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HARNESS GUIDE

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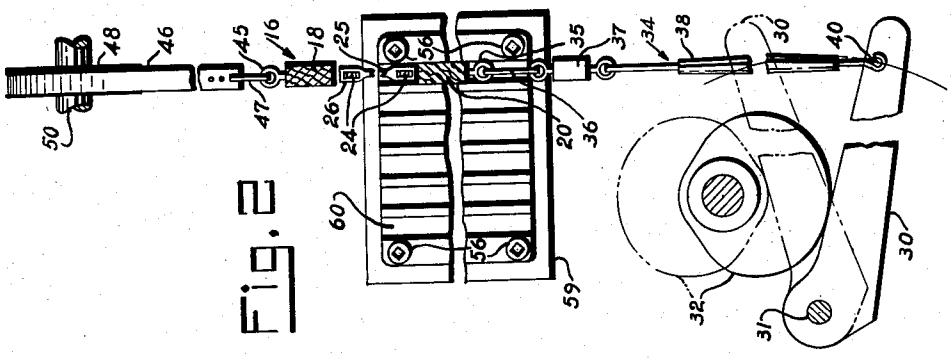


Fig. 2

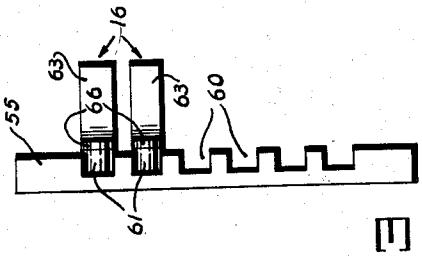


Fig. 3

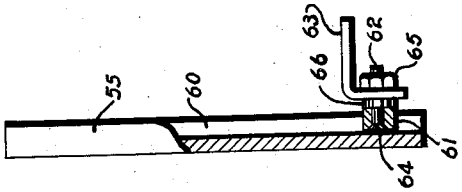


Fig. 4

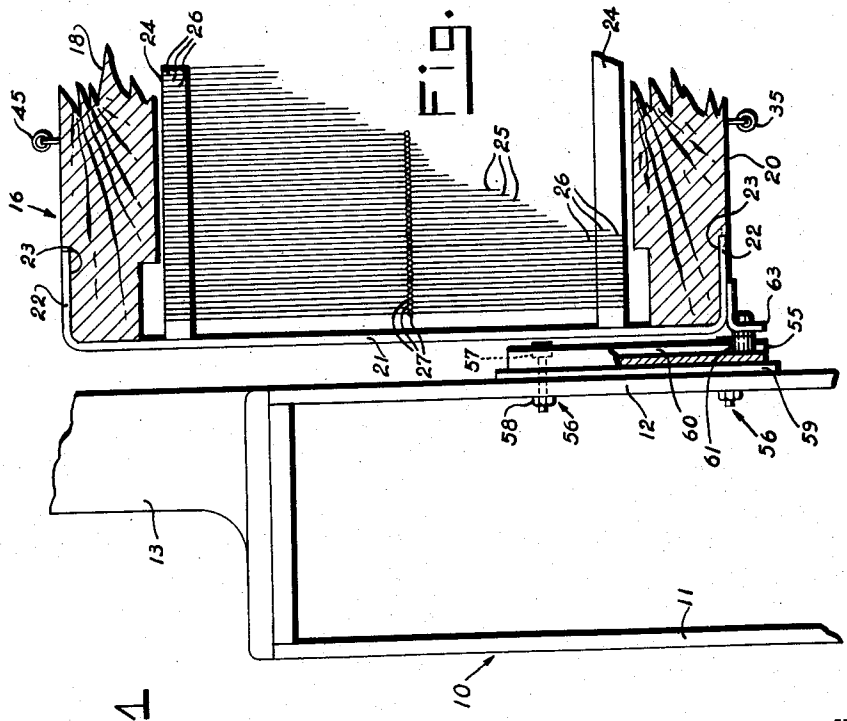


Fig. 1

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HARNESS GUIDE

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2 Claims. (Cl. 139—82)

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The present invention relates to an improvement in harness mechanisms for looms and more particularly to means for guiding the harnesses in their shedding movements.

A shedding device of the type to which the present invention applies commonly includes a plurality of harnesses carrying heddle wires with eyes through which the warp threads pass. The harnesses are suspended from the loom arch by a harness head motion and are depressed by cams which are mounted on the cam shaft or on an auxiliary shaft driven from said cam shaft. The cams operate on follower lever treadles which through straps or links move the harnesses downward. The head motion brings the harnesses to their original position.

The outer ends of the treadles to which the lower sections of the harness frames are connected by links or straps travel in arcuate paths and this imparts to said lower harness frame sections a tendency to deviate from straight vertical reciprocating courses. No such problem is present in connection with the upper sections of the harness frames, since the forces of the head motion tending to return said harness frames upwardly act in vertical directions in the planes of their corresponding harnesses.

As a result of the deviating tendencies imparted to the lower sections of the harness frames during loom operations, especially at high speeds, the harness frames are caused to sway and vibrate as they are reciprocated, this causes abrasion and wear on the warp yarn threads at the sections thereof where they pass through the heddle eyes and slapping of the frames together and against the handrail or reed cap. This slapping action creates undesirable noises, wear on the frames, and increased vibrations of the harness frames.

One object of the present invention is to provide a new and improved harness mechanism with simplified but nevertheless effective means which guides the harness frames for reciprocation in vertical parallel planes, while permitting said frames to be spread apart at their upper sections for repair to the heddle wires or eyes, for threading of the warp yarn or for any other reason.

In carrying out certain features of the present invention, where each harness frame is most strongly subjected to the deviating influence of its associated treadle, namely, at its lower section, said frame is guided for vertical planar movement, while the upper section of said harness frame is not so guided but is maintained

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against deviation from planar vertical movement by the restricting influence of the ordinary harness head motion. In the region of the loom were the lower sections of the harness frames operate, the presence of loom parts would prevent access to the harness frames even if the guide means for said lower frame sections were not present. Therefore, since access to the lower harness frame sections cannot be easily gained anyway, there is no disadvantage from the standpoint of accessibility in locating the guide means of the present invention in the region of the loom where the lower sections of the harness frames operate. This arrangement leaves the upper sections of the harness frames free to be spread apart for purposes of accessibility. The absence of guide means for the upper sections of the harness frame is particularly desirable, since the region of the loom where these sections operate is not cluttered with loom parts and it is advantageous to maintain said region free to afford access to the harness frames at said region.

Various other objects, features and advantages of the invention will be apparent from the following particular description and from an inspection of the accompanying drawings, in which—

Fig. 1 is a front elevation of an embodiment of the present invention and shows a fragment of a harness, a loomside and one of the guide means for the lower section of the harness;

Fig. 2 is a transverse section of the harness and shows said harness in connection with one of the guide members and with the means for operating said harness for shedding action;

Fig. 3 is a top plan view of a multiple guideway member for a number of harness frames and shows two rollers on one side of a pair of harnesses in position in respective guideways; and

Fig. 4 is a view partly in front elevation and partly in vertical section of the guideway and roller combination of Fig. 3.

Referring to the drawings, the loom comprises loomsides 10, shown of the type described and claimed in copending application Serial No. 691,237, filed August 17, 1946. The loomsides comprise a pair of vertical parallel frame webs 11 and 12 interconnected by suitable braces and cross-pieces (not shown) and supporting at the top a side arm of the loom arch 13.

Although only the left loomside with associated guide for one side of each harness is shown in the drawings, it must be understood that the right loomside with associated guide for the other side of the harness is of similar construction.

Between the two loomsides 10 is a series of parallel vertical harnesses 16, only two being shown. Each of the harnesses is shown comprising a frame having an upper wooden cross frame piece 18 and a lower wooden frame piece 20 interconnected by metal side frame pieces 21, each in the form of a U-shaped bracket with offset ends 22 fitting into respective recesses 23 in said cross pieces 18 and 20. The side frame pieces 21 are secured to the cross frame pieces 18 and 20 by suitable fastening means such as screws or the like (not shown).

Extending across the side frame pieces 21 and secured thereto by welding, or the like, are the heddle bars 24 desirably made of metal. Heddle wires 25 extend vertically between the heddle bars 24 and are provided at their ends with horizontally aligned loops 26 through which said bars extend. Intermediate their ends, the heddle wires 25 are provided with respective eyes 27 through which the warp threads pass to form the shed in the usual manner upon vertical reciprocation of the harnesses.

Each harness 16 is operated for vertical reciprocation. To that end, there is provided a series of treadles 30 pivotally supported at 31 on a common axis and arranged into two groups for angular reciprocation in opposite directions. The treadles 30 are angularly depressed by cams 32 engaging said treadles and arranged into two opposite groups to operate the treadles as two oppositely moving assemblages.

A pair of connections 34 between the lower section of each harness 16 and the free ends of a corresponding pair of similar treadles 30 serve to transmit the depressing movement of said treadles to said harness and thereby cause said harness to move downwardly. Each of these connections is shown comprising an eye screw 35 threaded into the lower cross frame piece 20, a link 36 hooked at one end to said eye screw, a turnbuckle 37 hooked at one end by the other end of said link, and a link 38 hooked at its upper end to the other end of said turnbuckle and hooked at its lower end to a pin 40 on a treadle 30.

The cam and treadle arrangement described serves to depress the harness 16. The head motion connected to the upper section of the harness serves to return the harness upward. This head motion may be of any well known type and is shown comprising sheave and strap connections each including an eye screw 45 threaded into the upper cross frame piece 18, a strap 46 with a tie 47 at one end hooked into said eye screw and a drive sheave 48 over which said strap passes and to which a similar tie at the other end of said strap is fastened. The sheave 48 is secured to a shaft 50 which may be spring-pressed or otherwise forced to urge said shaft in a direction to wind the strap on said sheave and thereby to lift the harness when said harness has reached the end of its downward stroke and has therefore been released from the depressing influence of the cam and treadle arrangement. The head motion forms no part of the present invention and is therefore shown in a simplified form merely for purposes of illustration. The head motion may be of any suitable construction well known in the art.

The sheave and strap harness return mechanism may be of the type to effect upward return movement of the one harness in response to the downward cam actuated movement of another harness. This may be effected for example, by

mounting two drive sheaves on the shaft 50 for operation in unison and by having the straps of the head motions for two harnesses wound in opposite directions on said sheaves, respectively, and secured thereto at one end. The shaft 50 in this arrangement is made to rotate by the downward cam actuated movement of one harness causing thereby the upward return movement of the other harness.

The lower section of the harness 16 tends to deviate or sway as a result of the arcuate movement of the lower ends of the connections 34 where said connections are secured to the treadles 30. The head return motion of the harness 16 has no deviating or swaying influence on the upper section of said harness, since the forces set up by said motion and imparted to said harness are in the plane of the harness and are so balanced that the resultants thereof act vertically.

As an important feature of the present invention, the lower section of each harness 16 is guided for vertical straight line movement. The guide means for this purpose comprises guide members 55 on opposite sides of the harnesses 16. Each of the guide members 55 is attached to the inner side of the corresponding loomside 10 and more specifically to the inner face of the inner frame web 12 by fastening members 56. Each of these fastening members 56 is shown comprising a bolt with a head 57 fitted in a counterbore of the guide member and provided with a socket for receiving a socket wrench. This bolt is threaded into a nut 58 welded to or otherwise rigid with the outer face of the inner frame web 12.

The section of the loomside frame web 12 to which the guide member 55 is secured is desirably reinforced and finished with a machined or finished backing plate 59 for said guide member.

The guide member 55 is provided with a plurality of vertical guideways 60 for a corresponding number of harnesses, six being shown. These guideways are shown in the form of channels, each adapted to receive with a snug rolling fit a roller 61 carried by a side of the harness 16 at its lower section. Each of these rollers is supported on a bolt 62 affixed to an angular bracket 63, one leg of which is secured to the lower offset 22 of the side frame piece 21 desirably by spot welding, the other leg carrying said bolt. The bolt 62 has a bevelled head 64 fitted in the countersink of the guide roller 61 and a nut 65. A washer 66 separates the roller from the bracket 63.

With the arrangement as shown, even though the lower sections of the harnesses 16 alone are guided, these harnesses will travel vertically in parallel planes without undue vibration or swaying. At the same time, the upper and even the middle heddle eye sections of the harnesses are accessible for yarn threading or other purposes and may be spread apart to render said sections more accessible without demounting the guide arrangement at the lower sections of said harnesses.

While the invention has been described with particular reference to a specific embodiment, it is to be understood that it is not to be limited thereto but is to be construed broadly and restricted solely by the scope of the appended claims.

We claim:

1. In a loom having spaced loomsides, a harness between said loomsides including a

frame member, a treadle motion connected to the bottom of said frame member adapted to pull said frame member downward into a shed forming position, a head motion connected to the top of said frame member adapted to pull said frame member upward into a second shed forming position, said head motion adapted to exert its pulling effect vertically and without substantial lateral components, said treadle motion adapted to exert its pulling effect vertically but with substantial lateral components, a guide member at each side respectively of said frame member and carried by said loomsides, and a guided member carried at each side respectively of said frame member adjacent the bottom thereof, said guide members and said guided members cooperating to restrain the bottom of said frame member against lateral movement while imposing no restraint on the lateral movement of the top of said frame member.

2. In a loom having spaced loomsides, a harness between said loomsides including a frame member, a treadle motion connected to the bottom of said frame member adapted to pull said frame member downward into a shed forming position, a head motion connected to the top of said frame member adapted to pull said frame member upward into a second shed forming position, said head motion adapted to exert its pulling effect vertically and without substantial lateral components, said treadle motion adapted to exert its pulling effect vertically but with substantial lateral components, a guide member at each side respectively of said frame member and attached to said loomsides, each of said guide members having a vertical guiding groove, and a guided member attached to each side respectively of said

frame member adjacent the bottom thereof, each of said guided members adapted to move in the groove of the guide member at its respective loomside to restrain the bottom of said frame member against lateral movement while imposing no restraint on the lateral movement of the top of said frame member, each of said guided members including a roller adapted to contact the side of the groove of its respective guide member, and mounted for rotation on an axis member extending from said frame member whereby said frame member may be swung at will about said rollers.

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