

[54] **GUIDE ELEMENT FOR THE WEFT PICKING MEANS IN A LOOM**

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[58] Field of Search.....139/188, 191, 125, 126, 126.1

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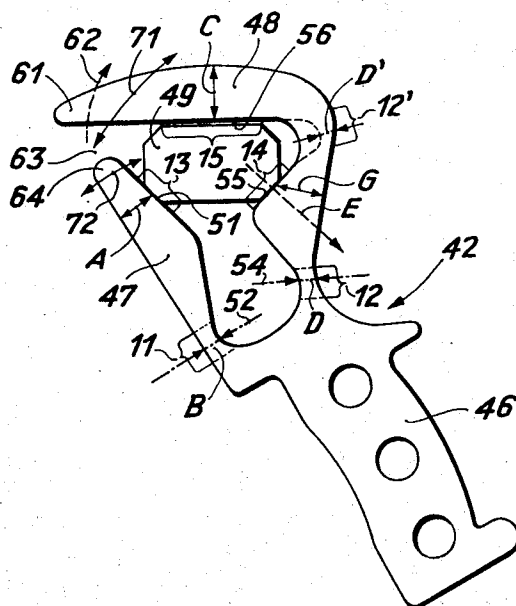
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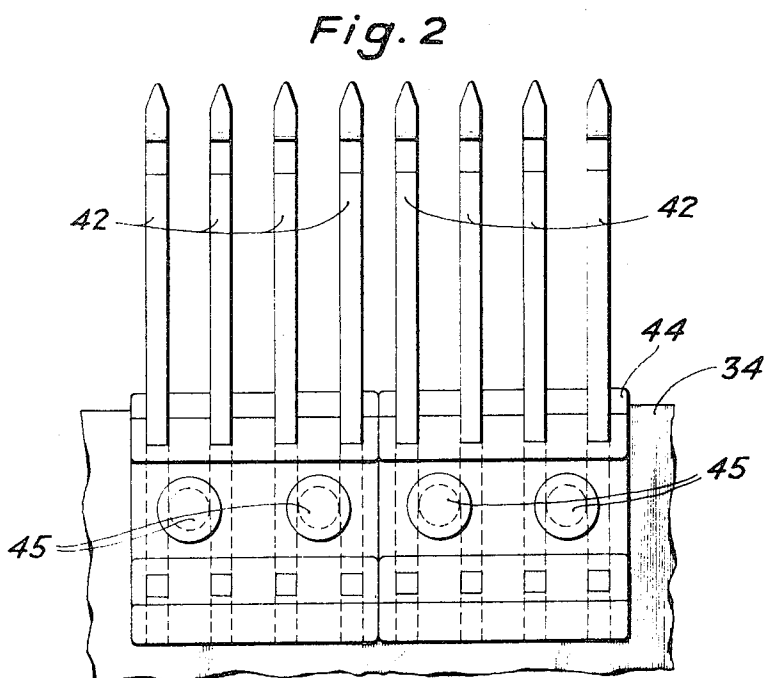
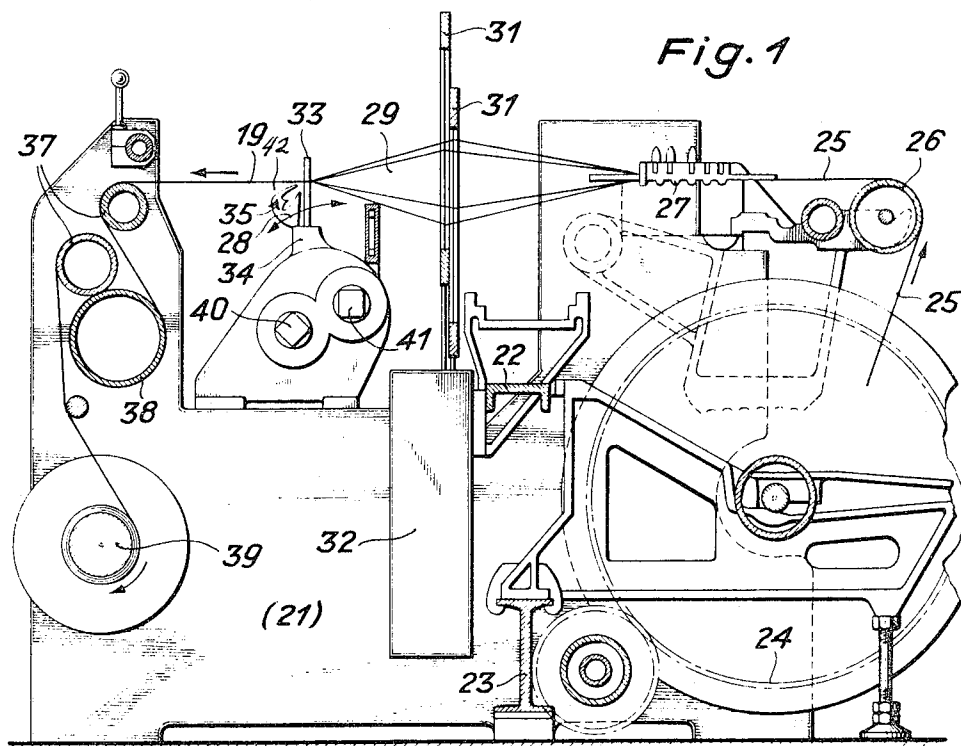
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ABSTRACT

The weft picking means is guided through the shed through a plurality of spaced guide elements. Each guide element is constructed with a foot which secures the guide element to the loom frame and a pair of jaws which define a guide path for the picking means. Either the jaws are formed with a reduced cross-section between the picking means guide surfaces and foot or the foot is formed with a reduced cross-section adjacent the jaws so as to permit resilient deflection of the jaws under canting forces of the picking means.

8 Claims, 6 Drawing Figures





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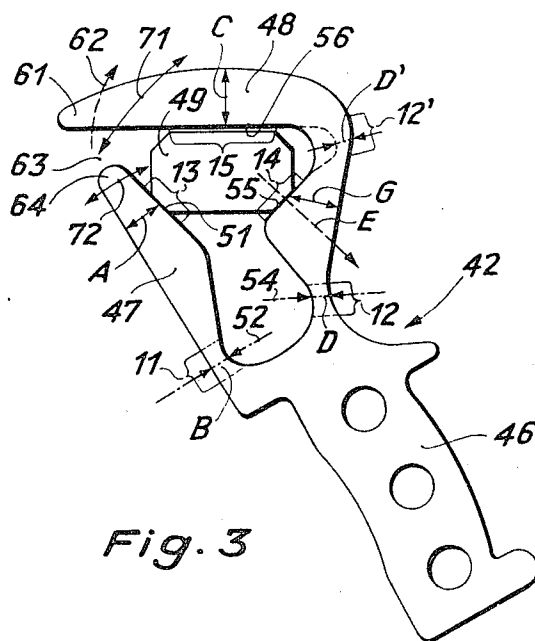


Fig. 3

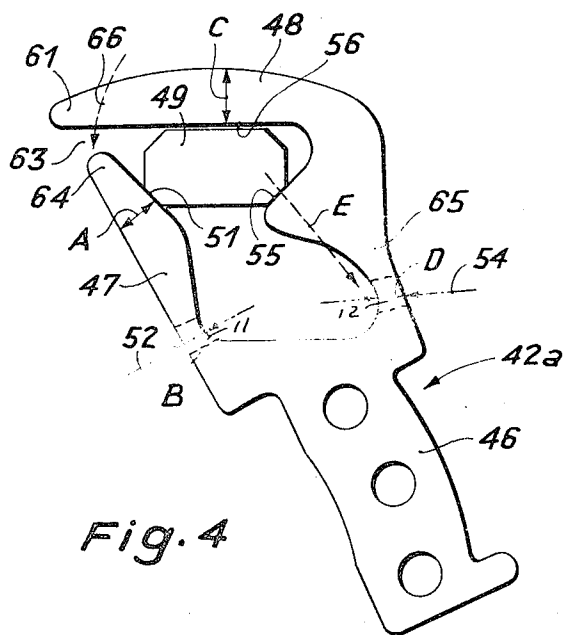


Fig. 4

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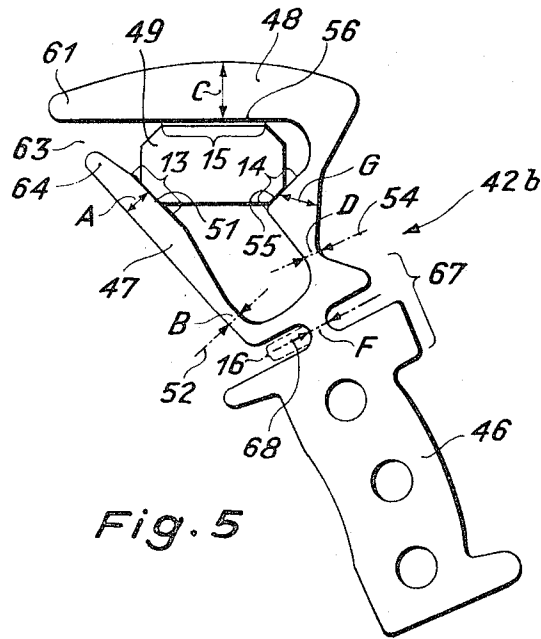


Fig. 5

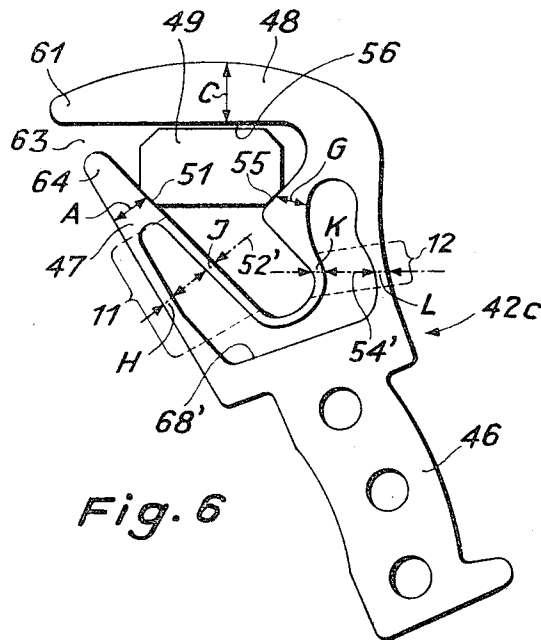


Fig. 6

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GUIDE ELEMENT FOR THE WEFT PICKING MEANS IN A LOOM

This invention relates to a guide element for a weft picking means of a loom.

Heretofore, looms have been provided with guide elements for guiding a weft picking means such as a shuttle through a shed. In many instances, these guide elements have required a precise mounting on the loom so as to accurately define a guide path for the picking means. Also, the guide elements have been formed with a foot portion and a pair of jaws which define a guide path for the shuttle. The foot portions and the sections connecting the foot portions have generally been of relatively large cross-section while the jaws have had cross-sections which diminish continuously or intermittently in the direction of the free ends of the jaws. Consequently, the jaws and foot have been particularly rigid in a plane perpendicular to the direction of travel of the shuttle. As a result, the vibration of the travelling shuttle through the guide element as well as the forces arising transversely relative to the trajectory of the shuttle when the shuttle changes direction slightly during picking have been absorbed only to a limited extent, if at all.

Further, because of lack of capability in absorbing these forces, the shuttle as well as the guide element have been subjected to excessive abrading. This has resulted not only in frequent replacement of the guide elements and shuttle but also in the depositing of unwanted abraded metal particles on the cloth or weft or warp yarns in the loom. This latter disadvantage has not usually caused a great deal of concern with cloths made of natural fibers as the abraded particles have penetrated between the fibers of the yarns into the thickness of the cloth and have become barely visible. However, this disadvantage has been particularly acute in the case of synthetic yarns since the abraded metal dust has become embedded in the warp or weft yarns and has often resulted in shadows or other soiling in the finished cloth.

Accordingly, it is an object of the invention to provide a guide element for a picking means of a loom which is capable of absorbing the vibration of the picking means.

It is another object of the invention to provide a guide element which acts as a shock absorber guide for a picking means of a loom.

It is another object of the invention to reduce abrasion between a picking means and the guide element therefor.

It is another object of the invention to avoid the need to precisely mount the guide element for a picking means.

Briefly, the invention provides a guide element for a weft picking means of a loom which is constructed with a foot and a pair of cantilevered jaws wherein the forces of the picking means generated in a transverse plane to the trajectory of the picking means are absorbed in a resilient manner. The jaws extend from the foot to define a guide path for the picking means and have surfaces which come into supporting contact with the picking means during travel. In order to absorb the transverse forces of the picking means, at least one of the jaws and/or the foot has a portion of a cross-section substantially smaller than the cross-section of the portions of the jaws containing the surfaces which come into contact with the picking means. This reduced cross-sectional portion permits the jaw or the entire guide element to deflect appreciably under the transverse forces of the picking means substantially in the direction of a plane perpendicular to the direction of travel of the picking means.

In one embodiment, the reduced cross-section portion in one of the jaws is formed in a plane relative to the surface contacted by the picking means so that the jaws tend to open from each other upon canting of the picking means. This reduces the possibility of any abrasion occurring between the jaws and picking means.

In another embodiment, the reduced cross-section portion of one of the jaws is located in a plane relative to the surface contacted by the picking means so that the jaws tend to close towards each other upon canting of the picking means. This allows an overriding portion of the jaw to come into contact with the top of the picking means so as to urge the picking means to return to its initial position.

In still another embodiment, the jaws are skeletonized by forming a hole in the jaws so as to form the reduced cross-section portions.

Any vibration of the picking means or other momentary forces arising transversely relative to the path of the picking means are thus absorbed by one or both jaws or the entire guide element. The guide elements which form the guide path for the picking means thereby form a shock-absorbent, resilient, vibration resistant guide. Consequently, the picking means is braked to a lesser extent by the guide elements during picking so that the speed of the picking means is maintained. Also, the need to precisely mount the guide element is obviated.

These and other objects and advantages of the invention will become more apparent from the following detailed description and appended claims taken in conjunction with the accompanying drawings in which:

FIG. 1 illustrates a schematic cross-sectional view through the side of a gripper shuttle loom incorporating guide elements of the invention therein;

FIG. 2 illustrates an enlarged front view of a plurality of guide elements in the loom of FIG. 1;

FIG. 3 illustrates a side view of a guide element of FIG. 2;

FIG. 4 illustrates a modified guide element according to the invention;

FIG. 5 illustrates a modified guide element having a reduced cross-section portion between the foot and jaws; and

FIG. 6 illustrates a skeletonized guide element according to the invention.

Referring to FIG. 1, the gripper shuttle loom, as is known, has a base consisting of two uprights 21 and longitudinal supports 22, 23. In addition, a warp beam 24 is mounted in the loom base to deliver warp yarns 25 over a tension beam 26 and through a warp stop motion 27 to a shed 29. The shed 29 is formed by heald shafts 31 which are operated by a suitable known drive mechanism 32, for example, an eccentric machine. Further, a sley 34 which carries a reed 33 and a shuttle guide 35 in front of the reed, as shown, is driven by a loom driving shaft 40 via a sley shaft 41 in a known manner in an arcuate path 28 relative to the shed 29. The shuttle guide 35 is made up of a fairly large number of self-supporting guide elements 42 which define a guide path for a gripper shutter (49, FIG. 3) which is to be shot along the shuttle guide 35 into the shed 29 when the shuttle guide 35 is moved into the shed 29. Finally, the loom directs the cloth 19 which is formed over suitable rolls 37, 38 onto a cloth beam 39.

Referring to FIG. 2, the shuttle guide elements 42 are fixed to the sley 34 by any suitable means such as bracket-shaped holders 44 and screws 45 and are each disposed in a plane transverse to the trajectory path of a gripper shuttle as well as the shed.

Referring to FIG. 3, each guide element 42 is constructed with a foot 46 which contains suitable aligning holes for machining or other manufacturing process, as are known, and which is directed upwardly relative to the sley 34 (FIG. 2) and a pair of jaws 47, 48 which extend integrally from the foot 46. These jaws 47, 48 are shaped so as to envelop the gripper shuttle 49 during movement of the gripper shuttle 49 in the guide path while inserting the weft in the shed 29 (FIG. 1). The jaws 47, 48 have surfaces 51, 55 on the inside which serve to support complementary surfaces of the gripper shuttle 49 during movement of the gripper shuttle 49 through the guide element 42.

The surface 51 of the lower jaw 47 which contacts the gripper shuttle 49 is formed in a portion 13 having a relatively large cross-section A per unit width as compared to the remainder of the jaw 47. In addition, the lower jaw 47 has a portion at a plane 52 between the shuttle contacting portion 13 and foot 46 which is of substantially smaller cross-section B per unit width. In like manner, the surface 55 of the upper jaw 48 is formed in a portion 14 having a relatively large cross-section E per unit width as compared to the remainder of the jaw 48 therebelow. Also, the upper jaw 48 has a surface 56 located above the top of the gripper shuttle 49 which is formed in a

portion 15 of relatively large cross-section C per unit width. The upper jaw 48 has a portion 12 in a plane 54 between the shuttle contacting portion 14 and foot 46 which is of substantially small cross-section D per unit width. This portion 12 is further located under a plane passing transversely through the contact surface 55. During operation, the gripper shuttle 49 is carried by the contact surfaces 51, 55 in the portions 13, 14 and is merely guided and occasionally pushed away by the other contact surface 56 in portion 15.

Since the portions 11, 12 are of smaller cross-section B, D, than the portions 13, 14, contacting the gripper shuttle 49, the jaws 47, 48 are either able to deflect under the vibration or irregular movements of the shuttle 49 as indicated by the respective arrows 71, 72 or able to absorb these forces.

In operation, should the shuttle 49 turn or cant in a clockwise direction as viewed in FIG. 3, it exerts a force E on the contact surface 55 of the upper jaw 48 which produces a clockwise rotational moment of the jaw 48 at the plane 54. As a result, the free end 61 of the upper jaw 48 tilts slightly upwardly as indicated by the arrow 62 away from the opposite free end 64 of the lower jaw 47. The gap 63 between the free ends of the jaws 47, 48 thus enlarges. This reduces the possibility of abrasion between the shuttle 49 and guide elements 42.

Alternatively, the portion 12 of small cross-section D may be displaced to a position, as shown in dotted lines in FIG. 3, to a position above the shuttle contact surface 55 and between the surfaces 55, 56.

Referring to FIG. 4, the guide element 42a is similar to that described above and similar reference characters are used to indicate like parts and portions as above. However, the portion 12 of reduced cross-section D and the rear portion 65 of the upper jaw 48 are located above a plane passing transversely through the shuttle contact surface 55. Thus, should the shuttle 49 tilt or cant in a clockwise direction as viewed, the force E exerted on the surface 55 produces a counterclockwise rotational moment of the jaw 48 at the plane 54. As a result, the free end 61 of the upper jaw 48 moves slightly downwardly as indicated by the arrow 66 towards the free end 64 of the lower jaw 47. The gap 63 thus becomes smaller. This permits the contact surface 56 to come into contact with the shuttle 49 so as to return the shuttle 49 to the original untilted state.

Referring to FIG. 5, wherein like reference characters indicate like parts and portions as above, the guide element 42b can alternatively also be formed with a portion 16 in the upper portion 67 of the foot 46 adjacent the jaws 47, 48 having a small cross-section F in a plane 68 relative to the cross-sections A, G, C of the jaw portions 13, 14, 15. In this case, the entire guide element 42b can deflect in the event of vibration, canting or other forces occurring transversely to the trajectory of the shuttle 49.

Referring to FIG. 6, wherein like reference characters indicate like parts and portions as above, the guide element 42c can also be formed in a skeletonized manner with a hole 68' through the jaws 47, 48 so that the cross-section of each jaw 47, 48 in the respective planes 52', 54' consist of a pair of spaced cross-section portions H, J and K, L, respectively.

The reduction in the cross-sections of the portions 11, 12, 16 above described refer to a reduction in the direction parallel to the path of the warp yarns as viewed in FIG. 1. The thickness of these portions 11, 12, 16, however, are of uniform dimension and are equal as shown in FIG. 2.

The invention thus provides a guide element which effectively absorbs the vibration and irregular transverse forces of a shuttle while substantially reducing abrasion of the shuttle or guide element. Further, the invention provides a guide element which is capable of resiliently deflecting under the forces of a shuttle and of quickly restoring the shuttle to an even keel or original level state. The guide element is thus capable of relatively long life requiring infrequent replacement due to wear while reducing the creation of abraded particles which may otherwise damage the yarns and cloth, especially

synthetic yarns. Also, since the guide element has a resilient action, there is no need to adjust the guide elements for the shuttle guide path as precisely as before.

The guide element of the invention can also be used, for example, in looms in which the weft picking means are gripper or weft insertion needles as well as in other types of looms.

It is noted that the resilience of the guide element of the invention can always be obtained by forming a portion of smaller cross-section than that portion in contact with a shuttle between the shuttle contacting portion and the foot.

What is claimed is:

1. A self-supporting guide element of uniform thickness for a weft picking means in a loom having
 - a foot for mounting of the guide element in the loom, and
 - a pair of jaws attached to said foot and extending therefrom in cantilevered manner to define a guide path for the weft picking means, each said jaw having a surface thereon for contacting the weft picking means during passage therethrough in said guide path, at least one of said jaws having a portion of substantially smaller width transverse to said guide path than the portion containing said surface located between said surface and said foot whereby said one jaw is capable of deflecting resiliently about said portion of smaller width in a direction transverse to said guide path.
2. A guide element as set forth in claim 1 wherein said foot includes a portion adjacent said jaws of smaller cross-section than said portion containing said surfaces whereby the guide element is capable of deflecting resiliently in a direction transverse to said guide path.
3. A guide element as set forth in claim 1 or 2 wherein one of said jaws overlies said guide path and includes a portion of smaller cross-section than said portion containing said weft picking means contacting surface located under a plane passing transversely through said contacting surface whereby a force passing transversely through said contacting surfaces causes said one jaw to rotate away from the other jaw of said pair of jaws at the free ends thereof.
4. A guide element as set forth in claim 1 or 2 wherein one of said jaws overlies said guide path and includes a portion of smaller cross-section than said portion containing said weft picking means contacting surface located over a plane passing transversely through said contacting surface whereby a force passing transversely through said contacting surface causes said one jaw to rotate toward the other of said pair of jaws at the free ends thereof.
5. A guide element as set forth in claim 1 wherein said jaws are skeletonized to have a pair of spaced cross-section portions in each jaw in each plane of said portion of smaller cross-section.
6. A guide element as set forth in claim 1 wherein one of said jaws includes a weft picking means contacting surface over said guide path.
7. A guide element of uniform thickness for a weft picking means in a loom comprising
 - a foot for mounting of the guide element in the loom, said foot having a portion of smaller cross-section than the remainder of said foot, and
 - a pair of jaws attached to said foot and extending therefrom in cantilevered manner to define a guide path for the weft picking means, each said jaw having a surface thereon for contacting the weft picking means during passage therethrough in said guide path, wherein said jaws are capable of deflecting resiliently in a direction transverse to said guide path about said portion of a smaller cross-section of said foot.
8. A self-supporting guide element of uniform thickness for a weft picking means in a loom comprising
 - a foot for mounting of the guide element in the loom, and
 - at least one jaw attached to said foot and extending therefrom in cantilevered manner, said jaw having a guide surface thereon for guiding the weft picking means in a guide path in the loom,

at least one of said foot and said jaw having a portion of substantially smaller width than the portion of said jaw containing said guide surface between said foot and said guide surface whereby said jaw is capable of deflecting resiliently about said portion of smaller width in a direction transverse to said guide path.

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