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TEXTILE TAPE AND METHOD OF FORMING SAME

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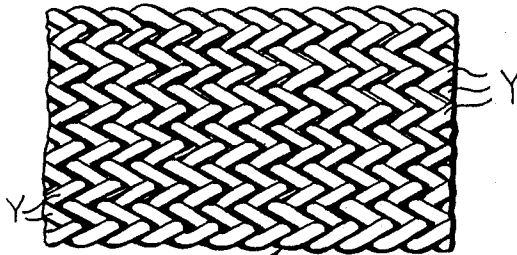


FIG-1

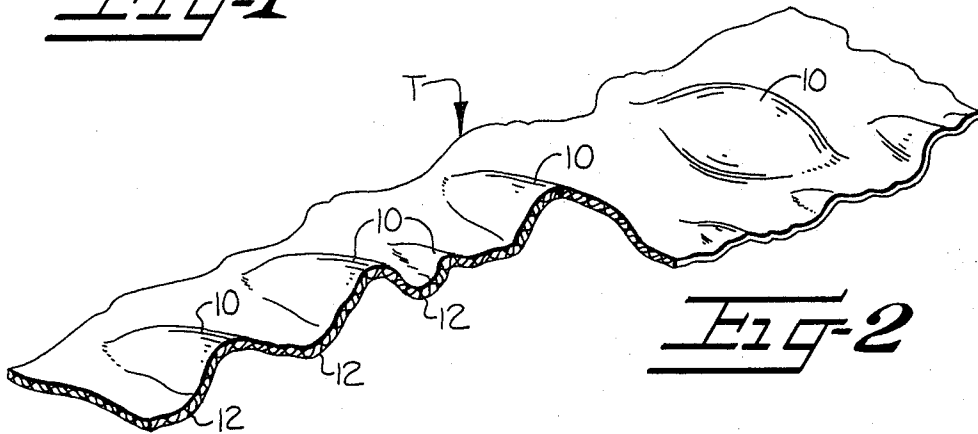


FIG-2

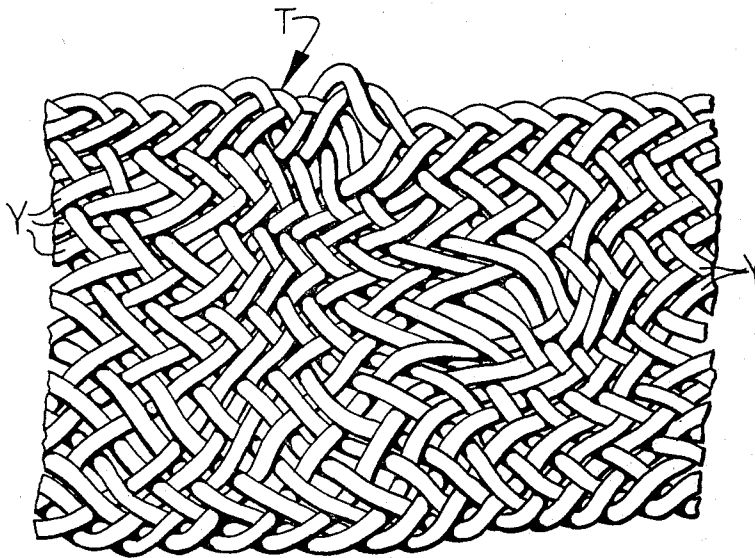


FIG-3

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**TEXTILE TAPE AND METHOD OF FORMING SAME**

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6 Claims

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This invention relates generally to a crinkled textile tape and more particularly to a crinkled textile tape and method of forming the same wherein the tape has substantial stretchability and recoverability, as well as increased bulk.

It is another object of the present invention to provide a crinkled textile tape of the type described which is suitable for use as a knitting yarn, such as for example in the hand knitting of sweaters or ladies' dresses.

It is another object of the present invention to provide a crinkled textile tape of the type described wherein the crinkled tape has randomly disposed and irregularly raised and depressed areas that impart substantial stretchability and recoverability thereto.

It is still another object of the present invention to provide a method of forming a crimped textile tape which may be economically carried out on a conventional stuffer crimping box.

In a preferred embodiment of the present invention, the crinkled textile tape is formed of a plurality of braided ends of thermoplastic yarn that are interwoven and extend in a sinuous path from one side of the tape and the randomly disposed and irregularly raised and depressed areas are heat-set therein. The braided tape is preferably very narrow, about 1/8 to 1/4 of an inch wide, and after the crimping operation the crimped tape is about twice as wide.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds, when taken in connection with the accompanying drawings, in which—

FIGURE 1 is a fragmentary plan view of the textile braided tape illustrating the manner in which the ends of thermoplastic yarn are interwoven and extend in a sinuous path from one side of the tape to the other;

FIGURE 2 is a fragmentary isometric view of a portion of the crimped tape with a longitudinal portion broken away to illustrate the randomly disposed and irregularly raised and depressed areas of the tape; and

FIGURE 3 is an enlarged fragmentary plan view of the crimped tape illustrating the distortion and separation of the interwoven braided ends.

The textile tape, broadly indicated at T in FIGURE 1, is initially formed about 1/8" to 1/4" wide and may be formed in any desired manner, such as by knitting, weaving or braiding. As shown in FIGURE 1, the tape is preferably braided with a plurality of thermoplastic yarn ends Y that successively extend from one side to the other and define connected and interwoven or interlaced transverse rows. The yarn ends Y pass over and under each other in what may be termed a 2 x 2 manner. The thermoplastic yarns are preferably multifilament nylon or multifilament polyester, and while the tape is shown as being a flat tape having substantially straight side edges, it is to be understood that the tape could be a flat tube or it may be braided in such a manner that the side edges are irregular, in the manner of rickrack. If desired, the textile tape may be dyed before it is textured.

After the tape T is formed, it is fed into the confined chamber of a stuffer crimping box where it is folded upon itself and packed therein. The stuffer box crimping

chamber is usually heated to set the tape in the crimped or packed condition. The tape is withdrawn from the chamber under a light tension and wound onto a take-up package.

There are several different types of commercially available stuffer crimping boxes which may be utilized, such as that shown in the U.S. Patent No. 2,758,357. While some slight modification may be necessary to feed the tape into and remove the same from the stuffer crimping box, it will not normally be necessary to otherwise modify the stuffer crimping box.

As the tape T is removed from the stuffer crimping box, it has randomly disposed and irregularly raised areas, such as that indicated at 10 in FIGURE 2, and depressed areas 12 formed therein. The raised and depressed areas cause the tape T to crinkle and provide substantial stretchability and recoverability thereto. For example, a relaxed six inch length of the crinkled tape will stretch to about nine inches or about 50 percent of its relaxed length. When the stretched tape is relaxed, it will quickly return to substantially its original length.

The crinkled tape T also has increased bulk and, as best shown in FIGURE 3, the individual yarn ends separate from each other after the crimping operation to increase the width of the tape substantially. In relaxed condition the crimped tape is about two times as wide as the original tape before the crimping process. When the crimped tape is stretched longitudinally to substantially its limit of stretchability, the interwoven yarn ends Y are drawn close together and the width of the tape reduces again to substantially its original braided width while the raised and depressed areas 10, 12 flatten out and substantially disappear.

The tape T may be formed wider than the preferred 1/4"; however, the conventional stuffer crimping box would then have to be modified to accommodate the wider tape. Also, wider crimped tapes would be harder to use as knitting and weaving yarns.

As shown in FIGURE 3, the yarns Y of the crimped tape T are separated slightly and their transverse path of travel back and forth across the tape is distorted. Although it is not apparent in FIGURE 3, the yarns are also distorted in a perpendicular plane in the raised and depressed areas. These distorted yarns are heat-set in this condition and straighten out when the tape is stretched longitudinally and have a strong tendency to immediately return to the distorted heat-set condition when the tape is relaxed.

As illustrative but non-limiting examples, it has been found that a satisfactory tape may be braided with 34 ends of 100 denier multifilament nylon to form a tape 1/8" wide. Also, a tape 1/4" wide can be satisfactorily braided of 74 ends of 100 denier multifilament nylon.

The novelty crimped tape produced in accordance with the present invention may be used in the hand or machine knitting of ladies' dresses and sweaters or it may be utilized in weaving.

In the drawings and specification there has been set forth a preferred embodiment of the invention and, although specific terms are employed, they are used in a generic and descriptive sense only.

**I claim:**

1. An elongate, narrow textile tape characterized by increased bulk and substantial stretchability and recoverability and comprising a plurality of thermoplastic yarn ends successively extending from one side of the tape to the other in a sinuous path and being braided together, said tape being crinkled and having randomly disposed and irregularly raised and depressed areas heat-set therein, said raised and depressed areas imparting substantial stretchability and recoverability to said tape, and said tape being substantially straight and flat and being within

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the range of about  $\frac{1}{8}$ " to  $\frac{1}{4}$ " wide when extended to substantially its limit of stretchability, but returning to its crinkled condition when relaxed.

2. A crinkled textile tape according to claim 1 wherein said tape is stretchable about 50 percent of its relaxed length.

3. A crinkled textile tape according to claim 2 wherein said tape is about two times as wide in its relaxed condition as it is in its stretched condition.

4. A method of forming an elongate, narrow, crinkled textile tape characterized by increased bulk and substantial stretchability and recoverability, said method comprising the steps of braiding a plurality of yarn ends while forming the tape about  $\frac{1}{8}$ " to  $\frac{1}{4}$ " wide, feeding the tape into a confined area and randomly folding the tape upon itself and forming randomly disposed and irregularly raised and depressed areas therein, setting the folded and confined tape to set the raised and depressed areas therein, and withdrawing the crinkled tape from the confined area.

5. A method of forming an elongate, narrow, crinkled textile tape characterized by increased bulk and substantial stretchability and recoverability, said method comprising the steps of braiding a plurality of ends of thermoplastic yarn while forming the tape about  $\frac{1}{8}$ " to  $\frac{1}{4}$ " wide, feeding the tape into a confined area and randomly folding the tape upon itself and forming randomly disposed and irregularly raised and depressed areas therein, heating the folded and confined tape to set the raised and depressed areas therein, and withdrawing the crinkled tape from the confined area.

6. A method of forming an elongate, narrow textile tape characterized by increased bulk and substantial stretchability and recoverability, said method comprising

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the steps of braiding a plurality of thermoplastic yarn ends and forming a substantially flat, narrow textile tape therefrom, feeding the tape into a confined area and forming randomly disposed and irregularly raised and depressed areas in the tape, and heat-setting the randomly disposed and irregularly raised and depressed areas in the tape to crinkle the tape and impart substantial stretchability and recoverability thereto, the tape assuming a substantially straight and flat condition when extended to substantially its limit of stretchability, but returning to its crinkled condition when relaxed.

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JOHN PETRAKES, *Primary Examiner*.

U.S. Cl. X.R.

28—72; 87—8, 11; 161—73, 128; 264—324