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(54) **DEVICE FOR CABLING AND CONTINUOUS  
FIXING OF WIRES FOLLOWED BY  
COMPLEMENTARY HEAT TREATMENT**

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(57) **ABSTRACT**

The device comprises: a two-for-one twisting spindle supporting a thread winding which is twisted or cabled via a second thread; a mechanism for pulling the thread in order to cancel the tension resulting from the twisting or cabling operation; a heater for heating the thread followed by a cooling area; and a mechanism for coiling the thread. Upstream from the heater, thread is subject to the action of at least one colorant.

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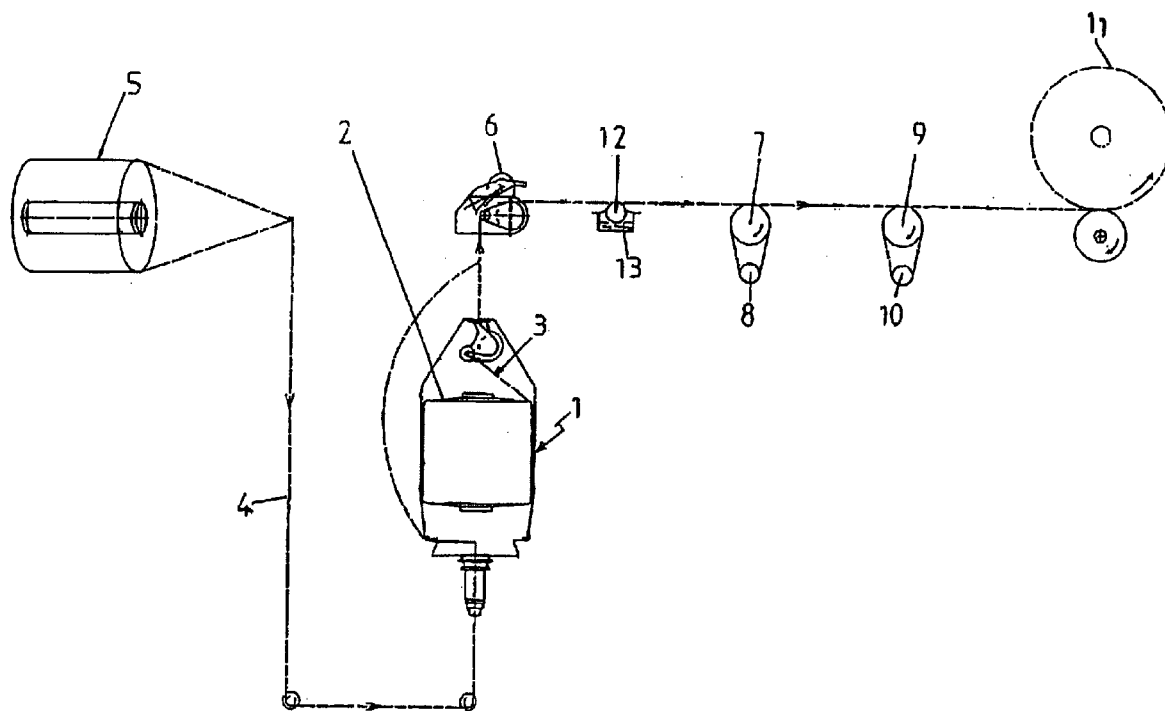
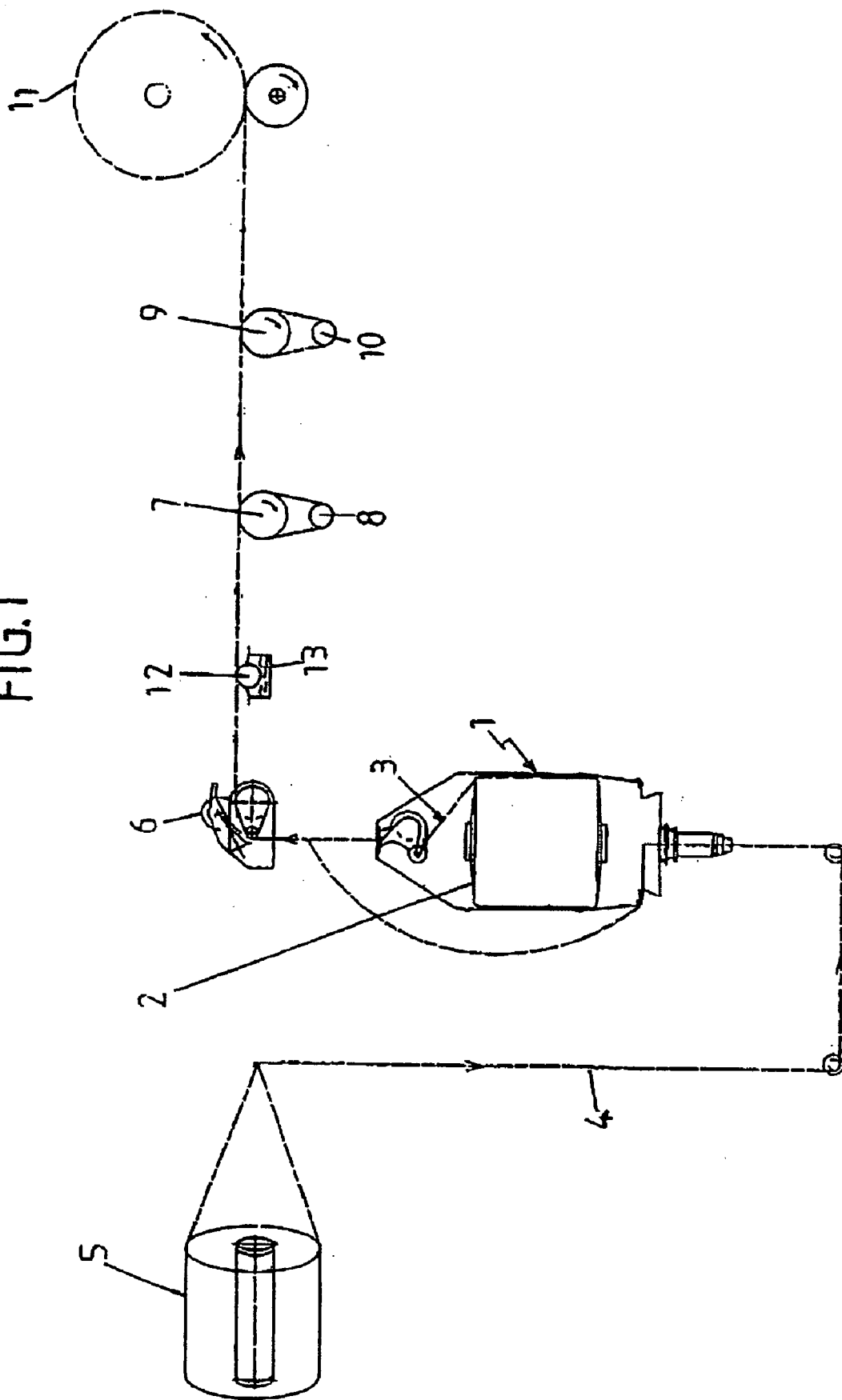


FIG. 1



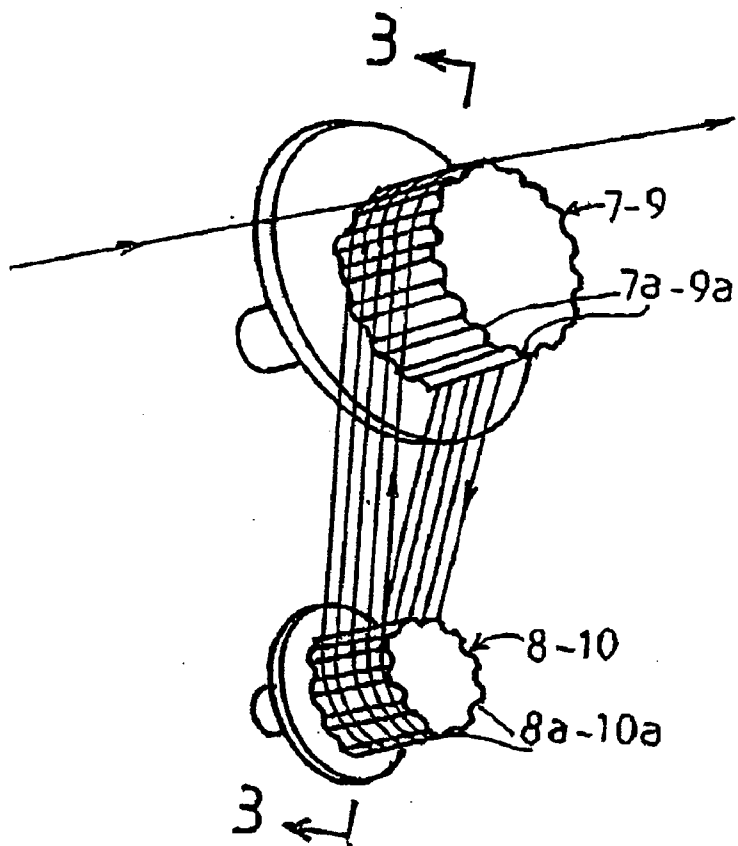
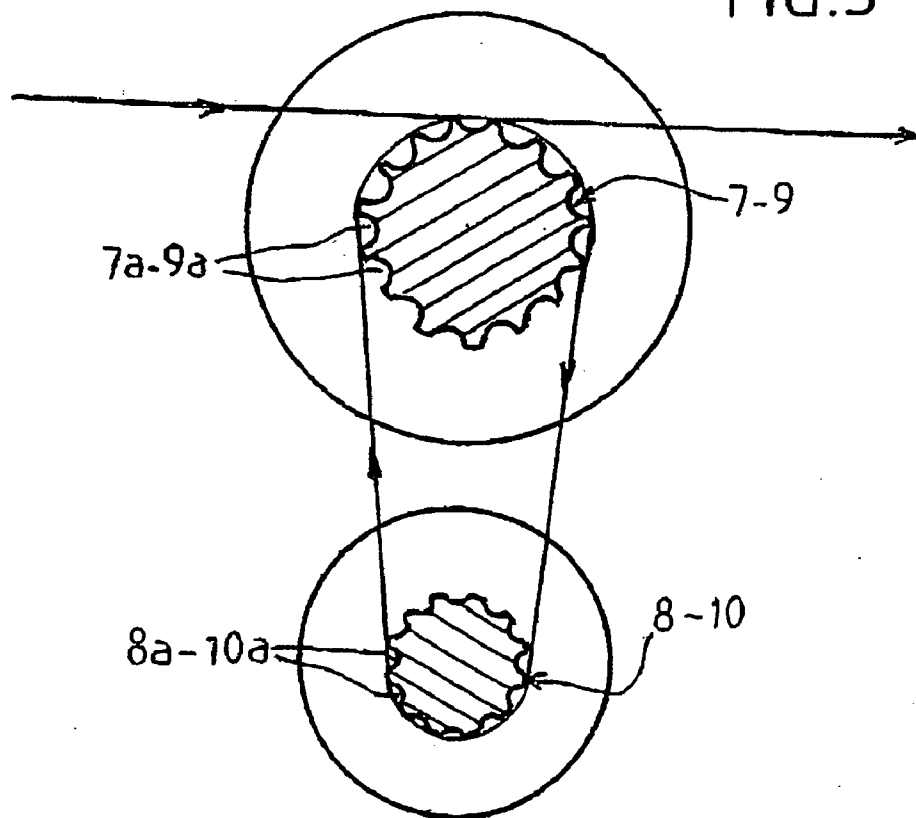


FIG. 2

FIG. 3



**DEVICE FOR CABLING AND CONTINUOUS  
FIXING OF WIRES FOLLOWED BY  
COMPLEMENTARY HEAT TREATMENT**

[0001] The invention relates to a device making it possible to carry out continuously the cabling and setting of continuous threads.

[0002] Such devices are used, for example, by machines making it possible to produce threads for carpets.

[0003] The prior art may be illustrated, as an in no way limiting indication, by the teaching of patents FR 1 455 499 and U.S. Pat. No. 3,525,205. It may be gathered from these documents that such machines comprise a central stand supporting a plurality of identical work stations consisting, as seen in the direction of passage of the thread, of a single or double twist spindle supporting a package of said thread, of means for the take-up of the thread, of a heat treatment oven followed by a cooling zone, and, finally, of means for winding up the treated thread. The heat treatment oven is arranged vertically (patent FR 1 455 499) or horizontally (patent U.S. Pat. No. 3,525,205). The thread is maintained in the relaxed state during heat treatment and during the cooling phase before winding.

[0004] The teaching of the patent FR 2 414 568 may also be mentioned, which discloses a machine, in which each work station comprises a double twist spindle followed by a heat treatment oven arranged between two take-up systems followed by winding-up means. Such a machine is used to carry out the drawing of a partially drawn thread by means of the double twist spindle which rotates at a speed such that the tension imparted to the thread in the balloon which it forms at the exit of said spindle brings about the drawing of the thread.

[0005] Machines similar to those described above for carrying out this direct cabling operation are also known. In this case, the thread coming from the package mounted on the single and/or double twist spindle is combined with a second thread coming from a second reel mounted fixedly on the stand of the machine. This second thread is delivered through the shank of the corresponding spindle to a cabling head arranged in the extension of the latter. An advantageous exemplary embodiment of this type of machine makes it possible to carry out both a twisting operation and a cabling operation, as may be gathered from the teaching of the patent FR 2 732 043, of which the present applicant is also the proprietor.

[0006] According to the teaching of this patent, the machine comprises a central stand supporting a plurality of identical work stations, each comprising:

[0007] a double twist or cabling spindle supporting a thread package, said thread being intended to be twisted or cabled together with a second thread;

[0008] means for the take-up of the thread, making it possible to cancel out the tension resulting from the twisting or cabling operation;

[0009] thread heating means followed by a cooling zone;

[0010] means for winding up the treated thread;

[0011] the heating means consist of a linear oven arranged vertically or substantially vertically;

[0012] the thread executes an outgoing and return travel within the oven into which the end of said thread is introduced in its lower part, while a system for the take-up and return for said thread is provided in the upper part;

[0013] means are provided for maintaining the thread under minimum tension during the cooling phase and in order to deliver it to the winding-up means.

[0014] These arrangements make it possible not only to double the duration of the heat treatment for an oven of given length, but also to control perfectly the tensions imparted to the thread during the heat treatment and cooling phases.

[0015] This latter solution affords important advantages, as compared with the prior art, but nevertheless cannot be considered as entirely satisfactory.

[0016] To be precise, in view of the treatment which the thread must undergo, the oven has to be brought to a relatively high temperature of the order of 210° C. and must have large dimensions. For example, the length or height of the oven may amount to 4.50 meters. It is necessary, moreover, to provide substantial means for ensuring the cooling of the thread in the relaxed state. For example, such means may consist of a relaxation cloth arranged horizontally underneath the oven. This cloth may either be individual for each work station or be common to all the stations and in that case extend over the entire length of the machine.

[0017] Proceeding from this prior art, the problem which the invention proposes to solve is to produce a bulk-tinted and set thread continuously.

[0018] In order to solve such a problem, a thread cabling and/or double twist device has been designed and refined, of the type comprising in a known way:

[0019] a double twist or cabling spindle supporting a thread package, said thread being intended to be twisted or cabled together with a second thread;

[0020] means for the take-up of the thread in order to cancel the tension resulting from the twisting or cabling operation;

[0021] thread heating means followed by a cooling zone;

[0022] means for winding up the thread.

[0023] According to the invention, and in light of the set problem to be solved, the device comprises, upstream of the heating means, means capable of subjecting the thread to the action of at least one dye.

[0024] The invention is explained in more detail below with the aid of the figures of the accompanying drawing in which:

[0025] **FIG. 1** is a diagrammatic view showing the principle of the device according to the invention for carrying out the continuous cabling and setting of thread and its coloration;

[0026] **FIG. 2** is a perspective view of an advantageous embodiment of the heating and cooling means;

[0027] **FIG. 3** is, on a larger scale, a cross-sectional view taken along the line 3-3 of **FIG. 2**.

[0028] As shown in FIG. 1, the device comprises, in a known way, a double twist or cabling spindle (1) making it possible to carry out either twisting or a direct cabling operation. The spindle, driven by an individual motor or any known appropriate means, receives a reel (2) of a first thread to be treated (3), called the “can thread”. To carry out the direct cabling operation, the spindle (1) has a hollow shank for delivering a second thread (4), called the “creel thread” coming from a reel (5). Thus, in a known way, the creel thread (4) is delivered through the hollow shank of the spindle so as to be combined with the can thread (3) in the region of a cabling head (6).

[0029] The cabling head (6) is of any known and suitable type. At its exit, the threads (3) and (4) are assembled by means of the conventional direct cabling method. It should be noted that the cabling head (6) may be combined with take-up means making it possible to cancel out the tension resulting from the cabling or from the twist. For example, as taught by the abovementioned French patent FR 2 732 043, the take-up means may be composed essentially of an assembly of the type comprising a capstan and a press roll. The combination with a grooved roll makes it possible to obtain an easing of the cabled thread. This results in a very high accuracy in the take-up speed of the threads and also in a cancelation of the tension resulting from the twisting or cabling operation.

[0030] The means for the heat treatment of the cabled thread (3-4) consist of at least one cylindrical godet (7) associated with a return guide (8) for allowing an easing of the threads. The godet (7) is brought to a defined temperature and is driven positively in rotation.

[0031] At the exit of the heating means (7) and (8), the treatment device has a cooling zone likewise consisting of the combination of a cylindrical godet (9) and of a return guide (10). At the exit of the cooling zone (9) and (10), the thread is wound onto a reception means in the form of a reel (11).

[0032] As mentioned, the godet (7) is associated with heating means making it possible to maintain it at a predetermined temperature. For example, these heating means are of the induction type, making it possible to maintain the godet within a predetermined temperature range, for example between approximately 90° C. and 240° C. The godet (7) is driven in rotation by any known and suitable means. The return roller (8) is mounted rotatably.

[0033] In an important way, the godet (7) and the guide roller (8) have spaced slots (7a) and (8a) formed parallel to their axis of rotation.

[0034] These arrangements make it possible to increase and improve the bulking effect of the cabled threads (3-4).

[0035] In the same way, the godet (9) and the return roller (10) have spaced slots (9a) and (10a) formed parallel to their axis of rotation. It should be noted that the godet (9) relating to the cooling zone may be brought to a temperature of between approximately 55° C. and 130° C.

[0036] The various slots of the godets (7) and (9) and of the return rollers (8) and (10) are rounded so as to form

grooves. As regards the slots, various embodiments may be provided, for example in terms of their dimensioning. The slots may be of the same depth or not. Advantageously, the slots are distributed uniformly on the circumference of the godet and of the return roller, without thereby ruling out an unequal distribution. Finally, these slots are parallel to one another or not.

[0037] The various solutions applied with regard to the godets (7) and (9) may be considered with regard to the return rollers (8) and (10).

[0038] Without thereby departing from the scope of the invention, the use of heating and cooling means other than those of the types described in patent FR 2 732 043 is not excluded.

[0039] Upstream of the heating means (7) and (8), at the exit of the cabling assembly (6), the threads (3) and (4) are subject to the action of a roller (12) or other means capable of applying a dye (13) to the threads (3-4).

[0040] These arrangements allow the continuous production of a cabled, bulk-tinted and set thread.

1. A device for the continuous cabling and setting of threads followed by an additional heat treatment, comprising:

a double twist or cabling spindle supporting a first thread, said first thread being twisted or cabled together with a second thread to form a twisted or cabled thread;

means for take-up of a thread in order to cancel out tension resulting from a twisting or cabling operation;

thread heating means followed by a cooling zone;

means for winding up the twisted or cabled thread; and

upstream of the heating means, means subjecting the twisted or cabled thread to action of at least one dye.

2. The device as claimed in claim 1, wherein the heating means comprises at least one cylindrical godet associated with a return guide or roller for allowing an easing of the thread, said godet being brought to a defined temperature and being driven positively in rotation.

3. The device as claimed in claim 2, wherein the cooling zone comprises an assembly of at least one cylindrical godet and return guide or roller ensuring the easing of the thread, said assembly being located between the heating godet and the winding-up means.

4. The device as claimed in claim 1, wherein the heating means comprises an oven.

5. The device as claimed in claim 3, wherein at least one godet and return guide or roller have spaced slots formed parallel to their axis of rotation.

6. The device as claimed in claim 5, wherein a bottom of the slots is rounded so as to form grooves.

7. The device as claimed in claim 6, wherein the grooves are distributed uniformly or not on a circumference of the at least one godet and of the return guide or roller.

8. The device as claimed in claim 6, wherein a bottom of the grooves delimits a diameter of same value or not.

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