Feb. 8, 1949. J. J. KAUFMANN 2,461,497

LOOM HARNESS

Filed July 3, 1946

Fig. 1.

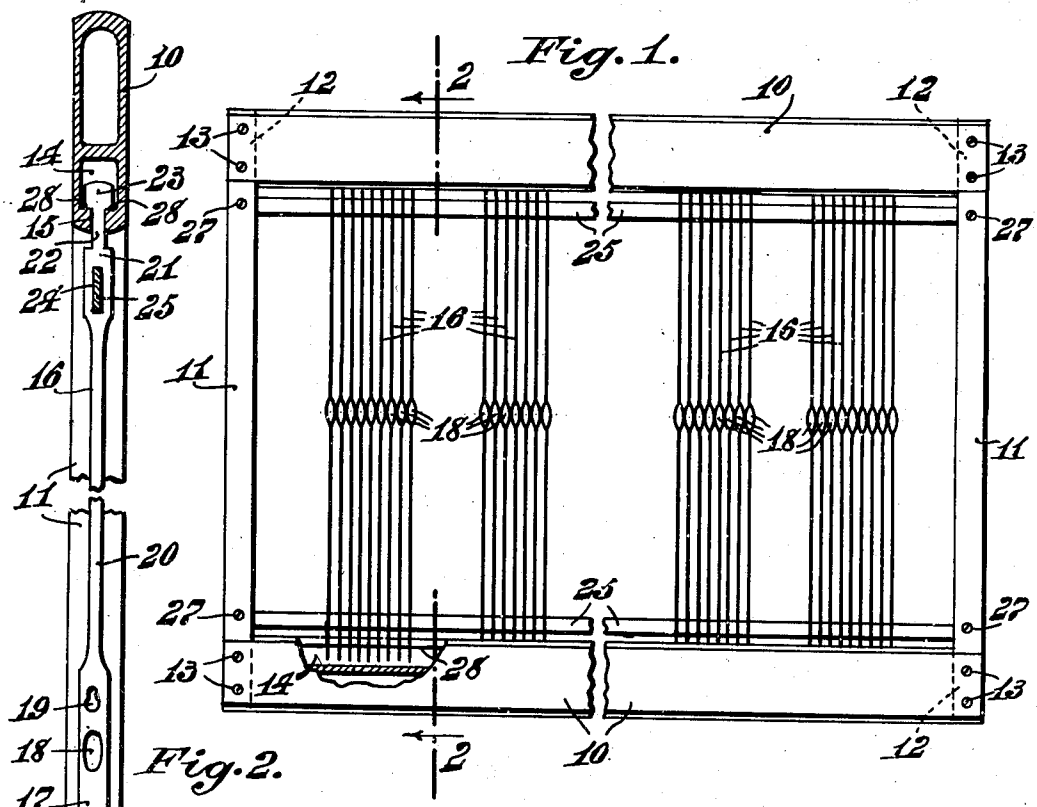


Fig. 2.

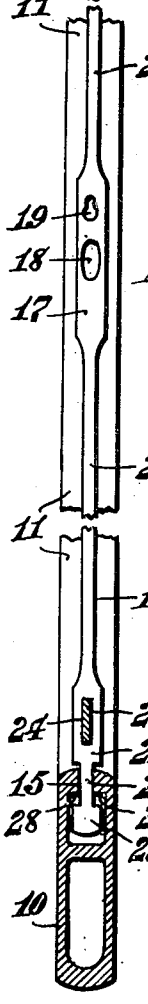


Fig. 3.

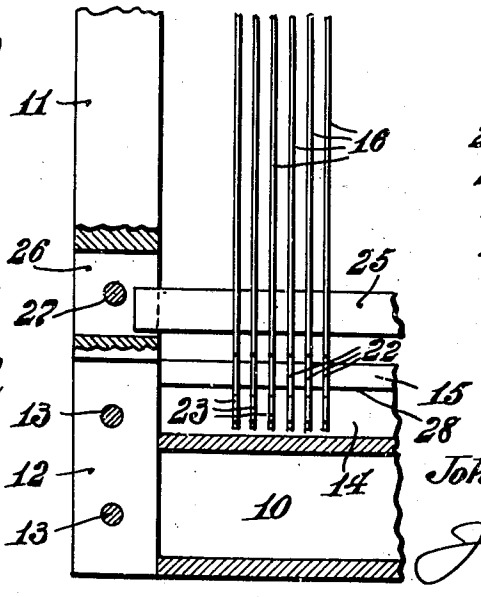
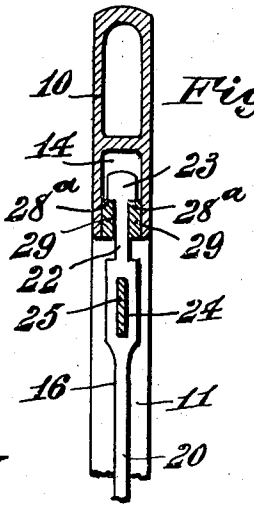


Fig. 4.



INVENTOR.
John Jacob Kaufmann,
BY
Jas. C. Wobensmith
ATTORNEY.

Patented Feb. 8, 1949

2,461,497

UNITED STATES PATENT OFFICE

2,461,497

LOOM HARNESS

John Jacob Kaufmann, Elkins Park, Pa., assignor to Steel Heddle Manufacturing Company, Philadelphia, Pa., a corporation of Pennsylvania

Application July 3, 1946, Serial No. 681,244

6 Claims. (Cl. 139—92)

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This invention relates to loom harness, and it relates more particularly to the frames, and the heddles mounted therein, for separating the warp ends into sheds through which the shuttle is passed to effect the weaving operation.

More specifically considered, the invention relates to loom harness in which heddles of a peculiar conformation are utilized, that is, of the type in which the heddles are made of thin flat strips of metal, and provided with head portions which are positioned in grooves provided in the inner portions of the top and bottom rails of the frames.

Heretofore, it has been suggested to use heddles having enlarged head portions which are slidably mounted in recesses or grooves along the inner edges of the top and bottom rails, but no one has heretofore produced a satisfactory heddle of this type made from thin flat strips of metal, nor has any one suggested a practical way of utilizing such heddles. It will be apparent that if the ends of such heddles are turned about their vertical axes, the same will become disengaged from the grooves and become detached from the frame with resulting injury not only to the harness, but also to the cloth being woven.

On the other hand, it will be found that heddles of this type are particularly adaptable for use in modern installations in which automatic drawing-in machines are used for entering the warp, as the same are freely traversable from one end of the frame to the other without interference from the hooks commonly used for supporting the heddle bars intermediate their ends.

It will also be found that there are many other advantages arising out of the use of heddles of this type.

The principal object of the present invention is to provide efficient and practical loom harness employing heddles of the character aforesaid, which harness is so constructed and arranged as to be utilizable in installations in which the warp is entered by means of the automatic drawing-in machines now more or less commonly used.

A further object of the present invention is to provide loom harness employing heddles of the character aforesaid, which is so constructed and arranged as to prevent the individual heddles from becoming accidentally disengaged from the grooves or recesses in which the ends thereof are mounted.

A further object of the invention is to provide loom harness of the character aforesaid in which broken and damaged heddles may be readily removed and replaced by others, or in which heddles may be removed, or increased in number, in the event of changes in the character of the cloth to be woven on the loom.

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

Figure 1 is a front elevation of a loom harness frame, and heddles mounted therein, embodying the main features of the present invention;

Fig. 2 is an enlarged sectional view thereof, the section being taken approximately on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged view, partly in elevation and partly in section, of the lower left-hand corner of the structure shown in Fig. 1; and

Fig. 4 is a fragmentary sectional view of the top portion of a modified form of the invention.

It will, of course, be understood that the description and drawing herein are illustrative merely, and that various modifications and changes may be made in the structure without departing from the spirit of the invention.

Referring now more particularly to Figs. 1, 2, and 3 of the drawing, in the particular embodiment of the invention therein shown, 10 are the top and bottom rails of the frame which are preferably made of extruded metal sections, the metal being preferably that of one of the light metal alloys which are now available, these being principally magnesium or aluminum. Some of the modern plastics or materials fabricated by means of such plastics may be employed for the frame members, if desired. The particular top and bottom rails 10 shown in the drawing are of the extruded metal type.

The ends of the top and bottom rails 10 are connected by means of side struts 11, which are preferably made of the same material as the top and bottom rails 10. For the purpose of connecting the top and bottom rails to the side struts 11 at the respective corners of the frame, the ends of the said struts 11 may be cut down to provide tenons 12 engaging complemental mortises in the ends of the struts 11, which may be provided by milling out such portions of the material of the top and bottom rails at the ends thereof as are necessary to effect a proper fit of the tenons 12. Screws 13, or other suitable fastening devices may be employed for securing the ends of the top and bottom rails 10 to the tenons of the side struts 11.

Along the inner marginal portions of the top

and bottom rails 10 there are provided grooves or recesses 14 running from end to end of the rail, each having a constricted opening or slit 15 extending to the inner edge of the rail 10 thereby to provide internal shoulders 28. This arrangement is provided for the mounting of the enlarged head portions of the heddles in the top and bottom rails 10 in a manner to be presently described.

The heddles 16 are made of thin flat strips of metal punched and formed to the desired shape. The central portion 17 of each heddle is of course provided with a central warp eye 18 of any preferred construction, and when the heddle frames are to be used in connection with installations in which the warp is entered by means of an automatic drawing-in machine there is also provided, adjacent the warp eye 18, a keyhole slot 19 for the control of the individual heddles by the selector mechanism of the drawing-in machine.

The heddles 16 are also preferably reduced in width, as at 20, intermediate the central portions 17 and the end portions 21 thereof for the purpose of reducing the weight of the harness, and also to permit the central portions 17 of the heddles 16 to be more easily twisted to the proper respective positions when the needle of the entering mechanism is passed through the eye 18 of the heddle for the purpose of entering the warp end therein.

Each of the end portions 21 of each heddle 16 is preferably left the full width of the strip, with the exception of a portion which is cut away on each side to provide a neck 22 which extends through the constricted portion 15 of the recess 14 in which the enlarged head portion 23 at each end of each heddle 16 is positioned.

Each of the heddles 16 is also provided, adjacent the neck portion 22, with a slot 24 through which a bar 25 passes. Each bar 25 preferably extends from end to end of the frame and has its end portions located in slots 26 in the side struts 11 of the frame. Any preferred means may be provided to prevent the bar 25 from becoming disengaged from the frame, as for example, the provision of a screw 27 extending across each of the slots 26 to serve as an obstruction which will normally prevent the bar 25 from passing outwardly through either of the slots 26 into which the ends of the bar extend.

In Fig. 4 of the drawing, there is shown a modified form of construction of the top and bottom rails of the frame, in which form the shoulders 28a, on which the head portions of the heddles rest or abut, are provided by means of steel bars 29 positioned at the sides within the grooves 14 and held therein in any suitable manner. The steel shoulders thus provided will wear considerably longer than the softer metal of the body portions of the rails, and will permit the heddles to slide lengthwise within the frames with greater ease and facility.

It will be apparent that there is provided, by the construction and arrangement hereinbefore set forth, a heddle frame, and heddles mounted therein, which are particularly adaptable for use in those installations in which automatic drawing-in machines are used for entering the warp through the harness, it being noted particularly that there are no obstructions to prevent the free passage of the heddles from one end of the frame to the other.

The bars 25 serve to stabilize the heddles 16 in the frame and prevent the individual heddles from turning at their end portions about their vertical axes when the central portion of the heddle is twisted to permit the free passage of the needle of the entering mechanism through the warp eye.

It will be apparent that if the end portions of a heddle be twisted approximately 90 degrees about the vertical axis, said end portions will then pass through the slot and become detached from the top and bottom rails in which they are supported normally, but the bars 25 will prevent this.

The bars 25 will also serve to equalize the strain in the event of undue pull on a particular heddle from any cause.

On the other hand, when it is desired to remove a damaged heddle from the frame for replacement by another, this may be readily accomplished by first removing the screws 27 from one of the end struts and sliding the stabilizer bars 25 from the frame. The same procedure may be followed when it is desired to add additional heddles to the frame, or to remove some of the heddles therefrom, whenever it is desired to change the number of the warp ends in the cloth to be woven on the loom.

It will also be understood that by the removal of the screws 13 at one end of the frame, the end strut at that end may be readily removed from the frame and thus permit the full set of heddles to be removed on the bars 25, whereby the orderly arrangement of the heddles may be preserved while the same are so removed from the frame.

I claim:

1. In loom harness comprising a frame having top and bottom rails, side struts connecting said rails at their ends, and heddles integrally made of thin flat strips of metal, the means for supporting the heddles in the frame comprising the provision, adjacent the inner edges of the top and bottom rails, of a recess extending from end to end in each of the rails, and a slot extending from said recess to the inner edge of the rail, each heddle being provided at each end with a head portion normally positioned within the recess and an adjacent neck portion extending through the slot in the rail of the frame, each of the heddles also being provided near its end portions with slots, and auxiliary stabilizing bars extending from end to end of the frame and passing through said slots in the heddles thereby to maintain the head portions of the heddles against turning and thus becoming detached from the rails.

2. In loom harness comprising a frame having top and bottom rails, side struts connecting said rails at their ends, and heddles integrally made of thin flat strips of metal, the means for supporting the heddles in the frame comprising the provision, adjacent the inner edges of the top and bottom rails, of a recess extending from end to end in each of the rails, and a slot extending from said recess to the inner edge of the rail, each heddle being provided at each end with a head portion normally positioned within the recess and an adjacent neck portion extending through the slot in the rail of the frame, each of the heddles also being provided near its end portions with slots, and auxiliary stabilizing bars extending from end to end of the frame and passing through said slots in the heddles thereby to maintain the head portions of the heddles against turning and thus becoming detached from the rails, the side struts having slots in which the end portions of the stabilizer bars are positioned.

3. In loom harness comprising a frame having top and bottom rails, side struts connecting said rails at their ends, and heddles integrally made of thin flat strips of metal, the means for supporting the heddles in the frame comprising the provision, adjacent the inner edges of the top and bottom rails, of a recess extending from end to end in each of the rails, and a slot extending from said recess to the inner edge of the rail, each heddle being provided at each end with a head portion normally positioned within the recess and an adjacent neck portion extending through the slot in the rail of the frame, each of the heddles also being provided near its end portions with slots, auxiliary stabilizing bars extending from end to end of the frame and passing through said slots in the heddles thereby to maintain the head portions of the heddles against turning and thus becoming detached from the rails, and means for normally maintaining the stabilizer bars in the frame.

4. In loom harness comprising a frame having top and bottom rails, side struts connecting said rails at their ends, and heddles integrally made of thin flat strips of metal, the means for supporting the heddles in the frame comprising the provision, adjacent the inner edges of the top and bottom rails, of a recess extending from end to end in each of the rails, and a slot extending from said recess to the inner edge of the rail, each heddle being provided at each end with a head portion normally positioned within the recess and an adjacent neck portion extending through the slot in the rail of the frame, each of the heddles also being provided near its end portions with slots, auxiliary stabilizing bars extending from end to end of the frame and passing through said slots in the heddles thereby to maintain the head portions of the heddles against turning and thus becoming detached from the rails, the side struts having slots in which the end portions of the stabilizer bars are positioned, and means for normally maintaining the stabilizer bars in the frame.

5. In loom harness comprising a frame having top and bottom rails, side struts connecting said rails at their ends, and heddles integrally made of thin flat strips of metal, the means for supporting the heddles in the frame comprising the provision, adjacent the inner edges of the top and bottom rails, of a recess extending from end to end in each of the rails, and a slot extending from said recess to the inner edge of the rail,

each heddle being provided at each end with a head portion normally positioned within the recess and an adjacent neck portion extending through the slot in the rail of the frame, each of the heddles also being provided near its end portions with slots, auxiliary stabilizing bars extending from end to end of the frame and passing through said slots in the heddles thereby to maintain the head portions of the heddles against turning and thus becoming detached from the rails, the side struts having slots in which the end portions of the stabilizer bars are positioned, and removable members extending across said slots providing obstructions for normally maintaining the stabilizer bars in the frame.

6. In loom harness comprising a frame having top and bottom rails, side struts connecting said rails at their ends, and heddles made of thin flat strips of metal, the means for supporting the heddles in the frame comprising the provision, adjacent the inner edges of the top and bottom rails, of a recess extending from end to end in each of the rails, and a slot extending from said recess to the inner edge of the rail, hard metal bars on each side of said slot, each heddle being provided at each end with a head portion normally positioned within the recess and bearing on said hard metal bars, each heddle also having a neck portion at each end adjacent the head portion and extending through the slot in the rail of the frame, each of the heddles also being provided near each neck portion with a slot, and auxiliary stabilizing bars extending from end to end of the frame and passing through said slots in the heddles.

JOHN JACOB KAUFMANN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
218,809	Brown	Aug. 26, 1879
409,725	Yeadon	Aug. 27, 1889
2,047,511	Kaufmann	July 14, 1936

FOREIGN PATENTS

Number	Country	Date
6,124	Great Britain	1903
103,260	Germany	June 7, 1899
424,530	France	May 16, 1911