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2,463,620

APPARATUS AND PROCESS FOR CRIMPING

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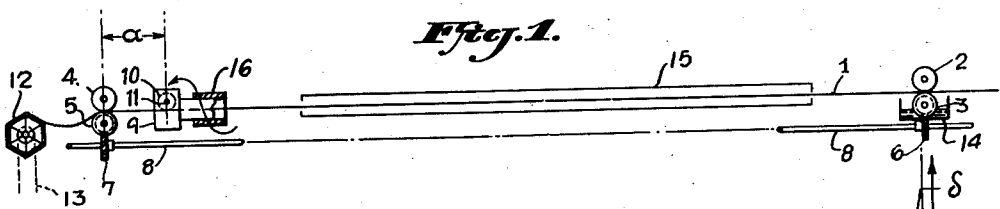


Fig. 2.

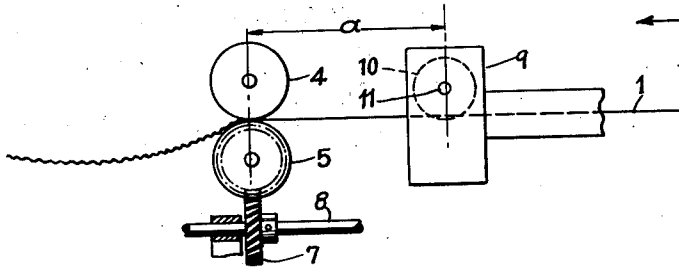


Fig. 6.

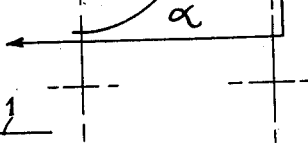


Fig. 5.

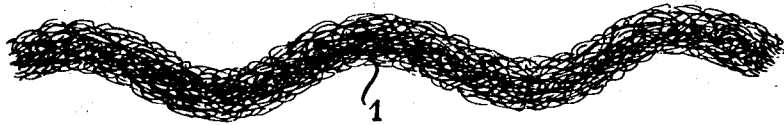


Fig. 3.

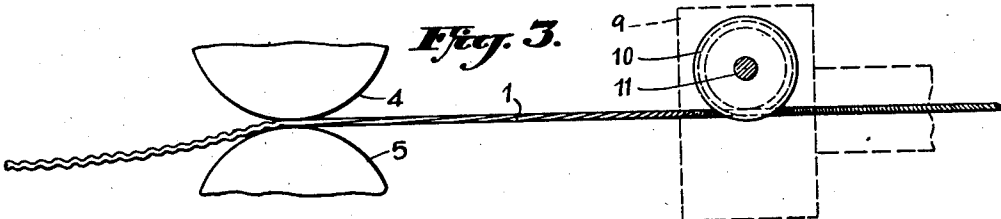
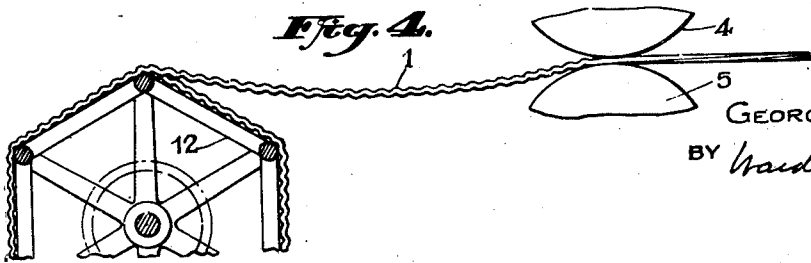


Fig. 4.



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APPARATUS AND PROCESS FOR CRIMPING

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6 Claims. (Cl. 57—58.5)

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This invention relates to the production of a permanently crimped endless yarn.

It is known that yarns may be crimped by highly twisting same and releasing the twist. I have found in accordance with my invention that when a twisting head is placed between a fixed entrance point and a fixed exit point, the yarn after crimping by twist will stretch and may remove some or nearly all of the crimp depending on the location of the head with respect to the discharge or exit point for the endless yarn.

The principal object of the invention accordingly is to provide a simple process and apparatus of the kind described for maintaining substantially all of the crimp produced by the high twisting and subsequent release.

The invention accordingly comprises the novel apparatus and combinations thereof, as well as the novel processes and steps of processes which may be carried out in such apparatus, specific embodiments of which are described herein by way of example only and in accordance with the manner in which I now prefer to practice the invention.

In the accompanying drawings forming part of this specification in which apparatus constituting part of my invention is shown—

Figure 1 is a schematic showing of an endless yarn passing under tension between rollers and engaged by a twisting head intermediate the rollers near the exit rollers;

Fig. 2 is a fragment of Fig. 1 somewhat enlarged showing the exit end of the apparatus;

Fig. 3 is a similar fragment to that shown in Fig. 2 but further enlarged, showing the thread passing to the twister head and through the exit rollers;

Fig. 4 is an enlarged view showing the exit rollers and the take-up reel;

Fig. 5 is a highly enlarged view of the yarn passing from the exit rollers to the reel, and

Fig. 6 is a curve plotted schematically to show the distance from the twisting head to the exit rollers as abscissa with the ordinates as the amount of twist.

In carrying out the process of my invention, I continuously feed an endless yarn under tension on a path between a fixed entrance support and a fixed exit support and crimp the yarn between these points by subjecting it to the opera-

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tion of a false-twisting device. By this operation, I highly twist the yarn through part of the path mentioned and then suddenly release the high twist in the yarn as it leaves the twisting operation and proceeds to the exit point. I have found it important to cause this release to occur within a relatively short distance of the exit point. During the travel of the yarn between the twisting operation and the exit point, the high twist is released, leaving the yarn in crimped form. Unless certain precautions are observed, I have found that the tension on the yarn tends to remove the crimp and in extreme cases where the release of the high twist occurs at a greater distance from the exit point, the crimp is seriously damaged and the goods produced are not up to the required standard for the production of the desired wool-like character resulting from this crimping of the yarn. I have found in accordance with my invention that if the high twist is released suddenly and within a certain distance of the exit that I can maintain the crimp in the yarn without removing any substantial amount of it. Tests carried out by me show that the release of the high twist should occur at a point less than one meter from the exit point. In practice, I employ a distance of about 2.5 to about 50 centimeters between the point where the release commences and the exit point. I have tested the process using distances of 2.5 cm., 4 cm., 12 cm., 25 cm., 50 cm., and 100 cm. as the distance between the twisting device and the exit point and I have found that although a distance of 100 centimeters produced a commercially useful result, the shorter distances produced more desirable results.

The yarn used may be a staple yarn or a continuous yarn and may be constituted of any of the usual forms of artificial silk, such as viscose, cellulose acetate, cuprammonium or the like, or may be made out of any of the various synthetic fibers or mixtures of these with artificial silk. I may also employ cotton. The yarn treated may be preliminarily subjected to various setting agents and I may heat the yarn in the path between the entrance rollers and the twisting operation by means of a heating device, if desired.

Referring now to the drawings, the numeral 1

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indicates a supply of endless yarn under tension. A pair of supporting rollers 2, 3, roller 3 being dipped into a container 14 for supplying setting agent to the yarn, and another pair of aligned supporting rollers 4, 5, define the entrance and exit, respectively, of a path for said endless yarn. These rollers 3 and 5 are shown as driven, respectively, by a suitable worm mechanism 6 and 7 mounted on a common shaft 8, driven from a source of power (not shown). 15 is a heating device located between the entrance roller and the twisting head 9. Setting agents mentioned above are disclosed in copending application of Heberlein et al., Serial No. 553,694, filed September 12, 1944.

Intermediate the pairs of rollers is a false-twisting head 9 for continuously highly twisting the endless yarn passing along the path to the head. The twisting head 9 has a grooved guide roller 10 placed on a shaft 11 arranged transversely with respect to the axis of the yarn 1. This false-twisting head is disposed at one end of a bored shaft of a motor 16 and is rotated at a velocity of the order of 50,000 R. P. M. or more as disclosed in copending application Künzle, Serial Number 656,865, filed March 25, 1946. The perimeter of the grooved guide roller is approximately tangential to the axis of the shaft and the thread passes to the roller approximately along the axis of the shaft, passes from the roller after making one turn thereabout, and proceeds along again approximately along the axis of the shaft to the exit of the shaft. Thus, the thread is practically maintained in alignment with the axis of the shaft in passing to and from the twisting head. The yarn is wound only once around the roller 10. After passing the twisting head 9, the high twist is released and the yarn when it finally resumes its original twist, that is, the same as it had at the time of entering the pair of rollers 2, 3, emerges from the rollers 4, 5 in crimped condition. The distance from the false-twisting head 9 to the bite of the rollers 4, 5 is about 2.5 to about 50 centimeters in practice, although, as stated above, it may be as high as 100 centimeters. The distance is such that the period of tension exerted on the yarn between the twisting head and the exit rollers is sufficiently short to prevent removal of any substantial amount of the crimp produced by the twisting device. After leaving the rollers, the crimped yarn passes to a reel 12 which is driven from a suitable source of power by the chain 13 to take-up the crimped yarn produced while exerting little, if any, tension thereon.

It will be seen more particularly in Fig. 2 that a schematical curve may be plotted for the twist based on the distance travelled by the yarn between the twisting head 9 and the exit rollers 4, 5. In this curve the abscissae are plotted as the distance α from the twisting-head to the exit rollers while the ordinates are plotted as the amount high δ (delta) of the high twist, as a result of the action on the continuous yarn between the entrance rollers. In Fig. 3 the continuously moving yarn is shown losing its high twist as it leaves the twisting head 9 and proceeds to the exit rollers 4, 5. The yarn 1 in crimped condition is shown in highly enlarged form in Fig. 6 and it is in this form that it is wound up on the reel 12.

What I claim is:

1. An apparatus for crimping yarns comprising, in combination, a supply of endless yarn, means for moving said yarn along a path includ-

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ing supporting devices for said yarn at the entrance and exit of said path, a false-twisting head on said path for continuously highly twisting said yarn passing therealong and for releasing the twist in said yarn after it has passed the head, thus providing a crimp therein, said twisting head being located at a distance from said exit sufficiently short to prevent removal of any substantial amount of the crimp produced by such false-twisting, a reeling device and means to take up the crimped yarn thereon while exerting substantially no tension on said yarn between said exit and said reeling device.

2. An apparatus for crimping yarns comprising, in combination, a supply of endless yarn, means for moving said yarn along a path including supporting devices for said yarn at the entrance and exit of said path, a false-twisting head on said path for continuously highly twisting said yarn passing therealong and for releasing the twist in said yarn after it has passed the head, thus providing a crimp therein, said twisting head being located at a distance of about 2.5 to 50 centimeters from said exit, a reeling device and means to take up the crimped yarn thereon while exerting substantially no tension on said yarn between said exit and said reeling device.

3. An apparatus for crimping yarns comprising, in combination, a supply of endless yarn, aligned rollers defining the entrance and exit of a path for said yarn, driving mechanism for said rollers, a false-twisting head on said path for continuously highly twisting said yarn passing therealong and for releasing the twist in said yarn after it has passed the head, thus providing a crimp therein, said twisting head being located at a distance of about 2.5 to 50 centimeters from said exit, a reeling device and means to take up the crimped yarn thereon while exerting substantially no tension on said yarn between said exit and said reeling device.

4. An apparatus for crimping yarns comprising, in combination, a supply of endless yarn, aligned rollers defining the entrance and exit of a path for said yarn, driving mechanism for said rollers, a false-twisting head between said rollers for continuously highly twisting said yarn passing along said path to the head and releasing the high twist in said yarn after it has passed the head, thus providing a crimp therein, said twisting head being located at a distance of about 2.5 to 50 centimeters from said exit rollers, said distance of said twisting head from said exit rollers being such as to shorten the period of tension between said head and said exit rollers so as to prevent removal of any substantial amount of the crimp produced by such false-twisting, a reeling device and means to take up the crimped yarn thereon while exerting substantially no tension on said yarn between said exit and said reeling device.

5. A process for crimping yarn which comprises, continuously feeding endless yarn under tension on a path between a fixed entrance point and a fixed exit point and crimping the yarn between said points by subjecting it to a false-twisting operation including highly twisting the yarn through part of the path, then suddenly releasing the high twist in the yarn as it leaves the twisting operation and proceeds to the exit point, the length of the path in which the twist is released being such that no substantial amount of the crimp produced thereby is re-

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moved, and withdrawing the crimped yarn from the exit point substantially without tension.

6. A process for crimping yarn which comprises, continuously feeding endless yarn under tension on a path between a fixed entrance point and a fixed exit point and crimping the yarn between said points by subjecting it to a false-twisting operation including highly twisting the yarn through part of the path, then suddenly releasing the high twist in the yarn at a distance of about 2.5 to about 50 centimeters from the exit, and withdrawing the crimped yarn from the exit point substantially without tension.

GEORG HEBERLEIN.

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REFERENCES CITED

The following references are of record in the file of this patent:

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Certificate of Correction

Patent No. 2,463,620.

March 8, 1949.

GEORG HEBERLEIN

It is hereby certified that errors appear in the printed specification of the above numbered patent requiring correction as follows:

Column 2, line 41, strike out "or", second occurrence; column 3, line 63, strike out the word "high", both occurrences;

and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 16th day of August, A. D. 1949.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.