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(54) FLEXIBLE BAND

(71) We, KABUSHIKI KAISHA SENDAI SEIMITSU ZAIRYO KENKYUJO and KABUSHIKI KAISHA DAINI SEIKOSHA, both Japanese body corporates of 31-6, 6-chome, Kameido, Koto-ku, Tokyo, Japan, 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 concerns a flexible band adapted for use as the bracelet of a watch.

According to the present invention, there is provided a flexible band adapted for use as the bracelet of a watch and comprising interengaging outer and inner helically wound members, each said member having spaced apart side walls which are integral with a base portion of the member and which extend therefrom towards the other or another member, each of the side walls of each said member extending into a space within the other said member.

Preferably the band has been flattened.

The outer surface of each side wall of at least one of said members may taper from the respective base portion.

At least one of said spaces may be defined completely by the side walls and base portion of the respective member.

Alternatively, or additionally, at least one of said spaces may be defined by a side wall, a central rib, and the base portion of the respective member.

In one embodiment of the invention, there are two outer members of respectively different widths, and two inner members of the same width. In this case the wider of the two outer members may be provided with the said central rib.

In another embodiment of the invention, there is a helically wound wire disposed between the convolutions of an outer helically wound member. In this case the said wire and the said outer helically wound member may be differently coloured.

In yet another embodiment of the present invention, the outer member is wider than the inner member.

The band may moreover comprise a centrally disposed core member about which the inner member is wound.

The invention also comprises a method of assembling a flexible band for use as a bracelet of a watch, comprising inter-engaging outer and inner members which each have spaced apart side walls integral with a base portion of the member, and winding said outer and inner members helically so that each of the side walls of each said member extends into a space within another said member.

Preferably the method includes the step of flattening; said flexible band.

The invention is illustrated, merely by way of example, in the accompanying drawings, in which:—

Figure 1 is a broken-away cross-sectional view of a flexible band known to the Applicants,

Figure 2 is a broken-away perspective view of the band shown in Figure 1,

Figure 3A is a broken-away sectional view of a first embodiment of a flexible band according to the present invention, the band being shown wound about a mandrel,

Figure 3B is a broken-away perspective view of the band of Figure 3A after the mandrel has been withdrawn and the band has been flattened, and

Figures 4, 5 and 6 are broken-away cross-sectional views of second, third and fourth embodiments respectively of flexible bands according to the present invention.

In Figures 1 and 2 there is shown a flexible band known to the Applicants which comprises a single helically wound member A whose helical shape has been flattened by a press or roller into the shape shown. The member A is substantially Z-shaped in cross-section having side walls B, C, at opposite sides thereof which respectively extend outwardly and inwardly of the band. The member A is also provided with a centrally disposed web D, a psace E being defined between the web D and the side wall B, and a space F being defined between the web D and the side wall C. The convolutions of the member A are inter-engaged with each other by reason of the fact that

the side wall B of each convolution is disposed in the space F of the adjacent convolution, while the side wall C of each convolution is disposed in the space E of the adjacent convolution.

In this construction, however, as best seen in Figure 2, the side walls and central portion of the band are irregularly curved since the side walls are more deformable and extensible than the central portion, and this curvature impairs the appearance of the band.

In Figure 3A there is therefore shown a first embodiment of a flexible band according to the present invention which comprises inter-engaging outer and inner channel members 1, 2 which are helically wound about a mandrel 3. The outer member 1 has spaced apart side walls 1*a* which are integral with a base portion 1*b* of the outer member 1 and which extend therefrom towards the inner member 2. The outer surfaces 1*a*¹ of each of the side wall 1*a* taper from the respective base portion 1*b* towards the inner member 2.

Similarly, the inner member 2, whose cross-sectional shape is substantially the same as that of the outer member 1, has spaced apart side walls 2*a* which are integral with a base portion 2*b* of the inner member 2 and which extend therefrom towards the outer member 1. The outer surfaces 2*a*¹ of each of the side walls 2*a* taper from the respective base portion 2*b* towards the outer member 1.

The members 1, 2 are inter-engaged by reason of the fact that each of the side walls 1*a* of each outer member 1 extends into a space 2*d* within the inner member 2, while each of the side walls 2*a* of each inner member 2 extends into a space 1*d* in the outer member 1. As will be seen from Figure 3A, each of the spaces 1*d* is defined completely by the side walls 1*a* and base portion 1*b* of the outer member 1, while each of the spaces 2*d* is defined completely by the side walls 2*a* and base portion 2*b* of the inner member 2.

The mandrel 3 about which the inner member 2 is helically wound may be cylindrical, conical, or frusto-conical, the arrangement being that after the inner member 2 has been helically wound about the mandrel 3, the outer member 1 is helically wound about the inner member 2. Thereafter, the mandrel 3 is removed, and the band is flattened in the radial direction by means of a press or a roller so that it is forced into the shape shown in Figure 3B.

The construction shown in Figure 3 has laterally straight edges without lateral curvature and, therefore, does not have the kind of curvature shown in Figure 2 and therefore has a superior appearance.

As will be seen, the generally rounded shape of the sides of the band of Figure 3 are such as to prevent them injuring the body or the clothes of a user of the band.

Although the band shown in Figures 3A and 3B is not intended to have any substantial expansibility, it is flexible by reason of the fact that each of the side walls 1*a*, 2*a* is freely mounted within it respective space 1*d*, 2*d*.

By reason of the provision of the tapering surfaces 1*a*¹, a relatively large clearance 4 is provided between the radially inner ends of the walls 1*a* of adjacent convolutions of the outer member 1, while by reason of the provision of the tapering surfaces 2*a*¹, a relatively large clearance 5 is provided between the inner end of the walls 2*a* of adjacent convolutions of the inner member 2. The clearances 4, 5 increase the flexibility of the metal band, while at the same time clearances 1*c* adjacent the radially outer ends of the side walls 1*a* can thereby be formed smaller than would otherwise be the case, thereby contributing to the good appearance of the band.

However, if desired either the outer member 1 or the inner member 2 may have outer surfaces 1*a*¹, 2*a*¹ which do not so taper.

In the further embodiments of the present invention which are described below, no reference is made to such tapering surfaces, but these can be provided if so desired.

Each of the embodiments of Figures 4 to 6 is generally similar in construction to that of Figures 3A and 3B and for this reason will not be described in detail.

However, in the Figure 4 construction, the band comprises two outer members 6, 7 and two inner members 8, 8¹. The outer member 7 has side walls 7*a* which are integral with and extend from a base portion 7*b*, whereas the outer member 6, which is wider than the outer member 7, is provided both with side walls 6*a* and with a central rib 6*c*, both the side walls 6*a* and the central rib 6*c* being integral with a base portion 6*b*.

The inner members 8, 8¹, are however of the same cross-sectional shape, each of the inner members 8, 8¹ having substantially the same width as that of the outer member 7. Each of the inner members 8, 8¹ has side walls 8*a* which respectively extend into a space in the outer member 6 which is defined between the central rib 6*c* and one of the side walls 6*a*, and a space between the side walls 7*a* of the outer member 7. Thus one of the spaces into which a side wall 8*a* extends is defined by a side wall 6*a*, the central rib 6*c*, and the base portion 6*b* of the outer member 6.

In the construction shown in Figure 5, a single outer member 9 and a single inner member 11 is employed, but the inner member 11 is wider than the outer member 9.

A helically wound wire 10 is disposed between the convolutions of the outer member 9 and may be differently coloured therefrom. The cross-sectional width of the wire 10 is small by comparison with the cross-sectional width of the outer member 9, the wire 10 being held in position between the convolutions of the outer member 9 by the inner member 11.

In the band shown in Figure 6, an outer member 12 is employed which is wider than an inner member 13 of the band. If the width of the inner member 13 is substantially less than that of the outer member 12, the flexibility of the band is very much improved.

Moreover, in the Figure 6 construction, there is employed a centrally disposed core member 14, e.g. of wire net, about which the inner member 13 is wound. However, it will be appreciated that a similar core member can be used in the other embodiments of the invention.

WHAT WE CLAIM IS:—

1. A flexible band adapted for use as the bracelet of a watch comprising inter-engaging outer and inner helically wound members, each said member having spaced apart side walls which are integral with a base portion of the member and which extend therefrom towards the other or another member, each of the side walls of each said member extending into a space within the other said member.

2. A flexible band as claimed in any preceding claim in which the band has been flattened.

3. A flexible band as claimed in claim 1 or 2 in which the outer surface of each side wall of at least one of said members tapes from the respective base portion.

4. A flexible band as claimed in any preceding claim in which at least one of said spaces is defined completely by the side walls and base portion of the respective member.

5. A flexible band as claimed in any preceding claim in which at least one of said spaces is defined by a side wall, a central rib. and the base portion of the respective member.

6. A flexible band as claimed in any preceding claim in which there are two outer members of respectively different widths and two inner members of the same width.

7. A flexible band as claimed in claims 5 and 6 in which the wider of the two outer members is provided with the said central rib.

8. A flexible band as claimed in any of claims 1 to 4 in which there is a helically wound wire disposed between the convolutions of an outer helically wound member.

9. A flexible band as claimed in claim 8 in which the said wire and the said outer helically wound member are differently coloured.

10. A flexible band as claimed in any of claims 1 to 4 in which the outer member is wider than the inner member.

11. A flexible band as claimed in any preceding claim in which the band comprises a centrally disposed core member about which the inner member is wound.

12. A flexible band substantially as hereinbefore described with reference to and as shown in any of Figures 3 to 6 of the accompanying drawings.

13. A method of assembling a flexible band for use as a bracelet of a watch comprising winding an inner member helically, and thereafter winding an outer member helically about the inner member, each said member having spaced apart side walls integral with a base portion of the member, and the members being wound so that each of the side walls of each said member extends into a space within another said member.

14. A method as claimed in claim 13 including the step of flattening said flexible band.

15. A method as claimed in claim 13 or substantially as herein described with reference to Figures 3 to 6 of the accompanying drawings.

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A helically wound wire 10 is disposed between the convolutions of the outer member 9 and may be differently coloured therefrom. The cross-sectional width of the wire 10 is small by comparison with the cross-sectional width of the outer member 9, the wire 10 being held in position between the convolutions of the outer member 9 by the inner member 11.

In the band shown in Figure 6, an outer member 12 is employed which is wider than an inner member 13 of the band. If the width of the inner member 13 is substantially less than that of the outer member 12, the flexibility of the band is very much improved.

Moreover, in the Figure 6 construction, there is employed a centrally disposed core member 14, e.g. of wire net, about which the inner member 13 is wound. However, it will be appreciated that a similar core member can be used in the other embodiments of the invention.

WHAT WE CLAIM IS:—

1. A flexible band adapted for use as the bracelet of a watch comprising inter-engaging outer and inner helically wound members, each said member having spaced apart side walls which are integral with a base portion of the member and which extend therefrom towards the other or another member, each of the side walls of each said member extending into a space within the other said member.

2. A flexible band as claimed in any preceding claim in which the band has been flattened.

3. A flexible band as claimed in claim 1 or 2 in which the outer surface of each side wall of at least one of said members tapes from the respective base portion.

4. A flexible band as claimed in any preceding claim in which at least one of said spaces is defined completely by the side walls and base portion of the respective member.

5. A flexible band as claimed in any preceding claim in which at least one of said spaces is defined by a side wall, a central rib. and the base portion of the respective member.

6. A flexible band as claimed in any preceding claim in which there are two outer members of respectively different widths and two inner members of the same width.

7. A flexible band as claimed in claims 5 and 6 in which the wider of the two outer members is provided with the said central rib.

8. A flexible band as claimed in any of claims 1 to 4 in which there is a helically wound wire disposed between the convolutions of an outer helically wound member.

9. A flexible band as claimed in claim 8 in which the said wire and the said outer helically wound member are differently coloured.

10. A flexible band as claimed in any of claims 1 to 4 in which the outer member is wider than the inner member.

11. A flexible band as claimed in any preceding claim in which the band comprises a centrally disposed core member about which the inner member is wound.

12. A flexible band substantially as hereinbefore described with reference to and as shown in any of Figures 3 to 6 of the accompanying drawings.

13. A method of assembling a flexible band for use as a bracelet of a watch comprising winding an inner member helically, and thereafter winding an outer member helically about the inner member, each said member having spaced apart side walls integral with a base portion of the member, and the members being wound so that each of the side walls of each said member extends into a space within another said member.

14. A method as claimed in claim 13 including the step of flattening said flexible band.

15. A method as claimed in claim 13 or substantially as herein described with reference to Figures 3 to 6 of the accompanying drawings.

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