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KNITTING ELEMENTS OF KNITTING MACHINERY

Filed Feb. 1, 1944

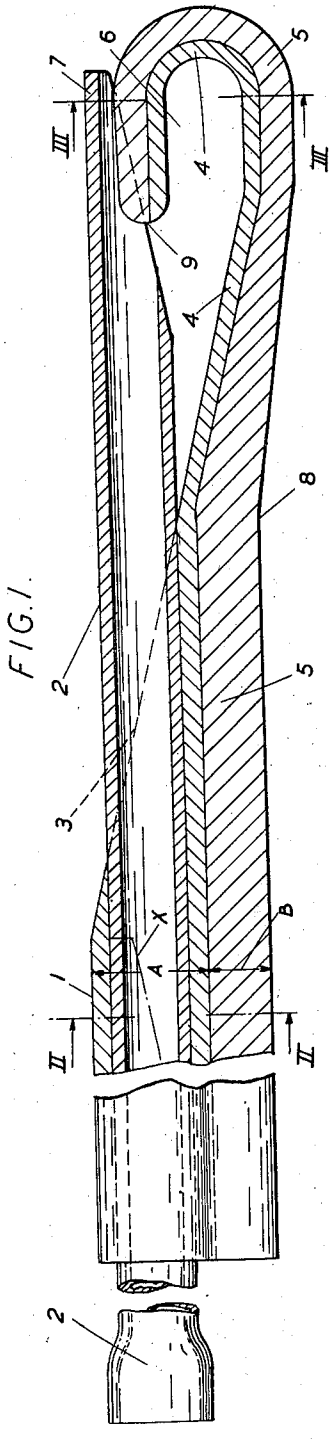


FIG. 1.

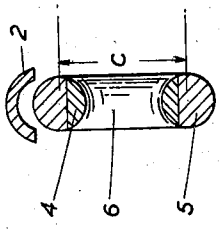


FIG. 3.

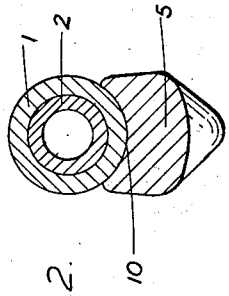


FIG. 2.

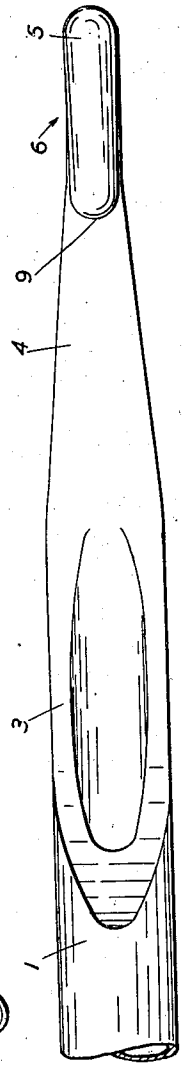


FIG. 4.

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2,393,931

KNITTING ELEMENT OF KNITTING MACHINERY

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4 Claims. (Cl. 66—120)

Knitting needles, for use in knitting machines, may be made so that a tubular shank is formed at one end with a bevelled cam portion merging into a hook. Such a needle is arranged to operate in association with a tongue mounted in the tubular shank to undergo to-and-fro motion relatively to the needle. In this relative to-and-fro movement the tip of the tongue alternately overlaps the needle hook and is concealed in the tubular shank. Thus, when a loop of yarn is supported by the hook, the tongue is withdrawn into the tubular shank while the needle is moved forward so as, by the cam action of the bevelled portion, to lift the knitted loop to a position such that the tongue, when it moves forward relatively to the needle to the position in which it overlaps the hook, will pass through the loop. Before the tongue covers the hook, however, yarn is lapped on the hook once more for the formation of a new loop. Then, when the hook is covered, the previously formed loop is cast off over the tongue and hook.

In United States Patent No. 2,229,929 needles as aforesaid are described and such needles may be formed so that the tubular shank has a base wall which is thicker than the other walls of the shank, the hook being formed so that it emerges from the base wall. This idea of forming the hook as a continuation of a thickened wall of the tubular shank has certain manufacturing advantages, particularly in the case of fine gauge needles where the thickness of the shank in a plane at right angles to that containing the hook must be very small. Furthermore, according to United States Patent No. 2,237,480, one method of forming such a needle is to build the needle from two separate parts soldered together, one part consisting of a fine gauge tube of uniform wall thickness and formed with the bevelled cam portion, and the other part consisting of a strip of metal extending along that side of the tube which terminates at the tip of the bevelled portion, the hook being formed, beyond the bevelled portion, on the strip. It is advantageous to secure together these parts of a machine knitting needle by a copper brazing process, but it has been found that, owing to the softness of the copper, such needles are not entirely satisfactory in practice, because the yarn wears away the thin copper layer at the point where the tip of the bevelled cam portion on the tubular part registers with the strip. A kink, therefore, appears which wears or tears the yarn as it passes from the hook to the bevelled portion. An aim of the present invention is to eliminate this disadvantage.

This aim is achieved, according to the invention, by a machine knitting needle comprising a member providing a tubular guide for a tongue and formed at one end with a bevelled portion terminating in an integral extension, and a strip permanently secured along the tubular member and along the extension thereof, the extension and the adjacent portion of the strip being formed into the shape of a hook. Thus the extension extends along the portion of the strip on which the hook is formed, so that the yarn, as it slides from the hook and along the bevelled portion of the needle, does not pass over any transverse joint between the strip and the tubular member and, therefore, runs no risk of being torn or frayed.

An alternative way of regarding the invention is to consider the shank, comprising the tubular member, as being formed integrally with the hook in much the same way as certain of the needles described in the aforesaid United States Patent No. 2,229,929, and the strip as providing a stiffening member secured round the outside of the hook and along the tubular member.

The invention also comprises the method of forming a machine knitting needle which includes forming a tubular member at one end with a bevelled portion terminating in an integral extension, after securing, as by brazing, a strip along the tubular member and along the extension, and forming the extension and the adjacent portion of the strip with a tapered portion terminating in a hook.

In order that the invention may be clearly understood and readily carried into effect, one construction in accordance therewith will now be described, by way of example, with reference to the accompanying drawing, in which—

Figure 1 is a side elevation, mainly in section and on a very greatly enlarged scale, of a machine knitting needle and an associated tongue,

Figure 2 is a section on the line II—II in Figure 1,

Figure 3 is a section on the line III—III in Figure 1, and

Figure 4 is a plan of the front portion of the needle appearing in Figure 1.

The needle comprises a member 1 providing a tubular guide for a tubular tongue 2. The forward end of the tubular member 1 is formed with a bevelled portion 3 which provides an opening of U-shaped cross-section through which the tongue 2 slides. The tip of the bevelled por-

tion 3 merges into an integral extension 4, and a strip 5 is secured, as by brazing or soldering, along the tubular member 1 and also along the extension 4. The latter and the adjacent part of the strip 5 are bent round to form a hook 6.

When the invention is applied to a warp knitting machine, a row of such needles, arranged parallel to each other, are secured at their tail ends by moulding into a block of lead or synthetic resin, and a row of such blocks is secured in the well known fashion along a needle bar which is moved to-and-fro by the mechanism of the knitting machine. The tongues are similarly mounted in blocks secured along a tongue bar which is also moved to-and-fro in timed relationship with the needle bar. Accordingly, in the to-and-fro movements of the needles and tongues, each tongue slides in the tubular member 1 of its respective needle, and the action is such that, after a loop of yarn has been drawn by the needle hook 6, the needle advances while the tongue 2 recedes to the position indicated by chain lines X in Figure 1 in which its tip 7 lies behind the bevelled portion 3 and is so concealed in the tubular member 1. In this movement the needle passes through the loop of yarn which travels along the bevelled portion 3 to a point such that the tongue can pass through the loop of yarn when the tongue again moves forward with respect to the needle. It is to be particularly noted that the yarn in passing from the hook 6 to the bevelled portion 3 does not travel over any transverse joint between the two parts of the needle but remains always embracing the tubular member, or, more precisely, the integral extension 4 thereof and the strip 5. Subsequently, of course, the loop of yarn is cast off when the needle recedes to draw a new loop of yarn and when the tip 7 of the tongue 2 has been advanced to the position shown in Figure 1 with respect to the needle.

In manufacturing the needle shown in the figures, the tubular member 1 is first secured to the strip 5 by brazing in a reducing or neutral atmosphere before the bevelled portion 3 and extension 4 are formed. The bevelled portion 3 and extension 4 are then formed so that the front end of the strip 5 corresponds to the extension and terminates at the tip thereof. The extension and the adjacent part of the strip 5 are then formed to the shape required for the hook. If the extension is initially the length required, this shaping process may be effected by grinding, but preferably a swaging process is employed which causes the extension and the adjacent portion of the strip to become longer and narrower, the final form being as shown in the drawing where a tapered part extending from the bevelled portion 3 merges into a pin of circular cross-section to be bent into the shape required for the hook 6. After being formed to the required shape, the tapered part is bent back at 8 (Figure 1) so that the tip 9 of the hook lies in the required position with respect to the path of the tongue 2. As shown in Figure 2, the top 10 of the strip 5 is concave to fit the tubular member 1 but, if desired, the outer surface of the tubular member may be flattened to engage a strip with a corresponding flat surface.

By way of example, it may be mentioned that in a 28 gauge needle designed in accordance with the invention for a warp knitting machine (that is a needle for a row containing 28 needles to the inch) the dimension A in Fig. 1 is 0.018 inch, the dimension B in Figure 1 is 0.010 inch, and the dimension C in Figure 3 is 0.020 inch. The overall length of this needle is 1.844 inches. The needle may be made of carbon steel, in which case the usual heat treatment for such material is necessary. The associated tongue may be made of stainless steel or the metal known as K Monel, phosphor bronze or other metal having suitable wearing properties. Alternatively, the needle may be made of stainless steel and furnished with a K Monel or analogous tongue.

Although the invention is particularly suitable for warp knitting machines, it may also be applied to other forms of knitting machines. Thus, the needles may be separately mounted in tricks and formed with butts to be acted upon by cams. The associated tongues would also be furnished with butts to be acted upon by further cams.

I claim:

1. A machine knitting needle comprising a member providing a tubular guide for a tongue and formed at one end with a bevelled portion terminating in an integral extension, and a strip permanently secured along the tubular member and along the extension thereof, the extension and the adjacent portion of said strip being formed into the shape of a hook.

2. A machine knitting needle comprising a member providing a tubular guide for a tongue and formed at one end with a bevelled portion terminating in an integral extension formed with a hook, and a stiffening strip permanently secured along the outer circumference of the hook, along the bevelled portion and along the tubular guide.

3. A machine knitting needle comprising a member providing a tubular guide for a tongue and formed at one end with a bevelled portion terminating in an integral extension, and a strip permanently secured along the tubular member and substantially along the whole of the extension, the extension and the adjacent portion of said strip being formed into a tapered portion terminating in a pin, of substantially circular cross-section, bent to the shape of a hook.

4. A machine knitting needle comprising a member providing a tubular guide for a tongue and formed at one end with a bevelled portion terminating in an integral extension, and a strip permanently secured along the tubular member and along the extension thereof, the extension and the adjacent portion of said strip being formed into the shape of a hook having its tip in alignment with the axis of the said tubular guide and the portion of the hook opposite the said tip offset to the side of the main body of said strip remote from said axis.

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