ABSTRACT OF THE DISCLOSURE

A first open ended cylindrical tube is rotatably mounted in an inclined position to receive an article in strip form from a knitting machine. Decorative yarn is stitched with an elastic pillar in a strip having purs or loops projecting essentially from one side of the pillar only. The strip passes from the knitting machine into the inclined rotating tube which includes a friction surface. The friction surface acts upon the strip, imparting a uniform helical twist to the strip such that the purs or loops appear to project radially from the longitudinal axis of the strip. A second rotating tube is located below the first tube and receives the helical strip from the first tube.

BACKGROUND OF INVENTION

This invention relates to a decorative article which may be used for a variety of purposes such as trimming for various fabrics, millinery, or other decorations, and to the manufacture of such articles.

SUMMARY OF INVENTION

It is an object of this invention to provide a decorative trim strip, and, furthermore, to provide simple and effective manufacture of such a strip.

For the achievement of these and other objects, this invention proposes machine stitching a series of purs or loops into a generally resilient elongated strip and imparting a uniform twist to the strip as it leaves the stitching mechanism. More specifically, a decorative yarn is stitched with an elastic pillar such that the yarn projects essentially from one side only of the stitches included in the pillar in the form of purs or loops and is then passed into means for imparting a uniform helical twist to the stitches. Preferably, the elastic pillar is in a state of tension as it is stitched with the yarn and will, upon release from the stitching mechanism, tend to gather the stitches of the strip from which the loops project.

The twist imparting means may take the form of a tube having opposite open ends and rotatably mounted at an inclined angle adjacent the stitching mechanism. This tube includes an inner frictional surface which engages the strip as it is fed into the tube. Friction between the frictional surface and strip, caused by the weight of the strip and the rotation of the tube, imparts a uniform helical twist to the strip.

It is further contemplated that a receiver having at least one open end can be rotatably mounted beneath the lower end of the tube such that the strip exits the lower end of the tube it passes into the rotating receiver. The receiver engages the strip and rotates at a speed approximately equal to that of the tube. The receiver stores the strip in a continuous length and, by virtue of its rotation, does so while preventing the disorientation of the strip in a uniform helical twist imparted to the strip by the tube.

In the finished strip the purs or loops, although projecting essentially from one side only of the elastic pillar, have the appearance of projecting radially on all sides of an elongated central pillar or, more generally, from the longitudinal axis of the strip. The strip is expandable longitudinally and is resilient so that it will return to a compact helical configuration when any such force is released.

Other objects and advantages will be pointed out in, or be apparent from, the description and claims, as will obvious modifications of the single embodiment shown in the drawings.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view showing the apparatus proposed by this invention; and

FIG. 2 is a perspective view of the strip trim proposed by this invention showing the article in its final helical state and also with a portion thereof developed to better illustrate the structural makeup of the strip.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The article resulting from the practice of this invention will have general application as a decorative trim, but will probably find particular application as a decoration for hats such as knitted children's caps.

Trim strip 10 proposed by this invention is shown in FIG. 2 and is comprised of an elastic pillar 20 and a decorative yarn 22. It will be appreciated that yarn of any variety or color can be used in connection with various types of elastic pillars. As will be described more completely hereinafter, yarn 22 is machine stitched with the elastic pillar 20 by means of a machine 32 which uses a shell or crochet stitch. The stitch is such that a series of purs or loops 24 project from one side of a stitch body 25 which contains pillar 20. This structure is illustrated by portion 26 which has been developed as a straight section for illustrative purposes.

Referring now to FIG. 1, trim machine 30 proposed by this invention comprises a combination of a crocheting machine 32 and a twist imparting mechanism 34.

The crocheting machine 32 is not shown in detail as the details of the machine are not necessary to an understanding of this invention. It is sufficient to an understanding of the invention to appreciate that two threads such as decorative yarn 22 and elastic pillar 20 are fed to crocheting assembly 33 where they are machine stitched together. The crochet stitch is such that the decorative yarn 22 projects in a series of loops 24 essentially from the side of body 25 as shown in FIG. 2 generally at 26. Furthermore, the crocheting machine 32 is effective to stitch pillar 20 into body 25 under tension, or in a stretched condition, so that when the stitched strip is released from the crocheting head the pillar contracts toward its natural condition and gathers body 25. Loops 24 and body 25 are shown to be a uniform straight strip in FIG. 2 at 26 for purposes of illustration; however, in reality, if the stitched strip is left to pass freely and undirected from the crocheting head the strip will evolve from the machine in a random, disorganized, twisted shape. This invention is concerned with the problem of preventing this random twist and imparting a desired uniform configuration to the strip to render it more suitable as a trim strip.

After the article is processed in the manner proposed by this invention, which will currently be explained, the trim strip 10 of this invention will appear as shown generally at 28 in FIG. 2, that is, as an elongated, expandable, resilient article having a permanent uniform helical twist such that loops 24 appear to project radially from the longitudinal axis of the strip as shown in FIG. 2.

The machine and method of the proposed invention impart a uniform helical twist to the strip. The elastic pillar 20 in contracting acts to fix the helical twist and thereby results in a strip having the uniform helical configuration.

Structurally, the twist imparting mechanism generally shown at 34 comprises a cylindrical tube 36 having two
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open ends 38 and 40. Preferably, the inner diameter 42 of the tube is large with respect to the diameter of the trim strip. The tube 36 is mounted on a support base 44 and is supported by rollers 46 and 48 which are disposed on support base 44. In addition to the two rollers 46 on the exposed side of the tube in FIG. 1, two similarly arranged rollers are provided on the opposite side of the tube, one of which is partially visible in the drawing. Rollers 46 and 48 engage diametrically opposite sides of cylinder 36 so that the cylinder is held between the rollers. Rollers 46 are directly connected to base 44 and roller 48 is connected to a support arm 50 attached to support base 44 and extends to the upper side of the cylinder. The tube 36 is rotated by means of a first motor 52 operatively engaged with a pulley 54. Drive belt 56 extends from pulley 54 and directly encircles cylinder 36 on its outer surface 60. Preferably belt 56 is disposed in the area of roller 48 which assists in preventing belt 56 from wandering along the outer surface 60 of tube 36 thus preventing any possibility of binding in the system. Also, a circumferential flange 58 is disposed above the lower rollers 46 and is engaged by the rollers to insure vertical orientation of the tube. Motor 52 is preferably associated with an infinitely variable speed control (not shown) so that the rotational speed of the motor can be precisely varied thereby allowing control of the rotational speed of the tube 36.

The interior of tube 36 is provided with a frictional surface which, as illustrated, comprises friction strips 62 spaced circumferentially along the inner surface 64 of the tube. Friction strips 62 may be any convenient friction material such as felt, the choice determined at least in part by yarn 22. The arrangement of alternate friction strips and open spaces is preferred as it results in periodic engagement of the trim strip by the friction strip with some impact.

Preferably tube 36 is disposed at an inclined angle with respect to crocheting machine 32 such that as the trim is fed into the upper end 38 of tube 36, the weight of trim strip 10 will keep the trim in engagement with the lower portion of inner surface 64 of tube 36 and cause the trim to travel freely through the tube and out of the lower end 40 of the tube.

The weight of the trim strip thus maintains engagement between the strip and tube and due to the frictional engagement between strips 62 and trim strip 10, rotation of tube 36 imparts a uniform helical twist to trim strip 10. Additionally, a helical twist is imparted to the stitched body 25 as it leaves the stitching assembly, the body then carrying the loops in series of uniform convolutions. Thus as the yarn and pillar are stitched together, instead of there being disorganized random twisting of the strip, feeding the trim strip 10 into the rotating tube 36 controls the configuration of the strip and a uniform helical twist results. The effect of the helical twist, is to give the trim strip 10 the characteristic or appearance that loops 24 appear to project radially from all sides of the longitudinal axis of the strip as shown in FIG. 2 at 28. Also, the tightness or frequency of the helical twist can be varied by controlling the speed of motor 52. The resulting strip can be cut into desired lengths and attached, for example, to a child's hat as one or more tassels or braids.

The trim strip 10 may be cut, either manually or by machine, into desired lengths as it exits the tube 36 to prevent the trim from unwinding itself into a random, disoriented configuration. Preferably, tube 36 has a substantial axial length of the trim strip and insures positive rotation of the trim strip, for example tube 36 should be of a length equal to or greater than the desired length of the particular strip.

As an alternative to cutting the strip at the exit end of the tube, a second cylindrical tube 66 is disposed vertically beneath the lower exit end 40 of tube 36. Tube 66 has an open end 68 and a closed end 70 such that trim strip 10, as it exits tube 36, can be fed directly into tube 66. Tube 66 is likewise rotatably mounted and is structurally similar to tube 36. Tube 66 is supported on platform 71, which closes end 70 and is capable of rotation about its axis by a motor 72 and carries platform 71 with it.

Cylinder 66 also includes friction strips 76, which are spaced circumferentially along the inner surface of tube 66, and the interaction between friction strips 76 and trim strip 10 is similar to that described with relation to tube 36. Preferably, motor 72 also has infinitely variable speed control which allows control over the rotational speed of tube 66 and it is preferred that tube 66 rotate at approximately the same speed as tube 36. In this fashion, tube 66 acts as a storage receiver for trim strip 10 as it is fed through tube 36 and permits manufacture of trim strip 10 in a continuous length with the rotation of tube 66 preventing loss of the helical twist imparted to strip 10 by cylindrical tube 36. The trim strip can later be cut in desired lengths.

The effect of the proposed invention is to provide a new article of manufacture by subjecting two elements to machine stitching and then controlling the manner in which the elements leave the stitching means. The article can be inexpensive mass produced and has an appealing appearance. In addition, due to its expandable, resilient features it can be stretched to separate adjacent convolutions and the adjacent convolutions will snap back to a compact form upon release.

Although the present invention has been disclosed in connection with a particular embodiment thereof, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

I claim:
1. A trim machine comprising the combination of:
   means for stitching a decorative yarn with an elastic pillar in an elongated strip having a stitched body including said pillar and loops projecting from said body, and
   twist means adjacent said stitching means for receiving said strip from said stitching means and for rotating said strip to impart a preselected helical twist to said strip whereby the loops appear to project radially from the longitudinal axis of said helical strip.
2. The trim machine of claim 1 wherein said stitching means is operative to stitch said pillar with said yarn under tension so that when released from said stitching mechanism said pillar gathers said stitched body.
3. The trim machine of claim 1 wherein said twist means comprises:
   a first tube having an open end and arranged with said open end facing toward said stitching means, so that said strip is received into said first tube through said open end,
   first drive means connected to and operative to rotate said first tube, and
   means within said tube and engageable with said strip as said strip is received in said tube to rotate said strip as said tube rotates and thereby impart said helical twist to said strip.
4. The trim machine according to claim 3 wherein:
   said first tube has spaced circumferential roller ends arranged at an inclined angle to the horizontal with the upper end facing said stitching means to receive said strip, and
   wherein said means within said first tube comprises:
   first friction means on the inside surface of said first tube.
5. The trim machine according to claim 4 wherein said first friction means includes a plurality of friction strips extending generally in an axial direction along the longitudinal axis of said first tube and spaced circumferentially around the inner surface of said tube.
6. The machine according to claim 4 wherein said first drive means is characterized by having a controllable
variable rotational speed so that the rotational speed of said first tube can be varied to vary the frequency of the helical twist imparted to said strip.

7. The trim machine according to claim 3: wherein said first tube includes relatively spaced first and second open ends, said first open end facing said stitching means,
a second tube having at least one open end spaced beneath the second open end of said first tube so that as said strip leaves said first tube it is received into said second tube, and
second drive means connected to and operative to rotate said second tube.

8. The trim machine of claim 7 including means within said second tube engageable with said strip to rotate said strip with said second tube so that the helical twist imparted to said strip in said first tube is retained.

9. The trim machine according to claim 8 wherein said first and second drive means are characterized by having a controllable variable rotational speed so that the rotational speeds of said first and second tubes are variable.

10. A trim machine comprising the combination of:
a machine for stitching a decorative yarn with an elastic pillar in elongated strips having a stitched body including said pillar and loops projecting generally on one side of said body,
a first cylindrical tube having first and second relatively spaced open ends, said first open end facing said stitching machine to receive said strip and said first tube mounted at an inclined angle to and sloping downwardly from stitching machine,
first drive means connected to and operative to rotate said first tube,
a first friction means on the inside surface of said first tube engageable with said strip as it is received in said first tube, friction between said friction means and said strip causing said strip to rotate with said first tube to impart a helical twist to said strip,
a second cylindrical tube having one open end spaced beneath the second open end of said first tube,
second drive means connected to and operative to rotate said second tube, and
means inside of said second tube and engageable with said strip as it is received into said second tube to rotate said strip with said second tube to retain said helical twist.

11. The trim machine according to claim 10 wherein said stitching machine is operative to stitch said pillar with said yarn under tension so that when released from said stitching mechanism said pillar gathers said stitched body.

12. A trim machine comprising the combination of:
means for joining an elongated pillar to a decorative member, and
means for imparting a helical twist to said elongated pillar and decorative member as joined by said first mentioned means to thereby impart a preselected configuration to said pillar and decorative member.

13. The method of manufacturing a trim strip comprising the steps of:
stitching, in a stitching assembly, a decorative yarn with an elastic pillar in a continuous strip having a stitched body including said pillar and also having loops of said yarn projecting from said stitched body, and
importing a helical twist to said strip as it leaves said stitching assembly.

14. The method of claim 13 wherein said elastic pillar is stitched with said yarn under tension to gather said stitched body as said body leaves said stitching assembly.

15. The method of claim 13 wherein:
said helical twist is imparted to said strip by feeding the strip from said stitching assembly to a first rotating cylindrical tube, and
feeding said strip as it leaves said first tube to a second rotating cylindrical tube rotating at approximately the same speed as said first cylindrical tube so that said strip is received into said second tube and the helical twist imparted by said first tube is retained in said second tube.

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ALFRED R. GUEST, Primary Examiner
U.S. Cl. X.R.