June 12, 1951 P. C. CONSOLETTI 2,556,468

HARNESS FRAME FOR LOOMS

Filed Feb. 28, 1950 3 Sheets-Sheet 1

Fig. 1

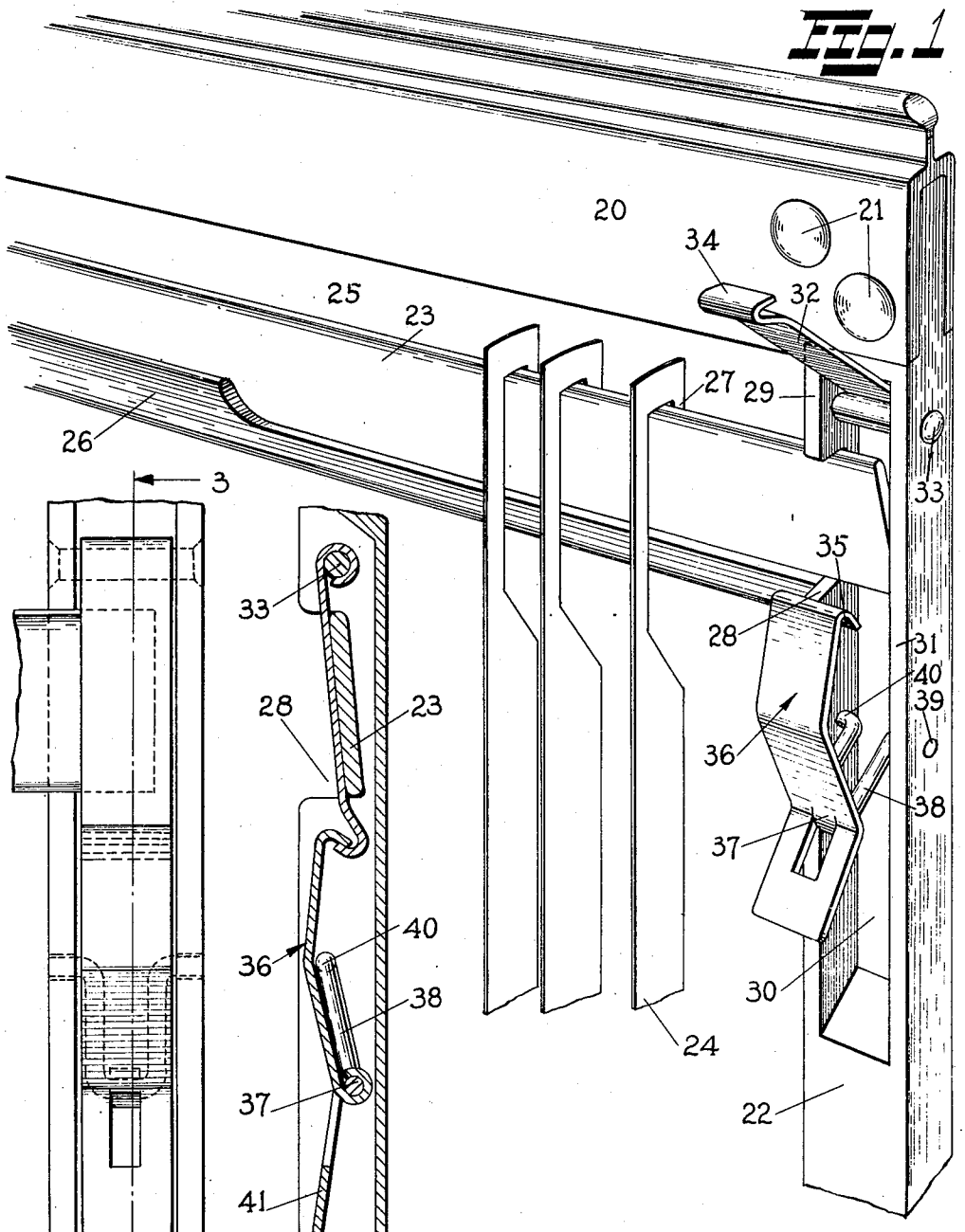






Fig. 2




Fig. 3

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HARNESS FRAME FOR LOOMS

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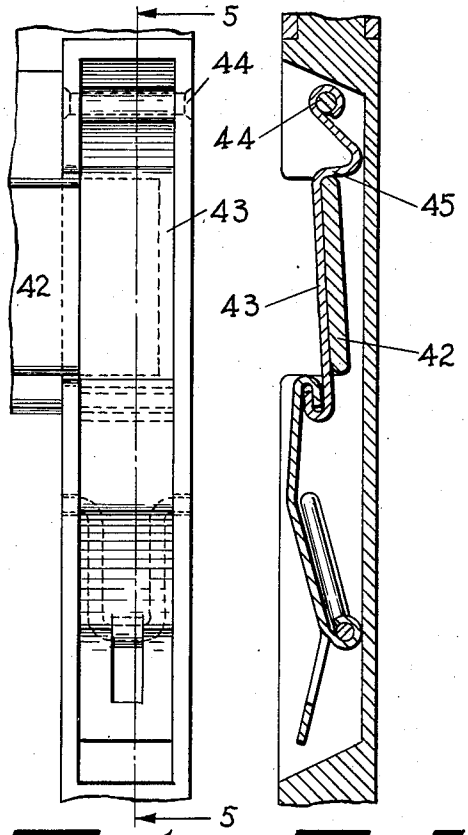



Fig. 4 Fig. 5

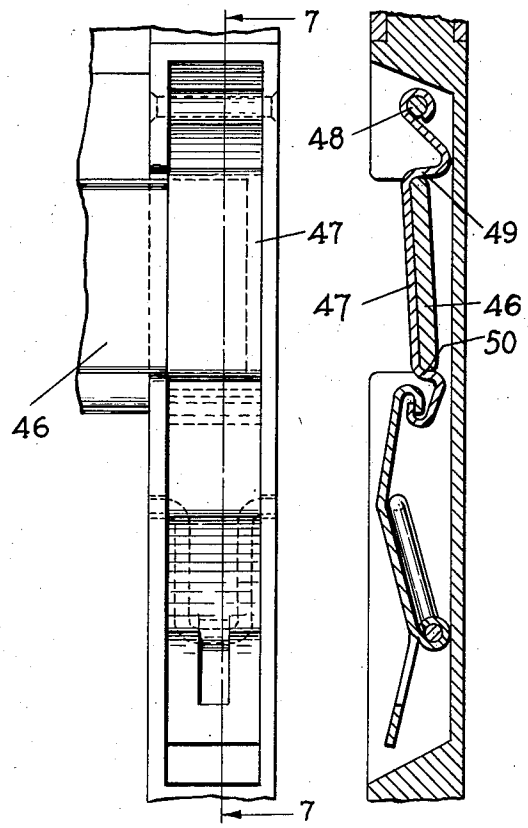



Fig. 6 Fig. 7

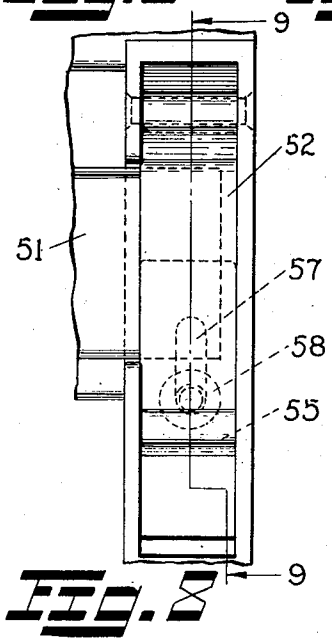



Fig. 8

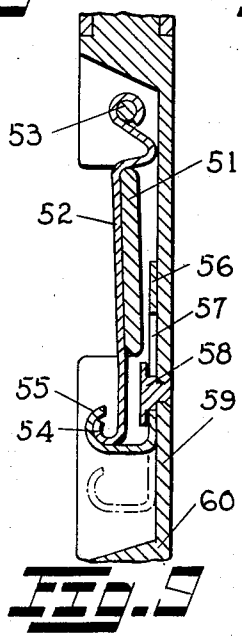



Fig. 9

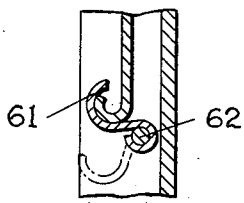



Fig. 10

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HARNESS FRAME FOR LOOMS

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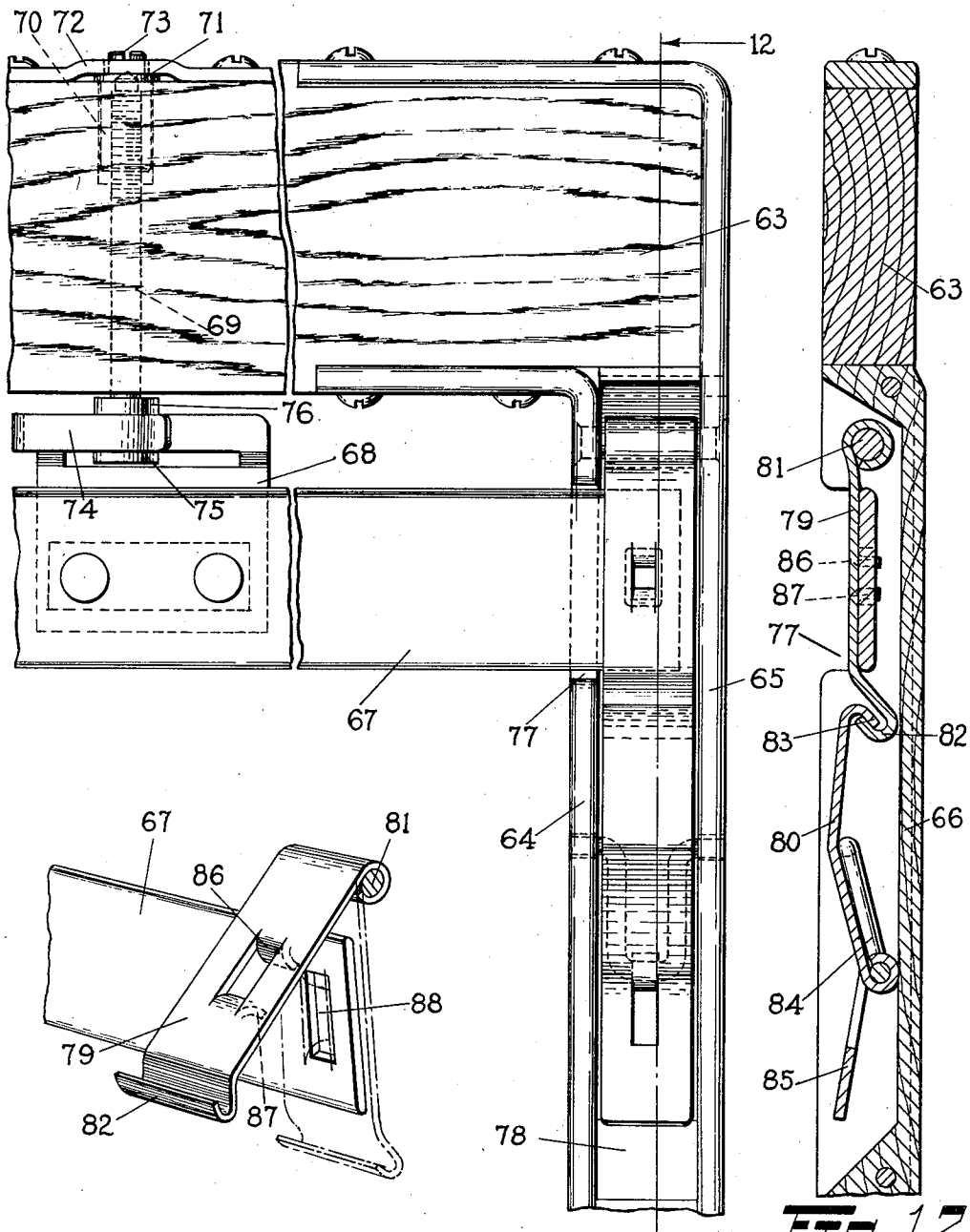



FIG. 13

FIG. 11

FIG. 12

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# UNITED STATES PATENT OFFICE

2,556,468

## HARNESS FRAME FOR LOOMS

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Application February 28, 1950, Serial No. 146,836

13 Claims. (Cl. 139—92)

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This invention pertains to means for releasably retaining heddle carrying bars in harness frames.

It is a general object of the invention to devise a simple and reliable, quick releasing type locking means for harness frames which shall be effective in retaining the removable heddle carrying bars and in providing for their ready release and removal from the frame, or for release of the ends thereof in such manner as to permit threading or removal of the heddles to and from the bars.

It is a more specific object to devise a bar retaining means which shall be engageable or disengageable without the use of any special tools and which shall, once it has been snapped into engaging position, be dependable and certain in its function so that there is no likelihood that continued and high speed operation of the harness mechanism shall have any effect thereon to cause it to become accidentally released.

It is a further object of the invention to devise such releasing means which is especially adapted to or for employment in harness frames constructed of metal, especially from light aluminum shapes such as extruded aluminum or cast aluminum structural parts.

Other objects of the invention will become apparent from the following more detailed disclosure.

In harness frames of the type to which the present specification relates, the frame itself constitutes a structural unit within which are releasably carried top and bottom heddle supporting bars or rods, these being preferably of hardened steel, stainless steel or the equivalent and adapted to permit the heddles to be threaded thereon or removed therefrom at will and to be slid along the length thereof from one end of the frame to the other. These heddle supporting bars must be maintained in reasonably good alignment, must be rigidly supported by the frame and their ends held in position so that the heddles cannot accidentally escape.

In carrying the invention into effect, the end struts of the frames are notched or otherwise provided for the reception of the ends of the heddle supporting bars, these ends preferably being flexed or initially bent to cause them to maintain a position outwardly of the notches thereby to facilitate threading or removal of the heddles. The bar ends are held in the notches and thus in straightened or aligned condition by novel quick releasable means, several forms of which have been illustrated and which will

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be described in the following more detailed description and each of which comprises quick releasable latch means adapted to be held in position by its own resilience when once moved to engaged position.

In general, all forms of the invention comprise a pivoted detent which may be swung to and from a position across the path of movement of the bar end as it enters or is withdrawn from the retaining notch. When moved across the path of the bar thereby to press it inwardly, the detent is held in position by one of several different types of latch means adapted to be snapped into position and to remain in that latched or locked position until forcibly withdrawn or unlatched as will hereinafter be described.

The invention is hereinafter described in greater detail by reference to the accompanying figures of drawing wherein:

Fig. 1 is a perspective view showing part of a harness frame to which the invention has been applied.

Fig. 2 is a detail view showing in elevation the latch means of Fig. 1.

Fig. 3 is a section taken at line 3—3, Fig. 2, and showing other details of the said latch means.

Fig. 4 is an elevation and Fig. 5 is a section taken at line 5—5, Fig. 4, showing a modification.

Figs. 6 and 7 are corresponding views showing a still different modification.

Figs. 8 and 9 are corresponding views showing a modification in which the latching means which cooperates with the detent takes a different form.

Fig. 10 is a small section showing a still different detent securing means.

Figs. 11 and 12 are an elevation and a section, respectively, showing the invention as applied to a frame partly of wood.

Fig. 13 is a perspective view showing the bar holding means in detail.

Now referring to Fig. 1, a harness frame has been illustrated in sufficient detail to show one type of structure with which the invention is to be employed. It includes a top frame rail 20 which is preferably of light aluminum alloy or similar material and which is interconnected at either end by certain rivets 21 to one end of an end strut 22 also preferably of similar light aluminum alloy, and which is cast or otherwise fabricated. It is to be understood that there are a top and bottom rail 20 and end struts 22 at either side thereby to form a rectangular framework within which are carried top and bottom heddle supporting bars 23 preferably of hardened steel, stainless steel or other metal of such type as to

resist wear and to support the heddles 24 on a smooth and continuous surface which is not likely to become marred or otherwise deformed by the continuous action of the heddles thereon during the repeated reciprocations of the harness mechanism. These bars 23 are preferably retained in a groove formed between a web 25 which extends from the upper part of the rail 20 down to a point below and disposed beneath the bar 23, and a forwardly and reversely directed projection or abutment 26 continuing therefrom. Each bar 23 is so positioned or angularly inclined as to leave a suitable amount of clearance between its back edge and the front of the web 25 for the hooked ends 27 of the heddles themselves. The front abutment 26 of the part of the rail in which the bar retaining notch or groove is formed is cut away for a few inches at each end of the frame as illustrated herein Fig. 1 so as to permit each end of the bar to be flexed outwardly so as to permit threading of the heddles thereon or withdrawal therefrom. An initial bend is preferably imparted to the bar ends so that they do not have to be held outwardly as has sometimes been the practice.

The end struts 22 are notched as at 28 for the reception of the adjacent bar end and this notch is actually formed in an inner rib 29 of the strut which at this point is recessed as at 30, said recess being defined by the inner rib 29 and an outer rib 31, and, of course, the back portion of the end strut since the recess does not extend more than part way through the section.

A preferred form of latch means as illustrated here in Figs. 1, 2 and 3, includes a detent 32 pivoted on a pin or rivet 33 which extends through the ribs 29 and 31 and across the intermediate recess portion 30. This detent is of sufficient length as illustrated in Figs. 2 and 3, to extend down across the face of the bar 23 to retain it in its notch 28, and terminates at its free end in a hook portion 34 which is engaged by a corresponding hook 35 at the cooperating end of a detent securing latch 36 which is bent to the shape shown and is pivoted on an intermediate portion 37 of a bail 38 the oppositely directed ends 39 and 40 of which project into openings in the ribs 29 and 31 to pivot therein.

The latch 36 extends to the other side of its pivot 37 on the bail to terminate in a finger piece or actuating member 41 which serves to press the latch downwardly into engagement at which time the hooked ends 35 and 34 are locked together as illustrated in Fig. 3 and the bail 38 moves to a position past its dead center so that the resilience of the parts which are formed to dimensions such that upon latching movement considerable tension is set up, maintain the detent and latch in locked engagement. The vibrational and other forces set up during normal operation of the harness mechanism in a loom are entirely insufficient to cause any unintended disengagement of the parts. The end of bar 23 will therefore be held within its notch 28 and the heddles cannot become disengaged therefrom or moved to the end of the bar farther than the inner surface of the end struts 22.

Now referring to Figs. 4 and 5, a modification of the basic mechanism illustrated in Figs. 1, 2 and 3 differs largely in that the detent is given an additional deflection or is provided with a shoulder above the point at which it contacts the bar thereby to provide additional restraining and vibration preventing means. Here the bar 42 is received in a notch in the usual way and the detent 43 is pivoted at 44 as in the first form of the invention, but that detent has an additional bend therein which provides a shoulder 45 so positioned as to bear directly on the top edge of the bar, that is, considering the uppermost bar or that herein illustrated. In the event the opposite or lower side of the frame had been illustrated, it is to be understood that the parts there are oppositely disposed so that corresponding elements would bear a reverse relationship insofar as the vertical disposal of the parts is concerned.

In this form of the invention it is not so necessary to restrict the notch within which the end of the heddle supporting bar is received to dimensions which fit as precisely.

In the form of the invention illustrated in Figs. 6 and 7, a similar bar 46 is retained by a detent 47 pivoted at 48 and this particular detent is so formed as to present shoulders 49 and 50 which embrace both the top and bottom edges of the bar. Here the detent really becomes the positioning element insofar as the vertical retention of the bar is concerned. In fact, this particular detent or form of the invention is designed to function where no positioning notch is used, although such a notch is herein illustrated and in certain instances the notch and the shouldered detent both cooperate to serve more effectively in the retention of the ends of the heddle supporting bars.

It is to be understood that in both forms of the invention, Figs. 4–7, the remaining parts of the latch mechanism are substantially similar to that described with respect to Figs. 1, 2 and 3 and that the function of the mechanism is substantially the same.

Now referring to Figs. 8 and 9, a modification of the invention will be described, the particular differences herein to be found concerning the latching means for the detent rather than the detent itself. Here a bar 51 has its ends held within notches in the end strut as above described, and a detent 52 pivoted at 53 is adapted to retain the bar end inwardly and against the back or rear edge of the notch. The particular detent illustrated is similar to that of Figs. 4 and 5, but it is to be understood that that of Figs. 1–3 or Figs. 6 and 7 could be employed just as well. One slight difference, however, is found in the lowermost or free end of the detent which is merely rolled over to form a bead as at 54 rather than being of hooked form since the locking means or latching means of this modification involves a clip or other member which has a snap action rather than locking by hooked interengagement with a latch which tends to retain it through a toggle action.

The latching member includes a snap clip 55 bent outwardly from a rectilinear slide member 56 having a slot 57 therein engageable over a shouldered rivet 58 which is passed through the rear wall 59 of the recessed end strut 60.

The position which the latching clip occupies when released or disengaged from the detent is shown in dot-and-dash lines. In actual practice the mechanic merely pushes the clip lengthwise of the recess to engage or disengage it over or from the bead 54. Normally that can be done manually without the aid of tools, but if desired, some suitable tool may be utilized.

In Fig. 10 a still further modification is illustrated, this comprising a pivoted catch having a hooked or clip-like end 61 formed as a part of a latch pivoted at 62 to a rivet passing laterally through the end strut, the dimensions of the

hooked catch and the position of the pivot being such that the end 81 may be snapped to and from engagement with the beaded end of the detent, it being obvious that the spring or resilience of both the detent and of the clip member itself serve in retaining desirable pressure contact between the engaging surfaces of the detent and the heddle supporting bar ends.

The invention has been described as it has been applied to a harness frame formed from light metal, for example, extruded aluminum or other alloy shapes or forms and cast aluminum parts, or from pressed or rolled steel shapes which may be much thinner than the aluminum or other light forms and therefore of reasonably low mass. It is, however, apparent that the invention is not by any means limited to use with metallic harness frames except that, of course, the heddle supporting bars must necessarily be of some very hard and wear-resistant material. If desired, the frame or parts thereof may be constructed of materials such as wood and in that event, the bar latching means may be employed with but slight modifications as will presently be described.

Referring to Figs. 11–13, the invention is shown as it has been applied to a frame in which the top and bottom rails have been made from wood. In these frames the wooden rails are tied together to form a rectangular frame by strip metal end struts. Here the rails 63 are tied into a rigid framework by end struts of strip stock which comprise an inner rib 64 and an outer rib 65. These are slightly spaced and are held apart by a wooden, plastic or other insert 66 riveted or otherwise retained in position between them. The insert is of such depth as to extend to the back of the frame to form a bearing or slider against which the adjacent frame may bear.

A heddle supporting bar 67 such as is commonly utilized in this type of frame is hung on intermediate supports 68 which slide into and from engagement with collared studs 69 which pass through the wood and are threaded into flanged sleeves 70. These sleeves have flanges 71 which engage between the wood and a metal cap 72 attached to the wood. These caps are apertured to permit the slotted heads 73 of the sleeves to protrude.

Attachment of the supports 68 to the studs is by spring clips 74 which engage in a groove formed between collars 75 and 76.

Normally the construction employed according to the prior art involves a sliding movement of the bars endwise of the frame so as to free the bar ends from the end strut at one end and to disconnect the intermediate hangers for the bars. That necessitates disconnecting locking means at both ends of each bar.

By use of the bars having flexed ends and the novel locking means of the instant invention, only one end of each bar need be released in order to remove or replace heddles, and it does not become necessary to displace the bars endwise, nor need the intermediate hangers be disturbed.

The inner rib 64 of each end strut is notched as at 77 for reception of its adjacent bar ends. These bars extend into the recess 78 formed between the ribs and filler piece or spacer 66 and are held in place by latch means including a detent 79 which may take any form heretofore described, and a latch 80 of type herein illustrated or of any form previously disclosed with respect to Figs. 1–10. Detent 79 is pivoted at 81 and has a hooked end 82 to be engaged by hook 83 of latch 80 which is itself hinged to bail 84, the ends of which swing in bearings in ribs 64 and 65. A finger grip 85 serves the same purpose as counterparts thereof previously mentioned.

An added feature employed with this type of frame, if desired, is for the purpose of limiting end play of the bars since they are not so well supported along their intermediate section as in the forms of the invention previously described. Such end play is undesired since it can become periodic as the parts tend to vibrate under rapid machine operation and therefore cause wear and possibly failure of some elements.

Each detent 79 has a projection which fits into a complementary aperture in the bar end thereby retaining it against movement. Here the detent has short projections 86 and 87 struck rearwardly thereof and which enter a rectangular hole 88 in in the bar end when the detent is swung to closed position. The proportions of the projections, their form and angular disposal are such that they fit tightly in the bar apertures and thus position the bars precisely and rigidly. This expedient may be used with any of those forms of the invention heretofore described, although it is more desirable with the modification of Figs. 11–13.

When the filler piece or spacer 66 is not availed of, the ribs 64 and 65 may be indented to form stops for latch member 80, preferably for the end 85 thereof, or a pin or rivet may be passed through the ribs and incidentally, if shouldered, serves as a spacer as well.

In all forms of the invention, the quick release and rapid reassembly of parts makes it very easy to disassemble the frame for cleaning or servicing.

While one preferred embodiment and several modifications of the invention have been disclosed, it is to be understood that the inventive concept may be carried out in a number of ways. This application is, therefore, not to be limited to the precise details described, but is intended to cover all variations and modifications thereof falling within the spirit of the invention and the scope of the claims.

I claim:

1. In a harness frame for looms which comprises top and bottom rails, end struts and heddle bars each of which is seated in a supporting and guiding portion of its respective rail, means for retaining said bars in position which includes a recess in said end struts adjacent the ends of each bar, a notch leading into each recess into which the adjacent bar end is received, and a quickly releasable latching means in each recess for locking the end of the bar in its notch.

2. In a harness frame for looms which comprises top and bottom rails, end struts and heddle bars each of which is seated in a supporting and guiding portion of its respective rail, means for retaining said bars in position which includes a recess in said end struts adjacent the ends of each bar, a notch aligned with the bar and leading into each recess into which the adjacent bar end is received, a detent pivoted at one side of the bar and movable to a position to close off the notch to retain the bar therein, and a catch for latching the detent in bar retaining position.

3. In a harness frame for looms which comprises top and bottom rails, end struts and heddle bars each of which is seated in a supporting and guiding portion of its respective rail, means for retaining said bars in position which includes a recess in said end struts adjacent the ends of

each bar, a notch aligned with the bar and leading into each recess into which the adjacent bar end is received, a detent pivoted at one side of the bar and swingable to a position in front of the bar, a hook at the end of said detent opposite its pivot, and a catch for latching the detent in bar retaining position which comprises a bail pivoted in the recess and a hooked latch pivoted to said bail and engageable with the hook on the detent, the pivot for the bail being so positioned that its point of connection moves past a dead center position when the latch hooked to the detent is pressed into the recess and imposes such strain on the parts at that time as to hold them in locked position, but when swung outwardly, serves to release tension on the parts and to permit them to be disconnected.

4. Mechanism as defined in claim 3, wherein said detent is further offset to provide a shoulder for assisting in positioning the bar.

5. Mechanism as defined in claim 3, wherein said detent is further offset to provide shoulder portions both above and beneath the bar thereby to assist in restraining the bar against movement.

6. Mechanism as defined in claim 3, wherein the said bar ends are apertured and a complementary projection is provided as a part of the detent for engagement within the aperture.

7. In a harness frame for looms which comprises top and bottom rails, end struts and heddle bars each of which is seated in a supporting and guiding portion of its respective rail, means for retaining said bars in position which includes a recess in said end struts adjacent the ends of each bar, a notch aligned with the bar and leading into each recess into which the adjacent bar is received, a detent pivoted at one side of the bar and swingable to a position in front of the bar, and means to retain said detent in bar locking position which comprises a hook movable to and from a position to engage the end of the detent and so positioned as to stress the detent inwardly against the bar when in locked engagement therewith.

8. Mechanism as defined in claim 7, wherein said detent has its free end upset to form a bead and said hook is pivoted in the end strut adjacent the end of the detent.

9. Mechanism as defined in claim 7, wherein said detent has its free end upset to form a bead and said hook is slideably mounted in said end strut to snap over and from the beaded end of said detent.



10. In a harness frame which comprises top and bottom rails, end struts and heddle bars each of which is supported at points intermediate its length by the adjacent rails, means for retaining said bars in position which includes a recess in said end struts adjacent the ends of each bar, a notch leading into each recess into which the adjacent bar end is movable, and a quick releasable latching means in each recess for locking the bar end in its notch.

11. In a harness frame for looms which comprises top and bottom rails, end struts and heddle bars each of which is supported in spaced relation to its respective rail by means suspending it therefrom at spaced points along its length, means for retaining said bars in position which includes a bar end receiving notch in said end struts adjacent the ends of each bar, a detent pivoted in said end strut at one side of the bar and movable to a position to close off the notch to retain the bar end therein, and a catch for retaining the detent in bar retaining position.

12. Mechanism as defined in claim 11 wherein means for preventing endwise movement of the heddle bars comprises a projection and complementary aperture in said detent and bar end.

13. Mechanism as defined in claim 11 wherein means for preventing endwise movement of the heddle bars comprises an aperture in the bar end and complementary projections struck from said detent and of a size and so positioned to enter the aperture and to prevent relative movement between the parts.

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