July 27, 1954 C. F. LIBBY 2,684,693

HARNESS FOR HIGH-SPEED NARROW-WEB LOOMS

Filed Nov. 16, 1951

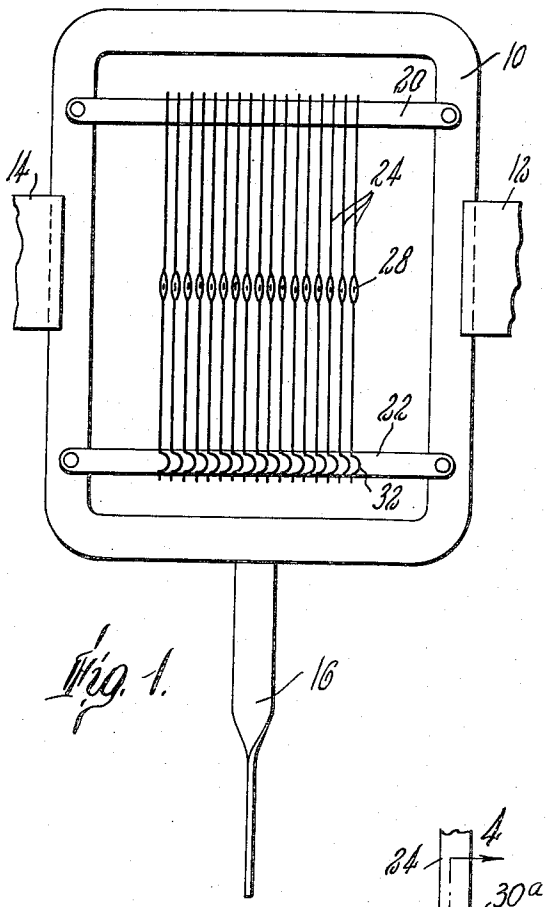


Fig. 1.

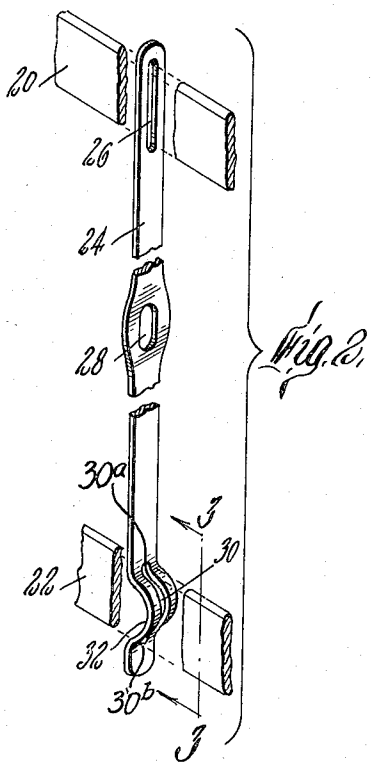


Fig. 2.

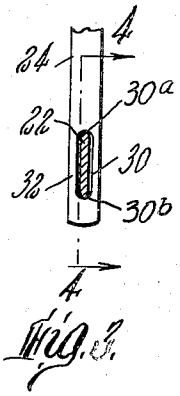


Fig. 3.

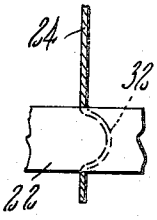


Fig. 4.

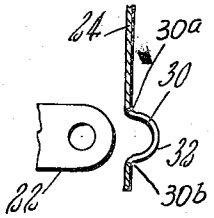


Fig. 5.

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HARNESS FOR HIGH-SPEED NARROW-WEB LOOMS

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4 Claims. (Cl. 139—92)

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This invention relates to improvements in the structure of harnesses for narrow-web looms which are operated at high speeds. In looms such as that described and illustrated in my Patent No. 2,180,831, granted November 21, 1939, wherein the filling is formed by loops of weft yarn projected through the shed by fingers or needles instead of by single yarns carried through the shed by shuttles, speeds of well over one thousand picks a minute are attained in practical operation. Since the shed must be changed after each pick and the maximum time interval available for a change at such speeds is necessarily brief, it follows that the movements of the harnesses must be correspondingly rapid.

A harness for a narrow-web loom usually consists of a rectangular frame to which are riveted two spaced horizontal cross-bars. Before being riveted to the frame, these cross-bars are threaded loosely through slots in the heddles which they are to support, the heddles being free to move along the bars if necessary to adjust themselves to the lead of the warp threads. Such structure is satisfactory for looms which are operated at a rate of a few hundred picks per minute, but in high speed looms the inertia of the heddles causes rapid wear between the ends of their slots and the edges of the cross-bars which extend through the slots. According to the present invention, the heddles are made to grip one of the cross-bars so as to eliminate play or looseness between the heddles and cross-bars. For this purpose a slotted portion of each heddle is curved so as to result in a shortening of the distance between the ends of the slot so that such distance is slightly less than the vertical width of the cross-bar. Hence, when the cross-bar is threaded through such a slot it will be resiliently gripped by the heddle and no vertical looseness or play between the heddle and frame will be possible.

For a more complete understanding of the invention, reference may be had to the following description thereof, and to the drawing, of which—

Figure 1 is an elevational view of a harness embodying the invention;

Figure 2 is a fragmentary perspective view on a larger scale of one of the heddles and the supporting cross-bars;

Figure 3 is a section on line 4—4 of Figure 2;

Figure 4 is a section on the line 4—4 of Figure 3; and

Figure 5 is a sectional view similar to Figure 4, but showing the cross-bar and heddle.

A typical harness for a narrow-web loom is illustrated in Figure 1, this harness comprising a rectangular frame 10 of flat metal which is vertically oscillated in suitable guides 12 and 14 by mechanism below the harness which is operatively connected therewith by a stem 16 projecting down from the frame 10. Extending across the frame 10 are two cross-bars 20 and 22, these cross-bars being thin strips of metal which extend horizontally across the opening defined by the frame 10, and being spaced apart by a distance nearly as great as the length of the individual heddles 24.

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The heddles 24 are of standard construction except for the lower portion thereof. Each heddle, as indicated in Figure 2, consists of a thin strip of metal having a longitudinal slot 26 near the upper end thereof which is adapted to receive the upper cross-bar 20 with a loose fit, the length of the slot 26 being greater than the width of the bar 20. Near its midpoint, each heddle is provided with a suitable eye 28 through which a warp thread extends when the harness is in use. A conventional heddle is supplied with a slot near its lower end similar to the slot 26 at its upper end, the cross-bars being loosely received in both slots so that the heddles can adjust themselves freely on the cross-bars in accordance with the leads of the warp threads.

According to the present invention the lower portion of the heddle 24 is provided with a slot 30 similar to the slot 26 but the portion of the heddle in which the slot 30 is located is reversely bent as at 32, so that the ends 30*a* and 30*b* of the slot 30 are brought closer together, the vertical distance between these ends being slightly less than the width of the cross-bar 22, as indicated in Figure 5. The reversely curved portion of the heddle may be variously shaped. In the example shown on the drawing, this portion is in the form of an arc, the ends of which merge with aligned straight portions of the heddle above and below it.

The heddle is made of spring steel or other resilient material so that the curved portion 42 can be distorted as much as necessary to admit the cross-bar 22 through the slot 30. When the cross-bar is threaded through the slot the resilience of the distorted part 32 causes the metal at the ends of the slot 30 to grip the edges of the cross-bar 22 and thus to hold the heddle firmly against any looseness or play with respect to the cross-bar 22. This prevents the edges of the cross-bars 20 and 22 from striking against the end edges of the slots through which they extend when the loom is operated at high speed.

I claim:

1. A loom harness comprising a frame, two parallel horizontal cross-bars mounted on said frame, and a series of heddles carried by said cross-bars, each said heddle having means tightly gripping one of said cross-bars.

2. A loom harness as in claim 1, each said heddle having a slot through which the other cross-bar loosely extends.

3. A loom harness comprising a frame, two cross-bars secured to said frame in parallel spaced positions, and heddles mounted on said cross-bars, each said heddle consisting of a spring metal strip with two slots through which said cross-bars respectively extend, each said slot having ends, each said heddle having the portion thereof between the ends of one of its slots reversely bent so that the ends of such slot are normally spaced apart by a distance slightly less than the width of the cross-bar, whereby said portion between the ends of the slot must be distorted to admit the cross-bar into the slot and the bar is resiliently gripped between the ends of the slot.

4. A loom harness as in claim 3, the bent portion of each heddle being in the form of an arc merging at its ends with aligned straight portions of the heddle.

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