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(54) Gripper strap for weaving looms.

(57) A gripper strap, to move the weft feeding grippers along the shed of shuttleless looms, is formed in two distinct parts made of different materials, the end part of said strap where the gripper is mounted consisting of an interchangeable element, separate from the rest of the strap and removably connected thereto.

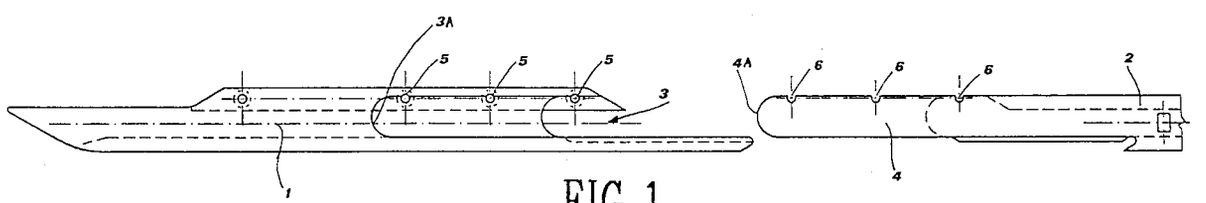

FIG.1

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The present invention concerns a gripper strap, of the type used to move the weft feeding grippers along the shed of shuttleless looms.

It is known to the skilled in the art that the drawback present in gripper straps of looms is that the end part of said straps, carrying the gripper, is subject to considerable wear. In fact, the transverse inertial forces due to the misaligned position of the gripper barycenter give rise to a high-friction contact between the end part of the strap, where the gripper is mounted, and the elements which guide the strap along the shed on the loom sley. On the other hand, such elements form a discontinuous guide and develop an abrasive action on said strap end. The main problem is to thus limit the wear of the strap end, so as to avoid the sure consequence of an irregular working, after a short period of use - due to excessive slack between the strap and the guide elements - and, therefore, the frequent replacement of the whole strap.

An attempt has already been made to solve this problem by interposing a wearproof element between the end of the strap and the guide elements, that is, by applying a stiffening and/or guiding plate or head at the end of the strap carrying the gripper, as in BE-A-681542 or in DE-A--2400166 wherein said head or plate are firmly fixed to the strap end. When adopting this principle, the strap is formed in a single piece, with a very stiff end allowing to limit deformation and distribute the load.

However this solution is, on one hand, not suitable for every type of loom and, on the other hand, it is not apt to guarantee satisfactory results when the strap guiding elements are not perfectly aligned, since a misaligned element produces impacts and bounces of the strap end.

It should also be noted that the construction - adopted so far - of gripper straps formed in one piece with their end part (possibly stiffened) carrying the gripper, has the drawback of not allowing a rational choice of the materials used to produce either said end part, or the remaining part of the strap: thus, for example, the technology based on the use of a flexible composite material, quite suitable for producing most of the gripper strap, often does not give satisfactory results for what concerns its end portion carrying the gripper, which portion is subject - as seen - to severe wear in contact with the guide elements.

In order to solve the aforementioned problem, the present invention supplies a gripper strap formed in two distinct parts made of different materials, the end part of said strap, where the gripper is mounted, consisting of an interchangeable element, separate from the rest of the strap and removably connected thereto.

Preferably, said end element of the strap according to the invention is engaged with the rest of the strap by a free fit and is removably fixed thereto by way of the gripper and together therewith.

The invention is now described in further detail, by mere way of example, with reference to a preferred embodiment thereof, illustrated on the accompanying drawings, in which:

Fig. 1 is a view of the strap in two parts, according to the invention, with the strap end - corresponding to the part carrying the gripper - shown separate from the rest of the strap;

Fig. 2 is a view of the strap of fig. 1, but with said end part engaged with the rest of the strap.

Figs. 3 to 5 are three cross-section views of the strap, along the lines III-III, IV-IV and V-V of fig. 2;

Fig. 6 shows the strap of the invention, illustrated in figs. 1 to 5, with a weft gripper mounted thereon; and

Fig. 7 is a cross-section view of the strap, on a very enlarged scale, along the line VII-VII of fig. 6.

As can be seen from fig. 1, the end 1 of the strap according to the invention - shaped so as to allow mounting thereon the front part of a weft feeding gripper - is separate from the rest of the strap 2.

Said strap end 1 is provided with a seat 3, into which is meant to fit the profiled end section 4 of the rest of the strap 2. As clearly shown in figs. 1 and 2, said section 4 has a shape mating with that of the seat 3, with corresponding semicircular ends 4A and 3A respectively.

The strap end 1 is made of stiff and highly wearproof material and is thus apt to move efficiently and for a long time, without creating any problems, into the elements guiding it along the shed. Viceversa, the remaining part of the strap 2 is made of highly flexible material, allowing it to be deformed to the extent required for its winding around the gear wheels provided for its reciprocating motion.

A plurality of screws 7 (figs. 6 and 7) are provided to fix the strap end 1 to the rest of the strap 2, when these two parts are reciprocally engaged by a free fit as shown in fig. 2, said screws crossing holes and/or corresponding notches, 5 and 6 respectively, formed in the two strap parts (fig. 1). The illustrated embodiment provides for through holes and notches 5 and 6, and the screws 7 screw simultaneously into threaded seats of the gripper 8, whereby the fixing between the two freely engaged strap parts 1 and 2 is obtained by way of the gripper itself. As clearly shown in fig. 3, the holes 5 of the strap end 1 are also provided with countersinks 9 to house the heads of the

screws 7.

It is evident that the strap end 1 can be easily replaced when starting to get worn: in this case, it is sufficient to loosen the screws 7, to remove the gripper 8 from the strap parts 1, 2, and to then connect again the gripper to the strap formed by a new end part 1 and by the rest of the strap 2 already in use. The operation is simple and very quick, and it allows to dispose, at a reduced cost, of a practically new strap.

The life of a gripper strap according to the invention is in any case longer than that of the conventional straps, even without replacing the strap end 1, due to the advantages - as far as flexibility and wear - guaranteed by the rational choice of the materials used for the two parts 1 and 2 forming the strap.

The connection between the strap end 1 and the rest of the strap 2 could be obtained - rather than through a free fit, as in the embodiment shown - through a suitably articulated joint (not shown).

In the first case, by fixing of the gripper, a fixed joint is established between the two parts 1 and 2, and the strap practically behaves as if it were formed in one piece, with the stiff end - carrying the gripper - as long as possible (up to the flexible portion winding around the gearwheel for its motion).

Whereas, if an articulated joint is provided between the strap end 1 and the rest of the strap 2, the strap turns out to be formed by a portion moving into the guide elements and carrying the gripper (strap end 1) and by a portion acting as thrust and draw element (rest of the strap 2), said joint transmitting only the compressive and tractive forces along the direction of motion.

The possibility, offered by the invention, to disjoin and easily replace the strap end - corresponding to the part carrying the gripper - from the rest of the strap itself, as specified heretofore, allows:

- to limit the number of replacements of the whole strap by interchanging once, or more frequently, only the end part thereof;
- to operate an optimal choice of the material and constructive technology adopted for the two distinct parts of the strap;
- to distinguish the guiding function of the gripper carrying end, from the thrusting and drawing function of the rest of the strap (when an articulated joint is provided to connect the end part to the rest of the strap).

According to the invention it is also possible, if wanted, to:

- interpose an elastic element (not shown in the embodiment illustrated) between the end part and the rest of the strap, so as to isolate any vibrations between the parts;
- form the strap end with an initial flexible portion, so as to limit and dampen any impacts against possibly misaligned guide elements.

It should be noted furthermore that, especially in the described embodiment with a fixed joint between the two strap parts (1 and 2), the engagement between the same takes place in correspondence of an area protected by the gripper, whereby the yarns of the warp chain are not apt to interfere therewith.

Claims

1. Gripper strap to move the weft feeding grippers along the shed of shuttleless looms, characterized in that it is formed in two distinct parts, the end part of said strap where the gripper is mounted consisting of an interchangeable element, separate from the rest of the strap and removably connected thereto.

2. Gripper strap as in claim 1), wherein said distinct, interchangeable, end element of the strap is made of a different material from the rest of the strap.

3. Gripper strap as in claims 1) and 2), wherein said end element of the strap is engaged with the rest of the strap by a free fit and is removably fixed thereto by way of the gripper and together therewith.

4. Gripper strap as in claims 1) and 2), wherein said end element of the strap is connected to the rest of the strap through an articulated joint.

5. Gripper strap as in claims 1) to 4), wherein an elastic vibration damping element is interposed between the end part of the strap and the rest of the strap.

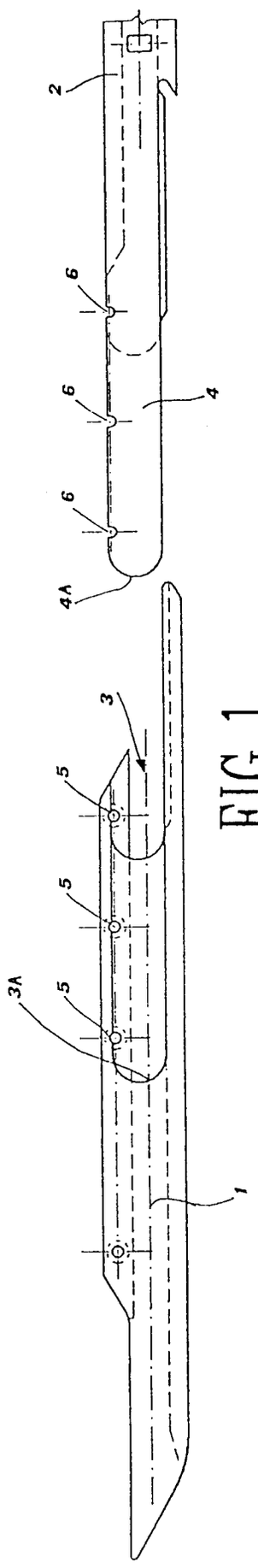

FIG.1

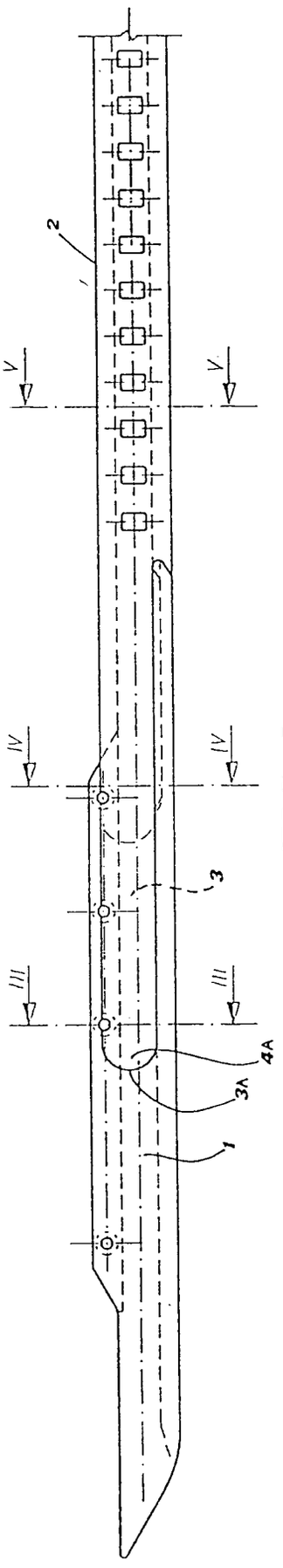

FIG.2

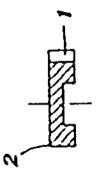

FIG.5

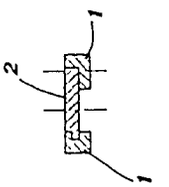

FIG.4

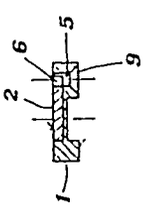

FIG.3

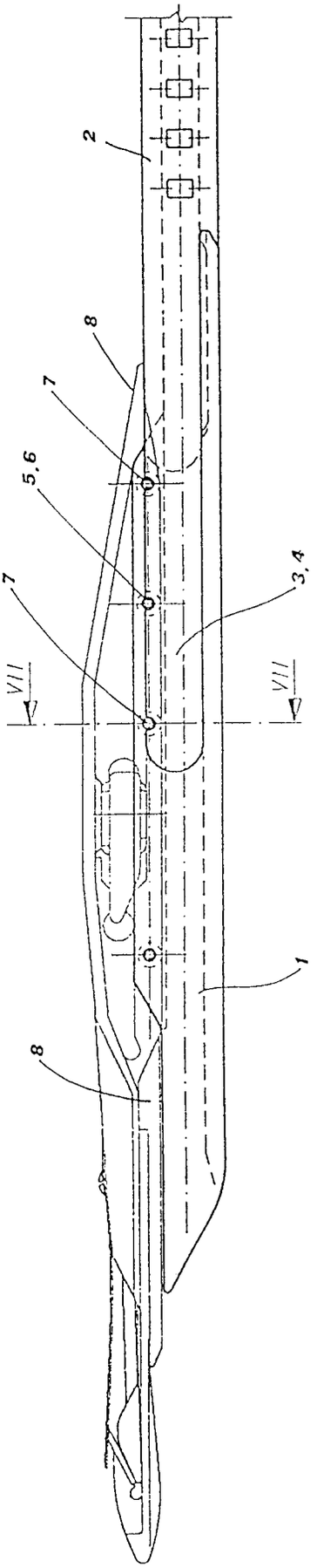

FIG.6

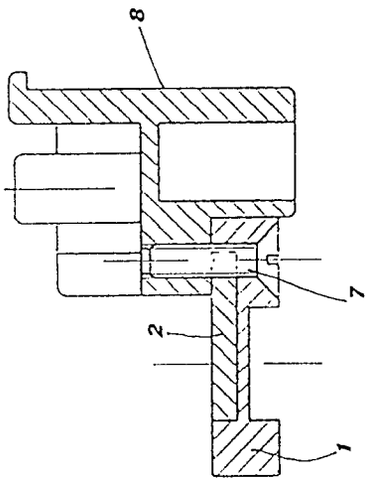

FIG.7

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 94 10 6840

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)
D,X	BE-A-681 542 (DESVEUS DURAN) * the whole document * ---	1	D03D47/20
A	FR-A-2 270 356 (DESVEUS DURAN) * page 4, line 33 - page 5, line 13; figures 7-10 * ---	1-4	
A,D	DE-A-24 00 166 (RÜTI) ---		
A	FR-A-2 642 093 (NUOVOPIGNONE) -----		

TECHNICAL FIELDS SEARCHED (Int.Cl.5)
D03D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	11 August 1994	Boutelegier, C

CATEGORY OF CITED DOCUMENTS

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A : technological background
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