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2,633,720

KNITTING NEEDLE

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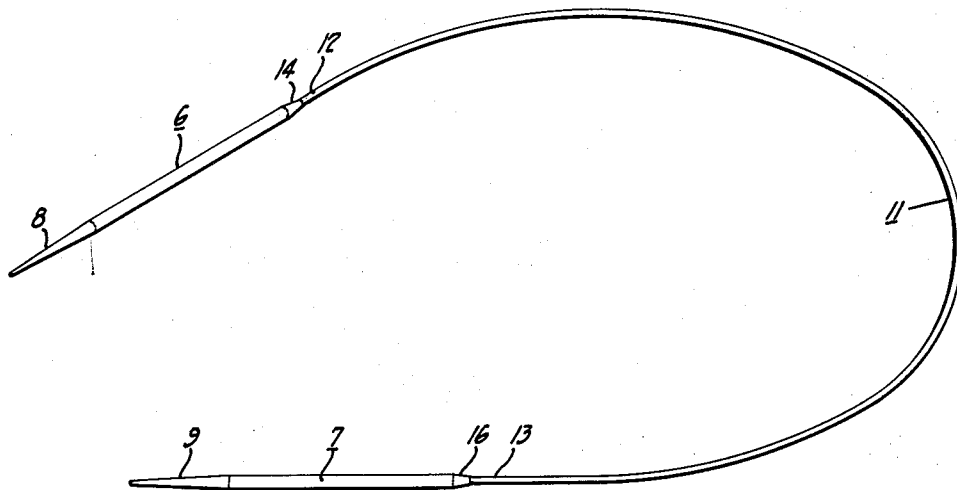


FIG. 1 -

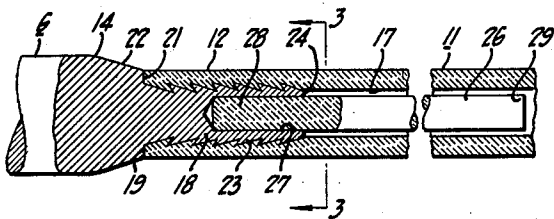


FIG. 2 -

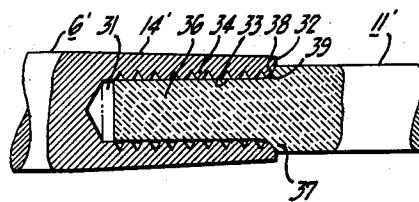


FIG. 4 -

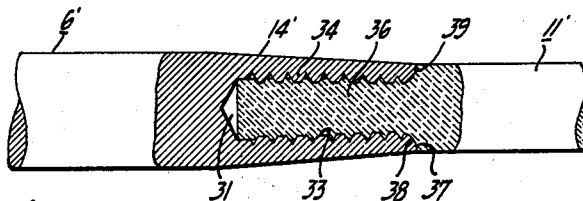


FIG. 5 -

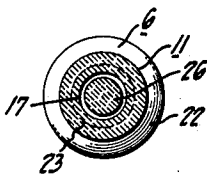


FIG. 3 -

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KNITTING NEEDLE

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22 Claims. (Cl. 66—117)

1

The invention relates to knitting needles and more particularly to the circular or hoop type of needle used for knitting an annularly or endless closed course such as desired in the knitting of skirts, sweaters and other seamless garments or portions thereof.

Circular knitting needles of the type to which the present invention relates have been constructed of a pair of steel rods, sometimes called "pins," pointed at one end for engagement with the yarn to be knitted and connected at their opposite ends to the opposite ends of a flexible steel cable forming the body or hoop part of the needle, and onto and over which the knitted loops are advanced as they are formed by the pins. While the steel cable is intended to provide the flexible part of the needle, it is, nevertheless, quite stiff and resilient, making the needle somewhat difficult and awkward to handle and limiting the use of the needle to garments having a relatively large diameter. For example, the steel cable type of knitting needle cannot be used for knitting items such as socks, sleeves or garments of like diameter, and it is customary in such instances to use a plurality of straight needles set in a polygonal fashion around the closed course to be knitted.

As will be understood, the most active flexing of the circular-type needle, and consequently the greatest wear and strain, occurs at the joiner between the pins and the cable and directly at the ends of the cable, due to the rapid and constant manipulation of the pins in the hands of the user. This concentration of strain and wear at the ends of the cable causes the breaking and fraying of the strands of the cable at its ends after a limited period of use, requiring the repair or replacement of the needle.

An object of the present invention is to provide a knitting needle of the character described having an improved combination of materials in the pins and flexible body part of the needle, and an improved method of and construction for permanently securing such parts together, whereby there is afforded a needle of such extreme lightness in weight and flexibility as to be ideally manipulatable in the hands of the user and capable of use in knitting small-diameter garments such as socks, sleeves and the like.

Another object of the invention is to provide a circular-type knitting needle combining well-known qualities of metal with the extremely tough, durable and flexible qualities of certain plastics in the cable portion of the needle, and in so joining and attaching these parts as to pro-

2

vide a needle which will positively prevent breaking or fraying of the cable at the pins, and to be otherwise practically indestructible in the course of normal use.

5 The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawing accompanying and
10 forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawing and description may be adopted within the scope of the invention as set forth in the claims.

15 Referring to said drawing:

Figure 1 is a side elevation of a knitting needle constructed in accordance with the present invention.

20 Figure 2 is an enlarged longitudinal cross-sectional view of the joiner portions of the cable and pin of the needle.

Figure 3 is a cross-sectional view of the part of the needle illustrated in Figure 2 and is taken substantially on the plane of line 3—3 of Figure 2.

25 Figure 4 is a cross-sectional view similar to Figure 2 but showing a modified form of construction.

30 Figure 5 is a longitudinal cross-sectional view similar to Figure 4 but showing a different position of the parts.

The circular knitting needle illustrated in the accompanying drawing is composed of a pair of relatively stiff, slender, elongated, rod-like members or pins 6 and 7, which are pointed at their ends 8 and 9 for engagement with the yarn to be knitted and facilitating the inter-looping of the yarn into knitted stitches, as is understood. These pins are preferably formed of metal such as steel, aluminum or alloys thereof, and for lightness and ease of handling I prefer to use an aluminum alloy such as is known generally under the name "Dural." In accordance with the present invention and as a principal feature thereof, the central flexible body or cable portion 11 of the needle is formed of a length of a tough, durable and flexible plastic having the opposite end portions 12 and 13 secured to the rear ends 14 and 16 of the pins 6 and 7. Preferably, the central or body portion of the present needle is composed of monofilament nylon, which affords the needle extreme strength and durability as well as a flexibility permitting the needle to be much shorter in
55 length and therefore capable of knitting smaller-

3

diameter garments than heretofore possible. Insofar as I am aware, there has been heretofore no successful method or process available for bonding nylon to metal, and it is in the overcoming of this problem that a principal feature of the present invention lies. More specifically, in the present construction there is provided a smooth peripheral joinder between the ends of the nylon cord and the attached ends of the pins 6 and 7, over which knitted loops may freely slide, and these attached ends are securely and permanently fastened together against longitudinal separation and in such a manner as to prevent breaking of the nylon at the joinder, where constant flexing takes place.

The joinder of one end 12 of the nylon cord 11 to one end 14 of the pin 6 is illustrated in Figure 2, it being noted that the joinder of the opposite cord end 13 to the other pin end 16 is identical in construction and the illustration and description of the one connection depicted in Figure 2 will suffice. With reference to this figure, it will be noted that the nylon mono-filament cord 11 is tubular in construction, having a hollow interior defined by the inside wall 17 of the tube and which is distended and pressed over and compressed upon a reduced cylindrical end portion 18 on the pin 6. The reduction in the normal diameter of the pin 6 to provide the end portion 18 defines, at the inner end of such portion, an annular shoulder 19 against which the end face 21 of the nylon tube is abutted. Also, the normal diameter of the pin 6 is somewhat greater than the external diameter of the tube 11, and a peripheral portion 22 of the pin contiguous with shoulder 19 is tapered in the direction of the shoulder to provide thereat a diameter equal to the external diameter of the tube, so as to afford a smooth peripheral joinder between the tube end and the pin at the shoulder 19. To hold the cord permanently affixed on the pin end portion 18, the latter is provided with a plurality of longitudinally-spaced annular serrations or barbs 23, which are imbedded into the inside wall 17 of the tube, due to the normal compression action of the tube wall against the periphery of end portion 18. If desired, the serrations 23 may be formed of threads on the periphery of pin portion 18 so that the tube end may be conveniently attached by threading onto the portion 18. In any event, the forming of the diameter of the serrations 23 slightly larger than the normal internal diameter of the tube will cause these serrations to be firmly imbedded in the nylon wall and provide a powerful gripping action permanently securing the nylon on the metal shank and positively prevent the longitudinal separation of these parts under ordinary use or deliberate pulling of the pins.

As has been hereinbefore noted, the principal strain on the needle occurs at the point of joinder between the flexible cord and the pins, and in the present construction, in the cord adjacent to end face 24 of the pins. While the tubular form of the cord 11 provides more than adequate strength and flexibility at this point, there may be a tendency, after acute bending of the pin relative to the cord, to effect a creasing of the tube adjacent to pin end 24. To prevent this creasing and to otherwise reinforce the nylon tube adjacent its joinder to the pin, I insert within the tube 11 and throughout its critical length of bending, a length 26 of solid, flexible nylon cord. As may be seen from Figure 2, there is provided in the pin end portion 18 a

4

central bore or recess 27 opening to the end face 24 thereof, within which is mounted and secured one end 28 of the nylon cord 26, the opposite end 29 of the cord 26 extending from the end face 24 of the pin by a distance more than sufficient to cover the critical area of bending. Desirably, the cord 26 has a length of up to about one inch.

A modified form of the invention is illustrated in Figures 4 and 5 of the drawing wherein the end 14' of the pin 6' is provided with a recess or bore 31 extending substantially axially thereof and opening to the end face 32 of the pin. The internal wall 33 of the bore 31 is preferably roughened or serrated in some fashion so as to provide a plurality of internal projections 34 spaced axially along the bore. These serrations are desirably formed by tapering the bore to provide threads extending peripherally around the wall 33 and in planes substantially perpendicular to the axis of the recess. Desirably, the internal edge of the thread is relatively flat, that is, not reduced to a sharp point, as may be accomplished by cutting a so-called square thread into the bore or using a tap which provides something less than a full thread.

The flexible nylon mono-filament cord 11' of the needle is preferably solid in this form of the invention and is formed with a reduced cylindrical end portion 36 having a diameter approximately equal to the internal diameter of the bore measured across the projections 34, less clearance, so as to permit ready insertion of the cord end 36 into the bore. After insertion of the cord as illustrated in Figure 4, the periphery of pin end 14' is compressed inwardly so as to imbed the projections 17 into the cord end 36 to thereby securely lock the pin and cord against separation. This compression may be accomplished in any suitable manner. Desirably, the pin end is first compressed between a pair of appropriate circular jaws, not shown, so as to preliminarily secure the pins and cord together and then the end 14' of the pin is spun so as to provide a uniform circumferential compression and a smooth taper of the end to the periphery of the cord 11' as illustrated in Figure 5. The use of square or flat threads as above discussed is of importance in permitting a very strong imbedding of the threads into the cord without danger of cutting or severing the cord.

As will be seen from the drawings, the reduction in diameter of cord end 36 provides at the outer end of the portion 36 an annular shoulder 37 which abuts the end face 32 of the pin. As an important feature of the present construction, the end wall 32 is formed with a rounded corner 38 in the bore 31, which fits into a similarly rounded corner 39 at the base of shoulder 37, and thereby substantially extends the length or area of the cord portion subject to hinge movement. These inter-fitting annular concavo-convex surfaces act in this respect somewhat like a ball-and-socket universal joint and materially strengthen the connection between the cord and the pin at this point.

It will now be clear that the knitting needle of the present invention is very light in weight and most easily manipulated in the hands of the user; is so perfectly flexible that much shorter lengths may be used for knitting smaller-diameter rounds than possible with circular needles heretofore available; and due to the qualities of the metal and nylon construction, is extremely durable and practically indestructible in ordinary use.

I claim:

1. A circular-type knitting needle comprising, a

5

pair of round slender metal rods each tapered to a point at one end for engagement with the yarn to be knitted, and a nylon cord having its opposite ends telescopically engaged with the opposite ends of said rods, said last-named rod ends being formed with annular peripheral serrations imbedded into said cord ends.

2. A knitting needle comprising, an elongated slender metal rod, a flexible nylon cord having one end thereof secured to one end of said rod, one of said ends being provided with a bore telescopically receiving said other of said ends, said rod end being formed with a plurality of peripheral serrations imbedded into said cord end, the periphery of said rod adjacent to the end thereof being tapered to the diameter of said cord so as to provide a smooth peripheral joinder between said rod and cord.

3. A knitting needle comprising, an elongated round slender rod pointed at one end for engagement with the yarn to be knitted, and a flexible cord of plastic material having a tubular end telescopically receiving the opposite end of said rod, said last-named rod end being formed with peripheral serrations imbedded into the internal wall of said tubular cord end.

4. A knitting needle comprising, an elongated round slender rod pointed at one end for engagement with the yarn to be knitted, a flexible cord of plastic material having a tubular end telescopically receiving the opposite end of said rod, said last-named rod end being formed with peripheral serrations imbedded into the internal wall of said tubular cord end, and a flexible plastic cord secured to said last-named rod and extending therefrom into the tubular interior of said cord end.

5. A knitting needle comprising, an elongated metal rod pointed at one end for engagement with the yarn to be knitted and formed with a reduced cylindrical portion at the opposite end thereof, a flexible nylon tube having one end inserted upon and telescopically receiving said rod end portion, said rod end portion being formed with outstanding peripheral serrations imbedded into the internal wall of said tube, said rod being tapered in the direction of said reduced portion thereof to the external diameter of said tube so as to provide a smooth peripheral joinder between said tube end and said rod, and a length of nylon cord secured to said last-named rod end and extending longitudinally therefrom in the hollow interior of said tube.

6. A circular type knitting needle comprising, a pair of elongated slender metal rods each pointed at an end for engagement with the yarn to be knitted and formed with a reduced cylindrical portion at the other end terminating in an annular shoulder and provided with a plurality of annular serrations, a flexible nylon tube having the opposite ends thereof inserted over and compressed upon said reduced portions to imbed said serrations into the interior wall of said tube and with said tube ends in abutment with said shoulders, said rods being tapered to said shoulders to provide thereat a diameter equal to the external diameter of said tube thereby affording a smooth peripheral joinder between said rod and tube, said second-named rod ends being formed with axially extending bores, and a pair of lengths of flexible nylon cord mounted interiorly of said tube adjacent the opposite ends thereof and secured in said rod end bores.

7. A knitting needle comprising, an elongated slender rod of relatively stiff material formed

6

with an axially extending recess opening to an end thereof, the wall of said recess being roughened to provide a plurality of internally extending projections, and a relatively flexible nylon cord having an end inserted in said recess, said rod end being compressed about said cord end so as to imbed said projections into said cord and secure said rod and cord against separation.

8. A knitting needle comprising, an elongated metal rod pointed at one end for engagement with the yarn to be knitted, and formed with an axially extending bore opening to its opposite end, the side wall of said bore being threaded to provide a plurality of peripheral threads in the axis of the bore, and a cord of plastic material having one end inserted in said bore, the periphery of said rod adjacent said bore being compressed about said cord thereby embedding said threads into said cord and tapering said rod periphery to the second-named end thereof to provide a smooth joinder of said periphery with the periphery of said cord.

9. A knitting needle comprising, an elongated round slender rod having an axially extending opening to an end thereof, the interior wall of said bore being formed with a plurality of serrations, a round nylon cord having a diameter smaller than the diameter of said rod end and larger than the diameter of said bore, an end portion of said cord being of a reduced diameter approximately equal to the diameter of said bore and defining an annular shoulder at the joinder of said reduced portion and remainder of said cord, said cord end portion being positioned in said bore with said shoulder in abutment with said rod end, the end portion of said rod surrounding said bore being compressed about said cord, said serrations being thereby embedded into the periphery of said cord end portion and the diameter of said rod end being reduced to the outside diameter of said cord shoulder.

10. A knitting needle comprising, an elongated round metal rod having a bore opening to an end face thereof, said bore being threaded to provide a plurality of longitudinally spaced threads, said end wall being rounded to provide an annular convex surface, a round nylon cord having a cylindrical end portion of reduced diameter fitted into said bore and an annular shoulder at the outside end of said portion mounted against said rod end face, the base of said shoulder being formed with an annular concavity fitting the convex surface of said rod end face, the portion of said rod surrounding said bore being compressed about said cord, said threads being thereby embedded into said cord end portion and the diameter of said rod end face being reduced to the outside diameter of said shoulder and the convex and concave surfaces aforesaid being pressed into bearing engagement.

11. A circular type knitting needle comprising, a pair of knitting needles of relatively stiff form, a central flexible body portion composed of nylon tubing, the ends of said body portion being telescopically mounted over and secured to ends of said needles, and elongated flexible elements connected to said needle ends and extending therefrom interiorly of said body portion.

12. A knitting needle comprising, an elongated slender rod of relatively stiff material formed with an axially extending recess opening to an end thereof, and a relatively flexible nylon mono-filament cord having an end inserted in said recess, said rod end being compressed about said cord end, said compression constituting the

only means for securing said rod and cord against separation.

13. A circular-type knitting needle comprising, a pair of round slender rods of relatively stiff material each tapered to a point at one end for engagement with the yarn to be knitted, and a flexible cord of plastic material having its opposite ends telescopically engaged with the opposite ends of said rods, said last-named rod ends being formed with annular peripheral serrations embedded into said cord ends.

14. A knitting needle comprising, an elongated slender rod of relatively stiff material, a flexible cord of plastic material having one end thereof secured to one end of said rod, one of said ends being provided with a bore telescopically receiving the other of said ends, said rod end being formed with a plurality of peripheral serrations embedded into said cord end, the periphery of said rod adjacent to the end thereof being tapered to the diameter of said cord so as to provide a smooth peripheral joinder between said rod and cord.

15. A knitting needle comprising, an elongated round slender rod pointed at one end for engagement with the yarn to be knitted, and a flexible cord of plastic material having a tubular end telescopically receiving the opposite end of said rod, said last-named rod end being roughened and having a diameter slightly larger than the normal internal diameter of said tubular end, whereby said tubular end is compressed against said last-named rod end so as to secure said rod and cord against separation.

16. A knitting needle comprising, an elongated round slender rod pointed at one end for engagement with the yarn to be knitted, and a flexible cord of nylon having a tubular end telescopically receiving the opposite end of said rod, said last-named rod end being roughened and having a diameter slightly larger than the normal internal diameter of said tubular end, whereby said tubular end is compressed against said last-named rod end so as to secure said rod and cord against separation.

17. A circular type knitting needle comprising, a pair of knitting needles of relatively stiff form, a central flexible body portion composed of nylon tubing, the ends of said body portion being telescopically engaged with the ends of said needles, and elongated means extending from said needle ends interiorly of said tubing for supporting the walls thereof against collapse adjacent the joinder to said needle ends.

18. A circular type knitting needle comprising, a pair of knitting needles of relatively stiff form, a central flexible body portion composed of nylon tubing, the ends of said body portion being telescopically engaged with the ends of said needles and elongated means connected to said needle ends and extending therefrom interiorly of said body portion.

19. A circular type knitting needle comprising, a pair of knitting needles of relatively stiff form, a central flexible body portion composed of nylon tubing, the ends of said body portion being telescopically engaged with ends of said needles, said needle ends being formed with axially extending recesses, and elongated flexible reinforcing means secured in said recesses and extending therefrom interiorly of said tubing for supporting the walls thereof adjacent said needle ends.

20. A circular type knitting needle comprising, a pair of knitting needles of relatively stiff form, a central flexible body portion composed of nylon tubing, the ends of said body portion being telescopically engaged with the ends of said needles, and flexible elongated means connected to said needle ends and extending therefrom interiorly of said body portion.

21. In a circular type knitting needle, a pair of knitting needles, and a central flexible body portion composed of mono-filament nylon cord, the opposite ends of said body portion and one end of each of said needles being compressively secured to one another in a substantially smooth peripheral joinder.

22. In a circular type knitting needle, a pair of knitting needles, and a central flexible body portion composed of mono-filament nylon cord, the opposite ends of said body portion and one end of each of said needles being secured to one another in a substantially smooth peripheral joinder.

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