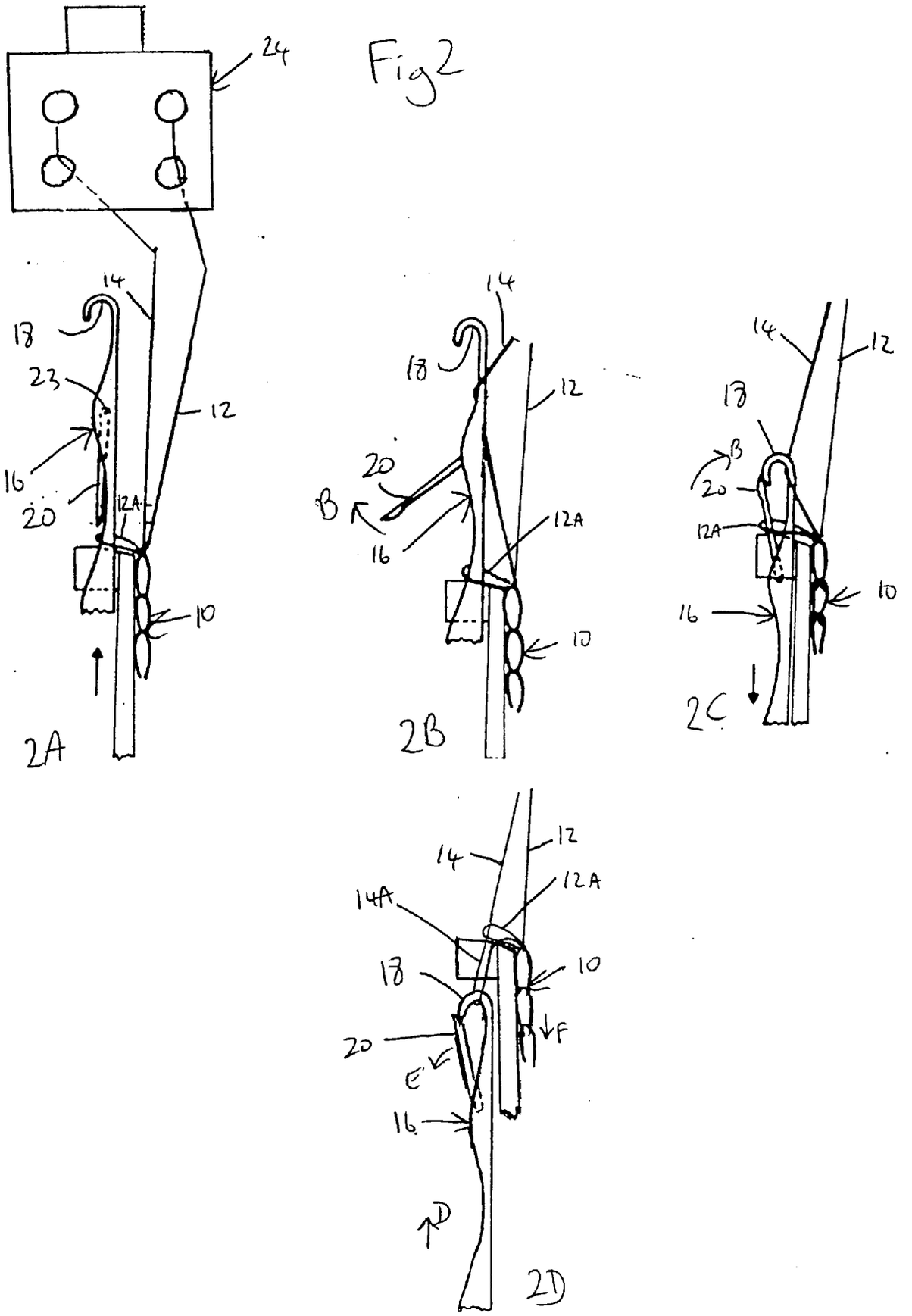


Fig 1

Fig2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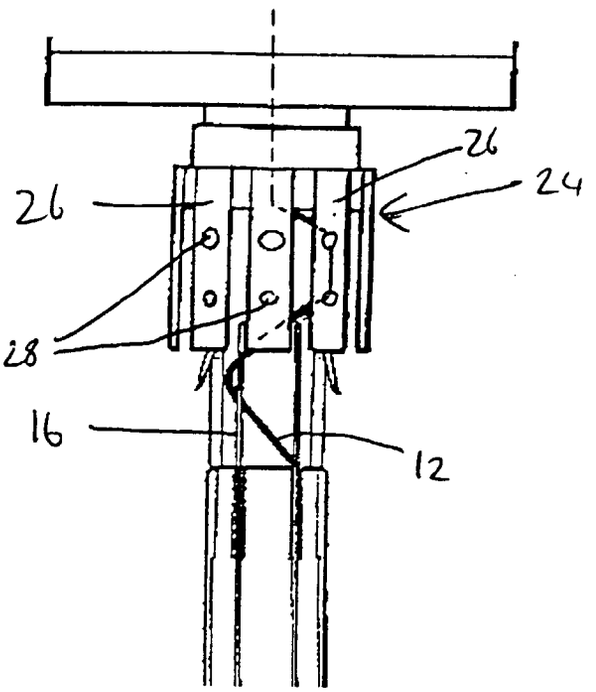

Fig 3