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SPLICED CONSTRUCTION OF TWISTED PAPER YARN FOR USE IN WEAVING

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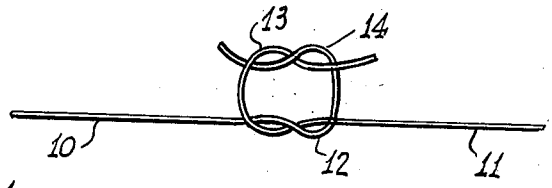


Fig. 1.

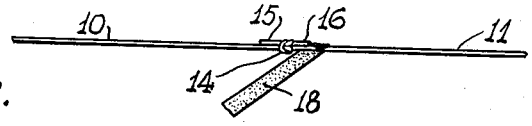


Fig. 2.

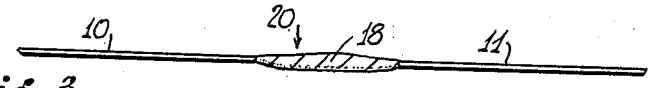


Fig. 3.

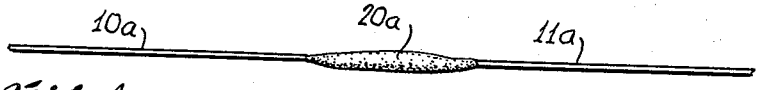


Fig. 4.

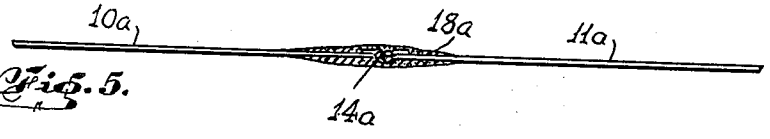


Fig. 5.

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SPLICED CONSTRUCTION OF TWISTED PAPER YARN FOR USE IN WEAVING

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7 Claims. (Cl. 154—53.6)

This invention relates generally to twisted paper yarn for use in the weaving of carpets, rugs, pile fabrics, and also for backings for woven and non-woven allied materials, and is particularly directed to an improved juncture or splice construction for uniting sections of such yarn so that any desired length may be continuously fed to a loom. The invention also embraces a novel method of joining successive sections of twisted paper yarn.

As is well known to those versed in the art, various constructions of splices or junctures have been attempted in connection with paper yarn for making woven and tufted carpets and other uses above indicated. However, all of such splices have proved unsatisfactory, being of insufficient strength to withstand the tension imparted during weaving, of undue bulk so as to catch in the heddles or other parts of a weaving machine, or involving operations requiring highly skilled personnel or the use of expensive, special equipment.

Accordingly, it is a general object of the present invention to provide a splice construction, and method of making the same, which overcome the above-mentioned disadvantages, and provide an extremely strong juncture, exceeding the strength of the yarn, and enable the spliced yarn to pass freely and easily through the heddles and other parts of a loom.

It is a further object of the present invention to provide a highly improved splice for twisted paper yarn, having the advantageous characteristics mentioned in the foregoing paragraph, which is of extremely simple construction, and which can be made quickly, easily and economically, either by hand or automatic equipment.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings, which form a material part of this disclosure.

The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts, which will be exemplified in the construction hereinafter described, and of which the scope will be indicated by the appended claims.

In the drawings:

Fig. 1 illustrates an early stage in the method of the present invention, wherein a pair of paper yarn sections are being tied together.

Fig. 2 shows an intermediate stage in the method and illustrates a pressure sensitive adhesive coated tape being wrapped about the tied yarn sections.

Fig. 3 illustrates the finished yarn section juncture or splice.

Fig. 4 shows a slightly modified form of splice or juncture according to the present invention.

Fig. 5 is a longitudinal sectional view showing the slightly modified splice of Fig. 4.

Referring now more particularly to the drawings, and specifically to Fig. 1 thereof, there is illustrated therein a pair of yarn sections **10** and **11** each fabricated of paper and twisted in the conventional manner. Twisted paper

strip from ⅛ inch wide and up has been found satisfactory for use in weaving carpets and rugs, and backings for other woven and non-woven allied materials. The adjacent end portions **12** and **13** of the respective yarn sections **10** and **11** are first tied together in a knot **14**. While the knot **14** is illustrated as being a square knot, it is appreciated that numerous other types of knots may be employed without departing from the invention. For example, a weaver's knot, a granny knot, and a modified weaver's knot have all been found entirely satisfactory.

When the knot **14** is drawn tight, see Fig. 2, to securely attach the yarn sections **10** and **11**, there necessarily remain free terminal yarn portions **15** and **16** of the yarn sections **10** and **11**, respectively. While the bare or uncovered knot **14** will not loosen, open, or "come out" if the yarn sections **10** and **11** are used in the weaving procedure, the free terminal ends **15** and **16** and the knot itself frequently catch in the heddles reed or adjacent yarns or other loom parts and cause rupture of a yarn section.

It is, therefore, desirable to provide an externally smooth covering, firmly secured, surrounding the knotted adjacent end portions **12** and **13** of the yarn sections. Toward this end, a strip or length of flexible tape **18**, having a coating of adhesive material on one side, is spirally wound about the knotted adjacent end portions **12** and **13**. Such a strip **18** may be fabricated of paper or other suitable material, and its adhesive coating preferably sensitive to slight pressure. More particularly, the strip or tape **18** is arranged at an angle with respect to one yarn section **11** and has one end portion initially wrapped about and secured to the latter yarn section adjacent to the knot **14**, as seen in Fig. 2. Spirally winding the remainder of the strip **18** about the knot **14** and adjacent portion of the yarn **10** will produce a covering **20** (see Fig. 3), closely surrounding and adhesively secured to the knotted adjacent end portions of the yarn sections. Further, the covering **20** will taper in opposite directions longitudinally of the yarn sections to merge with the latter and define a relatively smooth external contour. While the covering **20** will, of course, serve to reinforce the attachment of the yarn sections **10** and **11** by the knot **14**, the primary function of the covering is to streamline or define a relatively smooth external contour at the juncture or splice of the yarn sections.

The tying and wrapping procedures of Figs. 1 and 2, respectively, may obviously be accomplished by hand; and, such steps may also be performed by existing automatic equipment, if desired.

As a modification of the present invention, the adjacent portions of the twisted paper yarn sections **10***a* and **11***a*, see Figs. 4 and 5, may be securely tied together in a knot **14***a*, and provided with a coating or covering **20***a* fabricated entirely of flexible, adhesive material **18***a*. For example, the covering **20***a* may be applied by dipping or immersing the knot **14***a* and adjacent portions of the yarn sections **10***a* and **11***a* into liquid latex, or other plastic adhesive. It is preferred that the adhesive material **18***a* be thermoplastic, or other material adapted to solidify or cure at room temperature and remain flexible in its cured condition. While the adhesive material **18***a* will tend to approximately conformably surround the knot **14***a* and adjacent portions of the yarn sections **10***a* and **11***a* to define a relatively smooth external contour, it may be desirable to roll the adhesive material into the desired external contour, as between suitable rollers or the fingers of an operator, preferably just before the material solidifies or sets.

In the modification of Figs. 4 and 5, the covering **20***a* also serves to reinforce the attachment of yarn sections **10** and **11***a* by the knot **14***a*, and operates by its external-

ly streamlined contour to insure free yarn movement through a loom or other device. That is, the covering **20***a* prevents the knot **14***a* or its free terminal ends from catching on the heddles or reed or adjacent yarns or other parts of a loom, as described hereinabove in connection with the cover **20** of Fig. 3.

From the foregoing, it is seen that the present invention provides a slide or juncture for twisted paper yarn, and method of making the same, which fully accomplish their intended objects, and are well adapted to meet practical conditions of manufacture and use.

Although the present invention has been described in some detail by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be made within the spirit of the invention and scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. An elongate twisted paper yarn comprising at least two endwise adjacent sections having their adjacent end portions securely tied together in a knot, and a covering closely surrounding and adhesively secured to the knotted and adjacent end portions of said sections, said covering tapering in opposite directions longitudinally of said sections to define a relatively smooth external contour for unhampered yarn movement through a loom.

2. A yarn according to claim 1, said covering comprising a pressure sensitive adhesive coated tape spirally wound about the knotted and adjacent end portions of said sections.

3. A yarn according to claim 1, said covering comprising a coating of adhesive material on the knotted and adjacent end portions of said sections.

4. A yarn according to claim 1, said covering comprising a coating of flexible plastic material adhesively secured on the knotted and adjacent end portions of said sections.

5. An elongate twisted paper yarn for use in weaving, said yarn comprising at least two endwise adjacent sections having their adjacent end portions securely tied together in a knot, and a pressure sensitive adhesive coated tape spirally wound about the knotted adjacent end portions of said sections to reinforce their attachment by said knot and define a relatively smooth covering for said adjacent end portion.

6. An elongate twisted paper yarn for use in weaving, said yarn comprising at least two endwise adjacent sections having their adjacent end portions securely tied together in a knot, and a sheath of flexible material enclosing the knotted adjacent end portions of said sections to define a relatively smooth covering on the knotted adjacent end portions of said sections and having a smooth configuration tapering in opposite directions longitudinally of said sections.

7. An elongated twisted paper yarn for use in weaving, said yarn comprising at least two endwise adjacent sections having their adjacent end portions securely tied together in a knot, and a coating of flexible plastic material adhesively secured on the knotted adjacent end portions of said sections to define a relatively smooth covering for the knotted adjacent end portions of said sections.

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