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(54) Means to guide the motion of a pair of weft grippers along the shed of looms

(57) Means to guide the back and forth motion of a pair of weft yarn grippers (1) along the shed of looms with continuous weft feed, of the type comprising two control straps (2) movable on a substantially horizontal plane thanks to the action of two gearwheels with reciprocating motion. Said straps (2) are provided with an undercut notch (3) on their lower surface, and they com-

prise a plurality of guide elements (4) apt to geometrically mate with said undercut notch (3), while the gripper (1), mounted at the end of the strap (2) on its upper surface, has its barycenter coinciding with or below the barycenter of the strap section.

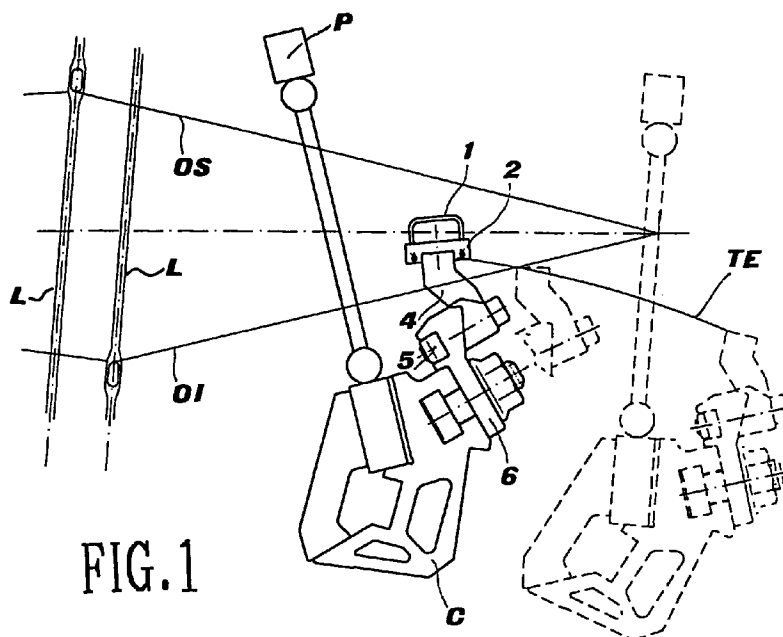


FIG.1

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Description

The present invention concerns means to guide the back and forth motion of a pair of weft yarn grippers along the shed of looms with continuous weft feed, of the type comprising two control straps caused to perform a rectilinear movement in opposed directions thanks to the action of two gearwheels with reciprocating motion.

As known, in modern shuttleless looms the efficient guiding of the weft grippers, without producing too much wear, still represents a very pressing problem, although many solutions have been studied to solve the same. This is mainly due to the positively contrasting requirements involved: in fact, on one hand, it is necessary to guarantee a correct motion of the straps and of the grippers and, on the other hand, the wear of the components and the mechanical stresses on the reciprocally sliding parts have to be reduced to a minimum.

The first looms of this type used to comprise two parallel and close rows of guide elements, positioned on both sides of each strap. Such elements, mounted on the sley, were in the form of opposite hooks with substantially rectangular seats, into which the straps were slidably engaged with their lateral surfaces and the ends of their upper and lower surfaces. This arrangement, though being very efficient for a correct guiding of the grippers, determined an excessively high wear which became worse and worse as loom weaving speeds were increasing. Moreover, the weft yarns were often caught into the seat for the strap, remaining stuck therein and thus being subject to very frequent breakages. Such an arrangement even produced damages in the warp yarns, as these were undesirably drawn apart by the guide elements of the row close to the reed, and could thus also get caught into the seats for the strap of the guide elements of said row and be easily broken.

Efforts were subsequently made to overcome these drawbacks. A solution consisted in modifying the shape of the seats of the hook elements, so as to reduce or eliminate the risk of the warp yarns, close to said elements, being caught between said seats and the strap. However this solution was by no means satisfactory from the point of view of wear, which was still too high. It also proved not to be efficient in the case of irregular or loose wefts.

Another solution consisted in eliminating the row of guide elements close to the reed, and assigning to the only row of hook elements left the task of efficiently guiding the straps and the grippers. Nevertheless this solution did not solve the problem of the warp yarns being caught into the seats of said guide elements - solved by the previous solution - and produced even higher wears. Moreover, the guiding action became less reliable, causing hunting problems which made the situation even worse.

A further solution consisted in limiting the guide elements to a single row of very simple hooks opposite to the reed, so as to guide the gripper straps only on the edge towards the fabric, letting them freely slide onto the

lower warp lap on one side and against the reed on the other side. Even this solution was however defective, in that the guiding was not sufficiently precise, especially at high speeds. A shimming operation was moreover required on the reed and, to keep constant the trajectory of the strap, this latter had to be semirigid, thereby notably increasing costs.

Finally, it has also been proposed to arrange the guide elements for the straps aligned on the sley, facing the reed and perpendicular thereto, the straps being provided with one or more undercut notches, each guide element engaging the upper surface of the straps and their, lateral surface far from the reed, as well as their lower surface onto an edge and into said notch, and also at least one of the lateral surfaces of the same notch. This solution, which notably improves the guiding of the straps - compared to that previously described - still produces however a strong friction, and therefore high wears.

These and other drawbacks are now efficiently overcome by the present invention, which concerns means to guide the back and forth motion of a pair of weft yarn grippers along the shed of looms with continuous weft feed - of the type comprising two control straps movable on a substantially horizontal plane thanks to the action of two gearwheels with reciprocating motion, said straps being provided with an undercut notch on their lower surface at least at their end carrying the gripper - characterized in that they comprise a plurality of guide elements apt to geometrically mate with said undercut notch, and in that the gripper, mounted at the end of the strap on its upper surface, has its barycenter coinciding with or below the barycenter of the strap section.

Said undercut notch of the strap and, consequently, the portion of said guide elements apt to geometrically mate therewith, will preferably have a rectangular, trapezoidal or arched section.

Moreover, said guide elements apt to geometrically mate with said undercut notch may comprise a vertical tooth projecting therefrom, which engages the side of the strap.

The present invention will now be described in further detail, with reference to the accompanying drawing, in which:

Fig. 1 is a vertical section view, across a loom in an intermediate area of the shed, showing the guide means of the present invention;

Fig. 2 is a top plan view of the guide means shown in fig. 1;

Figs. 3A-3D are lateral views showing four different variants of the guide element forming part of the means illustrated in figs. 1 and 2; and

Fig. 4 illustrates two strap sections for use according to the invention.

With reference to the drawing, the guide means of the present invention are shown mounted on a loom of the shuttleless type, with continuous weft feed, wherein

the back and forth motion of a pair of weft grippers along the shed is obtained through a pair of straps moved by two gearwheels with reciprocating motion.

Fig. 1 illustrates the reed P, the sley C, and two healds L, in a loom. Reference OI corresponds to the lower lap and reference OS to the upper lap of warp yarns. The aforementioned parts are shown in continuous lines in the position of weft yarn insertion, and in dashed lines in the beating up position. Fig. 1 also illustrates in dashed lines one of the guide elements for the gripper strap, in an intermediate position, and its trajectory between two end positions of the sley.

The weft gripper 1 is fixed onto the top flat surface of the strap 2 - which causes its motion along the shed - with its barycenter coinciding with that of the strap 2, or positioned below the same. Moreover, the strap 2 comprises on its bottom surface an undercut notch 3, which can have different shapes. In figs. 3A to 3D, the undercut notch 3 is shown, respectively, with a rectangular section (figs. 3A and 3B), with a trapezoidal section (fig. 3C), and with an arched section (fig. 3D). The undercut notch 3 can be formed along the entire length of the strap 2 which, in this case, will have the channel section 2A shown in fig. 4. Alternatively, the notch 3 may be provided only in correspondence of the end portion of the strap 2, onto which the gripper 1 is mounted, in which case the remaining part of the strap will have the more simple rectangular section 2B shown in fig. 4. The guide means for the strap 2 comprise a plurality of guide elements 4 apt to geometrically mate with the undercut notch 3 of said strap and thus having a shape strictly corresponding thereto. The elements 4 are fixed by screw means 5 to supports 6 mounted on the sley C.

As previously stated, the gripper 1 is positioned - in respect of the strap 2 - so that its barycenter coincides with that of the strap 2, or is placed in an even lower position. Thanks to this arrangement, in spite of the gripper 1 moving at high speed, the strap 2 is not caused to deviate from its path by said gripper, making it unnecessary to provide for further engagement means (as normally provided in known technique) to guide the strap 2. The absence of such engagement means considerably reduces frictions, and consequently wear of the strap 2, thereby notably lengthening its life.

At the most use can be made, as shown in fig. 3B, of guide elements 4 carrying a vertical tooth 7 projecting therefrom. Said tooth 7 allows to improve the guiding action (making it more thorough and precise) on the strap 2, which is engaged also on one side, thereby helping to fully eliminate any tendencies to hunting of said strap, without increasing frictions and wears.

Whatever the shape of the guide elements 4 and the corresponding shape of the strap notch 3 - among those described and illustrated - the arrangement of the present invention introduces considerable advantages compared to the previously known solutions, in that it provides a sufficiently reliable and precise guiding of the strap 2, while positively reducing its wear.

Furthermore, the arrangement according to the invention allows to notably limit the protrusion of the guide elements 4 into the warp lap, and to thereby reduce any consequent defects showing up in the fabric due to impacts between the warp yarns and said guide elements. The limited protrusion of the guide elements into the warp lap is placed in evidence in fig. 1 by the trajectory TE of said elements, which shows how these totally move out of the shed greatly in advance in respect of the corresponding elements of prior art.

It is understood that the present invention is not limited to the examples illustrated heretofore, but that variants can be introduced therein without thereby departing from its scope.

Claims

1. Means to guide the back and forth motion of a pair of weft yarn grippers along the shed of looms with continuous weft feed - of the type comprising two control straps (2) movable on a substantially horizontal plane thanks to the action of two gearwheels with reciprocating motion, said straps (2) being provided with an undercut notch (3) on their lower surface at least at their end carrying the gripper (1) - characterized in that they comprise a plurality of guide elements (4) apt to geometrically mate with said undercut notch (3), and in that the gripper (1), mounted at the end of the strap (2) on its upper surface, has its barycenter coinciding with or below the barycenter of the strap section.
2. Means as in claim 1), wherein said undercut notch (3) of the strap (2), and the portion of said guide elements (4) apt to geometrically mate therewith, have a rectangular section.
3. Means as in claim 1), wherein said undercut notch (3) of the strap (2), and the portion of said guide elements (4) apt to geometrically mate therewith, have a trapezoidal section.
4. Means as in claim 1), wherein said undercut notch (3) of the strap (2), and the portion of said guide elements (4) apt to geometrically mate therewith, have an arched section.
5. Means as in any one of the preceding claims, wherein said guide elements (4) apt to geometrically mate with said undercut notch (3) comprise a vertical tooth (7) projecting therefrom, which engages the side of the strap (2).

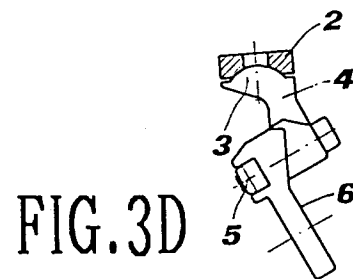
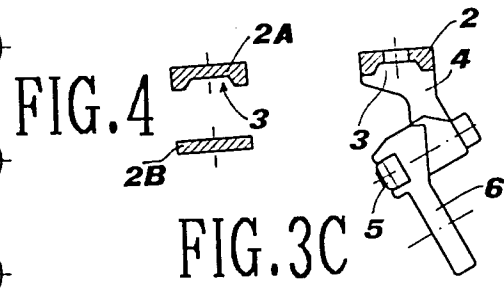
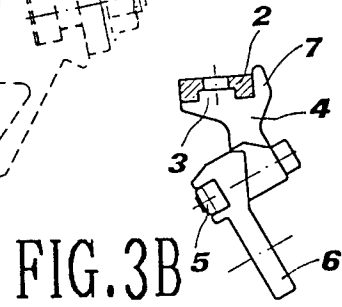
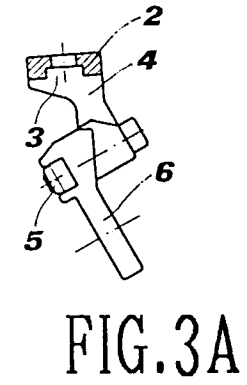
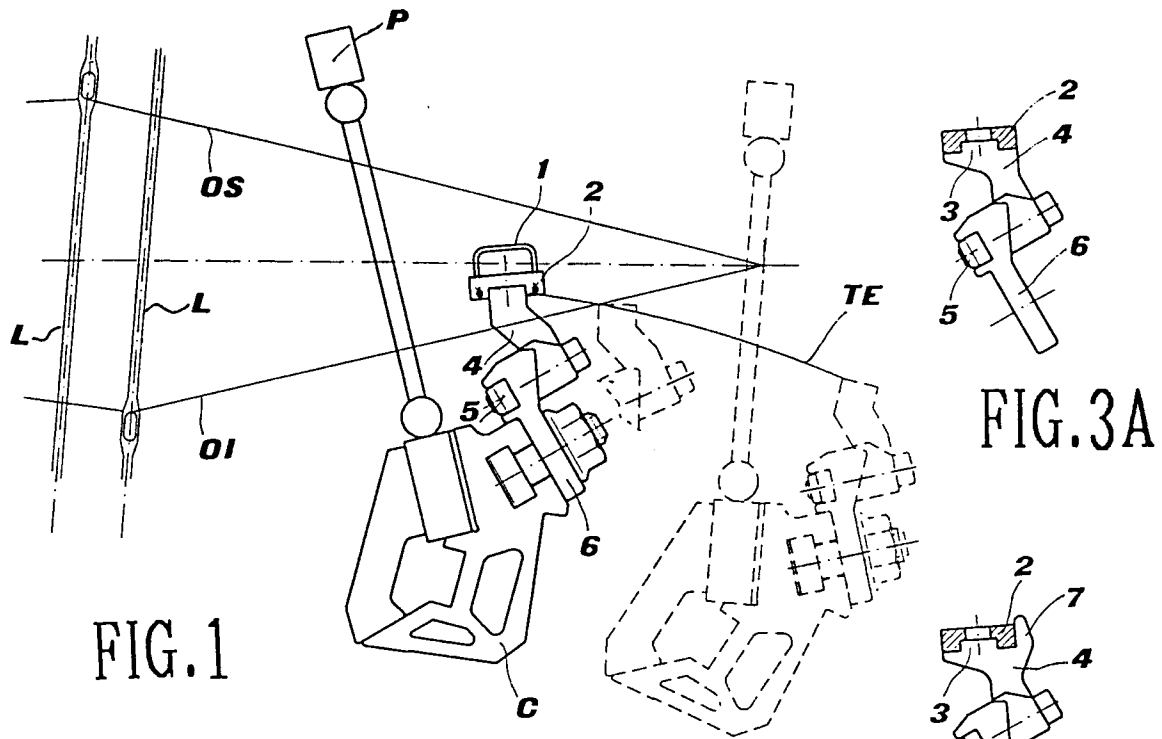


FIG. 2

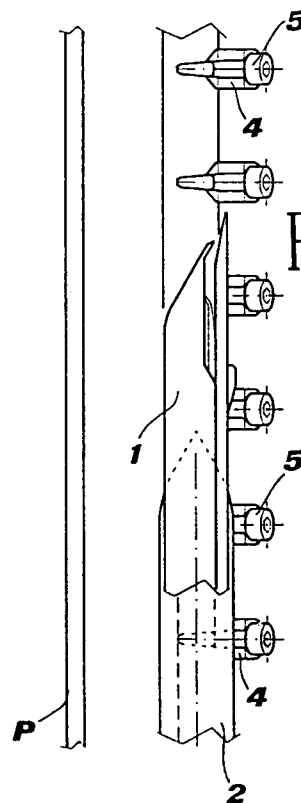
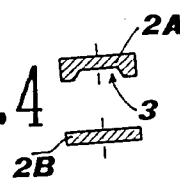


FIG. 4





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EUROPEAN SEARCH REPORT

Application Number
EP 95 11 7867

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.6)
X	EP-A-0 275 479 (VAMATEX) * abstract; figures 1-4 *	1,2,5	D03D47/27
X	EP-A-0 402 285 (SAURER) * figures 1,2 *	1,2,5	
X	EP-A-0 468 916 (SULZER) * the whole document *	1-5	
X	MELLIAND TEXTILBERICHTE, vol. 49, no. 4, April 1968 HEIDELBERG, pages 417-419, K. HABERHAUER 'Theorie und Entwicklung einer Hochleistungswebmaschine II' * figures 6-8 *	1,2,5	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			D03D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 28 February 1996	Examiner Boutelegier, C
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