Nov. 23, 1926. 1,607,928

H. E. VAN NESS

PACKAGE OF SPOT DYED YARN

Original Filed April 3, 1923

Fig. 1.

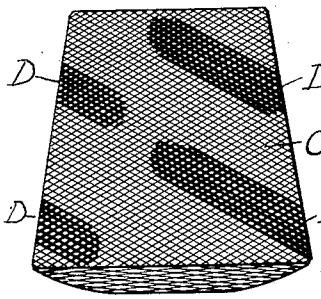


Fig. 2.

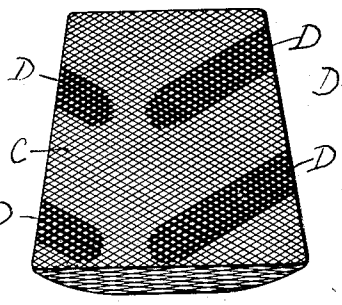


Fig. 3.

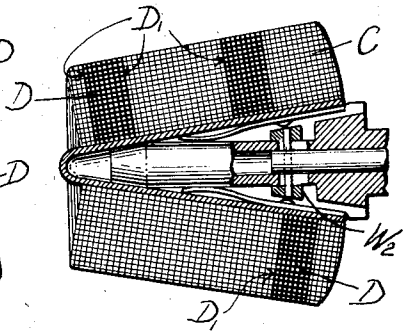


Fig. 4.

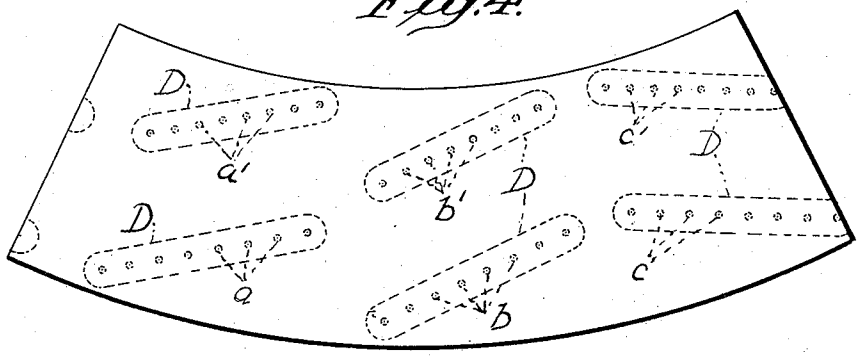
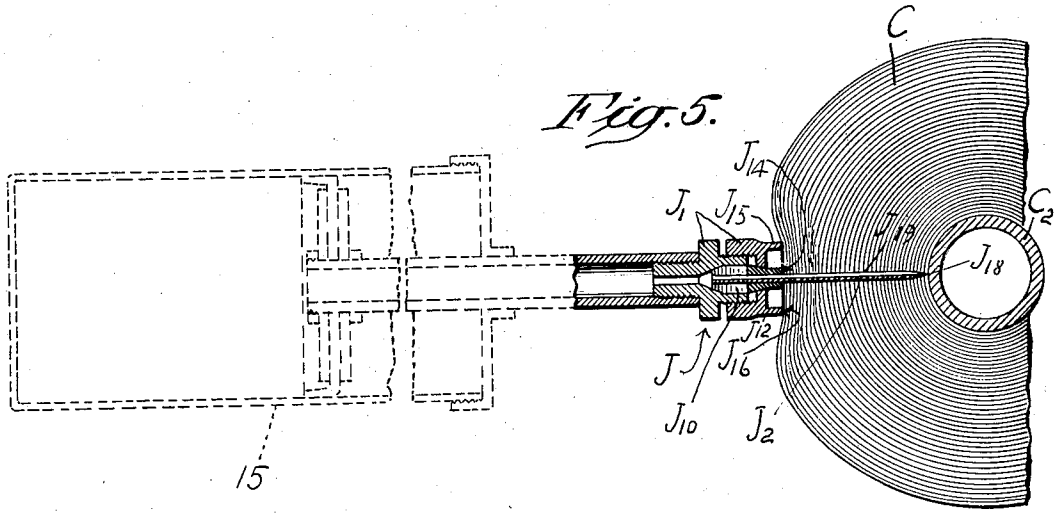


Fig. 5.



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UNITED STATES PATENT OFFICE.

HENRY E. VAN NESS, OF ELMIRA, NEW YORK.

PACKAGE OF SPOT-DYED YARN.

Original application filed April 3, 1923, Serial No. 629,633. Divided and this application filed June 30, 1924. Serial No. 723,430.

This invention relates to a new article of manufacture for use in making textile fabrics of the type known as mixtures.

An article embodying the invention consists of a mass of yarn or thread wound in the regular manner and having spaced dyed portions extending from its inner to its outer surface. The article is used by drawing the thread or yarn from it and forming it into a textile fabric by knitting or weaving. Each portion of the fabric thus produced is irregularly colored, but the irregularities are repeated with slight variations, so that the entire fabric has a uniform mixed appearance, without any discernible pattern.

In the form which I consider most desirable, the new article consists of a cross-wound cone of yarn having a plurality of long narrow dyed portions reaching from the outer surface of the mass to the inner surface thereof, and each extending parallel to a lay of the yarn. Owing, I believe, to the fact that the yarn forming such a cone contains long dyed portions interspersed with short dyed portions, the arrangement being repeated at intervals with slight variations, a fabric knitted from the cone has an attractive mixed appearance, without objectional irregularities in coloring and without any definite pattern.

In order that the invention may clearly be understood I will describe a specific article embodying the invention which is shown in the accompanying drawings, and in order to show one manner in which the article may be made, I will describe an illustrative method for making it. This method, which is described and claimed in U. S. Letters Patent No. 1,456,344 issued to me on May 22, 1923, on application, Serial No. 592,964, filed October 7, 1922, may conveniently be carried out by means of a machine described and claimed in my co-pending application, Serial No. 629,633, filed April 3, 1923, as a continuation in part of my aforesaid application, Serial No. 592,964. The present application is a division of my aforesaid application, Serial No. 629,633, on which U. S. Letters Patent No. 1,577,884 was issued to me on March 23, 1926.

In the annexed drawings, which show an illustrative embodiment of the invention and illustrate a method by which this embodiment may be made,

Figs. 1 and 2 are side views of an article embodying the invention;

Fig. 3 is an axial section of a partially completed article embodying the invention;

Fig. 4 is a diagrammatic view indicating the position of the dyed portions of the article on a development of its surface; and

Fig. 5 is a partial transverse section of the article showing, in longitudinal section, and partly in dotted lines, a simple form of apparatus which may be used in making the article.

The embodiment of the invention which is shown in the accompanying drawings is a "cone of yarn", that is, a hollow frusto-conical mass of yarn, cross-wound on a frusto-conical core so as to have two lays at an angle to each other, and having a convex surface at its larger end and a concave surface at its smaller end. Six spaced portions of the cone of yarn are dyed, as best seen in Figs. 1 to 4 inclusive.

Each of the dyed portions D is long and comparatively narrow and extends in the direction of one of the lays of the yarn, as best seen in the side views, Figs. 1 and 2. Each dyed portion extends from the outer surface of the cone C to its inner surface (i. e., its surface in contact with the core C^2) in a direction inclined to the axis of the cone and perpendicular to a plane tangent to the outer surface of the cone at the outer end of the dyed portion. The sides D^1 of each dyed portion are approximately straight, as seen in Fig. 3, and the ends of each dyed portion are also substantially straight, so that the area of each dyed portion is substantially uniform throughout the depth of the yarn of the cone.

The yarn of the cone contains long spots where it extends longitudinally through one of the dyed portions D of the cone and intermediate short spots where it extends transversely across one of these dyed portions. The arrangement of the spots on the yarn is repeated over each length of the yarn forming two complete layers over the surface of the cone. The repetition is, however, not exact owing to the fact that

less yarn is contained in a complete layer of the cone near the core than in a lay near the outer surface of the yarn.

When a textile fabric is knitted from the cone, the slight irregularity in each repetition of the arrangement of the colored portions of the yarn prevents these colored portions from forming a definite pattern in the fabric, and cooperates with the arrangement of the colored portions, and particularly the use of long colored portions at the irregular intervals, to produce a mixture of attractive appearance.

While the present invention is not limited to any particular method or means for making the new article, I will describe an illustrative method by which the article may be made, and a simple apparatus for carrying out this method. Such apparatus, illustrated in Fig. 5, includes an injector J which comprises a nozzle J^1 and a needle J^2 fixed in the discharge opening of the nozzle. The needle is held in a chuck J^{10} located in the body of the nozzle. The chuck is retained in the body by a nut J^{12}. The nozzle has at its outer end a flat contact surface J^{14} which is thrust against the surface of the mass of yarn to be dyed, and the nut J^{12} has at its outer end a stop J^{15} providing an annular surface J^{16} lying in substantially the same plane as the contact surface J^{14} and spaced therefrom.

The needle J^2 has a pointed front end J^{18}, the apex of which is on the axis of the needle. The needle is formed to provide a longitudinal passage J^{19} which extends substantially its entire length and communicates with the discharge opening of the nozzle. Lateral egress from this passage is permitted by giving it the form of an open groove.

Any suitable form of pump may be provided, and connected with the rear end of the nozzle J^1 so as to provide for forcing limited quantities of the liquid dye through the nozzle and needle under pressure. A simple manually operable force pump 15 for this purpose is indicated in dotted lines in Fig. 5. With this device, the amount of liquid dye passed through the needle is controlled directly by the operator. When the new article is to be made in large quantities, it is more desirable to use a more elaborate form of pump in which the quantity and pressure are controlled mechanically, such, for example, as the pump illustrated in my Patent No. 1,577,884.

In making the new article by means of the apparatus which has been described, the core C^2 of a cone of yarn C is supported on a suitable expansion clutch W^2 and dye is then injected into the cone of yarn from spaced points of its surface. In injecting the dye by means of the apparatus described, the needle J^2 is inserted squarely into the mass of yarn from a point of its outer surface. This brings the inner end of the needle substantially to the core C^2 of the cone, while at the same time the contact surface J^{14}, as well as the surface J^{16} of the stop J^{15}, is firmly pressed against the outer surface of the mass of yarn compressing the portion of it around the needle to some extent, and thus preventing the dye from leaking between the end of the nozzle and the outer surface of the mass of yarn. The pump 15 is then operated so as to force a small quantity of dye through the nozzle under considerable pressure. The liquid which is thus forced through the nozzle follows the groove in the needle and then penetrates into the mass of yarn forming a dyed portion of substantially uniform cross-section throughout the depth of the yarn.

In order to make the specific article illustrated in Figs. 1, 2 and 3, such injections of dye are made from each point of six series of points a, a', b, b', c, c'. The points of the series a, a', b, b' lie along one lay of the yarn, and the points of the series c, c' lie along the other lay of the yarn. The quantity of dye injected at each point is such that the dyed portions produced by the injections at the successive points of each series adjoin each other, so as to form a single long, narrow dyed portion.

It is apparent that the method described produces the specific embodiment of the invention described at the beginning of the specification. It should be clearly understood, however, that the invention is by no means limited to any specific method of making the article, nor to any specific arrangement of the dyed portions, otherwise than as specified in the claims which follow.

What I claim is:

1. A package of yarn for use in making fabrics of the type termed mixtures, comprising a continuous thread of spotted yarn wound on a core, and having its spots superimposed and forming one or more distinct dyed portions in the mass of yarn, each extending from the outer to the inner surface of the mass.

2. A package of yarn for use in making fabrics of the type termed mixtures, comprising a continuous thread of spotted yarn wound on a core, having its undyed portions superimposed, and its dyed portions superimposed and forming a distinct intermediate dyed portion in the mass of yarn extending from its outer to its inner surface.

3. A cone of yarn for knitting mixtures, consisting of a continuous thread of spotted yarn, having its spots superimposed and forming a band-like dyed portion, of such depth that it reaches from the outer to the inner surface of the cone of yarn.

4. A cone of yarn for knitting mixtures,

consisting of a continuous thread of spotted yarn wound on a core, and having its spots superimposed and forming a band-like dyed portion, of such depth that it reaches from the outer surface of the cone of yarn to the core of the cone, and of substantially uniform width throughout its depth.

5. A cone of yarn for knitting mixtures, comprising a continuous thread of spotted yarn cross-wound on a core, and having its spots superimposed and forming a band-like dyed portion extending part way around the cone parallel to a lay of the yarn and reaching from the outer surface of the cone to the core of the cone.

In testimony whereof I have hereunto set my hand.

HENRY E. VAN NESS.