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WARPING ARTIFICIAL YARNS

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Fig. 1.

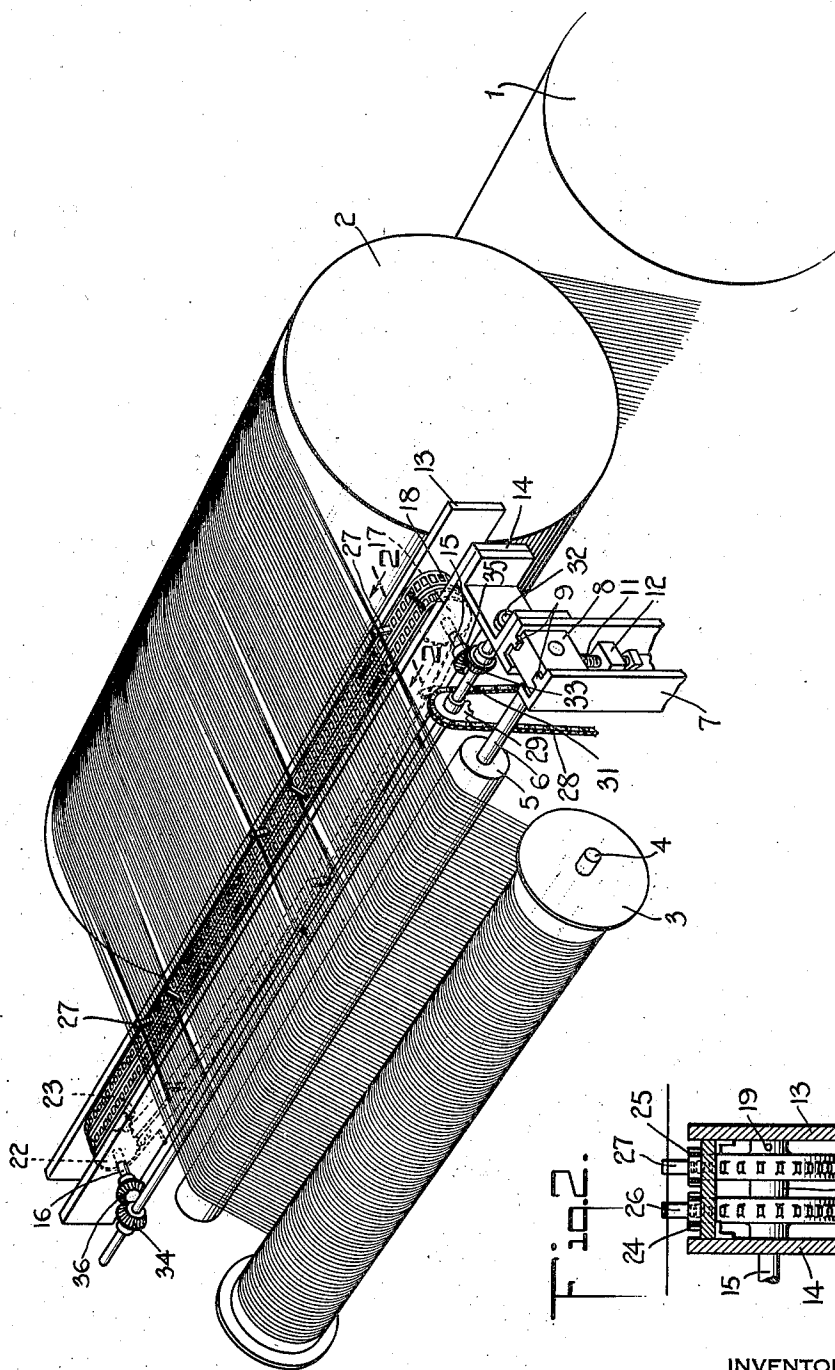
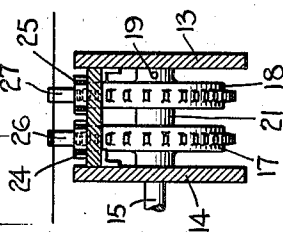


Fig. 2.



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WARPING ARTIFICIAL YARNS

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2 Claims. (Cl. 28—28)

This invention relates to a method and device for warping yarns and especially for warping artificial yarns that have been sized or coated with other substances in a slashing machine.

5 An object of the invention is the economic and expeditious production of warps having an even surface on the warp beam and in which the ends of yarn are separated or disassociated from each other and from which the ends of yarn reel off
10 with a substantially equal tension. Other objects of the invention will appear from the following detailed description and drawing.

In the drawing wherein like reference numerals refer to the same or similar elements in the re-
15 spective views,

Figure 1 is a perspective view of a part of a warp beam winding device constructed in accordance with our invention.

20 Figure 2 is a sectional view taken on the line 2—2 of Figure 1.

In forming warps of yarns which are coated with a sizing or other material there is a tendency for the yarns to become taped together into ribbons. This is especially true of warps formed
25 of yarns of continuous filaments which yarns have no projecting fibers to maintain them separated and especially when the yarns are relatively smooth such as those containing only a small amount of twist. In winding a fairly dense warp
30 where the warp ends lie close together there is a tendency of the threads to be taped together as they pass through the pressure rolls after being impregnated with a size or other substance. The subsequent drying operation which takes place by
35 passing the yarn over heated cylinders or cans, separates the sheet of warp ends to some extent, but the separation does not produce a warp sheet having groups of ends in the form of ribbons. If the yarn is run on to the warp beam while
40 containing these ribbons or tapes it builds up irregularly. Besides the unsightly appearance of this uneven surface of a warp beam, the threads tend to come off the beam with unequal tension during weaving, owing to the variation in diameter of the beam, and this causes various im-
45 perfections in the fabric.

We have found that when the sheet of warp ends or threads is broken up into individual or disassociated ends or threads after sizing or other-
50 wise coating same and prior to being wound upon a beam that a warp results in which the warp ends each have substantially the same tension. Warps constructed in accordance with this invention are less liable to form a fabric having
55 warp streaks. Further, by distributing the ten-

sion equally on all the warp ends breakage of same is greatly reduced, thus producing a fabric having fewer knots.

In accordance with our invention, we form warps of sized or otherwise coated yarns, by ap-
5 plying the coating to the yarns grouped as a warp-sheet, drying the coating and then breaking or separating the threads to individual ends or disassociated threads prior to winding them onto
10 a warp beam. Further, in accordance with our invention, we construct a device which separates coated and dried warp-sheets into individual threads prior to winding them upon a warp beam.

The device, forming a part of this invention, breaks up the ribbon formation of the warp
15 threads or ends and thus aids in producing a uniform sheet of threads running on to the warp beam resulting in a uniform warp. The device may comprise a standard type slashing machine having means for supporting a supply beam of
20 the kind employed with a warping mill, means for applying a coating to the warp, means for padding the coating on to the warp, such as pressure rolls, and drying cans for drying the coating. Further,
25 in place of a supply beam the device may be equipped such that the warp threads are unwound directly from a warp mill or on a warp creel through a sizing device, padding rolls and on to the drying cans. The feed end of the de-
30 vice is not shown in the drawing, as any suitable type of slashing device may be modified in accordance with this invention to produce warps in which the individual threads or ends are sepa-
rated.

In the drawing there is shown a part of a
35 slashing device, which slashing device is constructed in accordance with our invention. The forward end of the slashing device may be constructed in any suitable manner as stated above. The yarns, after coming from any suitable source
40 of supply and after having received a coating, are led around large heated drums, commonly termed drying cans, the last two of which are shown on the drawing. The rearward end of the machine may comprise drying cans 1 and 2
45 about which the threads are adapted to pass after having received a coating. These cans may be supported and rotated in any suitable manner. For receiving the warp there is provided a warp
50 beam 3 having an axle 4 by which it may be supported and rotated. Between the warp beam 3 and the drying can 2 there is provided a roller 5 supported by shaft 6 adapted to act as a guide
55 roller for maintaining a constant level of the yarn sheet as the warp beam increases in di-

ameter. The guide roller 5 may be suitably journaled in the main frame 7 of the device, only a part of which is shown on the drawing, by means of an adjustable bearing block 8 adapted to slide in a trackway 9 and its position regulated and maintained by any suitable means such as a threaded screw 11 operating through a tongue 12 attached to the main frame.

Suitably attached to the main frame of the device, at a position between the drying cans and the take-up warp beam, and running transversely of the length of the machine are two parallel supporting members 13 and 14. These supporting members 13 and 14 with their included mechanism may be placed after the last drying can or between two drying cans or before the first drying can. At substantially each end of these transverse supporting members are shafts 15 and 16, each of which carry two sprocket wheels. As more fully shown in Figure 2 one sprocket wheel 17 is rotatably mounted on the shaft 15 while the other sprocket wheel 18 is keyed thereto by means of the key 19 and the two sprocket wheels are separated by a collar 21. The sprocket wheels 22 and 23 on the shaft 16 are similarly mounted except that the opposite sprocket wheel is keyed to the shaft while the other is mounted in a floating relation thereto. For instance, the sprocket wheel 17 is rotatably mounted on the shaft 15 while sprocket wheel 22 is keyed to the shaft 16. Suitable sprocket chains 24 and 25 are threaded about the sprocket wheels 17-22 and 18-23, respectively. Suitably mounted on the sprocket chain 24 are fingers or quills 26 while on the sprocket chain 25 there is mounted similar fingers or quills 27. These fingers form an acute angle with the chain and are sloped opposite to the direction of travel of the chain. Any suitable number of these fingers may be employed. However, for the purpose of disassociating the threads of a normal size warp it is found sufficient to have the fingers spaced from 1 to 2 feet apart on the chains.

Any suitable driving means source of power may be employed. In the drawing one means of driving the chains is shown. This comprises a sprocket chain 28 adapted to register with the sprocket wheel on a suitable source of power preferably connected with the driving means of the slashing device proper. The chain 28 is adapted to register with and drive the sprocket wheel 29 suitably mounted on a shaft 31 which is journaled in the main frame as shown at 32. Also mounted on the shaft 31 are bevel gears 33 and 34 adapted to register with bevel gears 35 and 36 on the shafts 15 and 16, respectively. By this arrangement the chains 24 and 25 are driven in opposite direction at a uniform rate of speed, preferably synchronized with the speed of the take-up warp beam 3 and the drying cans 1 and 2.

The fingers or quills 26 and 27 may be made of any suitable material, preferably such a material that has a slight springiness and of constituents which will not react with the materials of the coating. For instance, these fingers may be formed of strips of cellulose nitrate, cellulose acetate or vulcanized fiberboard or they may be formed of metal such as strips of copper, brass, stainless steel or similar metal.

In the operation of the device a sheet of yarns drawn from a suitable source of supply, such as a warp beam, a warp mill or direct from a creel is passed through a bath containing the desired coating material and then through nip rollers which pad this material into the sheet of threads.

The sheet of threads having a coating applied thereto are then passed around a series of drying cans, any suitable number of which may be employed, for instance, 2 to 10 or more. When the sheet of threads leaves the last drying can the threads of the sheet are taped together in bunches which bunches may contain anywhere from 2 to 50 or more threads making the warp sheet appear as a plurality of ribbons of varying widths. This sticking together into ribbon-like bands of the warp is commonly termed "taping". The object of the invention is to break up these tapes into individual threads allowing the same to pass on to the warp beam in an even sheet of individual filaments having uniform tension and uniform size, so that in a weaving operation they pass through heddles, harnesses and other parts of the looms with an even tension without fraying or cutting of the individual filaments or threads by too great a pull as was formerly required to separate the threads of the tape band.

The fingers on the chains are of such a length and the guide roller is adjusted to such a position that the said fingers protrude through the sheet of the warp threads by about $\frac{1}{16}$ th to $\frac{1}{4}$ of an inch. The speed of the chains carrying the fingers may be of any suitable speed depending somewhat upon the spacing of the fingers or quills thereon. Although any suitable speed may be employed, it is preferable and the best results are produced by resulting the speed of the chains to about double the speed of the warp yarn.

This invention is applicable to the treatment of warps made of any type of textile thread. However, it is of particular importance in connection with threads of synthetic filaments or of silk which are formed from continuous links of filaments and contain no beard, nap or fuzz tending to maintain the individual threads separated from each other and especially when such threads have only a limited amount of twist say below 10 turns per inch. It is particularly applicable to the treatment of warps consisting solely of threads formed of organic derivatives of cellulose, such as the organic esters and ethers of cellulose. Examples of the organic esters of cellulose are cellulose acetate, cellulose formate, cellulose propionate and cellulose butyrate, while examples of the ethers of cellulose are ethyl cellulose, methyl cellulose and benzyl cellulose. However, the invention may be applied to warps of mixed threads containing some threads of organic derivatives of cellulose, mixed in any manner of alteration, with threads or yarns of other materials, such as silk, wool, cotton, linen, etc.

The coating material applied to the yarns may be any suitable coating material, such as sizes, lubricants, saponifying or sensitizing material or other suitable coating substance. The invention is particularly applicable to the applying of a size containing gelatin to warps formed of organic derivative of cellulose threads. The size may be prepared, for instance, by mixing gelatin, glycerine, oil and water to the proper consistency.

It is to be understood that the foregoing detailed description is given merely by way of illustration and that many variations may be made therein without departing from the spirit of our invention.

Having described our invention, what we desire to secure by Letters Patent is:

1. In a slashing device, the combination with means for drying a sheet of warp threads and a take-up warp beam, of means positioned between

the drying means and the take-up warp beam for disassociating any adherent threads in the sheet of warp threads, said disassociating means comprising a plurality of oppositely moving
5 bands adapted to travel transversely of the sheet of warp threads and members on the bands adapted to contact with the sheet of warp threads for separating any adherent threads therein.

2. In a slashing device, the combination with
10 means for drying a sheet of warp threads and take-up warp beam, of means positioned between

the drying means and the take-up warp beam for disassociating any adherent threads in the sheet of warp threads, said disassociating means comprising two oppositely moving endless bands
5 adapted to travel transversely of the sheet of warp threads and fingers mounted on said bands adapted to project through the sheet of warp threads for separating any adherent threads therein.

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