June 23, 1942. L. M. JOHNSTON 2,287,739

ADJUSTABLE SUPPORT FOR HEDDLE BARS

Filed July 23, 1941 2 Sheets-Sheet 1

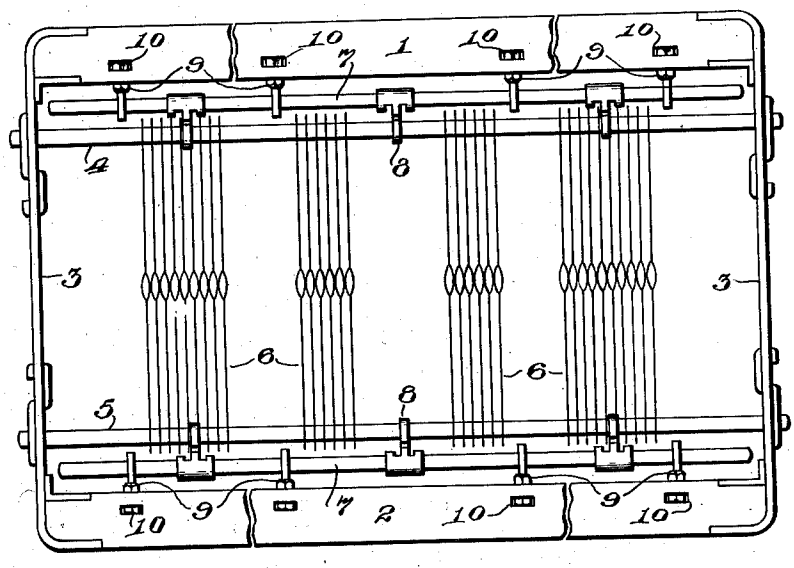


Fig. 1.

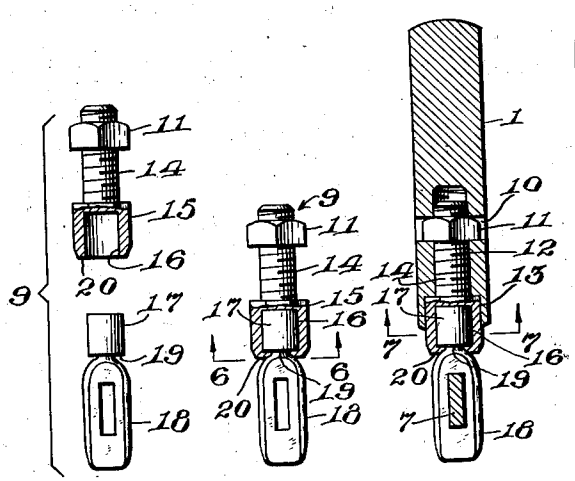


Fig. 2. Fig. 3. Fig. 4.

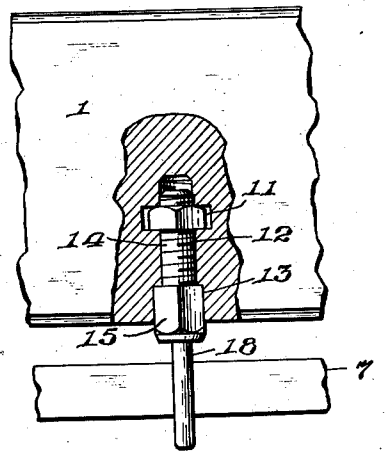


Fig. 5.

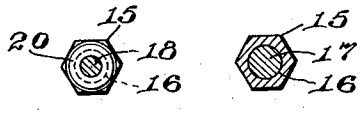


Fig. 6. Fig. 7.

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June 23, 1942. L. M. JOHNSTON 2,287,739

ADJUSTABLE SUPPORT FOR HEDDLE BARS

Filed July 23, 1941 2 Sheets-Sheet 2

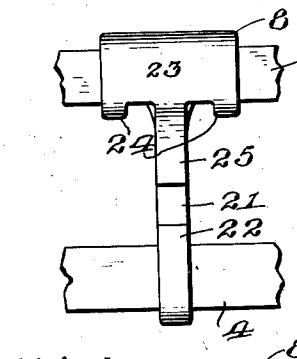


Fig. 8.

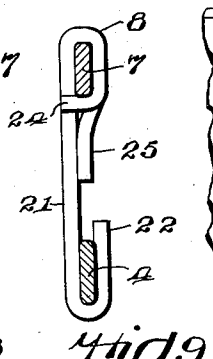


Fig. 9.

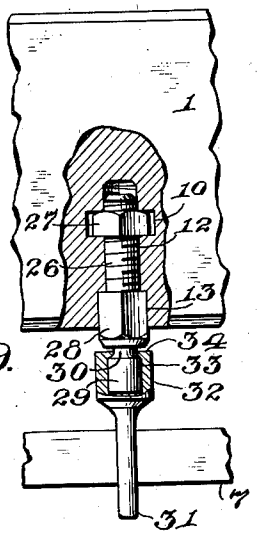


Fig. 11.

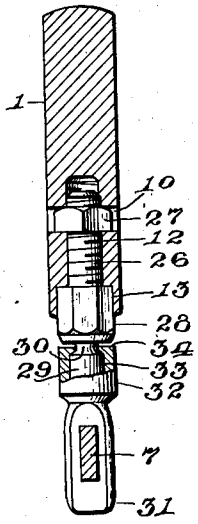


Fig. 12.

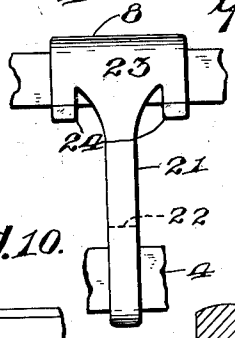


Fig. 10.

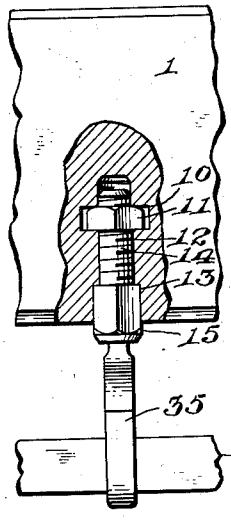


Fig. 13.

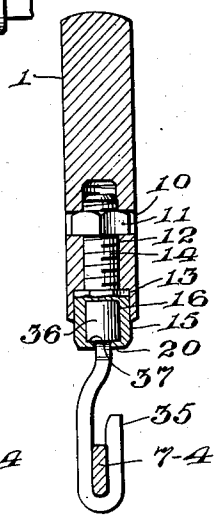


Fig. 14.

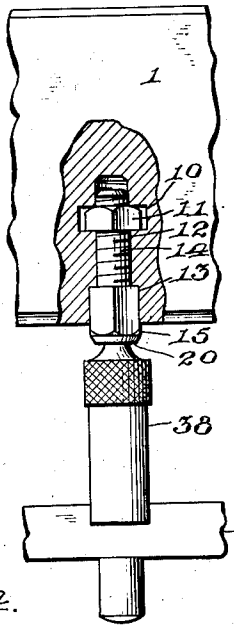


Fig. 15.

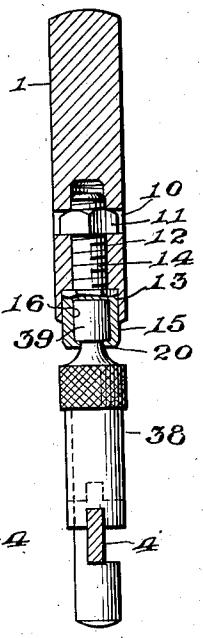


Fig. 16.

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UNITED STATES PATENT OFFICE

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ADJUSTABLE SUPPORT FOR HEDDLE BARS

Leo Montie Johnston, Jenkintown, Pa., assignor to Walker Manufacturing Company, Philadelphia, Pa., a corporation of Pennsylvania

Application July 23, 1941, Serial No. 403,638

8 Claims. (Cl. 139—92)

The object is to provide adjustable supports for heddle bars, but more specifically in independently adjustable means for varying the relative tension upon the heddle bars in transversely related portions of relatively wide harnesses, such for instance as those used in the weaving of piece goods having widths of over two feet and frequently up to and including ten and twelve foot widths, and even greater, but without limiting the invention in any way to any particular range of widths whatsoever.

Another and more specific object is to provide the combination of a frame, with a longitudinally extending heddle bar and the usual heddles supported thereby, an auxiliary or secondary intermediate bar between said frame and said first bar, longitudinally adjustable hooks, links, or equivalent means, for fixedly spacing said first bar with respect to said auxiliary bar, and spaced means receiving said auxiliary bar and adjustably supported by and with respect to said frame, to vary the tension upon selected groups of heddles with respect to other groups thereof.

Still another object is to provide a device of this character, in which the frame is provided with a preferably fixedly positioned nut or its equivalent, situated in a mortised or other suitable type of aperture or recess, and with a channel or bore leading through said frame axially towards said nut, together with a bolt extending rotatably through said channel or bore and into said nut, and provided with a cylindrical recess having a restricted entrance opening, in combination with a cylinder rotatably positioned within said recess and normally prevented from removal therefrom, said cylinder being provided upon its outer end with a suitably shaped hook or eye for the reception of the usual heddle bar or an auxiliary bar, positioned between said heddle bar and said frame.

And a still further object is to provide an improved hook member, which is preferably slidably mounted upon the auxiliary bar (when present) and disengageably engages the heddle bar, one or more of said hooks alternating with one or more of said adjustable means throughout the horizontal or longitudinal extent of said frame, and the said means being adjustable independently with respect to one another upon the same side of and upon the opposite sides of said frame.

With the objects thus briefly stated, the invention comprises further details of construction and operation, which are hereinafter fully brought out in the following description, when read in conjunction with the accompanying drawings, in which Fig. 1 is an elevational view of a heddle frame including one embodiment of the invention; Fig. 2 is an enlarged detail view of the two parts of a tension adjusting member comprising one embodiment of the invention, shown in initially spaced relation; Fig. 3 is a similar view but showing the two parts after having been operatively assembled; Fig. 4 is a similar view to that of Fig. 3 but showing the adjustable member in side elevation and operatively associated with the heddle frame and a bar, which may represent either a heddle bar or an auxiliary bar; Fig. 5 is a front elevation of the same assembly as that shown in Fig. 4, partially broken away; Figs. 6 and 7 are sections on the lines 6—6 and 7—7 of Figs. 3 and 4, respectively; Figs. 8, 9 and 10 are front, side and rear elevational views, respectively, of an improved hook for connecting the heddle and auxiliary bars; Figs. 11 and 12 are respectively front and side elevational views, partly in section, showing an assembly which comprises a bolt provided with the cylinder and an eye element having the recess for the reception of said cylinder; Figs. 13 and 14 are corresponding front and side views of a similar assembly, but in which the eye element is replaced by a hook element and in which the hook carries the cylinder; and Figs. 15 and 16 are similar views to those of Figs. 13 and 14, but in which the adjustable member comprises a recessed bolt, receiving the cylinder carried directly by a heddle bar-supporting latch, represented by the form of latch shown and described in detail in U. S. Patent No. 2,046,100, issued June 30, 1936, to John Walker, Jr.

Referring to Figs. 1 to 10, inclusive, a heddle frame is here shown as comprising a pair of parallel, oppositely positioned top and bottom rails 1 and 2, connected at their ends by any suitable means such as the straps 3. Heddle bars 4 and 5 extend longitudinally of the frame parallel with and in spaced relation to their respective adjacent rails 1 and 2, and operatively support a plurality of heddles 6, only a few of which are here illustrated. Between each of said rails and its adjacent heddle bar there is positioned an auxiliary bar 7, connected to its adjacent heddle bar by means of one or more slidable hooks 8, and to its adjacent frame rail by means of spaced adjustable elements 9. In describing the present invention, reference will be made, at least in most cases, only to the upper portion of said frame, as the lower portion thereof is simply a duplicate of the upper.

In the present invention, the frame rail is

provided with a mortised recess or aperture 10 in which is fixedly positioned a nut 11, that is, the nut can be withdrawn from such aperture when desired but is normally prevented from rotation therein, due to its being of a size closely approximating that of said aperture both in diameter and in height. From the inner edge of said rail a bore 12 leads into said recess, and is provided at its outer end with an enlarged countersunk portion 13. A bolt having a threaded shank 14 extends rotatably through said bore and engages said nut, while the enlarged head 15 of said bolt extends partially into said countersunk portion 13 of the bore and partially extends freely therefrom, in order that it may be gripped and rotated by means of a suitable wrench or other available tool (not shown).

The head 15 of said bolt is initially provided with an inwardly extending, axially positioned tubular recess 16, in which is snugly but rotatably positioned a cylindrical extension 17 of an eye member 18, the union of said extension and said eye being characterized by a reduced portion, providing an outwardly directed shoulder 19 upon said extension. With this construction, after the cylindrical extension has been inserted into the recess 16 of said bolt head, the peripheral edge portion 20 of the latter is forced radially inwardly, so as to partially surround and grip the said shoulder 19, as shown in Figs. 3 and 4, to prevent the escape of said cylinder from within said recess, while permitting said eye to rotate with respect to said bolt, as the latter is rotated and thereby adjusted longitudinally by and with respect to said nut and the supporting rail.

Referring specifically to Figs. 8, 9 and 10, each of the hooks 8 comprises a central shank portion 21, which in one direction terminates in a hook 22, normally receiving in slidable engagement the heddle bar 4. In the opposite direction, said shank merges into a transversely enlarged head, having an inverted U-shaped cross section and normally receiving in slidable engagement the auxiliary bar 7. Continuing around said last-named bar, said head comprises two laterally spaced fingers 24 which surround the inner edge portion of said auxiliary bar, to provide a closed channel through which said last-mentioned bar extends, but with respect to which said hook member is prevented from rotative movement, due to the substantial width of said head portion 23 and its relatively wide engagement with the auxilliary bar which it closely surrounds. In addition to and positioned between said fingers 24 there is preferably, though not necessarily, a third finger 25, which when present is also curved around the inner edge of said auxiliary bar and thence into close parallelism with the shank 21 of said hook member, to which it may be unitarily secured, if desired, as by spot-welding or the like, all towards insuring a rigid though light-weight hook for fixedly connecting said heddle and auxilliary bars together in spaced relation and at horizontally selected positions.

With this construction of the several parts involved, they are assembled as shown in Fig. 1, with the desired number of hooks and adjustable elements present, depending largely upon the horizontal extent of the frame. The tension upon the heddles is then determined, and where necessary to increase or to slacken such tension the several bolt heads 15 are rotated as much as may be individually necessary, thereby effecting a longitudinal adjustment of each such bolt and resulting variation in the vertical tension applied to spaced portions of the auxilliary bar 7, and through the hooks 8 to the heddle bars 4 and the heddles carried by them. With such a construction it will be immediately obvious that when necessary to vary the tension upon any portion or group of the heddles throughout an entire frame, it is unnecessary to disconnect any of the several parts, and only necessary to rotate one or more of said adjustable members to the proper degree, while such adjustment of any one or more such members can be made as frequently and to any desired extent without disturbing any of the others of such members.

Referring to Figs. 11 and 12, the bolt 26 here shown adjustably engages the nut 27 and is provided with a solid head 28, which in this case is provided in turn with a cylindrical extension 29, separated from said head by means of a reduced portion 30. The eye 31 in this case is provided with an enlarged head 32, having an axially positioned cylindrical recess 33 in which is rotatably positioned the correspondingly shaped extension 29, held in position by the inturned peripheral edge portion 34. Thus, the structure here presented is similar to that of Figs. 2–5, except that the cylinder is carried by the bolt instead of by the eye, and the cylinder-receiving recess is within the eye instead of in the bolt. Otherwise, the construction and operation are the same.

Referring to Figs. 13 and 14, the modification here shown comprises the same bolt as that shown in Figs. 2–5 and is therefore given the same numerals, while instead of an eye there is provided a hook member 35 for direct engagement with either the auxiliary bar 7 or with the heddle bar 4, said member terminating upwardly in a cylindrical head 36 having a downwardly directed shoulder 37, said head being positioned within the recess 16, and the edge portion 20 of the bolt head being deflected or constricted about said shoulder 36.

Referring to Figs. 15 and 16, the same numerals are again applied to the bolt and associated parts, while in lieu of the eye (of Figs. 2–5 and 11–12) or the hook (of Figs. 13–14) hereinbefore described, there is shown a latch 38 for connecting the heddle bar direct and adjustably to the frame rail. Any desired form of latch may be employed, but for purposes of illustration there is here illustrated that form of latch, which is shown in detail and described in United States Patent No. 2,046,100, issued June 30, 1936, to John Walker, Jr. Such a latch for quickly and detachably connecting the heddle bar (or the auxilliary bar) to the frame rail is provided upon its upper end with a cylindrical head 39, which is rotatably positioned within the recess of the bolt head 15, exactly as in the structure illustrated in Figs. 2–5 and 13–14.

It will be noted that in each of the forms here illustrated, that by providing a cylinder-and-socket swivel connection a relatively free angular movement is provided about the longitudinal axis of the longitudinally adjustable bolt, but that angular motion in any other direction or plane is positively prevented. Therefore, while a ball-and-socket joint might be employed, it will be realized that such a joint would permit lateral vibration of the heddle bars and the heddles carried thereby, whereas the cylinder-and-socket swivel structure permits angular oscillation and vertical adjustment, but definitely prevents any transverse or pendulum-like vibration.

Having thus described my invention, what I

claim and desire to protect by Letters Patent of the United States is:

1. A heddle frame, comprising the combination of a rail, a heddle bar carrying heddles, a nut-and-bolt unit one element of which is attached and secured against rotation with respect to said rail and the other element being provided with a swivel extension, an intervening element rotatably supported by said extension and normally connected to said bar, to permit adjustment of the tension upon the heddles carried by said bar without rotating or disengaging said intervening element from said bar.

2. A heddle frame, comprising the combination of a rail, a heddle-supporting bar, a nut carried by and prevented from rotation with respect to said rail, a bolt in threaded engagement with said nut, a supporting element for said bar, and a swivel connection between said element and said bolt.

3. A heddle frame, comprising the combination of a rail, a heddle-supporting bar, a nut carried by and prevented from rotation with respect to said rail, a bolt in threaded engagement with said nut, and an eye element receiving said bar and having a cylindrically shaped extension, said bolt having a cylindrically shaped recess rotatably receiving said extension, the periphery of said recess being inturned to prevent the escape of said extension.

4. A heddle frame, comprising the combination of a rail, a heddle supporting bar, an auxiliary bar, means longitudinally adjustable with respect to and connecting said bars, a nut carried by and prevented from rotation with respect to said rail, a bolt in threaded engagement with said nut and having a head provided with a cylindrically shaped recess, and an element detachably connected to said auxiliary bar and having a cylindrical extension rotatably secured within said recess, to permit adjustment of the tension upon the heddles carried by said bar by rotation of said bolt.

5. A heddle frame, comprising the combination of a rail, a heddle supporting bar, an auxiliary bar, a bar-connecting element comprising a hook engaging one of said bars and a head slidably engaging the other bar and prevented from angular oscillation with respect thereto, a nut carried by and prevented from rotation with respect to said rail, a bolt in threaded engagement with said nut and having a head, an element detachably connected to said auxiliary bar, and a swivel connection between said last-mentioned element and the head of said bolt, to permit adjustment of the tension upon the heddles supported by said bars by rotation of said bolt.

6. A heddle frame, comprising the combination of a rail, a heddle supporting bar, an auxiliary bar, a bar-connecting element comprising a hook engaging one of said bars and a head slidably engaging the other bar and prevented from angular oscillation with respect thereto, a nut carried by and prevented from rotation with respect to said rail, a bolt in threaded engagement with said nut and having a head, provided with a cylindrical recess, an element detachably connected to said auxiliary bar and provided with a cylindrical extension rotatably secured within said recess, to permit adjustment of the tension upon the heddles carried by said bars by rotation of said bolt.

7. A heddle frame, comprising the combination of a rail having a mortised recess, a bore extending into one edge of said rail and opening into said recess, a nut substantially filling said recess, a bolt extending through said bore and in threaded engagement with said nut, a heddle-supporting bar, an element disengageably connected to said bar, and a swivel connection between said element and said bolt.

8. A heddle frame, comprising the combination of a rail having a mortised recess, a bore extending into one edge of said rail and opening into said recess, a nut substantially filling said recess, a bolt extending through said bore and in threaded engagement with said nut, a heddle-supporting bar, an element disengageably connected to said bar and a cylinder-and-socket connection between said element and said bolt.

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