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(54) **Method for identifying yarn spools, in particular for identifying the quality of textile yarn wound on said spools**

(57) The scope is to avoid any manual action during the phase of applying to the textile yarn spools any devices suitable for identifying each spool. The solution consists in making arrangements so that said application of said spool identifying devices in the final spooling phase to produce a ring-shaped local thickening (20) on the lateral outer surface (21) of the spool (7-7A) by the localized deposition of a multiple number of yarn windings (5). The position of said ring-shaped local thickening (20) with respect to the extremities (22, 23) of said spool (7A) can thus be taken as a criterion for identifying the quality of the textile yarn (5) wound on said spool (7A) and/or the degree of filling said spool (7A), by establishing a univocal relationship between said position and a value or information.



Description

The object of this invention is a method for identifying yarn spools, in particular for identifying the quality of the textile yarn wound on said spools.

For various reasons, already well known to the experts and therefore not reported on this occasion for brevity, a textile production may generate a yarn of various characteristics or rather of various degrees of quality. This makes it necessary to apply a marking to differentiate the spools bearing a yarn of the same type but having different qualitative and/or weight characteristics. The problem is felt on all textile machines producing spools or similar devices, and in particular on styro-texturizing machines, also referred to below for exemplifying purposes.

At this time, these machines essentially comprise the following devices or units: a styro-texturizing device, a unit for sensing the tension of the yarn downstream of the styro-texturizing device, and an automatic spool lift-off unit including a yarn launching rod, and an electronic unit which handles the management of the textile machine and in particular the processing of the yarn's tension data so as to measure its quality, possibly by a rating system. This is usually of a conventional nature because it can be directly agreed with the purchaser of the spools of yarn. The results of this processing are reported on a label that the operator undertakes to associate with the respective spool. The phase of applying suitable identifying means to each spool based on the mentioned rating system is therefore carried out entirely by hand. This means that the operator is always forced to read the label to interpret the data marked on the same, identify the spool to associate the label with, and apply it at a point where it can be most visible and at the same time least exposed to damage as a result of the subsequent spool handling steps.

It has been observed that this operation is in the long term tedious, easily distracting and thus capable of inducing the operator to commit errors, with some negative consequences well known to the experts but omitted on this occasion for brevity.

The scope of this invention is therefore to eliminate the mentioned shortcoming or to furnish a method for identifying the spools of yarn without requiring the operator's attention, so as to guarantee that the univocal correspondence between the spool and the means used for identifying it are always correct and consequently most reliable.

It has been further observed that the use of labels to mark the spools of yarn presents certain shortcomings, as the labels normally used and usable are readable only from a distance that needs to be increased in view of extending the spaces and volumes of merchandise normally found in textile factories and their relative warehouses. Moreover, the conventional labels are readable only if the spools are correctly turned toward the viewer; if the spools are oriented so as to hide the

label from view or even in a random manner, they can be checked only by a direct action of the operator, who has to individually grasp and turn them in order to read the data filed on them. The information reported on a label may also be written in a language not accessible to the viewer.

A further purpose of this invention therefore consists in eliminating the mentioned shortcomings or in supplying a method for identifying the spools of yarn, so as to make the spool itself recognizable even at a relatively long distance, independently of the spool's orientation with respect to the viewer and of the fact that the spool is isolated or bunched up with others, regardless of the language known by the viewer.

These purposes are achieved by a method according to claim 1, referred to for brevity.

The ring-shaped thickening can be produced automatically during the spool's lift-off phase, thus avoiding any operator action. By applying a circular thickening to an entire spool, the same becomes visible independently of its orientation and from a distance greater than that available to an operator for reading an ordinary label. Every position of the ring-shaped thickening on at least one extremity of the spool can be associated with an information or a value recognized independently of the language spoken by the viewer.

The invention thus achieves the above objectives because the position of the mentioned ring-shaped thickening with respect to one or the other or both the extremities of the mentioned spool can be used as a criterion for identifying the quality of the textile yarn wound on said spool and/or the degree of filling the same, by setting up a univocal correspondence between the mentioned position and a value or information.

The method also provides the advantage of not requiring printers or any usage of inks to mark the spools, thus avoiding all the shortcomings and relative technical complications. Because of the fact that it can be implemented by the same machine processing the yarn, and in particular during the same operation shaping the spool, the method turns out to be immediately applicable at very limited cost.

The method is preferably, but not exclusively applicable to a textile machine according to claim 5, here referred to for brevity. This claim clearly shows that the invention is practicable in highly economical terms, because it may suffice to modify the automatic lift-off unit of a conventional textile machine.

In the exemplified case it suffices to provide at least one temporary arresting device, for example a small pneumatic piston acting as a stop for the yarn-launching rod in at least one pre-established position. The invention thus attains the further scope of economy and reliability, which is particularly appreciated in the domain of textile machines designed to operate continuously in order to achieve high productivity levels.

The invention is illustrated for a purely exemplifying and therefore non-limiting purpose with the aid of the

attached figures, which refer in particular to a styro-texturizing machine modified according to the invention. More precisely, the modification mainly involves the yarn-launching device, integrated with other devices to arrest the yarn launching rod in some pre-established positions. It is nevertheless obvious that the invention is also feasible on other textile machines such as for instance on spoolers, doublers and air-driven interlacers, all of them at any rate falling within the scope of protection of this invention.

Figure 1 is a partial and schematic side view of a styro-texturizing textile machine.

Figure 2 shows a ground view and first configuration of a yarn-launching device of a textile machine according to the invention.

Figure 3 is a view according to the arrow III of Figure 2.

Figure 4 shows a ground view and second configuration of a yarn launching device according to the invention.

Figure 5 is a view according to the arrow V of Figure 4.

Figure 6 shows a ground view and third configuration of a yarn-launching device of a textile machine according to the invention.

Figure 7 is a view according to the arrow VII of Figure 6.

Figure 8 shows a ground view and fourth configuration of a yarn-launching device of a textile machine according to the invention.

Figure 9 is a view according to the arrow IX of Figure 8. With reference to the Figures mentioned above, the styro-texturizing textile machine shown is generically indicated by the number 1 and comprises: a styro-texturizing device 2, a tension measuring device 3 installed downstream of said styro-texturizing device 2, an electronic unit 4 for processing said tension data to establish a quality rating of the yarn 5, and an automatic lift-off unit 6 for the spools 7. The styro-texturizing device 2, the electronic unit 4 and the automatic lift-off unit 6 are of a known and conventional construction and therefore not described in detail. The automatic lift-off unit 6 comprises a yarn-launching device 8, which unlike any known yarn launching device comprises at least one element 9 to stop a yarn launching rod 10. For the rest the automatic lift-off unit has a conventional construction.

The device for measuring the tension 3, the electronic unit 4 and the automatic lift-off unit 6 equipped with at least one arresting element 9 may also be applied to other textile machines or installations designed to implement the method according to the invention. The device 3, the electronic unit 4 and the automatic lift-off unit 6 equipped with at least one arresting element may be applied to spoolers, doublers, air-driven interlacers and the like, as well as to friction- and air-driven texturizing machines. The tension measuring device 3 measures the tension of the yarn upstream of

the automatic lift-off unit 6.

The yarn launching device 8 comprises a yarn launching rod 10 hinged at one extremity 11 and moved in a rotary manner by the first actuating devices 12. It is blocked in the pre-established positions by the arresting devices 9 governed by the electronic unit 4. Preferably, the actuating devices of the yarn launching rod comprise a first pneumatic piston 12, while the arresting devices preferably comprise at least a second pneumatic piston 9. For economic and constructive reasons aimed at allowing the use of a single second pneumatic piston 9, independently of the number of stops provided by the yarn launching rod 10, the second pneumatic piston 9 is set up in a mobile or variably positioned manner with respect to the yarn launching rod 10, so as to be able to arrest the mentioned rod 10 in accordance with certain fixed and pre-established rotation angles. As shown in particular in the Figures 3, 5, 7 and 9, the stem 14 of the piston 9 interferes perpendicularly with the trajectory of said yarn launching rod 10, whenever it is necessary to arrest the mentioned rod at the planned position.

The process is as follows. The yarn 5 slides toward the spool 7A in the direction shown by the arrow "F" in the Figure 1. Before winding itself up on the spool under process indicated by 7A to distinguish it from those already completed indicated by 7, the yarn 5 crosses the styro-texturizing device 2 and the tension measuring device 3 to reach the automatic lift-off unit 6, while engaging the undulate winding sley 15, and finally winds up on the spool 7A. The tension measuring device 3 measures the tension values of the yarn 5 downstream of the styro-texturizing device 2 and transmits them to the electronic unit 4, which memorizes and processes them based on a program that allows to rate the spool 7A in use depending on the quality of the yarn 5 wound on the same. The electronic unit 4 also controls all the remaining functions of the textile machine 1, in order to manage it. No other details of this process are given, as these aspects are in themselves known and generalized on textile machines of this type. When the spool 7A under process has reached its pre-established weight, the lift-off unit 6 starts moving and at the same time the method according to the invention is performed. The arms 16 hinged in 17 rotate in the direction of the arrow "G" so as to unload the spool 7A onto the bobbin rack 18 containing the previously processed spools. As a result of the lifting action, the yarn 5 disengages from the undulate winding sley 15 shaped in form of a "V". During the final winding phase, this consequently produces a localized ring-shaped thickening 20 on the lateral outer surface 21 of the spool 7A, by locally depositing a plurality of yarn windings 5. In the case illustrated in Figure 2, the localized ring-shaped thickening 20 is arranged in a central portion of the lateral outer surface, so that no action of a yarn launching device 8 is needed to shape it. When the windings of the ring-shaped thickening 20 have reached the expected

number, the yarn 5 is cut and an extremity ends up on the spool 7A, while the other is sucked in by an aspirating nozzle 24 which keeps it at the disposal of the yarn launching device 8 or in such a position as to be picked up by a catching extremity 25 of the yarn launching rod 10. The method according to the invention therefore provides for assuming a position (or distance) of the mentioned ring-shaped thickening 20 with respect to the extremities 22 and 23 (either or both) as a means for identifying the quality of the textile yarn wound on said spool and/or the degree of filling of said spool. This is made possible by setting up a univocal correspondence between said position and a value or an information, so that the position of the ring-shaped thickening 20 on the lateral surface 21 varies depending on said value or information, as shown in the subsequent Figures 4 and 6. Figure 8 shows on the other hand a particular case, in which the winding of the spool 7A has been arrested before allowing the spool to reach its expected weight, due to the fact that the yarn's defects were of such a number and type as to render the spool useless for any subsequent processing steps. Being totally free of any ring-shaped thickenings, the spool 7A is therefore rated to be underweight and discarded. With reference to the Figures 4 and 6, if the ring-shaped thickening 20 is to be fitted closer to the right-hand extremity 23 of the spool 7A during the lift-off steps, the yarn launching device 8 is actuated. The yarn 5 is caught by the extremity 25 of the yarn launching rod 10 and shifted over an appropriately pre-established distance by the position arresting devices or the second pneumatic piston 9, whose stem 14 projecting toward the outside limits the rotation of the rod 10 to a predetermined angle " α ". As shown in Figure 4, the localized ring-shaped thickening 20 is therefore generated in a position next to the right-hand extremity 23 of the spool 7A. When the windings of the ring-shaped thickening 20 have reached the expected number, the yarn launching rod reverts to its starting position, so that the yarn 5 is again capable of sliding within the range of action of the suction nozzle 24. The yarn 5 is cut and an extremity ends up on the spool 7A, while the remainder is sucked in by an aspirating nozzle 24 which keeps it at the disposal of the yarn launching device 8 or in such a position as to allow it to be caught by the catching extremity 25 of the mentioned rod 10. If desired, whenever a new reel is loaded between the arms 16, the yarn-launching device is re-actuated while the arresting devices 9 remain inactive. The catching extremity 25 picks up the extremity of the yarn retained by the aspirating nozzle 24 and moves it to the right-hand extremity 23 of the spool to be produced. As a result of the rotation of the reel 26, this produces the first windings which fasten the yarn 5 onto the reel 26, thus prompting the winding phase. The ondulate winding sley 15 picks up the yarn 5 while the spool descends due to the rotation of the arms 16 in a direction contrary to the arrow "G", and the winding process begins.

With reference to the Figure 6, if the ring-shaped

thickening 20 need be arranged on the right-hand extremity 23 of the spool 7A, the yarn launching device is actuated during the lift-off phase. The yarn 5 is picked up by the extremity 25 of the yarn launching rod 10 and shifted over an appropriate distance set up by the position of the arresting devices or by the second pneumatic piston 9, whose stem 14 projected toward the outside limits the rotation of the rod 10 to a pre-established angle " β " differing from the angle " α ". In the particular case shown, the difference between the rotation angles is created by shifting the arresting devices or the small piston 9 with respect to the hinge 11 of the yarn launching rod 10. Alternative solutions are at any rate possible, wherein the arresting devices may comprise a number of small pistons 9 equal to the expected arresting angles of the yarn launching rod 10. As shown in Figure 4, the localized ring-shaped thickening 20 is therefore produced on the right-hand extremity 23 of the spool 7A. When the windings of the ring-shaped thickening 20 have reached the expected number the yarn launching rod reverts to its starting position so that the yarn 5 can again slide within the range of action of the aspirating nozzle 24. The yarn 5 is cut and one extremity ends up on the spool 7A, while the remainder is sucked in by an aspirating nozzle 24 to keep it at the disposal of the yarn launching device 8, or in such a position as to be picked-up by the catching extremity 25 of the mentioned rod 10. If a new reel 26 is loaded between the arms 16, the yarn launching device starts moving again, while the arresting devices 9 remain inactive. The catching extremity 25 picks up the extremity of the yarn retained by the aspirating nozzle 24 and moves it to the right-hand extremity 23 of the spool to be produced. The rotation of the reel 26 produces the first windings which fasten the yarn 5 to onto the reel 26, thus allowing the winding phase to begin. The ondulate winding sley 15 picks up the yarn and the winding process repeats itself.

In summary, this method for identifying the spools of yarn, in particular for identifying the quality of a texturized yarn wound on said spools and /or the degree of filling of said spools comprises the following: a phase measuring the changing values of the yarn's tension downstream of the texturizing device, a phase of processing said values to establish a yarn rating, and a phase of applying certain devices to said spools 7A, capable of identifying each spool depending on said rating, which entails the production during the final winding phase of at least one localized ring-shaped thickening 20 on the lateral outer surface 21 of the spool 7A by the localized deposition of a plurality of windings, whereby the position of said localized ring-shaped thickening 20 with respect to the extremities 22 and 23 of the mentioned spool 7A is taken as a criterion for identifying the quality of the textile yarn 5 wound on said spool and/or the degree of filling of said spool by setting up a univocal correspondence between the mentioned position and a certain value or information. In particular, the step of applying said ring-shaped thickening 20 to said spools

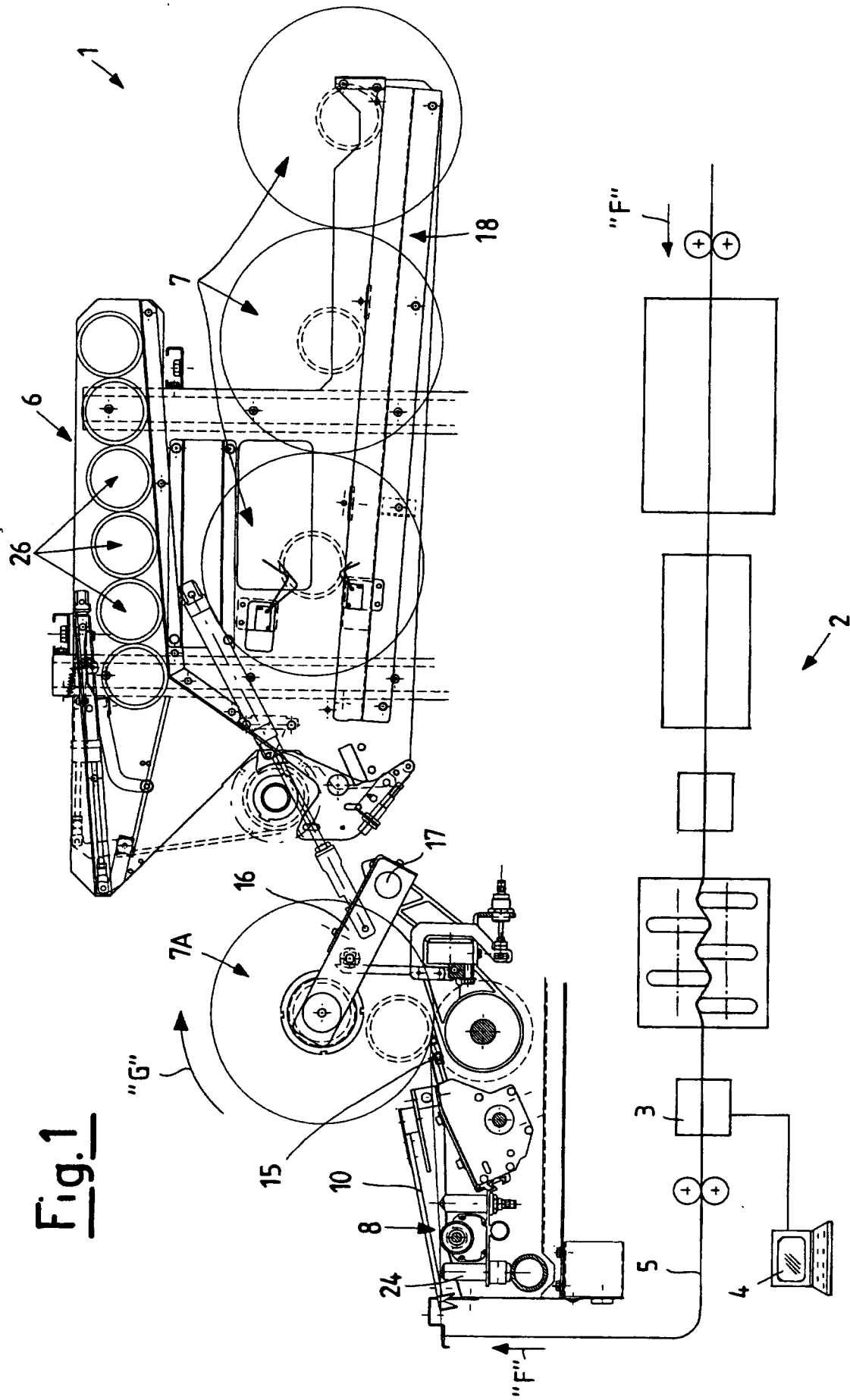
is carried out during the lift-off phase of the spool under production 7A, in particular beginning from the moment in which the yarn disengages from the ondulate winding sley 15, thus resulting in a considerable rationalizing of the overall winding process. Moreover, as the yarn 5 is kept in the position planned for the ring-shaped thickening 20 by the yarn launching rod 10 of the yarn launching device 8, the method turns out to be very economical, as it can be implemented by exploiting the devices already provided on board of the textile machine 1 to perform other functions.

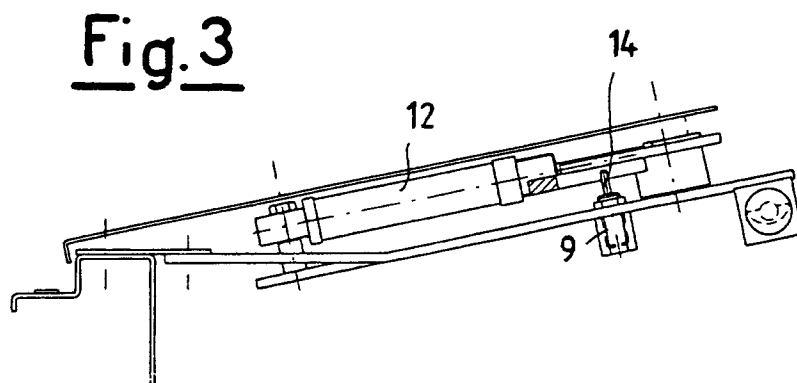
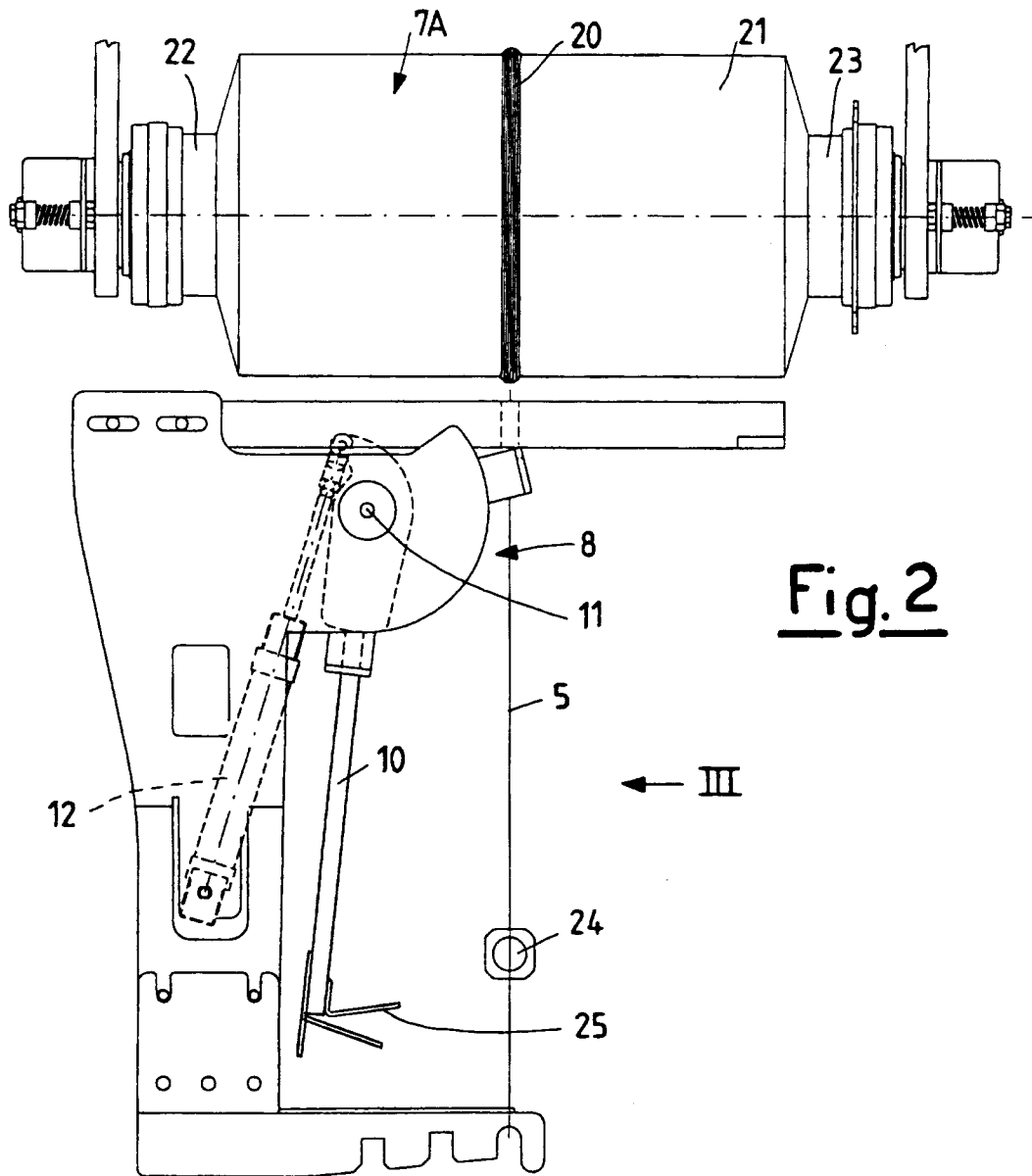
If considered useful, the lateral outer surface 21 of the spool 7A can also be fitted with a plurality of localized ring-shaped thickenings 20.

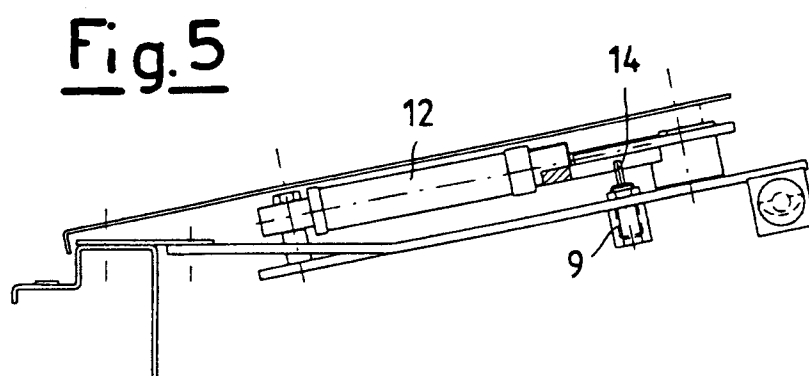
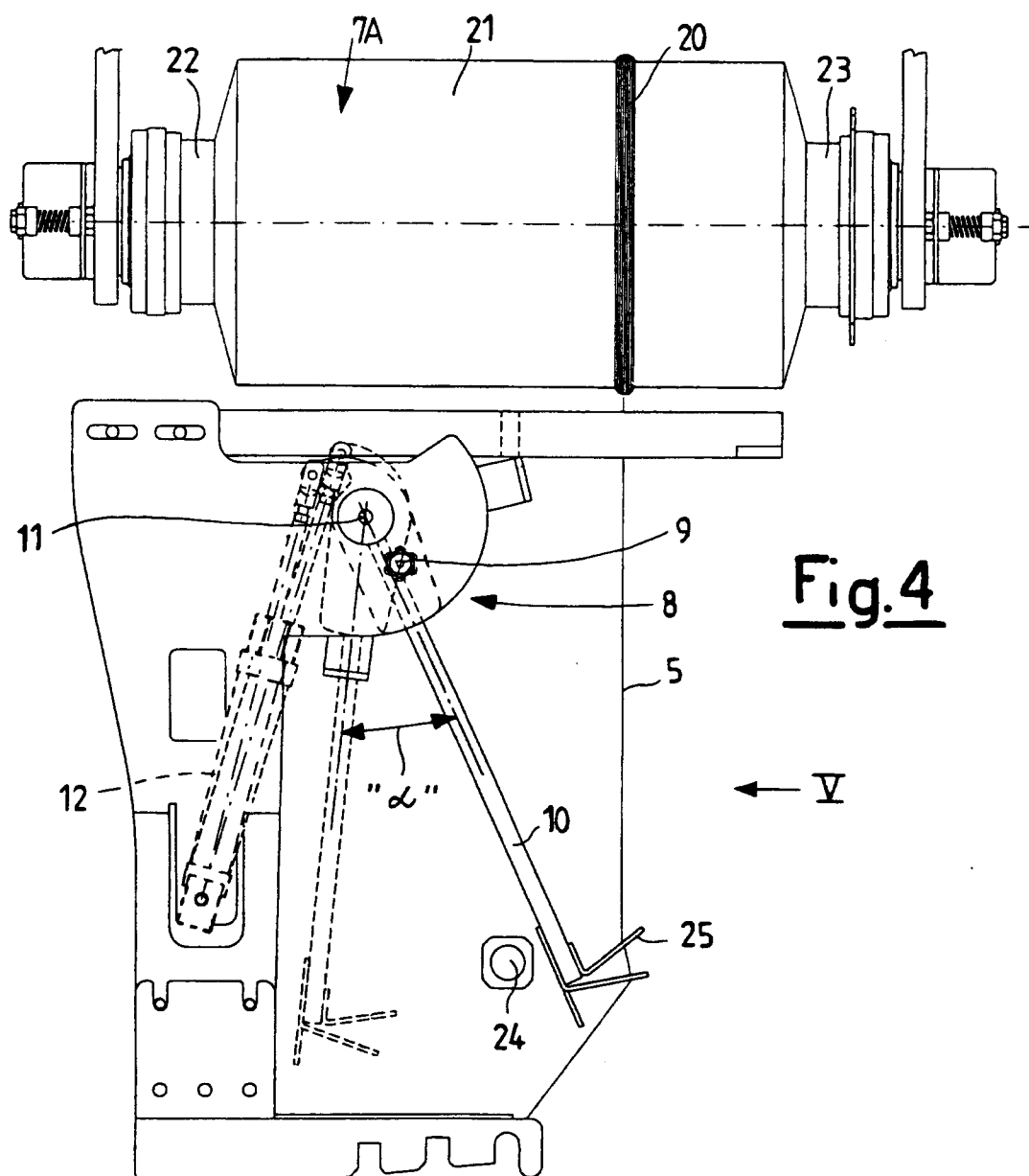
Claims

1. Method for identifying spools (7-7A) of yarn (5), in particular for identifying the quality of a textile yarn wound on said spools and/or the degree of filling of said spools, providing a phase of measuring the changes in the tension of the yarn, a phase of processing said values in order to establish a rating of the yarn, and a phase of applying to said spools devices suitable for identifying each spool according to said rating, characterized in that the phase of applying to said spools (7, 7A) of devices suitable for identifying each spool according to said rating involves generating at least one localized ring-shaped thickening 20 on the lateral outer surface (21) of the spool (7A) during the final winding phase by locally depositing a plurality of yarn windings, whereby the position of said localized ring-shaped thickening (20) with respect to at least one of the extremities (22, 23) of said spool (7A) is taken as a criterion for identifying the quality of the textile yarn (5) wound on said spool (7A) and/or for the degree of filling of said spool (7A) by setting up a univocal correspondence between said position and a value or information.
2. Method according to claim 1, characterized in that the textile yarn is of a styro-texturized type and that the changing values of the tension of the yarn are preferably measured downstream of the styro-texturizing device (2).
3. Method according to claim 1, characterized in that the phase of applying said localized ring-shaped thickening (20) to said spools (7A) is carried out during the lift-off phase of the spool itself (7A), in particular from the moment in which the yarn (5) disengages from the ondulate winding sley (15).
4. Method according to claim 1, characterized in that the textile yarn (5) is kept in the position planned for the localized ring-shaped thickening (20) by an appropriately positioned yarn launching rod (10).
5. Textile machine for implementing the method in accordance with one or more of the foregoing claims, characterized in that it comprises a device (3) for measuring the tension of the yarn, an electronic unit (4) for processing said tension values in order to establish a yarn quality rating (5), and an automatic lift-off unit (6) for the spools (7-7A) comprising a yarn launching device (8) equipped with a yarn launching rod (10) hinged (11) at one extremity, rotated by actuating devices (12) and blocked in pre-established positions by arresting devices (9) governed by an electronic unit (4) so as to perpendicularly interfere with the trajectory of said yarn launching rod (10).
6. Textile machine according to claim 5, characterized in that it represents one of the following machines: spooler, doubler, air-driven interlacer, friction texturizer or air-driven texturizer, wherein the tension measuring device (3) measures the tension upstream of the styro-texturizing device (2).
7. Textile machine according to claim 5, characterized in that the actuating devices of the yarn launching rod comprise a first pneumatic piston (12) and that the arresting devices comprise at least one second pneumatic piston (9).
8. Textile machine according to claim 7, characterized in that the second pneumatic piston (9) may be positioned with respect to the yarn launching rod (10) in such a manner as to arrest in accordance with certain rotation angles (α , β).
9. Spool of yarn (7, 7A) characterized in that it comprises on its lateral outer surface (21) at least one localized ring-shaped thickening (20) obtained by a local deposition of a plurality of windings of the yarn.

Fig.1







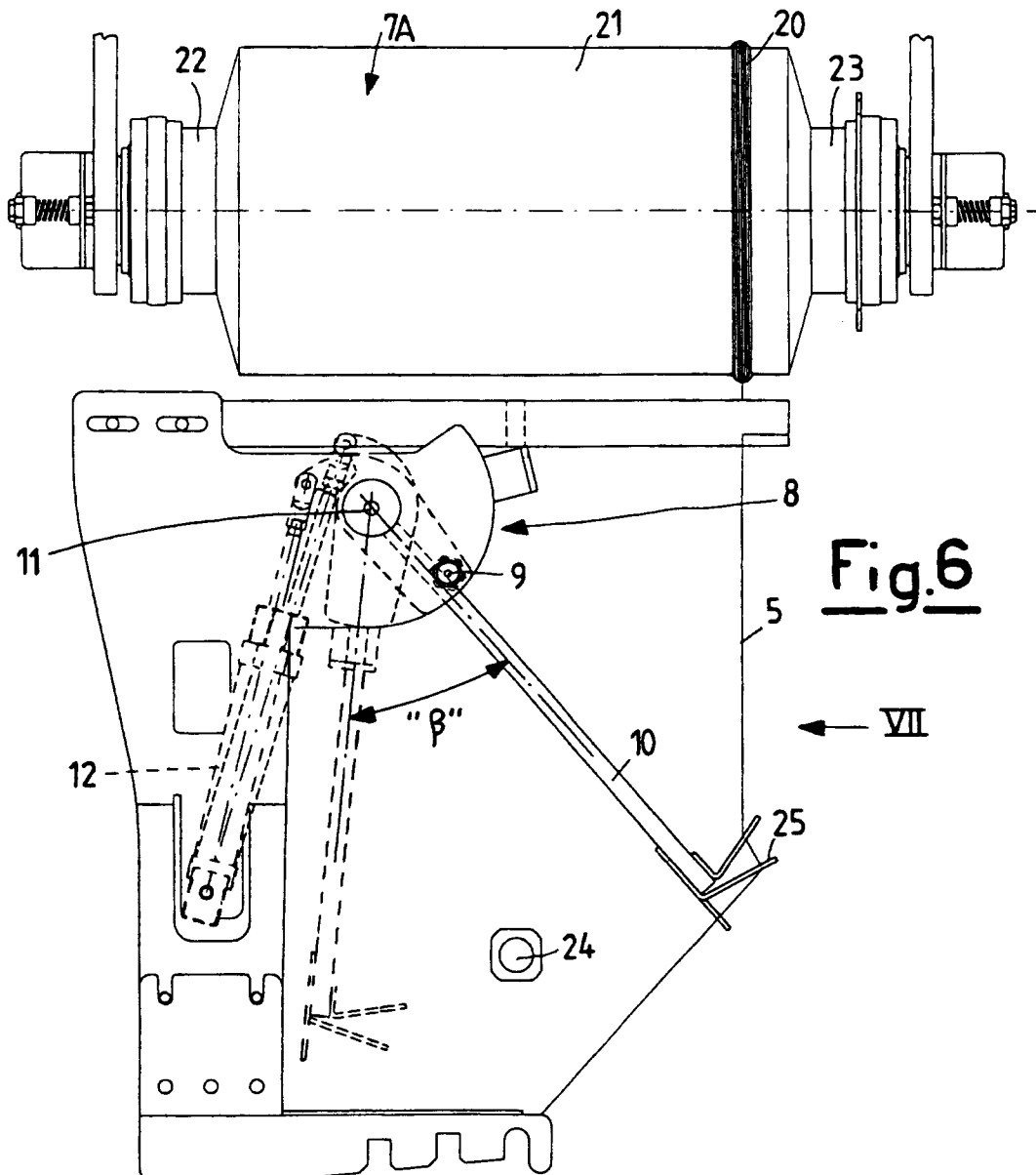
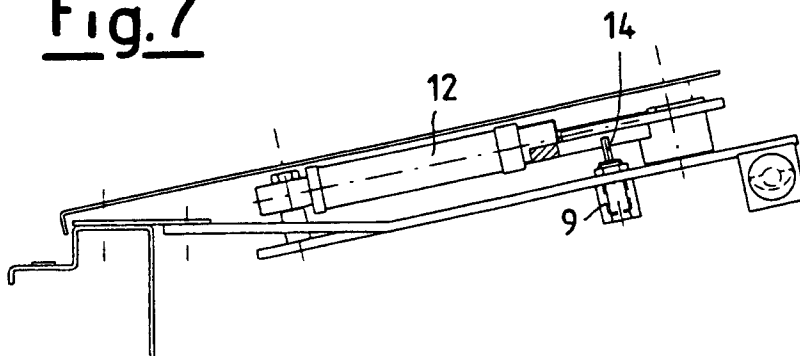
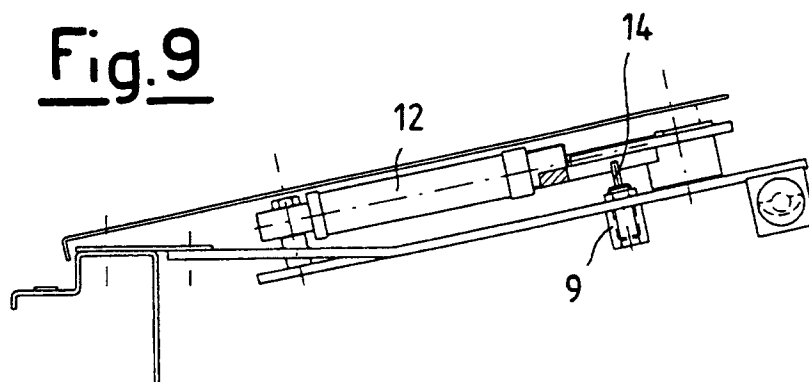
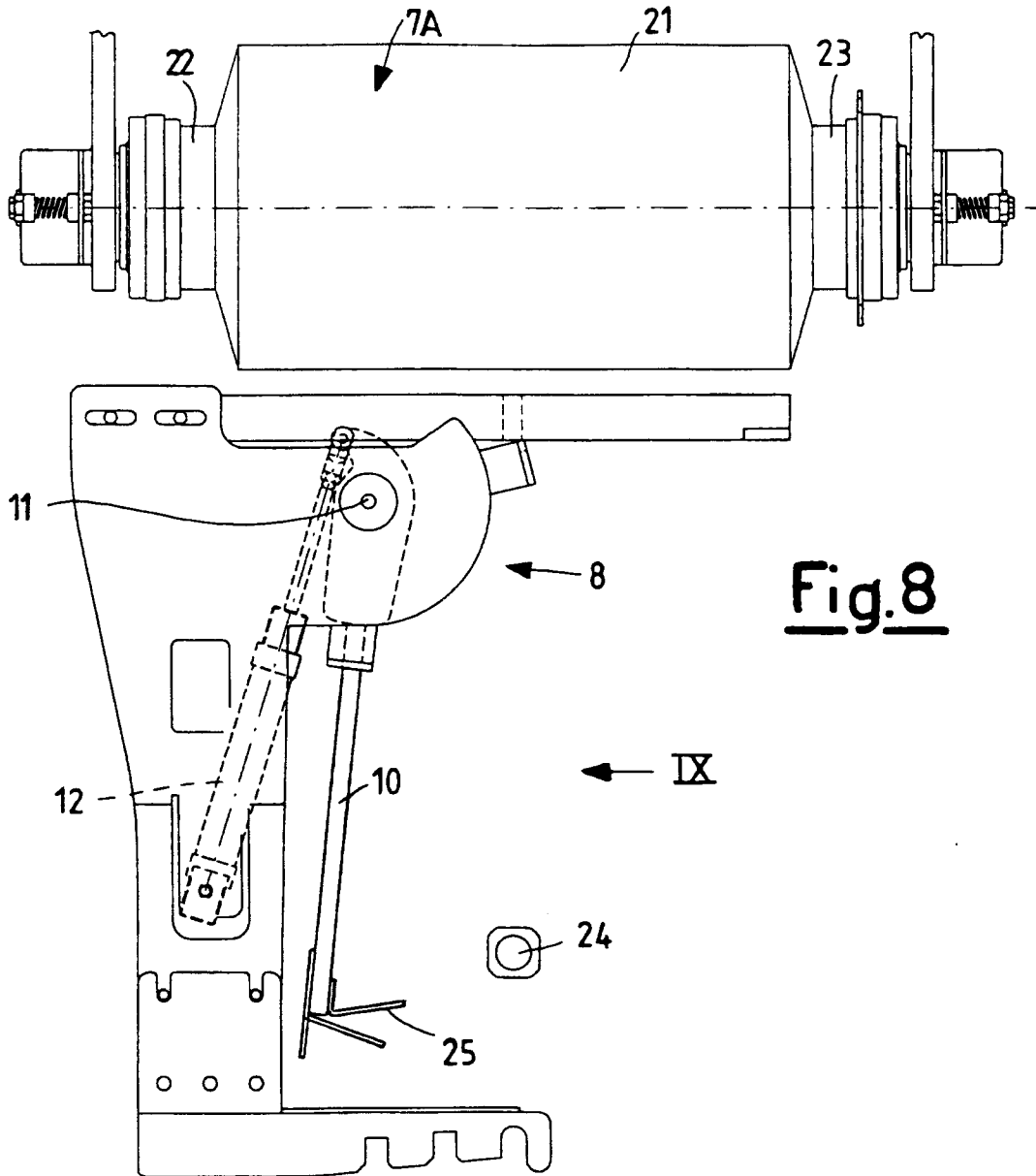


Fig. 7







European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 20 1470

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	DE 44 15 677 A (BARMAG AG) 17 November 1994	1-7, 9	B65H55/00 B65H75/00 B65H54/34
A	* the whole document * ---	8	
A	EP 0 207 471 A (BARMAG BARMER MASCHINENFABRIK AG) 7 January 1987 * the whole document * ---	1, 2, 5	
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A	EP 0 659 674 A (MENEGATTO S.R.L.) 28 June 1995 -----		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B65H
Place of search		Date of completion of the search	Examiner
THE HAGUE		1 September 1998	D'Hulster, E
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