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71 Applicant: VAMATEX S.p.A.
 Via Glera 18
 I-24020 Villa di Serio (Bergamo)(IT)

72 Inventor: Pezzoli, Nello
 Via Monte Grappa, 64
 I-24026 Leffe (Bergamo)(IT)

74 Representative: Vatti, Paolo, Dr. Ing. et al,
 Fumero - Studio Consulenza Brevetti
 Widenmayerstrasse 4/1
 D-8000 München 22(DE)

54 Arrangement for controlling the movement of the weft conveying grippers in shuttleless looms.

57 In a shuttleless loom, the movement of the weft conveying grippers is controlled by straps moved forward and backward by gearwheels mounted at the loom shed ends, the peripheral teeth of said gearwheels engaging with longitudinally aligned slots provided at the centre of the straps. The engagement between the straps and the gearwheels is constant and precise over a wide arc of each of the wheels, thanks to the guiding action (extending over the whole of said arc) provided by a narrow belt endlessly wound about guide pins and engaging with its slots the gearwheel teeth to act on the lateral portions of the strap.

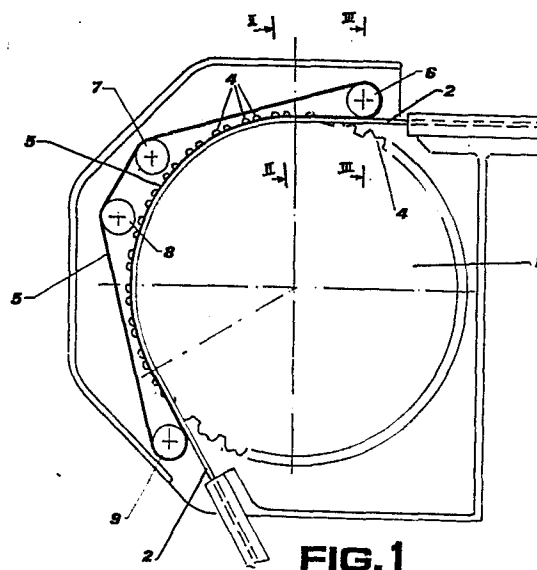


FIG. 1

"ARRANGEMENT FOR CONTROLLING THE MOVEMENT OF THE WEFT CONVEYING
GRIPPERS IN SHUTTLELESS LOOMS"

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5 This invention relates to important improvements in the means
for controlling the reciprocating movement of the weft conveying
grippers in shuttleless looms.

As known, one of the most serious problems in shuttleless looms
is the control of the reciprocating movement of the weft conveying
grippers, and this problem is the more difficult to solve the higher
10 the loom speed.

A recent solution to this problem has been proposed in the
European Patent Application N. 82103943.5 filed by the same Appli-
cant, providing an arrangement for controlling the movement of the
weft conveying grippers which makes use - in known manner - of a pair
15 of gearwheels performing reciprocating rotations at the loom shed
ends, and of a pair of gripper advancement straps engaging, through
longitudinally aligned central slots thereof, with the teeth of said
gearwheels. This arrangement provides for fixed continuous guides
extending over a wide arc of the gearwheels, along the periphery
20 thereof and at a short distance therefrom, and acting on both lateral
portions of the straps, to the side of said slots, to keep them in
constant and precise engagement with said gearwheels along said arc.

Although representing considerable progress over the previously
known art - particularly with regard to the high accuracy of engage-
25 ment between the gearwheel teeth and the strap slots, the smoothness
of the engagement between said teeth and slots, the straps flexibi-
lity and the continuity of this flexibility throughout the extent
of the straps, the distribution of stresses in the straps and the
constancy of accurate engagement between gearwheels and straps over
30 the entire length through which this engagement extends - the above
solution however appeared to present some inconveniences as, for ex-
ample, the difficulty of a sufficiently accurate and close engage-

ment and contact between the gripper straps and the gearwheels for the advancement thereof, the cost of the continuous fixed guides which require antifriction linings on their inner working surface, the requirement - difficult to satisfy - of a high precision in the
5 assembly position of said guides, and the high weight and cost of the straps which also require heavy and costly antifriction linings along their entire length.

To prevent these inconveniences, the present invention provides an improved arrangement for controlling the movement of the weft con-
10 veying grippers in shuttleless looms - of the type using a pair of gearwheels which perform short reciprocating rotations at the loom shed ends, and a pair of gripper advancement straps having longitudinally aligned central slots engaging with the teeth of said gearwheels - characterized in that it comprises, for each gearwheel and
15 for each advancement strap, at least one narrow belt endlessly wound about guide pins, which cause a portion thereof to adhere against the lateral portions of the strap in order to press this latter into engagement with a wide arc of the gearwheel.

The arrangement preferably provides, for each gearwheel and strap,
20 a single metal belt (which could also be of plastic or composite material), comprising slots similar to those of the straps for engaging the teeth of the gearwheels, but it could alternatively provide a pair of parallel belts for each gearwheel, acting only on the sides of the straps.

25 The belt guide pins of the arrangement according to the invention may be fixed pins, onto which the belts wind and are apt to slide - being caused to rotate by the gearwheels - or pins provided with a rotating bush or bearing. Particularly in the first case, it will be appropriate to line the inner side of the metal belts with a suitable antifriction material.
30

The invention will now be described in further detail, with reference to the accompanying drawing, which illustrates an embodiment

of the arrangement for controlling the movement of the grippers according to the invention itself and in which:

Figure 1 is a lateral view of the arrangement, in correspondence of one of the gearwheels moving forward the strap at one end of the
5 loom;

Figure 2 is a cross-section view on the line II-II of figure 1, showing a detail of the arrangement according to the invention; and

Figure 3 shows an embodiment of the guide pins for the belt of
10 the arrangement of figure 1, which is alternative to that shown in figure 2.

With reference to the drawing, the arrangement according to the invention comprises, on each side of a loom, a gearwheel 1 controlling a strap 2, to impart on said strap and on the gripper carried
15 thereby the to-and-fro movements which govern the insertion of the weft yarn into the loom.

The strap 2 comprises at its centre a row of elongated rectangular slots 3, through which it engages with the peripheral teeth
4 - of corresponding or complementary shape - of the gearwheel 1,
20 over a wide arc thereof.

The arc of the gearwheel 1, over which the strap 2 extends, is determined by the action of a belt 5, endlessly wound about guide pins 6, 7, 8 and 9, which are suitably positioned in respect of the gearwheel 1. It is a narrow metal belt, comprising at its centre a
25 row of slots 5a, similar to the slots 3 of the strap 2 and also apt to engage with the teeth 4 of the gearwheel 1. A wide portion of the belt 5 is forced to wind around the periphery of the gearwheel 1, so as to in turn force the strap 2 against said periphery, over a correspondingly wide arc, and to move forward and backward therewith,
30 driven by the teeth 4.

The pins about which the belt 5 winds may be fixed pins, as shown in figure 2 with reference to the pin 6, in which case the belt

must easily be able to slide on the surface of such pins, with a minimum friction. Hence, in this case, the inner surface of the belt will be lined with antifriction material.

Alternatively, the pins about which the belt winds may comprise
5 an external bush or bearing 10, as shown in figure 3 with reference to the pin 6a, to ensure less friction. In this case, there will be no sliding action between the belt and the pin, when the belt is moving, and it will not be necessary to line the inner surface of the belt 5 with antifriction material.

10 As stated, the belt is usually of metal (for instance, formed from a steel strip, 0.2 to 0.3 mm thick); nonetheless, a laminated plastic belt or a composite belt (for instance, of metal lined with plastic material) could also be used.

Furthermore - although not shown - the possibility should also
15 be provided to adjust the position of one or more of the pins 6, 7, 8 and 9, in order to put the belt 5 under tension and suitably adjust its position in respect of the periphery of the gearwheel 1, so as to obtain the most efficient engagement of said belt with the teeth 4, and above all with the strap 2, in order to keep it pressed
20 against the periphery of the gearwheel 1 to ensure correct operation.

The advantage of the arrangement comprising the belt, according to the present invention, lies in the fact of eliminating all relative sliding between the strap 2 and the means designed to press it against the gearwheel 1 and cause it to engage with the teeth 4
25 thereof (as opposed to previous arrangements, using guides or rollers). This reduces friction to a considerable extent and allows to avoid the antifriction linings always used in the past for the gripper straps, thereby evidently reducing and limiting the inertia of the moving masses and resulting into a considerable weight and
30 cost saving. Even if the antifriction material is still used for the inner lining of the belt 5, it is used in very small quantities - on account of the very limited length of said belt compared to the

length of the strap - such as not to appreciably interfere with the aforementioned advantages.

5 In addition, it is evident that the arrangement according to the invention provides a very precise guiding action, which is most appropriate for obtaining the engagement of the straps over a wide arc of the gearwheels for the advancement thereof, with a limited tractive effort in the belt (as the bending moment required for curving the strap and cause it to adhere to the gearwheel is successively guaranteed by the two pins 6 and 9, arranged at the ends
10 where the strap engages the gearwheel and where it leaves the same) and thus with absolute safety for a very long operating life of the mechanism.

It is understood that other embodiments of the arrangement, or modifications of those heretofore described, are possible and can
15 easily be devised by the skilled in the art. Consequently, they all fall within the scope of the present invention. For instance, the belt 5 illustrated in the accompanying drawings, which is of the same width as the strap 2 and is provided with slots for engaging the teeth 4, could be replaced by a pair of narrow parallel shortly
20 spaced belts, positioned at the sides of the teeth 4 and engaging the edges of the strap 2. The belt 5 could also be provided with teeth or projections, apt to engage the already existing slots 3 of the strap 2, or other slots specifically provided therein (for instance, at the sides of the slots 3), thereby improving the solidarity between the
25 belt 5 and the strap 2. Also solutions of this type fall, as to what has been said, within the scope of the present invention.

CLAIMS

1) An arrangement for controlling the movement of the weft conveying grippers in shuttleless looms, of the type using a pair of gearwheels which perform short reciprocating rotations at the loom shed ends and a pair of gripper advancement straps having longitudinally aligned central slots engaging with the teeth of said gearwheels, characterized in that it comprises, for each gearwheel and for each advancement strap, at least one narrow belt endlessly wound about guide pins, which cause a portion thereof to adhere against the lateral portions of the strap in order to press this latter into engagement with a wide arc of the gearwheel.

2) An arrangement as in claim 1, wherein for each gearwheel and strap a single belt is provided, comprising slots similar to those of the straps for engaging the gearwheel teeth.

3) An arrangement as in claims 1 and 2, wherein the guide pins are fixed pins.

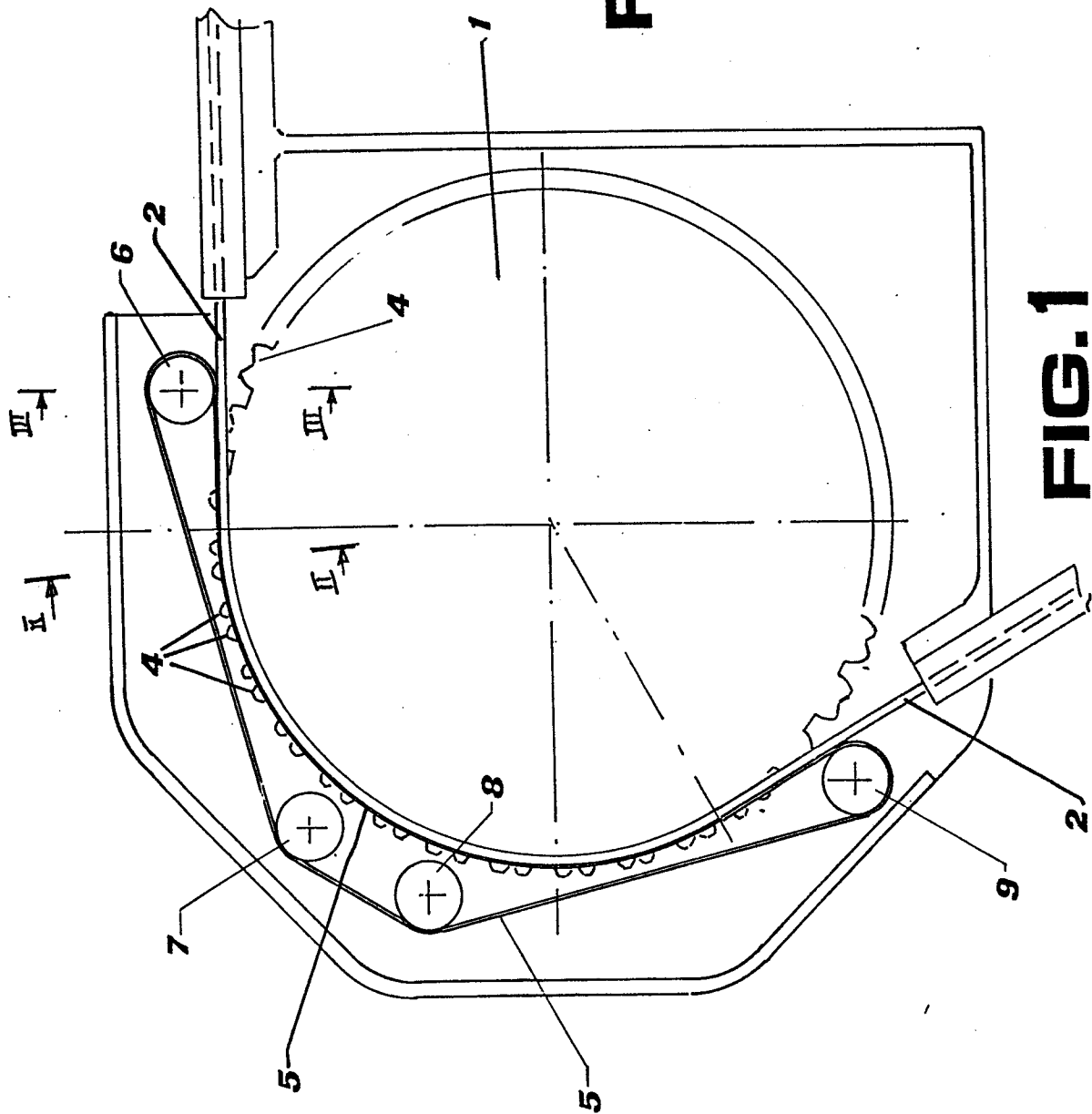
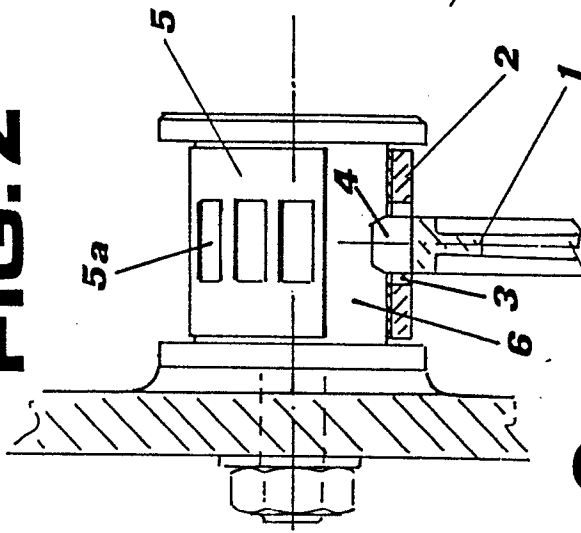
4) An arrangement as in claims 1 and 2, wherein the guide pins are pins provided with a rotating bush or bearing.

5) An arrangement as in claims 1 to 4, wherein the belt is of metal.

6) An arrangement as in claims 1 to 4, wherein the belt is of laminated plastic.

7) An arrangement as in claims 1 to 4, wherein the belt is of composite material.

8) An arrangement as in claims 1 to 7, wherein the belt comprises projections apt to engage into corresponding slots of the advancement straps.

**FIG. 2****FIG. 3**