Feb. 27, 1968 E. PFARRWALLER 3,370,616

HEDDLE FRAME

Filed March 1, 1966

Fig. 1

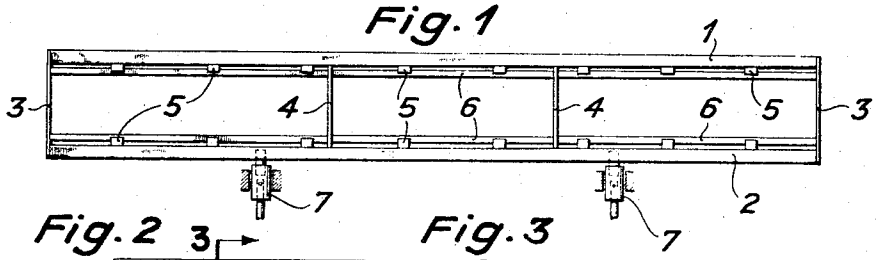


Fig. 2

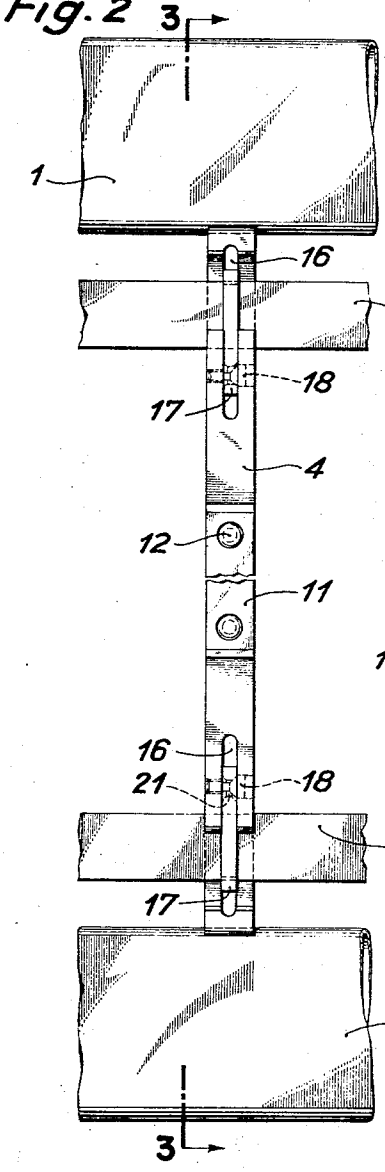


Fig. 3

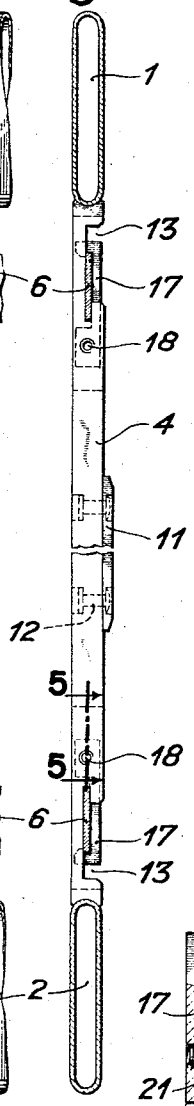


Fig. 4

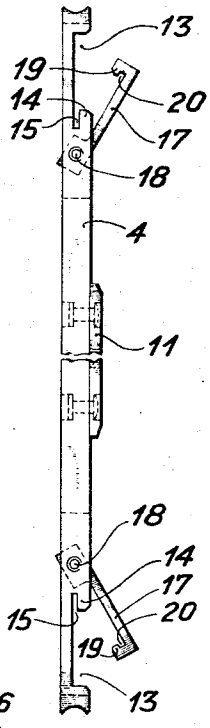
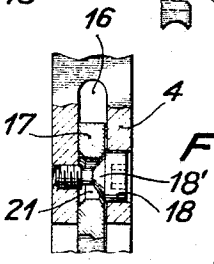


Fig. 5



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United States Patent Office

3,370,616
Patented Feb. 27, 1968

3,370,616

HEDDLE FRAME

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Filed Mar. 1, 1966, Ser. Ni. 530,866
Claims priority, application Switzerland, Mar. 1, 1965, 2,818/65
1 Claim. (Cl. 139—92)

ABSTRACT OF THE DISCLOSURE

There is disclosed a heddle frame for looms comprising upper and lower horizontal beams held together by vertical end struts, horizontal shafts affixed to those beams for the support of heddles, and an intermediate vertical strut movable lengthwise of the frame. The intermediate strut has concave ends engageable over the convex adjacent edges of the beams and has moreover adjacent each end thereof a notch for the accommodation of one of the shafts, and a hook journalled at one end in the strut to rotate in planes perpendicular to that of the frame into a position embracing the shaft.

The present invention pertains to a heddle frame having upper and lower beams connected by two end struts and by at least one intermediate strut, the frame further comprising two heddle-carrying shafts attached to the beams, the heddles being engaged on these shafts for the guidance of warp threads.

It has already been proposed to fasten the intermediate strut to the horizontal beams of the frame. In order to prevent contact between the warp threads and the intermediate strut, the latter is advantageously disposed in the vicinity of a severing and selvage-forming device which divides the cloth into two webs and past which the warp threads are guided.

Since the location of the severing and selvage-forming device is determined in part by the location of the means for fastening the intermediate strut to the beams of the frame, the possibility for varying the width of the webs into which cloth is divided is limited.

In accordance with the invention the above-described disadvantage is avoided, and there is provided an intermediate vertical strut which can be disposed at any position crosswise of the frame, i.e. at any position lengthwise of the beams, between the straps which hold the heddle-carrying shafts.

In accordance with the invention the intermediate vertical strut is fastened to the heddle shafts with hooks rotatable in planes perpendicular to the plane defined by the harness frame.

The construction according to the invention makes it possible readily to maintain the separation of the heddle shafts required for the necessary free play of the heddles. Since the intermediate strut can be readily assembled to and disassembled from the frame, the distribution of heddles is readily changed.

According to one embodiment of the invention the intermediate strut may be additionally supported by resting against the beams, producing a stiffening of the frame when the heddles are free from stressing by the warp threads.

The invention will now be further described in terms of a non-limitative exemplary embodiment and with the aid of the accompanying drawings in which:

FIG. 1 is a side elevation of the heddle frame of the invention;

FIG. 2 is a fragmentary view of the apparatus of FIG. 1, shown however at an enlarged scale;

FIG. 3 is a sectional view taken on the line 3—3 of FIG. 2;

FIG. 4 is a view in side elevation of an intermediate strut according to the invention; and

FIG. 5 is a detail sectional view taken on the line 5—5 of FIG. 3, but shown at an enlarged scale.

Referring to FIG. 1, reference characters 1 and 2 identify upper and lower horizontal beams of a heddle frame jointed by end struts 3. Intermediate struts 4 are also provided. Supporting pieces 5 are disposed on the beams 1 and 2 to carry the heddle shafts 6. The frame is supported at the lower beam 2 thereof on lifters 7 forming part of a loom drive mechanism not shown.

The intermediate strut 4 shown in FIGS. 2 to 5 bears against the adjacent or inner surfaces of the beams 1 and 2 and it is fastened to the heddle shafts 6. A guide shoe 11 is fastened to the strut 4 by means of rivets 12 and bears against the corresponding intermediate strut of an adjacent frame in the loom.

The ends of the strut 4 are shaped with a concave profile to match the convex profile of the beams 1 and 2. The strut moreover includes a notch 13 at each end, visible in FIGS. 3 and 4. Each of these notches terminates in a groove 15 behind a projection 14. The grooves 15 are at the end of their respecting notches 13 near the middle of the length of the strut 4. Longitudinally of the strut, at the position of each of the notches 13, the strut is apertured at an elongated slot 16 (FIG. 2). In each of the slots 16 a screw 18 extending crosswise thereof, i.e. in the plane of the heddle frame (cf. FIG. 2), carries a hook 17 rotatable about the screw in a plane perpendicular to the plane of the frame. The end 19 of the hook, which like the projection 14 is beveled, defines a groove 20 in the hook.

As shown in the detail view of FIG. 5, the hook 17 has a bore 21 therethrough, having a conical enlargement at at least one end thereof. In this way the hook can be centered about the screw 18, which has a matching conical head 18' adjacent the shank thereof. The head of screw 18 is countersunk into the strut 4 and has a hexagonal cavity therein which can be grasped with an Allen wrench or the like.

In order to insert the strut 4 into the heddle frame, the upper and lower beams 1 and 2 of the frame are sprung apart to permit the concavely profiled ends of the strut to pass over the convex profiles of the beams as the beams face each other. The beams 1 and 2 when released will spring back into engagement with the ends of the strut. The length of the strut 4 is slightly greater than the spacing of the beams so that the latter will engage the strut, preventing it from falling out of the heddle frame but not preventing the strut from being adjusted in position lengthwise of the beams, i.e. in the plane of FIGS. 1 and 2.

The cylindrical part of the bore 21 through each hook is oversized with respect to the cylindrical shank of the screws 21 by twice the depth of the hook groove 20. In consequence, with the screw 18 partly withdrawn so as to retract the conical head 18' thereof from the slot 16, the hook may be translated along its own length by about the depth of the groove 20 from the position to which the hook is drawn when the screw 18 is tightened down to engage its head 18' with the mating conical bore on the hook.

During the insertion of the strut 4 the hooks 17 are disposed in open position as indicated in FIG. 4 or even more widely open. The shafts 6 are received into the notches 13. When the beams are released from the sprung position to which they are flexed in order to permit initial engagement of the strut therewith, the beams carry the shafts 6 with them toward the mid-point of the strut, so

that the edges of the shafts nearer that mid-point move into the grooves **15**.

The hooks **17** are then rotated about the screws **18** back into parallelism with the length of the strut, the screws being retracted as above-described. In the course of this rotation the beveled ends **19** of the hooks cause them to slip over the adjacent edge of the shafts **6**, this motion being possible because of the loosened condition of screws **18** and because of the oversizing of bores **21** with respect to the shank of screws **18** above-described. With the hooks restored to parallelism with the strut and with their grooves **20** engaged over the shafts **6**, the screws **18** may be tightened down. By engagement of the conical head **18'** of the screws with the conical end surface on the bore **21**, the bores will be restored to concentricity with the screws **18**. This produces positive engagement of the shafts **6** in the grooves **20**, as indicated in FIG. 3, and also secures the hooks against rotation with respect to the strut.

Desirably, the hooks are so dimensioned and the screws **18** are so positioned in the strut, all with respect to the width of the shafts **6**, that when the screws **18** are drawn down tight the hooks will be drawn up against the shafts, each shaft abutting at one edge against the bottom of the groove **15** in the strut and at the other edge against the bottom of the groove **20** in the corresponding one of the hooks.

While the invention has been described hereinabove in terms of a presently preferred embodiment, it is not limited thereto. For example, the ends of the strut may be bifurcated instead of being provided simply with a concave profile. More generally, the invention comprises all modifications on and departures from the embodiment

hereinabove described which fall within the spirit and scope of the appended claim.

I claim:

1. A heddle frame comprising upper and lower beams joined by end struts, heddle-carrying shafts secured to said beams, and an intermediate strut having two hooks for engagement each with one of said shafts, said hooks being rotatable with respect to the intermediate strut in planes transverse to the plane defined by the frame, said intermediate strut including adjacent each end thereof a notch and including two screws about which said hooks are engaged at apertures through said hooks and by means of which said hooks can be fixed against rotation with respect to the intermediate strut, each of said hooks terminating in a groove at the end thereof remote from said aperture, the aperture through each of said hooks including a cylindrical portion oversized with respect to the shank of the corresponding one of said screws by substantially twice the depth of the groove on such hook, said aperture further including a concave conical portion, and the distance from the axis of said aperture to the bottom of said groove being substantially equal to the width of the corresponding one of said shafts plus the distance from the axis of said screw to the adjacent limit of said notch.

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