

May 6, 1969

C. F. KRAMER

3,442,298

LOOM HARNESS

Filed June 30, 1967

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FIG. 1

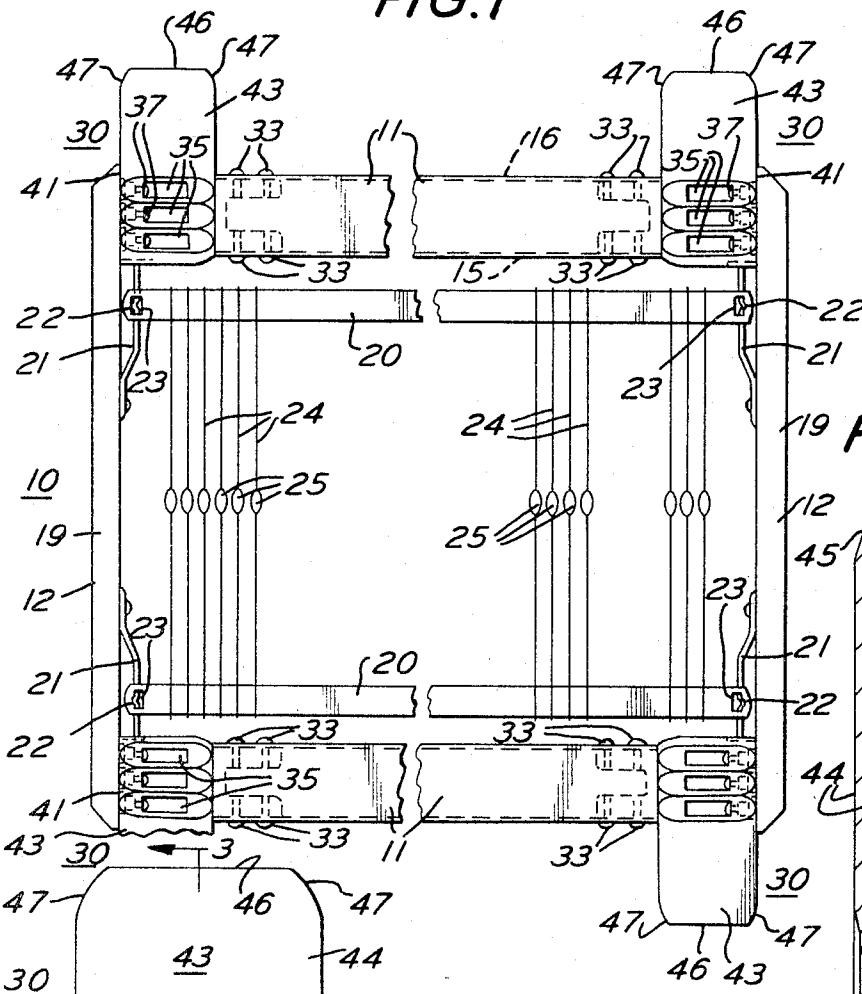


FIG. 3

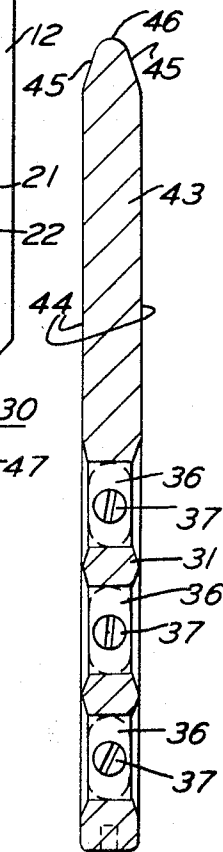
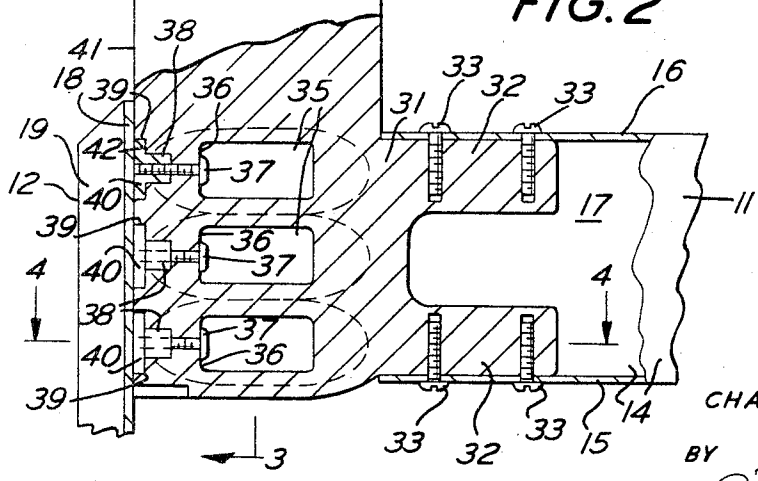


FIG. 2



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FIG. 4

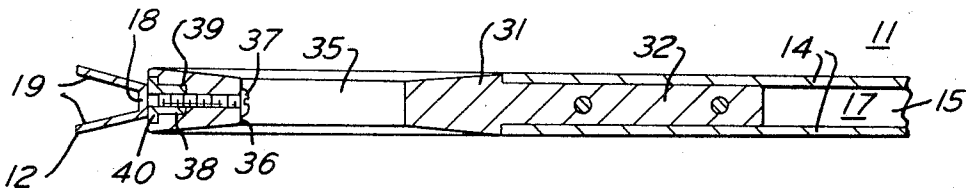


FIG. 5

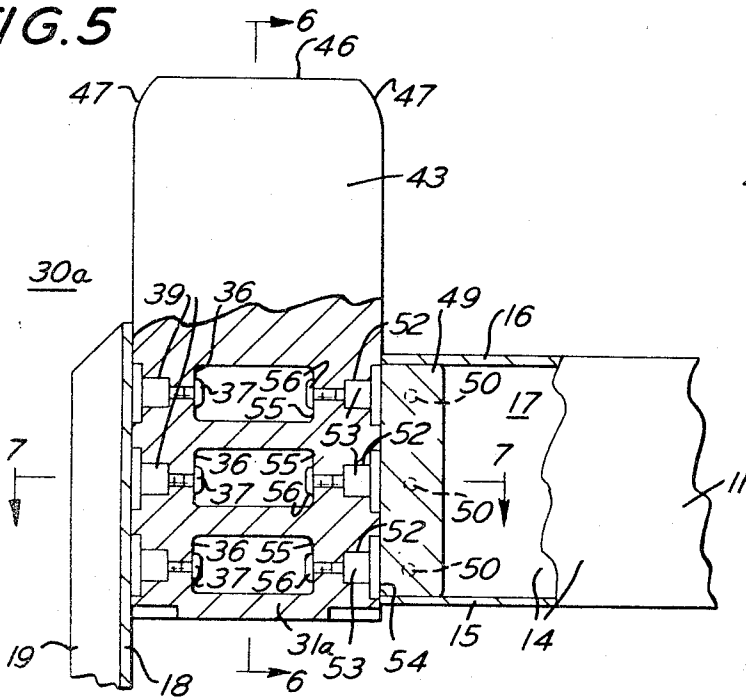


FIG. 6

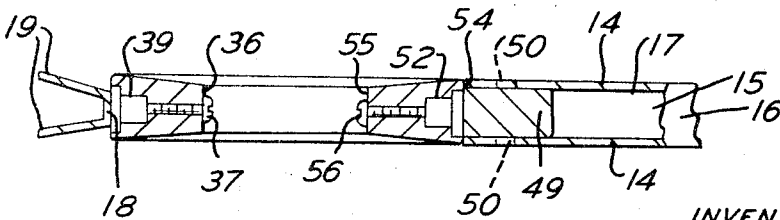
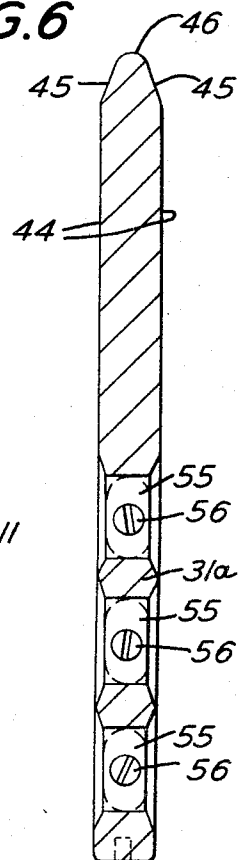


FIG. 7

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3,442,298

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Filed June 30, 1967, Ser. No. 650,457

Int. Cl. D03c 9/06

U.S. Cl. 139—91

8 Claims

ABSTRACT OF THE DISCLOSURE

Heddle frames having hollow tubular metallic top and bottom rails with connectors to the end braces. The connectors may have guides to maintain the separation of the frames during shedding.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates to loom harness and more particularly to connectors between the top and bottom rails and the end braces or struts of the harness frame of a weaving loom.

DESCRIPTION OF THE PRIOR ART

It has heretofore been proposed, in harness frames, to employ top and bottom rails of thin walled metal tubes and metallic end braces or struts. The attachment of such rails to the end braces or struts has presented difficulties in use.

Prior attempts to attach the top and bottom rails have resulted in unduly weakening the rails and metal fatigue in the rails caused failures.

It has also been proposed, as shown in the U.S. patent to John J. Kaufmann, No. 3,251,383, to provide so-called "nose guides" extending beyond the rails to aid in the separation of the harness frames during shedding, this being particularly advantageous with metallic rails to avoid abrasion of the frames.

SUMMARY OF THE INVENTION

The invention may be summarized as comprising an improved connection of the side struts or braces to thin tubular metallic top and bottom rails by connectors to which the struts are connected without the necessity for perforating, and weakening, the struts, the connectors having projecting portions which extend beyond the rails for separating the harness frames during shedding to reduce abrasion, the connections to the struts and rails being separable for replacement.

In accordance with the invention a loom harness frame having thin tubular metallic top and bottom rails has an improved connection to the side struts or braces.

It is the principal object of the present invention to provide a harness frame having tubular metallic top and bottom rails attached to the side struts or braces of the frame so as to be sturdy and free from likelihood of failure in use.

It is a further object of the present invention to provide a harness frame having thin tubular metallic top and bottom rails with attachments to the side braces or struts which avoid weakening of the rails or struts.

It is a further object of the present invention to provide, with attachments of the character aforesaid, spacers which aid in retaining contiguous frames from abrasive contact during the shedding operation.

Other objects and advantageous features of the invention will be apparent from the description and claims.

BRIEF DESCRIPTION OF THE DRAWING

The nature and characteristic features of the invention will be more readily understood from the following description taken in connection with the accompanying forming part thereof, in which:

FIGURE 1 is a front elevational view of a heddle frame embodying the main features of the present invention;

FIG. 2 is an enlarged view of one corner of the frame shown in FIG. 1, parts being broken away to show the details of construction;

FIG. 3 is a vertical sectional view taken approximately on the line 3—3 of FIG. 2;

FIG. 4 is a horizontal sectional view taken approximately on the line 4—4 of FIG. 2;

FIG. 5 is a view similar to FIG. 2 showing another preferred embodiment of the invention;

FIG. 6 is a vertical sectional view taken approximately on the line 6—6 of FIG. 5; and

FIG. 7 is a horizontal sectional view taken approximately on the line 7—7 of FIG. 5.

It should, of course, be understood that the description and drawings herein are illustrative merely, and that various modifications and changes can be made in the structure disclosed without departing from the spirit of the invention.

Like numerals refer to like parts throughout the several views.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now more particularly to FIGS. 1 to 4 of the drawings, a heddle frame 10 is shown of well known type comprising top and bottom rails 11 and side struts 12, the struts 12 and rails 11 being connected as hereinafter explained.

The rails 11 are preferably made of hollow steel tubes, rectangular in cross section with spaced parallel side walls 14 and spaced parallel inner and outer walls 15 and 16, bounding a hollow interior space 17 from end to end.

The struts 12 can be of any desired type but as illustrated are of metal channels with a flat central web 18 and diverging flanges 19.

Upper and lower heddle supporting rods 20 extend to just short of the webs 18 and are held in place by spring clips 21 which have projections 22 engaging in T-shaped apertures 23 in the rods 20. The heddle supporting rods 20 support a plurality of heddles 24 having central warp eyes 25 for controlling the warp.

In accordance with the present invention connectors 30 are provided between the rails 11 and the side struts 12. The connectors 30 may be of metal but are preferably of a synthetic plastic material having a low coefficient of friction when in rubbing contact with metal rails or with each other. Suitable materials include the plastic available under the trade name Delrin, and nylon, both of which are tough, resilient, inert and free from any tendency to soil the fabric being woven.

The connectors 30 preferably each includes a body portion 31 with vertically spaced horizontal or sidewise extensions 32 which engage in the interior space 17, contacting the interiors of the walls 14, 15 and 16 of the rails 11 and are held to the rails 11 by screws 33 which extend through the walls 15 and 16 and are in threaded engagement in the extensions 32.

The body portion 31 has a plurality of openings 35 with end faces 36, for the insertion of horizontally extending screws 37 which extend into engagement with the internally threaded shank 38 of an attaching element 39. The attaching elements 39 have flat heads 40 secured to the web 18, as by welding.

The edge face 41 of each connector 30 may be relieved,

or recessed as at 42, for the reception of attaching elements 39.

The connectors 30 preferably have beyond the rails 11, frame guide portions 43, with side faces 44, upper and lower or outer chambers 45 terminating with a rounded nose 46 and rounded corners 47. The connectors 30, preferably have the distance between the side faces 44 at least as great as the width of the rails 11 and if desired that distance may be greater than the width of the rails 11 to provide a more positive separating action.

Referring now more particularly to FIGS. 5, 6 and 7 another preferred form of connector 30a is there illustrated having a body 31a and an interior connector block 49 contacting the interiors of the walls 14, 15 and 16 of the rails 11 and held to the rails 11 by spot welds 50 on each side. The blocks 49 have secured thereto the heads 51 of a plurality of attaching elements 52, similar to the attaching elements 39. The attaching elements 52 have internally threaded shanks 53, the face 54 of the body 31a being relieved for the reception of the attaching elements 52.

The openings 35 have interior end faces 55 opposite the faces 36 and horizontal screws 56 with their heads engaging the faces 55 and extending into threaded engagement in the block 49.

The openings 35 have screws 37 engaged in attaching elements 39 as before.

The connectors 30a preferably have frame guide portions 43 as previously described.

In use the connectors 30 and 30a provide strong connections of the rails 11 to the side braces or stuts 12 and with the rails 11 free from undue stresses.

The guide portions 43 prevent engagement of the rails 11 during shedding by providing guiding and separating elements at the ends of the rails 11.

I claim:

1. In a heddle frame having top and bottom rails and side struts, the improvement which comprises: connectors interposed between the ends of each of said rails and said side struts, said connectors each having a body portion with central openings between opposite side faces of said frame, said side struts in facing relation to the ends of said body portion having attaching members carried thereby, fastening members detachably engaging said attaching members connecting said connectors to said side

struts and having portions disposed in said openings, said connectors each having a connecting portion connected thereto and extending within the end of the rail, and

fastening means securing said connecting portion and said end of said rail.

2. The combination according to claim 1 in which said connectors have projecting frame guide portions extending beyond the frame.

3. The combination according to claim 1 in which said fastening members comprise threaded elements having heads disposed in said openings.

4. The combination according to claim 1 in which said attaching members are secured on the inner faces of said side struts and have complemental threaded portions with which said threaded elements are engaged.

5. The combination according to claim 1 in which said connecting portion is an integral extension of said body portion.

6. The combination according to claim 5 in which said fastening means includes members engaging a rail and extending into said connecting portion.

7. The combination according to claim 1 in which: said side struts have web portions, and said fastening members are secured on the interiors of said web portions.

8. The combination according to claim 1 in which: said connecting portion includes a block extending within the end of the rail, and said fastening means comprises a welded connection between the rail end and the block.

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JAMES KEE CHI, Primary Examiner.