(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 453 032 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **91200870.3**

(51) Int. Cl.5: **D03D 47/34**

(22) Date of filing: **12.04.91**

(30) Priority: **17.04.90 NL 9000905**

(43) Date of publication of application:
23.10.91 Bulletin 91/43

(84) Designated Contracting States:
BE DE FR IT NL

(71) Applicant: **Rüti-Te Strake B.V.**
Dr. Huub van Doorneweg 26
NL-5753 PM Deurne(NL)

(72) Inventor: **Gunneman, Paul**
Medevoort 15
NL-5731 RM Mierlo(NL)

(74) Representative: **Boelsma, Gerben Harm, Ir. et al**
Octrooibureau Polak & Charlouis Laan
Copes van Cattenburch 80
NL-2585 GD Den Haag(NL)

(54) A method and device for (re) establishing the yarn course between a yarn source and a yarn consuming device.

(57) A method and device for (re)establishing the yarn course between a yarn source (1) and a yarn consuming device (6), by presenting the leading end of the yarn (12) at the inlet of a guiding passage leading through the yarn consuming device (6) and transporting said yarn through said guiding passage by means of a pressurized air jet. According to the invention the yarn is transported through the guiding passage in a pulsating manner.

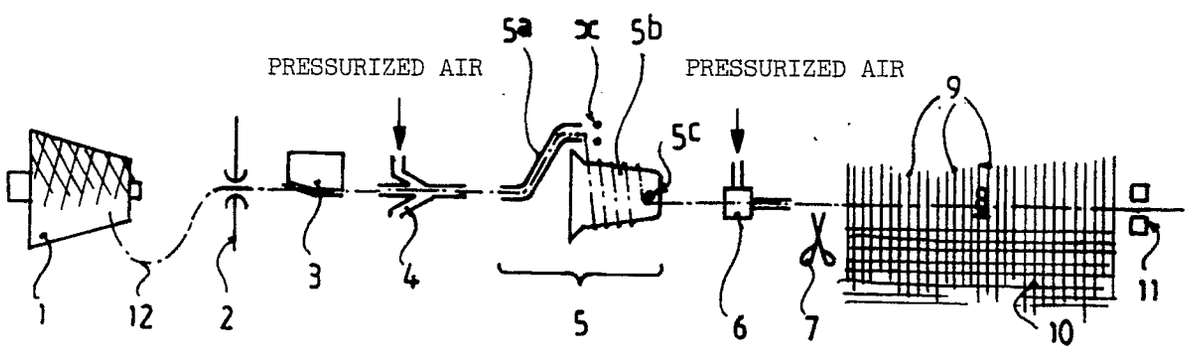


FIG. 1

EP 0 453 032 A1

The invention relates to a method for (re)-establishing the yarn course between a yarn source and a yarn consuming device, by presenting the leading end of the yarn at the inlet of a guiding passage leading towards the yarn consuming device and transporting said yarn through said guiding passage by means of a pressurized air jet.

Establishing the yarn course between a yarn source and a yarn consuming device, the so called "threading", is involved when starting up a new operational period of the yarn consuming device, when charging over to a different yarn type or colour, and also when a weft yarn course has to be repaired upon breakage.

More particularly reference is being made to the weft (preparing) section of a shuttle-less weaving machine as typical example of a yarn consuming device.

During the threading-in procedure the weft yarn usually has to follow a rather tortuous path which makes it very difficult or even almost impossible to thread the yarn in by hand. For that reason the threading-in of the weft yarn in modern weaving machines is sought to be effected, for the greater part, in an automatic manner. The air-transporting passage used therewith and the connected section of the yarn consuming device usually also show a rather tortuous course. As a result of this the head of the yarn taken along by the air jet may easily get arrested against portions of the guiding passage wall so that the yarn length following the leading end will get "dammed up". This may lead to clotting and hence to a considerable yarn waste.

The present invention aims at overcoming or at least reducing the above drawbacks. According to the invention this aim is achieved by transporting the yarn through the guiding passage in a pulsating manner.

Due to the pulsating type of transport the tendency of the yarn to get "dammed up" will be considerably reduced on one hand, whereas on the other hand the chance of the leading end of the yarn becoming blocked will be substantially reduced either or the leading end of the yarn - whenever becoming blocked - will easily become released again.

It will be appreciated that the pulse frequency may be selected depending on the type of yarn to be transported and that the control of the yarn may be influenced by varying the pulse frequency.

The pulsating transport of the yarn through the guiding passage may be effected in a practical way by pulsatingly braking the yarn at an upstream location while using a substantially constant pressurized-air jet.

The mention also relates to a device for (re)-establishing the yarn course between a yarn source and a yarn consuming means, more particularly between a weft yarn source and the weft (preparing) section of a shuttle-less loom, said device comprising a guiding passage leading towards the yarn consuming means and adapted to be supplied by a pressurized air jet. According to the present invention a device of this type well-known per se, is characterized in that at a location upstream of said guiding passage a yarn brake is provided which is adapted to be powered in a pulsating manner.

In this connection it should be taken into consideration that in modern shuttle-less weaving machines having automatic weft yarn threading facilities, a yarn brake is often provided upstream of the weft yarn threading passage. Under normal (weaving) conditions such a yarn brake is adjusted so as to apply a predetermined constant braking force onto the continuously moving weft yarn which keeps the yarn under a certain tension and will allow to control the yarn course through the machine. During such normal use the supply of pressurized air to the yarn threading passage will be turned off. It will be appreciated that such a brake may be utilized to fulfil the pulsating braking function according to this invention by pulsatingly interrupting the braking action or interruptingly lowering the braking level.

The invention will be hereinafter further explained by way of examples which reference to the accompanying drawings.

Fig. 1 shows a diagram of the major parts of the weft (preparing) section of a pneumatic weaving machine designed in accordance with the invention and

Fig. 2 is a diagrammatic perspective view on an enlarged scale of the yarn brake incorporating the invention and used in the weaving machine of Fig. 1.

As seen from the left to the right, i.e. in the main direction of movement of the weft yarn, the diagram of Fig. 1 shows the following parts and devices:

- a stationery weft yarn package 1, a yarn guiding eye (the so-called "balloon catcher") 2, an electro-magnetic yarn brake 3, a threading injector 4, a weft-preparing device 5, a main injector 6 functioning as a weft-inserting device, a cutting member 7, the weaving shed 8 with the warps 9 and the clothe 10 as well as a weft-detecting device 10.

Except the special embodiment of the yarn brake 3 this diagram corresponds to that of a well-known pneumatic weaving machine. In the diagram shown, a weft-preparing device of the "drum"-type is shown, consisting of a winding arm 5a (the so-called "flyer") having a guiding passage for the weft yarn, and a stationary drum 5b adapted to collect the weft yarn in the form of a number of

windings, as well as a blocking pin 5c extending from the winding surface of the drum.

In normal use the weft yarn 12 is continuously drawn from the yarn package 1 and guided, via the guiding eyelet 2 and the threading injector 4, towards and through the guiding passage in the winding arm 5a, which coils the yarn onto the drum 5b. Each time the yarn windings leyed onto the drum 5b have reached a total length corresponding with the desired weft length (=weaving width) the locking pin 5c is retracted from the winding surface of the drum 5b which releases the collected weft length and permits this weft length to be delivered to the main injector 6 which is supplied by pressurized air and is adapted to transport said weft length through the weaving shed 8.

The completion of the weft insertion is detected by the detecting device 11, while the inserted weft length is severed by the cutting member 7 at a location between the main injector 6 and the entrance of the weaving shed 8.

During normal use the threading injector 5 is functioning merely as a yarn guiding member, which guides the weft drawn from the package 1 along a certain path between surrounding constructive parts towards the entrance of the weft-preparing device 5. No pressurized air is supplied to the threading injector 4 under these conditions.

The threading injector 4 has to fulfil its threading function whenever the yarn course between the yarn package 1 and e.g. the location (marked by "x") of the weft-preparing device 5 at the start of a (new) operational period has to established. This so-called "thread procedure" is effected by presenting the leading end of the yarn 12 at the entrance of the threading injector 4, which is to be supplied by pressurized air during the threading procedure. The air flow generated by the pressurized air within the guiding passage through the injector takes the yarn along into the direction of the entrance of the winding arm 5a and causes the yarn to be transported through the passage within said winding arm 5a. The yarn leaving the winding arm 5a at the location x may thereafter be wound, in the desired number of windings, around the drum 5b, after which the leading end of the yarn is presented at the entrance of the main injector 6, which will subsequently take care for the first weft insertion through the weaving shed 8.

The arrival of the leading end of the yarn at the location x may e.g. be detected by a suitable detecting device and the detection signal may be used to cut-off the pressurized air supply to the threading injector 4. This completes the automatic (part) of the (threading) procedure.

So far the hereinbefore described threading procedure is of a well-known nature.

Thne improvement of the threading procedure obtained by the present invention will now be described. In order to prevent disturbances in the often rather tortuous transportion path of the yarn between the yarn package 1 and the detecting location x to be caused by an abutment of the leading end of the yarn and a "damming up" of the following yarn length, the threading operation is taking place in a pulsating manner. In the example shown in the drawing this is realized by providing a pulsatingly powered electro-magnetic yarn break 3 at a location upstream of the entrance of the threading injector 4, while the pressurized-air supply to the threading injector is - at least during the threading period - kept substantially constant. For this purpose use may be made of an electro-magnetic yarn brake as disclosed in the Applicants' U.S. patent application 07/352,168 (filed on May 15, 1989).

With reference to Fig. 2 the electro-magnetic yarn brake 3 comprises a coil 13 to be energized by a pulsating voltage source indicated at 19. A core and a pole shoe are indicated at 14 and 15 respectively. A spring strip 17 has a longitudinal slot 18 and is connected, at its slotted end, to the pole shoe 15.

The yarn 12 is moving on a supporting surface 16 in the direction indicated by the arrow. In the condition of the spring strip 17 shown by full lines, the yarn 12 is moving losely (i.e. without a braking force acting on it) across the supporting surface 16, thereby passing through the space left by the slot 18. In this condition the spring strip 17 is retracted by the pole shoe 15 under the influence of the attracting force generated by the momentaneous energization of the coil 13. Each time the coil is pulsatingly de-energized the spring strip 17 will return to its untensioned position shown by dash-dotted lines, in which position the yarn 12 is clamped between the supporting surface 16 and the overlying spring strip 17 with a certain braking force. This braking force may be adjusted (by well-known means not shown) to the desired level.

In the example of fig. 2 in fact a brake is involved which is exerting an adjustable constant braking force in its deënergized state and which will pulsatingly open when energized.

The yarn might also be guided between the spring strip 17 and the pole shoe 15, in which case no braking force is applied to the yarn in the deënergized state. In this case one could speak of a pulsatingly closing yarn brake.

It will be understood that other types of yarn brakes, e.g. with a mechanically adjustable braking level, may be used as well. In this connection yarn brakes of the double spring leaf type, yarn brakes of the poppet type and yarn brakes of the multiple deviation type would be suitable.

Claims

1. A method for (re)establishing the yarn course between a yarn source and a yarn consuming device, by presenting the leading end of the yarn at the inlet of a guiding passage leading through the yarn consuming device and transporting said yarn through said guiding passage by means of a pressurized air jet, characterized in that the yarn is transported through the guiding passage in a pulsating manner.

2. A method according to claim 1, characterized in that the yarn is pulsatingly braked at an upstream location while using a substan-tially constant pressurized air jet.

3. A device for (re)establishing the yarn course between a yarn source and a yarn consuming means, more particularly between a weft yarn source and the weft (preparing) section of a shuttle-less loom, said device comprising a guiding passage leading towards the yarn consuming means and adapted to be supplied by a pressurized air jet, characterized in that at a location upstream of said guiding passage a yarn brake is provided which is adapted to be powered in a pulsating manner.

4. A device according to claim 3, characterized by an electro-magnetic yarn brake connected to a pulsating voltage source.

5. A device according to claims 3-4, characterized by a yarn brake of the double leaf spring type.

6. A device according to claims 3-4, characterized by a yarn brake of the poppet type.

7. A device according to claims 3-4, characterized by a yarn brake of the multiple deviation type.

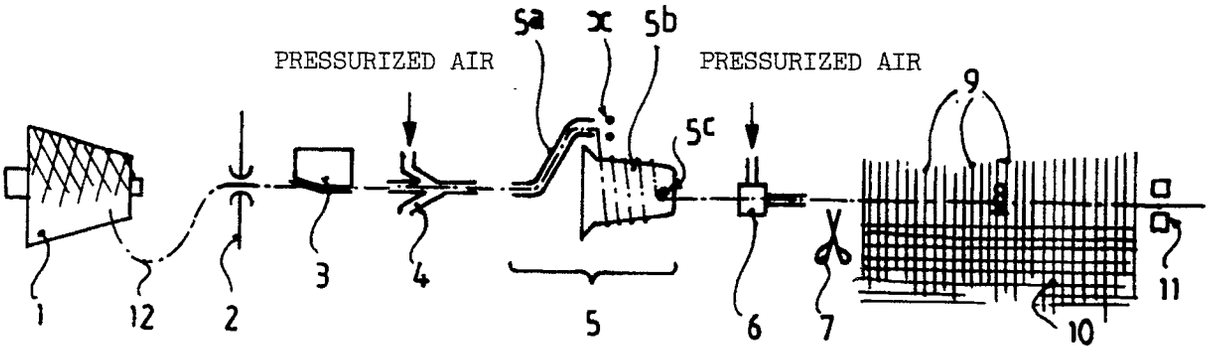
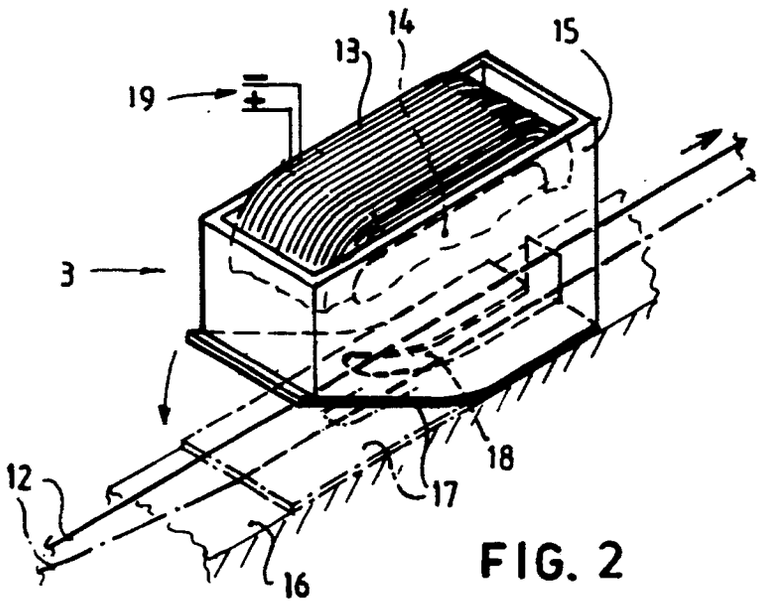

PRESSURIZED AIR
PRESSURIZED AIR
5a
x
5b
5c
9
1
12
2
3
4
5
6
7
8
10
11

FIG. 1


14
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19
3
12
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17
16

FIG. 2

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 20 0870

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.5)
A	BE-A-9 031 72 (PICANOL) * claim 5; figure 1 *	1	D 03 D 47/34

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

D 03 D
B 65 H

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
The Hague	25 June 91	BOUTELEGIER C.H.H.

CATEGORY OF CITED DOCUMENTS

X: particularly relevant if taken alone
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