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(54) Improved-operation compact gripper for weaving looms

(57) A gripper for a weaving loom is disclosed, of the type comprising a gripper body (101) onto which a fixed plate (104) and a flexible gripping strip (103) are mounted, which are capable of co-operating with each other to retain a weft yarn, the gripping strip (103) being pushed onto said fixed plate (104) by elastic means (105), and being further provided a control lever (V) attached at one end, at a connecting point (P), to said gripping strip (103) and comprising, at its other end, a control element (V_1) capable of co-operating together with a gripper-opening mechanism integral with the weaving loom, and in which the gripping strip (103) is secured at one end to a supporting shelf (110) laterally cantilevered from said gripper body (101) and the control lever (V) is secured below said gripping strip (103), extending backwards below said shelf (110) and bending upwards.

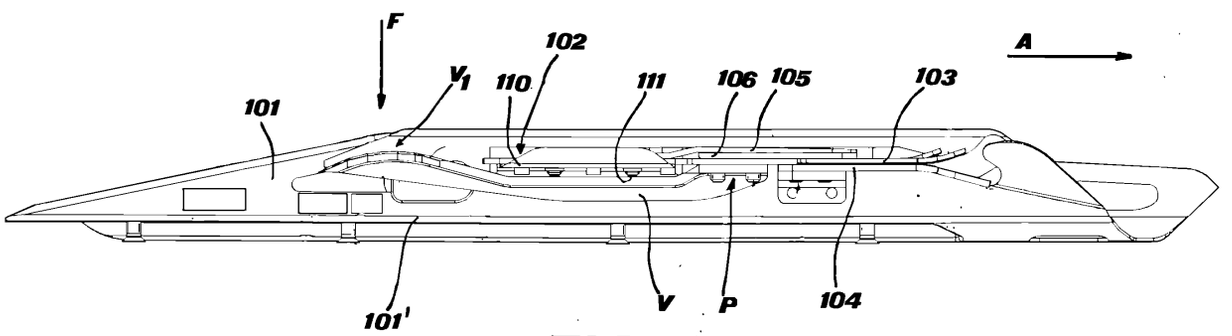

FIG_2

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Description

[0001] The present invention relates to a carrying or drawing gripper for a weaving loom, specifically a gripper with a flexible gripping system.

[0002] It is known that in gripper weaving looms a pair of grippers is used, one being a drawing gripper and the other being a carrying gripper, in order to carry the weft yarn through the shed.

[0003] Weaving grippers have various design and operating modes. One of these, which will be referred to in the following description, is so designed that grasping of the weft yarn is performed by a flexible metal strip which is suitably pushed against an abutting surface of a plate integral with the gripper body.

[0004] An example of such a gripper is depicted in fig. 1, which represents an elevation side view of a prior art gripper marketed under the brand SOMET and the identification code BDL311F.

[0005] The gripper comprises a main body 1, intended to be secured to a gripper-mounting strap (not shown), onto which a flexible gripping metal strip 3 is mounted through the fastening means 2, capable of engaging with a plate 4, integral with the gripper body 1.

[0006] Between the front end of the flexible metal strip 3 and the fixed plate 4, the weft yarn is intended to be grasped (not shown). In order to maintain a strong gripping effect of metal strip 3 onto plate 4, above metal strip 3 a further elastic element 5 is provided, which is elbow-shaped and secured at one end to the body 1 by the fastening means 2, and resting flexibly onto the metal strip 3 at the other end.

[0007] In the area where it engages the elastic element 5, the flexible metal strip 3 is provided with a stiffening metal band 6.

[0008] Further, in this same position the end of a control lever L is connected, cantilever projecting backward and ending with a control member L1 equipped with a suitably shaped cam surface, so as to co-operate with a loom engaging system (not shown).

[0009] Finally, the pressure that can be exerted by the elastic element 5 onto the flexible metal strip 3 can be adjusted by means of an adjusting block 7 that can be shifted longitudinally along the gripper body 1 to deform the element 5 to a higher or lower degree, and thus determine a higher or lower elastic load onto the metal strip 3.

[0010] Operation of this type of gripper provides that, as known, the weft yarn is grasped between the metal strip 3 and the plate 4, and here retained by the gripping action exerted by the elastic element 5. When the gripper reaches the position in which the weft yarn must be released, the surface L1 of the control lever L touches an engaging element integral with the weaving loom (the so-called gripper opener) which causes the lowering thereof, in the direction of arrow F in fig. 1. This causes the metal strip 3 to bend, against the spring thrust of the element 5, resulting in disengagement from the plate 4 and release of the weft yarn.

[0011] This type of gripper has some drawbacks.

[0012] First of all, as it can be noticed, the vertical overall dimensions of the mechanism illustrated are remarkable, because all control and adjustment members are located above the working surface of the metal strip 3 with the plate 4.

[0013] Furthermore, it must be considered that, due to this specific design and its overall dimensions, the metal strip 3 and the elastic element 5 are linked to the gripper body 1, through the fastening means 2, in a rather backward position (compared to the gripper feed direction A). This would imply that the theoretical fulcrum point of the metal strip 3, coinciding with the point of constraint, is extremely recessed in relation to the engaging area with the plate 4, resulting in the fact that opening of the gripper would not occur promptly and to the desired degree. Therefore, according to the prior art, a bearing island 8 is provided, located between the working position of the metal strip 3 on the plate 4 and fastening/connecting means 2, near to but backward of the connecting position of the control lever L. By choosing the appropriate stiffening element 6 and the shape of flexible metal strip 3, it is hence possible to move forward the actual fulcrum point of the metal strip itself, i. e. at the back edge 8a of bearing island 8.

[0014] Therefore, a force applied in direction F to the end L1 of lever L can be broken up - shifting it at the bearing island 8 - into a shear force onto metal strip 3, which tends to maintain the same adherent to island 8, and a torque that tends to rotate (by bending) metal strip 3 around rear edge 8a of island 8, producing the desired amount of deformation.

[0015] However, this layout introduces undesired strains and further friction in the gripping mechanism, which affect operation effectiveness.

[0016] It is therefore an object of the present invention to supply a gripper of the type equipped with a flexible gripping metal strip which has an improved and optimised layout, both in terms of the vertical overall dimensions and in terms of operation effectiveness.

[0017] Such object is achieved by means of a gripper as described in its essential features in the attached main claim.

[0018] Other inventive aspects of the system and method are described in the dependent claims.

[0019] Further features and advantages of the gripper according to the invention will be apparent from the following detailed description, given as an example and taken in conjunction with the annexed drawings, wherein:

[0020] fig. 1 represents, as already mentioned, a partially-interrupted elevation side view of a prior art gripper;

[0021] fig. 2 is an elevation side view of a gripper according to the invention; and

[0022] fig. 3 is a plan top view of the gripper depicted in fig. 2.

[0023] A gripper comprises, in a manner known per se, a main body 101, intended to be mounted over a gripper-mounting strap (not shown), onto which a flexible metal strip 103 is attached through fastening means 102, which is capable of grasping a weft yarn (not shown), together with a plate 104 attached to the gripper body 101.

[0024] Above the metal strip 103 an elastic, elbow-shaped pressure metal strip 105 is further provided, itself attached by an end to the gripper body 101 through the fastening means 102.

[0025] Between the pressure metal strip 105 and the gripping metal strip 103 a shimming 106 is preferably provided, intended to transfer the action of the former onto the latter and to determine static deformation of the pressure metal strip 105 in terms of its distance from the gripping metal strip 103: a sort of leaf spring is therefore created which increases the pressure exerted by the gripping system onto the weft yarn.

[0026] According to the invention, fastening means 102 are provided on a small shelf 110, integral with the gripper body 101 and cantilevered from its side, at a certain height from a mounting base 101' capable of securing the gripper to the gripper-mounting strap.

[0027] Furthermore, a control lever V is provided, secured at one end to a point P connecting it to the metal strip 103, near the shelf 110, and then cantilever projecting backwards, underneath the shelf, ending with a control member V_1.

[0028] The curved design of the lever V, well recognisable in fig. 2, allows to let the main part of the lever pass below the shelf 110, despite positioning the control member V_1 above it, so that it may properly engage with the gripper-opening mechanism integral with the weaving loom.

[0029] The functioning of the gripper according to the invention is similar to that known in the field. The elastic metal strip 105 in fact keeps constantly under pressure the gripping metal strip 103 resting on the fixed plate 104, so as to securely grasp the weft yarn. At the opening point of the gripper (at the loom end, for a drawing gripper), the control member V_1 of the lever V touches a suitable engaging element (not shown) which pushes it towards F. This push translates - in the connecting position P - into a modest shear strain onto the metal strip 103 and a torque (obtained as a multiplication of the push times the arm of lever V) which tends to bend the metal strip 103 upwards, thus opening the engagement with the fixed plate 104 and releasing the weft yarn retained between them.

[0030] The original design and layout of these members, positioned both above and below the working plane of the metal strip 103 and of the plate 104 (i.e. the plane where the weft yarn is gripped), produces an overall vertical limitation of the overall dimensions, achieving a first desired object.

[0031] Furthermore, as is apparent, the fulcrum point of the metal strip 103 - essentially coinciding with the point of constraint on the shelf 110 (for example the front fastening screw 111) - is sufficiently forward in relation to its position of co-operation with the fixed plate 104: hence further devices or arrangements are not necessary to differently determine the fulcrum point, which serves to avoid the frictions and functioning inefficiencies present in the prior art, thus achieving another desired object.

[0032] However, it is understood that the scope of the invention described above is not limited to the specific embodiment illustrated here, but that it extends to any other changes and variants which are within the reach of any skilled person in the art.

[0033] In particular, although for convenience reference has always been made to a drawing gripper, the teachings offered here can be similarly applied to a carrying gripper also.

Claims

1. Gripper for a weaving loom, of the type comprising a gripper body (101), intended to be secured to a gripper-mounting strap, onto which a fixed plate (104) and a flexible gripping strip (103) are mounted, capable of co-operating with each other to retain a weft yarn, said gripping strip (103) being pushed onto said fixed gripping plate (104) through elastic means (105), and furthermore a control lever (V) being provided, secured at one end at a connecting point (P) to said gripping strip (103) and comprising, at its other end, a control member (V_1) capable of co-operating with an engaging element integral with the weaving loom, **characterised in that** said gripping strip (103) is secured at one end to a supporting shelf (110) laterally cantilevered to a side of said gripper body (101) and **in that** said control lever (V) is attached underneath to said gripping strip (103) and extends backwards below said shelf (110) for a relevant portion of its length (110).

2. Gripper as claimed in claim 1), in which said control lever (V) is so shaped that the control member (V_1), when inactive, is located above and behind said shelf (110).

3. Gripper as claimed in claim 1) or 2), in which said flexible gripping strip (103) is completely cantilevered, no other intermediate contact points being provided in its portion between said shelf (110) and said fixed plate (104).

4. Gripper as claimed in claim 1), 2) or 3), in which said elastic means (105) are in the shape of a metallic lamina attached to said shelf (110), elbow-shaped and supplying an elastic thrust against said gripping strip (103).

5. Gripper as claimed in claim 4), in which a shimming (106) is provided between said elbow-shaped metallic lamina (105) and said gripping strip (103), so as to determine a sort of leaf spring element.

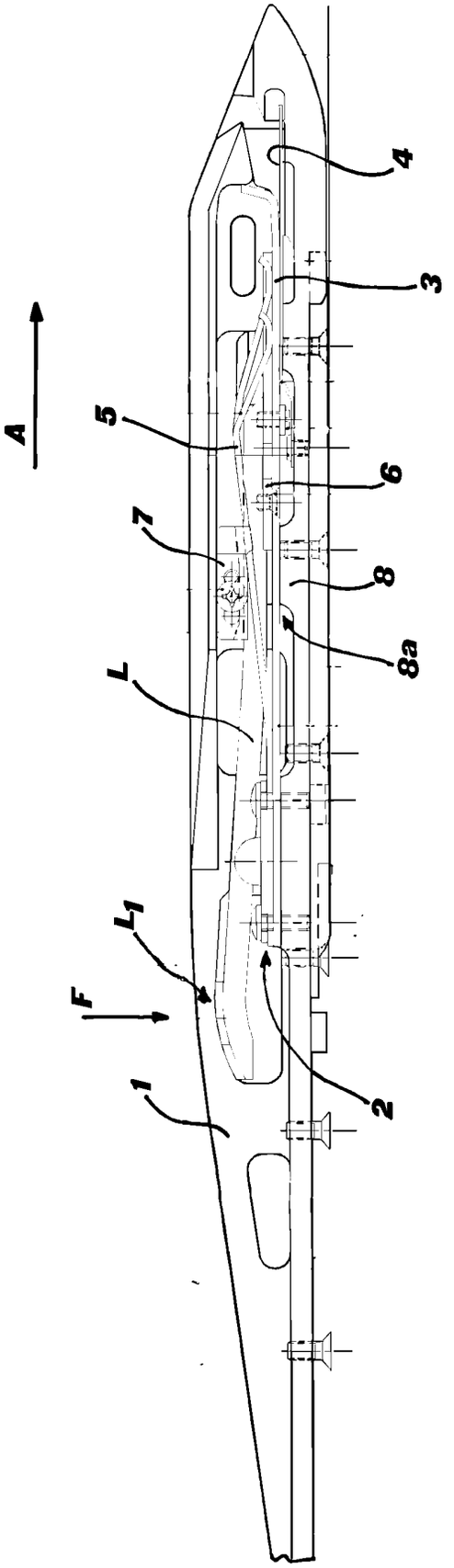

FIG.1
PRIOR ART

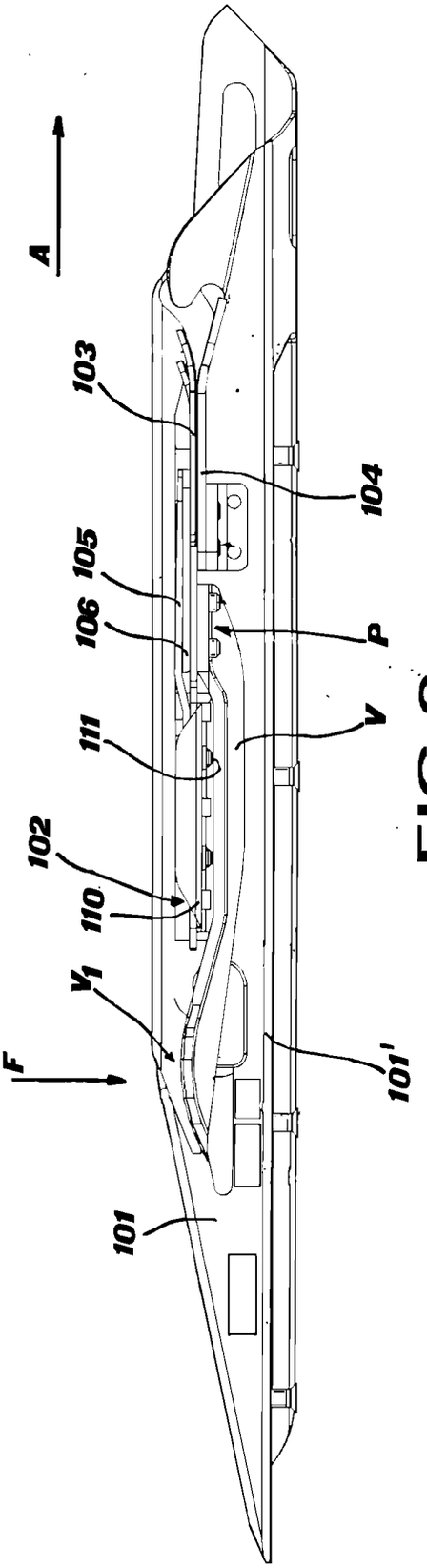
A
103
104
105
106
P
V
111
102
110
V1
F
101'
101

FIG.2

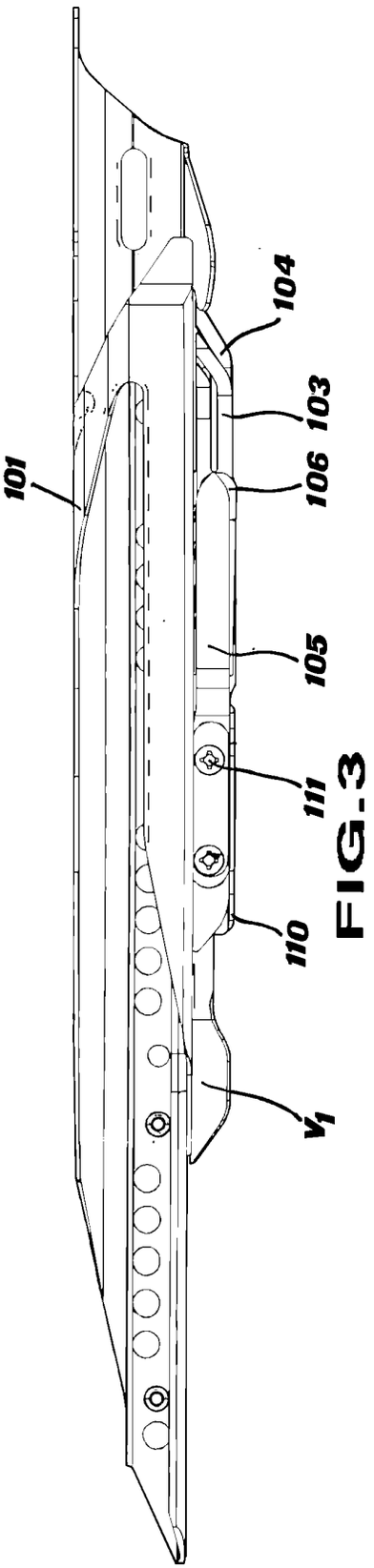
104
103
101
106
105
111
110
V1

FIG.3