Aug. 27, 1968 W. G. SCHARF 3,399,070

TECHNIQUE FOR FABRICATING FLECKED METALLIZED YARN

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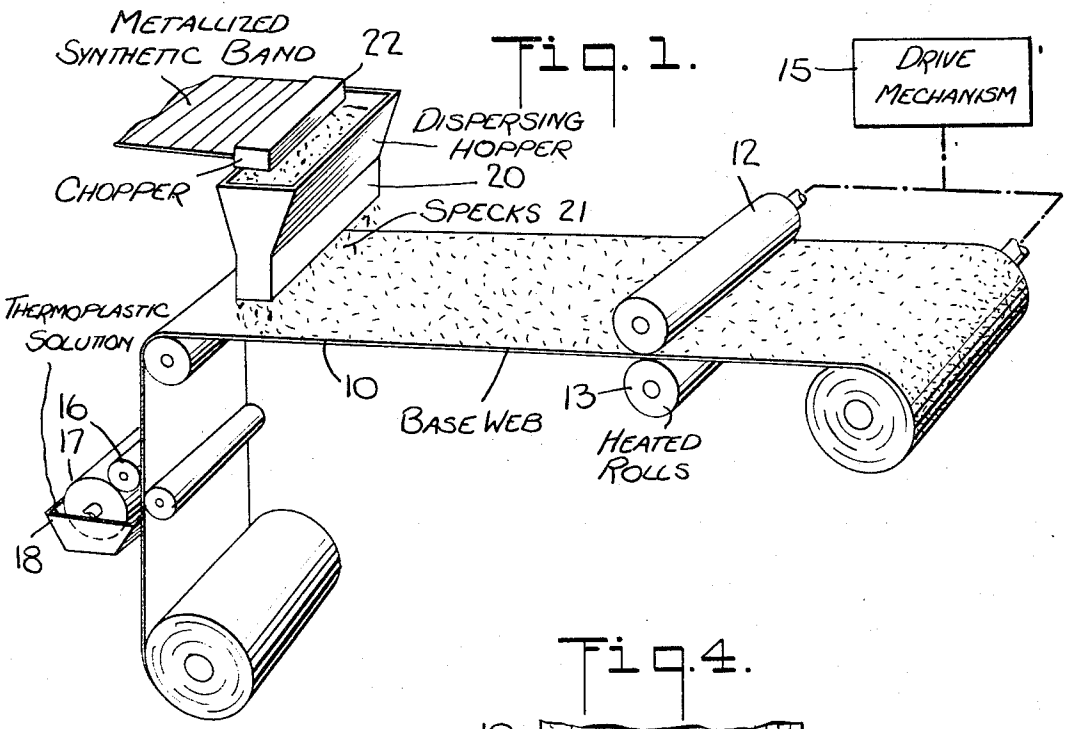


Fig. 1.

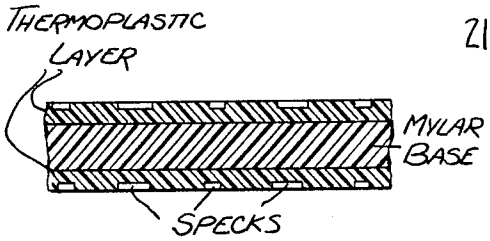


Fig. 3.

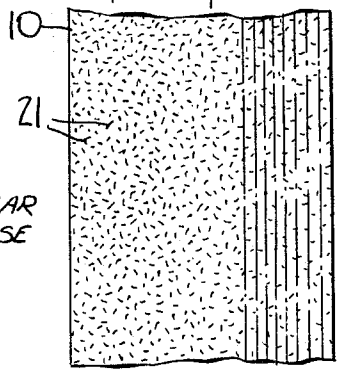


Fig. 4.

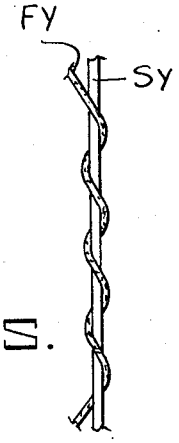


Fig. 5.

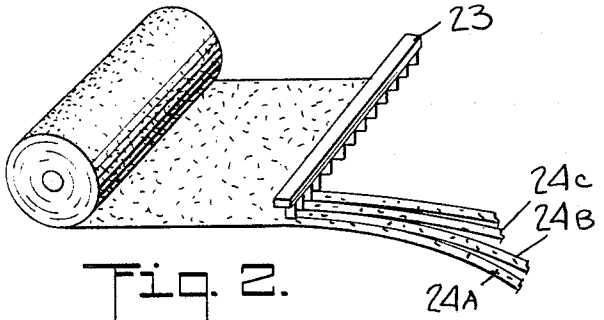


Fig. 2.

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TECHNIQUE FOR FABRICATING FLECKED METALLIZED YARN

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ABSTRACT OF THE DISCLOSURE

A process for producing a synthetic textile yarn having a flecked appearance, in which a base web of flexible synthetic material having a high softening point is coated on either side with a solution of heat-reactive thermoplastic material having a low melting point, specks of colored material, some of which are metallic, being dispersed randomly across the web while the coatings are not fully dried, the coated web thereafter being fed through heated pressure rolls which act to soften the coating and embed the specks therein.

This invention relates generally to decorative synthetic yarns for use in textiles and in other applications, and more particularly to a technique of producing a synthetic yarn having a flecked or dappled appearance resulting from the random distribution of multi-colored or metallic specks therein.

In my copending patent application entitled, "Flecked Metallized Yarn," S.N. 332,019, filed Dec. 20, 1963, now Patent 3,361,616 there is disclosed a novel synthetic yarn of transparent material having metallic specks of different color randomly distributed therein. The flecked effect provided by this yarn creates a new range of decorative possibilities in textile design, and it becomes feasible by the use of a yarn of this type to produce fabrics of original and highly ornamental design, or to produce finishing effects heretofore obtainable at far greater expense only by the use of a multitude of differently colored yarns in combination with complex weaving procedures. Because of the non-continuous nature of the metallic coloration, a greater degree of design flexibility is available in the weaving and knitting process, and it becomes possible with the flecked yarn to produce shantung-like effects, among others.

In the technique disclosed in my copending application, two webs of transparent material are used in conjunction with an array of metallized threads which lie at spaced parallel positions in a common plane. The webs and threads are simultaneously fed to laminating rolls, the array of threads at the same time being so manipulated as to cause the threads sandwiched between the webs to be sinuously arranged in meandering paths which repeatedly intersect the longitudinal axis of said webs. When the resultant sandwich web is slit longitudinally to produce laminated yarns, each yarn incorporates those portions of said metallized threads which appear at the point of intersection.

Thus my prior technique makes use of two transparent webs preferably of polymerized ethylene glycol terephthalate (Mylar) as well as a web of metallized materials slit into threads. While the resultant flecked yarn is of high quality, because of the three webs involved, the technique and the yarn produced thereby is relatively costly.

Accordingly, it is the main object of this invention to provide a technique for making a flecked yarn wherein flecks of multi-colored or metallic material are randomly dispersed and adhered to opposing sides of a single base web of flexible material, which technique is relatively inexpensive.

A significant advantage of the present invention is that the flecks may be produced by chopping waste metallized yarn and other material into confetti form, thereby effecting a further economy in the production of the flecked yarn.

Still another object of the invention is to provide a technique of the above described type wherein the base web may be opaque and colored, thereby affording contrasting decorative effect between the flecks and the base. Yet another object of the invention is to provide a flecked yarn of high quality which may be manufactured and sold at relatively low cost.

Briefly stated these objects are accomplished by coating eoch side of the base web with a heat-reactive thermoplastic layer, and then randomly dispersing onto the layers flecks of colored or metallic material. The flecked web is then conveyed through the heated rolls to effect adhesion between the flecks and the web, after which the web is slit into yarn size.

For a better understanding of the invention, as well as other objects and further features thereof, reference is had to the following detailed description to be read in conjunction with the accompanying drawing, wherein:

FIG. 1 is a schematic drawing, in perspective, showing a technique for producing a flecked web which when slit forms a speckled yarn in accordance with the invention;

FIG. 2 illustrates, in perspective, the apparatus for slitting the laminated web;

FIG. 3 is a longitudinal section taken through one of the speckled yarns;

FIG. 4 is a plan view of the laminated web prior to slitting; and

FIG. 5 is a perspective view showing the speckled yarn in supported form.

Referring now to FIG. 1 in a system in accordance with the invention for producing a flecked yarn thread, a single continuous web **10** of transparent thermoplastic material is drawn from a supply roll and is caused to travel into a hot rolling device constituted by heated pressure rolls **12** and **13**. The web may be constituted by cellophane, acetate, tri-acetate, acetate butyrate, polymerized ethylene glycol terephthalate (Mylar), or any other suitable transparent and flexible synthetic material having a relatively high melting point. The thickness of the web for ordinary yarn purposes should not exceed 2 mils, but of course other thicknesses may be used in other applications. The rolls **12** and **13** and the wind-up reel for the flecked web are operated by a suitable drive system **15**.

The upper surface of web **10** is coated with a heat reactive thermoplastic material in liquid form applied thereto by means of a roll **16** operating in conjunction with a transfer roll **17** which rotates in a well **18** containing the liquid.

The thermoplastic liquid may be any suitable heat reactive substance in solution, such as nitrocellulose amorphous polyester, vinyl or acrylic material having a low softening point. The thermoplastic coated web **10** is conveyed over a roll and under a dispersing hopper **20** which acts to distribute flecks **21** randomly onto the coat-

ed surface of the web. In practice the web may first be subjected to heat from an infrared source or other means to partially dry the coating before the flecked material is dispersed thereon; whereby some slight adhesion is effected between the still sticky surface of the web and the flecks.

The thermoplastic liquid may be clear in form in which event the coated web remains transparent, or a suitable pigment may be added to the solution whereby the coated web is rendered partially or totally opaque and has a solid color imparted thereto acting as a color ground to provide contrast with the flecks.

The flecks **21** of different color fed into the hopper **20** are in confetti form obtained by a chopping device **22**, bands or webs of pure metal foil, or metal foil sandwiched between plies of transparent synthetic plastic material, as disclosed in Prindle et al. Patent 2,714,569. Preferably, the bands or webs are of the non-laminated type made in accordance with Scharf Patent 2,974,055, wherein a base layer of thermoplastic material is vacuum coated with a metallic deposit such as aluminum in a thickness not exceeding one fifty-thousandth of an inch, the metallic deposit then being coated with a transparent plastic in liquid form which, when dried and cured, forms a thin film relative structurally to the base material and adhering directly to the metallic deposit. Since the thickness of this non-laminated thread is mainly determined by that of the base web, it is possible with a Mylar base to produce threads of less than one mil in thickness. It is important that the flecks be exceptionally thin, since they contribute to the ultimate thickness of the flecked yarn.

Non-laminated metallized web material of the above-described type may be made in multi-colored form, as disclosed in my copending applications S.N. 111,319 filed May 19, 1961, now abandoned; and S.N. 320,604, filed Oct. 28, 1963, now Patent 3,311,486. One advantage of the present invention is that the waste material resulting from trimming the edge of the multi-colored webs, or webs which fail to meet certain quality standards may be chopped up in accordance with the present invention, to provide the desired flecks. It is also possible to chop up non-metallic colored web material of the type disclosed in my copending applications S.N. 226,919, filed Sept. 28, 1962, now abandoned, and S.N. 253,155 filed Jan. 22, 1963, now Patent 3,147,582.

The colored metallized synthetic material is highly reflective and hence affords "glitter" effects, whereas the non-metallic colored material is non-reflective or flat. By combining reflective and flat color specks, a variety of decorative effects may be obtained.

Before the band or web material is chopped into flecks, it is preferably coated on both sides, with a layer of heat reactive thermoplastic material which is the same as or compatible with the layer on the base web **10**. This tends to improve the adherence of the flecks to the base web when they are later subjected to heat and pressure.

The hopper **20** may be any suitable mechanical device adapted to vibrate the specks of confetti fed therein and to disperse the confetti randomly across the web advancing therebelow. For this purpose the hopper may vibrate the specks through a suitable screen in a manner similar to so-called flocking techniques, or electrostatic means may be used for the purpose of spreading the confetti randomly. It is important that the dispersion be such as to separate the specks so that they do not entirely cover the base web. In this way the color of the web shows through as a contrasting background. It will be appreciated that the web may also be transparent whereby the only color in the ultimate yarn is that afforded by the specks.

The pressures rolls **12** and **13** are heated internally by electrical or other means to a temperature sufficient to soften the thermoplastic coating on the web and on the specks, if a coating is provided thereon, but insufficient to affect the base web. In this way the specks are pressed into the softened coating and adhere thereto, whereby the resultant flecked web, having the specks thereon is relatively smooth. After one side of the web **10** is coated and flecked in the manner disclosed hereinabove, the process is repeated on the other side. To avoid adhesion between the specks and the rolls, the rolls are preferably covered with a release material such as Teflon in sleeve form.

After the flecked web **10** is rolled up on roll with flecks adhering to both faces thereof, it is unwound and conveyed through a conventional slitter, such as the bank **23** of knives shown in FIG. 2, which serves to cut the web into a series of separate flat, flecked yarns **24A**, **24B**, **24C**, etc. In practice, the web may first be cut into broad bands which are thereafter slit to the ultimate yarn size.

The nature of the individual yarns is best appreciated by referring to FIGS. 3 and 4, wherein the longitudinal section of the web, which when slit, forms an individual yarn **24A** etc. is delineated by dashed lines running parallel to the longitudinal axis X of the sandwich web. It will be evident that randomly distributed along the longitudinal path of the individual yarn sections of the web are specks **21**.

If, as shown in FIG. 5, the flecked yarn FY is supported on a core yarn SY such as a solid-color cotton or synthetic filament, say of matt black, the solid color affords a ground which sets off the flecked metallic colors in the flecked yarn, thereby opening up another range of decorative effects.

When the flecked yarn is knit or woven into a fabric, the random distribution of the metallic or colored specks therein produces a fabric having an unusual and highly decorative appearance. If, for example, the flecked yarn appears only in the warp, and a clear weft yarn is interwoven therewith, then the streaks or particles differently colored flecks all run in the same direction to produce a shantung-like effect. But altogether different effects are obtained when using flecked yarns in both the warp and woof direction.

Alternatively, a flecked yarn may be produced by depositing on the base web an extremely thin metallic layer, as by the vacuum deposition technique, which layer is then protectively covered with a transparent film of synthetic material adhering thereto. Over this film there is printed a pattern of opaque color which exposes randomly distributed areas of the metallic layer lying thereunder. The opaque color is preferably matte to provide better contrast with the metal. The web so produced is then slit as disclosed above into yarn size.

While there have been shown a flecked metallized yarn and method of producing the same, in preferred form in accordance with the invention, it will be appreciated that many changes and modifications may be made therein without, however, departing from the essential spirit of the invention as defined in the annexed claims.

What I claim is:

1. The method of fabricating a flecked yarn comprising the steps of:

(A) coating each side of a base web of flexible synthetic thermoplastic material having a relatively high softening point with a solution of heat-reactive thermoplastic material having a relatively low melting point,

(B) dispersing randomly across said web after said coating is at least partially dried, separated specks of colored material, at least some of which are metallic, said specks being coated on both sides with a thermoplastic layer of a material the same as with the coating on said base web,

(C) passing the coated web having said specks thereon through heated pressure rolls to soften said coating and to embed said specks therein, the temperature of said rolls being sufficient to soften said coating but insufficient to affect said base web, and

(D) slitting said web into a plurality of ribbon-like yarns.

2. The method as set forth in claim **1**, wherein said web is polyethylene terephthalate.

3. The method, as set forth in claim 1, wherein said solution is a polyester.

4. The method, as set forth in claim 1, wherein said solution is a vinyl.

5. The method, as set forth in claim 1, wherein said solution is acrylic.

6. The method, as set forth in claim 1, wherein said solution is nitrocellulose.

7. The method as set forth in claim 1 wherein said specks are formed by chopping a band of metallized synthetic material into confetti-like particles.

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