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(54) IMPROVEMENTS IN OR RELATING TO LENGTHS OF SLIDING CLASP FASTENER CHAIN

(71) We, OPTI-HOLDING AG, of Burgstrasse 24, Glarus, Switzerland, a Company organised under the laws of Switzerland, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to lengths of sliding clasp fastener chain and a method of making such lengths, and is particularly concerned with chain for coloured sliding clasp fastener that is dyed to match the garment in which it is to be installed.

It is necessary in most garments to co-ordinate the colour of the various accessories with the fabric of the garment. To this end sliding clasp fasteners are produced in a wide range of colours, usually achieved by simply dyeing the fully assembled fastener.

Since the fastener is usually made of three different materials—textile stringer tapes, rows of interlocking elements of synthetic plastics material and synthetic plastics or natural-fibre thread interconnecting the tapes and elements—it has been found extremely difficult to achieve the same degree of colouration in all of its parts. Dyeing of a slider is usually found to be unnecessary, and end-stop members are either metallic staples or are made of the same material as the elements.

The colour contrast is particularly marked between the thread forming the stitching attaching each row of elements to its tape, and the elements. This difference is most troublesome when spun or twisted multifilament thread, be it synthetic or natural, is used. Even when the same polyamide or polyester that is used in the interlocking elements is employed for the attachment stitching, this contrast is present. One method of preventing this colour difference has been to use only slightly stretched or oriented synthetic-resin thread which, although it lacks something in stability and

strength, tends to have roughly the same dye-absorbing capacities as the stringer tapes and elements. However, the unavoidable differences between the extent of dye absorption in the stitching on one hand and in the elements and stringer tapes on the other has generally been accepted as inevitable.

Another solution has been to make the entire fastener out of transparent material. In this case a synthetic textile is used for the stringer tapes and the elements are woven into the edges of the tapes, no stitching being used. In order to enhance the transparency of such a fastener, as open a weave as possible is used for the tapes. Although such a solution has its theoretical merits, the fasteners so made are in reality not satisfactory: they are insufficiently transparent, they reflect and shine under certain light, and they are physically weak.

It is therefore an object of the present invention to provide a length of sliding clasp fastener chain wherein the stitching does not contrast or stand out from the interlocking elements and stringer tapes as a result of its colour.

Another object is the provision of a simple method for making such a length of colour-unified sliding clasp fastener chain.

According to one aspect of the present invention a length of sliding clasp fastener chain has a pair of stringer tapes each comprising a row of interlocking elements of dyed synthetic plastics material having a multiplicity of turns each provided with an interlocking head, an elongated dyed stringer tape having one longitudinal edge carrying said row of interlocking elements and stitching attaching said row to said stringer tape and formed from two interlocked threads, one of said threads overlying said turns of said row and being composed of a transparent synthetic plastics monofilament which is either colourless or is tinted with the same colour as the elements. Preferably said one thread is non-dye-absorbing.

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Thus the row of interlocking elements and the tapes are dyed but the visible stitching is transparent so that the colour of the tapes and the elements can be seen through the stitching.

The stitching securing the elements to the tapes may be a single needle double-chain stitch, when said one thread is a looper thread. Alternatively three threads may be used and the stitching may be double needle double-chain stitch with said one thread being the looper thread.

The invention is eminently suited to the type of stringer tape having a row of interlocking elements of generally helical formation, each turn of the helical coil constituting an interlocking member comprising a pair of co-planar arms lying in a plane perpendicular to the axis of the helical coil, when said one of said threads straddles the pair of arms. Alternatively, and with much the same effect, the row of interlocking elements may be a meander.

According to a further aspect of the invention a method of making a length of dyed sliding clasp fastener chain as hitherto defined comprises the steps of simultaneously dyeing each row of interlocking elements of synthetic plastics material and its textile stringer tape, and stitching the said row to the longitudinal edge of the stringer tape with two interlocked threads of transparent synthetic plastics monofilament, one of said threads overlying the turns of the row and being either colourless or tinted with the same colour as the elements. The stitching securing the interlocking elements to the tapes may be chain stitching with the said transparent thread overlying the interlocking elements of the row. It is preferred that the chain stitching is of the double-chain type, when three bights of said transparent thread may overlie each of said elements, when it is further preferred that the said bights lie substantially parallel to each other over said elements.

To enhance the degree to which the row of interlocking elements is secured to the tape, the method may further comprise the step of subjecting such transparent thread to heat where it passes over said interlocking elements.

The invention also includes a sliding clasp fastener incorporating a length of chain as hereinbefore defined.

Two embodiments of the invention will now be described with reference to the accompanying drawings in which:—

Figure 1 is a top view of a portion of a length of sliding clasp fastener chain according to the present invention;

Figure 2 is a section taken along line II-II of Figure 1;

Figure 3 is a bottom view of the length of chain of Figure 1;

Figure 4 is a section taken along line IV-IV of Figure 1;

Figures 5 and 6 are views similar to Figures 4 and 1, respectively, showing an alternative embodiment of the present invention;

Figure 7 is a schematic diagram showing how the length of chain of Figures 1-4 is made; and

Figure 8 is a view corresponding to a detail of Figure 4 showing the flattened threads.

Figures 1-4 show a pair of rows of interlocking elements 1 made from synthetic plastics monofilament in coiled formation, the plastics material being capable of being dyed. The rows 1 each have a plurality of turns 5 formed by upper and lower arms 6a and 6b, respectively, with interlocking heads 6c and rearward connecting sections 6d interconnecting neighbouring lower arms 6b to upper arm 6a. Each row 1 is stitched to a stringer tape 2 that defines a plane P. These tapes 2 are woven or knitted and can be dyed like the rows 1. Either synthetic or natural-fibre textile material may be used for the tapes.

The straight upper and lower arms 6a and 6b lie directly over each other and parallel to each other relative to the plane P. The heads 6c are flattened and the sections 6d lie at an angle to the plane P.

Each row of interlocking elements 1 is secured to the face of its stringer tape 2 at the edge thereof by longitudinal stitching 3, 4 comprising a transparent non-dye-absorbing monofilament looper thread 3 and a multifilament needle thread 4 which may or may not absorb dye. A double-chain stitch is used, so that on sewing the needle pieces the stronger from the tape side. Figure 1 shows that this type of stitch will leave three bights 7 of transparent thread 3 overlying each upper arm 6a, while the point 8 where the upper and lower threads 3 and 4 cross is buried in a filler cord 10 running longitudinally through the length of each coil 1. The looper thread 3 is never kinked but is only forced to conform at the bights 7 to a diameter of curvature equal to around twice the diameter D of the needle thread 4.

Since these bights 7 lie snugly over the upper arms 6a, especially as a result of a subsequent heat treatment which flattens the bights 7 as seen in Figure 8, the colour of the elements 1 will be clearly visible through the bights. Even if the thread 3 absorbs some dye, its close engagement with the coils 1 will still make it blend in completely.

Of course the needle thread 4 can also be transparent. Figure 3 shows how the single line of stitching of thread 4 is extremely innocuous on the tape side of the fastener.

Figures 5 and 6 show a length sliding

clasp fastener chain in which coiled rows of interlocking elements 1' have turns 5' secured to stringer tapes 2' by double chain stitching by means of a pair of needle threads 4' and a single looper thread 3'. The tapes 2' are each formed with a longitudinal fold 9 forming a flap 9a to which the elements 1' are stitched.

In this embodiment however the stitching is done from the coil side of the fastener, and then the tape is folded over at 9. Either the needle thread 4' or the looper thread 3' or both can be transparent, depending on need. In any case due to the relatively wide transverse lay of the looper thread 3' the fold 9 is maintained for use of the stringer in an invisible-type sliding clasp fastener.

Figure 7 shows schematically an apparatus for carrying out the sliding clasp fastener construction method according to the present invention. A pair of stringer tapes 2 are fed from supply bobbins 11 to a sewing station 12. A pair of interlocked rows 1 of interlocking elements as well as needle and looper threads 3 and 4 are also fed to this station 12 from respective supplies. A double-needle sewing machine 13 at the station 12 sews the interlocked rows 1 to the edges of the parallel stringer tapes 2 according to principles well known in the art, forming a double-chain stitch as described above over each turn with the needles piercing the tapes from underneath.

After attachment of the rows 1 to the stringer tapes with a dye-absorbing needle thread 3 and a non-dye absorbing monofilament 4 the completed length of chain 14 is fed to a dyeing station 15 where it is passed through a vat 16 containing textile dye. Subsequently the dyed length of chain whose monofilamentary looper threads 4 have absorbed no dye are fed to a station 17 where they are pressed between a pair of driven heated rollers 18 that serve to dry the length of chain 14 and to flatten and shrink the threads 4 where they overlap the turns 5. In this manner a very tight fastener is obtained.

Finally the dyed and heat-treated length of chain 14 is lead in the transport direction T to a station 19 where it is provided with end-stop members sliders, and where individual sliding clasp fasteners are cut out of it.

This method produces an excellent coil-type sliding clasp fastener which is dyed to blend exactly with whatever colour is desired. There is virtually no contrast between the colour of the stitching on one hand and that of the interlocking elements and the stringer tapes on the other.

WHAT WE CLAIM IS:—

1. A length of sliding clasp fastener chain

having a pair of stringer tapes each comprising a row of interlocking elements of dyed synthetic plastics material having a multiplicity of turns each provided with an interlocking head, an elongated dyed stringer tape having one longitudinal edge carrying said row of interlocking elements and stitching attaching said row to said stringer tape and formed from two interlocked threads, one of said threads overlying said turns of said row and being composed of a transparent synthetic plastics monofilament which is either colourless or is tinted with the same colour as the elements.

2. A length of chain as in Claim 1, wherein said one thread is non-dye-absorbing.

3. A length of chain as in Claim 1 or Claim 2, wherein said stitching is a single needle double-chain stitch, said one thread being the looper thread.

4. A length of chain as in Claim 1 or Claim 2, wherein said stitching is a double-needle, double-chain stitch, said stitching comprising a pair of needle threads overlying said turns and composed of transparent monofilament.

5. A length of chain as in any of Claims 1 to 4, wherein said elements and stringer tape are dyed in common and have the same colouration.

6. A length of chain as in any of Claims 1 to 5 wherein said row of interlocking elements is a generally helical coil, said turns of said coil each having a pair of co-planar arms lying in a plane perpendicular to the axis of the coil, said one of said threads straddling the pairs of arms.

7. A length of chain as in any of Claims 1 to 5 wherein said element is a meander.

8. A length of chain substantially as hereinbefore described with reference to Figures 1 to 4, or Figures 5 and 6 of the accompanying drawings.

9. A method of making a dyed length of chain as in Claim 1, comprising the steps of simultaneously dyeing each row of interlocking elements of synthetic plastics material and its stringer tape, and stitching the said row to the longitudinal edge of the stringer tape with two interlocked threads of transparent synthetic plastics monofilament, one of said threads overlying the turns of the row and being either colourless or tinted with the same colour as the elements.

10. A method as in Claim 9, wherein said stitching is chainstitching with said transparent thread overlying the interlocking elements of said row.

11. A method as in Claim 10 wherein said chainstitching is of the double-chain type.

12. A method as in any of Claims 9 to 11 further comprising the step of subjecting such transparent thread to heat where it passes over said interlocking elements.

13. A method as in Claim 11, wherein



clasp fastener chain in which coiled rows of interlocking elements 1' have turns 5' secured to stringer tapes 2' by double chain stitching by means of a pair of needle threads 4' and a single looper thread 3'. The tapes 2' are each formed with a longitudinal fold 9 forming a flap 9a to which the elements 1' are stitched.

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1. A length of sliding clasp fastener chain

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2. A length of chain as in Claim 1, wherein said one thread is non-dye-absorbing.

3. A length of chain as in Claim 1 or Claim 2, wherein said stitching is a single needle double-chain stitch, said one thread being the looper thread.

4. A length of chain as in Claim 1 or Claim 2, wherein said stitching is a double-needle, double-chain stitch, said stitching comprising a pair of needle threads overlying said turns and composed of transparent monofilament.

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6. A length of chain as in any of Claims 1 to 5 wherein said row of interlocking elements is a generally helical coil, said turns of said coil each having a pair of co-planar arms lying in a plane perpendicular to the axis of the coil, said one of said threads straddling the pairs of arms.

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12. A method as in any of Claims 9 to 11 further comprising the step of subjecting such transparent thread to heat where it passes over said interlocking elements.

13. A method as in Claim 11, wherein



three bights of said transparent thread over-
lie each of said elements.

14. A method as in Claim 13, wherein
said bights lie substantially parallel to each
5 other over said elements.

15. A method as in Claim 9, substantially

as hereinbefore described with reference to
the accompanying drawings.

16. A sliding clasp fastener incorporating
a length of chain according to claim 1. 10

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