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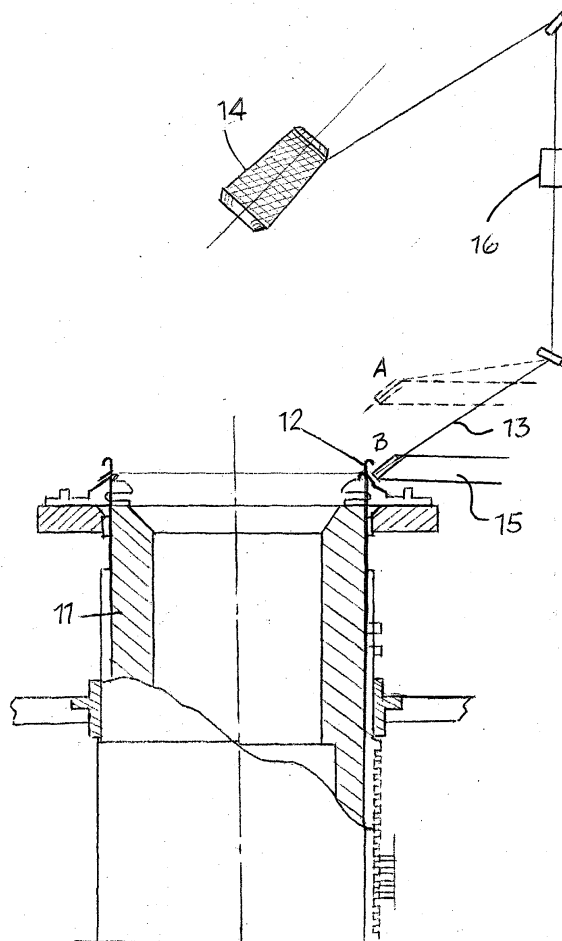
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(54) **Device for detecting the presence of yarn fed to needles on knitting and hosiery machines**

(57) The invention concerns knitting and hosiery machines and in particular a system for detecting the presence of yarn (13) being fed to the needles (12) on the cylinder (11) of such machines. Each yarn (13) is fed to the needles (12) through a yarn guide (15) moving between an out of work (A) to a work position (B) and is associated with a sensor (16) capable of detecting movement/presence of the yarn (13) and to stop the machine when the yarn guide (15) moves from the out of work (A) to the work position (B) and there is no movement/presence of the yarn (13).



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Description

Field of Invention

[0001] The present invention concerns the knitting machines in general, and in particular a control device for the presence of yarns being supplied to the needles of circular knitting and hosiery machines and to stop the machine if there is a lack in the feeding of yarn.

State of the Technique

[0002] Circular knitting and hosiery machines usually have a rotating cylinder and use needles located on said cylinder and each provided with a tongue movable between open and close position.

[0003] In normal work, the stitch is made by supplying the needles with one yarn. If this yarn, for whatever reason, breaks or fails to be supplied, the tongue of the needles remain open, protrude due to centrifugal force and a mechanical sensor reveals their presence, causing the machine to stop.

[0004] However, in the field of the knitting machines and more precisely for the production of stockings, work known as "in vanisé" is often carried out where the stitch is formed using two or more yarns which can either be one on top of the other or not so as to be one face and one back, according to requirements.

[0005] For a "in venisé" working, one needle is fed by two or more yarns supplied from respective different yarn guides, each movable between idle and working positions. Consequently, in the case of breakage or lack of feeding even of only one of the two yarns, the needle tongue continues to work normally with the yarn which is available, therefore the machine is not stopped and continues to proceed to produce faulty manufactured articles which have to be rejected.

[0006] Stopping a knitting or hosiery machine because of a breakage or lack of feeding of a yarn, when the needles are fed with two or more yarns at the same time, therefore causes a problem.

[0007] To avoid this problem, a system which memorises the flow of the yarns being supplied during the production of a first manufactured article to achieve self-learning on the part of the textile machine, was proposed. The system includes sensors associated with the various yarns and a computer which manages these sensors and which stop the machine if, during production of each successive manufactured article, a variation in flow is detected even in one yarn, either because it is broken or there is a lack of feeding. This system involves however the use of sensors, which must send signals to a computer corresponding to the flow of the various yarns during the production of the first manufactured article, and software and programming to compare the successive flows of the yarns with those which have been memorised and to stop the machine should a variation be found. Furthermore, each time the article to be

made is changed, all the manufacturing process for the new article has to be memorised.

Object and Summary of the Invention

[0008] This invention is aimed at resolving the above mentioned problem in a new and original way and above all in a way which is much simpler and economic.

[0009] One of the objects of this invention is in fact, to provide a system to control the presence of the yarns being fed in combination to the needles of a circular hosiery and knitting machine, which neither requires self-learning on the part of the machine nor consequently sophisticated electronics, and which is completely independent of the characteristics of the manufactured article to be made and/or from the fact that this may be modified or replaced by a new one.

[0010] This object is achieved, according to the invention, by associating each yarn being fed to the needles of a textile machine through a yarn guide, with a sensor capable of detecting flow/presence of the yarn itself, and stopping the machine when the yarn guide is moved from an idle position to a feeding position and the sensor does not detect flow of the relative yarn.

Detailed Description of the Invention

[0011] The invention will be described in detail in the continuation of this description made in reference to the enclosed drawing in which, the only figure shows a the schematic view of a cylinder with needles and a yarn guide in the work and out of work idle positions.

[0012] The type of circular hosiery or knitting machine taken into consideration here, usually includes a cylinder 11 housing needles 12 controlled and moving in the known way, to collect one or more yarns 13 to be knitted according to a knitting programme. Each yarn 13 comes from a respective reel 14 and is guided and supplies the needles 12 through a yarn guide 15 which moves between an out of work, idle position A, at a certain distance from the needles, and a work position B close to the needles, as shown in the drawing.

[0013] When the yarn guide 15 is in the out of work, idle position A, the yarn 13 is not fed to the needles 12, remaining in this way excluded from the knitting process; on the other hand the yarn guide 15 is placed in work position B when the relative yarn is required to feed the needles and knitted alone or together with at least one other yarn, as in the case of "in vanisé" manufacture, for example.

[0014] According to this invention, yarn 13, being fed to each yarn guide 15, is associated with a sensor 16 able to detect the flow, and consequently also the presence of the yarn to the yarn guide. The sensor 16, which can be of a known type, is connected to the electric circuit of the motor which drives and controls the cylinder 11 rotation and to the means which cause the in and out of work movements of the yarn guide 15.

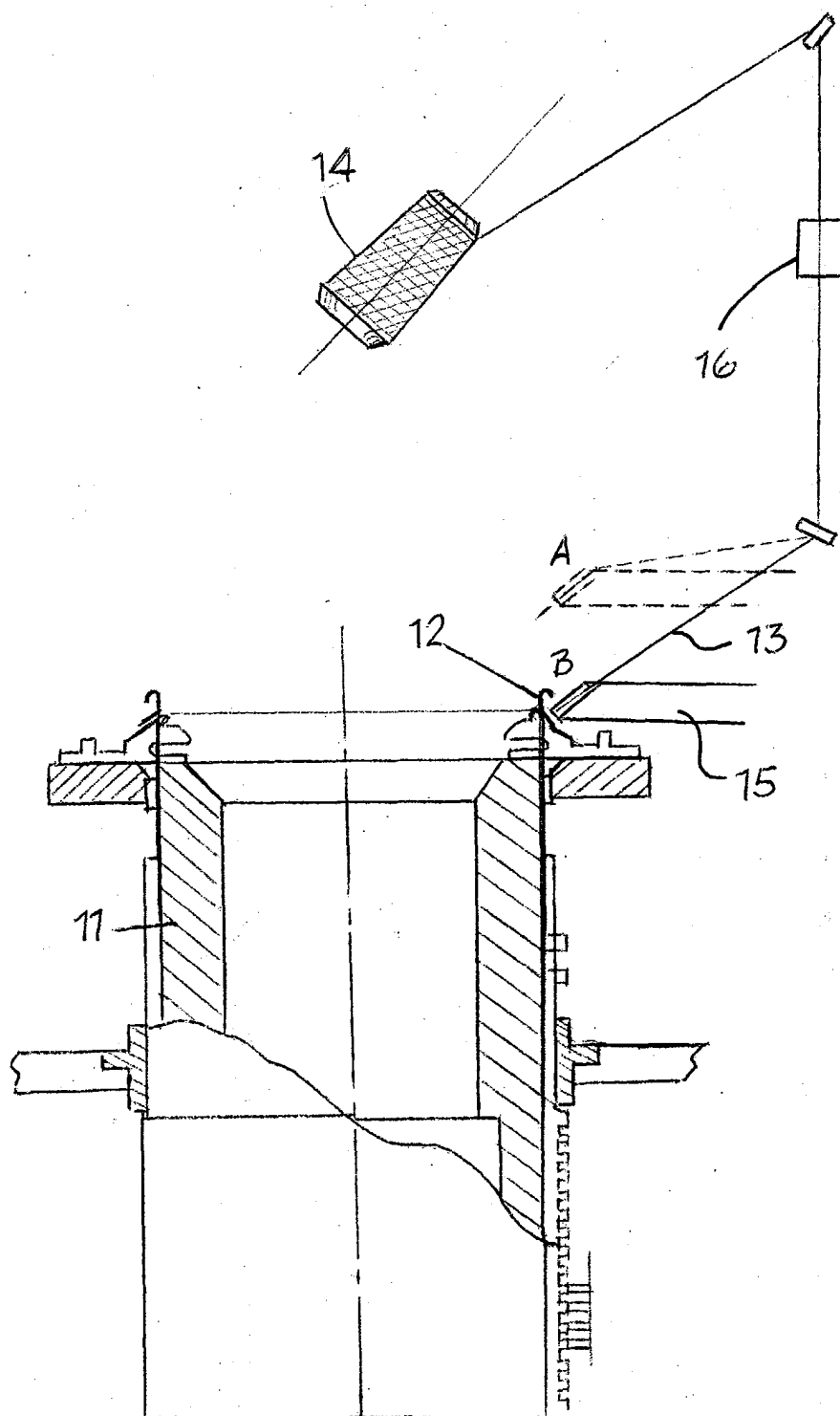
[0015] In particular, the sensor is devised and acts in combination with the yarn guide 15 to keep the electric circuit on the motor closed so that the latter and therefore the machine operate when the yarn guide is in the work position and the yarn, on flowing, regularly passes through the yarn guide and consequently supplies the needles for a correct formation of the stitches. On the other hand, if the sensor does not detect flow/presence of the yarn when the respective yarn guide passes from the out of work, idle position to the work position, it causes the electric circuit on the motor to open and stop the machine so as to prevent the manufacture of faulty articles and rejects due to the lack of supply of the yarn.

[0016] In other words, in compliance with the system of the invention, a knitting or hosiery textile machine is stopped when any yarn guide is placed in the work position to feed the needles on the cylinder and the related sensor does not detect movement of the yarn to the yarn guide itself.

Claims

1. A system for controlling the presence of the yarns being fed to the needles on the cylinder of circular knitting and hosiery machines with the object of stopping the machine when a lack of yarn occurs, and where each yarn being supplied through a yarn guide moving from an out of work, idle position to a work position, **characterised by** the feature of associating each yarn feeding the needles through a related yarn guide, with a sensor capable of detecting the flow/presence of the yarn itself, and to cause the stop of the machine when the yarn guide is moved from the out of work position to the work position and said sensor releases a signal which is indicative of absence of flow of the related yarn to said yarn guide.
2. The system according to claim 1, wherein the sensor associated with each yarn is placed in connection with the electric circuit of a motor which drives and controls the rotation of the cylinder with needles of the machine and with means controlling the in and out of work movements of the yarn guide corresponding to said yarn, so that the movement of the yarn guide to the work position concurrent with a failure to detect movement of the yarn on the part of said sensor causes the electric circuit to open, stopping the machine.

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EUROPEAN SEARCH REPORT

Application Number
EP 03 42 5468

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	GB 2 158 107 A (MEMMINGER GUSTAV) 6 November 1985 (1985-11-06) * page 5, line 17-113; claim 18; figures 1,6 *	1,2	D04B35/16
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			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			D04B
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 8 March 2004	Examiner Sterle, D
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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