A knitted garment (10) for the support and/or compression of parts of the body and/or for compression therapy is knitted in the shape of a tube (11, 12, 13, 14, 15, 16) using at least one elastic knitting thread and at least one elastic weft thread, at least in sections, on a flat bed knitting machine.
KNITTED GARMENT FOR THE SUPPORT AND/OR COMPRESSION AND/OR COMPRESSION THERAPY OF PARTS OF THE BODY

BACKGROUND OF THE INVENTION

[0001] Compression articles such as compression sleeves, compression gloves, socks and the like are used in particular to prevent or treat edemas, varicose veins, venous insufficiency, and after vein surgery. Further elastic articles are joint bandages or burn-care bandages. Support bandages are used in sports to protect against injury and, to a certain extent, to enhance performance. These articles are manufactured primarily as knitted garments, due to their good elastic properties. It is possible to manufacture the articles on a circular knitting machine. Tubes having a constant or variable—within limits—diameter can be produced on circular knitting machines. The advantage of these tubes is that they have no seams, which could possibly cause pressure points. On the other hand, the circularly-knit, elastic articles cannot always be adapted in an optimum manner to the anatomical details of the part of the body to be supported or compressed. The fit and desired effect of circular-knit articles are therefore not always optimal, especially when extreme anatomies are involved.

[0002] According to an alternative production method, the articles are manufactured out of one or more parts that are produced on a flat bed knitting machine. On a flat bed knitting machine, it is relatively easy to also manufacture contours having very complicated shapes using narrowing and knit widening with exact needle placement, and by using spacing techniques. For example, a glove can be created very well as a flat formed body of the actual hand shape. However, the individual pieces manufactured on a flat bed knitting machine must be subsequently sewn together. This increases the production costs of the article and results in seams that can negatively affect wearing comfort due to the formation of pressure points. In addition, seams are also often the very places in a knitted garment that can partially tear when stress is exerted on the knitted garment. This can negatively affect the service life and appearance of the knitted garment as a whole.

SUMMARY OF THE INVENTION

[0003] The present invention is based on the object of creating a knitted garment for the support and/or compression of parts of the body and/or for compression therapy that is comfortable to wear, has a long service life, and is economical to manufacture.

[0004] The present invention is attained using a knitted garment for the support and/or compression of parts of the body and/or for compression therapy characterized by the fact that it is manufactured as a tubular knitted garment using at least one elastic knitting thread and at least one elastic weft thread, at least in sections, on a flat bed knitting machine. The object is also attained using a method for manufacturing a knitted garment of this type.

[0005] The manufacture of tubular knitted garments on flat bed knitting machines is known in principle from the production of articles of clothing such as pullover sweaters and the like. In these cases, however, elastic knitting threads and, in particular, elastic weft threads do not have to be processed. Industry finally succeeded in processing elastic knitting threads and elastic weft threads to manufacture tubular knitted garments according to the present invention on a flat bed knitting machine by overcoming preconceived notions. The knitted garments according to the present invention are unique in that they are completely seamless and optimally fit to the anatomy of the particular part of the body. The integral knitting of the weft thread allows the elastic properties of the knitted garment to be controlled exactly. This also makes it possible to provide certain areas of the knitted garment with different elastic properties than it has in other areas. Since the knitted garment can be manufactured as a one, two, or three-dimensional formed body that is anatomically fit to the shape of the part of the body to be supported and/or compressed, knitted garments are therefore produced that have a level of wearing comfort not yet attained, an improved fit, and a precision of the desired compression and/or support function not yet attained.

[0006] The knitted garment can be manufactured as a tubular-circular knitted garment. The unique feature of this garment is the fact that the knitting thread and the weft thread form a spiral from one row of knitted stitches to the next, which results in identical and uninterrupted elasticity and pressure conditions on all sides of the tube.

[0007] It is also possible, however, to manufacture the knitted garment, at least in sections, out of two knitted parts joined with each other at the edges on the flat bed knitting machine. This results in visible connecting lines on the side that are not bulky, and, in particular, do not require separate working steps to be produced, as seams do. For reasons of appearance and/or functionality, the creation of “pseudo” seams such as these in the knitted garment can be entirely desirable.

Various joining techniques can be used to manufacture the knitted garments. A 1:1 weave is preferable.

[0008] The knitted garment can be manufactured using knitting threads and weft threads with an elasticity between 1% and 400%, and a linear density of 44 to 3,000 dtex. The elasticities and linear densities of the knitting threads and weft threads can differ.

[0009] To best fit the knitted garment to the anatomical details of the parts of the body where the knitted garment will be used, shaping and transfer techniques can be used, or the mesh size can be varied. Differences in the diameter of the tubular regions of the knitted garment can be attained by varying the thread tension, and by varying the elastic and compression properties, of course.

[0010] The benefit of the knitted garment can be enhanced even further by providing it with integrally knit applications such as pockets, eyelets, openings and the like. As a result, the knitted garment is provided with an additional benefit without an additional production expense.

[0011] Further advantages can be obtained when the knitted garment includes areas having different elastic or compression properties and/or other strengths and/or other material thicknesses. This is particularly significant in the manufacture of gloves. For example, to increase abrasion resistance, the inner surface of the hand can be produced of different materials, or it can be produced with a different material thickness than the side of the glove covering the back of the hand. In particular, the ends of the knitted
garment can also be provided with different elastic or compression properties than the remaining areas. This can prevent constrictions in the area of the ends of the knitted garment. The ends of the knitted garment can also be provided with a ribbed structure, thereby preventing the ends from rolling up. A looping technique can also be used to manufacture the ends of the threaded garment. With legsleeves or arm sleeves in particular, it is also advantageous to provide the upper ends of the knitted garment with integrally knit ribs on the inside made of elastan or elastodiene threads, to prevent the sleeve from sliding.

[0012] The knitted garment according to the present invention can have any shape imaginable and can be used for practically any part of the body. Preferred configurations of the knitted garments are compression arm sleeves or legsleeves, compression gloves, compression socks or compression tights. The knitted garment can also be a burn-care bandage or an athletic bandage. It is also possible to manufacture entire suits, e.g., for astronauts or high-performance athletes.

[0013] To optimally adapt the knitted garment to the body of the wearer of the knitted garment, the shape of the parts of the body can be determined using a body scanning method, and the flat bed knitting machine can be controlled using the data on the shape of the parts of the body. This allows articles to be manufactured that best fit the person who will be wearing them.

[0014] There are various possibilities for integrally knitting the elastic welt thread, which significantly affects the elastic and compression properties. In a preferred manufacturing method for the knitted garments, the at least one elastic welt thread can be tucked looped in the knitted garment.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] FIG. 1 shows a compression glove that is produced on a flat bed knitting machine out of a total of six tubular knitted garments.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0016] The sole figure shows a compression glove 10 that is produced on a flat bed knitting machine out of a total of six tubular knitted garments 11 through 16. Tube 11 having a large diameter encloses the hand itself, while tubes 12 through 16 enclose the five fingers of the hand. All tubes are joined individually and with each other in a seamless manner. This means there are no seams anywhere that could negatively affect wearing comfort and the service life of overall glove 10 due to an increased susceptibility to wear. The figure of compression glove 10 further shows that tube 11 in particular is adapted exactly to the anatomy of the hand. This means that tube 11 has a smaller diameter in the region of welt 11.1 than it does in region 11.2 of the thumb joint. This is achieved by increasing the number of meshes in region 11.2 compared to region 11.1. Shaping and/or transfer techniques can be used for this purpose. A further possibility for fitting glove 10 to the anatomy of the hand is to vary the mesh size or also the thread tension. These measures also allow the elastic properties of glove 10 to be varied in individual areas. Different weaves can also be used in individual areas to manufacture glove 10, of course. Ribs can be knitted in the area of glove welt 17, for example, which results in particularly high elasticity and prevents welt 17 from rolling up. If glove 10 is also worn when manual labor is performed, the inside of the hand can be provided with greater abrasion resistance. This can be accomplished by selecting a suitable material for the knitting threads, varying the material thickness, or selecting the appropriate weave.

[0017] It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of constructions differing from the types described above.

[0018] While the invention has been illustrated and described herein as a knitted garment for the support and/or compression of parts of the body, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

[0019] Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can, by applying current knowledge, readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention.

[0020] What is claimed as new and desired to be protected by Letters Patent is set forth in the appended claims.

1. A knitted garment for the support and/or compression of parts of the body and/or for compression therapy, comprising:

   a tubular knitted garment formed using at least one elastic knitting thread and at least one elastic welt thread, at least in sections, on a flat bed knitting machine.

2. The knitted garment as recited in claim 1, wherein the garment is a one, two or three-dimensional formed body adapted anatomically to the shape of the part of the body to be supported and/or compressed.

3. The knitted garment as recited in claim 1, wherein the garment comprises a tubular-circular knitted garment, at least in sections.

4. The knitted garment as recited in claim 1, wherein the garment comprises two knitted parts joined with each other at the edges on the flat bed knitting machine.

5. The knitted garment as recited in claim 1, wherein the garment has a 1:1 weave.

6. The knitted garment as recited in claim 1, wherein an elasticity of the at least one knitting thread and the at least one welt thread is 1% to 400%.

7. The knitted garment as recited in claim 1, wherein the at least one knitting thread and the at least one welt thread have a linear density of 3,000 dtex.

8. The knitted garment as recited in claim 1, wherein the garment is formed using shaping and/or transfer techniques.

9. The knitted garment as recited in claim 1, wherein the garment includes knitting stitches and tuck loops of different sizes.

10. The knitted garment as recited in claim 1, wherein the garment is provided with integrally knit applications such as pockets, eyelets, openings and the like.

11. The knitted garment as recited in claim 1, wherein the garment has areas with different elastic or compression properties and/or other strengths and/or other material thicknesses.
12. The knitted garment as recited in claim 11, wherein ends of the garment have elastic or compression properties that differ from those of remaining areas of the garment.

13. The knitted garment as recited in claim 1, wherein upper ends of the knitted garment are provided with integrally knit nubs on the inside made of elasthan or elastodiene threads.

14. The knitted garment as recited in claim 1, wherein the garment is a compression arm sleeve or legsleeve, a compression glove, a compression sock, or compression tights.

15. The knitted garment as recited in claim 1, wherein the garment is a burn-care or joint bandage.

16. The knitted garment as recited in claim 1, wherein the garment is an athletic bandage.

17. The knitted garment as recited in claim 1, wherein the garment is a suit, pants or a jacket.

18. A method for manufacturing a knitted garment for the support and/or compression of parts of the body and/or for compression therapy, comprising the following step: forming said knitted garment, at least in sections, as a tubular knitted garment using one or more elastic knitting threads with an elastic weft thread insert, on a flat bed knitting machine.

19. The method as recited in claim 18, further comprising the step of adapting the tubular knitted garment anatomically to the parts of the body using shaping techniques and/or transfer techniques and/or by varying the mesh size and/or the thread tension.

20. The method as recited in claim 18, further comprising the steps of determining a shape of the parts of the body using a body-scanning method, and controlling the flat bed knitting machine using the data on the shape of the parts of the body.

21. The method as recited in claim 18, wherein the at least one elastic weft thread is tuck looped in the knitted garment.