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APPARATUS FOR AND METHOD OF MAKING VARIEGATED TWISTED CORD

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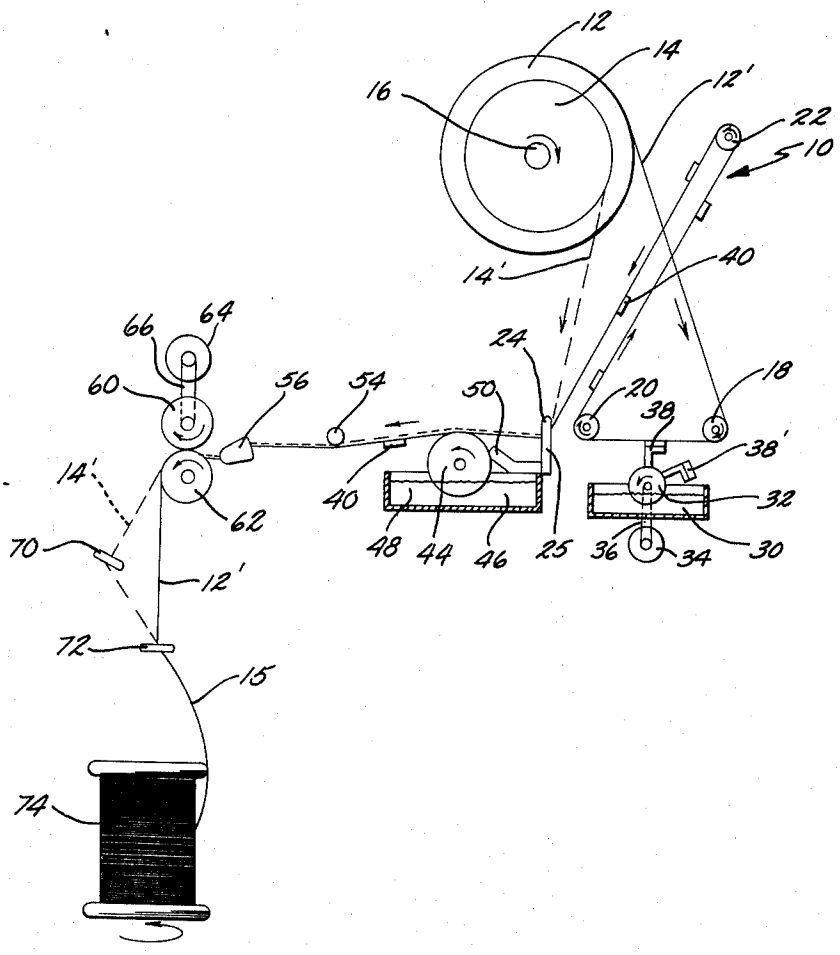

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APPARATUS FOR AND METHOD OF MAKING VARIEGATED TWISTED CORD

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This invention relates to twisted strand material, and more particularly to an inexpensive method and apparatus for forming twisted strands with variegated color effects.

Many woven products are currently formed from twisted strand material. Items such as automobile seat covers are often made of twisted paper strands woven into an open mesh, for example. Since such products must be priced relatively low in order to be commercially acceptable, efforts to provide varied color effects are definitely limited. Although several methods are known today for varying coloring effects on such products, these are not normally employed on this type of goods, except on high priced goods, since they require expensive procedures and equipment. Consequently, manufacturers and suppliers of this type of woven material cannot provide fabricators with bulk material that is economically priced and yet has widely varying color patterns.

It is therefore an object of this invention to provide a method and an apparatus for forming slub yarn of a variety of color effects, and moreover to do so at a relatively inexpensive cost.

It is another object of this invention to provide a method and apparatus for forming practically unlimited color variations by an extremely simple but effective technique, enabling even low-priced woven strand goods to have many attractive color variations. The number of patterns with even two strands is impressively large. With more than two strands, it is practically unlimited. Yet, conventional apparatus for forming twisted strands can be employed, with some modification, to achieve the novel results.

These and several other objects of this invention will become apparent upon studying this specification in conjunction with the drawing which is:

A side elevational view of the novel apparatus with the novel method of twisting being practiced thereon.

Basically, the inventive method and apparatus centers around the concept of achieving differential degrees of twisting between adjacent areas of each twisted strand. This differential occurs between zones of greater twist and intermediate zones of lesser twist. The zones of lesser twist occur during the twisting process because of the presence of a water repellent material at selected intervals along the ribbon to be twisted, which prevents the other dampened ribbon from twisting the same amount in these non-dampened zones.

Referring more specifically to the drawing, in the apparatus illustrated, the components include means for supporting pancakes of ribbon strand, means for applying a water repellent material such as paraffin wax to selected intermittent portions of one of the ribbons, means for dampening the strand, and means for twisting the ribbons together.

The pancakes of ribbon are illustrated, for example, as pancake **12** of a colored paper and pancake **14** of a white paper. Any selected colors may be utilized, as well as any number of ribbons. Two are shown for illustrative purposes. These are mounted upon a shaft **16** for rotation thereon. Each pancake is of conventional nature, up to about two feet in original diameter, and approximately one-quarter to three-quarters of an inch in width. This

may, of course, vary depending upon the type of material to be employed, the equipment and the use.

These ribbons are of a paper base for inexpensive products such as woven seat covers. They can be of a paper-cloth blend, or other similar materials in related aspects of the invention. The colored paper ribbon **12'** is pulled from its reel **12**, passes around a guide roller **18**, an adjacent guide roller **20**, a third guide roller **22** and through the guide loop **24**. The white paper **14'** is on the other hand, pulled directly from its pancake roll **14** to guide loop **24**, adjacent the colored ribbon.

Positoned intermediate the roller guides **18** and **20** for the colored ribbon is an applicator means for a repellent agent. This includes a vessel **30**, and a waxer wheel **32** rotatably mounted adjacent the top of the vessel. The wheel is driven by a motor **34** through a belt **36** or any other equivalent. Mounted upon this wheel is a plurality of a selected number of paddles **38** located at selected radial positions with respect to each other. In this example two paddles are shown adjacent each other.

When the paper base ribbon is to be treated with a water type softener, the vessel contains a molten paraffin wax at a temperature, for example, of approximately 200° F. As waxer wheel **32** revolves, the paddles dip into the molten wax and pass upwardly against one flat surface of ribbon **12'** to apply wax at selected intervals. Using the two closely spaced paddles, one interval is a few inches, and the next interval is a few inches, and the next interval is several inches. The larger interval or spacing occurs before the first paddle **38** again contacts the ribbon after the second paddle **38'** has passed.

Preferably, these paddles are circumferentially adjustable on the wheel to allow any selected spacing. Also, other paddles can be attached to enable any selected number of paddles to be employed.

Each paddle is normally of a substance such as sheet metal and has a flattened upper portion to contact the ribbon. Each carries enough soft paraffin to be applied to the ribbon, so that the paraffin penetrates and saturates that zone contacted.

As the ribbon passes on the outside of guide **20**, and then up around guide **22**, the wax deposits **40** (shown in exaggerated form) solidify. Preferably, strand **12'** is reverse twisted between guides **20** and **22** to assure movement of the wax deposits on the opposite side of the rollers. It is also reverse twisted between guide **22** and guide loop **24** of upstanding projection **25** to prevent the wax from being rubbed off with passage through this loop.

The two ribbons **14'** and **12'** are both passed continuously over a wetting roll **44** which continuously revolves and carries a water type wetting agent **46** from vessel **48** into contact with the strands. Preferably a slight amount of finely divided wax is added to this water vessel to form an emulsion. Paraffin wax has been found to be most effective protective agent repellent to the wetting or dampening agent, especially to water or water base substances. However, within the broader aspects of this invention other waxes such as carnauba wax, beeswax etc. could be employed, providing they are repellent to the wetting agent employed to decrease the resiliency of the ribbon, usually of paper base stock. Also, a synthetic plastic substance or related natural water repellent substances could be employed, e.g. a vinyl based polymer. The particular wetting or dampening agent can be varied also, to suit the particular ribbon stock in the manner desired. Sometimes it may be desirable to lessen the resiliency of the ribbon extensively, while other times it may be desirable to only partially decrease it. The selection of a particular protective agent for the ribbon material, and the particular wetting or dampening agent can be readily made by one having ordinary skill in the

art, merely with the use of a conventional handbook or by testing a couple of samples. A complete list here would be superfluous and almost without end and is believed unnecesasry once the principles are explained and the few materials preferred with respect to paper ribbons understood. A felt 50 may extend into contact with wheel 44 to regulate the amount of wetting fluid carried on its surface. It will be noted that the wax depoists 40 are positioned adjacent the wetting wheel as strip 12' passes it. Consequently, the dampening action occuring over the remainder of ribbon 12' and over the complete ribbon 14' does not occur at zones 40 of ribbon 12' where the paraffin material is present. The wax repels the water wetting agent to prevent saturation of the ribbon at this place. These portions of the ribbon therefore remain somewhat resilient to be biased to a flat condition rather than permanently assuming any shape imparted to it as the wetted areas do. The two ribbons then move past an alignment bar 54 and into the first twisting or folding eye 56.

This eye contracts the width of the ribbons by causing two or three folds. The folded strands are then passed through the pull out rolls 60 and 62 which are in contact with each other. It will be noted that these pull out rolls actually serve as the driving means for the ribbons through the entire process. They are driven by any siutable means such as motor 64 and drive belt 66. It will be realized that these motor and belt setups illustrated are simply to provide a complete disclosure. In actual operation, several of these ribbons or even several dozen are mounted side-by-side on a large apparatus and driven through suitable gearings from a common motor.

After the ribbons pass through these drive rolls, ribbon 14' moves through an offset eye 70 of conventional type, while ribbon 12' passes directly to the final twisting eye 72. Both pass through this final twisting eye and are twisted together into a strand. This offset eye and the final twisting eye are arranged with respect to a revolving wind-up reel 74 to cause the complete twisted strand to be wound on the reel.

The position of the offset eye 70 causes the colored paper 12' to wrap around the white paper, causing a wrap-around effect that makes the colored paper show up like a slub yarn. The dampened paper twists effectively in the areas between the waxed portions 40. However, at the waxed portions, since the colored paper is not dampened, the twisting action is substantially less because of the retained resiliency of the paper. Definite variations in color effects occur over the length of the strand because of this differential.

When a plurality of these strands are woven together, completely unusual and highly varied coloring effects are readily seen, to form a pleasing effect. It will be obvious to those having ordinary skill in the art that by varying the number of strands, and/or by varying the number of paddles 38 and 38', and/or by varying the positions of the paddles, and/or the number of strips to which wax is applied, the number of color variations on the twisted strand are almost limitless. Various additional advantages and objects will be apparent to those in the art. Certain minor structural modifications or changes in the method of approach can be made without departing from the concept of the invention as taught. Consequently this invention is to be limited only by the scope of the appended claims and the reasonably equivalent structures and methods to those defined therein.

We claim:

1. A method of twisting ribbon strips into a color variegated strand comprising the steps of: providing a plurality of ribbons of water-absorbing material of different colors; applying to areas of a least one of said strips a water repellent substance at spaced intervals; dampening said strips to lessen the resiliency thereof, except at said areas; and twisting said strips together, causing zones of greater twist in the water dampened portions and adjacent zones of lesser twist in the non-dampened more resilient portions.

2. A method of twisting paper base ribbon strips into a color variegated strand comprising the steps of: providing at least two paper base strips of different colors; applying a molten paraffin wax substance to spaced zones of at least one of said strips to saturate said zones; solidifying said wax; water dampening said strips except at said wax saturated zones; and twisting said strips, simultaneously forming areas of lesser twist at said spaced zones, and areas of greater twist between said spaced zones.

3. A method of twisting paper ribbon strips into a color variegated strand, comprising the steps of: providing at least two paper base strips of different colors; applying a water repellent wax substance to spaced zones of at least one of said strips; water dampening said strips except at said zones; and twisting said strips, simultaneously forming areas of lesser twist at said spaced zones, and areas of greater twist between said spaced zones.

4. Apparatus for forming color variegated twisted strand material comprising: support means for supporting a plurality of pancakes of untwised ribbons of different colors; applicator means for applying water repellent material to at least one of said ribbons, including intermittent contacting means; ribbon strip guide means for guiding a ribbon strip between said support means and said applicator means; strip dampening means; second guide means to guide the strips past said dampener means; and ribbon twisting means.

5. A method of twisting ribbon strips to form a color variegated strand comprising the steps of: providing a plurality of different color ribbons of material subject to decreasing resiliency with dampening; applying to at least one of said strips at spaced intervals a protective agent repellent to dampening agents; applying a dampening agent to said strips to dampen said strips except at the location of said protective agent; and twisting said strands together, while winding said colored strip containing said protective agent around the second strip, so that adjacent areas of lesser and greater twist create an appearance of slub yarn.

6. A method of twisting ribbon strips into a variegated color strand comprising the steps of: providing a plurality of ribbon strips of different colors, and of a material the resiliency of which is decreased with the application of a wetting agent thereto; applying to at least one of said ribbons at spaced intervals a substance that repels the wetting agent to be added; applying the wetting agent to said strips to wet them except at said spaced intervals; and twisting said strips into a strand having lesser areas of twist at said spaced intervals and greater areas of twist between said spaced intervals.

References Cited by the Examiner

UNITED STATES PATENTS

1,992,259	2/1935	Taylor	57—35
2,128,302	8/1938	Katz	57—162 X

MERVIN STEIN, *Primary Examiner.*