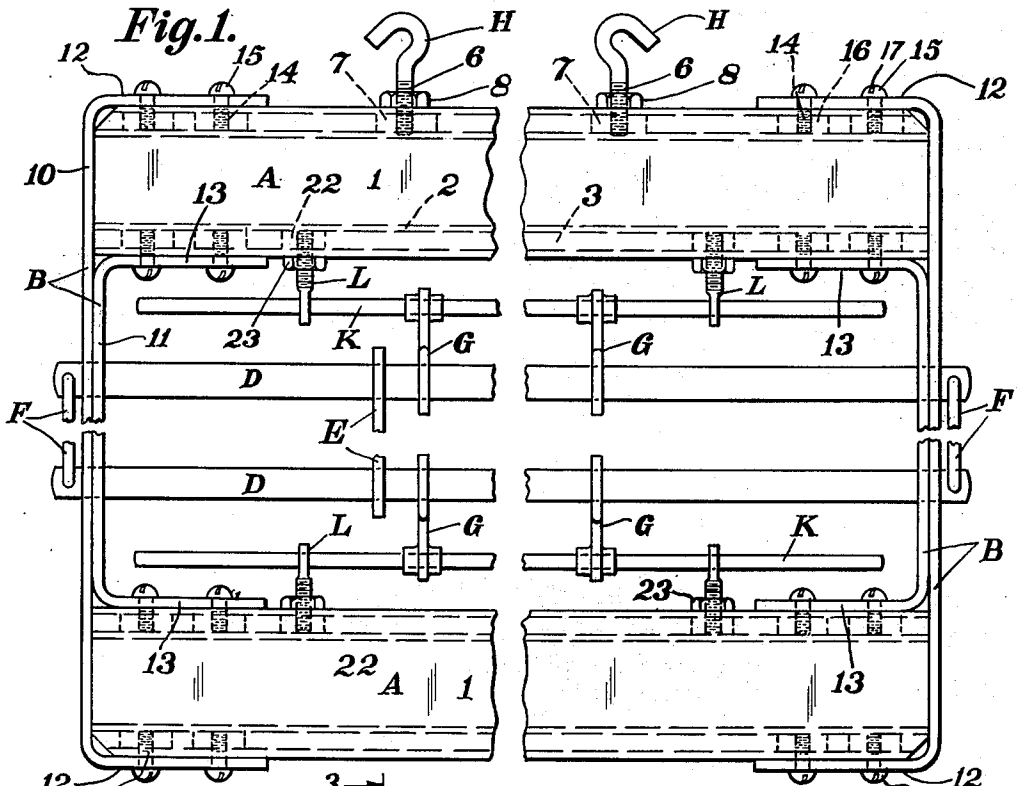
Feb. 9, 1954 B. T. LEVEQUE 2,668,559

LOOM HARNESS HEDDLE FRAME

Filed June 17, 1949 2 Sheets-Sheet 1

Fig.1.



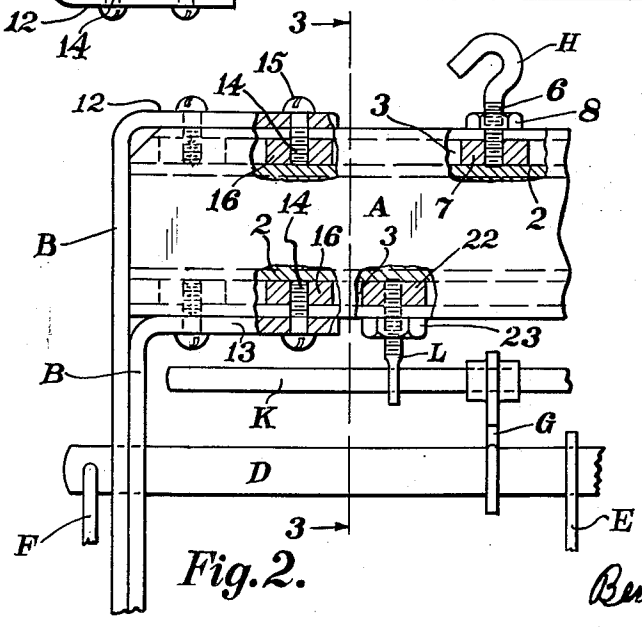


Fig.2.

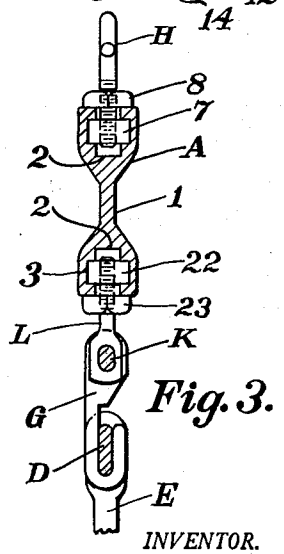


Fig.3.

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LOOM HARNESS HEDDLE FRAME

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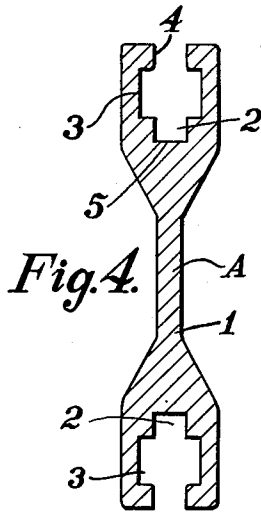


Fig. 4.

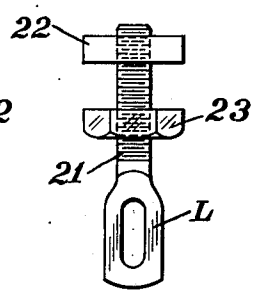


Fig. 5.

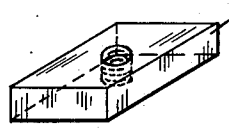


Fig. 6.

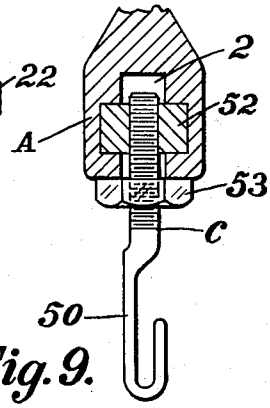


Fig. 9.

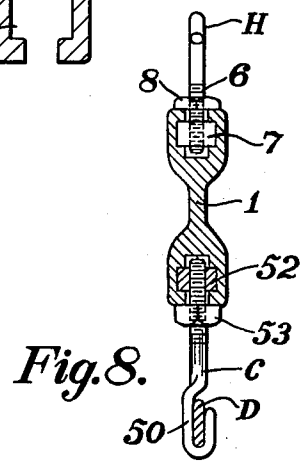


Fig. 8.

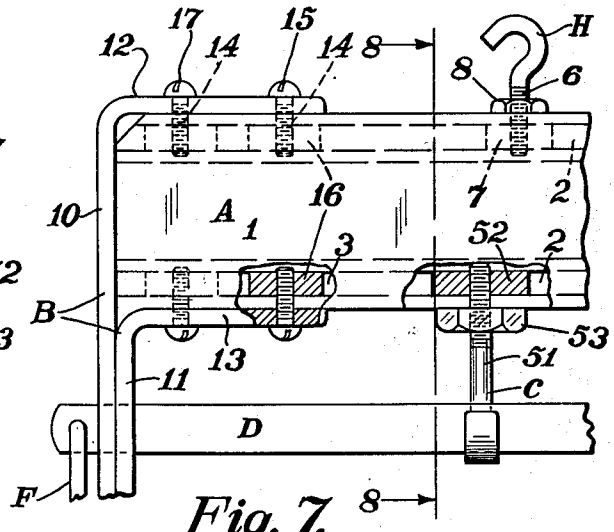


Fig. 7.

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UNITED STATES PATENT OFFICE

2,668,559

LOOM HARNESS HEDDLE FRAME

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Application June 17, 1949, Serial No. 99,701

7 Claims. (Cl. 139—92)

1

This invention relates to a heddle frame for looms and particularly heddle frames in which the heddles are made of metal and are strung on horizontal metal heddle bars each supported at a spaced distance one from the top and one from the bottom frame member which is known in the industry as a shaft.

The special type of shaft is the basic novelty in this construction and can be utilized in various ways.

Such harness frames are formed of top and bottom shafts which may be wood, or may be of metal, connected by end pieces which are generally of metal. Spaced parallel with and a short distance from the top shaft and from the bottom shaft are metal heddle bars on which the heddles are carried and in some cases these are supported partly by the end pieces and partly by heddle bar supporting members such as hooks or hangers which may extend directly from a top or a bottom shaft or there may be a supporting rod or auxiliary heedle bar between the main shafts and the heddle bars, such supporting rod being attached by suitable hangers to its adjoining main shaft while the supporting members or hooks which extend from it to the heddle bar are slidable on the supporting rod to permit the number of heddles to be increased and decreased for different types of warps.

As some harness frames are as long as eight feet, and as they are connected by harness straps and hooks to the harness shifting mechanism and as there may be a large number of harnesses one behind the other, some of which are constantly moving up and down, it is highly desirable that the harness frame should be thin from front to back of the loom and at the same time stiff and that it should not sag as such sagging allows the heddles to buckle and cause wear on them and on the warp threads.

As long harnesses may sag and require a considerable number of harness hooks, it is desirable that these should be adjustable lengthwise of the harness and also vertically to compensate for any irregularity or stretching of the harness supporting straps.

The construction of a harness frame and the connection of the heddle bars to the shafts and end pieces is highly important and it is also important that the construction should be such that heddles can be removed from the heddle bars or more heddles added from time to time.

It is desirable that the whole harness should be as light as possible and also that it should be so hung that it does not tend to tip forward or back whereby it might interfere with an adjoining harness.

I prefer to use a light metal of the group consisting of aluminum and magnesium or some light metal alloy but find that screw threads cut into such metals wear it out very quickly, and if hanger hooks are supports or supporting members for a supporting rod are so made that they will slide on such metal, it is worn out very quickly.

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The main purpose of my invention is to provide shafts for a harness frame which are simple and light in construction but which permit the use of clamping means each with an interior nut and an exterior clamping nut or member which will not need threaded holes in the shaft. These can be used not only as part of supporting means much as harness hooks and the hooks or supports for an auxiliary heddle bar or for a main heddle bar but can be positioned lengthwise of the harness, and if necessary, can be adjusted vertically.

My clamping means can also be used to releasably attach end pieces to my shafts to allow a certain amount of lengthwise adjustment and my standard shafts can be used with end pieces of harnesses of different height.

In my preferred form, there is a thin web extending from top to bottom of each shaft with an enlarged part at the top and one at the bottom. Into the outer edge, side or face of each such top and bottom part extends a dead end channel, each channel being open at each end and each being of substantially rectangular form and having intermedially extending toward its front and back side what I will call a nut slot to receive an interior nut to cooperate with an exterior nut or a bolt head in positioning, clamping and holding the shanks of the harness hanger hooks, the end piece arms and the supporting members for a supporting rod or auxiliary heddle bar or for the regular heddle bar in place.

Along each top and bottom or inside and outside edge, side or face, of each shaft there is such a channel which is open at such inside or outside edge and at the ends, such channel extending inward of the shaft from each such edge.

From each front and back side of each channel extends a nut slot which extends medially towards but not through the front and back faces of the shaft which slot is to receive an interior nut. This interior nut is preferably of rectangular cross section but may be of other shape preferably with flat parallel side faces and preferably also with flat parallel top and bottom faces. This nut should fit the nut slot with a close sliding fit so that it is slidable but not turnable. As the sides of the nut slot prevent the nut from turning when tightening the clamping means by turning the shank of the clamping member of the clamping means or the exterior nut on that shank, only one screw driver or wrench is needed for adjusting or readjusting the position of the clamping means, such as the harness hooks, the heddle bar supporting members or the end piece fastening bolts.

This complete channel is of the general shape

of a Greek cross with the outer side open, the nut slot being intermediate and the channel extending inward to a dead end beyond the nut slot.

At the top and bottom of each shaft is an enlarged part which extends its entire length and between them in my preferred embodiment, midway between front and back, is a connecting web. This web between front and back keeps each shaft evenly balanced.

The front and back surfaces of both the top and bottom enlarged parts of the preferred embodiment are in parallel planes with no projecting parts which might catch threads as the harnesses move.

The shanks of the harness hooks and bolts and of the supporting bar hangers and heddle bar hooks mentioned are threaded and engage what I will call an interior nut or member which may cooperate with a bolt head or an exterior nut, as the purpose is to clamp the shank in place so that there can be so sliding or moving, which would cause wear, and to avoid using a threaded hole in the relatively soft metal of the shaft.

In the preferred form, the end pieces are made of two strips of metal each bent at each end at a right angle, one bent end extending along the top, outer or outside edge at the end of the shaft and the other bent end extending along the bottom, inner or inside edge at the end of said shaft, these bent ends being attached in each case by means of a headed bolt having a shank which passes into a channel and engages an interior nut in a nut slot and on the exterior there being the bolt head whereby each bent end is clamped in place.

The special type of shafts is utilized in the following ways:

Where an auxiliary heddle bar or supporting rod is carried by the main shaft and from this auxiliary heddle bar, there are slidable hooks to support the regular heddle bars, the harness supporting hooks can be clamped in place and the auxiliary heddle bars can be fixed in position by supporting members which are clamped in place by interior and exterior nuts, while the regular heddle bar supporting hooks can slide on the auxiliary heddle bar and the heddles, of any type, can slide on the regular heddle bar.

If an auxiliary heddle bar or supporting rod is not used, heddle bar supporting members can be used each comprising at the inner end means to support a regular heddle bar, and having a screw shank which enters the nut slot in which is an interior nut into which this shank is screwed, there being an exterior nut by which the supporting member can be clamped in adjusted position lengthwise and the heddle bar can be slightly raised or lowered at different points to make it perfectly level.

Other advantages of my harnesses are that by using my shafts, and clamping devices, my harness frame is light but strong, it has longer wearing qualities than most others with a minimum of distortion; there is less waste in manufacturing and no expensive machines are required to make the parts and to assemble them.

A great advantage is that my shafts and clamping means can be standardized for the top and bottom shafts of harnesses of different lengths, and by changing the side or end pieces, they can be used with heddles of different heights, and types besides those illustrated in the drawings.

In the drawings,

Fig. 1 is an elevational view of a loom harness from the front, broken vertically and horizontally to show the four corners.

Fig. 2 is a view similar to the upper left of Fig. 1, with parts broken away to show the interior construction.

Fig. 3 is a vertical sectional view as on the line 3—3 of Fig. 2.

Fig. 4 is a vertical sectional view, similar to Fig. 3, of a shaft of my preferred type.

Fig. 5 is a detail view of a movably adjustable heddle bar supporting member.

Fig. 6 is an isometric view of an interior nut clamping member of a heddle bar supporting member such as shown in Figs. 3 and 5.

Fig. 7 is a view similar to Fig. 2 of a modification in which the main heddle bar is supported directly from the shaft by a slidably adjustable main heddle bar supporting member which can be clamped in any position and supports the main heddle bar in the usual way.

Fig. 8 is a sectional view as on line 8—8 of Fig. 7.

Fig. 9 is a detail showing a movable supporting member for a heddle bar in which the shank of the member is shown as extending through the interior nut.

In the specification and claims, by edge I mean the part along the top or bottom of a shaft which might be termed the margin, border or rim into an inner or outer face of which, as distinguished from a front or back surface, a channel is formed. The front and back surfaces are generally in parallel planes. The outer face and the inner face are shown in every construction as flat and as in planes at right angles to the front and back surfaces as an exterior clamping nut or screw head is to be used as a clamping member, with an interior member, and these preferably have flat faces which engage such outer or inner flat faces.

Instead of top and bottom, I use the word inside to mean inside the harness and by outside, I mean the opposite direction and by inner I mean the direction in a shaft which is towards the inside and by outer the opposite direction. The front and back of each shaft I call a surface.

In the claims, "supporting member" includes a harness hook such as H and also a "heddle bar supporting member" such as L or C whether the member supports a regular or usual type of heddle bar such as D, Figs. 1 to 7, or an auxiliary bar or supporting rod such as K, Figs. 1, 2, and 3.

The web between the outer edge or enlarged part and the inner edge or enlarged part may be much thicker than shown or even as thick as the edges.

In the drawings (Figs. 1 to 9), A, A represent stave members or shafts made of a light alloy or metal, such as aluminum or magnesium, which can be extruded, each with an enlargement at the outside and inside and with a medially disposed web 1 extending between them the entire length of the stave.

In the outer edge, by which is meant the top face of the top shaft and the bottom face of the bottom shaft, there is a dead end channel indicated by 2 which is of substantially rectangular shape and extending on each side of which is what I will call a nut slot 3, thus forming a channel in the shape of a Greek cross, open at the exterior side and coming to a dead end at the interior. The front and back parts of the nut slot 3, are dead ends.

This channel extends the full length of the

stave and is open at each end so that an interior nut or clamping member can be slipped into any desired position where it can be engaged by the screw shank of a supporting member or of an end holding member.

Such shank can enter the mouth 4 of channel 2 and can extend inward past nut slot 3 as far as the dead end 5, if necessary. This dead end part 5 is important because it allows more distance in readjusting the harness hooks H or the heddle bar supporting members L to raise or lower a shaft A or a heddle bar K, to keep the heddle bars K, K, parallel, and thus to avoid buckling.

H, H represent harness hooks, each of which has a threaded shank 6 which extends down into the channel in the outer side, engaging an interior nut 7 and having an exterior nut 8. By means of these nuts, each hook can be clamped in any desired position along the shaft by tightening nut 8 and its vertical position can be adjusted to some extent by screwing the shank in or out of nut 7.

B, B represent the end pieces, each of which is formed of two strips of metal 10 and 11, one being bent at right angles to form an arm 12, outside the outer side of a stave A and the other being bent at right angles to form an arm 13 on the inner side of a stave A. These strips forming each end piece are held in place by means of bolts 14, each with a head 15 and having a shank screwed into an interior nut 16, which is preferably oblong or square. Clearly the parts can be held firmly together by tightening each bolt 14 by means of its head slot 17 or all at one end of the harness frame can be loosened to allow the entire end piece at that end to be slipped away from the ends of the staves A after the spring latches such as F on that end are released from the ends of the heddle bars D, D.

When the shanks of bolts 14 are loosened in nuts 16, they can slide in a channel 2 and nuts 16 can slide in a nut slot and heads 15 along the outer side.

Such ends of the heddle bars D, D are now free, so that one or more heddles E can be slipped off their free ends or other heddles can be slipped thereon. If both heddle bars D, D with their heddles are to be completely removed, this can be done by releasing the spring latches F, F at the other end of the frame whereby both heddle bars with their heddles can be taken out and replaced by others. If the end pieces B at one end are moved outward so that the ends of top and bottom staves A, A, are between the bolts 14, 14, the end pieces B, B, carrying with them the outer end bolts 14, 14, can pivot on the inner end bolts 14, 14, so that the outer ends of the heddle bars D, D, are free and the heddles E, E, can be slipped on or off of the heddle bars.

In Figs. 1 to 6, there is shown a heddle bar supporting member G which is slidable on an intermediate or auxiliary heddle bar or supporting rod K which is shown as carried by heddle bar supporting means such as hangers L, each having a threaded shank 21 which extends into a channel 2 at the inside of a stave A. Each adjustable supporting member such as L can be clamped in place by means of an interior nut 22, shown as rectangular, and an exterior nut 23 shown as hexagonal. The heddle bar supporting members G, G for the regular heddle bars D, D may be of any well known type and as shown, are slidable on the auxiliary heddle bar or supporting rod K.

In the construction shown in Fig. 7, there is no intermediate or auxiliary heddle bar or supporting rod such as K but the heddle bar supporting members such as C are shown as including a hook member 50 at the free end thereof to support a regular heddle bar D. Each heddle bar supporting member C has a screw shank 51 at its opposite end which extends up into a channel 2 on the inner side of a stave A and is screwed into an elongated rectangular nut 52 similar to nut 22 which is shown more in detail in Fig. 6. After positioning the member C lengthwise, the vertical height of bar D can be adjusted by screwing shank 51 in or out of nut 52 and the parts are then locked in adjusted position by exterior clamping nut 53.

My shaft alone I believe is new and entitled to protection as such. It may be an article of commerce whether or not it has the relatively thin web between its outside and inside edges or top and bottom or its front and back faces are flat planes.

I believe a subcombination, forming part of a harness frame assembly associated with a clamping member which has a threaded shank extending into either one of the channels and screwed into an interior nut or member and into an exterior nut or having an exterior member like a head is also new.

It is also believed that the use of this type of shaft with different types of harness hooks, other types of end pieces, and various types of supporting members for the regular or auxiliary heddle bars or any of them, is also new.

Such harness hooks, heddle bar hooks and headed clamping devices for the end pieces I will call clamping means which when associated with my shaft will include an interior nut which is a clamping member and an exterior clamping member which may be a nut or a head and in the case of the harness hooks and heddle hooks, the clamping means also include a supporting member which may help to support the whole harness, as in the case of the harness hooks, or to support the auxiliary heddle bar or the main heddle bar as the case may be.

I make my harness shafts of an alloy of a metal of the group consisting of magnesium and aluminum. Such shafts are of advantage because such metal can be extruded or otherwise so made that a cross section is the same at any plane at right angles to their lengths. When made, shafts can be cut off at any desired length for any particular harness, and clamping means to make a complete harness can be used. Suitable clamping means can be used for the supporting hooks for the entire harness, for the supporting means for the regular heddle bars, or for auxiliary heddle bars, and for attaching the end pieces. Such clamping means can all be made with a standard nut which can be pushed into a nut slot from either end and can then be engaged with a shank of a standard size with a standard or uniform thread. These clamping means all permit positioning or adjustment lengthwise or from side to side of the loom, and to some extent vertically without cutting any threads in the shafts.

I believe my harness shafts as such are new and particularly in combination with one or more clamps each including an interior nut and any kind of exterior nut or clamping member.

The open ended lengthwise open ended channel such as 2, which is open at its mouth 4 on the exterior side of the stave and which comes to a dead end at the interior side, and the nut slot such as 3, extending medially towards the

front and back faces of the shaft may not be rectangular, but may be rounded or angular, but the faces or edges of the nut slot should be straight lengthwise and parallel so that an interior clamping nut which fits such slot with a fairly close fit can easily be moved along the slot but cannot turn circumferentially in the slot on the shank of such a member as H, L, 14 or C.

I claim:

1. In a loom harness, the combination of two supporting shafts, each shaft being made of an alloy of a metal of the group consisting of magnesium and aluminum extruded and each having at the outside edge an enlarged part and at the inside edge an enlarged part, there being a web extending between said parts substantially the length of the shaft, and there being in each edge a lengthwise channel extending the entire length of the shaft open at each end with an entrance in the face of the edge and with a nut slot extending medially towards the front and back; a plurality of harness hooks each including a threaded shank extending through a channel entrance into a channel in the face of an outer edge and engaging an interior nut positioned in and movable in its nut slot and an exterior nut on the outer face of the outer edge of the shaft, whereby each harness hook can be clamped in a desired position; a plurality of heddle bar supporting members, each having at its free end, means to support a heddle bar and at its opposite end having a threaded shank extending through a channel entrance into a channel in the face of an inner edge of the shaft and engaging an interior nut positioned in and movable in its nut slot, and an exterior nut on the inner face of the inner edge of the shaft whereby each heddle bar supporting member can be clamped in a desired position; and two harness frame end pieces, each of which is formed of two strips of metal each bent at each end at a right angle, one bent end extending over the channel in the outer edge at the end of a shaft and being attached thereto by a headed bolt with a threaded shank which passes into such channel and engages an interior nut in the nut slot, the bent end of the other strip extend over the channel in the inner edge at the end of such shaft and being attached thereto by a headed bolt with a threaded shank which passes into such channel and engages an interior nut in the nut slot of that channel.

2. In a loom harness, the combination of two supporting shafts, each shaft being made of an alloy of a metal of the group consisting of magnesium and aluminum extruded and each having at the outside edge an enlarged part and at the inside edge an enlarged part, there being a web extending between said parts substantially the length of the shaft, and there being in each edge a lengthwise channel extending the entire length of the shaft open at each end with an entrance in the face of the edge and with a nut slot extending medially towards the front and back; a plurality of harness hooks each including a threaded shank extending through a channel entrance into a channel in the face of an outer edge and engaging an interior nut positioned in and movable in its nut slot and an exterior nut on the outer face of the outer edge of the shaft, whereby each harness hook can be clamped in a desired position; a plurality of heddle bar supporting members, each having at its free end, means to support a heddle bar and at its opposite end having a threaded shank extending through a channel entrance into a channel in the face of an inner edge of the shaft and engaging an interior nut positioned in and movable in its nut slot; an auxiliary heddle bar supported by such heddle bar supporting members, a regular heddle bar to slidably support heddles; regular heddle bar supporting members to support the regular heddle bar and slidable on the auxiliary heddle bar; and two harness frame end pieces, each of which is formed of two strips of metal each bent at each end at a right angle, one bent end extending over the channel in the outer edge at the end of a shaft and being attached thereto by a headed bolt with a threaded shank which passes into such channel and engages an interior nut in the nut slot, the bent end of the other strip extending over the channel in the inner edge at the end of such shaft and being attached thereto by a headed bolt with a threaded shank which passes into such channel and engages an interior nut in the nut slot of that channel.

3. In a loom harness, the combination of two supporting shafts, each shaft being made of an alloy of a metal of the group consisting of magnesium and aluminum and each having in each lengthwise edge a lengthwise channel open at each end and extending the entire length of the shaft, each said channel having an entrance in the face of the edge and having a nut slot extending medially towards the front and back of the shaft the entire length of the channel; two heddle bars and two end pieces; clamping means for supporting the harness in a loom, clamping means for supporting a heddle bar from each shaft and clamping means for attaching end pieces to the ends of the shafts, all such clamping means including a threaded shank extending through a channel entrance into a channel in the face of an edge of a shaft and engaging an interior nut in a nut slot.

4. A device as specified in claim 3 in which the side edges of each nut slot are parallel and the side edges of the interior nut therein are parallel and the nut closely and slidably fits in its nut slot.

5. A device as specified in claim 1 in which the side edges of each nut slot are parallel and the side edges of the interior nut therein are parallel and the nut closely and slidably fits in its nut slot.

6. A device as specified in claim 2 in which the side edges of each nut slot are parallel and the side edges of the interior nut therein are parallel and the nut closely and slidably fits in its nut slot.

7. A device as specified in claim 3 in which each harness frame end piece has a bent end extending over a channel in a shaft and is attached thereto by two headed bolts, each bolt passing into such channel and being threaded through the nut in such channel.

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