March 7, 1961 J. J. KAUFMANN 2,973,786

LOOM HARNESS

Filed Dec. 6, 1957

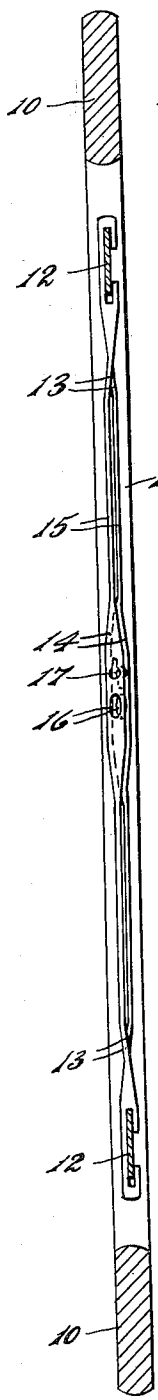

Fig. 1.

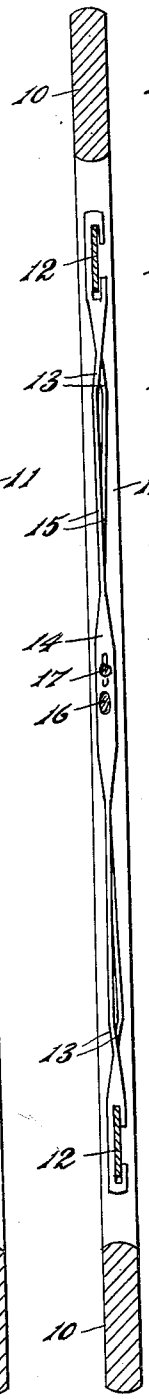

Fig. 2.

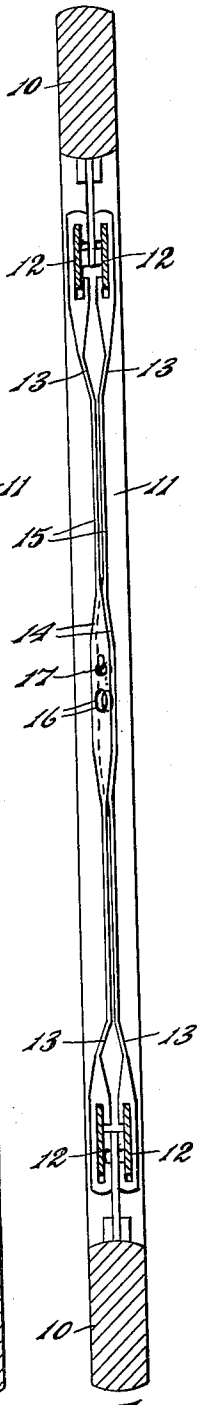

Fig. 3.

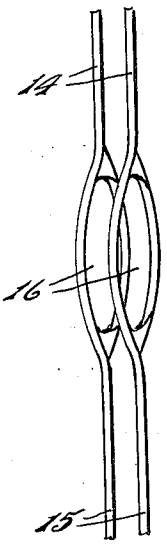

Fig. 5.

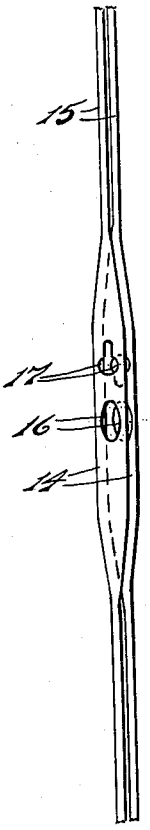

Fig. 4.

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LOOM HARNESS

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5 Claims. (Cl. 139—92)

This invention relates to loom harness, and it relates more particularly to the construction of the heddles, and the arrangement thereof in the frames, whereby the shedding may be done more easily, particularly in close installations for weaving cloth of high warp count.

This invention is particulraly adaptable for use in connection with loom harness the frames of which have mounted therein heddles quite similar to those known in the industry as "Duplex" heddles, in which the central or warp eye portions of alternate heddles are respectively disposed in separated vertical planes for the purpose of easing the warp past the warp eyes of adjacent frames when the shedding occurs.

The invention further relates to loom harness, of the aforesaid character, in which the heddles may be readily manipulated or controlled by the release key rods of warp drawing-in machines used for entering the warp.

However, the invention is also adaptable for use in that type of loom harness in which two sets of heddles are used in frames having their end portions mounted on two separate rods at the top, and two separate rods at the bottom of the frame.

The principal object of the present invention is to provide loom harness in which the alternate heddles have their warp eye portions in slightly separated vertical planes and in which the heddles are additionally provided with apertures suitably shaped for the passage therethrough of the release key rods of a drawing-in machine, to permit the proper manipulation of such heddles during the drawing-in operation for entering the warp ends.

A further object of the invention is to provide, in a loom harness of the character aforesaid, an arrangement of the heddles whereby the harness frames may be made of less thickness than has heretofore been possible when heddles of the "Duplex" type were used in the frames.

A further object of the present invention is to provide loom harness, of the character aforesaid, which is so constructed and arranged as to permit the alignment on a single axis, of the key rod apertures of the heddles, thereby to facilitate the entering of the warp by means of drawing-in machines of the ordinary type.

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 thereof, in which:

Figure 1 is a vertical sectional view of a loom harness frame having heddles, somewhat similar to those of the Duplex type, mounted on single heddle rods at the top and at the bottom respectively, and having their central warp eye portions, as well as their key apertures, so disposed as to facilitate the alignment of the central portions of the heddles in a single central vertical plane, to permit the insertion therein of the release key rod for the control and manipulation of the heddles by the mechanism of the drawing-in machines;

Fig. 2 is a view similar to Fig. 1 but showing the heddles with their control portions brought to positions whereby the release key rod apertures, as well as the warp eyes, are disposed in a central vertical plane, for the control and, manipulation of the heddles by the release key rod;

Fig. 3 is a view similar to Fig. 1, but illustrating a modified form of the invention in which heddles of a somewhat different type are employed, which heddles are alternately mounted on pairs of separate heddle rods provided at the top and bottom respectively of the frame;

Fig. 4 is a detail view, enlarged, of the central portions of a pair of adjacent heddles in the positions shown in Fig. 1 of the drawing; and

Fig. 5 is a fragmentary front elevation, further enlarged, of the warp eye portions of a pair of adjacent heddles with said warp eye portions in the relative positions normally assumed in the harness frame.

It should, 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 disclosed without departing from the spirit of the invention.

Referring now more particularly to Figs. 1 and 2 of the drawing, the heddle frame there shown may be of any preferred form, such as those employing top and bottom shafts or rails **10**, connected at their ends by end struts **11**, said parts being of any preferred type, such as are well known and in common use.

The harness frames are each provided with heddle supporting rods **12** mounted in the frame and supported at their ends, as well as intermediate their ends, in any preferred manner.

The heddles shown in Figs. 1 and 2 of the drawing are somewhat similar to the heddles of the well known "Duplex" type, that is, they are each offset adjacent their end portions, as at **13**, whereby the central warp eye portions **14** of alternate heddles are disposed in separate vertical planes disposed transversely to the run of the warp. However, the offsetting of the heddles in the present invention is of a lesser extent than in the ordinary "Duplex" heddles whereby the central warp eye portions of each adjacent pair of heddles are slightly overlapping but to a sufficient extent, as and for the purpose to be presently explained.

The central portion of each heddle **15** is provided with a warp eye **16**, through which warp eye a warp end (not shown) extends in the usual manner when the harness is in use.

Ordinarily, loom harness heddles which are used in installations in which drawing-in machines are employed for entering the warp, are each provided with a suitably shaped aperture **17** through which the release key rod of the drawing-in machine passes for control of the heddles during the drawing-in operation.

The apertures **17** above referred to are usually of key hole shape and have their narrow portions extending alternately upwardly and downwardly from the main portions of the apertures in adjacent heddles so that, as the release key rod of the drawing-in machine is operated, the heddles are released, one by one, and at the proper time, for the passing of the warp ends through the warp eyes. Of course, said release apertures may be made of other and different shapes complemental to the release key rod of the drawing-in machine.

In the preferred arrangement as shown in Figs. 1 and 2 of the drawing, the heddles are offset sidewise, as at **13**, out of the central plane of the frame; the alternate heddles being disposed in one direction out of said central plane, and the other alternate heddles being offset in the other direction out of the central plane.

However, in the present invention, the amount of the

offset is much less than has heretofore been provided in heddles of the ordinary "Duplex" type, so that in the present instance there is a substantial overlapping of the central or warp eye portions of alternate heddles, the amount of overlap being such that parts of the main portions of the key rod apertures will be in alignment, and also a part of each of the warp eyes will be in alignment with the others, longitudinally of the frame.

By the foregoing arrangement it is possible to readily and easily bring the central or warp eye portions of the heddles into register whereby the key rod apertures, as well also as the warp eyes, will be in longitudinal alignment, and this condition may be brought about by the insertion of a pointed aligning rod through either the key rod apertures or the warp eyes, this action being facilitated, or made possible by reason of the fact that said apertures will be disposed as shown in Figs. 1, 3 and 4 of the drawing, with portions of the apertures overlapping, so that the pointed end of an aligning rod may be readily passed through either of said sets of apertures for the desired purpose.

In Fig. 3 of the drawing there is shown a modified form of the invention in which the heddles are mounted at their upper and lower ends on separate heddle rods provided at the top and bottom of the frame.

The warp eye portions will initially be disposed in slightly separated vertical planes in a manner similar to warp eye portions as shown in Figs. 1 and 2 of the drawing.

The arrangement shown in Fig. 3 is otherwise substantially the same as that shown in the other figures, and the heddles are mounted alternately on the two heddle supporting rods in pairs with their central warp eye portions disposed in a manner similar to the arrangement as shown in Figs. 1 and 2 of the drawing.

I claim:

1. Loom harness for use in installations in which the warp is entered by a drawing-in machine having a release rod, said harness including harness frames, heddle supporting rods in said frames, and heddles made of thin flat metal, each of said heddles having a central warp eye aperture and an aperture through which the release rod is adapted to pass, the vertical center lines of the warp eye apertures of alternate heddle being disposed in one plane and the vertical center lines of the warp eye apertures of the other alternate heddles being disposed in another slightly separated plane, the separation of said planes being of an amount whereby portions of the apertures are in longitudinal alignment for the passing therethrough of an aligning rod adapted when inserted to bring the warp eye portions of the heddles into register.

2. Loom harness as defined in claim 1 in which the apertures through which the aligning rod is inserted are the release rod apertures.

3. Loom harness as defined in claim 1 in which the apertures through which the aligning rods are inserted are the warp eye apertures.

4. Loom harness as defined in claim 2 in which the harness frame is provided with a single heddle supporting rod at the top and a single heddle supporting rod at the bottom, and the heddles are offset adjacent their end portions an amount sufficient only to cause the overlapping of the portions of the heddles in which the aligning apertures are located.

5. Loom harness as defined in claim 1 in which the harness frame is provided with a pair of heddle supporting rods at the top, and a pair of heddle supporting rods at the bottom, and the heddles are offset inwardly adjacent their end portions an amount sufficient to cause the overlapping of the portions of the heddles in which the aligning apertures are located.

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CERTIFICATION OF CORRECTION

Patent No. 2,973,786 March 7, 1961

John J. Kaufmann

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 20, for "particulraly" read -- particularly --; column 4, line 17, for the claim reference numeral "2" read -- 1 --.

Signed and sealed this 18th day of July 1961.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents