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(54) Drive belt having variable stiffness for weft conveying grippers in looms.

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DE-A-2 030 433
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RESEARCH DISCLOSURE, no. 199, November 1980, pages 480,481, no. 19933, Havant Hampshire, GB, "Reinforced tape for flexible rapier weaving machines"

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Description

As known, many types of shuttleless weaving looms use, for conveying the weft through the shed, pairs of carrying grippers exchanging the weft thread half way through the shed. Such grippers, a carrying gripper and a drawing gripper, are — in most cases — controlled by flexible straps of plastic material or metal, provided with notches into which engage the toothings of driving gearwheels rotating continuously, for short arcs, with reciprocating motion.

With the up-to-dating of these types of looms and the increase in the working speed, the masses and overall dimensions of the grippers, as well as the masses and dimensions of the straps, have been gradually reduced, mainly in order not to increase the inertial loads. This resulted, however, into a less precise guiding, as the straps are subjected to combined bending and compressive stresses, deriving from the mass of the grippers and from accelerations, and they hence tend to be lifted from the sliding plane. This has deteriorated the conditions in which weft exchange takes place and it has increased the risk of said exchange not taking place at all, or taking place incorrectly, with obvious inconvenience in the running of the loom and in the success of the weaving operation.

To obviate these drawbacks, the normal praxis consists in increasing the stiffness of the straps controlling the weft carrying grippers, in that this precaution acts in favour of the precision of the grippers movement and hence of the weft exchange between such grippers.

It should not be forgotten, however, that the straps in question wind around the gearwheels controlling them and that, by increasing the stiffness thereof, the wears in the bending areas are simultaneously increased.

In the DE—B—2902729 the problem has been faced considering the principle that it is not necessary to strengthen the stiffness of the straps along the whole length thereof, but only in correspondence of those parts whereon they are subjected to particularly high compressive stresses which tend to lift them. The strap parts which are instead subjected to lower compressive stresses, or even to tractive efforts — as the lengths which, with the straps totally inside the shed, are situated close to the ends of the shed itself — do not require any stiffening.

Starting from this principle, the control strap for the weft carrying gripper of the DE—B—2902729 has a stiffness which varies along its length, this variable stiffness being obtained by suitably varying the composition of the layers of different materials (generally plastic materials) which form the strap. Besides, in the case of the DE—B—2902729, this has been obtained by adopting for the strap complicated configurations which are costly to realize and which considerably alter its exterior shape, which becomes extremely uneven giving rise to inconveniences in use.

Whereas, the present invention supplies a strap having a stiffness which varies along its length,

the exterior shape of the strap being quite conventional and perfectly uniform throughout its length.

Said strap is characterized in that said variable stiffness is obtained by incorporating into a strap of normal stiffness a core or lining, varying in thickness and/or width along the strap length, in a continuous or discontinuous manner.

The invention will now be described in detail hereinafter, with reference to the accompanying drawings, in which:

Fig. 1 is an axonometric view of a strap according to the invention, of which

Figs. 2 and 3 show diagrammatically two preferred embodiments, represented in a longitudinal section in the sense of their thickness.

With reference to the drawings, it can be seen that the strap 1 of figures 1 and 2 is formed of a core 2 of highly stiff plastic material, incorporated into an ordinary strap structure 3, also of plastic material, but of less stiffness.

The core 2 is delimited in the sense of the thickness by two step configurations (steps 4, 5 and 6) being formed of lengths or zones of decreasing thickness 7, 8, 9 and 10. The stiffening core 2 is completely missing in correspondence of the strap area 11, where the strap — consisting of the mere structure 3 — appears as an ordinary type strap.

It is evident that the stiffness of the strap 1, thus formed, is normal in correspondence of the area 11, while it gradually increases, in a discontinuous manner, in correspondence of the areas 10, 9, 8 and 7, this last area of the strap being the stiffest one to guarantee the most efficient working of the loom.

In the embodiment of figure 3, the core 12 incorporated into the structure 13 of the strap 1 has a thickness varying continuously between a maximum 14 and a minimum 15 and, also in this case, said core is missing in correspondence of the area 16, with the same results as far as stiffness, which however varies in a continuous manner, instead of varying by steps.

It is understood that, instead of incorporating a core (as 2 and 12) into an ordinary strap structure (as 3 and 13), the strap according to the invention could be obtained by associating thereto — by glueing into both of its major faces — stiffening strips of metal or plastic material, having suitable characteristics. Such strips should of course vary in thickness or width, by steps or in a continuous manner.

Furthermore, the passage from flexible layers to stiff layers should be gradual, in the sense of the thickness in the strap and, for this purpose, it is appropriate to introduce also the use of a third material (not shown in the drawing) with intermediate characteristics of flexibility.

With weft carrying grippers control straps of the aforescribed type, a perfect working of the loom is obtained also at high speeds, thanks to the stiffening thereof in correspondence of the areas where it is essential. On the other hand, by reducing said stiffness where it is only partially

required, or not required at all, one also reduces the heating and wear which would be produced with straps uniformly stiffened along their length.

The costs will also be reduced, for less use of the special materials usually required in order to obtain stiffening, while safety and reliability will increase, as the structural characteristics of the strap will allow to stand the stresses to which the strap itself is subjected, thereby clearly reducing fatigue. Finally, also the noise deriving from the strap movement will be less than that of the straps with uniform stiffness.

The strap according to the invention can be improved even further by applying onto both of its major faces a layer of antifriction material, as "Teflon".

It is already known to apply a lining of this type to the upper major face A of the strap but, up to date, the lower face B had never been lined in a similar way deeming that, on account of the centrifugal force to which the strap is subjected, it would always be in contact — in the strap guide — with the inner upper part, and it would not rub against the lower part. This would be true in the case of uniform rotary motion, which is the type of motion less similar to the strap motion. Whereas, due to the continuous reversals of acceleration and speed, the strap rubs its inner part less than its outer part, but still to a considerable extent.

Thus, by lining the lower part of the strap with the same material normally used for lining the upper part, the loom can be operated at speeds and for lengths of time so far unthinkable. The aforespecified frictions are in fact considerably reduced, resulting into less heating and wear of the strap.

Claims

1. Control strap for weft carrying grippers in shuttleless weaving looms, having a stiffness which varies along its length by varying the composition of the layers forming the strap, the

stiffness being variable through the length of the strap, characterized in that said variable stiffness is obtained by incorporating into a strap (1) of normal stiffness a core or lining (2, 12), varying in thickness and/or width along the strap length, in a continuous or discontinuous manner.

2. Control strap as in claim 1, wherein both major faces of the strap are lined with antifriction material.

Patentansprüche

1. Kontrollriemen für Einschlag-tragende Halter in schiffchenlosen Webstühlen, mit einer Steifigkeit, die aufgrund von variierenden Zusammensetzungen der Schichten, die den Riemen bilden, entlang dessen Länge variiert, wobei die Steifigkeit über die Länge des Riemens verändert werden kann, dadurch gekennzeichnet, daß besagte variable Steifigkeit dadurch erreicht wird, daß in einem Riemen (1) normaler Steifigkeit ein Kern oder ein Belag (2, 12) enthalten ist, dessen Dicke und/oder Weite sich kontinuierlich oder diskontinuierlich über die Riemenlänge ändern.

2. Kontrollriemen nach Anspruch 1, wobei beide Hauptflächen des Riemens mit schmierendem Material belegt sind.

Revendications

1. Courroie de commande pour lances porte-trames de métier à tisser sans navette, ayant une raideur qui varie sur sa longueur par variation de la composition des couches qui constituent la courroie, la raideur étant variable suivant la longueur de la courroie, caractérisée en ce que ladite raideur variable est obtenue par incorporation dans une courroie (1) de raideur normale, une âme ou garniture (2, 12) variant d'épaisseur et/ou de largeur sur la longueur de la courroie, de manière continue ou discontinue.

2. Courroie de commande selon la revendication 1, où les deux faces principales de la courroie sont garnies de matériau antifriction.

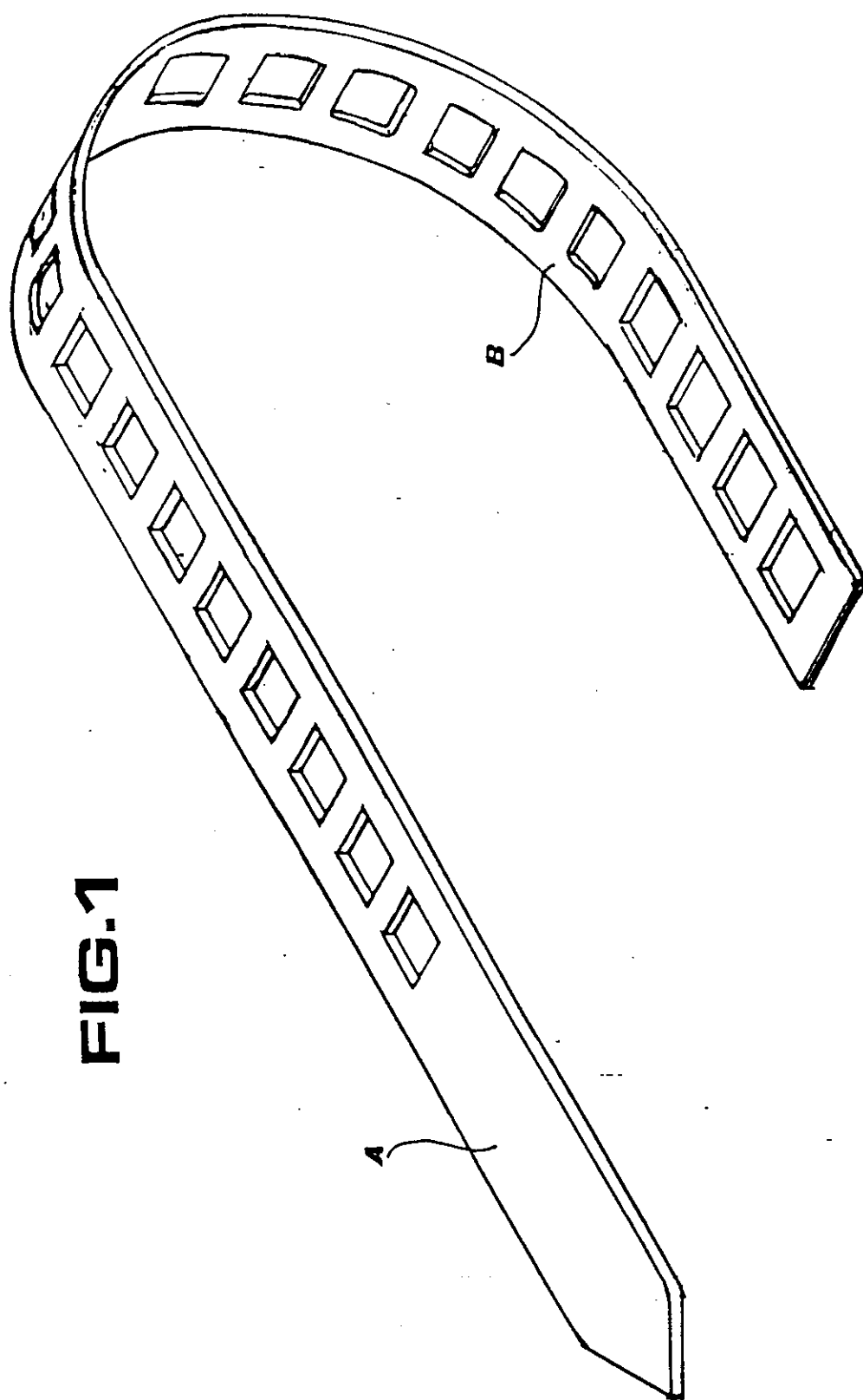


FIG. 1

FIG. 2

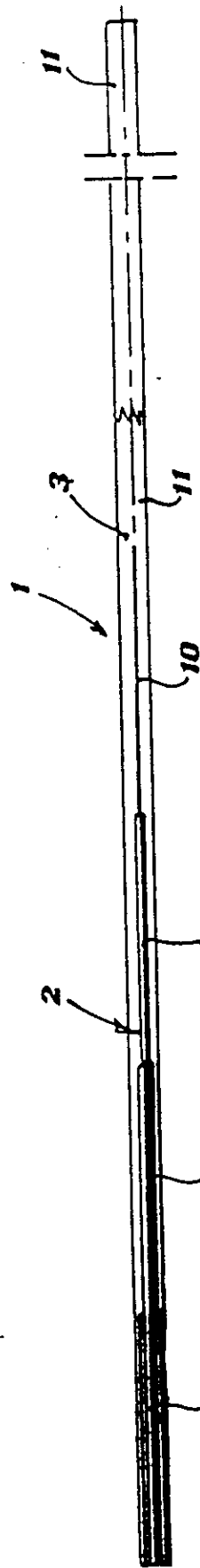
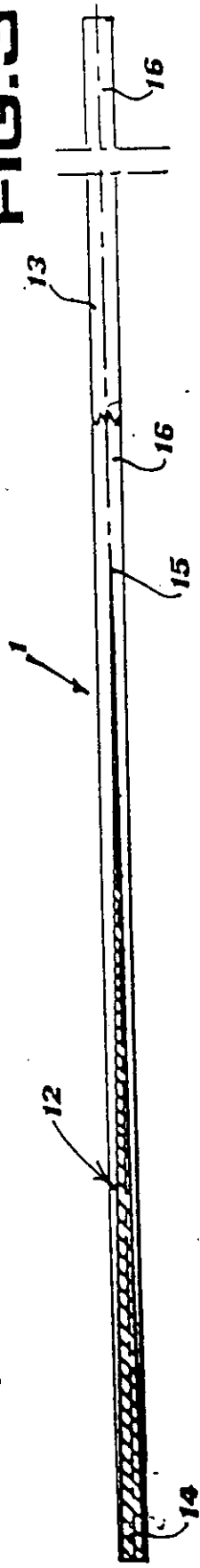


FIG. 3



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**** END OF REGISTER ENTRY ****