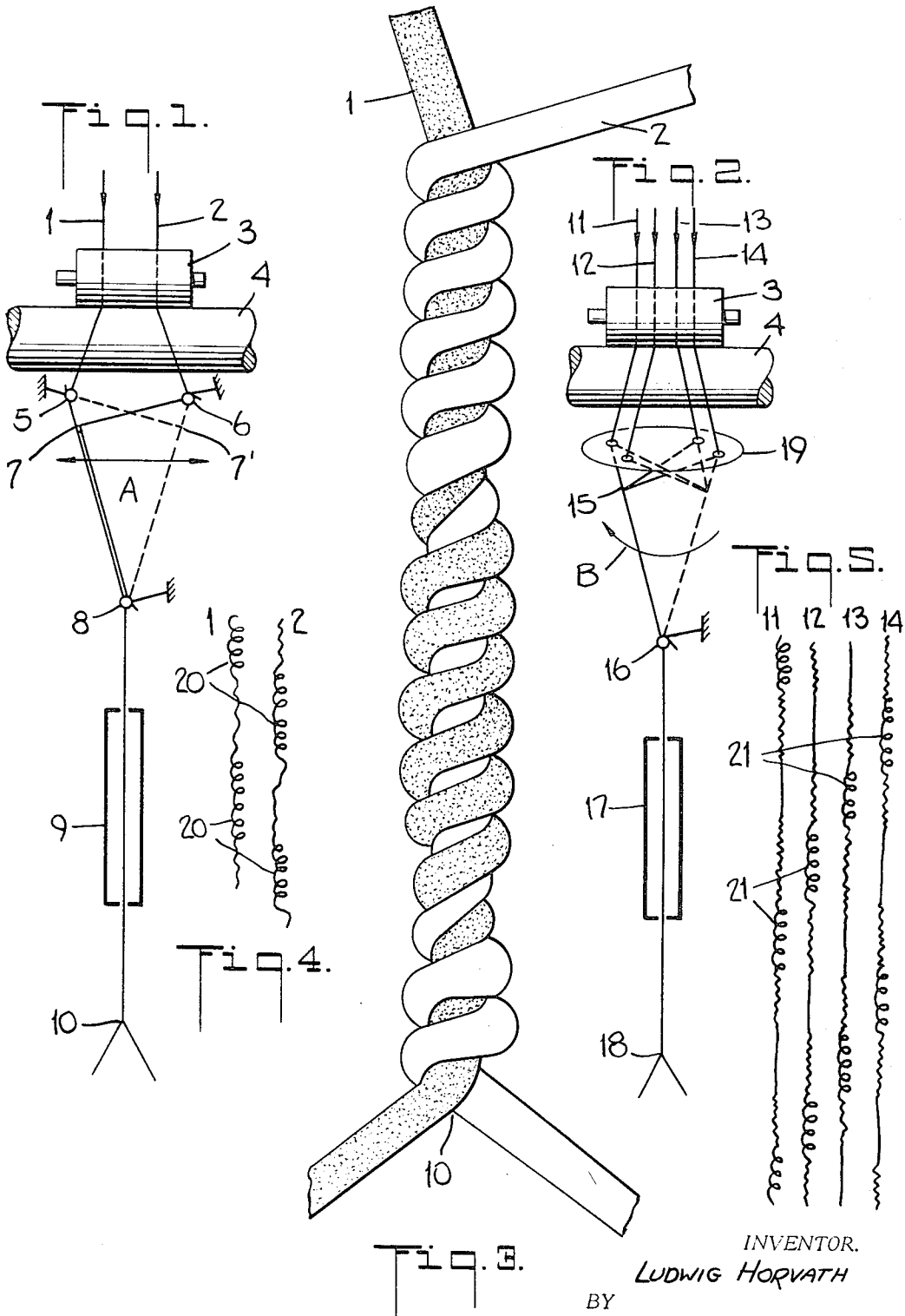


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METHOD AND APPARATUS FOR MANUFACTURE OF  
SLUB-CONTAINING TEXTURED YARNS  
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## METHOD AND APPARATUS FOR MANUFACTURE OF SLUB-CONTAINING TEXTURED YARNS

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### ABSTRACT OF THE DISCLOSURE

Process and apparatus for the manufacture of slub-containing yarns comprising first temporarily high-twisting a number of yarns together, heat-setting the yarns while in the highly twisted condition and separating the yarns, wherein the yarns are passed through spaced-apart guide means ahead of the point of juncture and the ratio of the distance between the guide means to the distance from the plane of the guide means to the juncture point is of the order of 1:1 to 5:1, and product obtained thereby.

This invention relates to a method and apparatus for imparting slubs to textile yarns.

It is known to manufacture elastic textile yarns by temporarily highly-twisting thermoplastic multifilament yarns by means of false-twisting and heat setting same while in the highly-twisted state. Furthermore, processes are known by which several monofilament or multifilament yarns are temporarily highly-twisted together by a false-twist device and are heat set in the highly-twisted state, after which the back-twisted yarns are separated.

I have now shown that by a novel adaptation of this system, and the observance of certain conditions, I can produce a slub-containing textured synthetic yarn which contributes interesting and desirable novel effects in fabrics knitted or woven therefrom.

Accordingly, my invention comprises a process and apparatus for the manufacture of slub-containing textured yarns by first leading a number of yarns individually through a feeding device, thence through yarn guiding means which maintains the yarns apart, and finally to a point of juncture or joining point. The joined yarns are then mutually highly-twisted and the mechanical deformations thus formed are set whilst in the highly-twisted state. The yarn guiding means may consist of a separate guiding member such as a guide ring for each individual yarn, or a single member such as a plate having a number of bearing openings corresponding to the number of individual yarn ends being treated, may be used.

The process according to the invention may utilize the customary well-known false-twisting device, or the so-called "spindle-less" process, wherein two or more yarns being unwound from spools are mutually ply-twisted with each other, subjected to heat-setting in this state and again separated by continuously separating and winding them on spools.

The process according to the invention is especially suitable for texturing of endless threads or thread bundles respectively, as well as of staple fiber yarns of thermoplastic material, especially of polyamides (polyhexamethylene-adipamide, condensates of epsilon-aminocaproic acid or 11-aminoundecanoic acid), polyesters (polyethylene glycol terephthalate), materials on a vinyl basis (polyacrylonitrile) or polyolefines, furthermore, cellulose acetate, as well as mixed spun yarns of thermoplastic fibers and non-thermoplastic natural fibers.

There has thus been outlined rather broadly the more important features of the invention in order that the

detailed description thereof that follows may be better understood, and in order that the present contribution to the art may be better appreciated. There are, of course, additional features of the invention that will be described hereinafter and which will form the subject of the claims appended hereto. Those skilled in the art will appreciate that the conception upon which this disclosure is based may readily be utilized as a basis for the designing of other structures for carrying out the several purposes of the invention. It is important, therefore, that the claims be regarded as including such equivalent construction as do not depart from the spirit and scope of the invention.

A specific embodiment of the invention has been chosen for purpose of illustration and description, and is shown in the accompanying drawings, forming a part of the specification wherein:

FIG. 1 is a diagrammatic elevation of apparatus for formation of slubs by ply-twisting two yarns, according to the invention;

FIG. 2 is similar to FIG. 1 but illustrates apparatus for ply-twisting four yarns;

FIG. 3 is an enlarged view of the yarn as plied by the apparatus of FIG. 1; and

FIGS. 4 and 5 illustrate the individual yarns of FIGS. 1 and 2, respectively, after separation.

Referring to FIG. 1, yarns 1 and 2 emanate from a source (not shown) and are fed downwardly, as viewed, by forwarding or feed rollers 3, 4. The yarns then pass through thread guides 5, 6 respectively, after which they come together at a point of juncture 7 and are ply-twisted. The yarns, in their ply-twisted state, then pass through a heater 9 where they are heat set and arrive at a separation point 10 at which they are drawn apart.

In the present embodiment, the yarns 1 and 2 are spaced apart approximately 1 cm. while the rings 5 and 6 are 18 mm. apart and the point 7 of the order of 6 mm. from the plane in which the rings 5 and 6 lie. The ratio of the distance of 18 mm. between guide rings and the 6 mm. distance between point 7 and the plane of the rings 5 and 6 is 3:1 and thus falls within the preferred ratio of up to 5:1. It will be appreciated that the yarn guides may be constructed for adjustment to any desired position so as to achieve the optimum ratio.

As a result of differences in the tensions occurring in the yarn and differences in the way the yarns are twisted together, the point 7 moves constantly back and forth between positions 7 and 7', as indicated by the double arrow A. As an effect of this, one of the yarns, say the yarn 1, is rotated about its own axis and is enwrapped by yarn 2 until a certain amount of windings are obtained, whence the yarns change their respective positions and the yarn 2 is rotated about its axis and yarn 1 is wound on same until again a change of position takes place. Thereafter, the alternating cycle continues and the plied yarn according to FIG. 3 is produced.

As stated, the plied yarn passes through a yarn guide 8 and is heat set in the heater 9 and separated at 10, after which the individual yarns are found to appear as shown in FIG. 4 presenting slubs 20 of medium size.

Turning now to FIG. 2, four individual yarns 11, 12, 13 and 14 are shown being advanced as indicated by the arrows through rollers 3, 4 at a distance of approximately 3 mm. from one another, and thence through eyes of a guide plate 19, the eyes defining corners of a square, the sides of which are 14 mm. long. Any polygon may be used depending upon the number of yarns, which number will correspond with the number of corners of the polygon. The yarns come together at a point of juncture 15 and are then ply-twisted, the point 15 being located about 7 mm. from the surface of plate 19. The ratio of the distance between adjacent eyes in plate 19 and the distance be-

tween the plate 19 and the point 15, i.e. 2:1, is optimal and again is within the preferred ratio of up to 5:1.

In the embodiment of FIG. 2, the differences in tension and numbers of turns of the yarns causes a torsional force which causes the point 15 to rotate as indicated by the arrow B. During this process only one yarn is twisted about its own axis while the other yarns are wound on the one until a change of position occurs and the next yarn, in the direction of the arrow B, rotates about its axis while the remaining yarns are wound about same, and so on, each yarn consecutively rotating on its axis while the others are wound upon it. At any point therefore, the outermost of the plied yarns forms a slub while the two yarns between the outermost yarn and the core yarn do not at that point form slubs. The thus plied yarn then passes through a yarn guide 16, heating device 17 and reaches separation point 18 where the individual yarns are separated. The individual yarns present an appearance as shown in FIG. 5 with medium-size slubs 21.

From the foregoing description it will be seen that I contribute novel method and apparatus for forming slubs in textured textile yarns; and knitted and woven fabrics have actually been produced from the yarns made according to my invention which demonstrate a marked similarity to textile fabrics produced from natural fibers with respect to hand and appearance.

I believe that the construction of my novel apparatus and the practise of my method will be understood and that the advantages of my contribution will be appreciated by those persons skilled in the art.

I now claim:

1. Apparatus for the manufacture of slub-containing textured textile yarns comprising, means feeding a plurality of yarns, means for temporarily highly twisting said yarns together, means setting said yarns while in the highly twisted state, means separating said yarns from one another, and yarn guide means positioned between the feeding means and the setting means, said yarn guide means comprising a first fixed yarn guide between the point of juncture of the yarns and said setting means and a plurality of further yarn guides displaced from one another in a plane transverse to the travelling direction of the yarns between the point of juncture of the yarns and the feed means, said yarn guide means being constructed to permit freedom of movement of said point of juncture in a direction transverse to the travelling direction of the yarns.

2. Apparatus according to claim 1 characterized in that said further yarn guides are adjustable in said plane relative to each other.

3. Apparatus according to claim 1 characterized in that the yarn guide means is formed with a plurality of thread guide openings arranged in a plane transverse to the travelling direction of the yarns, said thread guide openings being arranged to define the corners of a polygon lying in said plane.

4. Apparatus according to claim 1, characterized in that the yarn guide means is a plate formed with a number of thread guiding openings positioned to define the corners of a polygon.

5. Method of manufacturing slub-containing textured textile yarns by temporarily highly twisting a number of yarns together, heat-setting same while in the highly twisted condition, and separating the individual yarns, characterized by passing the individual yarns respectively through first and second individual yarn guide means upstream of the point of juncture of the yarns and thence through a third common yarn guide means downstream of the point of juncture of the yarns and maintaining said first and second yarn guide means displaced from each other by a first distance in a direction transverse to the direction of yarn movement while allowing free movement of said point of juncture also in a direction transverse to the direction of yarn movement, and maintaining said juncture at a second distance from a plane containing said first and second guide means, the ratio of said first distance and said second distance being of the order of 1:1 to 5:1.

6. Method according to claim 5, further characterized in that said ratio is 2:1.

7. Textured slub-containing yarn produced according to the process of claim 5.

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