United States Patent [19]

Ivanto

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[54] **DEVICE FOR PRODUCING FALSE TWIST ON A THERMOPLASTIC FILAMENT**

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[52] **U.S. Cl.** **57/77.4**

[51] **Int. Cl.** **D02g 1/02**

[58] **Field of Search**..... 57/34 R, 34 HS, 77.3, 77.4, 57/77.45

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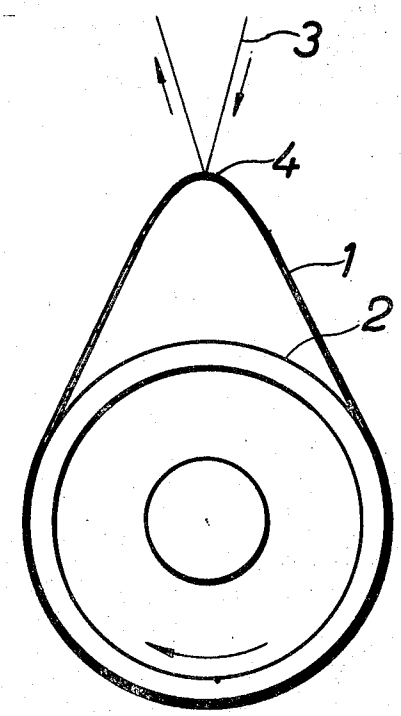
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[57] **ABSTRACT**

A device for producing a false twist on a thermoplastic filament which, heated to a plastic condition, is on its path of travel made to touch an endless belt moving transversally with reference to it, and which belt has high friction against the filament and has been conducted over a pulley imparting a motion to it. For stabilizing the point of contact between the filament and belt the belt forms at this point a sharp bend, which prevents the hunting of the filament.

8 Claims, 6 Drawing Figures



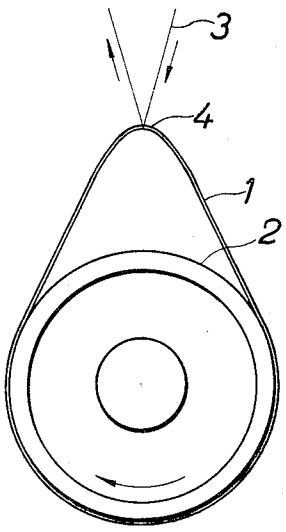


Fig. 1

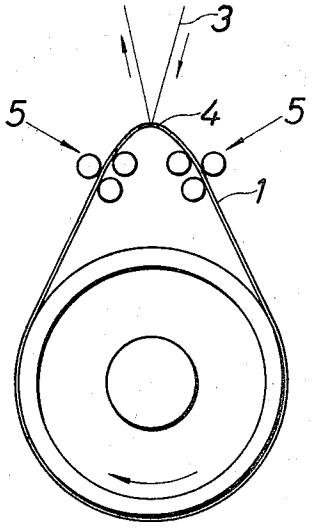


Fig. 2

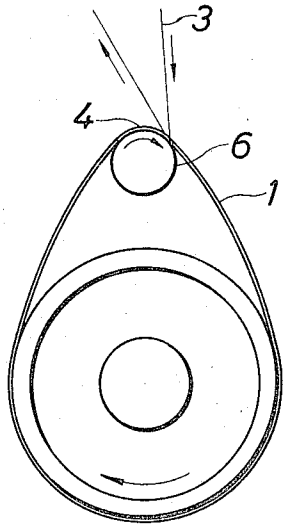


Fig. 3

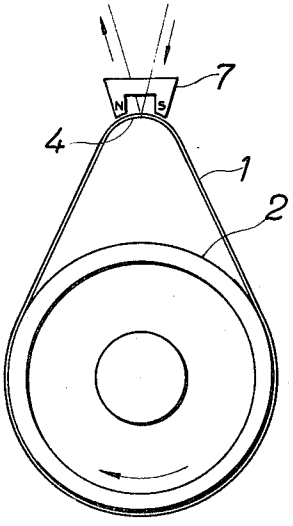


Fig. 4

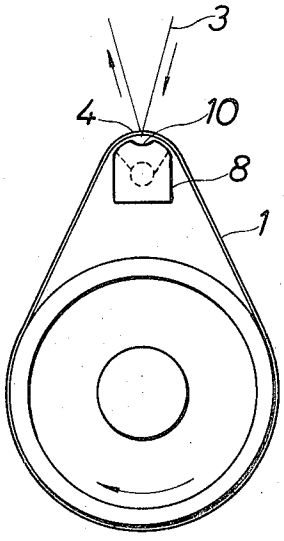


Fig. 5

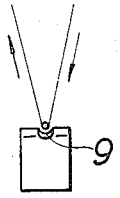


Fig. 6

DEVICE FOR PRODUCING FALSE TWIST ON A THERMOPLASTIC FILAMENT

It is known in prior art to produce false twist on a thermoplastic filament which, heated to a plastic condition, is conducted through a sleeve rotating about its axis and the ends or entire inner surface of which has been provided wiht a friction surface, which is touched by the filament. Such curling sleeves work excellently, but their capacity is limited because the speed of rotation of the sleeve cannot be increased at will.

In order to eliminate this drawback, it has already been suggested to cause the filament that has been heated to a plastic condition, in the course of its travel, to touch an endless belt moving transversally with reference to it and which belt has high friction with the filament and has been carried over a pulley, by which a motion is imparted to it. The speed of the belt can be made very high, whereby the capacity of the device increases correspondingly. But then one encounters the difficulty that the filament begins to oscillate, or hunt, along the belt. In other words, the point of contact between the filament and the belt performs a continuous reciprocal movement. This, in its turn, has the consequence that the curled filament will be non-uniform as regards its quality. Moreover, the tension of the filament, as it contacts the belt, will continuously vary and may become so high as to cause rupture of the filament.

The aim of the present invention is to eliminate these drawbacks. The objects of the invention is therefore a device for forming a false twist on a thermoplastic filament, which, heated to a plastic condition, is on its travel made to touch an endless belt moving transversally with reference to it, this belt having high friction against the filament and being carried over a pulley by which it is imparted a movement. The invention is characterized in that, in order to stabilize the point of contact between the filament and the belt, the belt forms at this point a sharp bend, which prevents the hunting of the filament. By the aid of the invention the speed of the belt, and correspondingly the speed of the filament, can be considerably increased, because the risk of filament rupture has been reduced. Moreover, the thread that is obtained has a homogeneous quality.

The invention is described in the following with the aid of an example and with reference to the attached drawing, wherein

FIGS. 1–5 show various embodiments of the invention, and

FIG. 6 shows the embodiment according to FIG. 5, seen from one side.

In FIG. 1, the reference numeral 1 indicates a friction belt loop that has been passed over a pulley, which imparts a motion to it. The speed of rotation of the pulley 2, and thereby also the translatory speed of the belt 1, is high. The belt 1, which may consist e.g. of plastic, has a circular cross section. Through the belt loop 1 the filament 3, heated to a plastic condition, has been conducted, and this filament is subject to a tensile stress so that a sharp bend 4 of the belt 1 is formed. As a result of the bend 4, the point of contact of the filament 3 and belt 1 will be stabilized so that the filament 3 cannot hunt along the belt 1. When the filament 3 and belt 1 both progress with a high speed, a false twist is produced in the filament as a result of friction. Since in the

embodiment according to FIG. 1 a comparatively high tensile stress is produced in the filament 3, it is obvious that this embodiment cannot be employed when the filament is thin.

The embodiment according to FIG. 2, however, may be used for the curling of thin filaments also. This embodiment differs from that presented in the foregoing in that in the belt 1 a bend 4 is produced with the aid of freely rotating rolls 5, which guide the belt 1.

According to FIG. 3, again, a bend is produced in the belt 1 by the aid of a freely rotating roll 6, which places tension on the belt. The surface of the roll 6 has low friction with regard to the filament 3. The filament is conducted into the gap between the belt 1 and the roll 6 from such direction that it touches both the belt and the roll. Hereby, the point where the filament 3 touches the belt 1 will be accurately determined.

According to FIG. 4, the bend 4 in the belt 1 is produced by the aid of a magnet 7, which attracts the belt. To this purpose, the belt consists of a magnetic material, e.g. of plastic with metal powder admixture. In this case the pulley 2 may also be made magnetic, whereby the friction between it and the belt 1 is improved.

According to FIGS. 5 and 6, the bend 4 in the belt 1 is produced by means of an air nozzle 8, which by compressed air effect pushes against the belt. The air nozzle 8 has a groove 8 for the belt, with a slit on its bottom through which compressed air is supplied so that an air cushion is produced between the groove and the belt, which keeps the belt at a distance from the groove. Furthermore, the nozzle 8 has a transversal groove 10 at the point where the filament 3 and the belt 1 come into contact.

It is obvious to one skilled in the art that different embodiments of the invention may vary within the scope of the patent claims set forth hereinafter. For instance, the belt 1 may have a cross section other than circular. Most appropriately, the path of contact between the filament 3 and the belt 1 is curved.

I claim:

1. Improvement in a device for producing a false twist on a thermoplastic filament which, heated to a plastic condition, is on its path of travel made to touch an endless belt moving transversally with reference to it, and which belt has high friction against the filament and has been conducted over a pulley imparting a motion to it, wherein the improvement comprises that for stabilizing the point of contact between the filament and belt the belt forms at this point a sharp bend, which prevents the hunting of the filament.

2. Device according to claim 1, characterized in that the bend in the belt is produced by traction caused by the filament.

3. Device according to claim 1, characterized in that the bend in the belt is produced by elements guiding the belt, such as freely rotating rolls.

4. Device according to claim 1, characterized in that the bend in the belt is produced by a freely rotating roll placing tension on the belt, which roll has low friction against the filament, and that the filament has been conducted into the gap between the belt and the roll from such a direction that it touches both the belt and the roll.

5. Device according to claim 1, characterized in that the bend in the belt is produced by a magnet attracting the belt and that the belt, to this purpose, consists of a

magnetic material, for instance of plastic with metal powder admixture.

6. Device according to claim 5, characterized in that the pulley is magnetic for improvement of the friction between it and the belt.

7. Device according to claim 1, characterized in that the bend in the belt is produced by an air nozzle, which by compressed air effect pushes the belt towards the filament.

8. Device according to claim 7, characterized in that the air nozzle has for the belt a groove having in its bottom a slit, through which compressed air is supplied so that between the groove and the belt an air cushion is formed, which keeps the belt at a distance from the groove.

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